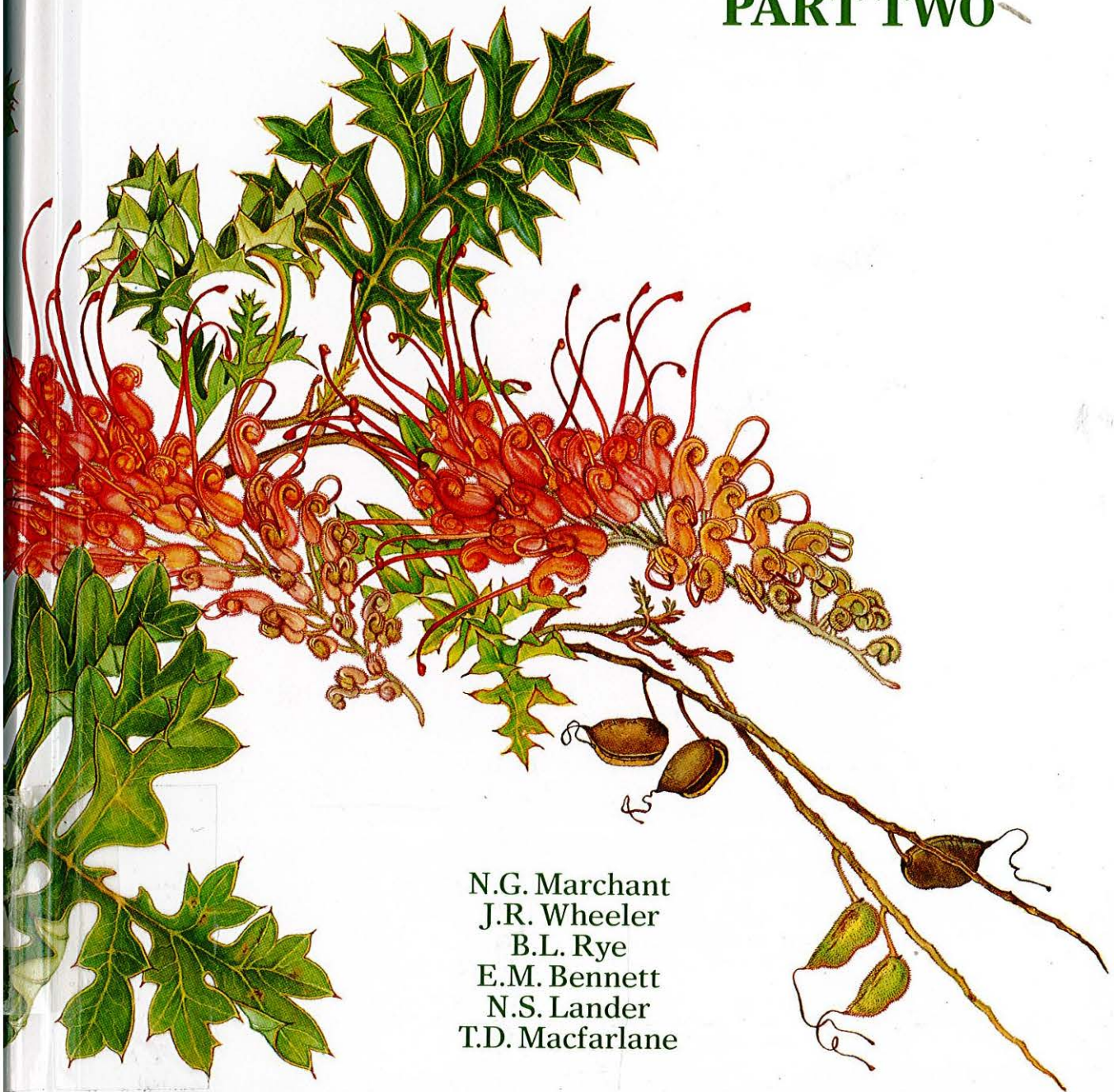
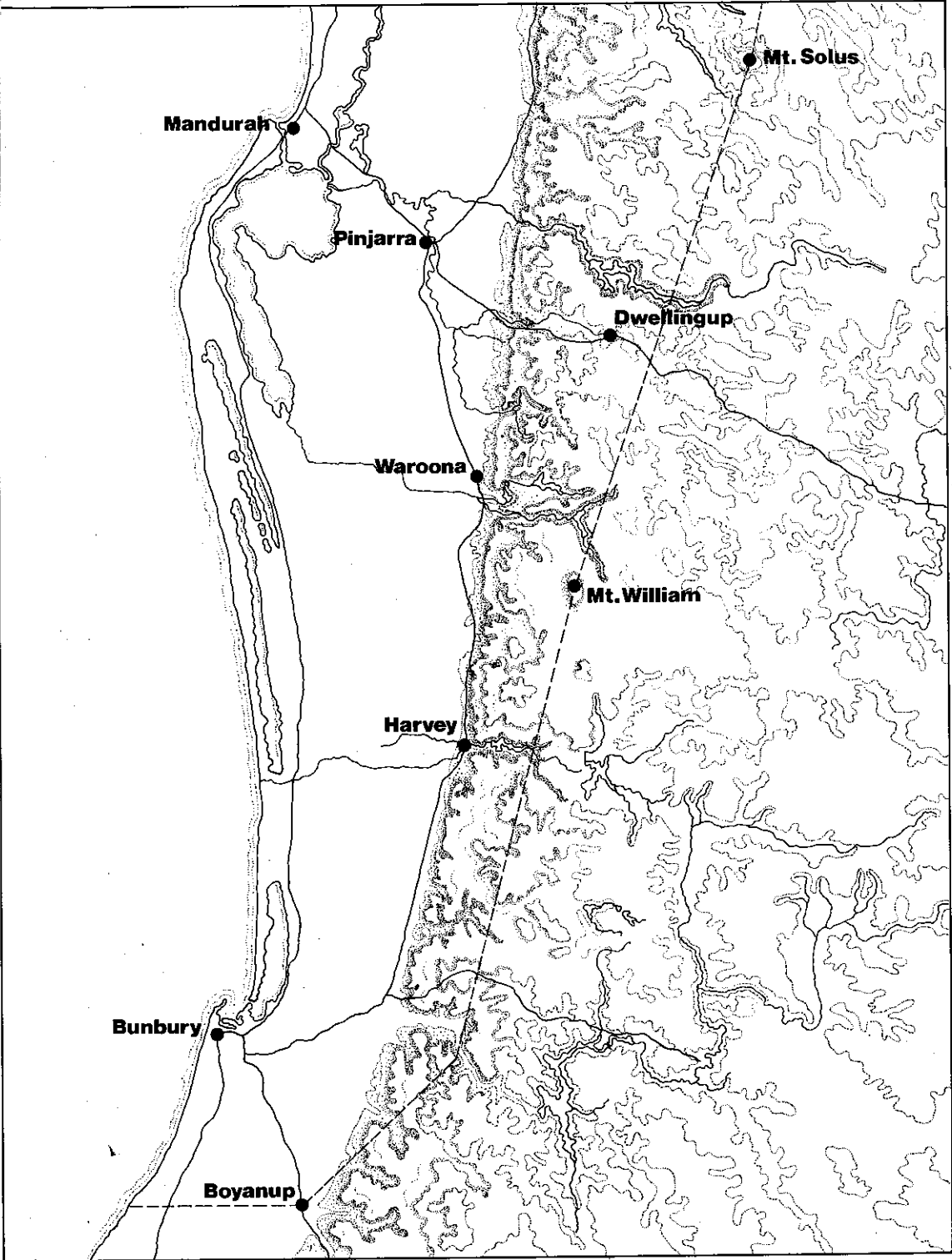


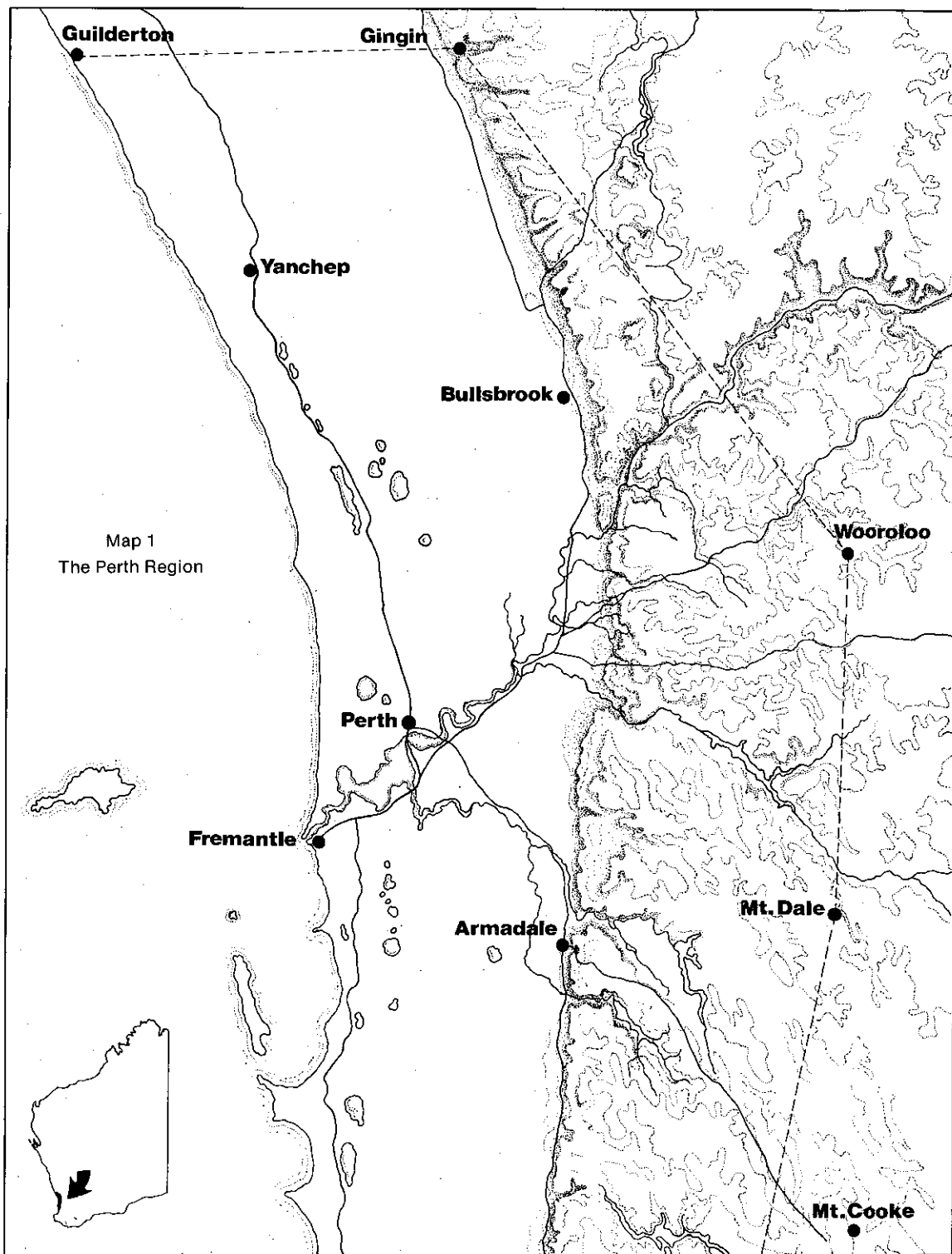
FLORA OF THE PERTH REGION

PART TWO



N.G. Marchant
J.R. Wheeler
B.L. Rye
E.M. Bennett
N.S. Lander
T.D. Macfarlane





Map 1
The Perth Region

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The Flora of the Perth Region is dedicated to
Emeritus Professor B.J. Grieve
who, since 1954, has provided keys to the wildflowers of south western Australia.

Western Australian Herbarium
Department of Agriculture, Western Australia.

FLORA OF **THE** **PERTH REGION**

N.G. Marchant
J.R. Wheeler
B.L. Rye
E.M. Bennett
N.S. Lander
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Illustrations and cover painting by Margaret Menadue

PART TWO

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ABBREVIATIONS

adj.	adjective
aff.	(<i>affinis</i>) akin to
ca	(<i>circa</i>) about or approximately
cf.	(<i>confer</i>) compare
e.g.	(<i>exempli gratia</i>) by way of example; for example
f.	(<i>filius</i>) son
Fig.	Figure
m	metre
mm	millimetre
N.S.W.	New South Wales
N.T.	Northern Territory
pers. comm.	personal communication
pl.	plural
Qld	Queensland
q.v.	(<i>quod vide</i>) which see
S.A.	South Australia
sp.	species
subsp.	subspecies
Tas.	Tasmania
var.	variety
Vic.	Victoria

SYMBOLS

*	alien taxon
<	smaller than
>	greater than
x	by, e.g. 10 x 5 mm = 10 mm long by 5 mm wide
x	hybrid taxon; crossed with

FAMILY 101 SCROPHULARIACEAE

J. R. Wheeler

Annual or perennial herbs, rarely shrubs or trees, sometimes semi-parasitic on the roots of other plants. Leaves exstipulate, alternate, opposite, whorled or all basal, simple, lobed or rarely pinnatisect. Inflorescence of bracteate spikes, racemes, cymes or flowers solitary in the leaf axils; flowers bisexual, usually zygomorphic; bracteoles present or absent. Calyx deeply 2-5-lobed and sometimes 2-lipped or completely divided into 2-5 free sepals. Corolla slightly to distinctly zygomorphic, often 2-lipped, sometimes spurred or saccate at the base. Stamens usually 2-5, attached to the corolla tube, and alternating with the lobes; anthers 1 or 2-celled, opening by longitudinal slits, sometimes the cells confluent; staminodes sometimes present. Nectary disc sometimes present. Ovary superior, of 2 carpels connate and forming a compound 2-celled ovary; ovules 2 to numerous, placentation axile. Fruit a capsule, septicidal and/or loculicidal, or opening by pores, rarely a berry. Seeds numerous, angular or winged. A cosmopolitan family of 190 genera and 4000 species. 30 genera native to Australia with several more naturalized. This family includes many ornamental plants.

1. Corolla distinctly 2-lipped. Stamens 4.
 2. Corolla tube spurred or gibbous at the base, throat closed. Calyx 5-lobed.
 3. Corolla gibbous at the base. Leaves linear to narrowly elliptic..... ***MISOPATES**
 3. Corolla conspicuously spurred at the base. Leaves ovate, circular or reniform.
 4. Plants villous. Leaves ovate to circular or hastate, entire, pinnately veined..... ***KICKXIA**
 4. Plants glabrous. Leaves reniform, shallowly lobed, palmately veined..... ***CYMBALARIA**
 2. Corolla tube not spurred or gibbous, throat not closed. Calyx 4-lobed.
 5. Lobes of upper lip of corolla recurved and 2-lobed..... **EUPHRASIA**
 5. Lobes of upper lip of corolla more or less incurved, entire or emarginate.
 6. Calyx with almost equal narrow lobes. Seeds smooth or reticulate..... ***PARENTUCELLIA**
 6. Calyx with unequal broad lobes. Seeds longitudinally ridged..... ***BELLARDIA**
1. Corolla not distinctly 2-lipped. Stamens 2, 4 or 5.
 7. Stamens 2 or apparently 2.
 8. Calyx deeply divided into 4 or 5 sepals. Prostrate to erect herb with usually opposite leaves.
 9. Capsule compressed. Corolla rotate with a short tube. Stamens 2; staminodes absent..... **VERONICA**
 9. Capsule ovoid. Corolla slightly 2-lipped with a long tube. Stamens 2; staminodes 2, minute..... **GRATIOLA**
 8. Calyx campanulate, shortly 3-lobed. Dwarf ephemeral with clustered basal leaves..... **GLOSSOSTIGMA**
 7. Stamens 4 or 5.
 10. Dwarf plants. Flowers minute, solitary on long slender pedicels arising from a tuft of basal leaves..... **LIMOSELLA**
 10. Erect, decumbent or prostrate herbs. Flowers in spikes, racemes or panicles.
 11. Corolla 4-lobed, deeply slit on one side. Calyx reduced to 2 sepals..... ***DISCHISMA**
 11. Corolla 5-lobed, not slit on one side. Calyx 5-lobed.
 12. Erect annual to 0.2 m high with opposite leaves. Flowers small, calyx ca 2.5 mm long..... ***POLYCARENA**
 12. Stout biennial to 2 m high with a basal rosette and alternate, cauline leaves. Flowers large, calyx 5-8 mm long..... ***VERBASCUM**

***BELLARDIA** All.

Annual semi-parasitic herbs. Leaves opposite, sessile to subsessile, serrate to pinnatifid. Inflorescence a dense terminal, leafy spike-like raceme. Calyx campanulate, deeply 2-lipped, with each lip of 2 short, subequal lobes. Corolla tubular, 2-lipped; upper lip hooded, entire or emarginate; lower lip spreading,

3-lobed, with the middle lobe smallest. Stamens 4, didynamous; filaments dilated towards the base; anthers 2-celled, densely hairy with curled hairs, mucronate. Style slightly exerted, hairy; stigma clavate. Capsule ovoid to globular, slightly compressed, dehiscent loculicidally by 2 valves. Seeds numerous, longitudinally ridged. 3 species of the Mediterranean Region, 1 introduced to W.A.

***B. trixago (L.) Ail.**

Bellardia

Erect, glandular-hairy annual 0.15-0.5 m high. Leaves linear to narrowly ovate, 20-80 x 2-10 mm, obtusely and distantly toothed to almost pinnatifid, hairy with simple, curved and glandular hairs. Flowers shortly pedicellate; bracts leaf-like. Calyx 8-12 mm long; calyx lips ovate to broadly ovate, 3-4 mm long, their lobes short, 0.5-2 mm long. Corolla pink or purple and white, 18-25 mm long, glandular-hairy. Anthers 2-2.5 mm long. Capsule ovoid, 7-9 x 5 mm, enclosed in the calyx, hairy with simple and glandular hairs, apex acute.

Naturalized in a variety of habitats on the Coastal Plain and Darling Scarp and Range. Extends north to near Geraldton and south to the extreme south west of the state and along the south coast to Albany. Native to the Mediterranean Region, Turkey, Iran and north eastern Africa.

Flowers October-November.

***CYMBALARIA Hill**

Annual or perennial herbs often with trailing or creeping stems. Leaves usually alternate, sometimes opposite, petiolate, reniform to almost circular, palmately veined, entire or palmately lobed. Flowers solitary in the leaf axils, rarely in cymes. Calyx deeply divided into 5 nearly equal sepals. Corolla 2-lipped; tube spurred at the base; throat closed by a projecting palate; upper lip entire or 2-lobed; lower lip 3-lobed. Stamens 4, didynamous. Capsule globular, 2-celled, each cell opening by an apical pore which has 3 valves. About 15 species of the Mediterranean Region, 1 occurring in W.A.

***C. muralis P. Gaertner, Meyer & Scherb.**

Ivyleaf Toadflax

Glabrous, creeping perennial herb with stems to 0.8 m long. Petioles slender, ca 15 mm long. Leaves alternate, reniform to semi-circular, 9-14 x 15-26 mm, shallowly 5-lobed, each lobe rounded with a blunt mucro. Flowers solitary; pedicels slender, 15-20 mm long, at first erect but recurved in fruit. Sepals subequal, narrowly ovate, 1.5-2 mm long, acute. Corolla violet or blue, 6-9 mm long; tube 3.5-4.5 mm long; spur 1.5-2 mm long, obtuse, curved; upper lip 2-lobed; palate paler or yellowish. Stamens included; anthers minute, 0.5-1 mm long. Capsule glabrous, longer than the calyx. Seeds ovoid, rugose, ridged.

Recorded for the Coastal Plain near Perth. Possibly naturalized, native to the Mediterranean Region.

Flowers recorded for October.

***DISCHISMA Choisy**

Annual or perennial herbs or small shrubs. Leaves alternate or the lowermost opposite. Flowers in terminal, often dense, bracteate spikes, the bracts hiding the flowers. Calyx reduced to 2 sepals. Corolla tube slender, deeply split on one side; corolla limb expanded, flat or concave, 4-lobed. Stamens 4, didynamous, inserted below the corolla lobes, 1 pair sometimes deeper in the tube; filaments short, linear or terete; anthers minute, 2-celled. Ovary 2-celled; ovules 1 per cell. Style terete, included or exerted; stigma simple. Fruit included within the calyx, indehiscent, or separating into 2 single-seeded mericarps. Seeds subterete. 13 species all from South Africa, 2 introduced to W.A. This genus has sometimes been included in the family Selaginaceae.

1. Bracts with a short acuminate or obtuse apex. Fruit indehiscent, cylindrical, 2-seeded ***D. arenarium**
 1. Bracts with a long, leaf-like apex. Fruit separating into 2 mericarps... ***D. capitatum**

***D. arenarium** E. Meyer

Prostrate or decumbent annual herb to 0.2 m high, the stems white-woolly with multicellular hairs when young. Leaves sessile, linear to very narrowly obovate, 7-15 x 1-2.5 mm, sparsely hairy towards the base, toothed towards the apex. Inflorescence an ovoid to cylindrical spike, 8-25 mm long. Bracts ovate, 3-6 mm long, abruptly acuminate to obtuse, ciliate. Sepals narrowly ovate, 2.5-3 mm long, as long as, or longer than the corolla tube, ciliate. Corolla white, 2-3 mm long; tube slender, ca 2 mm long; limb 0.5-1 mm long, minutely 4-lobed, with the 2 middle lobes longer than the 2 outer lobes. Fruit indehiscent, cylindrical, ca 2 mm long, smooth to rugose.

Naturalized on near-coastal sands from Yalgorup National Park to Moore River. Extends south to the extreme south west and also occurs at Cape Le Grand National Park. Native to South Africa.

Flowers August-October.

***D. capitatum** (Thunb.) Choisy

An erect or ascending annual herb 50-200 mm high, the stems white-woolly with multicellular hairs when young. Leaves sessile, linear, 12-22 x ca 1 mm, entire or shortly toothed. Inflorescence an ovoid to cylindrical spike, 10-35 mm long. Bracts 7-12 mm long, ovate to broadly ovate at the base and tapering abruptly into a long linear, leaf-like apex, strongly veined, ciliate. Sepals linear, 1.5-2.5 mm long, shorter than or as long as the corolla tube, ciliate. Corolla white; tube very slender, 3-6 mm long; limb ca 1 mm long, minutely 4-lobed, with the 2 middle lobes longer than the 2 outer lobes. Fruit separating into 2 single-seeded mericarps at maturity; mericarps cylindrical, ca 2 mm long, minutely rugose.

Naturalized on sandy or peaty soils near Perth and north of the Perth Region in the Eneabba area. Native to South Africa.

Flowers August-September.

EUPHRASIA L.

Annual or perennial, semi-parasitic herbs or shrubs. Leaves opposite or the upper ones alternate, rather fleshy but brittle, margins toothed or rarely entire. Inflorescence of simple, terminal, spike-like racemes or flowers solitary; flowers sessile or shortly pedicellate. Calyx zygomorphic, campanulate or cylindrical, 4-lobed. Corolla 2-lipped; upper lip hooded, enclosing the anthers, terminating in 2 reflexed lobes; lower lip 3-lobed. Stamens 4, didynamous, the posterior pair inserted higher in the corolla tube; filaments straight or curved; anthers 2-celled, the cells connivent, dehiscing by longitudinal slits, glabrous or sparsely to densely hairy and awned, the awns often unequal. Style filiform; stigma capitate or 2-lobed. Capsule usually shortly cylindrical to ovoid or ellipsoid, slightly compressed laterally, obtuse or shallowly emarginate, opening loculicidally by 2 valves. Over 100 species, widespread in temperate areas of the northern and southern hemispheres, with 2 in W.A. Reference: Barker, W.R. 1982. J. Adelaide Bot. Gard. 5: 1-304.

E. scabra R. Br.

Yellow Eye-bright

Erect annual herb 85-500 mm high, hairy with glandular and nonglandular hairs. Upper leaves ovate to elliptic, rarely narrowly ovate, 6-20 x 1-9.5 mm, pinnatifid to serrate, scabrous with short, glandular and nonglandular hairs; lower leaves shorter. Inflorescence of dense racemes each with 10-54 flowers; pedicels up to 1 mm long; bracts leaf-like. Calyx 4-9 mm long, densely hairy; lobes 2-5.5 mm long, acute to acuminate. Corolla yellow, sometimes with brown markings, 8-14 mm long; hood, 3-5 mm long, emarginate; upper lip with obtuse or acute lobes; lower lip slightly longer than the upper, the lobes obtuse to emarginate. Staminal filaments glabrous; anthers with glabrous to hairy connectives, awns usually unequal. Capsule narrowly ellipsoid to ellipsoid, 5-9 x 2-3 mm, the upper part densely hairy. Seeds numerous, narrowly ellipsoid, angular.

A single record from Fremantle in the Perth Region. Also recorded for near Geraldton and from the extreme south west of the state to Esperance. Occurs also in S.A., Vic., Tas. and N.S.W.

Flowers recorded for October.

GLOSSOSTIGMA Wight & Arn. ex Arn.

Dwarf creeping ephemerals or short-lived perennials, rooting at the nodes. Leaves opposite or clustered, petiolate. Flowers solitary, axillary on long slender pedicels; bracteoles absent. Calyx campanulate, 3-lobed, with 1 broad and 2 narrower lobes. Corolla 3-5-lobed. Stamens 4 and didynamous or only 2; anthers 1-celled. Style short, dilated towards the apex into a curved, spatulate stigma. Fruit a 2-valved capsule, splitting loculicidally. Seeds numerous, minute. A genus of about 5 species in India, Africa, New Zealand and Australia, 3 species occurring in W.A.

1. Stamens 2. Lower surface of leaf with a distinct midvein..... **G. diandrum**
 1. Stamens 4. Lower surface of leaf with an obscure midvein..... **G. drummondii**

G. diandrum (L.) Kuntze

Minute glabrous herb, sometimes forming mats. Leaves linear, narrowly elliptic or narrowly obovate, 2-15 x up to 1 mm, midvein distinct below, apex obtuse. Flowers small; pedicels 2-15 mm long, erect. Calyx campanulate, 1-1.5 mm long; lobes 3, short, unequal, obtuse, slightly enlarged in fruit. Corolla white blue or mauve, 1.5-2.5 mm long, 3-5-lobed; lobes 0.5-1 mm long, sometimes ciliolate. Stamens 2. Capsules slightly shorter than the calyx, membranous. Seeds striate.

Recorded for near Bunbury in the Perth Region. Occurs in winter-wet depressions in scattered localities of W.A. Recorded for S.A. and N.S.W. and also New Zealand, India and Africa.

Flowers September.

Easily confused with *G. drummondii*, the latter having 4 stamens and a rather thicker leaf blade.

G. drummondii Benth.

A minute glabrous herb, forming dense mats. Leaves narrowly spatulate, 2-10(15) x up to 1 mm, midvein obscure below except on the petiole, apex obtuse. Flowers small; pedicels 3-10(20) mm long, erect. Calyx campanulate, 1-2 mm long; lobes 3, short, unequal, obtuse, slightly enlarged in fruit. Corolla white, blue or pink, 2-3 mm long, 5-lobed; lobes ca 1 mm long. Stamens 4. Capsule slightly shorter than the calyx, membranous. Seeds striate.

Occurs in winter-wet depressions near Perth. Also inland in more arid regions, occurring in granite rock pools from Wongan Hills to the Coolgardie area and south to near Esperance. Also occurs in S.A. and Vic.

Flowers August-December.

GRATIOLA L.

Small perennial herbs with opposite sessile leaves. Flowers solitary, axillary, with a pair of bracteoles close under the calyx. Calyx divided to the base into 5 slightly unequal sepals. Corolla tubular, 2-lipped; upper lip broad, entire or shortly 2-lobed; lower lip 3-lobed. Stamens 2, included in the tube; anthers 2-celled, the cells connivent; staminodes 2, filiform or absent. Style filiform but dilated and deflected towards the entire or 2-lobed stigma. Fruit a 2-celled capsule, opening from the central axis by 4 valves. Seeds numerous, minute, reticulate and striate. About 20 species in temperate and subtropical regions, 2 occurring in W.A.

G. peruviana L.

Erect or ascending herb to 0.3 m high, viscid with glandular hairs and often also flattened, multicellular hairs, rarely glabrous. Leaves subsessile to stem-clasping, narrowly oblong to narrowly ovate, 5-28 x 1.5-6 mm, margins distantly toothed, rarely almost entire. Flowers sessile to shortly pedicellate; bracteoles narrowly oblong or narrowly ovate. Sepals narrowly ovate, 3-6 mm long, glandular-hairy, acuminate or obtuse. Corolla white or pink to purple, 9-15 mm long, hairy at the throat; tube 7-10 mm long; lobes obtuse. Stamens 2, sometimes extremely small; staminodes 2, slender, with minute globular heads. Capsule broadly ovoid, 3-5 mm long.

Occurs in swamps of the Coastal Plain and in the Darling Range from Muchea to Harvey. Also extends south to the extreme south west and the south coast as far as Cape Le Grand National Park. Recorded for S.A. and Vic., also for New Zealand and extra-tropical South America.

Flowers mostly October-December.

A closely related species, *G. pedunculata* R. Br., is recorded for W.A. and differs only in its longer pedicels and absence of staminodes. This may occur in the Perth Region. Studies are needed to determine whether the Australian material is the same as the South American.

*KICKXIA Dumort.

Annual or perennial herbs, prostrate, procumbent or climbing. Leaves alternate or the lowermost opposite, shortly petiolate, pinnately veined. Flowers solitary and axillary or in terminal or lateral racemes; bracts leaf-like but smaller. Calyx deeply divided into 5 subequal sepals. Corolla distinctly 2-lipped; upper lip 2-lobed; lower lip 3-lobed with a projecting palate closing the throat; tube extended into a long, cylindric or narrowly conical spur. Stamens 4, didynamous, included. Capsule globular or ovoid, 2-celled, indehiscent or each cell dehiscent by a circumscissile caducous lid or more rarely a valve shaped persistent lid. Seeds numerous, ovoid to cylindric, alveolate, rugose or tuberculate. About 25 species, mostly in the Mediterranean Region, 2 introduced into W.A.

1. At least some leaves hastate or sagittate at the base. Sepals narrowly ovate, 3-4.5 x 1-2 mm. Spur more or less straight..... *K. *elatine*
 1. All leaves entire, rounded to cordate at the base. Sepals ovate, 3.5 x 1.5-3 mm. Spur curved..... *K. *spuria*

*K. *elatine* (L.) Dumort.

Pointed Toadflax

A prostrate annual, villous with long simple and glandular hairs. Leaves ovate to broadly ovate, 4-30 x 3-20 mm, the uppermost becoming smaller, usually sagittate or hastate at the base. Flowers solitary; pedicels filiform, 7-12 mm long, villous throughout or glabrous except just below the flower where it is villous. Sepals narrowly ovate, 3-4.5 x 1-2 mm, acute, enlarging slightly in fruit. Corolla 7-12 mm long including spur; upper lip violet; lower lip yellow; spur narrowly conical, acute, only slightly curved or straight. Capsule depressed globular, ca 4 mm across, dehiscent by 2 caducous lids. Seeds ellipsoid, ca 1 mm long, alveolate.

A weed of settled and cultivated areas, naturalized on the Coastal Plain and Darling Range. Native to Europe and western Asia.

Flowers November-April.

There are 2 subspecies recorded for the Perth Region.

subsp. *elatine*

Pedicels glabrous except just below the flower.

Recorded for 33 km south east of Perth and for Darkan and Mt. Barker.

subsp. *crinita* (Mabille) Greuter

Woolly Toadflax

Pedicels villous throughout.

Recorded for Perth and Harvey. Also recorded for New Norcia and southwards from the Perth Region to Jerramungup.

*K. *spuria* (L.) Dumort.

Roundleaf Toadflax

Prostrate annual with slender stems to 0.5 m long, villous with long simple and glandular hairs. Leaves ovate to broadly ovate or almost circular, 8-30 x 6.5-27 mm, obtuse or mucronate, rounded to subcordate at the base. Flowers solitary or in loose lateral racemes; pedicels filiform, usually 8-15 mm long, villous. Sepals ovate, 3.5 x 1.5-3 mm, acute, slightly enlarging in fruit. Corolla 8-12 mm long including spur; upper lip purple; lower lip yellow; spur narrowly conical, curved, acute. Capsule depressed globular, ca 4 mm across, dehiscent by 2 caducous lids. Seeds ellipsoid, ca 1 mm long, alveolate.

An occasional weed of settled areas. Naturalized at Perth, Toodyay and near Bridgetown. Native to Europe and western Asia.

Flowers October-April.

LIMOSELLA L.

Dwarf, usually annual creeping herbs, growing in or near water. Leaves basal, rarely alternate on short branches, petiolate. Flowers small, solitary in leaf axils, sessile or pedicellate. Calyx tubular to campanulate, usually 5-angled and shortly 5-lobed. Corolla rotate; tube short; lobes 4 or 5, almost equal, spreading. Stamens 4, exserted; anthers 1-celled. Style short; stigma capitate. Fruit a globular, membranous capsule, dehiscing septically by 2 valves. Seeds numerous. Approximately 15 species in northern and southern temperate areas, with 2 species in W.A., 1 native and 1 introduced.

L. australis R. Br.

A glabrous, stoloniferous, sometimes semi-aquatic herb. Leaves narrowly oblong to narrowly spatulate, 10-40 x 0.5-2 mm including the petiole. Flowers small, solitary; pedicels 5-30 mm long. Calyx ca 2 mm long, unequally 5-lobed; lobes triangular. Corolla white, pink or purple, 2-3 mm long; lobes 5, almost equal, narrowly ovate, the inner surface sparsely glandular-hairy. Capsule ovoid to globular, ca 2.5 x 2 mm.

Occurs in swamps of the Coastal Plain. Also recorded north of the Perth Region at Carnamah and Dirk Hartog Island, and on the south coast and Recherche Archipelago. Occurs in all states except N.T. Recorded in Africa and New Zealand.

Flowers September-November.

***MISOPATES** Raf.

Annual herbs with lower leaves opposite and upper leaves alternate. Inflorescence a terminal, bracteate, spike-like raceme; flowers shortly pedicellate; bracts leaf-like. Calyx almost completely divided into 5 unequal, linear sepals. Corolla 2-lipped; tube broad, abaxially gibbous at the base; upper lip erect, 2-lobed; lower lip 3-lobed, the throat closed by a palate. Stamens 4, didynamous, included. Capsule obliquely ovoid to pyriform, unequally 2-celled, the upper cell indehiscent, the lower cell dehiscing by 2 apical, dentate pores. Seeds numerous, compressed, with one face smooth and keeled, the other face papillose with a sinuate, dentate border. 2 species in southern, western and central Europe, 1 of which is introduced in W.A.

***M. orontium** (L.) Raf.

Lesser Snapdragon

Erect, glandular-hairy herb 0.2-0.5 m high. Leaves linear or narrowly elliptic, 25-50 x 3-8 mm, glandular-hairy, acute, narrowed at the base. Raceme loose; flowers subsessile but becoming pedicellate in fruit. Sepals 9-20 mm long, villous with glandular and nonglandular hairs, acute. Corolla pink, 10-15 mm long. Capsule obliquely ovoid to obliquely broadly ovoid, 5-8 x 4-6 mm, glandular-hairy. *Antirrhinum orontium* L.

A weed in settled districts. Naturalized on the Coastal Plain and Darling Scarp and Range near Perth. Native to western Asia.

Flowers July-October.

***PARENTUCELLIA** Viv.

Annual glandular-hairy herbs, semi-parasitic on the roots of other plants; stems erect. Leaves opposite, sessile or subsessile, lobed. Inflorescence a terminal, bracteate, spike-like raceme; flowers subsessile or shortly pedicellate; bracts leaf-like. Calyx tubular, shortly 4-lobed. Corolla 2-lipped; upper lip hooded, entire or emarginate; lower lip longer, 3-lobed with a ridged palate. Stamens 4, didynamous; anthers mucronate at the base. Fruit a slightly compressed, narrowly ovoid to shortly cylindrical capsule, dehiscing loculicidally by 2-valves. Seeds numerous, minute, smooth or reticulate. 4 species in Europe and central and western Asia, 2 of which are introduced into W.A.

1. Flowers red, 9-15 mm long, only slightly longer than the calyx. Capsule cylindrical, glabrous..... ***P. latifolia**
1. Flowers yellow, 17-19 mm long, much longer than the calyx. Capsule ovoid, hairy..... ***P. viscosa**

***P. latifolia** (L.) Caruel

Common Bartsia

Annual herb 50-300 mm high, hairy with long multicellular, glandular hairs. Leaves ovate, 7-21 x 3-12 mm, deeply 3-7-toothed or palmately lobed. Flowers viscid. Calyx 9-14 mm long, thin, 4-veined; lobes narrowly ovate to triangular, 3-4 mm long, much shorter than the tube, obtuse to subacute. Corolla red to purple, 9-15 mm long, only slightly longer than the calyx. Anthers sparsely woolly on the back, very shortly mucronate. Capsule cylindric, 8-11 x 2-3 mm, glabrous, opening by 2 valves at the apex.

Naturalized on the Coastal Plain and the Darling Scarp from just north of Perth to Waroona. Also north to near Geraldton, east to Southern Cross and south to the extreme south west and to Cape Arid. Native to Europe.

Flowers September-October.

***P. viscosa** (L.) Caruel

Sticky Bartsia

Annual or rarely biennial herb 0.1-0.5 m high, hairy with multicellular, glandular hairs and sometimes also with scabrous, nonglandular hairs. Leaves narrowly ovate to narrowly triangular, 12-40 x 4-15 mm, acute or subacute, margins shortly 7-11-toothed. Flowers viscid. Calyx 9-13 mm long, thin, 12-veined; lobes narrowly triangular, 4.5-7 mm long, about as long as the tube, subacute. Corolla yellow, 17-19 mm long, much longer than the calyx. Anthers woolly on the back, mucronate. Capsule ovoid, 10-12 x 4-5 mm, hairy, opening by 2 valves at the apex.

Naturalized on the Coastal Plain from just north of Perth to Harvey. Also south to the extreme south west of the state and Albany. Native to western Europe.

Flowers August-November.

***POLYCARENA** Benth.

Annual or perennial herbs, rarely shrubs, more or less viscid. Leaves simple, usually opposite but the upper ones alternate. Flowers in terminal, bracteate spikes or heads. Calyx either actinomorphic and 5-lobed or zygomorphic and 2-lipped; tube cylindric or campanulate; lobes linear. Corolla 5-lobed, funnel shaped or more or less campanulate; lobes spreading. Stamens 4, didynamous, included or slightly exerted, inserted deep in the corolla tube; filaments linear; anthers 1-celled. Ovary narrowly ovoid to ellipsoid, 2-celled; ovules numerous. Style filiform, included or slightly exerted. Fruit a shortly cylindric to subglobular, slightly compressed, dehiscent capsule. Seeds 3-angled or 3-winged. About 40 species from South Africa, with only 1 introduced into W.A.

***P. heterophylla** (L.f.) Levyns

An erect annual herb 60-200 mm high, hairy with long multicellular and short glandular hairs. Leaves narrowly to broadly ovate, usually 5-13 x 3-8 mm, usually sessile but the lowermost petiolate, hairy with multicellular hairs, obtuse. Inflorescence an ovoid spike, elongating in fruit; bracts narrowly elliptic, 2-3 mm long, longer than the calyx, hairy, obtuse. Calyx actinomorphic to very slightly 2-lipped, ca 2.5 mm long, deeply 5-lobed almost to the base; lobes narrowly oblong to narrowly ovate, hairy with multicellular and glandular hairs, obtuse. Corolla white, pink or yellow, ca 3 mm long; lobes ca 1 mm long, obtuse. Staminal filaments slender; anthers exerted. Capsule compressed, ovate in outline, 3-4 mm long, glabrous.

Recorded for Perth and possibly naturalized. Also occurs near Northam and Beverley. Native to South Africa.

Flowers recorded for September.

***VERBASCUM** L.

Biennial herbs or rarely shrubs, with a basal rosette of leaves and tall erect stems. Cauline leaves alternate. Flowers in terminal racemes or panicles. Calyx almost actinomorphic, deeply 5-lobed. Corolla yellow, rotate; tube short; lobes 5, nearly equal but the lower 3 slightly larger. Stamens 5; filaments of all or at least the upper 3 stamens hairy, those of the lower 2 stamens longest; anthers either all

reniform or those of the lower 2 stamens obliquely inserted and adnate to the filament. Stigma capitate. Fruit an ovoid to subglobular capsule, dehiscent septically. Seeds numerous, small. Approximately 360 species mainly in northern temperate Europe and Asia, with 3 species introduced to W.A. Species of this genus hybridize readily, but the hybrids are generally sterile.

***V. virgatum** Stokes

Twiggy Mullein

Stout biennial herb to 2 m high, simple or branched near the base; hairy with glandular and nonglandular hairs. Leaves up to 420 x 7-65 mm, margins toothed or crenate; basal leaves narrowly oblong to oblong or spatulate, sessile to shortly petiolate; cauline leaves smaller and stem-clasping, oblong to ovate. Inflorescence a long, terminal bracteate raceme; flowers clustered, 1-5 in the axil of each bract in the lower part of the raceme but in the upper part of the raceme the flowers are usually solitary; axillary racemes sometimes developed below the terminal one; bracts ovate to cordate; pedicels 1-3 mm long in flower. Calyx 5-8 mm long, glandular-hairy; lobes narrowly elliptic, 3-6 mm long, unequal, acute. Corolla 20-40 mm across. Stamens 5; filaments villous with long purple hairs; anthers of upper stamens small, reniform; anthers of lower stamens larger, obliquely inserted and adnate to the filament. Capsule 5-8 mm across, exceeding the calyx. Seeds pitted.

Common and naturalized on roadsides of the Coastal Plain and Darling Range from near Perth to Bunbury and extends south to Denmark. Native to Europe and western Asia.

Flowers June-November.

VERONICA L.

Herbs or shrubs. Leaves opposite or the uppermost alternate. Flowers in terminal or axillary, bracteate racemes, or solitary in the leaf axils. Calyx almost completely divided into 4 or 5 sepals. Corolla irregularly rotate; tube short; lobes 4, often unequal, spreading, the uppermost lobes being the largest. Stamens 2, exserted; anthers 2-celled. Style filiform with a small capitate stigma. Fruit a capsule, usually compressed, rarely inflated at the base, dehiscent septically or loculicidally by 2 valves. Seeds few or numerous. Approximately 300 species, mostly northern temperate, including many alpine and a few southern temperate species, with 5 in W.A., of which 3 are native and 2 introduced.

1. Flowers in racemes or corymbs, subsessile to shortly pedicellate, the pedicels up to 4 mm long. Capsule obovate, circular or obcordate in outline.
2. Corolla shorter than the narrow, glandular-hairy sepals. Flowers in bracteate racemes, sessile or on pedicels up to 1 mm long..... ***V. arvensis**
2. Corolla longer than the elliptic, ciliate sepals. Flowers in loose racemes or corymbs in the axils of the upper leaves, on pedicels 2-4 mm long..... **V. calycina**
1. Flowers solitary on slender pedicels 12-30 mm long. Capsule transversely obcordate in outline..... ***V. persica**

***V. arvensis** L.

Wall Speedwell

Erect or procumbent annual herb, with stems to 0.4 m long, hairy with multicellular glandular and nonglandular hairs. Leaves opposite or the uppermost sometimes alternate, subsessile or the lowermost shortly petiolate, broadly ovate, 6-13 x 4-12 mm, sparsely hairy, obtuse, margins crenate. Inflorescence of long, terminal or axillary, bracteate racemes; flowers distant, sessile or shortly pedicellate, the pedicels up to 1 mm long; lower bracts leaf-like, the upper bracts narrowly ovate. Sepals unequal, narrowly ovate to narrowly elliptic, 3-4 mm long, enlarging to 5 mm long in fruit, glandular-hairy, obtuse. Corolla blue, shorter than the sepals. Capsule compressed, broadly obcordate in outline, ca 3 x 3 mm, margins ciliate.

Possibly naturalized at Perth and also at Bridgetown and Denmark. Native to Europe and Asia.

Flowers September-October.

V. calycina R. Br.

Cup Speedwell, Hairy Speedwell

A stoloniferous perennial herb, villous with long multicellular hairs. Aerial stems erect or procumbent, with retrorse hairs which are usually in 2 opposite rows. Leaves opposite, petiolate except for sometimes the uppermost, broadly ovate, 10-25 x 7-18 mm, obtuse, margins coarsely crenate. Flowers in short, loose racemes or corymbs in the axils of the uppermost leaves; pedicels 2-4 mm long. Sepals elliptic, subequal, 5-6.5 mm long, enlarging to 10 mm long in fruit, obtuse, margins ciliate. Corolla violet, 7-8 mm long, the lobes broadly obovate, obtuse. Capsule compressed, broadly obovate or circular in outline, shorter than the calyx.

Occurs on the Coastal Plain in Yalgorup National Park. Also recorded for near Donnybrook, Pemberton and the Stirling Range. Occurs in all states except N.T.

Flowers recorded for October in the Perth Region.

***V. persica** Poiret

Creeping Speedwell

Prostrate or decumbent annual herb, with stems to 0.5 m long, hairy with multicellular hairs. Leaves usually opposite, shortly petiolate, ovate to very broadly ovate, 5-23 x 5-20 mm, sparsely hairy, obtuse, margins crenate. Flowers solitary in the leaf axils; pedicels slender, 12-30 mm long, hairy with somewhat curled, multicellular hairs. Sepals slightly unequal, ovate to elliptic but sometimes rather narrowly so, 3-5 mm long, enlarging in fruit to 8 mm long, obtuse, margins ciliate. Corolla blue, ca 5 mm long, lobes broadly obovate, obtuse. Capsule compressed, transversely obcordate in outline, 3-5 x 7-10 mm with 2 broad, divergent lobes.

Occurs near Perth and possibly naturalized. Also recorded for Manjimup. Native to western Asia and now widespread.

Flowers September.

FAMILY 102 MYOPORACEAE**B. L. Rye**

Prostrate shrubs to small trees, hermaphrodite; vegetative and/or floral parts viscid to resinous, the resin often in prominent tubercles and often forming flakes or layers on the surface. Stipules absent. Leaves usually alternate but the first 2 leaves of a branch usually opposite, simple. Inflorescence of axillary flowers, with 1-10 flowers per axil; bracts absent. Bracteoles very rarely present. Calyx persistent, with 5 or rarely 4 lobes or sepals, often enlarging after flowering. Corolla usually caducous, 5-lobed, sometimes 2-lipped; lobes imbricate. Stamens 4 or rarely 5, inserted on the corolla tube alternate to the corolla lobes; anther versatile, longitudinally dehiscent. Ovary superior, usually 2-celled but often with septa dividing each cell into 2 or rarely more false cells, not lobed; ovules 1-3 per cell or false cell. Style simple. Fruit dry or drupe-like, indehiscent but often dividing toward the apex into 4 parts; seeds usually 1 per cell. Over 200 species in ca 5 genera, concentrated in Australia, extending north to China, east to the Pacific Islands and also represented in the West Indies and islands of the Indian Ocean.

1. Corolla 8-30 mm long; tube 5-18 mm long..... **EREMOPHILA**
 1. Corolla 3-6 mm long; tube 2-3 mm long..... **MYOPORUM**

EREMOPHILA R. Br.

Shrubs or small trees. Leaves entire or toothed. Flowers 1-5 per leaf axil, often pedicellate. Calyx of 5 or rarely 4 sepals, rarely shortly connate at the base, sometimes enlarged in fruit. Corolla tube often long and curved above the middle; lobes 5, in 2 lips or somewhat unequal, the abaxial lip of 1-3 lobes, the adaxial lip of 2-4 lobes. Stamens 4, often well exerted, the adaxial pair usually distinctly shorter than the abaxial pair. Ovules 2 or 3 or rarely 1 per cell. Style filiform, sometimes uncinuate, usually well exerted. Fruit dry or rarely a drupe, indehiscent but sometimes partially splitting near

the apex, ribbed or rarely winged. 170 species, confined to the Australian mainland and concentrated in W.A., over 125 species occurring in W.A.

1. Leaves sessile, broadly ovate. Corolla white to lilac, 8-10 mm long..... **E. brevifolia**
 1. Leaves petiolate, obovate. Corolla red to yellow or green, 16-30 mm long..... **E. glabra**

E. brevifolia (A. DC.) F. Muell.

Erect shrub, up to 2 m high, glabrous. Leaves alternate, sessile and somewhat stem-clasping, broadly ovate, usually 3-6 x 2.5-5 mm, obtuse, entire or coarsely toothed. Flowers 1 or rarely 2 per leaf axil, very shortly pedicellate. Sepals narrowly oblong to narrowly triangular, ca 4 mm long, acute. Corolla 2-lipped, white to pink-lilac, 8-10 mm long; tube shortly cylindrical at the base, expanding in the distal part to a broad obliquely campanulate throat, glabrous outside, woolly in the throat; abaxial lip 3-lobed; adaxial lip 2-lobed; lobes 2-3 mm long, obtuse. Stamens scarcely exerted from the corolla throat; anther ca 1 x 1.5 mm.

Recorded once or twice from the Darling Range east of Perth. Elsewhere the only records are from Geraldton and the Moore River.

Flowers probably August-November.

E. glabra (R. Br.) Ostenf.

Tar Bush

Shrub, up to 1.5 m high; young growth with small stellate hairs and some glandular hairs, sometimes silvery or viscid. Leaves 22-65 x 4-13 mm including the petiole; blade narrowly obovate to elliptic, tapering gradually to the petiole. Pedicels 3-6 mm long. Sepals ovate to almost linear, 5-8 mm long, enlarged in fruit, sparsely or densely stellate-hairy. Corolla yellow to red or green, often 2-coloured, elongate, somewhat incurved, 16-30 mm long, with minute glandular hairs, 2-lipped, acutely lobed; abaxial lip a single lobe, narrowly oblong, 5-12 mm long, reflexed; adaxial lip 4-lobed, 1-3 mm long. Stamens well exerted; anther 1.6-2 mm broad.

Occurs from Rockingham northward, mainly in sandy limestone areas along the coast, less frequently recorded from winter-wet depressions on the eastern side of the Coastal Plain. Extends north to Exmouth Gulf and east across most of southern Australia, occurring in all mainland states.

Flowers mainly July-January.

This is a very variable species. In the Perth Region there appear to be 2 main variants, one with yellow to red flowers and occurring mainly on coastal limestone and the other with greenish flowers and occupying damp habitats further inland. Elsewhere in W.A. the species shows a greater range of variation and frequently has shorter leaves.

MYOPORUM Sol. ex G. Forster

Shrubs or small trees. Leaves usually alternate, petiolate, entire or toothed. Flowers usually clustered in the axils, pedicellate, actinomorphic or slightly zygomorphic. Calyx divided to the middle or lower, not enlarged in fruit; lobes or sepals 5, the abaxial lobe often somewhat enlarged. Corolla often white; lobes 5; nearly equal or the abaxial lobes somewhat larger. Stamens 4 or rarely 5, sometimes almost equal, more commonly with 1 pair shorter than the other pair, enclosed to slightly exerted. Ovary 2-4-celled; ovules 1 or rarely 2 per cell. Fruit dry or a drupe, usually small. Over 30 species, mainly in Australia, with representatives in Mauritius, from south east Asia to New Zealand and on Pacific islands, ca 10 species occurring in W.A.

1. Leaves thin, not succulent; petiole 0.5-2 mm long. Sepals narrowly ovate, 2-4 mm long..... **M. caprarioides**
 1. Leaves thick, succulent; petiole 5-15 mm long. Sepals ovate, 1.2-1.6 mm long..... **M. insulare**

M. caprarioides Benth.

Slender Myoporum

Shrub, up to 2 m high, glabrous, sometimes prominently dotted with oil glands. Leaves with a petiole 0.5-2 mm long; blade narrowly ovate to narrowly obovate, 17-70 x 3.5-13 mm, thin, not succulent, tapering to the petiole, acute, serrate. Flowers 1 or 2 per leaf axil; pedicel 6-16 mm long, slender. Sepals free almost to the base, narrowly ovate, 2-4 mm long. Corolla white with mauve spots or entirely pink-mauve, glabrous outside; tube 2-3.5 mm long; lobes 1.5-4 mm long, obtuse, sparsely hairy inside. Stamens 4, exserted; filament 2-4 mm long; anther 0.7-1 mm broad. Style 2-4 mm long, glabrous. Fruit brown, almost globular, 2-3 mm long. *M. gracile* Bartling

Occurs along the coast, mainly in limestone areas dominated by Tuart, commonly associated with winter-wet depressions and watercourses. Extends along the coast from Dongara to Busselton.

Flowers all year except possibly during part of winter.

M. insulare R. Br.

Blueberry Tree

Dense shrub, up to 3 m high but often low and spreading, glabrous. Leaves with a petiole 5-15 mm long; blade obovate, 25-75 x 7-21 mm, thick, succulent, tapering to the petiole, abruptly acuminate and mucronate, entire or often minutely serrulate mainly toward the apex. Flowers usually 3-6 per leaf axil; pedicel compressed, 3-8 mm long. Sepals free almost to the base, ovate, 1.2-1.6 mm long, dotted with glands, often minutely serrulate. Corolla white with purple spots in the throat, the distal part hairy inside; tube 2.5-3 mm long; lobes 1.5-2 mm long, obtuse. Stamens 4, scarcely exserted; filament ca 1.5 mm long; anther usually 1-1.3 mm broad. Style up to ca 4 mm long, usually glabrous. Fruit succulent, white with purple markings when fresh, drying black, almost globular, ca 3 mm long. *M. adscendens* R. Br.

Occurs on stable sand dunes along the coast from Yalgorup National Park northward. Extends north to the Kimberley. Also occurs from Esperance to Cape Arid. Occurs in all states except N.T.

Flowers August-November, commencing in May north of the region.

The variant occurring in the Perth Region extends north to Dorre Island. Specimens occurring from Shark Bay northward and probably also a few occurring further south have narrowly ovate leaves. Specimens from the Esperance to Cape Arid area have more prominently toothed leaves.

FAMILY 103 OROBANCHACEAE*J. R. Wheeler**

Annual or perennial herbs, lacking chlorophyll and parasitic on the roots of other plants. Stems erect. Leaves reduced to alternate, exstipulate scales. Inflorescence a bracteate, terminal raceme or spike, rarely flowers solitary; flowers bisexual, 2-lipped, bracteoles present or absent. Calyx tubular, zygomorphic, 2-lipped or 4 or 5-lobed, sometimes reduced to 2 distinct sepals. Corolla 2-lipped and zygomorphic or 5-lobed and almost actinomorphic. Stamens 4 or 5, 4 fully developed, didynamous, inserted on the corolla tube, included, the 5th stamen reduced to a staminode or absent; anthers usually 2-celled, opening by longitudinal slits, minutely mucronate. Ovary superior, of 2 or 3 connate carpels forming a compound, 1-celled ovary with 2-6 placentas; ovules numerous. Style slender; stigma capitate or 2-4-lobed. Fruit a loculicidal capsule, opening by 2 valves. Seeds small, numerous, ellipsoid or globular. A family of 17 genera and ca 150 species, widespread in temperate and subtropical regions of the northern hemisphere, closely related to Scrophulariaceae.

***OROBANCHE L.**

Annual, biennial or perennial herbs. Flowers in dense spikes or racemes; bracteoles usually present, adnate to the calyx. Calyx either tubular to campanulate and 4 or 5-toothed or divided into 2 lateral sepals which are entire or 2-lobed. Corolla distinctly 2-lipped; tube erect or curved; upper lip equal to or shorter than the lower lip, emarginate or 2-lobed; lower lip 3-lobed. Ovary with 4 placentas. About 140 species of temperate and subtropical regions. 2 species, 1 of which is introduced, are reported for Australia, 1 introduced in W.A.

Parasitic herb 0.1-0.5 m high, yellowish brown, hairy with multicellular glandular hairs. Stems erect, swollen at the base. Scale leaves brown, narrowly ovate to narrowly triangular, 13-22 x 3-6 mm, sparsely hairy. Inflorescence a bracteate spike. Calyx of 2 narrowly ovate sepals, 8-14 mm long; each sepal divided almost equally into 2 slender, subulate segments. Corolla yellowish tinged with purple, 10-20 mm long; tube curved, equal in width throughout its length and not conspicuously inflated towards the base; upper lip 2-3 mm long, shortly notched, with the lobes directed forwards; lower lip 3-lobed, with the lobes obtuse and crisped. Stamens 8-10 mm long, at length exserted; filaments glabrous above, slightly dilated and sparsely hairy towards the base, inserted ca 2-3 mm up from the base of the corolla tube; anthers ca 1 mm long. Stigma purple, broadly 2-lobed. Capsule turgid to slightly compressed, ellipsoid, 7-10 x 2.5-3.5 mm, glabrous. Seeds dark brown to black, <0.5 mm long, alveolate. **Fig. 220**

Widespread and naturalized on a variety of soils on the Coastal Plain and Darling Scarp and Range from Yancheep and Bullsbrook south to near Bunbury. Extends north to Cockleshell Gully and Carnamah and south to the extreme south west and Denmark. Native to Europe.

Flowers August-November.

Further research on the correct name of this taxon is needed. *O. cernua* Leofl. var. *australiana* (F. Muell. ex Tate) J. Black is also recorded for W.A. but this record may be a misidentification of *O. minor*.



Fig. 220. *Orobanche minor*. A, Flowering stem. B, Upper part of flowering stem. C, Flower. D, Glandular hairs. E, Flower slit open to show stamens. F, Ovary and style. G, Transverse section of ovary.

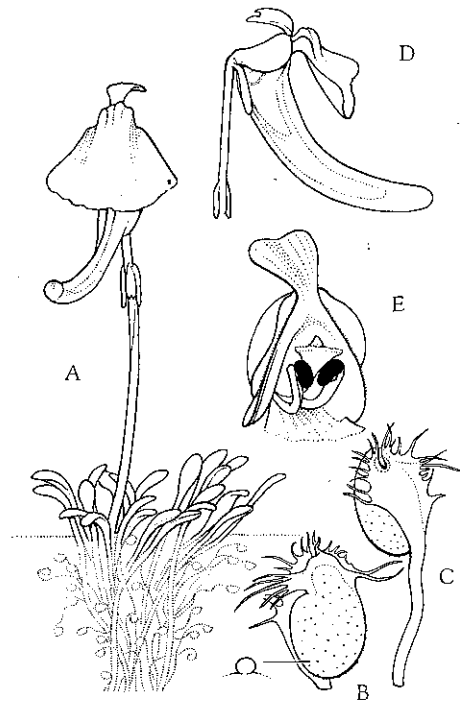


Fig. 221. *Utricularia menziesii*. A, Habit. B and C, Two views of bladder. D and E, Two views of flower.

FAMILY 104 LENTIBULARIACEAE

J. R. Wheeler

Insectivorous herbs growing in or near water, either rooted in the substrate or rootless and free-floating. Stems sometimes with modified alternate or whorled, submerged, leaf-like branches, often considered to be leaves and which bear characteristic small, hollow bladders; bladders with a trap-door entrance, capable of ingesting minute insects and crustaceans. Leaves alternate and often crowded into basal rosettes, exstipulate, simple or dissected, sometimes much reduced. Flowers solitary or in bracteate racemes on a leafless peduncle, bisexual, zygomorphic; bracts representing reduced leaves. Calyx persistent, of 4 or 5 sepals, 4 or 5-lobed or 2-lipped, the lips appearing as 2 distinct sepals. Corolla showy, 2-lipped, the lower lip prolonged and spurred or saccate at the base. Stamens 2, connivent, included, inserted at the base of the corolla tube; anthers 1-celled or with 2 confluent cells. Ovary superior, of 2 carpels connate to form a compound, 1-celled ovary; ovules numerous, attached to a central placenta. Style very short or absent; stigma papillose, unequally 2-lobed. Fruit a membranous capsule, usually opening by 2-4 valves. Seeds small, numerous. Cosmopolitan family of 5 genera and 200 species.

1. Sepals 4. Upper lip of corolla of 2 acuminate lobes..... **POLYPOMPHOLYX**
 1. Sepals 2. Upper lip of corolla obtuse or notched..... **UTRICULARIA**

POLYPOMPHOLYX Lehm.

Slender, glabrous herbs with filiform structures bearing small, almost globular, stipitate bladders. Leaves narrowly spatulate. Peduncle erect, with 1 or 2 flowers only or a loose raceme; bracts minute, at the base of each pedicel, not peltately attached. Sepals 4, in 2 whorls, the outer 2 much larger than the inner 2, slightly enlarged in fruit. Corolla with a short tube; upper lip erect, of 2 acuminate lobes; lower lip larger, spreading, deeply divided into 3 obtuse or 2-lobed lobes, produced into a concave, protruding palate which more or less closes the throat and is prolonged downwards at the base into a spur. Capsule globular. 5 species in Australia, South America and Madagascar (Malagasy), with 2 species in W.A.

1. Flowers large, spur up to half as long as the lower lip. Herb 80-230 mm high..... **P. multifida**
 1. Flowers small, spur nearly as long as the lower lip. Herb 20-75 mm high..... **P. tenella**

P. multifida (R. Br.) F. Muell.

Pink Petticoats

Herb 80-230 mm high. Bladders 1-2 mm long. Leaves narrowly spatulate, 6-11 mm long. Peduncle filiform with 1 or 2 flowers only, or with flowers in a loose raceme; pedicels filiform, 3-10 mm long. Sepals almost circular, 1-2.5 mm long. Corolla pink; upper lip 2-4 mm long, scarcely exceeding the sepals, divided into 2 narrow lobes; lower lip large, usually 8-13 mm long, with 3 circular, obtuse, notched or 2-lobed lobes; spur 3-6 mm long, obtuse; palate yellow, with a 5-lobed protuberance.

Occurs in winter-wet depressions on the Coastal Plain and Darling Scarp and Range. Extends north to Mt. Lesueur and south to the south coast and Porongurup Range.

Flowers August-November.

P. tenella (R. Br.) Lehm.

Pinkfans

Herb 20-75 mm high with tufted stolons. Bladders 1-1.5 mm across. Leaves 3-6 mm long. Peduncle filiform, with 1 or 2 flowers only; pedicels 1-3 mm long. Sepals broadly ovate to circular, 1.5-2 mm long, obtuse. Corolla pink; upper lip ca 2 mm long, deeply divided into acuminate lobes; lower lip 4-5 mm long, the 3 lobes obtuse, entire to shallowly notched; spur 2.5-4 mm long; palate yellow or white.

Occurs in swamps near Perth, north to near Bullsbrook and in the Darling Range at Gleneagle and Boulder Rock. Also recorded north of the Perth Region near Coorow, along the south coast between Albany and Cape Le Grand National Park, and in the Stirling Range. Also occurs in Vic.

Flowers August-September.

UTRICULARIA L.

Slender, glabrous herbs with filiform structures bearing small, stipitate, almost globular bladders. Leaves simple or pinnately dissected, caducous. Flowers solitary or in racemes on simple peduncles, radical or axillary; bracts small, 1-3 at the base of each pedicel. Sepals 2, spreading, usually slightly unequal, slightly enlarged in fruit. Corolla with a very short tube; upper lip erect, obtuse or notched; lower lip longer and broader, entire or 3-lobed and produced into a concave, protruding palate which more or less closes the throat and is prolonged downwards at the base into a spur. Capsule globular, 2-valved. Cosmopolitan genus of about 250 species, with 26 in W.A.

- | | |
|--|----------------------|
| 1. Submerged aquatic plant. Leaves pinnately divided. Corolla yellow. | |
| 2. Upper and lower corolla lips more or less equal, 6-8 mm wide. Leaves unbranched at base, sometimes branched in upper half..... | * <i>U. biflora</i> |
| 2. Upper corolla lip shorter and narrower than the lower, the lower 15-18 mm wide. Leaves all 2-branched at the base, each branch pinnate..... | <i>U. australis</i> |
| 1. Herb of wet places, erect, twining or creeping on mud or in shallow water. Leaves entire. Corolla, at least lower lip, pink, red or purple, rarely white. | |
| 3. Peduncle erect. | |
| 4. Spur longer than the lower lip. Flowers solitary. | |
| 5. Flowers scarlet, large, with a long spur 15-20 mm long..... | <i>U. menziesii</i> |
| 5. Flowers violet, small, with a short spur 4-5 mm long..... | <i>U. violacea</i> |
| 4. Spur shorter than the lower lip. Flowers solitary, paired, or in whorls of 3. | |
| 6. Upper corolla lip yellow. Spur 4-6 mm long..... | <i>U. inaequalis</i> |
| 6. Upper corolla lip purple or lilac, rarely white. Spur 3-4 mm long..... | <i>U. dichotoma</i> |
| 3. Peduncle twining..... | <i>U. volubilis</i> |

U. australis R. Br.

Rootless, submerged, free-floating perennial herb, with slender flexuose stems 0.3-0.9 m long. Bladders 1.5-4 mm long, arising from the basal parts of the leaf pinnae. Leaves alternate along the submerged stems, 2-branched at the base, each branch divided into 10-14 alternate pinnae; pinnae dichotomously divided into filiform segments. Peduncle erect, emergent, with a raceme of 2-8 flowers; pedicels erect, becoming reflexed in fruit; bracts fan shaped, ca 3 mm long. Sepals broadly ovate, almost equal, 2-4 mm long. Corolla yellow; upper lip shorter and narrower than the lower lip, erect, ovate, entire or emarginate; lower lip broad, spreading, reniform, 15-18 mm wide; spur shorter than the lower lip; palate orange with brown or maroon markings.

Occurs in fresh, still water to 0.6 m deep. Recorded for a lake south of Lake Gnangara, Perth. Also recorded for Cape Le Grand National Park and Millstream on the Fortescue River. Occurring in all states except N.T. Also occurs in New Zealand, New Guinea, Africa and north temperate regions of Europe and Asia.

Flowers recorded for November.

**U. biflora* Lam.

A submerged, free-floating perennial herb, with slender flexuose stems. Leaves not 2-branched at the base, sometimes branched in the upper part, pinnate; pinnae divided into 3 or more fine segments up to 5 mm long. Peduncle erect, filiform; 50-150 mm high, with a raceme of 1-4 flowers; pedicels filiform, to 15 mm long, extending to 25 mm in fruit; bracts reniform, 1 x 2 mm. Sepals 2.5-4 mm long. Corolla yellow; upper and lower lips about equal, 6-8 mm wide; spur about as long as or shorter than the lower lip; palate yellow, streaked with red, prominent, glandular-hairy.

A single record from shallow water of Lake Jandabup near Wanneroo in the Perth Region. Introduced, native to eastern North America.

Flowers November-December.

U. dichotoma Labill.

Fairy Aprons

Herb with creeping stems, growing on mud or on the bottom in shallow water. Bladders 1-1.5 mm across. Leaves linear, ovate or spatulate, 5-25 mm long, obtuse or acute, tapered at the base. Peduncle filiform, erect, 50-300 mm high, with solitary flowers or flowers in 1 or 2 pairs or whorls of 3; pedicels filiform, 1-8 mm long, extending in fruit; bracts opposite or in whorls of 3, narrowly oblong, peltately attached. Sepals purplish, ovate, semi-circular to circular, ca 3 mm long, entire or notched. Corolla purple or lilac, rarely white; upper lip small, longer than the sepals, entire or shallowly notched; lower lip semi-circular, 5-20 mm across, entire or notched; spur shorter than the lower lip, 3-4 mm long, blunt; palate yellow or white.

Recorded for Lake Jandabup near Wanneroo in the Perth Region. Also recorded for the Stirling Range and the south coast of W.A. at Cape Le Grand National Park. Widespread in all states except N.T.

Flowering period usually October-March.

U. inaequalis A. DC.

Bladders 1-4 mm long. Leaves linear, 12-35 mm long, acute. Peduncle erect, 60-150 mm high, with a solitary flower; pedicels 4-8 mm long; bracts opposite or in whorls of 3, linear, peltately attached. Sepals broadly obovate to circular, subequal to unequal, 3-4 mm long, obtuse. Upper corolla lip yellow, 4-8 mm long, deeply 2-lobed, the lobes divergent; lower lip purple, semi-circular to reniform, 7-19 x 15-35 mm; spur shorter than the lower lip, 4-6 mm long, obtuse; palate yellow with 3-5, raised ridges. *U. hookeri* Lehm.

Occurs in swamps near Perth, north towards Bullsbrook and south to Waroona. Also recorded for Boyup Brook and Cape Le Grand National Park.

Flowers September-October.

U. menziesii R. Br.

Redcoats

Perennial herb with a small corm. Bladders small ca 1 mm long. Leaves narrowly spatulate, 2-4 mm long, with a very long slender petiole. Peduncle filiform, 20-70 mm high with a large, solitary flower; pedicels 7-10 mm long; bracts opposite or in whorls of 3, narrowly oblong, ca 3 mm long, peltately attached. Sepals broadly obovate, unequal, the larger one ca 5 mm long, obtuse. Corolla scarlet; upper lip obovate, 7-9 mm long, shallowly notched, bent back over the sepal; lower lip 8-10 x 10-12 mm, entire or crenate; spur dark red, large, 15-20 mm long, obtuse, curved upwards; palate yellow and ridged. **Fig. 221**

Occurs in winter-wet depressions or swamps near Perth and south to Waroona. Also recorded for Cockleshell Gully, north of the region. Occurs in the extreme south west and along the south coast from Busselton to Point Malcolm.

Flowers July-September.

U. violacea R. Br.

Bladders few and small, 0.5-1 mm long. Leaves linear to narrowly spatulate, 3-8 mm long, obtuse. Peduncle filiform, erect, 20-50 mm high, with a small solitary flower; pedicels 2-4 mm long; bracts opposite, oblong to obovate, ca 1 mm long, peltately attached. Sepals almost circular, slightly unequal, the larger one ca 2 mm across. Corolla violet, rarely white; upper lip 2-2.5 mm long, notched or 2 or 3-lobed; lower lip 2-4 x 8-11 mm, very shortly 3-lobed or crenate; spur pale, longer than the lower lip, 4-5 mm long; palate yellow and 5-ridged.

Occurs in swamps or winter-wet depressions of the Coastal Plain and Darling Scarp and Range, near Perth, north to Bullsbrook and south to Pinjarra. Recorded for near York. Occurs in the extreme south west and along the south coast between Busselton and Cape Le Grand National Park. Also recorded for S.A. and Vic.

Flowers September-October.

U. volubilis R. Br.

A perennial herb with a short corm and stolons. Bladders 4 mm across. Leaves linear, in a basal tuft. Peduncle slender, twining, to 1 m high, with flowers in 1 or 2 pairs, rarely reduced to a single, terminal flower; pedicels 15-35 mm long; bracts opposite, linear or narrowly oblong, 3-5 mm long, peltately attached. Sepals purple, broadly obovate, 3-5 mm long, almost equal, thin, obtuse. Corolla purple; upper lip broadly obovate to circular, ca 7 mm long, folded back over the sepals, notched; lower lip semi-circular, 10-19 x 17-33 mm, entire; spur broad, 5-10 mm long, obtuse; palate yellow.

Recorded for Perth and a lake north of Lake Gnangara. Also occurs along the south coast from Lake Muir and Walpole to Cape Le Grand National Park.

Flowers September-November and February.

FAMILY 105 CAMPANULACEAE**J. R. Wheeler**

Herbs, usually with a milky latex, rarely shrubs or small trees. Leaves alternate, opposite or more rarely whorled, exstipulate, simple. Inflorescence a raceme, cyme or the flowers solitary; flowers usually bisexual, actinomorphic, usually 5-merous. Calyx adnate to the ovary, with persistent calyx lobes. Corolla tubular, campanulate or rotate, with 5 lobes. Stamens usually 5; filaments attached to an annular epigynous disc or to the base of the corolla; anthers 2-celled, connivent, opening by longitudinal slits. Ovary of 2-5 carpels connate to form a compound, inferior or half-inferior ovary; ovules numerous, placentation axile. Style as long as or longer than the corolla tube, hairy; stigma 2-5-lobed. Fruit a capsule or berry opening by pores or slits. Seeds numerous. A family of about 30-40 genera and 1000 species of worldwide distribution, mostly in temperate regions. In some floras the family Campanulaceae is divided into 2 subfamilies, the Campanuloideae and the Lobelioideae. The latter is here treated as a separate family.

WAHLENBERGIA Schrad. ex Roth

Annual or perennial erect herbs. Leaves opposite at the base but becoming alternate up the stem, lower leaves often quite different from the upper leaves. Flowers either solitary on long peduncles or in leafy cymes. Corolla campanulate or rotate. Anthers narrowly oblong in outline; filaments dilated and more or less ciliate at the base. Ovary inferior, 2-5-celled. Fruit a capsule dehiscent loculicidally by apical valves. Seeds light brown, minute, often compressed. A genus of about 200 species, chiefly in southern temperate areas, of which 9 occur in W.A., 8 native and 1 introduced. This is a genus whose species are very variable and the differences between the taxa not clear cut. Currently undergoing revision by P. Smith.

- | | |
|--|-----------------------|
| 1. Stigma 5-lobed. Corolla bluish green with dark blue centre, densely hairy inside..... | *W. capensis |
| 1. Stigma 2 or 3-lobed. Corolla usually blue, but without the dark centre, almost glabrous inside. | |
| 2. Staminal filaments dilated into broad wings. Calyx lobes 4-9 mm long, acute. | |
| 3. Flowers large, corolla 12-20 mm long. Calyx lobes subulate, 7-9 mm long..... | W. stricta |
| 3. Flowers small, corolla ca 6 mm long. Calyx lobes narrowly triangular, 4-6 mm long..... | W. multicaulis |
| 2. Staminal filaments only very narrowly winged. Calyx lobes 2-3 mm long, obtuse..... | W. preissii |

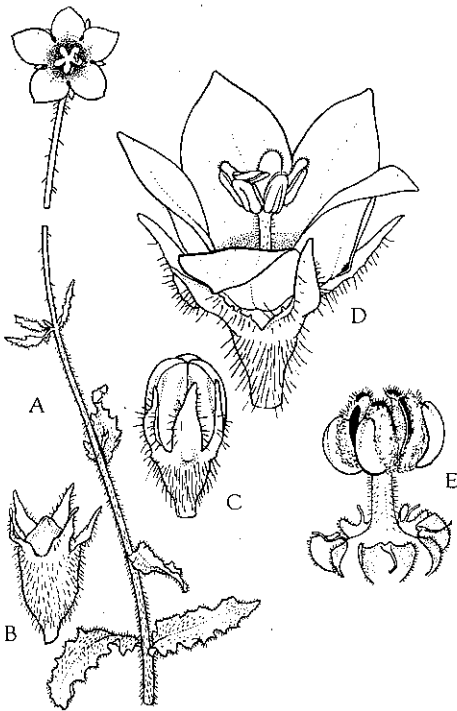


Fig. 222. *Wahlenbergia capensis*. A, Flowering stem. B and C, Buds. D, Flower. E, Staminal filaments and style with deciduous anthers adhering to the stigma lobes.

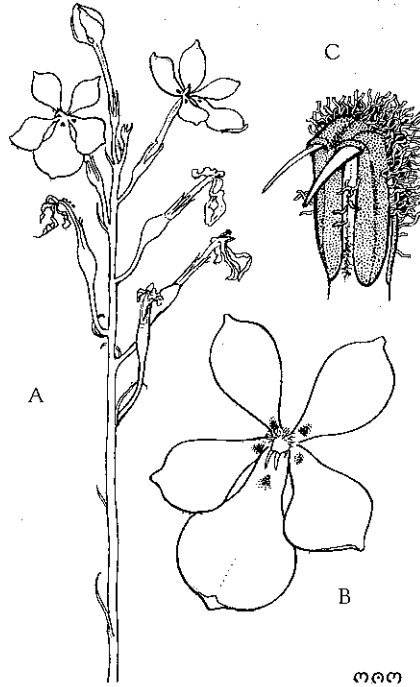


Fig. 223. *Isotoma hypocrateriformis*. A, Flowering stem. B, Flower. C, Anthers.

****W. capensis* (L.) A. DC.**

Cape Bluebell

An annual hispid herb to 0.5 m high. Leaves obovate or oblong at the base, becoming narrowly triangular further up the stem, undulate, hispid, margins toothed; lower leaves 10-50 x 2-8 mm. Peduncles single-flowered; hispid towards the top. Flowers 5-merous. Calyx tube 3-6 mm long, densely hispid with recurved hairs; calyx lobes narrowly triangular, 5-7 mm long, ciliate. Corolla rotate, 10-12 mm long, bluish green but dark blue in the centre and often with black spots; tube short, densely hairy inside; lobes narrowly ovate, spreading, obtuse or acuminate. Staminal filaments dark blue, petal-like, greatly dilated into broad wings. Style dark blue, exserted; stigma 5-lobed. Capsule obovoid, 5-celled, 10-11 x 7-10 mm. Fig. 222

Occurs on the Coastal Plain near Perth and northwards to Geraldton. Introduced to W.A., native to Cape Province of South Africa.

Flowers September-November.

***W. multicaulis* Benth.**

An annual or perennial, almost glabrous, erect herb to 0.5 m high. Leaves narrowly obovate, 10-60 x 2-6 mm, glabrous or sometimes sparsely hispid, margins thickened and cartilaginous, entire or minutely toothed; upper leaves becoming smaller and linear. Peduncle simple or branched with small, 5-merous flowers. Calyx tube 3-5 mm long; lobes narrowly triangular, 4-6 mm long, acute. Corolla blue, ca 6 mm long; tube short; lobes ovate, spreading. Staminal filaments with incurved lateral wings, ciliate. Style with a 3-lobed stigma. Capsule 3-celled, obconic, 10-12 x 4-5 mm.

Occurs in the Jarrah forest of the Darling Range east of Perth near Darlington and Woorlool. Also recorded for Margaret River and Esperance. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers recorded for October and January.

A rarely collected species.

W. preissii Vriese

Slender, erect, branched annual to 0.4 m high with hispid leaves and lower stems, but often glabrous in the upper part. Leaves ovate, obovate or narrowly triangular, 10-25 x 2-6 mm, usually undulate, margins thickened and cartilaginous, entire or minutely toothed; upper leaves becoming smaller up the stem, linear to narrowly triangular. Flowers 4 or 5-merous. Calyx tube 3-4 mm long, usually glabrous; lobes triangular, 2-2.5 x 1 mm, with a faint midrib, obtuse, margins paler and very minutely toothed. Corolla white, pale pink, purple or blue, 4-5 mm long; lobes spreading. Staminal filaments narrowly dilated at base, minutely ciliolate. Style with a 2-lobed stigma. Capsule 2-celled, obconic, 3-7 x 1-2 mm.

Occurs on the Coastal Plain and Darling Scarp from Yancheep to south of Perth. Also north to Geraldton and south to Nannup and inland to Pingelly, with isolated records for Stokes Inlet, Chillinup and west of Norseman. Also occurs in S.A.

Flowers September-October.

W. stricta Sweet

Perennial herb to 0.5 m high with many-branched stems, hispid below, glabrous in the upper part. Leaves ovate, 10-70 x 2-10 mm, the midrib and margins hispid, the margins thickened, cartilaginous and minutely toothed; upper leaves becoming smaller and linear. Peduncle simple, with a large solitary 5-merous flower. Calyx glabrous; tube ca 4 mm long; lobes subulate, 7-9 mm long, acute. Corolla blue, campanulate, 17-20 mm long; tube 8-10 mm long; lobes ovate, 9-10 mm long, acute. Staminal filaments broadly dilated into triangular wings which are densely ciliate. Style with a 3-lobed stigma. Capsule 3-celled, ellipsoid to globose, 3-12 x 3-8 mm, shorter than the persistent calyx lobes.

A single record near the eastern border of the Perth Region on the Albany Highway. Occurs in all states except N.T.

Flowers recorded for November in the Perth Region.

FAMILY 106 LOBELIACEAE**J. R. Wheeler**

Annual or perennial herbs. Leaves exstipulate, alternate, simple. Inflorescence a raceme or the flowers solitary in leaf axils; flowers bisexual, zygomorphic, 5-merous, sometimes on long peduncles. Calyx tube adnate to the ovary, 10-veined, lobes erect or spreading. Corolla tubular and lobed, sometimes 2-lipped; tube either entire or slit to the base on the upper side; lobes usually unequal in size and the lower 3 larger than the upper 2. Stamens 5; filaments connate in a tube; anthers connate in a ring around the style, 2-celled, opening by longitudinal slits, shedding their pollen inwards, often with apical cilia or bristles. Ovary inferior, of 2 connate carpels forming a 2-celled compound ovary; ovules numerous, placentation axile. Style at length exerted through the ring of anthers; stigma 2-lobed. Fruit a loculicidal, 10-veined or ribbed capsule, opening by 2 apical valves, rarely a berry. Seeds numerous, minute. A family of 29 genera and ca 1120 species, mostly of temperate regions. This family is often considered to be a subfamily of the family Campanulaceae, but differs in its zygomorphic flowers, connate anthers and 2-celled ovary.

- | | |
|--|----------------------|
| 1. Anthers with dense cilia at the apex, rarely with bristles. Corolla tube slit to base. | |
| 2. Corolla 2-lipped with unequal lobes, the 2 upper lobes smaller and recurved. Anthers connate in an obliquely incurved ring. | |
| 3. Flowers and capsule pedicellate or pedunculate. Style glabrous..... | LOBELIA |
| 3. Flowers and capsule sessile. Style puberulous..... | GRAMMATOTHECA |
| 2. Corolla lobes all equal. Anthers connate in an erect ring..... | *MONOPSIS |
| 1. Lower 2 anthers each with a long bristle at the apex. Corolla tube usually entire or very shortly slit (sometimes slit to near the base in <i>I. scapigera</i>)..... | ISOTOMA |

GRAMMATOTHECA C. Presl

Annual herbs with sessile leaves. Flowers axillary, sessile between 2 bracts. Calyx lobes spreading. Corolla slit to the base on the upper side, 2-lipped, the lower 3 lobes larger than the 2 recurved upper lobes. Stamens inserted at the base of the corolla; anthers connate in an obliquely incurved ring, all densely ciliate at the apex. Style minutely puberulous. A monotypic genus occurring both in W.A. and South Africa. This genus is extremely close to the genus *Lobelia* and further research may show that the differences are insufficient to maintain generic distinction.

G. bergiana (Cham.) C. Presl

Prostrate or procumbent glabrous annual. Leaves linear, 20-55 x 1-2 mm, minutely denticulate. Flowers appearing pedicellate due to the very long calyx tube, but actually sessile; bracts linear, 1-4 mm long, acute, with scabrous margins. Calyx tube linear in outline, 6-10 mm long; lobes triangular, 1-3 mm long, spreading to reflexed, margins scabrous. Corolla blue with a white throat, 7-10 mm long; tube longer than the lobes; 3 lower lobes broadly ovate, acute; the 2 upper lobes narrow, very minutely hairy at apex. Capsule more or less narrowly cylindrical, 10-30 mm long, often slightly curved. Seeds ellipsoid, shiny.

Occurs mostly on river banks in the Darling Scarp east of Perth and also on the Coastal Plain near the Peel Inlet. Also occurs on the south coast from Scott River to Northcliffe. Also occurs in South Africa. This species is doubtfully native.

Flowers mainly March-April.

ISOTOMA (R. Br.) Lindley

Annual, glabrous herbs with simple or branched stems. Flowers axillary, solitary on long peduncles or in racemes. Calyx tube usually oblique; lobes erect. Corolla tubular, entire or very slightly slit on the upper side, rarely slit to near the base; lobes obovate, spreading, nearly equal or the upper 2 only a little smaller than the lower 3. Staminal filaments adnate to the corolla to above the middle of the corolla tube; anthers connate in an obliquely incurved ring, the lower 2 anthers each having a bristle at the apex, the upper 3 anthers glabrous or hairy. Seeds brown, smooth and shiny. 12 species, mostly Australian, of which 5 occur in W.A.

- | | |
|--|----------------------------|
| 1. Leaves in a basal rosette. Flowers solitary, on a long peduncle 30-100 mm long, arising from a basal rosette..... | I. scapigera |
| 1. Leaves scattered up the stems. Flowers racemose or axillary, on pedicels 8-35 mm long. | |
| 2. Flowers in terminal racemes; corolla 20-27 mm long. Leaves linear. | I. hypocateriformis |
| 2. Flowers axillary; corolla 6-12 mm long. Leaves narrowly ovate to obovate..... | I. pusilla |

I. hypocateriformis (R. Br.) Druce

Woodbridge Poison

Erect herb with simple leafy stems 0.2-0.5 m high. Leaves linear to filiform, 8-25 x 0.5-1 mm, entire. Flowers in a large terminal, often 1-sided raceme; pedicels 8-20 mm long. Calyx tube obliquely oblong, obovate or elliptic in outline, often narrowly so, 6-15 mm long; lobes subulate, 5-10 mm long. Corolla white, mauve, pink or blue, 20-27 mm long; lobes broadly obovate, acute, shorter than the tube, the 3 lower lobes a little larger than the upper lobes and of these the central lobe largest. The 2 lower anthers with long bristles and minute cilia, the 3 upper anthers sparsely hairy with white or yellow, flattened hairs without bristles. Capsule obliquely narrowly cylindrical to obliquely narrowly ellipsoid, 9-15 x 3-6 mm. Seeds acutely trigonous. *Laurentia hypocateriformis* (R. Br.) F. Wimmer **Fig. 223**

Widespread in varied habitats from Yanchep and Gingin southwards to Lake Clifton and Logue Brook Dam. Widespread throughout the south west from Kalbarri to Cape Le Grand.

Flowers November-December.

I. pusilla Benth.

A small, slightly succulent, erect herb 50-120 mm high with branched leafy stems. Leaves sessile, narrowly ovate to narrowly obovate, 5-13 x 1-3 mm, entire or minutely toothed. Flowers axillary; pedicels slender, 8-35 mm long. Calyx tube oblong in outline, 2-5 mm long; lobes narrowly triangular, as long as the tube. Corolla blue or purple, the throat often yellow, 6-12 mm long; lobes shorter than, or nearly as long as the tube, the 2 upper lobes a little smaller than the 3 lower lobes. The 2 lower anthers each with a bristle and sometimes with a few scattered hairs a little back from the apex or glabrous. Capsule slightly obliquely and narrowly cylindrical to slightly obliquely and narrowly ellipsoid, 4-7 x 1.5-2 mm. Seeds ellipsoid. *Laurentia pusilla* (Benth.) A. DC.

Occurs in winter-wet depressions on the Coastal Plain from north of Perth to Harvey. Also recorded for Eneabba and Capel.

Flowers October-December.

I. scapigera (R. Br.) Don

Small, erect herb 50-150 mm high. Leaves usually in a basal rosette, rarely also with a few cauline leaves, ovate or obovate, 6-30 x 2-13 mm, obtuse, narrowed at the base into a short petiole, dentate. Flowers solitary, pedunculate; peduncles slender, 30-150 mm long, arising from the basal rosette, rarely leafy towards the base. Calyx tube obliquely or broadly elliptic in outline, 2.5 mm long; lobes narrowly triangular, 3-5 mm long, acute. Corolla purple or blue, 8-14 mm long; tube sometimes slit to near the base; lobes subequal, obovate to ovate, almost as long as the tube, acute. The 2 lower anthers each with a long bristle and several short cilia, the 3 upper anthers glabrous, or rarely with a few cilia. Capsule obliquely obovoid or ellipsoid, 7-10 x 3-4 mm. Seeds ellipsoid. *Laurentia scapigera* (R. Br.) Endl.

Occurs on winter-wet swampy flats at Cannington and at Gingin in the Perth Region. Occurs north of the region at Three Springs and extends south of the region, often in saline winter-wet depressions, to the extreme south west and along the south coast to Point Malcolm.

Flowers September-December.

LOBELIA L.

Annual or perennial herbs, often with a milky, acrid sap. Flowers in racemes or solitary and terminating long, simple or branched peduncles, sometimes bracteolate. Calyx tube sometimes gibbous; lobes erect. Corolla blue, slit to the base on the upper side, 2-lipped, with the lower 3 lobes large and spreading and the upper 2 lobes small and recurved. Stamens inserted at the base of the corolla; anthers connate in an obliquely incurved ring and usually tipped by dense cilia. Style glabrous. A cosmopolitan genus of 300-400 species, of which 10 occur in W.A.

1. The 2 lower anthers with cilia and bristles at apex, the upper anthers hairy a little below apex. Stems narrowly winged **L. alata**
1. All anthers with tufts of cilia only at apex. Stems not winged.
 2. Flowers in a 1-sided raceme.
 3. Scabrous herb. Corolla with the middle lobe of the 3 lower corolla lobes broad, 8-12 mm wide. Seeds winged **L. heterophylla**
 3. Glabrous herb. Corolla with all the 3 lower corolla lobes narrow, to 5 mm wide. Seeds not winged **L. gibbosa**
 2. Flowers terminating long simple or branched peduncles.
 4. Capsule twice as long or more than wide, only slightly oblique. Calyx lobes subulate, 5-10 mm long.
 5. Seeds black, rugose. Calyx tube and capsule veined but smooth. **L. rhytidisperma**
 5. Seeds brown, smooth, shiny. Calyx tube and capsule distinctly 10-ribbed **L. tenuior**
 4. Capsule scarcely longer than wide, gibbous. Calyx lobes triangular, 3-5 mm long **L. rhombifolia**

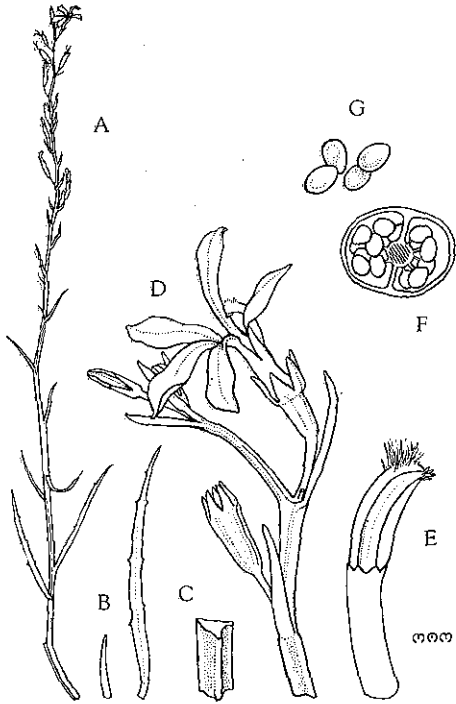


Fig. 224. *Lobelia alata*. A, Flowering branch. B, Leaves. C, Enlargement of cut stem. D, Upper part of flowering stem. E, Stamens. F, Transverse section of ovary. G, Seeds.

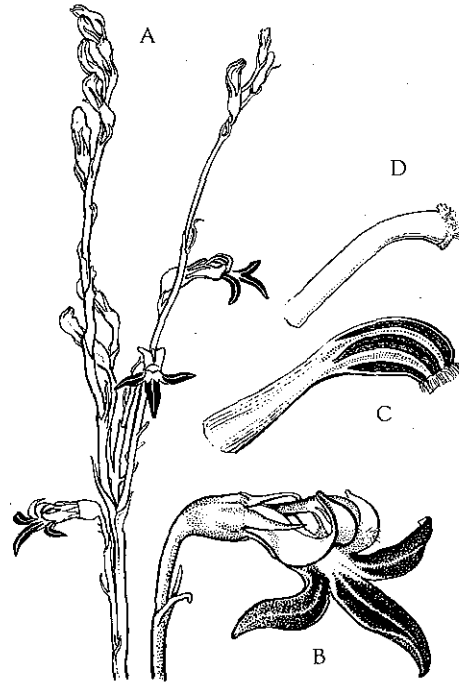


Fig. 225. *Lobelia gibbosa*. A, Flowering stem. B, Flower. C, Stamens. D, Style.

L. alata Labill.

Perennial herb with prostrate to ascending, glabrous, angular or narrowly winged stems. Leaves linear to narrowly ovate, 20-50 x 2-10 mm, becoming smaller and bract-like up the stem, lowermost often broader and obovate to spatulate, glabrous, margins minutely or distinctly toothed. Inflorescence a loose raceme; pedicels axillary, 3-10(15) mm long; bracteoles < 0.5 mm long, at the base of the pedicel and hidden by the leaf bases. Calyx lobes triangular, 1-2.5 mm long, erect, entire. Corolla blue or sometimes almost white, 6-10 mm long; lobes as long as the tube, the 3 lower lobes spatulate, equal or the middle one of the 3 longest, the 2 upper lobes very narrow. Lower 2 anthers with long and short bristles at the apex, the 3 upper anthers with hairs a little back from the apex. Capsule narrowly cylindrical, 8-12 x 1.5-2.5 mm, glabrous. **Fig. 224**

Occurs in varied habitats but often in winter-wet depressions on the Coastal Plain and Darling Range from Yanchee and Muchea southwards to Bunbury. Widespread in the south west of the state from Geraldton to the south coast. Occurs in all states except N.T. Also in New Zealand, South Africa and South America.

Flowers much of the year, but frequently in March-April.

In coastal districts from Augusta to Point Dover and islands of the Recherche Archipelago there is a prostrate, white-flowered variant which is more compact and has broad, spatulate, dentate leaves, both near the base and further up the stem.

L. gibbosa Labill.

Erect, glabrous annual herb to 0.5 m high with usually simple stems. Leaves distant, sessile, linear to filiform, 15-30 x 0.5-1 mm, becoming shorter up the stem, entire. Flowers in a loose 1-sided raceme; pedicels 3-15 mm long; bracteoles 2, linear, inserted at the base of the pedicel. Calyx tube obliquely obovate to obliquely elliptic in outline, 3-5 mm long, smooth, 10-veined; lobes narrowly triangular to subulate, 3-6 mm long. Corolla blue, often with white markings, 14-18 mm long, completely glabrous;

3 lower lobes all narrowly ovate to narrowly obovate, 2-5 mm wide, obtuse or acute. Anthers all densely ciliate at the apex and otherwise glabrous. Capsule gibbous, broadly and obliquely obovoid, 5-8 x 4-7 mm. Seeds pale brown, minute, tetragonal or trigonous. **Fig. 225**

Recorded only for Lake Leschenaultia in the Darling Range. Occurs on the south coast from the extreme south west of the state to Cape Arid, and inland to Hyden and Narrogin. Also recorded for north of the region at Kondut and on the North West Coastal Highway. Occurs in all states except N.T.

Flowers November-March.

L. heterophylla Labill.

An erect annual herb to 0.4 m high, retrorsely scabrous in the Perth Region. Leaves usually linear to filiform, 15-40 x 1-4 mm, entire, toothed or pinnatisect; the basal leaves rarely narrowly obovate. Flowers in a 1-sided raceme; pedicels 10-35 mm long; bracteoles narrowly triangular, inserted on the middle of the pedicel. Calyx tube obliquely obovate in outline, 3-8 mm long, scabrous, with 10 prominent ribs; lobes narrowly triangular to subulate, 6-9 mm long, scabrous, particularly on the margins. Corolla blue, often yellow in the throat, 18-22(25) mm long; 3 lower lobes obovate to spatulate, the middle one very broadly so, being usually 8-12 mm wide; upper lobes ciliate with rather flattened hairs. Anthers all with dense tufts of cilia at the apex, sometimes the tufts extending a little back from the apex. Capsule obliquely ellipsoid or obovoid or more or less globular, 8-10(15) x 5-7(10) mm, 10-ribbed, sparsely hairy, particularly on the ribs. Seeds trigonous, each angle broadly winged with a scarious transparent wing.

Recorded for the Darling Scarp and Range east of Perth and also Gingin. Widespread through arid regions of the state from the Hamersley Range to the Nullarbor Plain and Bremer Range, but also occurring on the south coast between the extreme south west and Hopetoun. Also occurs in arid regions of central Australia.

Flowers September-January.

L. rhombifolia Vriese

Glabrous, much-branched procumbent or erect annual herb 0.1-0.4 m high. Leaves oblong, obtriangular or obovate, 8-27 x 3-10 mm, dentate or lobed, with the largest lobes often at the base of the leaf, narrowed at the base into a short petiole; the upper leaves becoming smaller and bract-like, linear, dentate or sometimes entire. Flowers solitary on terminal peduncles; peduncles 15-120 mm long. Calyx tube gibbous, 1.5-3 mm long; lobes triangular, 3-5 mm long, thin, acute, with a distinct midrib. Corolla blue to light purple, the throat white and yellow, 10-17 mm long; 3 lower lobes obovate, glabrous; upper lobes with a few hairs. Anthers all with tufts of cilia at the apex and otherwise glabrous. Capsule gibbous, broadly and very obliquely obovoid or broadly and very obliquely ellipsoid, 5-7 x 4-5 mm, glabrous, faintly veined. Seeds minute, ellipsoid to trigonous. **Fig. 226**

Occurs on the Darling Scarp and Range near Perth and south to Dwellingup. Also occurs north of the Perth Region at Regans Ford and on the south coast between Nornalup and Fitzgerald River. Also recorded for Vic.

Flowers September-November.

L. rhytidosperma Benth.

An erect, glabrous or minutely scabrous herb to 0.3 m high. Leaves 15-30 x 3-7 mm; lower leaves obovate and pinnatisect; upper leaves linear and dentate. Flowers terminating long, simple or branched peduncles; peduncles 30-185 mm long. Calyx tube narrowly obtriangular in outline, 6-8 x 2.5-3 mm, distinctly 10-veined but smooth; lobes subulate, 3-9 mm long. Corolla blue with yellow in the throat, 18-25 mm long; 3 lower lobes obovate to spatulate, the middle lobe larger than the others; upper lobes auriculate, ciliate at the apex. Anthers all ciliate at the apex and sometimes also with a few hairs at the base of the anthers. Capsule obliquely and narrowly obconic to obliquely and narrowly obovoid, 8-18 x 3-6 mm. Seeds black, rugose on one face and acutely angled on the other face.

Occurs usually on the lateritic soils of the Darling Scarp near Perth and at Dwellingup. Extends northwards to Northampton and is also recorded for Gascoyne Junction and for south of Capel.

Flowers mainly October-December.

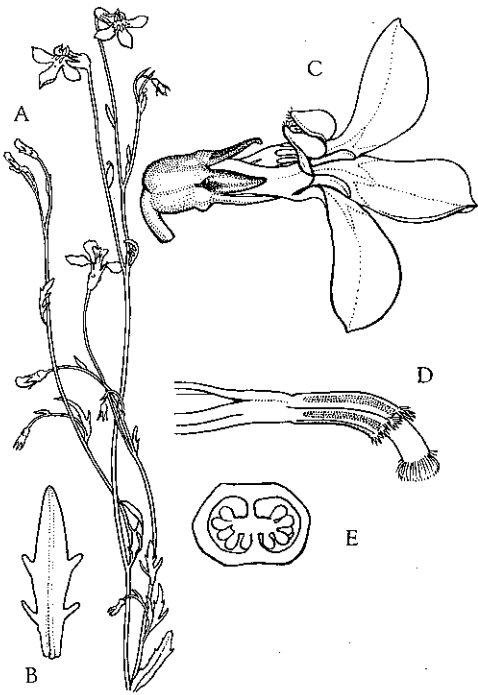


Fig. 226. *Lobelia rhombifolia*. A, Flowering stem. B, Leaf. C, Flower. D, Stamens and style. E, Transverse section of ovary.

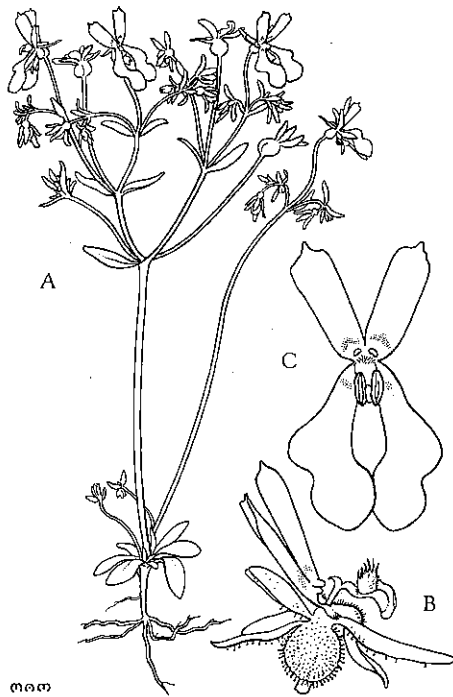


Fig. 227. *Stylidium calcaratum*. A, Habit. B and C, Two views of flower.

L. tenuior R. Br.

Erect or ascending, branched annual herb 0.3-0.5 m high, glabrous or scabrous. Lower leaves petiolate, ovate to obovate, deeply lobed to pinnatisect, 18-50(70) x 3-10 mm; upper leaves becoming linear, pinnatisect or lobed. Flowers on long peduncles terminating the many branchlets; peduncles 20-140 mm long. Calyx tube oblong in outline, 3-7 mm long, distinctly ribbed; lobes subulate, 5-10 mm long. Corolla blue, 12-22 mm long; lower 3 lobes obovate; upper lobes ciliate. Anthers all with tufts of cilia at the apex, otherwise glabrous. Capsule slightly obliquely narrowly ellipsoid to obliquely narrowly cylindrical, 10-17 x 3-4.5 mm. Seeds light brown, compressed, elliptic in outline, shiny, smooth.

Widespread in predominantly sandy soils of the Coastal Plain and Darling Scarp from Gingin to Bunbury. Also occurs along the south coast from Cape Leeuwin to the Bow River.

Flowers October-January.

*MONOPSIS Salisb.

Small annual herbs with sessile leaves. Flowers solitary on axillary peduncles. Calyx tube oblique; lobes spreading. Corolla slit to the base on the upper side, the tube much longer than the short lobes; lobes all equal, corolla not 2-lipped. Stamens inserted at the base of the corolla; anthers connate in an erect, not oblique, ring and all tipped by dense cilia. Style filiform; stigma of 2 curved, filiform branches. 18 species, mostly tropical and South African, with 1 naturalized in W.A.

**M. simplex* (L.) F. Wimmer

Slender, erect annual herb 50-200 mm high, sparsely hairy to almost glabrous; stems simple or branched. Cauline leaves linear, 12-40 x 1-2 mm, toothed, with rarely a few small obovate basal leaves also present. Flowers small, on long axillary peduncles; peduncles 10-35 mm long; bracteoles absent. Calyx obliquely obovate to obtriangular in outline, ca 2 mm long, usually sparsely hairy, rarely densely so, distinctly veined but smooth; lobes narrowly triangular to subulate, 3-4 mm long, spreading to reflexed in fruit, minutely scabrous, margins sparsely ciliate. Corolla deep blue, 6-7 mm long; lobes

broadly ovate, 2-3 mm long. Anthers ca 1.5 mm long, all with tufts of cilia at the apex. Capsule obtriangular in outline, 5-7 x 2-3 mm, slightly ribbed. Seeds dark brown, ellipsoid, foveolate.

Widespread throughout the region, naturalized in winter-wet depressions on the Coastal Plain and Darling Range. Extends southwards to Albany and east of the region to Northam and Muresk. Native to South Africa.

Flowers October-December.

FAMILY 107 STYLIDIACEAE

J. R. Wheeler

Annual or perennial herbs, rarely shrubs. Leaves exstipulate, usually alternate, simple. Inflorescence of terminal, bracteate racemes, panicles, cymes, corymbs or flowers solitary; flowers usually bisexual, usually zygomorphic, epigynous. Calyx tube adnate to the ovary, with (2)5(7) lobes which are usually free but sometimes 2 are connate. Corolla tubular, rarely of free petals, with 5 usually spreading lobes; lowest lobe much smaller and modified, known as the "labellum". Stamens 2, adnate to the style forming the "column" which is often irritable and mobile; anthers 2-celled but sometimes incompletely so with a very short septum, sometimes apically confluent, opening by longitudinal slits. Stigma entire or 2-lobed. Epigynous nectary disc or glands often present. Ovary inferior, of 2 carpels connate forming a compound, 1 or 2-celled ovary; ovules numerous. Fruit a capsule, usually 2-celled, opening from the top by 2 valves, rarely indehiscent. 5 genera and ca 155 species of tropical and temperate regions, mainly in Australia, but also in New Zealand, New Guinea, Indonesia, south eastern Asia and the southern parts of South America. Reference: Erickson, R. 1958. Triggerplants.

1. Column immobile, with a stigma of 2 hairy projections. Labellum hood shaped and surrounding the column, labellum mobile..... **LEVENHOOKIA**
1. Column irritable and mobile, with an entire stigma. Labellum small, recurved, immobile..... **STYLIDIUM**

LEVENHOOKIA R. Br.

Small erect ephemerals. Leaves few, small, alternate. Inflorescence simple or corymbosely branched. Calyx tube globular, lobes all free. Corolla with 4 almost rounded lobes each tapered at the base; labellum irritable, mobile, concave, hood shaped but often with broad lobes at the base, enclosing the top of the column and either sessile on the margin of the corolla tube or stipitate. Column erect, immobile, slightly exerted. Stigma of 2 long, hairy, finger-like projections. When the flower is visited by an insect the labellum is released and its movement causes the column to shed the pollen. Ovary 1-celled, with a basal placenta. Capsule globular, glandular-hispid. Seeds few. 10 species in southern Australia, of which 9 occur in W.A.

1. Corolla tube as long as or longer than the calyx lobes.
 2. Corolla tube at least twice as long as the calyx lobes. Flowers pink.
 3. Corolla tube twice as long as calyx lobes. Inflorescence racemose, densely glandular-hairy..... **L. preissii**
 3. Corolla tube 3-5 times longer than the calyx lobes. Inflorescence umbellate, sparsely glandular-hairy..... **L. leptantha**
 2. Corolla tube a little longer than the calyx lobes. Flowers white..... **L. dubia**
1. Corolla tube shorter than the calyx lobes or absent.
 4. Flowers inconspicuous, clustered among the floral bracts, pedicels very short. Plant glabrous except for the sparsely glandular-hairy calyx tube..... **L. pusilla**
 4. Flowers conspicuous, umbellate, pedicels long. Plant glandular-hairy..... **L. stipitata**

L. dubia Sonder

A very small, erect, glandular-hairy ephemeral herb 15-55 mm high. Leaves scarcely petiolate, ovate, oblong or obovate, 2-6 x 1-1.5 mm. Flowers few and inconspicuous, shortly pedicellate, in a few-flowered raceme or umbel. Calyx glandular-hairy; tube 1-2 mm long; lobes linear to subulate, 1.5-2 mm long.

acute. Corolla white with a yellow throat, 3-4 mm long; tube as long as or a little longer than the calyx lobes; lobes small, obovate, not stipitate; labellum small, on a short hinge, hood-like and 2-lobed. Column short, sheath reduced to a thickened collar. Capsule ca 2 mm across.

Recorded from granitic rocks on the Darling Scarp near Perth and on a granite rock near the Brookton Highway. Widespread from Mt. Magnet to Esperance. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers mainly September-October.

L. leptantha Benth.

Small, slender, ephemeral herb 20-90 mm high, sparsely glandular-hairy. Leaves alternate, ovate, elliptic or obovate sometimes narrowly so, 2-6 x 0.5-1 mm. Flowers shortly pedicellate, in an umbel or rarely solitary; bracts narrow, acute. Calyx glandular-hairy; tube 1-1.5 mm across; lobes free, oblong, 1-2 mm long, scarcely longer than the tube. Corolla rose-pink with dark spots at the base of the lobes, 8-13 mm long; tube narrow, 5-8 mm long, 3 or more times longer than the calyx lobes; lobes broadly obovate; labellum shortly hinged, with 2 rounded lobes at the base and a long appendage parallel with the hood. Column short. Mature capsule not seen.

A single collection from Gingin. Often occurs in winter-wet depressions associated with granitic outcrops or seasonal wetlands, from Kalbarri to Bolgart and Gingin and inland as far as Meekatharra and Southern Cross. Also recorded for Albany.

Flowers mostly September-October.

L. preissii (Sonder) F. Muell.

Glandular-hairy, ephemeral herb 70-170 mm high, much-branched with ascending branchlets. Leaves narrowly obovate to narrowly spatulate, 8-19 x 1-1.5 mm, densely glandular-hairy. Flowers numerous, pedicellate, in several dense racemes, each terminating a branchlet. Calyx densely glandular-hairy; tube 1-1.5 mm long; lobes linear, 2-3 mm long. Corolla rose-pink, 5-9 mm long; tube narrow, twice as long as the calyx lobes; lobes obovate, stipitate; labellum on a long hinge, hood-like with 2 rounded lobes at the base and a long appendage at the apex. Column slender, sheath short. Capsule 2-4 mm across.

Occurs in swamps on the Coastal Plain near Perth and southwards to Yallingup and Pemberton.

Flowers mainly October-January.

L. pusilla R. Br.

A very small, almost completely glabrous, reddish ephemeral herb 20-80 mm high. Leaves few, petiolate, ovate, spatulate or circular, 3-10 x 1-4 mm, glabrous, obtuse. Flowers inconspicuous, crowded in a dense head-like corymb, shortly pedicellate and hidden among the reddish floral bracts. Calyx tube 1-1.5 mm across, sparsely glandular-hairy; lobes linear, 1-2 mm long, usually glabrous, acute. Corolla pink, rarely white, 1.5-2.5 mm long, scarcely longer than calyx lobes; tube minute; lobes broadly obovate to circular, narrowed at the base; labellum shortly hinged, hood-like with 2 linear basal spurs. Column short. Capsule 1.5-2 mm across.

Occurs on lateritic and granitic soils of the Darling Scarp and Range near Perth. Extends northwards to the Geraldton area and southwards to the extreme south west and along the south coast to Cape Arid National Park and as far inland as Peak Charles National Park. Occurs also in S.A.

Flowers mostly September-December.

L. stipitata (Sonder) F. Muell.

Slender, glandular-hairy, simple or branched ephemeral herb 30-90 mm high. Leaves few, oblong to linear, 5-10 x 0.5-2 mm, the lowermost leaves obovate or spatulate. Flowers on long, slender, glandular-hairy pedicels, arranged in umbels or short racemes; bracts linear, 3-10 mm long; pedicels 5-12 mm long. Calyx glandular-hairy; tube 1-1.5 mm across; lobes linear, ca 2 mm long, acute. Corolla pink, 3-5 mm long; tube minute or absent; lobes obovate, stipitate; labellum on a long hinge, hood-like with 2 broad lobes at the base. Column slender, erect with a long sheath. Capsule 2 mm across.

Occurs usually on the heavier soils of the Darling Scarp and Range, between Perth and Gidgegannup, often in winter-wet depressions near Perth, but also occurring on the Coastal Plain between Yanchep and south of Perth. Extends north to Mogumber and southwards to the extreme south west and along the south coast to Cape Arid National Park and inland as far as Peak Charles National Park.

Flowers October-December.

STYLIDIUM Sw. ex Willd.

Ephemeral herbs with a bulbous rootstock or perennial herbs with a woody rootstock and often adventitious, aerial roots, with either an erect or creeping habit. Leaves often confined to apical or basal rosettes or tufts, sometimes with short leafy stems. Broad scarious scale leaves occasionally present. Corolla lobes in 2 pairs, usually arranged either laterally, with 1 posterior and 1 anterior lying together, or arranged vertically, with the 2 anterior lobes vertical and the 2 posterior lobes extended, rarely arranged in a fan shape; labellum small, usually recurved and sometimes with broad or narrow appendages; throat bare or with 2-8 appendages. Column or "trigger" elongated, usually exerted beyond the corolla, bent, mobile, irritable, when poised bent down between and lower than the corolla lobes. When the flower is visited by an insect the column is suddenly and rapidly released, depositing pollen on the insect. In older flowers where the pollen has been shed and the anthers shrivelled, the hairy stigma receives pollen from an insect by the same action of the column. Anthers usually elliptic, pale or dark in colour, sometimes fringed with glands. Ovary inferior, wholly or partially 2-celled; ovules numerous. Stigma undivided, usually sessile between the anthers, hairy, cushion shaped, rarely strap-like or finger-like. Fruit a capsule which opens apically. About 145 species mostly Australian, especially in W.A., also in south east Asia and New Zealand. Approximately 130 species occur in W.A. References: Banyard, B.J. & James, S.H. 1979. Austral. J. Bot. 27,1: 27-37; Carlquist, S. 1969. Aliso 7,1: 13-64; Coates, D.J. 1981. Austral. J. Bot. 29: 397-417; Farrell, P.G. & James, S.H. 1979. Austral. J. Bot. 27,1: 39-45; James, S.H. 1979. Austral. J. Bot. 27,1: 17-25.

1. Plant without a well defined rosette or tuft of leaves.
 2. Leaves closely appressed, overlapping up the stem. Flowers sessile, 2-4 among the uppermost leaves. Corolla lobes more or less equal... **S. preissii**
 2. Leaves spreading. Flowers pedicellate in an irregular corymb or solitary on a peduncle. Corolla lobes unequal in size.
 3. Calyx and capsule globular. Calyx lobes free..... **S. ecorne**
 3. Calyx and capsule narrowly cylindric to cylindric. Anterior 2 calyx lobes connate.
 4. Corolla inconspicuous, 1.5-2 mm long; throat bare. Capsule 5-8 mm long.
 5. Corolla lobes paired vertically..... **S. despectum**
 5. Corolla lobes paired laterally..... **S. inundatum**
 4. Corolla conspicuous, 3-6 mm long; throat with 4-6 appendages. Capsule 8-15 mm long.
 6. Capsule 10-15 mm long. Corolla pink with dark red markings and a white centre..... **S. longitubum**
 6. Capsule 8-10 mm long. Corolla pink and white with a yellow throat..... **S. utricularioides**
1. Plant with a well defined rosette or tuft of leaves, either basal or apical, often also with scattered leaves up the stems.
 7. Rosette or tuft apical, sometimes with additional tufts or rosettes on old stems which may appear basal.
 8. Flowers sessile or pedicellate among the leaves of the apical rosette or tuft; peduncle absent.
 9. Flowers sessile. Capsule beaked..... **S. rhynchocarpum**
 9. Flowers on pedicels 10-20 mm long. Capsule not beaked..... **S. repens**
 8. Flowers sessile or pedicellate, on a peduncle arising from the apical rosette or tuft.
 10. Capsule narrowly cylindric to cylindric, 10-20 mm long.
 11. Corolla lobes unequal. Calyx tube 8-13 mm long..... **S. bulbiferum**
 11. Corolla lobes almost equal. Calyx tube 4-9 mm long..... **S. dichotomum**
 10. Capsule ellipsoid, 4-9 mm long.
 12. Leaves spurred at the base. Peduncle glandular-hairy..... **S. adpressum**
 12. Leaves not spurred at the base. Peduncle hairy with white, curled, nonglandular hairs, rarely also a few minutely glandular hairs.
 13. Corolla lobes almost equal. Inflorescence a narrow raceme, peduncle 10-40 mm long..... **S. sp. A**
 13. Corolla lobes very unequal. Inflorescence a compact head, peduncle 5-15 mm long..... **S. breviscapum**
7. Rosette or tuft basal only.

14. Peduncle with 1 or more whorls of leaf-like bracts.
15. Peduncle with a single whorl of bracts. Leaves obovate to spatulate, 4-11 mm wide.
16. Inflorescence densely glandular-hairy. Leaves darker on upper surface, faintly striate..... **S. amoenum**
16. Inflorescence almost glabrous. Leaves greyish on both surfaces, strongly striate..... **S. rigidifolium**
- ✓ 15. Peduncle with (1)2-6 whorls of bracts. Leaves linear to narrowly spatulate, 1-6 mm wide.
17. Calyx glabrous, glaucous. Corolla white to pink or mauve, lobes paired vertically..... **S. brunonianum**
17. Calyx glandular-hairy. Corolla yellow, lobes paired laterally **S. diuroides**
14. Peduncle without whorls of bracts.
18. Leaf apex terminating in a long hair.
19. Calyx tube narrowly cylindric, 5-9 mm long. Floral axis with yellow nonglandular hairs..... **S. pubigerum**
19. Calyx tube obconic or ellipsoid, 2-5 mm long. Floral axis usually with yellow glandular hairs, rarely glabrous.
20. Leaf margins minutely ciliolate or serrulate.
21. Bracts terminating in a long hair. Peduncle glabrous, floral axis glandular-hairy.
22. Leaves linear. Calyx tube scabrous with curved, glandular or nonglandular hairs, the lobes almost glabrous..... **S. miniatum**
22. Leaves linear to narrowly spatulate. Calyx tube and lobes densely glandular-hairy..... **S. piliferum**
21. Bracts without a long hair at the apex. Peduncle and floral axis glabrous, only calyx and corolla glandular-hairy **S. caespitosum**
20. Leaf margins distinctly ciliate.
23. Peduncle densely glandular-hairy. Labellum with long appendages..... **S. ciliatum**
23. Peduncle glabrous in the lower half, glandular-hairy in the upper half. Labellum with short winged appendages..... **S. hispidum**
18. Leaf apex not terminating in a long hair.
24. Peduncle with scattered spurred bracts.
25. Tall reed-like herb to 0.7 m high, with flowers in a compact raceme. Capsule broadly ovoid..... **S. junceum**
25. Small erect herb to 0.1 m high, with flowers in a head surrounded by floral bracts. Capsule cylindric..... **S. guttatum**
24. Peduncle with or without scattered bracts, the bracts never spurred.
26. Leaves in basal rosettes.
27. Inflorescence a loose or dense raceme or panicle.
28. Leaves glabrous.
29. Leaves spatulate, 50-100 x 7-27 mm, Labellum triangular; throat with 6 appendages..... **S. carnosum**
29. Leaves linear to narrowly obovate, 12-37 x 1-2 mm. Labellum broadly ovate with 2 subulate appendages; throat bare..... **S. caespitosum**
28. Leaves densely hairy, with white glandular hairs..... **S. lineatum**
27. Flowers solitary or in a small irregular corymb, rarely in small open paniculate clusters.
30. Calyx and capsule globular.
31. Minute annual, to 40 mm high, with flowers < 0.5 mm across..... **S. perpusillum**
31. Annual herb, to 200 mm high, with flowers 10-20 mm across.
32. Nectary spur almost as long or longer than calyx lobes. Corolla white or pale pink..... **S. calcaratum**
32. Nectary spur minute or absent. Corolla deep rose-pink..... **S. ecorne**
30. Calyx and capsule narrowly cylindric, obconic, ellipsoid or obovoid.

33. Corolla lobes paired vertically.
 34. Corolla lobes very unequal.
 35. Calyx tube glabrous. Throat appendages 2..... **S. obtusatum**
 35. Calyx tube glandular-hairy. Throat appendages 4-6.... **S. utricularioides**
 34. Corolla lobes almost equal or only slightly unequal.
 36. Upright corolla lobes emarginate and boot shaped..... **S. emarginatum**
 36. Upright corolla lobes curved and acute..... **S. petiolare**
 33. Corolla lobes paired laterally.
 37. Calyx lobes all free..... **S. pulchellum**
 37. Anterior 2 calyx lobes connate.
 38. Corolla bright pink, often red at the base with a white throat, conspicuous, 2-4 mm long. Throat appendages 4..... **S. roseo-alatum**
 38. Corolla white to pink, inconspicuous, 1.5-2 mm long. Throat bare..... **S. inundatum**
 26. Leaves in basal tufts.
 39. Leaves linear, flaccid and grass-like, usually more than 30 mm long.
 40. Basal tufts with scale leaves intermingled with the leaves.
 41. Leaves hispid. Flowers almost sessile in a head..... **S. crossocephalum**
 41. Leaves glabrous. Flowers pedicellate in a panicle or corymb.
 42. Inflorescence a few-flowered corymb. Throat appendages 4, all small..... **S. schoenoides**
 42. Inflorescence a many-flowered panicle. Throat appendages 6, 2 of them large and petal-like..... **S. affine**
 40. Scale leaves absent or present below the basal tuft of leaves.
 43. Peduncle pilose, floral axis and calyx densely glandular-hairy. Corolla pink..... **S. elongatum**
 43. Peduncle, floral axis and calyx glabrous to sparsely glandular-hairy. Corolla usually white to yellow.
 44. Inflorescence a narrow raceme. Leaves sparsely glandular-hairy on the margins..... **S. squamellosum**
 44. Inflorescence a broad thyrses or panicle. Leaves glabrous.
 45. Capsule 4-6 mm long. Calyx glabrous, lobes acute..... **S. canaliculatum**
 45. Capsule 15-20 mm long. Calyx sparsely glandular-hairy, lobes obtuse..... **S. divaricatum**
 39. Leaves terete, linear, narrowly obovate, narrowly spatulate or narrowly elliptic, thick, not grass-like.
 46. Leaves broad, 5-15 mm wide. Inflorescence a dense, narrow raceme or panicle.
 47. Leaves glabrous. Peduncle glabrous. Calyx lobes 2.5-3 mm long, acute..... **S. crassifolium**
 47. Leaves hirsute. Peduncle densely hirsute. Calyx lobes 3-4 mm long, obtuse..... **S. pycnostachyum**
 46. Leaves narrow, ca 1 mm wide. Inflorescence a loose or broad panicle or thyrses.
 48. Leaves terete, 15-50 mm long, margins not serrate or transparent..... **S. dichotomum**
 48. Leaves linear, 45-125 mm long, margins serrate or transparent..... **S. leptophyllum**

S. adpressum Benth.

Trigger-on-stilts

Small, erect or stoloniferous perennial herb 30-150 mm high, often with aerial roots and with several branches arising from apical rosettes. Stems with appressed or somewhat spreading leaves and apical rosettes, which may sometimes appear basal on older growth. Leaves narrowly triangular, 3-13 x up to 1 mm, thick, convex below, acute to mucronulate, peltately attached with a white basal spur, margins sometimes scarious and ciliate; apical leaves longer and more spreading than the cauline leaves and clustered into apical rosettes. Inflorescence a compact head-like corymb arising from the apical rosette;

peduncle red, 7-15 mm long, glandular-hairy; flowers 3-15 or more per corymb, very shortly pedicellate. Calyx tube narrowly elliptic in outline, 3-7 mm long, glandular-hairy; lobes free, triangular, 1-2 mm long, acute. Corolla pink or white, 6-9 mm long, glandular-hairy; tube about as long as calyx lobes; lobes oblong to obovate, almost equal, paired laterally; labellum narrowly triangular, with 2 subulate appendages; throat with 6 subulate appendages. Capsule compressed, elliptic in outline, 5-7 mm long, the 2 cells separating down the deeply compressed centre.

Occurs in sandy soils of the Coastal Plain from Perth northwards. Widespread in sand heath north of the region to Geraldton and also inland to Southern Cross.

Flowers September-November.

Most specimens from the Perth Region and coastal sand heath north of the region to Eneabba belong to a variant with longer spreading leaves.

S. affine Sonder

Queen Triggerplant

Erect perennial herb to 0.5 m high with all leaves in dense basal tufts. Leaves linear, 150-320 x 2.5-5 mm, flat, thin, flaccid, grass-like, glabrous. Scale leaves intermingled with the leaves, pinkish, 20-55 mm long, scarious. Inflorescence a loose panicle; peduncle 120-530 mm long, hairy to the base with long, sericeous hairs which have very minute glandular tips (almost glandless); floral axis 35-150 mm long, glandular-hairy; flowers pedicellate; bracts narrowly triangular, 4-9 mm long, acute, densely glandular-hairy. Calyx glandular-hairy; tube ellipsoid to ovoid, 3-6 mm long; lobes oblong, 3-5 mm long, obtuse, 2 connate for most of their length. Corolla pink, 11-16 mm long, sparsely glandular-hairy; tube almost equal to calyx lobes; lobes unequal, paired vertically, the upright pair larger, rounded-oblong; labellum elliptic with 2 appendages; throat with 6 appendages, 2 of which are large and petal-like and ca 3 mm long, the remaining 4 small and linear. Capsule ovoid to globular, 7-10 mm long. *S. caricifolium* Lindley subsp. *affine* (Sonder) Carlq.

Occurs on the lateritic soils of the Darling Scarp and Range. Extends south to the extreme south west and Manjimup as well as Fitzgerald River National Park.

Flowers September-November.

This species was treated as a subspecies of *S. caricifolium* Lindley by Carlquist, but differs sufficiently to be reinstated as suggested by Coates (1981). *S. caricifolium* differs in having smaller, white flowers and rough hairy leaves. Intermediates between *S. affine* and *S. caricifolium*, with hairy leaves and pink to white flowers, are recorded for just outside the Perth Region, between the Brockman River and west of Toodyay and may extend to the eastern border of the region. A variant, which occurs on the sandy soils of the Coastal Plain, has been shown by Coates (1981) to be chromosomally different from *S. affine*.

S. amoenum R. Br.

Lovely Triggerplant

Perennial herb to 0.5 m high with a basal rosette of leaves. Leaves narrowly obovate to spatulate, 18-45 x 4-11 mm, glabrous, upper surface dark green, lower surface pale green with faint fan-like striations, apex acuminate, base gradually tapered. Inflorescence a raceme; peduncle 80-340 mm long, glabrous to sparsely glandular-hairy, with a single whorl of leaf-like bracts above the middle of the peduncle; bracts obovate, 4-11 mm long, acute; floral axis 40-190 mm long, densely glandular-hairy; flowers pedicellate; floral bracts narrowly triangular, 2-6 mm long. Calyx tube broadly ellipsoid, 2 mm long, densely hairy with yellow glandular hairs; lobes free, narrowly triangular, 2-3 mm long, glabrous or sparsely glandular-hairy, acute. Corolla white, blue or purple, 4-5 mm long; tube shorter than the calyx lobes; lobes elliptic, almost equal, paired laterally; labellum triangular; throat with 6 gland-tipped appendages. Capsule broadly ellipsoid to globular, ca 3 mm across.

Occurs usually on the lateritic soils of the Darling Scarp and Range from east of Perth to Logue Brook. Extends southwards to the extreme south west and along the south coast to near Albany. Also occurs north of the region at Bindoon.

Flowers October-December.

S. amoenum var. *caulescens* (Lindley) Benth., which has a leafy stem 30-40 mm long, has been recorded from Darlington by James (1979).

S. breviscapum R. Br.

Boomerang Triggerplant

Small, stoloniferous perennial herb with aerial roots and thickened nodes; stems much-branched, ascending, arising from apical rosettes or tufts. A few scattered cauline leaves present with an apical

tuft of slightly longer, spreading leaves, the tufts sometimes appearing basal on older growth. Leaves terete, 3-17 x ca 1 mm, fleshy, usually obtuse. Inflorescence a compact head; peduncle short, 5-15 mm long, with long, white-woolly, nonglandular hairs and sometimes also with shorter, minutely glandular hairs; floral axis absent or up to 10 mm long; flowers more or less sessile; bracts linear to narrowly ovate. Calyx tube narrowly cylindrical to cylindrical, 5-7 mm long, sparsely glandular-hairy and sometimes also sparsely woolly; lobes free, broadly oblong, ca 1 mm long, apex obtuse, margins scarious. Corolla yellow, pink or white with red markings, 5-7 mm long; tube longer than the calyx lobes; lobes very unequal, paired laterally, 1 in each pair long and curved, the other small and broadly obovate; labellum small, elliptic; throat bare. Capsule compressed, elliptic in outline, 6-9 mm long, the 2 cells separating.

Occurs in a few localities of the Darling Scarp and Range and on the Coastal Plain. Widespread, usually in the wheatbelt from Mt. Lesueur to Cape Arid and as far inland as Merredin, Naremben and Lake King.

Flowers mainly September-December.

A variable species. Those specimens from the inland areas are smaller, more compact plants, with shorter leaves and shorter pedicels. Those from the south coast have longer leaves, a less dense, but many-flowered inflorescence, a less woolly peduncle and longer, narrowly oblong calyx lobes.

S. brunonianum Benth.

Pink Fountain Triggerplant

An erect, usually glabrous perennial herb to 0.5 m high with leaves in a basal rosette, sometimes with a visible stem below the rosette. Leaves greyish green, variable from linear to narrowly obovate or narrowly spatulate, usually 18-45 x 1-6 mm, rather flaccid, either faintly fan-veined towards the apex or with a single midvein. Inflorescence a large loose raceme; peduncle 70-400 mm long, glabrous, glaucous, with 2-6 whorls of linear bracts 10-17 mm long; floral axis 20-150 mm long, almost glabrous with only a few glandular hairs on the pedicels; floral bracts linear. Calyx glabrous, glaucous; tube ellipsoid, 1.5-2 mm long, ridged; lobes free, oblong, 2-3 mm long, obtuse. Corolla white, pink or mauve, 4-6 mm long; tube about as long as calyx lobes; lobes almost equal, paired vertically; labellum triangular; throat with 6 linear, clavate or gland-tipped appendages. Capsule almost globular, 2-3 mm across.

Widespread on the Coastal Plain and the Darling Scarp and Range. Extends north to Kalbarri and south to the extreme south west and Stirling Range.

Flowers September-November

This is a very variable species. The broader, obovate-leaved specimens have sometimes been misidentified as *S. striatum* Lindley, a species of doubtful status. There appears to be a gradation between the narrow and broader leaved variants, all of which have 2 or more whorls of bracts on the peduncle. *S. brunonianum* is also very similar to *S. rigidifolium*, but the latter has rigid, striate, obovate to spatulate leaves and only 1 whorl of bracts on the peduncle. A variant with purple flowers occurs north of the Perth Region between Jurien and Kalbarri.

There are 2 subspecies, both occurring in the region.

subsp. **brunonianum**

Perennial herb to 0.5 m high, with leaves 18-45 mm long.

Occurs on the Coastal Plain and the Darling Scarp and Range. Extends north to Kalbarri and south to Nannup.

subsp. **minor** (Benth.) Carlq.

Perennial herb to 0.2 m high. Leaves less than 10 mm long and slightly smaller flowers than those of subsp. *brunonianum*.

Occurs usually near the Stirling Range and Albany, but also recorded for Kalamunda, in the Perth Region by Carlquist (1969).

S. bulbiferum Benth.

Circus Triggerplant

Small, glandular-hairy, stoloniferous perennial herb to 0.15 m high, with thickened nodes and often aerial roots, either forming circular mats or growing almost erect, with many-branched, reddish stems arising from apical rosettes. Leaves scattered on the stems as well as in apical rosettes but the rosettes sometimes appearing basal on older growth, linear, 4-16 x 0.5-1 mm, spreading, acute to long-mucronate, the margins glabrous or ciliate. Inflorescence a loose 1-6-flowered cluster; peduncle 10-40 mm long,

glandular-hairy; floral axis 15-30 mm long, glandular-hairy; flowers shortly pedicellate; bracts linear. Calyx tube narrowly cylindrical, 8-13 mm long; lobes free, oblong, ca 3 mm long, obtuse. Corolla pink, reddish or white with red spots at the base of the lobes, 5-8 mm long; tube shorter than the calyx lobes; lobes unequal, paired laterally, 1 lobe of each pair larger than the other; labellum small, circular, with short appendages; throat bare. Capsule cylindrical, 13-20 mm long, twisted after the release of the seeds.

Widespread, usually on the lateritic or granitic soils of the Darling Scarp and Range but also sometimes on the Coastal Plain. Extends northwards to Northampton and south to near Busselton.

Flowers September-November.

This is a variable species with several variants occurring in the Perth Region. It is similar to *S. breviscapum*, especially to the variant of that species which occurs on the south coast. One variant of *S. bulbiferum* which has strong roots which raise the plant above ground level, occurs on the Coastal Plain. Another variant with larger flowers and capsules, occurs near the Murray and Harvey Rivers. Other variants occur north of the region. One occurring at Bolgart has solitary flowers and prominently ciliate leaves. Another variant, also north of the region, has a more slender, few-flowered inflorescence.

***S. caespitosum* R. Br.**

Fly-away Triggerplant

An erect perennial herb 60-330 mm high, with all leaves in a compact, basal rosette. Leaves linear to narrowly obovate, 12-37 x 1-2 mm, usually widening slightly towards the apex, glabrous, keeled, apex acute to shortly piliferous, margins entire to minutely serrulate. Inflorescence a loose raceme or panicle; peduncle 40-210 mm long, glabrous; floral axis 30-180 mm long, glabrous; flowers on long pedicels; bracts oblong, 2-3 mm long, acute, rarely piliferous. Calyx tube ellipsoid, 2-3 mm long, sparsely glandular-hairy; lobes all free, oblong, 1.5-2 mm long, glabrous, with scarios margins. Corolla pink or white with red markings, 5-6 mm long; tube a little longer than the calyx lobes; lobes oblong or elliptic, obtuse, almost equal, paired laterally; labellum broadly ovate, with 2 subulate appendages; throat bare. Anthers dark, distinctly fringed with white glands. Capsule ellipsoid, 4-6 mm long, sparsely glandular-hairy.

Collected from east of Bunbury, near the eastern border of the Perth Region. Occurs in winter-wet depressions or seepage areas from Busselton to Albany.

Flowers November-January.

***S. calcaratum* R. Br.**

Book Triggerplant

Slender, glandular-hairy ephemeral herb, usually (25)80-200 mm high with a small basal rosette of leaves. Leaves ovate, obovate, elliptic to almost circular, 3-9(15) x 1-4 mm. Inflorescence a loose corymb; peduncle 40-120 mm long; floral axis 10-80 mm long; flowers 10-20 mm across, pedicellate; bracts at base of the pedicels ovate. Calyx tube globular, 1-2 mm across, glandular-hairy; lobes oblong to elliptic, 2-4 mm long, spreading, unequal in size, the middle one of the 3 posterior lobes almost horizontal and more deeply inserted on the calyx tube. Corolla white or pink, often with red spots at base of the lobes, usually 4-10 mm long; tube 2-4 mm long, produced into a long nectary spur opposite the labellum; lobes unequal, paired vertically, the upright pair smaller, spatulate and 3-dentate, the extended pair curved and shallowly lobed at the middle; labellum concave; throat appendages 2 or absent. Column bent at the middle with a small spur at the bend; stigma strap-like, ciliate. Capsule globular, 2-3 mm across. **Fig. 227**

Widespread throughout the Perth Region on the Coastal Plain and the Darling Scarp and Range. Extends northwards to the Murchison River, inland to near Southern Cross and southwards to the extreme south west and along the south coast to Esperance. Also occurs in S.A. and Vic.

Flowers September-November.

Easily confused with *S. ecorne*, but *S. calcaratum* can be distinguished by its longer corolla spur.

***S. canaliculatum* Lindley**

Delicate Triggerplant

A delicate, erect, perennial herb 60-280 mm high, the rootstock thickened with the remains of old leaves. All leaves in a basal tuft, linear, 30-110 x ca 1 mm, grass-like, thin, flaccid, glabrous. Inflorescence a loose panicle; peduncle 55-220 mm long, glabrous; bracts several, linear, becoming smaller up the peduncle; floral axis 15-75 mm long, glabrous apart from the pedicels which are sparsely glandular-hairy. Calyx glabrous; tube cylindrical, 3-5 mm long; lobes free, narrowly triangular, 2-3 mm long, acute. Corolla usually yellow, sometimes white or pink, often with darker reddish markings, 5-7 mm long; tube much shorter than calyx lobes; lobes narrowly ovate, almost equal, paired vertically; labellum narrowly triangular, with a long point and small appendages; throat with 6 glandular appendages. Anthers broadly elliptic. Capsule cylindrical, 4-6 mm long, glabrous.

Often in winter-wet seepages, widespread in the Perth Region on the Coastal Plain and Darling Scarp and Range from near Perth to Bunbury and continuing just south of the region, between Bunbury and Capel.

Flowers September-December.

***S. carnosum* Benth.**

Fleshy-leaved Triggerplant

Erect, stout, perennial herb to 1 m high with rigid, triangular scales around the bulbous rootstock, but below the rosette of leaves. All leaves in a basal rosette, spatulate, 50-100 x 7-27 mm including petiole, dark green with thickened reddish margins, fleshy, glabrous, obtuse, gradually tapered into a petiole at the base. Inflorescence a long raceme; peduncle 0.3-0.65 m long, stout, glabrous, with several scattered, linear bracts, 10-15 mm long; floral axis 0.2-0.35 m long, glandular-hairy; flowers shortly pedicellate. Calyx glandular-hairy; tube cylindric to obovoid, 2-3 mm long; lobes free, narrowly ovate, 2-3 mm long, glandular-hairy at the base only. Corolla white, ca 5 mm long; tube almost as long as calyx lobes; lobes slightly unequal to almost equal, laterally paired; labellum triangular; throat with 6 linear appendages. Capsule globular or broadly ellipsoid, ca 3 mm long.

Occurs mainly on the lateritic soils of the Darling Scarp and Range but also on sands of the Coastal Plain from Perth southwards. Extends north to Mt. Lesueur and south to Mt. Barker.

Flowers September-October.

***S. ciliatum* Lindley**

Golden Triggerplant

Erect perennial herb to 0.4 m high with all leaves in a compact basal rosette. Leaves linear to narrowly spatulate and curved towards the apex, 15-26 x 1-1.5 mm, keeled, glabrous except towards the apex; apex often minutely scabrous, piliferous terminating in a long hair, margins long-ciliate. Inflorescence a loose raceme or panicle; peduncle 90-180 mm long, densely covered with yellow glandular hairs; floral axis 40-180 mm long, with dense yellow glandular hairs; flowers pedicellate; bracts oblong to obovate, ca 7 mm long, piliferous. Calyx densely glandular-hairy; tube obconic, 3-5 mm long; lobes oblong, 2-3 mm long, 2 of them connate. Corolla white to yellow, 5-8 mm long; tube as long as calyx lobes; lobes broadly obovate, almost equal or unequal, paired vertically; labellum small, with several long appendages; throat bare. Anthers black, distinctly fringed with red glands. Capsule obovoid, 5-6 mm long.

Occurs on the lateritic soils of the Darling Scarp and Range from near Perth to Harvey. Extends eastwards to Beverley and south to Bridgetown. Also occurs in S.A.

Flowers September-November.

***S. crassifolium* R. Br.**

Thick-leaved Triggerplant

Tall, erect, perennial herb 0.3-0.7 m high, basally tufted with 1-6 basal tufts of leaves. Leaves linear to narrowly elliptic, 90-250 x 5-15 mm, thick and somewhat fleshy, glabrous. Inflorescence a long narrow, raceme-like panicle; peduncle 0.2-0.4 m long, stout, glabrous; floral axis 0.2-0.35 m long, hairy with hairs which have very small glandular tips; flowers pedicellate; bracts narrowly ovate, 10-19 mm long. Calyx densely glandular-hairy; tube narrowly cylindric, 8-15 mm long; lobes free, narrowly triangular, 2.5-3 mm long, acute. Corolla white or pink with darker purplish markings, 6-10 mm long, glandular-hairy; tube about as long as calyx lobes; lobes equal to slightly unequal, rounded-oblong, paired laterally; labellum green, elliptic, with 2 pointed appendages; throat bare or with 2-4 slender hairs. Capsule narrowly cylindric, 17-23 mm long, glandular-hairy.

Recorded for Pinjarra and also just east of the region along the Toodyay Road. Occurs usually in winter-wet seepages or depressions between Busselton and east of Ravensthorpe. Also recorded for north of the region at Perenjori.

Flowers September-December.

This species is close to *S. elongatum* and *S. confluens* B.J. Banyard & S.H. James. The latter, which is not in the Perth Region, differs from *S. crassifolium* in its narrowly ellipsoid capsule, shorter bracts, pink rather than green labellum, and in its habit of forming large clumps. Both diploid and tetraploid forms of *S. crassifolium* have been recorded by Banyard and James (1979).

***S. crossocephalum* F. Muell.**

Posy Triggerplant

Erect perennial herb to 0.3 m high with a woody rootstock and swollen nodes, sometimes with aerial roots. Leaves all in a basal tuft, linear, 70-130 x 1.5 mm, densely hispid with nonglandular white hairs,

acute, margins recurved. Scale leaves intermingled with the bases of the leaves, pinkish, 9-15 mm long, mucronate, margins broad and scariosus. Inflorescence a dense head, 15-40 mm across, surrounded by bracts which are narrowly triangular, 14-18 mm long, mucronate with broad, scariosus and lacerated margins; peduncle 45-230 mm long, glabrous. Calyx tube cylindric to obconic, 4-5 mm long, hairy in the upper half with a few white, spreading, nonglandular hairs; lobes unequal, the 2 larger lobes connate to the middle and 8-10 mm long, the 3 smaller lobes 4-5 mm long, mucronate, margins broad, scariosus, lacerated. Corolla usually white with red and purple markings, 12-17 mm long, glandular-hairy; tube about equal in length to calyx lobes; lobes very unequal, paired vertically, the upright pair larger and strongly curved; labellum triangular with a long point, glandular-ciliate; throat with 6 appendages, 2 of them erect, large, 3-4 mm long and petal-like, the other 4 small, linear and glandular-hairy. Column broad; anthers almost globular; stigma a finger-like projection with a hairy apex. Capsule broadly ovoid to globular, ca 6 mm long.

Occurs on the sandy soils of the Coastal Plain from Wanneroo northwards. Extends north to Geraldton.

Flowers October-November.

S. despectum R. Br.

Dwarf Triggerplant

A small, erect, glabrous or glandular-hairy ephemeral herb 15-80 mm high with white, fibrous, tufted roots. Leaves alternate, not in a basal or apical rosette, narrowly ovate to ovate, 1-4 x 0.5-1 mm. Inflorescence an irregular corymb or raceme, or the flowers solitary; peduncle 10-30 mm long, leafy; floral axis, when present, 10-40 mm long. Calyx tube narrowly cylindric, 3-5 mm long; lobes narrowly oblong, 1-1.5 mm long, the 2 anterior ones connate for most of their length. Corolla inconspicuous, white or pale pink, usually 1.5-2 mm long, little longer than the calyx lobes; lobes narrowly obovate, paired vertically, almost equal or the 2 posterior petals slightly larger than the 2 anterior; labellum small, ovate, deflexed; throat bare. Capsule narrowly cylindric, 5-8 mm long.

Occurs in seasonal wetlands on the Coastal Plain near Perth. Also occurs along the south coast from Nornalup to Mt. Ragged. Occurs in S.A., Vic., Tas. and N.S.W.

Flowers October-December.

This species is very similar to and sometimes confused with *S. inundatum*, differing in the absence of a basal rosette as well as corolla lobe orientation and size. *S. despectum* and *S. inundatum* have at various times been treated as conspecific.

S. dichotomum DC.

Pins and Needles

Erect or creeping, stoloniferous perennial herb 0.1-0.3 m high, with swollen nodes and often aerial roots, with several, much-branched, ascending stems arising from apical tufts. Leaves in apical tufts, which may appear basal on older growth due to the extreme shortness of the sparsely leaved stem, terete or almost so, 15-50 x ca 1 mm, mucronate, margins of young leaves scariosus and minutely ciliate, margins of older leaves minutely scabrous. Inflorescence a loose panicle; peduncle 30-130 mm long, glandular-hairy; floral axis 10-90 mm long, glandular-hairy; flowers shortly pedicellate; bracts linear. Calyx glandular-hairy; tube narrowly cylindric to cylindric, 4-9 mm long; lobes free, narrowly ovate to ovate, 2-3 mm long, obtuse. Corolla pink, less often yellow or white, with dark markings on the outside, 5-7 mm long; tube about equal in length to the calyx lobes; lobes oblong, almost equal, paired laterally; labellum ovate with short appendages; throat bare. Column slender, much longer than the corolla. Capsule cylindric, ca 10 mm long.

Widespread throughout the Perth Region, occurring both on the sands of the Coastal Plain and the heavier soils of the Darling Scarp and Range. Extends northwards to near Kalbarri and southwards to Ravensthorpe and Frank Hann National Park.

Flowers October-December.

This species is very similar to *S. leptophyllum*, differing mainly in habit. *S. dichotomum* in the Perth Region is a leafy-stemmed perennial sometimes with a creeping, stoloniferous habit, swollen nodes and dichotomously-branched stems with apical tufts of leaves. *S. leptophyllum* is a perennial with a short, woody, branched rootstock with swollen nodes and a basal tuft of leaves. Leaves often longer outside the region.

S. diuroides Lindley

Donkey Triggerplant

Erect perennial herb 120-300 mm high, sometimes with a visible stem below the tuft of basal leaves. Leaves terete or triquetrous, 18-42 x 0.5-1 mm, glabrous, usually obtuse. Inflorescence a raceme;

peduncle 45-220 mm long, glabrous, with 1 or 2 whorls of linear bracts 10-20 mm long, sometimes with a few scattered bracts above the whorls; floral axis 20-95 mm long, glabrous apart from the pedicels which are sparsely glandular-hairy; floral bracts narrowly ovate to linear, 3-6 mm long. Calyx tube cylindrical to broadly ellipsoid, 1.5-2.5 mm long, sparsely glandular-hairy with large, flattened, yellow glands; lobes free, narrowly oblong, 2.5-3 mm long, glabrous. Corolla yellow, often with brown markings, 4-5 mm long; tube shorter than the calyx lobes; lobes rounded-oblong, almost equal, paired laterally; labellum elliptic with a long point; throat with 6 linear, glandular appendages. Capsule broadly ellipsoid, 2-3 mm long, glandular-hairy. **Fig. 228**

Occurs on sandy soils of the Coastal Plain and lateritic soils of the Darling Scarp and Range near Perth. Extends northwards to Geraldton and eastwards to York.

Flowers mainly October-November.

Subsp. *nanum* Carlq. occurring near Cranbrook and Pallinup, differs in being a smaller plant, 60-80 mm high, with leaves only 3-6 mm long.

S. divaricatum Sonder

Daddy-long-legs

Small, erect, perennial herb 50-260 mm high with a short, woody rootstock, sometimes branched and bulbous at the nodes. All leaves in a basal tuft, linear, 22-70 x 0.5-1.5 mm, flattened, thin, flaccid, grass-like, glabrous, usually acute. Inflorescence a dichotomously branched, widely spreading thyrs, with clusters of 3 almost sessile flowers; peduncle 20-100 mm long, glabrous; floral axis 40-170 mm long, much longer than the peduncle, glabrous; bracts linear. Calyx tube narrowly cylindrical, 9-13 mm long, glabrous except for a few glandular hairs just below the lobes; lobes free, oblong, 1-1.5 mm long, glabrous, obtuse, margins scarios. Corolla white or yellow, 3-3.5 mm long, glabrous; tube longer than the calyx lobes; lobes rounded-oblong to obovate, almost equal, arranged like a fan; labellum minute, with 2 very long, hair-like appendages; throat with 2 hair-like appendages. Anthers pale, often distinctly fringed. Capsule cylindrical to narrowly obovoid, 15-20 mm long, twisted.

Occurs in winter-wet depressions and swamps of the Coastal Plain and Darling Range from Harvey northwards. Extends north to Watheroo.

Flowers October-December.

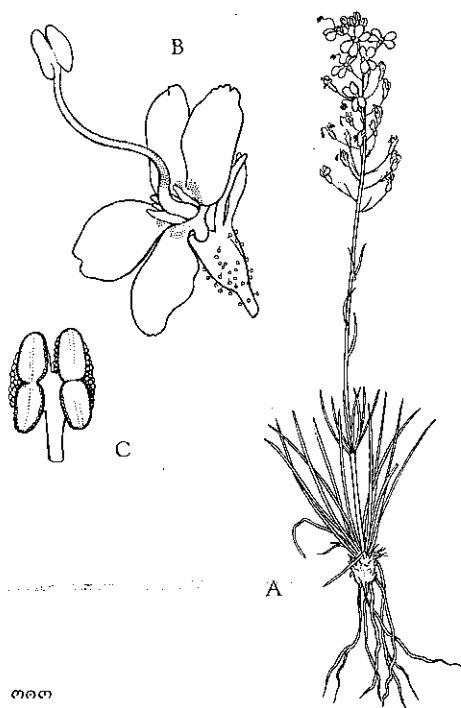


Fig. 228. *Stylidium diuroides*. A, Habit. B, Flower. C, Anthers.



Fig. 229. *Stylidium pycnostachyum*. A, Habit. B, Flower. C, Anthers. D, Labellum. E, Anthers.

S. ecorne (F. Muell. ex R. Erickson & J.H. Willis) P.G. Farrell & S.H. James Foot Triggerplant

A slender, glandular-hairy ephemeral herb 50-180 mm high. Leaves in a basal rosette, broadly ovate to almost circular, 2-7 x 1-2 mm, sometimes withering early. Inflorescence a loose corymb, rarely flowers solitary; peduncle 30-100 mm long; floral axis, when present, 20-55 mm long; bracts ovate. Calyx tube globular, 1-2 mm across, glandular-hairy; lobes oblong to elliptic, 2-4 mm long, spreading, unequal in size, the middle 1 of the 3 posterior lobes almost horizontal and more deeply inserted on the calyx tube. Corolla rose-pink, 5-9 mm long; nectary spur very small or absent; lobes unequal, paired vertically; the upright pair smaller, oblong and 3-lobed or acuminate and entire; the extended pair curved and shallowly lobed; labellum spatulate, petal-like; throat appendages 2 or absent. Column bent at the middle, with a small spur at the bend; stigma strap-like, ciliate. Capsule globular, 2-3 mm across. *S. calcaratum* R. Br. var. *ecorne* F. Muell. ex R. Erickson & J.H. Willis

Occurs in winter-wet depressions on the Darling Scarp between Perth and Serpentine Dam and on the Coastal Plain between Perth and Gingin. Extends north to the Murchison Gorge. Also recorded south of the region at Dunsborough, Manjimup and Northcliffe. Also occurs in S.A. and Vic.

Flowers September-November.

This species is very similar to *S. calcaratum* and was formerly considered to be a variety of that species.

S. elongatum Benth.

Tall Triggerplant

Erect, caespitose perennial herb 0.2-0.6 m high, forming large clumps of up to 30 tufts, the short rootstock thickened with old leaf bases. All leaves in a basal tuft, linear, 100-230 x 2-6 mm, grass-like, thin, flaccid, glabrous. Inflorescence a long narrow raceme or panicle; peduncle 0.15-0.2 m long, stout, pilose with long, somewhat curled, nonglandular hairs; floral axis 0.12-0.15 m long, rarely to 0.45 m long, hairy with long glandular hairs; flowers pedicellate; bracts ovate, 7-14 mm long, longer than the pedicels. Calyx densely hairy with long glandular hairs; tube elliptic in outline, 3-6 mm long; lobes free, narrowly elliptic, 2-3 mm long, obtuse. Corolla pink, 5-7 mm long, glandular-hairy; tube about as long as or a little shorter than calyx lobes; lobes rounded-oblong, almost equal, paired laterally; labellum pink in colour, small, with 2 very long, pointed appendages; throat with 2 long, slender hairs. Capsule compressed, elliptic in outline, 5-7 mm long, hairy with long, white, glandular hairs. *S. crassifolium* R. Br. subsp. *elongatum* (Benth.) Carlq.

Recorded for Wungong Gorge, south of Perth. Occurs on sandy heaths from Three Springs northwards to Kalbarri.

Flowers August-September.

This taxon is treated by Carlquist as a subspecies of *S. crassifolium*. However, differences include habit, peduncle hairiness, shape of mature capsule, calyx tube and lobes. These differences suggest that *S. elongatum* should be regarded as a distinct species, as suggested by Banyard and James (1979). Both diploid and tetraploid variants of *S. elongatum* have been recorded.

S. emarginatum Sonder

Biddy-four-legs

Small, slender, erect, ephemeral herb 45-65 mm high, glabrous apart from the pedicels; scarious leaf bases dilated to form a bulb-like rootstock. Leaves in a basal rosette, linear to ovate, 5-17 x 1-3 mm. Inflorescence a few-flowered corymb or flowers solitary; peduncle 25-55 mm long; floral axis, when present, 15-30 mm long; pedicels glandular-hairy; bracts 1-3, either in the middle or at the base of the pedicel, oblong to ovate, 2-4 mm long. Calyx tube cylindrical to obovoid, 2.5-4 mm long, sometimes slightly twisted; lobes free, oblong to elliptic, 1-2.5 mm long, obtuse. Corolla white or yellow with reddish streaks and spots, 7-10 mm long; tube as long as or longer than calyx lobes; lobes paired vertically, almost equal, emarginate and boot shaped, paired vertically, the upright pair often narrower with a rounded lobe and a narrow point at the apex, the extended pair terminating in 2 rounded lobes; labellum subulate; throat appendages 6, triangular, glandular-hairy. Capsule cylindrical to obovoid, 5-7 mm long, sometimes slightly twisted.

Recorded from Serpentine and from Boulder and Sullivan Rocks in the Darling Scarp and Range. Also recorded for south of Williams, just east of the Perth Region and north of Geraldton.

Flowers August-September.

Subsp. *decipiens* Carlq. which is recorded for the Stirling Range has corolla lobes very similar to those of *S. petiolare*.

S. guttatum R. Br.

Dotted Triggerplant

Small, erect, perennial herb 30-110 mm high with a woody, sometimes branched rootstock, covered with the remnants of old leaf bases, sometimes producing aerial roots from swollen nodes. Leaves all in a basal tuft, linear, 6-32 x ca 1 mm, thick, glabrous, acute. Inflorescence a dense head of sessile flowers surrounded by floral bracts; floral bracts linear to spatulate, thick and fleshy; peduncle 15-80 mm long, glabrous, rather fleshy with a few linear bracts; bracts 4-6 mm long, acute, spurred at the base. Calyx tube cylindrical, 5-8 mm long, sparsely glandular-hairy in the upper half; lobes free, narrowly oblong, 3-4 mm long, glabrous, obtuse, margins white and scarious. Corolla white with red markings, 5-9 mm long, glabrous; tube shorter than or equal to calyx lobes; lobes almost equal, rounded-oblong, paired vertically, the upright pair slightly larger; labellum triangular with 2 subulate appendages; throat appendages 5, 2 of them prominent and linear, 3 of them reduced to inconspicuous, raised, red protuberances. Capsule cylindrical.

Occurs in winter-wet depressions of the Coastal Plain and Darling Scarp and Range from a little south of Perth north to Muchea. Also occurs in the Stirling and Porongurup Ranges and along the south coast between Augusta and Albany.

Flowers November-December.

S. hispidum Lindley

White Butterfly Triggerplant

Erect perennial herb 0.1-0.4 m high with all leaves in a compact, basal rosette. Leaves linear, 12-37 x ca 0.5 mm, glabrous above, scabrous below, keeled, piliferous the apex ending in a long hair, margins long and densely ciliate with cilia ca 0.5 mm long. Inflorescence a loose, branched panicle or raceme; peduncle 40-300 mm long, glabrous at the base but densely covered with yellow glandular hairs in the upper half; floral axis 20-130 mm long, densely hairy with yellow glandular hairs; flowers shortly pedicellate; bracts ovate, 2-4 mm long, piliferous. Calyx glandular-hairy; tube obconic, 3-5 mm long; lobes oblong, 2-3 mm long, 2 lobes connate and the other 3 partly connate, obtuse, margins scarious and transparent. Corolla white, cream or yellow, often with red markings, 6-10 mm long; tube longer than the calyx lobes; lobes oblong, unequal, paired vertically, the extended pair smaller; labellum with small winged appendages; throat bare. Anthers red, distinctly fringed with red glands. Capsule narrowly ovoid, 5-6 mm long.

Occurs usually on the lateritic soils of the Darling Scarp and Range from the north eastern corner of the Perth Region south to Yarloop. Also extends north to New Norcia and east to near Northam.

Flowers August-October.

S. inundatum R. Br.

Hundreds and Thousands

Small, erect, glabrous or glandular-hairy ephemeral herb 15-80 mm high with white, fibrous, tufted roots. Basal rosette present or absent, the leaves when present, linear to narrowly ovate, 3-6 x 0.5-1.5 mm; cauline leaves alternate, narrowly ovate to ovate, 1-4 mm long. Inflorescence an irregular corymb or a raceme, or flowers solitary; peduncle 10-30 mm long, glabrous; floral axis, when present, 10-35 mm long; flowers shortly pedicellate. Calyx tube narrowly cylindrical, 3-5 mm long; lobes narrowly oblong, 1-1.5 mm long, the 2 anterior ones connate for most of their length. Corolla inconspicuous, white, pink or violet, usually 1.5-2 mm long, little longer than the calyx lobes; lobes narrowly obovate, almost equal, paired laterally, the 2 posterior petals slightly smaller than the 2 anterior; labellum small, ovate, deflexed; throat bare. Capsule cylindrical, 5-8 mm long. *S. brachyphyllum* Sonder

Occurs in seasonal wetlands on the Coastal Plain and Darling Scarp near Perth. Also occurs south of the region, along the south coast from Pemberton to Cape Arid. Occurs in S.A., Vic. and Tas.

Flowers September-November.

This species is extremely similar to *S. despectum*, differing only in the presence of a basal rosette and in the corolla lobe orientation and size. The two have at various times been treated as conspecific.

S. junceum R. Br.

Reed Triggerplant

An erect, reed-like, perennial herb 0.2-0.7 m high, with a short, woody rootstock and all leaves in a basal tuft. Leaves linear, 15-40 x 1-1.5 mm, thick, minutely scabrous, 2-grooved below, acute, entire or with minutely serrulate margins. Inflorescence a dense spike-like or head-like raceme; peduncle 0.15-0.65 m long, glabrous with a few appressed, scattered bracts along the peduncle; floral axis 10-45 mm long, glandular-hairy; flowers shortly pedicellate; floral bracts narrowly ovate, 4-8 mm long, acute, spurred at the base, margins scarious. Calyx tube narrowly ovoid, 2.5-5 mm long, sparsely glandular-hairy; lobes free, narrowly triangular, unequal, with 2 of them 4-7 mm long and 3 of them 2-3 mm long, acute to mucronate, margins scarious. Corolla pink with red spots in the yellow throat, 5-7 mm long; tube much shorter than calyx lobes; lobes almost equal, oblong, obtuse, paired laterally; labellum small, broadly elliptic and glandular-ciliate; throat appendages small, covered with black glandular hairs. Capsule broadly ovoid, ca 5 mm long.

Widespread on both the sands of the Coastal Plain and the heavier soils of the Darling Scarp and Range throughout the Perth Region. Extends north to near Eneabba and south to the extreme south west and Albany.

Flowers August-December.

A smaller variant, subsp. *brevius* (E. Pritzel) Carlq., occurs in and near the Stirling Range and Cape Riche. It is characterised by its shorter, broader, more or less spatulate leaves and longer capsule.

S. leptophyllum DC.

Needle-leaved Triggerplant

Erect, perennial herb, 60-220 mm high, with a short, woody rootstock below the basal tuft of leaves. Leaves linear, usually 45-125 mm x up to 1 mm, glabrous, thick, margins transparent or minutely serrate. Inflorescence a loose panicle; peduncle 40-150 mm long, densely glandular-hairy; floral axis 15-90 mm long; flowers shortly pedicellate; bracts linear, glandular-hairy, acute. Calyx densely glandular-hairy; tube narrowly cylindrical, 3-8 mm long; lobes free, narrowly oblong to narrowly ovate, 1.5-4 mm long, obtuse. Corolla pink with dark red spots at the white throat, 4-6 mm long, sparsely glandular-hairy; tube shorter than calyx lobes; lobes oblong, almost equal, obtuse, paired laterally; labellum small, broadly elliptic with small appendages; throat bare. Capsule narrowly ellipsoid to cylindrical, 10-12 mm long.

Recorded for Armadale and Woorloo, near Perth and northwards. Extends north to Geraldton and south east to Wagin and the Stirling Range.

Flowers September-November.

This is similar to and easily confused with *S. dichotomum*, the two differing mainly in habit. Further studies are needed to examine the status of these taxa.

S. lineatum Sonder

Sunny Triggerplant

Erect perennial herb to 0.4 m high with leaves in a basal rosette. Leaves greyish green, spatulate, 10-30 x 3-8 mm, densely hairy with long white, glandular hairs below, sparsely hairy and striately veined above. Inflorescence a loose raceme; peduncle 0.2-0.3 m long, glandular-hairy at the base, glabrous in the upper half, with a few scattered bracts 2-5 mm long; floral axis 35-185 mm long, glandular-hairy; pedicels glandular-hairy; bracts linear. Calyx glabrous, slightly glaucous; tube cylindrical to ellipsoid, 2-3 mm long; lobes free, oblong to narrowly obovate, ca 3 mm long, obtuse. Corolla yellow, 6-7 mm long; tube a little shorter than the calyx lobes; lobes slightly unequal, oblong, obtuse, paired laterally; labellum triangular; throat appendages 8, conspicuous. Capsule ovoid.

Occurs on the Darling Scarp and Range near Perth. Also recorded for Manjimup.

Flowers recorded for November.

S. longitubum Benth.

Jumping Jacks

Small, rather fleshy-stemmed, minutely glandular-hairy ephemeral herb 50-120 mm high, with white fibrous roots. Leaves few, alternate, not in a well-defined rosette or tuft, the lowermost ovate but becoming linear higher up the stem, 2-6 x ca 1 mm. Inflorescence an irregular corymb; peduncle 40-65 mm long, leafy; floral axis 10-60 mm long; flowers pedicellate. Calyx tube narrowly cylindrical, 5-7 mm long, glandular-hairy; lobes narrowly oblong, 2-3 mm long, the 2 anterior ones connate for most of their length. Corolla pink with dark red or purple markings and a white centre, 3-5 mm long; lobes unequal, paired laterally, the larger posterior ones elliptic to obovate, the smaller anterior ones oblong to narrowly obovate; labellum small, triangular, deflexed; the throat with 4 linear, toothed appendages. Capsule cylindrical, 10-15 mm long.

Occurs in seasonal wetlands in a few localities on the Coastal Plain from Bullsbrook to Bunbury. Also recorded for near Busselton.

Flowers October-December.

This species is very similar to *S. utricularioides* but differs in colour, orientation of corolla lobes and in length of the capsules. It is also similar to the *S. inundatum* complex but has larger flowers and longer capsules.

S. macrocarpum (Benth.) R. Erickson & J.H. Willis

Flagon Triggerplant

An erect perennial herb 60-200 mm high with a short woody rootstock. All leaves in a basal tuft, linear to terete, 15-50 x 0.5-1.5 mm, thick, glabrous, mucronate. Inflorescence a broad panicle or thyrs; peduncle 30-150 mm long, glabrous; floral axis 20-130 mm long, glabrous; flowers almost sessile; bracts linear, 2-3 mm long. Calyx tube narrowly cylindrical, (6)10-15(20) mm long, sparsely glandular-hairy in upper half; lobes free, oblong, ca 2 mm long, obtuse. Corolla white or pink often with dark red markings near the yellow throat, sparsely glandular-hairy, ca 6 mm long; tube about equal to calyx lobes; lobes almost equal, rounded-oblong, paired laterally; labellum minute, broadly elliptic, with broad appendages; throat bare. Anthers dark, often distinctly fringed. Capsule narrowly obovoid, 17-20 mm long, glabrous, twisted.

Occurs usually on near-coastal sands and limestones of the Coastal Plain near Perth. Extends northwards to north of Kalbarri. Also recorded for Collie and Albany.

Flowers September-October.

S. miniatum Mildbr.

Pink Butterfly Triggerplant

Erect perennial herb 0.15-0.4 m high with the older nodes sometimes swollen. All leaves in a basal rosette, greyish, linear, 18-37 x 0.5-1 mm, glabrous above, usually minutely scabrous below, piliferous, the apex terminating in a long hair, margins entire or minutely serrulate. Inflorescence a raceme or narrow panicle; peduncle 60-300 mm long, glabrous; floral axis 5-80 mm long, glandular-hairy; flowers pedicellate; bracts narrowly ovate, ca 5 mm long, piliferous. Calyx tube obconic, 3-5 mm long, hairy with yellow, scabrous, curved hairs which usually are minutely glandular-hairy; lobes oblong, 2-3 mm long, 2 connate almost to apex and 3 free, usually glabrous but sometimes ciliolate with glandular hairs along the scarious margins. Corolla white to pink, often with red spots in the yellow throat, 5-6 mm long; tube almost as long as calyx lobes; lobes obovate or oblong, unequal, paired vertically, the upright pair larger; labellum broadly elliptic to almost circular; throat bare. Anthers distinctly fringed with reddish glands. Capsule narrowly obovoid, 5-6 mm long, scabrous.

A single collection in the region, from Guildford. Occurs north of the region near Bolgart and New Norcia.

Flowers August-October.

S. obtusatum Sonder

Pinafore Triggerplant

Small, slender, erect ephemeral herb 30-100 mm high, glabrous apart from the pedicels; scarious bases of the petioles dilated to form a bulb-like rootstock. Leaves in a basal rosette, oblong, obovate or broadly obovate, 7-15 x 1-2 mm. Inflorescence an irregular corymb, rarely flowers solitary; peduncle 20-70 mm long; floral axis when present 7-35 mm long; pedicels glandular-hairy; bracts alternate on the pedicels

or in a whorl at the base of the pedicels, narrowly elliptic to ovate, 1-3 mm long. Calyx tube sometimes reddish in colour, obconic to cylindrical, 2-7 mm long, twisted; lobes elliptic, 1.5-3 mm long, obtuse, sometimes connate for about half of their length. Corolla white, yellow, pink or red, 4-10 mm long; tube longer than the calyx lobes; lobes unequal, vertically paired, the upright pair smaller, narrowly oblong to linear, usually acute, the extended pair broadly obovate, narrowed at the base; labellum subulate; throat appendages 2. *S. boltgartense* R. Erickson & J.H. Willis; *S. asteroideum* R. Erickson & J.H. Willis

Occurs mainly in winter-wet depressions of the Coastal Plain near Perth. Also extends north to Eneabba, east to near Northam and south to Williams and near Busselton.

Flowers September-November.

Several of the specimens from the Perth Region belong to *S. obtusatum* Sonder var. *rubricalyx* (R. Erickson & J.H. Willis) Carlq., which differs from the typical variety in its elliptic leaves and in the calyx lobes being connate for about half of their length.

***S. perpusillum* J.D. Hook.**

Tiny Triggerplant

Minute, slender, sparsely glandular-hairy annual herb 15-40 mm high. Leaves linear to ovate, 1-3 x 0.5-1 mm, few, in a basal rosette. Inflorescence of solitary flowers, or 2 or 3 together in a cluster; peduncle 10-30 mm long, glabrous; flowers 0.5 mm across, on glabrous to sparsely glandular-hairy pedicels. Calyx tube globular, ca 1 mm across, sparsely glandular-hairy; lobes free, oblong to elliptic, 1-1.5 mm long, a little longer than the tube. Corolla white, minute, ca 2 mm long; the lobes unequal, paired vertically, blunt, broadest at the apex, upright lobes smaller than the extended lobes and often hooded forward; labellum petal-like, pointed. Column short, bent in the middle but spurless; stigma fan-like and brush-tipped. Capsule globular, ca 1.5 mm across.

Occurs in winter-wet depressions, often on damp moss of granitic rocks on the Coastal Plain and Darling Range from Bullsbrook to Jarrahdale. Occurs south of the region, from Busselton to near Esperance and is also recorded for Eneabba. Occurs in S.A., Vic. and Tas.

Flowers October-November.

***S. petiolare* Sonder**

Horn Triggerplant

A slender, erect, ephemeral herb 55-130 mm high, glabrous apart from the pedicels, with scarious leaf bases dilated to form a bulb-like rootstock. Leaves in a basal rosette, oblong to narrowly ovate to obovate, 10-25 x 1-3 mm including petiole. Inflorescence an irregular corymb or flowers solitary; peduncle 30-100 mm long; floral axis 20-35 mm long; pedicels glandular-hairy; bracts elliptic to ovate, 2-4 mm long, scattered alternately along the pedicels and 1 at the base, or sometimes 2 or 3 at the base of the pedicel only. Calyx tube obconic, 3-4 mm long, twisted; lobes free, elliptic, 2-3 mm long, acute or almost so. Corolla white or pink, 6-8 mm long; tube nearly as long as calyx lobes; lobes slightly unequal, paired vertically, the upright pair narrow, curved, acute, the extended pair broader, oblong to obovate; throat appendages 6; labellum subulate. Capsule obovoid, 5-6 mm long, twisted.

Widespread on the Coastal Plain and Darling Scarp throughout the Perth Region. Also extends northwards to Geraldton and south to the extreme southwest and Stirling Range.

Flowers September-October.

Reported as hybridizing with *S. pulchellum* by Carlquist (1969).

***S. piliferum* R. Br.**

Common Butterfly Triggerplant

Erect perennial herb 0.15-0.5 m high with all leaves in a compact basal rosette. Leaves linear to narrowly spatulate and curved towards the apex, 11-35 x 1.5-2.5 mm, usually glabrous, keeled, piliferous, the apex terminating in a long hair, margins entire to minutely serrulate. Inflorescence a loose raceme or panicle; peduncle 0.1-0.35 m long, glabrous; floral axis 10-200 mm long, densely covered with yellow glandular hairs; flowers pedicellate; bracts ovate, 3-5 mm long, piliferous. Calyx densely glandular-hairy; tube narrowly ellipsoid to narrowly obconic, 2.5-3.5 mm long; lobes narrowly oblong to narrowly ovate, 2-2.5 mm long, 3 free and 2 connate almost to the apex, obtuse, margins scarious. Corolla white or pink, 4-6 mm long; tube as long or longer than the calyx lobes; lobes oblong to obovate,

unequal, paired vertically, the upright pair larger; labellum broadly elliptic with short, winged appendages; throat bare. Anthers dark, distinctly fringed with red glands. Capsule narrowly obovoid to ellipsoid, 4-5 mm long, glandular-hairy.

Occurs on sandy soils of the Coastal Plain from Pinjarra northwards. Widespread from Northampton to near Esperance.

Flowers September-October.

A dwarf subspecies, subsp. *minor* (Mildbr.) Carlg., occurs south of the Perth Region and is recorded between the Stirling Range and near Hopetoun.

S. preissii (Sonder) F. Muell.

Lizard Triggerplant

Small, erect, branched perennial herb to 100 mm high with purplish aerial roots. Stems filiform, covered with closely appressed, overlapping, scale-like leaves. Leaves triangular, ca 2 x 0.5 mm, keeled, apex acute to subulate and scarious, margins scarious and ciliate at the base. Flowers sessile, 2-4 among the upper leaves; peduncle absent. Calyx tube more or less globular, ca 1 mm across; lobes scarious, streaked with red, ovate, 2-3.5 mm long, the anterior 2 connate to about the middle. Corolla pink or white, ca 7 mm long; the tube shorter than the calyx lobes; lobes oblong to obovate, almost equal; labellum large, ovate with a glandular-ciliate margin; throat bare. Capsule not seen.

This species has a disjunct distribution, occurring on the Coastal Plain at Jandakot near Perth and also on the south coast between Albany and Cape Arid National Park.

Flowers recorded for October in the Perth Region.

S. pubigerum Sonder

Yellow Butterfly Triggerplant

An erect perennial herb 80-250 mm high with all leaves in a compact basal rosette. Leaves linear, 10-30 x 1-1.5 mm, usually glabrous, keeled, piliferous, the apex terminating in a long hair, margins minutely ciliate. Inflorescence a loose raceme or panicle; peduncle 65-160 mm long, glabrous; floral axis 20-70 mm long, hispid with yellow, nonglandular and sometimes also glandular hairs; flowers pedicellate; bracts ovate, 3-4 mm long, piliferous. Calyx hairy with yellow hispid hairs; tube narrowly cylindrical, 5-9 mm long; lobes narrowly oblong, 2-3 mm long, connate almost to the apex and forming 2 lips, margins not scarious. Corolla cream to yellow with red spots near the throat, 5-9 mm long, glandular-hairy; tube nearly as long as calyx lobes; lobes unequal, paired vertically, the upright pair larger and oblong, the extended pair smaller and elliptic; labellum broadly elliptic, ciliate with glandular hairs; throat bare. Anthers not fringed with glands. Capsule cylindrical, 10-13 mm long, shortly hispid.

Occurs on the Darling Scarp and Range near Perth. Also occurs northwards to Bolgart.

Flowers September-October.

A variant occurs at Forrestfield and from between Bindoon and Toodyay north to Wongan Hills and New Norcia. This has glandular hairs as well as nonglandular hairs and only 2 of the calyx lobes are connate, the other 3 being free. *S. pubigerum* is also similar to *S. miniatum*, differing in its indumentum, its narrowly cylindrical rather than obconic calyx tube and the anthers without fringed glands. Further research is necessary to determine the status of this variant.

S. pulchellum Sonder

Thumbelina Triggerplant

Small, slender, erect ephemeral herb 50-110 mm high, glabrous apart from the pedicels; scarious bases of the petioles dilated to form a bulb-like rootstock. Leaves in a basal rosette, oblong to obovate, 8-25 x 1-2 mm. Inflorescence a loose, irregular corymb or small panicle; peduncle 30-80 mm long; floral axis 10-30 mm long; pedicels glandular-hairy; bracts elliptic or oblong, 1-2 mm long, obtuse. Calyx tube cylindrical, 3-3.5 mm long, twisted; lobes free, elliptic, 1.5-2 mm long, thick, obtuse. Corolla pink or white, often with red markings, rarely red, ca 3 mm long; the tube nearly as long as the calyx lobes; lobes oblong, almost equal, obtuse, paired laterally; throat appendages 2-4; labellum subulate. Capsule cylindrical, 4-7 mm long.

Occurs on the Coastal Plain between Perth and Boyanup and in the Darling Range near Sullivan Rock. Also south of the region to Manjimup and Mt. Barker.

Flowers September-December.

S. pycnostachyum Lindley

Downy Triggerplant

Stout, woolly, erect perennial herb 0.15-0.25 m high with a bulbous rootstock, covered with old leaf bases and long, white, woolly hairs. All leaves in a basal tuft, narrowly obovate to narrowly spatulate, 55-150 x 10-14 mm including the petiole, veins and margins densely hirsute with white nonglandular hairs. Inflorescence a dense narrow panicle; peduncle 90-150 mm long, stout, densely hirsute with white nonglandular hairs, with a few scattered bracts; floral axis 55-140 mm long, glandular-hairy; pedicels glandular-hairy; bracts narrowly ovate to narrowly oblong, 10-17 mm long but becoming smaller upwards. Calyx densely glandular-hairy; tube narrowly cylindrical, 9-14 mm long; lobes free, elliptic, 3-4 mm long, obtuse. Corolla white or yellow often with pink or purple markings, 8-9 mm long, glandular-hairy; tube about as long as calyx lobes; lobes obovate, almost equal; labellum small, broadly elliptic; throat bare. Anthers dark with pale fringed glands. Capsule narrowly cylindrical, 15-20 mm long. **Fig. 229**

Occurs on the lateritic soils of the Darling Scarp and Range near Perth. Also occurs north of the region near Jurien Bay.

Flowers October-December.

S. repens R. Br.

Matted Triggerplant

Small, creeping, stoloniferous perennial herb with long, aerial roots and with several ascending, filiform, spreading branchlets arising from apical rosettes, usually bare but sometimes with appressed leaves. Apical leaves in terminal rosettes, but sometimes appearing basal on older growth, narrowly triangular, 3-7(11) x 0.5 mm, fleshy, acute to mucronate, peltately attached with a white basal spur, margins sometimes scarious. Flowers solitary among the apical leaves on red, glandular-hairy pedicels, usually 10-20 mm long; peduncle absent. Calyx tube obconic, ca 2 mm long, glandular-hairy; lobes free or connate almost to apex into 2 lips 1-2 mm long, acute, margins scarious and ciliate. Corolla white to pink with red spots at the base of the lobes, 4-5 mm long; tube a little shorter than calyx lobes; lobes oblong to obovate, almost equal, paired laterally; throat appendages 4; labellum narrowly triangular, with or without minute linear appendages. Capsule ellipsoid, ca 4 mm long, glandular-hairy. **Fig. 230**

Widespread on the Coastal Plain and Darling Scarp throughout the Perth Region. Also extends north to Kalbarri and south to the extreme south west and along the south coast to Israelite Bay.

Flowers much of the year.

A variant, var. *sacculatum* (R. Erickson & J.H. Willis) Carlq. occurs north of the Perth Region with almost sessile flowers and a column which is dilated into a pouch. Var. *diplectroglossum* R. Erickson & J.H. Willis occurs in the Stirling Range and has narrower leaves, free calyx lobes and 2 fine, long labellum appendages. Two chromosome number variants have been recorded by James (1979).

S. rhynchocarpum Sonder

Black-beaked Triggerplant

Erect or spreading, much-branched perennial herb to 0.5 m high, rooting at the nodes, with leafy stems arising from apical rosettes, which may sometimes appear basal on old growth. Leaves linear or narrowly obovate to spatulate, 9-24 x 1-3 mm, glabrous, usually with recurved margins; cauline leaves spreading to recurved. Flowers sessile, in a head-like cluster amongst the leaves of the apical rosette; peduncle absent; bracts at base of calyx, linear. Calyx tube curved and dilated in the lower half, narrowly cylindrical in upper half, 15-18 mm long, glandular-hairy; lobes free, linear, 1.5-3 mm long, acute. Corolla pink or yellow with red markings, 5-7 mm long; tube as long as or longer than calyx lobes; lobes oblong, almost equal, paired laterally; labellum elliptic with small appendages or ciliate with glandular hairs; throat bare. Capsule beaked, 18-20 mm long, the lower half curved, obliquely narrowly ovoid and the upper half narrowly cylindrical, the upper cell narrow and sterile.

Occurs in the Jarrah forest of the Darling Scarp and Range near Perth. Also occurs south of the Perth Region from Wellington Dam to the extreme south west and the south coast as far east as the Recherche Archipelago.

Flowers mostly October-December.

Specimens from Kalamunda have flat leaves, with several, prominent, longitudinal veins whereas in other specimens only the midrib is prominent.

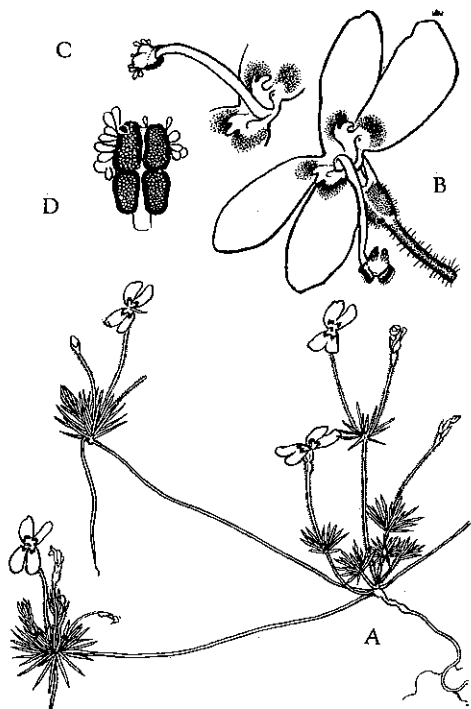


Fig. 230. *Styloidium repens*. A, Habit. B, Flower. C, Column. D, Anthers.

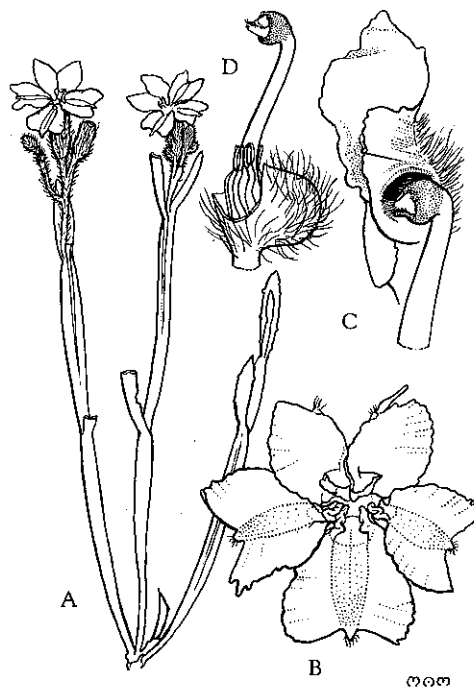


Fig. 231. *Dampiera alata*. A, Flowering branch. B, Flower. C, Upper corolla lobe with auricle enclosing indusium. D, Flower with corolla and part of calyx removed to show stamens and style.

***S. rigidifolium* Mildbr.**

Stiff-leaved Triggerplant

An erect, almost glabrous perennial herb to 0.4 m high with a basal rosette of leaves. Leaves narrowly obovate to spatulate, 18-33 x 4-6 mm, coriaceous, glaucous, glabrous, fan-like veins prominent on both surfaces, acuminate, gradually tapered at the base. Inflorescence a large narrow raceme; peduncle 0.14-0.2 m long, glabrous, with a single whorl of narrowly ovate to linear, acute, leaf-like bracts 5-8 mm long; floral axis 70-120 mm long, glabrous to sparsely glandular-hairy; flowers pedicellate; floral bracts linear, 4-5 mm long. Calyx glabrous; tube cylindric, 3-4 mm long and narrowed at the base, glaucous, ridged; lobes free, narrowly ovate or narrowly elliptic, 3-5 mm long, obtuse. Corolla pale yellow with violet spots at the base of the lobes, ca 6 mm long; tube shorter than calyx lobes; lobes oblong to elliptic, almost equal; labellum triangular; throat with 6 small appendages. Capsule not seen.

Apparently endemic to the Darling Scarp and Range near Perth.

Flowers October.

Further studies are needed on this species to determine whether it is conspecific with *S. striatum* Lindley. If it proves to be so, then *S. striatum* is the correct name for this species.

***S. roseo-alatum* R. Erickson & J.H. Willis**

Pink-winged Triggerplant

Small, slender, ephemeral herb 40-60 mm high, minutely and sparsely glandular-hairy. Leaves linear, 2-8 x 0.5-1 mm, all in a basal rosette. Inflorescence a 1-5-flowered irregular corymb; peduncle 15-80 mm long; floral axis, when present, 10-50 mm long, with minute scattered bracts. Calyx tube narrowly cylindric, 3-5 mm long; lobes oblong, 1-2 mm long, the 2 anterior ones connate for most of their length. Corolla conspicuous, bright pink, often red towards the white throat, 2-4 mm long; lobes oblong, almost equal, rounded or blunt at the apex, paired laterally; labellum minute, triangular, rather fleshy, recurved; throat appendages 4, linear or tooth-like. Capsule cylindric, 5-10 mm long.

Occurs in winter-wet depressions of the Darling Scarp from Perth northwards to near Badgingarra. Also recorded from near Manjimup.

Flowers October-November.

This species is similar to and may be confused with *S. utricularioides* and *S. longitubum*, but these latter species have longer calyx tubes, lobes and capsules.

S. schoenoides DC.

Cow Kicks

Erect perennial herb to 0.4 m high with leaves in a basal tuft. Leaves linear, 100-270 x 1.5-2.5 mm, thin, flaccid, grass-like, glabrous, acute, flat or with margins recurved and 2-grooved below. Scale leaves intermingled with the bases of the leaves, pink, 15-60 x 3-4 mm, scarious, acute. Inflorescence a loose, 2-6-flowered corymb; peduncle 0.1-0.35 m long, hairy with short glandular and long nonglandular hairs, a few bracts present; floral axis 15-110 mm long, glandular-hairy; flowers pedicellate; bracts narrowly triangular, 6-10 mm long, glandular-hairy, dilated at the base. Calyx densely glandular-hairy; tube ovoid to ellipsoid, 3-8 mm long; lobes free, oblong, 3-8 mm long, obtuse. Corolla white to cream, 14-22 mm long, sparsely glandular-hairy; tube shorter than calyx lobes; lobes rounded-oblong, unequal, paired vertically, the upright pair curved and larger, the extended pair occasionally connate to the middle; labellum triangular, ciliate, with 2 long, narrow appendages; throat appendages 4, small. Column broad; anthers pale and fringed with greenish glands; stigma tongue shaped. Capsule ellipsoid to almost globular, 6-10 mm long, glandular-hairy.

Widespread throughout the Perth Region on the sandy soils of the Coastal Plain and the heavier soils of the Darling Scarp and Range. Extends north to Mt. Lesueur and south to Albany and Hopetoun.

Flowers August-October.

S. squamellosum DC.

Erect perennial herb 0.15-0.35 m high, with a short woody rootstock covered with short scale leaves below a basal tuft of leaves. Leaves linear, 30-55 x 1.5-2.5 mm, thin or slightly fleshy, flaccid, grass-like, with glandular hairs on the margins. Inflorescence a narrow raceme; peduncle 90-240 mm long, glabrous or sparsely glandular-hairy, with a few scattered bracts; bracts erect, linear, 3-5 mm long; floral axis 35-170 mm long, glandular-hairy; flowers pedicellate. Calyx sparsely glandular-hairy or glabrous, sometimes rather glaucous; tube narrowly ellipsoid or narrowly cylindric, 4-5 mm long; lobes free, narrowly obovate, 3-5 mm long, obtuse. Corolla cream or yellow, sometimes with purplish markings, 5-9 mm long; tube shorter than calyx lobes; lobes rounded-oblong, almost equal, paired laterally; labellum elliptic, with a long point and basal appendages; throat with 6 appendages. Capsule narrowly obovoid, 6-7 mm long. *S. zeicolor* R. Erickson & J.H. Willis

Recorded in winter-wet depressions near the eastern border of the northern Perth Region, near Bullsbrook. Occurs through the wheatbelt from Geraldton, south east to Ravensthorpe.

Flowers August-November.

S. utricularioides Benth.

Pink Fan Triggerplant

Small, slender, minutely glandular-hairy, ephemeral herb 60-120 mm high. Leaves few, alternate or rarely clustered in a basal rosette, lowermost leaves ovate but becoming linear higher up the stem, 2-5 x 0.5-1.5 mm. Inflorescence an irregular corymb; peduncle 15-85 mm long, leafy; floral axis 10-75 mm long; flowers pedicellate. Calyx narrowly cylindric, ca 5 mm long, glandular-hairy; lobes narrowly oblong, 2-3 mm long, the anterior 2 lobes connate for most of their length. Corolla pink and white with a yellow throat, 4-6 mm long; the lobes unequal, spreading or paired vertically; the upright lobes smaller, curved, sometimes with an enlarged apex; the extended lobes larger, spatulate; labellum triangular, deflexed; throat appendages 4-6, linear. Capsule narrowly cylindric, 8-10 mm long.

Apparently endemic to the Perth Region, where it occurs in seasonal wetlands of the Coastal Plain and Darling Scarp and Range near Perth and Bunbury.

Flowers October-November.

This species is very similar to *S. longitubum*, differing mainly in corolla colour and capsule size. A variant, *S. utricularioides* var. *rosulatum* Mildbr., recorded from near Midland Junction, has a basal rosette of leaves.

S. sp. A

Stoloniferous, erect, bushy perennial herb to 0.4 m high with 2 or 3 ascending branches arising from apical rosettes. Leaves scattered and clustered into apical rosettes, linear to plano-convex, 5-15 x 0.5-1 mm, spreading, usually obtuse. Inflorescence a narrow panicle; peduncle 10-40 mm long, pilose with white, simple or glandular hairs; floral axis 15-30 mm long, glandular-pilose; pedicels slender, ca 1 mm long. Calyx tube narrowly ellipsoid to narrowly cylindrical, 2.5-4 mm long, densely glandular-hairy; lobes free, narrowly triangular, ca 1 mm long, acute. Corolla pink, with 2 deep pink bands in the throat, occasionally all white, 5-7 mm long; lobes almost equal, paired laterally, sparsely glandular-pilose outside and minutely papillose inside; labellum with small lateral appendages; throat usually bare. Capsule narrowly ellipsoid, ca 5 mm long.

Occurs in the Darling Range between the Helena Valley and Mt. Cooke, just outside the region. Extends south to Boddington and east to Brookton.

Flowers mainly December-February.

FAMILY 108 GOODENIACEAE**J. R. Wheeler**

Annual or perennial herbs or shrubs. Leaves exstipulate, alternate or spirally arranged, rarely opposite or whorled, simple. Inflorescence of cymes, racemes, heads, spikes or flowers solitary in the axils; flowers bisexual, zygomorphic, usually 5-merous, sometimes bracteate and bracteolate. Calyx tube more or less adnate to the ovary or free; limb divided into persistent lobes or reduced to a ring, rarely absent. Corolla tube slit to the base or nearly to the base on the upper side; lobes winged, either digitately arranged or 2-lipped, sometimes with dark coloured elliptic depressions called "auricles"; the lower lip 3-lobed; the upper lip 2-lobed and often separated lower down. Stamens alternate with the corolla lobes, free or attached to the base of the corolla tube; anthers free or connate around the style, 2-celled, opening by longitudinal slits; nectary glands sometimes present. Ovary of 2 connate carpels forming an inferior, half-inferior or rarely superior 1 or 2(4)-celled ovary; ovules 1-many per cell, placentation axile or basal-axile. Style usually terminating in an indusium, which is often cup shaped and usually ciliate around the orifice; stigma entire or 2-lobed, enclosed in the indusium. Fruit a dehiscent capsule, opening by 2 or 4 valves, or an indehiscent nut or drupe. 14 genera and ca 300 species, mostly in Australia but also in New Zealand, Japan, New Guinea, Indonesia and the Indo-Pacific area. Currently being revised by Dr. R.C. Carolin.

All leaf measurements include petiole except where otherwise stated.

1. Ovary inferior or half-inferior.
 2. Anthers connate around the style.
 3. Corolla glabrous outside. Calyx 6-28 mm long, glabrous, lobes conspicuous, linear or subulate.
 4. Flowers in clusters terminating long, branched, leafless peduncles.
 - Upper corolla lobes with concave auricles **ANTHOTIUM**
 4. Flowers in leafy corymbs. Upper corolla lobes without auricles. **LECHENAULTIA**
 3. Corolla hairy outside with stellate, dendritic or centrifixed hairs. Calyx 2-3 mm long, densely hairy with hairs similar to those of the corolla, lobes minute or absent..... **DAMPIERA**
 2. Anthers free.
 5. Ovary with 1 or 2 ovules. Fruit an indehiscent drupe or nut, with 1 or 2 cylindrical seeds.
 6. Corolla blue, white or pink, lobes usually digitately arranged. Calyx glabrous or hairy with simple or glandular hairs **SCAEVOLA**
 6. Corolla yellow, 2-lipped with upper lobes separated at a lower level. Calyx stellate-hairy **VERREAUXIA**
 5. Ovary with 4 or more ovules. Fruit a dehiscent capsule with several flat, circular seeds.
 7. Indusium cup shaped. Calyx tube 0.5-4 mm long..... **GOODENIA**
 7. Indusium 2-lipped. Calyx tube 10-20 mm long..... **LECHENAULTIA**
 1. Ovary superior..... **VELLEIA**

ANTHOTIUM R. Br.

Tufted perennial herbs with a basal rosette of leaves. Inflorescence a pedunculate dense corymb of terminal clusters or of solitary flowers arranged in a pedunculate panicle. Calyx tube adnate to the ovary; lobes 5. Corolla 5-lobed; the 2 upper lobes free almost to the base, erect, winged on one side only and with broad, concave auricles surrounding the indusium; the 3 lower lobes connate to the middle with narrow wings, longer than the 2 upper lobes. Anthers connate around the style. Ovary inferior, 2-celled; ovules numerous, in 2 rows per cell. Indusium cup shaped, the orifice glabrous. Fruit a 4-valved capsule, opening laterally. Seeds small. 2 species, endemic to the south west of W.A.

A. humile R. Br.

Small, glabrous, perennial herb to 0.3 m high. Leaves linear to terete, to 100 x 1-2 mm, thick. Flowers in loose (1)3-10-flowered clusters terminating branches of the panicle; bracts linear, 5-40 mm long; bracteoles narrowly triangular, ca 2 mm long. Calyx 7-14 mm long; tube narrowly cylindrical, 5-10 mm long, ribbed, the ribs continued upwards into persistent lobes; lobes narrowly triangular to subulate, 2-4 mm long, apex acute and often slightly recurved. Corolla usually blue to purple in the region, elsewhere often pink or white, 5-8 mm long, glabrous outside and inside, upper lobes usually exceeding the calyx. Indusium glabrous, slightly longer than wide. Capsule narrowly cylindrical, 5-10 mm long.

Occurs in winter-wet depressions of the Coastal Plain from Perth to Mandurah. Also recorded for Yallingup.

Flowers November-February.

Specimens from the Perth Region belong to var. *junciforme* (Vriese) Pritzel. The typical variety is a dwarf herb to 0.1 m high with smaller flowers in a compact, pedunculate corymb and occurs in the south from Albany and Gnowangerup to Cape Arid National Park. Further research will probably show these 2 varieties to be distinct species.

DAMPIERA R. Br.

Perennial herbs, or shrubs with a usually grey indumentum of stellate, dendritic or centrifixed hairs. Flowers in bracteate and sometimes bracteolate cymes, racemes or spikes. Calyx tube adnate to the ovary; lobes 5, very small or absent. Corolla usually blue to purple with grey hairs, slit on the upper side; the 2 upper lobes unequally winged, erect and enclosing the indusium within 2 concave, red or purple auricles; the 3 lower lobes broadly and equally winged, spreading; the wings usually blue. Anthers connate around the style. Ovary inferior, usually 1-celled with 1 ovule. Style glabrous, terminating in a shortly 2-lipped indusium; indusium orifice glabrous. Fruit a small indehiscent nut or drupe, crowned by the persistent base of the corolla. Endemic to Australia, with 70 species occurring in W.A.

1. Stem winged. Ovary gibbous.
 2. Indumentum of flowers loose, spreading. Stem usually 2-winged..... **D. alata**
 2. Indumentum of flowers appressed. Stem usually 3-winged..... **D. coronata**
1. Stem not winged. Ovary not gibbous.
 3. Stems trigonous or triquetrous. Flowers with closely appressed hairs.
 4. Leaves obtriangular to obtusulate, angularly 3-toothed. Calyx ferruginous-hairy..... **D. triloba**
 4. Leaves linear to narrowly elliptic, usually entire. Calyx more or less glabrous..... **D. trigona**
 3. Stems terete or ribbed. Flowers with loose, spreading stellate to dendritic or short woolly-stellate hairs.
 5. Flowers cymose. Leaves flat or with revolute margins.
 6. Leaves sessile. Erect perennial herb.
 7. Leaves 6-20 mm long, densely woolly-stellate below and with recurved to revolute margins. Stems distinctly ribbed..... **D. lavandulacea**
 7. Leaves 15-40 mm long, glabrous above and below. Stems not distinctly ribbed..... **D. linearis**
 6. Leaves petiolate. Perennial herb with trailing stems..... **D. hederacea**
 5. Flowers spicate or racemose. Leaves linear to terete, fleshy..... **D. teres**

D. alata LindleyWinged-stem *Dampiera*

Erect, multi-stemmed perennial herb to 0.6 m high, glabrous apart from the inflorescence. Stems winged with 2 thick, opposite wings each 1.5-5 mm wide. Lower leaves gradually tapered into a petiole; upper leaves sessile, coriaceous, oblong to obovate, often narrowly so, 20-50 x 5-20 mm, more or less acute, entire or toothed. Inflorescence of small loose cymes; peduncles solitary or several together, each with 1-3 pedicellate flowers, sparsely stellate-hairy; bracts and bracteoles narrowly triangular, 3-6 mm long, sometimes ciliate. Calyx 2-3 mm long, loosely and densely stellate-hairy to dendritic-hairy; tube gibbous; lobes ovate to triangular, to 1 mm long but hidden in the indumentum. Corolla blue, 10-15 mm long, with dark grey, loose, spreading stellate to dendritic hairs. Fruit gibbous, ca 3 mm across, sparsely hairy to glabrous. **Fig. 231**

Occurs on the Coastal Plain and Darling Scarp and Range throughout the Perth Region. Also occurs as far north as Watheroo and in the south west from Augusta to Albany and the Stirling and Porongurup Ranges.

Flowers August-November.

D. coronata Lindley

An erect perennial herb to 0.5 m high, glabrous apart from the inflorescence. Stems winged, with usually 3 wings each 1.5-2.5 mm wide. Lower leaves gradually tapered into a petiole; upper leaves sessile, variable in shape from narrowly oblong or narrowly obovate to obovate, 15-45 x 4-15 mm, usually acute, toothed. Flowers in small cymes; peduncles in the upper axils each with a few shortly pedicellate flowers; bracts narrowly ovate to triangular, 2-3 mm long; bracteoles absent. Calyx 2-3 mm long, hairy with appressed, centrifixed hairs; tube gibbous; lobes ovate to triangular, less than 1 mm long, obtuse. Corolla blue, 10-20 mm long, with dark grey, closely appressed, centrifixed hairs. Fruit gibbous, ca 3 mm across, sparsely hairy to glabrous.

Occurs on the Coastal Plain and Darling Scarp from Gingin to Perth. Also as far north as Jurien Bay and as far south as Cape Naturaliste.

Flowers July-November.

D. hederacea R. Br.Karri *Dampiera*

Procumbent perennial herb with trailing stems, loosely tomentose with stellate or dendritic hairs. Leaves petiolate, more or less ovate, entire or angularly lobed, sometimes with prominent basal lobes, 10-40 x 5-30 mm excluding petiole, hairy with stellate to dendritic hairs above but often becoming glabrous, densely woolly with dendritic hairs below, base rounded to cordate. Inflorescence cymose; peduncles slender, longer than the leaves, each with several pedicellate flowers; bracts leaf-like, narrowly ovate to ovate, 1-3 mm long, dendritic-hairy; bracteoles absent. Calyx ca 2 mm long, densely and loosely hairy with grey dendritic hairs; tube not gibbous; lobes variable in size from minute and concealed in the indumentum, to almost half the length of the tube. Corolla blue, rarely white, 4-10 mm long, with spreading grey dendritic hairs. Fruit ovoid to ellipsoid, ca 2-mm long, sparsely hairy.

Occurs alongside streams near Waroona Dam and in the extreme south west from Yallingup to Albany.

Flowers mainly October-January.

D. lavandulacea Lindley

Usually erect, multi-stemmed perennial herb to 0.5 m high with distinctly ribbed glabrescent stems. Leaves sometimes fasciculate, sessile, deciduous, narrowly obovate to narrowly elliptic, 6-20 x 1-7 mm, coriaceous, glabrescent above, densely woolly below with white stellate hairs, margins recurved to revolute, entire or obscurely toothed. Flowers small, pedicellate, usually in axillary few-flowered cymes, rarely solitary; bracts or bracteoles slightly unevenly placed on the pedicels, narrowly obovate, 3-7 mm long, loosely stellate-hairy. Calyx 2-3 mm long, loosely and densely hairy with grey dendritic hairs; tube not gibbous; lobes minute, concealed in the hairs. Corolla blue, 7-12 mm long, with grey, somewhat woolly, dendritic or stellate hairs. Fruit cylindrical, 2-3 mm long, hairy.

Occurs in the Darling Range near Perth. Widespread from Eneabba and Paynes Find to the south coast, between Albany and Israelite Bay. Also occurs in S.A.

Flowers August-November.

D. linearis R. Br.

Common Dampiera

An erect perennial herb to 0.5 m high, mostly glabrous apart from the inflorescence. Leaves sessile, variable in shape, elliptic, obovate or obtrullate, sometimes narrowly so, 15-40 x 2-15 mm, coriaceous, glabrous, obtuse, tapered at the base, entire or toothed. Inflorescence of pedunculate leafy cymes; flowers pedicellate; bracts and bracteoles narrowly elliptic to narrowly obovate, 6-8 mm long, leaf-like, loosely stellate-hairy or dendritic-hairy, apex often recurved. Calyx ca 2 mm long, grey with dense stellate or dendritic hairs; tube not gibbous; lobes minute or absent. Corolla blue, 10-17 mm long, with loose, grey, stellate or dendritic hairs outside. Fruit cylindrical, 3-5 mm long, hairy.

Widespread on the Coastal Plain and Darling Scarp and Range from Yanchep to Brunswick Junction. Also occurs northwards to Coorow and throughout the extreme south west, wheatbelt and south coast as far as Israelite Bay.

Flowers July-November.

In the Perth Region specimens from the Darling Range usually have obtrullate or obovate, distinctly toothed leaves 8-15 mm wide, whereas specimens from the Coastal Plain usually have narrowly elliptic to narrowly obovate, entire or only very slightly toothed leaves 2-7 mm wide. Diploid plants on laterite and tetraploid plants on coastal sands have been recorded just south of the region by Bousfield, L. and James, S.H. 1979. Chromosoma 55: 309-323.

D. teres Lindley

Erect, much-branched shrub to 0.6 m high. Stems with very short, woolly-stellate hairs, sometimes glabrescent. Leaves often fasciculate, linear to terete, 6-15 x ca 1 mm, fleshy, veins not apparent, entire. Inflorescence of slender spikes or racemes; flowers small, shortly pedicellate; bracts and bracteoles narrowly ovate to narrowly triangular, 1-2 mm long, stellate-hairy. Calyx 2-3 mm long, shortly stellate-hairy; tube not gibbous; lobes triangular to ovate, 1-1.5 mm long. Corolla pale to dark blue, 8-15 mm long, with dark grey, short, stellate hairs. Fruit broadly cylindrical, ca 2 mm long, densely hairy.

Occurs on sandy soils of the Coastal Plain near Gingin and Bullsbrook. Extends north to Jurien Bay and Wongan Hills, and is also recorded from near York.

Flowers August-January.

D. trigona Vriese

Angled-stem Dampiera

Slender, almost glabrous, erect or ascending perennial herb. Stems trigonous to triquetrous. Leaves sessile, linear to narrowly elliptic, 10-50 x 1.5-6 mm, entire or distantly and minutely toothed. Inflorescence of large loose cymes with branched peduncles; flowers pedicellate; bracts subulate, 3-6 mm long. Calyx ca 3 mm long, glabrous; tube not gibbous, ribbed; lobes absent. Corolla blue, rarely white, 8-15 mm long, very sparsely hairy with dark grey, appressed, centrifixed hairs. Ovary 2-celled, with 1 ovule per cell. Fruit cylindrical to broadly cylindrical, 3-4 mm long, glabrous.

Occurs in winter-wet depressions of the Coastal Plain and Darling Scarp from Perth to Harvey. Extends southwards to Busselton and Albany and north of the region to Mogumber.

Flowers August-November.

D. triloba Lindley

Perennial herb or small, erect, multi-stemmed shrub to 0.3 m high, hairy with ferruginous, stellate or dendritic hairs. Stems trigonous, sparsely stellate-hairy. Leaves sessile, coriaceous, more or less obtrullate to obtriangular, 10-60 x 7-24 mm, angularly 3-toothed or lobed, glabrous to sparsely stellate-hairy. Inflorescence cymose; peduncles and pedicels ferruginous stellate-hairy; bracts narrowly triangular, 1-2 mm long, ferruginous stellate-hairy; bracteoles absent. Calyx 2-3 mm long, densely ferruginous stellate-hairy; tube not gibbous; lobes absent. Corolla blue, 7-10 mm long, covered with ferruginous and grey, appressed, centrifixed hairs. Fruit cylindrical to broadly cylindrical, 3-4 mm long, sparsely stellate-hairy.

Recorded for Bayswater and Gnangara in the metropolitan area. Also recorded for Cunderdin.

Flowers August-December.

GOODENIA Smith

Herbs or shrubs. Leaves alternate or in basal rosettes or tufts. Inflorescence of terminal or axillary racemes, spikes, cymes or umbel-like clusters; peduncles and pedicels with or without bracts or bracteoles. Calyx tube adnate to and usually shorter than the ovary; lobes 5. Corolla mostly blue or yellow, the tube adnate to the calyx tube and ovary, slit on the upper side, sometimes with a hollow protuberance or spur towards the base between the calyx lobes; limb 2-lipped and 5-lobed; lobes winged, the 2 upper lobes separating at a lower level. Stamens free. Ovary inferior except at the summit which extends upwards within the corolla tube, incompletely 2-celled, with a septum varying from rudimentary to almost reaching the summit; ovules several in 2 rows, rarely solitary. Fruit a dehiscent capsule, opening by 2 or 4 valves. Seeds flat, usually with a thickened or winged margin. Approximately 170 species, mostly Australian, with 106 in W.A.

1. Corolla blue or pinkish blue. Bracteoles always present, placed about midway on the pedicels.
 2. Glauous, glabrous herb. Cauline leaves oblong, ovate or elliptic and cordate to sagittate at base..... **G. eatoniana**
 2. Glandular-hairy, rarely glabrous herb. Cauline leaves linear to semi-terete..... **G. caerulea**
1. Corolla yellow. Bracteoles absent, sometimes paired bracteoles on only a few flower stalks.
 3. All leaves in a basal rosette apart from linear bracts in the forks of the inflorescence. Capsule narrowly obconic. Indusium longer than broad..... **G. laytoniana**
 3. Leaves basal and cauline. Capsule broadly ellipsoid to globular. Indusium broader than long.
 4. Basal leaves narrowly obovate to obovate. Flowers large; calyx 3-6 mm long, corolla 12-16 mm long..... **G. pulchella**
 4. Basal leaves linear to very narrowly oblong or very narrowly elliptic. Flowers small; calyx 1.5-3 mm long; corolla 3-10 mm long..... **G. filiformis**

G. caerulea R. Br.

Slender, erect, usually glandular-hairy perennial herb to 0.4 m high. Stems sometimes flexuose. Basal leaves linear to semi-terete, 35-70 x 2-5 mm, dilated at the base, entire. Cauline leaves shorter, 8-30 x ca 1 mm, glabrous to glandular-hairy, acute. Flowers in a loose leafy raceme; pedicels axillary, 15-40 mm long; bracteoles midway on the pedicel, very narrowly ovate to linear, 2-5 mm long. Calyx 6-12 mm long, glandular-hairy; lobes linear, 4-8 mm long, acute. Corolla blue with yellow and white in the throat, 12-20 mm long; the tube pouched towards the base. Style hairy in the upper half, densely so under the indusium; indusium slightly broader than long, sparsely hairy, the orifice densely ciliate. Capsule ovoid to broadly ovoid, 6-8 x 4-5 mm. Seeds circular, 2-3.5 mm across, broadly winged. **Fig. 232**

Widespread on the Darling Scarp and Range from Bullsbrook and Wooroloo to Harvey. Also widespread throughout the south west, from Geraldton to Albany and East Mt. Barren, extending inland as far as Merredin.

Flowers October-December.

G. eatoniana F. Muell.

Erect or prostrate, glabrous and rather glaucous perennial herb to 0.3 m high. Basal leaves petiolate, narrowly ovate to obovate, 10-30 x 4-6 mm. Cauline leaves sessile, oblong, ovate or elliptic, 10-22 x 5-12 mm, apex obtuse, base cordate to auriculate or sagittate, margins entire or minutely toothed. Flowers axillary in a leafy raceme; pedicels slender, 15-50 mm long; bracteoles about midway on the pedicel, narrowly ovate to ovate, 2-7 mm long. Calyx 4-7.5 mm long; lobes narrowly ovate, 3-5 mm long. Corolla blue, sometimes pinkish blue, 10-20 mm long; the tube scarcely pouched. Style almost glabrous except just below the indusium where it is hairy; indusium broader than long, sparsely hairy, the orifice densely ciliate. Capsule ovoid, 5 x 4 mm. Seeds ovate, narrowly winged.

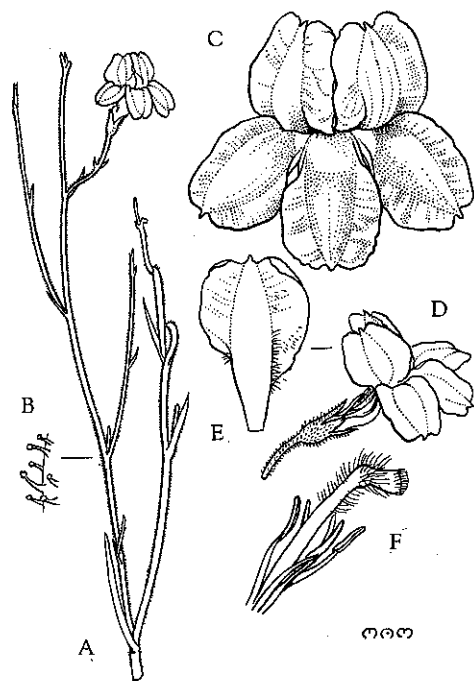


Fig. 232. *Goodenia caerulea*. A, Flowering branch. B, Glandular hairs from stem. C and D, Two views of flower. E, Corolla lobe. F, Stamens surrounding style.

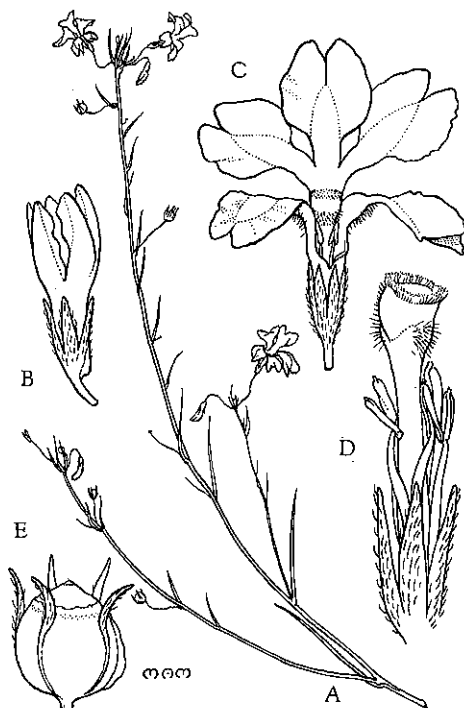


Fig. 233. *Goodenia filiformis*. A, Flowering branch. B, Late bud. C, Flower. D, Flower with corolla removed to show stamens and style. E, Capsule with persistent calyx.

Recorded from west of Collie and probably in the Perth Region. Extends southwards to the extreme south west of the state between Augusta and the Bow River.

Flowers October-January.

G. filiformis R. Br.

Slender, almost glabrous, ascending perennial herb to 0.4 m high. Basal leaves petiolate, narrowly oblong or narrowly elliptic to linear, to 100 x 1-4 mm. Cauline leaves sessile, linear, 10-60 x < 0.5-3 mm, entire. Flowers in a loose raceme or umbel-like clusters on branched peduncles; pedicels filiform, 6-30 mm long; bracteoles absent. Calyx 1.5-3 mm long, very sparsely hairy with appressed hairs; lobes narrowly elliptic to narrowly ovate, 1-2 mm long, obtuse. Corolla yellow, 3-12 mm long, glabrous or sparsely hairy outside; tube shortly spurred; lobes broadly winged. Style glabrous except for a few hairs under the indusium; indusium broader than long, sparsely hairy, orifice densely ciliate. Capsule globular, 2-3 mm across. Seeds circular, 1.5-2 mm across, with broad, thickened margins. Fig. 233

Occurs in winter-wet depressions of the Coastal Plain and Darling Scarp and Range, from Bullsbrook to Bunbury and inland to Woorlooloo. Extends north to near Geraldton and south to the extreme south west and along the south coast to Cape Arid.

Flowers usually September-January.

Flower size is very variable in this species.

G. laytoniana Benth.

A small tufted perennial herb, prostrate or to 80 mm high. Basal leaves linear to narrowly spatulate, 15-30 x 1.5-2.5 mm, almost glabrous, entire. Flowers in a dichotomous or trichotomous panicle or panicle of umbel-like clusters, puberulous with simple or glandular hairs; pedicels filiform, ca 10 mm long;

bracts at the forks of the panicle, linear, 3-8 mm long; bracteoles absent but sometimes paired bracts resembling bracteoles present on only a few flower stalks. Calyx 2-3 mm long, puberulous with simple or glandular hairs; lobes narrowly oblong, 1-1.5 mm long, obtuse. Corolla yellow, 4-8 mm long, puberulous outside; lobes unequally winged. Style glabrous; indusium ca 1 mm long, longer than broad, glabrous apart from the orifice which is usually minutely ciliate or rarely glabrous. Capsule narrowly obconic, 4-5 mm long, 4-valved, the septum reaching almost to the top of the capsule. Seeds numerous, small, not winged. *G. claytoniacea* F. Muell.

A rarely collected species from swampy flats near Midland and Bullsbrook. Also recorded from Albany.

Flowers December-January.

G. pulchella Benth.

Erect or ascending, glabrous or sparsely hairy perennial herb to 0.45 m high. Basal leaves petiolate, narrowly obovate to obovate, 15-130 x 2-15 mm, entire or distantly and shallowly toothed. Cauline leaves narrowly elliptic or narrowly obovate to linear, 15-50 x 1-5 mm. Flowers in a pedunculate, leafy raceme or in umbel-like clusters; pedicels filiform, 10-40 mm long; bracteoles usually absent. Calyx 3-6 mm long, sparsely hairy with appressed hairs, the base obtuse; lobes narrowly oblong to narrowly elliptic, 2.5-4 mm long, obtuse. Corolla yellow, 12-16 mm long, glabrous or sparsely hairy outside; the tube shortly spurred. Style glabrous except just below the indusium where it is sparsely hairy; indusium broader than long, almost glabrous to sparsely hairy, orifice densely ciliate. Capsule broadly ellipsoid to globular, 2.5-4 x 2-3.5 mm. Seeds circular, ca 2 mm across with broad, thickened margins.

Recorded for winter-wet depressions near Gingin, Wooroloo, Guildford and the Helena Valley. Extends inland to Wagin and south to the extreme south west of the state and along the south coast to Cape Arid.

Flowers usually September-December.

G. pulchella is very similar to *G. tenella* R. Br., but the latter has an attenuate base to the ovary, thinner leaves and a shorter spur to the corolla. There are no collections of *G. tenella* from within the Perth Region, but it is recorded from the head of the Gingin Brook, north east of Gingin and also south of the region from near Donnybrook to the south coast between Augusta and Albany.

LECHENAULTIA R. Br.

Glabrous shrubs with sessile, usually linear, leaves. Flowers either solitary and terminal, or several together in leafy terminal corymbs. Calyx glabrous; tube linear, wholly adnate to the ovary, ribbed; lobes linear, narrowly oblong or subulate. Corolla blue, white or yellow and red, glabrous outside and sparsely to densely woolly inside; tube usually slit to the base; lobes narrowly or broadly winged, usually all separated at about the same level and spreading. Anthers linear, usually connate around the style. Ovary inferior, 2-celled, with numerous ovules in 2 ascending rows in each cell. Indusium broadly 2-lipped. Fruit a capsule, brown, narrowly cylindrical, 4-valved, glabrous. Approximately 24 species, all but one in Australia, with 21 in W.A. mostly confined to the south west.

- | | |
|--|-----------------------|
| 1. Corolla wings broad, 4-8 mm wide. Calyx tube 10-20 mm long in the mature flower. | |
| 2. Corolla blue, not gibbous. Shrub with erect branches, from heavy, especially lateritic soils..... | L. biloba |
| 2. Corolla yellow and reddish, gibbous. Shrub with arched procumbent branches, from near-coastal sands and limestones..... | L. linarioides |
| 1. Corolla wings narrow, usually less than 2 mm-wide. Calyx tube 3-11 mm long in the mature flower. | |
| 3. Flowers in dense corymbs. Corolla to 10 mm long, the corolla tube usually shorter than the calyx lobes..... | L. expansa |
| 3. Flowers in loose corymbs. Corolla 10-20 mm long, the corolla tube longer than the calyx lobes..... | L. floribunda |

L. biloba LindleyBlue *Lechenaultia*

An erect or straggling shrub to 0.6 m high. Leaves linear, 6-10(15) x 0.5-1 mm, thick, triquetrous or slightly keeled, mucronate or obtuse. Flowers usually in irregular clusters, sometimes in leafy corymbs; bracts leaf-like, linear to subulate. Calyx 15-25 mm long; tube 10-17 mm long, longer than the surrounding leaves; lobes linear to subulate, 5-8 mm long, as long as or longer than the corolla tube, mucronate. Corolla blue, rarely white, 17-25 mm long; tube 5-7 mm long, villous inside with multicellular flattened hairs; lobes broadly winged, mucronate, the 2 upper lobes usually separated at a slightly lower level; wings broad, 4-8 mm wide, flat, with distinct transverse veins and ciliate margins. Style glabrous to the base of the indusium; indusium sometimes sparsely villous, with a densely ciliate orifice. Capsule 20-40 mm long, ribbed. **Fig. 234**

Widespread on lateritic and granitic soils of the Darling Scarp and Range from north of Perth to south of Pinjarra and inland to Wooroloo. Extends north to Eneabba and south to the extreme south west, also widespread through the wheatbelt.

Flowers July-November.

A variant occurs in the wheatbelt with small, narrowly elliptic, erect, appressed, obtuse leaves and flowers in more compact corymbs.

L. expansa R. Br.

Low spreading shrub to 0.6 m high with slightly ribbed branchlets. Leaves linear, 3-10(15) x 0.5-1 mm, thick, slightly keeled to triquetrous, mucronate. Flowers sessile in dense leafy corymbs; bracts leaf-like. Calyx 6-12.5 mm long; tube 3-6.5 mm long, usually shorter than the surrounding leaves; lobes linear to subulate, 3-6 mm long, usually longer than the corolla tube, mucronate. Corolla blue, usually 6-8(10) mm long; tube 3-4 mm long, densely villous inside with multicellular flattened hairs; lobes narrowly winged and terminating in a short, rounded point; wings ca. 1 mm wide, undulate and white ciliate. Upper part of style and indusium sparsely villous with flattened, white hairs; indusium with a densely and minutely ciliate orifice.

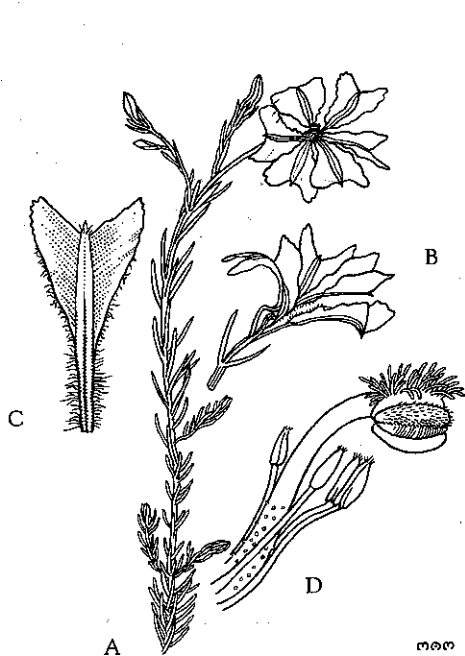


Fig. 234. *Lechenaultia biloba*. A, Flowering branch. B, Flower. C, Corolla lobe. D, Stamens surrounding style.

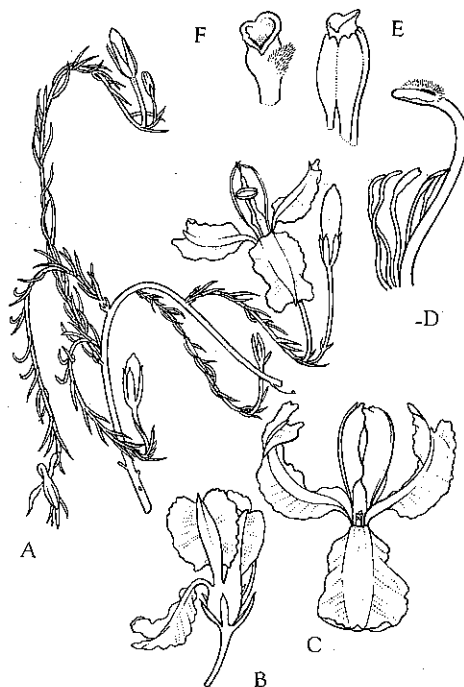


Fig. 235. *Lechenaultia linarioides*. A, Flowering branch. B and C, Two views of flower. D, Stamens and style. E, Anthers connate around indusium. F, Indusium.

Usually occurs on sandy soils, often of winter-wet depressions of the Coastal Plain and Darling Scarp and Range from north of Perth to Harvey and east to Wooroloo. Also occurs northwards to near Coorow and from Collie and Nannup southwards, along the south coast from Augusta to Albany.

Flowers October-December.

Some specimens from Pinjarra and Harvey have leaves up to 15 mm long and larger flowers with the corolla up to 10 mm long.

***L. floribunda* Benth.**

Erect shrub to ca 0.5 m high with slightly ribbed branchlets. Leaves linear to narrowly oblong, 3-8 x 0.5-1 mm, thick, slightly keeled to triquetrous, obtuse to mucronate. Flowers sessile in loose leafy corymbs; bracts leaf-like. Calyx 10-16 mm long; tube 7-11 mm long, longer than the surrounding leaves; lobes linear to subulate, 3-5 mm long, shorter than the corolla tube, mucronate. Corolla blue or white, (10)12-16 mm long; tube 6-9 mm long, hairy inside; lobes narrowly winged, all separated at about the same level, mucronate; wings 1-2 mm wide, flat or undulate, faintly veined, margins sparsely ciliate. Style almost glabrous except at the base of the indusium, where a few flattened white hairs sometimes occur; indusium with a densely ciliate orifice. Capsule 10-18 mm long.

Occurs on the Coastal Plain from the Peel Estuary northwards. Extends north to Geraldton.

Flowers mainly October-December.

One or two specimens from the north of the Perth Region have corolla lobes with wider wings and are very similar to *L. biloba*. A variant occurs between Lake Grace and Lake King with small, crowded leaves and a minutely papillose calyx tube.

***L. linarioides* DC.**

Yellow Leschenaultia

Spreading shrub, prostrate or to 1.5 m high with arched, more or less procumbent, finely ribbed branchlets. Leaves linear, 5-20 x 0.5-1 mm, thick, flat to keeled, acute to mucronate, often deciduous on older branchlets. Flowers solitary, terminating short branchlets or several together in an often twisted leafy corymb; bracts leaf-like. Calyx 16-28 mm long; tube 10-20 mm long, longer than the surrounding leaves, ribbed; lobes narrowly oblong, 6-8 mm long, usually shorter than the corolla lobes, thin, acute, margins pale. Corolla yellow and red, 15-25 mm long; tube gibbous, ca 10 mm long, broad, densely bearded inside with long flattened, multicellular hairs and minute papillae; lobes broadly winged, mucronulate, the lower lobes yellow, the upper lobes reddish, connivent and shorter; wings 3-5 mm wide. Anthers free. Style subulate, glabrous; indusium sparsely hairy with flattened white hairs, orifice minutely ciliate. Capsule more or less very narrowly cylindrical but curved, 20-40 mm long. **Fig. 235**

Occurs on near-coastal sands and limestones near Perth. Also northwards to Dirk Hartog Island, extending inland to Mingenew and near Mullewa, where it grows on sand.

Flowers June-November.

SCAEVOLA L.

Herbs or shrubs with alternate leaves. Flowers solitary in the leaf axils or in bracteate, leafy spikes, sessile, pedicellate or pedunculate. Bracts leaf-like; bracteoles smaller, inserted just below the calyx. Calyx tube adnate to the corolla and ovary; lobes usually short, less commonly subulate, free part of calyx reduced to a ring, or rarely absent. Corolla blue, purple, pinkish or white, sometimes streaked; tube slit to the base on the upper side, not pouched or spurred, more or less villous inside; lobes spreading, usually digitately, either equal or the upper lobes slightly shorter, winged, auricles absent. Stamens free. Ovary wholly inferior, rarely the summit free and extending into the corolla, 1 or 2 celled, rarely 4-celled; ovules 1 or 2 per cell. Fruit an indehiscent dry nut or slightly succulent drupe. Seeds usually 1 in each cell, broadly cylindrical. Approximately 90 species, mostly Australian, some species pantropic, with 58 in W.A.

1. Flowers solitary or rarely in simple dichasia, on axillary peduncles.
2. Calyx with subulate lobes, 7-21 mm long. Wings of corolla transversely veined.
 3. Bracteoles obovate, 15-35 mm long..... **S. calliptera**
 3. Bracteoles linear, 3-15 mm long..... **S. phlebopetala**
2. Calyx very shortly lobed, the lobes up to 1 mm long. Wings of corolla not transversely veined.
 4. Flowers on long peduncles; corolla 14-25 mm long, sparsely hairy outside with spreading hairs. Leaves hairy with scabrous to pilose hairs, minute hirsute hairs and minute glandular hairs..... **S. pilosa**
 4. Flowers sessile to very shortly pedicellate; corolla 25-40 mm long, densely hairy outside with appressed hairs. Leaves sparsely hairy with pilose hairs..... **S. platyphylla**
1. Flowers sessile to very shortly pedicellate, in spikes, clusters, racemes or panicles.
 5. Style glabrous or hairy with simple white hairs. Indusium broader than long.
 6. Corolla hairy inside with both simple and penicillate hairs.
 7. Glabrous viscid shrubs with obovate, elliptic or circular leaves.
 8. Flowers 13-22 mm long. Leaves thin, elliptic to obovate, acute. **S. nitida**
 8. Flowers 9-13 mm long. Leaves thick, obovate to circular, obtuse..... **S. crassifolia**
 7. Glabrous or hairy shrubs or perennial herbs with narrowly elliptic, narrowly obovate or linear leaves.
 9. Corolla 12-30 mm long.
 10. Glabrous shrub. Corolla almost glabrous outside. Leaves stem-clasping at base..... **S. globulifera**
 10. Scabrous or villous shrubs. Corolla hairy outside. Leaves not or only slightly dilated at the base.
 11. Inflorescence glandular-hairy. Calyx a thickened, glandular ring..... **S. glandulifera**
 11. Inflorescence villous. Calyx a sparsely ciliate, undulate or shallowly lobed cup..... **S. holosericea**
 9. Corolla 7-10 mm long.
 12. Corolla blue. An erect shrub. Calyx glabrous..... **S. thesioides**
 12. Corolla white with a mauve to brown throat. A tufted perennial. Calyx hirsute..... **S. lanceolata**
 6. Corolla hairy inside with simple hairs only.
 13. Corolla blue. Calyx obtusely lobed. Leaves ovate to elliptic..... **S. platyphylla**
 13. Corolla white, often streaked with purple or brown. Calyx a truncate ring. Leaves narrowly obovate to narrowly elliptic.
 14. Shrub greyish, sericeous to villous. Corolla 7-10 mm long..... **S. canescens**
 14. Perennial herb or shrub, glabrous to strigose. Corolla 12-20 mm long..... **S. paludosa**
5. Style hairy with dark purple bristles. Indusium narrower than long.
 15. Flowers in short dense spikes. Corolla 6-8 mm long..... **S. fasciculata**
 15. Flowers in elongated loose spikes. Corolla 5-6 mm long..... **S. aff. helmsii**

S. calliptera Benth.

Prostrate or ascending perennial herb. Stems hairy with minute hirsute or glandular hairs and long scabrous or hispid hairs at right angles to the stem. Basal leaves spathulate, gradually tapered into a petiole. Cauline leaves usually sessile, narrowly obovate to obovate, oblong or almost obtrullate, 23-72 x 4-39 mm, scabrous or hispid above and below, acute, coarsely dentate in the upper half. Flowers solitary on axillary peduncles; peduncles with spreading scabrous hairs and also with minute, hirsute or glandular hairs; bracteoles leaf-like, obovate, 15-35 x 4-12 mm. Calyx 10-17 mm long, scabrous and minutely hirsute or glandular-hairy; lobes subulate, 7-14 mm long. Corolla blue, 20-30 mm long, hairy inside with simple hairs and elongated protuberances, hairy outside with simple hairs; lobes with distinctly transversely veined wings. Anthers with a few hairs at the apex. Ovary 2-celled. Style glabrous in the lower half, densely hairy below the indusium; indusium as broad as or broader than long with a dense tuft of hairs at the base, orifice minutely ciliate. Fruit cylindrical, 5-8 x 3-3.5 mm, verrucose, puberulous and scabrous.

Occurs usually on the heavier soils of the Darling Scarp and Range, from north of Perth to near Brunswick Junction. Extends north to near New Norcia and south to Mt. Frankland, north of Walpole.

Flowers September-January.

Previously confused with *S. striata* R. Br. which does not occur in the region. *S. striata* differs from *S. calliptera* in having antrorsely, more or less appressed scabrous hairs on the stems and peduncles, as well as shorter calyx lobes which are not more than twice as long as the calyx tube.

***S. canescens* Benth.**

Grey Scaevola

Prostrate or decumbent greyish shrub, densely hairy with villous, sericeous or woolly hairs. Leaves more or less sessile, narrowly obovate or narrowly elliptic, 25-52 x 3-10 mm, thick, densely villous and sericeous, obtuse, gradually tapered at the base, margins entire and slightly recurved. Inflorescence of short dense spikes or clusters; flowers sessile; bracts and bracteoles leaf-like, narrowly ovate, 6-9 mm long. Calyx short, 1-2 mm long; free part reduced to a minute ring. Corolla white or purple and white sometimes streaked with brown, 7-10 mm long, sericeous inside and outside. Style almost glabrous except for a few hairs at the base of the indusium; indusium as broad as or broader than long, more or less glabrous apart from the densely ciliate orifice. Fruit ellipsoid to cylindric, ca 2.5 x 1.5 mm, hairy and rugose. Fig. 236

Widespread on the sandy soils of the Coastal Plain. Extends north to Kalbarri and south to the south coast.

Flowers June-November.

***S. crassifolia* Labill.**

Glabrous, often viscid and shining, prostrate or decumbent shrub to 0.8 m high. Leaves petiolate, obovate, circular or spatulate, 30-75 x 10-33 mm, thick, obtuse, margins denticulate. Flowers in dense terminal spikes or panicles, more or less sessile, but the lowermost flowers sometimes shortly pedicellate; bracteoles ovate, 1.5-2 mm long, obtuse. Calyx 1.5-2 mm long, almost glabrous; free part of calyx short,

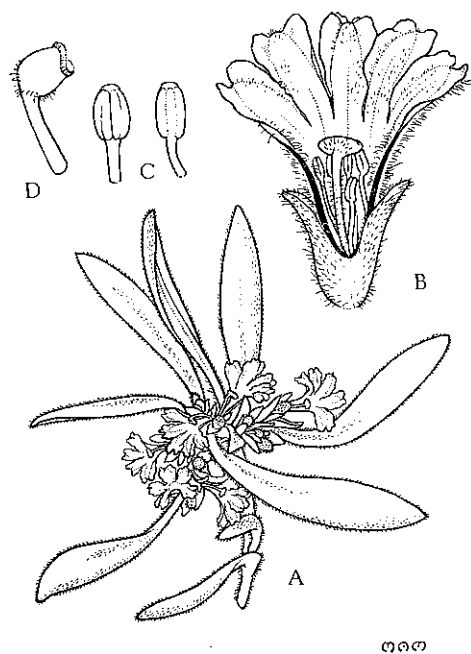


Fig. 236. *Scaevola canescens*. A, Upper part of flowering branch. B, Flower. C, Two views of anther. D, Indusium.

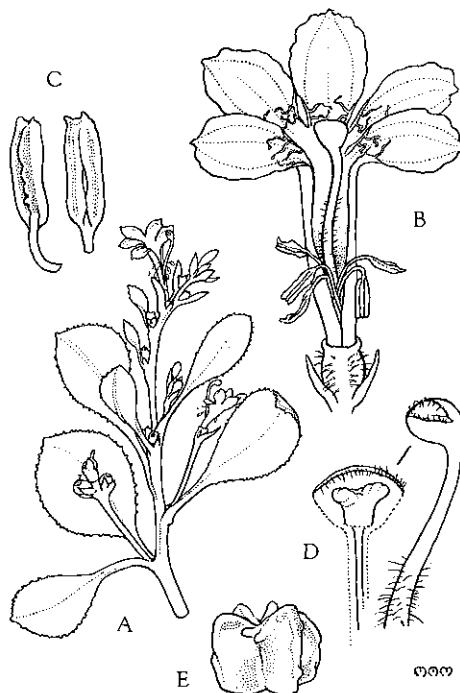


Fig. 237. *Scaevola crassifolia*. A, Flowering branch. B, Flower. C, Two views of anther. D, Upper part of style with an enlargement of inside of indusium. E, Fruit.

truncate and undulate to very shortly and obtusely lobed. Corolla blue to mauve, 9-13 mm long, almost glabrous outside, hairy inside with usually simple but also a few penicillate hairs. Ovary 2-celled. Style sparsely hairy; indusium as broad as or broader than long, glabrous to sparsely hairy, orifice ciliate. Fruit more or less globular, 2-3.5 mm across, slightly compressed, hard, woody, minutely hairy. **Fig. 237**

Occurs on near-coastal sands and limestones from Moore River to south of Perth and on Garden and Rottnest Islands. Extends north to Shark Bay and south around the coast to Point Culver, west of Eyre. Also in S.A.

Flowers much of the year, usually November-January in the Perth Region.

This species is close to *S. nitida*, but the latter has thin, elliptic, acute leaves and larger flowers.

S. fasciculata Benth.

An erect shrub to 1 m high with sparse to dense wool in the axils of the upper leaves. Leaves fasciculate, sessile, linear to subulate or sometimes almost terete, usually 3-10 x ca 0.5 mm, glabrous, entire. Inflorescence a short terminal spike, 20-40 mm long; flowers small, numerous, almost sessile; bracts and bracteoles linear, 4-8 mm long. Calyx 1.5-2 mm long, shortly hairy; lobes subulate, ca 1 mm long. Corolla pink, blue or white, often with dark spots in the throat, 6-8 mm long, glabrous or sparsely hairy inside and out; lobes scarcely winged. Ovary 1-celled, the convex summit free from the calyx. Style covered with short, dark purple, bristly hairs; indusium narrow, longer than wide, 1-1.2 mm long, glabrous apart from the shortly ciliate orifice. Fruit ellipsoid, ca 2.5-3 x 1.5 mm, 5-ribbed, shortly and sparsely hairy. **Fig. 238**

Occurs on the Darling Scarp and Range near Perth to south of Harvey. Extends north to Wannamal.

Flowers August-November.

S. fasciculata belongs to a section of the genus *Scaevola* which is considered by Dr R.C. Carolin to be very close to the genus *Goodenia*. It is expected that this species will be transferred to that genus in the near future.

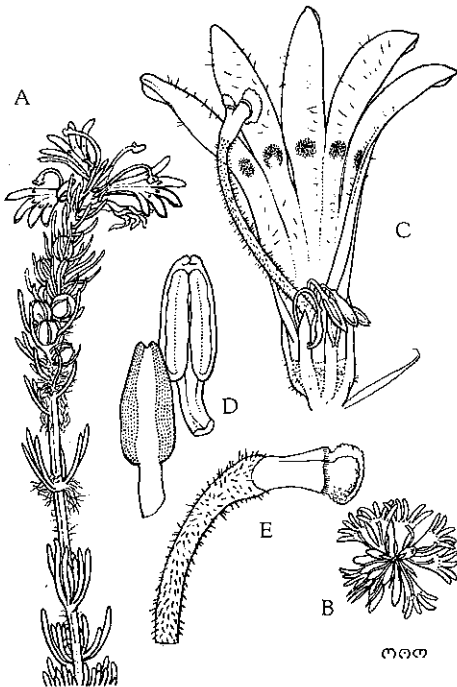


Fig. 238. *Scaevola fasciculata*. A, Flowering branch. B, Cluster of flowers. C, Flower. D, Two views of anther. E, Style.

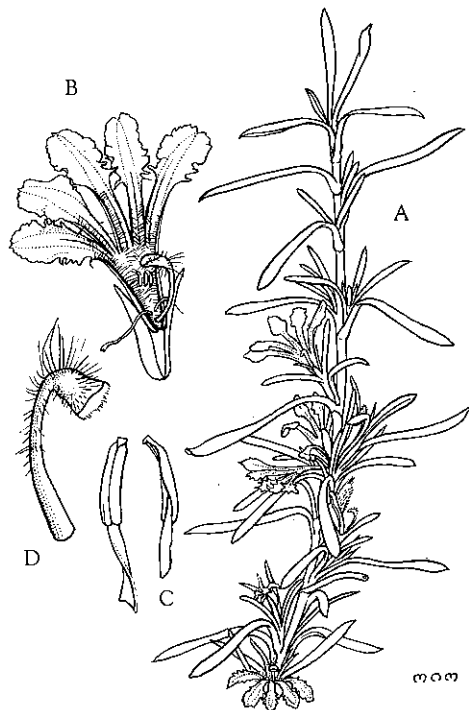


Fig. 239. *Scaevola paludosa*. A, Flowering branch. B, Flower. C, Two views of anther. D, Style.

S. glandulifera DC.

Erect perennial herb to 0.6 m high, with puberulous and long scabrous hairs. Leaves narrowly elliptic, narrowly oblong or narrowly obovate to linear, 28-80 x 2-10 mm, acute, gradually tapered towards the base, margins entire or coarsely toothed. Inflorescence a glandular-hairy terminal spike; flowers sessile; bracts and bracteoles leaf-like, narrowly oblong or narrowly triangular to linear or bracteoles subulate, 6.5-10 mm long. Calyx 2-3 mm long; free part of calyx reduced to a thickened glandular-hairy rim or absent. Corolla blue to violet-blue, 15-30 mm long, shortly hairy outside, hairy inside with penicillate and simple hairs. Ovary 2-celled. Style hairy; indusium as broad as or broader than long, hairy, the orifice densely ciliate. Fruit cylindrical to broadly cylindrical, 4-5 x 2-3 mm, verrucose and faintly ribbed, glabrous.

Occurs usually on the heavier soils of the Darling Scarp and Range from Red Hill to near Harvey. Extends north to Geraldton and south to the south coast near Albany.

Flowers usually October-December.

S. globulifera Labill.

A sprawling, multi-stemmed, glabrous shrub to 0.6 m high. Leaves very narrowly obovate or very narrowly elliptic to linear, 25-90(115) x 1.5-13(25) mm, acute, gradually tapered into a petiole in the lower half but dilated and stem-clasping at the base, margins entire or toothed. Inflorescence a terminal spike; flowers sessile; bracts and bracteoles narrowly ovate or narrowly triangular to subulate, very variable in length, bracteoles 3.5-10 mm long and usually sparsely ciliate. Calyx 2-4 mm long; free part of calyx undulate, shallowly lobed, up to 0.5 mm long. Corolla blue, 12-21 mm long, almost glabrous outside, hairy inside with simple and penicillate hairs; wings of the lobes sparsely ciliate. Ovary 2-celled. Style hairy; indusium as broad as or broader than long, glabrous or almost so, apart from the shortly ciliate orifice. Fruit broadly cylindrical to broadly ellipsoid, 3-6 x 2.5-4 mm, glabrous, verrucose.

Occurs on near-coastal calcareous or sandy soils, from Moore River to Bunbury. Extends north to Northampton and southwards around the coast as far as Cape Le Grand.

Flowers September-November.

S. aff. helmsii Pritzel

Erect, almost glabrous shrub to 0.6 m high with sparse wool in the axils of the leaves. Leaves fasciculate, sessile, linear, 10-50 x 0.5-1 mm, glabrous, entire. Inflorescence an elongated terminal spike; flowers almost sessile; bracts and bracteoles narrowly oblong to linear, bracteoles 1-2 mm long. Calyx ca 2 mm long, 5-ribbed, glabrous; lobes narrowly triangular, ca 1 mm long, acute. Corolla white, 5-6 mm long, glabrous outside, sparsely hairy inside; lobes scarcely winged. Ovary 1-celled, the convex summit free from the calyx. Style covered with dark purple, bristly hairs; indusium narrow, longer than wide, glabrous apart from the sparsely ciliate orifice. Fruit almost globular, ca 2 mm across, ribbed, glabrous.

This variant is recorded from granitic rocks near the Brookton Highway in the Perth Region. *S. helmsii* normally occurs from Mt. Churchman, south of Paynes Find, to Lake Grace and Salmon Gums and west as far as York.

Flowers recorded in the Perth Region for November and January.

The identity of the material in the Perth Region is uncertain. It is nearest to *S. helmsii*, from which it differs in leaf length and flower size. *S. helmsii* typically has leaves 2-3 mm long and corolla 3-5 mm long. *S. helmsii*, along with *S. fasciculata*, belongs to a group of species which are expected to be transferred to the genus *Goodenia* in the near future.

S. holosericea Vriese

Silky Scaevola

Erect or spreading shrub to 0.6 m high, villous with soft, erect to spreading hairs. Leaves narrowly elliptic to narrowly obovate, 25-90 x 2-11 mm, villous, acute, gradually tapered in the lower half into a petiole and slightly dilated at the base, margins entire or distantly toothed. Inflorescence a villous terminal spike; flowers sessile; bracts and bracteoles narrowly ovate to linear, bracteoles usually 3-7 mm long. Calyx 2-3 mm long, glabrous to hairy; free part of calyx an undulate, truncate or shortly

lobed cup, ca 0.5 mm long, sparsely ciliate. Corolla pale blue, 12-18 mm long, hairy outside with simple hairs, hairy inside with simple and penicillate hairs. Ovary 2-celled. Style villous; indusium as broad as or broader than long, glabrous to sparsely villous with a ciliate orifice. Fruit obovoid to broadly obovoid, 4-5 x 2.5-4 mm, rugose, glabrous to sparsely hairy.

Apparently endemic to the Perth Region, occurring on sandy soils between Perth and Bunbury.

Flowers October-November.

This species is similar to *S. lanceolata* but differs in habit, indumentum and flower colour.

S. lanceolata Benth.

A tufted perennial herb to 0.4 m high. Leaves linear, up to 200 x 2-8 mm, glabrous or almost so, thick, gradually narrowed into a petiole in the lower half, but dilated and stem-clasping at the base, margins entire or distantly toothed. Inflorescence a dense, hirsute, terminal spike which becomes lengthened and interrupted as flowering advances; flowers more or less sessile; bracteoles very narrowly ovate to linear, 4-5(7) mm long. Calyx 1.5-2.5 mm long, hirsute; free part of calyx sinuate, cup shaped, < 0.5 mm long, ciliate. Corolla white with a mauve to brown throat, 7-10 mm long, hairy outside with spreading to erect hairs, hairy inside with simple and penicillate hairs. Ovary 2-celled. Style hairy; indusium as broad as or broader than long, glabrous apart from the ciliate orifice. Fruit ovoid to globular, 3-5 mm long, ribbed, rugose and hairy.

Occurs on sandy soils of winter-wet depressions or swamps of the Coastal Plain and Darling Range from Muchea and Wooroloo south to Waroona.

Flowers September-November.

All specimens housed in the W.A. herbarium previously considered as *S. longifolia* Vriese are now considered to belong to *S. lanceolata*.

S. nitida R. Br.

Shining Fanflower

An erect, glabrous and often viscid shrub usually 1-3 m high. Leaves elliptic to obovate, 35-95 x 15-40 mm, the lower leaves petiolate but the upper leaves more or less sessile, acute, margins denticulate. Inflorescence a loose to dense spike or panicle; flowers sessile; bracteoles narrowly ovate to narrowly triangular, 4-7 mm long, acute. Calyx 1-2 mm long, glabrous; free part of calyx a minute undulate ring. Corolla blue, white or pinkish, 13-22 mm long, almost glabrous outside, hairy inside with simple and also several penicillate hairs; wings of corolla lobes ciliate. Ovary 2-celled. Style sparsely hairy; indusium as broad as or broader than long, sparsely hairy to almost glabrous, orifice ciliate. Fruit obovoid to ellipsoid, 3-4 x 2-2.5 mm, glabrous, apex truncate.

Occurs on near-coastal sands from Yanchep to Safety Bay. Extends north to Cervantes and south to the extreme south west and along the south coast to east of Albany. Also in S.A.

Flowers August-December.

This species is similar to *S. crassifolia* which has thicker, obovate, circular to spatulate, obtuse leaves and smaller flowers.

S. paludosa R. Br

Spreading, decumbent or prostrate perennial herb or shrub, hairy with strigose hairs or almost glabrous. Leaves narrowly obovate to narrowly elliptic, 25-110 x 2.5-20 mm, rather thick and fleshy, acute, gradually tapered into a long petiole which is dilated at the base, margins entire, sometimes with tufts of hairs in the axils. Inflorescence of short axillary spikes; flowers sessile; bracteoles narrowly ovate, 7-15 mm long, ciliate. Calyx 2-3.5 mm long; free part of calyx reduced to an undulate, truncate ring, < 0.5 mm long. Corolla white, sometimes pale brownish purple in the throat, 12-20 mm long, densely hairy outside with golden, appressed, retrorse hairs, hairy inside with simple hairs only; wings of the corolla lobes often lacerated and ciliate. Ovary 1-celled. Style hairy and with a tuft of hairs below the indusium; indusium as broad as or broader than long, almost glabrous apart from the densely ciliate orifice. Fruit ellipsoid, ca 3-4 x 1.5 mm, glabrous and rugose. **Fig. 239**

Occurs on sandy soils of the Coastal Plain near Perth and sandy soils of the Darling Range. Extends north to Eneabba and south to near Williams.

Flowers September-December.

S. phlebopetala F. Muell.

Velvet Fanflower

Prostrate, scabrous, hispid or hirsute perennial herb. Leaves usually sessile, but the lowermost petiolate, narrowly obovate to narrowly oblong, 20-80 x 3-18 mm, obtuse or acute, gradually tapered at the base, margins entire or toothed. Flowers solitary or in simple dichasia on axillary peduncles; bracteoles linear, 3-15 mm long. Calyx 12-21 mm long, shortly hirsute and scabrous with long, strong, yellowish hairs; lobes subulate, 8-15 mm long. Corolla blue, 12-27 mm long, shortly hirsute outside and densely hirsute inside with simple hairs; lobes broadly winged, the upper lobes separated very slightly lower than the lower lobes; wings transversely veined. Anthers with a few hairs at the apex. Ovary 2-celled. Style glabrous in the lower half, more or less hairy in the upper half; indusium as broad as or broader than long, hairy and with a tuft of hairs at the base, orifice densely ciliate. Fruit ellipsoid, 8-9 x 3-4 mm, strongly ribbed, rugose, shortly hirsute and strongly scabrous in the Perth Region.

Occurs usually on sandy soils in the north of the Perth Region between Bullsbrook and Gingin, but is recorded for the Helena River and John Forrest National Park near Perth. Extends northwards to north of Kalbarri.

Flowers usually October-November in the Perth Region.

Some specimens from north of the region are less hirsute and have glandular as well as scabrous hairs on the inflorescence.

S. pilosa Benth.

An erect or sprawling perennial herb to 0.7 m high, softly hairy with long, scabrous to pilose, tubercle-based hairs and also minute hirsute and glandular hairs. Lowermost leaves obovate, narrowed into a petiole. Upper leaves sessile, oblong to obovate or rarely ovate, 10-65 x 5-30 mm, obtuse or acute, cordate to auriculate and stem-clasping at the base, margins coarsely toothed. Flowers solitary on axillary peduncles; bracteoles leaf-like, ovate, 8-14(23) x 5-8(11) mm, margins toothed. Calyx 2-4 mm long, minutely glandular-hairy; lobes to 1 mm long, acute or obtuse. Corolla blue, pink or purple, 14-25 mm long, sparsely hairy outside, more densely so inside with thicker, simple hairs; lobes broadly winged, uppermost lobes separated at a slightly lower level; wings not transversely veined. Anthers with a few hairs at the apex. Ovary 2-celled. Style glabrous in the lower half, hairy in the upper half with a tuft of hairs just below the indusium; indusium white, as broad as or broader than long, glabrous apart from the ciliate orifice. Fruit ellipsoid, 4-5 x 2-3 mm, rugose and minutely glandular-hairy. **Fig. 240**

Occurs on the heavier soils of the Darling Scarp and Range from Perth to Yarloop and inland to Wooroloo. Also recorded for north of the Perth Region at Cockleshell Gully and east of the region, between Merredin and Southern Cross.

Flowers mainly October-December.

S. platyphylla Lindley

Erect shrub to 1 m high, hairy with scabrous to pilose and minutely glandular hairs. Leaves sessile, often stem-clasping, ovate to elliptic, 25-45 x 10-27 mm, palmately veined, sparsely pilose particularly on the margins and veins, obtuse or acute, margins entire to coarsely toothed and ciliate. Inflorescence a terminal spike or raceme; flowers sessile or shortly pedicellate; bracts and bracteoles leaf-like, ovate to elliptic, 15-30 mm long. Calyx 4-5 mm long, hairy with closely appressed hairs; lobes ca 1 mm long, obtuse. Corolla blue, 25-40 mm long, appressed hairy outside, densely woolly inside the throat with simple hairs; lobes broadly winged; the wings not transversely veined. Ovary 2-celled. Style hairy; indusium as broad as or broader than long, densely hairy with a tuft of long hairs at the base and a densely ciliate orifice. Mature fruit not seen. **Fig. 241**

Occurs on the Darling Scarp and Range near Perth. Extends north to New Norcia and east to east of York.

Flowers September-January.

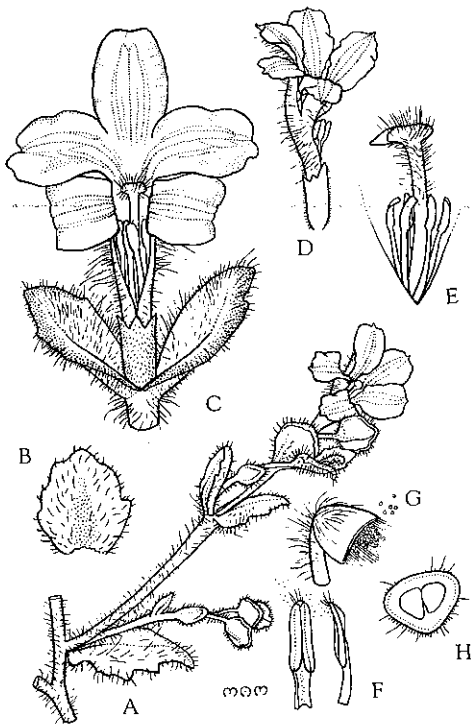


Fig. 240. *Scaevola pilosa*. A, Flowering branch. B, Bracteole. C, Flower with subtending bracteoles. D, Flower. E, Stamens surrounding style. F, Two views of anther. G, Indusium. H, Transverse section of ovary.

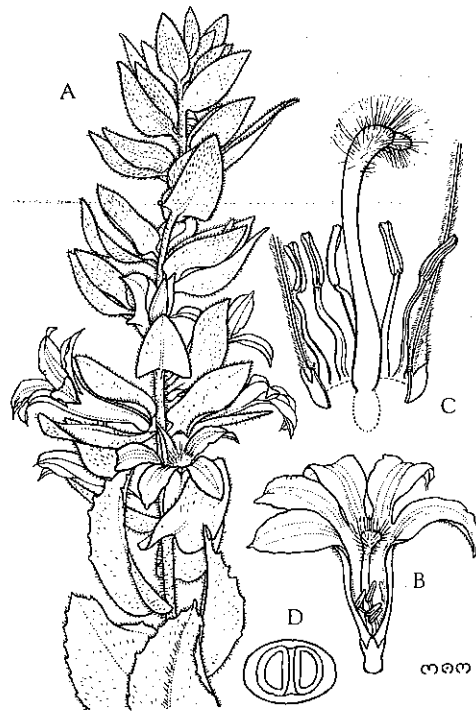


Fig. 241. *Scaevola platyphylla*. A, Flowering branch. B, Flower. C, Part of flower slit open to show stamens and style. D, Transverse section of ovary.

S. thesioides Benth.

Erect glabrous shrub to 1 m high. Leaves linear, 20-75 x 1.5-4 mm, acute, rather thick, entire or minutely toothed. Inflorescence a terminal spike; flowers sessile, small; bracts and bracteoles narrowly triangular, 3-5 mm long. Calyx 1-1.5 mm long, glabrous; free part of calyx reduced to a narrow ring or absent. Corolla blue, 7-9 mm long, glabrous or sparsely hairy outside with simple hairs, hairy inside with simple and penicillate hairs. Ovary 2-celled. Style sparsely hairy in the lower half, glabrous towards the indusium; indusium as broad as or broader than long, glabrous apart from a very sparsely ciliate orifice. Fruit slightly compressed, circular to very broadly obovate in outline, 1.5-2 x 2-2.5 mm, often somewhat gibbous, glabrous, faintly ribbed.

Occurs on calcareous and sandy soils of the Coastal Plain from Yanchep to Yalgorup National Park. Extends north to Kalbarri.

Flowers usually September-December.

A variant which occurs on the south coast from the Stirling Range to Israelite Bay is characterised by filiform leaves and smaller flowers.

VELLEIA Smith

Annual or perennial herbs with reduced stems. Leaves in a basal or ascending rosette, petiolate. Flowers in dichotomous axillary cymes on ascending or prostrate peduncles. Sepals 3-5, free from the ovary, free or connate, the posterior sepal slightly larger than the others. Corolla 2-lipped; tube with an often obscure anterior pouch, adnate to the ovary towards the base only; lobes winged, upper 2 lobes with prominent auricles and separated at a lower level than the 3 lower lobes. Stamens 5, free. Ovary superior or mostly superior, incompletely 2-celled, with up to 20 ovules in 2 rows either side

of a short septum. Indusium circular to oblong in outline, the orifice ciliate. Fruit a 2 or 4-valved capsule. Seeds flat, circular with a thickened rim or winged. 20 species confined to Australia and New Guinea, of which 12 occur in W.A. Reference: Carolin, R.C. 1967. Proc. Linn. Soc. New South Wales 92,1: 27-57.

1. Corolla yellow to orange with broad wings. Sepals connate into a tube..... **V. trinervis**
 1. Corolla white, pink or blue with narrow wings. Sepals free, sometimes connate at the very base..... **V. cynopotamica**

V. cynopotamica F. Muell.

A sparsely villous annual herb. Leaves in a basal rosette, oblong to spatulate and dentate or lyrate to almost pinnatifid, 15-60 x 3-10 mm, villous, obtuse, gradually tapering into a linear petiole. Peduncle ascending, up to 0.2 m high; bracteoles free. Sepals 5, free or connate only at the very base, oblong to narrowly elliptic, ca 4 mm long, sparsely hairy and shortly ciliate, the posterior sepal scarcely longer than the others. Corolla pink, white or bluish, 5-7 mm long, glabrous inside and glabrous to hairy outside; lobes slightly shorter than the tube, narrowly winged. Ovary hairy; ovules ca 3. Style glabrous; indusium cup shaped, broader than long, sparsely hairy, the orifice very shortly ciliate. Capsule globular, 5-7 mm across, 2-valved, hairy. Seeds broadly winged, 3-4 mm across, including the wing.

A single specimen recorded for the metropolitan area. Occurs in disturbed areas north of Perth from the Murchison River to Southern Cross. Also recorded for Esperance. Also occurs in S.A.

Flowers August-October.

V. trinervis Labill.

Glabrous or villous perennial herb to 0.5 m high. Leaves in a basal rosette, linear to spatulate, 50-200 x 5-25 mm, more or less obtuse, gradually tapering into a linear petiole, margins entire or dentate. Peduncle erect, up to 0.4 m high, glabrous or villous; bracteoles oblong to narrowly triangular, 5-19 mm long, free or connate at the base, entire. Calyx 4-5.5 mm long; sepals connate into a tube, 2-3 mm long, glabrous or villous outside and villous inside; lobes triangular, 2-2.5 mm long, acute. Corolla yellow to orange and brown, 8-12 mm long, hairy outside and villous in the throat; lobes longer than the tube, broadly winged. Ovary sparsely hairy; ovules ca 6. Style more or less glabrous; indusium broadly obovate, sparsely hairy, the orifice densely ciliate. Capsule ovoid, ca 7 x 4 mm, 4-valved, almost glabrous. Seeds 2 mm across, punctate with a thickened rim.

Occurs in winter-wet depressions of the Coastal Plain and Darling Range from Perth to Harvey. Widespread in damp situations throughout the south west of the state, from Jurien Bay and Badgingarra to Cape Le Grand.

Flowers August-January.

VERREAUXIA Benth.

Perennial herbs or shrubs with stellate or woolly hairs. Leaves either in a basal rosette or continued for a short way up the flowering stem. Inflorescence a long, slender, pedunculate raceme or panicle; flowers shortly pedicellate. Calyx tube adnate to the ovary; lobes 5, more or less equal in length to the calyx tube. Corolla 2-lipped; tube slit on the upper side; lobes spreading, more or less equally winged, hairy outside, almost glabrous inside, the 2 upper lobes separated at a slightly lower level than the 3 lower lobes; auricles absent. Stamens free. Ovary wholly inferior, 1-celled with 1 ovule. Indusium cup shaped, the orifice densely ciliate. Fruit an indehiscent nut. 3 species confined to W.A.

V. reinwardtii (Vriese) Benth.

A perennial herb to 1.5 m high. Leaves usually basal but continued up the lower part of the flowering stem, narrowly obovate to spatulate, 25-90 x 5-20(35) mm, becoming small and bract-like upwards, densely felty tomentose with cottony stellate hairs both above and below, obtuse. Peduncle often more than 0.5 m high, cottony tomentose; bracts small, linear to narrowly ovate. Calyx densely tomentose

with white, stellate hairs or small, glandular hairs and with long, white or purple, multicellular hairs; tube ovoid, 1.5-2.5 mm long; lobes linear to narrowly ovate, 1-2.5 mm long. Corolla yellow, 7-10 mm long, sparsely hairy outside with multicellular and glandular hairs, or densely tomentose with white, stellate hairs. Style sparsely hairy.

Occurs on sandy soils near Perth and at Yanchep, Gingin and in the Avon Valley. Extends north to the Hutt River and through the wheatbelt southwards to Wagin and Nyabing.

Flowers August-January.

FAMILY 109 RUBIACEAE

B. L. Rye

Trees, shrubs, vines or herbs, usually hermaphrodite. Stipules alternating with the petioles at each node, or axillary, often adnate to the petioles in a sheath around the stem, often as large as the leaves, sometimes branched. Leaves almost always opposite and decussate but often appearing whorled when the stipules are leaf-like, entire. Inflorescence usually a cyme or a branched panicle or head of cymes, often reduced, rarely 1-flowered. Flowers commonly actinomorphic, usually insect-pollinated. Calyx lobes as many as the corolla lobes but often very reduced or absent, sometimes with 1 lobe brightly coloured and larger than the other lobes. Corolla lobes usually 4 or 5. Stamens as many as and alternating with the corolla lobes, inserted on the corolla tube or throat. Nectary disc often present. Ovary usually inferior, rarely half-inferior or superior, usually 2-celled; ovules 1-numerous per cell. Style simple; stigma usually capitate or 2-branched. About 6500 species in 450 genera, cosmopolitan but concentrated in the tropics.

1. Flowers free, in a few-flowered cyme. Corolla 0.25-0.5 mm long..... *GALIUM
 1. Flowers connate at the base, in a globular head. Corolla 3-4 mm long..... OPERCULARIA

*GALIUM L.

Annual or perennial herbs or dwarf shrubs, usually hermaphrodite. Stems 4-angled. Stipules and leaves similar, forming whorls. Inflorescence a cyme or sometimes a panicle or head of cymes, the ultimate branches often lacking bracts. Bracteoles absent. Pedicels often longer than the ovary. Calyx adnate to the ovary; lobes as many as the corolla lobes or absent. Corolla commonly rotate; tube very short; lobes 4 or rarely 3, spreading. Anthers exerted. Ovary ovoid. Style deeply divided; stigma capitate or clavate. Fruit ovoid, dry or rarely somewhat succulent. About 400 species, cosmopolitan, 6 species occurring in W.A.

1. Ovary and fruit glabrous, papillose. Corolla lobes much longer than the tube..... *G. divaricatum
 1. Ovary and fruit with uncinat hairs. Corolla lobes a similar length to the tube..... *G. murale

*G. divaricatum Pourret ex Lam.

Annual herb, up to 250 mm high, with 1 or several main erect stems. Stems slender, 4-ribbed, with minute hairs or teeth along the ribs. Stipules and leaves usually in whorls of 6-8, linear or almost so, 4-11 x 0.2-1 mm, sometimes with a few stiff hairs on the upper surface near the base; margins often revolute, with short stiff hairs or teeth. Inflorescence an umbel-like cyme, terminating a slender branchlet, 2-4-flowered; bracts narrowly elliptic, shorter than the leaves. Pedicels ca 1 mm long. Calyx lobes absent. Corolla 0.3-0.5 mm long, glabrous; lobes much longer than the tube. Fruiting pedicel usually 1-1.5 mm long; fruit globular, 2-lobed, 0.5-0.7 mm, glabrous, papillose; lobes not separating.

Naturalized in winter-wet depressions and along watercourses on the eastern side of the Coastal Plain and on the Darling Range. Extends from Chittering to near Boddington, perhaps also occurring near Eneabba. Native to the Mediterranean Region.

Flowers October-December.

***G. murale (L.) All.**

Small Goosegrass

Annual herb, with erect or procumbent stems, up to 100 mm high. Stems slender, glabrous, longitudinally ribbed. Stipules and leaves in whorls of 3-6, narrowly obovate, 2-6 x 0.6-1.5 mm, tapering to the stem, acute and mucronate, with tiny hairs mainly on the margin. Flowers solitary or paired in the leaf axils, 1-4 per whorl. Calyx lobes absent. Corolla yellowish, 0.25-0.5 mm long, glabrous; lobes about half as long as the tube, acute. Fruiting pedicel deflexed, up to 1.5 mm long; fruit black, obloid or narrowly obloid, 1.3-1.7 mm long, 2-lobed; lobes becoming separate and curved, ca 0.3 mm broad, with a band of uncinata hairs along the outside, the largest hairs apical and usually 0.3-0.5 mm long.

Naturalized in winter-wet depressions on Rottnest and Garden Islands, also from a rocky run-off area on Mt. William in the Darling Range. Other W.A. records are from Busselton, Hamelin Bay and near Pingelly. Native to the Mediterranean Region and south western Europe.

Flowers August-November.

The Mt. William specimen differs from the coastal specimens in its smaller leaves, with the petiole ca 0.5 mm long, and smaller flowers. It may represent a different species and needs further study.

OPERCULARIA Gaertner

Herbs or undershrubs, rarely twiners, often foetid when fresh. Stipules usually adnate with the base of the petioles in a short sheath, simple and tooth-like above the sheath or with 2 or more teeth or branches. Leaves opposite. Inflorescence a globular head or a cluster of heads with the component heads connate to adjacent heads, usually in a fork of the stem or terminal; peduncle often recurved; flowers (in all but 1 species) connate to adjacent flowers at the base. Corolla funnel shaped; lobes 3-5, valvate. Stamens inserted at the base of the corolla tube; filament long; anther exerted, large. Ovary apparently 1-celled; ovule 1, erect. Style filiform, divided to the middle or lower into 2 branches but 1 branch sometimes aborted; branches usually papillose to hairy. Fruiting head usually with several 2-valved capsules, the outer valves connate in a persistent cup, the inner valves connate in a deciduous operculum. Seeds obovate or oblong, often rugose. About 18 species, confined to Australia, 11 species occurring in W.A.

1. Leaves linear or very narrowly obovate. Stem hairs < 0.5 mm long... **O. vaginata**
1. Leaves narrowly ovate or broader. Stem hairs 0.5-1.5 mm long.
 2. Stem hairs stiff, up to 1 mm long. Leaves with recurved margins; hairs on the abaxial surface usually restricted to the midrib and margin **O. echinocephala**
 2. Stem hairs flexible, 1-1.5 mm long. Leaves flat; hairs on the abaxial surface occurring on prominent lateral veins as well as the midrib ... **O. hispidula**

O. echinocephala Benth.

Partially woody perennial herb, up to 0.3 m high. Young stems with prominent longitudinal ribs; hairs widely spreading, stiff, the longest hairs 0.5-1 mm. Stipules 2-7 mm long, 2-toothed above the sheath. Leaves shortly petiolate; blade usually narrowly ovate to ovate, 10-35 x 1.5-9 mm, with recurved to revolute lateral margins, the midrib prominent on the undersurface; hairs similar to the stem hairs, occurring on the veins and margin of the undersurface, scattered on the upper surface. Inflorescence a compound head, subsessile or on a very short recurved peduncle, when terminal appearing to be on a long straight peduncle but actually sessile within the uppermost leaf pair, many-flowered, 7-12 mm or rarely 12-20 mm in diameter excluding the styles. Bracts and calyx lobes rigid and widely spreading, giving the inflorescence a spiky appearance, green, 3-8 mm long, with stiff cilia. Corolla pinkish, 3.5-4 mm long; tube glabrous; lobes 5, ca 1 mm long, hairy. Anthers exerted and maturing well before the style, 2-2.5 mm long. Style pinkish, 6-9 mm long. **Fig. 242**

Occurs in lateritic soils on the Darling Scarp and Range from Perth to Yarloop. Not recorded outside the Perth Region but probably not endemic to the region because it has been recorded close to the eastern margin.

Flowers August-November.



Fig. 242. *Opercularia echinocephala*. A, Flowering branch. B, Flower head. C, Female flower. D, Ovary and style. E, Persistent outer cup of compound fruit.

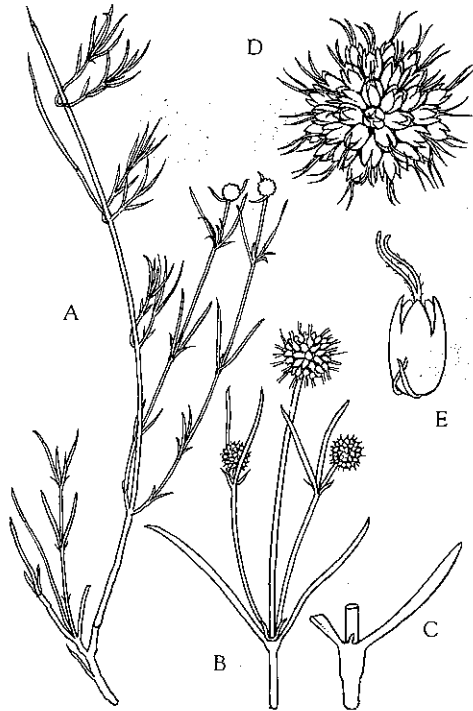


Fig. 243. *Opercularia vaginata*. A, Flowering branch. B, Upper part of flowering branch. C, Leaf. D, Flower head. E, Flower.

***O. hispidula* Endl.**

Hispid Stinkweed

Shrub, up to 1 m high, with rather slender branches, sparsely to rather densely hairy or rarely almost glabrous. Stems sometimes with prominent longitudinal ribs; hairs somewhat spreading, slender, 1-1.5 mm long, flexible. Stipules often free for most of their length, 2-10 mm long, usually with 2 or more branches or teeth, hairy. Leaves with a slender petiole 2-12 mm long; blade ovate or narrowly ovate, 23-47 x 6-16 mm, flat, acute, the undersurface distinctly reticulate-veined; hairs similar to those on the stems, occurring mainly on the major veins. Inflorescence a simple or compound head, usually subsessile or on a very short recurved peduncle, rarely on a longer peduncle in a primary stem fork, 6-13 mm in diameter. Calyx lobes purplish, subulate, 2.5-5 mm long, hairy. Corolla usually 3-4 mm long, sparsely hairy especially in the distal half; lobes 5, 1-1.5 mm long. Anthers 2-2.5 mm long. Style 4-8 mm long.

Occurs from Yanchep southward, in limestone areas along the coast and in lateritic areas with Jarrah on or near the Darling Scarp. Extends along the south coast to Cape Arid National Park.

Flowers September-December.

South of the Perth Region, specimens tend to have smaller leaves, smaller flower heads and smaller stamens.

***O. vaginata* Labill.**

Spreading shrub, usually 0.25-0.3 m high, often appearing glabrous. Young stems slender, ribbed; hairs very sparse to dense, widely spreading, < 0.5 mm long. Stipules free for most of their length, 1.5-4 mm long, the free portion entire or 2-toothed, ciliate. Leaves lacking a definite petiole, linear or very narrowly obovate, 12-65 x 0.7-4 mm, tapering to the base, acute, glabrous or with hairs similar to those on the stems. Inflorescence a compound head, on an erect rather long peduncle or sessile within the terminal leaf pair, green, 6-18 mm in diameter, many-flowered. Bracts and calyx lobes narrowly triangular, 1.5-8 mm long, ciliate. Corolla 3-4 mm long, glabrous or with hairs on the lobes; lobes 4 or 5, 1-1.5 mm long. Anthers 2-2.5 mm long. Style 4-6 mm long. Seeds reported to have 2 longitudinal appendages. **Fig. 243**

Occurs in sand dunes and limestone areas along the coast, also in lateritic and granitic areas on or near the Darling Scarp and on the Range. Extends from Shark Bay to Israelite Bay, occurring as far inland as Coolgardie.

Flowers mainly August-October.

Outside the Perth Region, this species appears to intergrade with *O. spermacocea* Labill. but the latter tends to have smaller leaves, inflorescence and peduncles, its leaves are often distinctly hairy and its seeds lack appendages.

*FAMILY 110 CAPRIFOLIACEAE

J. R. Wheeler

Shrubs, woody vines or rarely small trees or herbs. Leaves opposite, usually exstipulate, simple or pinnate, sometimes resinous. Inflorescence usually of bracteolate cymes or axillary pairs; flowers bisexual, 4 or 5-merous. Calyx small with imbricate lobes. Corolla actinomorphic or zygomorphic, sometimes 2-lipped, tubular with 4 or 5 spreading lobes; tube often nectariferous, sometimes gibbous or spurred at the base. Stamens 2-5, attached to the corolla tube and alternate with the corolla lobes; anthers versatile, dorsifixed, 2-celled, opening by longitudinal slits. Ovary inferior or rarely half-inferior, 2-5(-8)-celled, the cells sometimes incompletely connate in the upper part; ovules 1-many per cell, pendulous, placentation axile. Style terminal with a capitate or lobed stigma. Fruit a fleshy drupe, berry or capsule or sometimes dry and indehiscent. A family of 15 genera and 400 species mostly of the northern hemisphere in temperate and tropical mountainous regions. Many species are cultivated as ornamentals and have fragrant flowers.

*LONICERA L.

Shrubs, woody climbers or twiners. Leaves simple, usually entire, exstipulate but the leaf bases connected by a raised line at the node. Flowers in axillary pairs on long peduncles, in 3-flowered cymes or in terminal heads or whorls; each pair of flowers subtended by a pair of bracts and 4 bracteoles. Calyx 5-lobed. Corolla 5-merous, elongated, usually 2-lipped and zygomorphic. Stamens 5; filaments inserted near the top of the corolla tube; anthers exerted. Ovary 2 or 3-celled, the walls of ovaries of paired flowers sometimes connate; ovules 3-8 per cell. Style filiform, exerted; stigma capitate. Fruit a few-seeded berry, sometimes those of each pair are connate forming 1 berry. About 200 species of North America, Europe, Asia, Africa and Malaysia, with 1 introduced to W.A.

**L. japonica* Thunb.

Japanese Honeysuckle

Semi-evergreen woody climber. Stems hairy when young. Leaves petiolate, ovate to elliptic, 20-70 x 13-35 mm, acute or acuminate, sparsely hairy on the margins and veins only. Flowers in axillary pairs; peduncle 3-10 mm long, hairy; bracts leaf-like, ovate to elliptic, 7-15 x 4-10 mm; bracteoles minute, broadly ovate, ciliate. Calyx campanulate; tube 1-2 mm long; lobes triangular, 1-1.5 mm long, ciliate. Corolla cream in colour, 30-45 mm long, glandular-hairy; tube 15-23 mm long; lobes 10-20 mm long, 4 of them connate for most of their length forming an upper lip and 1 free, upper lip 4-lobed, lower lip entire. Berry black, globose, ca 6-7 mm across.

Cultivated as an ornamental in many parts of the world and naturalized in the region at Harvey. Also recorded at Balingup. Native to eastern Asia.

Flowers recorded for November.

FAMILY 111 VALERIANACEAE*J. R. Wheeler**

Herbs, rarely shrubs. Leaves opposite, rarely whorled or basal, exstipulate, simple, pinnatisect or pinnately compound. Inflorescence a dense or open cyme, bracteate, often bracteolate, usually without an epicalyx; flowers bisexual, usually zygomorphic. Calyx of 5-25 usually small segments, occasionally absent, often inrolled to form a ring which unrolls and expands in fruit to form a pappus. Corolla actinomorphic to zygomorphic, sometimes 2-lipped; the tube often gibbous or spurred and nectariferous; the lobes 3-5, unequal, imbricate. Stamens 1-4; filaments inserted towards the base of the corolla tube; anthers versatile, 2-celled, opening by longitudinal slits. Ovary inferior, 3-celled with 1 pendulous ovule in 1 cell and the other 2 cells sterile, reduced or absent. Style terminal; stigma entire or lobed. Fruit a dry, indehiscent, single-seeded achene, often crowned by the plumose calyx. A family of about 13 genera and 300 species, cosmopolitan but most frequent in north temperate regions.

***CENTRANTHUS Necker ex Lam. & DC.**

Erect, glabrous annual or perennial herbs. Inflorescence of bracteolate cymes. Calyx appearing annular in flower, with 5-25 inrolled lobes, which expand in fruit to form a plumose pappus. Corolla zygomorphic; the tube gibbous near the middle or spurred near the base, with an internal longitudinal membrane extending from the spur to the mouth of the corolla tube; lobes 5. Stamen 1. Flowers protandrous and cross pollinated by long-tongued insects. Achene dorsiventrally compressed, glabrous. About 12 species in the Mediterranean Region, with 2 introduced to W.A.

***C. macrosiphon Boiss.**

Glabrous annual herb, to 0.4 m high. Leaves obovate or elliptic, often broadly so, 12-65 x 4-45 mm, margins crenate, dentate or incised; the lower leaves narrowed into a petiole; the upper leaves sessile and smaller. Inflorescence usually capitate, a compound cyme with several partial cymes. Corolla pink to red; tube linear, 4.5-9 mm long; spur 0.5-1.5 mm long; lobes elliptic to broadly obovate, ca 1 mm long. Stamen exserted; anther oblong in outline. Style filiform; stigma shortly 3-lobed. Achene ovate in outline, 3-4 x 1.5 mm, 1 face smooth, swollen and rounded, the other face 3-ribbed; pappus ca 3 mm long.

Naturalized in disturbed areas of the Coastal Plain from Perth to Yalgorup National Park and on Garden Island. Native to Spain.

Flowers August-October.

FAMILY 112 DIPSACACEAE*J. R. Wheeler**

Herbs or rarely shrubs. Leaves opposite or sometimes whorled, exstipulate, simple, entire, toothed or dissected. Inflorescence a cymose head, rarely racemose, with a bracteate and hairy or naked receptacle, usually with a floral involucre of bracts, rarely the flowers in axillary verticillasters; flowers bisexual, zygomorphic, 4 or 5-merous, sessile, usually each surrounded by an epicalyx of connate bracts. Calyx deeply cut into 4 or 5 lobes or awns, rarely into 10 pappus-like bristles, rarely absent. Corolla slightly to distinctly zygomorphic, funnel shaped, 4 or 5-lobed. Stamens 4, rarely 2 or 3, exserted; filaments inserted towards the top of the corolla tube and alternating with the corolla lobes; anthers 2-celled, opening by longitudinal slits. Ovary inferior, adnate to the receptacle, 1-celled, with 1 pendulous ovule. Style filiform, terminal; stigma entire, notched or 2-lobed. Nectary gland present around the base of the style. Fruit a small dry indehiscent achene, enclosed by the epicalyx and usually crowned by the persistent calyx. A family of 10 genera and about 270 species, native to Europe, Asia and Africa. Some members are cultivated as garden plants.

***SCABIOSA L.**

Annual or perennial herbs, rarely shrubs. Leaves opposite, simple or pinnate. Inflorescence a pedunculate head; head convex with an involucre of 1-3 rows of herbaceous bracts; receptacle elongated with linear to ovate receptacular bracts. Epicalyx, sometimes called "involucre", cylindrical, 8-ribbed, grooved or pitted, the apex a plicate funnel shaped cup or "corona". Calyx cupular with 5 spreading setaceous lobes. Corolla usually 5-lobed. Stamens 4; filaments filiform; anthers linear in outline. About 100 species in temperate areas of Europe, Asia and Africa, with 1 introduced to W.A.

***S. atropurpurea L.**

Purple Pincushion

Sparsely hairy to glabrous, annual or perennial herb to 1 m high. Basal leaves petiolate, spatulate, crenate to coarsely toothed; cauline leaves lyrate to pinnatisect, ca 50-90 x 10-20 mm. Flower heads 20-40 mm across, becoming oblong in outline in fruit, the outermost flowers largest; involucre bracts 8-10, ovate, hairy and ciliate, acute; receptacular bracts ovate, ciliate. Epicalyx campanulate; corona short, scarious, incurved, undulate, lobed. Calyx tube ca 8 mm long, narrow, with 5 minutely barbed awns. Corolla white, pink, red or purple; tube to 10 mm long; lobes 4-6, spreading, unequal, to 11 mm long. Achenes elliptic in outline, ca 2 mm long.

Naturalized in disturbed areas of Perth suburbs. Native to the Mediterranean Region.

Flowers October-January.

FAMILY 113 ASTERACEAE (COMPOSITAE)**N.S. Lander**

Annual, biennial, or perennial herbs or shrubs, seldom climbers or small to medium sized trees, sometimes with milky latex; glabrous or with various types of glandular or eglandular hairs. Leaves alternate or opposite, sometimes opposite below and alternate above, seldom whorled, exstipulate, petiolate, simple and entire or variously toothed or lobed to compound or variously dissected. Flowers (florets) sessile in a compact head on a common receptacle, sometimes individually subtended by a small receptacular bract, nearly always collectively surrounded by an involucre of few to many bracts; heads variously radiate, discoid, disciform, or ligulate, according to the kind and arrangement of the flowers, or in many Mutisieae of still another special type; the receptacle sometimes pitted. Individual florets epigynous, perfect (bisexual) or unisexual or neutral. Corolla sympetalous, actinomorphic or zygomorphic, commonly 5-merous; calyx represented by a pappus of scales, awns, short setae, long, capillary, barbellate or plumose bristles, or a translucent to chartaceous or coriaceous crown or ring, or by some combination of these, or seldom absent. Stamens as many as the corolla lobes and alternate with them; filaments attached low in the corolla tube; anthers elongate, connate into a tube, rarely merely connivent, nearly always provided with a short, apical appendage, obtuse to often sagittate or prolonged into tails basally. Ovary inferior, of 2 carpels, 1-celled, with a single basal, erect ovule. Style usually 2-lobed (often undivided in functionally staminate flowers), variously hairy or papillose externally and sometimes also internally, sometimes stigmatic across the whole inner surface, but more often with ventromarginal stigmatic lines that often stop short of the summit so that there is a sterile appendage. Fruit an achene, rarely a drupe, crowned by the persistent (less often caducous) pappus. One of the two largest families of flowering plants, with more than 1100 genera and perhaps as many as 20,000 species, cosmopolitan.

The tribal classification of the composites adopted in the synopsis below is in accordance with that provided by the following reference which also serves as an excellent introduction to the extensive literature dealing with this family. Reference: Heywood, V.H., Harbourne, J.B. & B.L. Turner (eds) 1977. *The Biology and Chemistry of the Compositae* (2 vols). Academic Press, London.

SYNOPSIS OF ASTERACEAE IN THE PERTH REGION

Tribe Anthemideae	<i>*Argyranthemum, *Chrysanthemum, Cotula, *Soliva, *Ursinia</i>
Tribe Arctoteae	<i>*Arctotheca, *Arctotis, *Berkheya</i>
Tribe Astereae	<i>*Aster, Brachycome, *Conyza, Lagenifera, Olearia, *Solidago</i>
Tribe Calenduleae	<i>*Chrysanthemoides, *Osteospermum</i>
Tribe Cynareae	<i>*Carduus, *Carthamus, *Centaurea, *Cirsium, *Silybum</i>
Tribe Eupatorieae	<i>*Eupatorium</i>
Tribe Heliantheae	<i>*Acanthospermum, *Ambrosia, *Coreopsis, *Galinsoga, *Helianthus, *Xanthium</i>
Tribe Inuleae	<i>Angianthus, Asteridea, Blennospora, Calocephalus, Chrysocoryne, Craspedia, *Dittrichia, Gnaphalium, Helichrysum, Helipterum, Leptorhynchus, Millotia, Myriocephalus, Pithocarpa, Podolepis, Podotheca, Pseudognaphalium, Quinetia, Rutidosis, Siloxerus, *Vellereophyton, Waitzia</i>
Tribe Lactuceae	<i>Actites, *Chondrilla, *Cichorium, *Crepis, *Hedypnois, *Helminthotheca, *Hypochaeris, *Lactuca, *Leontodon, *Picris, *Sonchus, *Taraxacum, *Tolpis, *Tragopogon, *Urospermum</i>
Tribe Mutiseae	<i>Trichocline</i>
Tribe Senecioneae	<i>Senecio</i>

1. Milky latex absent. Corollas, or some of them, tubular, filiform, 2-lipped or absent.
2. Florets all male or all female in the same head: male heads discoid with tubular florets; female heads with florets lacking a corolla, and with involucre bracts connate about florets to form a hard, dehiscent, nut-like receptacle, the tips of the bracts often present as spiny processes.
3. Leaves pinnatisect or pinnatifid. Involucre bracts of male heads connate. Female heads 1-flowered..... ***AMBROSIA**
3. Leaves lobed but not pinnately divided. Involucre bracts of male heads free. Female heads 2-flowered..... ***XANTHIUM**
2. Florets all bisexual, or bisexual and unisexual or neuter in the same head.
4. Receptacular bracts present.
5. Leaves opposite, at least at the base of the plant.
6. Involucre bracts developing hooked spines, tightly embracing achenes. Disc florets male..... ***ACANTHOSPERMUM**
6. Involucre bracts without hooked spines, not embracing achenes. Disc florets all female or only the outermost male.
7. Receptacular bracts more or less conduplicate and clasping or enfolding the achenes..... ***HELIANTHUS**
7. Receptacular bracts more or less flat, not or scarcely embracing the achenes.
8. Ligules of marginal florets large, showy, bright yellow. Achenes winged..... ***COREOPSIS**
8. Ligules of marginal florets small, white. Achenes not winged..... ***GALINSOGA**
5. Leaves alternate or basal.
9. Leaves deeply dissected into filiform segments. Receptacular bracts truncate apically..... ***URSINIA**
9. Leaves broadly ovate, or triangular, with margins toothed but not dissected. Receptacular bracts more or less attenuate apically..... ***HELIANTHUS**
4. Receptacular bracts absent.
10. Margins of the receptacle pits extended to form linear processes. ***ARCTOTIS**

10. Margins of the receptacle pits (if present) not extended to form linear processes.
11. Heads radiate (marginal florets ligulate, central florets tubular), sometimes minutely radiate.
12. Pappus present.
13. Pappus coroniform, sometimes minutely so.
14. Pappus conspicuous.
15. Pappus dimidiate..... ***ARGYRANTHEMUM**
15. Pappus symmetric..... ***ARCTOTHECA**
14. Pappus minute and inconspicuous..... **BRACHYCOME**
13. Pappus of flexible or rigid bristles or capillary hairs or scales.
16. Marginal florets with 3-lobed ligule and inner lip of 2 narrow, coiled lobes; central florets bilabiate, the outer lip 3-lobed, the inner 2-lobed..... **TRICHOCLINE**
16. Marginal florets ligulate with 5-lobed limb; central florets tubular, 4 or 5-lobed.
17. Achenes of ray florets terete or slightly flattened.
18. Pappus of free, membranous scales..... ***ARCTOTHECA**
18. Pappus of bristles or capillary hairs.
19. Shrubs or undershrubs with woody stems..... **OLEARIA**
19. Herbs, stems not woody.
20. Involucral bracts uniseriate..... **SENECIO**
20. Involucral bracts multiseriate.
21. Plant strongly aromatic. Achenes hairy..... ***DITTRICHIA**
21. Plant more or less odourless. Achenes glabrous or minutely papillose.
22. Involucral bracts herbaceous, filiform or narrowly linear, glandular-hairy..... **ASTERIDEA**
22. Involucral bracts with a broad scarious lamina, the outer ones sessile, the inner ones with a herbaceous claw, septate-hairy..... **PODOLEPIS**
17. Achenes of ray florets distinctly flattened.
23. Florets golden yellow..... ***SOLIDAGO**
23. Florets white or pink, drying blue, or cream or pale yellow.
24. Heads conspicuously radiate (marginal florets clearly ligulate). Pappus of soft capillary hairs..... ***ASTER**
24. Heads inconspicuously radiate (marginal florets only minutely ligulate). Pappus of scabridulous bristles..... ***CONYZA**
12. Pappus absent.
25. Ray florets yellow.
26. Fruit a globular or ovoid, more or less smooth drupe..... ***CHRYSANTHEMOIDES**
26. Fruit an ovoid, broadly winged or more or less cylindrical achene.
27. Disc florets dark brown, reddish or blue. Achenes ovoid and broadly 3-winged..... ***OSTEOSPERMUM**
27. Disc florets yellow. Achenes more or less cylindrical-triangular..... ***CHRYSANTHEMUM**
25. Ray florets pink, white, blue or violet.
28. Achenes produced into a short, glandular beak..... **LAGENIFERA**
28. Achenes not beaked..... **BRACHYCOME**
11. Heads discoid (all florets tubular) or disciform (marginal florets filiform, or lacking corollas or otherwise differing from tubular central florets).
29. Heads small, crowded in a compound head on a common receptacle, sometimes surrounded by a general involucre; each partial head consisting of 1-25 tubular florets surrounded by a partial involucre.
30. Heads disciform: central florets tubular and bisexual; marginal florets tubular, filiform and female..... **GNAPHALIUM**

30. Heads discoid.
31. General involucre of numerous leaf-like bracts in several rows; bracts usually with a white, yellow or transparent scarious, erect or radiating lamina often forming a petal-like ray..... **MYRIOCEPHALUS**
31. General involucre absent or consisting of 1 or a few scarious or leafy bracts without an erect or radiating lamina.
32. Partial heads with receptacular bracts.
33. Pappus of 15-20 white, plumose bristles..... **CRASPEDIA**
33. Pappus of 4-7 jagged scales connate basally..... **SILOXERUS**
32. Partial heads without receptacular bracts.
34. Pappus absent or inconspicuous, consisting of a few short scales, sometimes ending in a barbellate or plumose bristle, or connate in a minute, more or less denticulate, jagged ring.
35. Bracts subtending partial heads more or less similar except for the concave nature of some to the capitular bracts. Achenes brown..... **ANGIANTHUS**
35. Bracts subtending partial heads totally unlike the capitular bracts. Achenes pink or purple..... **CHRYSOCORYNE**
34. Pappus conspicuous, consisting of several plumose bristles free or more or less dilated and shortly connate basally.
36. Involucral bracts of partial heads without a lamina. Achenes glabrous with a transparent pellicle which becomes glutinous when moistened. Pappus of 8-10 woolly-plumose bristles dilated and shortly connate basally to form a small cup..... **BLENNOSPORA**
36. Involucral bracts of partial heads with or without a broad, scarious lamina. Achenes glabrous or papillose, without a pellicle. Pappus of several flat, linear scales or bristles, ciliate-plumose from the base or the tip only, free or shortly connate basally..... **CALOCEPHALUS**
29. Heads distinct, not crowded into compound heads, sometimes densely clustered but without a common receptacle or general involucre.
37. Involucral bracts not spine-tipped but herbaceous or thin, dry and membranous or with a coloured, petal-like lamina.
38. Heads disciform, marginal florets filiform or lacking a corolla.
39. Marginal florets never lacking a corolla. Pappus present, conspicuous.
40. Outer involucral bracts herbaceous, with or without narrow, scarious margins, lacking a petal-like lamina.
41. Involucral bracts more or less equal, uniseriate, sometimes with a few small outer bracts..... **SENECIO**
41. Involucral bracts unequal, 3 or 4-seriate..... ***CONYZA**
40. Outer (and sometimes inner) involucral bracts dry and scarious, at least towards the tip, with or without a petal-like lamina.
42. All involucral bracts thin and transparent, without a coloured tip or petal-like lamina, the inner ones usually clawed and transversely wrinkled..... **PODOLEPIS**
42. Almost all or at least the inner involucral bracts with a coloured tip or petal-like lamina.
43. Nearly all florets tubular and bisexual, outermost few filiform and female..... **HELICHRYSUM**
43. Nearly all florets filiform and female, innermost few tubular and bisexual.
44. Innermost involucral bracts concave and embracing adjacent floret..... ***VELLEREOPHYTON**

44. Innermost involucre bracts flat, not embracing adjacent floret.
45. Involucre bracts pale yellow or gold. Florets pink or reddish..... **PSEUDOGNAPHALIUM**
45. Involucre bracts transparent, green, pale brown or buff. Florets white, tipped reddish purple..... **GNAPHALIUM**
39. Marginal florets often lacking corolla. Pappus absent.
46. Heads distinctly pedunculate..... **COTULA**
46. Heads sessile..... ***SOLIVA**
38. Heads discoid, all florets tubular, bisexual, central florets sometimes male.
47. Pappus absent..... **PITHOCARPA**
47. Pappus present.
48. Pappus of apically notched or awned scales.
49. Achenes papillose on outer surface. Pappus scales 7-11, obovate, apically notched..... **RUTIDOSIS**
49. Achenes uniformly silky-hairy. Pappus scales produced into long, fine awns apically..... **QUINETIA**
48. Pappus of capillary, barbellate or plumose bristles.
50. Achenes not shortly stipitate or beaked..... ***EUPATORIUM**
50. Achenes shortly stipitate or beaked.
51. Outer involucre bracts herbaceous, with more or less scarious margins and lacking a petal-like lamina.
52. Achenes shortly stipitate, not beaked. Pappus of barbellate or plumose bristles..... **PODOTHECA**
52. Achenes sessile, conspicuously beaked. Pappus of barbellate bristles..... **MILLOTIA**
51. Outer (and sometimes inner) involucre bracts dry and scarious, at least towards the tip, with a more or less petal-like lamina.
53. Achenes projected into a long, slender apical beak.
54. Outer involucre bracts thin and transparent..... **LEPTORHYNCHOS**
54. Outer involucre bracts opaque and coloured pink, white or yellow..... **WAITZIA**
53. Achenes not projected into an apical beak.
55. Pappus bristles uniformly plumose from the base, sometimes more or less basally dilated and scale-like..... **HELIPTERUM**
55. Pappus bristles barbellate from the base, plumose towards the tips..... **HELICHRYSUM**
37. Involucre bracts ending in sharp tips or spines.
56. Receptacles with pit margins produced into acuminate processes, but not setose..... ***BERKHEYA**
56. Receptacle densely setose.
57. Achenes with an oblique attachment scar.
58. Outer involucre bracts not resembling leaves. Pappus of uneven bristles or absent in all achenes or marginal achenes only..... ***CENTAUREA**
58. Outer involucre bracts as long as and resembling leaves; pappus of linear scales, sometimes absent from marginal achenes..... ***CARTHAMUS**
57. Achenes with a nearly central, horizontal, basal attachment scar.
59. Pappus bristles plumose..... ***CIRSIIUM**
59. Pappus bristles scabrous.
60. Stems with narrow, spinose wings. Anther filaments free..... ***CARDUUS**
60. Stems not spiny-winged. Anther filaments connate..... ***SILYBUM**

1. Milky latex usually present. Corollas of all florets ligulate.
61. Pappus, at least of outer achenes, of small scales or a denticulate crown.
62. Florets blue. Pappus of outer achenes of minute, fringed scales..... *CICHORIUM
62. Florets yellow. Pappus of outer achenes of small scales or a denticulate crown.
63. Inner involucre bracts becoming incurved, swollen and firm in fruit, partly enclosing the outer achenes..... *HEDYPSOIS
63. Inner involucre bracts becoming slightly hardened at fruiting, but not swollen or incurved or enclosing the outer achenes..... *TOLPIS
61. Pappus of simple capillary bristles or plumose bristles.
64. Pappus of plumose bristles, at least in part.
65. Receptacular bracts present..... *HYPOCHAERIS
65. Receptacular bracts absent.
66. Plants glabrous at maturity, sometimes floccose when young.
67. Leaves all radical. Plumose branches of the pappus not intertwining..... *LEONTODON
67. Leaves radical and cauline. Plumose branches of the pappus intertwining..... *TRAGOPOGON
66. Plants rough-hairy.
68. Beak of achenes short, hollow. Pappus uniseriate..... *UROSPERMUM
68. Beak of achenes slender, not hollow. Pappus biseriate.
69. Outer involucre bracts oblong-cordate, inner ones clearly smaller, linear or narrowly elliptic. Achenes uniform, transversely wrinkled, orange..... *PICRIS
69. Outer involucre bracts broadly oblong-cordate, frequently equal to inner ones. Achenes often dimorphic, outer ones villous, white, inner ones transversely wrinkled, red-brown. *HELMINTHOTHECA
64. Pappus of capillary bristles, at most somewhat barbellate.
70. Achenes with a long, slender beak, from half as long to longer than the body.
71. Plants caulescent with some more or less well-developed cauline leaves; branched above and with several to many heads.
72. Florets numerous. Achenes without scales at the base of the beak..... *CREPIS
72. Florets 9-12. Achenes with a circle of small scales at the base of the beak..... *CHONDRILLA
71. Plants strictly scapose, each scape with a solitary, terminal head..... *TARAXACUM
70. Achenes beakless or with a short, stout beak less than half as long as the body.
73. Achenes obconic, truncate. Pappus of few coarsely scabrous bristles..... *TOLPIS
73. Achenes narrowed or constricted apically or more or less beaked. Pappus of capillary bristles, sometimes intermixed with fine, down-like, barbed hairs.
74. Pappus of capillary bristles intermixed with fine, down-like, barbed hairs.
75. Achenes elliptic in outline, narrowed towards both ends; margin wingless or narrowly winged; faces with 1-4 prominent ribs which are never raised to form small wings. *SONCHUS
75. Achenes flask shaped in outline, constricted apically; margin with broad, flat wings; faces with 3 prominent ribs more or less raised to form smaller secondary wings..... ACTITES
74. Pappus of capillary bristles only.
76. Involucre mostly cylindrical. Achenes more or less compressed and unequally ribbed with minute, ascending hairs on the ribs or at least on the margins..... *LACTUCA
76. Involucre usually obconic. Achenes more or less terete and equally ribbed, rough with minute, ascending projections on the ribs..... *CREPIS

***ACANTHOSPERMUM** Schrank

Branching, annual herbs. Leaves opposite, entire, repand or dentate. Heads solitary in leaf axils and in forks of stems, sessile or shortly pedunculate, inconspicuously radiate, heterogamous, homochromous. Involucre of 2 dissimilar series: the outer of 4-6 broad, foliaceous bracts, the inner of prickly or spiny, bony bracts each enclosing an achene; receptacle convex, chaffy throughout with soft, loosely folded bracts which embrace the disc achenes. Ray florets 5-10, female, ligulate, minute, yellow; achenes somewhat compressed parallel to radii of head, pappus absent. Disc florets 5-15, male, yellow; anthers entire or sagittate basally. A genus of about 5 species, all weedy, native to tropical and subtropical America. One species introduced in W.A.

***A. hispidum** DC

Starburr

Erect, annual herb with stems which fork repeatedly forming a flat-topped plant to ca 1 m tall, conspicuously hirsute. Leaves opposite, dull green, ovate or elliptic, 25 x 5-30 mm; base more or less cuneate; margin shallowly toothed; apex obtuse. Heads solitary in forks of upper branches, sessile; outer involucre bracts 4-6, foliaceous, elliptic to ovate. Ray florets 5-10, inconspicuous, ca 1.2 mm long; achenes cuneate, ca 6 mm long, flattened, black, smooth, each enclosed by a spiny bract surmounted by 2 rigid subulate awns ca 4 mm long. Disc florets ca 6, campanulate, ca 2 mm long; anthers entire basally; achenes abortive, each enfolded in a chaffy bract ca 1.5 mm long.

A weed of sandy soils, often on roadsides, alluvial flats and waste places. A single, doubtful record from Kenwick is recorded for the Perth Region. Also recorded from the Kimberley Region. A native of Brazil, now widely distributed in tropical and subtropical regions.

Flowers May-June.

An undesirable and potentially serious introduced weed the burrs of which can irritate and injure human skin.

ACTITES N.S. Lander

Fleshy, perennial herbs with creeping rhizome. Leaves alternate, deeply pinnatisect, lobed or entire, spathulate or narrowly ovate, sessile or tapering into narrow strap-like bases. Heads on leafy scapes, homogamous, homochromous; involucre of many imbricate bracts in several rows; bracts foliaceous with a median line of prominent, spiny processes. Florets bisexual, ligulate, usually yellow, hairy below ligule. Achenes flask shaped, smooth and glabrous, margins forming broad, flat wings, with ribs on face often raised to form smaller wings. Pappus of many minutely barbellate bristles and barbed hairs connate in tufts or free to their bases. A monotypic genus endemic to Australia. Reference: Lander, N.S. 1976. *Telopea* 1,2: 129-135.

A. megalocarpa (J.D. Hook.) N.S. Lander

Fleshy, perennial herb to 0.3 m tall, with creeping rhizome, forming large clumps. Stems branched, somewhat woody at base, otherwise herbaceous with longitudinal furrows, glabrous. Leaves radical and cauline, alternate, deeply pinnatisect, lobed or entire, narrowly spathulate or elliptic, 15-170 x 5-45 mm, tapering into narrow, strap-like bases or sessile with cordate bases, coriaceous, glabrous; margins sinuate, irregularly prickly-dentate; apex acute or obtuse. Heads 10-30 mm in diameter, pedunculate on stout, leafy, glabrous scapes to 210 mm long; involucre bracts many, narrowly triangular, 4-27 x 1-5 mm, with a median line or up to 10 prominent spiny processes. Florets yellow, sometimes pale purple basally, 11-20 mm long, sparsely hairy immediately below ligule; anther tubes 1.9-3.8 mm long; styles 0.6-1.8 mm long, densely barbellate. Achenes cream to yellow, flask shaped, constricted at apex, 4.3-8.0 x 1.3-3.2 mm, flattened, glabrous, smooth; margins forming broad, flat wings with prominent ribs on faces often raised to form smaller wings. *Embergeria megalocarpa* (J.D. Hook.) Boulos

Confined to coastal dunes and cliffs. Recorded from Garden Island. Also from near Augusta and east of Esperance. Occurs at various points along the coast of S.A., Vic., Tas., N.S.W. and Qld.

Flowering October in the Perth Region, elsewhere September-June.

***AMBROSIA L.**

Monoecious, annual or perennial herbs, frequently woody at base, often rhizomatous or stoloniferous, leafy, resinous and aromatic with glandular hairs. Leaves alternate or opposite at lower nodes, usually petiolate, entire, palmately or pinnately lobed or dissected. Heads unisexual, both male and female borne in narrow, elongate raceme-like or spike-like aggregations with female heads clustered in axils of basal leaves and of bracts on short branches below male heads. Male heads nodding, usually hemispherical; involucre bracts few, more or less connate in a single row; receptacle flat, chaffy throughout; florets several to many, each with rudimentary style and aborted ovary; anthers usually more or less separate at anthesis; pappus absent. Female heads with one or few florets; involucre bracts connate about the florets to form a hard, dehiscent, nut-like involucre, the tips of the bracts often evident as spiny processes; florets lacking pappus, corolla and stamens. A cosmopolitan, predominantly American genus of about 50 species, many of them desert shrubs, with 2 species introduced in W.A. The pollen of all species is highly allergenic.

1. Taprooted annual. Cauline leaves distinctly petiolate. Fruiting involucre somewhat spiny at apex..... ***A. artemisiifolia**
 1. Rhizomatous perennial forming dense clumps. Cauline leaves subsessile. Fruiting involucre tuberculate, not spiny at apex..... ***A. psilostachya**

***A. artemisiifolia L.**

Annual Ragweed

Erect, branching herb to ca 1 m tall, taprooted; hirsute or hispidulous. Leaves mostly opposite, the upper ones alternate, petiolate, subsessile or sessile on the inflorescence; blades ovate, to 55-100 x 20-70 mm, pinnatifid or bipinnatifid; lobes narrowly elliptic, acute, directed forward; rachis winged, to 3 mm wide; petioles to 30 mm long. Male heads in raceme-like aggregations to 200 mm long; female heads in few to several-headed clusters, the inflorescence often much-branched and paniculate. Male involucre slightly oblique, 2.5-4 mm in diameter; bracts crenate at the margins, villous, long-hirsute or hispidulous; chaffy bracts of the receptacle filiform. Female involucre obovoid, ca 3 mm long, hispid-strigose or smooth, angled and somewhat reticulate; spines 5-7, subulate, short, surrounding the head near apex. Fruiting involucre somewhat spiny at apex.

A weed of roadsides, water courses and cultivation in wetter areas. Sometimes invading crops, but not a serious weed of cultivation. Recorded from Armadale. A native of North America, now cosmopolitan.

Flowers May.

This species is a major cause of hayfever and contact dermatitis. The notes with the single specimen from Armadale mention "runners", not usually a feature of this species. The specimen agrees with descriptions of this species from elsewhere in all other respects.

***A. psilostachya DC.**

Perennial Ragweed

Erect, branching, perennial herb to ca 1 m tall, rhizomatous and forming dense clumps, scabrous hairy. Leaves mostly alternate, lower ones opposite, subsessile; blades ovate to narrowly elliptic, 30-100 x 15-75 mm, pinnatifid or bipinnatifid; lobes narrowly elliptic, acute or acuminate, entire or the lower few-toothed, scabrous and glandular-hairy, the hairs with blistery bases. Inflorescence often much-branched, 35-100 mm long; male heads in raceme-like aggregations; female heads in few to several-headed clusters. Male involucre oblique, ca 2.5 mm diameter; bracts crenate at the margins, often with 2 larger teeth at the distal side, hispidulous, the short hairs with conspicuous, blistery bases. Female involucre obovoid, ca 2.5 mm long, rugose, hirsute; spines 4-6, short, acute or blunt. Fruiting involucre tuberculate at apex.

An aggressive coloniser of waste ground. Recorded from the metropolitan area to Rockingham. Also from Busselton, Koorda and Norseman. A native of North America, now cosmopolitan.

Flowers February-March in the Perth Region, April elsewhere.

This species is a major cause of hayfever and contact dermatitis.

ANGIANTHUS Wendl.

Annual herbs or perennial shrubs, glabrous or white woolly-hairy. Leaves usually alternate, sessile, entire. Heads compound, ellipsoid or obovoid, of 20-200 or up to 1500 partial heads; bracts subtending compound heads leaf-like, more or less inconspicuous or forming a general involucre much shorter than the head. Partial heads with 1-4 abaxial, translucent subtending bracts that overlap the involucre bracts; involucre bracts (2-)4, translucent, arranged so that 2 outer, concave bracts surround (0-)2 inner, flat bracts; receptacle naked. Florets (1)2(3) per partial head, bisexual, tubular, 3-5-lobed; anthers tailed; style branches truncate. Achenes ellipsoid or more or less obovoid, glabrous, variably papillose. Pappus setose, chaffy or coroniform, or absent. A genus of 15-17 species, endemic to Australia, 14-16 in W.A. Reference: Short, P.S. 1983. *Muelleria* 5,2: 152-179.

1. Bushy shrubs or undershrubs. Receptacle of compound heads conic. **A. cunninghamii**
1. Herbs. Receptacle of compound heads convex.
 2. Pappus absent..... **A. preissianus**
 2. Pappus of 5 or 6 conspicuous, ovate, awned scales..... **A. micropodioides**

A. cunninghamii (DC.) Benth.

A low, much-branched bushy shrub or undershrub to 0.5 m tall, densely white woolly-hairy. Leaves spreading or recurved, oblong-cuneate to linear, 5-2.6 x 2-3 mm; apex obtuse. Compound heads ovoid-globular, 5-9 x 4.5-8 mm, in terminal corymbs, the upper leaves passing into oblong, imbricate floral leaves forming a general involucre shorter than the head. Partial involucre of 2 keeled and 2 flat bracts. Receptacle of compound heads conic. Florets 2 or 3 in each partial head, thickened and bulb-like at base. Achene 1-1.5 x 0.5 mm. Pappus absent.

Occurs on sands of coastal foredunes, on the margins of salt pans and on limestone. Recorded from Claremont. Also recorded along the coast to near Carnarvon.

Flowers March in the Perth Region, elsewhere February-July.

A. micropodioides (Benth.) Benth.

Erect or decumbent annual to 100 mm tall, with loose, white woolly hairs. Leaves narrow-linear, 5-15(28) x 0.5-1 mm, mucronate. Compound heads more or less globular, 4-6 x 4-5 mm, closely surrounded by an involucre of leaves exceeding the head. Partial heads with 2 keeled and 2 narrowly spatulate, flat, transparent involucre bracts. Receptacle of compound heads convex. Florets 2 in each partial head. Achene 8-10 x 5-6 mm. Pappus of 5 or 6 obovate, jagged scales each terminating in simple awns, shorter than the florets.

Recorded from the banks of the Swan Estuary at Point Walter and at East Perth. Extending northwards to Geraldton and eastwards to Lake Campion.

Flowers December-February in the Perth Region, elsewhere in November.

A. preissianus (Steetz) Benth.

Erect or prostrate annual to 150 mm tall, sometimes simple, usually much branched from the base; glabrous or with an indumentum of loose, white woolly hairs. Leaves scattered, narrowly elliptic or linear, 5-12 x 1-2 mm, more or less succulent; mucronate. Compound heads turbinate or hemispherical when fully mature, 4-10 x 4-10 mm, surrounded by an involucre of narrowly ovate or narrowly elliptic leaves more or less equal to the head. Partial involucre of 2 keeled and 2 flat, translucent bracts. Receptacle of compound heads convex. Florets 2 in each partial head, sometimes thickened and bulb-like at the base. Achene 5-8 x ca 3 mm, with an apical fringe of glandular hairs. Pappus absent.

Occurs in sandy soil along water courses, estuaries, salty claypans, in soil pockets on granite outcrops and by roadsides. Recorded from Cannington and Bunbury. Also from Watheroo National Park to Cape Arid. Occurs in S.A. and Vic.

Flowers October in the Perth Region, elsewhere October-December.

***ARCTOTHECA** Wendl.

Perennial herbs, stemless or sometimes creeping or decumbent. Leaves alternate, petiolate, pinnatifid, rarely undivided, white-woolly beneath. Heads solitary, pedunculate, terminal or axillary, radiate, heterogamous, homochromous or heterochromous; involucre campanulate; bracts in 3-6 rows, sometimes acuminate, glabrous or with cobweb-like hairs; receptacle flat, without bracts. Ray florets sterile, ligulate; ligule 3-toothed and much longer than the tube; staminodes sometimes present; pappus coroniform or of several scales or absent. Disc florets bisexual, funnel shaped with 5 acute lobes; style terete, thickened and cylindric above; achenes more or less obovoid or cylindric; pappus of translucent scales or a crown of membranous scales. A genus of about 4 species, native to southern Africa, 2 introduced in W.A.

1. Leaves lyrate, variable in the degree of incision, not fleshy. Disc florets becoming black. Pappus of 6-8 free, membranous scales..... **A. calendula*
 1. Leaves broadly ovate, margin sinuate or entire, base truncate, cordate or broadly cuneate, fleshy. Disc florets yellow. Pappus coroniform (membranous scales connate)..... **A. populifolia*

****A. calendula* (L.) Levyns**

Capeweed

Decumbent or ascending, annual herb to ca 0.3 m tall with a basal rosette, conspicuously hairy. Leaves alternate, lyrate, 30-250 x 10-45 mm, green above, white-tomentose below, not fleshy, variable in the degree of incision, the lobes toothed. Heads solitary on glandular-hairy scapes; involucre almost hemispherical; bracts in 4 or 5 unequal rows, green, broad, the outer ones with short, spreading tips. Ray florets 15-20; ligule 15-25 mm long, yellow with dark purple veins, often with a brown blotch at the base. Disc florets numerous, almost black; achene obovoid, enveloped in pink or brown wool; pappus of 6-8 narrowly obovate, membranous, translucent scales. *Arctotis calendula* L., *Cryptostemma calendula* (L.) Druce **Fig. 244**

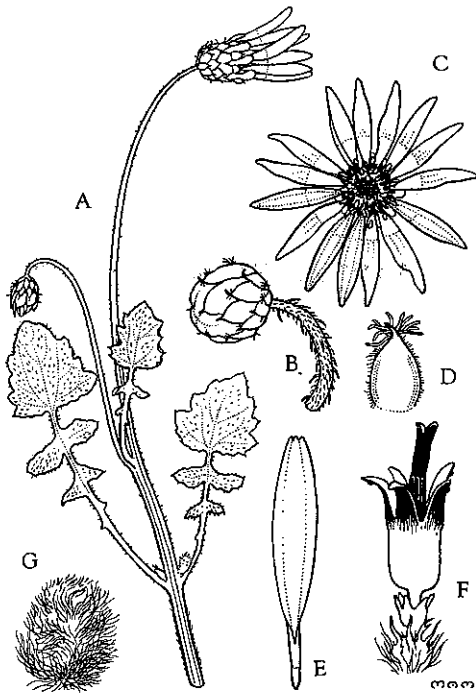


Fig. 244. *Arctotheca calendula*. A, Flowering stem. B, Immature flower head. C, Flower head. D, Involucral bract. E, Ray floret. F, Disc floret. G, Achene.

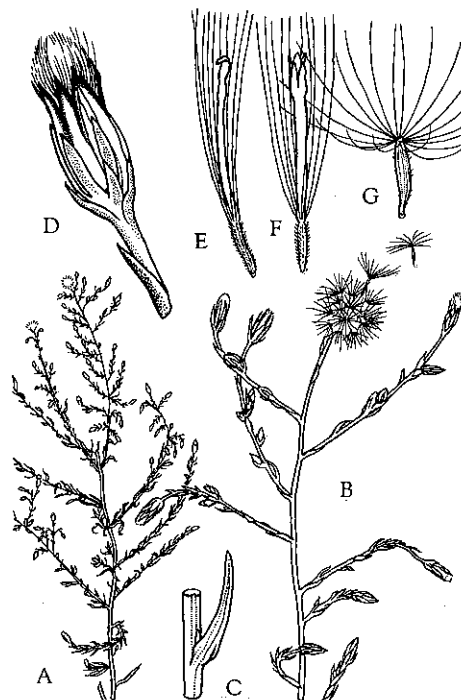


Fig. 245. *Aster subulatus*. A and B, Flowering and fruiting branches. C, Leaf. D, Flower head. E, Ray floret. F, Disc floret. G, Achene.

Found throughout the Perth Region. Widespread in the south west. A weed of roadsides, waste places and cultivated land. A native of South Africa, now widespread.

Flowers July-October in the Perth Region, elsewhere August-November.

This species can cause contact dermatitis.

***A. populifolia** (P. Bergius) Norlindh

Dune Arctotheca

Decumbent, fleshy, perennial herb to 0.3 m tall, densely white woolly-hairy. Leaves alternate, broadly ovate, 11-75 x 10-85 mm, fleshy; margin sinuate or entire; base truncate, cordate or broadly cuneate; apex obtuse; petioles stout, to 120 mm long, broadening at the base. Heads solitary on stout scapes; involucre almost hemispherical, to 20 mm wide; bracts in 4 or 5 unequal rows, the inner ones with translucent margins. Ray florets 10-15; ligule 5.5-9.0 mm long, yellow, becoming purple, prominently veined. Disc florets numerous, yellow; achene enveloped in white wool; pappus coroniform, of connate, membranous, translucent scales. *Arctotheca nivea* (L. f.) Lewin

On coastal foredunes throughout the Perth Region. Also found along the coast from Geraldton to Esperance. A weed of coastal sand dunes. A native of South Africa and Mozambique, now widespread.

Flowers May-November in the Perth Region, until January elsewhere.

Young specimens from Bunbury and Capel exhibit marked lobing of the leaves, a phenomenon discussed by Norlindh, T. 1967. *Aquilo Ser. Bot.* 6: 84-93.

***ARCTOTIS L.**

Herbs, sometimes almost stemless, tomentose or glandular-hairy. Leaves alternate, sessile or petiolate, entire to pinnatisect. Heads solitary, pedunculate, radiate, heterogamous, homochromous or heterochromous; involucre campanulate; bracts in 5 or 6 rows, ovate to linear, acuminate with margins membranous and sometimes ciliate; receptacle flat, honeycombed, with the margin of the pits extended to form linear processes. Ray florets female, ligulate; ligule 3-toothed, up to 6 times longer than the tube; staminodes often present; style terete, often swollen at the base, thickened above, with more or less narrowly elliptic branches; achene cylindrical, ribbed, sometimes transversely rugose, with 2 linear or terete cavities on the back and with a basal tuft of long hairs; pappus of 5-10 translucent scales as long as the corolla-tube. Disc florets bisexual, tubular, abruptly widened above with 5 narrowly elliptic, usually glandular lobes; anthers shortly auriculate at the base, with ovate apical appendages; style terete, with a ring at the base and thickened above, shortly 2-lobed; achene with a basal tuft of hairs; pappus of delicate, translucent scales, scarcely longer than the achene. A genus of about 100 species from Africa, with 1 introduced in W.A.

***A. stoechadifolia** P. Bergius

White Arctotis

Prostrate or decumbent, perennial herb, softly white-hairy. Leaves obovate-cuneate to narrowly elliptic, the narrow ones lyrate, the upper ones sessile and toothed. Heads solitary on conspicuous scapes, radiate, heterogamous, heterochromous; involucre hemispherical, to 30 mm in diameter; involucral bracts many in several rows, the outer ones acuminate, the inner ones broad and scarious. Ray florets many; ligule white with yellow base. Disc florets numerous. Achenes silky hairy, 5-ribbed, 3 lateral ribs winged and incurved towards the middle giving the appearance of a 3-celled fruit. Pappus of 7 or 8 pink, oblong scales.

A weed of coastal sand dunes. Naturalized at Swanbourne and City Beach. Also found at Jurien Bay. Specimens from outside the Perth Region have prominently lobed leaves. A native of South Africa, introduced to Australia as a garden plant.

Flowers October-November in the Perth Region, September-January elsewhere.

***ARGYRANTHEMUM** Webb

Suffruticose perennials to 1.5 m tall; stems procumbent to ascending, sulcate. Leaves more or less entire or variously dissected. Heads (1-)2-50 per branch on erect, striate peduncles in a lax, corymbose inflorescence, radiate, heterogamous, heterochromous or homochromous; involucre hemispherical; bracts imbricate in 3 or 4 rows, herbaceous, green, the veins thick, the margins scarios; receptacle convex to conic, naked. Ray florets female, ligulate, yellow, white or pink; achenes trigonous, with 1-3 wings, or wingless, turbinate, usually arcuate, sometimes coalesced into groups of 2-9; pappus completely or partially coroniform, or absent. Disc florets bisexual; corolla tubular, campanulate, 5-lobed, yellow or deep purple-red, usually sparsely glandular-hairy; achenes obconic, terete, 4-angled or laterally compressed with 1 or 2 wings or wingless, sometimes coalesced with the ray achenes; pappus completely or partially coroniform, or absent. A genus of 22 species endemic to Madeira and the Canary Is, with 2 introduced in W.A. Reference: Humphries, C.J. 1976. Bull. Brit. Mus. (Nat. Hist.) Bot. 5(4): 147-240.

1. Stout candelabrum-like plant. Leaves glaucous, crowded around the base of the peduncle, the lower ones caducous..... *A. foeniculaceum
 1. Delicate plant. Leaves green, on all parts of the stem, the lower ones persistent..... *A. frutescens

***A. foeniculaceum** (Willd.) Webb ex Schultz-Bip.

Tenerife Daisy

Stout, candelabrum-like, procumbent to ascending perennial to 1 m tall, branching throughout the plant, glabrous. Leaves 30-100 x 10-65 mm, more or less obovate in outline, bipinnatisect (rarely tripinnatisect), petiolate, glabrous, glaucous, crowded around the base of the peduncle, the internodes short; primary lobes 2-8, 0.5-5 x ca 0.5 mm, almost opposite, acuminate; secondary lobes 2-10, alternate to almost opposite, 2-15 x ca 2 mm, acute; lower leaves caducous. Heads solitary or 1-5 per inflorescence; involucre 10-18 mm diameter; bracts in 3 rows, the outer ones triangular to obspathulate, scarios with a fleshy midrib; inner bracts with an expanded, scarios, translucent apex. Ray florets 16-22 x 4-5 mm, white, the apex obtuse to 2 or 3-lobed; achene (3-)5-6 x 3-5 mm, trigonous, arcuate, 2 or 3-winged, with 2 wide lateral wings and 1 small, cuneiform abaxial wing; pappus coroniform, dimidiate on the dorsal edges, dentate. Disc florets 3-3.5 mm long; corolla yellow, the tube whitish; achenes 2-3 x 1-2 mm, obconic, laterally compressed to more or less quadrangular, usually with 1 small abaxial wing, arcuate in outer row; pappus coroniform, dentate.

Recorded from near Claremont where it has colonized limestone rises. A species native to Madeira and the Canary Islands.

Flowers December.

***A. frutescens** (L.) Schultz-Bip.

Marguerite

Delicate, procumbent to erect perennial to 0.8 m tall, branching throughout or only at the base, glabrous to hispidulous. Leaves 15-80 x 5-60 mm, obovate to narrowly obovate in outline, pinnatisect to bipinnatisect (rarely tripinnatisect), petiolate, glabrous to hispidulous, coriaceous, succulent; primary lobes 2-10, opposite or alternate, 2-40 x 0.5-6 mm, elliptic to narrowly elliptic; secondary lobes 2-6, opposite to alternate, 1-10 x 0.5-4 mm, narrowly elliptic, obtuse or acuminate. Leaf clusters common in the axil of cauline leaves; lower leaves persistent. Heads 4-30 per inflorescence; involucre 6-22 mm diameter; bracts in 3 rows, triangular to obspathulate or narrowly obovate; inner bracts scarios with an expanded, translucent apex. Ray florets 7-15 x 2-5 mm, white, 1-3-lobed at the apex; achenes 3-5 x 2-4.5, trigonous, arcuate, 3-winged, two lateral wings expanded, coriaceous, with convex adaxial surfaces, abaxial wings obtriangular; pappus coroniform, dimidiate, the margins laciniate. Disc florets 2-4 mm long, corolla yellow; achene 2.5-4 x 1-2 mm, obconic, laterally compressed to sometimes more or less terete, arcuate in outer row, 1-winged, irregularly ribbed; pappus coroniform, dimidiate, with laciniate margins, sometimes vestigial or absent. *Chrysanthemum frutescens* L.

Recorded from Freshwater Bay where it has colonized a limestone cliff. A species native to the Canary Islands, now widely cultivated.

Flowers July.

*ASTER L.

Annual or perennial herbs. Leaves simple. Heads pedunculate, in leafy panicles or solitary, radiate, usually heterogamous; involucre bracts imbricate and in many rows; receptacle flat, pitted, the pits with toothed membranous borders, bracts absent. Ray florets in a single row, rarely absent, female or neuter, ligulate. Disc florets bisexual, tubular; anthers entire and rounded basally. Achenes flattened but not ribbed. Pappus of several rows of capillary hairs. A genus of about 250 species of which half are from central and North America, the remainder from Europe and a few from South Africa. One species introduced in W.A.

***A. subulatus** Michaux

Bushy Starwort

Erect, annual or biennial herb, 0.3-0.8 m tall, much-branched; with a few scattered simple hairs or almost glabrous. Leaves alternate, sometimes fasciculate, linear, narrowly elliptic, ovate or obovate, 25-155 x 3-16 mm, those of the stem sessile or half-clasping, those of the inflorescence reduced and bract-like. Heads small in large, loose panicles; involucre cylindric, 2-4 mm diameter, bracts in 3 or 4 rows, narrowly ovate, herbaceous with scarios margins, glabrous. Ray florets many in several rows, female, ligulate; ligules white or pink, drying blue, almost erect and slightly exceeding the involucre. Disc florets 8-10. Achenes flattened, narrow, hairy, ca 2 mm long. Pappus of many, soft capillary bristles. Fig. 245

A weed of damp soils in disturbed areas. Widespread and abundant in the Perth Region. Also recorded from Busselton, Augusta and Pingelly. A native of North America, now cosmopolitan.

Flowers February-November in the Perth Region, elsewhere throughout the year.

ASTERIDEA Lindley

Erect or spreading, annual herbs, sometimes persistent, with one or several stems. Leaves alternate, linear to narrowly elliptic, entire. Heads terminal, solitary, pedunculate, radiate, heterogamous, homochromous or heterochromous; involucre broadly campanulate or hemispherical; bracts numerous, herbaceous, filiform or narrowly linear; receptacle flat, naked. Marginal florets in a single row, sometimes few, female, ligulate, irregular or tubular. Central florets numerous, bisexual, tubular; anthers with fine tails. Style branches truncate or obtuse. Achenes fusiform, papillose or glabrous. Pappus or capillary bristles, either minutely barbellate or plumose in the upper part. A genus of about 7 species, endemic to southern Australia, mostly in W.A. Reference: Kroner, G. 1980. Mitt. Bot. Munchen 16: 1-268.

1. Pappus bristles plumose in upper half..... **A. gracilis**
 1. Pappus bristles barbellate, not plumose in upper half..... **A. pulverulenta**

A. gracilis A. Gray

Erect, annual herb, glabrous or slightly woolly hairy. Leaves alternate, sessile, linear to narrowly elliptic, 15-70 x 1-5 mm, upper surface green, with scattered simple hairs, lower surface white with appressed woolly hairs; margin entire; apex acute. Involucre hemispherical, 4.0-7.5 mm in diameter; bracts in 8-11 rows, filiform or narrowly linear, conspicuously glandular-hairy, the inner ones with apices fimbriate and brush-like. Marginal florets 5-8; ligule broad, 3-lobed, white to pink. Central florets white. Achenes small, ellipsoid, brown, glabrous. Pappus of 3-6 bristles, plumose in the upper half. *Athrixia gracilis* (A. Gray) Benth.

Occurring on heavy clay at Helena Valley and near Gosnells. Also recorded from west of Williams.

Flowers September.

A. pulverulenta Lindley

Erect, annual herb, conspicuously hairy with simple hairs. Leaves alternate, sessile, linear to narrowly elliptic, to 15-70 x 1-6 mm, margin entire; apex acute. Involucre hemispherical, 15-20 mm in diameter; bracts in 4-7 rows, filiform or narrowly linear, conspicuously glandular-hairy, the innermost with

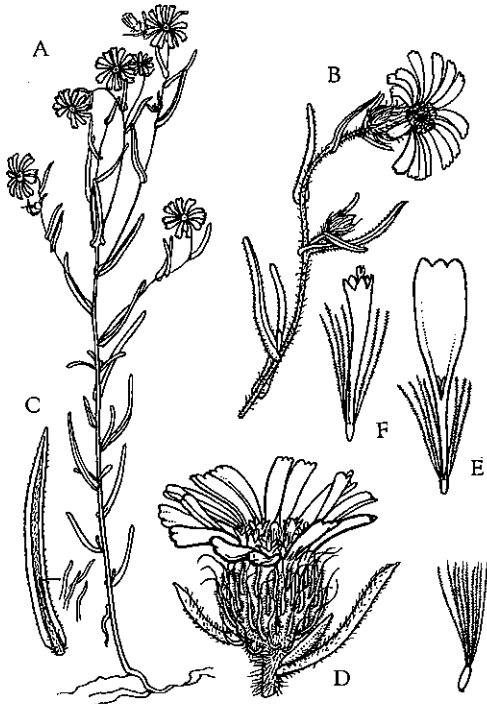


Fig. 246. *Asteridea pulverulenta*. A, Habit. B, Flowering branch. C, Leaf with enlargement of hairs. D, Flower head. E, Ray floret. F, Disc floret. G, Achene.

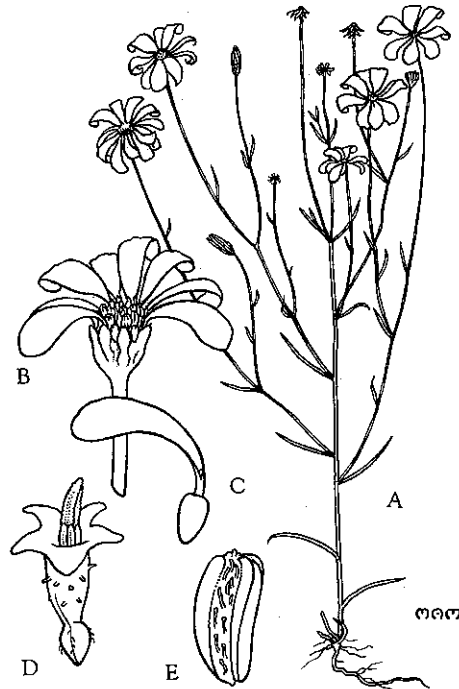


Fig. 247. *Brachycome pusilla*. A, Habit. B, Flower head. C, Ray floret. D, Disc floret. E, Achene.

fimbriate, brush-like apices. Marginal florets 22-44; ligule broad, 3-lobed, white. Central florets white. Achenes small, ellipsoid, brown, glabrous. Pappus of 5-11 minutely barbellate bristles. *Athrixia pulverulenta* (Lindley) Druce Fig. 246

Occurs in sandy soil from Gingin to Yalgorup National Park and inland to Helena Valley. Extending southwards to Albany and inland to Lake Muir.

Flowers October-December.

***BERKHEYA Ehrh.**

Perennial herbs or undershrubs, with cobweb-like or woolly hairs. Leaves alternate, often spiny. Heads terminal on single stems or on branchlets, axillary, corymbose or umbellate, radiate or discoid, homogamous or heterogamous; involucre campanulate; bracts in 5 or 6 rows, often with the margins of pits in the receptacle surrounding each floret produced and enveloping the ovary or extended into filiform processes. Ray florets present or absent, sterile, ligulate; ligule 3 or 4-toothed, to 8 times length of tube. Disc florets tubular, 5-lobed, glandular-hairy, sometimes glandular at apices; anthers linear, sagittate at base, with narrowly elliptic apical appendages; style terete, undivided or with linear, obtuse branches; achene more or less obovoid, ribbed, pilose, glandular-hairy or glabrous. Pappus of 1 or 2 rows of scales or bristles. A genus of about 150 species, mainly from South Africa, 1 introduced in W.A.

***B. rigida** (Thunb.) Ewart, J. White & B. Rees

African Thistle, Hamelin Thistle

Erect, somewhat woody perennial to ca 0.6 m tall, often rooting at the nodes and forming colonies, loosely woolly-hairy. Leaves pinnatisect, 30-100 mm long, with linear-revolute, pungent-pointed lobes at right angles to the rachis. Heads terminal and axillary, discoid, homogamous, homochromous;

involucral bracts in several rows, rigid, divaricate, pungent-pointed, the revolute margins with several pairs of spines 7-12 mm long; receptacle with stiff, deeply lacerate scales. Florets all bisexual, tubular. Achenes ribbed, glabrous. Pappus a crown of minute scales.

Recorded from Perth and Bunbury. Also found near Hamelin Bay. An undesirable weed colonizing coastal sands. A native of South Africa, probably introduced to Australia in ships' ballast at various points along the coast. Reference: Meadly, G.R.W. 1965. 'Weeds of Western Australia'.

Flowers January-May in the Perth Region, elsewhere from October.

BLENNOSPORA A. Gray

Annual herbs, much-branched from the base, more or less grey or white cottony-woolly. Leaves alternate, sessile, entire. Heads compound, more or less globular; general involucre absent or with a few floral leaves; general receptacle small or branching. Partial heads discoid, stipitate, 2 or 3-flowered, homogamous, homochromous; involucre of several rows of dimorphic bracts, the outer persistent, the inner fewer and longer than the others, deciduous. Florets tubular, bisexual, yellow or purplish red to black, 4 or 5-lobed. Anthers shortly tailed. Style branches truncate. Achenes obovoid, glabrous, with a transparent pellicle which becomes glutinous when moistened. Pappus of numerous, fine, woolly-plumose bristles, becoming dilated, scale-like and shortly connate at the base to form a small cup. A genus of 2 species endemic to southern Australia, both in W.A. Reference: Short, P.S. 1981. *Muelleria* 4: 395-417.

B. drummondii A. Gray

Small, annual herb to 90 mm tall, loosely grey-woolly. Leaves alternate, narrowly linear, 10-30 x 0.5-2 mm, the uppermost and the few floral ones shorter. Compound heads ovoid-globular, 6-10 mm in diameter; floral leaves absent or few. Partial heads 2 or 3-flowered; subtending bracts narrowly oblong, scarious, woolly-hairy; outer involucral bracts persistent, oblong-cuneate, very woolly near the top of the claws with a green midrib present, inner bracts usually 4, caducous, longer than the others, ovate, concave. Florets purplish red to black, 5 or 4-lobed. Achene obovoid, glabrous with a transparent pellicle. Pappus of 8-10 unequal plumose bristles, dilated basally and connate to form a short cup.

Occurs mainly in moss swards on granite outcrops, but also in woodland and mallee communities. Recorded from Millendon. Scattered throughout south western W.A. Also recorded from S.A. and Vic.

Flowers September.

BRACHYCOME Cass.

Annual or perennial herbs, rarely undershrubs. Leaves radical, cauline or both, alternate, entire, lobed or pinnately compound. Heads solitary, pedunculate, radiate, heterogamous, heterochromous, rarely homochromous; involucre usually hemispherical; bracts in 2 or 3 rows, almost equal, herbaceous, glabrous, glandular or woolly-hairy; receptacle slightly to steeply convex, pitted or smooth, bracts absent. Ray florets in a single row, female, ligulate. Disc florets bisexual, tubular, 5-toothed, yellow; anthers obtuse at the base, the connective sometimes produced into an apical appendage. Style branches narrowly elliptic, papillose on the outside. Achene flattened or turgid, glabrous, glandular or tuberculate, often ornate with wings, longitudinal folds or grooves. Pappus of free or connate bristles, shorter than achene, or absent. A genus of ca 90 species, mostly from Australia, New Guinea and New Zealand, with 19 species in W.A. Reference: Davis, G.L. 1948. *Proc. Linn. Soc. New South Wales* 73: 142-242.

- | | |
|--|------------------------|
| 1. Leaves all cauline. Erect annual, branching above base. | |
| 2. Ligule of ray florets 1 mm or less long..... | B. glandulosa |
| 2. Ligule of ray florets 6 mm or more long..... | B. iberidifolia |
| 1. Leaves mostly radical. Erect annual, branching at base. | |
| 3. Achene black, microscopically tessellated, glabrous, 0.9-1.1 x 0.5-0.6 mm..... | B. bellidiodes |
| 3. Achene brown, smooth with long, apically rolled hairs distally, 1.8 x 0.9 mm..... | B. pusilla |

B. bellidioides Steetz

Erect annual to 130 mm tall, with one to several stems arising basally, each terminating in a slender peduncle, glabrous. Leaves entire or with a few small, lateral teeth, linear to broadly linear, sessile, obtuse to subacute; radical leaves 10-25 x 1-1.5 mm, forming a basal cluster; heads 1-9, usually 1-3, on filiform peduncles; involucre ca 7 mm in diameter; bracts ca 28, 2.0-3.2 x 0.7-1.2 mm, ovate, subacute to acute, entire or slightly serrulate; receptacle convex to broadly conic, slightly pitted. Ray florets up to 26; ligule ca 6 x 1.2-2.3 mm, usually white, sometimes blue. Achene 0.9-1.1 x 0.5-0.6 mm, black, with minute, rectangular papillae giving the surface a minutely tessellated appearance. Pappus minutely coroniform.

Occurs in sandy soils of the Coastal Plain between Yanchep and Fremantle as well as the Darling Range at Mundaring. Extending northwards to Jurien Bay and southwards to Albany.

Flowers August-October.

Contrary to previous descriptions of this species, the ray florets are sometimes blue.

B. glandulosa (Steetz) Benth.

Erect, branching annual to 210 mm tall, glandular-hairy. Leaves cauline, sessile, 20-40 mm long, pinnatisect, the segments narrowly to broadly linear, shortly mucronate; first pair of cauline leaves spatulate, entire, obtuse, connate. Heads up to 16 on slender, leafy peduncles; involucre 6-7 mm in diameter; bracts 12-15, 2.5-4.0 x 1.5-2.7 mm, elliptic, subacute, densely glandular, with slightly lacerate margins; receptacle slightly convex, not pitted. Ray florets 8-10; ligule white, ca 1 x 0.3 mm, hardly exceeding the bracts. Achene to 3 x 1.8 mm, obovate in outline, flat, the body straw-coloured and slightly curved, the concave surface facing the centre of the receptacle, pappus absent; margin broad, wing-like, smooth and entire, golden-brown, excised at the apex, sometimes extending towards the base and almost ciliate.

Occurs in sandy soils on the Coastal Plain and scarp from Ellen Brook to Midland. Extending inland to Pingelly and southwards to the Stirling Range.

Flowers August in the Perth Region, elsewhere August-September.

Contrary to previous descriptions of this species, several specimens have achenes with excisions extending along the margin almost to the base, giving them a distinctly ciliate appearance.

B. iberidifolia Benth.

Swan River Daisy

Erect, branching annual to 0.45 m tall, more or less glandular-hairy occasionally glabrous. Leaves cauline, pinnatisect with linear segments or rarely entire, 5-80 mm long. Heads 1-55; involucre 5-7 mm diameter; bracts 12-30, 1.7-4.4 x 0.7-1.8 mm, oblong, subacute to acute, glabrous or sparsely glandular, the margins entire or minutely serrulate; receptacle broadly convex to steeply conic, hardly pitted. Ray florets 8-22; ligule 6-16 x 1.5-4.0 mm, white or violet. Achene 1.1-1.7 x 0.4-0.8 mm, dark brown, minutely tessellated at maturity giving it a greyish appearance, narrowly clavate, slightly flattened, with the central area sometimes slightly depressed between 2 conspicuous longitudinal ridges, curled hairs present distally. Pappus microscopic or minutely coroniform.

Occurs in sandy soils of the Coastal Plain and along watercourses of the scarp between the Moore River and the Harvey River. Extending northwards to Carnarvon and southwards to Bremer Bay. Also found in S.A. and N.T.

Flowers August-May in the Perth Region, elsewhere to July.

B. pusilla Steetz

Erect annual to 120 mm tall, branching from the base, each stem terminating in a filiform peduncle, glabrous. Leaves radical and cauline, simple, entire, linear to broadly linear, subacute; radical leaves in a basal cluster, occasionally with several minute teeth, 10-25 x 1-2 mm, the basal pair connate; cauline leaves 5-20 x ca 1 mm. Heads 1 or 2; involucre ca 5 mm in diameter; bracts ca 14, 2.5 x 1.2 mm, subacute to acute, slightly lacerate; receptacle broadly conic. Ray florets ca 14, ligule 2.5-4.0 mm long, usually

blue, sometimes white. Achene brown, 1.8 x 0.9 mm, narrowly cuneate in outline, flattened, with a longitudinally depressed area on each face, surrounded by a thick, smooth margin, with long, apically rolled hairs scattered over the surface, particularly at the apex. Pappus minutely coroniform. **Fig. 247**

Occurs in sandy soils of the Coastal Plain and along watercourses of the scarp. Recorded from the inner metropolitan area and Guildford to Wooroloo. Extending northwards to Northampton, inland to Bullfinch and southwards to Cape Arid.

Flowers September in the Perth Region, elsewhere August-November.

Contrary to previous descriptions of this species, the ray florets are sometimes white.

CALOCEPHALUS R. Br.

Annual or perennial herbs or small shrubs, more or less cottony white-woolly, rarely glabrous. Leaves alternate or opposite, sessile, entire. Heads compound, more or less globular, or ovoid to depressed ovoid, of 10-100 partial heads; general involucre absent or else a few leafy or scarious bracts; common receptacle globular or conic. Partial heads shortly stipitate or sessile, discoid, homogamous, homochromous; involucre of 1 or 2 rows of translucent or scarious bracts, a lamina usually present on some bracts; receptacle without bracts. Florets 2-25 per partial head, tubular, bisexual, 5-lobed. Anthers tailed. Style branches truncate. Achenes usually compressed ovoid, glabrous or papillose. Pappus of several flat, linear scales or bristles, plumose from the base or at the tip only, free or shortly connate basally. A genus of ca 15 species endemic to Australia, 12 in W.A. Recent work suggests that these species could be placed in a number of distinct genera. Reference: Short, P. 1981 in Jessop, J. P. ed. Fl. Central Australia.

- | | |
|--|-------------------------|
| 1. Small herb to 80 mm tall. Involucral bracts with a radiating lamina.
Partial heads 6 or more-flowered..... | C. angianthoides |
| 1. Dwarf shrub to 1 m tall. Involucral bracts without appendages. Partial heads 2 or 3-flowered..... | C. brownii |

C. angianthoides (Steetz) Benth.

Small, annual herb to 80 mm tall, branching from the base; stems copper-coloured, almost glabrous or densely white-hairy with scale-like hairs. Leaves alternate, linear, 4-10 x 1-2 mm, acute to obtuse. Compound heads globular to ovoid, 5-10 mm in diameter, creamy-yellow, surrounded by a few small, scarious, woolly bracts. Partial heads 6 or more-flowered; subtending bracts narrow, concave, white-hairy, those of the involucre numerous, the outer ones linear-spathulate, ciliate with long, woolly hairs, the broad, scarious tip glabrous but brown and erect, the inner ones about 6, oblong, scarious, glabrous, with a scarious, yellow or white, radiating, reniform lamina. Achene obovoid, light brown, glabrous. Pappus annular, jagged, with several bristles as long as the florets and plumose towards the tip with long cilia.

Occurs in sandy soils amongst low woodland. Recorded from the inner metropolitan area. Known from scattered localities throughout the wheatbelt.

Flowers October-November in the Perth Region, until February elsewhere.

C. brownii (Cass.) F. Muell.

Dwarf shrub to 1 m tall, much-branched, densely white-tomentose. Leaves alternate, linear, to narrowly obovate, 2-15 x 1-1.5 mm, obtuse. Compound heads more or less globular, 8-13 mm in diameter, white with a few small floral leaves at the base. Partial heads 2 or 3-flowered; subtending bracts and those of the involucre oblong-cuneate, scarious with a green midrib, woolly hairy adaxially, without appendages, those of the involucre about 10. Florets yellow. Achene ovoid, papillose. Pappus of 8-12 flat, plumose bristles shortly connate basally.

Occurs mainly amongst coastal foredunes and rocks. Recorded from Cottesloe to Bunbury. Extending northwards to Kalbarri, southwards to Nornalup and further eastwards. Also recorded from S.A., Vic. and Tas.

Flowers throughout the year.

***CARDUUS L.**

Annual or perennial herbs with spiny-winged stems; with cobweb-like hairs or glabrous. Heads discoid, homogamous, homochromous; involucre depressed-globular to cylindrical; bracts usually in many rows, more or less densely imbricate, spiny-tipped; receptacle densely setose. Florets bisexual, tubular, with one lobe more or less longer than the others, purple, rarely pink or white. Anthers sagittate, with slender entire or lacerate basal appendages. Achenes glabrous, smooth or 5-10-ribbed, sometimes with an apical tubercle. Pappus of many rows of unequal bristles connate basally into a ring. A genus of ca 120 species, mainly in Europe, north Africa and Asia, a few in tropical Africa, with 3 species introduced in W.A. Reference: Phillips, E.N.M. 1977. *Watsonia* 11(4): 384-385.

1. Cauline wings well developed, extending to the apex. Inner bracts longer than the florets, often tinged purple. Pappus 10-15 mm long... ***C. tenuiflorus**
1. Cauline wings discontinuous near the apex. Inner bracts as long as or shorter than the florets, green. Pappus 15-20 mm long..... ***C. pycnocephalus**

***C. pycnocephalus L.**

Slender Thistle

Annual herb to 1 m tall; stems with cobweb-like hairs, grey-tomentose in upper part; cauline wings to 5 mm wide, discontinuous near the apex. Leaves ovate to obovate, sparsely hairy above, with cobweb-like hairs below, with 2-5 pairs of palmate lobes, each with an apical spine. Heads solitary or in clusters of 2 or 3, subsessile or pedunculate on wingless scapes to 100 mm long; involucre cylindrical, 15-20 x 7-15 mm diameter; bracts faintly 3-veined in the lower half, herbaceous throughout, green, inner ones as long as or shorter than the florets, the tips minutely scabrous on the backs and margins. Florets 10-14 mm long, reddish purple. Achenes 4.5-5.0 mm long, compressed, light brown to buff-coloured, striate with ca. 20 veins; apical tubercle small, shortly stipitate, entire. Pappus of scabrous bristles, 15-20 mm long.

A weed of roadside and pastures. Recorded from Chittering and Yancheep. Extending to Nannup and Jerramungup. A native of southern Europe, now cosmopolitan.

Flowers November-December in the Perth Region, elsewhere until April.

***C. tenuiflorus Curtis**

Sheep Thistle, Winged Slender Thistle

Annual or biennial herb to 0.75 m tall; stems more or less hairy with cobweb-like hairs; cauline wings to 10 mm wide, extending to the apex. Leaves obovate to narrowly obovate or elliptic, 35-100 x 7-65 mm, sparsely hairy above, with cobweb-like hairs below; with 6-8 pairs of broadly triangular lobes each with an apical spine. Heads sessile in compact clusters of 3-10; involucre cylindrical, 15-20 x 5-10 mm in diameter; bracts herbaceous throughout, inner ones longer than the florets, often coloured the same as the florets, the mid-vein raised in the distal third. Florets purple, 10-14 mm long. Achenes 3.5-4.0 mm long, with 10-13 veins, grey to fawn, compressed, striate, entire; apical tubercle shortly stipitate. Pappus of scabrous bristles, 10-15 mm long.

A weed of roadsides, pastures and dry open areas. Recorded from Garden Island. Also from Cape Naturaliste. A native of Europe, now cosmopolitan.

Flowers September in the Perth Region, elsewhere October.

***CARTHAMUS L.**

Usually spiny, branched annuals; rarely perennial and woody at the base; glandular-hairy and more or less villous-lanate or with cobweb-like hairs. Leaves usually pinnatifid to pinnatisect, with spiny margin. Heads solitary on stems and branches, discoid, homogamous, homochromous; involucre bracts multiseriate, imbricate, spiny, the outer ones leaf-like, the inner ones sometimes with an apical appendage. Florets all tubular, bisexual, yellowish or violet to pinkish purple. Anther-filaments usually densely bearded. Achenes obovoid to obpyramidal, 4-angled, glabrous, the outer ones usually coarsely rugose, pappus absent, the inner more or less smooth, usually with a persistent pappus of many rows of linear scales. A genus of about 13 species, native to Europe, Africa and Asia, 3 introduced in W.A.

***C. lanatus L.**

Saffron Thistle

Erect annual herb to 0.7 m tall, glandular and woolly-hairy, at least when young. Leaves rigid, shiny, prominently veined, bright green, lower ones shortly pedicellate, upper ones stem-clasping, conduplicate, 20-80 x 15-35 mm, basal ones up to 130 x 30 mm. Involucre ovoid; bracts narrowly ovate, outer ones twice as long as inner ones, patent to deflexed, shiny. Florets pale yellow, rarely white; anthers white, with violet lines. Pappus of narrow, acute, translucent scales.

A weed of crops, pasture and waste ground reducing grain yield and value, also troublesome in wool. Recorded from Chittering and Coogee. Widely distributed throughout the wheatbelt and goldfields. A native of southern Europe, now cosmopolitan.

Flowers January-March in the Perth Region, elsewhere December-March.

Specimens from W.A. are referred to *C. lanatus* subsp. *baeticus* (Boiss. & Reuter) Nyman.

***CENTAUREA L.**

Annual, biennial or perennial herbs, rarely dwarf shrubs. Leaves undivided to pinnatisect. Heads solitary or in clusters of 2 or 3 at apex, discoid or radiate, heterogamous, homochromous; involucre cylindrical to globular; bracts often with fimbriate or spiny appendages; receptacle densely setose. Marginal florets sterile, tubular. Central florets tubular, bisexual, 5-8-lobed. Achenes somewhat compressed. Pappus persistent, rarely caducous, of 2 or several rows of scabrous or plumose setae or scales, the innermost row short, with setae or scales longer than those of the outer row and sometimes connate at base, sometimes absent. A large genus of more than 600 species found throughout the world, with 3 introduced in W.A.

- | | |
|--|-------------------------|
| 1. Florets pale purple. Achene pappus absent..... | *C. calcitrapa |
| 1. Florets yellow. Pappus present, at least on central achenes. | |
| 2. Intermediate involucre bracts with a short, often reddish spine and basal spinules pinnately arranged. Pappus bristles equal to or shorter than achene..... | *C. melitensis |
| 2. Intermediate involucre bracts with a long yellow spine and basal spinules palmately arranged. Pappus bristles up to 1.5 times length of achene..... | *C. solstitialis |

***C. calcitrapa L.**

Star Thistle

Erect, annual herb to 1 m tall, divaricately branched from the base; stems striate with sparse crisped hairs. Leaves grey-lanate when young, becoming greenish and glandular-hairy; lower ones pinnatifid with narrowly obovate, acute, serrate lobes, up to 150 mm long; upper ones pinnatifid with narrowly linear-obovate segments, 10-30 mm long; the uppermost narrowly obovate or somewhat hastate. Heads sessile or shortly pedunculate, subtended by a few small leaves; involucre glabrous, slender, ca 15 x 6-10 mm diameter, ovoid-cylindrical; bracts coriaceous, ovate, faintly veined, with scarious margins; outermost bracts short; intermediate bracts with broadly ovate, pale green bases topped by rigid, divaricate, pale spines to 20 mm long which are pinnately spinose at base. Florets pale purple, glandular. Achenes flattened obovoid, obliquely attached to receptacle, pale, with brown streaking and mottling, pappus absent.

A weed of pastures and of cultivated or waste ground. Recorded from Fremantle and Robb's Jetty. Native to Europe, western Asia and north Africa, now widespread in temperate regions of the world.

Flowers October-January in the Perth Region, elsewhere November-January.

***C. melitensis L.**

Cockspur Thistle, Maltese Cockspur

Erect, annual or biennial herb to 0.8 m tall; stems striate, strigose, winged above. Leaves green, crispate-puberulent, the margins scabrous; lower ones lyrate-pinnatifid to sinuately lobed, ca 150 mm long; upper ones oblong-linear, 3-10 x 20-66 mm long, entire or with few shallow teeth, strigose on both surfaces, glandular. Heads terminal on short branches from the upper axils or apical, solitary or in clusters of 2 or 3; involucre ca 10 x 8-12 mm diameter; bracts yellowish and sparsely puberulent

or glabrous; outermost bracts and intermediate ones with upper part equal to or longer than base with patent, apical spine 5-8 mm long, pinnately spinose marginally for its lower half, spines often reddish; innermost bracts with reduced spines and narrow, scarious margin. Florets yellow, glandular. Achenes flattened obovoid, brownish with pale striations, sparsely hairy. Pappus bristles of uneven length, the longest equal to the achene.

A weed of roadsides, cultivated areas, stock routes and other disturbed areas. Recorded from Yanchep, Gingin, Reabold Hill, Rottnest Island and Canning Vale. Widespread elsewhere on the coast from Carnarvon to Busselton, and between Fitzgerald River and Cape Le Grand, extending throughout the goldfields and wheatbelt and across the southern part of the Nullarbor Plain. A native of the Mediterranean Region, Africa and Asia, now cosmopolitan.

Flowers September-January in the Perth Region, from September-March elsewhere.

Suspected of poisoning sheep.

***C. solstitialis L.**

St Barnaby's Thistle

Erect, biennial herb to 1 m tall; stems woolly and conspicuously winged. Leaves scabrous and with cobweb-like, lanate or woolly hairs; lower ones usually lyrate to pinnatifid, with triangular-oblong lobes; upper ones linear to narrowly elliptic, entire, mucronate. Heads solitary, terminal on slender branches; involucre ovoid-globular; bracts broadly ovate, sparsely woolly towards the base; outermost bracts short and broad with 3-5 digitate spines about as long as the spreading apical spine, 10-15(-30) mm long, subtended by 2 pairs of small, lateral spines; innermost bracts longer than the intermediate ones, upper part with short, digitate spines and conspicuous scarious lateral wings. Florets yellow, eglandular, longer than involucre; tube, with dark veins. Achenes flattened obovoid, ca 2.5 mm long; central ones pale brown or mottled, with a pappus of uneven bristles, often exceeding the length of the achene up to 1.5 times; marginal ones dark brown, pappus absent.

Colonizes disturbed ground such as roadsides, fallow land and cultivated areas, mainly in areas of abundant winter rainfall. A single record from Cannington. Also from near Esperance and Caiguna. A native of southern Europe now widespread in warm temperate and cool subtropical regions of the world.

Flowers January in the Perth Region, October-March elsewhere.

All the material from W.A. appears to belong to *C. solstitialis* subsp. *solstitialis*. It is a serious agricultural pest. A cause of a nervous condition of horses.

***CHONDRILLA L.**

Biennial or perennial herbs; stems solitary or several, much-branched. Leaves entire to runcinate-dentate; cauline ones often narrow or bract-like. Heads numerous, small, with up to 15 florets, ligulate, homogamous, homochromous; involucre cylindrical; bracts biseriate, the outer ones much shorter than the inner; receptacle flat, without bracts. Florets ligulate, bisexual, yellow. Achenes terete with numerous ribs and surmounted by a short or long beak subtended by a collar of short scales. Pappus of many rows of soft, simple hairs. A genus of ca 25 species from Europe, the Mediterranean Region and central Asia, 1 introduced in W.A.

***C. juncea L.**

Skeleton Weed

Biennial or perennial rhizomatous herb to 1 m tall; stem usually solitary with numerous ascending branches, often tangled, glabrous or with rigid hairs, greyish green. Leaves glabrous or with a few rigid hairs; basal leaves 40-120 x 15-45 mm, soon withering, obovate, more or less acute, deeply and irregularly runcinate-dentate, narrowed to a short, winged petiole, basal leaves grading into cauline leaves; cauline leaves linear or narrowly obovate, entire or denticulate, 10-60 x 0.5-3 mm. Heads terminal, lateral or axillary, solitary or in groups of 2-5, sessile or with short peduncles; involucre narrowly cylindrical, 9-12 x 2.5-5 mm; bracts linear to narrowly obovate, obtuse to subacute, glabrous or sparsely hairy, the inner series 7-9. Florets 9-12, yellow. Achenes terete, 8-10 mm long, pale, striate, with a conspicuous slender beak subtended by 4 or 5 obtuse scales. Pappus of fine, barbellate bristles.

Recorded from Lake Pinjar. Outbreaks have occurred near Ballidu, Wongan Hills, near Geraldton, near Esperance and along the Trans-Australian Railway Line. A native of Europe and the Mediterranean Region, now widespread in temperate regions of the world.

Flowers mostly in summer, but also sporadically throughout the year.

A serious weed of cultivation causing substantial losses in cereal crop yield and choking machinery because of its wiry stems.

*CHRYSANTHEMOIDES Fabr.

Shrubs or subshrubs, sometimes spiny, glabrous or with cobweb-like hairs. Leaves alternate, mostly obovate and narrowed into a petiole, entire to toothed. Heads shortly pedunculate, usually a few together or solitary, radiate, heterogamous, heterochromous, many-flowered; involucre campanulate; bracts in 2-4 rows, free, linear to obovate; receptacle more or less convex, without bracts. Marginal florets ligulate, female; tube sometimes rudimentary; ligule more or less oblong-elliptic, 3-toothed, up to 9.5 times the length of the tube; staminodes sometimes present; style linear, with linear, obtuse branches. Disc florets male; tube funnel shaped, glandular-hairy, 5-lobed; anthers shortly tailed, with ovate, apical appendage; ovary abortive, linear or oblong, 3-angled, glabrous; style terete, minutely 2-lobed. Fruit a drupe, with a hard endocarp, globular to obovoid or more or less cylindrical, smooth or with more or less raised veins, pappus absent. A genus of 2 species from South Africa, with one extending into tropical Africa, 1 introduced in W.A.

**C. monilifera* (L.) Norlindh

Bitou Bush, Boneseed

Erect shrub 1-3 m tall; stems and leaves glabrous or with cobweb-like hairs. Leaves dull green, mostly obovate, elliptic or narrowly obovate, 3-8 x 1-2.5 mm. Heads in terminal corymbs; involucre ca 25 mm in diameter; bracts in 2 or 3 rows, broadly ovate or obovate. Ray florets yellow. Disc florets brown. Fruit globular or ovoid, about as broad as long, ca 0.8 mm in diameter, more or less smooth, purple-green.

Recorded from Perth and Armadale. Also from Nabawa near Geraldton and Narrogin. An aggressive weed, especially in coastal areas where it colonizes dune areas, competing with and totally eliminating native species as well as invading roadsides and waste areas. A native of the south western Cape District of South Africa, now introduced as a garden subject and as a sand dune stabilizer in many parts of the world.

Flowers March-October in the Perth Region, elsewhere July-October.

Material from W.A. is referable to *C. monilifera* subsp. *monilifera*. Reference: Gray, M. 1976. Contrib. Herb. Austral. 16: 1-5.

*CHRYSANTHEMUM L.

Suffrutescent annuals, glabrous or somewhat hairy; stems simple or branched. Leaves oblong to obovate, deeply lobed or bipinnatisect; lobes almost entire or incise-dentate; bases half-clasping. Heads pedunculate, solitary or 2-5 on each branch, radiate, heterogamous, homochromous or heterochromous; involucre bracts in 2 or 3 rows, ovate, obtuse, scarious-tipped; receptacle convex, without bracts. Ray florets female, ligulate; ligules yellow throughout or reddish at the base, becoming yellow distally, or yellow at the base, becoming white distally; achenes 3-angled, the ribs often winged; pappus coroniform or absent. Disc florets bisexual, tubular; corolla laterally expanded and 2-winged, yellow or purple; achene cylindrical to cylindrical-triangular, 5-10-ribbed, the posterior rib sometimes winged; pappus coroniform or absent. In its narrowest sense a genus of 3 species distributed around the Mediterranean but widely cultivated as ornamentals. 2 species introduced in W.A.

**C. segetum* L.

Corn Marigold

Suffrutescent annual to 0.8 m tall, simple or branched, glabrous, blue-green, somewhat fleshy. Leaves oblong to obovate in outline, the lower and middle cauline ones deeply incised-dentate, the upper ones almost entire, 10-70 x 4-15 mm; bases half-clasping. Heads solitary, on stout, somewhat inflated

peduncles; involucre 13-20 mm in diameter; outer bracts ovate, obtuse, yellowish green with a pale brown marginal band, the apex scarious; inner bracts similar but widened at the appendage. Ray florets yellow throughout; achene with 2 lateral wings; lateral face with 1 or 2 ribs, adaxial face with 3 prominent ribs; pappus absent. Disc florets yellow; achene 10-ribbed, pappus absent.

Recorded from near Bunbury and Gingin. Also known from New Norcia, near Augusta and Albany. Widely cultivated as a garden subject and occurring as a garden escape. Probably native to the Aegean area, but widely distributed in temperate regions of the world.

Flowers August-November.

CHRYSOCORYNE Endl.

Erect annual herbs; stems and leaves with scale-like, glandular hairs. Leaves alternate, sometimes almost opposite, sessile, entire. Heads compound, narrowly ellipsoid to ellipsoid or narrowly obovoid to obovoid or cylindric to obloid, of 30-50 partial heads; bracts subtending compound heads leaf-like, not forming a conspicuous general involucre. Partial heads each with abaxial, transparent subtending bract; involucre bracts 2-ca 10, transparent, flat to concave, either paired and opposite each other or arranged in 1 or 2 whorls; receptacle without bracts. Florets 1-8 per partial head, bisexual, tubular, 3-5-lobed; anthers tailed, style branches truncate. Achenes more or less obconic to obovoid. Pappus a ring with several apically divided bristles or absent. A genus of 6 species all endemic to Australia and all recorded in W.A. Reference: Short, P.S. 1983. *Muelleria* 5,3: 185-201.

1. Involucral bracts of partial heads 2, midrib inconspicuous. Florets 1-4 per partial head, 3-5-lobed. Anthers 3-5, each with ca 20-60 pollen grains. Pappus absent..... **C. drummondii**
1. Involucral bracts of partial heads ca 4-10, midrib, at least of outermost ones distinct. Florets 1-8 per partial head, 5-lobed. Anthers 5, each with ca 300-450 pollen grains. Pappus a small jagged ring, sometimes with several apically divided bristles..... **C. pusilla**

C. drummondii A. Gray

Annual herb to 30-60 mm tall, stems and leaves densely covered in scale-like, glandular hairs. Leaves opposite at the base, the upper ones alternate, all narrowly obovate to obovate or narrowly elliptic to elliptic, 2-11 x 0.4-1 mm, often with a small, transparent apical appendage. Compound heads oblong, ca 5-25 mm long, ca 2-3.5 mm in diameter, of 50-150 partial heads. Partial heads with subtending bract broadly elliptic or broadly ovate to broadly depressed-ovate, 1.6-2.3 x 1.8-2.7 mm, variably hairy, often with a few scale-like, glandular hairs; involucre bracts 2, concave, upper margins variably ciliate, midrib inconspicuous. Florets 1-4 per partial head, 3-5-lobed; floral tube tapering more or less gradually to a thickened base, sometimes with a few glandular hairs on the lower half; anthers 3-5, each with ca 20-60 pollen grains. Achenes obovoid, 0.4-0.5 x ca. 0.3 mm, papillose, purplish, pappus absent.

Occurs around coastal and inland salty depressions and granitic outcrops or in open woodland. Recorded from Cannington. Extending from Enneaba to Esperance. Also found in southern S.A. and south western Vic.

Flowers October in the Perth Region, elsewhere September-December.

C. pusilla (Benth.) Endl.

Annual herb 15-150 mm tall, stem and leaves with scale-like, glandular hairs. Leaves alternate, sometimes almost opposite, linear or elliptic to narrowly elliptic or obovate to narrowly obovate, 2-3 x 0.5-4 mm, often with a small, transparent apical appendage. Compound heads usually narrowly ellipsoid to ellipsoid or narrowly obovoid to obovoid, sometimes ovoid, 11-22 x 3-7 mm, of 20-80 partial heads. Partial heads with subtending bract widely obovate or ovate, 1.3-2.8 x 1.7-3.3 mm, variably hairy or glabrous, sometimes with a few glandular hairs; involucre bracts ca 4-10, the outermost ones with a distinct midrib. Florets 1-8 per partial head, 5-lobed; tube with an abrupt taper in the lower half,

sometimes with a few glandular hairs; anthers 5, each with ca 300-450 pollen grains. Achenes obovoid, 0.4-0.5 x ca 0.3 mm, papillose, purplish. Pappus usually a small jagged ring, sometimes with several apically divided bristles extending to half the length of the floret.

Occurs around coastal and inland claypans, saline depressions and granitic outcrops or in shrubland and hummock grassland. Recorded from Cannington and Midland. Extending from Meekatharra to near Esperance. Widespread in central and southern Australia in all mainland states.

Flowers December in the Perth Region, elsewhere October-May.

*CICHORIUM L.

Annual or perennial herbs; stems usually solitary, branched. Leaves narrowly obovate, runcinate-pinnatifid or dentate. Heads numerous, terminal and axillary, ligulate, homochromous, homogamous; involucre cylindrical; bracts in 2 rows, the outer shorter; receptacle more or less flat, without bracts. Florets ligulate, bisexual. Achenes obovoid, more or less angular, truncate at apex. Pappus of 1 or 2 rows of short, obtuse scales. A genus of 9 species from Europe, western Asia and north Africa, 1 species introduced in W.A.

**C. intybus* L.

Chicory

Perennial herb to 1.5 m tall with stout taproot, glabrous or scabrous with more or less rigid hairs; stems striate, branched. Basal leaves shortly petiolate, 70-300 x 10-120 mm; cauline leaves sessile, 12-60 x 3-25 mm, with fewer teeth or entire, stem-clasping, uppermost forming leafy bracts below branches of panicle. Heads solitary on swollen, hollow peduncles, or in sessile clusters in the axils of such peduncles, or along the branches; involucre 10-14 x 4-10 mm; outer bracts ca 8, broadly ovate with pale, hard bases, but spreading and green above, margins ciliate; inner bracts ca 5, 2-3 times the length of the outer ones and narrower, erect, green, hairy and ciliate apically. Florets blue. Achenes 2-3 mm long, brown with dark mottling. Pappus of minute, fringed scales.

A weed of road verges and waste areas. Recorded from Perth, Mt. Helena and Bunbury. Extending southwards to Busselton and eastwards to Northam and Brookton. A native of Europe, western Asia and north Africa, now found throughout temperate regions of the world.

Flowers November-April in the Perth Region, November-May elsewhere.

This species is often mistaken for *Chondrilla juncea* L., Skeleton Weed. Widely cultivated as a medicinal plant and as a coffee substitute.

*CIRSIIUM Miller

Spiny, biennial or perennial herbs, rarely annuals. Leaves alternate, entire to pinnatisect, with spinulose margins and upper surface, and usually spiny teeth or lobes. Heads discoid, homochromous, homogamous; involucre bracts imbricate, usually with a simple apical spine; receptacle with numerous, setaceous scales. Florets tubular, bisexual, rarely unisexual, purple or yellow, rarely white. Achenes oblong, gibbous, compressed, the truncate apex with a distinctly annular margin surrounding a more or less conic, central projection. Pappus of several rows of plumose setae, the inner ones somewhat longer than the outer ones and simple, often flattened, narrowly obovate and ciliate towards the apex, the pappus of the marginal florets often with fewer, simple setae. A genus of ca 150 species from temperate regions of the northern hemisphere, with 2 species introduced in W.A.

**C. vulgare* (Savi) Ten.

Spear Thistle

Biennial herb to 3 m tall with erect, spinose-winged stem, branched above. Leaves decurrent, with sparse cobweb-like hairs to tomentose beneath, upper surface strigose with spiny hairs; basal leaves large, narrowly ovate in outline, pinnatifid with spinose lobes; cauline leaves to 150 mm long, pinnatifid,

the segments each with erect and deflexed lobes, all lobes acuminate with an apical spine 2-15 mm long. Heads terminal on main and upper branches, shortly to long-pedunculate, in a panicle or corymb, usually without subtending leaves; involucre broadly ovoid, becoming loosely spreading at maturity, 25-50 x 20-50 mm; bracts with sparse cobweb-like hairs to lanate, rarely almost glabrous, gradually narrowing into a long, slender, spreading, pungent, apical spine, green below, pale and spinose above. Florets purple-red, exceeding the involucre. Achenes 3.5-5 mm long, pale streaked with black. Pappus 20-30 mm long.

A common weed of roadsides and pastures in higher rainfall areas. Occurs from Yanchep southwards throughout the Perth Region. Extending inland to the wheatbelt from York to Wagin and east to Salmon Gums, and along the south coast from Denmark to Albany. A native of Europe, western Asia and north Africa; now cosmopolitan.

Flowers October-May in the Perth Region, elsewhere throughout the year.

This species is often incorrectly called Scotch Thistle.

**CONYZA* Less.

Annual or perennial herbs, rarely shrubs, often much-branched, variously hairy. Leaves alternate, simple, entire or toothed or pinnately to bipinnately lobed. Heads pedunculate in panicles or corymbs, disciform or minutely radiate, campanulate, homochromous, heterogamous; involucre broadly turbinate; bracts imbricate, in 2-4 rows, herbaceous, often with narrow, scarious margins, the outer ones smaller; receptacles flat or somewhat convex, without bracts. Marginal florets numerous, in several rows, female, filiform, truncate or minutely 2-5-toothed or with a short ligule, cream-coloured, white or rarely pinkish. Central florets few, bisexual, tubular, expanded above, 5-lobed, cream, white or yellow. Achenes laterally flattened with up to 3 veins on each face, usually hairy. Pappus of capillary, more or less unequal hairs in a single row, more or less concealing the florets. A cosmopolitan genus of ca 60 species, chiefly tropical and subtropical in both hemispheres and including some native to eastern Australia. 5 species introduced in W.A.

The nomenclature of weedy *Conyza* species in Australia and elsewhere has been much confused in the past and is still not fully resolved. References: Kleinschmidt, H.E. & Johnson, R.W. 1977. 'Weeds of Queensland'; Michael, P.W. 1977. Proc. of the Sixth Asian-Pacific Weed Sci. Soc. Conf. 1: 87-95.

1. Leaves and stems densely hairy; lateral branches commonly overtopping or at least equal to the main axis. Heads usually more than 10 mm diameter when dry. Marginal florets filiform, slightly dilated and acutely 3-toothed at the often purplish apex. Pappus white or pinkish..... **C. bonariensis*
1. Leaves and stems sparingly hairy; lateral branches never overtopping the main axis. Heads usually less than 10 mm diameter when dry. Marginal florets filiform or minutely ligulate. Pappus white or straw-coloured.
2. Heads generally more than 5 mm in diameter when dry. Involucral bracts sparingly hairy, rarely purple-tipped. Marginal florets white or pale yellow, filiform, without ligules.
3. Strongly erect herb; stems very leafy, simple below, branching into a densely pyramidal compound inflorescence with lateral branches not overtopping main axis. Margins of lower leaves usually coarsely dentate. Achenes with pale margins. Pappus of straw-coloured bristles..... **C. albida*
3. Delicate and weakly spreading herb; stems sparingly leafy, much-branched into a loose, irregular compound inflorescence. Margins of all leaves entire. Achenes with bright orange margins. Pappus of whitish bristles..... **C. sp. A*
2. Heads generally less than 5 mm diameter when dry. Involucral bracts glabrous or nearly so, often purple-tipped. Marginal florets white, sometimes mauve below, minutely ligulate..... **C. parva*

***C. albida** Willd. ex Sprengel

Tall Fleabane

Erect, roughly hairy, annual herb to 2 m tall; stems very leafy, usually simple below, branching above into a densely pyramidal, compound inflorescence, the lateral branches never overtopping the main axis, the whole forming a pyramidal compound inflorescence. Leaves sessile, up to 100 x 15 mm, narrowly elliptic to elliptic, sparsely hairy; margins entire or toothed, the lower leaves usually coarsely dentate. Heads many, disciform, usually less than 10 mm diameter when dry; involucre bracts in ca 3 rows, narrowly elliptic, acuminate; dark with pale, scarious margins, only sometimes purple-tipped, sparingly hairy, reddish brown on the inner surface when reflexed. Marginal florets filiform, white, or pale yellow, without ligules or minutely ligulate. Achenes ca 1.3 mm long, narrowly elliptic in outline, sparsely hairy, with thickened, pale margins. Pappus of straw-coloured, scabridulous bristles.

A weed of cultivation, waste places and roadsides. Widespread throughout the metropolitan area. Extending southwards to Margaret River and Albany. A native of South America; now widespread in warm parts of the world.

Flowers January-August in the Perth Region, elsewhere until October.

***C. bonariensis** (L.) Cronq.

Flaxleaf Fleabane

Erect, roughly hairy, annual herb to 1.2 m tall; stems very leafy, often simple below, branching above into a compound inflorescence, the lateral branches commonly overtopping or at least equal to the main axis. Leaves sessile, narrowly ovate to elliptic, up to 100 x 10 mm, but often not more than 50 x 5 mm, twisted near the base, densely hairy, margins entire or toothed, often markedly undulate as well. Heads disciform, usually more than 10 mm in diameter when dry; involucre bracts in ca 3 rows, narrowly elliptic, acuminate, dark with pale, scarious margins, strongly pilose, whitish on the inner surface when reflexed. Marginal florets filiform, slightly dilated and acutely 3-toothed at the often purplish apex. Achenes ca 1.8 mm long, narrowly elliptic in outline, sparsely hairy, with thickened margins. Pappus of dirty white or pinkish, scabridulous bristles.

A weed of cultivation, waste places and roadsides. Common throughout the Perth Region. Also recorded from the Recherche Archipelago. A native of South America, now widespread in warm parts of the world.

Flowers October-May in the Perth Region, elsewhere September-April.

***C. parva** Cronq.

Erect, glabrous or sparsely hairy, annual herb to ca 0.5 m tall; stems very leafy, usually simple below, branching above into an elongated panicle, the lateral branches not overtopping the main axis. Leaves linear or narrowly elliptic, to ca 40 x 5 mm, narrowed to a petiole-like base; margins entire or toothed, commonly ciliate. Heads usually ca 5 mm in diameter when dry, minutely radiate; involucre bracts in ca 4 rows, linear to narrowly elliptic, acuminate, very often purple-tipped, glabrous or sparsely hairy. Marginal florets white, sometimes mauve below, minutely ligulate. Achenes ca 1.5 mm long, narrowly elliptic in outline, sparsely hairy, margin thickened, bright orange. Pappus of whitish, scabridulous bristles.

A weed of waste places. Recorded from the metropolitan area. Also found near Albany. A native of South America now widespread in warm parts of the world.

Flowers February-March in the Perth Region and elsewhere.

***C. sp. A**

Delicate, weakly spreading, sparingly pilose herb; stems conspicuously striate, much-branched into a loose, irregular, compound inflorescence, the lateral branches not overtopping the main axis; sparingly leafy. Leaves green, membranous, simple, narrowly elliptic, to 45 x 5 mm; base narrowed and petiole-like; margins entire; apex narrowly acute. Heads discoid, 5-10 mm in diameter when dry, solitary on delicate peduncles; involucre bracts in 3 or 4 rows, very narrowly elliptic, acuminate, green with pale scarious margins, sparingly hairy. Marginal florets filiform, minutely 3-lobed, white, without ligule. Achenes ca 1.3 mm long, narrowly elliptic in outline, sparsely hairy; margin thickened, bright orange. Pappus of white, scabridulous bristles.

Recorded from Bibra Lake where it has colonized the lake margin.

Flowers October.

The name and provenance of this species are unknown at the time of writing.

Note. *C. canadensis* (L.) Cronq. is known from a single collection made in 1977 on the Department of Agriculture property at Perth and may have become more widely established. *C. canadensis* is close to *C. parva* from which it can be distinguished by its hairy stems, conspicuously ciliate leaf margins and its involucre bracts which lack purplish apical spots.

*COREOPSIS L.

Annual or perennial herbs, seldom shrubs. Leaves opposite, rarely alternate, entire or variously lobed or dissected. Heads pedunculate, solitary or loosely paniced, broadly campanulate, radiate, heterogamous, homochromous or heterochromous; involucre bracts in 2 distinct rows, dimorphic, the outer narrower, shorter and more herbaceous than the inner, all connate at the base; receptacle flat or slightly convex, chaffy with thin, flat bracts. Ray florets neuter, conspicuous, rather broad, yellow, multi-coloured or sometimes pink or white. Disc florets tubular, bisexual; anthers entire or sagittate at base; style branches flattened, with short or elongate, more or less truncate to caudate, hairy appendages. Achenes flattened or becoming incurved, winged or wingless, not beaked. Pappus of 2 smooth or upwardly barbed, short awns or teeth, or a minute crown, or absent. A genus of ca 100 species native to North and South America, some Pacific Islands and Africa, 1 species introduced in W.A.

**C. grandiflora* Hogg ex Sweet

American Tickseed

Occasionally annual but usually perennial herb with a short, woody stem to 0.6 m tall, glabrous, or with spreading, villous hairs, leafy below, naked and elongate above. Leaves pinnatifid into linear to narrowly elliptic lobes, or the lowermost entire, lateral lobes rarely more than 5 mm wide, the terminal ones often a little wider, glabrous to hirsute. Heads few or solitary on long naked peduncles, 40-65 mm in diameter, homochromous, outer involucre bracts 8-10, narrowly elliptic, glabrous or nearly so, acuminate, more or less scarious-margined, 5-10 mm long; inner involucre bracts narrowly ovate or oblong-ovate, longer and broader than the outer ones; receptacular bracts flat and chaffy below, caudate-attenuate, somewhat awn-like above. Ray florets ca 10 mm long, yellow. Achenes with thin, flat wings, circular in outline or broader, 2-3 mm long, black, often with large, callus, abaxial excrescences at top and bottom. Pappus a pair of small scales.

Recorded from Greenmount where it occurs as a roadside garden escape. A native of North America, widely cultivated for its attractive flowers.

Flowers November.

COTULA L.

Prostrate, perennial or decumbent, annual herbs, usually growing in large patches, mats or clumps, rooting at the nodes, most parts of the plants with pellucid glands. Leaves bipinnatifid or tripinnatifid, sometimes simple; margins entire or toothed; base petiolate and amplexicaul or partly so. Heads solitary, axillary or terminal or one inflorescence and one vegetative shoot branching from the same axil, pedunculate, discoid or disciform, homogamous or heterogamous, homochromous; involucre bracts herbaceous, in 2 or more almost equal rows, inner ones elongating after flowering; receptacle cone shaped, flat, or convex, sometimes hemispherical. Marginal florets female, in one or more rows, or none, with or without a tubular or compressed corolla jointed or connate to ovary, inflated or not, 4-toothed, but sometimes the teeth obscure or none. Disc florets bisexual, or functionally male, or male only; corolla tubular, sometimes winged, sometimes base-sheathing and extending over ovary, widened in upper part, 4 or very rarely 3-toothed, teeth erect, horizontal or reflexed, sometimes anterior lobe of outermost ones expanded into a pseudo-ray; stamens 4, rarely 3. Achenes winged or not, terete or strongly compressed, sometimes 4-sided, adaxially convex, glabrous or variously hairy with uniseriate

or biseriate trichomes alternating with scattered, tapered trichomes, pedicellate or sessile, pappus absent. A genus of ca 80 species, most of them in South Africa and New Zealand, some in north Africa, Asia, Australia, New Guinea, South America and the Falkland Islands. 6 species occur in W.A.

- 1. Leaves entire, coarsely toothed or lobed.
- 2. Leaves filiform, entire..... **C. cotuloides**
- 2. Leaves oblong, entire, coarsely toothed or lobed..... **C. coronopifolia**
- 1. Leaves distinctly pinnate or pinnatisect.
- 3. Florets of 3 kinds: marginal lacking corollas, intermediate with conspicuous zygomorphic corollas, central with tubular corollas. Peduncles inflated and hollow..... ***C. turbinata**
- 3. Florets of 2 kinds: marginal with or without corollas, central with tubular corollas. Peduncles solid.
- 4. Marginal florets numerous in 2-4 rows. Achene papillose on both faces..... **C. australis**
- 4. Marginal florets 1-6 in a single row. Achenes glabrous or with short, stiff hairs on outer face only.
- 5. Marginal achenes broadly winged..... **C. coronopifolia**
- 5. Marginal achenes wingless..... ***C. bipinnata**

C. australis (Sieber ex Sprengel) J.D. Hook.

Common Cotula, Carrot Weed

Slender, diffusely branched annual to 200 mm tall, usually bearing lax, spreading hairs. Leaves 10-30 mm long, membranous, more or less oblong, pinnatisect to bipinnatisect, the segments linear, entire, acute; radical and lower stem leaves petiolate, base stem-clasping; upper leaves more or less sessile with lobed, scarious bases. Heads solitary, terminal on very slender solid peduncles; involucre 2-5 mm in diameter, bracts in several rows, linear-oblong, obtuse, sparsely hairy or glabrous. Marginal florets numerous in 2-4 rows; corollas absent; achene obovoid, flattened, narrowly winged, both faces papillose, conspicuously pedicellate. Disc florets few; corolla tubular, 4-lobed, yellow; achene narrow but turgid, papillose on both faces, not markedly flattened, subsessile.

Occurs in a variety of soils, usually near water. Recorded from throughout the Perth Region. Extending southwards to the Busselton area, also near Balladonia and Mt. Jackson. This species is found throughout temperate Australia, often as a weed of gardens and roadsides. It is also known from New Zealand and South Africa where it is thought to have been introduced.

Flowers August-November in the Perth Region, elsewhere until May.

***C. bipinnata** Thunb.

Ferny Cotula

Small, spreading annual to 200 mm tall, sparingly pilose or glabrous. Leaves bipinnate, 10-20 mm long; lobes linear-subulate, rigid, mucronate and mostly toothed; bases broad, half-clasping. Heads 6-8 mm in diameter, solitary, terminal on short, solid peduncles; involucre numerous in 2 equal rows, oblong, obtuse, ca 3.5 mm long; receptacle flat. Marginal florets 1-6 in a single row; corolla absent; achene broad, not winged, conspicuously pedicellate. Disc florets numerous; corolla pale yellow; achene glabrous, subsessile.

Recorded from Cannington. Widely distributed elsewhere from Kalbarri to Cape Riche, extending eastwards to Wongan Hills, Northam and Beverley. A weed of moist, sandy places. A native of South Africa.

Flowers September in the Perth Region, elsewhere August-November.

C. coronopifolia L.

Waterbuttons

Stoloniferous annual or perennial with creeping, usually stout and succulent stems, glabrous. Leaves alternate, oblong and entire or coarsely toothed, or compound pinnate, 12-80 mm long; base loosely stem-clasping. Heads 8-12 mm in diameter, solitary, axillary and terminal on slender peduncles; involucre numerous, oblong. Marginal florets in a single row; corolla minute, 2-lobed, merging

into the wing of the achene; achene broadly winged, outer face with short stiff hairs, conspicuously pedicellate. Disc florets numerous; corolla small, bright yellow, 4-lobed; achene narrowly winged, flattened, outer face only with short hairs, subsessile. **Fig. 248**

Probably native, frequenting damp situations including wet pastures, creek banks in fresh or brackish water, the margins of salt marshes and drains. Recorded from throughout the Perth Region. Also throughout south western W.A. Found in all states except N.T.

Flowers at all times of the year.

A species found in all temperate regions of the world.

***C. cotuloides* (Steetz) Druce**

Smooth Cotula

Spreading to weakly erect, stoloniferous annual to 200 mm tall, sparsely pilose to almost glabrous. Leaves alternate, filiform to 20-60 mm long; margins entire; base membranous and stem-clasping. Heads 6-12 mm in diameter, solitary, axillary and terminal on slender peduncles; involucre obconic; bracts numerous, elliptic to almost circular; receptacle hemispherical. Marginal florets crowded in many rows; corolla absent; achene flat, broadly membranous-winged, conspicuously incurved, both faces glabrous, subsessile. Disc florets few; corolla pale yellow, sometimes tinged violet, tubular, dilated above, 4-lobed; achene smooth, flat, the margin thickened but not winged, sessile.

Occurs on a variety of soils in swampy areas, on salt-lake margins and around granitic outcrops. Recorded from Guildford, Alfred Cove, Cannington and Harvey. Widespread throughout south western W.A.

Flowers September-October in the Perth Region, elsewhere until December.

This species may represent the same taxon as *C. vulgaris* var. *australasica* J.H. Willis which occurs in S.A., Vic. and Tas., but is probably not conspecific with the African *C. vulgaris*.

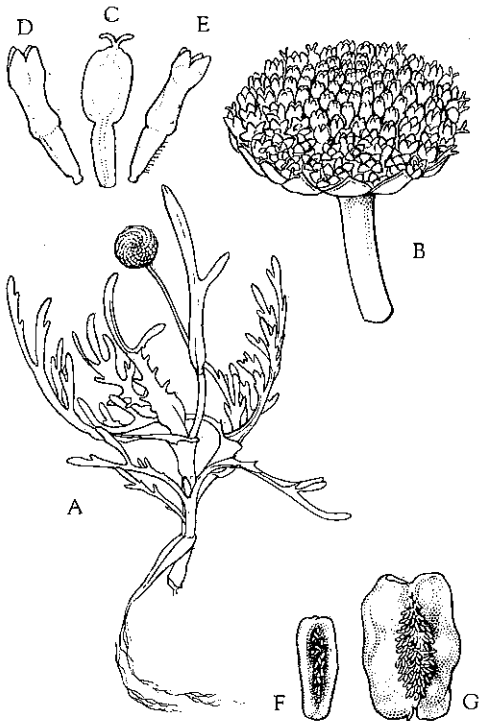


Fig. 248. *Cotula coronopifolia*. A, Flowering branch. B, Flower head. C, Marginal floret. D and E, Disc florets. F, Achene of disc floret. G, Achene of marginal floret.

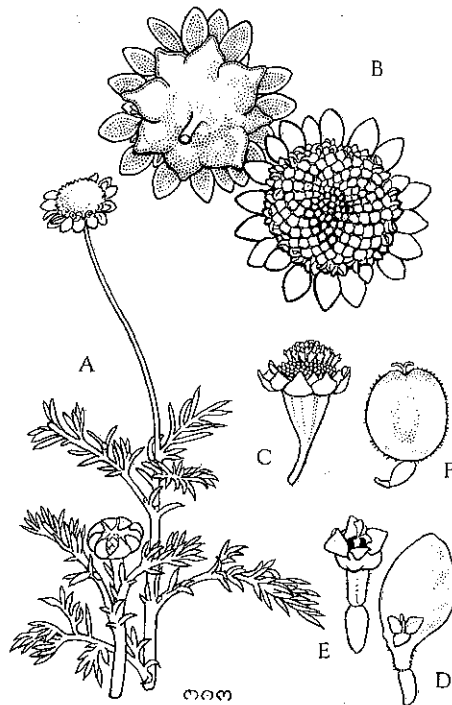


Fig. 249. *Cotula turbinata*. A, Flowering branch. B and C, Three views of flower head. D, Ray floret. E, Disc floret. F, Achene.

***C. turbinata L.**

Funnel Weed

Annual herb to 0.4 m tall, villous. Leaves pinnately or bipinnately lobed, 10-50 mm long, lobes acute, not all lying in one plane; base broad. Heads solitary on stout, inflated, hollow peduncles; involucre broadly obconic; bracts in 2 rows, glabrous, with translucent margins. Marginal florets numerous in several rows; corolla absent; achene flat, rough with short hairs, with thickened margin, usually sterile. Intermediate florets numerous in several rows; corolla white or pinkish, zygomorphic, with the anterior lobe much enlarged and ligule-like. Central florets numerous in many rows; corolla white or pink, yellow, tubular, actinomorphic. Achenes of intermediate and tubular florets glabrous, obovoid, with thickened margins. Fig. 249

A weed of sandy soils, particularly in lawns. Recorded from the metropolitan area and Bunbury. Extending southwards to near Busselton and Albany. A native of South Africa.

Flowers July-October in the Perth Region, elsewhere September-October.

CRASPEDIA G. Forster

Annual or perennial, unbranched herbs. Leaves radical and/or cauline and alternate, sessile or with a short petiole, entire. Compound heads globular, oblong, ovoid or hemispherical, of 50-100 or more partial heads, homogamous, homochromous; general involucre of small bracts with membranous margins, extending onto the compound receptacle to subtend partial heads but usually obscured when in full flower. Partial involucre of a few bracts lacking a distinct lamina; receptacle with translucent scales, each scale subtending a floret. Florets 3-10 per partial head, tubular, bisexual, 5-lobed. Anthers tailed. Style branches truncate. Achenes more or less obovoid, silky hairy. Pappus of plumose bristles. A genus of ca 12 recognized species endemic to Australia and New Zealand, 1 in W.A. A critical revision of the entire genus is long overdue.

C. sp. A

Erect, probably perennial herb to ca 0.6 m tall, with 3-10 adventitious root-tubers 50-80 mm long. Indumentum sparsely woolly. Radical leaves narrowly obovate, 8-30 x 80-200 mm, tapering into a narrow, petiolate base; margin entire; apex acute to acuminate. Cauline leaves becoming smaller and distant, narrowly elliptic; apex long-acuminate; base broadly stem-clasping. Compound heads more or less globular, 15-30 mm in diameter, solitary on long, slender scapes; general involucre of a few, short, green bracts with brown, membranous margins, extending onto the general receptacle so as to subtend partial heads but soon obscured by the expanding compound head. Partial involucre bracts mostly translucent and colourless. Florets pale yellow to pale orange. Achenes obovoid, densely hairy. Pappus of 15-20 white, plumose bristles as long as the florets, connate basally in a short ring.

On sandy soils, usually in open woodland. Widespread throughout the Perth Region. Extending north to Mt. Lesueur, south to Cape Naturaliste, Albany and Esperance and inland to the Stirling Range.

Flowers July-October in the Perth Region and elsewhere.

The identity of this species must await a critical revision of the genus. In the past, specimens from W.A. have been referred variously to *C. uniflora* Forst. (a New Zealand taxon), *C. richea* Cass., *C. glauca* (Labill.) Spreng. and *C. pleiocephala* F. Muell. Only a single taxon seems to be represented by material held at the W.A. Herbarium.

***CREPIS L.**

Annual, biennial or perennial herbs, usually much-branched. Leaves almost entire to pinnatisect or lobed. Heads 1 to numerous, ligulate, homogamous, homochromous; involucre bracts in 2 series, the outer shorter, the inner sometimes hardened and keeled in fruit; receptacle flat or convex, usually pitted, the raised margins of the pits often ciliate, rarely also with 1 or 2 rigid hairs or narrow, membranous scales between the florets. Florets all ligulate, bisexual, usually yellow, sometimes orange, pink, white or multi-coloured. Achenes yellowish to black, uniform or dimorphic to trimorphic, more or less cylindrical, ribbed, narrowed towards apex, sometimes beaked. Pappus of 1-many rows of usually white and soft, sometimes greyish or yellow as well as brittle hairs. A genus of ca 200 species found chiefly in Europe and Asia, some in Africa and North America, with 3 introduced in W.A.

1. Achenes always dimorphic with marginal achenes embraced by the inner involucre bracts, inner achenes 10-20 mm long..... **C. foetida*
 1. Achenes usually uniform, sometimes dimorphic, but marginal achenes never embraced by the inner involucre bracts, inner achenes 4-9 mm long..... **C. vesicaria*

**C. foetida* L.

Foetid Hawksbeard

Annual herb to 0.7 m tall, simple or branched from base or middle, hispid with simple and glandular hairs. Leaves radical and cauline; radical leaves lyrate, denticulate to bipinnate, 30-130 x 12-30 mm, apically acute or acuminate; cauline leaves smaller, elliptic, ovate, narrowly obovate, runcinate to deeply pinnatifid, sessile, apically acuminate, basally auriculate. Heads terminal, solitary on branches of a corymbose panicle; involucre 4-13 x 7-16 mm; outer involucre bracts ca 0.6 times the length of the inner ones, subulate; receptacle with ciliate pits and a linear scale subtending each floret. Florets orange-yellow; ligules reddish purple on outer face. Achenes dimorphic; marginal ones closely embraced by bracts, 6-7 mm long, finely striate, scabrous, acuminate but not or only shortly beaked; inner ones 10-20 mm long, attenuate into a slender, scabrous beak. Pappus of fine, minutely barbellate, white bristles, 5-6 mm long.

Recorded at Byford, near Chittering and at Woorooloo, and a few scattered localities in the south west. A native of southern and central Europe, now cosmopolitan.

Material from W.A. is referable to *C. foetida* subsp. *rhoeadifolia* (Bieb.) Celak.

Flowers November-January.

**C. vesicaria* L.

Perennial, biennial or annual herb to 1.5 m tall, usually much-branched, purplish below, glabrous or somewhat hispid with simple and glandular hairs. Leaves radical and cauline; radical leaves obovate, spatulate or ovate, 20-80 x 100-350 mm, with margins sinuately or retrorsely denticulate, dentate or runcinate-pinnatifid, pinnatisect or bipinnatisect, often lyrate, sometimes pectinate, apically obtuse to acute, basally narrowed; cauline leaves like the radical ones but sessile, becoming narrowly elliptic to bract-like, basally auriculate-amplexicaul. Heads many, often in a lax corymb; involucre 5-14 mm diameter; outer involucre bracts usually $\frac{1}{4}$ - $\frac{1}{3}$ as long as inner ones; receptacle with ciliate pits. Florets yellow; ligule usually reddish or purplish on outer face. Achenes brown or yellowish, fusiform, uniform or dimorphic, the marginal achenes never embraced by the inner involucre bracts, inner achenes 4-9 mm long, beaked, ca 10-ribbed. Pappus of soft white hairs, 5-6 mm long.

Recorded from Pinjarra. A native of Europe and north Africa, a common weed in Britain.

Flowers November.

**DITTRICHIA* Greuter

Perennial or annual herbs or subshrubs. Leaves simple, alternate. Heads solitary or in corymbs or panicles, radiate, homogamous, homochromous; involucre bracts imbricate in many rows; receptacle flat or slightly convex, without bracts. Ray florets female, the ligule often very short, yellow. Disc florets tubular, bisexual, yellow. Achenes cylindric, abruptly contracted apically. Pappus of many simple, basally connate bristles. A genus of 2 species native to southern and western Europe, both introduced in W.A.

**D. graveolens* (L.) Greuter

Stinkwort

Erect, aromatic, annual herb to 0.5 m tall, viscid with glandular hairs. Lower leaves 2-13 x 20-75 mm, narrowly elliptic to narrowly obovate, entire or remotely denticulate; upper leaves sessile, semi-amplexicaul. Heads in large, pyramidal, leafy panicles; involucre 4-7 mm in diameter; outer involucre bracts 0.5-1 x ca 3 mm, linear-triangular, green; inner involucre bracts 0.7-1 x 4-7 mm, with pale margins. Ray florets shortly ligulate; ligules 4-7 mm long, not or scarcely exceeding the involucre, often slightly reddish. Achenes ca 2 mm long, hairy. Pappus with ca 30 barbellate bristles. **Fig. 250**

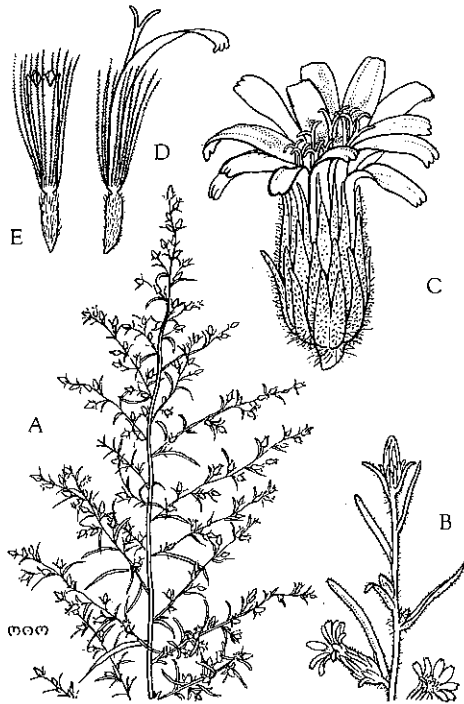


Fig. 250. *Dittrichia graveolens*. A, Flowering branch. B, Flowering branchlet. C, Flower head. D, Ray floret. E, Disc floret.

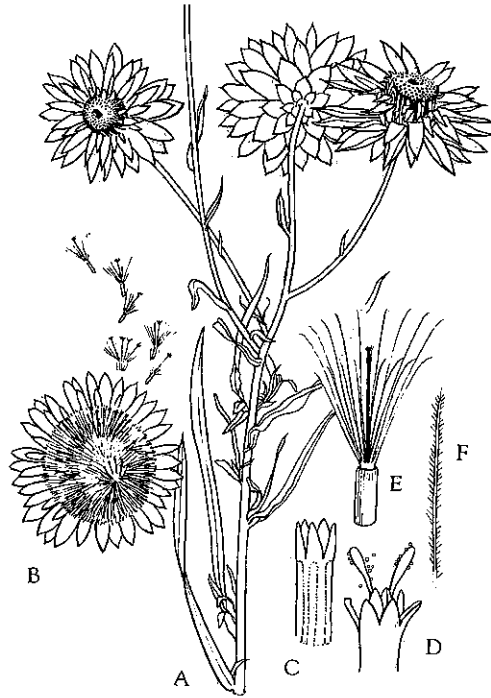


Fig. 251. *Helichrysum macranthum*. A, Flowering branch. B, Flower head. C and D, Upper part of disc floret. E, Achene. F, Pappus bristle.

A weed of waste ground. Recorded from Bayswater and Perth. Also found near Geraldton, Eneabba, Wagin, and Mt. Barker. Native to southern Europe and northern Africa, now a widespread weed in temperate regions of the world.

Flowers April-November in the Perth Region and elsewhere.

This species is a cause of contact dermatitis in humans and can be poisonous to stock; it also taints milk.

*EUPATORIUM L.

Perennial herbs or shrubs, sometimes climbing. Leaves opposite, rarely alternate, entire or toothed, rarely dissected. Heads numerous in terminal corymbs, rarely in panicles, homogamous, homochromous, few to many-flowered; involucre cylindrical, ovoid, campanulate or almost hemispherical; involucre bracts in 1 to many series; receptacle without bracts. Florets all tubular, scarcely widened upwards or cylindrical below, campanulate above, 4 or 5-lobed, purplish, bluish or white, bisexual; anthers obtuse basally; style branches filiform, obtuse, externally papillose. Achenes 5-angled. Pappus of numerous bristles in 1-3 series, often scabrous, rarely barbellate. A genus of ca 400 species, mostly American, a few Asian or European, 1 introduced in W.A.

**E. adenophorum* Sprengel

Perennial herb to 2 m tall, much-branched, glandular-hairy. Leaves opposite, petiolate, ovate or rhombic, 60-100 mm, conspicuously 3-veined; apex acute to acuminate; margin crenate; base broadly cuneate; petiole to 40 mm long. Heads campanulate, crowded in corymbs terminating the twigs and

short, stiff lateral branches; involucre ca 5 mm in diameter; involucre bracts in 2 series, narrowly elliptic. Florets numerous, white. Achenes ca 2 mm long, almost cylindrical, 5-angled. Pappus of numerous scabrous bristles, 3-4 mm long.

Recorded from a suburban garden in Applecross where it occurred as a spontaneous weed. A native of Mexico, California, the West Indies and South America, now a troublesome weed in many regions of the world.

Flowers December.

An acute disease of the lungs of horses is associated with the grazing of this weed. This species was placed in the genus *Ageratina* by King, R.M. and Robinson, H. 1970. *Phytologia* 19: 208-229, but this has not been followed by recent authors.

*GALINSOGA Ruiz Lopez & Pavon

Annual herbs. Leaves opposite, variously dentate. Heads small, radiate, heterogamous, heterochomous; bracts few, broad, green, several veined, each subtending a ray, sometimes adnate at base to the two adjacent receptacular bracts, a few shorter and narrower outer bracts often present; receptacle conic, chaffy, its bracts membranous, rather narrow, nearly flat. Ray florets few, short, broad, only slightly exceeding the disc, white or pink, female and fertile. Disc florets bisexual, tubular, yellow; style arms flattened with short, minutely hairy appendages. Achenes 4-angled, scarcely compressed or, especially the outer ones, somewhat flattened parallel to the bracts. Pappus of scales, often fimbriate or awn-tipped, that of the ray reduced or absent. A genus of 4 species native to central and South America, 1 introduced in W.A. Reference: Canne, J.M. 1977. *Rhodora* 79: 319-389.

**G. parviflora* Cav.

Potato Weed, Yellow Weed

Erect, annual herb to 0.6 m tall, much-branched, glabrous or sparsely hairy with appressed or sometimes spreading hairs. Leaves ovate or narrowly ovate, 40-70 x 12-40 mm, almost glabrous or sparsely appressed hairy, petioles appressed hairy, or finely villous with spreading, glandular hairs. Heads numerous on slender, more or less glandular-hairy pedicels in leafy cymes; involucre almost hemispherical, ca 5 mm diameter; bracts in several rows, the innermost row about 5, ovate and slightly concave, the outer rows smaller. Ray florets white, ca 5; ligule short, 3-lobed. Disc florets yellow. Achenes black with scattered white bristles, 1-1.5 mm long, obovoid. Pappus of the ray florets inconspicuous or absent; pappus of the disc florets of conspicuous, translucent and plumose scales, shorter than the achenes.

A weed of gardens, roadsides and waste places. Recorded from Wanneroo and Harvey. A native of South America, now cosmopolitan.

Flowers from June-December.

GNAPHALIUM L.

Annual or perennial herbs, rarely shrubs, greyish or white-woolly. Leaves alternate, entire, sessile, sometimes clasping or decurrent. Heads small, usually in glomerules which are variously arranged, often spiciform, corymbose or paniculate, sometimes solitary, disciform, heterogamous, homochromous; involucre ovoid to campanulate, involucre bracts multiseriate, at least the upper part scarious; receptacle without bracts, sometimes foveolate. Marginal florets in 2 to many rows, female, filiform, minutely toothed; style branches filiform. Central florets bisexual, few, tubular, often expanded above, 5-lobed; anther bases sagittate, more or less tailed; style branches short, truncate, penicillate. Achenes subterete. Pappus of uniseriate bristles, sometimes absent in female florets. A genus of ca 200 species, worldwide, but with the main centre of diversity in the Americas. Some are native to Australia, with 7 in W.A. Generic delimitation has long been a problem in *Gnaphalium* and related groups. Some local species previously included in *Gnaphalium* are now referred to *Pseudognaphalium* and *Vellereophyton*. References: Hilliard, O.M. & Burt, B.L. 1981. *Bot. J. Linn. Soc.* 82: 181-232; *Bot. J. Linn. Soc.* 82: 233-265.

1. Heads in dense terminal clusters subtended by 5-8 floral leaves. Florets 16-20 female and 1 bisexual per head. Pappus bristles free to base, persistent..... **G. sphaericum**
1. Heads in small glomerules arranged in a more or less spiciform inflorescence. Florets 80-100 female and 2 or 3 bisexual per head. Pappus bristles connate basally into a ring, caducous.
 2. Leaves noticeably discoloured, thinly hairy or almost glabrous above, densely white-felted below, margins somewhat crisped. Heads in dense, terminal, spiciform panicles, clusters subtended by short leaves. Involucral bracts often purplish or brown, glabrous except at the base..... ***G. coarctatum**
 2. Leaves less noticeably discoloured, hairy on both surfaces but more densely so beneath, margins flat. Terminal panicles usually branched, at least at the base, clusters subtended by longer leaves. Involucral bracts straw-coloured, outer ones sparsely lanate..... ***G. pensylvanicum**

***G. coarctatum Willd.**

Spiked Cudweed

Annual or biennial herb with basal rosette and several radiating, usually decumbent, lateral flowering branches to 0.5 m long. Leaves to 20-120 x 2-9 mm, narrowly spatulate, becoming smaller upwards and grading into inflorescence bracts, markedly discoloured, green and glabrescent above, often drying brown, white-felted below; margins somewhat crisped. Heads oblong, in small glomerules subtended by short leaves or arranged in spiciform, compound panicles; involucre ca 2 x 4 mm; involucral bracts in ca 3 series, outermost broadly ovate, translucent; innermost narrowly elliptic, about equal to the florets, green, glabrous except at base, margins translucent, tips reddish purple to golden-brown. Florets ca 80-100 female, 2 or 3 bisexual, whitish and tipped reddish purple. Achenes ca 0.5 mm long, papillose, becoming mucilaginous when wet. Pappus of many scabrous bristles connate basally into a ring, caducous.

A weed of lawns, gardens and roadsides. Only recorded from the metropolitan area, but probably more widespread. A native of South America, now a widespread weed in warmer parts of the world.

Flowers October-December.

This species has long been known as *Gnaphalium spicatum* Lam. non Mill., an illegitimate name.

***G. pensylvanicum Willd.**

Soft, annual herb, branched from the base, with stems to ca 0.4 m tall, the central one erect, the laterals decumbent, rooting where they touch the ground, plant loosely white-woolly. Leaves 40-80 x 20-40 mm, narrowly spatulate, decreasing in size and passing into inflorescence bracts, hairy on both surfaces, more densely so beneath; margins flat. Heads oblong, in small glomerules arranged in a usually branched terminal panicle, clusters subtended by longer leaves; involucre ca 2 x 3 mm; involucral bracts in ca 3 series, innermost equal to the florets, pale brown or buff-coloured, outer ones sparsely lanate. Florets ca 80-100 female, 2 or 3 bisexual, whitish and tipped reddish purple. Achenes ca 0.5 mm long, papillose, mucilaginous when wet. Pappus bristles many, scabrous, connate basally into a smooth ring, caducous.

A weed of lawns and damp places. Recorded from South Perth, but probably more widespread. A native of North and South America, now widespread as a weed in warmer parts of the world.

Flowers October.

G. sphaericum Willd.

Erect annual or biennial herb, 0.3-0.7 m tall, with one to several stems, white-lanate with long, loosely matted hairs. Lower leaves elliptic, obovate or spatulate to almost linear, 10-80 mm long, glabrescent on upper surface; apex obtuse with conspicuous apiculum; base sessile or narrowly petiolate; margin

undulate. Upper leaves similar to lower ones but smaller, linear, with revolute margins, merging into floral leaves. Heads in a dense terminal cluster, 8-25 mm in diameter, subtended by 5-8 floral leaves; involucre of partial heads 3-4 mm long, shortly pedicellate; involucre bracts straw-coloured to brownish, green basally, inner bracts longer and narrower than the outer ones. Florets ca 16-20 female, 1 bisexual, reddish purple. Achenes sparsely and minutely papillose, ca 0.5 mm long. Pappus bristles many, scabrous, free, persistent.

Occurs in a wide variety of habitats and soils. Widespread in the Perth Region. Extending throughout south west W.A. and northwards to the Abrolhos Islands. Found in all states and in New Zealand.

Flowers July-December in the Perth Region and elsewhere.

*HEDYPTIS Miller

Annual herbs with milky latex, usually with many branched stems. Leaves radical or cauline and alternate, entire, dentate or lobed, sessile or more or less petiolate. Heads solitary and terminal, or forming a loose, almost paniculate inflorescence, ligulate, homogamous, homochromous; receptacle without bracts; involucre campanulate or depressed globular; involucre bracts in 2 rows, the outer very small, inner becoming incurved and firm in fruit. Florets all bisexual, ligulate, exceeding the involucre, yellow, the outer sometimes with a greenish stripe on the under surface; anthers not tailed basally. Achenes more or less cylindrical, often incurved, the outer ones partly enclosed in the involucre bracts. Pappus of narrow, long-aristate scales, sometimes also including hairs. A genus of 3 species, mainly Mediterranean, 1 introduced in W.A.

**H. rhagadioloides* (L.) F.W. Schmidt

Cretan Weed

Procumbent or erect, annual herb to 0.6 m tall, more or less scabrous-hairy. Leaves 2-25(-35) x 5-180(-250) mm, mostly narrowly elliptic to obovate, entire to deeply dentate or lobed; radical ones with winged petioles, cauline ones usually sessile. Heads solitary on long, naked, rigid peduncles which are usually hollow and swollen near the summit; involucre 30-110 x 70-105 mm; involucre bracts narrowly elliptic, glabrous or scabrous-hairy, more or less acute, the inner ones becoming swollen and incurved in fruit. Achenes 5-7.5 mm long, often narrowed apically, reddish brown, scabrous-hairy. Pappus of outer achenes a small, denticulate crown, that of the inner achenes double, consisting of 4 or 5 narrowly ovate, awned scales with a few minute basal scales; or rarely all the achenes with a coroniform pappus.

An occasional weed of settled areas, particularly along roadsides. Recorded from near Perth. Occurring sporadically northwards to the Murchison River, eastwards to near Southern Cross, and southwards to Busselton. A native to the Mediterranean Region and western Asia.

Flowers October in the Perth Region, elsewhere September-November.

Although many variants of this species have been recognized, none seem to have any geographical or ecological basis. Some authors relegate the variant found in Australia to *H. rhagadioloides* subsp. *cretica* (L.) Hayek.

*HELIANTHUS L.

Erect, annual or more often perennial herbs, the perennials with underground stem tubers. Leaves opposite or alternate, simple, entire or toothed. Heads terminal and solitary, or numerous in terminal corymbs, radiate, heterogamous, homochromous or heterochromous; involucre bracts almost equal, imbricate in 2 or more rows; receptacle flat or convex, with conduplicate bracts enfolding the achenes. Ray florets neuter, ligulate, yellow. Disc florets bisexual, tubular, yellow, orange, red or purple; style branches flattened, hispidulous externally, the marginal stigmatic lines poorly developed. Achenes obovate in outline, somewhat compressed at right angles to the involucre bracts, glabrous or hairy. Pappus of 2 awns or narrow scales, very soon caducous. A genus of ca 110 species, mostly North American, 3 introduced in W.A.

1. Leaves mostly opposite. Disc florets with yellow lobes. Achenes sparsely patent hairy..... ***H. tuberosus**
1. Leaves alternate, sometimes opposite below. Disc florets with red, purple or brown lobes. Achenes glabrous or densely appressed hairy.
2. Involucral bracts generally more than 4 mm wide, ovate or obovate, frequently abruptly attenuate. Disc usually more than 30 mm in diameter. Achene glabrous..... ***H. annuus**
2. Involucral bracts generally less than 4 mm wide, gradually attenuate. Disc usually less than 30 mm in diameter. Achenes densely appressed-hairy..... ***H. debilis**

***H. annuus L.**

Sunflower

Erect annual to 3 m tall, branching from the base, scabrous-hairy throughout. Leaves mostly alternate, petiolate, ovate or broadly triangular, 10-200 x 60-120 mm; base obtuse, truncate or cordate; margin usually serrate; apex acute to acuminate. Heads solitary on long terminal peduncles, larger or smaller in cultivated variants; involucral bracts ovate or ovate-oblong, more than 4 mm wide, mostly abruptly attenuate, usually scabridulous to silky hairy. Ray florets bright yellow. Disc florets brownish black or purplish black. Achenes ca 5 mm long, glabrous, brown or black, often with white stripes.

A weed of habitation, roadsides and waste land in dry places. Widespread throughout the metropolitan area. Also around Geraldton. Native to North America.

Flowers February-May in the Perth Region, elsewhere March-September.

Commonly grown for its oil-producing seeds and as a fodder plant. It sometimes occurs as a ruderal, either the small-headed typical plant described here, or the selected, giant-headed garden and agricultural cultivars occasionally seen along roadsides.

***H. debilis Nutt.**

Erect annual or perennial to 2 m tall, branching mostly from above the middle, with distinctly purplish, mottled stems, scabrous-hairy throughout. Leaves alternate, petiolate, deltate to ovate, 10-40 x 9-30 mm; base cordate to hastate, truncate or obtuse; margin irregularly serrate; apex acute to acuminate; petiole 10-40 mm long. Heads solitary on long terminal peduncles, 30-60 mm in diameter, the disc 15-20 mm in diameter; involucral bracts in 3 rows, 7-10 x 1-2 mm, narrowly obovate, exceeding the disc, gradually attenuate, scabridulous. Ray florets deep yellow. Disc florets with purplish lobes. Achenes ca 4 mm long, densely appressed-hairy, grey.

A garden escape found along roadsides. Recorded from the inner metropolitan area. A native of North America, often grown as an ornamental.

Flowers March-April.

Material from the Perth Region appears to belong to *H. debilis* subsp. *cucumerifolius* (Torrey & Gray) Heiser, sometimes given specific status as *H. cucumerifolius* Torrey & Gray.

***H. tuberosus L.**

Jerusalem Artichoke

Erect perennial to 4 m tall, with tuber-bearing rhizomes, scabrous-hairy throughout. Leaves petiolate, mostly opposite, ovate to oblong, to 60-160 x 10-50 mm; base broadly acute, decurrent on the petiole; margin serrate-dentate; apex acute to acuminate. Heads numerous, corymbose, mostly 50-80 mm in diameter, the disc 15-25 mm diameter; involucral bracts narrowly obovate, acuminate or attenuate, rather dark basally, ciliate and scabridulous. Ray florets light yellow. Disc florets yellow. Achenes sparsely patent hairy, brown-coloured.

A weed of moist soils on roadsides and waste places. Recorded from Midland Junction. A native of North America, widely cultivated for its edible tubers.

Flowers in December.

HELICHRYSUM Miller

Herbs, subshrubs or shrubs, glabrous or variously hairy. Leaves alternate, rarely opposite, entire, usually sessile or stem-clasping, sometimes petiolate. Heads solitary or in a compact or spreading, corymbose, compound inflorescence, discoid or disciform, homogamous; involucre hemispherical, campanulate, globular, ovoid or cylindrical; involucre bracts imbricate in few to many series, scarious, membranous or chartaceous, the outer sessile or shortly clawed, inner bracts similar or with a narrow or broad-winged or wingless claw ending in a spreading, erect or appressed chartaceous petal-like white or coloured lamina, innermost bracts often with a minute lamina; receptacle usually without bracts or rarely with bracts. Florets either all bisexual, tubular and 4 or 5-toothed, or few to many marginal, female, slender, 2 or 3-toothed and several central ones sterile; anther bases sagittate, tailed; style branches of bisexual flowers truncate, penicillate. Achenes more or less terete to obovoid, often compressed, rarely contracted apically, not beaked, sometimes obscurely angled or ribbed, glabrous, variously hairy or papillose. Pappus of numerous, apically barbellate or plumose capillary bristles, or few bristles, or reduced, occasionally absent. A genus of ca 500 species, mainly in Europe and Asia as well as South Africa and Australia, 26 in W.A. Reference: Burbidge, N.T. 1958. Austral. J. Bot. 6: 229-284.

1. Laminae of involucre bracts large and radiating, white or pinkish.
2. Plant scabrous or woolly-hairy; achenes glabrous or shortly papillose.
3. Erect plant to 2 m; floral leaves absent; laminae chartaceous; all florets bisexual..... **H. macranthum**
3. Erect plant to 0.5 m; 2 or 3 woolly floral leaves subtending each head; laminae thin and pliable; marginal florets female, remainder bisexual..... **H. leucopsideum**
2. Plant glandular-hairy, becoming woolly-tomentose towards the peduncles; achenes more or less densely hairy with long, transparent papillae..... **H. lindleyi**
1. Laminae of involucre bracts small and erect, or if radiating very small < 2 mm long, white..... **H. cordatum**

H. cordatum DC.

Tangle Daisy

Weakly erect or spreading perennial to 0.7 m tall, with densely tomentose branches. Leaves petiolate, cordate, 20-70 x 15-20 mm; upper surface green but drying olive green or almost black, almost glabrous; lower surface densely white-tomentose like the stems and with slightly prominent veins; margins entire; apices obtuse. Heads shortly pedunculate in terminal, corymbose clusters forming large, open panicles, disciform; involucre bracts with a narrowly elliptic claw and an acute, spreading, white lamina less than 2 mm long. Florets 15-20, the outer few female, filiform, the remainder bisexual, tubular. Achenes ovoid, glabrous or more or less papillose, light brown. Pappus of many, soft or barbellate slightly thickened bristles, persistent.

Occurs on coastal sand dunes. Recorded from Yanchep to Bunbury. Extending northwards to Jurien Bay and southwards along the coast to Albany.

Flowers October-April in the Perth Region and elsewhere.

H. leucopsideum DC.

Erect perennial to 0.5 m tall, with red and glabrous or loosely woolly stems. Leaves sessile, linear or narrowly elliptic, to 20-60 x 1-12 mm, sparsely scabrous-hairy above, usually grey-tomentose below; margin recurved; apex shortly acuminate. Heads solitary, terminal, subtended by a few small floral leaves, discoid; involucre hemispherical, 30-40 mm in diameter; involucre bracts narrowly obovate, outer ones with a short woolly claw, inner ones with a longer papillose claw, lamina radiating, 10-15 mm long, becoming smaller towards the disc, thin and pliable, white or tinged pink. Florets white, outer few female, filiform, the remainder bisexual, tubular. Achenes compressed ovoid, light brown, glabrous. Pappus of many apically barbellate bristles.

Occurs on a variety of soils in open woodland, often with Wandoo. Recorded from Millendon. Extending inland northwards to the Wongan Hills and southwards to the Stirling Range and Bremer Bay. Also known from S.A., Vic., Tas. and N.S.W.

Flowers September-December in the Perth Region, elsewhere October-January.

H. lindleyi H. Eichler

Erect, slender, branching annual to 0.5 m tall, glandular-hairy, stems becoming woolly-tomentose towards the peduncles. Leaves sessile, mostly opposite, linear, to 8-50 x 0.5-1 mm. Heads solitary on long peduncles, discoid; involucre hemispherical, to 30 mm in diameter; the outer involucre bracts brown, narrowly elliptic, appressed, with scarious margins and slightly woolly, the inner ones with a broad linear claw and an oblong, obtuse, radiating, petal-like, pink or white lamina. Florets all bisexual, tubular. Achenes flask shaped, light brown, more or less densely hairy with long, transparent papillae. Pappus of numerous, uniformly barbellate bristles.

Occurs on a variety of soils in open woodland. Widespread in the Perth Region. Extending throughout south western W.A. from the Murchison River to the Stirling Range and inland to Kalgoorlie.

Flowers August-September in the Perth Region, until July elsewhere.

H. macranthum Benth.

Erect, perennial herb to 2 m tall, scabrous-hairy. Leaves narrowly to broadly obovate, becoming linear above, to 150 x 20 mm; base strap-like, sessile or half-clasping; margin minutely ciliate; apex narrowly acute. Heads solitary, terminal on stout peduncles, without floral leaves, disciform; involucre hemispherical, 40-80 mm in diameter when open; involucre bracts rigid, white or tinged pink with a short, broad claw, outermost with an ovate lamina, innermost with a short, more or less spreading, narrowly triangular lamina. Florets pale yellow, outermost female, filiform, the remainder bisexual, tubular. Achenes compressed-ovoid, glabrous, dark brown. Pappus of ca 25 barbellate bristles, plumose above, connate into a ring basally. *H. niveum* Graham non Less., non Boiss & Heldr. and *H. bracteatum* (Vent.) Willd. var. *albidum* DC. **Fig. 251**

Occurs on a variety of soils on the Darling Scarp and Range throughout the region. Widespread in south western W.A., extending northwards to Geraldton, southwards to Mt. Manypeaks and inland to the Stirling Range.

Flowers September-January in the Perth Region, until June elsewhere.

This species may be conspecific with *H. papillosum* Labill., described from Tasmania. It is obviously closely related to certain yellow-headed variants of *H. bracteatum* (Vent.) Willd., although these are notably absent from the Perth Region. The highly polymorphic *H. bracteatum* complex, widespread throughout Australia, is in need of taxonomic study.

HELIPTERUM DC.

Annual herbs or shrubs, glabrous or variously hairy. Leaves alternate, rarely opposite basally, entire, usually sessile or stem-clasping. Heads solitary, terminal or axillary, in globular clusters, leafy spikes, or spreading corymbs, discoid or disciform, homogamous or heterogamous, homochromous; involucre hemispherical, campanulate, ovoid or cylindrical; involucre bracts imbricate in several rows, outer ones scarious-membranous, sessile or shortly clawed, passing into inner bracts, inner ones similar or with a more or less winged claw ending in a spreading or appressed, chartaceous, petal-like lamina, innermost bracts often with a smaller lamina; receptacle flat, slightly convex or distinctly conic, without bracts. Florets usually all tubular, bisexual, 4 or 5-lobed, sometimes with a few male florets in the centre, rarely with a few marginal ones which are female, filiform and 2-4-lobed; anthers with fine tails; style branches angular-terete, truncate or conic. Achenes angular-terete, subterete or obovoid, often compressed, rarely contracted apically, never beaked, glabrous, papillose or variously hairy. Pappus of capillary or dilated and scale-like bristles, finely plumose-ciliate from the base, those of male or female florets fewer or wanting. A genus of ca 100 species in Africa and Australia, 45 in W.A.

- | | |
|---|----------------------|
| 1. Involucre bracts lacking a radiate white or coloured lamina..... | H. spicatum |
| 1. Involucre bracts with a radiate white or coloured lamina. | |
| 2. Achenes glabrous or papillose. | |
| 3. Heads solitary on long peduncles..... | H. cotula |
| 3. Heads shortly pedunculate in corymbose clusters..... | H. corymbosum |
| 2. Achenes densely woolly or silky-hairy. | |
| 4. Lamina of involucre bracts pure white or tinged pink. Receptacle distinctly conic..... | H. pyrethrum |
| 4. Lamina of involucre bracts pink, sometimes intensely purple basally. Receptacle flat or slightly convex..... | H. manglesii |

H. corymbosum (A. Gray) Benth.

Erect, slender herb to 0.6 m tall, more or less glabrous to sparsely white woolly-hairy. Leaves sessile, narrowly linear-subulate, 12-50 x 0.5-3 mm. Heads terminal, shortly pedunculate in corymbose clusters; involucre cylindrical to conic, 4-5 mm long; involucre bracts in several series, glabrous or almost so, the outer ones pale, straw-coloured, scarious-membranous, ovate, grading into the inner ones with a spreading, thin, white, ovate lamina to ca 1.5 mm long. Florets 6-10, all bisexual, tubular. Achenes narrowly obovoid-compressed, glabrous or with elongate papillae. Pappus of 12-18 plumose, basally connate bristles.

Occurs on a variety of substrates including limestone, granite and laterite. Widespread throughout the Perth Region. Extending northwards to Northampton.

Flowers October-November in the Perth Region and elsewhere.

H. cotula (Benth.) DC.

Slender, erect, simple or branching annual to 0.3 m tall, sparsely woolly-hairy below, densely so above. Leaves opposite below, becoming alternate above, sessile, narrowly linear, almost filiform, 0.5-1 x 5-20 mm. Heads solitary, terminal on long, more or less leafless peduncles; involucre hemispherical, spreading, 10-25 mm in diameter when fully open; involucre bracts imbricate in several rows, outer and innermost bracts light straw-coloured or translucent, with a small, yellow, white or pinkish, triangular lamina, intermediate ones with a short, broad claw and larger ovate lamina. Florets numerous, all bisexual, tubular, a few central ones sometimes sterile. Achenes compressed-ellipsoid, distinctly papillose or glabrous, light brown. Pappus of 10-15 plumose bristles, often with an apical tuft of yellow hairs. Fig. 252

Occurs in open woodland on a variety of soils. Found throughout the Perth Region. Extending northwards to Kalbarri, southwards to Augusta and Mt. Barker, and inland to Wyalkatchem and the Stirling Range.

Flowers August-November in the Perth Region, until December elsewhere.

Yellow-headed forms are sporadic and rarely collected.

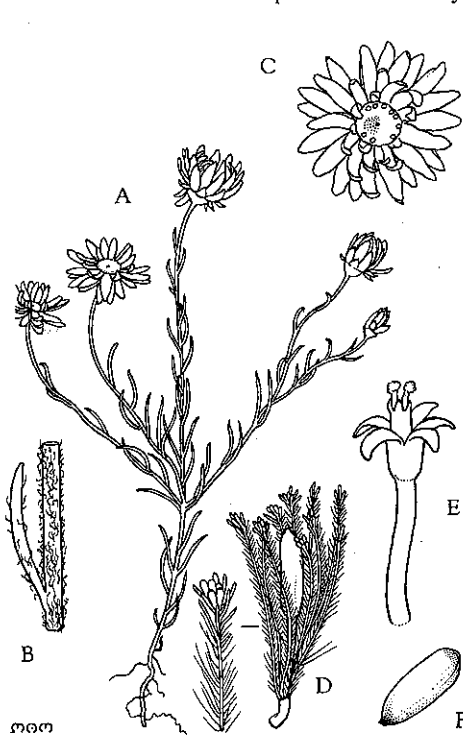


Fig. 252. *Helipterum cotula*. A, Habit. B, Leaf. C, Flower head. D, Bud with enlargement of pappus bristle. E, Open floret. F, Achene with pappus fallen.

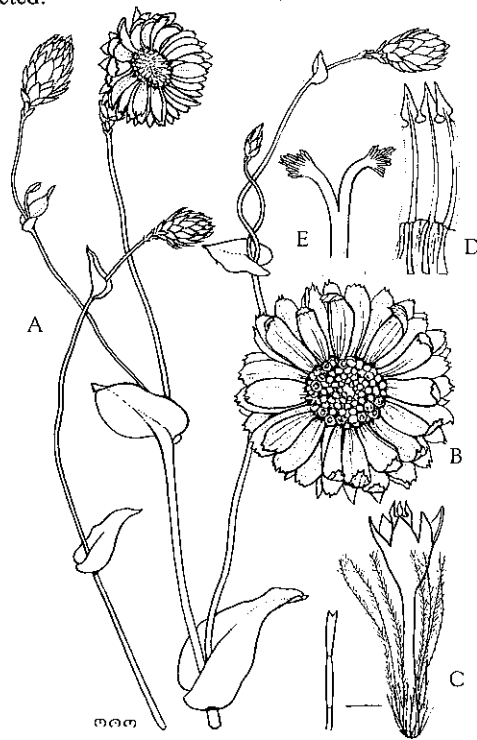


Fig. 253. *Helipterum manglesii*. A, Flowering branches. B, Flower head. C, Floret with enlargement of ovary hair. D, Stamens. E, Style.

H. manglesii (Lindley) F. Muell. ex Benth.

Erect, simple or much-branched annual to 0.6 m tall, with smooth, reddish brown stems, glabrous throughout apart from a few woolly hairs on the peduncles. Leaves alternate, sessile, stem-clasping, broadly ovate, ovate, or elliptic to narrowly elliptic, 6-46 x 3-34 mm; base usually auriculate, with broadly obtuse lobes; margin entire; apex broadly obtuse to acute, often minutely apiculate. Heads terminal, solitary on long slender peduncles bearing scattered, scarious scales; involucre hemispherical 20-50 mm in diameter; outer bracts sessile, scarious, transparent, inner ones with a narrow claw and a radiating, petal-like, pink to deep pink lamina, sometimes intense purple basally; receptacle flat or slightly convex. Florets all bisexual, tubular, yellow. Achenes compressed-ellipsoid, densely woolly-hairy. Pappus of 15-20 equally plumose bristles. **Fig. 253**

Occurs in low open woodland on loamy soils. Recorded from Darlington and Kelmscott. Extending from Kalbarri to the Stirling Range and inland to Coolgardie and Balladonia.

Flowers September-October in the Perth Region, August-November elsewhere.

H. pyrethrum (Steetz) Benth.

Erect, simple or little-branched herb to 200 mm tall, with basally thickened stems, glabrous throughout. Leaves narrowly ovate to linear, 3-12 x 0.5-2 mm. Heads solitary, terminal, shortly pedunculate; involucre hemispherical, 7-12 mm long; bracts in several series, glabrous, the outer ones few, short and scarious grading into the inner ones which have a spreading, thin, ovate lamina 4-10 mm long, pure white or tinged pink; receptacle distinctly conic. Florets numerous, tubular, the marginal ones bisexual, the inner ones male. Achenes compressed-ovoid, densely silky-hairy. Pappus of 10-15 more or less dilated and scale-like, plumose-ciliate bristles.

Occurring in clay or wet mud. Restricted to the Perth Region. Recorded only from Upper Swan and near Bunbury.

Flowers October-November.

H. spicatum (Steetz) F. Muell. ex Benth.

Erect or somewhat decumbent herb to 0.3 m tall, with many stems diverging basally, loosely woolly-hairy. Leaves narrowly linear or filiform, 15-70 x 0.5-2 mm. Heads in dense globular or ovoid clusters or elongated into an oblong spike; involucre narrowly ovoid or cylindrical, 4-8 mm long; bracts scarious, shiny, reddish brown or straw-coloured, lacking a spreading lamina. Florets 5 or 6, all tubular, bisexual, the central ones sometimes male. Achenes ovoid, densely silky-hairy. Pappus of numerous, rigid, plumose bristles.

Occurs in low open woodland on a variety of soils. Recorded from Guildford. Widespread from Murchison River to near Esperance and inland to Southern Cross.

Flowers November in the Perth Region, from July elsewhere.

***HELMINTHOTHECA** Zinn

Erect or ascending, branching herbs, scabrous to prickly hairy. Leaves radical and cauline, alternate, entire or coarsely toothed. Heads solitary at the tips of branches, often corymbose, ligulate, homogamous, homochromous; involucre ovoid-urceolate or campanulate; bracts multiseriate, the outer ones 3-5, broadly oblong-cordate, inner ones markedly smaller, narrowly elliptic or linear; receptacle without bracts. Florets all ligulate, yellow. Achenes dimorphic; marginal ones cylindrical, villous, finely beaked, embraced by the involucral bracts, persistent; inner ones obovoid, glabrous, transversely wrinkled, finely beaked. A genus native to the Mediterranean Region and south western Asia, 1 introduced in W.A. Closely related to *Picris* and often united with it.

***H. echioides** (L.) Holub

Stout, erect annual or perennial herb to 1 m tall, irregularly branched, strongly hispid. Radical and lower stem leaves narrowly obovate, to 200 x 25 mm, irregularly toothed, narrowed below into a petiole-like base; upper leaves narrowly ovate, to 100 x 200 mm, sessile, clasping, sometimes decurrent. Heads

shortly pedunculate in irregular corymbs; involucre ca 15 mm in diameter; bracts unequal with 5 ovate-cordate, leaf-like outer ones and ca 10 linear or elliptic inner ones with a long, subulate, hispid process behind the tip. Florets yellow. Achenes dimorphic: outer ones 3-3.5 mm long, finely beaked, white, villous, embraced by the involucre bracts, persistent; inner ones glabrous, ca 2.5-4 mm long, transversely wrinkled, red or dark-brown, finely beaked. Pappus of outer achenes reduced, that of inner achenes more or less as long as the body. *Picris echioides* L.

A weed of waste places or disturbed places near settlement. Occasional in the metropolitan area. Recorded elsewhere in south west W.A., including Cunderdin and Mt. Barker. A native of the Mediterranean Region and south western Asia.

Flowers November-December in the Perth Region, until January elsewhere.

*HYPOCHAERIS L.

Annual to perennial herbs, with stems solitary to few, usually branched. Leaves mostly radical, entire, toothed to pinnatifid. Heads solitary or few in branched, corymbose panicles, ligulate, homogamous, homochromous; involucre oblong-cylindric or campanulate; bracts multiseriate, imbricate; receptacle flat, with bracts. Florets all ligulate, yellow or white, the outermost sometimes with a greenish or reddish stripe adaxially. Achenes cylindric, ribbed, often rough, the inner ones usually beaked. Pappus of 1 or 2 rows of scabrous or plumose hairs or rarely of fimbriate scales. A genus of 50-100 species, native to Europe, western Asia, north Africa and South America.

Plants of this genus in W.A. are treated here as a single species pending further collection and study. All of the differences that have been used to distinguish between *H. glabra* L. and *H. radicata* L., including duration, indumentum characteristics, ligule dimensions, number of involucre bracts and achene dimorphy, are subject to failure, possibly reflecting past hybridisations and segregation. A similar situation seems to pertain in the south eastern U.S.A. Reference: Cronquist, A. 1980. "Vascular Flora of the Southeastern United States. Volume 1, Asteraceae."

**H. glabra* L.

Smooth Catsear

Annual or perennial herb to 1 m tall, essentially glabrous, often spreading hispid below. Leaves in a basal rosette, 10-200 x 3-35 mm, obovate, narrowed to a clasping base, sinuate-toothed to pinnatifid or entire, glabrous, sparsely and coarsely hairy, sometimes densely so on upper surface; margin entire or ciliate. Heads solitary at the apices of long, branched, distantly bracteate peduncles; involucre 8-20 mm long; involucre bracts elliptic, glabrous or more or less spinulose above. Florets many, the outer ones equal to or exceeding the involucre; ligules golden yellow abaxially, greenish yellow dorsally. Achenes brown, striate, scabrous above, 2.5-17 mm long, central ones attenuate with a long, smooth beak, marginal ones often with a short beak or without a beak. Pappus of 2 rows of hairs, the outer ones scabrous or sparsely plumose, the inner ones longer and plumose. **Fig. 254**

A common weed of gardens, lawns and cultivated ground, occurring in a variety of habitats. Recorded from throughout the Perth Region. Widespread throughout the south west of W.A. from Dirk Hartog Island to the Recherche Archipelago inland to Kulin. A native of Europe, now a cosmopolitan weed.

Flowers April-November in the Perth Region, until December elsewhere.

*LACTUCA L.

Annual to perennial herbs with milky latex. Leaves petiolate or sessile, alternate, radical or cauline, entire, coarsely toothed or pinnatifid, often somewhat spiny. Heads numerous in a more or less paniculiform inflorescence, ligulate, homochromous, homogamous; involucre narrowly cylindric; involucre bracts imbricate in few series, herbaceous, unequal; receptacle without bracts, pitted. Florets all ligulate and bisexual, yellow, blue or rarely white. Achenes weakly or strongly compressed, winged or strongly ribbed, more or less beaked. Pappus of numerous capillary bristles. A genus of ca 100 species, chiefly from temperate Europe, Asia and Africa, 2 introduced in W.A.

1. Leaves glabrous throughout, cauline ones oblong to linear, upper ones entire. Florets pale yellow, often reddish adaxially. Achene with beak 1.5-3 times as long as body..... **L. saligna*

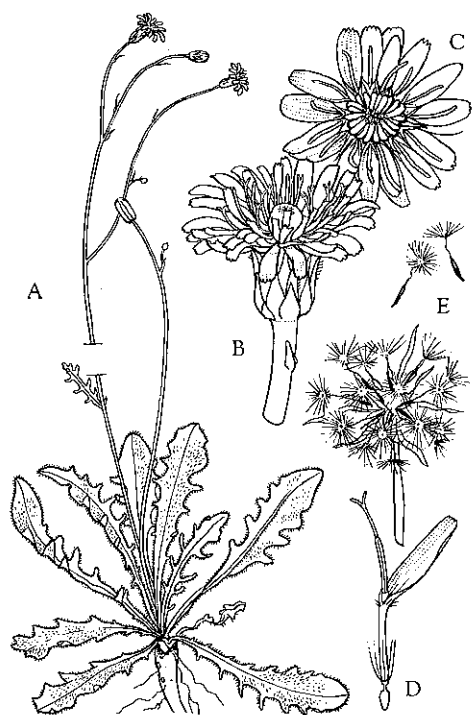


Fig. 254. *Hypochaeris glabra*. A, Habit. B and C, Two views of flower head. D, Floret. E, Achenes being released from fruiting head.

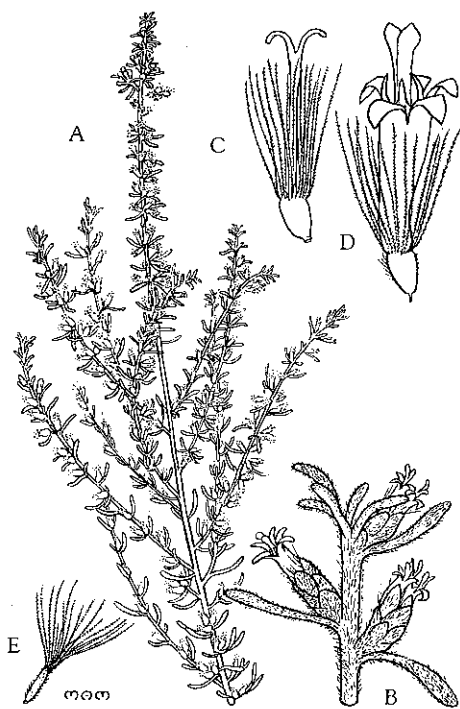


Fig. 255. *Olearia axillaris*. A, Flowering branch. B, Upper part of flowering branch. C, Marginal floret. D, Disc floret. E, Achene.

- l. Leaves spinulose on the margins and on the midrib beneath, cauline ones circular to obovate, upper ones pinnately divided. Florets pale yellow. Achene with beak more or less as long as body, rarely longer. **L. serriola*

**L. saligna* L.

Wild Lettuce

Annual or biennial herb, to 1 m tall, rigid, erect, glabrous, branched. Leaves up to 150 x 80 mm, decreasing in size upwards, lower ones linear and undivided to pinnatifid with narrow distant lobes, upper ones oblong to linear; base sagittate with acuminate auricles; margin entire; leafy bracts of inflorescence narrow with acuminate auricles. Heads many in a long, narrow, loose, usually spike-like panicle; involucre 10-15 mm long; involucre bracts imbricate, purplish above, minutely papillose to rough. Florets pale yellow, often reddish abaxially, sometimes drying blue. Achenes 5-8 mm long; body compressed, elliptic in outline, striate, pale brown; ribs 7-8, scabrous to apex; beak 1.5-3 times as long as body. Pappus of numerous, silky, barbellate bristles about as long as beak.

Occasional in the metropolitan area. Recorded from scattered localities throughout the south west of W.A. A native of Europe, now cosmopolitan.

Flowers January-May in the Perth Region and elsewhere.

**L. serriola* L.

Prickly Lettuce

Annual or biennial herb, to 1.8 m tall, rigid, erect, glabrous or basally setose, branched. Leaves up to 200 x 100 mm, decreasing in size upwards, runcinate-pinnatifid, only the topmost obovate and less divided, spinulose on the mid-rib and sometimes on the main veins below; base sagittate-amplexicaul; margin spinulose-ciliate; leafy bracts of inflorescence small, ovate-sagittate, with conspicuous, obtuse or rounded auricles. Heads many in a long, loose, pyramidal or spike-like panicle with stiff, patent branches; involucre 7-15 mm long; involucre bracts imbricate, purplish above, minutely papillose. Florets 7-15 (35), ligules pale yellow, sometimes drying blue. Achenes 3-6 mm long, a third as wide;

body compressed, elliptic in outline, striate, greyish; ribs 5-9, scabrous below but with stout bristles above; beak more or less as long as body, rarely longer. Pappus of numerous, silky, barbellate bristles about as long as beak.

A weed of waste or cultivated ground or of disturbed places near settlement. Occasional in the metropolitan area and at Mt. Helena. Recorded from scattered localities throughout the north of south western W.A. from Carnarvon southwards. A native of southern Europe, north Africa and western Asia, now cosmopolitan.

Flowers December in the Perth Region and elsewhere.

The variant of this species with lobeless leaves, mistakenly called *L. virosa* L., does not occur in W.A.

LAGENIFERA Cass.

Perennial herbs to 0.4 m tall, usually stoloniferous, unbranched, more or less septate hairy. Leaves mostly radical, with a few much smaller, cauline ones; radical leaves rosetted, obovate or elliptic, base acute-cuneate; margin serrate, crenate, undulate or lobed; apex acute to obtuse. Heads solitary or 1-3 per scape, radiate, heterochromous, heterogamous; involucre campanulate to hemispherical; involucre bracts in 2-4 series, herbaceous, oblong to narrowly obovate, acute to obtuse with narrow, scarious margins. Ray florets many in one or more rows, female, ligulate, white to purple. Disc florets male or bisexual, tubular, 5-lobed. Anthers with connective prolonged beyond the pollen cells to form a terminal appendage. Styles dimorphic, those of rays smooth, those of the disc papillose adaxially. Achenes compressed, obovate to narrowly obovate in outline; margins thickened; apex produced into a short glandular beak. Pappus absent. A genus of 15 species in Australia, New Zealand, south east Asia and central and South America, 1 in W.A. The relationship between *Lagenifera* and *Solenogyne* Cass. is yet to be resolved by comprehensive study. References: Cabrera, A.L. 1966. *Blumea* 14: 285-308. Drury, D.G. 1974. *New Zealand J. Bot.* 12: 365-96; Adams, L.G. 1974. *Brunonia* 2: 43-65.

Cabrera (1966) has recognized the presence of *L. gracilis* Steez in W.A., Vic., N.S.W. and Qld. However, all specimens included in this genus in W.A. appear to be conspecific, exhibiting continuous variation from one extreme to the other in all characters and are treated here as *L. huegelii*.

L. huegelii Benth.

Perennial herb 70-320 mm tall, with leaves in a basal rosette and several robust, scapiform stems. Radical leaves, petiolate, narrowly obovate, to 143 x 32 mm, almost glabrous to densely hairy with long, simple hairs; margin dentate to serrate; apex obtuse. Culine leaves 5-11, sessile, narrowly elliptic, becoming filiform below the head, to 7.6 mm long; margins entire or distantly toothed; apex acuminate. Heads solitary; involucre hemispherical, ca 5 mm high, 8-11 mm in diameter; involucre bracts numerous in several rows, oblong, to 5 x 1.2 mm, obtuse to subacute, glabrous or hispidulous abaxially, the margins ciliate, outermost ones narrow and shorter. Ray florets ca 70 in ca 4 rows, white or pink; tube 1 mm long, glandular; ligule oblong, 1.5 x 0.3-1 mm. Disc florets to 3 x 1 mm. Achenes obovate, compressed, 3-4 x 1-2 mm, light or dark brown, microscopically glandular distally and often bearing a few white, simple hairs on each face; beak 0.8-1 mm long, microscopically glandular.

Occurs in a variety of soils. Recorded from throughout the Perth Region. Widespread in south western W.A. from Jurien Bay to Cape Arid. Also recorded from S.A., Vic., and Tas.

Flowers July-December in the Perth Region, from March elsewhere.

*LEONTODON L.

Annual to perennial herbs with milky latex, sometimes tuberous, scapes solitary to numerous, sometimes branched, naked or with few or many bracts. Leaves all radical, entire to deeply pinnatisect. Heads 1 to few, rarely many, ligulate, homochromous, homogamous; involucre bracts in several imbricate series; receptacle pitted, without bracts. Florets all bisexual, ligulate, yellow, rarely orange, the outer often with a reddish or greyish adaxial stripe. Achenes more or less cylindrical, more or less beaked, longitudinally ribbed, with numerous transverse ridges or minute rigid hairs. Pappus of 10-40 uniseriate, monomorphic plumose bristles, or of biseriate, more or less dimorphic bristles, the outer sometimes plumose and with dilated bases, the inner always plumose and with dilated bases. A genus of ca 50 species from Europe and central Asia, 1 introduced in W.A.

***L. saxatilis** Lam.

Hairy Hawkbit

Biennial or perennial herb to 0.35 m tall; scapes single, naked, mostly glabrous, but sparsely hairy basally. Leaves narrowly obovate to oblong, 20-150(-250) x 3-10 mm, hispid with simple or long-stipitate, 2 or 3-lobed hairs; base attenuate into a long or short petiole; margin entire, dentate to pinnatifid; apex obtuse to acute. Heads solitary; involucre 7-11 x 4-9 mm; bracts ca 12, more or less equal, herbaceous, narrowly elliptic, glabrous or hispid with hairs like those on the leaves, with a few smaller outer bracts. Florets deep yellow, the outermost greyish violet adaxially. Achenes fusiform, 3-6 mm long, scabrous, dimorphic, outer ones incurved, inner ones more or less beaked. Pappus dimorphic, that of the outer achenes reduced to a short lacinate crown, that of the inner achenes partly of plumose bristles, partly of shorter outer scales more or less tipped with scabrous bristles. *L. taraxacoides* (Vill.) Merat

A weed of lawns and waste places. Occasional in the metropolitan area. Also found in scattered localities from Busselton to Esperance. A native of Europe, now widespread.

Flowers October-November in the Perth Region, until February elsewhere.

LEPTORHYNCHOS Less.

Annual or perennial herbs or undershrubs, more or less septate or glandular-hairy. Leaves alternate, entire. Heads solitary, terminal on long, bracteate scapes, discoid, homochromous, homogamous or heterogamous; involucre broadly turbinate, campanulate or hemispherical; involucre bracts imbricate in several series, the outer ones and the tips of the laminae of the others very thinly scarious and erect; receptacle flat, bracts absent. Florets all tubular; a few marginal ones usually female, filiform, 3 or 4-toothed; central ones bisexual, 5-toothed, exceeding the involucre, often curved outwards and overhanging the bracts. Anthers finely tailed. Style branches more or less terete, truncate. Achenes small and narrow, compressed, contracted or prolonged apically into a short or long beak. Pappus of several capillary bristles, scabrous, shortly barbellate or almost plumose towards their tips. An endemic Australian genus of ca 12 species, 1 in W.A.

L. scabrus (Benth.) Haegi

Erect annual herb to 0.4 m tall, simple or branched above, sparsely septate-hairy. Leaves linear, narrowly obovate, 10-30 x 1-8 mm; base attenuate, half-clasping; margin entire; apex acute or abruptly acuminate. Heads terminal, solitary on long, stout scapes up to 180 mm long with scattered, translucent membranous scales merging into those of the involucre; involucre hemispherical, 10-15 x 20-30 mm; involucre bracts in several imbricate series, the outer narrowly elliptic, scarious and translucent, passing into the inner ones with linear, glandular claws and small scarious tips. Florets bisexual, bright yellow, exceeding the involucre, flared above, densely septate-hairy above. Achenes 1.5-4.5 mm long, minutely papillose, narrowed abruptly into a long, slender, smooth beak. Pappus of numerous fine, capillary bristles.

Occurs on coastal sands. Recorded from near Mandurah. Extending from Jurien Bay around the coast to Bremer Bay. Also recorded from S.A., Vic. and N.S.W.

Flowers September-October in the Perth Region, August-November elsewhere.

In W.A. and in other states this species has long been known under its synonym *L. medius* Cunn. ex DC. (1838) which, however, antedates *Rhytidanthe scabra* Benth. (1837). In W.A. it has been mistakenly known as *L. elongatus* DC., a species apparently absent from this state and characterised by its perennial habit, white to pale-yellow florets and achenes which taper into a short, thick, papillose beak.

MILLOTIA Cass.

Annual, erect or decumbent herbs, more or less diffusely branched basally, usually whitish woolly-hairy, sometimes with pilose or short, glandular hairs. Leaves cauline, erect, alternate or becoming so, with an obtuse, reddish or yellowish, glabrous mucro. Heads solitary, terminal on conspicuous peduncles, discoid, homochromous, homogamous; involucre cylindrical; bracts uniseriate or biseriate, 3-20, with herbaceous midribs and scarious margins and apices; receptacle pitted, without bracts. Florets bisexual, tubular to funnelform, creamy white to yellow, the tubes erect or deflexed over the involucre, usually bearing sparse, minute, glandular hairs. Anthers with fine, ciliate tails. Style apices acute to

narrowly obtuse and dilated adaxially with dense papillae to form expanded, cone-like appendages. Achenes very narrowly cylindrical, conspicuously beaked, densely papillose. Pappus a ring of barbate or more or less plumose bristles, or of small scales, or absent. A genus of 5 species native to Australia, 3 in W.A. The relationship of this genus to *Scyphocoronis* A. Gray and *Toxanthes* Turcz. is worthy of further investigation. References: Schodde, R. 1963. Trans. & Proc. Roy. Soc. South Australia 87: 209-241; Schodde, R. 1968. Trans. & Proc. Roy. Soc. South Australia 92: 27-32.

1. Apices of involucre bracts caudate, rarely acuminate or acute. Corolla funnelliform, deflexed over involucre bracts, limb with 5 (rarely 4) spreading, acute to almost attenuate lobes. Anther cells oblong, connective apices exerted prominently beyond the corolla limb at anthesis..... **M. myosotidifolia**
1. Apices of involucre bracts acute to attenuate, fimbriate. Corolla tubular, erect, limb with 4 erect, more or less obtuse lobes. Anther cells elliptic, connective apices only slightly protruding from the limb at anthesis..... **M. tenuifolia**

M. myosotidifolia (Benth.) Steetz

Annual herb 160-300 mm tall, white-woolly or glabrous. Leaves narrowly to broadly obovate or spatulate, rarely oblong or linear, 5-60 x 10-80 mm; base attenuate, amplexicaul; margin entire; apex more or less mucronulate. Heads solitary on more or less stout peduncles; involucre 3-10 mm long; bracts 3-20, usually biseriate and basally imbricate, narrowly to broadly oblong, carinate with straw-coloured or sometimes red-purple margins, caudate, rarely acuminate or acute. Florets numerous; corolla funnelliform, 25-70 mm long, deflexed over involucre, creamy-white or yellow; lobes 5, rarely 4, more or less spreading, acute to almost attenuate, 0.5-0.8 mm long. Anthers with oblong cells, the connective tip 0.2-0.5 mm long, exerted prominently beyond the corolla limb at anthesis. Achenes more or less strigillose, very narrowly cylindrical, rarely cylindrical, 3-10 mm long, pale brown to brownish black, sparsely papillose; beak 0.6-5.5 mm long, compressed, distinctly demarcated from ovular region with papillae more or less restricted to margins. Pappus of 15-30 more or less erect, barbate bristles nearly as long as corolla.

Occurs in sandy soils. Recorded from Yanchep to Yalgorup and inland to Roleystone. Extending northwards to near Carnarvon, inland to Southern-Cross and southwards to the Stirling Range. Also recorded from S.A., Vic., Tas. and N.S.W.

Flowers August-September in the Perth Region, from July elsewhere.

M. tenuifolia Cass.

Aromatic annual herb to 100-140 mm tall with white-woolly and pale golden, glandular-pilose hairs. Leaves narrowly linear, sometimes narrowly obovate, 5-25 x 1-5 mm, base hardly amplexicaul; margin entire; apex acute. Heads solitary on slender peduncles; involucre 3-8 mm long; involucre bracts 5-20, more or less uniseriate, hardly imbricate, linear to oblong, navicular with straw-coloured or red-tinged margins and acute to attenuate, fimbriate apices. Florets numerous; corolla tubular 1.8-4 mm long, more or less erect, rarely deflexed, lemon yellow; lobes 4, more or less erect, narrowly obtuse, 0.2-0.4 mm long. Anthers with elliptic cells, the connective tip 0.1-0.3 mm long, only slightly protruding from the limb at anthesis. Achenes muricate, very narrowly cylindrical-clavate, 3-7.5 mm long, reddish brown to black; beak 0.6-3.5 mm long, terete, merging gradually into ovular region. Pappus of 19-35 more or less ascending, finely barbate bristles, usually longer than the corolla.

Occurs in grey rarely reddish sands or clayey or stony leached soils. Recorded only at Yarloop and Guildford. Extending from Wittenoom to Esperance and east to Balladonia in W.A. Also recorded from S.A., Vic., Tas. and N.S.W.

Flowers October in the Perth Region, August-November elsewhere.

MYRIOCEPHALUS Benth.

Annual herbs, glabrous or hairy. Leaves radical or alternate, sessile, entire. Compound heads of numerous partial heads each subtended by a bract on the general receptacle; general involucre hemispherical to depressed ovoid; general involucre bracts numerous, conspicuous, leaf-like or scarious,

multiseriate, often woolly-hairy, each usually with a radiating or erect lamina. Partial heads 1-9-flowered, discoid, homogamous, homochromous; involucre of several scarios bracts; receptacle naked. Florets bisexual, tubular, 3-5-lobed. Anthers more or less conspicuously tailed at base. Style branches terete, truncate. Achenes compressed obovoid, sparsely or densely hairy. Pappus absent or of 1-13 simple or plumose bristles. An endemic Australian genus of ca 10 species, 6 in W.A. This genus, which stands in urgent need of a revision, almost certainly encompasses several distinct genera.

1. Erect or decumbent plants to 0.3 m tall. Laminae of general involucre more or less conspicuous and spreading, white.
2. Erect plants to 0.2 m tall. Partial heads 4-6-flowered. Pappus absent or of 1 or 2 microscopic scales **M. appendiculatus**
2. Decumbent plants to 0.3 m long. Partial heads 2 or 3-flowered. Pappus of 1-4 bristles **M. helichrysoides**
1. Dwarf, stemless or short-stemmed prostrate plants to 50 mm long. Laminae of general involucral bracts inconspicuous and erect, pale or transparent.
3. Stemless. Florets 5-lobed. Pappus of 2 bristles **M. isoetes**
3. Stemless or stems prostrate to 50 mm long. Florets 3 or 4-lobed. Pappus absent or of 1 bristle **M. rhizocephalus**

M. appendiculatus Benth.

Erect annual herb to 200 mm tall, sparingly branched, with loose, woolly and short glandular hairs. Leaves linear or narrowly ovate, 5-35 x 1-5 mm; base slightly dilated, half-clasping; apex acuminate. Compound head terminal, solitary, general involucre hemispherical, 0.5-1.5 mm in diameter; general involucral bracts numerous in several rows, scarios, woolly hairy basally, with white ovate-oblong spreading laminae forming a ray around the cluster. Partial heads numerous, 4-6-flowered. Florets 5-lobed. Achenes minutely hairy with simple hairs. Pappus absent or of 1 or 2 microscopic scales.

Occurs in low open woodland in coarse sand and clay, often in moist depressions. Recorded from Bullsbrook, Upper Swan and Midland Junction. Also at Eneabba and Mt. Ragged.

Flowers November-December in the Perth Region, September-November elsewhere.

M. helichrysoides A. Gray

Weak, annual herb, decumbent, to 300 mm long, somewhat branching, glabrous. Leaves linear, 20-70 x 0.5-3 mm; base slightly dilated, half-clasping; apex obtuse. Compound heads terminal, solitary; general involucre radiate, 10-15 mm in diameter; general involucral bracts numerous in several rows, outer ones with white margins and spreading, petal-like laminae forming a ray around the cluster. Partial heads numerous, 2 or 3-flowered. Florets 5-lobed. Achenes hairy with simple hairs. Pappus of 1 or 2, rarely 3 or 4 fine bristles.

Occurs in low open woodland, swamps, drainage channels or ditches in moist clay or peat soils. Recorded from Bullsbrook, Muchea and Boyanup. Extending southwards to Busselton.

Flowers September-December in Perth Region, until October elsewhere.

M. isoetes Diels

Dwarf, annual, stemless herb. Leaves linear, 20-160 x 0.5-2 mm; base broadly dilated; apex acuminate. Compound heads sessile, solitary or crowded; general involucre hemispherical, 5-25 mm in diameter; general involucral bracts numerous in several rows, with pale or transparent margins and an inconspicuous, erect lamina. Partial heads numerous, 3-flowered. Florets 5-lobed. Achenes conspicuously woolly-hairy. Pappus of 2 fine bristles.

Occurs in low open woodland on moist clay soils. Recorded from Bellevue and Ellen Brook. Also at Busselton, Pingelly and Merredin.

Flowers in October in the Perth Region, from September elsewhere.

M. rhizocephalus (DC.) Benth.

Dwarf, annual, stemless herb or stems prostrate, to 50 mm long; glabrous to sparsely woolly. Leaves linear 20-70 x 1-3 mm; base dilated and half-clasping; apex acuminate. Compound heads terminal, solitary or in clusters; general involucre 8-20 mm in diameter; general involucral bracts with pale green or transparent margins and an inconspicuous, erect lamina. Partial heads 1-5-flowered. Florets 3 or 4-lobed. Achenes sparingly hairy with simple hairs. Pappus absent or a single bristle.

Occurs on a variety of soils in low open woodland. Recorded from Bellevue. Widespread in south western W.A. from Mingenew to near Israelite Bay. Also recorded from all mainland states except N.T.

Flowers in October in the Perth Region, September-November elsewhere.

OLEARIA Moench

Perennial shrubs, undershrubs or rarely herbs, glabrous or variously hairy. Leaves alternate or opposite, entire or toothed. Heads solitary, terminal, often on short branches forming a corymbose or paniculate inflorescence, radiate or rarely disciform, heterogamous, heterochromous; involucre broadly hemispherical to narrowly ovoid; bracts imbricate in several rows, herbaceous with scarious margins; receptacle pitted, the borders of the pits often denticulate, without bracts. Ray florets in a single row, female, ligulate, rarely slender and filiform or deficient. Disc florets numerous or few, bisexual, tubular, usually yellow, sometimes purple or blue. Anthers acute, obtuse or tailed at the base. Style branches flattened with short, thick appendages above stigmatic lines. Achenes striate, terete or slightly compressed, glabrous or variously hairy. Pappus of numerous, usually unequal bristles. A genus of ca 100 species found in Australia, New Guinea, New Zealand, Lord Howe Island, Chatham Islands and Rapa, (Tubuai Islands, south Pacific). 27 species occur in W.A.

1. Stems and vegetative parts hoary or ashen grey with close woolly hairs. Marginal florets minutely ligulate or filiform **O. axillaris**
1. Stems and vegetative parts glabrous or variously hairy, but never hoary or ashen grey. Marginal florets 10 or more, conspicuously ligulate.
 2. Stems and vegetative parts glabrous, glandular or woolly, occasionally with a few scattered, patent, septate hairs on leaf margins. Leaves 3-30 x 0.5-3 mm, always entire **O. elaeophila**
 2. Stems and vegetative parts hispid or scabrous with patent, septate hairs, rarely glabrous and then leaves 40-130 x 10-30 mm. Leaf margins usually distinctly lobed, sometimes entire.
 3. Leaves always hispid with patent septate hairs, linear, narrowly obovate, 3-25 x 0.3-10 mm, base narrowed into a petiole, not half-clasping, margins recurved, usually with 1-6 prominent teeth or lobes. Involucre 5-12 mm in diameter, rays 10-12 **O. paucidentata**
 3. Leaves usually scabrous with septate hairs, but sometimes glabrous, sessile, narrowly to broadly elliptic, obovate, oblong or cuneate, 40-130 x 10-30 mm; base often dilated and half-clasping, margins coarsely and irregularly toothed, rarely entire. Involucre 10-30 mm in diameter, rays numerous **O. rudis**

O. axillaris (DC.) F. Muell. ex Benth.

Erect, much-branched shrub to 2 m tall, more or less hoary or ashen grey with close, woolly hairs. Leaves alternate, somewhat crowded, sessile, narrowly linear, ovate or obovate, 12-18 x 2-3 mm, woolly, white or grey on both surfaces or glabrous and shiny above; base more or less attenuate; margin entire, recurved or revolute; apex acute to obtuse. Heads sessile or subsessile, terminating short leafy shoots; involucre narrowly ovoid, 5-6 mm long; involucral bracts elliptic to ovate, obtuse, outer ones woolly hairy throughout, inner ones with only the apex woolly hairy. Florets 8-15, white; marginal ones 2-6, tubular and filiform or minutely ligulate; disc florets 6-10, exceeding the involucre. Achenes compressed obovoid, conspicuously hairy, rarely glabrous. Pappus of more or less barbellate bristles. **Fig. 255**

A species of coastal sand dunes. Recorded from Yanchep to Bunbury. Extending northwards to Bernier Island and around the coast to Eyre. Also recorded from S.A., Vic., Tas. and N.S.W.

Flowers March-August in the Perth Region, April-October elsewhere.

Although this species is rather variable over its range in the degree of woolliness, leaf shape and ligule size, plants from the Perth Region are quite uniform.

***O. elaeophila* (DC.) F. Muell. ex Benth.**

Erect shrub to 1 m tall, glabrous, glandular-hairy or woolly-hairy, occasionally with a few scattered, patent, septate hairs on leaf margins. Leaves alternate, distant or crowded, spreading, mostly linear, sometimes narrowly obovate, 3-30 x 0.5-3 mm; base rarely dilated and then only slightly so; margin entire, recurved; apex acute. Heads solitary, terminating small branchlets forming an irregular, loose panicle or corymb; involucre ovoid-turbinate or almost hemispherical, 6-15 mm in diameter; involucre bracts narrowly elliptic, acute, usually with a tuft of woolly hairs at the tip. Ray florets 10-20, ligules pale blue, mauve, white or purple. Disc florets white, pale blue or violet. Achenes compressed obovoid, silky-hairy. Pappus of more or less equal, barbellate bristles, several of the outer ones short.

Occurs in a variety of substrates including loam, grey and yellow sand and clay above laterite or limestone, often in moist or swampy habitats amongst shrubland or low open woodland. Recorded from near central Perth and near Bunbury. Extending northwards to Leeman, southwards to Augusta and eastwards to Albany.

Flowers March-May in the Perth Region, January-July elsewhere, with a single record from October.

Specimens of this species have previously been referred to *O. muricata* (Steetz) Benth. and *O. strigosa* (Steetz) Benth. The identity of *O. strigosa* is uncertain. *O. muricata* can be distinguished by its densely hispid pubescence and its erect leaves with conspicuously dilated bases.

***O. paucidentata* (Steetz) F. Muell. ex Benth.**

Erect shrub to 1.5 m tall, hispid with short patent, septate hairs. Leaves alternate, scattered or clustered, linear or narrowly obovate, 3-25 x 0.3-10 mm, spreading; base narrowed; margins recurved, usually with 1-6 prominent teeth or lobes on each side, occasionally entire; apex acute to obtuse. Heads solitary, terminal, usually conspicuously pedunculate, sometimes sessile, forming leafy panicles; involucre hemispherical, 5-12 mm in diameter; involucre bracts elliptic, acute to acuminate, often with a tuft of woolly hairs at the apex. Ray florets 10-20, ligules pale violet, blue, white or mauve. Disc florets violet, blue or white. Achenes compressed obovoid, sparsely to densely hairy with simple hairs. Pappus of more or less unequal, barbellate bristles, sometimes with a few short outer ones. **Fig. 256**

Occurs on a variety of substrates, often in damp situations, river banks or swamps, especially amongst Jarrah and Karri-Marri. Recorded from the Darling Range south of Wooroloo. Extending southwards to Augusta and eastwards to Mt. Barker.

Flowers April-November in the Perth Region, until January elsewhere.

Specimens of this species have formerly been referred to *O. muricata* and *O. strigosa* (see note under *O. elaeophila*).

***O. rudis* (Benth.) F. Muell. ex Benth.**

Erect woody herb or few-branched subshrub to 2 m tall, more or less scabrous with rigid septate hairs or almost glabrous, rarely glabrous. Leaves alternate, sessile, narrowly to broadly elliptic, obovate, oblong or cuneate, 40-130 x 10-30 mm; base often dilated and half-clasping; margin coarsely and irregularly toothed, rarely entire; apex obtuse, acute or acuminate. Heads solitary on stout peduncles arranged in a terminal, leafy corymb; involucre broadly hemispherical, 10-30 mm in diameter; involucre bracts narrowly elliptic, acute or acuminate. Ray florets numerous, mostly blue or mauve, sometimes white. Disc florets yellow. Achenes compressed, narrowly cylindrical, conspicuously ribbed, with a few scattered hairs. Pappus of more or less equal, barbellate bristles. **Fig. 257**

Occurs in sand and clay above limestone, laterite or granite amongst low open woodland or shrubland. Widespread along the coast. Extending northwards to Eneabba, southwards to Augusta and the Stirling Range, and at a few scattered localities in the wheatbelt and goldfields, including Bruce Rock and Coolgardie. Also recorded from S.A. and Vic.

Flowers May-December in the Perth Region and elsewhere.

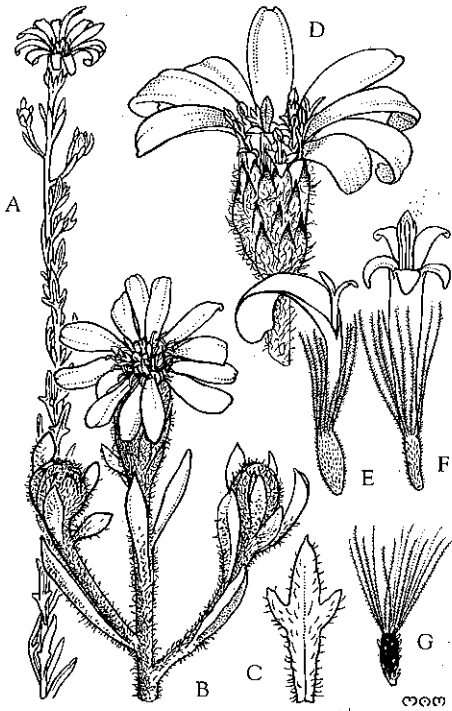


Fig. 256. *Olearia paucidentata*. A and B, Flowering branch. C, Leaf. D, Flower head. E, Ray floret. F, Disc floret. G, Achene.



Fig. 257. *Olearia rudis*. A, Flowering branch. B, Flower head. C, Ray floret. D, Disc floret.

*OSTEOSPERMUM L.

Herbs or shrubs, prostrate to erect, glabrous or variously hairy. Leaves alternate, rarely opposite, entire, toothed or variously lobed. Heads solitary or paniculate, radiate, heterogamous, homochromous or heterochromous; involucre campanulate, more or less hemispherical or turbinate; bracts 1-4-seriate, margins scarious; receptacle flat or convex, without bracts. Ray florets uniseriate, female. Disc florets usually male, sometimes bisexual, tubular, widened above, 5-lobed. Anthers with an ovate or triangular-ovate apical appendage; bases sagittate, the lobes of adjacent anthers connate and produced into a more or less conspicuous tail. Style of the ray florets with glabrous, filiform branches, that of the disc florets shortly 2-lobed, papillose, with a ring of hairs below the point of division. Achenes glabrous, monomorphic or dimorphic, rarely polymorphic, straight or slightly curved, terete or usually 3-9-ribbed, smooth rugose, tuberculate or with various processes, winged or wingless, sometimes with an apical cavity, rarely beaked. Pappus absent. A genus of 67 species, mostly South African, 2 introduced in W.A.

**O. clandestinum* (Less.) Norlindh

Stinking Roger

Erect annual herb to 0.5 m tall, glandular-hairy and somewhat sticky to touch. Leaves alternate, oblong, elliptic, ovate or obovate, basal ones up to 100 x 15 mm, lower ones shortly petiolate, becoming sessile upwards; margin sinuate-lobed, becoming entire upwards; apex obtuse or acute. Heads terminal, several in a branched inflorescence, erect when young, pendulous in fruit; involucre campanulate, 5-20 mm in diameter; involucral bracts 8-13, obtuse with broad, membranous margins. Ray florets equal to the bracts or one and a half times as long; tube dark brown; ligule deep yellow. Disc florets dark brown, reddish or dark blue. Achenes ovoid, 8.5-10 x 3.5-8.5 mm, with 3 broad, membranous wings, the outer face wrinkled with spiny outgrowths or almost smooth, a hollow chamber with a single fenestrate area developing in the outer face above the ovary. **Fig. 258**

A weed of waste places, road verges and damp places such as granite outcrops. Widespread in the metropolitan area; found throughout south west W.A. inland as far as Moorine Rock and Peak Charles. A native of South Africa.

Flowers July-October in the Perth Region, from May elsewhere.

*PICRIS L.

Erect, branching, annual or perennial herbs, roughly hairy. Leaves radical and cauline, alternate, entire, coarsely toothed or pinnatifid, rarely almost entire. Heads solitary at the tips of branches, rarely corymbose, ligulate, homogamous, homochromous; involucre ovoid-urceolate or campanulate; involucre bracts multiseriate, the outer ones narrowly obovate, the inner ones manifestly smaller, often scale-like; receptacle without bracts. Florets bisexual, ligulate, yellow. Anthers sagittate at the base, with acute or shortly setaceous-acute auricles. Style branches long, glabrous. Achenes straight or curved, obscurely angled or ribbed, transversely rugose, stoutly beaked, glabrous. Pappus biseriate, the inner row of deciduous plumose setae, the outer row similar or of rough simple hairs. A genus of 40-50 species, natives of the Mediterranean Region, temperate Europe, north eastern Africa, Asia and Australia. 1 species in W.A.

**P. squarrosa* Steetz

Biennial to 1.5 m tall, hispid with short, minutely hooked hairs. Leaves narrowly elliptic or linear, 10-240 x 1-15 mm, the lower ones tapering toward the base, the upper ones fewer and smaller; margin slightly and distinctly toothed; apex long-acuminate. Heads solitary, terminating a many-branched inflorescence; involucre campanulate, 10-20 mm in diameter; involucre bracts narrowly elliptic, in several series, the outermost shorter and recurved, with a median line of stout bristles or glabrous. Florets bright yellow. Achenes cylindrical, ca 7.5 mm long, orange, strongly muricate, with a stout beak ca one third the length of the body. Pappus of plumose bristles, about as long as the achene.

Occurs in disturbed areas and road verges, and therefore probably introduced. Recorded from the metropolitan area. Sporadic from Geraldton to Pemberton.

Flowers in August in the Perth Region, October-November elsewhere.

This entity clearly deserves specific status. It has previously been recognized as *P. hieracioides* L. in Australia. Material from W.A. represents *P. hieracioides* var. *squarrosa* (Steetz) Benth. which differs from the type variety of that species in its more hispid vestiture, almost entire leaves, larger flower heads with more numerous, recurved outer involucre bracts, and its somewhat beaked achenes. It matches specimens from coastal S.A., Vic. and N.S.W. and also from New Zealand.

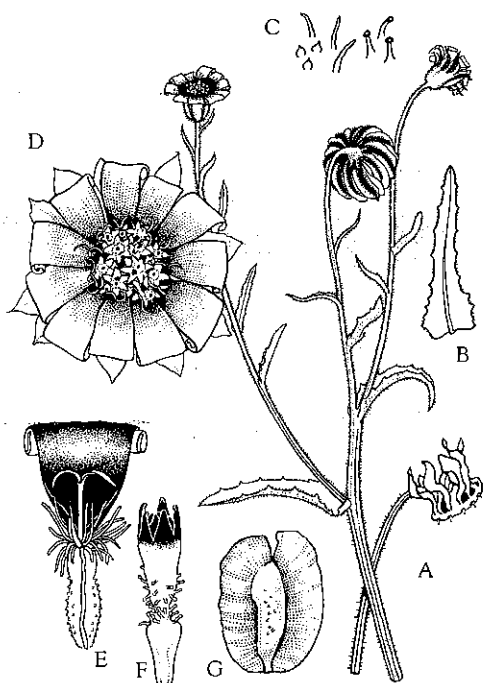


Fig. 258. *Osteospermum clandestinum*. A, Flowering branch. B, Leaf. C, Enlargement of hairs. D, Flower head. E, Ray floret. F, Disc floret. G, Achene.

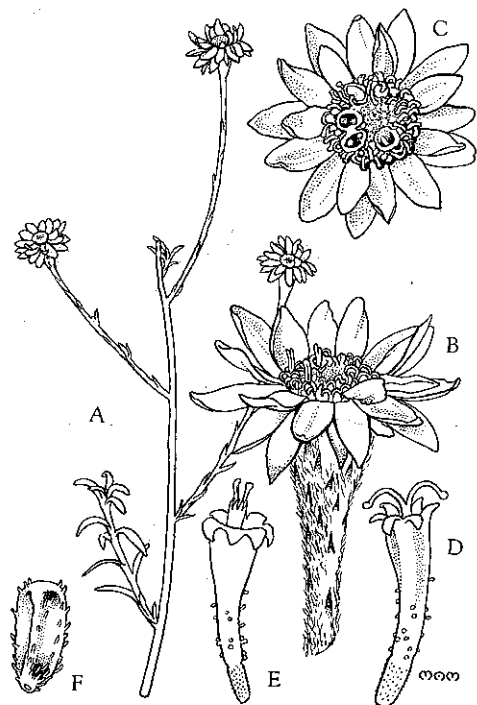


Fig. 259. *Pithocarpa pulchella*. A, Flowering branch. B and C, Two views of flower head. D and E, Florets. F, Achene.

PITHOCARPA Lindley

Annual herbs to 1 m tall, often somewhat woody at the base, with erect or ascending much-branched stems, woolly-hairy. Leaves alternate, mostly on the lower part of the stem, linear to narrowly obovate, the upper ones gradually smaller and passing into the lower inflorescence bracts. Heads solitary, terminating lateral branches or in small corymbs of 2-9, these corymbs sometimes aggregated to form larger, corymbose panicles, discoid, homogamous, homochromous; involucre turbinate or obconic, 3-15 mm in diameter; involucre bracts numerous, the outer ones short and appressed, the inner ones much longer, with a more or less coloured, radiating or erect lamina, all with woolly hairs on the abaxial surface; receptacle flat, without bracts. Florets 15-65, bisexual, tubular or 5-lobed. Anthers with fine tails at the base. Style branches divaricate, more or less recurved, truncate and often shortly penicillate apically. Achenes angular, glabrous or papillose. Pappus absent. A genus of 3 or 4 species endemic to south western W.A. Reference: Lewis, P. & Summerhayes, V.S. 1951. Kew Bull. 5(3): 435-440.

1. Heads in flat-topped corymbs. Involucre 3-4 mm in diameter; involucre bracts hardly differentiated, inner ones with an erect lamina. Achenes glabrous..... **P. corymbulosa**
1. Heads solitary. Involucre 10-15 mm in diameter; involucre bracts clearly differentiated, inner ones with a spreading lamina. Achenes densely papillose..... **P. pulchella**

P. corymbulosa Lindley

Erect annual herb to 1 m tall, white-hairy. Leaves few, scattered, chiefly on the lower parts of the stem, sessile, linear or narrowly elliptic, 5-25 x 1-5 mm, discolorous, adaxial surface dark green, abaxial surface white-hairy; apex acuminate. Heads short-pedunculate in flat-topped corymbs; involucre narrowly conic, 3-4 mm in diameter, 6-8 mm long; involucre bracts hardly differentiated, the inner ones with a conspicuous erect white lamina, not darkly pigmented, outer ones gradually smaller and extending down the peduncle, woolly, with a small, erect, pale lamina. Florets 15-20 per head, pale yellow, conspicuously papillose basally. Achenes obovoid, glabrous, ca 1 mm long.

Occurs in laterite above granite amongst Wandoo or Jarrah woodland, but rarely collected. Endemic to the Darling Range.

Flowers January-February.

P. pulchella Lindley

Erect, annual herb with slender but rigid stems to 0.5 m tall, white to grey hairy. Leaves few, scattered, chiefly on the lower parts of the stem, sessile, linear to narrowly elliptic, 5-25 x 1-4 mm, slightly discolorous, adaxial surface dark green, abaxial surface white woolly-hairy; apex acuminate. Heads solitary on long peduncles, rarely 4 or 5 in indistinct corymbs; involucre campanulate, 10-15 mm in diameter, 6-10 mm long; involucre bracts clearly differentiated, inner ones with a conspicuous spreading, white and more or less darkly pigmented lamina, outer ones gradually smaller and extending down the peduncle, woolly with a small, erect, dark brown lamina. Florets 40-65 in each head, yellow, conspicuously papillose basally. Achenes obovoid, densely papillose, ca 1 mm long. **Fig. 259**

Occurring in sandy soil above limestone or laterite amongst Jarrah woodland. Recorded from Yanchep and Wanneroo. Extending northwards to Jurien Bay, eastwards to Toodyay and southwards to Williams.

Flowers April-July in the Perth Region, elsewhere sporadically throughout the year, but mostly in summer months.

There seems little by which to distinguish *P. pulchella* from *P. achilleoides* Lewis & Summerhayes; these two species may prove to be conspecific.

PODOLEPIS Labill.

Annual or perennial herbs, septate-hairy, occasionally hispid. Leaves radical and cauline; the cauline ones alternate, commonly sessile and decurrent, linear to elliptic; radical ones petiolate, forming a conspicuous basal cluster or only present on young plants, elliptic. Heads solitary and terminal on the main stem or axillary and numerous, occasionally clustered with very short peduncles, radiate or disciform, heterogamous, rarely homogamous, homochromous or heterochromous; involucre cylindrical, conic, campanulate or turbinate; involucre bracts multiseriate with a scarious, entire, smooth or wrinkled, erect lamina, the outer bracts sessile, the intermediate ones with a herbaceous claw which sometimes has scarious margins and appears sessile; receptacle flat, without bracts. Marginal florets female or bisexual, ligulate or filiform, yellow, white or pink. Central florets bisexual, tubular, yellow or white. Anthers with fine tails and pointed terminal appendages. Style branches filiform in female florets, truncate in bisexual ones. Achenes usually terete and microscopically papillose, rarely thick and tuberculate. Pappus of capillary bristles, finely barbellate or more or less plumose, often connate basally, rarely in bundles. An endemic Australian genus of ca 20 species, 10 in W.A. Reference: Davis, G.L. 1957. Proc. Linn. Soc. New South Wales 81 (3): 245-286.

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|--|---------------------|
| 1. Heads radiate: marginal florets conspicuously ligulate. | |
| 2. Florets white or pink..... | P. gracilis |
| 2. Florets yellow..... | P. canescens |
| 1. Heads disciform: marginal florets filiform..... | P. lessonii |

P. canescens Cunn. ex DC.

Branching, annual herb to 0.85 m tall, white-woolly. Radical leaves not always present, petiolate, obovate, to 120 x 15 mm, acute. Cauline leaves sessile, decurrent, elliptic to narrowly obovate, to 100 x 16 mm, subacute to acute. Heads on peduncles up to 60 mm long, solitary or up to 100 forming a loose panicle, radiate, heterogamous, homochromous; involucre broadly conic, 15-25 mm in diameter, 7-15 mm long; involucre bracts straw-coloured to golden or reddish brown, with a microscopically serrulate, acute to acuminate, distally rugose lamina; intermediate bracts 6-10 mm long, with an oblong, to narrowly ovate lamina 2-2.5 mm wide, and a long slender glandular claw, yellow. Central florets yellow. Marginal florets numerous, female, ligulate, usually 3-lobed. Achenes terete, 1.5-2 x 0.4-0.6 mm, microscopically papillose. Pappus of 12-25 microscopically barbellate bristles.

Found on a variety of soils in Jarrah, Marri and Tuart open woodland, widespread north of Bunbury. Extending northwards to Shark Bay and southwards to Bremer Bay, widespread throughout the Eremaean Botanical Province. Also recorded from S.A., Vic., N.S.W. and N.T.

Flowers September-December in the Perth Region, from April elsewhere.

P. gracilis (Lehm.) R.A. Graham

Slender, usually branching annual to 0.5 m tall, sparsely woolly. Cauline leaves to 100 x 20 mm, obovate to broad-linear, sessile, shortly decurrent, acute to acuminate. Radical leaves seldom present. Heads on filiform peduncles, solitary or up to 25 forming a loose panicle, radiate, heterogamous, heterochromous or homochromous; involucre broadly conic, 9-20 mm in diameter, ca 10 mm long; involucre bracts straw-coloured to reddish brown, smooth and shining with a more or less distinct rib; intermediate bracts ca 7 mm long, with a smooth, triangular, acute or ovate and subacute, shortly mucronate lamina and a slender, glandular claw, equal in length to the lamina. Marginal florets numerous, female, ligulate, 2-3-lobed, white or pink. Central florets white or pink. Achenes terete, 1-1.4 x ca 0.5 mm. Pappus of 6-20 minutely barbellate bristles. **Fig. 260**

Occurs in grey sand and laterite in Marri, Jarrah and Tuart open woodland. Widespread throughout the Perth Region, extending northwards to Jurien Bay, eastwards to Wongan Hills and southwards to Albany.

Flowers August-December in the Perth Region, October-January elsewhere.

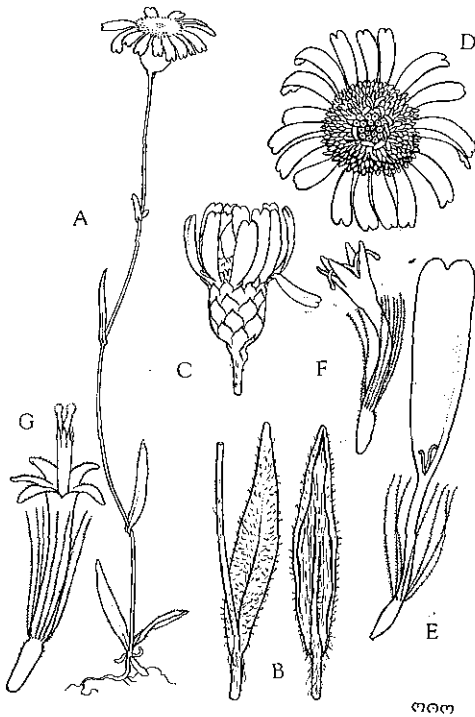


Fig. 260. *Podolepis gracilis*. A, Habit. B, Two views of leaf. C and D, Two views of flower head. E, Ray floret. F and G, Disc florets.

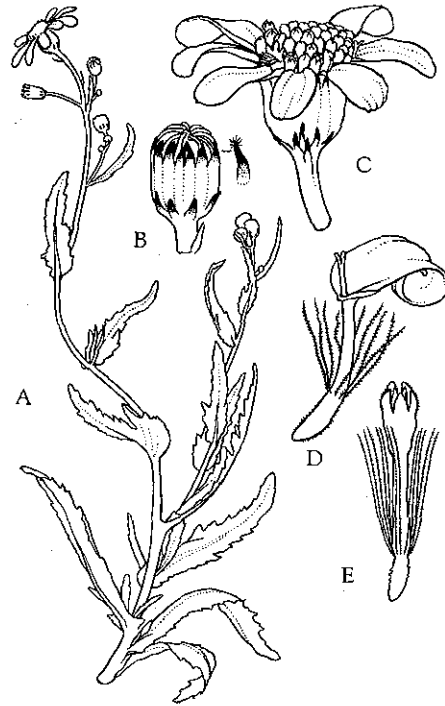


Fig. 261. *Senecio lautus*. A, Flowering branch. B, Immature flower head with enlargement of involucre bract. C, Flower head. D, Ray floret. E, Disc floret.

***P. lessonii* (Cass.) Benth.**

Annual herb to 0.4 m tall, usually much-branched, sparsely woolly. Cauline leaves up to 70 x 15 mm, narrowly obovate, sessile, decurrent, acute, sparsely septate-hairy on upper surface, densely woolly below. Radical leaves, when present, up to 45 x 12 mm, obovate, tapering to the base. Heads on naked, filiform peduncles, solitary or up to 80 forming a loose panicle, discoid, heterogamous, homochromous; involucre cupular, 3-7 mm long, 6-12 mm in diameter; involucre bracts pale, semi-transparent, soft, shallowly wrinkled, acute with fringed margins; intermediate bracts ca 5.5 mm long, the lamina triangular, 3 mm wide with a slender claw. Marginal florets 8-16, filiform, 3 or 4-lobed, yellow. Central florets 4 or 5-lobed. Achenes terete, 1 x 0.4 mm, almost smooth. Pappus of marginal florets a single, distally more or less plumose bristle; pappus of disc florets with 3 or 4 distally plumose bristles.

Occurs in a variety of soils in open woodland. Widespread throughout the Perth Region. Extending northwards to the Murchison River, eastwards to Coolgardie and southwards to near Esperance.

Flowers from August-November in the Perth Region, until December elsewhere.

PODOTHECA Cass.

Erect or decumbent, annual herbs, glabrous or scabrous hairy. Leaves alternate, narrowly linear, elliptic or obovate, entire, acute or acuminate. Heads rather large, terminal, sessile or on long peduncles, usually dilated under the involucre, discoid, homogamous, homochromous; involucre narrowly cylindrical or conic or broadly obconic; involucre bracts imbricate, multiseriate, outcurved, the inner ones thin and transparent, erect; receptacle without bracts. Florets bisexual, tubular, 5-lobed, yellow, equal to or exceeding the involucre, sometimes outcurved and out-topping it. Anthers with fine tails. Achenes obovoid, compressed, angular, very shortly stipitate, sometimes silky-hairy. Pappus of barbellate or plumose bristles, free or connate basally. An endemic Australian genus of 4 or 5 species, all in W.A.

1. Flowering heads 10-20 mm long x 10-40 mm in diameter. Pappus bristles barbellate..... ***P. chrysantha***

1. Flowering heads 20-50 mm long x 3-20 mm in diameter. Pappus bristles plumose.
2. Tips of outer involucre bracts often reflexed. Florets more or less equal to involucre, pale yellow, often purple-lobed..... **P. angustifolia**
2. Tips of outer involucre bracts erect. Florets exceeding the involucre and reflexed over it, deep yellow..... **P. gnaphalioides**

P. angustifolia (Labill.) Less.

Erect or decumbent annual to 300 mm tall, usually branching from the base, rarely simple, scabrous-hairy, often viscid, rarely almost glabrous. Leaves linear to narrowly obovate, 10-80 x 1-6 mm, acute. Heads terminal, sessile or on short, stout peduncles; involucre narrowly cylindrical or narrowly conic, 20-40 mm long, 3-15 mm in diameter, obconic at fruiting stage; involucre bracts linear or narrowly ovate, the acuminate tips erect or often reflexed, densely woolly. Florets numerous, equal to the involucre and only ever exceeding it slightly, pale yellow, often purple-lobed. Achenes obovoid, silky-hairy. Pappus of 4-6 plumose bristles.

Occurs in sand, clay and loam above limestone or granite amongst open woodland. Widespread on the Coastal Plain and at Rottnest Island. Extending northwards to Shark Bay, around the coast to Cape Arid, and at scattered localities inland including Wubin, Wongan Hills and near Balladonia. Also recorded from S.A., Vic., Tas. and N.S.W.

Flowers September-October in the Perth Region, August-January elsewhere, with one record for June.

P. chrysantha (Steetz) Benth.

Erect annual to 0.5 m tall, simple or slightly branched above, glabrous or scabrous-hairy. Leaves linear or narrowly elliptic, 1-100 x 1-5 mm, acute or acuminate. Heads solitary or terminal on stout peduncles; involucre broadly obconic, 10-20 mm long, 10-40 mm in diameter; involucre bracts narrowly ovate, the acute tips erect, more or less glabrous, acute. Florets numerous, slightly exceeding the involucre, yellow. Achenes obovoid, shortly stipitate. Pappus of 8-10 barbellate bristles, white, sometimes tinged pink at the tip.

Occurs in sandy soils above limestone or in wet depressions amongst open woodland. Recorded on the Coastal Plain and Darling Scarp north of Bunbury. Extending northwards to Eneabba, eastwards to Leonora and southwards to Augusta.

Flowers August-November in the Perth Region, until December elsewhere.

P. gnaphalioides R.A. Graham

Erect or decumbent annuals to 0.5 m tall, usually branching from the base, rarely simple, glabrous or somewhat scabrous-hairy. Leaves linear to narrowly obovate, 10-100 x 1-10 mm, acute. Heads terminal, on long, stout peduncles, rarely sessile; involucre narrowly conic, 20-50 mm long, 5-20 mm in diameter, becoming broadly obconic at fruiting stage; involucre bracts linear or narrowly obovate, the tips acuminate, erect, woolly. Florets numerous, considerably exceeding the involucre and reflexed over it, deep yellow. Achenes obovoid, silky-hairy. Pappus of 4-6 plumose bristles.

Occurs in sand, clay and loam above limestone and granite, amongst low open woodland and in shrubland. Recorded from throughout the Perth Region. Extending northwards to Kalbarri, eastwards to Sandstone and southwards to Kojonup.

Flowers September-October in the Perth Region, from August elsewhere.

Specimens hitherto recognized as *P. pygmaea* A. Gray appear to be merely drought-induced, dwarf variants of *P. gnaphalioides*.

***PSEUDOGNAPHALIUM** Kirpiczn.

Annual, biennial or perennial herbs. Leaves narrowly ovate, elliptic or linear, often decurrent, margins flat or undulate, woolly or glandular, surfaces often discoloured. Heads in small clusters, disciform, heterogamous, homochromous; involucre bracts 3 or 4-seriate, innermost ones equal to or slightly

exceeding the florets, white to yellow, often buff or cream, with the stereome usually fenestrated, rarely undivided; receptacle smooth or honeycombed, without bracts. Marginal florets numerous, female, filiform or narrowly tubular. Central florets few, bisexual, tubular, scarcely expanded upwards, externally glandular-hairy. Achenes usually glabrous, rarely with duplex hairs. Pappus of scabrous bristles cohering basally by patent cilia. A genus of ca 10 species, mostly from Africa and the Americas, 1 introduced in W.A.; a segregate of *Gnaphalium*. Reference: Hilliard, O.M. & Burt, B.L. 1981. Bot. J. Linn. Soc. 82: 181-232.

***P. luteoalbum (L.) Hilliard & B.L. Burt**

Jersey Cudweed

Erect annual or short-lived, perennial herb, to 0.7 m tall, densely grey-lanate. Lower leaves petiolate, obovate, 20-50 x 2-8 mm; apex obtuse, minutely callose. Stem leaves sessile, smaller, narrowly obovate or oblong to linear; the uppermost ones with slender, acuminate, scarious apices. Heads in a leafless cyme; involucre campanulate, ca 5-15 mm in diameter; involucre bracts oblong or obovate, obtuse, pale yellow or golden, shiny, scarious, 5-6 mm long. Florets numerous, female, 4-10 bisexual, pink or reddish. Achenes sparsely and minutely papillose. Pappus of scabrous hairs free to their bases, caducous. *Gnaphalium luteoalbum* L.

A species of dry woodland habitats and pastures. Occurs throughout the Perth Region. Widespread elsewhere in W.A. Cosmopolitan in distribution.

Flowers throughout the year in the Perth Region and elsewhere.

QUINETIA Cass.

Small, slender, annual herbs, woolly-hairy. Leaves petiolate, alternate, entire. Heads terminal or almost axillary, discoid, homogamous, homochromous; involucre cylindric; involucre bracts few, nearly equal; receptacle without bracts. Florets few, bisexual, tubular, 4 or 5-lobed. Anthers shortly or obscurely tailed. Style branches subulate, almost acute. Achenes cylindric, not beaked. Pappus of several scales, narrowly ovate at the base, tapering into a fine awn. A monotypic genus endemic to Australia.

Q. urvillei Cass.

A small, slender, erect annual to 200 mm tall, woolly-hairy. Leaves petiolate, conduplicate, reflexed, linear-cuneate to broadly obovate, 8-20 x 2-5 mm; apex mucronate. Heads very shortly pedunculate, terminal or appearing axillary from the shortness of the lateral shoots; involucre narrowly cylindric, 4-5 mm long; involucre bracts 3 or 4, oblong-linear, slightly scarious on the margins. Florets 2-4, very slender, purplish-red. Achenes narrowly cylindric-cuneate, as long as the involucre, silky-hairy, contracted at the base into a very short hairy stipe. Pappus scales 3-8, the awns as long as the achene, exceeding the florets.

Occurs in moist soils above granite, and on the Coastal Plain. Recorded from Yanchep to Mt. William and Boyanup. Extending northwards to near Geraldton, southwards to Yallingup and eastwards to Cape Le Grand. Also recorded from S.A. and Vic.

Flowers August-December in the Perth Region, August-October elsewhere.

RUTIDOSIS DC.

Annual or perennial herbs, usually woolly-hairy. Leaves alternate, entire. Heads terminal, pedunculate, rarely in small, dense cymes, discoid, homochromous, homogamous; involucre hemispherical or ovoid; involucre bracts multiseriate, loosely imbricate, very scarious, the inner ones with a broad, more rigid base; receptacle convex, without bracts. Florets all bisexual, tubular, 4 or 5-toothed. Anthers very shortly or not tailed. Style branches truncate. Achenes cylindric or obconic, scarcely compressed. Pappus of several chaffy scales, entire, jagged or divided into bristle-like lobes. An endemic Australian genus of ca 12 species, 2 in W.A.

R. multiflora (Nees) Robinson

Small, slender, annual herb 15-50 mm tall, glabrous except for a few long hairs near the base of the leaves and about the inflorescence. Leaves linear, 8-10 x 1 mm, succulent, stem-clasping, the lower ones often opposite. Heads clustered, sessile among the floral leaves; involucre cupular, ca 3 mm long;

involucral bracts 10-15, multiseriate, almost equal, all sessile, ovate or circular, scarious with a green midrib. Florets minute, ca 25 in the terminal heads, ca 3 or 4 in the lateral ones, 4 or 5-toothed. Achenes more or less cylindrical, slightly compressed, curved, the outer surface densely papillose. Pappus of 7-11 obovate, often apically notched scales, 1-1.5 mm long.

Occurs mainly on granite outcrops, also in red sand or loam. Recorded along the Darling Scarp from Helena Valley to Wokalup. Extending northwards to Wongan Hills, southwards to Porongurup Range and eastwards to east of Esperance.

Flowers August-October in the Perth Region and elsewhere, with a single record for April.

SENECIO L.

Herbs, subshrubs or rarely trees; glabrous or variously hairy. Leaves alternate or radical, entire or variously toothed, lobed or dissected. Heads solitary, corymbose, paniculate or subracemose, heterogamous or homogamous, radiate or discoid; involucre cylindrical, campanulate or hemispherical; involucral bracts uniseriate, interlocking by their membranous margins, usually with at least a few small outer bracts; receptacle flat or somewhat convex, without bracts. Marginal florets ligulate or filiform and female, sometimes wanting, yellow, blue, purple or white. Central florets tubular, bisexual, yellow, white, blue or purple. Anther bases obtuse or minutely sagittate. Style branches usually truncate, penicillate, rarely rounded, awl shaped or tipped with a small cone. Achenes generally more or less cylindrical, 5-10 ribbed. Pappus of copious, smooth, scabrous or rarely barbellate, capillary hairs, generally white. The largest genus of flowering plants with ca 2000 species, cosmopolitan in distribution, ca 40 in Australia, 17 in W.A. Reference: Belcher, R.O. 1956. Ann. Missouri Bot. Gard. 43(1): 1-85.

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| 1. Heads discoid: florets all tubular and bisexual, or with some marginal florets filiform and female. | |
| 2. All florets tubular, bisexual. | |
| 3. Leaves densely woolly-white when young, with wool persisting on the undersides..... | S. gilbertii |
| 3. Leaves sparsely simple-hairy, almost glabrous or glabrous. | |
| 4. Perennial. Leaves ovate, elliptic or linear with acutely toothed margins. Florets exceeding the involucre..... | S. ramosissimus |
| 4. Annual. Leaves obovate, irregularly toothed to pinnatifid. Florets more or less equal to the involucre..... | *S. vulgaris |
| 2. Marginal florets filiform, female, central ones tubular, bisexual. | |
| 5. Leaves linear to narrowly elliptic, usually entire, sometimes minutely denticulate, greyish woolly-hairy..... | S. quadridentatus |
| 5. Leaves obovate or linear, narrowly elliptic or ovate, more or less coarsely and irregularly sharp-toothed, sometimes deeply pinnatisect, glabrescent or densely hispid beneath. | |
| 6. Involucral bracts 8-11, ca 5 mm wide, the apices ciliolate and darkened..... | S. diaschides |
| 6. Involucral bracts 11-13, 1-1.5 mm wide, the apices papillose, not darkened..... | S. hispidulus |
| 1. Heads radiate: marginal florets conspicuously ligulate, female; central florets tubular, bisexual. | |
| 7. Ligules yellow..... | S. lautus |
| 7. Ligules white or pale purple..... | S. leucoglossus |

S. diaschides D. Drury

Perennial herb to 1.2 m tall, with few or no major branches below the inflorescence, often with short branchlets congested with leaves and borne in the axils of the uppermost leaves, glabrescent. Leaves sessile, auricles (if present) simple or bidentate, above the auricles more or less petiolate and cuneate; lower leaves 100-130 x 15-25 mm, obovate or linear, irregularly dentate; upper leaves similar but reduced. Heads pedicellate, in corymbs, discoid; involucre slender, cylindrical, 5-6 mm long; involucral bracts 8-11, 45-50 x 5 mm, 2-veined, strongly keeled in bud, flattening at anthesis, becoming rigid and widely extended after fruiting, the apices darkened and ciliolate. Florets 8-21; marginal ones filiform, female, 3 or 4-lobed; central ones bisexual, tubular, 4 or 5-lobed. Achenes 2.5 mm long, almost cylindrical, non-

rostrate, reddish brown, with 10 broad, low, flat ridges, with trichomes subappressed in the very narrow grooves. Pappus hairs slender, snowy white, equal to the florets, exceeding the involucre bracts by ca 2 mm. *S. cahillii* Belcher

Regarded here as native but possibly introduced to W.A. Found as an aggressive invader of disturbed areas. Recorded from forest and foothills near Harvey. Also extends to Collie and Pemberton. Recorded for Vic., N.S.W. and Qld. Recorded in New Zealand.

Flowers September-January in the Perth Region, August-June elsewhere.

S. gilbertii Turcz.

Erect perennial to 1.5 m tall; young stems and undersides of leaves densely clothed with white woolly hairs. Leaves sessile, auriculate, obovate, deeply pinnatifid with obovate, often toothed lobes; basal leaves to 140 x 30 mm, becoming as small as 10 x 0.5 mm above. Heads numerous, in corymbs, discoid; involucre cylindrical 5-7 x 3-7 mm; involucre bracts ca 12, loosely spreading at fruiting, tips scarious, slightly reflexed. Florets more than 20, bisexual, tubular, 5-lobed, exceeding the involucre. Achenes cylindrical, ca 1.5 x 0.5 mm, greyish with lines of whitish, subappressed hairs between the ribs. Pappus of white hairs, almost equal to the florets.

Endemic to the Darling Range, habitat unknown. Recorded from Glen Forrest and Wooroloo. Extending to Bindoon and York.

Flowers September-November.

S. hispidulus A. Rich.

Annual herb to 1 m tall, simple or sparingly branched below the inflorescence, glabrous or minutely puberulous or sometimes densely clothed with crisped, multicellular hairs. Leaves 30-70 (110) x 5-10 (20) mm, linear, narrowly elliptic or ovate, sessile; auriculate with coarsely bidentate auricles, or the lowest leaves sometimes more or less petiolate with minute linear auricles, more or less coarsely and irregularly sharp-toothed, sometimes deeply pinnatisect and the segments sharply denticulate, densely hispid beneath with multicellular hairs, less densely to sparsely hispid above or sometimes glabrescent, upper surface frequently roughly wrinkled or scabrous after drying, with the hairs almost tuberculate. Heads pedicellate, terminal and axillary in corymbs, usually rather congested, sometimes in diffuse panicles, discoid, 6-10 mm long; involucre slender, cylindrical; involucre bracts 11-13, 4.5-6 x 1-1.5 mm, prominently 2-veined, strongly keeled, becoming rigid and widely reflexed after fruiting, the apices papillose, not darkened. Florets more than 20; marginal ones filiform, female, 3-5-lobed; central ones bisexual, tubular, 5-lobed. Achenes 1.5-2 mm long, swollen, cylindrical, non-rostrate but with a callose-annulate apex, blackish brown, with whitish, subappressed hairs in rows of variable width between the low, rounded ribs. Pappus hairs slender, white, exceeding the involucre bracts, almost equal to the florets.

Occurs mainly in sandy soil above laterite but also in red loam and on granite outcrops amongst low open woodland. Recorded from Helena Valley to Bunbury. Extending northwards to Mt. Lesueur and southwards to Augusta and Fitzgerald River National Park. Also recorded from S.A., Vic., Tas. and N.S.W. as well as New Zealand.

Flowers September-July in Perth Region, August-December elsewhere.

Plants from W.A. referred to this species are exceedingly variable, notably in leaf morphology, and almost certainly represent several taxa.

S. lautus G. Forster ex Willd.

Variable Groundsel

Erect, annual or perennial herb to 0.7 m tall, glabrous. Leaves very variable, linear, narrowly elliptic, obovate or broadly elliptic, entire, pinnatifid or pinnatipartite, 10-100 x 0.1-30 mm; base narrowed or broadly dilated, auriculate and stem-clasping; margin entire or toothed; apex acute. Heads loosely corymbose, radiate; involucre campanulate, 5-12 mm long, 0.6-1 mm in diameter; involucre bracts 12-20, often dark-tipped and 2-ribbed when dry, with several outer smaller ones at the base. Marginal florets 8-14, ligulate, female, yellow, 5-10 mm long. Central florets numerous, bisexual, yellow, tubular, 5-lobed. Achenes cylindrical, 2.8-3.2 x 0.4-0.6 mm, white, striate, hairy, rarely glabrous. Pappus of numerous, white, capillary hairs almost equal to the florets. **Fig. 261**

Native to Australia and New Zealand, found in a wide variety of soils and habitats. Recorded from coastal sands and limestone from Yanchep to Harvey River, also on lateritic soils in open woodland at Helena Valley. Extending northwards to Cape Range and Hamersley Range, eastwards to the Nullarbor and southwards to Augusta, Stirling Range and Esperance.

Flowers August-January in the Perth Region, until April elsewhere.

Ali, Austral. J. Bot. 17: 161-176 (1969), recognized four Australian subspecies. W.A. specimens were referred by him to *S. laetus* subsp. *dissectifolius* Ali or subsp. *maritimus* Ali which, over the entire geographic range of the species, cannot be satisfactorily distinguished. Material from the Perth Region comprises two easily recognizable variants: subsp. *dissectifolius* has mostly finely dissected or lobed, narrow leaves; and subsp. *maritimus* Ali has undivided or rarely coarsely lobed, dentate, broad leaves.

S. leucoglossus F. Muell.

Erect annual to 1.3 m tall, glabrous. Leaves few, ovate or obovate, 10-50 x 3-15 mm, lower ones petiolate, without auricles, upper ones sessile with broad, stem-clasping auricles; margin acutely and irregularly toothed and lobed; apex acute. Heads small, in corymbs forming a large, loose panicle, radiate; involucre cylindrical, 5-8 x 0.2-0.3 mm; involucre bracts ca 8, narrowly obovate with 1 or 2, small, outer ones, acuminate, minutely ciliolate. Marginal florets female, ligulate, 1-3, the ligules white or pale purple. Central florets tubular, bisexual, 8-10, white, slightly exceeding the involucre, 5-lobed. Achenes narrowly ellipsoid, 1.5-2 x 0.3-0.5 mm, greyish, with narrow grooves between broadly flattened ribs beset with short, white, subappressed hairs. Pappus of fine, white, capillary hairs almost equal to the disc florets.

Endemic to the Darling Range, found in sandy gravel over granite in open woodland. Recorded from Mundaring to near Harvey. Also found west of Williams.

Flowers from August to December.

S. quadridentatus Labill.

Perennial to 0.7 m tall with striate stems, sparingly branched below the inflorescence, with erect to suberect branches, greyish woolly-hairy when young, more or less glabrescent later. Leaves sessile, linear to narrowly elliptic 15-200 x 2-14 mm, more or less minutely and distantly callose-denticulate; base sometimes with minute, linear, simple auricles; margin usually revolute, entire; apex acute to subacuminate. Heads terminal and axillary, forming corymbose cymes, discoid; involucre slender, cylindrical; involucre bracts 11-13, 6.5-8 x 0.4-0.2 mm, the apices glabrescent, 2-veined, with veins prominent on the lower third only, acuminate, ciliolate. Florets more than 20; marginal ones female, filiform, 3 or 4-lobed; central ones bisexual, tubular, 4 or 5-lobed. Achenes 2.5-4 mm long, cylindrical or slightly arcuate, more or less attenuate-rostrate, with narrow grooves between broadly flattened ribs beset with short, white, subappressed hairs, reddish or olive-brown. Pappus hairs slender, white, exceeding the involucre, equal to the florets.

Recorded in a variety of soils, often in moist situations amongst open woodland. Recorded from Welshpool, Kalamunda, Byford and Harvey. Widespread throughout south western W.A., eastwards to Laverton and southwards to near Esperance. Also recorded from S.A., Vic., Tas., N.S.W. and Qld.

Flowers September-December in the Perth Region, until June elsewhere.

S. ramosissimus DC.

Stout, erect perennial to 2.5 m tall, glabrous. Leaves sessile, ovate, elliptic or linear, 15-140 x 2-35 mm; base half-clasping with acutely lobed auricles, margins acutely toothed; apex acuminate. Heads small and numerous in a large, pyramidal panicle, discoid; involucre campanulate, 3-6 mm long; involucre bracts ca 12, narrowly elliptic, with lobes often darkened at the more or less ciliolate tips. Florets above 20, bisexual, tubular, yellow, slightly exceeding the involucre. Achenes ovoid or cylindrical, 0.8-1.3 x 0.2-0.3 mm, black at maturity, with short, white subappressed hairs. Pappus hairs white, almost equal to the florets.

Found in well-drained sand above limestone and in dark-brown loam above granite in open woodland. Recorded from Yanchep to Bunbury. Extending southwards to Cape Leeuwin and eastwards to the Porongurup Range and Bremer Bay.

Flowers October-March in the Perth Region, September-December elsewhere.

***S. vulgaris L.**

Common Groundsel

Erect, annual herb to 0.75 m tall, sparsely hairy with simple hairs or almost glabrous. Leaves obovate, irregularly toothed to pinnatifid, 20-100 x 5-45 mm, the lower petiolate, the upper sessile with broad, stem-clasping auricles. Heads in dense corymbs, discoid; involucre cylindric, 5-8 mm long, 5-10 mm in diameter; involucre bracts narrowly obovate, acuminate with short, black-tipped bracteoles at base. Florets (of all W.A. specimens) tubular, bisexual, numerous, more or less equal to the involucre, yellow. Achenes cylindric, 1.5-2.5 x 0.2-0.4 mm, greyish, conspicuously striate. Pappus of numerous, white, capillary hairs equal to or surpassing the florets.

A weed of sandy soils. Occasional in the metropolitan area. Recorded from scattered localities in south western W.A. including Augusta and Fitzgerald River National Park. Native to Europe and Asia, now widely distributed in temperate regions.

Flowers July-October in the Perth Region, until February elsewhere.

W.A. material of this species appears to belong to subsp. *vulgaris*.

SILOXERUS Labill.

Diminutive annual herbs, simple and minute or with major branches at basal and/or upper nodes, glabrous or hairy. Leaves in a basal rosette or opposite to alternate, sessile; base often with transparent margins; margin entire; apex mucronate. Compound heads more or less ellipsoid or ovoid to depressed ovoid; general involucre bracts conspicuous, leaf-like, often equal to or exceeding the length of the head; general receptacle a single hairy axis, the axis becoming hollow with age. Partial heads evenly distributed over the general receptacle, usually more or less indistinct and lacking subtending bracts; involucre bracts ca 5-15, in 1 or 2 indistinct whorls, mainly transparent, but the upper portion opaque and often crenulate, with a green, more or less glabrous midrib; receptacles with one bract per floret resembling the partial involucre bracts. Florets 4-22 per capitulum, tubular, 3-5-lobed. Style branches truncate. Anthers 3-5, tailed. Achene purple, obovoid, sparsely to densely papillose. Pappus of 4-7 jagged scales connate at the base or a jagged ring lacking distinct scales. A genus of 3 species endemic to south western W.A. Reference: Short, P.S. 1983. *Muelleria* 5(3): 204-209.

- | | |
|---|----------------------|
| 1. Pappus half as long or rarely the length of the floret. Involucre and receptacular bracts 2-6.3 mm long..... | S. humifusus |
| 1. Pappus equal to or slightly exceeding the length of the floret. Involucre and receptacular bracts 1.3-1.9 mm long..... | S. filifolius |

S. filifolius (Benth.) Ostenf.

Annual herb to 65 mm tall, simple or with major branches at basal and/or upper nodes, glabrous or variably hairy. Leaves often opposite at the base, the upper ones alternate, linear or narrowly obovate, 0.5-1.7 x ca 0.1 mm. Compound heads ellipsoid or obovoid to very broadly ovoid, 6-27 mm long, ca 5-15 mm in diameter. Partial heads with 10-13 involucre and receptacular bracts, all bracts obovate to widely obovate, 1.3-1.9 x 0.7-1.4 mm, crenulate near the apex, white or pale pink. Florets 4 or 5, 4 or 5-lobed, the tube distinctly swollen in the lower half, 0.4-0.7 mm long. Achenes more or less obovoid, 0.4-0.7 x 0.2-0.3 mm, variably papillose. Pappus of 4-6 jagged, basally connate scales, 0.6-0.9 mm long, equal to or slightly exceeding the florets.

Occurs in a variety of habitats including drainage channels, open sandy sites and moist situations around granite outcrops amongst scrub and open woodland. Recorded from Gingin to Bunbury. Extending southwards to Northcliffe, inland to near Hyden and eastwards to Cape Le Grand.

Flowers October-January in the Perth Region, from September elsewhere.

S. humifusus Labill.

Annual herb to 90 mm tall, simple or with major branches at basal and upper nodes, glabrous or variably hairy. Leaves often opposite at the base, the upper ones alternate, linear to narrowly obovate, 10-30 x 1-15 mm. Compound heads broadly ellipsoid or ovoid to broadly depressed ovoid, 6-29 mm long, 5-13 mm in diameter. Partial heads with 8-10 involucre and receptacular bracts, all bracts narrowly

obovate to obovate, 2-6.3 x 0.7-1.9 mm, crenulate near the apex, white or pale pink. Florets ca 5, 4 or 5-lobed, the tube distinctly swollen in the lower half, 0.9-2.3 mm long. Achenes more or less obovoid, 0.7-1 x 0.3-0.4 mm, variably papillose. Pappus of 5-7 jagged, basally connate scales, 1-1.7 mm, ca ½ as long or rarely equal to the florets.

Occurs in a variety of habitats including moist depressions in sandy soils amongst scrub or open woodland. Recorded from throughout the Perth Region. Extending northwards to Jurien Bay, southwards to Augusta and Walpole, eastwards to Cape Arid and inland to Lake King.

Flowers October-February in the Perth Region, from June elsewhere.

*SILYBUM Adans.

Erect, annual or biennial herbs, glabrous. Leaves alternate, marbled white above, sinuate-lobed or pinnatifid, undulate; margins spiny. Heads large, solitary, terminal, erect or drooping, discoid, homogamous, homochromous; involucre broadly subglobular; involucre bracts multiseriate, spiny; receptacle flat, densely setose. Florets bisexual, tubular, slender below, abruptly expanded above, deeply 5-lobed, red-purple. Stamen filaments glabrous or hairy, connate; anthers with a narrowly triangular apical appendage and sagittate, tailed base. Style scarcely thickened below the branches, with a ring of short hairs, branches narrowly obovate, flattened, connate, minutely papillose externally. Achenes oblong-obovate in outline, compressed. Pappus of many scabrous, more or less chaffy bristles in several series, connate at the base, deciduous. A genus of 2 species native to the Mediterranean Region, 1 introduced in W.A.

*S. marianum (L.) Gaertner

Variegated Thistle

Annual or biennial herb to 300 mm tall, simple or sparingly branched, glabrous or slightly cottony-hairy. Leaves alternate, oblong in outline, to 800 x 400 mm, light-green, marbled with white along veins abaxially; margins sinuate-lobed or pinnatifid, spiny; basal leaves narrowed to the sessile base, cauline leaves amplexicaul with rounded, spiny, appressed auricles. Heads solitary, terminal; involucre urceolate, large, 30-90 mm in diameter; involucre bracts green, imbricate, multiseriate, the middle and outer ones ovate-oblong with a broad, spinulose-ciliate base and a coarse, more or less leaf-like, divaricately spreading, spine-tipped and basally spine-margined appendage, outermost ones with a white mealy surface. Florets purple. Achenes 6-7 mm long, faintly transversely wrinkled. Pappus of numerous, slender, unequal, scabrous, more or less chaffy bristles.

A weed of waste places and pastures on loamy soils. Recorded from the metropolitan area near Perth. Sporadic in the lower south west of W.A. inland to Kellerberrin and at Albany. Native of southern Europe, north Africa and south western Asia, now a cosmopolitan weed.

Flowers October in the Perth Region, until December elsewhere.

*SOLIDAGO L.

Fibrous-rooted, perennial herbs from a rhizome or caudex. Leaves alternate, entire or variously toothed, sessile, petiolate. Heads several to often numerous, small, in axillary clusters or more often forming a thyrsoid to paniculiform, less often racemiform or corymbiform inflorescence, radiate or discoid, heterogamous, homochromous; involucre campanulate, tubular or cylindrical; involucre bracts more or less imbricate, multiseriate, rarely almost equal, more or less chartaceous at the base, commonly with a herbaceous green tip; receptacle small, flat or slightly convex, without bracts or occasionally with a few bracts near the margin, commonly more or less alveolate. Ray florets few to many, female, ligulate. Disc florets seldom more than 25(-60), bisexual, tubular, yellow, rarely white. Anthers nearly or quite as long as the filaments. Style branches flattened, with ventromarginal stigmatic lines and a narrowly elliptic, externally hairy appendage. Achenes with several ribs, subterete or angled, glabrous or hairy. Pappus of numerous, capillary, usually white bristles, these sometimes much reduced. A largely North American genus of ca 125 species, 1 introduced in W.A.

***S. canadensis L.**

Goldenrod

Perennial from elongate, creeping rhizomes, to ca 2 m tall, the stem densely spreading-puberulent at least above the middle. Leaves chiefly sessile, cauline, numerous and crowded, 3-nerved, narrowly elliptic, tapering at both ends, to 120 x 20 mm, becoming smaller upwards, densely puberulent beneath, merely scabrous or almost glabrous above. Heads in a paniculiform inflorescence with strongly recurved-second branches; involucre 2-4.5 mm long; involucre bracts thin and slender, acute or acuminate, yellowish, without a well defined, green tip. Ray florets 8-17, short and slender. Disc florets 2-8. Achenes shortly hairy. Pappus of well developed, capillary bristles longer than the achene.

A weed of roadsides, railway lines and waste places. Recorded from the inner metropolitan area. Also recorded from Northam and Busselton. A native of North America, now a cosmopolitan weed.

Flowers in May in the Perth Region, April-June elsewhere.

Material present in W.A. agrees well with published descriptions of *S. canadensis* var. *scabra* Torrey & A. Gray, as does that from N.S.W.

***SOLIVA Ruiz Lopez & Pavon**

Low, more or less caulescent or mat-forming, annual herbs. Leaves small, alternate, often clustered beneath the heads, pinnatifid or tripinnatifid or with more or less palmately divided pinnae. Heads terminal and commonly surpassed by the immediately subtending branches, either closely clustered at the base or scattered along the branches, disciform, heterogamous, homochromous; involucre hemispherical to subglobular; involucre bracts 1 or 2-seriate, dry and scarios or herbaceous; receptacle naked, flat to conic-elevated. Marginal florets numerous, female, with elongate, indurate-persistent style and no corolla. Central florets few, male, tubular, 4-lobed. Achenes compressed at right angles to the radii of the head, with thin or corky, narrow or broad, often ornamented wings. Pappus absent. A genus of ca 8 species native to South America, † introduced in W.A.

***S. pterosperma (A.L. Juss.) Less.**

Jo-Jo, Onehunga Weed

Mat-forming annual to 200 mm in diameter, loosely hairy. Leaves up to 30 x 12 mm overall, pinnatifid, the pinnae rather irregularly, almost palmately divided into narrow segments. Heads mostly less than 10 mm wide at maturity, scattered along the stems; involucre hemispherical, 3-4 mm long; involucre bracts ovate to elliptic, more or less herbaceous; receptacle small, conic. Central florets not strongly narrowed basally. Achenes 2.5-4 mm wide; body scabrous-hispidulous; wings broad, thin, unornamented, broadest near or above the middle, constricted below but flared towards the base, prolonged distally into a pair of spinulose tips ca 1 mm long.

A weed of lawns and roadsides. Found in the inner metropolitan area and at Wagin and Collie. Probably widespread in the south west of W.A. Native to South America, a cosmopolitan weed.

Flowers September-November in the Perth Region, until December elsewhere.

***SONCHUS L.**

Annual or perennial herbs, sometimes woody at the base. Leaves radical or alternate, cauline ones often auriculate-amplexicaul, entire, dentate, pinnatifid or dissected. Heads in irregular, corymbose panicles or subumbellate, rarely solitary, ligulate, homogamous, homochromous; involucre ovoid or campanulate; involucre bracts multiseriate; receptacle without bracts. Florets ligulate, yellow, often pinkish or reddish abaxially with age. Anthers sagittate at the base; auricles shortly setaceous-acuminate. Style branches medium to long, with small, pollen-sweeping hairs. Achenes mostly compressed, ellipsoid to cylindric, ribbed, sometimes transversely rugose, rough or smooth, contracted above to form a more or less stout, smooth beak. Pappus of numerous capillary bristles intermixed with stouter setae. A genus of ca 60 species, natives of Europe and Asia, but the majority native to Africa, Madeira, the Canary and Cape Verde Islands. 3 species are introduced in W.A. References: Boulos, L. 1972. Bot. Not. 125: 287-319; Boulos, L. 1973. Bot. Not. 126: 155-196; Boulos, L. 1974. Bot. Not. 127: 402-451.

- 1. Leaves with conspicuously prickly margins. Achene with broadly winged margins..... ***S. asper**
- 1. Leaves with weakly or scarcely prickly margins. Achene with thickened margins..... ***S. oleraceus**

***S. asper Hill**

Rough Sowthistle

Annual herb with erect, hollow stems to 1.5 m tall; glaucous, glabrous except for a few spreading, gland-tipped hairs. Leaves obovate-panduriform, seldom pinnatifid, to ca 200 x 50 mm; basal auricles rounded, conspicuously prickly-toothed, appressed. Heads several in a corymb; involucre 9-13 mm long in fruit. Florets pale yellow, corolla tube somewhat longer than the ligule. Achenes elliptic, tapering equally at both ends, 2.5-3 mm long, strongly compressed, 3(-5)-ribbed on each face, never transversely rugose, the margins broadly winged. Pappus of numerous, white, capillary bristles.

A weed of waste places and disturbed ground. Found in moist soils near Rockingham and at Byford. Recorded sporadically throughout south western W.A. Native of Europe, Asia and north Africa, now cosmopolitan.

Flowers August-November in the Perth Region, throughout the year elsewhere.

***S. oleraceus L.**

Common Sowthistle

Annual herb with erect, hollow stems to 1.5 m tall, glaucous, glabrous except sometimes for a few spreading, gland-tipped hairs. Leaves runcinate-pinnatifid to occasionally merely toothed, soft, progressively less divided upward and more or less reduced, the margins rather weakly or scarcely prickly, 60-300 x 10-150 mm; all but the lowermost ones prominently auriculate, the auricles well rounded but eventually sharply acute. Heads several in a corymb; involucre 9-13 mm long in fruit. Florets pale yellow, corolla tube equal to the ligule. Achenes narrowly obovate, 2.5-3 mm long, somewhat compressed, 3-5-ribbed on each face, transversely wrinkled, margins thickened, minutely retrorsely hispid. Pappus of numerous, white; capillary bristles and fine, down-like, barbed hairs.

A weed of waste places and disturbed ground in a variety of soils. Found throughout the Perth Region. Extending northwards to Dorre Island, widespread throughout southern W.A. from Wittensoom to the Nullarbor Plain. Native to Europe, Asia and north Africa, now cosmopolitan.

Flowers June-December in the Perth Region, June-February elsewhere.

***TARAXACUM Wigg.**

Stemless, scapigerous, perennial herbs. Leaves confined to a basal rosette, entire or variously lobed. Scapes simple, hollow. Heads solitary, terminal, ligulate, homogamous, homochromous; involucre campanulate or oblong; involucre bracts multiseriate, the outer ones shorter, often recurved; receptacle pitted, without bracts. Florets bisexual, ligulate, yellow. Anthers sagittate at the base; auricles shortly setaceous-acuminate. Style branches long, slender, obtuse, with long, pollen-sweeping hairs. Achenes 4 or 5-angled, ribbed, the ribs usually mucronate or echinate above, crowned with a short cone and a long beak. Pappus slender, rough, unequal hairs in several rows. A mainly northern hemisphere genus, some species now widely distributed as weeds, called 'dandelions'. 1 species is introduced in W.A. Agamospermy is commonplace in this genus and some botanists recognize ca 2000 agamospecies (microspecies) currently classified in 32 sections.

***T. officinale Wigg.**

Dandelion

Taprooted, perennial herb with milky sap; sparsely hispid or glabrous. Leaves radical, obovate, entire or runcinate-pinnatifid, 50-170 x 5-30 mm; base narrowed, scarcely or obscurely winged, often reddish; lobes more or less triangular, the terminal one tending to be larger than the others; margin irregularly denticulate. Scapes 50-210 mm long, glabrous or sparsely hairy. Heads 20-30 mm in diameter; involucre bracts 15-30, these at first erect, finally reflexed, narrowly elliptic, not horned, dark green, margins pale, apices acuminate; outer bracts reflexed, narrowly elliptic, smaller, up to ca 10 mm long. Florets golden-yellow, numerous, marginal ones often apparently sterile. Fertile achenes pale grey or brownish, broadly obovoid, 2.8-3 x 0.8-1 mm, mucronate above, ribbed; beak 2-3 times as long as achene with a narrow, conic cusp below. Pappus creamy white.

A weed of roadsides, waste places and of cultivation. Occasional in the metropolitan area. Recorded from scattered localities in south west W.A., including Norseman, Manjimup and Albany, but poorly collected and probably far more widespread.

Flowers irregularly throughout the year.

Although the name *T. officinale* Wigg. has often been used in an aggregate sense, particularly for members of the section *Vulgaria* Dahlst., it has not been typified and its identity remains completely unknown, even at the sectional level. Further, the microspecies identity of material introduced to Australia has not been ascertained. Reference: A.J. Richards 1973. *Watsonia* 9, Suppl.: 1-141.

***TOLPIS Adans.**

Annual to perennial, usually scapigerous herbs with one to many, usually branched stems. Leaves mostly radical, entire to dentate or pinnatifid. Heads few to many, pedunculate in lax, corymbose panicles; ligulate, homogamous, homochromous or heterochromous; involucre campanulate; bracts in 1-3 series; receptacle flat, pitted, without bracts. Florets ligulate, yellow or the inner purplish brown or reddish brown, usually turning greenish when dry. Achenes obconic, closely ribbed, smooth, glabrous. Pappus setose, biseriate, of short or long, rigid hairs, or a mixture of the two, the hairs sometimes expanded basally. A genus of ca 20 species, mainly in the Mediterranean Region, 1 introduced in W.A.

****T. barbata* (L.) Gaertner**

Yellow Hawkweed

Annual, scapigerous herb to 0.4 m tall, with spreading branches overtopping the heads, somewhat woolly hairy. Leaves mostly radical, forming a basal rosette, 20-100 x 4-15 mm, narrowly elliptic to broadly ovate or obovate; base narrowed and strap-like; margin entire to coarsely dentate; apex acute. Heads solitary or several, on thickened peduncles with few to many, linear, curved, setaceous supplementary bracts; involucre hemispherical, 6-16 mm in diameter; involucre bracts ca 20, narrowly linear, acute, at first erect but later spreading, becoming slightly hardened and persistent at fruiting. Florets puberulous externally, all yellow or sometimes the innermost ones reddish brown. Achenes ca 1.5 mm long; compressed. Pappus a crown of small, scale-like hairs with 4 or 5 bristles which are longer than the achene, the bristles sometimes absent from the marginal achenes. *T. umbellata* Bertol.

A weed of cultivated land and beside railway lines. Recorded from Armadale, Harvey and Boyanup. Occasional in the lower southwest of W.A. including Margaret River, Nannup and Balingup. A native of southern Europe, now cosmopolitan.

Flowers October-January.

***TRAGOPOGON L.**

Biennial or perennial herbs with milky sap and solitary or sparingly branched stems. Leaves alternate, linear to narrowly triangular, entire, amplexicaul. Heads solitary or few, ligulate, homogamous, homochromous; involucre cylindric or narrowly campanulate; involucre bracts uniseriate, triangular-acuminate; receptacle pitted, without bracts. Florets bisexual, ligulate, yellow, blue or purple. Anthers sagittate at the base; auricles acute or shortly setaceous-acuminate. Style branches long. Achenes fusiform, narrowed upwards into a long beak, terete or angled, ribbed, often muricate on the ribs, the outer ones occasionally beakless. Pappus uniseriate, of mostly plumose, or the marginal achenes with 1 row of scabrous, rigid hairs. A genus of ca 45 species, native of Europe, Africa and western Asia, 1 introduced in W.A.

****T. porrifolius* L.**

Salsify

Annual or biennial herb to 1.3 m tall, with thick, cylindric rootstock; glabrous to somewhat floccose-lanate. Leaves sessile, narrowly triangular, up to 350 x 20 mm. Heads solitary on swollen, hollow peduncles; involucre campanulate, 30-50 mm long; involucre bracts ca 8, triangular-acuminate, 25-40 mm long in flower, surpassing the rays, elongating to 40-70 mm in fruit. Florets pinkish violet to pale purple, variable in length from 1/2 as long as bracts. Achenes terete, 25-40 mm long, gradually narrowed to a stout beak. Pappus ca 20 mm long, plumose with longer whitish, barbellate bristles.

Recorded from Midland Junction. Also found at Bridgetown. An escape from cultivation. Native to southern Europe and northern Africa, now a weed near settlement in many parts of the world.

Flowers November in the Perth Region and elsewhere.

The rootstock of this species provides the vegetable 'salsify'.

TRICHOCLINE Cass.

Perennial herbs, usually stemless with swollen rhizomes. Leaves in a basal rosette, entire or variously lobed. Heads generally solitary, on long scapes, radiate, heterogamous, homochromous or heterochromous; involucre hemispherical; involucre bracts multiseriate, the outermost ones leafy; receptacle flat, without bracts, sometimes ciliate. Florets dimorphic. Marginal florets in a single row, female; outer lip ligulate, 3-lobed; inner lip of 2 inconspicuous, narrow, coiled lobes. Central florets bisexual; corolla bilabiate, lips more or less equal in length, the outer 3-lobed, the inner 2-lobed. Anthers cylindrical or ovoid, papillose or glabrous. Pappus of simple, barbellate bristles in several series. A genus of ca 40 species mostly native to South America but with a single species native to W.A.

T. spathulata (Cunn. ex DC.) J.H. Willis

Native Gerbera

Perennial herb to 1 m tall with adventitious, brown, elongate root tubers and a tufted, woolly stock. Leaves 4-15, all radical, petiolate, narrowly obovate or ovate, 50-80 x 3-5 mm; sinuate, shortly and broadly lobed or almost lyrate, margin glabrous or white cottony-hairy on underside. Heads solitary on slender, glabrous or cottony-hairy scapes to 500 mm tall; involucre broadly hemispherical, 10-50 mm in diameter; involucre bracts narrowly ovate, imbricate, the outer ones becoming shorter. Marginal florets 8-20, cream-coloured, the lower lip narrowly ovate, 15-30 mm long, briefly 3-lobed apically, the filiform segments of the upper lip not half so long, coiled. Central florets numerous, ca a third as long as the ray florets, lower lobes narrowly linear, coiled. Achenes cylindrical, densely papillose. Pappus of numerous, rigid, capillary bristles as long as the disc florets. Reference: Willis, J.H. 1967. W. Austral. Nat. 10: 157-158. **Fig. 262**

Occurs in stony sand and clay soils of the Darling Range and Scarp from Gingin to south of Harvey. Extending northwards to Jurien Bay, south to near Busselton and eastwards to Albany and Cape Riche.

Flowers December-January in the Perth Region, October-April elsewhere.

Pate, J.S. & Dixon 1982. Tuberous Cormous and Bulbous Plants, record an unnamed variant in the Perth Region. This needs further taxonomic study.

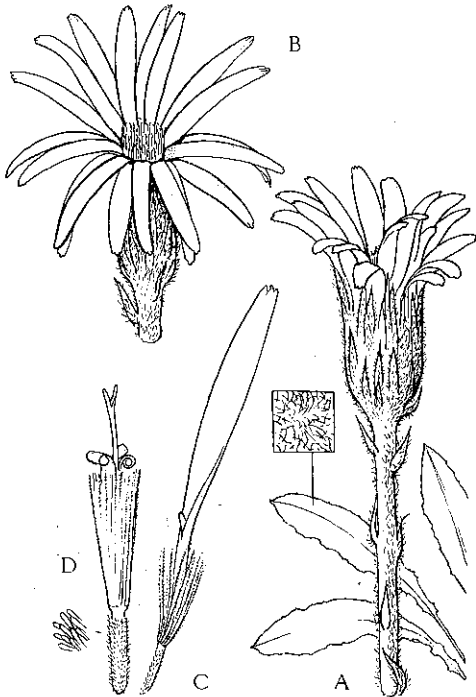


Fig. 262. *Trichocline spathulata*. A, Flowering stem and basal leaves with enlargement of hairs of leaf. B, Flower head. C, Ray floret. D, Disc floret with enlargement of hairs from ovary.

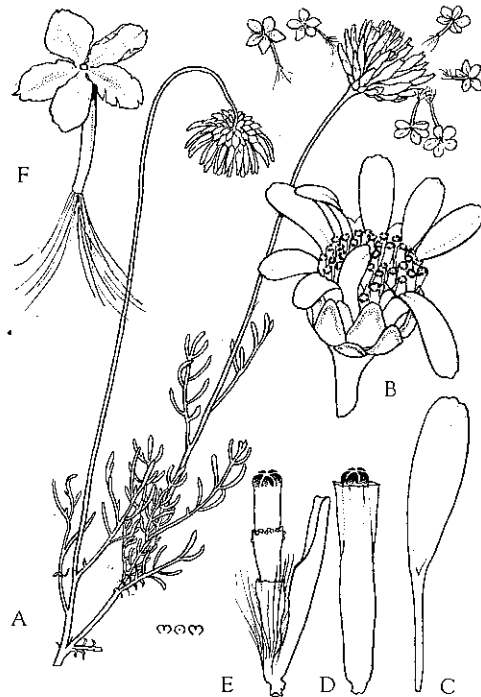


Fig. 263. *Ursinia anthemoides*. A, Flowering branch. B, Flower head. C, Ray floret. D and E, Disc florets. F, Achene.

***UROSPERMUM Scop.**

Annual or biennial herbs with milky sap, sparingly branched, hairy or hispid. Leaves radical or alternate, coarsely toothed to lyrate-pinnatifid, amplexicaul. Heads large, on long peduncles inflating in fruit, ligulate, homogamous, homochromous. Involucre campanulate; involucre bracts few, uniseriate, shortly connate basally, smooth or bristly; receptacle flat or concave, setose, without bracts. Florets bisexual, ligulate, pilose at the junction of the tube and limb, yellow. Anthers with an ovate apical appendage and sagittate bases, the auricles acute or setaceous-acuminate. Style branches long, linear, with short, pollen-sweeping hairs. Achenes narrowly cylindrical, subterete, usually curved, 5-10-ribbed, beaked, beak very long with an inflated, hollow base. Pappus of narrow, scale-like, plumose bristles, uniseriate, connate basally. A genus of 2 species, native to the Mediterranean Region, 1 introduced in W.A.

***U. picroides (L.) Scop. ex F.W. Schmidt**

False Hawkbit

Annual or biennial herb to 1.2 m tall, sparingly branched, with stout, hollow, hispid, leafy stems. Leaves up to 300 x 150 mm, decreasing in size upwards, hispidulous, often lyrate-pinnatifid with coarsely and irregularly toothed lobes; base broad, stem-clasping. Heads solitary or 2 or 3 corymbosely arranged at the tips of the branches; peduncles inflated in fruit; involucre campanulate, ca 30 x 30 mm in fruit; involucre bracts ca 8, membranous, setose. Florets yellow. Achenes almost sigmoid in outline; body ca 4 mm long, somewhat compressed, rough with peg-like projections, winged at the base; upper part infertile, differentiated into an oblique, inflated, muricate, hollow cone ca 4 mm long, crowning the body of the achene, tapering upwards into a slender, terete, hispid beak. Pappus of delicate, plumose bristles, caducous.

A weed of moist situations including along watercourses, coastal inlets and roadsides, on a variety of soils. Recorded from the metropolitan area. Extending from Dirk Hartog Island to Perenjori. Native to the Mediterranean Region, now widespread in temperate regions of the world.

Flowers October-November in the Perth Region, from August elsewhere.

***URSINIA Gaertner**

Annual or perennial herbs, sometimes shrubby. Leaves alternate, serrate, pinnatifid or pinnately dissected. Heads medium-sized or large, rarely small, pedunculate, solitary or in lax panicles, heterogamous, radiate, homochromous or heterochromous; involucre hemispherical or broadly campanulate; involucre bracts multiseriate, the inner ones with broad, rounded, scarious tips, the outer ones narrower with scarious margins; receptacle flat or convex, with bracts embracing the flowers and either with an appendage or truncate, sometimes more or less lobed. Ray florets neuter, ligulate. Disc florets bisexual, fertile or functionally male, tubular. Anthers with entire, obtuse bases. Style branches oblong, flattened, penicillate, those of the inner florets sometimes not or scarcely divided. Achenes subterete, ribbed, narrowed to the base, sometimes with a basal tuft of hairs. Pappus of 5 or 6 broad scales or of scales and an inner series of 4 or 5 bristles or slender scales. A largely South African genus of ca 40 species, the majority endemic to the south western Cape Province, with 2 introduced in W.A.

***U. anthemoides (L.) Poiret**

Erect, annual herb to 0.5 m tall, stems much-branched, glabrous or somewhat woolly-hairy. Leaves deeply dissected, 10-50 x 2-20 mm, the upper lobes usually further divided, the lower lobes shorter. Heads solitary at the ends of long peduncles; involucre hemispherical, 12-25 x 5-20 mm; involucre bracts ovate, yellowish, the outer ones with narrow scarious margins, progressively more pronounced inwards, the innermost ones with scarious tips; receptacular bracts slightly narrowed towards the base and truncate. Ray florets orange or yellow, sometimes dark basally, usually dark adaxially. Disc florets yellow. Achenes more or less terete, narrowed basally, 5-8 x 0.5-1 mm, ribbed, glabrous or hairy, black, with a basal tuft of woolly hairs. Pappus of 5 broadly ovate, white, petal-like scales. **Fig. 263**

A weed of roadsides and waste places on a variety of soils. Widespread throughout the Perth Region. Extending throughout south western W.A. Originally from South Africa.

Flowers August-September in the Perth Region and elsewhere.

*VELLEREOPHYTON Hilliard & B.L. Burt

Annual or perennial herbs, with few or many leafy stems, grey or white-lanate. Leaves narrowly obovate or spatulate; apex subacute or obtuse; margins flat; base markedly narrowed, often petiolar. Heads few or many in woolly, subcorymbose clusters, disciform, heterogamous or homogamous; involucre bracts 3-5-seriate, woolly externally, the inner ones almost equal and equal to the florets; the stereome fenestrate in upper half, concave below and embracing the adjacent floret, the lamina thin, pellucid, occasionally purplish above the stereome, white at the tip, obtuse or rounded, spreading; receptacle almost smooth, without bracts. Florets 10-40, yellow, often red-tipped. Marginal florets female, filiform, (0-)1-30, fewer than, equal to or up to 10 times more numerous than the central ones. Central florets bisexual, tubular, scarcely broadened above, 5-lobed, glandular-hairy externally. Anthers with small obtuse apical appendage, conspicuously tailed. Achenes smooth. Pappus of more or less plumose bristles, sometimes cohering basally. A genus of 3 species from South Africa, segregated from *Gnaphalium*, with 1 species introduced in W.A. Reference: Hilliard, O.N. & Burt, B.L. 1981. Bot. J. Linn. Soc. 82: 181-232.

**V. dealbatum* (Thunb.) Hilliard & B.L. Burt

White Cudweed

Erect annual or short-lived, perennial herb, branched from the base, 0.3-0.8 m tall, white-lanate. Leaves alternate, narrowly obovate or spatulate, 12-25 x 2-4 mm; apex broadly acute; base narrowed into a short petiole, 10-30 mm long. Heads in dense terminal clusters or corymbs subtended by short floral leaves, the clusters solitary or terminating the branches of a loose corymb; involucre shortly cylindrical; involucre bracts ca 2.5 mm long, oblong, erect with white obtuse tips, the lower part often purple but sometimes translucent or greenish. Florets ca 40; central bisexual ones 3-5. Achenes brown with short, glandular hairs. Pappus bristles falling freely. *Gnaphalium candidissimum* Lam., nom illeg. Fig. 264

A weed of damp places in a variety of soils. Found throughout the Perth Region. Widespread in south west W.A. between Bolgart and Albany. A native of South Africa, now widespread as a weed.

Flowers October-December in the Perth Region, elsewhere throughout the year.



Fig. 264. *Vellereophyton dealbatum*. A, Habit. B, Flowering branch. C, Flower head. D, Marginal floret without achene. E, Central floret without achene. F, Central floret.

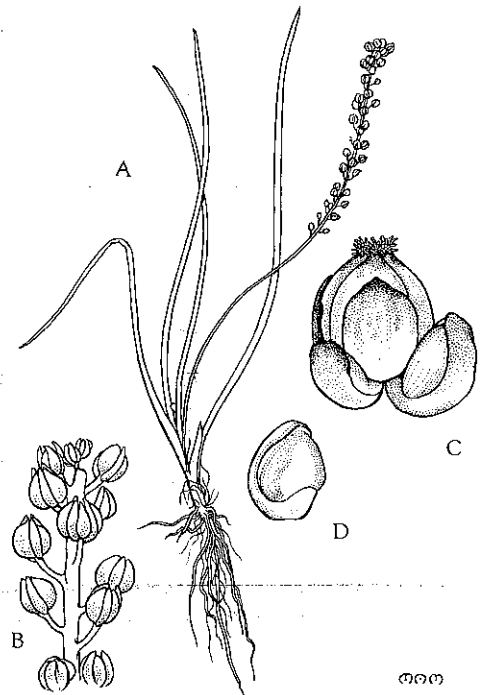


Fig. 265. *Triglochin striata*. A, Habit. B, Part of raceme. C, Flower. D, Perianth segment and stamen.

WAITZIA Wendl.

Annual herbs, simple to much-branched, glabrous, glandular, scabrous or woolly. Leaves alternate, linear, narrowly elliptic or obovate; base usually amplexicaul; margin entire; apex acute. Heads terminal, solitary or in corymbose clusters, rarely in leafy racemes, discoid, homogamous, homochromous; involucre broadly turbinate, campanulate, hemispherical or subglobular; involucre bracts multiseriate, coloured and petal-like, the outer ones sessile, the inner ones narrowly clawed; receptacle flat, without bracts. Florets numerous, bisexual, tubular, 5-toothed, white, yellow or orange. Anthers finely tailed. Style branches nearly terete, truncate or with very short cones, almost capitate. Achenes somewhat compressed, glabrous or papillose, terminating in a slender beak. Pappus of simple, barbellate or plumose bristles, usually connate basally. An endemic Australian genus of ca 7 species. The relationship of this genus to *Helichrysum*, *Leptorhynchos* and *Ixiolaena* requires further investigation.

1. Stems and leaves glabrous, sparsely woolly or scabrous. Involucre broadly hemispherical when mature, lamina of bracts coloured white, yellow or pink without narrow apical appendages.
2. Leaves scabrous-hairy to glabrous. Involucral bracts golden yellow..... **W. aurea**
2. Leaves glabrous to woolly-hairy; involucre bracts bright yellow, white or pink.
3. Involucre 10-30 mm in diameter; bracts white or pink. Achene glabrous. Pappus bristles finely barbellate..... **W. suaveolens**
3. Involucre 5-15 mm in diameter; bracts mainly bright yellow, sometimes white. Achene strongly papillose. Pappus bristles strongly barbellate..... **W. citrina**
1. Stems and leaves densely woolly-hairy. Leaves oblong-spathulate. Involucre nearly globular when mature, lamina of bracts straw-coloured with narrow apical appendages..... **W. paniculata**

W. aurea (Benth.) Steetz

Erect, annual herb to 0.5 m tall, simple or branching at the base, sparsely woolly-hairy. Leaves sessile, narrowly linear, elliptic or obovate, 20-80 x 2-13 mm, scabrous-hairy to glabrous; base amplexicaul; apex acute, mucronulate. Heads in terminal, loosely corymbose clusters; involucre hemispherical, 1-2.3 mm in diameter; involucre bracts with an entire, golden yellow lamina and a green, densely woolly-hairy claw. Florets yellow. Achenes ovoid-compressed, brown, glabrous, produced into a long, slender beak several times longer than the body. Pappus of finely barbellate bristles, yellow, becoming white basally.

Occurs in a variety of soils amongst scrub or open woodland. Recorded from Helena Valley, Rottne Island, Midland, Kelmscott and Harvey. Widespread throughout the south west.

Flowers November-December.

W. citrina (Benth.) Steetz

Erect, annual herb to 0.4 m tall, simple or branching from base, glabrous or sparsely woolly-hairy, rarely densely so. Leaves linear, elliptic or obovate, 10-70 x 1-5 mm; base amplexicaul; apex acute, mucronulate. Heads in terminal, loosely corymbose clusters, rarely solitary; involucre hemispherical, 5-15 mm in diameter; involucre bracts with a white or pale yellow, denticulate-ciliate lamina and a membranous, woolly-hairy claw. Florets yellow or white. Achenes cylindrical to ellipsoid, strongly papillose, usually produced into a long slender beak several times longer than the body, rarely with beak short or absent. Pappus of short, strongly barbellate or shortly plumose, yellow or white bristles.

Occurs in a variety of soils amongst scrub or open woodland. Widespread in the Perth Region. Extending throughout southern W.A. Also recorded in S.A., N.S.W. and N.T.

Flowers September-November in the Perth Region, from August elsewhere.

Plants of this species without beaked achenes may be confused with *Helipterum cotula* (Benth.) DC. from which they can be distinguished by their sessile (rather than broadly clawed) outer involucre bracts, and their barbellate (rather than distinctly plumose) pappus hairs.

W. paniculata (Steetz) F. Muell. ex Benth.

Erect annual to 180 mm tall, densely woolly-hairy. Leaves oblong-spathulate, the upper ones becoming linear, 6-25 x 1-5 mm; base amplexicaul; apex acute, mucronulate. Heads sessile on very short axillary branches forming an oblong, densely leafy panicle or raceme; involucre broadly ovoid or globular, 4-7 mm in diameter; involucre bracts with an erect, scarious, straw-coloured, ciliate, woolly-hairy lamina with a small, glabrous erect or spreading tip, and a green, glabrous claw. Florets cream-coloured. Achenes ovoid, strongly papillose, produced into a short beak. Pappus of white, plumose bristles.

Occurs in open woodland in a variety of soils. Recorded from the Darling Scarp from Helena Valley to Byford. Extending throughout the south west.

Flowers July-November.

W. suaveolens (Benth.) Druce.

Erect annual to 300 mm tall, almost glabrous to scabrous or loosely woolly-hairy. Leaves narrowly linear or obovate, 8-80 x 1-6 mm; base amplexicaul; apex acute, often mucronulate. Heads solitary or few in loosely corymbose clusters; involucre hemispherical, 10-30 mm in diameter; involucre bracts with a white or pink lamina and green glandular-hairy, often woolly-hairy claw. Florets creamy-white. Achenes ovoid, brown, glabrous, produced into a long, slender beak several times longer than the body. Pappus of white, finely barbellate bristles.

Occurs in open woodland in a variety of soils. Recorded from Yanchep to Bunbury and inland to Helena Valley and Collie. Extending northwards to Kalbarri, southwards to Augusta and eastwards to Fitzgerald River National Park.

Flowers October-December in the Perth Region, September-December elsewhere.

This species may be conspecific with *W. podolepis* (Gaud.) Steetz from which it appears to differ merely in the laminae of the innermost involucre bracts which are elliptic, white or translucent, smooth and glabrous, rather than cuneate, crenulate, dark and densely hairy.

***XANTHIUM L.**

Monoecious annual herbs. Leaves alternate, petiolate, toothed or lobed. Heads axillary or terminal, solitary or clustered, unisexual, the female below the male. Male heads globular, many-flowered; involucre short; involucre bracts few, narrow, in 1 or 2 series; receptacle hemispherical, without bracts; florets tubular, 5-lobed; anthers with a small apical appendage, obtuse base and connate filaments. Female heads ovoid, 2-flowered; involucre completely enveloping the 2 female flowers, 2-chambered within, covered in hooked spines outside, apex 1 or 2-beaked; corolla absent; pappus lacking; style branches long, linear, acute, the tips exerted on the inner face of each terminal beak near its base. Achenes obovoid or cylindrical, solitary in each involucre chamber, involucre enlarging, hardening and shed as a 2-celled unit. A genus of ca 30 species, cosmopolitan in distribution, 2 introduced in W.A.

***X. spinosum** L.

Bathurst Burr

Coarse, annual, somewhat woody herb to ca 1 m tall; stem yellowish with a yellow 3-toothed spine subtending each petiole. Leaves alternate; petiole ca 10 mm long, lamina up to ca 80 x 20 mm, narrowly rhomboidal; apex commonly 3-lobed, the terminal lobe very long and narrow; margin entire, dark green above, drying blackish, white-felted below. Male heads globular, 4-5 mm in diameter, in the upper leaf axils. Female heads solitary in lower leaf axils. Fruiting heads (burrs) ellipsoid, 8-12 mm long, closely covered with hooked spines, the 1 or 2 apical horns straight, shorter than the spines and inconspicuous, sometimes absent.

Occasional in the metropolitan area. Recorded from Midland Junction, Darlington, Fremantle and Coogee. Also found at Tammin, Kalgoorlie and Albany. A serious weed of disturbed and cultivated land. Probably South American in origin, now a widespread weed in most countries where summer rains are experienced.

Flowers January-May in the Perth Region, until June elsewhere.

X. spinosum can interfere with summer crops and pastures, but the characteristic that has made it such an undesirable weed is the tenacious nature of the burrs. Their hooked spines readily become attached to clothing, bags and animals, especially sheep.

SUBCLASS LILIIDAE (MONOCOTYLEDONS)

FAMILY 114 APONOGETONACEAE

B. L. Rye

Perennial herbs, aquatic in fresh water, rooted in the substrate. Leaves all basal; petiole usually long; blade floating or submerged, simple. Inflorescence a terminal spike, simple or 2-10-branched, erect, emergent. Perianth segments 0-6. Stamens usually 6 in 2 whorls, rarely up to 25 in 3 or 4 whorls; anther 2-celled, longitudinally dehiscent. Carpels 2-9, usually 3-6, superior, coherent in the basal $\frac{1}{2}$ - $\frac{3}{4}$; ovules 2-8 or rarely 1 per carpel; styles 1 per carpel, simple. Fruiting carpels free, each a follicle. 1 genus in Africa and from southern Asia to Australia.

APONOGETON L. f.

Perennial herbs, aquatic in fresh water, with a short thickened rhizome or corm, hermaphrodite or rarely dioecious, glabrous. Leaves with small axillary scales; petiole somewhat sheathing at the base; blade usually floating and with several main parallel veins, sometimes submerged and scarcely expanded. Flowering stem leafless; inflorescence with a caducous or rarely persistent spathe. Flowers green to yellow (in native Australian species), small. Perianth segments often 2, usually persistent. Carpels usually sessile, attenuate to the style; style short, with an abaxial stigmatic groove. Follicles usually distinctly beaked. About 40 species, 2 species occurring in W.A. Reference: van Bruggen, H.W.E. 1969. *Blumea* 17: 121-137.

A. *hexatepalus* H. Bruggen

Perennial herb; underground storage organ brown, up to 50 x 10 mm. Leaves: petiole 0.15-0.4 m long; blade floating, narrow, up to 200 x 6 mm, with 5-9 faint parallel veins. Flowering stems slender, 0.2-0.4 m high to the base of the spathe. Inflorescence branching into 2 at the spathe, which is just below the water surface, sometimes further branched above the water, up to 170 mm long, the lower 40-80 mm lacking flowers, with distant clusters of flowers above, the clusters spirally arranged; axis white. Perianth segments 6, green, 0.5-1 mm long. Stamens 6, ca 1.5 mm long. Carpels 3 or rarely 4, ca 1.25 x 0.75 mm; ovules 2. Follicles green, beaked.

Inhabits clay-based permanent swamps, from Kenwick southward. Extends south to the extreme south west corner of the state.

Flowers August-September.

FAMILY 115 HYDROCHARITACEAE

B. L. Rye

Perennial or rarely annual herbs, of fresh water or coastal saline water, partially or totally submerged, rooted in the substrate or rarely free-floating, usually dioecious, sometimes monoecious or hermaphrodite. Leaves often somewhat sheathing or expanded at the base; axillary scales 1-many in young leaves, sometimes persistent. Inflorescence of 1-many spathes, each with 1-numerous flowers; spathes usually of 2 partly connate bracts. Flowers actinomorphic or rarely zygomorphic, often with a floral tube, reaching and breaking the water surface before anthesis or sometimes remaining submerged. Outer perianth segments 3 or rarely absent, sepal-like, usually green. Inner perianth segments 3 or sometimes absent, petal-like or rarely sepal-like. Stamens 2-numerous; anther basically 2-celled, longitudinally dehiscent. Ovary inferior, 1-celled but often with partial divisions between the carpels; placentas 2-20 or rarely more, usually 3-6, parietal. Styles as many as the carpels, free or connate at the base, filiform, often with 2 stigmatic branches; stigma(s) dry, papillose. Fruit submerged, usually irregularly dehiscent, often succulent or coriaceous; seeds several to numerous. 80-100 species in ca 15 genera, cosmopolitan.

1. Marine or estuarine plants. Flowers all submerged HALOPHILA
1. Freshwater plants. Flowers all floating or some floating and some submerged.

2. Mature leaves sessile, usually linear. Plants dioecious, the flowers all reaching the water surface and open-pollinated.
3. Male flowers reaching the water surface by elongation of the floral tube. Stamens 9..... ***EGERIA**
3. Male flowers released, free-floating. Stamens 2 or 3.
4. Leaves in whorls of 3-8. Female flowers reaching the surface by elongation of the peduncle..... **HYDRILLA**
4. Leaves arising in tufts along the stolons. Female flowers reaching the surface by elongation of the floral tube..... ***VALLISNERIA**
2. Mature leaves with a long petiole; blade ovate to elliptic. Flowers bisexual, some submerged and cleistogamous..... **OTTELLA**

***EGERIA** Planchon

Perennial herbs, submerged in fresh water, rooted at nodes bearing lateral branches, perhaps sometimes free-floating, dioecious. Stems simple or dichotomously branched. Leaves opposite or whorled, sessile, minutely toothed; axillary scales usually 2, ovate to circular, entire. Spathes axillary, sessile, tubular, 2-5-flowered in male inflorescence, 1 or rarely 2-flowered in female inflorescence; bracts 2, connate. Flowers sessile but appearing pedicellate because of the slender floral tube, which elongates sufficiently to expose the flower above the water, insect-pollinated. Outer perianth segments 3, green, herbaceous. Inner perianth segments 3, white, much larger than the outer perianth segments. Stamens 9; filament glandular-papillose. Staminodes 3 in female flowers. Nectaries 3. Ovary with a long filiform beak; placentas 3; ovules up to 9. Styles 3, opposite the inner perianth segments, free, 2-4-branched. Fruit an irregularly dehiscent capsule, ovoid, usually 3-6-seeded. 2 species, native to subtropical South America, 1 species naturalized in W.A. Reference: Cook, C.D.K. & Urmi-Konig, K. 1984. Aquat. Bot. 19: 73-96.

***E. densa** Planchon

Perennial herb, rooted in the substrate, many-branched. Leaves in crowded whorls of 3-6, very dark green, usually 10-40 x 2-5 mm, acute, minutely toothed. Spathes of male inflorescence 8-12 mm long, split down 1 side; spathes of female inflorescence 10-15 mm long, sometimes scarcely split. Floral tube 25-75 mm long. Outer perianth segments 3-4 mm long. Inner perianth segments usually 9-12 mm long in male flowers, shorter in female flowers. Stamens golden. Styles opposite the inner perianth segments, connate for the length of the floral tube; stigma or free part of the style ca 3 mm long, divided into 3(4) hairy apical lobes.

Reported only from Perth, where it has apparently been introduced into some lakes from aquarium stock. Native to Brazil, Argentina and Uruguay.

Flowers probably December-March.

HALOPHILA Thouars

Perennial herbs, marine or estuarine, monoecious or dioecious, rooted in the substrate. Rhizome creeping; nodes with 1-several simple roots, a leafy shoot and 2 scales, 1 scale enveloping the rhizome and 1 scale associated with the erect shoot. Stems often scarcely developed, with 1-20 or more pairs of leaves. Leaves entire or shortly toothed; axillary scales 1-3, linear to narrowly ovate. Inflorescence of 1 spathe subtending 1 flower or rarely 1 male and 1 female flower, sessile, submerged; spathe bracts 2, free, imbricate, keeled, membranous. Male flowers pedicellate, without a floral tube. Female flowers sessile or subsessile; floral tube cylindrical. Perianth segments 3, presumably of the outer whorl, the inner segments absent, imbricate in male flowers, very reduced in female flowers. Stamens 3, alternate to the perianth segments; anther dehiscent to the outside. Styles 3-5, simple. Fruit ovoid or globular, thin-walled, beaked. Seeds few to numerous. About 9 species, widely distributed in tropical to warm-temperate seas, 4 species occurring in W.A.

1. Monoecious. Leaves: petiole 3-angled; blade finely serrulate, glabrous or hairy..... **H. decipiens**
1. Dioecious. Leaves: petiole terete; blade entire, glabrous.
2. Leaves with a linear to narrowly ovate-elliptic blade, usually with 14-16 pairs of cross veins. Styles 6..... **H. australis**

2. Leaves usually with an almost elliptic blade and 10-12 pairs of cross veins. Styles 3..... **H. ovalis**

H. australis Doty & Stone

Perennial herb, dioecious, glabrous. Rhizome 1-2 mm in diameter, the internodes usually 20-60 mm long; roots 1 per node; scales 3-8 mm long. Erect vegetative stems with little or no developed axis and 1 pair of leaves. Leaves: petiole terete, usually distinctly longer than the blade; blade almost linear to narrowly ovate-elliptic, 25-70 x 6-15 mm, obtuse, entire; cross veins usually in 14-16 pairs, sometimes forked. Inflorescence sessile when male, borne on a lateral shoot 50-150 mm long when female, the lateral shoot often producing further flowering shoots, each 1-flowered; spathe bracts narrowly ovate, 4-10 mm long. Male flower with a pedicel up to 20 mm long at anthesis; perianth segments 0.5-0.7 mm long. Female flowers sessile; floral tube 2-5 mm long; perianth segments up to 1 mm long. Anthers ca 2 mm long. Styles 6, 6-20 mm long. Fruit ovoid, 7-13 mm long. Seeds 50-60 mm long. *H. ovalis* (R. Br.) J.D. Hook. subsp. *australis* (Doty & Stone) Hartog.

Occurs mainly in sheltered waters, from low tide mark to 23 m deep. Extends from Dongara southward then eastward along the W.A. coast. Also occurs in S.A., Vic., Tas., and N.S.W.

Flowers October-January.

H. decipiens Ostenf.

Perennial herb, monoecious. Rhizome ca 1 mm in diameter, the internodes 10-45 mm long; roots 1 per node; scales 3-5 mm long, glabrous or with scattered hairs outside. Erect vegetative stems with little or no developed axis and 1 pair of leaves. Leaves: petiole 3-angled, distinctly shorter than the blade; blade bright green, narrowly elliptic-obovate, usually 10-15 x 2.5-4 mm, obtuse, finely serrulate; cross veins usually in 5-7 pairs, simple. Inflorescence of 1 male and 1 female flower on an erect lateral shoot 3-10 mm long; spathe bracts ovate, 3-7 mm long, acuminate. Male flower with a pedicel 4-8 mm long at anthesis; perianth segments ovate, 1-1.5 mm long. Female flower sessile; floral tube 1-2 mm long; perianth segments minute. Anthers ca 1 mm long. Styles 3, ca 2.5 mm long. Fruit ellipsoid, 3-5 mm long. Seeds ca 30.

Occurs from Cockburn Sound northward, probably in sheltered waters. Also occurs in Vic., N.S.W., Qld and N.T. Extends from tropical parts of the eastern Indian Ocean to the Caribbean.

Flowers October-December.

H. ovalis (R. Br.) J.D. Hook.

Sea Wrack

Perennial herb, dioecious, glabrous. Rhizome 1-2 mm in diameter, the internodes 10-70 mm long; roots usually 1 per node; scales 2-5 mm long. Erect vegetative stems with little or no developed axis and 1 pair of leaves. Leaves: petiole terete, often longer than the blade; blade usually almost elliptic, usually 15-35 x 8-14 mm, broadly obtuse, entire; cross veins usually in 10-12 pairs, sometimes forked. Inflorescence sessile, 1-flowered; spathe bracts narrowly ovate, 5-10 mm long. Male flower with a pedicel up to 25 mm long at anthesis; perianth segments elliptic, 3-6 mm long. Female flower sessile; floral tube 3-8 mm long; perianth segments up to 1 mm long. Anthers ca 2 mm long. Styles 3, usually 10-25 mm long. Fruit globular or ovoid, 3-5 mm long excluding the persistent floral tube. Seeds 20-30.

Inhabits estuaries and sheltered off-shore areas in water up to 17 m deep. Extends from the Kimberley south to Cowaramup Bay. Also occurs in N.S.W., Qld, N.T. and possibly Vic. Extends from Africa to Hawaii, the northernmost location being Japan.

Flowers August-April.

HYDRILLA Rich.

Perennial herbs, submerged in fresh water, rooted in the substrate, dioecious or rarely monoecious, regenerating vegetatively by bulbil-like buds. Leaves mostly whorled, 3-8 or rarely more per whorl, sessile, glabrous; axillary scales usually 2, translucent, irregularly fringed. Inflorescence of 1-flowered axillary spathes, very shortly pedunculate or sessile; spathe bracts 2, connate, splitting or rupturing at apex as flower emerges. Male flowers shortly pedicellate, shed in bud, free-floating on the water surface at anthesis, without a floral tube. Female flowers reaching the surface by elongation of the floral tube. Outer perianth segments 3. Inner perianth segments 3, alternate to the outer segments. Stamens 3; filament short; anther explosively dehiscent. Staminodes 3 or absent in female flowers. Ovary with 3 placentas. Styles 3, simple. Fruit indehiscent. Seeds rarely more than 5. One species, native to Europe, Africa, Asia and Australia. Reference: Cook, C.D.K. & Luond, R. 1982. *Aquat. Bot.* 13: 485-504.

H. verticillata (L. f.) Royle

Water Thyme

Perennial herb. Stems with internodes mainly 5-40 mm long. Leaves usually in whorls of 4-6 but those at the base of a branch or on the stolon commonly opposite, green, often with small reddish brown dashes, almost linear, 6-25 x 1-3 mm, 1-veined, finely toothed. Male inflorescence with 1 or sometimes more spathes per leaf whorl; peduncles up to 1 mm long; spathes subglobular, 1.5-3 mm long, with 8-16 subulate appendages surrounding a small apical knob, 1-flowered. Female inflorescence sessile, cylindric, ca 5 mm long, 2-branched at the apex, usually 1-flowered. Floral tube of female flowers 15-100 mm long, slender. Perianth segments transparent or green-translucent; outer segments usually partly reddish, 1.2-3 mm long, much broader than the inner segments. Stamens ca 1 mm long. Fruit almost cylindric, ca 7 x 1.5 mm. Seeds 2-6.

Apparently native, occurring near Perth in stagnant or slow-flowing fresh water, to a depth of 3.5 m. Occurs in all Australian states except Tas. Also occurs in Asia, Africa and Europe.

Flowers probably April-May.

OTTELIA Pers.

Perennial or rarely annual herbs, of fresh water, without a stolon but sometimes with a creeping rhizome, rooted in the substrate, usually with an erect corm-like stem, commonly monoecious or dioecious. Leaves all basal, glabrous; blade often floating; axillary scales 2-10 per leaf, not fringed. Inflorescence of axillary spathes; spathes solitary in the axils, long-pedunculate, 1-many-flowered, with longitudinal ribs or wings, usually reaching the water surface; bracts 2 per spathe, connate at least at the base. Male flowers initially pedicellate; female or bisexual flowers sessile or subsessile, the bisexual flowers sometimes cleistogamous. Outer perianth segments 3, persistent in fruit. Inner perianth segments 3, white or yellow, sometimes with a reddish base, alternate to and larger than the outer segments. Stamens 3-15 or rarely more, usually in whorls of 3. Staminodes often present in male and female flowers. Ovary with 3-20 or more placentas; ovules numerous. Styles 3-20 or more, 2-branched. Fruit somewhat succulent, irregularly dehiscent or disintegrating, many-seeded. 21 species, mainly in the tropics and subtropics, 1 species occurring in W.A. Reference: Cook, C.D.K. Symoens, J.-J. & Urmi-Konig, K. 1984. *Aquat. Bot.* 18: 263-274.

O. ovalifolia (R. Br.) Rich.

Swamp Lily

Annual or perennial herb, emergent, hermaphrodite or perhaps polygamous. Juvenile leaves strap-like. Mature leaves winged at the base of the petiole; blade floating on the water surface, elliptic to ovate, usually 20-120 mm long, much shorter than the petiole, obtuse, 5-7-veined. Spathes of 2 kinds, some emergent and some submerged, 1-flowered; emergent spathes green or purplish, usually 30-40 mm long, the flower open-pollinated; submerged spathes with a shorter peduncle, remaining closed, the flowers cleistogamous and autogamous. Emergent flowers: outer perianth segments narrowly ovate, 15-35 mm long; inner segments cream-white with a dark reddish purple base, usually ca 30 mm long, broad, longitudinally creased; nectary glands 3, opposite the inner segments, yellow; stamens in 3 groups opposite the outer segments, 4 or less per group, with a slender yellow anther ca 10 mm long; ovary beaked, projecting from the spathe at anthesis; styles 6-9, a similar length to the anthers. Cleistogamous flowers with very reduced sepals and petals; anthers disintegrating to release pollen onto stigma; ovary not beaked.

Occurs in stagnant or running fresh water on the Coastal Plain, Darling Scarp and Range. Extends in near-coastal areas from the Perth Region to Israelite Bay and also occurs in the Kimberley. Occurs in all mainland Australian states. Probably also native to New Caledonia.

Flowers October-April.

***VALLISNERIA** L.

Perennial or possibly sometimes annual herbs, submerged in fresh water, with a stolon, rooted in the substrate below each erect stem or leaf tuft, dioecious. Leaves sessile, slightly sheathing at the base, commonly strap shaped, glabrous; axillary scales 2-10, not fringed. Spathe bracts 2, valvate in bud, separating in flower, recurved at the apex, not ribbed. Male flowers numerous per spathe, on an elongate axis, minute, shed in bud, free-floating on the water surface at anthesis. Female flowers 1-many per spathe, reaching the surface by elongation of the peduncle, the stigmas just penetrating the surface. Floral tube absent. Outer perianth segments 3; segments of male flowers unequal, 2 reflexed and forming buoyant floats and the other erect. Inner perianth segments minute, 1 in male flowers, 3 in female flowers.

Stamens 2, partly connate. Staminodes 1 in male flowers, 3 in female flowers. Ovary 1-celled; placentas, 3, often obscure. Styles 3, 2-branched almost to the base. Fruit withdrawn below the surface by a spiralling of the peduncle, enveloped at the base by the spathe, elongate, indehiscent, many-seeded. 3-5 species, cosmopolitan, especially in tropical and subtropical regions, concentrated in Australia, 2 species occurring in W.A. Reference: Lowden, R.M. 1982. *Aquat. Bot.* 13: 269-298.

***V. spiralis L.**

Ribbon Weed

Perennial herb. Leaves in tufts along a slender stolon, strap shaped, usually 50-300 x 2-25 mm, sometimes much larger or smaller, usually minutely toothed around the apex. Male inflorescence: spathes long-pedunculate, 10-20 mm long; flowers < 1 mm long. Female inflorescence: spathes with a long slender peduncle, thin, membranous; flowers 15-25 mm long, narrowly cylindrical. Outer perianth segments concave, 1-2 mm long or rarely 2-3 mm long in female flowers. Inner perianth segments minute, scarcely visible. Stamens 2 or 3. Styles contained in the concavity of an outer perianth segment, pinkish white, 2-branched almost to the base, broad, thick, succulent. *V. gigantea* Graebner

Naturalized in watercourses near Perth. Occurs naturally in northern W.A. Native to all Australian states and to parts of Asia, Africa and Europe.

Flowers November-May.

There are 2 varieties recognized. All Australian material is of var. *denseserrulata* Makino.

***FAMILY 116 ALISMATACEAE**

B. L. Rye

Perennial herbs, emergent aquatics or growing near wetlands, with a creeping rhizome, glabrous, often producing a milky sap. Leaves basal, petiolate, sheathing at the base; blade usually well developed, parallel-veined. Inflorescence usually terminal, many-branched, the pedicels or primary branches often in whorls of 3, each flower subtended by a bract. Flowers bisexual or unisexual, actinomorphic. Outer perianth segments 3, sepal-like, green, imbricate. Inner perianth segments 3, petal-like, alternate to the outer segments, imbricate, deciduous, usually white. Stamens 6-numerous or rarely 3; anther 2-celled, longitudinally dehiscent to the outside. Nectaries borne at the basal margins of the carpels or elsewhere on the receptacle. Carpels superior, usually free, 6-numerous, each with a style; ovules 1 or rarely several. Fruit of free nutlets or rarely of basally dehiscent follicles. About 75 species in ca 12 genera, cosmopolitan.

***ALISMA L.**

Perennial herbs, with a short rhizome, hermaphrodite. Leaves submerged, floating or aerial, petiolate. Inflorescence usually a compound panicle, with whorled branches. Stamens 6, in pairs opposite the inner perianth segments, coherent at the base and forming a nectary; filament narrow. Carpels 10-28 in a single whorl, free; ovule 1; style arising to the inside shortly below the apex of the ovary, slender. Fruiting carpels obovate to elliptic, laterally compressed, with a short lateral beak. 5 or more species, mainly in temperate parts of the northern hemisphere, 1 species naturalized in W.A.

***A. lanceolatum With.**

Stout perennial herb, erect, up to 1 m high when in flower. Stems hollow, up to 12 mm in diameter. Leaves aerial; petiole up to 200 mm long, ca 5 mm broad in the distal part, broader at the base; blade narrowly ovate, up to 200 x 60 mm, often tapering to the base. Inflorescence compound, open, spreading, usually over 0.3 m long, with widely spaced nodes, a central main stem surrounded by up to 7 smaller branches arising at each node, some branches and their subtending bract much larger than other branches and bracts of the same node. Pedicels long. Outer perianth segments ovate, ca 2 mm long. Inner perianth segments pink, probably ca 4.5 mm long. Anthers broad. Styles equal to or longer than the ovary, fairly erect, stigmatic on 1 side in the distal $\frac{1}{2}$ - $\frac{2}{3}$.

Recorded from Harvey on the Coastal Plain, probably growing in damp ground or shallow water. There are no other records for the south of the State but there is one doubtful record for the north. Native to Europe, north Africa and western Asia.

Flowers probably December-February.

This species has sometimes been misidentified as the related species, *A. plantago-aquatica* L.

FAMILY 117 JUNCAGINACEAE

B. L. Rye

Perennial or rarely annual herbs, associated with freshwater or saline marshes, sometimes aquatic, often with a rhizome. Leaves mainly or all basal, usually sheathing and linear, usually with a ligule. Inflorescence a spike or raceme, terminal; bracts absent. Flowers actinomorphic, small, bisexual or unisexual, wind-pollinated. Perianth segments often 6 in 2 whorls of 3, sometimes fewer, herbaceous. Stamens often 6, sometimes 8 or < 6; anther 2-celled, subsessile, elongate, longitudinally dehiscent to the outside. Ovary of 3-6 free or connate carpels, 1-6-celled; ovules 1 per cell or carpel. Style terminal, short or the stigma sessile; stigma dry, not papillose. Fruit separating into free carpels, with a persistent central axis, buoyant in water; carpels each a follicle, dehiscent to the inside. About 25 species in 5 genera, cosmopolitan, concentrated in Australia.

TRIGLOCHIN L.

Small, annual or perennial herbs, commonly known as Arrowgrasses, tending to occupy damp habitats, sometimes aquatic, tufted, hermaphrodite (in Australia) or dioecious. Inflorescence a simple raceme, sometimes spike-like. Flowers protogynous. Perianth segments usually 3-6, rarely 1, usually pink or red at least in the distal part. Stamens 1-6, usually in 2 superposed whorls, each stamen attached to the base of a perianth segment. Carpels up to 6, often with 3 fertile carpels alternating with 3 aborted carpels, usually connate. Fruit dry, the axis cylindric, with styles in a circle on the truncate or beaked apex. About 18 species, extending from Indonesia and nearby areas to New Zealand and also occurring in the Americas and Africa, concentrated in Australia, ca 12 species occurring in W.A. The genus is in need of revision.

1. Carpels all fertile, either 6 and connate or 3-6 and free. Robust perennial with a root tuber..... **T. procerata**
1. Carpels 3 fertile and 3 aborted, connate. Annual or, if perennial, then with stolons.
 2. Carpels free at the apex, the styles well separated..... **T. mucronata**
 2. Carpels connate to the truncate or conic apex of the fruit, the styles meeting at the base.
 3. Perennial herb, with stolons. Fruit broadly elliptic when pressed... **T. striata**
 3. Annual herbs, lacking stolons. Fruit not as above.
 4. Fruit with definite basal spurs 1-3.5 mm long.
 5. Non-terminal flowers with 6 perianth segments and stamens. Fruiting pedicel 3-6 mm long; fruit shortly conic at the apex..... **T. sp. A**
 5. Non-terminal flowers with 3 perianth segments and stamens. Fruiting pedicel up to 1 mm long; fruit truncate at the apex..... **T. calcitrapa**
 4. Fruit lacking spurs or the spurs tiny.
 6. Fruiting pedicel 1-11 mm long. Stamens usually fewer than the perianth segments.
 7. Fruit narrowly conic-ovoid, 2.5-6 mm long, truncate at the apex. Non-terminal flowers usually with 2 or 3 stamens..... **T. centrocarpa**
 7. Fruit ovoid or narrowly ovoid, 1.5-3 mm long, shortly conic at the apex. Non-terminal flowers with 1 stamen..... **T. trichophora**
 6. Fruiting pedicel 0.2-0.5 mm long. Stamens as many as the perianth segments.
 8. Non-terminal flowers with 3 stamens. Fruit 1-1.25 mm broad. **T. muelleri**
 8. Non-terminal flowers with 1 stamen. Fruit ca 0.3 mm broad. **T. minutissima**

T. calcitrapa Hook.

Spurred Arrowgrass

Annual herb, up to 135 mm high. Leaves 15-100 mm long. Raceme 1-20-flowered, up to 40 mm long in fruit. Perianth segments 3 or rarely 4 in non-terminal flowers, 3 or 6 in the terminal flower, ovate, 1-3 mm long, acute; segments in non-terminal flowers unequal, 1 abaxial and 2 lateral, the lateral segments more distal. Stamens 3 in non-terminal flowers, 3 or 6 in the terminal flower; anther 0.7-1.1 mm long. Functional carpels 3, alternating with 3 aborted carpels. Fruiting pedicel 0.1-1 mm long; fruit almost cylindric or narrowly conic, 4-10 x 0.7-1.2 mm not including the spurs, truncate at the apex; basal spurs 6, pointing downward or widely spreading, usually 2.5-3.5 mm long.

Occurs in winter-wet depressions on the eastern side of the Coastal Plain. Extends from the Hutt River to Ravensthorpe and well inland into the arid zone.

Flowers August-October.

Outside the Perth Region the basal spurs are often curled upward. Inland specimens sometimes have fruits only ca 3 mm long, with spurs ca 1 mm long. *T. calcitrapa* is readily distinguished from *T. sp. A* in the Perth Region. However, a specimen from Dorre Island appears to be intermediate and the 2 taxa are reported to intergrade in S.A. (Black 1978). A variant from the Busselton area, which resembles *T. calcitrapa* but has long fruiting pedicels, is also difficult to place.

T. centrocarpa Hook.

Annual herb, up to 150 mm high. Leaves usually 15-80 mm long. Raceme usually 5-25-flowered, rarely with 60 or more flowers, 10-70 mm long in fruit. Perianth segments 3-6, ovate, 0.8-1.5 mm long, acute. Stamens often 1 or 2 in the lower flowers and inserted on the abaxial and adjacent perianth segments, 2 or 3 in more distal flowers, 3 or more in the terminal flower; anther 0.25-0.5 mm long, sometimes very broad. Functional carpels 3, alternating with 3 aborted carpels, becoming black in fruit. Fruiting pedicel 1-11 mm long; fruit narrowly conic-ovoid, 2.5-6 x 0.5-1 mm, lacking basal spurs or with small lateral spurs at the base, truncate at the apex.

Occurs on the eastern side of the Coastal Plain and on the Darling Range, in winter-wet depressions, along watercourses and in damp habitats associated with rocks. Occurs in all Australian states.

Flowers July-October.

The distinction between this species and *T. trichophora* is not clear, although the 2 species are readily distinguished in the Perth Region and occupy distinct habitats. A variant occurring north of the Perth Region and also in arid or semi-arid areas has a conic apex to the fruit, as in *T. trichophylla*, but otherwise resembles *T. centrocarpa*.

T. minutissima F. Muell.

Annual herb, up to 140 mm high but usually ca 50 mm high. Leaves 15-70 mm long. Raceme spike-like, 5-36-flowered, 12-70 mm long in fruit. Perianth segments 1 and abaxial in non-terminal flowers, 3 in 1 whorl in the terminal flower, ovate, ca 1.25 mm long, acute. Stamens 1 in non-terminal flowers, 3 in the terminal flower; anther 0.6-0.7 mm long. Functional carpels 3, alternating with 3 aborted carpels, black at maturity. Fruiting pedicel 0.3-0.5 mm long; fruit fairly uniformly coloured, almost cylindrical but slightly broader at the base, 2-2.25 x ca 0.3 mm, lacking basal spurs, truncate at the apex.

Occurs in sandy clay in winter-wet depressions and along watercourses on the Coastal Plain. Extends around the coast from Eneabba to the Recherche Archipelago, and inland to Wongan Hills. Also occurs in Vic., N.S.W. and possibly S.A.

Flowers September-October.

Specimens from the South Stirlings area to Cape Arid and from Wongan Hills have fruits ca 0.4 mm broad, usually with pale-coloured aborted carpels strongly contrasting with black functional carpels. They also tend to have shorter leaves than specimens from the Perth Region. This variant should probably be recognized as a distinct subspecies. To the north and inland of the Perth Region there is a long-fruited variant, which appears to be a new unnamed species but is certainly closely related to *T. minutissima*.

T. mucronata R. Br.

Prickly Arrowgrass

Annual herb, up to 220 mm high. Leaves 40-110 mm long, usually ca 1 mm broad. Raceme spike-like, usually 3-20-flowered, up to 90 mm long in fruit. Perianth segments 6 in 2 whorls or reduced, often to 1 whorl, ovate; lower segments 0.8-1.7 mm long, all or some bearing a stamen; upper segments smaller, rarely bearing a stamen. Stamens up to 6, usually 3 or less; anther 0.5-1 mm long. Functional carpels 3, alternating with 3 aborted carpels. Fruiting pedicel up to 1 mm long; fruit shortly obconic-cylindrical, 2-5 x 2-3 mm not including the styles or spurs, barely to shortly spurred at the base, the summit of each carpel with a free style; functional styles widely spreading or reflexed, 0.5-2.5 mm long, the points of aborted carpels more erect.

Occurs on winter-wet depressions and along watercourses, often in saline soils, on the Coastal Plain. Extends from Dirk Hartog Island to south of Balladonia. Also occurs in S.A. and Vic.

Flowers July-November, especially September-October.

T. muelleri Buchenau

Annual herb, up to 250 mm high. Leaves 40-140 mm long. Raceme spike-like, with 12-35 or more flowers, 40-150 mm long in fruit. Perianth segments 3 in non-terminal flowers, with 2 lateral and a lower abaxial segment, 6 in 2 whorls in the terminal flower, ovate, 0.8-2.5 mm long. Stamens 3 in non-terminal flowers, 6 in the terminal flower; anther 1-1.25 mm long. Functional carpels 3, alternating with 3 aborted carpels. Fruiting pedicel 0.2-0.5 mm long; fruit rounded oblong in outline, 2-3 x 1-1.25 mm, lacking basal spurs, truncate at the apex.

Occurs in winter-wet depressions on the eastern side of the Coastal Plain near Perth. Also recorded in the Busselton area and in S.A.

Flowers September-November.

T. procera R. Br.

Perennial herb, up to 2 m high, with a thick rhizome, the roots terminating in a tuber. Leaves emergent from still water, floating in running water, probably up to 2 m long, 2-20 mm broad. Raceme with 15-numerous flowers, up to 300 mm long in fruit. Perianth segments 6 in 2 whorls, almost circular, 2-3 mm long. Stamens 6; anther 1-2 mm long. Fruiting pedicel 1-4 mm long; fruit of 6 connate carpels or of 3-6 free carpels, 5-8 mm long not including the styles, subglobular to ellipsoid if the carpels are connate, lacking basal spurs; carpels 2-2.5 mm broad, much incurved, somewhat compressed, with a curved ridge along each lateral surface. *Cynogeton procerum* (R. Br.) Buchenau

Occurs in fresh water, usually less than 0.8 m deep, in watercourses and winter-wet depressions on the eastern side of the Coastal Plain. Extends from Eneabba to the Recherche Archipelago, a distinct variant or related species also occurring in the Kimberley. Occurs in all Australian states. Also occurs in Indonesia and nearby areas.

Flowers mainly June-November.

A very variable species in need of further study, with 2 very distinct varieties occurring in the Perth Region. Var. *procera* has 6 connate carpels, stamens ca 1 mm long, inflorescence up to 150 mm long and leaves 2-7 mm broad. Var. *eleutherocarpa* Benth. has 3-6 free carpels, stamens 1.5-2 mm long, inflorescences up to 300 mm long and leaves usually 8-20 mm broad. These varieties appear to show differences as great as those used to separate some of the annual species in the genus. Var. *dubia* (R. Br.) Benth., which occurs in the Kimberley, is sometimes regarded as a distinct species, *T. dubia* R. Br.

T. striata Ruiz Lopez & Pavon

Streaked Arrowgrass

Perennial herb, up to 0.5 m high, with stolons. Leaves usually 75-450 x 1-3 mm, sometimes exceeding the fruiting stems. Raceme with 15 to very numerous flowers, usually 40-200 mm long in fruit. Perianth segments 6 in 2 whorls, broadly ovate, 1-1.5 mm long, usually obtuse. Stamens 6 but not always all maturing; anther 0.7-1 mm long. Functional carpels 3, alternating with 3 aborted carpels. Fruiting pedicel 1-2 mm long; fruit broadly elliptic when pressed, 2-3 x 1.7-2.5 mm, lacking basal spurs, truncate at the apex. **Fig. 265**

Occurs on the Coastal Plain in winter-wet depressions, watercourses and in other damp habitats. Extends from Lancelin to east of Esperance. Recorded in all Australian states except N.T. Also occurs in New Zealand, the Americas and South Africa.

Flowers probably all year round, especially October-March.

T. trichophora Nees ex Endl.

Annual herb, up to 175 mm high. Leaves 25-100 mm long. Raceme usually 5-35-flowered, 13-50 mm long in fruit. Perianth segments of non-terminal flowers usually 5, sometimes 3 or 4, rarely 6, acute; abaxial segment ovate, 0.7-1 mm long, larger than the other segments. Stamens 1 and abaxial in non-terminal flowers, 3 in the terminal flower; anther 0.2-0.3 mm long. Functional carpels 3, alternating with 3 aborted carpels. Fruiting pedicel 1-8 mm long, usually 4-5 mm long; fruit ovoid or narrowly ovoid, 1.5-3 x 0.6-0.8 mm, lacking basal spurs or with small lateral spurs, with a shortly conic apex ca 0.25 mm long.

Occurs in limestone areas along the coast. Extends from Dirk Hartog Island to Hamelin Bay. Also occurs in S.A.

Flowers June-October.

See note under *T. centrocarpa*.

T. sp. A

Spurred Arrowgrass

Annual herb, up to 200 mm high. Leaves 15-90 mm long. Raceme 1-25-flowered, up to 70 mm long in fruit. Perianth segments 6 in 2 whorls, ovate, 1-1.5 mm long, acute. Stamens 6; anther 0.3-0.4 mm long. Functional carpels 3, alternating with 3 aborted carpels. Fruiting pedicel 3-6 mm long; fruit bottle shaped, 4-7 x 1-2.5 mm not including the spurs, with a conic apex 0.3-0.5 mm long; basal spurs 6, curled upward at least at the apex, usually 1.5-2.5 mm long, usually with 2 smaller descending lobes located between the pair of spurs on each carpel. *T. calcitrapa* Hook. var. *isingiana* J. Black; *T. calcitrapa* Hook. var. *pedunculata* Buchenau

Occurs in limestone areas along the coast. Extends from north of Carnarvon to Fitzgerald River National Park and well inland into arid areas of the State. Also occurs in S.A. and N.T.

Flowers July-October.

See note under *T. calcitrapa*.

FAMILY 118 NAJADACEAE**B. L. Rye**

Annual or perennial herbs, submerged, monoecious or dioecious. Leaves somewhat expanded and sheathing at the base, often with 2 small axillary scales, not ligulate. Male flowers almost always subtended by an outer involucre of free or connate scales, always with an inner involucre, which is sometimes considered to be the perianth; inner involucre flask shaped, thin, membranous, with a narrow, somewhat 2-lobed mouth. Female flowers with 1 or no involucres; involucre (when present) equivalent to the inner involucre of male flowers, inconspicuous, membranous. Stamen 1. Ovary of 1 carpel, superior, 1-celled; ovule 1, basal, erect. Stigmas 2-4, elongate. Fruit a nut. 1 genus, almost cosmopolitan. The family name has sometimes been spelt Naiadaceae.

NAJAS L.

Annual or perennial herbs, submerged in fresh or brackish water, rooted in the substrate. Stems much-branched. Leaves usually opposite or appearing whorled or clustered, linear or subulate, toothed or entire, 1-veined. Flowers solitary or rarely several in the axils, very small and inconspicuous, hydrophilous. Anther almost sessile, usually 2-celled, irregularly dehiscent. Fruit with a very thin pericarp closely surrounding the seed. About 35 species, 3 occurring in W.A. The generic name has sometimes been spelt *Naias*.

N. marina L.

Perennial or possibly annual herb, dioecious, the young stems often with coarse spiny teeth. Leaves usually appearing whorled or clustered, linear, usually 20-80 x ca 3 mm, with coarse spiny teeth on the margins, the adaxial surface often with 1 to several spiny teeth. Flowers solitary in the axils. Anther 2-celled, ca 3.5 mm long. Stigmas 2-4, usually 3. Seeds usually 4-4.5 x 2-2.5 mm.

Occurs in fresh water lakes and streams on the Coastal Plain. Extends in near-coastal areas from Roebourne to Northcliffe. Occurs in all mainland Australian states.

Flowers recorded February-March.

FAMILY 119 POTAMOGETONACEAE**B. L. Rye**

Perennial herbs, aquatic, with a creeping rhizome, rooted in the substrate, usually hermaphrodite, glabrous. Stems erect. Leaves usually alternate and distichous; sheath well developed, open; blade submerged or floating, attached near the summit or lower on the sheath or attached directly to the node so that the sheath is axillary, usually ribbon-like; axillary scales 2-many. Inflorescence a spike or 1-flowered, pedunculate, emergent. Flowers actinomorphic, small. Perianth segments (when present) 4, free, valvate, clawed, rounded. Stamens 2 or 4; anther sessile or subsessile, 2-celled, longitudinally dehiscent to the outside. Ovary of 2-8 or rarely more free carpels, superior; ovules 1 per carpel. Fruit

of 1-4 or rarely more drupelets or nutlets. Over 100 species in 3 or 4 genera, cosmopolitan. As recognized here this family includes Ruppiaceae, which is often regarded as a distinct family, but excludes several other families, such as Zosteraceae.

1. Perianth segments 4. Stamens 4..... POTAMOGETON
 1. Perianth absent. Stamens 2..... RUPPIA

POTAMOGETON L.

Perennial herbs, in fresh or sometimes brackish to saline water, with a slender rhizome. Leaves usually alternate at most nodes, often opposite at the base of each peduncle, the lower leaves submerged, the upper leaves floating or submerged; sheath axillary, free or sometimes adnate to the petiole or base of the blade, open, membranous, often decayed on older stems; blade parallel-veined or 1-veined. Spike simple, slightly emergent, cylindric, dense or rarely interrupted, somewhat succulent. Flowers protogynous, wind-pollinated. Perianth segments 4, shortly clawed, brownish, thickened. Stamens 4; anther inserted on the claw of a perianth segment. Ovary of 4 carpels; ovules usually attached toward the base. Style short or the stigma sessile. Fruit consisting of up to 4 beaked nutlets or drupelets, sessile, usually buoyant in water; nutlets (in the Perth Region) laterally compressed, almost circular or semi-circular. About 100 species, cosmopolitan, 5 species occurring in W.A.

1. Leaves all submerged, sessile, 0.5-9 mm broad.
 2. Leaves 0.5-2.5 mm broad; axillary sheath adnate to the blade for 10-15 mm..... **P. pectinatus**
 2. Leaves 3-9 mm broad; axillary sheath free.
 3. Leaves linear; margin entire, flat..... **P. ochreatus**
 3. Leaves narrowly obovate to narrowly oblong; margin minutely toothed, somewhat undulate to strongly crisped..... ***P. crispus**
 1. Upper leaves emergent and floating, petiolate, 12-25 mm broad..... **P. drummondii**

***P. crispus** L.

Curly Pondweed

Perennial herb; rhizome long; stems trailing, probably up to 1 m long, compressed. Leaves all submerged; axillary sheath free, 2-6 mm long; blade sessile, green, narrowly obovate to narrowly oblong, 30-45 x 5-9 mm, obtuse, usually with 3 prominent longitudinal veins, minutely toothed and usually undulate on the margin. Inflorescence with up to 10 flowers. Fruiting spike usually 10-15 mm long; peduncle 15-70 mm long. Nutlets olive-green to brown, 5-7 mm long; beak conspicuous, somewhat curved, up to 3 mm long.

Naturalized in the Perth Region, recorded only from Lake Monger on the Coastal Plain. Recorded from Narrogin and the north of the state. Occurs in all Australian states and is usually regarded as native. Native in the northern hemisphere.

Flowers not recorded in the Perth Region, recorded September-December in other areas of southern Australia.

P. drummondii Benth.

Perennial herb, with floating upper leaves; stems probably up to 2 m long. Submerged leaves sessile or shortly petiolate; axillary sheath free; blade almost linear to ovate or elliptic, 40-120 x 5-20 mm, much thinner than the floating leaves. Floating leaves petiolate; petiole 35-80 mm long; blade elliptic to broadly elliptic, 20-40 x 12-25 mm, 10-15-veined, opaque. Fruiting spike 10-20 x ca 5 mm; peduncle usually 30-65 x 1-1.5 mm. Nutlets 2-2.5 mm long, compressed, distinctly beaked.

Occurs in still and running fresh water on the Darling Range. Extends from Jurien Bay to Cape Arid National Park.

Flowers October-February.

P. ochreatus Raoul

Blunt Pondweed

Perennial herb, rhizomatous; stems branched, up to 4.5 m long. Leaves all submerged; axillary sheath free from the leaves, up to 15 mm long, wearing into long fibres; blade sessile, green to brownish,

translucent, linear, usually 50-100 x 3-6 mm, flat, entire, few-veined. Fruiting spike 10-15 x 7-9 mm; peduncle usually 40-65 x 1-1.5 mm. Nutlets 3-4 mm long, compressed, distinctly beaked.

Occurs in running or stagnant fresh water on the Coastal Plain and Darling Range. Extends in near-coastal areas from Jurien Bay to Albany. Recorded in all states except N.T. Also occurs in New Zealand.

Flowers mainly October-January.

P. pectinatus L.

Fennel Pondweed

Perennial herb, strongly rhizomatous; stems probably up to 3 m long, usually much-branched, slender. Leaves all submerged; axillary sheath adnate to the lower part of the leaf blade, the adnate portion usually 10-15 mm long, the free portion a point usually 3-7 mm long; blade sessile, green or brownish, narrowly linear, usually 40-90 x 0.5-1 mm, rarely up to 2.5 mm broad, few-veined. Fruiting spike usually 12-55 x 5-7 mm, interrupted, with 2-6 unequally spaced groups, each group usually of 2 or 3 fruits; peduncle slender, 20-120 mm or more long. Nutlets brownish, ca 3 mm long, compressed, with a very short beak.

Inhabits still to fast-flowing fresh to brackish or rarely saline water, on the Coastal Plain. Extends from north of Port Hedland to Augusta. Recorded in all states except N.T. Occurs in all continents of the world.

Flowers October-January.

RUPPIA L.

Annual or perennial herbs, submerged in saline or brackish water or rarely in sea water, rooted at the nodes, hermaphrodite. Leaves attached to the stems or rhizomes, alternate except when subtending an inflorescence; sheath broad at the base, tapering to a slender 2-lobed summit; blade filiform, 1-veined; axillary scales 2. Inflorescence terminal, 2 or rarely 1-flowered. Flowers usually protandrous. Perianth absent. Stamens 2, with small appendages, which are sometimes regarded as perianth segments. Carpels 2-16, commonly 4, shortly stipitate; ovule pendulous. Stigma sessile, peltate. Fruiting carpels often prominently stipitate. 6 species, cosmopolitan, 4 species occurring in W.A. This genus has often been placed in its own family, Ruppiales. Reference: Jacobs, S.W.L. & Brock, M.A. 1982. Aquatic Botany 14: 325-337.

1. Leaf apex 2-lobed or truncate. Fruiting carpels usually 4, 3-5 mm long; beak ca 1.5 mm long..... **R. megacarpa**
1. Leaf apex obtuse, often with several irregular teeth. Fruiting carpels usually 5 or more, rarely 1-4, usually 1.5-2.5 mm long; beak < 0.5 mm long.
2. Fruiting carpels with a beak ca 0.3 mm long; stipe much longer than the fruit..... **R. polycarpa**
2. Fruiting carpels without a beak but initially with a lateral crest, stipe absent or shorter than the fruit..... **R. tuberosa**

R. megacarpa Mason

Robust perennial herb, up to 1.5 m high, much-branched. Leaves bright to olive green; sheath 10-40 mm long; blade 45-220 x 0.2-0.7 mm; apex 2-lobed to truncate, often minutely toothed. Peduncle up to 300 mm long, becoming spiralled in fruit. Carpels usually 4, rarely 5 or 6 in the upper flowers. Fruitlets with a stout tapering stipe, olive green, sometimes partially reddish, pouched, 3-5 mm long; beak ca 1.5 mm long.

Inhabits saline water in estuaries and lakes, usually close to the coast. Extends from the Murchison River to Cape Arid National Park, mainly on the coast but with a few occurrences inland. Also occurs in S.A., Vic., N.S.W. and New Zealand.

Flowers August-December.

R. polycarpa Mason

Annual or delicate perennial herb, up to 0.4 m broad, with crowded short stems. Leaves dark green when fresh; sheath up to 50 mm long; blade 50-300 x up to 0.4 mm; apex obtuse, often minutely toothed. Peduncle up to 50 mm long, becoming spiralled in fruit. Carpels (2-4)5-16, usually 8. Fruitlets in an umbel-like arrangement, with a long slender stipe much longer than the fruitlet, brownish, 1.7-2.7 mm long, asymmetric; beak 0.2-0.3 mm long.

Occurs in fresh to moderately saline water in lakes and rivers. Widespread in the south west, extending north to the Pilbara and probably well inland. Also occurs in S.A., Vic., N.S.W. and New Zealand.

Flowers June-October.

This species and *R. tuberosa* are very similar in habit but the latter is confined to very saline habitats whereas *R. polycarpa* usually occurs in moderately saline to fresh water.

***R. tuberosa* J.L. Davis & Toml.**

Annual or delicate perennial herb, with a conspicuous swollen tuber up to 1.5 mm broad. Leaves: sheath usually 6-12 mm long; blade up to 80 mm long, < 0.5 mm broad; apex irregularly rounded, with several teeth. Peduncle long, exceeding the leaves, sometimes spiralled. Carpels 5-12, with a prominent lateral crest. Fruitlets sessile or longer than the stipe, flask shaped, lacking a pronounced apical beak but with a transversely ridged lateral crest when young, probably between 1.5 and 2.5 mm long.

In the Perth Region, recorded only from Rottnest Island, growing in very saline lakes. Extends from Shark Bay to Lake Grace. Also occurs in S.A. and Vic.

Flowers August-September.

See note under *R. polycarpa*.

FAMILY 120 ZOSTERACEAE

B. L. Rye

Perennial herbs, marine, submerged, with a creeping rhizome, monoecious or dioecious, glabrous. Leaves alternate, usually distichous; sheath compressed, ligulate, sometimes 2-lobed at the summit; blade linear or filiform, 1-veined or with 3-11 parallel veins; axillary scales usually 2. Inflorescence of 1 or more spikes, with a succulent axis enclosed in a spathe, compressed, 1-sided, the flowers in 2 rows; peduncle often partly adnate to the subtending axis; spathe with a leaf-like bract and inner sheath; axis often with a row of well developed marginal lobes covering some or all of the flowers; floral bracts absent. Flowers small, hydrophilous. Perianth absent. Stamen 1; anther sessile, 2-celled, longitudinally dehiscent to the outside; pollen filamentous. Style divided almost to the base into 2 stigmatic branches. Ovary superior, 1-celled; ovule 1, pendulous. Fruit either a drupe or firm and irregularly dehiscent, small. 18 or 19 species in 3 genera, cosmopolitan.

- 1. Rhizome with 2 vascular bundles in the cortex; main rhizome fairly straight, with short lateral branches. Stems usually < 20 mm long..... **ZOSTERA**
- 1. Rhizome with 4-12 vascular bundles in the cortex; rhizome dicotomous or producing fairly substantial branches. Stems up to 300 mm long..... **HETEROZOSTERA**

HETEROZOSTERA (Setch.) Hartog

Perennial herbs, monoecious; rhizome dichotomous or producing fairly substantial branches, with 4-12 vascular bundles in the outer cortex, 2 simple roots arising at each node. Stems arising singly at each or some of the rhizome nodes, erect, simple, with up to 15 internodes. Leaves usually 7-10 per stem, clustered toward the apex; sheath open, with overlapping membranous flaps, usually persisting longer than the blade; blade linear, 3-veined, entire. Spathe with marginal lobes, the male and female flowers alternating in each row. Style base broad. Fruit with a scarious pericarp, beaked. 1 species, occurring in southern Australia and in Chile.

***H. tasmanica* (Martens ex Asch.) Hartog**

Eelgrass

Perennial herb; rhizome 0.75-2 mm in diameter, with 2 roots arising at each node; internodes 5-45 mm long. Stems arising at irregular intervals, up to 300 mm but usually < 100 mm long; internodes up to 15, 7-35 mm long. Leaves up to 10 in a cluster terminating each stem, completely shed in autumn; sheath 10-40 mm long, the marginal flaps narrowly overlapping, ca 1 mm broad; ligule ca 0.5 mm long; blade 50-250 x 1-2.5 mm, usually deeply notched at the apex. Spikes with 3-6 male flowers and 3-6 female flowers. Style ca 7 mm long. Fruit 3-4 x 2 mm.

Inhabits shallow sheltered waters, both off-shore and in estuaries, to depths of 15 m. Extends from Dongara to S.A., Vic., Tas. and N.S.W. Also occurs in Chile.

Flowers August-October; fruits mainly November-January.

This species is superficially very similar to *Zostera mucronata*. The number of vascular bundles in the cortex is perhaps the most reliable distinguishing character.

ZOSTERA L.

Perennial herbs, monoecious; rhizome fairly straight, giving rise to short lateral branches, with 2 vascular bundles in the cortex, 1 or more simple roots and a sheath or leaf-bract at each node. Stems arising singly and laterally at each rhizome node, subtended by a scale, short. Leaves clustered on each stem; sheath persisting longer than the blade. Spathe usually with marginal lobes, the male and female flowers alternating in each row. Style base broad. Fruit with a scarious pericarp. At least 12 species, mainly in temperate and subtropical areas of the world, 1 species occurring in W.A.

Z. mucronata Hartog

Perennial herb; rhizome 0.5-1.5 mm in diameter, with 2 or 3 roots arising at each node; internodes 4-40 mm long. Scales ca 20 x 2 mm, membranous, lacking a blade. Stems usually < 20 mm long. Leaves 2-5 per stem, 3-veined; sheath 13-77 mm long, not broader than the blade, the marginal flaps overlapping in the proximal part; ligule 0.1-0.2 mm long; blade 20-300 x 0.75-1.75 mm, not narrowed at the base, 3-toothed at the apex. Spikes with 4-6 male flowers and 4-6 female flowers. Style ca 2 mm long. Fruit ca 2 mm long.

Occurs in sandy or muddy intertidal zones in estuaries, from the mouth of the Swan River southward. Extends around the coast to the W.A. border. Also occurs in S.A.

Flowering period not known.

The species has sometimes been misidentified as *Z. muelleri* Irmisch ex Asch., which occurs in S.A., Vic. and Tas. It can also be confused with *Heterozostera tasmanica*. See note under the latter.

FAMILY 121 POSIDONIACEAE

B. L. Rye

Perennial herbs, marine, hermaphrodite; rhizome creeping, laterally compressed, a sheath-like leaf base or scale arising at each node, 1 or more roots arising from all or some nodes. Leaves alternate, distichous on the rhizome; sheath open, ligulate, the thin lateral margins referred to as flaps; blade linear, with parallel veins. Inflorescence of 1 or more spikes, terminal, long-pedunculate; spikes subtended by 2 or 4 bracts. Perianth absent. Stamens 3; anther sessile, 2-celled; pollen filiform. Gynoecium of a single carpel, 1-celled; ovule 1, pendulous. Fruit with a succulent pericarp. 1 genus, on southern Australian coasts and in the Mediterranean Region. The family has sometimes been included in Zosteraceae and both families have sometimes been included in Potamogetonaceae.

POSIDONIA Koenig

Perennial herbs, wholly submerged or sometimes (not in W.A.) exposed at low tide, glabrous. Leaves with numerous dark tannin dots and stripes; sheath initially 2-lobed at the apex, persistent after the blade has been shed but often becoming worn down into fibres. Lowest bract as long as or exceeding the inflorescence until the blade is shed. Anther cells well separated on a broad connective, located toward the base on the outer surface, longitudinally dehiscent. Stigma terminal, sessile, disc shaped, irregularly lobed, often persistent in fruit. Fruit small, buoyant in water. 9 species, of which 1 is widespread on Mediterranean coasts and 8 occur on southern Australian coasts, the latter all occurring in W.A. References: Cambridge, M.L. & Kuo, J. 1979. Aquatic Botany 6: 307-328; Kuo, J. & Cambridge, M.L. 1984. Aquatic Botany 20: 267-295.

1. Spikes 2-7 per peduncle. Leaves membranous, 7-21-veined; sheath flaps overlapping for $\frac{1}{3}$ - $\frac{2}{3}$ of their length; ligule and apical lobes fairly prominent.

2. Fruit narrowly ovoid. Intact leaves 1 or 2 per shoot; sheath brown, persistent; epidermal cells with sinuate walls in surface view..... **P. sinuosa**
2. Fruit somewhat compressed pyriform or falcate. Intact leaves 2 or 3 per shoot; sheath disintegrating into pale fibres with age; epidermal cells with smooth walls.
3. Leaves narrow, 7-11-veined; epidermal cells elongate. Fruit pyriform..... **P. angustifolia**
3. Leaves rather broad, 14-21-veined; epidermal cells as broad as long. Fruit falcate..... **P. australis**
1. Spikes 6-14 per peduncle. Leaves coriaceous, 5-9-veined; sheath flaps overlapping for $\frac{3}{4}$ to all of their length; ligule and apical lobes not clearly differentiated.
4. Intact leaves 1 or 2 per shoot; epidermal cells of the blade rough-walled in surface view..... **P. robertsoniae**
4. Intact leaves 2 or 3 per shoot; epidermal cells of the blade smooth-walled in surface view.
5. Leaf blade 1-2 mm broad when fresh; flaps on the leaf sheath overlapping completely or nearly so; epidermal cells 1.5-2.5 times as long as broad in surface view..... **P. denhartogii**
5. Leaf blade 2.5-7 mm broad when fresh; flaps on the leaf sheath overlapping for up to $\frac{3}{4}$ of their length; epidermal cells usually 3-5 times as long as broad in surface view..... **P. coriacea**

P. angustifolia M.L. Cambridge & J. Kuo

Perennial herb; rhizome 4-6 mm broad. Leaves 2 or 3 intact per shoot; sheath 50-120 x 4-6 mm, the flaps overlapping for $\frac{2}{3}$ of their length, disintegrating to a few pale-coloured fibres; ligule up to 1 mm long; blade up to 0.75 m x 3-6 mm, flat, membranous, 7-11-veined; epidermal cells (in surface view) 3-6 times as long as broad, smooth-walled. Bracts linear. Peduncle 100-180 mm long, with 2-4 spikes. Spikes hidden beneath the leaf canopy, elongating after anthesis, 10-50 mm long. Stamens with an acuminate connective. Stigma not toothed, with 2 or rarely 3 spurs. Fruit asymmetrically pyriform, ca 25 x 10-12 mm, slightly laterally compressed.

Occurs both in sheltered shallow areas and in open waters up to 35 m deep, forming continuous cover in mature meadows. Extends around the west coast from Carnarvon southward and along the south coast. Also occurs in S.A.

Flowers mainly August-September.

P. australis J.D. Hook.

Fibreball Weed

Perennial herb; rhizome 5-8 mm broad. Leaves 2 or 3 intact per shoot; sheath 60-190 x 9-15 mm, the flaps overlapping only in the lower $\frac{1}{3}$, disintegrating into masses of pale-coloured fibres with age; ligule 0.5-1 mm long; blade up to 0.6 m x (6-)10-15(-20) mm, flat, membranous, 14-21-veined; epidermal cells (in surface view) 0.5-1 times as long as broad, smooth-walled. Bracts expanded toward the apex. Peduncle 0.15-0.45 m long, with 2-7 spikes. Spikes projecting above the leaf canopy, 30-75 mm long. Stamens obtuse and with 3-5 small irregular teeth at the apex of the connective. Stigma with 3 irregular processes in a horseshoe shape. Fruit falcate in outline, up to 30 mm long, laterally compressed.

Occurs in sheltered embayments in water up to 15 m deep, forming continuous cover in mature meadows, sometimes growing with *P. sinuosa*. Extends along the west coast from Carnarvon southward and along the south coast. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers mainly August-September.

P. coriacea M.L. Cambridge & J. Kuo

Perennial herb; rhizome 1-4 mm broad. Leaves 2 or 3 intact per shoot; sheath 80-200 x 2-8 mm, the flaps slightly overlapping for ca $\frac{3}{4}$ of their length; ligule ca 1 mm long; blade up to 1.2 m x 2.5-7 mm, biconvex near the base, flat toward the apex, coriaceous, 7-11-veined; epidermal cells usually 3-5 times as long as broad, smooth-walled. Peduncle 0.25-0.4 m long, with 3 or 4 spikes. Spikes 30-40 mm long. Stigma 2-crested, papillose. Fruit broadly elliptic, about twice as long as broad, laterally compressed.

Occurs in mobile sand or in sand pockets in limestone reefs, in water 1-30 m deep, with a good swell. Extends along the west coast from Shark Bay southward and along the south coast but has not been found between Geographe Bay and Eucla. Also occurs in S.A.

Flowers mainly August-September.

See note under *P. robertsoniae*.

***P. denhartogii* J. Kuo & M.L. Cambridge**

Perennial herb; rhizome 2-3 mm broad. Leaves 2 or 3 intact per sheath; sheath 80-150 x 2-2.5 mm, the broad flaps overlapping for their full length, breaking down into strips and then bundles of fine entangled fibres; ligule 0.5-1 mm long; blade up to 1 m x 1-2 mm, convex or biconvex in the lower part, flat above, coriaceous, 5-7-veined; epidermal cells (in surface view) 1.5-2.5 times as long as broad, smooth-walled. Bracts linear. Peduncle 0.3-0.4 m long, with 3 or 4 spikes. Spike length unknown. Stigma papillose. Fruit falcate, usually 16-36 x 5-12 mm, convex on the upper surface.

Occurs from Perth southward, on white sand, in water up to 7 m deep. Extends along the south coast. Also occurs in S.A.

Flowers mainly August-September.

See note under *P. robertsoniae*.

***P. robertsoniae* J. Kuo & M.L. Cambridge**

Perennial herb; rhizome 2-3 mm broad. Leaves 1 or 2 intact per shoot; sheath 90-140 x 2.5-4 mm, the flaps overlapping for almost their entire length; blade up to 1.5 m x 2.5-4 mm, flat to biconvex, somewhat coriaceous, 6-9-veined; epidermal cells (in surface view) 1.5-4 times as long as broad, the lateral walls rugose in the middle. Bracts with a spatulate apex. Peduncle 0.2-0.3 m long, with 3 or 4 spikes. Spike length unknown. Stigma papillose. Fruit falcate, 25-30 x 1-10 mm, laterally compressed.

Occurs from Warnbro Sound southward, in water 0.5-20 m deep, on white sand. Extends around the coast to Israelite Bay.

Flowers mainly August-September.

P. robertsoniae, *P. coriacea* and *P. denhartogii* were previously included under *P. ostenfeldii* Hartog, which can be distinguished from all 3 species by its terete leaves. All form small to large clumps in mature meadows. Apart from the characters given in the key, *P. robertsoniae* is distinguished from the other species in this group by the corrugated appearance of its leaf surface in cross-section and by the distribution of fibre bundles among the parenchyma tissue in the leaf sheath.

***P. sinuosa* M.L. Cambridge & J. Kuo**

Perennial herb; rhizomes 5-8 mm broad. Leaves 1 or 2 intact per shoot; sheath 60-120 x 4-11 mm, the flaps overlapping in the lower half, darkening to brown when old and remaining intact, not disintegrating further except when dry; ligule up to 0.5 mm long; blade up to 1.2 m x 4-11 mm, slightly convex-concave, membranous, 8-13-veined; epidermal cells (in surface view) 4-12 times as long as broad, with sinuous lateral walls. Bracts linear. Peduncle 80-150 mm long, with 2-4 spikes. Spikes hidden beneath the leaf canopy, elongating after anthesis, 10-50 mm long. Stamens 3-dentate at the apex of the connective. Stigma irregularly dentate, usually with 3-5 spurs. Fruit narrowly ovoid, up to 20 mm long, not compressed.

Occurs in marine embayments and near-shore areas, in water up to 15 m deep. Extends along the west coast from Shark Bay southward and along the south coast. Also occurs in S.A.

Flowers mainly August-September.

In mature meadows, *P. sinuosa* is unique in that it forms rows parallel to the prevailing water current rather than growing in clumps or forming a continuous cover.

FAMILY 122 CYMODOCEACEAE

B. L. Rye

Perennial herbs, submerged, marine, dioecious, glabrous; rhizome creeping, rooted in the substrate, with scarious scales. Leaves distichous; sheath open, 2-lobed, ligulate, leaving a prominent, open or closed circular scar when shed; blade linear or nearly so, 3-several-veined; axillary scales 1-many. Inflorescence a small cyme or raceme of cymes or of solitary or paired axillary flowers; bracts present. Flowers small, hydrophilous. Perianth absent. Stamens 2 per flower or possibly representing 2 very reduced flowers each of 1 stamen, the anthers adaxially connate at least in part, shortly stipitate or sessile, the stalk possibly a pedicel or peduncle rather than a filament; anther 2-celled, longitudinally dehiscent to the outside; pollen thread-like. Carpels 2 per flower or possibly representing 2 flowers each of 1 carpel, free; ovule 1, pendulous; style terminal, filiform, usually divided for most of its length into 2 or 3 stigmatic branches, rarely simple. Fruiting carpels indehiscent, small, succulent, buoyant in water, probably 1-seeded. 6 genera and ca 18 species, mainly on tropical to warm temperate coasts.

- 1. Flowers in a loose cyme. Stems and roots arising at each node along the rhizome..... SYRINGODIUM
- 1. Flowers each terminating a short branch. Stems arising 3 or more nodes apart on the rhizome.
 - 2. Stems arising at every fourth node, the roots arising from the preceding internode. Fruit lacking a comb..... THALASSODENDRON
 - 2. Roots arising at each node and stems at irregular intervals. Fruit surrounded by a large 4-lobed comb..... AMPHIBOLIS

AMPHIBOLIS Agardh

Perennial herbs, marine, viviparous. Rhizome sympodial; roots 1 or 2 per rhizome node, alternating at successive nodes between the right and left sides of the rhizome. Stems erect, arising at irregular intervals along the rhizome, becoming much branched, noded. Leaves in a terminal tuft; sheath compressed, 2-lobed and with a central ligule, leaving a closed circular scar when shed; blade 8-12-veined, shed together with the sheath, usually semi-circularly emarginate at the apex. Flowers solitary, terminating a short lateral shoot, enclosed by leaves. Anthers large, crowned by 2 or 3 branched appendages. Styles 2 per inflorescence, 3-branched in the distal half. Fruit of 1 carpel, surrounded at the base by 4 large upturned lobes, which are together known as the comb; comb persistent at the base of the seedlings after they are shed from the parent plant. 2 species, confined to the south and lower west coasts of Australia, both species occurring in W.A.

- 1. Apex of the leaf sheath with 2 acute lobes and a shorter central ligule. Female flowers surrounded by 4 or more scales up to 8 mm long..... **A. antarctica**
- 1. Apex of the leaf sheath with 2 rounded lobes and a longer central ligule. Female flowers scaleless or with 1 or 2 very small scales..... **A. griffithii**

A. antarctica (Labill.) Sonder & Asch. ex Asch.

Sea Nymph

Perennial herb, up to 0.8 m high. Stems 1-2.5 mm broad; internodes 2-25 mm long on main stems. Leaves: sheath 6-14 mm long, with 2 acute lobes and a shorter, crescent shaped ligule; lateral margins of the sheath incurved, narrow, overlapping near the base only; blade 15-50 x 5-9 mm. Scales surrounding the female flower 4 or more, up to 8 mm long, scarious, ciliate. Fruit comb ca 10 mm long, with 2 narrow lobes and 2 broad lobes, the narrow lobes with 7-11 bristles and the broad lobes with 13-18 bristles. *Cymodocea antarctica* (Labill.) Endl.

Occurs off-shore in sublittoral areas subject to a continuous swell, at depths of up to 27 m. Extends along the west coast from Carnarvon southward and along the south coast. Also occurs in S.A., Vic. and Tas.

Flowers probably September-February.

A. griffithii (J. Black) Hartog

Perennial herb, up to 0.6 m high. Stems 1-1.5 mm broad, usually with short, distant, lateral branches; internodes up to 60 mm long on main stems. Leaves in dense terminal tufts; sheath 8-20 mm long, terminating in 2 rounded lobes and a longer rounded ligule; lateral margins of the sheath broad, overlapping for their whole length; blade usually 15-75 x 2.5-6 mm. Female flowers scaleless or with 1 or 2 very small filiform scales. Fruit comb with 2 narrow lobes and 2 broad lobes, the narrow lobes with 11-15 bristles and the broad lobes with 19-26 bristles.

Recorded off-shore in sublittoral areas with a continuous swell and in saline estuaries, at depths of up to 16 m. Extends along the west coast from Geraldton southward and along the south coast. Also occurs in S.A.

Flowers recorded October-March.

SYRINGODIUM Kuetzing

Perennial herbs, submerged, marine. Rhizome monopodial, with 1 or more roots and a short erect stem arising at each node, herbaceous. Leaves usually 2 or 3 per stem; sheath persistent after the blade has been shed; blade very narrowly linear, terete; leaf scar open. Inflorescence a rather loose cyme, each flower enclosed in a reduced leaf or bract. Male flowers pedicellate. Female flowers sessile. Anthers 2 per inflorescence, without an apical appendage. Styles 2 per inflorescence, 2-branched to near the base. Fruiting carpels 4-angled in cross-section, beaked, inconspicuously ridged along outer surface, with a stony endocarp; beak 2-branched. 2 species, the first occurring on coasts of the Indian and Pacific Oceans and the other species on Caribbean coasts.

S. isoetifolium (Asch.) Dandy

Perennial herb; rhizome slender, 1-3 roots and a short erect stem arising at each node; internodes usually 15-35 mm long. Scales ca 5 mm long, not persistent. Leaves 2-4 per stem; sheath often tinged with red, 15-55 mm long; blade 70-300 x 1-2 mm, narrowed at the base. Male pedicels ca 7 mm long. Anthers ovate, ca 4 mm long. Styles 6-10 mm long. Fruit obliquely ellipsoid, usually 3.5-4 mm long. *Cymodocea isoetifolia* Asch.

Occurs from Rockingham northward, mainly in sand in the sublittoral belt, from just below the low-water mark to depths of up to 7 m. Also occurs across the north of Australia and extends from the Red Sea to Fiji.

Flowers recorded October-November, April-May; fruits recorded May-June.

THALASSODENDRON Hartog

Perennial herbs, marine, often viviparous; rhizome robust, with 1 or 2 erect stems arising at every fourth internode and 1-5 roots (usually 2) arising at the internode preceding the stem-bearing internode. Stems simple or with few branches. Leaves in a terminal cluster; sheath compressed, narrowed at the base, leaving a closed circular scar when shed; blade linear, many-veined, the apex denticulate and almost truncate. Flowers terminating short lateral shoots, enclosed in 4 leafy bracts, the inner 2 bracts differing in shape between the male and female plants. Anthers with a terminal appendage. Styles 2 per inflorescence, 2-branched almost to the base. False fruit consisting of the succulent inner bract and 2 enclosed carpels, 1 of which is usually aborted. 2 species, of which 1 is widely distributed along tropical coasts in the Indian and Pacific Oceans but not recorded in W.A., the other species confined to W.A.

T. pachyrhizum Hartog

Perennial herb; rhizome robust, up to 5 mm broad, with internodes 3-5 mm long and deciduous scales ca 10 mm long; roots paired, usually 50-70 mm long, 3-5 mm broad. Stems arising singly along the rhizome. Mature leaves borne at nodes 1.5-18 mm apart, shed in March; sheath up to 45 mm long, the lobes and ligule obtuse; blade usually 50-300 x 7-14 mm, with 13-19 parallel veins; leaf scar usually denticulate throughout. Style ca 20 mm long. Carpels ellipsoid, ca 2 mm long. False fruit 55-70 mm long.

Occurs on limestone reefs and relatively sheltered sand beds at depths of up to 35 m. Extends around the coast from North West Cape to Bremer Bay.

Fruits recorded June-October.

This species has sometimes been misidentified as *Cymodocea angustata* Ostenf.

FAMILY 123 ZANNICHELLIACEAE

B. L. Rye

Annual or perennial herbs, aquatic, submerged in fresh or brackish water, with a creeping rhizome, rooted in the substrate, monoecious or sometimes dioecious, glabrous; roots simple. Leaves alternate, distichous, sheathing or rarely with a free axillary sheath, usually ligulate; blade usually present, linear, 1-veined or incompletely 3-veined. Inflorescence of axillary flowers. Flowers small, inconspicuous, hydrophilous. Perianth segments (when present) 3, basally connate, scale-like or forming a cup, minute. Stamens 1-3, if 2 or 3 then fully connate so that the anther appears to have up to 6 cells; anther 1 or 2-celled, longitudinally dehiscent. Carpels 1-9, free, superior; ovule 1, pendulous; stigma dry. Fruit of nutlets or drupelets. 7 or 8 species in 4 genera, cosmopolitan.

LEPILAENA J.L. Drumm. ex Harvey

Annual or perennial herbs, of fresh or saline water, with filiform rhizomes and stems. Leaves alternate except near the flowers, sheathing at the base; blade narrowly linear, 1-veined. Flowers solitary in the leaf axils; pedicel often elongating in fruit. Perianth of male flowers consisting of 3 minute segments or a small cup, much shorter than the anthers; perianth segments of female flowers 3, persistent, ovate to elliptic, membranous. Anthers 1 or 3 and connate throughout, sessile or subsessile, 2-celled. Styles simple; stigma asymmetrically peltate. Carpels 3. Fruit of 3 nutlets, contained within the persistent perianth. 4 or 5 species, confined to Australia and New Zealand, all species occurring in W.A.

L. preissii (Lehm.) F. Muell.

Slender Water Mat

Annual or short-lived perennial herb, monoecious. Leaves usually 10-40 x 0.2-0.4 mm, entire, obtuse to acute. Flowers usually clustered in threes, often with 1 male and 2 female or 2 male and 1 female in each cluster. Female flowers usually closely clustered among the leaf sheaths but sometimes 1 flower of the cluster becoming well exerted on a long pedicel while other flowers remain subsessile. Perianth segments of male flowers minute; perianth segments of female flowers often whitish and relatively conspicuous, elliptic, 2.5-3 mm long, distinctly 2-branched at the summit. Anthers 3, connate in a 6-celled mass, 0.7-1.5 mm long. Stigmas asymmetrically funnel shaped. Fruiting pedicel usually < 0.5 mm long; nutlets black at maturity, ca 1.5 x 7 mm, crowned by the persistent basal part of the style. *Althenia preissii* (Lehm.) Asch. & Graebner

Occurs in brackish or saline water on the Coastal Plain near Perth. Probably extends in near-coastal areas through much of the south west but there are few collections. Also occurs in S.A., Vic. and Tas.

Flowers recorded September-November.

*FAMILY 124 ARACEAE

B. L. Rye

Usually perennial herbs with a rhizome or corm, sometimes scrambling shrubs or vines with aerial roots, or epiphytes, rarely free-floating aquatics, usually monoecious or hermaphrodite, rarely dioecious. Leaves alternate, often all basal, usually distinctly petiolate and sheathing at the base, rarely reduced

to the sheath; blade usually simple. Inflorescence a simple spike with a succulent axis, often referred to as a spadix, terminal, usually with massed flowers, almost always subtended by a large spathe, without any other bracts; spathe usually prominent, often brightly coloured. Flowers actinomorphic, minute, rarely some flowers sterile, sometimes producing a bad smell, attracting flies. Perianth absent or of 2 whorls, with 2-4 segments or lobes per whorl, often much reduced in unisexual flowers. Stamens 1-4 or 6 or rarely 8, often connate; filament short or absent; anther basifixed, 2-celled or rarely 1-celled, usually dehiscent to the outside. Ovary 1-many-celled, superior; ovules 1-many per cell. Style terminal and short or the stigmas sessile. Fruit commonly a berry, sometimes dry or coriaceous and irregularly dehiscent or the whole inflorescence forming a compound fruit. About 2000 species in 110 genera, mainly tropical, sometimes temperate.

1. Free-floating aquatic plant. Leaves sessile or shortly petiolate, up to 150 mm long, hairy *PISTIA
1. Terrestrial plants. Leaves prominently petiolate, usually 0.5-1 m long, glabrous.
 2. Spathe constricted, the upper part yellow. Ovary 1-celled..... *COLOCASIA
 2. Spathe not constricted, white. Ovary 3-celled..... *ZANTEDESCHIA

*COLOCASIA Schott

Large perennial herbs or small shrubs, monoecious, glabrous. Leaves arising at the base, simple; petiole erect, long, stout; blade pointing downward, peltate, broad, notched at the base, reticulate-veined. Peduncle stout. Spathe erect, convolute, constricted; basal portion an inflated closed sheath, thick, with overlapping margins; distal portion an expanded blade, eventually shed. Spike with numerous flowers, often terminating in a sterile appendage, the male flowers in the basal portion, which is separated by sterile flowers from the much shorter female portion above. Perianth absent. Ovary 1-celled; placentas parietal; ovules many, in 2-4 rows. Fruit a small berry. About 8 species, extending from south east Asia to Polynesia, 1 species occurring in W.A.

**C. esculenta* (L.) Schott

Taro

Stout perennial herb, up to 3 m high, with creeping succulent underground organs. Leaves all basal; petiole green to violet or reddish, rarely over 1 m long; blade dark green, usually 0.15-0.6 m x 125-225 mm. Peduncle usually shorter than the petioles. Spathe usually 150-300 mm long; basal portion green or red-purple; distal portion yellow, possibly sometimes becoming reflexed. *C. antiquorum* Schott

Naturalized in drains and along watercourses on the Coastal Plain and Darling Range near Perth. Regarded as native in northern W.A. and possibly Qld. Probably native only in Indonesia and nearby areas.

Flowering time not known.

*PISTIA L.

Perennial herbs, aquatic, free-floating, regenerating by stolons, monoecious; rhizome floating, short, with numerous roots. Leaves in a rosette, densely hairy. Spathe constricted. Spike partly adnate to the spathe, with 1 female flower below the spathe constriction, a cup shaped membrane level with the constriction and a whorl of male flowers above. Perianth absent. Anther sessile, dehiscent to the outside by 4 pores. Ovary 1-celled; ovules numerous. Style short, thick, persistent in fruit. Fruit irregularly dehiscent, many-seeded. 1 species, occurring throughout the tropics and subtropics, naturalized in W.A.

**P. stratiotes* L.

Water Lettuce

Perennial herb, free-floating on the water surface, producing 1-several stolons; rhizome up to 50 mm long, the dangling roots up to 0.5 m long; stolons terminating in a new plant, eventually breaking down. Leaves sessile or becoming shortly petiolate; blade pale green, almost spatulate to broadly obovate, 30-150 mm long, up to 80 mm broad, truncate or emarginate, 7-15-veined, with a dense mat of white hairs toward the base especially on the adaxial surface. Peduncle short or absent. Spathe 10-40 mm

long, greenish white, hairy outside, glabrous inside, sheathing and split down 1 side in the basal half, the distal part spreading. Spike shorter than the spathe. Male flowers 2-8 per spike. Stigma disc-like, reaching nearly to the male flowers, hairy. Fruit green, ovoid to ellipsoid, 6-10 mm long.

A single record from Caversham. Native to most tropical and some subtropical parts of the world but not in Australia.

Flowering period not known.

*ZANTEDESCHIA Sprengel

Perennial herbs, with a tuber-like rhizome, monoecious. Leaves several per shoot, arising at the base, simple; petiole sheathing at the base, long; blade reticulate-veined. Peduncle stout. Spathe erect, coloured or leaf-like, persistent, convolute, not constricted. Spike with numerous flowers, the lower flowers female and the upper flowers male. Perianth absent. Anthers sessile, truncate, dehiscent by apical pores; pollen forming moniliform strings. Stamines sometimes present in the female flowers. Ovary 3-celled; ovules 2-many per cell. Style short or the stigma sessile. Fruit a berry, 1-3-celled; seeds few-many, globular. At least 6 species, mainly in southern Africa but also represented in tropical Africa, 1 species naturalized in W.A.

*Z. aethiopica (L.) Sprengel

Arum Lily

Erect perennial herb, up to 1 m high when in flower, glabrous. Stems stout, ca 6 mm in diameter. Leaves radical, dark green; petiole sheathing in the basal part, up to 0.4 m long; blade ovate-cordate, usually ca 250 x 130 mm, acuminate. Spathe white, up to 150 x 100 mm; proximal portion funnel shaped but slit to the base, with the edges overlapping; distal portion widely spreading away from the slit, pointed and recurved at the apex. Spike bright yellow, shorter than the spathe but protruding, the male portion much longer than the female portion. Female flowers with stamens. Berry orange-yellow.

Occupies moist disturbed sites from Perth southward. Probably extends through the more humid parts of the south west. Native to South Africa.

Flowers mainly August-November.

FAMILY 125 LEMNACEAE

B. L. Rye

Annual herbs, aquatic in fresh water, free-floating above or below the water surface, small or minute, monoecious or rarely dioecious, glabrous, without separate stems and leaves but with a single photosynthesising body known as the "thallus", reproducing mainly by budding. Roots (when present) 1-several, simple, suspended from a point on the undersurface of the thallus. Thallus with 1 or 2 budding pouches, the young budded thalli often remaining attached to the parent plant for some time. Inflorescence rarely produced, borne in a pouch in the thallus, with 1 female and 1-3 male flowers. Perianth absent. Stamen 1; anther basifixed, 2-celled or rarely 1-celled, dehiscent by longitudinal or transverse slits. Ovary superior, 1-celled, globular; ovules 1-7, basal. Style terminal, short. Fruit a utricle, with up to 4 minute seeds. 35 species in 4 genera, cosmopolitan. Reference: Landolt, E. 1980. Veroff. Geobot. Inst. O Zurich.

1. Root 1. Thallus lacking brown pigment cells and stellate crystals, scaleless..... LEMNA
 1. Roots 2 or more. Thallus with brown pigment cells and stellate crystals, with a membranous scale on undersurface..... SPIRODELA

LEMNA L.

Annual herbs, monoecious. Root 1 or rarely absent, dangling, long, with a tubular sheath at the base, the apical cap rather conspicuous. Thallus floating above the water surface or sometimes submerged, green, rather compressed, 1-5-veined, without scales and stellate crystals, when floating oval and slightly

turned up at both ends, often tending to adhere to neighbouring thalli, with at most 1 inflorescence. Budding pouches 2, lateral and toward 1 end of the thallus; buds often becoming detached in autumn when the parent plant sinks to the bottom. Inflorescence with a reduced membranous spathe. Anther 2-celled, transversely dehiscent. Stigma concave. 13 species, cosmopolitan, 2 species occurring in W.A.

L. disperma Hegelm.

Duckweed

Annual herb, usually in a closely connected group of 2-6 thalli, numerous plants forming a dense green surface mat. Root 1, usually 10-40 mm long, rarely up to 100 mm long. Thallus floating on the water surface, green, elliptic to obovate, 1-4 mm long, usually biconvex, thick and opaque, obtuse, 1-3-veined or the veins not noticeable.

Occurs on the Coastal Plain from Bullsbrook southward, on still fresh water. Outside the Perth Region the species has only been recorded from Busselton but is probably widespread in the more humid parts of the south west. Occurs in all Australian states.

Flowering period not known.

This species has previously been referred to as *L. minor* L. or *L. gibba* L., both of which appear to be extra-Australian species.

SPIRODELA Schleiden

Annual herbs, monoecious. Roots 2-many or rarely 1. Thallus rather compressed, with a small membranous scale covering the base of the roots, 5-16-veined or rarely 3-veined, with brown pigment cells and stellate crystals, often tending to adhere to neighbouring thalli, with at most 1 inflorescence. Budding pouches 2, lateral. Inflorescence with a reduced membranous spathe. Anther 2-celled, transversely dehiscent. Stigma concave. 4 species, almost cosmopolitan, 1 species occurring in W.A.

S. punctata (G. Meyer) C. Thompson

Thin Duckweed

Annual herb, often in a closely connected group of several thalli, numerous plants forming a dense green surface mat. Roots 2-11 per thallus, usually few, up to 40 mm long. Thallus floating on the water surface, green, elliptic to obovate, 2-5 mm long, somewhat convex on both surfaces, opaque; abaxial surface often with a purplish tinge, sometimes with 1-5 veins visible. *S. oligorrhiza* (Kurz) Hegelm.

Occurs on the Coastal Plain from north of Wanneroo to Perth, on still fresh water. Not recorded elsewhere in W.A. but the species is unlikely to have so restricted a range. Also occurs in S.A., Vic., N.S.W. and Qld.

Flowering period not known.

FAMILY 126 DIOSCOREACEAE

B. L. Rye

Herbs or shrubs, usually climbing, with a basal rhizome or tuber-like thickening, dioecious or sometimes hermaphrodite. Leaves alternate or rarely opposite, usually distinctly petiolate; petiole often twisted or jointed at the base; blade broad, often with 3-13 main veins and a reticulum of smaller veins. Inflorescence a raceme, spike or panicle. Flowers actinomorphic. Perianth segments 6, all rather similar, often connate at the base. Nectaries often present. Stamens sometimes 6 in 2 whorls of 3, sometimes reduced to 3 with the inner 3 becoming staminodes or absent, inserted on the base of the perianth, sometimes shortly connate at the base; anther 2-celled, longitudinally dehiscent, the connective often broad. Ovary inferior, 3-celled; ovules usually 2 per cell and superposed. Styles 3, free or connate at the base. Fruit a capsule or nut or rarely a berry. Seeds often winged. About 600 species in 6 genera, in tropical and warm temperate areas.

DIOSCOREA L.

Shrubs, producing slender twining stems annually from a tuber, commonly known as Yams, dioecious. Leaves petiolate, not sheathing. Perianth segments free (at least in Australia). Stamens (in Australia) 6. Fruit a 3-angled or 3-lobed capsule, longitudinally dehiscent at the angles. Seeds winged. Up to 600 species depending upon the circumscription of the genus, occurring mainly in tropical and subtropical regions, 3 species occurring in W.A.

D. hastifolia Endl.

Warrine

Scrambling and climbing shrub, with very slender twining stems reaching heights of up to 2 m. Leaves alternate; petiole 1-4 mm long, slender; blade tending to be triangular to hastate in the lower leaves and linear in the upper leaves, 25-70 x 2-8 mm. Inflorescence spike-like, with subsessile flowers, 40-100 mm long and usually 15-30-flowered when male, shorter and usually 2 or 3-flowered when female. Perianth segments elliptic to almost circular, 2.5-3 mm long in male flowers, ca 1 mm long in female flowers. Ovary initially ca 5 mm long and slender, rapidly enlarging after pollination. Capsule prominently 3-winged, crowned by the persistent perianth, 15-25 x 15-25 mm; wings extending the full length of the capsule and protruding laterally. Seeds compressed, ca 10 mm broad; wing encircling the body, broad, translucent. **Fig. 266**

Occurs on the Darling Scarp and Range from Perth northward. Extends east to York and north to Shark Bay.

Flowers May-July; full-sized fruits August-November.

FAMILY 127 ASPARAGACEAE*T. D. Macfarlane**

Plants woody or herbaceous. Rootstocks rhizomatous, roots sometimes tuberous. Stems erect or climbing. Leaves reduced to scales with cladodes (green leaf-like modified branches) in their axils. Flowers solitary, racemose or almost umbellate, axillary or on surfaces or margins of cladodes, unisexual (plants dioecious) or bisexual; pedicels articulate. Perianth segments 6, free or partly connate, sometimes with a corona. Stamens 3 or 6; filaments free or connate into a column; anthers dorsifixed. Ovary superior, 1 or 3-celled; ovules 2 to many per cell. Styles almost free to completely connate. Fruit a berry. Seeds black. A family of 6 genera and ca 110 species in Africa, Canary Islands, Europe, western Asia and northern Australia.

***ASPARAGUS L.**

Climbers or small shrubs with softly woody annual or perennial stems, glabrous or hairy. Rhizome perennial. Roots fibrous or tuberous. Stems usually much-branched; branches sometimes similar to main stems or sometimes distinct. Leaves cauline, solitary or fascicled, alternate, scale-like, usually brown, often with a spine or spur from the lower surface, sometimes spines cauline. Cladodes solitary or fascicled, flat, angled or terete, arising in axils of leaves but sometimes absent from flower-bearing branchlets. Flowers solitary or fascicled in the axils of cauline leaves, bisexual or rarely unisexual. Perianth deciduous or occasionally persistent; segments free or connate at base, equal or unequal. Stamens 6; filaments sometimes spurred at base, attached to base of perianth; anthers versatile, dehiscent by longitudinal slits. Ovary 3-celled with 2-several ovules per cell. Style filiform; stigma 3-lobed, less often entire or the style divided nearly to the base. Fruit a 1-few-seeded berry, usually red. A genus of fewer than 100 species (300 according to older views), native to Europe, Africa, Madagascar (Malagasy), Asia and one extending to northern Australia, 2 naturalized species occurring in south western W.A. Current research, as indicated by Obermeyer in the reference below, suggests that African species with bisexual flowers will in future be placed in a different genus. This will affect the Perth Region species. References: Jessop, J. P. 1966. *Bothalia* 9: 31-96; Jessop, J. P. 1979. *Asparagus*. in van Steenis, C.G.G.J. (ed.) *Flora Malesiana Ser. 1*: 215-217; Obermeyer, A.A. 1983. *S. Afr. J. Bot.* 2: 243-244.

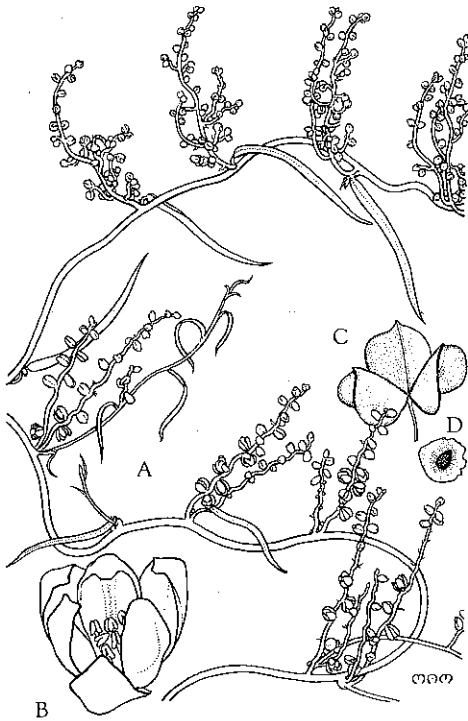


Fig. 266. *Dioscorea hastifolia*. A, Flowering stems. B, Male flower. C, Capsule. D, Seed.

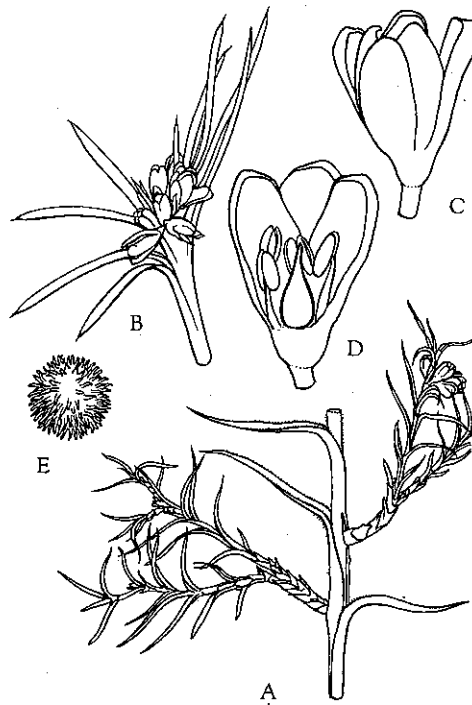


Fig. 267. *Acanthocarpus preissii*. A, Flowering branch. B, Cluster of flowers. C, Flower. D, Flower slit open to show stamens, ovary and style. E, Capsule.

1. Cladodes entire, ovate, with many parallel veins..... **A. asparagoides*
 1. Cladodes digitately 3-lobed, linear, without obvious veins..... **A. crispus*

**A. asparagoides* (L.) W.F. Wight

Smilax Asparagus

Roots tuberous. Stems twining, often 1-2 m tall. Leaves scarious, lacking spines. Cladodes solitary, alternate, ovate to broadly ovate with acute apex, 15-30 x 4-15 mm, glossy green, glabrous, rather thin in texture, with many parallel veins. Flowers single or paired in cladode axils, bisexual, greenish white; peduncle 5-6 mm long, articulate near top. Perianth ca 6 mm long, very spreading. Staminal filaments with 2 basal spurs. Ovary with 4-9 ovules per cell. Style nearly as long as perianth; stigma shortly 3-lobed. Berry 7-10 mm diameter, green at first, finally red.

Naturalised in the Perth Region, both in disturbed sites and native vegetation, often abundant. Also elsewhere in the south west. Native to southern and tropical Africa.

Flowers August-September.

**A. crispus* Lam.

Roots tuberous. Stems twining, 0.5-1 m tall. Leaves scarious, lacking spines. Cladodes alternate, digitately 3-lobed; lobes linear, 3-5 x 0.25 mm, with acute apex, not obviously veined. Flowers single in cladode axils, bisexual, white; peduncle 6-10 mm long, not articulate. Perianth 5-6 mm long, often reflexed. Staminal filaments with 2 basal spurs. Ovary with ca 4 ovules per cell. Style nearly as long as perianth; stigma shortly 3-lobed. Berry not seen.

Naturalised at Kings Park and Bunbury. Native to South Africa.

Flowers July-August.

FAMILY 128 DASYPOGONACEAE

T. D. Macfarlane

Xerophytic perennials, either herbs with rhizomatous rootstock and short or almost absent stem, or shrubs or trees with a short to tall, branched or unbranched, woody stem. Leaves basal, cauline or in a terminal rosette. Inflorescence a spike, raceme, head or panicle or flowers solitary. Flowers bisexual or unisexual (plants dioecious), usually small, sometimes large. Perianth usually dry and glumaceous, rarely all segments or the inner ones petal-like; segments 6, in 2 whorls, free or partly connate. Stamens 6; anthers basifixed or dorsifixed, dehiscent by longitudinal slits or terminal pores. Ovary superior, completely or incompletely 3-celled with 1 ovule per cell (2 in Chamaexeros) or 1-celled with 3 ovules. Style 1 with 3-lobed stigma or styles 3. Fruit a capsule or indehiscent and 1-seeded. Seeds brown or whitish. A family of 8 genera and 64 species in Australia, New Guinea and New Caledonia. Most genera are restricted to south western W.A. *Calectasia* is sometimes placed in a separate family, Calectasiaceae.

1. Inflorescence scape completely covered by overlapping bracts. Stem massive, woody, unbranched, up to 8 m tall. Leaves in a terminal rosette..... KINGIA
1. Inflorescence scape or peduncle, if present, naked or with widely spaced bracts. Stem, if woody, slender, branched, not over 1 m tall. Leaves basal, distributed along stem, or in many terminal tufts on branches.
 2. Branched woody shrubs. Leaves 3-65 mm long, distributed along stems or in many terminal tufts on branches.
 3. Perianth ca 3 mm long, whitish. Anthers not exerted, inconspicuous. Fruit a rough to spiny capsule..... ACANTHOCARPUS
 3. Perianth segments 6-17 mm long, bright blue. Anthers yellow or orange, exerted, conspicuously contrasting with perianth. Fruit concealed in flower and falling with it, not a capsule..... CALECTASIA
 2. Tufted herbs. Leaves 50-850 mm long, usually basal, rarely less than 100 mm long and then plants grass-like or flowers in globular heads on long scapes.
 4. Inflorescence scape exceeding leaf tips, hairy. Flowers sessile in a single terminal globular head with protruding pungent bracts..... DASYPOGON
 4. Inflorescence scape shorter than or exceeding leaf tips, glabrous. Flowers in racemes, spikes or panicles or a terminal cluster but then the flowers clearly pedicellate; pungent bracts lacking.
 5. Leaf margins fimbriate. Flowers bisexual. Ovules 2 per cell..... CHAMAEXEROS
 5. Leaf margins not fimbriate. Flowers unisexual (plants dioecious). Ovule 1 per cell..... LOMANDRA

ACANTHOCARPUS Lehm.

Woody perennial rhizomatous shrubs, with 1-several stems, often branched from leaf axils. Leaves all cauline, distichous, with overlapping sheaths and short rigid pungent blades. Flowers terminal on branches, arranged in compact, bracteate, cymose clusters of pedicellate flowers, the flowers usually of varying age, small, inconspicuous. Perianth segments 6, petal-like, deciduous, free, erect, in 2 similar whorls. Stamens 6; filaments connate at the base, outer 3 free from perianth, inner 3 attached to perianth for a short distance; anthers not exerted, inconspicuous, versatile, dorsifixed, dehiscent by slits. Ovary conical, 3-celled, with 1 ovule per cell. Style undivided; stigma minute. Fruit a capsule, large, more or less globular, dehiscing loculicidally, 1-3-seeded; seeds globular, with thin brown testa. Currently regarded as a monotypic genus restricted to south west Australia, although research being undertaken by A.S. George will probably result in more species being recognized.

A. preissii Lehm.

Shrubs up to 1 m tall with 1-several cane-like stems arising from a rhizomatous rootstock, the stems forming dense clumps 1 m across. Stems and branches concealed by overlapping leaf sheaths. Leaf blades spreading or recurved, 30-65 mm long. Flowers several in small terminal clusters, the clusters compact

or loose, the flowers erect or pendulous on slender pedicels; pedicels 1.5-2 mm long. Flowers ca 3 mm long, campanulate, white or outer perianth segments with a central green or purple stripe. Capsules solitary or clustered, attached subterminally as a result of post-flowering growth of 2 subterminal branches, pale green to yellow, globular, minutely to prominently spiny. **Fig. 267**

Common on the western part of the Coastal Plain, growing in calcareous sandy soils extending almost to the beach, and also on the Darling Scarp, growing among granite rocks. Occurs as far north as Exmouth.

Flowers April-August.

Two variants of *A. preissii* occur in the Perth Region: a relatively soft-leaved variant on the Darling Scarp and a more rigid-stemmed and rigid-leaved one on the Coastal Plain. The research mentioned above should determine their status.

CALECTASIA R. Br.

Shrubs with fibrous roots growing from short compact rhizomes; stems perennial, erect, slender, flexible, woody, often branched, covered with sheaths of old leaves. Leaves on stems and branches crowded on growing areas, irregularly or spirally arranged, linear-subulate, overlapping. Flowers solitary at ends of stems and branches, very shortly pedicellate, closely surrounded by leaves of which the several uppermost ones are modified as bracts, bisexual, conspicuous. Perianth persistent, tough, finely hairy especially externally, salverform, with a long funnellform or cylindric tube largely concealed by leaves and bracts; lobes equal, in 2 whorls, coloured. Stamens 6, the 2 whorls slightly unequal in length; filaments filiform, inserted at mouth of tube; anthers exerted, basifixed, dehiscent by terminal pores, which may extend longitudinally. Ovary sessile, abruptly narrowing into style, 1-celled, with 3 ovules. Style very long, filiform, exerted, with small terminal stigma. Fruit 1-seeded, indehiscent, delicate, destroyed by developing seed, enclosed in and falling with the eventually deciduous, parachute-like perianth which has a pointed and barbed base. Seed obconical, whitish, smooth. A genus endemic to southern Australia in which 2 species are currently recognized, though further research may increase this figure. Reference: Anway, J.C. 1969. Austral. J. Bot. 17: 147-159.

- | | |
|--|-----------------------|
| 1. Perianth lobes hairy at throat of tube and lower part of inner surface;
outer lobes 12-17 mm long..... | C. grandiflora |
| 1. Perianth lobes entirely glabrous at throat of tube and on inner surface;
outer lobes 8-12 mm long..... | C. cyanea |

C. cyanea R. Br.

Blue Tinsel Lily, Star of Bethlehem

Shrubs forming clumps up to 0.3 m in diameter. Stems slender, woody, branched or unbranched, perennial, 0.1-0.6 m tall. Leaf blades 3-15 x 0.5-1.5 mm, partly or completely finely hairy, eventually disarticulating from the persistent sheaths; sheaths of leaves and bracts densely and finely hairy on back, margins usually not conspicuously fringed. Perianth iridescent blue or purple, sometimes turning reddish brown with age; outer lobes 8-12 x 1.5-5 mm. Anthers large, 4-7 mm long, yellow or orange, contrasting strongly with perianth, exerted on filaments 0.5-6 mm long. **Fig. 268.**

Grows on sandy soil on the Coastal Plain and gravelly soil at the base of the Darling Scarp. Widespread in the south west from Eneabba south eastwards possibly to the south coast. Also S.A. and Vic.

Flowers June-September.

C. grandiflora Preiss

Shrubs ca 0.3 m high. Stems woody, branched. Leaf blades 7-30 mm long, usually glabrous, eventually disarticulating; sheaths of leaves and bracts usually glabrous except for a conspicuous marginal fringe, occasionally the back densely and finely hairy and then the fringe sometimes absent. Perianth iridescent blue; outer lobes 12-17 mm long. Anthers 4-5.5 mm long, yellow, not changing colour with age, contrasting strongly with perianth.

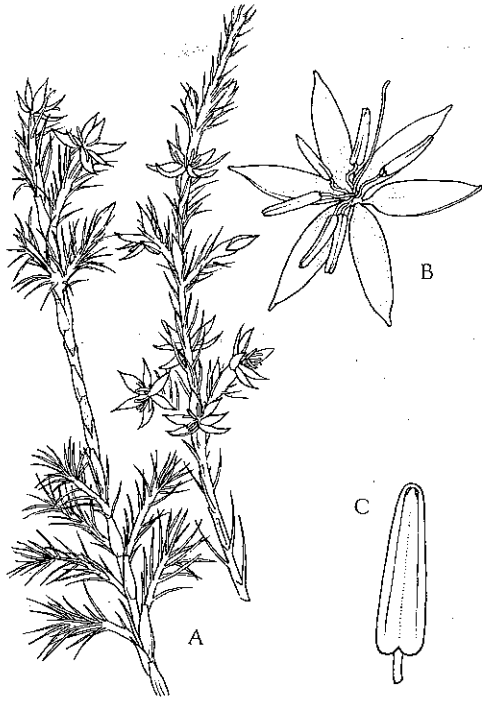


Fig. 268. *Calectasia cyanea*. A, Flowering branches. B, Flower. C, Anther.

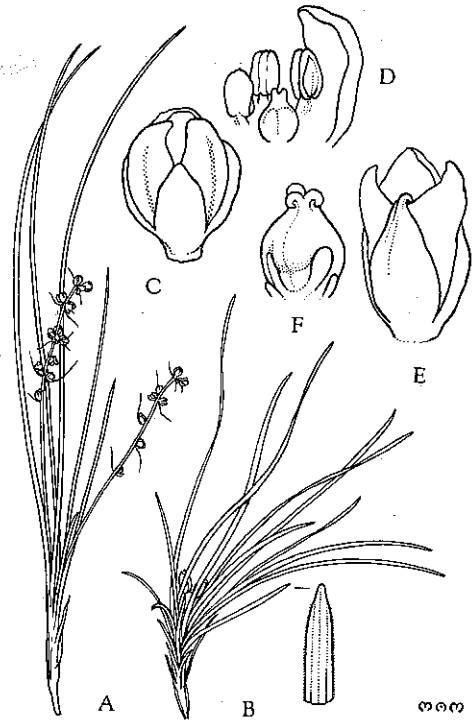


Fig. 269. *Lomandra brittanii*. A, Male plant. B, Female plant with enlargement of leaf apex. C, Male flower. D, Part of male flower showing perianth segment, 3 stamens and vestigial ovary. E, Female flower. F, Ovary and style surrounded by staminodes.

Known only from a few localities (Cannington to Serpentine) at the eastern edge of the Coastal Plain, where it grows in sandy soils in *Banksia* woodland or sandy or clay soils in swamps. Probably widespread in W.A. south east of the region.

Flowers August-September.

This species was until recently included in *C. cyanea* and its distribution is as yet poorly known. It was not recognized by Anway (see above).

CHAMAEXEROS Benth.

Tufted perennials with small knotted rootstock which is sometimes extended as a short, tough, vertical stem with terminal leaves, sometimes a shortly elongated rhizome present. Leaves many, in dense 2-ranked tufts, with white membranous or scarios margins, at least when young. Inflorescences 1 to many, growing from axils of leaves, pedunculata, paniculate or head-like. Flowers pedicellate. Perianth persistent; segments 6, in 2 whorls, slightly connate at base, equal in length but outer segments broader, petal-like, yellow. Stamens 6, equal; filaments adnate to perianth at base, tapering upwards; anthers versatile, dorsifixed, introrse. Ovary 3-celled, with 2 ovules per cell; style filiform, undivided; stigma small, terminal. Fruit a capsule, globular, dehiscent loculicidally, bearing persistent perianth segments. Seeds brown, globular, wrinkled when dry. A genus of 3 species endemic to south western Australia. References: Kuchel, R. H. 1976. *Nuytsia* 2: 118-123; Stevens, P.F. 1978. *J. Arnold Arbor.* 59: 129-155. All authors prior to Stevens described 1 ovule per cell instead of two.

C. serra (Endl.) Benth.

Tufted plants with short stems 10-50 mm long, covered in imbricated sheathing leaf bases, sheaths of old leaves persisting, leaf blades eventually disintegrating. Leaves linear, 60-300 x 1.5-4 mm, flat, erect or curved, with broadly rounded apex and white scarios margin. Inflorescences several per tuft, growing from among basal leaves, $\frac{1}{4}$ - $\frac{1}{3}$ as long as leaves; peduncles stout, rigid, bearing a head-like

cluster of scarious bracts which enclose buds, at anthesis the several to many flowers in each cluster exerted on slender pedicels up to 15 mm long. Perianth yellow, ca 4.5 mm long. Stamens almost as long as perianth and as long as style; anthers yellow. Ovary small, green.

Known from a few locations on the Darling Range and Scarp, growing in clay or lateritic soil. Widespread east of the region as far inland as Tammin and south to the south coast.

Flowers September-October.

DASYPOGON R. Br.

Rhizomatous (in Perth Region) or arborescent perennials. Stems either perennial, tall, woody and unbranched, or annual, short, tough, sometimes woody, sparingly branched or unbranched. Leaves many, basally aggregated, scattered along the stem or, in the arborescent species, aggregated near the stem apex, sheathing at base, the blade linear or tapering slightly, tough. Inflorescence single and terminal on each stem or branch or, in the arborescent species, numerous on each stem, borne singly in leaf axils. Peduncles elongated, slender, tough, with several sparsely distributed bracts; flowers forming a globular head, arranged obscurely in clusters of 4, each cluster subtended by a bract. Perianth persistent, segments 6 in 2 whorls; outer 3 segments tough, bearing barbed hairs on the exterior, connate to about the middle forming a tube, lobes erect, ovate or narrowly obovate; inner 3 segments petal-like, attached to tube at base, equal in length to outer 3 but slightly to much narrower, spatulate, acute. Stamens 6, much longer than perianth; filaments stout, adnate to tube at base; anthers versatile, dorsifixed in lower third, dehiscing longitudinally. Ovary incompletely 3-celled, with 1 ovule per cell. Style resembling filaments. Fruit 1-seeded, globular, indehiscent, enclosed in hardened perianth tube. A genus of 3 species endemic in south western Australia. Reference: Staff, I.A. & Waterhouse, J.T. 1981. in Pate, J.S. & McComb, A.J. (eds), *The Biology of Australian Plants*.

- | | |
|---|--------------------------|
| 1. Leaves dark green, crowded near base of stem; blades 125-370 mm long..... | D. bromeliifolius |
| 1. Leaves glaucous, well spaced along elongated stem (but sheaths still partly overlapping); blades 70-110 mm long. Flower bracts 4.5-6.5 mm wide at base of exposed portion..... | D. obliquifolius |

D. bromeliifolius R. Br.

Pineapple Bush

Tufted rhizomatous perennial, often forming large clones. Stem 70-300 mm long to the base of the first peduncle bract to be separated from the leaves by a naked internode. Leaves crowded at base of plant, with sheaths almost completely overlapping, concealing stem; blades dark green, 125-370 mm long, 2.5-9 mm wide at base, with coarse marginal spines. Peduncle 280-530 mm long from base of first bract, hairy, with 5-10 widely spaced leaf-like bracts. Flowers in a globular head 24-30 mm in diameter at anthesis. Cluster-bracts 1.5-2.8 mm wide at the base of the exposed part, narrowly to very narrowly triangular, acuminate, pungent. Inner perianth segments spatulate, 0.9-1.1 mm wide at widest point.

Widespread and common on the Coastal Plain south of Wanneroo, growing in sandy soil in Jarrah and *Banksia* woodland, sometimes in low lying situations. Extends to the Phillips River near Hopetoun.

Flowers September-January.

D. obliquifolius Lehm. ex Nees

Tufted rhizomatous perennial. Stems sometimes branched, 230-300 mm long to the base of the first peduncle bract to be separated from the leaves by a naked internode. Leaves numerous, widely spaced along the elongated stem, which is concealed by partly overlapping sheaths; blades glaucous, 70-110 mm long, 1.9-2.5 mm wide at base, with fine marginal spines. Peduncle 120-280 mm long from base of first bract, hairy, with 4-10 widely spaced leaf-like bracts. Flowers in a globular head 20-23 mm in diameter at anthesis. Cluster-bracts 4.5-6.5 mm wide at the base of the exposed part, triangular, acute to acuminate, pungent. Inner perianth segments spatulate, 1.6-2.2 mm wide at widest point.

Known in the Perth Region at only two localities on the Coastal Plain but has been found as far north as Eneabba. Grows in sandy soil in Jarrah and *Banksia* woodland and may prove to be fairly common in the northern part of the region.

Flowers September-October.

KINGIA R. Br.

Arborescent, with unbranched perennial stems covered with close-packed persistent leaf bases; roots fibrous, growing from shortly below apex down through leaf-base covering of stem, not visible externally. Leaves numerous, in a terminal rosette. Inflorescences numerous (4-100 per plant), growing singly from upper leaf axils, globular or ovoid heads borne on stout unbranched peduncles, which are covered in overlapping bracts; bracts with broad sheathing base and extended apical point, herbaceous, silky-hairy. Flowers in each head many, almost sessile, each subtended by a broad, acute, herbaceous, silky-hairy bract, with 2 lateral narrow keeled bracteoles. Perianth of 6 free segments in 2 indistinct whorls, softly scarious, conspicuous, densely hairy on exterior. Stamens 6; filaments filiform, longer than perianth, attached to receptacle; anthers basifixed, dehiscent inwardly through slits. Ovary densely hairy, 3-celled, with 1 ovule per cell, narrowly cylindrical and tapering into the long filiform style; stigma minute, lobed. Fruit indehiscent, 1-seeded. A monotypic genus restricted to south western Australia. Reference: Staff, I.A. & Waterhouse J.T. 1981. in Pate, J.S. & McComb, A.J. (eds.) The Biology of Australian Plants.

K. australis R. Br.

Drumsticks, Grass Tree, Black Gin

Arborescent, with unbranched cylindrical stem up to 8 m tall, covered with old leaf bases and often blackened by fire. Leaves very long (up to 1 m) and slender above the broad, hairy, flattened and concealed base, quadrangular in section, rather brittle, glabrous or silky-hairy, the blade up to 3.5 mm wide, forming an approximately globular terminal rosette, old leaves forming a skirt around upper part of stem. Peduncles 200-300 mm long, covered with overlapping bracts, bearing a globular to conical head 50-70 mm in diameter, the head with many flowers and herbaceous bracts. Perianth conspicuous; segments yellowish green or pale brownish green at anthesis, ca 25 mm long, fusiform when flattened. Stamens exerted from flower as is the style. Fruit 1-seeded, indehiscent, seldom found and poorly known.

Widespread and common on the Coastal Plain and less commonly on the Darling Range. Also occurs northward to the Hill River and southward to Cape Riche, east of Albany.

Flowers July-August.

Plants in the Stirling Range to Albany region are silvery leaved owing to greater hairiness. They have been named *K. argentea* Preiss ex Lehm. and may merit recognition at some rank.

LOMANDRA Labill.

Dioecious perennials. Stems very short and erect, concealed among leaf bases, or sometimes (not in Perth Region) elongated, erect or procumbent. Leaves few to numerous; blade filiform, terete or narrowly to rather broadly linear or rolled; base sheathing, with membranous or scarious margins which often split into fibres. Inflorescences various; branches, clusters of flowers and individual flowers subtended by bracts of varying number, the outermost bract or bracts of flower clusters being termed cluster-bracts. Perianth segments 6, in 2 whorls (the outer segments sometimes shorter and thinner); segments all free, or all 6 or only the inner 3 connate to the middle. Male flowers with 6 stamens and a vestigial ovary; stamens inserted on perianth at various levels; anthers on filaments or sessile, dorsifixed, introrsely dehiscent by longitudinal slits. Female flowers with 6 staminodes, which are usually inserted like the stamens of male flowers of the same species, and a sessile 3-celled ovary; ovules 1 per cell. Style short or absent; stigma consisting of 3 thick recurved lobes. Fruit a capsule, loculicidally dehiscent, with persistent perianth underneath. Seeds pale brown, globular or ellipsoid, smooth or irregularly wrinkled. A genus of 50 species all in Australia but 2 extending to New Guinea and one of these also in New Caledonia. 26 species in W.A. References: Lee, A.T. 1966. Contr. New South Wales Natl. Herb., Flora Series 34: 16-42; Choo, T.S. 1969. M.Sc. thesis, University of Western Australia; Stevens, P.F. 1978. J. Arnold Arbor. 59: 129-155; Macfarlane, T.D. 1984. Nuytsia 5: 13-24.

1. Male flowers sessile.
2. Leaves terete, stiff, rush-like, hairy at least at base; leaf bases not sheathing..... **L. spartea**
2. Leaves not terete, not rush-like, glabrous; base with sheathing margins.
3. Perianth segments connate to about the middle..... **L. suaveolens**
3. Perianth segments free or connate at base only.
4. Inflorescence a panicle with flowers in clusters; branches always present at several nodes, 8-35 mm long..... **L. sonderi**

4. Inflorescence a spike (if branches present at lower 1 or 2 nodes then not over 5 mm long) with flowers in groups of 2 or 3 or solitary.
5. Flowers in groups of 2 or 3, rarely solitary, purple, widely spaced. Stamens all inserted near base of perianth segments..... **L. britannii**
5. Flowers solitary, rarely 2 or 3 together at a node, yellow or cream (rarely flushed with purple), densely packed and overlapping. Outer stamens attached basally, inner 3 attached near middle of perianth segments..... **L. caespitosa**
1. Male flowers distinctly pedicellate.
6. Male flowers in clusters of 5-20 at each node of inflorescence axis.
7. Leaves hairy, at least on young leaves or at the base, sometimes only on the margin.
8. Leaves terete..... **L. spartea**
8. Leaves flat.
9. Inflorescence 200-600 mm long, half as long to much longer than leaves; male inflorescence a compact more or less cylindrical raceme (occasionally with 1 or 2 branches)..... **L. preissii**
9. Inflorescence 50-100 mm long, much less than half as long as leaves; male inflorescence a more open panicle with numerous branches..... **L. sericea**
7. Leaves glabrous.
10. Inflorescence one-third as long as fully grown leaves or less, or flowering plants leafless following fire.
11. Flowers yellowish green to cream (often with small purple markings). Inflorescence with numerous flowers at each node; flowering August-October..... **L. odora**
11. Flowers with outer perianth segments purple or red, inner segments predominantly yellow. Inflorescence with up to 5 flowers at each node; flowering April-June..... **L. hermaphrodita**
10. Inflorescence at least half as long as fully grown leaves, usually three-quarters to one-and-a-half times as long, plants not flowering while leafless following fire.
12. Flowers white, often with small purple or green markings, strongly scented.
13. Leaf-base margins shredding into fine fibres which blacken or turn dark brown..... **L. nigricans**
13. Leaf-base margins remaining entire and membranous or at most exhibiting a few longitudinal splits, remaining white or turning pale yellowish..... **L. integra**
12. Flowers purple, yellow or greenish yellow, not strongly scented.
14. Pedicels 0.5-1.5 mm long. Inflorescence a compact cylindrical raceme or occasionally a panicle, with flower or branch whorls coalesced so that inflorescence appears uninterrupted, or the whorls up to 25 mm (rarely more) apart at base of inflorescence..... **L. preissii**
14. Pedicels 5-10 mm long. Inflorescence a long open raceme or panicle with flower or branch whorls 30-100 mm apart at base of inflorescence..... **L. purpurea**
6. Male flowers solitary or 2 or 3 together along inflorescence axis.
15. Perianth segments spreading or reflexed.
16. Leaves flat, 3-10 mm wide; leaf bases not splitting into fibres..... **L. drummondii**
16. Leaves flat, concave, semi-terete or terete, 1-3 mm wide (leaves more than 2 mm wide never flat); leaf bases usually splitting into fibres..... **L. micrantha**
15. Perianth segments incurved so that the flowers are globular or ellipsoid.
17. Leaf bases pale brown, pink or purple. Old leaves coiled, straw-coloured. Flowering August-October..... **L. maritima**
17. Leaf bases white or pale grey. Old leaves coiled, deep reddish brown. Flowering April-June..... **L. hermaphrodita**

L. brittanii Choo

Leaves 50-200 x 0.5-1 mm, fine, soft, flat or concave, densely covered with minute hairs or papillae; leaf-base margins white or yellowish, often splitting into fibres; apex rounded or irregularly truncate. Male inflorescence 30-80 mm long, inconspicuous, shorter than leaves, a spike of 6-20 flowers in groups of 2 or 3, arranged in whorled groups or lower nodes often bearing a short branch 1-4 mm long with a terminal cluster of 2 or 3 flowers. Bracts prominent, longer than flowers, with short broad bases and long narrow tips. Female inflorescence a much reduced raceme or panicle 10-20 mm long, concealed among leaf bases, the 1-5 pedicellate flowers in a single terminal cluster. Male flowers purple or yellowish purple, globular, 2.5-3.5 mm long, sessile or the lower flowers very shortly pedicellate; perianth segments free, incurved; outer segments markedly shorter, narrower and thinner, purple; inner segments purple or yellowish purple, longer and broader, thick and fleshy with membranous incurved margins. Stamens all equal in length or the inner 3 longer; anthers on short filaments, which are enlarged in their lower parts. Female flowers purple, larger, 4-6 mm long, campanulate; staminodes inserted like the stamens in male flowers; stigmas sessile on ovary. **Fig. 269**

Known from a few localities with laterite or sand in the Jarrah forest east and south east of Perth and one unconfirmed locality with sand near the coast south of Mandurah. Extends just outside the region to Boddington. Poorly known because it is inconspicuous but probably common on the Darling Range.

Flowers October-November.

L. caespitosa (Benth.) Ewart

Tufted Mat Rush

Leaves filiform or narrowly linear, flat or semi-terete, 120-350 x 1-2 mm, glabrous; leaf-base margins exhibiting little or no splitting into fibres; apex rounded. Male and female inflorescences almost identical, consisting of a spike 15-35 mm long; flowers densely packed, solitary and irregularly arranged or occasionally lower flowers 2 or 3 together. Bracts conspicuous, longer than the flowers, especially in the lower part of the inflorescence, with broad base and long narrow tip. Male flowers yellow or cream, 2.5 mm long, sessile. Perianth segments free, erect, the outer perianth segments markedly shorter and thinner than the thickened inner segments. Stamens all equal in length, the outer 3 inserted at the base of the outer perianth segments, the inner 3 inserted at a higher level on the inner perianth segments. Female flowers and perianth segments as for male flowers; stigmas on a short style.

Widespread on sandy soil in Jarrah woodland on the eastern half of the Coastal Plain and also in laterite on the Darling Range. Occurs from Eneabba to Albany and inland to Beverley.

Flowers July-October.

L. drummondii (F. Muell. ex Benth.) Ewart

Leaves 200-500 x 3-12 mm, very coarse, flat above and beneath, glabrous; leaf-base margins brown or purple, not splitting into fibres; apex rounded. Male inflorescence 100-300 mm long, shorter than or as long as leaves, a panicle with alternate branches and flowers solitary or in clusters of 2 or 3. Bracts shorter to slightly longer than pedicel. Female inflorescence similar to male one. Male flowers 2.5-4 mm long, on pedicels 1-3 mm long, purple; perianth segments spreading or reflexed, free, all equal in shape and size or the outer 3 slightly narrower. Stamens all equal in length, attached near base of perianth. Female flowers similar to male flowers, pedicellate; stigmas borne on a distinct style.

Only known in the Perth Region from a few localities along Albany Highway south of Armadale, but probably widespread in the Perth Region on lateritic soil in the Jarrah forest. South of the region it extends to near Walpole.

Flowers May-June.

L. hermaphrodita (C.R.P. Andrews) C. Gardner

Plants consisting of several plantlets forming small tufts, often found flowering while leafless after burning or grazing. Leaves basal, narrowly linear, flat or plano-convex, often twisted or coiled, 150-450 x 1-2 mm, green or occasionally glaucous, glabrous, old leaves coiled, reddish brown; apex rounded or obtuse; leaf-base margins white or pale grey, splitting into fibres. Male inflorescence a panicle, 30-80 mm long; lower nodes bearing opposite or whorled branches with flowers either solitary or grouped 2 or 3 together; middle and upper nodes bear 2-4 opposite or whorled pedicellate flowers. Bracts red,

shorter or slightly longer than pedicels. Female inflorescence a panicle, very similar to, but usually shorter and less branched than male inflorescence. Male flowers purple and yellow, globular or ovoid, 2-4 mm long; pedicels 1-5 mm long. Perianth segments free, incurved; outer segments markedly shorter and thinner in texture, purple; inner segments longer and fleshy, yellow, sometimes flushed with purple. Stamens about equal in length, inserted at base of perianth segments. Female flowers 4-6 mm long; pedicels 0.5-8 mm long; stigmas nearly sessile on ovary. *Xerotes andrewsii* W.V. Fitzg.

Found in sandy soil on the Coastal Plain and lateritic soil on the Darling Range, growing throughout the Perth Region. Also known from south of the Region nearly to Albany.

Flowers April-June.

This inappropriately named species is probably always dioecious, although it sometimes has a misleadingly large pistillode in male flowers. All *Lomandra* species are dioecious, but bisexual flowers occur very rarely among the unisexual ones in a few species, and more frequently in 1 or 2 eastern Australian species. Blackall and Grieve (1954) *How to Know Western Australian Wildflowers*, vol. 1, used the invalid name *L. andrewsii* for *L. hermaphrodita*.

***L. integra* T.D. Macfarlane**

Plants consisting of several tufts attached to an elongated, straight or rather gnarled, ascending rhizome, with roots arising from the rhizome deep in the soil, well below leaf bases. Leaves rather coarse, 70-580 x 0.7-3 mm, variable in length relative to width, ranging from short and broad (especially, but not only, following burning) to long and filiform, both forms sometimes occurring on the same plant, flat beneath and above or convex beneath and flat or shallowly channelled above; apex obtuse; leaf-base margins membranous, not splitting into fibres (though sometimes exhibiting a few longitudinal splits), white or turning yellowish or pale brown. Male inflorescence a panicle or raceme of whorled clusters of numerous flowers, half as long to longer than leaves; branches often present at lowest 1-several nodes, (5-)30-120 mm long; longest internode between flower or branch clusters (10-)20-80 mm. Cluster-bracts (except at lowest 1 or 2 nodes) inconspicuous, deltate or broadly triangular with a short acute apex, shorter than to as long as pedicels of mature flowers. Female inflorescence a spike or paniculate spike of whorled clusters of flowers or branches, similar in length to male inflorescence. Flowers scented, white, often with purple markings on upper part of perianth segments, especially the outer 3. Male flowers with perianth spreading at anthesis, segments all thin in texture, outer 3 slightly shorter; pedicels 2-4 mm long. Stamens about equal in length. Female flowers sessile; stigmas on a short style.

Grows on lateritic soils in the Jarrah forest southward from Perth. Extends south of the region to Augusta and Denmark.

Flowers August-November.

***L. maritima* Choo**

Leaves 300-600 x 1-2 mm, flat or shallowly channelled, glabrous, the old leaves often coiled, straw-coloured; leaf-base margins pale brown, pink or purple, splitting into fibres; apex rounded. Male inflorescence a panicle 30-100 mm long, much shorter than leaves; branches short, alternate or occasionally opposite or whorled, flowers solitary or occasionally 2 or 3 together. Bracts red, narrow, tapering, shorter to slightly longer than pedicel. Female inflorescence similar to male one. Male flowers 3.5-6 mm long, on pedicels 2-10 mm long, purple and yellow, globular to ovoid; perianth segments incurved, free except at base; outer segments shorter, membranous, purple; inner segments longer, fleshy, yellow. Stamens inserted near base of perianth segments, all on distinct filaments but the inner 3 longer. Female flowers 5-8 mm long, on pedicels 1-5 mm long, purple and yellow; staminodes inserted like stamens in male flowers; stigmas sessile on ovary.

Grows on sandy soils near the coast. Extends from north of Geraldton south to Bunbury.

Flowers late August-October.

***L. micrantha* (Endl.) Ewart**

Leaves 300-600 x 1-3 mm, fine to very coarse, flat, concave, semi-terete or terete, glabrous; leaf-base margins white to brown, often splitting into fibres; apex rounded. Male inflorescence 60-300 mm long, much shorter than the leaves, a panicle with alternate branches and flowers solitary or in clusters of

2 or 3. Cluster-bracts typically much shorter than the pedicel. Female inflorescence a panicle or raceme with flowers arranged alternately, opposite or irregularly. Male flowers ca 2.5 mm long, on pedicels 1-4 mm long, dull greenish purple to brown; perianth segments spreading or reflexed, free, all equal in shape and size or the outer segments slightly shorter and narrower. Stamens all equal in length, inserted near base of perianth. Female flowers on pedicels up to 2 mm long or nearly sessile; stigmas borne on a distinct style. **Fig. 270**

Found on a variety of soils from near-coastal areas to the Darling Range, widely distributed and probably growing throughout the Perth Region. Extends from the Greenough River to east of Esperance. Also occurs in S.A., Vic., N.S.W.

Flowers May-September.

Although inflorescence morphology appears uniform in this species, there is a great variety of leaf form. Leaves range from very fine and flattened in eastern parts of the Coastal Plain to thick and flattened nearer the coast to thicker and semi-terete on the Darling Range. Plants with very robust rush-like leaves occur toward the south coast and are to be described as a separate subspecies. At least 3 different chromosome numbers occur in W.A. and they show some correlation with morphological features.

L. nigricans T.D. Macfarlane

Plants consisting of 1-several tufts attached to a short compact rhizome, roots arising close to leaf bases. Leaves rather coarse, 230-680 x 0.8-2.7 mm, convex beneath and flat or shallowly channelled above; apex obtuse; leaf-base margins shredding early into fine fibres, which turn dark brown to black. Male inflorescence a panicle or interrupted raceme of whorled clusters of numerous flowers, half to as long as the leaves; branches often present at lowest 1-several nodes, (10-)30-90 mm long; longest internode between flower or branch clusters (9-)20-70 mm long. Cluster-bracts (except at lowest 1 or 2 nodes) inconspicuous, with broad base and short obtuse or erose apex, shorter than pedicels of mature flowers. Female inflorescence a spike or paniculate spike of whorled clusters of flowers or branches,

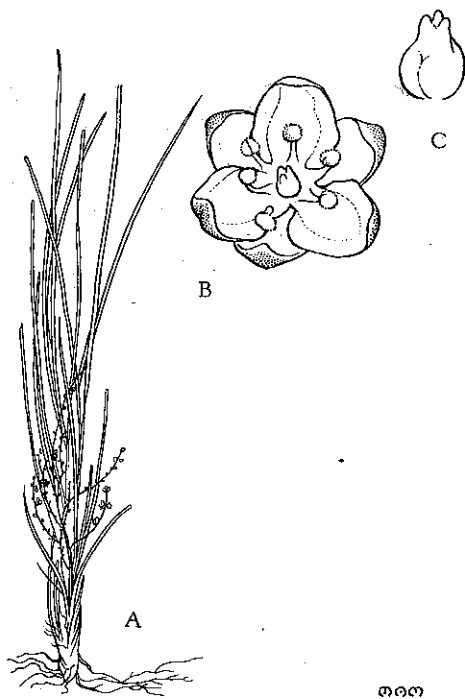


Fig. 270. *Lomandra micrantha*. A, Male plant. B, Male flower. C, Vestigial ovary.

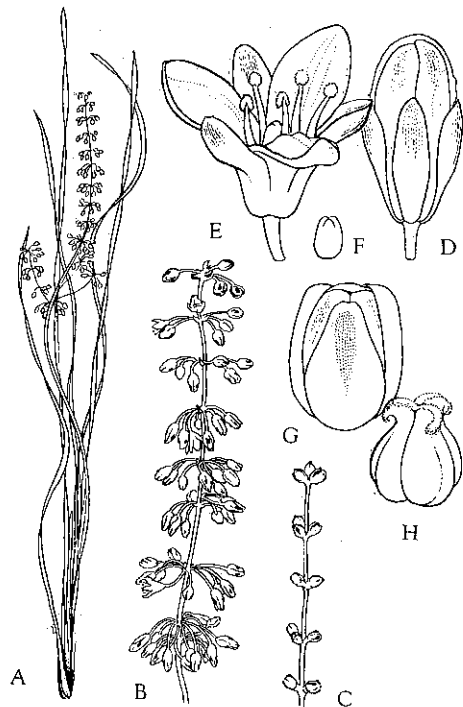


Fig. 271. *Lomandra nigricans*. A, Male plant. B, Male inflorescence. C, Female inflorescence. D, Male bud. E, Male flower. F, Vestigial ovary from male flower. G, Female bud. H, Ovary and style from female flower.

similar in length to male inflorescence. Flowers scented, white with purple markings on upper part of perianth segments, especially the outer 3. Male flowers with perianth spreading at anthesis but campanulate before and afterwards, segments all thin in texture, equal or the outer 3 slightly shorter; pedicels 2-7.5 mm long. Stamens about equal in length. Female flowers sessile; stigmas on a short style. **Fig. 271**

Grows on grey or yellow sandy soils in woodland on the Coastal Plain and on lateritic soil in the Jarrah forest. Common throughout the Perth Region and extending east to Northam, south to Albany and along the south coast to east of Israelite Bay.

Flowers late May-August.

L. odora (Endl.) Ewart

Plants small, leaves 100-540 x 0.5-1.2 mm, fine, convex beneath, flat above or sometimes very shallowly channelled; apex obtuse; leaf-base margins at first membranous, eventually breaking up into fibres, remaining white or turning greyish. Male inflorescence a compact raceme or panicle of whorled clusters of numerous flowers, less than half as long as leaves (but may be longer in plants recently burnt or grazed); branches (when present) occurring only at lowest 1 or 2 nodes, inconspicuous, usually no longer than 10 mm, occasionally up to 25 mm; longest internode between clusters 4-10(-18) mm long. Cluster-bracts conspicuous, with broad base and long apical point, slightly shorter to slightly longer than pedicels of mature flowers. Female inflorescence a compact spike of 1-several whorled clusters of flowers, similar in length to male inflorescence. Flowers scented, greenish yellow to cream, sometimes with purple marks toward tip of outer perianth segments. Male flowers with perianth spreading at anthesis and remaining open afterwards; segments all thin in texture, equal or the outer 3 rather shorter; pedicels 3-5 mm long. Stamens about equal in length. Female flowers sessile; stigmas on a short style.

Widespread though apparently not common, growing on sandy soils (often near swamps) in woodland on the Coastal Plain and has been collected from the Darling Range. Occurs from Perth south to Bridgetown.

Flowers August-early October.

L. preissii (Endl.) Ewart

Leaves 280-600 x (1)2-5 mm, flat or concave, glabrous or occasionally hairy toward the base; leaf-base margins brown, not splitting into fibres; apex rounded. Male inflorescence 200-600 mm long, half as long as leaves to much longer, a cylindrical raceme of flowers arranged in whorled clusters, the whorls close-packed or the lower whorls spaced apart (rarely the lower 1-3 nodes bearing 1 or more branches); rachis 25-100 mm long, borne on a long peduncle. Cluster-bracts very broad, longer than the pedicel. Female inflorescence a spike or raceme 250-600 mm long; flowers arranged in whorled clusters. Male flowers 2-3 mm long, on pedicels 0.5-1.5 mm long, greenish yellow or purple; perianth segments spreading, free, all equal in shape and size, the outer slightly thinner. Stamens all equal in length, inserted near base of perianth segments; filaments long, connate near base. Female flowers sessile or subsessile, greenish yellow or purple; stigmas sessile on ovary or on a short style. **Fig. 272**

Widespread in the Perth Region on laterite in the Jarrah forest or sandy soils on the Coastal Plain. Occurs from the Hill River to Albany.

Flowers April-July.

The yellow and purple colour variants are found in both sexes and frequently grow side by side.

L. purpurea (Endl.) Ewart

Leaves 200-600 x 4-10 mm, very coarse, flat, glabrous; leaf-base margins yellowish, membranous, not splitting into fibres (although with occasional splits); apex rounded or retuse. Male inflorescence a loose panicle or raceme up to 1.2 m tall, considerably exceeding the leaves, the rachis 100-300 mm long; branches whorled, bearing widely spaced whorled clusters of flowers. Cluster-bracts very broadly ovate to deltate, much shorter than pedicels. Female inflorescence a spike, sometimes slightly branched, up to 1 m tall, bearing whorled clusters of flowers. Male flowers 3-4 mm long, on pedicels 5-10 mm long, dark purple (occasionally yellow); perianth segments spreading, free, all equal in shape and size or the inner segments broader. Stamens all equal in length, inserted near base of perianth segments. Female flowers sessile or subsessile; stigmas sessile on ovary.

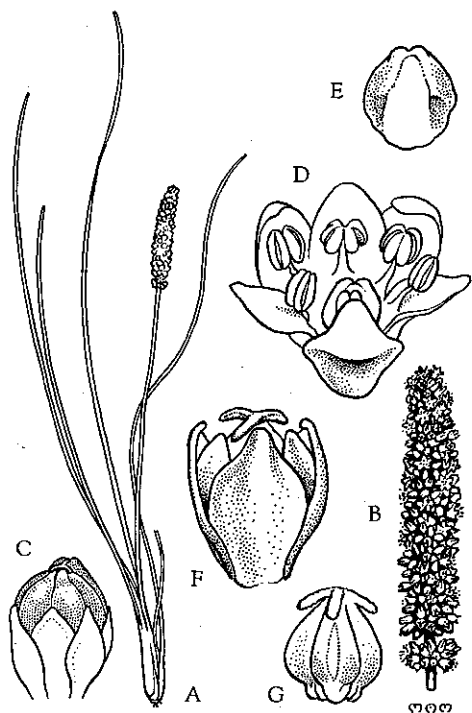


Fig. 272. *Lomandra preissii*. A, Male plant. B, Male inflorescence. C, Bud. D, Male flower. E, Vestigial ovary from male flower. F, Female flower. G, Ovary and style from female flower.

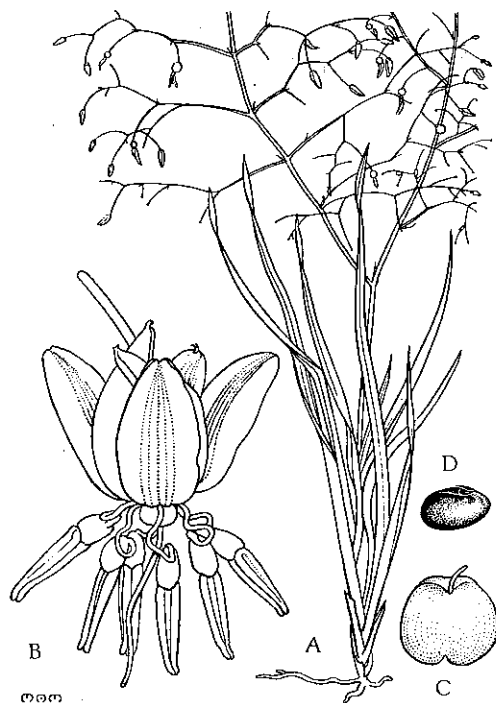


Fig. 273. *Dianella divaricata*. A, Habit. B, Flower. C, Fruit. D, Seed.

Grows mainly on lateritic soil in the Jarrah forest but occasionally on sand in woodland on the Coastal Plain, found from Wooroloo southward. Extends south to Mount Barker.

Flowers October-November.

L. sericea (Endl.) Ewart

Leaves 200-600 x 2-5 mm, stiff, coarse, flat, hairy at least on young leaves and leaf bases; leaf base margins white, not splitting into fibres; apex rounded. Male inflorescence 25-100 mm long, much shorter than leaves, a panicle with whorled branches bearing whorled clusters of flowers. Cluster-bracts broadly ovate to deltate. Female inflorescence a spike bearing 1-several whorled clusters of flowers. Male flowers 2-3.5 mm long, on pedicels 1-3 mm long, purple or the inner perianth segments yellow on the margins; perianth segments erect, free, the outer segments distinctly shorter and thinner than the inner. Stamens unequal, 3 with filaments ca 0.5 mm long inserted near base of outer perianth segments, 3 with anthers almost sessile at middle of inner perianth segments. Female flowers sessile, purple or purplish yellow; staminode insertion as with stamens of male flowers; stigmas sessile on ovary.

Grows on sand or laterite, widespread in the Perth Region though not common, found most often on the Coastal Plain. Ranges from Encabba to Albany and the Stirling Range.

Flowers August-September.

L. sonderi (F. Muell.) Ewart

Leaves 300-850 x 1.8-7 mm, stiff, flat, glabrous; leaf-base margins white to yellowish, not splitting into fibres; apex rounded or acute. Inflorescence axis flattened in both sexes. Male inflorescence a paniculate spike 100-400 mm long, usually shorter than leaves, rarely about as long, branches borne at lower nodes, usually whorled; flowers arranged in whorled clusters on upper part of main axis and on the branches. Cluster-bracts broadly ovate to deltate. Female inflorescence a spike 100-300 mm long, consisting of several whorled clusters of flowers. Male flowers 2.5-3.5 mm long, sessile; outer 3 perianth segments free, purple or brownish yellow, thinner and a little shorter than the inner segments; inner segments yellow, considerably thicker, connate in the lowest third. Stamens unequal, 3 with short

filaments ca 0.5 mm long inserted near base of outer perianth segments and 3 with sessile anthers attached above middle of inner perianth segments. Female flowers sessile, yellow or purplish; staminodes inserted like the stamens of male flowers; stigmas sessile on ovary.

Grows on lateritic soil in the Jarrah forest, known from as far north as Mundaring and extending south of the region to Albany. Both yellow flowered and yellow-and-purple flowered plants may grow together.

Flowers October-November.

***L. spartea* (Endl.) Ewart**

Leaves 300-600 x 1-2 mm, rigid, terete, hairy at least on leaf bases and young leaves, leaf bases not differentiated into a sheathing base; apex pointed. Scale leaves with membranous margins present at base of plant. Male inflorescence 30-70 mm long, a spike bearing 2-6 whorled clusters of flowers. Cluster-bracts very broadly ovate to deltate. Female inflorescence consisting of a single terminal cluster of several sessile or subsessile flowers. Male flowers 2-2.5 mm long, sessile or subsessile, purple; perianth segments free, slightly spreading, almost equal in length, the outer segments thinner. Stamens unequal, 3 with short filaments inserted near base of outer perianth segments, 3 with anthers almost sessile near middle of inner perianth segments. Female flowers purple; staminodes attached like stamens of male flowers; stigmas more or less sessile on ovary.

Occurs in lateritic soil in Jarrah or Marri forest on the Darling Range. Extends east of the Perth Region to Williams and Wandering.

Flowers July-September.

***L. suaveolens* (Endl.) Ewart**

Leaves 100-350 x 0.5-2 mm, soft to stiff, flat or semi-terete, glabrous, often rather glaucous; leaf-base margins white to yellow, splitting into fibres; apex rounded. Male inflorescence 30-80 mm long, much shorter than the leaves, a spike with flower clusters arranged alternately or the upper clusters becoming opposite, or a panicle with alternately arranged branches in lower part of main axis and flower clusters in upper part arranged as in spikes. Cluster-bracts very broadly ovate to deltate, shorter than flowers. Female inflorescence a compact spike 10-50 mm long, consisting of a single terminal cluster of flowers. Male flowers 3.5-6 mm long, sessile, purple or yellow; perianth segments connate to the middle forming a long tube, the free lobes all equal in length, the outer lobes broader. Stamens all equal in length; anthers on short filaments, almost sessile, inserted at base of perianth lobes. Female flowers sessile, purple or yellow; perianth segments free, with staminodes inserted basally; stigmas borne on a short style or sessile on ovary.

Grows on a variety of soils throughout the Perth Region; on the Coastal Plain it can be found in both Jarrah and Tuart woodland. Ranges from Mt. Lesueur to the Porongurup Range.

Flowers April-July.

FAMILY 129 XANTHORRHOACEAE

D. Bedford

Large arborescent or small tufted perennials. Leaves numerous in a dense crown or tuft. Inflorescence a cylindrical spike-like structure on a woody scape. Flowers bisexual, surrounded by numerous bracts. Perianth segments 6 in 2 whorls. Stamens 6; filaments inserted on the receptacle; anthers versatile, dorsifixed, dehiscent by slits. Ovary superior, 3-celled, with several ovules per cell. Capsule protruding from the persistent perianth and bracts. Seeds 1 or 2 per cell. An endemic Australian family with a single genus.

XANTHORRHOEA Smith

Woody-stemmed perennials with an arborescent to subterranean stem, secondarily thickened. Stem branched or unbranched, covered with closely packed persistent leaf-bases. Leaves numerous in 1 or more terminal rosettes, each of which forms either a tuft or crown of leaves. Leaves long, linear, tapering from a broad, thickened, distinct leaf-base to a fine, pointed, more or less pungent apex; leaf transverse sectional shape variable from quadrate-rhombic to broadly transversely rhombic or narrowly to broadly obtriangular; leaf margins bordered with fine, more or less rigid, usually microscopic hair-like structures. Scape slender or thick, usually glabrous. Spike short to very long, of numerous closely packed sessile flowers; flowers in obscure clusters (condensed cymes) arranged spirally on the axis and subtended by cluster-bracts, each flower surrounded by numerous floral bracts (here called packing-bracts); usually only 1 inflorescence per apex though 1 to few per plant. Perianth persistent; segments free; outer segments more or less scarious, erect, narrowly oblong to spatulate; inner segments more or less petal-like, cream to white, broader and longer than the packing-bracts, the distal half recurved over the bract surface or conspicuously exerted at flowering. Staminal filaments flattened, tapered, glabrous. Ovary tapering to the single terete style; stigma entire, sometimes grooved, terminal. Capsule obtuse to acute, loculicidally dehiscent. Seeds usually 2-4 per fruit. An endemic Australian genus of ca 30 taxa, ca 8 occurring in W.A.

1. Plant with above ground stem.
 2. Scape length and spike length more or less equal. Cluster-bracts prominent on spike..... **X. acanthostachya**
 2. Scape length much less than spike length. Cluster-bracts obscure.... **X. preissii**
1. Plant without above ground stem.
 3. Scape greater than 10 times length of spike, usually ca 5 mm in diameter. Petals large, obvious..... **X. gracilis**
 3. Scape 3-5 times length of spike, usually 5-20 mm in diameter. Petals small, not obvious..... **X. brunonis**

X. acanthostachya Bedford

Trunk short to 1.5 m tall; crowns 1 or 2. Leaves in a more or less hemispherical crown, green to slightly glaucous, 0.6-0.7 m long, quadrate-rhombic in transverse section, 2-2.25 mm wide and 1.5-2 mm thick. Scape 400-500 mm long, 7-16 mm in diameter. Spike usually more or less equal in length to the scape, 400-500 mm long and 20-40 mm in diameter, with a distinctly prickly appearance. Cluster-bracts very elongated, subulate, usually very prominent, glabrous or almost so. Packing-bracts subulate, often twisted or folded, glabrous or almost so. Outer perianth segments acute, beaked, glabrous except for hairs in the beak. Inner perianth segments more or less erect, soft and petal-like at apex, chartaceous below, sometimes beaked. Fruit dark brown, acute.

Uncommon, apparently endemic to the Perth Region, occurring in lateritic soil on the Coastal Plain and slopes of the Darling Range.

Flowers November-December.

The spike of this species has a distinctively prickly appearance due to the relatively prominent, elongated, subulate cluster-bracts.

X. brunonis Endl.

Single or more usually branched tufted perennial with a subterranean stem (up to 100 mm above ground in very old plants), often forming caespitose clumps. Leaves in erect tufts, green, not glaucous, usually 0.5-0.8 m long, broadly transversely rhombic to broadly obtriangular in transverse section, usually 3-4 mm wide and ca 2 mm thick. Scape 3-5 times longer than spike, (0.3-)0.7-0.9(-1.1) m long, and 5-20 mm in diameter. Spike (70-)100-300(-650) mm long and 20-40 mm in diameter, glabrous in appearance. Cluster-bracts narrowly triangular, short, acute, not prominent at flowering. Packing-bracts usually short to intermediate in length, shiny, acute, margins below apices almost glabrous or fringed with hairs, margins of apices more or less glabrous. Outer perianth segments scarious, acute, keeled, tapering to a terminal beak, glabrous except for a tuft of short papillose hairs in the beak. Inner perianth segments petal-like above, chartaceous below, apices reflexed along bract surface at maturity.

Widespread and common on the Coastal Plain north and south of Perth, growing in sandy soil in *Banksia* or Jarrah woodland.

Flowers October-November and possibly September.

There is considerable variation in specimens presently ascribed to this taxon. The type and majority of collected specimens conform to the description above. However a number of specimens which are superficially similar to this taxon have the packing-bract apices fringed with hairs as well as slight differences in leaves and scape length. These specimens may either represent an as yet undescribed subspecies of *X. brunonis* or may be sufficiently distinct to warrant species status.

X. gracilis Endl.

A tufted perennial with a subterranean stem, sometimes forming caespitose clumps. Leaves loosely erect to decumbent, 0.5-0.6 m long, broadly obovate to broadly obtriangular in transverse section, (1.8-)3(-3.8) mm wide and (1.2-)1.5(-2.8) mm thick. Scape greater than 10 times longer than the spike, slender, (0.85-)1.5(-2) m long, usually ca 5 mm in diameter. Spike (40-)100-110(-200) mm long, (7-)13-14(-20) mm in diameter, dark brown and velvety before flowering, with prominent, cream, petal-like inner perianth segments and prominent anther filaments at flowering. Cluster-bracts narrowly triangular, not prominent at flowering. Packing-bracts and outer perianth segments short, with acute, dark brown apices, hairy. Inner perianth segments cream, petal-like, large and prominent, recurved, hairy at the apices. Fruit usually long and pointed, often curved upward.

Throughout the Darling Range in sandy soil with laterite. Widespread in south western W.A.

Flowers in spring and early summer.

A very distinctive trunkless species due to its long slender scape, short spike and long leaves.

X. preissii Endl.

Blackboy

Trunk short to tall, 0.3 m to over 3 m tall; crowns 1-many. Leaves in an irregular hemispherical crown, green, not glaucous, quadrate-rhombic to broadly quadrate-rhombic in transverse section, (1.7-)2.2-2.8(-3.3) mm wide and (1.5-)2.1-2.4(-2.7) mm thick. Scape much shorter than spike, (0.3-)0.6-1(-1.4) m long, (9-)20-30(-42) mm in diameter. Spike green at flowering, (1-)1.5-2.5(-3.2) m long and (20-)30-60(-70) mm in diameter. Cluster-bracts obscure. Packing-bracts short to intermediate in length, acute, more or less glabrous. Outer perianth segments short to intermediate in length, acute, almost glabrous to sparsely hairy. Inner perianth segments recurved at maturity, soft and petal-like at apices, chartaceous below, with 3-5 distinct dark veins. Fruit obtuse when mature.

Throughout the region. Widespread in the south west.

Flowers January-November; fruits November-December.

There is considerable variation in leaf width and thickness, and a small amount of variation in leaf shape in this taxon. Specimens on lateritic or loam soils and in higher rainfall areas have larger leaves, sometimes tending to be wider than they are thick. Variants with reflexed leaves were previously regarded as *X. reflexa* Herbert. The type specimen of *X. reflexa* is *X. preissii*, although a part of Herbert's original description refers to *X. drummondii* Harvey which does not occur in the Perth Region.

*FAMILY 130 AGAVACEAE

B. L. Rye

Robust perennials, often woody at the base, rarely arborescent, often with a short rhizome, unbranched or sparsely branched, usually hermaphrodite. Leaves crowded, often basal, sessile, simple, narrow, often thick and succulent, often prickly or spiny. Inflorescence a raceme or panicle, usually massive. Flowers usually actinomorphic. Perianth segments 6, in 2 whorls of 3, petal-like, often connate at the base. Stamens 6, inserted on or at the base of the perianth segments; anther 2-celled, attached adaxially or basally, longitudinally dehiscent. Ovary inferior or superior, 3-celled; placentas usually axile; ovules 1 to numerous per cell. Stigmas 3, on a definite terminal style or sometimes sessile. Fruit a loculicidal capsule or a berry. Seeds compressed. Almost 600 species in ca 18 genera, mainly in warm and often arid regions.

***AGAVE L.**

Robust perennials, rarely with a woody trunk, flowering only once then dying after the fruits have ripened, sometimes suckering from the base of the stem, hermaphrodite. Leaves crowded, persisting for several years, usually large or very large, often very succulent or fibrous; blade terminating in a spine, usually with lateral teeth. Inflorescence a large panicle, terminal; organs of vegetative reproduction, which are known as bulbils, sometimes replacing some of the flowers. Outer and inner perianth segments very similar, often green or white. Stamens longer than the perianth; filament long; anther versatile. Ovary inferior; ovules numerous. Style filiform; stigma slightly 3-lobed. Fruit a loculicidal capsule. Seeds numerous, thin. About 300 species, in tropical and subtropical parts of the Americas, 1 species naturalized in W.A.

***A. americana L.**

Century Plant

Plant vegetative for 5-60 or more years, developing a short thick base, reproducing vegetatively by suckers; flowering stem growing very rapidly, up to 7 m high. Leaves in a basal rosette, bluish green, sometimes with a yellow margin, 1-2 m long, usually ca 150 mm broad, thick, succulent, rigid, toothed; terminal spine ca 20 mm long; teeth each on a large succulent prominence, grey, triangular, usually 5-10 mm long. Inflorescence 1-1.5 m long. Flowers yellowish. Perianth commonly ca 35 mm long. Stamens exceeding the perianth. Ovary ca 30 mm long. Capsule brown at maturity, ca 50 mm long.

Naturalized in a few locations in or near Perth, including Kings Park and Rottnest Island. Native to Mexico.

Flowers recorded January.

FAMILY 131 HYPOXIDACEAE**B. L. Rye**

Perennial herbs, with a tuber-like rhizome or corm, hermaphrodite. Leaves mostly arising at the base, conspicuously veined or folded, often covered by long whitish hairs. Inflorescence a raceme or sometimes 1-flowered, terminal. Flowers pedicellate, actinomorphic. Perianth segments usually 6, equal, fairly persistent, spreading. Stamens usually 6 in 2 whorls, sometimes 3-5; anther 2-celled, usually basifixed with a sagittate base, longitudinally dehiscent. Ovary inferior, 3-celled, rarely with 1 or 2 cells aborted, often with an apical beak; ovules few-numerous per cell, in 2 rows. Style terminal. Fruit a capsule or an indehiscent schizocarp. Seeds often black, small. Over 180 species in 9 genera, occurring throughout the world except for Europe and northern Asia.

HYPOXIS L.

Perennial herbs, small, with a corm or corm-like rootstock, which is covered by coarse stiff fibres. Stem filiform. Leaves radical, grass-like, long, sheathing at the base. Inflorescence often 1-flowered. Perianth segments 4-6, persistent. Stamens 4-6. Ovules 4-20 per cell. Stigmas 3 or rarely 2, erect, often longer than the style below, papillose. Fruit a capsule, circumscissile just below the summit, then irregularly dehiscent. Seeds ellipsoid to globular, sometimes conspicuously beaked. About 145 species, occurring in the Americas, Africa and from southern Asia to New Zealand, ca 6 species occurring in W.A. The genus is being revised by R.J.F. Henderson.

- | | |
|--|------------------------|
| 1. Stem bracts 2, opposite or almost so, not subtending a branch, 1-7.5 mm long..... | H. glabella |
| 1. Stem bracts 1 or, if more, then distant and the additional bracts each subtending a branch, 8-30 mm long. | |
| 2. Capsule globular to ovoid. Perianth segments 6. | |
| 3. Stigmas 1.5-4 mm long. Anthers ca 3.5 mm long..... | H. vaginata |
| 3. Stigmas 0.7-1 mm long. Anthers 1-1.5 mm long..... | H. sp. A |
| 2. Capsule elongate, tapering to the stem. Perianth segments usually 4, rarely 5 or 6..... | H. occidentalis |

H. glabella R. Br.

Tiny Star

Perennial herb, 20-200 mm high, glabrous. Stems 10-110 mm long. Leaves often spreading, filiform, usually curved, 50-250 mm long. Stem bracts 2, opposite or almost so, below the middle of the stem, filiform, 1-7.5 mm long. Flowers 1-3 per plant, each terminating a long stem arising from the basal sheaths. Perianth segments 6, green outside, bright yellow inside, narrowly ovate; outer 3 segments often pink and cream around the margin, at least 3.5 mm long in flower, up to 9.5 mm long in fruit; inner 3 segments paler in colour and shorter than the outer segments. Stamens 6; outer 3 stamens shorter than the inner stamens; inner stamens 2.3-4 mm long, with an anther 1-2 mm long. Ovary usually 2-3 mm long. Style 2.5-4 mm long including the stigmas; stigmas 1-2 mm long. Capsule globular or obovoid, usually 2.5-5 mm long, up to 3 mm broad. *H. hookeri* Geerinck, *H. leptantha* Benth.

Occurs in loam or clay, sometimes in shallow soil over granite, on the Darling Scarp and Range near Perth, possibly also occurring on the Coastal Plain. Extends from the Murchison River to south of Balladonia. Also occurs in S.A., Vic., Tas., N.S.W. and New Zealand.

Flowers May-October.

The species has also been known by an illegitimate name, *H. pusilla* J.D. Hook. Outside the Perth Region the ovary is up to 5 mm long.

H. occidentalis Benth.

Perennial herb, up to 300 mm high, glabrous. Stems 40-260 mm long. Leaves usually fairly erect, narrowly linear, 60-270 mm long. Stem bracts 1 or rarely 2, 17-55 mm long; second bract (when present) usually subtending a branch with an additional flower. Flowers usually 1-3 per plant, sometimes 4-12, usually each terminating a long stem arising from a basal sheath, rarely the extra flowers arising at the height of the stem bract and subtended by an opposite second bract. Perianth segments 4-6, usually 4 in the Perth Region, green outside, yellow inside, narrowly ovate, 6-16 mm long. Stamens 4-6, often still 6 when there are only 4 perianth segments, 3-7 mm long; anther 2-5.5 mm long. Style 2-4 mm long including the stigmas; stigmas 1.5-4 mm long. Ovary narrow, tapering to the stem, 6.5-13 mm long. Capsule elongate, broadest toward the summit, tapering to the stem.

Occurs on the Coastal Plain, Darling Scarp and Range. Extends from north of Geraldton to the Porongurup Range and inland to Pingelly.

Flowers mainly June-September.

South of the Perth Region the specimens are sometimes smaller. North of the region the plants and flowers tend to be larger, most flowers have 6 perianth segments and the stigmas usually reach the top of the anthers. The variant in the Perth Region will probably be recognized as a new subspecies (R.J.F. Henderson pers. comm.). See also the note under *H. vaginata*.

H. vaginata Schlecht.

Perennial herb, 80-250 mm high, glabrous. Stems 70-230 mm long. Leaves narrowly linear, erect or somewhat curved, 90-255 mm long. Stem bracts 1 or 2, 15-30 mm long; second bract (when present) usually subtending a branch with an additional flower, sheathing in the lower part. Flowers 1-3 per plant, either each terminating a stem or branch arising from the base of the plant or 1 terminal and the other flowers arising from the position of the stem bract. Perianth segments 6, green outside, yellow inside, narrowly ovate; outer 3 segments 9-14 mm long; inner 3 segments slightly smaller than the outer segments. Stamens 6, all 5-6 mm long or the outer 3 stamens shorter; inner stamens with an anther 3.5-3.8 mm long. Ovary 2-6 mm long. Style 1-2.5 mm long not including the stigmas; stigmas 1.5-4 mm long. Capsule not seen but probably almost globular.

Recorded from Coolup to Harvey on the eastern side of the Coastal Plain. Extends south to Capel. Occurs in all states except N.T.

Flowers July-September.

This taxon is distinguished from *H. occidentalis* mainly by its shorter capsule. Further study is needed to determine whether the 2 taxa are sufficiently distinct to be maintained as separate species.

H. sp. A.

Perennial herb, usually 75-100 mm high, glabrous. Stems 20-50 mm long. Leaves often curved and spreading, narrowly linear, 70-100 mm long. Stem bract 1, erect, usually near the middle of the stem, sheathing, very narrowly ovate, 8-20 mm long. Flowers 1 or 2 per plant, terminating a long stem arising from the basal sheaths. Perianth segments 6, yellow inside, narrowly ovate; outer 3 segments green outside, 6-10 mm long; inner 3 segments paler in colour and shorter than the outer segments. Stamens 6; outer 3 stamens shorter than the inner stamens; inner stamens 3.5-4 mm long, with an anther 1-1.5 mm long. Style 2-2.5 mm long not including the stigmas; stigmas 0.7-1 mm long. Ovary 4-7 mm long. Capsule not seen but probably not very elongate.

Recorded only from Mundaring to Brookton Highway, associated with laterite or granite on the Darling Range.

Flowers July-September.

Although no mature capsules have been seen, this species appears to be intermediate between *H. vaginata* and *H. occidentalis* in capsule length, differing from both species in its short stigmas but long style. Possibly it is just a variant of *H. vaginata*.

A Note on FAMILY LILIACEAE

T. D. Macfarlane

The scope of the family Liliaceae has recently been narrowed; the family is no longer considered to be represented by plants native or naturalized in the Perth Region. Liliaceae is replaced by families 129, 133-137 and 139. In addition, Xanthorrhoeaceae, which has already long been excluded from Liliaceae by some authors, is here treated as the two families 128 Dasypogonaceae and 129 Xanthorrhoeaceae. As with all families in this Flora, the replacement families appear in the key to the families and each family description is followed, when appropriate, by a key to the Perth Region genera. In addition, as a time-saving measure for people still accustomed to the former concept of the Liliaceae, a combined key to the Perth Region genera of the segregate families (excluding Xanthorrhoeaceae and Dasypogonaceae) is provided below. Reference: Dahlgren, R.M.T. & Clifford, H.T. 1981. The Monocotyledons, a Comparative Study.

Key to Genera of Lily Families (formerly LILIACEAE sens. lat.)

1. Inflorescence an umbel, or if flowers solitary then inner perianth segments fringed.
 2. Inner perianth segments fringed **THYSANOTUS**
(133 ANTHERICACEAE)
 2. Inner perianth segments not fringed.
 3. Flowers yellow or brownish yellow. Anther filaments hairy..... **TRICORYNE**
(133 ANTHERICACEAE)
 3. Flowers purple, white, red or pink. Anther filaments glabrous.
 4. Flowers purple. Anthers 3..... **SOWERBAEA**
(133 ANTHERICACEAE)
 4. Flowers white, red or pink. Anthers 6.
 5. Style gynobasic. Plant with onion smell when bruised ***ALLIUM**
(*136 ALLIACEAE)
 5. Style or styles terminal on ovary. Plant lacking onion smell when bruised.
 6. Perianth segments free. Flowers borne on a leafy stem..... **BURCHARDIA**
(138 COLCHICACEAE)
 6. Perianth segments partly connate. Flowers borne on a leafless scape..... ***NOTHOSCORDUM**
(*136 ALLIACEAE)
1. Inflorescence a spike, raceme, panicle or head, or if flowers solitary then the inner perianth segments not fringed.

7. Inflorescence a head, or a spike with the flowers concealed by overlapping chartaceous bracts.
8. Inflorescence a spike with the flowers concealed by overlapping chartaceous bracts..... **JOHNSONIA**
(133 ANTHERICACEAE)
8. Inflorescence a head.
9. Scape covered by bracts..... **HENSMANIA**
(133 ANTHERICACEAE)
9. Scape not covered by bracts.
10. Inflorescence bracts chartaceous, not pungent..... **LAXMANNIA**
(133 ANTHERICACEAE)
10. Inflorescence bracts pungent.
11. Base of stem woolly. Flowers blue or purple..... **ARNOCRINUM**
(133 ANTHERICACEAE)
11. Base of stem not woolly. Flowers white..... **BORYA**
(133 ANTHERICACEAE)
7. Inflorescence a raceme, panicle, or spike in which the flowers are not concealed by overlapping chartaceous bracts.
12. Anther filaments hairy or scabrous (at least 3 of the 6) or anthers with papillose or hairy basal appendages.
13. Leaves distributed along stem and branches..... **STYPANDRA**
(132 PHORMIACEAE)
13. Leaves basal, sometimes withered at flowering time.
14. Anthers all with basal hairy or papillose appendages which are partly attached to upper portion of filaments. Flowers pink or violet..... **ARTHROPODIUM**
(133 ANTHERICACEAE)
14. Anthers lacking basal appendages, although all or at least 3 filaments hairy or scabrous. Flowers yellow or predominantly white.
15. Leaves and scape enclosed at base by brown or purplish, membranous, tubular scales..... ***TRACHYANDRA**
(134 ASPHODELACEAE)
15. Leaves and scape not enclosed at base by tubular scales.
16. Pedicels articulate near middle. Perianth segments white with a brown or purple stripe..... ***ASPHODELUS**
(134 ASPHODELACEAE)
16. Pedicels not articulate. Perianth segments yellow..... **BULBINE**
(134 ASPHODELACEAE)
12. Anther filaments all glabrous; anthers not appendaged.
17. Plant much-branched. Leaves absent or very reduced; cladodes sometimes present.
18. Leaf-like cladodes subtended by small scale-like or bract-like leaf remnants distributed along stem and branches. Fruit a berry..... ***ASPARAGUS**
(*127 ASPARAGACEAE)
18. Plant leafless, bearing only bracts subtending branching points and flowers. Fruit a capsule dehiscing along 1 side..... **CORYNOTHECA**
(133 ANTHERICACEAE)
17. Plant not much-branched except sometimes in inflorescence. Well-developed leaves present; cladodes lacking.
19. Style deeply 3-lobed or styles 3.
20. Inflorescence a spike. Leaves 2 or 3. Styles filiform, erect or ascending..... **WURMBEA**
(138 COLCHICACEAE)
20. Inflorescence a raceme. Leaves usually 5 or more. Styles very short, more or less horizontal on shoulders of ovary, with very short, free, horizontal or recurved stigmas..... ***BAEOMETRA**
(138 COLCHICACEAE)
19. Style entire or only very slightly lobed terminally.
21. Inflorescence a panicle, or if an unbranched raceme then more than 1 flower subtended by each bract.

22. Anthers dehiscing by terminal pores.
 23. Perianth externally smooth. Fruit a berry..... **DIANELLA**
 (132 PHORMIACEAE)
 23. Perianth externally scabrous. Fruit a capsule..... **AGROSTOCRINUM**
 (133 ANTHERICACEAE)
22. Anthers dehiscing by full-length slits.
 24. Inflorescence a panicle. Leaves all basal..... **CHAMAESCILLA**
 (133 ANTHERICACEAE)
 24. Inflorescence a simple raceme or branched, forming
 a panicle with racemose branches. Leaves basal and
 cauline..... **CAESIA**
 (133 ANTHERICACEAE)
21. Inflorescence a raceme, with only 1 flower subtended by each
 bract.
 25. Perianth segments connate into a tube. Inflorescence
 partially enclosed by leaves..... ***LACHENALIA**
 (*135 HYACINTHACEAE)
 25. Perianth segments free. Inflorescence well exerted from
 leaves.
 26. Three stamens consisting of filament only or with tiny
 remnant of anther, 3 with fully developed anther; inner
 perianth segments glandular at tip..... ***ALBUCA**
 (*135 HYACINTHACEAE)
 26. All 6 stamens with a well developed anther. Perianth
 segments all lacking a glandular tip..... ***ORNITHOGALUM**
 (*135 HYACINTHACEAE)

FAMILY 132 PHORMIACEAE

T. D. Macfarlane

Rhizomatous perennials. Leaves equitant, usually tough. Inflorescence a panicle or cyme. Pedicel articulate near flower. Flowers large, usually blue. Perianth segments 6, free or connate at base. Stamens 6; filaments glabrous or hairy; anthers dorsifixed at the middle or near the base, or basifixed, dehiscent through longitudinal slits or terminal pores. Ovary completely or incompletely 3-celled, with several to many ovules per cell. Style simple. Fruit a capsule or berry. Seeds black. Sometimes regarded as Dianellaceae. A family of 5 genera and less than 30 species, mainly in the southern hemisphere. Reference: Henderson, R.J.F. & Clifford, H.T. 1984. *Taxon* 33: 423-427.

1. Staminal filaments glabrous, apically thickened. Fruit a berry..... **DIANELLA**
 1. Staminal filaments hairy, not apically thickened. Fruit a capsule..... **STYPANDRA**

DIANELLA Lam. ex Juss.

Caespitose (in Perth Region) or climbing perennial herbs, stoloniferous or with a short rhizome. Roots fibrous. Leaves several per shoot, basal or on stems, distichous; blades long, dorsiventral in upper part, laterally compressed in lower part, sheathing at base. Stem erect, rigid. Flowers pedicellate in a panicle, pedicel bracts small or absent. Perianth persistent, not twisting after flowering, petal-like, blue; segments free, equal or the inner 3 shorter, glabrous. Staminal filaments inserted on base of perianth segments or free, glabrous, often abruptly thickened at apex and sometimes nearly to base; anthers basifixed, dehiscent by terminal pores, which are often continued in longitudinal slits. Ovary 3-celled, with 4-8 ovules per cell. Style filiform, undivided; stigma terminal, minutely capitate. Fruit a globular or ovoid berry. Seeds few, shining, globular or angled. A genus of about 20 species occurring in Africa, Madagascar (Malagasy), India, south east Asia, Australia, New Zealand and Pacific Islands including Hawaii, 3 species occurring in W.A.

D. divaricata R. Br.

Leaves several, up to 850 x 15 mm, linear, tough, glabrous, the margins revolute, lower leaves overlapping basally, stem leaves becoming shorter upwards. Panicle up to 1 m tall, loose. Flowers pendulous. Perianth 6-18 mm long, segments spreading or recurved. Anthers brown; filaments yellow, slightly sinuous near base. Mature fruit a blue berry. • Fig. 273

Common and widespread on a variety of soils on both the Coastal Plain and the Darling Range. The general distribution of this species is not as yet clear because of confusion between *D. divaricata* and the other south western species *D. revoluta* R. Br. Their combined distribution is as follows: wide-ranging in south west Australia from Carnarvon and Laverton in the north to the south coast and occurring as far east as the Nullarbor Plain.

Flowers October-November.

STYPANDRA R. Br.

Tufted or shrubby perennials with compact or rhizomatous rootstock. Stems herbaceous or woody. Leaves several or many, basal or cauline, with sheathing base and short glabrous blade. Inflorescence a few-many-flowered terminal dichotomous cyme, bracts small or the lower ones leafy. Flowers with petal-like perianth; segments almost equal, free, eventually deciduous, not twisted after flowering, glabrous. Staminal filaments each with dense woolly beard in upper part; anthers basifixed, dehiscent longitudinally, recurving or rolling after dehiscence. Ovary 3-celled, with several ovules per cell. Style filiform; stigma entire, small. Capsules dehiscent loculicidally or septicidally in upper part into 3 valves. Seeds smooth, ovoid. An Australian genus of about 6 species, 1 in W.A.

S. glauca R. Br.

Blindgrass

Plants caespitose. Stems up to 1 m tall, at first herbaceous, later woody. Leaves distributed along stem, sheaths overlapping but not crowded, erect, rather soft in texture, blade 40-120 x 1.2-5 mm. Branches often present in axils of old leaves on primary stem, bearing narrower leaves usually less than 2 mm wide, sheaths overlapping but usually not crowded. Flowers blue or occasionally white, 8-16 mm long, somewhat pendulous. Anthers and filament beard yellow. Capsules obloid, 8-10 mm long, dark. *S. grandiflora* Lindley, *S. imbricata* R. Br. Fig. 274

Widespread along the Darling Range and Scarp growing on granite rocks and sometimes in lateritic or clay soils in eucalypt woodland; it has also been found on coastal limestone at Yanchep. Ranges from near Geraldton to east of Esperance. Also occurs in S.A., Qld, N.S.W., Vic. and New Caledonia.

Flowers August-early November.

Recent work has shown that the W.A. plants should all be regarded as one species (previously 2 or 3 species have been recognized) and that the appropriate name is *S. glauca*. However the species is very variable, and this conclusion is somewhat tentative. In W.A. *S. glauca* is toxic to animals.

FAMILY 133 ANTHERICACEAE**T. D. Macfarlane** (except where otherwise credited)

Rootstock rhizomatous or small and indeterminate; roots sometimes tuberous. Herbs or much-branched shrubs. Leaves sometimes xeromorphic or absent, usually basal, stem leaves (if present) usually widely spaced and reduced, stems sometimes densely leafy. Inflorescence an open panicle, raceme, or a head with numerous imbricate bracts. Perianth segments 6, free or the inner 3 or all 6 connate in a short to long tube, all similar or sometimes the whorls differentiated, spirally twisted or not after flowering. Stamens 6 or 3; filaments glabrous or hairy; anthers chiefly basifixed or nearly so, sometimes dorsifixed (only *Laxmannia* in Perth Region), sometimes the cells contiguous on the face of a broad connective more or less continuous with the filament, dehiscent by longitudinal slits or terminal pores. Ovary superior, 3-celled; ovules 1-many per cell. Style entire, terminal or nearly so (gynobasic in *Tricoryne*). Fruit usually a loculicidal capsule, rarely irregularly or unilaterally dehiscent (*Corynotheca*) or falling as separate nutlets (*Tricoryne*). Seeds black or rarely dark brown; aril present or absent. About 690 species in 34 genera, widespread but particularly well represented in Africa and Australia.

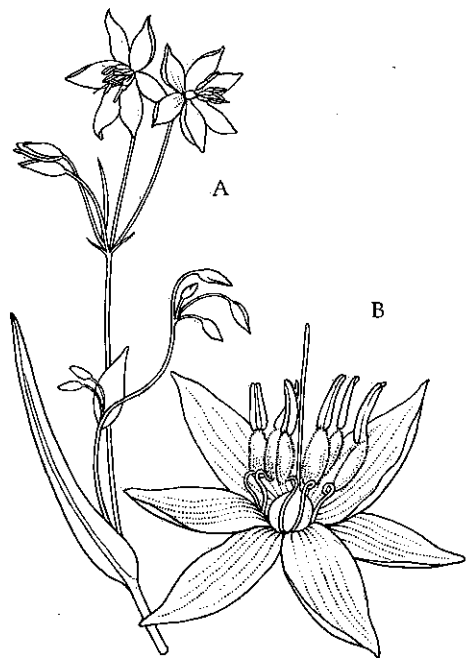


Fig. 274. *Stypandra glauca*. A, Flowering branch. B, Flower.



Fig. 275. *Agrostocrinum scabrum*. A, Flowering branch. B, Inflorescence and flower with enlargement of hairs. C, Stamen, ovary and style. D, Two stamens, before and after dehiscence. E, Flower with twisted perianth after flowering. F, Capsule with persistent bases of perianth segments. G, Seed.

- 1. Flowers sessile in heads or in very dense spikes, the whole head or each flower subtended by large chartaceous or pungent overlapping bracts.
 - 2. Scape covered by bracts **HENSMANIA**
 - 2. Scape or peduncle not covered by bracts, or scape absent.
 - 3. Inflorescence bracts chartaceous, not pungent.
 - 4. Inflorescence an elongated ovoid spike, the flowers concealed by overlapping chartaceous bracts..... **JOHNSONIA**
 - 4. Inflorescence a globular, hemispheric or turbinate head, the flowers visible in centre of head, surrounded by an involucre of chartaceous bracts..... **LAXMANNIA**
 - 3. Inflorescence bracts pungent, firm, not chartaceous.
 - 5. Base of stem woolly. Flowers blue or purple..... **ARNOCRINUM**
 - 5. Base of stem not woolly. Flowers white..... **BORYA**
- 1. Flowers pedicellate, not in heads or very dense spikes. Bracts inconspicuous.
 - 6. Flowers in umbels, or if solitary then the inner perianth segments fringed.
 - 7. Inner perianth segments fringed **THYSANOTUS**
 - 7. Inner perianth segments not fringed.
 - 8. Perianth yellow or brownish yellow, spirally twisted after flowering. Staminal filaments hairy..... **TRICORYNE**
 - 8. Perianth purple, not spirally twisted after flowering. Staminal filaments glabrous..... **SOWERBAEA**
 - 6. Flowers in panicles, racemes or cymes, or solitary. Inner perianth segments not fringed.

9. Plant leafless, intricately branched. Flowers borne singly or 2 together toward tips of branches..... **CORYNOTHECA**
9. Plants with leaves (sometimes withered at flowering time), not intricately branched. Inflorescence a terminal raceme or panicle.
10. Leaves basal, often withered at flowering time.
11. Perianth spirally twisted after flowering. Anthers lacking basal appendages..... **CHAMAESCILLA**
11. Perianth not spirally twisted after flowering. Anthers with papillose or hairy basal appendages which partly invest the filament..... **ARTHROPODIUM**
10. Leaves basal and cauline, not withered at flowering time.
12. Perianth smooth. Flowers in a simple or branched raceme, several flowers at each node..... **CAESIA**
12. Perianth scabrous. Flowers in a panicle..... **AGROSTOCRINUM**

AGROSTOCRINUM F. Muell.

Caespitose perennials with fibrous roots, compact rootstock and several annual stems. Stems each associated with several grass-like leaves, basal and cauline. Inflorescence paniculate. Perianth of 6 free segments, in 2 distinct but approximately equal whorls; outer segments externally scabrous, rather opaque, with 5 conspicuous and evenly spaced veins and narrow marginal wings; inner 3 smooth, more translucent, veins very unevenly spaced and usually only 3 visible for full length of segment, with broad marginal wings. Perianth spirally twisting after flowering and then circumscissile from above the base. Stamens 6; filaments glabrous and filiform; anthers longer than filaments, attached at base, the attachment enclosed in a short tube or partial tube, dehiscent by terminal pores. Ovary sessile, 3-celled with 2 ovules per cell. Style attached at centre of apical depression in ovary, filiform, undivided; stigma small, terminal. Capsule loculicidal. Seeds 1 or 2 per cell, black, shining, ovoid or semi-ovoid. A monotypic genus endemic in south western Australia.

A. scabrum (R. Br.) Baillon

Caespitose perennial, 0.4-0.9 m tall. Stems slender, erect. Leaves several, lacking a distinct sheath, grass-like, tough, separated by distinct stem internodes shorter than leaves. Inflorescence a terminal loose panicle of several to many flowers, overtopping the leaves; panicle branches conspicuously scabrous. Perianth conspicuous, bright blue, 11-20 mm long, spirally twisting after flowering then circumscissile above the base leaving a distinctive cup shaped structure around the young capsule; outer segments scabrous. Stamens erect, crowded around style. Capsule with characteristic depressed apex. **Fig. 275**

Widespread in the Perth Region, chiefly on lateritic soil in the Jarrah forest but occasionally in sand on the eastern Coastal Plain. Occurs east of the region as far as Muntadgin and as far as the south coast to east of Esperance.

Flowers September-December.

ARNOCRINUM Endl. & Lehm. ex Endl.

Caespitose perennial herbs. Roots fibrous. Stems 1-several per plant, annual, tough, bracteate, unbranched to much-branched. Leaves in a basal tuft, with characteristic woolly bases. Inflorescences terminal on branches, each a compact ovoid head-like spike of up to 25 flowers, with 2 large bracts subtending each flower, the bracts overlapping and pointed, the basal few sometimes empty. Flowers almost sessile, with perianth conspicuous and exerted from bracts at anthesis. Perianth persistent, spirally twisted after flowering, with 6 segments connate into a short tube at base; lobes in 2 identical whorls. Stamens 6 (sometimes erroneously described as 3 stamens alternating with 3 staminodes), shorter than perianth, in 2 whorls of unequal length; filaments inserted near top of perianth tube; anthers dorsifixed very near the base, dehiscing inwardly through longitudinal slits, with sterile tips, anthers of stamens opposite outer perianth segments shorter, all anthers cohering into a 2-level ring around the style, the lower level composed of the short anthers, the two levels linked by interdigitation and coherence of the alternating members of the two anther whorls. Ovary globular to cylindrical, small and enclosed by perianth tube, 3-celled with 2 ovules per cell. Style undivided, filiform; stigma terminal, slightly expanded. Fruit a capsule, delicate, enclosed within bracts, dehiscing by 3 valves. Seeds ovoid or globular, black, smooth and shiny. A genus of 3 or 4 species confined to the south west of W.A.

A. preissii Lehm. ex Endl.

Plants 240-600 mm tall. Stems many, unbranched or branched, leafless but with small or enlarged leaf-like bracts subtending the branches, glabrous or with woolly tufts at nodes and in branch axils. Leaves several, basally aggregated, linear, 50-150 x 1.5-3 mm, soft, sparsely to densely clothed with woolly hairs; leaves often withered at flowering time, sometimes leaving only their hairy bases in the form of a ball of wool. Inflorescences 10-20 x 9-15 mm, woolly because of tufts of hairs protruding from between bracts. Inflorescence bract margins membranous, narrowing gradually and disappearing before the apex, each side with stiff divergent spines and the apex with a stiff point. Flowers ca 10 mm long; perianth blue or purple, lobes spreading widely, soon withering and spirally twisting.

Common in Jarrah and *Banksia* woodland or heathland on the Coastal Plain where it grows in sandy or sandy clay soil. Distribution extends to north of Geraldton.

Flowers October-February.

ARTHROPODIUM R. Br.

Tufted perennials with fibrous roots and fusiform tubers at the root tips or the tubers obloid and sessile on the rootstock. Leaves few to many, basal, soft, linear. Axis annual, erect, bearing 1-several leafy bracts below a terminal inflorescence. Inflorescence a raceme or panicle, with a bract subtending each branch and each pedicel or group of pedicels, when pedicels more than 1 the bracts enclosing very small bracteoles. Pedicels filiform, erect or nodding, articulate above the middle. Perianth persistent, closing but not twisting after flowering, eventually dehiscent from or a little above the base before the capsule matures; segments 6, free, nearly equal but the outer ones broader, their margins entire or undulate. Stamens 6; filaments filiform or flattened, with an appendage at each side consisting of a band of tissue (composed of papillae or capitate hairs) occupying from the upper third to nearly the whole length, attached to the anther and partly to the filament, the lower ends free and diverging; anthers basifixed, linear, introrse. Ovary sessile, globular, 3-celled, with 8-12 ovules per cell. Style terminal, filiform, with a small slightly expanded stigma. Fruit a capsule, globular, dehiscent loculicidally. Seeds few per cell, black, rugose. A genus of about 10 species mainly in Australia but also New Guinea, New Zealand, New Caledonia and Madagascar (Malagasy). 3 species currently recognized in W.A. The closely related genus *Dichopogon* Kunth has sometimes been included in *Arthropodium* (Payson, J.P.D.W. 1957. *Nova Guinea* 8: 388-391). The Perth Region species have previously been placed in *Dichopogon* but that genus, as currently recognized, does not occur here.

1. Flowers (or pedicels) 1 per bract **A. preissii**
 1. Flowers (or pedicels) 2-several per bract **A. capillipes**

A. capillipes Endl.

Tubers at root tips, distant from rootstock. Plant up to 1 m tall, stem often robust and up to 9 mm in diameter. Leaves many, up to 500 x 12 mm, forming a procumbent rosette, usually withered at flowering time. Panicle large, branched and the branches often themselves branched; branches spreading. Flowers many, 2-7 in the axil of each bract, pendulous. Perianth pink to violet; segments 8.5-10.5 mm long, reflexed at anthesis. Anthers purple, 2.8-5.4 mm long; filament appendage violet, occupying about half the length of the filament. **Fig. 276**

Growing in a variety of soils from sand over limestone in Tuart forest and sand in Jarrah and Marri woodland on the Coastal Plain to among granite rocks on the Darling Scarp. Ranges from Geraldton to south of Norseman.

Flowers November-March.

A. preissii Endl.

Tubers sessile on rootstock. Plant up to 0.5 m tall, stem slender, 1-2 mm in diameter. Leaves few, up to 250 x 6 mm, more or less erect. Panicle branched, rarely with the branches themselves branched. Flowers many, 1 in the axil of each bract, pendulous. Perianth violet; segments 8.5-11.5 mm long, spreading or reflexed at anthesis. Anthers 4.1-4.8 mm long; filament appendage occupying about half the length of the filament, colour unknown. **Fig. 277**

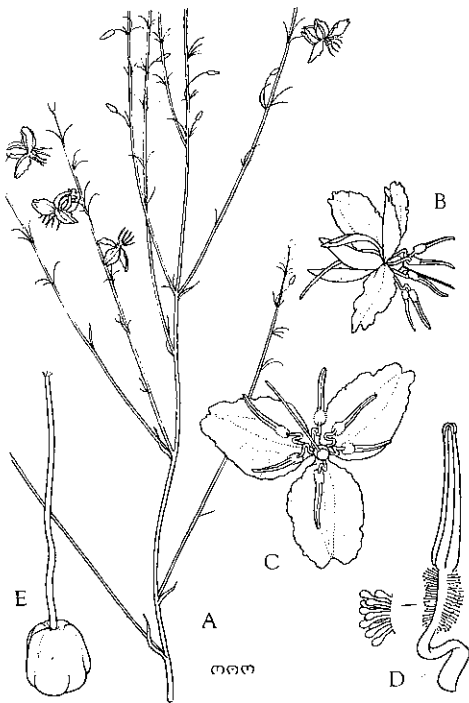


Fig. 276. *Arthropodium capillipes*. A, Inflorescence. B and C, Two views of flower. D, Stamen with enlargement of hairs comprising appendage. E, Ovary and style.

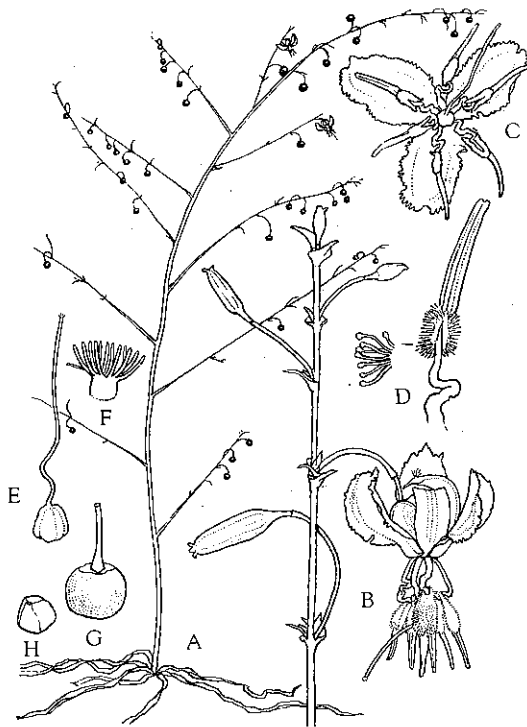


Fig. 277. *Arthropodium preissii*. A, Habit. B, Part of inflorescence. C, Flower. D, Stamen with enlargement of hairs on upper part of filament. E, Ovary and style. F, Stigma. G, Fruit. H, Seed.

Habitat so far unrecorded; this poorly collected species is known only from Cannington in the Perth Region. Also found from Moora to Busselton and inland to Pingelly.

Flowers September-October.

BORYA Labill.

D. M. Churchill

Perennials often forming dense swards or isolated clumps. Stems short or long, often branched, tough, stout, underground and rhizomatous or decumbent, ascending or erect. Leaves cauline, often clustered apically on elongated stems or branches; blade linear-subulate, usually deciduous, disarticulating near the base at a distinct suture above the expanded sheathing base; base with a distinct upper and lower part. Inflorescence a condensed spike of 3-48 flowers on a long scape subtended by spirally arranged, subulate, leaf-like, photosynthetic bracts, the longest sometimes with a basal suture; fertile bracts closely imbricate at first, greenish brown to black; bracteole subtending each flower, enfolding the perianth tube. Perianth white or straw-coloured, tubular or funnel shaped and divided into 6 spreading segments, the segments reflexed at maturity. Stamens 6; filaments inserted at throat of tube, glabrous; anthers yellow or orange, sometimes glandular. Ovary sessile, 3-celled; ovules 15. Style filiform, entire. Capsule enclosed by persistent bracts and perianth. Seeds 1-3, brown or black, with distinctive ornamentation. 10 species, all Australian and 7 occur in W.A. Reference: Churchill, D.M. 1985. *Muelleria* 6,1: 1-8.

1. Leaf margins with distinct notch between suture and the dilated leaf base. Outermost bracts finely ciliate..... **B. constricta**
1. Leaf margins widening evenly below suture line, notch absent. Outermost bracts glabrous.
 2. Margins of leaf bases hirsute. Leaves more than 15 per shoot apex. **B. sphaerocephala**
 - 2.. Margins of leaf bases glabrous. Leaves less than 12 per shoot apex. **B. scirpoidea**

B. constricta D.M. Churchill

Plants isolated in clumps or massed. Stems erect, ascending or prostrate, 20-250 mm long. Lower part of leaf base dark brown to black, with fine matted hairs, often glabrescent on older leaves; upper part of leaf base pale, 0.3-0.7 mm long, rarely 1 mm long, constricted with a notch on each margin. Leaves persistent, 24-48 per shoot apex, 8-20 x 0.6-1.2 mm, ciliolate; apex black, pungent, easily detached as a sharp spine when touched; abaxial stomatal channel narrowed to a fine line at base or not extending across leaf suture. Flowering scapes deciduous from summer to spring, suture present; outermost longest bract subtending inflorescence with hirsute midrib; inner fertile bracts black, inflected, not imbricate. Fig. 278

Confined to a few isolated granitic outcrops in the Darling Range east of Jarrahdale. Widespread on granitic outcrops from Wubin inland to Bullabulling and Pingrup east to Mt. Ragged.

Flowers August-September.

A drought tolerant species which like *B. sphaerocephala* has orange-brown leaves in the dry months. The leaves re-green or are shed in the following wet months.

B. scirpoidea Lindley

Plants isolated, clumped or forming open swards. Rhizomes 10-30 mm underground with closely packed erect shoots extending up to 5-10 mm above ground. Lower part of leaf base brown, glabrous or with a small lateral hook shaped membrane when adjacent to a flower scape; upper part of leaf base pale green or faded yellow, slender, 1-3 mm long, margins parallel or tapering uniformly to base. Leaves deciduous, 3-12 per shoot, 20-50 x 0.5-0.7 mm, margins smooth or minutely scabrous, apex black and acuminate; abaxial stomatal channel broad, extending across leaf suture onto leaf base. Flowering scapes deciduous, suture present; outermost longest bract subtending the inflorescence glabrous, often sutured and deciduous; inner fertile bracts black-brown, imbricate, broad, upper margins thin and slightly wavy.

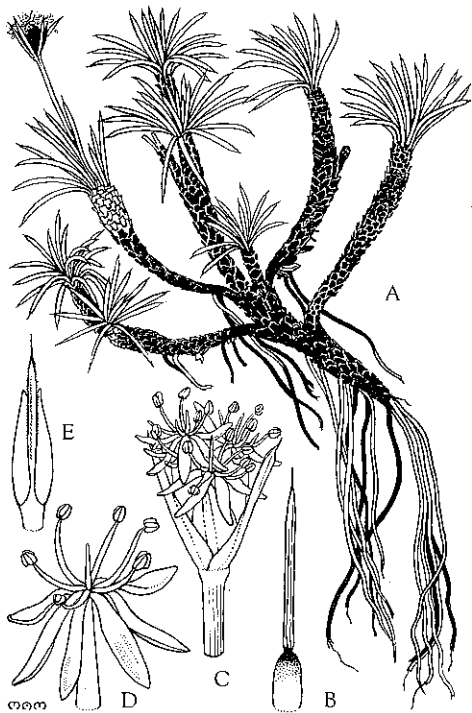


Fig. 278. *Borya constricta*. A, Habit. B, Leaf. C, Flower head. D, Flower. E, Bract.

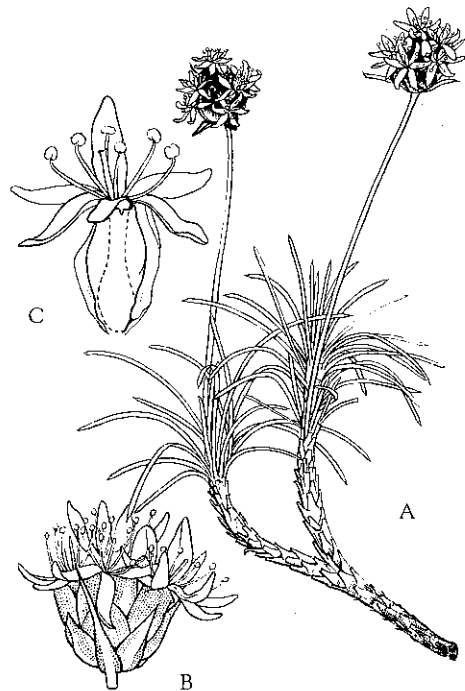


Fig. 279. *Borya sphaerocephala*. A, Flowering branch. B, Flower head. C, Flower.

Recorded from swamps of the Coastal Plain on winter-wet sand and clay soil. Widespread but localised from Perth to Albany and inland to Lake Muir.

Flowers September-October.

This species avoids drought by shedding all leaves in summer. New leaves grow in late autumn and winter.

B. sphaerocephala R. Br.

Plants isolated, clumped or forming an extensive ground cover. Stems erect or ascending, 10-250 mm high. Lower part of leaf base pale yellow or light brown, with coarse matted hairs often persisting on old stems; upper part of leaf base pale yellow, 1-3 mm long, the margins tapering uniformly to base. Leaves persistent, 18-30 per shoot apex, 35-120 x 0.4-1.25 mm, margins smooth and translucent or minutely scabrous, apex dark-coloured and acute; abaxial stomatal channel narrowing to a fine line extending across the leaf suture onto leaf base. Flowering scape persistent, suture absent; outermost longest bract subtending inflorescence with glabrous margins; inner fertile bracts dark brown, broad, imbricate. Fig. 279

Common on granitic outcrops particularly on the Darling Scarp near Perth but becoming less frequent further south. Widespread from the Murchison River inland to Bullfinch and south to Donnybrook and Ravensthorpe.

Flowers August-September.

A drought tolerant species which has orange-brown leaves when dormant in late spring and summer. The lower leaves re-green or are shed the following late autumn.

CAESIA R. Br.

Roots thickened, sometimes with distinct tubers. Leaves crowded near base with 1 or more leaf-like bracts on stem or inflorescence scape. Inflorescence a panicle of few, long, erect, raceme-like branches bearing many flowers, or a simple raceme. Flowers single or in clusters of several in the axils of bracts. Perianth spirally twisted after flowering, eventually deciduous; segments 6, similar in length and width, connate at base. Stamens 6; filaments attached to base of perianth; anthers dehiscing by longitudinal slits, versatile, attached almost basally. Ovary 3-celled, with 1 or 2 ovules per cell. Style undivided. Capsule broader above, obtusely 3-angled or 3-lobed. Seeds globular, black with pale aril, finely sculptured. A genus of about 12 species in Australia, Africa and New Guinea. 2 or 3 species in W.A.

C. parviflora R. Br.

Roots bearing tubers distant from rootstock. Leaves linear, up to 350 x 6 mm, flat or folded. Inflorescence as long as leaves or longer, a panicle with several erect raceme-like branches. Flowers several in axils of bracts, often numerous along each branch. Bracts up to 6 mm long. Pedicels slender, articulate just beneath the flower, 7-9 mm long. Perianth white inside, blue or purple outside, 4-5 mm long. Capsule 3-4 mm long, moulded around seeds.

Widespread in the Perth Region, growing in swampy soils or dry woodland habitats on the Darling Range and Coastal Plain. Distributed from the Geraldton region to the south coast and occurring in the wheatbelt. Also occurs in the other states except N.T.

Flowers September-November.

A second, very similar, species commonly occurs in the Perth Region, usually growing in swampy places and differing in having uniformly thickened roots, larger flowers and capsules, flowers that are brownish outside, and there are possibly differences in inflorescence features. More research is needed into these differences and to determine the correct name to be applied to the species.

CHAMAESCILLA F. Muell. ex Benth.

Roots tuberous. Leaves basal, flat, broad, obtuse. Inflorescence on a leafless scape, a dichotomous corymb or thyrsoid panicle; pedicels solitary within scarious bracts. Perianth of 6 nearly equal, free, spreading segments, spirally twisted after flowering, eventually deciduous. Stamens 6; anthers dehiscing by longitudinal slits, attached almost at base, versatile. Ovary 3-celled, with 8-18 ovules per cell. Style undivided. Fruit a capsule, broadening markedly upwards, 3-lobed, each lobe flattened, dehiscing loculicidally. Seeds black, glossy, slightly flattened, 3-sided. An endemic Australian genus of 3 species, all native to W.A.

1. Leaves 1-3 (usually 2) per plant..... **C. versicolor**
 1. Leaves several (4 or more) per plant.
 2. Leaves usually 4-7. Panicle open, corymbose (branches all reaching to same level so that panicle looks more or less flat-topped). Style up to 2.5 mm long, reaching to base of anthers or shorter..... **C. corymbosa**
 2. Leaves 9-20 or more. Panicle dense, thyrsoid (main branches ending at different levels). Style 3.4-4.5 mm long, reaching to upper part of highest anthers or exceeding all anthers..... **C. spiralis**

C. corymbosa (R. Br.) F. Muell. ex Benth.

Blue Squill

Plant 40-290 mm tall. Leaves 4-7 or more per plant, 2-12 mm wide. Inflorescence scape hairy toward base. Flowers 1 and terminal above a bract or few to several in an open corymbose (more or less flat-topped) panicle. Perianth segments bright blue, 7-10 mm long. Stamens 4-7 mm long; anthers 1-1.8 mm long. Style 1.9-2.5 mm long, shorter than anthers or about reaching their bases (in Perth Region). Ovules 8 per cell. **Fig. 280**

Common in the region, growing usually in seasonally moist soils, sand over clay on the eastern side of the Coastal Plain and shallow soil or moss swards on granite rocks on the Darling Range. Distributed from just north east of the region to east of Esperance. Also occurs in S.A., Vic., N.S.W. and Tas.

Flowers mainly August-October.

A variable species which requires further study.

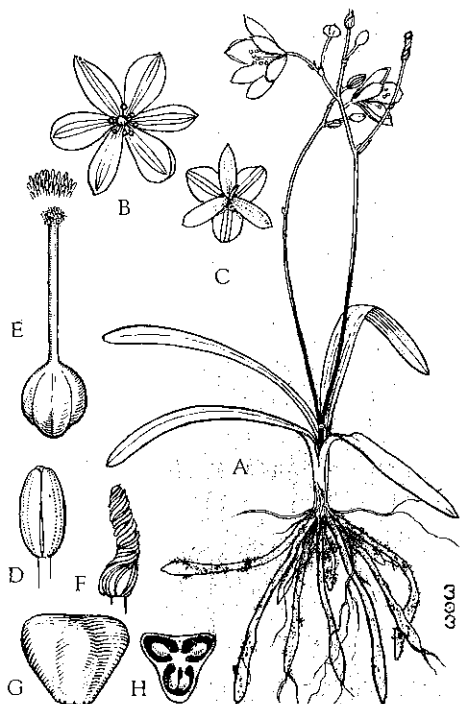


Fig. 280. *Chamaescilla corymbosa*. A, Habit. B and C, Two flowers. D, Anther. E, Ovary and style with enlargement of stigma. F, Perianth twisted after flowering. G, Capsule. H, Transverse section of capsule.

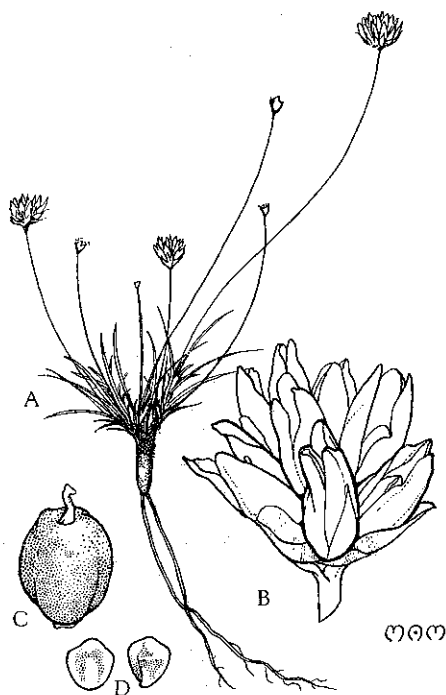


Fig. 281. *Laxmannia squarrosa*. A, Habit. B, Flower head. C, Capsule. D, Seeds.

C. spiralis (Endl.) F. Muell. ex Benth.

Plant 160-330 mm tall. Leaves 9-20 or more per plant, maximum leaf width per plant 1.5-3.5 mm. Inflorescence scape usually sparsely papillose to hairy toward base, occasionally entirely glabrous. Flowers many, in a dense thyrsoid panicle. Perianth segments bright blue, 8-11 mm long. Stamens 5-7 mm long; anthers 1-2.5 mm long. Style 3.5-4.5 mm long, reaching nearly to top or beyond anthers. Ovules 8-18 per cell.

Grows in damp sandy soil; known in the Perth Region only from a few places near Muchea but widespread to the east of the region, ranging from north of Watheroo to east of Ravensthorpe on the south coast, common in the southern wheatbelt.

Flowers September-October.

C. versicolor (Lindley) Ostenf.

Plant 120-330 mm tall. Leaves 1-3 (usually 2) per plant, maximum leaf width per plant 4.6-30 mm. Inflorescence scape papillose or hairy toward base or entirely glabrous. Flowers several, in an open, almost corymbose, panicle. Perianth segments 9-13 mm long, bright blue. Stamens 5.3-7 mm long; anthers 1.8-2 mm long. Style 3.5-5 mm long, reaching nearly to top or beyond anthers. Ovules 10-12 per cell.

Found only a few times on the Darling Scarp east of Perth, growing on lateritic or clay soils. Extends from north of the Murchison River and grows east to Kellerberrin.

Flowers August-September.

CORYNOTHECA F. Muell. ex Benth.

Wiry herbs or shrubs. Roots fibrous. Leaves absent in mature plants though bracts subtending lower branches elongated, rather leaf-like, withered at flowering time. Inflorescence main axis stem-like, much-branched. Flowers borne racemously along ultimate branches, 1 or occasionally 2 of different ages per node, subtended by a minute bract and bracteole. Flowers small. Perianth petal-like, of 6 spreading segments, all nearly equal in length, connate in lower part, spirally twisted over ovary after flowering and eventually deciduous. Stamens 6, inserted at base of perianth lobes, those opposite inner segments a little longer; anthers versatile, attached nearly basally, dehiscing by longitudinal slits. Ovary 3-celled, with 1 or 2 ovules per cell. Style undivided. Fruit a 1-seeded capsule (resembling a nut and sometimes so described), dehiscing along full length of 1 side only, obovoid or obliquely ellipsoid or rather irregular, beaked, with surface marked by raised reticulate veins. Seed obloid, black, striate, with a dark-and-pale bicoloured, elaborate, hood-like aril. An endemic Australian genus of perhaps 3 species all occurring in W.A., often included in *Caesia* but separable by the shrub-like habit, stem-like inflorescence with intricate branching, the greater degree of perianth fusion and by the very different capsule and seed.

C. micrantha (Lindley) J.F. Macbride

Shrub to 0.4 m tall. Leaves absent in mature plant but bracts subtending lower branches often elongated up to 30 mm long, leaf-like, withered at flowering time. Main inflorescence axis (or stem) tough, dichotomously or trichotomously branched at nodes up to 50 mm apart (in Perth Region); branches also dichotomously branched 1-several times, ultimate branches bearing alternately arranged single or paired flowers. Pedicels less than 2 mm long, articulate just below flower. Flowers rather inconspicuous, white or purplish white. Perianth segments ca 4 mm long, spreading, connate for up to one third of their length. Fruits green, eventually darkening.

Grows in sandy soils in woodland on the Coastal Plain. This species is widespread outside the region, the exact distribution, like the distinctions from other species of the genus, being poorly known.

Flowers mainly November-January.

HENSMANIA W. Fitzg.

Plants tufted, with several inflorescences per plant. Roots fibrous. Leaves several, basal, with a few scales (cataphylls) at base. Inflorescence with unbranched scape, covered by bracts. Flowers in a terminal, turbinate head surrounded by an involucre of imbricate bracts, several to many, shortly pedicellate, subtended by one or more scarious or membranous bracts, which are sometimes as long as the flower. Bracts sometimes entire at base but distally consisting of a dense tuft of woolly hairs. Perianth persistent, rather delicate, of 6 equal segments connate below middle into a tube. Stamens 3, inserted at base of inner perianth lobes; filaments flattened, very short; anthers basifixed, about as wide as filaments, the cells distinct on the connective, parted in upper section, dehiscing inwardly by longitudinal slits. Ovary 3-celled, with 2 ovules per cell. Style undivided; stigma small. Fruit a loculicidal capsule. Seeds black, shining, with large pale aril attached near one end. An endemic W.A. genus with 1 described species and 1 or 2 undescribed.

H. turbinata (Endl.) W. Fitzg.

Plants tufted. Leaves 120-400 x 1-2 mm, rigid, terete, smooth, lacking grooves but with fine longitudinal lines, straight, curved or sometimes somewhat spirally coiled, bearing a pungent point. Inflorescences much shorter than leaves, 27-70 mm long. Bracts of scape and involucre pointed, fringed with long hairs. Flowers yellow, numerous, nearly concealed among the woolly white hairs of the subtending bracts.

Grows in sandy soils on the Coastal Plain from Cannington northwards. Extends north of the region to near Coorow.

Flowers January-February.

JOHNSONIA R. Br.

Plants tufted, with several inflorescences. Roots fibrous. Leaves several-many, basal. Inflorescence terminal, a dense obloid to cylindric spike, with flowers concealed within large, often coloured, overlapping, chartaceous bracts; flowers each subtended by one bract and often a much smaller bracteole; lowest 1-several bracts empty, the lowest bract of all usually prolonged as an erect leaf or leaf-like bract which superficially appears continuous with scape; scapes absent or present, short to long, unbranched, leafless. Perianth persistent or eventually deciduous, not twisting after flowering, of 6 equal segments connate for lower third or less into a short tube. Stamens 3, attached to inner perianth segments at top of tube; filaments flattened, broad, connate a little above insertion; anthers apparently continuous with filaments, dehiscing inwardly through longitudinal slits, sometimes the lower part of each cell sterile. Ovary 3-celled, with 2 ovules per cell. Style undivided, long, filiform; stigma small. Fruit a capsule, tough, obloid, dehiscing loculicidally. Seeds obloid, black, shining, with a prominent, subterminal, hooded, dark aril. A genus of 4 species endemic to south western Australia.

1. Scape and inflorescence bracts glabrous.
2. Inflorescence bracts pink (occasionally white), chartaceous, with soft acute tip; inflorescence curved outward or downward..... **J. lupulina**
2. Inflorescence bracts pale green with brown venation and faint pink marking, firm, with brown pungent tip; inflorescence erect..... **J. sp. A**
1. Scape hairy; inflorescence bracts ciliate on margins (sometimes only the lower bracts are ciliate).
3. Scape 70 mm or more long..... **J. pubescens**
3. Scape absent or up to 45 mm long..... **J. acaulis**

J. acaulis Endl.

Plants small. Longest leaves 48-220 mm long, distinctly longer than inflorescence, glabrous or sparsely to densely hairy all over, flat, ribbed, rather thick. Scape absent or up to 45 mm long, densely hairy. Inflorescence 15-35 mm long, erect; subtending leaf-like bract, when distinguishable, 10-27 mm long; flower-subtending bracts ciliate on margins, often sparsely to densely hairy on outer surface, ovate, acute, green with pink or purplish coloration; bracteoles present, shorter than the subtended flower. Flowers partly pink or purple.

Found a few times in the Perth Region on sandy soils on the Coastal Plain and Darling Range in dry woodland habitats. Extends to the south coast where it ranges as far east as Israelite Bay.

Flowers August-early October.

J. lupulina R. Br.

Hooded Lily, Native Hop, Rush Lily

Plants large. Longest leaves 190-380 mm long, shorter than inflorescence, glabrous, flattened but rather thick. Scape 420-660 mm tall, glabrous. Inflorescence 35-60 mm long, erect when young, later out-curved to pendulous; subtending leaf-like bract 20-165 mm long; flower-subtending bracts glabrous, ovate, acute, usually pink, occasionally white; bracteoles shorter than the subtended flower or absent. Flowers dull purple, at least when bracts pink.

Not yet recorded from the Perth Region but known from just outside at Collie, Donnybrook and Capel. Extends to Mt. Manypeaks on the south coast.

Flowers September-December.

J. pubescens Lindley

Pipe Lily

Plants small to large. Longest leaves 160-350 mm long, as long as or distinctly longer than inflorescence, glabrous to densely hairy, flattened and rather thick or terete. Scape 70-255 mm tall, hairy. Inflorescence 25-50 mm long, erect; subtending leaf-like bract 7-60 mm long, shorter to much longer than inflorescence; flower-subtending bracts ciliate on margins at least toward base of inflorescence, and often sparsely hairy on surface, ovate, acute, pale pink and white, sometimes entirely white or greenish white; bracteoles often present, shorter or longer than the subtended flower. Flowers white or purplish white.

Widespread on the Coastal Plain growing in usually dry sandy soils in woodland. Distributed from Dongara in the north to just south of the region.

Flowers August-October.

J. sp. A.

Plants large. Longest leaves 280-340 mm long, as long as inflorescence or slightly longer, glabrous, flat. Scape 190-280 mm tall, glabrous. Inflorescence 45-60 mm long, erect, bracts tightly appressed so that inflorescence is cylindrical; subtending leaf-like bract 11-33 mm long, distinctly shorter than inflorescence, often inconspicuous; flower-subtending bracts glabrous, ovate, with pungent sometimes slightly recurved point, pale green with brown and faint pink markings; bracteoles present, about equal in length to the subtended flower. Flower colour unknown.

This recently discovered species is known from only one location in the region, near Serpentine, but perhaps occurs elsewhere on the southern part of the Coastal Plain; grows on sandy soil in woodland. Also known from just south of the region near Margaret River.

Flowers recorded October-November.

LAXMANNIA R. Br.

Perennials. Stems often branched, short and compact or elongated, sometimes diffuse, often supported on stilt roots. Leaves cauline; sheaths surrounding and closely appressed to stems and branches, exceeding insertion of blade, produced into apical or subapical filiform appendages, often woolly-hairy; blades trigonous or channelled, tough, numerous. Inflorescence of axillary, sessile or short to long-pedunculate heads; heads several to many-flowered, surrounded by empty, conspicuous, often dark-coloured bracts; flowers each subtended by a bract, which is often divided into woolly hairs. Perianth persistent, often chartaceous, of 6 segments in 2 similar or unequal whorls, changing little after flowering, not twisted; outer segments free; inner segments connate in lower part, shorter to slightly longer than outer segments. Stamens 6, each with a distinct filament, the 3 opposite the outer segments inserted at top of tube, the 3 opposite the inner segments inserted near middle of segment; anthers versatile, dorsifixed near middle, the two cells parted above and below point of attachment, dehiscing through longitudinal slits. Ovary almost stipitate, 3-celled, with 1-6 ovules per cell. Style filiform; stigma terminal, entire. Capsule dehiscing loculicidally. Seeds few, black, curved on one side, 2 or 3-faceted on other, areolately patterned, lacking an aril. An endemic Australian genus currently of ca 8 species, all but 2 in southern W.A.

1. Stems short, stout (more than 1.5 mm in diameter), entirely covered with overlapping leaf-sheaths or their remains. Leaves all in terminal tufts or each stem or branch covered with leaves.
2. Flowers 6.5-9 mm long..... **L. grandiflora**
2. Flowers 4-5 mm long..... **L. squarrosa**
1. Stems elongated, slender (less than 1 mm in diameter), often wiry, with stem exposed in the long internodes between remains of leaf-sheaths. Leaves in terminal tufts or in tufts regularly distributed along stem.
3. Inflorescences borne on peduncles 3-20 mm long, usually 1 per terminal leaf tuft. Perianth segments white with red stripe..... **L. ramosa**
3. Inflorescences sessile, distributed along stem, 1 per leaf tuft. Perianth segments white..... **L. sessiliflora**

L. grandiflora Lindley

Stems short, usually less than 40 mm long, erect, branched but the whole plant compact, stems and branches covered with leaf-sheaths or remains of old sheaths, stout (more than 1.5 mm in diameter). Leaves in dense terminal tufts, often covering whole stem or branch; sheaths with usually 3 apical, conspicuous, awn-like appendages; blades 11-47(-65) x 0.7-1 mm with short more or less pungent point. Inflorescences pedunculate, straight, erect, 20-220(-300) mm tall, always at least some of them exceeding leaves, often several growing from each leaf tuft; heads 10-26 mm in diameter. Perianth segments white; outer segments 6.5-9 mm long, inner segments about half as long.

Grows in lateritic or clay soils in Wandoo woodland on the Darling Range. Extends from the Moore River north of the region south to the south coast and widely distributed in the wheatbelt.

Flowers July-October.

L. ramosa Lindley

Stems elongated, up to 300 mm long, sprawling, rooting from distant nodes, slender, wiry (less than 1.5 mm in diameter), exposed in the long internodes between remains of leaf-sheaths. Leaves occurring in dense terminal tufts and often present but more widely spaced below the tufts, usually absent (except for sheath remains) on older parts of stems and branches; sheaths with several weak, tangled, inconspicuous terminal appendages; blades 10-25 x 0.4-0.7 mm, each with a short fragile point. Inflorescences 1 per terminal leaf tuft; peduncles 3-20 mm long, stout, often recurved, frequently closely resembling the leaves; heads 6.5-9 mm in diameter. Perianth segments white with a red stripe; outer segments 3-4 mm long; inner segments nearly as long to slightly longer.

Common in sandy, often swampy, soils on the eastern Coastal Plain and on the Darling Range. Ranges from just north of the region to east of Esperance on the south coast.

Flowers May-June.

L. sessiliflora Decne.

Stems elongated, 40-200 mm long, erect, rooting from base only, the whole plant with few stems and main branches or forming a dense mass, stems and main branches exposed in the long internodes between remains of leaf-sheaths, slender (less than 1.5 mm in diameter). Leaves in terminal clusters and in small tufts distributed at regular intervals along the length of stems and main branches, lower parts occasionally leafless; sheaths with several weak, hair-like, inconspicuous, apical appendages; blades 5-23 x ca 0.5 mm with short fragile point, leaves in terminal clusters usually longer than in lateral clusters. Inflorescences sessile, 1 per lateral and terminal tuft of leaves; heads 4-11 mm in diameter. Perianth segments white; outer segments 3-6 mm long; inner segments half to three-quarters as long.

Grows on sand on the eastern part of the Coastal Plain and on laterite in Jarrah forest and clay in Wandoo woodland on the Darling Range. Widespread in the south west of W.A. from north of Kalbarri to the Lort River on the south coast west of Albany. Also in S.A., Vic., Tas. and N.S.W.

Flowers May-July.

L. squarrosa Lindley

Stems very short to elongated, 20-100 mm long, erect, often branched dichotomously several times, covered with leaf-sheaths or remains of old sheaths, stout (more than 1.5 mm in diameter). Leaves covering whole stem or branch or in a tuft covering the apical 5-25 mm; sheaths with usually 3 awn-like filiform appendages; blades 7-45 x 0.3-1 mm, with short pungent point. Inflorescences sessile among leaves or on straight erect peduncles up to 170 mm long, often several growing from each leaf tuft; heads 9-15 mm in diameter. Perianth segments white, often with a red stripe; outer segments 4-5 mm long; inner segments more than half to three-quarters as long. *L. sessilis* Lindley **Fig. 281**

Widespread in the Perth Region on dry or sandy soils in woodland on the Coastal Plain and in lateritic soil or shallow soil over granite rocks on the Darling Range. Ranges from Mt. Lesueur and Watheroo in the north to Israelite Bay in the south east.

Flowers August-November.

Plants with sessile inflorescences occur over much of the range of the species but in the Perth Region seem to be restricted to the Darling Range. Previously known as *L. sessilis*, they may be worthy of recognition at a lower rank.

SOWERBAEA Smith

Roots fibrous. Plants tufted, with several scapes arising from a small rootstock. Leaves basal and on lower part of scape, narrowly linear or filiform, sheathing at base. Scape simple or occasionally with a secondary scape arising from the axil of one or more cauline leaves, long, with a terminal umbel of numerous flowers surrounded and subtended by small, usually scarious bracts. Perianth persistent, not twisting after flowering; segments 6, outer 3 free and slightly shorter, inner 3 free or connate at base. Fertile stamens 3, opposite inner segments; filaments short, dilated toward top; anthers basifixed, dehiscing through full-length longitudinal slits, the cells free to below their middle or to their base. Sterile stamens 3, lacking anthers, the filaments similar to those of fertile stamens but often reduced in size. Ovary 3-celled, with 2-6 ovules per cell. Style filiform, with slightly expanded stigma. Fruit a capsule, enclosed within persistent perianth, dehiscing loculicidally. Seeds angular, black, minutely tuberculate. A genus of 5 species endemic to Australia. 2 species in W.A. Reference: Stewart, D.A. & Barlow, B.A. 1976. Austral. J. Bot. 24: 349-367.

S. laxiflora Lindley

Purple Tassels

Plants 150-450 mm tall. Leaves glabrous, erect, usually less than half to as long as scape, occasionally as long, flat or grooved above, convex or keeled beneath, up to 1.5 mm wide, tapering, with membranous margins basally. Scape thicker than leaves, erect, rarely with secondary scapes growing from cauline leaf axils. Umbel single, terminal, 20-35 mm in diameter at anthesis. Pedicels filiform, lengthening as flower matures, 10-13 mm long at anthesis, articulate at base of flower. Flowers purple. Perianth segments spreading, broadly ovate, 7-8 mm long, closing after flowering. Anthers large, conspicuous, yellow, closely surrounding style, with cells free in their upper two-thirds to three-quarters. Ovary with 3-5 ovules per cell. **Fig. 282**

Common in the Perth Region on sandy or clay soils in woodland, sometimes growing near watercourses. Extends from Kalbarri to near Denmark on the south coast; there is an outlying northern occurrence at North West Cape.

Flowers mainly August-October.

THYSANOTUS R. Br.

Roots fibrous or thickened into tubers. Axis consisting of an annual or perennial leafless herbaceous stem bearing annually produced umbels or solitary flowers, or an annual leafless inflorescence scape bearing a terminal umbel, panicle of umbels or cymose arrangement of umbels. Leaves absent or present and annually replaced or persisting for several seasons, basal, grass-like, terete, flat, adaxially grooved or channelled, glabrous or hairy. Flowers solitary or up to ca 50 together in umbels, the umbels arranged in various ways on stem or inflorescence scape. Perianth of 6 free segments, not spirally twisted after flowering; outer perianth segments with entire margins, green or the same colour as the inner; inner segments fringed, purple or rarely blue. Stamens 6 (outer 3 are opposite outer perianth segments, inner

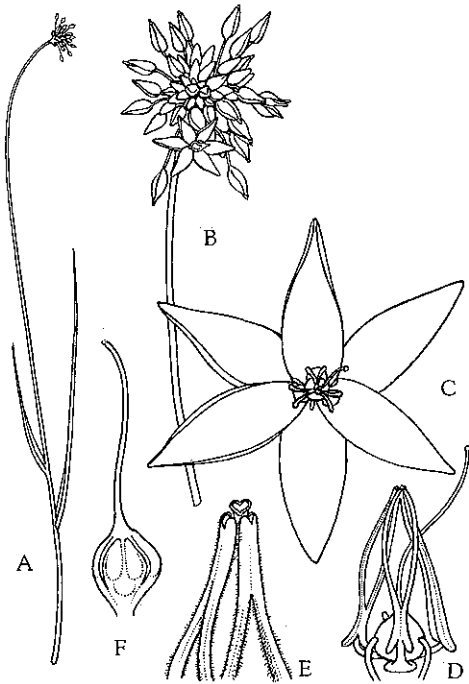


Fig. 282. *Sowerbaea laxiflora*. A, Flowering stem. B, Umbel. C, Flower. D, Stamens, ovary and style. E, Apices of anthers. F, Ovary and style.

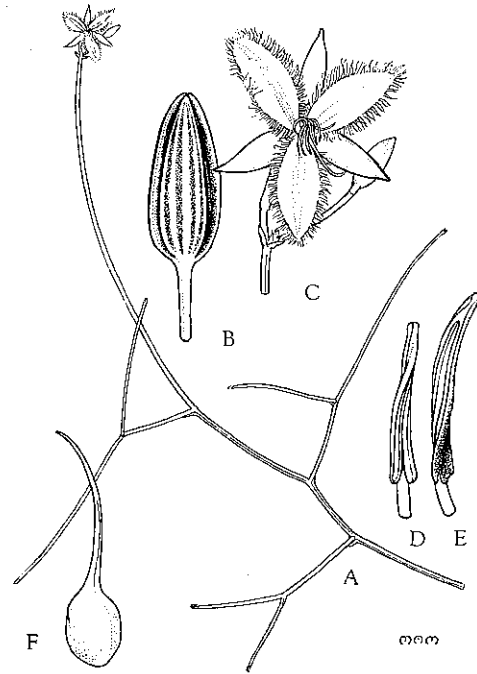


Fig. 283. *Thysanotus dichotomus*. A, Flowering branch. B, Bud. C, Flower and bud. D, Outer anther. E, Inner anther. F, Ovary and style.

3 opposite inner perianth segments) or 3 (outer 3 absent), usually bent somewhat to one side; anthers basifixed or nearly so, equal or those of the outer stamens shorter, straight or curved, twisted or not twisted, dehiscent by terminal pores in some species, by full-length slits in others. Ovary sessile, cylindrical or globular, 3-celled; ovules 2-ca 20 per cell (2 in Perth Region). Style single, simple, straight or curved. Capsule loculicidally dehiscent, enclosed in persistent perianth. Seeds cylindrical to somewhat globular or flattened, black with a pale straw-coloured, yellow or orange aril. 47 species, all Australian but one extending to New Guinea and another through south east Asia to China, 43 species in W.A. Reference: Brittan, N.H. 1981. *Brunonia* 4: 67-181.

1. Stamens 3 per flower.
 2. Leaves hairy, sometimes sparsely covered with very short hairs..... **T. triandrus**
 2. Leaves smooth, hairless.
 3. Pedicel of fruit reflexed. Leaves glaucous. 1 anther filament longer than others..... **T. glaucus**
 3. Pedicel of fruit erect. Leaves not glaucous. Anther filaments all equal..... **T. multiflorus**
1. Stamens 6 per flower.
 4. Stem twining or trailing.
 5. Anthers dehiscent by terminal pores..... **T. manglesianus**
 5. Anthers dehiscent by full-length slits..... **T. patersonii**
 4. Stem or inflorescence scape erect.
 6. Anthers dehiscent by full-length slits..... **T. tenellus**
 6. Anthers dehiscent by terminal pores.
 7. Anthers all equal or nearly equal in length, all straight or slightly curved or 3 straight and 3 slightly curved.
 8. Main axis with 3-many bract-bearing or branch-bearing nodes distributed throughout its length.
 9. Main axis bearing a dense intricate mass of dichotomizing side branches for most of its length; internodes between branching points of lateral branches < 10 mm, typically 5 mm (ignore terminal flower-bearing segments)..... **T. fastigiatus**

9. Main axis bearing several well spaced branches throughout its length or in upper $\frac{1}{3}$ only; internodes between branching points on lateral branches > 10 mm, typically 15-50 mm.
10. Leaves absent at flowering time. Stem glabrous, slender and delicate, occasionally dichotomizing. Umbels with 1 or 2 (rarely 3 or 4) flowers..... **T. gracilis**
10. Leaves present at flowering time. Stem densely covered with short hairs, strong, tough, not dichotomizing. Umbels with 4-6 flowers..... **T. arbuscula**
8. Main axis an inflorescence scape without nodes below a terminal umbel or lowest branch of a panicle borne in its upper third.
11. Leaves 1-5, glabrous..... **T. thyrsoides**
11. Leaves 4-6, glabrous above, densely covered with short blunt hairs beneath..... **T. scaber**
7. Anthers markedly unequal in length, 3 shorter and straight, 3 longer and curved.
12. Main axis an inflorescence scape without nodes below a terminal umbel or the lowest branch of a panicle borne in the upper third.
13. Leaves 1-5, glabrous..... **T. thyrsoides**
13. Leaves 4-6, glabrous above, densely covered with short blunt hairs beneath..... **T. scaber** ×
12. Main axis a stem with 3-many nodes distributed throughout its length, the nodes marked by a dichotomy in the stem, by a branch or by a bract.
14. Stem markedly flattened or quadrangular..... **T. anceps** /
14. Stem terete, sometimes ridged.
15. Stem branching dichotomously, the resulting 2 branches equal or nearly equal in size..... **T. dichotomus** ×
15. Stem unbranched or branching monopodially (main stem continuing, branches markedly subordinate in size).
16. Leaves absent at flowering time.
17. Fruiting pedicels recurved. Flowers 2 or 3 (rarely 4) per umbel. Plants of western Coastal Plain or near-coastal areas..... **T. arenarius**
17. Fruiting pedicels erect. Flowers 4-10, occasionally less, per umbel. Plants of Coastal Plain and Darling Range.... **T. sparteus**
16. Leaves present at flowering time.
18. Stem 500-700 mm long, with several branches, the branches themselves branched. Flowers 2 or 3 (rarely 4) per umbel..... **T. arenarius**
18. Stem 300-410 mm long, usually unbranched or with 1-4 simple branches. Umbels of 4 or 5 flowers..... **T. asper**

T. anceps Lindley

Tubers absent. Rootstock irregular, rhizomatous. Leaves present only in young plants, 10-15, ca 30 mm long, channelled, hirsute. Stem erect, ca 370-500 mm tall, quadrangular and hirsute at base, becoming markedly flattened and glabrous above, ca 4 mm wide, branching monopodially 3 or 4 times. Branches more or less terete near node and ca 1 mm wide, flattened above. Umbels on stem and branches terminal with occasionally a few sessile or shortly pedunculate ones below, 2 or 3-flowered. Pedicels ca 7 mm long, articulate near base, erect in flower and fruit. Perianth segments 13-14 mm long. Stamens 6; anthers dehiscent by terminal pores, very unequal; outer 3 anthers 3.5-4 mm long, straight, twisted; inner 3 anthers 7-8 mm long, curved, twisted.

An uncommon species which grows in lateritic soil in Jarrah or Marri forest on the Darling Range. Also occurs east of the Perth Region and northwards to near Jurien.

Flowers October-December.

T. arbuscula Baker

Plant densely covered with short hairs. Tubers absent. Rootstock a cylindrical rhizome. Leaves few, only occasionally produced, 60 mm long, rather dry and scarious. Stem erect, 280-930 mm tall, branching dichotomously from $\frac{2}{3}$ above base, terete, striate; branch internodes 15-95 mm long. Umbels terminal, 4-6-flowered. Pedicels 3-4 mm long, articulate near base at about the level of bract apices, erect in flower and fruit. Perianth segments 10 mm long. Stamens 6; anthers dehiscent by terminal pores, equal in length, 7-8 mm long, straight, not twisted.

Grows in sandy and lateritic soils on the eastern part of the Coastal Plain and the Darling Range in woodland or forest. Occurs from Jurien Bay to the Blackwood River and also east of the Perth Region as far as Beverley.

Flowers September-January.

T. arenarius N.H. Brittan

Tubers absent. Rootstock small, ca 10 mm diameter. Leaves numerous, basal, often present at flowering time, linear, up to 230 x 3-5 mm, flat on top, keeled beneath, hairy on the margin or all over. Stems prostrate to erect, 500-700 mm long or more, terete, longitudinally ridged with the ridges hairy throughout or glabrous in upper part or sometimes glabrous throughout, branching monopodially; clusters of roots and leaves sometimes produced at stem nodes; branches simple or branched, often more than 1 per node. Umbels terminal, maximum number of flowers in each usually 2 or 3, rarely 4. Pedicels 6.5-10 mm long, articulate near base, recurved in fruit. Perianth segments 12.5-16 mm long. Stamens 6, declinate; anthers dehiscent by terminal pores, very unequal in length; outer 3 anthers 3.5-5.5 mm long, straight to slightly curved, usually twisted; inner 3 anthers ca 9 mm long, curved, twisted.

Growing on the western part of the Coastal Plain, especially near the coast, this species is found on sandy soils in *Agonis* dominated vegetation or *Banksia* woodland. Extends from Shark Bay to the south coast.

Flowers October-December.

T. asper Lindley

Tubers absent. Rootstock inconspicuous. Leaves numerous, basal, present at flowering time, 100-210 x 1 mm, slightly expanded at base into narrow membranous wings, tapering to blunt apex, channelled, densely hairy on both surfaces or occasionally only on margins. Stems often several per plant, 300-410 mm long, striate, hairy to glabrous, usually unbranched or with 1-4 branches, main stem and branches each terminating in a terminal umbel of 4 or 5 flowers. Pedicels ca 10 mm long, articulate 3-4 mm above base, erect in flower and fruit. Perianth segments ca 20 mm long. Stamens 6; anthers dehiscent by terminal pores, very unequal in length; outer 3 anthers 5-6 mm long, purple, straight; twisted; inner 3 anthers ca 12 mm long, yellow, curved, twisted.

Grows on the Coastal Plain and on the Darling Range and Scarp in sandy and lateritic soils. Ranges from north of Eneabba to Perth and east to Tammin.

Flowers mostly October-January

T. dichotomus (Labill.) R. Br.

Tubers absent. Rootstock more or less globular or segmented, up to 50 mm in diameter, producing several shoots. Leaves 5-10 per plant, basal, usually withered before flowering time, 80-140 mm long, very narrowly ovate, ciliate-fringed on margins or occasionally glabrous. Stems up to 0.6 m high, ridged, with papillae or tuberculate swellings usually present on ridges, branching dichotomously several times, length of internodes varying between plants; intertwining of stems may produce a more or less hemispherical plant form. Branches terminating in a single umbel of 1-3 flowers. Pedicels 6-10 mm long, erect in flower and fruit, articulate 2-2.5 mm from base. Perianth segments 10-18 mm long. Stamens 6; anthers dehiscent by terminal pores, unequal in length, twisted; outer 3 anthers 4-6 mm long, straight; inner 3 anthers 6-8 mm long, curved. **Fig. 283**

Grows in sand or laterite, widespread through the Perth Region. Very widespread in south western Australia, from the Murchison River to Esperance and extending well inland.

Flowers mainly September-December.

T. dichotomus varies considerably in appearance as a result of being sometimes intricately branched and sometimes sparsely and openly branched.

***T. fastigiatus* N.H. Brittan**

Tubers absent. Rootstock more or less globular or segmented, ca 8-10 mm in diameter. Leaves present only in young plants, soon withering, 50-90 x ca 1 mm, hairy. Stem barely ridged and densely hairy at base, clearly ridged with hairs restricted to ridges higher up, up to 400 mm tall, straight or slightly flexuous, undivided but bearing a dense mass of dichotomizing lateral branches for most of its length, the interwoven branches giving a cylindric structure. Flowers solitary on ends of many of the branches. Pedicels ca 2 mm long, articulate 1 mm from base. Perianth segments ca 8 mm long. Stamens 6; anthers dehiscent by terminal pores, all of equal length, ca 4 mm, straight, slightly twisted.

Endemic to the Perth Region where it is known only from a few localities from Kalamunda to Roleystone, growing in laterite in Jarrah forest.

Flowers November-May.

***T. glaucus* Endl.**

Tubers absent. Rootstock bearing leafy clusters. Leaves on each cluster 20-30, linear, terete, 50-100 mm long, bluish glaucous in lower part, sometimes reddish toward apex; lowermost 10-15 mm of leaf bearing translucent membranous wings. Inflorescence usually 1 per leafy cluster, 140-210 mm tall, scape branching at 2 or 3 nodes in upper 40-50 mm only, each node with 1 or 2 branches; scape and branches terete, glabrous; branches each ending in an umbel which, by post-flowering elongation, finally forms a condensed raceme; umbels with up to 10 flowers. Pedicels 6-7 mm long, articulate 2-3.5 mm from base, reflexed in fruit. Perianth segments 12-13 mm long. Stamens 3; 1 filament long, 2 short; anthers dehiscent by terminal pores, ca 7 mm long.

This uncommon species has been found only a few times in the Perth Region, growing on the Coastal Plain. Ranges from Jurien Bay to Busselton.

Flowers October-March.

***T. gracilis* R. Br.**

Tubers absent. Rootstock small, 10-20 mm in diameter. Leaves few-many, basal, 50-90 mm long, glabrous. Stems up to 400 mm tall, leafless, terete, glabrous, dichotomously branched but usually only once or twice, internodes 130-150 mm long. Umbels terminal with 1 or 2 (sometimes 3 or 4) flowers. Pedicels 7 mm long, articulate near base. Perianth segments 10 mm long. Stamens 6; anthers dehiscent by terminal pores, all equal, 5-6 mm long, more or less straight, not twisted.

Grows in laterite or heavy soils, sometimes over granite, in *Eucalyptus* woodland on the Darling Range and adjacent part of the Coastal Plain. Occurs from a little north east of the Perth Region south to Albany.

Flowers September-January (occasionally later).

***T. manglesianus* Kunth**

Tubers more or less sessile. Rootstock small. Leaves produced infrequently. Stem produced annually, sometimes hairy at base, elsewhere glabrous or with minute tubercular swellings on ridges, 100 mm to 1 m long, twining around vegetation or trailing along ground. Branches many, unbranched to several times dichotomously branched. Flowers borne singly on ends of branches, subtended by 2 small opposite bracts. Pedicels up to 5 mm long, articulate very close to base. Perianth segments 10.5-16 mm long. Stamens 6; anthers dehiscent by terminal pores, not twisted, unequal, ratio of outer to inner anthers 1/1.4 or more; outer anthers straight; inner anthers markedly curved. Capsule occupying only lower part of persistent perianth segments, remainder of segments forming a narrow "tail" above capsule. *T. patersonii* R. Br. subsp. *manglesianus* (Kunth) N.H. Brittan **Fig. 284**

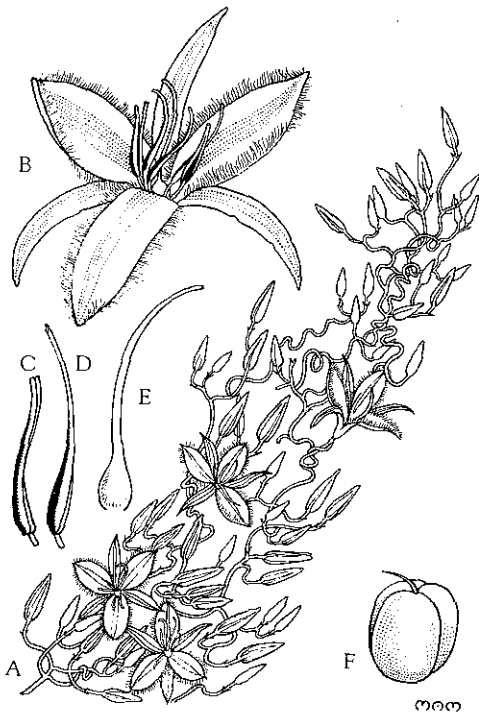


Fig. 284. *Thysanotus manglesianus*. A, Flowering stem. B, Flower. C, Outer anther. D, Inner anther. E, Ovary and style. F, Capsule.

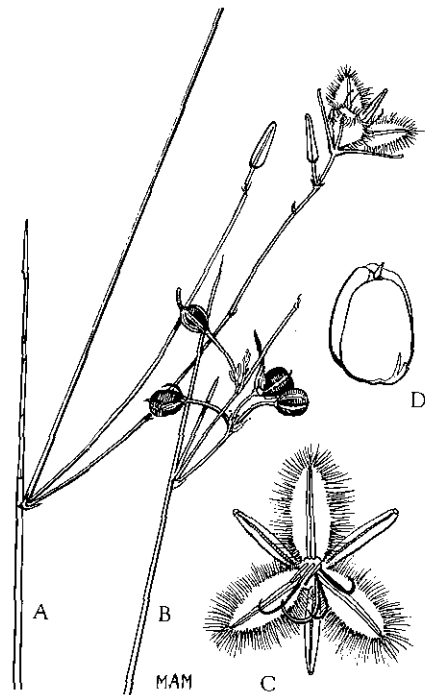


Fig. 285. *Thysanotus sparteus*. A, Flowering branch. B, Fruiting branch. C, Flower. D, Capsule.

Found on the Coastal Plain and Darling Range in woodland. Widespread in southern W.A. south west of a line from the Gascoyne River to Balladonia.

Flowers mainly August-November.

T. multiflorus R. Br.

Tubers absent. Rootstock bearing a number of plantlets. Leaves 3-30 per plantlet, all basal, flat or channelled, 70-570 (usually 200-300) x 2-5 mm, glabrous. Leaf bases bearing membranous margins which may be ciliate. Inflorescence scape half to twice length of leaves but usually about equal, usually 150-370 mm tall, bearing a single terminal umbel; luxuriant plants may have a second sessile umbel 50-100 mm below terminal one. Umbels 4-60-flowered. Pedicels 6-28 mm long, articulate at level of bract apices, erect in fruit. Perianth segments 7-17 mm long (usually about 11 mm). Stamens 3; filaments twisted so that anthers lie close together on one side of flower; anthers dehiscent by terminal pores, equal, 5 mm long, usually curved, at least slightly twisted.

Widespread in the Perth Region on sandy soils on the eastern Coastal Plain and on laterite on the Darling Range. Distributed from just outside the region north east of Perth to Hopetoun on the south coast.

Flowers mainly September-January.

T. patersonii R. Br.

Tubers sessile or shortly pedicellate. Rootstock small. Leaves produced infrequently, 1 or 2, linear, terete, 100-200 mm tall. Stems usually 1, occasionally 2, produced annually, terete and sometimes hairy at base, becoming angular and glabrous or with minute tubercular swellings on ridges above, 100 mm to 1 m long, twining around vegetation or trailing along ground. Branches usually many, unbranched to several times dichotomously branched. Each branch terminating in a single flower subtended by two opposite bracts 1-2 mm long. Pedicel 1-5 mm long, articulate very close to base. Perianth segments usually 6-10.5 mm long, fringes of inner segments occasionally extremely short. Stamens 6; anthers dehiscent by full-length slits, equal or slightly unequal, ratio of outer to inner anther lengths less than 1/1.4, all straight, not twisted. Capsule filling persistent perianth segments.

Has been found a few times on the Coastal Plain and Rottnest Island. Widespread in the southern half of W.A. Occurs in all states.

Flowers mainly August-November.

T. patersonii formerly included *T. manglesianus* as a subspecies.

T. scaber Endl.

Tubers sometimes present, 150-180 mm from rootstock. Leaves about 4-6, basal, 200-300 x 2 mm, channelled, tapering to rounded apex, scabrous with short blunt hairs underneath, bases with membranous sheathing margins. Inflorescence 350-400 mm tall, scape comprising two-thirds of height, glabrous or with short hairs toward base. Inflorescence a panicle, the final branches terminating in a 4-8-flowered umbel. Pedicels 10-12 mm long, articulate close to base. Perianth segments 7.5-11 mm long. Stamens 6; anthers straight, not twisted, dehiscent by terminal pores, outer 3 slightly shorter, ca 3-4 mm long.

Grows in laterite or clayey soils in the Jarrah forest east of Perth. Has been found occasionally on the Darling Range east of the Perth Region, from the Avon River to Boddington.

Flowers October-November.

T. sparteus R. Br.

Tubers absent. Rhizome large and irregular, 15-60 mm in diameter. Leaves absent. Young stems much-branched, the branch tips sometimes inrolled, crozier-like, usually sterile. Mature stems 0.39-1 m tall, tough and often rather thick, terete and often longitudinally ridged in lower part, entirely glabrous or hairy in lower 20-50 mm or rarely hairy throughout, branched monopodially; primary branches several (often more than 1 per node), well spaced, divergent, branched, all of similar length or becoming shorter upwards (the plant corymb-like), each bearing a terminal umbel and often 1-several other umbels along its length, the latter sessile or on short secondary branches. Maximum number of flowers per umbel usually 4-10, occasionally 2 or 3. Pedicels 5-10 mm long at flowering time, articulate near level of bract apices, erect in fruit. Perianth segments 10-17(-22) mm long. Stamens 6; anthers dehiscent by terminal pores, unequal in length; outer 3 anthers 2.5-5.5 mm long, straight, twisted; inner 3 anthers 7-10 mm long, curved, twisted. **Fig. 285**

Widespread in the Perth Region, growing in sand in *Banksia* woodland on the Coastal Plain and in laterite on the Darling Range. Ranges from Kalbarri to Israelite Bay including the wheatbelt.

Flowers mainly December-February.

T. tenellus Endl.

Tubers distant from the rootstock. Rootstock small. Leaves 5-27, 100-280 mm long, channelled, with membranous wings at base, ridged beneath, ridges and margins papillose. Inflorescences 1-several per plant, 70-440 mm tall; scape erect, terete, papillose on ridges, branching in upper part, each branch bearing a terminal umbel of 1-4 flowers. Pedicels 8-17 mm long, articulate near base. Perianth segments 6.5-13 mm long. Stamens 6; anthers dehiscent by full-length longitudinal slits, all equal or subequal in length, not twisted or only slightly twisted, straight; outer 3 anthers 2-4 mm long; inner 3 anthers 2.5-5 mm long. *T. drummondii* Baker

Common on clay or lateritic soils on the eastern margin of the Coastal Plain and on the Darling Scarp and Range. Occurs from Moora to Albany, including east of the Perth Region. Also occurs in S.A.

Flowers September-November.

T. thyrsoideus Baker

Tubers distant from rootstock, hirsute. Leaves 1-5, 150-600 x 1-1.5 mm, somewhat channelled, glabrous. Inflorescence 1 or occasionally 2 per plant, 140-640 mm tall; scape terete, glabrous, branching in upper $\frac{1}{3}$ - $\frac{1}{4}$ into a more or less dense pyramidal panicle. Branches bearing terminal umbels (occasionally 1 or 2 sessile ones below terminal ones) of 1-3 (occasionally up to 5) flowers. Pedicels

6-14 mm long, articulate at about level of bract apices, elongating markedly after flowering, erect in flower, distinctly reflexed and downward directed in fruit. Perianth segments 7-14 mm long. Stamens 6; anthers dehiscent by terminal pores, equal to markedly unequal in length, twisted; outer 3 anthers 2.5-5 mm long, straight; inner 3 anthers 3.75-9 mm long, curved.

Widespread in the Perth Region from near the coast, where it grows on calcareous sand, to the Jarrah forest, where it is more common and grows on lateritic soils. Distributed north to Eneabba, south to Cape Riche on the south coast, and inland to Cunderdin.

Flowers September-November.

W.A. records of *T. tuberosus* R. Br., a species which does not occur in this state, were probably misidentifications of *T. thyrsoides*.

T. triandrus (Labill.) R. Br.

Tubers absent. Plants composed of several plantlets arising from a common rootstock, each plantlet with 5-40 leaves. Leaves all basal, 50-430 x 1.5-3 mm, almost flat and unridged to channelled to almost terete, densely hairy or occasionally with only short stiff hairs or papillae. Inflorescences several to many per plant, 80-420 mm tall; scape equal to or taller than leaves, frequently hairy near base, becoming glabrous higher up, occasionally entirely glabrous, bearing a single terminal umbel of 4-50 flowers (the scape rarely branched, the branches also bearing an umbel). Pedicels 5-35 mm long, articulate at $\frac{1}{3}$ - $\frac{1}{2}$ from base, rarely up to $\frac{2}{3}$. Perianth segments 9-15 mm long. Stamens 3; filaments twisted so that anthers lie together on one side of flower; anthers dehiscent by terminal pores, equal, 5 mm long, slightly curved, slightly twisted. *T. bentianus* Ewart & White

Widespread in the Perth Region, mainly growing in sand on the Coastal Plain but occasionally to be found on lateritic soils on the Darling Range. Ranges from Eneabba to Israelite Bay on the south coast.

Flowers September-November.

This species varies considerably in hair density, leaf shape, pedicel length and relative dimensions of scape and leaves.

TRICORYNE R. Br.

Roots fibrous, rather thick. Rootstock a compact or short horizontally elongated rhizome, producing 1-several stems which are sometimes horizontal and subterranean at first. Stem (or inflorescence axis) usually branched, terete, angular or flattened and leaf-like. Leaves basal and/or cauline, more or less linear or reduced to scales. Inflorescences consisting of terminal umbels, each with small scarious flower-subtending bracts and outer, larger, sometimes leaf-like bracts. Pedicels articulate at base of flower. Perianth spirally twisting after flowering, eventually deciduous, of 6, free, more or less equal, entire segments. Stamens 6; filaments filiform, with a dense tuft of capitate hairs in middle or upper part, inserted on receptacle; anthers basifixed but with top of filament in the short tubular base of anther, dehiscent inwardly through full-length longitudinal slits. Ovary deeply 3-lobed, 3-celled, with 2 ovules per cell; style attached near bases of the nearly free cells. Fruit consisting of 3 (sometimes 1 or 2 because of abortion) 1-seeded indehiscent nutlets. Seeds black, subglobular, striate. A genus of 6 species in Australia and New Guinea. 2 species in W.A.

1. Outer umbel bracts small, the largest 3-10 mm long, dry and brown or green, shorter (usually much shorter) than open flower plus pedicel. Plants usually tall and twiggy, with long internodes and sparsely distributed leaves **T. elatior**
1. Outer umbel bracts large and leaf-like, the largest 12-35 (usually more than 20) mm long, usually longer than open flower plus pedicel. Plants usually compact with short internodes and crowded leaves **T. humilis**

T. elatior R. Br.

Yellow Autumn Lily

Plants rhizomatous, several-stemmed, much-branched. Stems (100-)300-500 mm tall, tough, terete, striate or ridged, glabrous, though often with minute tubercles on ridges; branches terete, ridged or angled. Leaves up to 90 mm long, spaced along stem, at flowering time all conspicuous and green or

brown and dry, or the lower ones conspicuous and the upper ones reduced to small brown scales. Outer umbel bracts 3-10 mm long, dry or green, shorter than flower. Flowers usually 8-11 in the larger umbels of each plant, occasionally less; pedicel 4-10 mm long at anthesis. Perianth 6-12 mm long at anthesis, yellow, brown outside. Filaments and anthers yellow. **Fig. 286**

Widespread and common on sand throughout the Coastal Plain, less commonly on the Darling Range on laterite. Occurs from Kalbarri to east of Kalgoorlie and on the south coast at Albany and Cape Arid. Also occurs in the Kimberley and all other states.

Flowers September-February.

T. humilis Endl.

Plants rhizomatous, usually short, compact, much-branched, with short internodes and crowded leaves and inflorescences, sometimes elongated with long internodes and the leaves crowded near base or distributed along stem. Stems 45-260 mm tall, only moderately tough, ridged, angled or, in lower part, nearly terete to somewhat flattened but with 2 or more distinct longitudinal ridges, glabrous, minutely tuberculate or occasionally sparsely hairy. Leaves up to 35-130 x 4-5 mm, at flowering time all conspicuous and green. Outer umbel bracts large, green and leaf-like, 12-35 mm long, usually longer than flower. Flowers 5-20 in the larger umbels of each plant; pedicels 6-17 mm long at anthesis. Perianth 7-11 mm long at anthesis, yellow, brown outside. Filaments and anthers yellow.

Grows on laterite on the Darling Range and on sand, often swampy, on the eastern edge of the Coastal Plain. Occurs from Perth to the Stirling Range and south coast.

Flowers October-December.

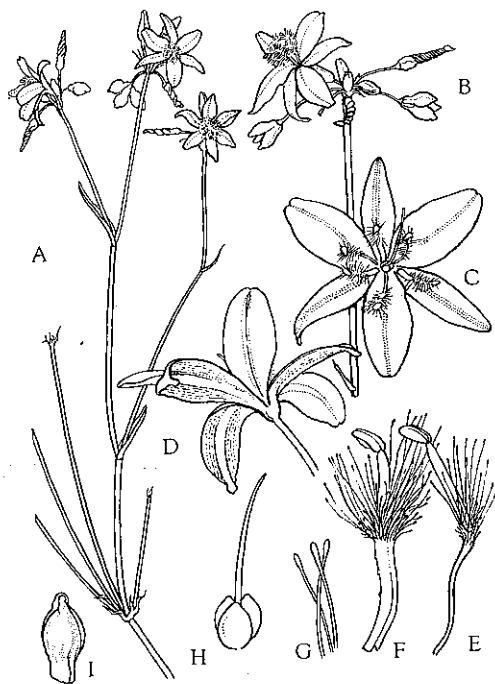


Fig. 286. *Tricoryne elatior*. A, Flowering branch. B, Umbel. C and D, Two views of flower. E and F, Stamens with tufts of hairs near middle of filament. G, Hairs from staminal filament. H, Ovary and style. I, Fruit.

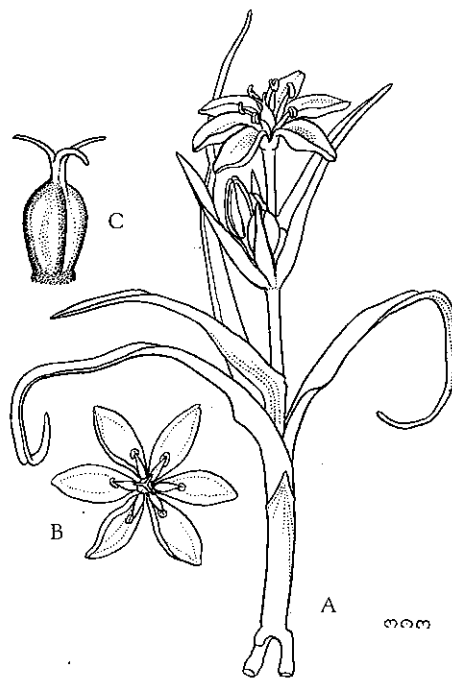


Fig. 287. *Burchardia multiflora*. A, Habit. B, Flower. C, Ovary and style.

FAMILY 134 ASPHODELACEAE

T. D. Macfarlane

Roots fibrous, swollen or tuberous. Rhizomatous, often geophytic, herbs or shrubs, rarely climbers. Leaves basal, often in a rosette, or cauline, often succulent. Inflorescence a raceme or panicle. Perianth segments 6, similar, connate near base or for most of their length or occasionally (always in Perth Region) free, petal-like. Stamens 6, rarely 3 sterile; filaments glabrous or occasionally scabrous or hairy, filiform or abruptly broadened and ovary-clasping at base; anthers dorsifixed, dehiscent by longitudinal slits. Ovary superior, 3-celled, with 2-many ovules per cell. Fruit a loculicidal capsule. Seeds usually black, occasionally dark brown or grey. A family of ca 800 species in 18 genera, mainly in Africa, Madagascar (Malagasy), the Mediterranean Region and Asia, with a few representatives in Australia, New Zealand and North America.

- 1. Leaves and scapes enclosed at base by brown or purplish, membranous, tubular scales..... *TRACHYANDRA
- 1. Leaves and scapes not enclosed at base by tubular scales.
 - 2. Pedicel articulate near middle. Perianth segments white with a brown or purple stripe..... *ASPHODELUS
 - 2. Pedicel not articulate. Perianth segments yellow..... BULBINE

*ASPHODELUS L.

Annuals or rhizomatous perennials. Roots fibrous or swollen. Leaves all basal, linear, with sheathing bases. Inflorescence a raceme or panicle. Flowers solitary, each subtended by a bract. Pedicels articulate. Perianth deciduous, not spirally twisting after flowering; segments free or shortly connate, equal, spreading. Stamens 6; base of filaments expanded, covering ovary and at least sometimes hairy, the upper part filamentous and glabrous. Ovary with 2 ovules per cell. Style simple, filiform; stigma 3-lobed. Capsule usually 6-seeded. Seeds black, angular, the faces with several deep depressions. About 12 species in the Mediterranean Region and Asia, 1 species naturalized in W.A.

**A. fistulosus* L.

Wild Onion, Onion Weed

Annual or short-lived perennial. Roots fibrous. Rootstock scarcely swollen. Leaves numerous, long, terete or subterete, hollow, 180-400 x 1.5-4 mm, much shorter than to as long as inflorescence. Inflorescence 200-600 mm high, branched or unbranched; scape hollow; bracts broad-based with long acuminate apex, about as long as pedicel. Pedicel articulate near the middle. Flowers white with a brown or purple central stripe on each perianth segment; segments 7-12 mm long. Stamens and style nearly as long as perianth. All filaments at base broad, flattened, shortly hairy, then abruptly narrowed and geniculate; upper part minutely papillose.

A common naturalized plant, especially along roadsides, also occurs widely through the southern half of W.A. Native to the Mediterranean Region to India.

Flowers June-October.

BULBINE Wolf

Stemless annual or perennial herbs. Roots fibrous or tuberous. Leaves several, succulent, basal, with an expanded membranous sheath at base. Inflorescence a raceme on a long scape. Flowers solitary, each subtended by a bract; pedicel articulate just beneath the flower or not articulate. Perianth segments equal, free or very shortly connate, twisted then deciduous after flowering. Stamens 6; inner 3 or all filaments bearded above middle. Ovary with 2-5 ovules per cell. Style filiform, undivided, with a small terminal stigma. Seeds 3-angled, black, often rough, margin sometimes winged. 60 species in the world, mainly African, 2 in W.A.

B. semibarbata (R. Br.) Haw.

Leek Lily

Annual herbs. Roots fibrous. Leaves shorter than inflorescence, up to 250 x 2 mm, nearly linear, channelled. Inflorescence very variable in height, 150-300 mm tall, the flowers arranged alternately along half or more of the axis; pedicels up to 13 mm long, usually erect in fruit, occasionally reflexed, not

articulate. Flowers yellow; perianth 6-8 mm long; 3 stamens long with dense beard on filaments just beneath anthers, 3 short with glabrous filaments. Ovary with 2 ovules per cell. Seeds not winged on the angles. *Bulbinopsis semibarbata* (R. Br.) Borzi

Has been found only a few times near Byford and along the Murray River, growing in wet places on clayey soil. Widespread in the southern half of W.A. Occurs in all states.

Flowers mainly September-October.

A variable species. Outside the Perth Region it sometimes shows greater extremes in height, and there may be differences in perianth length, staminal filament ornamentation, ovule number and seed morphology.

*TRACHYANDRA Kunth

Geophytic or rhizomatous herbs or shrubby perennials, glabrous, hairy or glandular-hairy. Roots fibrous, spindle shaped or tuberous and connate. Rhizome short, woody, discoid or slightly vertically elongated. Leaves basally aggregated or cauline, often with a tubular sheathing base, each leaf, inflorescence and sometimes also the whole shoot surrounded by tubular membranous scales at base. Inflorescence a raceme or panicle (branched raceme) or rarely umbel-like. Flowers solitary in the axil of a single bract; pedicels not articulate or obscurely articulate just beneath the flower. Perianth deciduous, not spirally twisting after flowering; segments free, nearly equal. Stamens 6, inserted at very base of perianth segments, spreading or the inner 3 filaments connivent around the ovary and different from the outer 3; filaments retrorsely scabrous. Ovary with 2-16 ovules per cell. Style filiform; stigma small, entire. Seeds brown or grey, angled but not flattened, sometimes with scattered glands. An African genus of 47 species, 1 species naturalized in W.A. Reference: Obermeyer, A.A. 1962. *Bothalia* 7: 669-767.

**T. divaricata* (Jacq.) Kunth

Roots slightly thickened at base, tapering. Leaves and scape enclosed at base by brown or purplish membranous scales. Leaves several, basal, linear, 350-450 x 2.5-5 mm, flat, rather thick, glabrous or papillose, rough to the touch, slightly shorter to slightly longer than inflorescence. Inflorescence scape smooth and glabrous, stout, branched in upper half, the branches themselves often branched. Flowers many, distributed singly along the axes; pedicels 5-10 mm long at flowering time, erect, obscurely articulate just below the receptacle; perianth segments white with a green or purplish vein and often 2 yellow spots near base of each segment, 8-12 mm long, spreading or recurved. Stamens yellow; filaments retrorsely scabrous in upper part, all shortly hairy at the base; outer 3 spreading; inner 3 connivent around the ovary at base, spreading above. Ovary with 12-20 ovules per cell. *Anthericum divaricatum* Jacq.

Naturalized near the coast southwards from Perth and invading farmland near Lake Preston. Known from scattered locations south of the region as far as Walpole and from near a lake inland; probably common but poorly recorded. Native to the Cape region of South Africa.

Flowering has been recorded in September and October.

*FAMILY 135 HYACINTHACEAE

T. D. Macfarlane

Bulbous herbs. Leaves basal, often 2. Inflorescence on a short or long naked scape, a raceme or occasionally a spike or head-like or a single terminal flower. Perianth petal-like, tubular or the segments free; tube short or long, often constricted above a wider lower part; lobes 6, short to long, often the whorls unequal. Stamens 6, or 3 with 3 staminodes; filaments often expanded in lower part, sometimes connivent, usually inserted above base of perianth, often at top of tube, sometimes at the base; anthers dorsifixed, dehiscent through longitudinal slits. Ovary superior, 3-celled, with 2, few or many ovules per cell. Style usually simple, sometimes the stigma shortly 3-lobed. Fruit a capsule. Seeds black. A family of 44 genera and ca 850 species, mainly in Africa, Europe, Asia and North America, with a few in South America and Madagascar (Malagasy).

1. Perianth segments connate into a tube. Inflorescence partially enclosed by leaves..... *LACHENALIA
1. Perianth segments free. Inflorescence well exerted from leaves.
 2. Three stamens consisting of filament only or with tiny remnant of anther, 3 with fully developed anther. Inner perianth segments glandular at tip..... *ALBUCA
 2. All 6 stamens with fully developed anther. Perianth segments all lacking a glandular tip..... *ORNITHOGALUM

*ALBUCA L.

Bulbous herbs. Plants glabrous, hairy or glandular-hairy. Leaves basally aggregated, often in a rosette, flat or terete, sheathing at base. Inflorescence a simple raceme; each flower subtended by a bract, flowers large, erect or pendulous; pedicels long or short. Perianth segments persistent, free, oblong, ovate or circular; outer 3 spreading; inner 3 closed around stamens, ovary and style, rarely spreading, hooded and glandular at apex. Stamens 3 with 3 staminodes (in Perth Region) or 6; filaments terete or winged, sometimes expanded at base and enclosing ovary; anthers versatile, reduced or absent from staminodes. Ovary with numerous ovules per cell. Style thick, angled, narrowed toward base; stigma terminal, conical, 3-lobed or capitate. Capsules loculicidally or both loculicidally and septicidally dehiscent. Seeds flat, semi-circular, black, shiny, papillose. A genus of 100 species in Africa and Arabia, 1 species naturalized in W.A.

**A. canadensis* (L.) F.M. Leighton

Plants 0.25-1.5 m tall. Bulb surrounded by scaly or membranous tunics, usually with many bulbils. Leaves 3-6, 200-600 x 10-30 mm, flat, glabrous, 2-ranked, green or withered at flowering time. Peduncle tall, slender or stout; raceme many-flowered. Bracts 18-50 mm long, broad at base with long tapering point, shorter than pedicel. Pedicels 25-60 mm long, ascending, tip recurved at anthesis so that flower is more or less pendulous. Flowers solitary, not scented. Perianth segments yellow or greenish yellow with a green median stripe; outer segments 17-22 mm long, markedly longer than the inner segments, which have an apical gland. Outer stamens sterile, the anther remnants minute or absent, filaments about as long as those of the fertile stamens. *A. major* L.

Naturalized at a few localities near Perth and outside the Perth Region at Busselton and Albany. Native to southern Africa (despite its name).

Flowers September-October.

*LACHENALIA J.F. Jacq.

Plants bulbous. Leaves basal, 1-several, flat, funnellform or terete, sheathing at base, glabrous, hairy or papillose, often with spots or stripes. Inflorescence a terminal, unbranched, densely many-flowered raceme or spike, each flower subtended by a bract; uppermost flowers often vestigial. Pedicels long, short or absent. Flowers erect or pendulous, usually zygomorphic. Perianth persistent, variously coloured; segments 6, connate into a tube toward base, the lobes spreading or cohering in a tube; inner segments usually longer than outer. Stamens attached to top of perianth tube, included or much exerted; filaments filiform; anthers versatile. Ovary ovoid, with many ovules per cell. Style long or occasionally short; stigma slightly expanded. Capsule enclosed by the persistent perianth, membranous, loculicidally dehiscent. Seeds globular, black, shining, with an inconspicuous to large and swollen aril. A genus of ca 55 species native to southern Africa, 1 species naturalized in W.A.

**L. reflexa* Thunb.

Inflorescence height 45-100 mm from ground. Leaves 2, basal, spreading or ascending, broadly linear or broadest in lower part, 60-350 x 15-25 mm, flat or slightly channelled, glabrous. Inflorescence a raceme; peduncle and often the lower flowers enclosed in sheathing leaf base; pedicels ca 2 mm long; flowers erect, more or less tubular but somewhat swollen in middle. Perianth somewhat succulent, greenish yellow, ca 25 mm long, zygomorphic, with one of the outer segments slightly longer and pouched at the apex; inner segments longer, opening by a small aperture at the apex.

Naturalized at a few locations on the Coastal Plain near Perth, at least sometimes found in damp soils. Native to South Africa.

Flowers July-August.

***ORNITHOGALUM L.**

Bulbous herbs. Leaves 1-many, basal. Inflorescence a terminal corymbiform or elongate raceme borne on a leafless and bractless scape or stem, each flower borne singly on a short to long pedicel in the axil of an often conspicuous bract. Perianth segments free or rarely connate at the base, all similar, persistent, variously coloured. Stamens free from perianth; filaments simple or with basal elaborations; anthers versatile. Ovary 3-celled, often with 6 longitudinal exterior grooves; ovules few to many (20-40 in W.A. species) per cell. Style absent or short to long, undivided; stigma terminal, capitate or 3-lobed. Capsule loculicidal. Seeds black, globular, ovoid, angled or flattened. A genus of about 200 species in Europe, Asia and Africa, 2 species naturalized in W.A. References: Obermeyer, A. A. 1978. *Bothalia* 12: 323-376; Zahariadi, C. 1980. in Tutin, T.G. et al. (eds.) *Flora Europaea*, vol. 5.

1. Perianth segments white. Staminal filaments all similar, widening gradually from tip to base, lacking any basal elaboration..... ***O. arabicum**
1. Perianth segments, yellowish to blackish brown basally on inside, otherwise white. Staminal filaments opposite inner perianth segments abruptly widened near base into an oblong flat section appressed to ovary, other 3 filaments lacking any basal elaboration..... ***O. thyrsoides**

***O. arabicum L.**

Bulb scales pale brown. Leaves 5-6, up to 500 x 25 mm, linear, flat or concave, all basal. Inflorescence a loose terminal corymbose raceme of 6-16 flowers, exceeding the leaves. Pedicels 25-40 mm long in lower part of inflorescence, each subtended by a tapering whitish or yellowish bract often as long as pedicel. Flowers large, cup shaped, unpleasantly scented. Perianth segments ca 30 x 16 mm, free, white, slightly toothed at apex. Stamens with filaments all similar, widening gradually from apex to base. Ovary shiny greenish black in upper half, green below.

Naturalized in places along roadsides (e.g. near the coast at South Fremantle); also known from scattered localities elsewhere in south western W.A. Native of the Mediterranean Region and Portugal.

Flowers recorded in October.

***O. thyrsoides Jacq.**

Chinkerichee

Bulb scales pale brown. Leaves ca 6, short and broad, up to 120 x 20 mm, flat or concave, often withering by flowering time, much shorter than scape. Inflorescence an elongated more or less cylindric and rather dense raceme of 11-33 flowers. Pedicels 23-30 mm long in lower part of inflorescence, each subtended by a white to pale brown broad-based acuminate bract up to two-thirds as long as the pedicel. Flowers large, usually cup shaped or stellate, unpleasantly scented. Perianth segments 14-18 x 9-10 mm, free, white with a yellowish brown to blackish brown base on the inside, apex acute to rather truncate. Filaments of inner 3 stamens abruptly widened at base into an oblong flat section appressed to side of ovary, with 2 short incurved teeth at top of flattened section; other 3 filaments widening gradually from apex to base. Ovary dull purple.

Naturalized in the Perth Region (e.g. at Kalamunda). Native of South Africa.

Flowers recorded in October.

O. thyrsoides is extremely toxic in all plant parts including the seeds.

FAMILY 136 ALLIACEAE*T. D. Macfarlane**

Rootstock a bulb or corm, rarely a rhizome. Leaves basal. Scape simple, leafless. Inflorescence terminal, an umbel subtended by an involucre of 2 or more bracts. Perianth segments 6, free or partially connate, sometimes with a corona. Stamens 6, occasionally 3, filaments sometimes elaborated or connate; anthers dorsifixed or occasionally versatile, attached near base, or basifixed, dehiscent through

longitudinal slits. Ovary superior, 3-celled, with 2-many ovules per cell. Style simple or occasionally shortly 3-parted. Fruit a loculicidal capsule. Seeds black. A family of ca 570 species in 32 genera, particularly diverse in North America but also occurring in Africa, Europe and Asia.

1. Plant with onion smell when bruised. Perianth segments free or nearly so at base. Style gynobasic..... ***ALLIUM**
1. Plant lacking onion smell when bruised. Perianth segments connate into a short tube at base. Style terminal on ovary..... ***NOTHOSCORDUM**

***ALLIUM L.**

Plants with smell and taste of onions. Bulbous (in the Perth Region) or rhizomatous perennial herbs. Leaves mostly basal, sometimes cauline, linear or narrowly ovate, flat or terete, sometimes hollow, sometimes convolute, sheathing at base. Flowers few to many per umbel, umbel subtended by 1 or more scarious, sometimes coloured spathe bracts; bracts more or less connate, enclosing the immature umbel. Pedicels rather slender, not articulate, often with bracteoles at base. Flowers variously coloured, small, hermaphrodite, sometimes replaced by bulbils. Perianth persistent; segments free or very slightly connate at base, 1-veined. Stamens free or connate at base, usually inserted on base of perianth; filaments often bearing lateral teeth or appendages. Ovary 3-celled; ovules 2-14 per cell, 2 in W.A. Style slender, gynobasic or nearly so, entire or 3-parted near apex. Capsules loculicidally dehiscent. Seeds black, usually angled, rarely globular, rarely with an aril; testa finely patterned. A genus of about 400 species native to Europe, Asia, northern Africa, North America and a single species each in Sri Lanka and South Africa; 5 species naturalized in W.A. Reference: Stearn, W.T. 1980. in Tutin, T.G. et al. (eds.) Flora Europaea, vol. 5.

1. Anthers exerted from perianth or nearly so; filaments of inner 3 stamens each with a lateral filamentous appendage each side of and much longer than anther. Plants very robust, ca 1 m tall with a globular umbel of more than 100 flowers..... ***A. porrum**
1. Anthers included in perianth; filaments of all stamens lacking lateral appendages. Plants less robust, not exceeding 0.6 m tall, umbel not globular, containing less than 50 flowers.
 2. Stem sharply 3-angled, erect in flower but collapsed on ground at fruiting time. Flowers pendulous at anthesis. Style distinctly divided into 3 near apex..... ***A. triquetrum**
 2. Stem terete or nearly terete but with 2 or 3 slight longitudinal ridges, erect in flower and fruit. Flowers erect at anthesis. Style undivided at apex..... ***A. neapolitanum**

***A. neapolitanum** Cirillo

Naples Onion

Leaves usually 2, basal or nearly so, parting from stem at same height, flat, 5-20 mm wide, about as tall as stem or slightly shorter; margin denticulate or papillose towards base. Stem 200-600 x up to 7 mm, nearly terete but with 2 or 3 longitudinal ridges, solid, erect during and after flowering. Spathe single, undivided, shorter than pedicels. Umbel 45-90 mm in diameter, more or less hemispheric, 8-40-flowered. Flowers white; pedicels 15-30 mm long. Perianth 9 mm long; segments remaining erect when fruit mature. Stamens shorter than perianth; filaments simple. Ovary with 2 ovules per cell. Style end and stigma entire. Seeds without aril.

Naturalized in the Perth Region. Native to southern Europe, northern Africa, and south west Asia.

Flowers recorded in September.

***A. porrum** L.

Leek

Robust plants. Leaves several, parting from stem at different heights, flat, somewhat channelled, usually 8-20 mm or more wide. Stem very tall, usually ca 1 m high, up to 10 mm in diameter toward base, terete, solid, erect in flower and fruit. Spathe single, undivided, with narrow and considerably elongated apex, longer than umbel, falling early. Umbel 50-60 mm in diameter, globular, more than 100-flowered. Flowers white, pink or dark red; longest pedicels ca 40 mm long; perianth 5-5.5 mm long, segments remaining erect when fruit mature, papillose on outer surface, especially on midrib. Stamens

longer than perianth, anthers exerted or virtually so at anthesis; outer 3 filaments simple; inner 3 filaments with 2 lateral filamentous appendages greatly exceeding the anther. Ovary with 2 ovules per cell. Style end and stigma undivided. Seeds without an aril. *A. ampeloprasum* L. var. *porrum* (L.) Gay.

Naturalized occasionally on disturbed sites in the Perth Region and also cultivated. This is a morphologically distinct cultivated variant of *A. ampeloprasum* L. The latter is native to southern Europe, northern Africa and western Asia.

Flowers recorded in December.

***A. triquetrum** L.

Three-cornered Garlic

Leaves usually 2 or 3 per stem, basal, parting from stem at same height, triquetrous in lower part, flat above and keeled beneath in upper part, 3-15 mm wide; margins smooth. Stems 1 or more per plant-cluster, 100-450 mm tall, distinctly and sharply triquetrous, hollow, erect at anthesis, collapsed onto ground when fruit mature. Spathes 2, about equal to pedicels. Umbel 40-70 mm in diameter, neither globular nor hemispheric, flowers usually pendant at anthesis and all bending to one side, 3-15-flowered. Flowers white with central green stripe on each segment; pedicels 10-30 mm long; perianth ca 12 mm long; segments remaining erect when fruit mature. Stamens shorter than perianth; filaments simple. Ovary with 2 ovules per cell. Style distinctly 3-parted in upper 1 mm. Seeds black, with a conspicuous white aril at one end.

Naturalized in many disturbed places in the Perth Region and also cultivated as a garden flower; naturalized at various south western localities outside the Perth Region. Native to southern Europe and northern Africa.

Flowers mainly August-September.

***NOTHOSCORDERUM** Kunth

Plants without taste and smell of onions when bruised. Bulbous perennial herbs. Leaves basal, linear, sheathing at base. Inflorescence a terminal umbel on a long unbranched scape or stem; flowers pedicellate, at first enclosed within a spathe of 2 bracts which remain connate at base after opening. Perianth persistent; segments connate into a short tube at base, 1-veined. Stamens inserted on lower part of perianth and half as long; filaments simple. Ovary 3-celled, with 4-12 ovules per cell. Style attached terminally; stigma entire. Capsule dehiscent loculicidally. Seeds black, angled. 35 species native to North and South America, 1 species naturalized in W.A.

***N. gracile** (Aiton) Stearn

Bulb with basal bulbils. Leaves several, linear, flat, 4-20 mm wide, shorter than, or equal to, mature inflorescence. Stem or scape 300-600 x 5 mm, terete, hollow. Spathe shorter than pedicels of mature flowers. Umbel of 10-25 flowers. Flowers fragrant, white or with pink midvein on perianth segments; pedicels 10-40 mm long, erect. Perianth 10-15 mm long; segments connate for $\frac{1}{4}$ - $\frac{1}{3}$ of their length, remaining erect when fruit mature. Stamens shorter than perianth.

Naturalized at several locations near Perth and also elsewhere in the south west outside the Perth Region. Native to South America.

Flowers recorded in October and November.

In W.A. this species has sometimes been known incorrectly as *Allium roseum* L., *A. orientale* Boiss. or *Nothoscorderum inodorum* (Aiton) Nicholson.

***FAMILY 137 AMARYLLIDACEAE**

B. L. Rye

Perennial or rarely annual herbs, usually with a bulb or rhizome, hermaphrodite, glabrous or largely glabrous, sometimes reproducing vegetatively by bulbils. Stipules absent. Leaves sessile, entire. Inflorescence 1-flowered or a cyme but often head-like or umbel-like by condensation, terminal,

subtended by a spathe. Perianth segments 6, in 2 whorls, petal-like, sometimes connate. Corona often present between the perianth and stamens, petal-like and possibly comprised of accessory perianth lobes. Stamens basically 6 in 2 whorls opposite the perianth segments, sometimes some stamens reduced to staminodes; anther 2-celled, usually dehiscent to the inside. Ovary inferior or rarely half-inferior, usually 3-celled, rarely 1-celled; ovules few to numerous. Style simple; stigma capitate or shortly 3-lobed. Fruit a capsule or berry. About 85 genera and 1100 species, mainly tropical or subtropical.

1. Perianth segments free almost to the base, white with a green spot.
 Corona absent..... *LEUCOJUM
1. Perianth segments connate for much of their length and adnate to the
 corona, white or yellow. Corona yellow or orange..... *NARCISSUS

*LEUCOJUM L.

Perennial herbs, tufted, with a bulb. Leaves basal, linear or narrowly linear. Spathe bracts 1 or 2, large. Inflorescence 1-flowered or an umbel of several flowers. Flowers pendulous, campanulate. Perianth segments white or pale pink, all fairly similar, free or very shortly connate. Corona absent. Stamens inserted at the base of the perianth; filament usually much shorter than the anther; anther basifixed. Ovary 3-celled. Style filiform. Fruit a loculicidal capsule, pyriform to subglobular, the pericarp somewhat succulent; seeds numerous. About 12 species in Europe and northern Africa, 1 species naturalized in W.A.

**L. aestivum* L.

Snowflake

Perennial herb, up to 0.6 m high, glabrous. Stem hollow, compressed, apparently 2-winged. Leaves linear, usually 200-450 x 10-15 mm, obtuse. Spathe bract 1, 35-45 mm long. Umbel 1-sided, usually 3-7-flowered; pedicels 25-55 mm long. Perianth segments white, with a green spot just below the thickened apex, 12-15 mm long. Stamens shorter than the perianth segments; anther ca 4.5 mm long. Style usually somewhat longer than the stamens. Seeds black.

Recorded from disturbed sites in Perth, Bunbury and Boyanup. Also recorded from the Bridgetown area.

Flowers July-September.

*NARCISSUS L.

Perennial herbs, with a bulb, glabrous. Leaves arising at the base. Spathe bract 1, usually scarious. Inflorescence 1-flowered or an umbel of 2-15 flowers. Bracteoles small or absent. Flowers usually white to yellow or with both white and yellow, sometimes fragrant. Floral tube including perianth and corona tissue. Corona free above the floral tube, usually conspicuous, rarely reduced to a small rim or scales. Stamens usually included in the corona or floral tube. Fruit a capsule, ellipsoid to subglobular, the pericarp dry. Up to 50 species, in Europe, western Asia and northern Africa, 2 species naturalized in W.A.

**N. tazetta* L.

Jonquil

Stout perennial herb, up to 0.7 m high; bulb up to 50 mm long. Leaves linear, 150-700 x 5-21 mm, obtuse. Spathe 35-60 mm long. Umbel usually 3-15-flowered; pedicels unequal, the longest pedicel 30-65 mm long. Flowers actinomorphic, fragrant. Floral tube white or yellow, 12-18 mm long. Perianth lobes white or yellow, usually ovate, 10-20 mm long. Corona conspicuous, yellow or orange, 3-5 x 6-10 mm. Ovary 4-7 mm long.

Occurs in disturbed, usually moist sites on the Coastal Plain and Darling Range from Bindoon to Boyanup. Extends east to Northam. Native to the Mediterranean Region.

Flowers July-September.

FAMILY 138 COLCHICACEAE

T. D. Macfarlane (except where otherwise credited)

Perennial herbs with annual above-ground parts. Rootstock a corm or tuberous or creeping rhizome. Stem usually leafy, occasionally leaves basal and the stem or scape reduced. Flowers solitary, terminal or axillary, or in bracteate or ebracteate racemes or spikes, or in umbels or more or less in heads. Perianth segments nearly always 6, equal or almost equal, petal-like, free or connate at least near base, sometimes bearing nectaries. Stamens as many as and opposite the perianth segments; anthers usually dorsifixed, occasionally basifixed, dehiscent through longitudinal slits. Ovary superior, nearly always 3-celled, with usually many, occasionally 2-6, ovules per cell. Styles as many as ovary cells, free or partly connate. Fruit a capsule, dehiscent loculicidally or occasionally septicidally. Seeds brown. A family of 20 genera and ca 200 species, widespread but absent from South America, well represented in southern Africa and the Mediterranean Region.

- | | |
|---|-------------------|
| 1. Inflorescence an umbel..... | BURCHARDIA |
| 1. Inflorescence a raceme or spike. | |
| 2. Inflorescence a spike. Leaves 2 or 3. Styles filiform, erect or ascending..... | WURMBEA |
| 2. Inflorescence a raceme. Leaves usually 5 or more. Styles very short, more or less horizontal on shoulders of ovary with short, free, horizontal or recurved stigmas..... | *BAEOMETRA |

***BAEOMETRA** Salisb.

Glabrous geophytic herbs, growing from an annually replaced corm surrounded by black tunics. Stem unbranched. Leaves several, basal and spaced along stem, decreasing in size upward, each with tubular sheathing base and short to long blade. Inflorescence a bracteate raceme (sometimes almost a spike). Perianth deciduous; segments 6, equal, free, erect, narrow and incurved in lower half, broader in upper half. Stamens 6; filaments inserted on lower part of perianth segments, filiform, glabrous; anthers versatile, dorsifixed, dehiscent by longitudinal slits. Ovary 3-celled, with numerous ovules per cell. Styles 3, free, very short, more or less horizontal on shoulders of ovary with short, free, horizontal or recurved stigmas. Capsule dehiscent septicidally. Seeds numerous, globular or flattened hemispheric, brown. A genus of 1 species native to the Cape region of South Africa.

***B. uniflora** (Jacq.) G. Lewis

Single-stemmed plants 180-500 mm tall. Leaves several, basal and spaced along stem, upper ones short; leaf bases sheathing; blade dilated in lower part, upper part (when present) long, linear, channelled. Raceme terminal, of 1-8 flowers. Flowers 11-18 mm long. Perianth segments yellow inside with purple at base, reddish or orange-yellow outside, falling early after flowering. Capsule elongated, up to 40 mm long, cylindrical with a groove along each septum.

Recorded as naturalized in disturbed places near Bassendean and Bullsbrook; also outside the region near Donnybrook. Native to the Cape region of South Africa.

Flowers recorded in October and December.

B. uniflora has been reported as toxic to cattle in South Africa.

BURCHARDIA R. Br.

Roots fibrous, some thickened for storage. Perennials, growing annually from small rootstock, underground part surrounded by brown chartaceous tunics. Stem simple or branched. Leaves few, basal and cauline; basal leaves long and narrow; cauline leaves shorter with dilated base. Inflorescence an umbel (in the Perth Region) or a single flower, terminal on the stem or each branch, surrounded by a small involucre of bracts. Perianth segments 6, free, spreading, deciduous, not spirally twisted after flowering, each enclosing the corresponding stamen in the bud, flat in the open flower. Floral nectaries present but inconspicuous at the base of each perianth segment (in the Perth Region) or absent. Stamens 6; filaments glabrous, flattened or swollen; anthers versatile, attached near base, dehiscent by

longitudinal slits. Ovary 3-celled with numerous ovules per cell. Style short, with 3 short or long, recurved stigmatic lobes. Capsule 3-angled, with a furrow in each face along the septum, septicidally dehiscent. Seeds angular, brown. An Australian genus of 5 species, all occurring in the south west and one extending to eastern Australia.

1. Buds and flowers pink or pinkish white. Anthers purple. Uppermost stem bract (node below umbel of main stem) (20-)34-160 mm long, markedly dilated at base, abruptly narrowing into a long, fine, tapering point..... **B. multiflora**
1. Buds and flowers white, sometimes with faint tinges of pink at tips of perianth segments. Anthers yellow. Uppermost stem bract 8-27 (-46) mm long, narrow to rather broad, tapering evenly to a short blunt point.
 2. Stem unbranched (rarely 1 branch present, much thinner than main stem). Flowers usually 2-6(-7) per umbel..... **B. umbellata**
 2. Stem branched, branches usually 2 or 3, about as thick as the main stem. Flowers 8-20 per umbel..... **B. sp. A**

B. multiflora Lindley

Plants short to tall; stem 45-270 mm tall, unbranched or rarely with 1 or more branches. Bract at last node on main stem below the umbel (20-)34-160 mm long, markedly dilated at base, narrowing abruptly into a long tapering apical point. Umbel bracts usually large, the longest one 9-45 mm long. Flowers 2-8(-20) per umbel. Longest pedicel of a fully open flower in each umbel 20-62 mm long. Buds deep pink, flowers pinkish white with deep pink median strip on exterior of each segment. Anthers purple. Capsule angular, lacking reinforcing rib on angles. **Fig. 287**

Grows in wet soil around granite rocks on the Darling Range and winter-wet depressions on the Coastal Plain, common throughout the Perth Region. Occurs from north of the Hill River to Albany.

Flowers July-October, continuing to November south of the region.

B. umbellata R. Br.

Plants tall, slender; stem 280-600 mm tall, usually unbranched, occasionally with a single branch bearing a second umbel. Bract at last node on main stem below umbel short, 8-27(-46) mm long, narrow to rather broad but lacking a long tapering point. Umbel bracts small, the longest one 5-12 mm long. Flowers 2-7 per umbel. Longest pedicel of a fully open flower in each umbel 9-23 mm long. Buds and flowers white with only faint tinges of pink, especially at tips of perianth segments. Anthers yellow. Capsule angular, with a strongly reinforcing rib on each angle. **Fig. 288**

Very common in the Perth Region, growing on usually dry sandy soils in Jarrah and *Banksia* woodland on the Coastal Plain and on granitic soil on the Darling Scarp. Ranges from Northampton to Cape Naturaliste. Occurs in all states except N.T.

Flowers mainly August-September.

B. sp. A

Plants very tall and robust; stem 500-600 mm tall, with 1 or more strong branches about as thick as the main stem. Bract at last node on main stem below umbel 10-22 mm long, rather broad but lacking a long tapering point. Umbel bracts rather small, the longest one 4-12 mm long. Flowers mostly 8-20 per umbel, occasionally fewer. Longest pedicel of a fully open flower in each umbel 14-38 mm long. Buds and flowers white. Anthers yellow. Capsule angled, lacking a strongly reinforcing rib on each angle.

An uncommon species growing in seasonally swampy grey sandy soils on the Coastal Plain in the northern half of the Perth Region. Extends north to Cataby.

Flowers September-November.

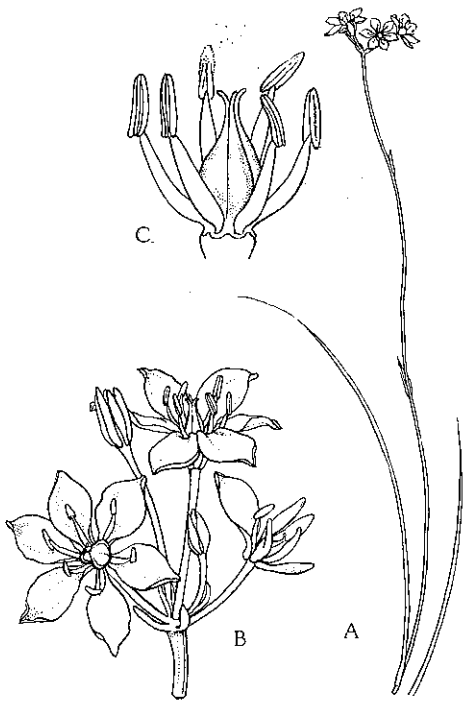


Fig. 288. *Burchardia umbellata*. A, Flowering stem. B, Umbel. C, Flower with perianth removed to show stamens, ovary and style.

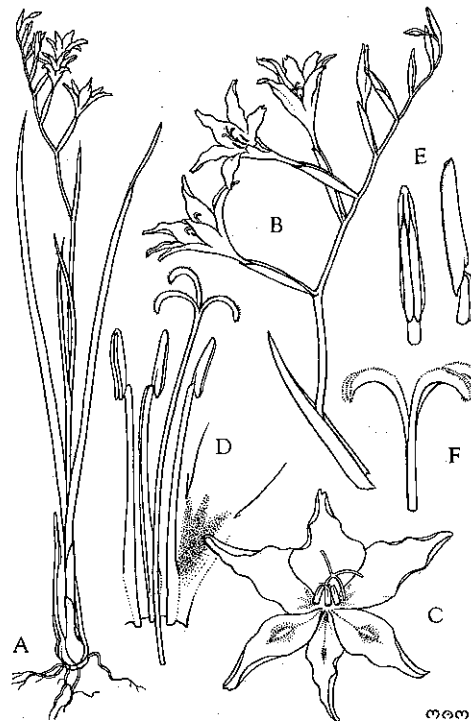


Fig. 289. *Gladiolus angustus*. A, Habit. B, Inflorescence. C, Flower. D, Stamens and style. E, Anthers. F, Upper part of 3-lobed style.

WURMBEA Thunb.

B. L. Rye

Glabrous geophytic herbs, minute to up to 0.3 m high, with an elongate corm. Leaves 2 or 3, spirally arranged, usually narrow, the upper 1 or 2 leaves with a tubular sheath tightly enclosing the stem and often with a marked cup shaped dilation at the base enclosing an immature inflorescence. Flowers either solitary and terminal or several and sessile on an unbranched axis; bracts absent. Perianth persistent, usually pink or white; segments 6 (rarely more), connate at the base, the tube up to half as long as the perianth. Floral nectaries often visible as a band or other structure, usually in the proximal part of each perianth segment. Stamens adnate to the perianth at the base, the filaments free above; anther usually dorsifixed. Ovary of 3(4) cells; ovules 10-25 per cell, axile. Styles as many as the carpels, free or connate for up to half their length. Capsule dehiscent in the distal half. Seeds several per cell, brown, globular. Over 30 species, throughout extra-tropical Australia and also in Africa, 15 species occurring in W.A. *Anguillaria* R. Br. Reference: Macfarlane, T.D. 1980. *Brunonia* 3: 145-208.

1. Leaves 2(3); lower 2 leaves basal, similar in breadth and shape..... *W. pygmaea*
1. Leaves 3; lower 2 leaves well separated, differing in shape and width.
2. Nectary a circular or oval spot in the centre of each perianth segment slightly above the middle. Perianth segments 6-8 or more..... *W. tenella*
2. Nectary a band or ridge across each perianth segment, ca $\frac{1}{3}$ from the base. Perianth segments 6.
3. Nectary a ridge, curved around and more or less clasping the filament, with a protuberance at each side of the perianth segment, pink..... *W. monantha*
3. Nectary a flat transverse band, sometimes with a slight break in the middle, not folded around the filament, white or rarely pink ... *W. dioica*

W. dioica (R. Br.) F. Muell.

Early Nancy

Perennial herb, 0.1-0.3 m high. Corm 5-15 mm in diameter. Leaves 3, well spaced; lowest leaf basal, longest, with the narrowest base; highest leaf attached well below the inflorescence, shortest, with the most dilated base. Flowers 1-10, bisexual or unisexual. Perianth white, 6.5-10 mm long; tube short; lobes 6, rather narrow. Nectary a flat transverse band, continuous or sometimes with a slight break in the middle, below the centre of the perianth segment, white or rarely pink. Anthers purple. Staminodes in female flowers absent or present and lacking an anther. Ovary 3-celled, sharply delimited from the free styles. *Anguillaria dioica* R. Br.

Occurs in various, usually damp, habitats on the Coastal Plain and foothills of the Darling Scarp from Medina northward. Extends from north of Geraldton to Albany. Also occurs in S.A., Vic., Tas., N.S.W. and Qld.

Flowers mainly July-September.

There are 2 subspecies, subsp. *alba* T.D. Macfarlane occurring in W.A. and subsp. *dioica* in the other states. Two variants occur in the Perth Region, one of which is dioecious and the other hermaphrodite or andromonoecious. They need further study.

W. monantha (Endl.) T.D. Macfarlane

Perennial herb, up to 0.2 m high, hermaphrodite. Corm 8-23 x 3-9 mm. Leaves 3, well spaced, all or the upper 2 with a dilated base; lowest leaf narrowest; uppermost leaf shortest and sometimes very reduced. Flowers 1-10. Perianth 7-9 mm long; tube short; lobes 6, white, often becoming pink-tinged near the margins, channelled for the filament below the nectary, reflexed at the nectary. Nectary a continuous thickened structure below the centre of the perianth segment, raised at each side and more or less clasping the filament, pink. Anthers red to purple. Ovary 3-celled, sharply delimited from the free styles.

Recorded from Yanchep to Mandurah, occurring close to the coast, usually in areas with limestone, most common in recently burnt areas. Extends from Dirk Hartog Island toward the south coast.

Flowers July-August.

W. pygmaea (Endl.) Benth.

Perennial herbs, up to 0.2 m high, hermaphrodite or dioecious. Corm 15-20 x 3-10 mm. Leaves 2(3); lower 2 leaves similar and basal, long, up to 8 mm broad; third leaf (when present) attached well above the other 2, dilated. Flowers 1-5, the axis of the inflorescence becoming procumbent in fruit. Perianth white, becoming pink-tinged, 5-6 mm long; tube $\frac{1}{4}$ - $\frac{1}{2}$ as long as the perianth; lobes usually 6, erect. Nectary a raised semi-circular ridge, below the centre of the perianth segment. Anthers pink or purple. Ovary 3-celled, tapering gradually to the free styles.

Probably mainly in rocky habitats, recorded on the Coastal Plain and the Darling Scarp near Perth. Extends from north of Geraldton to Ludlow.

Flowers June-July.

W. tenella (Endl.) Benth.

Eight Nancy

Perennial herb, up to 0.1 m high, hermaphrodite. Leaves 3, well spaced or the lowest leaf basal and the upper 2 close together shortly below the flower, spreading; lowest leaf long, filiform, not dilated at base; middle leaf much shorter, dilated at base; uppermost leaf very short, dilated. Flowers 1 or rarely 2, erect. Perianth white, suffused with pink above and below, especially at maturity, 6-7 mm long; tube short; lobes usually 8, sometimes 6 or 7, rarely more than 8, widely spreading. Nectary a small spot slightly above the centre of the perianth segment, purple. Anthers purple or red. Ovary 4-celled or rarely (when perianth segments 6) 3-celled, sharply delimited from the free styles.

Within the Perth Region recorded once from the scarp near Perth growing on gravel and twice from near Bunbury growing on sand. Widespread elsewhere, extending from north of Meekatharra to the western Nullarbor.

Flowers June-July.

FAMILY 139 IRIDACEAE

G. Perry (except where otherwise credited)

Herbaceous perennials, rarely annuals; rootstock a corm, bulb or rhizome, sometimes a compact rhizome or rootstock, rarely roots fibrous; the above ground parts renewed annually, occasionally evergreen. Stems simple or branched. Leaves frequently distichous, usually equitant, usually sword shaped, narrowly elliptic or linear, sometimes terete, parallel-veined, sheathing at the base. Inflorescence of various types, often subtended by 1 or 2 spathes. Flowers bisexual, often short-lived, sessile or pedicellate; commonly individually subtended by floral bracts. Perianth actinomorphic or zygomorphic, petal-like, of (3)6 free segments or tubular and (3)6-lobed, the tube sometimes very short; lobes or segments in 2 whorls and either more or less similar or the outer 3 differing from the inner 3 in colour, shape, position or size; outer whorl with 2 upper and 1 lower lobe or segment; inner whorl with 1 upper and 2 lower lobes or segments. Stamens 3, usually either symmetrically arranged around the style and erect or spreading, or unilateral and arched under the upper lobe of the inner whorl, occasionally irregularly arranged; filaments free or connate; anthers basifixed; staminodes occasionally present. Ovary almost always inferior, 3-celled, with axile placentation. Style short or long, divided into 3 style branches which are entire or divided, crests sometimes present. Fruit a loculicidal capsule; seeds several to numerous. About 80 genera and 1500 species, cosmopolitan in distribution but predominantly in the southern hemisphere, 59 species recorded from W.A., 44 of these introduced and 15 native.

- | | |
|---|---------------|
| 1. Flowers terminal on a long or short peduncle, flower either 1 per inflorescence, subtended by 2 floral bracts, or many flowers enclosed by 2 spathes. | |
| 2. Flowers solitary on each peduncle, each flower subtended by 2 bracts..... | *ROMULEA |
| 2. Flowers numerous, only 1 or 2 open each day, the buds and fruits enclosed by 2 spathes..... | PATERSONIA |
| 1. Flowers disposed singly or in cymose clusters along branched or unbranched inflorescence axes. | |
| 3. Flowers sessile with 2 floral bracts. Inflorescence unbranched and spike-like or branched. | |
| 4. Style branches divided into 2 segments or minutely 2-lobed at the tip. | |
| 5. Outer floral bract divided. Style branches minutely 2-lobed..... | *SPARAXIS |
| 5. Outer floral bract undivided. Style branches divided into 2 segments. | |
| 6. Flowers secund on a horizontal, flexuose axis. Leaves soft, not fibrous..... | *FREESIA |
| 6. Flowers distichously arranged on an erect, straight axis. Leaves usually coriaceous and fibrous..... | *WATSONIA |
| 4. Style branches undivided. | |
| 7. Perianth tube widening abruptly into a broadly cylindrical upper part. Perianth yellow and red or all yellow..... | *CHASMANTHE |
| 7. Perianth tube either narrowly cylindrical throughout or narrowly cylindrical in lower part and funnel shaped above. Perianth not yellow and red or all yellow. | |
| 8. Floral bracts herbaceous, sometimes membranous or dry at the apex. | |
| 9. Style branches filiform, sometimes slightly expanded at apex. Perianth tube cylindrical or slightly widened towards the throat. | |
| 10. Perianth blue. Inflorescence branched..... | ORTHROSANTHUS |
| 10. Perianth white and red. Inflorescence a spike..... | *HESPERANTHA |
| 9. Style branches spatulate or narrowly obovate. Perianth tube cylindrical in lower part, funnel shaped in upper part. | |
| 11. Leaves plicate. Perianth purple, blue, mauve or almost white..... | *BABIANA |
| 11. Leaves not plicate. Perianth lilac, pink, cream, green or white..... | *GLADIOLUS |

8. Floral bracts membranous or scarious.
12. Stamens symmetrically arranged around the style..... *IXIA
12. Stamens unilateral and curved towards the upper lobe of the inner whorl, sometimes randomly arranged in old flowers..... *TRITONIA
3. Flowers pedicellate, grouped in cymes, each cyme surrounded by 2 large spathes. Inflorescence axis branched.
13. Style branches undivided and without crests. Tufted annuals with fibrous roots..... *SISYRINCHIUM
13. Style branches divided into 2 segments or terminating in 2 crests. Perennials arising from a corm.
14. Style branches deeply divided into 2 segments.
15. Perianth maroon to black; margins of segments undulate. Style branches fimbriate along the upper margins..... *FERRARIA
15. Perianth yellow and brown; margins of segments not undulate. Style branches not fimbriate..... *HEXAGLOTTIS
14. Style branches either shortly divided into 2 segments or ending in 2 crests.
16. Perianth salmon pink with yellow and green markings. Style branches inconspicuously crested or not crested..... *HOMERIA
16. Perianth blue or dull yellow-brown flushed blue or purple. Style branches conspicuously crested.
17. Perianth blue. Spathes membranous. Ovary with a long, persistent, sterile prolongation resembling a perianth tube..... *GYNANDRIRIS
17. Perianth dull yellow brown flushed blue or purple. Spathes herbaceous or scarious. Ovary without a long sterile prolongation..... *MORAEA

***BABIANA** Ker Gawler ex Sims

Small perennials. Corms small, globular. Stems subterranean or extending above ground and erect, declinate or decumbent. Leaves basal, 1-several; blade linear, narrowly elliptic or sword shaped, sometimes cuneate, rarely terete, usually hairy, strongly ribbed, almost always plicate. Inflorescence a few-many-flowered spike; flowers sessile, sometimes scented. Floral bracts inserted at base of the ovary, usually herbaceous, often with a dry brown apex, occasionally completely brown; inner bract smaller than the outer, usually with translucent margins, shortly divided or divided to the base. Perianth actinomorphic or zygomorphic and 2-lipped; tube narrowly cylindric in the lower part and funnel shaped in the upper part; lobes equal or unequal. Stamens inserted near the top of the perianth tube, symmetrically arranged or unilateral; filaments free; anthers usually narrowly elliptic in outline. Style slender; style branches undivided, expanded at the apex, often folded lengthwise. Capsule cylindric or globular. Seeds several, dark, small, usually angular. About 60 species mostly in South Africa, with 2 species naturalized in W.A. Reference: Lewis, G.J. 1959. J. S. African Bot. Suppl. 3: 1-149.

1. Perianth zygomorphic and 2-lipped; tube slightly curved; lower lobes of both whorls each with 2 blood red marks below the middle..... *B. disticha
1. Perianth actinomorphic, tube straight; lower lobes of both whorls without blood red marks..... *B. stricta

***B. disticha** Ker Gawler

Baboon Flower

Plant 0.15-0.3 m high. Corm 15-30 mm in diameter. Stem erect, fairly stout, simple or branched, hairy. Leaves 6-8; blade narrowly elliptic to sword shaped, 100-140 x 10-20 mm, hairy, plicate. Spike compact, many-flowered; flowers fragrant. Outer floral bract herbaceous except for the apex which is dry and brown, 10-20 mm long, hairy, apex obtuse and mucronate, sometimes with truncate lateral teeth; inner bract divided to the base, apex of each segment acute. Perianth zygomorphic and 2-lipped, dark purplish blue, the lower lobes of both whorls each with 2 blood red marks just below the middle; tube ca 16 mm long, slightly curved; lobes obovate to oblong, 16-24 x 6-12 mm, those of the inner whorl wider than those of the outer whorl, outer lobes mucronate and obviously ciliate outside on the median vein. Anthers purple, ca 5 mm long. Style branches spatulate, ca 2 mm long. Capsule cylindric, 8-10 mm long. *B. plicata* Ker Gawler an illegitimate name.

Only recorded for a few localities between Bindoon and Waroona. Not recorded elsewhere in W.A. Native to South Africa.

Flowers September-October.

Apparently hybridizes with *B. stricta* as some specimens appear to be intermediate in some characters.

****B. stricta* (Aiton) Ker Gawler**

Baboon Flower

Plant 0.15-0.35 m high. Corm 15-30 mm in diameter. Stem erect or suberect, slender, usually simple, sometimes with 1-4 short branches, hairy. Leaves 6-8; blade narrowly elliptic to sword shaped, 40-200 x 6-12 mm, hairy, plicate. Spike fairly loose, 4-8-flowered; flowers faintly scented. Outer floral bract herbaceous except for the apex which is dry and brown, 10-20 mm long, hairy, apex obtuse and mucronate, sometimes with truncate lateral teeth; inner bract divided to the base, apex of each segment acute. Perianth actinomorphic, purple, blue, mauve or almost white usually with the 2 lower or sometimes all 3 lobes of the inner whorl much paler and sometimes with a light yellow centre; tube dark blue, 11-15 mm long, straight; lobes obovate, 18-23 x 8-13 mm, almost equal or those of the outer whorl sometimes slightly smaller than those of the inner whorl, outer lobes mucronulate and often sparsely ciliate outside on the median vein just below the apex. Anthers purple, 4-6 mm long. Style branches spatulate, ca 3 mm long. Capsule not seen.

Recorded from scattered localities between Gingin and Bunbury. Also recorded from Busselton to Albany. Native to South Africa.

Flowers August-October.

***CHASMANTHE N.E. Br.**

Medium to large perennials. Corms large, depressed globular. Stems erect, simple or branched. Basal leaves several; blade narrowly elliptic to sword shaped; cauline leaves reduced, bract-like, sheathing. Inflorescence many-flowered, branched or unbranched. Flowers sessile; floral bracts inserted at base of ovary, herbaceous with dry membranous margins; inner bract shorter than the outer, apex shortly divided. Perianth zygomorphic, yellow, orange or red; tube curved, very narrowly cylindrical in the lower part, widening abruptly into a broadly cylindrical upper part; lobes unequal, upper lobe of the inner whorl hooded and much longer than the others. Stamens inserted at base of the wider part of the perianth tube, unilateral and curved under the upper lobe of the inner whorl; filaments free. Style filiform; style branches undivided, recurved. Capsule usually depressed globular. Seeds few, large, globular or angled, shiny. About 10 species in southern Africa, with 1 species naturalized in W.A.

****C. floribunda* (Salisb.) N.E. Br.**

African Cornflag

Plant 1-1.5 m high. Corm ca 60 mm in diameter. Blade of basal leaves narrowly sword shaped, 400-600 x 20-50 mm. Inflorescence up to 0.3 m long; flowers numerous. Floral bracts green often tinged purple or brown; outer bract ca 10 mm long. Perianth yellow and red or all yellow; tube 35-45 mm long, the lower narrow part 8-12 mm long and twisted, the upper part wider and ca 5 mm across; upper lobe of the inner whorl obovate, 25-28 x ca 8 mm; other lobes 12-16 mm long. Staminal filaments yellow or orange, middle filament exceeding the longest perianth lobe, the other 2 slightly shorter; anthers purple, black or yellow, linear to narrowly elliptic in outline, ca 7 mm long. Style branches 4 mm long. Capsule 3-lobed. Seeds red-brown, sharply angled. *C. aethiopica* auct., non (L.) N.E. Br.

A garden escape now widely naturalized in suburban Perth. Also naturalized in country towns of the south west, between Perth and Albany. Native to South Africa.

Flowers July-October.

***FERRARIA Burman ex Miller**

Small to medium perennials. Rootstock a row of persistent corms, a new corm added annually. Stems erect, usually branched and usually covered with leaf sheaths. Leaves few to numerous, cauline, glabrous, often glaucous, suberect or spreading, lower leaves with a sword shaped to linear blade; upper leaves shorter and bract-like, almost entirely sheathing. Inflorescence a corymb of few to numerous cymes;

each cyme 2 or 3(6)-flowered, the flowers emerging successively. Flowers with a strong unpleasant scent, pedicellate, open for 1-3 days. Spathes herbaceous, the outer spathe shorter than the inner. Floral bracts inserted at base of pedicel, membranous. Perianth actinomorphic; segments free, the outer segments slightly larger than the inner, clawed; claws suberect, forming a cup; limbs spreading, soon reflexed, margins undulate. Stamens symmetrically arranged; filaments connate except for the upper 1-4 mm; anthers appressed to style branches. Style filiform; style branches divided into 2 segments, the segments fimbriate along the upper margin. Capsule globular to cylindrical. Seeds numerous, brown to straw-coloured, angular. About 10 species in central and southern Africa. 1 species naturalized in W.A. Reference: De Vos, M.P. 1979. J. S. African Bot. 45: 295-375.

***F. crispa** Burman

Black Flag

Plant 0.17-0.35 m high. Corm depressed globular. Leaves numerous; blade of lower leaves 150-300 x 5-15 mm, thickened in the middle with a prominent pseudo-midrib, tips often slightly incurved. Cymes numerous, 2(3)-flowered. Spathes 30-60 mm long, margins translucent. Flowers live for 1 day. Perianth maroon to black with lighter markings, margins of limbs brownish green; segments of the outer whorl 15-20 mm long, the claws 8-10 mm long, the limbs broadly triangular, 10-15 mm wide, spreading, margins undulate, apex acuminate; segments of the inner whorl smaller; the claws of both whorls forming a cup 12-15 mm across. Anthers black. Style branches 3-4 mm long deeply divided into 2 slender tapering segments; fimbriae dense, tufted. Capsule cylindrical, 15-20 mm long. *F. undulata* L. an illegitimate name.

Naturalized on roadsides and vacant land in the suburbs of Perth. Not recorded elsewhere in W.A. Native to South Africa.

Flowers August-September.

***FREESIA** Ecklon ex Klatt

Small perennials. Corms small, conical or globular. Stems erect or suberect, bent horizontally below the inflorescence or prostrate. Leaves several; blade narrowly elliptic to sword shaped, soft. Inflorescence a horizontal, flexuose, secund spike; flowers sessile, usually strongly scented. Floral bracts inserted at base of ovary, herbaceous with translucent margins or pale, dry and scarious; outer bract undivided; inner bract smaller, enclosed by outer bract, apex shortly divided. Perianth more or less actinomorphic or zygomorphic; tube cylindrical, narrowly cylindrical in the lower part, widening into a broader upper part; lobes either subequal or unequal with the upper lobe of the inner whorl largest and often hooded. Stamens inserted at the base of the wider part of the perianth tube, unilateral and curved, held opposite the upper lobe of the inner whorl; filaments free; anthers white, narrowly elliptic in outline. Style filiform; style branches divided for half their length. Capsule more or less globular to cylindrical, 3-lobed, rough, papillose. Seeds several, globular, shiny. About 19 species, mainly in southern South Africa, with 1 naturalized in W.A. Reference: Goldblatt, P. 1982. J. S. African Bot. 48: 39-91.

***F. aff. leichtlinii** Klatt

Freesia

Plant 0.1-0.4 m-high. Corm conical, 10-15 mm in diameter. Stem erect or suberect. Leaf blades narrowly elliptic to narrowly ovate, 50-350 x 4-8(12) mm. Spike 3-8-flowered. Floral bracts green with translucent margins, sometimes tinged purple, outer bract 8-15 mm long. Flowers strongly sweet-scented. Perianth zygomorphic and 2-lipped, white, cream or yellow, usually flushed purple on the outside, the lower lobes of both whorls often with yellow to orange markings; tube 30-45 mm long, the narrow lower part 10-20 mm long, bent below the funnel shaped upper part; lobes unequal; the upper lobe of the inner whorl obovate to broadly elliptic, 15-20 x 12-15 mm, usually hooded. Anthers usually white, sometimes purple, ca 6 mm long. Capsule cylindrical, 10 mm long, rugulose. *F. refracta* auct., non (Jacq.) Klatt

A garden escape which is now widely distributed in the region. Also widespread throughout the south west of the state.

Flowers August-October.

This taxon is almost certainly of hybrid origin.

***GLADIOLUS L.**

Small to large perennials. Corms small to medium, usually globular. Stems erect or flexuose. Basal leaves 1-several; blade either flat and linear, narrowly elliptic to sword shaped or terete, entire and sometimes grooved; upper cauline leaves reduced and bract-like. Inflorescence unbranched and spike-like or branched; flowers sessile, sometimes scented. Floral bracts inserted at base of ovary, usually large, herbaceous, apex sometimes dry or membranous, the inner bract shortly divided. Perianth actinomorphic or zygomorphic; tube well developed, usually curved, narrowly cylindrical in the lower part, funnel shaped in the upper part; lobes either subequal and spreading or unequal, when unequal the upper lobe of the inner whorl largest, erect and sometimes hooded and the lower lobes of both whorls smaller and forming a lip. Stamens inserted at base of wider part of the perianth tube, usually unilateral and together with the style arched in front of the upper lobe of the inner perianth whorl; filaments free. Style slender, terete; style branches undivided, expanded at the apex, folded lengthwise. Capsule globular to cylindrical. Seeds numerous, usually winged. About 150 species mainly in South Africa and the Mediterranean Region. 8 species naturalized in W.A. Reference: Lewis, G.J. et al. 1972. J. S. African Bot. Suppl. 10: 1-316.

1. Leaf blade spirally twisted, sparsely hairy; sheath hairy. Anthers yellow, 10-12 mm long..... ***G. caryophyllaceus**
1. Leaf blade flat, glabrous; sheath glabrous or sparsely minutely hairy. Anthers purple, 6-8 mm long.
 2. Perianth lobes 40-70 mm long, with long tapering undulate tip; tube 65-75 mm long..... ***G. undulatus**
 2. Perianth lobes 22-40 mm long, apex acute or obtuse, but never with long tapering undulate tip; tube 30-50 mm long..... ***G. angustus**

***G. angustus L.**

Long Tubed Painted Lady

Plant 0.3-0.6 m high. Corm globular, 15-20 mm in diameter; cormels sometimes present. Basal leaves 3-5; sheath with purple flecks, sparsely minutely hairy; blade linear to sword shaped, 350-750 x 5-20 mm, flat, glabrous, midrib prominent. Spike loose, 2-10-flowered. Outer floral bract green to brown, 30-45 mm long; inner bract green, 25-30 mm long. Perianth zygomorphic, white or very pale lilac to pink, the lower lobes of both whorls with a conspicuous dark red or purplish red hastate mark at about the middle with a line of the same colour extending down to the throat, the throat flushed red; tube 30-50 mm long, straight, cylindrical in the lower part, funnel shaped in the upper part; lobes unequal, acute or obtuse; upper lobe of the inner whorl elliptic, 35-40 x 10-16 mm; upper lobes of the outer whorl slightly smaller, narrowly elliptic to elliptic; lower lobes of both whorls subequal, narrowly elliptic, 22-30 x 7-9 mm. Anthers purple, 6-7 mm long, curved. Style branches spatulate, 6-7 mm long. Capsule apparently does not form in W.A. **Fig. 289**

Cultivated as an ornamental and naturalized in Perth suburbs. Also found on disturbed sites in the south west. Native to South Africa.

Flowers October-November.

***G. caryophyllaceus (N.L. Burman) Poiret**

Plant 0.4-0.8 m high. Corm ovoid to subglobular, 20-30 mm in diameter. Basal leaves 4-6; sheath hairy; blade sword shaped, 80-250 x 10-20 mm, spirally twisted, sparsely hairy. Spike more or less loose, 2-11-flowered; flowers strongly scented. Floral bracts green, sometimes tinged purple; outer bract 25-70 mm long; inner bract slightly shorter. Perianth zygomorphic, pale to dark pink, variously streaked and spotted with shades of pink; tube 30-40 mm long, bent at about the middle, the lower part cylindrical, the upper part funnel shaped; lobes unequal, the upper lobe of the inner whorl largest, broadly obovate, 25-35 x 20-25 mm; upper lobes of the outer whorl obovate, 22-30 x 15-20 mm; lower lobes of both whorls obovate to spatulate, 25-35 x 14-18 mm, connate for the basal 5-7 mm. Anthers yellow, 10-12 mm long, slightly curved. Style branches spatulate, 4-5 mm long. Capsule cylindrical, 20-30 mm long. Seeds numerous, winged.

Common and naturalized in disturbed areas and some frequently burnt bushland between Yanchep and Fremantle. Also recorded for one locality near Moora. Native to, but now very rare, in south western Cape Province of South Africa.

Flowers August-October.

***G. undulatus L.**

Plant 0.7-1.4 m high. Corm ovoid, 15-30 mm in diameter; cormels often present. Basal leaves 3-5, glabrous; blade sword shaped, up to 1.5 m x 20 mm, flat. Spike loose, erect, 4-6(12)-flowered. Floral bracts green or brown; outer bract, 50-80 mm long; inner bract 30-40 mm long. Perianth cream or green, sometimes tinged pink, the lower lobes of both whorls with a dark green to purple median line extending down into the tube; tube 65-75 mm long, straight or slightly curved, the lower part cylindrical and 50-60 mm long, the upper part funnel shaped; lobes narrowly elliptic, with long tapering, undulate apices; upper lobes of both whorls 55-70 x 12-17 mm; lower lobes of both whorls 40-60 x 9-12 mm. Anthers purple, ca 8 mm long. Style branches narrowly obovate, ca 8 mm long. Capsule apparently does not form in W.A.

A garden escape which is commonly found in the older Perth suburbs and in the Darling Range east of Perth, but not elsewhere in W.A. Native to, and rather rare, in south western Cape Province of South Africa.

Flowers October-December.

***GYNANDRIRIS Parl.**

Small perennials. Corms small, globular. Stems short. Leaves 1 or 2, produced from the base and lower aerial node, linear and grooved, or flat and coiled. Inflorescence a corymb of few cymes; each cyme several-flowered; flowers pedicellate, short-lived, emerging successively. Spathes colourless, large, membranous. Floral bracts inserted at base of the pedicel, membranous. Perianth actinomorphic, blue, the segments free almost to the base; segments of the outer whorl clawed, the limbs spreading or reflexed; segments of the inner whorl erect or spreading. Stamens appressed to the style and style branches; filaments connate for part of their length. Ovary cylindrical with a long, persistent, sterile prolongation resembling a perianth tube. Style slender; style branches flattened, petal-like, each ending in 2 petal-like crests. Capsule globular or cylindrical, soft-walled, enclosed in the spathes. Seeds small, angular. About 7 species, mostly in southern Africa, one in the Mediterranean Region and western Asia, 1 naturalized in W.A.

***G. setifolia (L. f.) R. Foster**

Thread Iris

Small plant, 50-80 mm high. Corm 5-15 mm in diameter. Leaves 100-500 x 1-2 mm, spreading. Flowers opening about midday and fading late in the afternoon. Spathes 25-30 mm long, the outer spathes connate for the lower 8-10 mm. Perianth lilac, the outer segments with a yellow marking and the inner with a white marking; lower parts of segments forming a cup ca 9 mm deep, upper parts spreading or slightly reflexed; segments of outer whorl 16-18 x 4-6 mm; segments of inner whorl shorter and much narrower. Anthers purple, linear in outline, ca 3 mm long. Ovary cylindrical, ca 8 mm long, with a sterile prolongation 10-12 mm long. Style branches lilac, 8-10 mm long, each ending in 2 petal-like crests. Capsule cylindrical, 10-15 mm long.

Within the Perth Region recorded only from South Perth and Subiaco. Also recorded from Wongan Hills, north of Geraldton, south of Boyup Brook and inland to Southern Cross. Native to Cape Province of South Africa.

Flowers September-October.

In the vegetative state this species is easily mistaken for *Romulea rosea*.

***HESPERANTHA Ker Gawler**

Small perennials. Corms small, depressed globular to campanulate. Stems erect, usually produced above ground. Basal leaves 3 or more; blade linear to narrowly elliptic or sometimes falcate; cauline leaves short, bract-like, sheathing. Inflorescence a spike, sometimes reduced to a single flower; flowers sessile, often scented. Floral bracts inserted at base of ovary, usually herbaceous, sometimes membranous at the apex; inner bract often smaller than the outer, apex shortly divided. Perianth actinomorphic, usually white or cream; tube cylindrical but widening slightly towards the throat, usually straight; lobes equal or unequal, spreading. Stamens usually inserted at the throat, usually symmetrically arranged; filaments free. Style slender; style branches filiform, spreading, undivided. Capsule ovoid to cylindrical. Seeds numerous, brown. About 55 species in Africa south of the Sahara with most species in South Africa. A single species naturalized in W.A. References: Goldblatt, P. 1982. *Ann. Missouri Bot. Gard.* 69: 370-378; Goldblatt, P. 1984. *J.S. African Bot.* 50: 15-141.

***H. falcata** (L. f.) Ker Gawler

Plant 0.25-0.45 m high. Corm campanulate, base with a diameter of 8-15 mm. Leaves 3-5; blade linear or falcate, 50-250 x 4-8 mm. Spike 3-8-flowered. Floral bracts herbaceous, often with reddish tips; outer bract 8-10 mm long; inner bract slightly narrower. Perianth white with the outside of the lobes of the outer whorl dark red; tube green, 5-9 mm long, straight; lobes narrowly ovate to narrowly elliptic; lobes of the outer whorl 10-15 x 4-5 mm; lobes of the inner whorl slightly wider. Anthers yellow, erect, ca 5 mm long. Style branches ca 10 mm long. Capsule ovoid, 7-10 mm long. Seeds numerous, brown, angular. *H. graminifolia* auct., non Sweet

Occurs on poorly drained soils which become inundated in winter, recorded from the Coastal Plain and the Darling Range east of Midland. Not recorded elsewhere in W.A. Native to the winter rainfall area of south western South Africa.

Flowers August-October

***HEXAGLOTTIS** Vent.

Small to medium perennials. Corms small, globular. Stems straight or flexuose, usually branched. Lower leaves (1)2(3), produced from the base and lower aerial nodes, long, linear, grooved; upper leaves bract-like, almost entirely sheathing. Inflorescence of several-flowered cymes arranged in terminal fascicles or laterally along the stem; flowers pedicellate, short-lived, emerging successively. Spathes membranous or herbaceous with a dry membranous apex, sometimes lacerate. Floral bracts inserted at base of the pedicel, membranous. Perianth actinomorphic, usually yellow; segments usually free, those of the inner whorl shorter than those of the outer whorl, clawed, limbs spreading. Stamens symmetrically arranged and spreading; filaments connate at the base; anthers linear in outline, circinate after anthesis. Style short; style branches divided almost to the base into 2 filiform segments. Capsule cylindrical to clavate. Seeds numerous, brown, angular. 4 species in South Africa. 1 species naturalized in W.A.

***H. lewisiae** Goldblatt

Plant 0.2-0.6 m high. Corm 15-20 mm in diameter. Stem flexuose. Lower leaves 2 or 3, 300-600 x 2-6 mm. Spathes herbaceous in the lower part, dry and brown in the upper part, apex lacerate; outer spathe 20-30 mm long; inner spathe 25-40 mm long. Flowers with an unpleasant smell, opening in the afternoon. Perianth yellow with the outside of the segments of the outer whorl brown; segments free; claws forming a cup, ca 2 mm deep; segments of the outer whorl narrowly obovate, 16-20 x 5-8 mm; segments of the inner whorl obovate to spatulate, 14-18 x 5-8 mm. Anthers yellow, ca 3 mm long. Style branches 4-5 mm long, divided almost to the base. Capsule cylindrical, 10-15 mm long. *H. flexuosa* (L. f.) Sweet an illegitimate name.

Recorded from Gingin, Harvey and near Bunbury. Also recorded from near Moora, Wongan Hills and Hopetoun. Native to south western Cape Province of South Africa.

Flowers September-October.

***HOMERIA** Vent.

Small to medium perennials. Corms small to medium, globular. Stems erect, straight or flexuose, usually branched. Lower leaves 1-3, produced from the base and lower aerial nodes, usually linear, grooved, straight or coiled in the upper part; upper leaves short, bract-like, entirely sheathing. Inflorescence a corymb of few to several cymes; each cyme several-flowered; flowers pedicellate, short-lived, emerging successively. Spathes herbaceous at least in the lower part, apex acuminate, the outer spathe shorter than the inner. Floral bracts inserted at base of the pedicel, membranous. Perianth actinomorphic, yellow, pink or orange; segments free, almost equal or those of the inner whorl smaller, usually clawed; claws erect and appressed to the staminal tube, or forming a cup; limbs horizontal or reflexed. Stamens symmetrically arranged and erect; filaments connate; anthers oblong to linear in outline, appressed to the style branches. Style slender; style branches either shortly divided or crested. Capsule narrowly cylindrical to cylindrical, sometimes shortly beaked. Seeds numerous, brown, angular. 31 species, in southern Africa. 2 species naturalized in W.A. Reference: Goldblatt, P. 1981. Ann. Missouri Bot. Gard. 68: 413-503.

1. Plant with 1 long lower leaf, upper leaves short and bract-like. Perianth segments of outer whorl 30-40 mm long..... **H. flaccida*
 1. Plant with 2 or 3 long lower leaves, upper leaves short and bract-like. Perianth segments of outer whorl 22-24 mm long..... **H. miniata*

**H. flaccida* Sweet

One-leaf Cape Tulip

Plant 0.3-0.7 m high. Corm 15-20 mm in diameter. Stem flexuose in upper part. Lower leaf 1, linear, 400-700 x 5-10 mm. Spathes herbaceous; outer spathe 40-60 mm long; inner spathe 80-90 mm long. Flowers with an unpleasant smell, opening very early morning, fading in the afternoon. Perianth salmon pink, the base of each segment with a yellow triangular marking outlined in orange, the outside with a prominent green midrib; segments of the outer whorl 30-40 mm long, the claw 12-14 mm long, the limb oblong to obovate, 10-12 mm wide; segments of inner whorl narrower, limb narrowly obovate; claws of both whorls forming a cup 12-14 x 15-20 mm. Anthers 8-9 mm long. Style branches divergent, 5-6 mm long, stigma 2-lobed; crests erect, triangular. Capsule cylindrical, 40-55 mm long, with a beak 2 mm long. *H. collina* auct., non (Thunb.) Salisb. *H. breyniana* auct., non (L.) G. Lewis

Widespread throughout the region. Extends from east of Geraldton to Albany and Esperance, inland as far as Southern Cross. Native to south western Cape Province of South Africa.

Flowers September-November.

**H. miniata* (Andrews) Sweet

Two-leaf Cape Tulip

Plant 0.2-0.4 m high. Corm 10-20 mm in diameter, with numerous small cormels. Stem straight or slightly flexuose in upper part. Lower leaves 2 or 3, linear, 200-600 x 5-12 mm. Spathes herbaceous in the lower part, dry and brown in the upper part; outer spathe 40-50 mm long; inner spathe 50-60 mm long. Flowers opening about midday, fading late afternoon. Perianth salmon pink, the base of each segment with a triangular yellow nectar guide dotted and outlined in green; segments of the outer whorl 22-24 mm long, the claw narrow and ca 2 mm long, the limb oblong to obovate and 8-10 mm wide; segments of the inner whorl smaller, the limb narrowly obovate; claws of both whorls appressed to the staminal tube. Anthers ca 3 mm long. Style branches short, deeply divided into 2 segments; crests absent. Capsule cylindrical, 10-12 mm long, beak absent.

Occurs throughout the region. Also widespread in the wheatbelt as far north as Jurien as well as east to Kalgoorlie. Native to western parts of South Africa.

Flowers July-October.

*IXIA L.

Small perennials. Corms small, more or less globular. Stems slender and wiry. Leaves several; blade filiform, narrowly elliptic or sword shaped, usually soft, veins prominent. Inflorescence few-many-flowered, unbranched and spike-like or branched; flowers distichously or spirally arranged, sessile. Floral bracts inserted at base of ovary, short, membranous, usually translucent and colourless or sometimes dry, opaque and brown; outer bract usually divided into 3 at the apex; inner bract shortly divided at the apex. Perianth almost always actinomorphic; tube slender and cylindrical, or cylindrical in the lower part and widening gradually towards the throat; lobes equal or almost equal, spreading. Stamens inserted on the perianth tube, usually symmetrically arranged and erect; filaments usually free, sometimes partly connate, included or exserted; anthers erect, usually linear in outline. Style filiform, included or exserted; style branches undivided, short. Capsule cylindrical to globular. Seeds numerous, brown, small, usually angular. 44 species endemic to Cape Province of South Africa. 3 species naturalized in W.A. Reference: Lewis, G.J. 1962. J. S. African Bot. 28: 45-195.

1. Perianth tube 60-70 mm long..... **I. paniculata*
 1. Perianth tube 5-20 mm long.
 2. Floral bracts colourless with light brown veins, 3-7 mm long. Staminal filaments free..... **I. polystachya*
 2. Floral bracts ferruginous in the upper part and greyish or purple in the lower part, 8-12 mm long. Staminal filaments connate at base or free and connivent..... **I. maculata*

***I. maculata L.**

Yellow Ixia

Plant 0.2-0.5 m high. Corm with a flat base; 10-20 mm in diameter, sometimes with 1 or 2 stolons each with a terminal cormel. Stem erect, simple. Leaf blades narrowly elliptic, 80-300 x 5-10 mm. Floral bracts greyish or purple in the lower part, the upper part ferruginous, 8-10 mm long; outer bract undivided, mucronate; inner bract shortly divided into mucronate lobes. Spike 4-many-flowered, flexuose. Perianth yellow with a dark purple-brown or maroon centre, lobes of the outer whorl often reddish on the outside; tube cylindric, slightly expanded at the throat, 10-15 mm long; lobes subequal, elliptic to obovate, 18-25 x 10-12 mm. Staminal filaments usually connate at least at the base, sometimes free and connivent; Anthers yellow, 7-9 mm long. Style branches linear or sometimes slightly expanded towards the apex, 3-5 mm long.

Recorded in the suburbs of Perth. Also found at Donnybrook and Narrogin. Native to south western Cape Province of South Africa.

Flowers August-September.

Colour variants, usually with larger flowers, have been recorded from the region. These appear to be of garden origin.

***I. paniculata Delaroché**

Plant 0.3-0.6 m high. Corm 10-20 mm in diameter. Stem erect, usually with 1 or more short, suberect branches. Leaf blades narrowly elliptic, 300-500 x 4-8 mm. Spikes 4-12-flowered, fairly loose. Floral bracts colourless in the lower part, the upper part brown, 8-12 mm long; outer bract entire or very shortly divided at the apex; inner bract shortly divided at the apex. Perianth cream to yellow, usually flushed pink on the outside; tube 60-70 mm long, narrowly cylindric in the lower part then widening gradually towards the throat; lobes of the outer whorl narrowly obovate, 20-25 x ca 6 mm, those of the inner whorl slightly narrower. Staminal filaments free; anthers purple, ca 6 mm long. Style branches spatulate, folded lengthwise, ca 2 mm long, recurved. Capsule not seen.

Naturalized near Perth and Boyanup. Also recorded from Bridgetown and Albany. Native to south western Cape Province of South Africa.

Flowers September-November.

***I. polystachya L.**

Variable Ixia

Plant 0.5-1 m high. Corm with a flat base, 10-20 mm in diameter. Stem erect, simple or with 1-4 suberect, short branches. Leaf blades narrowly elliptic, 200-500 x 3-5 mm, erect. Floral bracts colourless with light brown veins, 3-7 mm long; outer bract with obtuse apex; inner bract shortly divided into mucronate segments. Spike many-flowered, compact; flowers faintly scented. Perianth white with a central blue-green circular mark, the segments of the outer whorl tinged blue to purple on the outside; tube very narrowly cylindric, 5-10 mm long; lobes elliptic or obovate, 14-20 x 10-14 mm. Staminal filaments free; anthers dark blue, 7-8 mm long. Style branches folded lengthwise, ca 3 mm long. *I. metelerkampiae* auct., non L. Bolus

Recorded only from near Perth and near Capel. Also recorded south of the region near Donnybrook. Native to south western Cape Province of South Africa.

Flowers September-October.

***MORAEA Miller**

Small to medium perennials. Corms globular. Stems slender, simple or branched. Lower leaves 1-several, produced from base and lower aerial nodes, linear or terete, sometimes grooved; upper leaves short, bract-like, usually entirely sheathing. Inflorescence a corymb of few to several cymes, each cyme several-flowered; flowers pedicellate, short-lived, emerging successively. Spathes usually herbaceous, sometimes with a dry brown apex, or spathe entirely dry and brown, apex acuminate or sometimes lacerate. Floral bracts inserted at base of the pedicel, membranous. Perianth actinomorphic, segments usually free; segments of the outer whorl clawed, limbs spreading or reflexed; segments of the inner whorl smaller, either clawed with spreading limbs or entire and erect. Stamens appressed to the style and style branches; filaments usually connate at the base; anthers linear in outline. Style usually short;

style branches flattened, petal-like, each ending in paired crests. Capsule globular, cylindric or ellipsoid. Seeds numerous, dark brown, globular or angular. About 90 species in Africa south of the Sahara. 2 species naturalized in W.A. Reference: Goldblatt, P. 1976. Ann. Missouri Bot. Gard. 63: 657-786.

***M. vegeta L.**

Plant 0.1-0.3 m high. Corm ca 10 mm in diameter. Stem hairy. Lower leaves several, glaucous, linear, 100-300 x 3-6 mm, often dry and lacerate at the apex. Spathes herbaceous, sometimes with a dry brown apex, acuminate; outer spathe 25-45 mm long; inner spathe 30-50 mm long. Perianth dull yellow to brown, flushed blue or purple; segments of the outer whorl obovate, 20-25 mm long; segments of the inner whorl smaller; limbs of both whorls reflexed. Staminal filaments 5-6 mm long, connate in the lower third; anthers blue, 3-4 mm long. Style branches narrowly elliptic, 7-8 mm long; crests 7-10 mm long. Capsule ellipsoid, 6-8 mm long, soft-walled, the position of the outermost seeds clearly evident. Seeds angular.

Recorded only from Maddington in suburban Perth. Native to south western Cape Province, South Africa.

Flowers August-September.

ORTHROSANTHUS Sweet

T. D. Macfarlane

Rootstock compact. Leaves usually basal, 2 or 3 cauline, becoming shorter toward the apex of the stem. Inflorescence axillary, paniculate, consisting of pedunculate and sometimes also sessile few-flowered clusters (which may be reduced to a single flower), each cluster or single flower enclosed within 2 spathes, and each flower subtended by an additional membranous floral bract. Flowers actinomorphic, with a very short perianth tube and 6 spreading subequal lobes. Stamens 3, free (in Perth Region) or connate into a very short tube or for one-third to three-quarters of their length; anthers basifixed. Style very short, 3-lobed, with filiform branches alternating with the outer perianth lobes. Capsules enclosed in bracts. A genus of 7 species, 4 in Australia, all occurring in W.A., 3 in America. Reference: Geerinck, D. 1974. Bull. Jard. Bot. Nat. Belg. 44: 29-60.

O. laxus (Endl.) Benth.

Morning Iris

Plants forming erect caespitose clumps with several to many stems. Leaves grass-like, usually basal; basal leaves several per stem, 100-400 x 1-6 mm, flat, ribbed, hairy to glabrescent, the margins sometimes scabrous; cauline leaves shorter, each subtending an inflorescence. Inflorescences exceeding the leaves, each consisting of 1-4 pedunculate clusters of several sessile flowers enclosed by a spathe of 2 unequal, broad, green, striate, herbaceous bracts, the bracts glabrous or ciliate on keel; outer bract 11-15 x 3-5 mm. Flowers blue; tube 2-3 mm long; perianth lobes 25-30 x 6-8 mm. Stamens usually free. **Fig. 290**

Found on a variety of soils throughout the Perth Region. A widespread species ranging from Northampton to Bremer Bay.

Flowers August-October.

This species has been subdivided into 2 varieties, var. *laxus* which is 400-600 mm tall with leaves 3-6 mm wide, and var. *gramineus* (Endl.) Geerinck which is 100-400 mm tall with leaves 1-2 mm wide. Both varieties occur in the Perth Region.

PATERSONIA R. Br. ex Ker Gawler

T. D. Macfarlane and D. A. Cooke

Perennial herbs with compact rootstock or short segmented rhizome. Leaves equitant (in fan shaped clusters) or rarely only 1 or 2 per stem, radical. Inflorescence terminal; flowers several within a spathe of 2 rigid bracts, arranged in 2 sessile few-flowered spikes each enclosed by a further 2 narrower bracts, each flower subtended by a bract similar in texture to spathe bracts or scarious. Perianth actinomorphic,



Fig. 290. *Orthrosanthus laxus*. A, Flowering stem. B, Part of inflorescence and bud. C, Stamens and style.

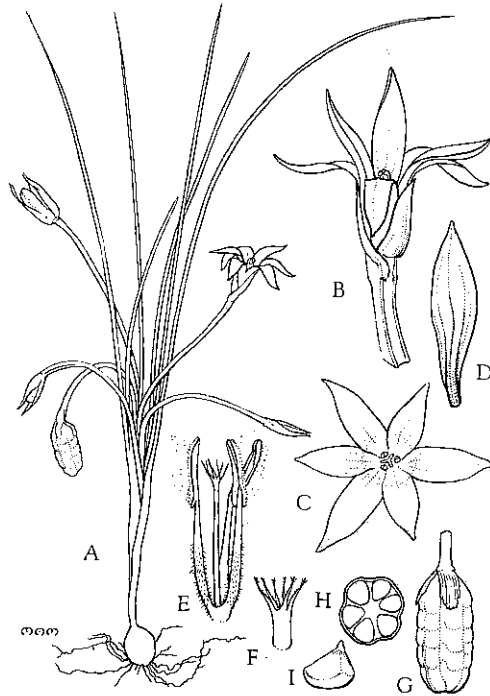


Fig. 291. *Romulea rosea*. A, Habit. B and C, Two views of flower. D, Perianth segment. E, Stamens surrounding style. F, Stigma. G, Capsule. H, Transverse section of capsule. I, Seed.

with a filiform tube and 3 broad spreading outer lobes, the 3 inner lobes very small and erect. Stamens 3; filaments connate to the middle or nearly to the top in a tube; anthers basifixed. Style filiform, longer than the anthers, with 3 spreading or reflexed broad flattened branches alternating with the outer perianth lobes. Seeds globular, cylindric or angular, with or without an aril. A genus of 17 Australian species, 13 occurring in W.A., 1 or 2 species in Borneo and New Guinea. References: Geerinck, D. 1974. *Bull. Jard. Bot. Nat. Belg.* 44: 29-60; Cooke, D.A. In press. *Flora of Australia*, vol. 46.

- | | |
|--|------------------------|
| 1. Spathe bracts hairy on the surface (disregard the midrib or keel). | |
| 2. Leaves 1 or 2 per stem, longest leaf < 200 mm long. Peduncle 15-35 mm long..... | P. babianoides |
| 2. Leaves several to many per stem; longest leaf usually 300-600 mm long. Peduncle 60-500 mm long..... | P. rudis |
| 1. Spathe bracts glabrous on the surface. | |
| 3. Peduncle 35 mm long or less, glabrous or woolly-hairy..... | P. pygmaea |
| 3. Peduncle 60 mm long or more, always glabrous. | |
| 4. Outer bract of spathe 60 mm long or more..... | P. umbrosa |
| 4. Outer bract of spathe 50 mm long or less. | |
| 5. Spathes never glaucous. Leaves less than 2 mm wide, terete, grooved..... | P. juncea |
| 5. Spathes often rather glaucous. Leaves 2-11 mm wide, flat, smooth..... | P. occidentalis |

P. babianoides Benth.

Plants rhizomatous, each stem arising separately from a segment of the segmented, rather fleshy, shortly horizontal rhizome. Cataphylls 2 or more below leaves. Leaves 1 or 2, basal, 120-180 x 5-14 mm, more or less petiolate, flat, conspicuously ribbed, pilose. Inflorescence distinctly shorter than leaves; peduncle 15-35 mm long, villous; spathes green, striate, villous, the outer spathe bract 25-30 x 3-3.5 mm. Flowers purple. Perianth tube 15-20 mm long; outer lobes 15-20 x 12-15 mm. Staminal tube usually 3-lobed, 3.5-5 mm long.

Occurs on lateritic soils. In the region only known on the Darling Range from Helena Valley to Jarrahdale but probably widespread in the Jarrah forest. Also recorded from a few localities in the south west from Nannup to Denmark.

Flowers September-November.

P. juncea Lindley

Plants caespitose with compact rootstock. Leaves several to many, crowded near base and overlapping, 70-220 x 0.6-1.5 mm, sessile, terete or almost terete, prominently ribbed, glabrous or finely hairy on margins only. Inflorescence about equal to or distinctly longer than leaves; peduncle 60-240 mm long, glabrous, striate; spathes chestnut brown, smooth, glabrous, with scarious margins, the outer spathe bract 30-45 x 3-5 mm wide. Flowers pale violet. Perianth tube 25-35 mm long; outer lobes 15-25 x 13-18 mm. Staminal tube undivided, 4-5 mm long. *P. juncea* Lindley var. *elongata* Benth.

Grows on dry or seasonally wet sand or lateritic soil in the Jarrah forest and the eastern parts of the Coastal Plain throughout the region. Occurs from Geraldton to Busselton and east to Pingelly as well as along the south coast to Israelite Bay.

Flowers August-October.

P. occidentalis R. Br.

Purple Flag, Common Flag

Plants caespitose, with compact rootstock. Leaves several to many, crowded near base of stem and overlapping, 150-550(-750) x 2-11 mm, sessile, flat, slightly ribbed, glabrous except along the margins, which are scabrous or hairy. Inflorescences usually slightly to distinctly longer than the leaves but sometimes equal or slightly shorter; peduncle usually 150-540 mm long, rarely as short as 80 or as long as 750 mm, glabrous; spathes more or less elliptic, greenish to dull brown, often rather glaucous, not striate, glabrous, or with midrib (keel) scabrous or hairy, at least near apex; outer spathe bract 30-50 x 6-12 mm. Flowers purple. Perianth tube 25-35 mm long; outer lobes 15-35 x 10-22 mm. Staminal tube undivided or 3-lobed, 4-6 mm long. *P. longiscapa* Sims ex Sweet

Mainly on grey or yellow sandy soil but also coastal calcareous sand and granitic soil; found throughout the Perth Region. A widespread species recorded from the Murchison River to east of Esperance.

Flowers September-December, occasionally also in other months.

P. pygmaea Lindley

Plants caespitose, with a compact rootstock. Leaves several to many, attached above a short scaly section of stem, dense and overlapping, 40-170 x 1.5-3 mm, sessile, flat, ribbed, hairy only along margins, one margin sometimes woolly near base. Inflorescences distinctly shorter to about equal to leaves, rarely much longer; peduncle from less than 10-35 mm long, glabrous, glabrescent or woolly-hairy all over; spathes brown, obscurely striate or smooth, hairy only on midrib of each bract and sometimes restricted to the apical part; outer spathe bract 25-43(-60) x 3.5-6(-8) mm. Flowers purple. Perianth tube ca 25 mm long; outer lobes 14-22 x 12-18 mm. Staminal tube usually undivided, sometimes 3-lobed, 3.5-5 mm long.

Recorded on lateritic or sometimes sandy soils in the Jarrah forest near the Darling Scarp, south of Lesmurdie. Occurs as far south as Albany and the Stirling Range.

Flowers August-October.

P. rudis Endl.

Hairy Flag

Plants caespitose. Leaves several to many, crowded near base of stem and overlapping, 300-700 x 3-8 mm, sessile, flat, slightly ribbed, the margins and bases hairy. Inflorescences equal to or slightly shorter than leaves; peduncle 200-500 mm long, hairy; spathes blackish, striate, whitish hairy; outer spathe bract 40-65 x 8-13 mm. Flowers violet. Perianth tube 20-30 mm long; outer lobes 25-35 x 20-30 mm. Staminal tube undivided, 4-6 mm long. *P. sericea* R. Br. ex Ker Gawler var. *rudis* (Endl.) Geerinck

On lateritic or sandy lateritic soil of the Jarrah forest as far south as Canning Dam. Occurs north to New Norcia.

Flowers October-January.

***P. umbrosa* Endl.**

Plants caespitose, with compact rootstock. Leaves many, crowded near base of stem and overlapping, 0.36-1 m x 3-6.5 mm, sessile, flat, slightly ribbed, glabrous, rarely hairy. Inflorescences slightly shorter than leaves, rarely longer; peduncle 110-770 mm long, glabrous; spathes narrowly more or less elliptic, green, never glaucous, glabrous or sometimes puberulous on keel; outer spathe bract 60-85 x 6-9 mm. Flowers yellow. Perianth tube ca 50 mm long; outer lobes 25-35 x 22-25 mm. Staminal tube undivided, 6-8 mm long. *P. xanthina* F. Muell., *P. umbrosa* Endl. var. *xanthina* (F. Muell.) Domin

Inhabits lateritic soil in the forest near the Darling Scarp southwards from Perth. Known from as far south as the Stirling Range.

Flowers August-October.

Purple-flowered and yellow-flowered variants occur, which were until recently regarded as the separate species *P. umbrosa* and *P. xanthina* F. Muell. but are now known as *P. umbrosa* forma *umbrosa* and *P. umbrosa* forma *xanthina* (F. Muell.) Geerinck respectively. Only the yellow-flowered variant is found in the Perth Region. Purple-flowered plants occur near the south coast and in the Stirling Range.

***ROMULEA Maratti**

Small perennials. Corms more or less globular, ovoid or campanulate. Stems short, often not extending above the ground. Basal leaves one to several; blade terete or compressed cylindric, often with 4 longitudinal grooves; cauline leaves when present shorter than the basal leaves. Inflorescence with 1 or more flowers, each terminal on a peduncle and subtended by 2 floral bracts inserted at the base of ovary; peduncle semi-terete, often recurved after flowering. Floral bracts herbaceous often with membranous margins, inner bract sometimes entirely scarious. Perianth actinomorphic; tube usually short and funnel shaped; lobes equal or almost equal, lower parts forming a cup, upper parts spreading. Stamens inserted on the perianth tube, symmetrically arranged, erect; filaments usually free; anthers usually linear in outline. Style slender; style branches usually deeply divided. Capsule obovoid to cylindric, usually enclosed within floral bracts. Seeds numerous, brown, small, globular or angular. About 90 species in the Mediterranean Region and Africa with most species in South Africa. 3 species naturalized in W.A. References: De Vos, M.P. 1972. J. S. African Bot. Suppl. 9: 1-307; De Vos, M.P. 1983. Flora of Southern Africa 7,2: 10-73.

1. Perianth yellow; tube 3-4 mm long..... ***R. flava**
 1. Perianth pink with a yellow cup; tube 1.5-3 mm long..... ***R. rosea**

***R. flava** (Lam.) De Vos

Plant 0.1-0.3 m high. Corm subglobular, 10-15 mm in diameter. Stem short. Basal leaf 1, subterete or compressed cylindric, 100-400 x up to 3 mm, glabrous; cauline leaves 2 or 3, uppermost entirely sheathing. Floral bracts subequal, 10-15 mm long, outer bract with prominent veins; inner bract colourless with a central brown stripe and brown flecked margins. Flowering peduncles suberect, 20-60 mm long. Perianth yellow with the lobes of the outer whorl greenish on the outside; tube 3-4 mm long; lobes equal, narrowly obovate, 11-12 x 3-4 mm. Anthers yellow, 3-4 mm long. Capsule obovoid to cylindric, ca 10 mm long; fruiting peduncle recurved at first but straightening as capsule ripens.

Recorded from eastern Perth suburbs and near Pinjarra. Extends southwards to Busselton. Native to south western South Africa.

Flowers August-September.

Specimens from the Perth Region belong to var. *minor* (Beg.) De Vos.

***R. rosea (L.) Ecklon**

Guildford Grass

Plant 0.1-0.4 m high. Corm subglobular, up to 20 mm in diameter. Stem very short, covered by leaf bases. Leaves several, basal, compressed cylindrical, up to 400 x 2 mm. Floral bracts subequal, 8-12 mm long; outer bract with a brown membranous apex; inner bract with wide brown or brown-streaked membranous margins. Flowers short-lived. Flowering peduncles suberect, 30-200 mm long. Perianth lilac-pink or magenta-pink with a yellow cup, sometimes throat violet-blue, outside of perianth lobes of outer whorl yellowish green, often with 3 dark longitudinal stripes; tube 1.5-3 mm long; lobes equal, narrowly obovate, 8-25 x 3-8 mm. Anthers yellow, 3-5 mm long. Capsule obovoid, 8-12 mm long; fruiting peduncle recurved at first, straightening as capsule ripens. **Fig. 291**

Naturalized and very common near Perth. A weed of crops and pastures in the higher rainfall areas of the south west. Native to south western and southern South Africa.

Flowers August-October.

Two varieties of this species occur in the region. In *R. rosea* var. *australis* (Ewart) De Vos the inner surface of the perianth is lilac-pink and the outside has 3 dark longitudinal stripes. In *R. rosea* var. *communis* De Vos the inner surface of the perianth is magenta-pink with a violet-blue throat.

***SISYRINCHIUM L.**

Small annuals or perennials either tufted and with fibrous roots or shortly rhizomatous. Stems compressed, usually winged. Leaves basal and cauline, linear. Inflorescence a corymbose cyme of several flowers enclosed within 2 spathes; flowers pedicellate, small, short-lived. Spathes herbaceous. Floral bracts inserted at base of the pedicel. Perianth actinomorphic, violet, blue, yellow or white; segments free almost to the base, subequal or the outer wider than the inner, lower parts forming a cup, upper parts spreading. Stamens inserted at the base of the perianth segments, symmetrically arranged; filaments connate for the whole or part of their length. Style branches filiform, undivided. Capsule globular to ovoid, exserted from the spathes on an elongated, filiform pedicel. Seeds numerous, black, globular, pitted. About 80 species mostly from South America. 1 naturalized in W.A.

***S. exile E. Bickn.**

Small, annual, tufted, grass-like plant, 70-150 mm high, with fibrous roots. Stem 2 mm wide, usually simple. Leaves 10-80 x 1-2 mm, sheathing at the base, the lower part with conspicuous translucent margins. Spathes herbaceous; outer spathe 25-30 mm long, connate for the lower 3 mm, margins translucent in the lower part; inner spathe 20-25 mm long, margins translucent for almost the entire length. Perianth yellow with a star shaped reddish purple marking in the centre; segments equal, oblong to obovate, 6-7 mm long, apiculate; cup ca 1.5 mm across. Staminal filaments connate at the base; anthers yellow, ca 1 mm long. Capsule reddish brown, ca 2 mm long.

Recorded as a weed of Perth suburbs and Boyanup. Native to South America.

Flowers October-December.

***SPARAXIS Ker Gawler**

Small perennials. Corms small to medium, globular. Stems erect or suberect, cormels developing in leaf axils after flowering. Basal leaves several, glabrous; blade sword shaped, midrib prominent; cauline leaves, short, almost entirely sheathing. Inflorescence a few-several-flowered spike. Flowers sessile. Floral bracts inserted at base of ovary, dry, scarious, with irregular dark brown markings; outer bract often deeply divided; inner bract smaller, apex shortly to deeply divided. Perianth actinomorphic; tube narrowly cylindrical in the lower part, funnel shaped in the upper part; lobes subequal, spreading, narrowly obovate, obovate or spatulate. Stamens inserted at the base of the wider part of the perianth tube, symmetrically arranged and erect, or asymmetrically arranged and spreading; filaments free; anthers straight, curved, or spirally coiled. Style slender; style branches either short with expanded tips or filiform, the apex minutely 2-lobed. Capsule small, globular or cylindrical, membranous. Seeds several, globular, smooth, shiny. 6 species all from the south west of South Africa. 2 species naturalized in W.A. Reference: Goldblatt, P. 1969. J. S. African Bot. 35: 219-252.

1. Perianth cream to white, sometimes with a yellow marking on lower lobes. Anthers white..... *S. *bulbifera*
 1. Perianth purple-pink with yellow and maroon markings towards the base of each lobe. Anthers yellow or brown..... *S. *pillansii*

*S. *bulbifera* (L.) Ker Gawler

Harlequin Flower

Plant 0.15-0.6 m high. Corm 10-15 mm in diameter. Stem erect, glabrous, usually branched, small cormels developing in leaf axils after flowering. Basal leaves 5-10; blade 50-300 x 4-12 mm. Spike 1-5-flowered. Outer floral bract 15-20 mm long, apex deeply divided into 1-3 cusps; inner bract smaller, apex deeply divided into 2 cusps. Perianth cream to white inside, sometimes the lower lobes of both whorls with a yellow centre, the outside of all lobes often with a central purple stripe; tube yellow, 12-16 mm long; lobes narrowly elliptic to narrowly obovate, 20-30 x 7-12 mm. Stamens asymmetrically arranged; anthers white, ca 5 mm long, slightly curved at the apex. Style branches filiform, curved, 6-10 mm long. Capsule cylindrical, membranous. *S. grandiflora* auct., non (Delaroché) Ker Gawler

A garden escape now widely naturalized near Perth. Occurs also between Busselton and Bridgetown. Native to south western Cape Province of South Africa.

Flowers September-October

*S. *pillansii* L. Bolus

Harlequin Flower

Plant 0.3-0.4 m high. Corm 15-30 mm in diameter. Stem erect or semi-erect, simple or branched, glabrous, bearing small cormels in the lower leaf axils. Basal leaves 8-10; blade 100-250 x 6-12 mm. Spike 3-7-flowered. Outer floral bract 20-25 mm long, apex shortly divided; inner bract smaller, apex shortly divided. Perianth purple-pink, the base of each lobe with a yellow cordate marking inside, below a maroon or purple band; tube yellow, 13-14 mm long; lobes subequal, narrowly obovate or obovate, 20-27 x 10-12 mm. Stamens symmetrically arranged; anthers yellow or brown, ca 7 mm long, incurved and slightly twisted at the apex. Style branches 4-5 mm long, expanded at the apex. Capsule not seen. *S. tricolor* auct., non Ker Gawler

A garden escape naturalized in Perth suburbs. Also recorded from Donnybrook. Native to South Africa.

Flowers September-October.

*TRITONIA Ker Gawler

Small to medium perennials. Corms small, depressed globose. Stems erect or suberect, usually well developed and glabrous. Basal leaves several; blade sword shaped, falcate or narrowly elliptic to narrowly obovate; cauline leaves smaller, bract-like, almost entirely sheathing. Inflorescence few-many-flowered, unbranched and spike-like or branched. Flowers sessile. Floral bracts inserted at base of ovary, membranous, usually becoming scarious; outer bract 3-5-lobed or irregularly lobed; inner bract equal or slightly smaller, shortly 2-lobed. Perianth actinomorphic or zygomorphic, cream, yellow, orange or pink; tube usually cylindrical in the lower part and funnel shaped in the upper part; lobes subequal or unequal with the upper lobe of the inner whorl largest and usually hooded. Stamens inserted at the base of the wider part of the perianth tube, usually unilateral and curved towards the upper lobe of the inner whorl, sometimes becoming randomly disposed later; filaments free; anthers linear in outline. Style long, slender; style branches short, spreading, undivided. Capsule ovoid to ellipsoid, membranous. Seeds numerous, small, globose or angular. About 30 species in Africa, south of the equator mainly in South Africa. 2 species naturalized in W.A. References: De Vos, M.P. 1982. J. S. African Bot. 48: 105-163; De Vos, M.P. 1983. J.S. African Bot. 49: 347-422.

1. Perianth almost actinomorphic, widely cup shaped, orange to pinkish orange..... *T. *crocata*
 1. Perianth zygomorphic and 2-lipped, white or cream with prominent black to purple veins..... *T. *lineata*

*T. *crocata* (L.) Ker Gawler

Plant 0.4-0.5 m high. Corm 15-30 mm in diameter. Basal leaves 4-8; blade narrowly elliptic, narrowly obovate or sword shaped, 70-250 x 4-12 mm. Spike 6-10-flowered; flowers with rose-like scent. Floral

bracts membranous, light coloured, streaked with purple or brown and with dark brown margins; outer bract 9-15 mm long, 3-lobed. Perianth almost actinomorphic, widely cup shaped, orange to pinkish orange, the lobes with a white median line on the outside and wide translucent margins; lower lobes of both whorls with a yellow median stripe inside extending into the tube; tube 12-14 mm long, curved, the lower part cylindric, the upper part funnel shaped, 7-10 mm across at the throat; lobes almost equal, obovate to spatulate, slightly hooded, 25-28 x 16-20 mm, apex obtuse. Stamens initially curved towards the upper lobe of the inner whorl, later randomly arranged; anthers light purple, 6-7 mm long, curved. Style branches pinkish, ca 6 mm long. Capsule not seen. Fig. 292

Recorded near the southern boundary of the Perth Region at Boyanup. Also recorded from the Busselton and Margaret River area and Balingup. Native to southern Cape Province of South Africa.

Flowers October.

****T. lineata* (Salisb.) Ker Gawler**

Plant 0.3-0.6 m high. Corm 15-25 mm in diameter. Basal leaves 4-6; blade narrowly elliptic to narrowly sword shaped, 70-300 x 4-18 mm. Spike (2)5-9(15)-flowered. Outer floral bract brown, 10-15 mm long, midvein prominent, irregularly lobed; inner bract translucent with 2 prominent brown veins, 2-lobed. Perianth zygomorphic and 2-lipped, white or cream with prominent black to purple veins; tube 12-13 mm long, cylindric in the lower part, funnel shaped in the upper part, with a diameter of 7-10 mm at the throat; lobes unequal; upper lobe of the inner whorl broadly obovate, 20-22 x ca 15 mm; upper lobes of the outer whorl oblong to obovate, 20-22 x ca 12 mm; lower lobes of both whorls narrowly obovate to obovate, 19-21 x ca 10 mm, with a yellow callus in the form of a low median ridge extending down into the tube. Stamens curved towards upper lobe of inner whorl; anthers purple to black, ca 8 mm long, curved. Style branches white, ca 4 mm long. Capsule not seen.

A garden escape now naturalized in older Perth suburbs, the Darling Range and north of Bunbury. Extends to Margaret River and near Donnybrook. Native to South Africa where it is widespread.

Flowers October.



Fig. 292. *Tritonia crocata*. A, Flowering stem. B, Flower and buds. C and D, Longitudinal section of flower, both halves shown.

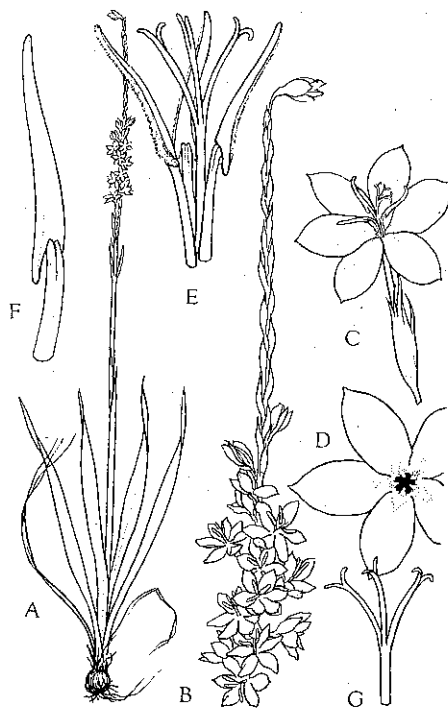


Fig. 293. *Watsonia marginata*. A, Habit. B, Inflorescence. C and D, Flowers. E, Stamens and style. F, Anther. G, Upper part of style.

***WATSONIA** Miller

Medium to large perennials. Corms large, depressed globular. Stems stout, erect. Basal leaves several; blade sword shaped, usually coriaceous and fibrous; cauline leaves short, bract-like, almost entirely sheathing. Inflorescence many-flowered, unbranched and spike-like or branched; flowers distichously arranged, sessile, sometimes scented. Floral bracts inserted at base of ovary, herbaceous or dry and scarious, especially at the apex; outer floral bract undivided. Perianth actinomorphic or zygomorphic, usually orange, red, pink, mauve, or white; tube long, straight or curved; lobes equal or those of the inner whorl wider than those of the outer whorl. Stamens inserted on the perianth tube, symmetrically arranged and erect, or unilateral and curved in front of the upper lobe of the inner whorl; filaments free; anthers usually linear in outline; staminodes sometimes present. Style slender; style branches usually deeply divided into 2 segments, the segments rarely further divided. Capsule cylindrical or globular, woody. Seeds numerous, compressed, oblong in outline, with a wing at each end. About 70 species in southern Africa, mostly from mountainous areas with 8 species naturalized in W.A. The genus is in need of revision hence the application of species names is very difficult. In addition, hybridization between species appears to be common in W.A.

1. Perianth tube narrowly cylindrical in lower part, broader and cylindrical in upper part.
 2. Perianth lobes less than $\frac{1}{3}$ length of perianth tube **W. aletroides*
 2. Perianth lobes more than $\frac{1}{3}$ length of perianth tube.
 3. Cormels present in axils of cauline leaves and floral bracts **W. bulbifera*
 3. Cormels absent **W. meriana*
1. Perianth tube funnel shaped.
 4. Stamens symmetrically arranged; staminodes 3, alternating with the stamens **W. marginata*
 4. Stamens asymmetrically arranged; staminodes absent.
 5. Perianth tube straight **W. leipoldii*
 5. Perianth tube curved.
 6. Perianth tube 12 mm across at the throat. Outer perianth lobes shortly acuminate **W. wordsworthiana*
 6. Perianth tube 8-9 mm across at the throat. Outer perianth lobes sometimes minutely mucronate but never acuminate **W. versfeldii*

****W. aletroides*** (Burm. f.) Ker Gawler

Plant 0.3-0.6 m high. Corm ca 25 mm in diameter. Stem simple or branched. Basal leaves 4-6; blade 150-300 x 5-10 mm. Spike loose, many-flowered, flowers patent. Floral bracts 20-25 mm long. Perianth pink; tube 35 mm long, curved, the lower part narrowly cylindrical with a diameter of 1.5-2 mm, widening rather abruptly into a broader, cylindrical upper part, with a diameter of ca 8 mm; lobes elliptic, ca 9 x 7 mm. Anthers ca 7 mm long. Style branches deeply divided into 2 segments. Capsule not seen.

Only recorded from Kings Park, Perth, where it is established in woodland. Native to South Africa.

Flowers September.

****W. bulbifera*** J. Mathews & L. Bolus

Bulbil *Watsonia*, Bugle Lily

Plant 1.5-2.5 m high. Corm ca 60 mm in diameter. Stem usually branched. Blade of basal leaves 300-1100 x 25-40 mm, midrib and margins yellow; cauline leaves with cormels developing in the axils. Spike loose, many-flowered; flowers erect, becoming patent with age. Floral bracts reddish brown, membranous, equal in length, 18-20 x ca 10 mm, with cormels developing in the axils. Perianth reddish orange, the inside of the tube with white longitudinal stripes; tube 50-55 mm long, curved, the lower part narrowly cylindrical ca 2.5 mm across, widening rather abruptly into a broader, cylindrical upper part 8-9 mm across; lobes of outer whorl oblong, 23-25 x 7-8 mm; lobes of inner whorl obovate, 24-27 x 9-11 mm, base more or less auriculate, the upper lobe of the inner whorl arched. Stamens unilateral and together with the style arched under the upper lobe of the inner perianth whorl; anthers purple to black, ca 11 mm long. Style branches pink, ca 6 mm long, divided to about the middle into 2 segments. Capsule not seen.

Widespread throughout the region. Also widespread in the south west from east of Geraldton to Esperance. Native to South Africa.

Flowers October-December.

****W. leipoldtii* L. Bolus**

Plant to 2 m high. Corm ca 50 mm in diameter. Stem branched. Blade of basal leaves, 900-1200 x 25-35 mm, midrib and margins prominent and yellow. Inflorescence unbranched and spike-like or branched, the lowest branch subtended by a sheathing cauline leaf, those above by smaller ever decreasing bract-like leaves; flowers erect. Floral bracts herbaceous in the lower half, brown and membranous in the upper half; outer bract 20-30 mm long; the inner bract equal in length or slightly longer. Perianth pink to red, the inside of the tube with white longitudinal stripes; tube 55-60 mm long, straight, funnel shaped, ca 2.5 mm across at the base widening gradually to ca 8 mm across at the throat; lobes spreading; lobes of outer whorl narrowly elliptic to elliptic, 30-33 x ca 12 mm, apex minutely mucronate; lobes of inner whorl narrowly obovate to obovate, 33-36 x ca 13 mm. Stamens asymmetrically arranged; anthers purple, ca 9 mm long. Style branches 3-6 mm long, deeply divided into 2 segments. Capsule not seen.

Apparently widespread in the region. Also probably widespread in the south west. Native to South Africa.

Flowers October-November.

****W. marginata* (L. f.) Ker Gawler**

Plant to 1.5 m high. Corm ca 60 mm in diameter. Stem usually simple. Blade of basal leaves 250-550 x 15-45 mm, margins thickened and yellow. Spike many-flowered with short appressed branches; flowers sweetly scented. Floral bracts herbaceous in the lower part, brown and chartaceous in the upper part; outer and inner bracts 10-20 mm long. Perianth pale violet, with a white triangular mark sometimes surrounded by purplish red at the base of each lobe; tube 13-15 mm long, curved above the middle, the lower part cylindric and the upper part funnel shaped; lobes spreading, apex usually cuspidate; lobes of the outer whorl obovate, 15-18 x 8-11 mm; lobes of the inner whorl elliptic, 16-20 x 9-14 mm. Stamens symmetrically arranged; anthers yellow, 8-10 mm long; staminodes 3, alternating with the stamens. Style branches ca 5 mm long, shortly divided. Capsule cylindric to obovoid, ca 10 mm long. **Fig. 293**

Recorded from Perth to the Bunbury area. Also occurs near Busselton. Native to South Africa.

Flowers October-December.



Fig. 294. *Watsonia meriana*. A, Habit. B, Flower. C and D, Two views of anther. E, Upper part of style.

Fig. 295. *Watsonia versfeldii*. A, Inflorescence. B, Leaves. C, Flower. D, Anthers. E, Upper part of style.

***W. meriana** (L.) Miller

Plant 0.75-1.5 m high. Corm 30-50 mm in diameter. Stem simple or branched. Blade of basal leaves 60-1000 x 20-35 mm, midrib and margins yellow. Spike many-flowered; flowers erect, becoming patent with age. Floral bracts herbaceous in the lower part, pink-brown and membranous in the upper part; outer bract 18-25 mm long; the inner bract equal in length or slightly longer. Perianth reddish orange, pink, purple or white and often tinged pink or green, the inside of the tube with white longitudinal stripes, usually somewhat translucent; tube 45-60 mm long, curved; the lower part narrowly cylindrical, 2-3 mm across, widening rather abruptly into a broader, cylindrical upper part 7-10 mm across; lobes of outer whorl oblong to obovate, 20-30 x 7-11 mm, apex cuspidate; lobes of inner whorl obovate, 20-28 x 9-15 mm, base more or less auriculate, the upper perianth lobe of the inner whorl arched. Stamens unilateral and together with the style arched under the upper lobe of the inner perianth whorl; anthers usually purple, 8-9 mm long. Style branches ca 4 mm long, deeply divided into 2 segments. Capsule cylindrical, ca 15 mm long. **Fig. 294**

Widespread throughout the region. Also widespread throughout the south west from east of Geraldton to Esperance. Native to South Africa.

Flowers October-November.

***W. versfeldii** J. Mathews & L. Bolus

Plant 1-1.5 m high. Corm 50-80 mm in diameter. Stem branched. Blade of basal leaves 500-600 x 30-35 mm, midrib and margins distinctly thickened and yellow. Inflorescence unbranched and spike-like or branched, the lowest branch subtended by a sheathing cauline leaf, those above by smaller ever decreasing bract-like leaves; flowers initially ascending, becoming patent with age. Floral bracts herbaceous in the lower half, brown and membranous in the upper half; outer bract 12-20 mm long; inner bract equal or slightly shorter than the outer. Perianth white or pink to lilac, the tube white or purple with white stripes inside; tube 50-56 mm long, curved, the lower half narrowly cylindrical ca 2 mm across, the upper half funnel shaped, 8-9 mm across at the throat; lobes obovate to spatulate, spreading; lobes of the outer whorl 30-35 x 11-13 mm, apex sometimes mucronulate; lobes of the inner whorl 30-38 x 14-15 mm, undulate. Stamens asymmetrically arranged; anthers white at first soon turning purple in colour variants, ca 11 mm long. Style branches ca 4 mm long, divided to about the middle into 2 segments. Capsule cylindrical, 30 mm long. **Fig. 295**

Recorded from Perth to near Bunbury. Also extends south to near Margaret River.

Flowers October-November.

***W. wordsworthiana** J. Mathews & L. Bolus

Plant 1.5-2 m high. Corm 60-70 mm in diameter. Stem branched. Blade of basal leaves 300-500 x 20-30 mm, midrib and margins distinctly thickened and yellow. Inflorescence unbranched and spike-like or branched, the lowest branch subtended by a sheathing cauline leaf, those above by smaller ever decreasing bract-like leaves; flowers initially ascending, becoming patent with age. Floral bracts reddish brown, sometimes green at the base; outer bract 18-23 mm long, the inner bract equal or slightly shorter. Perianth purplish pink, the tube with white longitudinal stripes inside; tube 30-45 mm long, curved, the lower part narrowly cylindrical and ca 4 mm across; the upper part funnel shaped, 12 mm across at the throat; lobes elliptic to obovate, spreading; lobes of the outer whorl 28-37 x 12-16 mm, apex shortly acuminate; lobes of the inner whorl 30-38 x 14-19 mm, undulate. Stamens asymmetrically arranged; anthers purple, ca 12 mm long. Style branches 4-7 mm long, deeply divided into 2 segments, the segments irregularly further divided. Capsule not seen. **Fig. 296**

Recorded from near Bunbury. Also extends south to near Margaret River.

Flowers October-November.

FAMILY 140 ORCHIDACEAE**B. L. Rye**

Perennial herbs, with an annually replaced underground tuber or succulent roots (in the Perth Region), hermaphrodite. Leaves simple; radical leaves 1 or rarely more, borne within a scarious sheathing scale; cauline leaves usually reduced to bracts. Inflorescence a raceme or spike or 1-flowered, terminal. Flowers subtended by a bract, slightly to very zygomorphic but sometimes appearing actinomorphic. Perianth

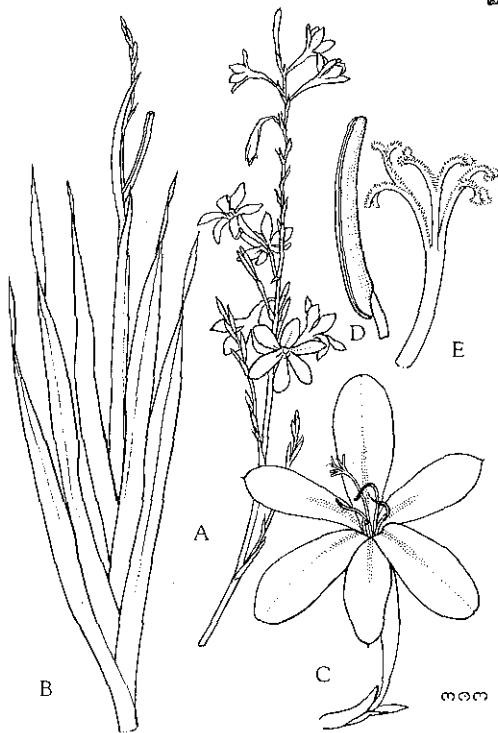


Fig. 296. *Watsonia wordsworthiana*. A, Inflorescence. B, Leaves. C, Flower. D, Anther. E, Upper part of style.

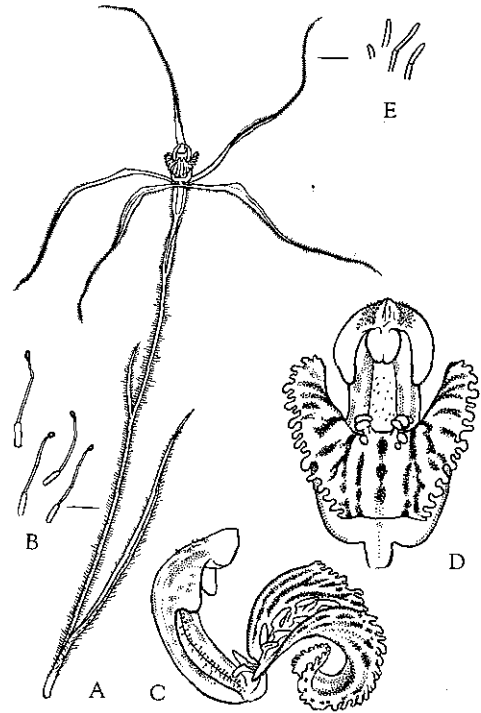


Fig. 297. *Caladenia denticulata*. A, Flowering stem. B, Glandular hairs from stem. C and D, Two views of labellum and column. E, Hairs of petals.

segments 6, the outer 3 segments usually referred to as sepals and the inner 3 as petals, the abaxial petal usually modified and known as the labellum; labellum variously shaped, often with calli (stout glandular hairs) or other appendages, often playing an important role in pollination. Stamens 1 or 2, connate and adnate to the stigma in a central structure known as the column; pollen usually grouped into 1 or 2 pairs of pollinia. Ovary inferior, 1-celled, with 3 parietal placentas, usually distinctly ribbed, elongate, often glandular-hairy; ovules very numerous. Fruit a loculicidal capsule, dehiscent by 3 longitudinal slits but remaining closed at the top and bottom; seeds numerous, minute. About 17,000 species in 735 genera, cosmopolitan. References: Clements, M.A. 1982. Preliminary Checklist of Australian Orchidaceae; Erickson, R. 1965. Orchids of the West; Hoffman, N. & Brown, A. 1984. Orchids of South-west Australia; Nicholls, W.H. 1969. Orchids of Australia.

In all genera described here, apart from *Cryptostylis* and *Prasophyllum*, the flowers apparently become inverted very early in their development so that at maturity the originally adaxial sepal becomes abaxial and the originally abaxial labellum becomes adaxial. Throughout this treatment, the non-lateral sepal is referred to as abaxial, even in *Cryptostylis* and *Prasophyllum*.

1. Flowers shorter than the subtending leaf-like bracts, sessile, in a dense spike. Adaxial sepal spurred at the base..... *MONADENIA
1. Flowers at least as long as the bracts, subsessile to long-petiolate, solitary or in a raceme, the raceme usually loose. Adaxial sepal not spurred at the base.
2. Flowers with a hood comprised of the adaxial sepal and lateral petals; the connate lateral sepals forming an abaxial lip. Stem leaves 3- numerous, similar to any basal leaves..... PTEROSTYLIS
2. Perianth segments all free or only 2 of them connate. Stem leaves absent or reduced to bracts.
3. Flower 1, subsessile within the basal leaf at anthesis. Adaxial sepal hood shaped, adhering to the labellum, the other perianth segments minute..... CORYBAS

3. Flowers 1-numerous, borne well above the basal leaf. Adaxial sepal usually not hood shaped, free from the labellum, not dwarfing the other segments.
4. Perianth almost actinomorphic, with 6 fairly similar petal-like segments.
5. Labellum not clawed, lacking appendages..... **THELYMITRA**
5. Labellum clawed, with a knuckle-like thickening and a cluster of narrow calli..... **EPIBLEMA**
4. Perianth zygomorphic, the labellum well differentiated from the other 5 segments, which may also be variable.
6. Labellum densely covered by long glistening purple hairs, much larger than the other perianth segments, with a terminal ribbon-like appendage..... **CALOCHILUS**
6. Labellum glabrous or the hairs not as above, often shorter than the other segments, without a ribbon-like appendage.
7. Leaves 2-20. Lateral petals ear-like, yellow with red to brown markings..... **DIURIS**
7. Leaves 1 or very rarely 2. Lateral petals not ear-like or, if ear-like, then not coloured as above.
8. Leaf terete, hollow, sheathing the stem for some distance.
9. Flowers inverted so that the labellum is uppermost. Adaxial sepal not greatly exceeding the lateral sepals..... **PRASOPHYLLUM**
9. Flowers not inverted. Adaxial sepal much larger than the lateral sepals..... **MICROTIS**
8. Leaf not terete, not hollow, the blade usually arising near the ground.
10. Labellum with a long slender claw; limb peltately attached.
11. Stem swollen, with a conspicuous spreading bract. Leaf withering before anthesis; flowers 2-8..... **SPICULAEA**
11. Stem slender; stem bract absent or closely appressed to the stem. Leaf persistent or, if withering, then flower 1.
12. Labellum with a long claw, not irritable. Column wings narrow, not pouched..... **DRAKAEA**
12. Labellum without a long claw, irritable. Column wings forming a conspicuous pouch..... **PARACALEANA**
10. Labellum usually sessile or shortly clawed; limb not peltate.
13. Stem bracts absent; leaf present.
14. Sepals and lateral petals all alike, very narrow, not clawed. Labellum protruding, not clawed, glabrous..... **ACIANTHUS**
14. Lateral sepals longer than the other segments, fairly broad, clawed; lateral petals very narrow. Labellum not protruding, curled, very hairy..... **ERIOCHILUS**
13. Stem bracts 1-several or, if absent, then the leaf also absent.
15. Flowers not inverted. Labellum usually with calli or fringed; other segments usually broad or noticeably unequal.
16. Stem and leaf glabrous. Adaxial sepal distinctly broader than the lateral sepals and lateral petals.
17. Labellum fringed but lacking calli. Lateral sepals and petals clavate..... **LEPORELLA**
17. Labellum with numerous calli across the limb. Lateral sepals and petals not clavate..... **LYPERANTHUS**
16. Stem and leaf usually hairy. Adaxial sepal not obviously broader than the lateral sepals and lateral petals.
18. Calli 2, arising at the base of and a similar length to the labellum..... **ELYTHRANTHERA**
18. Calli many, on the labellum limb, much shorter than the labellum..... **CALADENIA**
15. Flowers inverted. Labellum lacking calli, not fringed, conspicuous; other segments very narrow, subequal..... **CRYPTOSTYLIS**

ACIANTHUS R. Br.

Perennial herbs, with a small rounded tuber, glabrous. Leaf 1, basal, very broad; blade lying almost flat on the ground. Stem bracts absent. Inflorescence a loose raceme of 2-numerous flowers or rarely 1-flowered. Sepals and lateral petals alike, narrow; adaxial sepal erect; lateral sepals and petals spreading to pendulous. Labellum sessile, undivided, spreading, broader and more conspicuous than the other perianth segments, with 2 basal calli. Column semi-terete, abruptly incurved, terminating in a knob-like anther. About 20 species occurring in Australia, New Caledonia and New Zealand, 2 species occurring in W.A.

1. Labellum almost triangular, usually 4-5 mm long..... **A. tenuissimus**
 1. Labellum almost oblong, usually 10-12 mm long..... **A. reniformis**

A. reniformis (R. Br.) Schltr.

Mosquito Orchid

Slender perennial herb, 50-200 mm high. Leaf blade circular-cordate, up to 50 mm broad. Inflorescence 1-10-flowered; pedicels 2-3 mm long. Flowers usually reddish brown. Adaxial sepal 9-14 x 1-1.5 mm; lateral sepals and lateral petals usually 9-12 mm long, narrower than the adaxial sepal. Labellum almost oblong, 9-15 x 2-5 mm. Calli prominent. Column ca 5 mm long. *A. huegelii* (Endl.) Nicholls & Goadby

Occurs in moist shady sites on the Coastal Plain and Darling Range. Extends from near Kalbarri to Israelite Bay. Recorded in all states except N.T. Also occurs in New Zealand.

Flowers July-September.

There are 2 varieties, both occurring in the Perth Region but var. *huegelii* (Endl.) A.S. George is much more common in the region. Var. *huegelii* occurs in varied habitats, extending from coastal sand dunes to the Darling Range, whereas var. *reniformis* occurs mainly in coastal sand under *Agonis flexuosa*. Var. *huegelii* has a narrow labellum < 3 mm long whereas var. *reniformis* has a broad labellum 3-5 mm long.

A. tenuissimus Nicholls & Goadby

Dwarf Mosquito Orchid

Very slender perennial herb, 60-170 mm high. Leaf blade at or near the base of the stem, circular-cordate, 10-30 mm broad. Inflorescence 2-10-flowered; pedicels 2-3 mm long. Flowers green, often with purplish markings. Adaxial sepal 7-8 x 0.5-1 mm; lateral sepals and lateral petals 6-7 mm long, narrower than the adaxial sepal. Labellum broad at the base where it embraces the column, appearing almost triangular from the front, usually 4-5 x 2-3 mm, acute. Calli prominent. Column ca 4 mm long.

Occurs in winter-wet depressions on the Coastal Plain near Perth. Scattered records from Augusta to Esperance.

Flowers September-October.

CALADENIA R. Br.

Perennial herbs, with a rounded tuber, the species with long-acuminate perianth segments commonly known as Spider Orchids. Stem nearly always hairy; hairs simple or glandular or a mixture of both, widely spreading, soft, with an expanded basal cell, very fine above. Leaves 1 or very rarely 2, basal, usually somewhat elongate, nearly always with simple and/or glandular hairs. Stem bract normally 1, usually somewhat spreading and conspicuous. Inflorescence 1-flowered or a loose raceme of 2-many flowers; pedicels usually 10-40 mm long. Sepals and lateral petals obtuse to long-acuminate, often with glandular hairs on the abaxial surface and on the acuminate point if present; adaxial sepal usually erect; lateral sepals and petals often widely spreading. Labellum usually shortly clawed, undivided or 3-lobed, usually recurved at the apex, with calli on the limb, often laterally fringed or toothed; calli sessile or stipitate, often in longitudinal rows. Column usually distinctly 2-winged in the upper part, usually terminating in a definite point. Probably over 85 species, mainly in Australia but also represented in Indonesia and nearby areas, New Caledonia and New Zealand, ca 68 species occurring in W.A. Several new or reinstated species are recognized here on the advice of S.D. Hopper, who is revising the genus.

1. Petals much longer than the sepals. Leaves 1 or 2, glabrous or nearly so..... **C. menziesii**
1. Petals shorter than or barely exceeding the sepals. Leaf 1, usually somewhat hairy.
2. Sepals usually obtuse or acute, rarely shortly or broadly acuminate, not clavate or rarely the adaxial sepal clavate, not prominently glandular-hairy.
3. Leafless at the time of flowering. Stem glabrous; bract closely appressed, inconspicuous..... **C. aphylla**
3. Leaf always present. Stem hairy; bract somewhat spreading, usually conspicuous.
4. Lateral sepals and petals closely reflexed. Labellum prominently striped; calli in 2 parallel rows..... **C. cairnsiana**
4. Lateral sepals and petals spreading. Labellum not prominently striped; calli not as above.
5. Calli in 4 or more parallel rows, not forming a plate.
6. Labellum fringed; hairs 3-4.5 mm long. Column without an obvious apical point..... **C. discoidea**
6. Labellum with lateral calli up to 2 mm long. Apical point of the column obvious, up to 1 mm long.
7. Flowers pink or white and pink. Sepals narrow, sometimes almost acuminate; adaxial sepal often constricted and appearing clavate..... **C. hirta**
7. Flowers usually blue, rarely mauve or yellow or white. Sepals not acuminate, not constricted.
8. Stem bract somewhat spreading. Leaf linear, almost glabrous..... **C. deformis**
8. Stem bract appressed. Leaf broadly ovate, hairy.
9. Labellum distinctly 3-lobed, the lateral lobes erect and the mid-lobe recurved..... **C. sericea**
9. Labellum undivided, not recurved..... **C. gemmata**
5. Calli in 2 converging rows or in a semi-circle, their bases usually connate into a plate.
10. Lateral sepals partly connate. Point of the column apex barely visible..... **C. nana**
10. Lateral sepals not connate. Column apex with a prominent point.
11. Flowers pink, white or reddish brown. Lateral lobes of the labellum obtuse.
12. Sepals and lateral petals reddish brown on the abaxial surface. Calli converging to a point near the apex of the labellum..... **C. marginata**
12. Sepals and lateral petals white or pink on both surfaces. Calli almost in a semi-circle near the base of the labellum limb.
13. Leaf greenish on both surfaces. Basal calli free for most of their length..... **C. latifolia**
13. Leaf red-purple on the abaxial surface. Basal calli connate in a plate for most of their length..... **C. reptans**
11. Flowers yellow, often marked with red. Lateral labellum lobes acute to acuminate..... **C. flava**
2. Sepals long-acuminate; acuminate point usually longer than the dilated basal portion, clavate or prominently glandular-hairy.
14. Acuminate point of the sepals narrowly clavate, the glandular hairs not protruding beyond the outline of the club.
15. Labellum not fringed; calli crowded on a broad band. Sepal club < 4 mm long..... **C. macrostylis**
15. Labellum fringed; calli usually in definite rows. Sepal club > 5 mm long.
16. Labellum very tremulous, green to yellowish green with a reddish apex.

17. Dilated base of the lateral sepals pointing down, not markedly arched. Labellum fringe usually radiating, sometimes erect..... **C. radiata**
17. Dilated base of the sepals markedly arched upward. Labellum fringe directed upward.
18. Labellum 26-33 mm broad including the fringe. Calli crowded or in many indistinct rows..... **C. lobata**
18. Labellum 15-24 mm broad. Calli in 4 rows..... **C. dilatata**
16. Labellum not tremulous, usually red-purple or white-yellow, with reddish margins.
19. Sepal clubs prominent, extending almost the whole length of the point. Petals normally distinctly clavate..... **C. longiclavata**
19. Sepal clubs very narrow, only extending along ca half the point. Petals not prominently clavate.
20. Reddish portion of the labellum ca half as broad as the basal cream portion, recurved only in the distal quarter..... **C. ferruginea**
20. Reddish portion of the labellum not markedly narrower than the basal portion, highly recurved in the distal half.
21. Labellum fringe 5-8 mm long, rarely extending higher than the column; hairs not branched.
22. Fringing hairs of the labellum minutely hairy or glabrous, not terminally swollen. Petals pendulous, slightly clavate..... **C. pectinata**
22. Fringing hairs of the labellum glabrous, terminally swollen. Petals spreading, not clavate..... **C. huegelii**
21. Labellum fringe 10-14 mm long, extending well above the column; hairs often 2-branched near the apex..... **C. sp. A**
14. Acuminate point of the sepals not clavate, the glandular hairs visibly protruding.
23. Labellum with lateral calli up to 1.5 mm long non-marginal calli in 2 rows. Column without definite apical point.
24. Sepals and lateral petals entirely or mainly red or maroon.
25. Lateral petals stiffly spreading above the horizontal, 30-50 mm long. Labellum 4-6 mm broad, including marginal calli..... **C. sp. B**
25. Lateral petals lax, pendulous for most of their length, 45-80 mm long. Labellum 9-15 mm broad including the fringe..... **C. sp. C**
24. Sepals and lateral petals white to yellow, sometimes with red-purple markings..... **C. denticulata**
23. Labellum fringed, the lower hairs 3-7 mm long; calli in 4-6 rows. Column with an apical point 0.3-1 mm long..... **C. longicauda**

C. aphylla Benth.

Leafless Orchid

Perennial herb, usually 0.2-0.4 m high. Stem very slender, glabrous. Leaf present in non-flowering plants, absent in flowering plants, green with prominent white stripes, glabrous. Stem bract 1 or rarely absent, below the middle of the stem, closely appressed to the stem, very small. Flower 1, whitish or pale yellow, usually 40-45 mm in diameter. Sepals and lateral petals 18-25 mm long, very narrowly ovate, tapering at the base, shortly acuminate; adaxial sepal erect, incurved; other segments spreading. Labellum clawed, 3-lobed, mottled with red-brown and mauve, ca half as long as the sepals, not fringed; middle lobe longer than the lateral lobes, with a recurved yellow apex, the margin undulate. Calli numerous or few, in 2 parallel rows down the centre of the middle labellum lobe, with a mauve stipe and yellow apex. Column with red bands, usually 11-12 mm long; apical point 0.3-0.8 mm long.

In the Perth Region, only recorded from near Bunbury on the Coastal Plain. Occurs mainly in sandy soil or on rocky hills in near-coastal areas from Busselton to east of Esperance.

Flowers March-May.

A very distinct species, perhaps sufficiently so to be separated as a new genus (S.D. Hopper pers. comm.). Its distinctive features include the prominent white stripes on the leaf and the absence of the leaf in flowering individuals.

C. cairnsiana F. Muell.

Zebra Orchid

Slender perennial herb, 0.05-0.3 m high; stem wiry. Leaf linear, hairy; blade usually 50-120 x 1.5-2 mm. Flowers 1 or very rarely 2. Sepals and lateral petals pale with dark stripes, narrowly linear, 10-15 x 1-2 mm, very shortly acuminate and often glandular at the apex, hairy on the abaxial surface; adaxial sepal erect; lateral sepals and petals reflexed against the ovary. Labellum erect, shortly clawed, distinctly banded with deep reddish stripes, broadly ovate, 10-12 x 6-8 mm, entire, not recurved in the upper part. Calli in 2 parallel rows down the centre of the labellum, broad. Column 8-10 mm long, without an apical point.

Occurs from Waroona southward, on the Coastal Plain. Extends from Kalbarri to Israelite Bay.

Flowers August-October.

The species has been reported to hybridize with *C. denticulata* and *C. sp. B*. A variant extending from Paynes Find to near Esperance differs from the variant represented in the Perth Region in being smaller and having spreading lateral sepals and lateral petals. It will probably be recognized as a new subspecies (S.D. Hopper pers. comm.).

C. deformis R. Br.

Blue Fairy Orchid

Perennial herb, less than 200 mm high. Leaf linear, usually 20-80 mm long, almost glabrous. Flowers 1 or rarely 2, usually deep blue. Sepals and lateral petals narrowed at the base, obtuse to acute; adaxial sepal 12-25 mm long; lateral sepals spreading, slightly shorter than the adaxial sepal; lateral petals spreading, usually 13-17 mm long. Labellum narrowed at the base, slightly shorter than the lateral petals, clasping the column, obscurely 3-lobed, distinctly banded; lateral lobes toothed or ciliate toward the apex, the hairs < 1 mm long; middle lobe triangular. Calli in many rows right across the labellum limb, forming teeth on the lateral margins of the middle lobe. Column 10-12 mm long; apical point 1-1.5 mm long.

Widespread on the Coastal Plain and Darling Range. Extends from north of Kalbarri to Israelite Bay and inland to Southern Cross. Occurs in all states except N.T.

Flowers June-August.

C. denticulata Lindley

Slender perennial herb, 50-250 mm high, hairy. Leaf 50-150 x 1-6 mm. Flowers 1 or rarely 2. Sepals and lateral petals pale yellow to white, with reddish markings, long-acuminate, not clavate, distinctly glandular-hairy on the acuminate point; adaxial sepal erect, as long as or slightly shorter than the lateral sepals; lateral sepals stiff and spreading at the base but lax and pendulous above, 35-110 x 1.5-4 mm, the acuminate point longer than the dilated portion; petals stiffly spreading at the base then gradually curving downward or pendulous, 25-100 mm long. Labellum shortly clawed, white to yellow, with red markings, 7-15 x 5-15 mm, recurved at the apex, with calli or teeth up to 1.5 mm long on the lateral margins. Non-marginal calli in 2 rows, often reddish. Column 8-11 mm long, lacking a definite apical point. *C. filamentosa* R. Br. var. *denticulata* (Lindley) H.G. Reichb. Fig. 297

Occurs on the Coastal Plain from Yalgorup National Park northward, and on the Darling Scarp near Perth. Extends from Kalbarri to east of Esperance and inland to Coolgardie.

Flowers late July-September, elsewhere continuing to early December.

An extremely variable species with 4 variants occurring in the Perth Region and a further 5 variants occurring only outside the region. These variants will probably be described as subspecies (S.D. Hopper pers. comm.). One of the variants in the region, occurring in Wandoo woodland on the Darling Scarp and flowering in July-August within the region, can be distinguished by its golden yellow perianth segments with conspicuously dark glandular points. Another variant, with small perianth segments, the lateral petals usually 25-40 mm long, and with short stems, occurs on the Darling Scarp near Perth and flowers in July-August. A similar but larger variant with somewhat larger perianth segments is much more widespread and flowers in August-September within the region. This variant includes the type of the species. The last variant from the Perth Region is very distinct and could be regarded as a new species rather than a subspecies (S.D. Hopper pers. comm.). It has very large perianth segments, the lateral petals 80-100 mm long and labellum 10-15 mm long. It flowers in September and appears to be endemic in the region, extending from Medina to south of Mandurah in sand on the western side of the Coastal Plain.

C. dilatata R. Br.

Green Spider Orchid

Perennial herb, up to 0.5 m high, hairy. Leaf up to 250 x 20 mm but sometimes very narrow. Flowers 1 or rarely 2, often ca 100 mm in diameter. Sepals and lateral petals yellowish green with a central red stripe, long-acuminate, the acuminate point more than half their length, the sepals narrowly clavate in the distal 7-11 mm; lateral sepals with the dilated base markedly arched upward; petals shorter and narrower than the sepals. Labellum clawed, very tremulous, 3-lobed, 12-15 x 15-24 mm including the fringe, ca $\frac{1}{3}$ as long as the sepals, deeply fringed at the tops of the green lateral lobes; fringing hairs directed upward, up to 5.5 mm long; middle lobe with a maroon apex. Calli in 4 parallel rows on the proximal part of the labellum, maroon; basal calli 4-5 mm long. Column 14-18 mm long; apical point 0.5-1 mm long.

In the Perth Region recorded only from Boyanup on the Coastal Plain. Extends from Manmanning to the Esperance area. Occurs in all states except N.T.

Flowers August-November.

The species has been reported to hybridize with *C. longicauda*. All Perth Region specimens are of var. *falcata* Nicholls, which is restricted to W.A. and may be sufficiently distinct to be regarded as a separate species (S.D. Hopper pers. comm.). Var. *dilatata* occurs in S.A., Vic., Tas., N.S.W. and Qld and there is a doubtful record for W.A. from Jerramungup. The latter variety differs in having horizontal or pendulous lateral sepals.

C. discoidea Lindley

Dancing Orchid

Perennial herb, usually 0.1-0.35 m high, very hairy. Leaf blade 50-180 x 3-15 mm. Flowers 1 or 2, yellowish green streaked with red, usually 30-35 mm in diameter. Perianth segments acute or very shortly acuminate; lateral sepals spreading, 15-17 x 4-7 mm; lateral petals spreading, narrower and slightly longer than the lateral sepals. Labellum shortly clawed, not divided, 9-12 mm long, much broader than the other perianth segments, markedly fringed, with dark red veins; fringing hairs 3-4.5 mm long. Calli in several rows near the centre of the labellum, stout. Column 11-13 mm long, without a definite apical point. **Fig. 298**

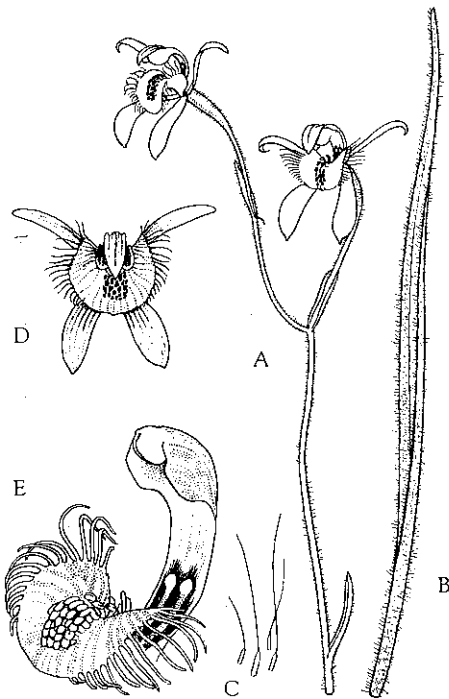


Fig. 298. *Caladenia discoidea*. A, Flowering stem. B, Leaf. C, Hairs from stem. D, Flower. E, Labellum and column.



Fig. 299. *Diuris longifolia*. A, Flowering stem. B, Flower. C, Labellum and column.

Occurs in sandy woodlands on the Coastal Plain, also rarely recorded on the Darling Scarp. Extends from Kalbarri to Israelite Bay, mainly in near-coastal areas.

Flowers August-October.

C. ferruginea Nicholls

Slender perennial herb, up to 0.4 m high. Leaf 70-120 x 3.5-10 mm, hairy. Flowers 1 or 2. Sepals and lateral petals red-brown except for the pale brown clubs on the sepals; adaxial sepal erect, long-acuminate, ca as long as the lateral sepals, narrowly clavate in the distal 8-15 mm; lateral sepals pendulous, usually 30-45 x 2.5-5 mm, the upper part of the acuminate point narrowly clavate; petals fairly erect, usually 25-35 x 2-3.5 mm, attenuate, not clavate. Labellum shortly clawed, cream in the basal half, pink-red above, 13-20 x 8-11 mm, laterally fringed, the reddish portion recurved in the distal quarter; fringe prominent. Calli in 4 rows. Column 13-15 mm long; apical point ca 0.5 mm long or scarcely visible.

Occurs from Perth southward, in clay-based winter-wet depressions on the eastern side of the Coastal Plain. Extends to Mount Barker.

Flowers August-October.

C. flava R. Br.

Cowslip Orchid

Perennial herb, usually 0.1-0.3 m high, hairy. Leaf usually 50-150 x 5-20 mm. Flowers 1-5 on a flexuose stem, usually 35-50 mm in diameter. Sepals and lateral petals yellow, with some red markings, ovate, contracted at the base, acute or sometimes obtuse; lateral sepals and petals spreading, the petals shorter than the sepals. Labellum shortly clawed, 9-11 mm long, deeply 3-lobed; middle lobe ca twice as long as the lateral lobes, not recurved. Calli on the margins of the middle lobe, also occurring in an almost semi-circular plate at the base of the limb; marginal calli 2 or 3 per margin, long. Column 6.5-9 mm long; apical point 1.5-2.5 mm long.

Widespread in sandy soils on the Coastal Plain and in laterite areas on the Darling Range. Extends from north of Kalbarri to Israelite Bay.

Flowers August-October.

The species has been reported to hybridize with *C. latifolia* and *C. marginata*.

C. gemmata Lindley

Blue China Orchid

Perennial herb, usually 50-200 mm high, hairy. Leaf often ovate, 10-30 mm or more long, usually 10-15 mm broad. Stem bract closely appressed to the stem, usually close to the flower. Flowers 1 or 2, usually deep blue, sometimes yellow or white, usually 35-50 mm in diameter. Sepals and lateral petals 11-30 mm long, contracted at the base or clawed, acute or obtuse; lateral sepals and petals spreading. Labellum shortly clawed, undivided, broadly ovate, 5-8 mm long, not recurved. Calli in many rows across the full breadth of the limb. Column 7-9 mm long; apical point 0.3-0.5 mm long. *C. ixioides* Lindley

Occurs in sand on the Coastal Plain and in lateritic or granitic areas on the Darling Range. Extends from Kalbarri to Israelite Bay.

Flowers August-October, after fire.

Both the yellow-flowered variant, forma *lutea* S.C. Clemesha, and the blue-flowered variant, forma *gemma*, occur in the Perth Region.

C. hirta Lindley

Sugar Candy Orchid

Perennial herb, 0.15-0.3 m high, hairy. Leaf 30-90 x 7-25 mm. Flowers 1-3, white or pale pink, rarely deep pink. Sepals and lateral petals 18-30 mm long, rather narrow, often almost acuminate but the point shorter than the dilated basal portion; adaxial sepal often narrowly clavate; lateral sepals and petals spreading. Labellum shortly clawed, almost ovate, 9-13 mm long, not distinctly lobed, shortly fringed or toothed from the middle upward; hairs 1-2 mm long. Calli in 4-6 rows. Column 10-14 mm long; apical point 0.5-1 mm long. *C. tenuis* R. Fitzg.

Occurs in sand on the Coastal Plain and in lateritic and granitic soil on the Darling Scarp. Extends from Kalbarri to Israelite Bay.

Flowers August-October.

C. huegelii H.G. Reichb.

-King Spider Orchid

Perennial herb, 0.15-0.55 m high, hairy. Leaf blade 130-240 x 5-17 mm. Flowers 1 or 2. Sepals and lateral petals white or cream, with reddish markings; adaxial sepal erect, long-acuminate, almost as long as the lateral sepals, narrowly clavate in the distal 5-6 mm; lateral sepals splayed upward above the horizontal; narrowly clavate in the distal 5-12 mm; lateral petals very acute, not clavate. Labellum shortly clawed, white in the basal half, red-maroon above, 17-21 x 15-23 mm including the lateral fringes; fringing hairs glabrous, terminally swollen, the lower hairs 5-6 mm long. Calli in 4 or more rows. Column 15-16 mm long; apical point up to 0.5 mm long.

Inhabits winter-wet depressions on the Coastal Plain. Extends around the coast from Lancelin to Denmark.

Flowers September-November.

C. latifolia R. Br.

Pink Fairy Orchid

Perennial herb, 0.1-0.45 m high, hairy. Leaf blade 60-240 x 15-32 mm. Flowers 1-4, pink or white or both colours, 20-35 mm in diameter. Sepals and lateral petals 17-20 mm long, contracted at the base, obtuse or acute; lateral sepals and petals spreading, the lateral sepals slightly longer than the other segments. Labellum sessile, 8-9 mm long, deeply 3-lobed; middle lobe much longer than the lateral lobes. Calli several along each margin of the middle lobe, also in a semi-circle near the base; marginal calli 1-1.5 mm long; other calli free for most of their length. Column 7-9 mm long; apical point ca 1 mm long.

Occurs along the coast and in woodlands on the Coastal Plain. Extends from Kalbarri to Israelite Bay. Also occurs in S.A., Vic. and Tas.

Flowers August-October.

The species has been reported to hybridize with *C. flava*.

C. lobata Fitzg.

Butterfly Orchid

Fairly robust perennial herb, 0.2-0.6 m high, hairy. Leaf blade usually 10-100 x 5-10 mm. Flowers 1 or rarely 2, yellow-green with red markings. Perianth segments long-acuminate, the acuminate point at least as long as the dilated basal portion; sepals narrowly clavate in the distal 6-11 mm, the dilated base markedly arched upward; adaxial sepal usually 50-75 mm long; lateral sepals longer than the adaxial sepal; lateral petals shorter than the sepals, not clavate. Labellum with a long narrow claw, very tremulous, 3-lobed, usually 15-20 mm long, 26-35 mm broad including the fringes on the green lateral lobes; fringing hairs directed upward, ca 6 mm long; middle lobe deep maroon at the apex, shortly toothed. Calli crowded or in many indistinct rows on the proximal part of the labellum, maroon; basal calli 3-4 mm long. Column 17-22 mm long; apical point ca 1 mm long.

Recorded from Waroona and Ludlow. Extends along the south coast to Albany and the Stirling Range.

Flowers September-November.

Hybrids have been recorded between this species and *C. longicauda*.

C. longicauda Lindley

Common White Spider Orchid

Slender perennial herb, up to 0.7 m high. Leaf 100-300 x 4-20 mm. Flowers 1 or rarely 2-4. Sepals and lateral petals cream, sometimes with red or pink markings, long-acuminate, not clavate, prominently glandular-hairy on the acuminate point; adaxial sepal erect, a similar length to the lateral sepals; lateral sepals pendulous or stiffly spreading, 40-140 x 5-9 mm, the point slightly to ca twice as long as the dilated portion; petals pendulous or stiffly spreading, somewhat smaller than the sepals. Labellum shortly clawed, white, rarely with a red apex, basally erect, the apex curled under, 20-30 x 7-15 mm, fringed on the margins; fringing hairs dull red or with a white apex, slender, the longest hairs 3-7 mm long. Calli in 4-6 rows, red-pink. Column 13-19 mm long; apical point 0.3-1 mm long. *C. patersonii* R. Br. var. *longicauda* (Lindley) R.S. Rogers

Occurs in sand on the Coastal Plain and in varied habitats on the Darling Range. Extends from Kalbarri to Mt. Ragged. Possibly also occurs in S.A.

Flowers August-November.

This species was previously included in the eastern Australian species, *C. patersonii* R. Br. There are 3 variants, all occurring in the Perth Region. These will probably be described as new subspecies or one possibly as a new species (S.D. Hopper pers. comm.). One variant is known only from Jarrah woodland near Australind and flowers in September. It is distinguished by its broad robust labellum with an irregular fringe and often with a red apex. Another variant, which includes the type of the species, occurs in sand on the Coastal Plain and lateritic areas on the Darling Range and extends throughout the species range, flowering in August-October. Its lateral sepals have a pendulous acuminate point about twice as long as the dilated basal portion. The last variant occurs in winter-wet depressions and granite outcrops on the Darling Range and extends to Albany. It flowers in October-November and the lateral sepals have a stiffly spreading acuminate point, which is only slightly longer than the dilated basal portion.

***C. longiclavata* E. Coleman**

Clubbed Spider Orchid

Perennial herb, 0.15-0.75 m high, hairy. Leaf blade 30-300 x 5-10 mm. Flowers 1 or 2, maroon and yellow. Sepals and lateral petals usually with broad red stripes down the centre; sepals 35-40 mm long, conspicuously clavate for about half their length, broadly dilated toward the base; petals slightly shorter and narrower. Labellum shortly clawed, yellowish and maroon, ovate, 11-15 mm long, undivided, dentate near the apex and fringed below; lower hairs 3-4 mm long. Calli maroon, usually in 4 rows down the centre of the labellum. Column 10-14 mm long; apical point up to 0.5 mm long. *C. magniclavata* W.H. Nicholls

Occurs in lateritic soils and associated with granite outcrops on the Darling Range, also rarely in sand on the Coastal Plain. Extends inland to York and along the south coast to Esperance.

Flowers August-October.

The species has 3 distinct variants, of which only var. *longiclavata* is known to occur in the Perth Region. However, both of the other variants, which should probably be regarded as distinct species, occur fairly close to the region and might occur within it (A. Brown pers. comm.). One of these is var. *rhomboidiformis* (E. Coleman) A.S. George and the other is probably unnamed. In var. *rhomboidiformis*, which extends from Busselton to Augusta, the petals have a fine point instead of a club. The other variant extends from Bindoon to Esperance and differs from the typical variant in having thicker clubs, more slender calli with a more recurved apex and a more conspicuous labellum fringe. It is also usually darker in colour.

***C. macrostylis* Fitzg.**

Leaping Spider Orchid

Perennial herb, usually 100-250 mm high, hairy. Leaf blade usually 50-140 x 2-6 mm. Flowers 1-3. Sepals and lateral petals pale yellow with 1-3 red lines down the centre, long-acuminate, clavate in the distal 1-3 mm, the acuminate point a similar length to the dilated portion; lateral petals 22-25 mm long, slightly shorter and narrower than the sepals. Labellum shortly clawed, pale yellow with dark red stripes and margin, ovate, 7-10 mm long, toothed near the apex. Calli crowded in a broad band on the labellum limb, dark red-brown or black. Column 10-12 mm long; apical point up to 0.5 mm long.

Recorded from sandy woodland areas on the Coastal Plain and from lateritic soils with Jarrah on the Darling Range. Extends from Chittering Valley to Albany.

Flowers August-October.

***C. marginata* Lindley**

White Fairy Orchid

Rather slender perennial herb, 80-250 mm high, hairy. Leaf blade 35-110 x 4-15 mm. Flowers 2-4. Sepals and lateral petals reddish brown on the lower surface, white above, usually narrowly ovate, 10-16 mm long, obtuse or acute; lateral sepals and petals spreading. Labellum shortly clawed, 4-6 mm long, 3-lobed; lateral lobes large, erect, the abaxial margin somewhat fringed; middle lobe very shortly fringed in the lower half, toothed above. Calli in 2 converging rows along each side of a long central callus plate, 0.5 mm long. Column 5-7 mm long; apical point ca 0.5 mm long. *C. paniculata* R. Fitzg., *C. purdieana* C. Andrews

Occurs in winter-wet depressions on the Coastal Plain and associated with granite outcrops on the Darling Range from Perth southward. Extends along the south coast to east of Esperance.

Flowers October-November, especially after fire.

Hybrids have been recorded between this species and *C. flava*.

C. menziesii R. Br.

Rabbit Orchid

Slender perennial herb, usually 0.1-0.3 m high. Leaves 1 or 2, oblong, succulent, glabrous or nearly so; blade usually 50-180 x 10-30 mm. Stem bract appressed to the stem, with a spreading acuminate apex. Flowers 1-3, white and pink or rarely pure white. Sepals 9-15 mm long, contracted at the base, obtuse or acute; adaxial sepal reddish on the outside; lateral sepals and petals spreading. Lateral petals erect, ear-like, purple-red, ca 20 mm long, narrowly linear in the lower half, the upper half expanded to a club 0.5-1 mm broad. Labellum shortly clawed, white with dark pink markings, almost ovate, 5-6 mm long, almost entire. Calli in 2-4 rows along the centre of the labellum limb. Column 5-6 mm long, without a definite apical point.

Occurs on the Coastal Plain and Darling Range, mainly in moist habitats. Extends from Jurien Bay to east of Esperance in near-coastal areas. Also occurs in S.A., Vic. and Tas.

Flowers August-October, especially after fire.

A very distinct species, once regarded as a separate genus, *Leptoceras* (R. Br.) Lindley. S.D. Hopper (pers. comm.) is considering reinstating the genus. It is unusual in sometimes having 2 leaves, in the leaves being oblong and succulent and in the long ear-like lateral petals.

C. nana Endl.

Pink Fan Orchid

Perennial herb, usually 50-200 mm high. Leaf usually 20-100 x 5-8 mm. Flowers 1-3, pink or pinkish mauve, commonly ca 25 mm in diameter. Sepals and lateral petals obtuse or acute; lateral sepals spreading, 9-14 x 4-5 mm, connate for $\frac{1}{3}$ to $\frac{2}{3}$ of their length; lateral petals spreading, smaller than the lateral sepals. Labellum with a rather long claw, 5-8 mm long, undivided; limb ovate. Calli marginal and in a plate; marginal calli short and long, up to 2 mm long; plate calli in 2 converging rows. Column 4-7 mm long, without a definite apical point.

Occurs from Perth southward, associated with winter-wet depressions on the Coastal Plain. Extends along the south coast to Albany and the Stirling Range.

Flowers September-October, after fire.

C. pectinata R.S. Rogers

Perennial herb, up to 0.5 m high. Leaf blade 70-200 x 3-14 mm. Flowers 1 or 2. Sepals and lateral petals white or cream, with reddish markings; adaxial sepal erect, long-acuminate, almost as long as the lateral sepals, narrowly clavate in the distal 14-22 mm, the acuminate point longer than the dilated basal portion; lateral sepals usually 40-50 x 2.5-4 mm; lateral petals pendulous, indistinctly clavate. Labellum shortly clawed, white in the basal half, red-maroon above, 12-15 mm long, much broader than the other perianth segments, laterally fringed; fringing hairs 4-5 mm long, minutely hairy to glabrous, not distinctly swollen at the apex. Calli in 4 or more rows. Column 17-20 mm long; apical point ca 0.5 mm long.

Occurs from Perth southward, in sand on the Coastal Plain, also rarely in sand pockets on the Darling Range. Extends around the coast to east of Esperance.

Flowers August-September.

Outside the Perth Region there are 2 other variants. One matches the type and occurs in the central part of the species range. It has very prominently clavate sepals but lacks petal clubs and the fringing hairs of the labellum are densely covered by minute hairs. Another variant occurs in the eastern part of the species range and has prominent petal clubs. The variant occurring in the region extends from Lancelin probably to the south coast. All 3 variants will be recognized as subspecies (S.D. Hopper pers. comm.).

C. radiata Nicholls

Ray Spider Orchid

Perennial herb, usually 0.15-0.4 m high, hairy. Leaf blade 60-220 x 4-5 mm. Flowers 1 or 2, green or yellowish, with reddish markings, up to 90 mm in diameter. Sepals and lateral petals with reddish markings, long-acuminate, the acuminate point longer than the dilated basal portion; adaxial sepal prominently clavate in the distal 15-20 mm; lateral sepals with the dilated base pointing down, prominently clavate in the distal 9-13 mm; lateral petals shorter than the sepals, not clavate. Labellum

with a long claw, 15-20 x 15-19 mm including the fringes, very tremulous; claw crimson, broad; limb green with a deep maroon apex, cordate, prominently fringed on the margins; fringing hairs usually radiating outward, 5-8 mm long. Calli in 4 rows along the centre of the limb, deep maroon; basal calli 3-4 mm long. Column 12-15 mm long; apical point 0.5-1 mm long.

Occurs in winter-wet depressions on the Coastal Plain near Pinjarra and Yarloop. Extends along the south coast to Manypeaks.

Flowers October-November.

C. reptans Lindley

Little Pink Fairy Orchid

Perennial herb, 40-200 mm high, hairy. Leaf usually 15-35 mm long, up to 10 mm broad. Flowers 1 or 2, pink, 15-30 mm in diameter. Sepals and lateral petals paler on the abaxial surface, usually obtuse; lateral sepals and petals spreading. Labellum with a long claw, usually ca 6 mm long, deeply 3-lobed; lateral lobes erect, with 3 prominent stripes; middle lobe not recurved. Calli on the margins of the middle lobe, also in an almost semi-circular plate near the base of the limb, stout; marginal calli 1-2 mm long; plate calli connate for most of their length. Column 5-6 mm long; apical point up to 1 mm long.

Occurs in woodlands on the Coastal Plain and in lateritic or granitic areas on the Darling Range. Extends from Kalbarri to West Mt. Barren.

Flowers July-August, especially after fire, continuing to October outside the region.

C. sericea Lindley

Silky Blue Orchid

Perennial herb, usually 0.1-0.35 m high, hairy. Leaf blade usually 30-110 x 7-23 mm, silky-hairy. Stem bract appressed to the stem. Flowers 1 or 2, blue or mauve. Sepals and lateral petals usually 15-25 mm long, obtuse to acute; lateral sepals and petals spreading. Labellum shortly clawed, 12-13 mm long, almost equally 3-lobed at the apex; lateral lobes erect; middle lobe with a few marginal calli, the calli < 0.5 mm long. Non-marginal calli in 4-6 parallel rows along the labellum limb, with several long calli at the base of the limb. Column 10-14 mm long; apical point < 0.5 mm long.

Occurs from Perth southward, mainly in lateritic areas in the Darling Range, rarely recorded in woodlands on the Coastal Plain. Extends along the south coast to Albany.

Flowers August-October, especially after fire.

The species has been reported to hybridize with *Elythranthera brunonis*.

C. sp. A

Slender perennial herb, 0.4-0.7 m high or rarely up to 1 m high, hairy. Leaf linear, usually 85-200 x 5-14 mm. Flowers 1 or 2. Sepals and lateral petals cream with red or pink markings; adaxial sepal erect, somewhat shorter than the lateral sepals, long-acuminate, narrowly clavate in the distal 15-25 mm; lateral sepals pendulous, 60-70 x 3-7 mm, long-acuminate, the terminal 20-35 mm a brown club; petals spreading to pendulous, shorter and narrower than the lateral sepals, attenuate but not acuminate. Labellum shortly clawed, greenish cream in the lower half, red-maroon above, 20-30 x 9-15 mm excluding the fringe, laterally fringed, the reddish distal portion doubled under; fringes usually extending well above the column and 10-14 mm long; fringing hairs 5-10 mm long. Calli in 4 rows, reddish. Column 17-20 mm long; apical point up to 1 mm long.

Occurs on the Coastal Plain from Gnangara southward. Extends south to Yallingup.

Flowers September-October.

This species is related to *C. pectinata* and *C. huegelii*.

C. sp. B

Red Spider Orchid

Slender perennial herb, 80-250 mm high, hairy. Leaf 35-100 x 1-3.5 mm. Flowers 1 or 2. Sepals and lateral petals maroon, long-acuminate, not clavate, distinctly glandular-hairy on the acuminate point, the point longer than the dilated basal portion; adaxial sepal erect, as long as the lateral sepals; lateral sepals stiffly spreading forward and down from the vertical, 25-55 x 1.5-2.5 mm; petals stiffly spreading

horizontally or upwards, slightly shorter than the sepals. Labellum shortly clawed, white with red-purple markings, 6-8 x 4-5 mm, with marginal teeth or calli < 0.5 mm long; apex curled under. Non-marginal calli in 2 rows, maroon at the apex. Column 7.5-10 mm long, without a definite apical point.

Occurs from Mandurah northward on the Coastal Plain, Darling Scarp and Range. Extends from Kalbarri to Narrogin and inland to Mt. Churchman.

Flowers mainly August-September.

This species is related to *C. denticulata*, *C. filamentosa* R. Br. and *C. sp. C*.

C. sp. C

Slender perennial herb, 0.25-0.4 m high, hairy. Leaf 60-120 x 3-6 mm. Flowers usually solitary. Sepals and lateral petals red, variegated with creamy yellow at the base, long-acuminate, not clavate, distinctly glandular-hairy on the acuminate point, the point longer than the dilated basal portion; adaxial sepal erect near the base then curving forward, sometimes shorter than the other sepals; lateral sepals lax, pendulous except at the base, 60-95 x 3-5 mm; petals lax, pendulous except at the base, 40-80 x 1.5-3 mm. Labellum shortly clawed, cream with red markings, 12-15 x 9-15 mm, with lateral teeth or calli ca 0.5 mm long; apex curved under. Non-marginal calli in 2 rows. Column 10-12 mm long, without a definite apical point.

Recorded just north of Bunbury, in sand on the Coastal Plain. Extends from York to Ravensthorpe.

Flowers August-October.

This species is related to *C. denticulata*, *C. filamentosa* and *C. sp. B*.

CALOCHILUS R. Br.

Perennial herbs, with a tuber, glabrous. Leaf 1, basal, sheathing at the base; blade linear, channelled. Inflorescence 1-flowered or a loose raceme of up to 10 flowers. Adaxial sepal erect, broad, concave; lateral sepals somewhat spreading, broad, acute. Lateral petals shorter than the sepals. Labellum much longer than the other perianth segments, undivided, densely bearded (in W.A.); hairs with a metallic sheen. Column short, broad, with narrow thick wings. Over 10 species, mainly in Australia, also represented in New Zealand, New Caledonia and New Guinea, 2 species occurring in W.A.

C. robertsonii Benth.

Beard Orchid

Fairly stout perennial herb, 0.2-0.4 m high. Leaf erect, 100-300 x 4-5 mm, clasping at the base. Stem bract 1, erect, 35-70 mm long. Inflorescence 1-6-flowered; pedicels up to 20 mm long. Flowers green with purplish or red-brown markings. Sepals ca 10 mm long, the lateral sepals spreading. Lateral petals striped with red, ca 5 mm long. Labellum 16-20 mm long, densely bearded, terminating in a ribbon-like point; hairs purple, long, glistening; point 3-6 mm long, glabrous.

Recorded from winter-wet depressions on the Coastal Plain near Perth. Scattered records from Toodyay to Albany. Occurs in all states except N.T. Also occurs in New Zealand.

Flowers mainly October.

CORYBAS Salisb.

Dwarf herbs, with a small tuber, commonly known as Helmet Orchids, glabrous. Leaf 1, very broad, borne almost flat on the ground. Stem bracts absent. Flower 1, subsessile within the leaf at anthesis, the stem then elongating. Adaxial sepal erect, hood shaped, adhering to the labellum; lateral sepals and petals linear, small. Labellum large; base tubular, enclosing the column; limb closely reflexed on the tube, broad, denticulate or shortly fringed. Column short, thickened under the stigma, winged. Capsule borne well above the ground. At least 60 species, ranging from India and the Philippines to Australia and New Zealand, 3 species occurring in W.A.

C. dilatatus (Rupp & Nicholls) Rupp & Nicholls ex Rupp

Helmet Orchid

Dwarf perennial herb, less than 20 mm high except when fruiting. Leaf elliptic or cordate, 16-27 mm long, pruinose on the abaxial surface. Flower erect, borne close to the leaf. Adaxial sepal dark reddish purple and pale green, 16-19 x ca 15 mm, the apex projecting over and beyond the labellum limb. Lateral sepals and petals projecting forward, the sepals ca 5 mm long, the petals shorter. Labellum limb shorter than the labellum tube, usually broader than the adaxial sepal, the central part pale, the lateral margins purplish and toothed. Fruiting stem extending markedly, up to 0.3 mm long when the mature capsule sheds the seeds.

In the Perth Region known only from Stratham but the species has also been recorded from just north of Gingin. Occupies a variety of moist habitats along the south coast to the Stirling Range and Two Peoples Bay. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers July-August.

W.A. material differs from the typical variant of *C. dilatatus*, which occurs in eastern Australia, and may warrant recognition as a new species or subspecies.

CRYPTOSTYLIS R. Br.

Perennial herbs, with succulent roots, glabrous. Leaves 1-several, basal, erect; petiole long; blade broad. Stem bracts usually 2 or 3. Inflorescence a loose raceme, with several to numerous flowers. Flowers reversed so that the labellum is above the column. Sepals and lateral petals linear, greenish, the petals shorter than the sepals. Labellum large, deeply coloured, undivided, the base enclosing the column. Column very short and broad, with lateral appendages. About 18 species ranging from south eastern Asia to Australia and New Caledonia, 1 species occurring in W.A.

C. ovata R. Br.

Slipper Orchid

Stout perennial herb, up to 0.75 m high. Leaves 1 or 2; petiole with purple spots, 15-90 mm long, with 2 or 3 bracts in the axil; blade 35-200 x 22-70 mm, purplish on the abaxial surface. Stem bracts 2-5, closely sheathing, the basal bract 12-35 mm long. Flowers usually numerous. Sepals and lateral petals widely spreading or slightly reflexed at anthesis, then becoming erect, thread-like, 20-30 x 1.5-3 mm. Labellum reddish with obvious veins, 25-35 x 7-13 mm, expanded in the upper part, the margins folded upward, often recurved at the apex. Column ca 3 mm long.

Recorded growing in winter-wet depressions on the Coastal Plain and Darling Scarp near Perth. Also occurs in the extreme south west, extending along the south coast to Fitzgerald River National Park.

Flowers November-February.

DIURIS Smith

Perennial herbs, with a tuber, commonly known as Donkey Orchids, glabrous. Leaves 2 to numerous, arising from the base, distichous or whorled, narrow. Stem bracts usually 1-4, erect, sheathing. Inflorescence usually a loose several-flowered raceme, sometimes 1-flowered. Flowers rather large and conspicuous, usually yellow with brown or purple markings. Adaxial sepal rather broad, its base clasping the column; lateral sepals usually pendulous, parallel or crossed, usually narrowly linear, longer than the adaxial sepal. Lateral petals longer than the adaxial sepal, clawed; claw slender; limb broad. Labellum usually intermediate in length between the lateral sepals and petals, deeply 3-lobed, the middle lobe broad. Column very short, the wings produced into erect lateral lobes, but not continued behind the anther. At least 26 species, confined to Australia except for 1 species in Timor, 6 named species occurring in W.A. A taxonomically difficult genus in need of revision.

1. Leaves usually 5-10 or more, up to 100 mm long, often spirally twisted.
2. Sepals all almost equal in length. Lateral lobes of the labellum with toothed or smooth margins; middle lobe markedly ridged..... **D. setacea**
2. Adaxial sepal shorter than the lateral sepals. Lateral labellum lobes fimbriate; middle lobe compressed..... **D. purdiei**

1. Leaves 2 or 3 (rarely more in *D. emarginata*), usually exceeding 100 mm, not spirally twisted or only at the apex.
3. Middle labellum lobe a similar length to the lateral lobes, not clawed..... **D. longifolia**
3. Middle labellum lobe much longer than the lateral lobes, clawed.
4. Flowers usually boldly marked with dark spots; column wings often with purple markings. Plants usually 0.2-0.5 m high..... **D. laxiflora**
4. Flowers mainly yellow, the column wings lacking purple marks. Plants usually 0.6-0.9 m high..... **D. emarginata**

D. emarginata R. Br.

Tall Donkey Orchid

Slender or stout perennial herb, usually 0.6-0.9 m high. Leaves 2 or 3, usually 150-300 x ca 1 mm. Stem bracts usually 3 or 4. Raceme loose, with up to 7 flowers; pedicels up to 45 mm long. Flowers mainly yellow with red-brown markings. Adaxial sepal embracing the column, 9-15 x 3-5 mm; lateral sepals 18-25 x 1-2.5 mm. Lateral petals erect, slightly shorter than the lateral sepals; claw 5-6 mm long; limb ca 12 x 7 mm. Labellum 8-17 x 5-10 mm; middle lobe clawed, at least twice as long as the lateral lobes. *D. pauciflora* R. Br.

Occurs in winter-wet depressions on the Coastal Plain from Perth southward. Extends inland to York and along the south coast to east of Esperance.

Flowers September-December.

This very variable species seems to intergrade with *D. laxiflora* and has 2 varieties, only var. *emarginata* occurring in the Perth Region. Var. *pauciflora* (R. Br.) A.S. George, which occurs on the south coast and was once recognized as a distinct species, differs in its smaller flowers with usually less red-brown markings and rarely attains a height of more than 0.3 m.

D. laxiflora Lindley

Bee Orchid

Slender perennial herb, 0.2-0.5 m high. Leaves 2-5, arising at or very near the base, 80-200 x 0.5-2 mm. Stem bracts 2-5, usually 2, the basal bract sometimes leaf-like. Raceme often very loose, 2-5-flowered; pedicels up to 45 mm long at anthesis. Flowers yellow usually with bold red-brown markings. Adaxial sepal a similar length to the labellum; lateral sepals usually parallel, 10-20 x 1-1.5 mm. Lateral petals erect; claw 3-7 mm long; limb 6-12 x 4-10 mm. Labellum 8-11 x 3-5 mm; lateral lobes 5-6 mm long; middle lobe clawed, much longer than the lateral lobes. Column wings often with purple markings. *D. carinata* Lindley

Occurs on the Coastal Plain and Darling range, growing in winter-wet depressions or associated with granite outcrops. Widespread in the south west between Kalbarri and Israelite Bay.

Flowers usually September-November, rarely August.

See note under *D. emarginata*. A variant of *D. laxiflora* from Medina has very small colourful flowers, which open in August. Its status needs to be assessed.

D. longifolia R. Br.

Common Donkey Orchid

Perennial herb, 0.15-0.45 m high, often stout. Leaves 2 or 3, usually of unequal length, the longest leaf usually 100-200 x 4-10 mm, channelled. Stem bracts usually 2 or 3. Inflorescence usually a loose raceme of 2-8 flowers, rarely 1-flowered; pedicels up to 30 mm long at anthesis. Flowers variously coloured in yellow and brown, usually large. Adaxial sepal rounded, 10-13 x ca 8 mm; lateral sepals crossed, green, 16-20 x 1-3 mm. Lateral petals erect; claw 4-7 mm long; limb 9-20 x 7-13 mm. Labellum brownish or mauve, 7-12 mm long; middle lobe not clawed, not or barely exceeding the lateral lobes in length. **Fig. 299**

Occurs in sandy soils on the Coastal Plain and in heavier soils on the Darling Range. Widespread in the south west from north of Kalbarri to Israelite Bay and inland to Coolgardie. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers July-October.

This polymorphic taxon will probably be divided into 3 species or subspecies, all occurring in the Perth Region (S.D. Hopper pers. comm.). The most common variant has probably already been named as *D. corymbosa* Lindley. *D. longifolia* has been reported to hybridize with *D. purdiei*.

D. purdiei Diels

Slender perennial herb, 0.1-0.3 m high. Leaves usually 5-10, enclosed at the base by 2 prominent sheaths, 70-110 x 0.5-1.5 mm, spirally twisted. Stem bract usually 1 near the base of the stem, up to 70 mm long. Inflorescence 1-6-flowered; pedicels up to 45 mm long at anthesis. Flowers golden brown, with purple veins on the abaxial surface, becoming purple on drying. Adaxial sepal 9-11 x 3-5 mm; lateral sepals 9-22 x 1-2 mm. Lateral petals projecting backward, almost horizontal; claw 3-6 mm long; limb 6-10 x 4.5-8.5 mm. Labellum 9-18 x 6-11 mm; lateral lobes ca half the length of the labellum, deeply cleft on the outer margin.

Apparently endemic to the Perth Region, occurring in sand in winter-wet depressions on the Coastal Plain from Perth to Yarloop.

Flowers September-October, after fire.

This species has been reported to hybridize with *D. longifolia*.

D. setacea R. Br.

Bristly Donkey Orchid

Slender or fairly robust perennial herb, 0.12-0.3 m high. Leaves usually 5-20, enclosed at the base by 2 prominent sheaths, 50-120 x 0.5-1 mm, often spirally twisted, often bristly. Stem bracts usually 2. Inflorescence 1-7-flowered; pedicels up to 35 mm long at anthesis. Flowers usually yellow with a few reddish or brown markings, rarely fairly darkly blotched. Adaxial sepal prominent, 10-15 x 5-6 mm; lateral sepals parallel, 11-16 x 1-3 mm. Lateral petals erect; claw ca 3 mm long; limb 8-9 x 4-6 mm. Labellum usually 10-12 x 5-7 mm; lateral lobes about half as long as the labellum, toothed or smooth on the margin. *D. filifolia* Lindley

Occurs in lateritic soils and associated with granite outcrops on the Darling Range and in sand, associated with winter-wet depressions, on the Coastal Plain. Extends from Kalbarri to east of Esperance.

Flowers mainly October-November, especially after fire.

DRAKAEA Lindley

Perennial herbs, with a rounded succulent tuber, commonly known as Hammer Orchids, usually glabrous. Stem wiry, the basal part reddish and narrower than the central part. Leaf 1, basal, flat on the ground, ovate to cordate, spongy. Stem bract 1, below the middle of the stem, closely sheathing, usually 4-6 mm long. Flower 1; pedicel usually 10-20 mm long. Sepals and lateral petals almost equal in length, narrowly linear; adaxial sepal erect; other segments reflexed downward, usually against the ovary. Labellum widely separated from the other perianth segments, with a long narrow claw arising almost perpendicularly from the basal claw of the column; limb mobile, peltately attached to the claw, unequally 2-lobed, broad, partially hairy and partially glandular. Column winged, abruptly incurved near the middle, with a long linear basal claw. 7 species, endemic to the south west of W.A. The genus is being revised by S.D. Hopper.

1. Labellum apex distinctly upturned. Apical point of the column prolonged 1-2 mm beyond the anther.
2. Plant usually 0.2-0.3 m high. Large lobe of the labellum usually spotted with prominent warts, abruptly upturned at the apex..... **D. elastica**
2. Plant up to 0.2 m high. Large labellum lobe not distinctly spotted, rather gradually upturned at the apex..... **D. sp. A**
1. Labellum apex pointing forward. Apical point of the column absent or protruding by up to 0.6 mm.
3. Bulbous proximal part of the large labellum lobe hairy all over. Leaf dull grey-green with dark green veins.
4. Column limb ca 3 mm long; apical point prolonged ca 0.5 mm beyond the anther..... **D. sp. B**
4. Column limb 3.5-5.5 mm long, lacking an apical point..... **D. glyptodon**
3. Large labellum lobe hairless except in the vicinity of the claw. Leaf shiny pale green, without prominently coloured veins..... **D. jeanensis**

D. elastica Lindley

Warty Hammer Orchid

Very slender perennial herb, usually 0.2-0.35 m high. Leaf pale grey-green with a dark reddish margin, 6-16 x 7-14 mm, glabrous. Sepals and lateral petals yellow-green and red, 12-15 x 0.5-1 mm. Labellum usually spotted; limb 10-12 x ca 4 mm long, borne 9-16 mm from the base of the column; large lobe covered by hairs and usually spotted with prominent warty glands in the proximal part, the apex very abruptly turned up and truncate; small lobe 3-4 mm long, with prominent glands, usually slightly hairy. Column limb 5-6 mm long, borne 6-7 mm above the base; apical point 1-1.5 mm long, prolonged beyond the anther. *D. fitzgeraldii* Schlechter

Reported on the Coastal Plain and Darling Scarp. Extends around the coast from Watheroo to Mt. Manypeaks and inland to York.

Flowers September-October.

This species has been reported to hybridize with *D. glyptodon*.

D. glyptodon Fitzg.

King-in-his-Carriage

Very slender perennial herb, usually 0.15-0.3 m high. Leaf dull green with a reddish margin and dark green veins, 7-16 x 7-14 mm, glabrous. Sepals 7-12 x 0.5-1 mm. Lateral petals slightly shorter than the sepals. Labellum limb dark red-brown, 7-12 mm long, borne 6-9 mm above the base of the column; large lobe bulbous and hairy toward the base, the glabrous apex pointing away from the small lobe; small lobe dark-coloured, 2-3 mm long, glandular. Column limb 3.5-5.5 mm long, borne 4-5 mm above the base, lacking an apical point.

Inhabits low-lying sandy flats on the Coastal Plain. Extends from Coorow to the south coast and to east of Esperance and inland to near Wickiepin.

Flowers September-October.

D. glyptodon has been reported to hybridize with *D. elastica*.

D. jeanensis R.S. Rogers

Hammer Orchid

Very slender perennial herb, usually 0.15-0.3 m high. Leaf shiny pale green, 14-20 x 13-21 mm, glabrous. Sepals and lateral petals 12-14 x ca 1 mm. Labellum limb 10-12 mm long, borne 15-18 mm above the base of the column, with a definite broad constriction between the large and small lobes, which is densely covered by reddish purple tufted hairs; large lobe partly yellowish green and partly reddish purple on the base, hairless except in the vicinity of the claw; small lobe almost globular, 3-4 mm long including the constriction, with purplish black mulberry-like glands interspersed with hairs. Column limb 4-5 mm long, borne 5-6 mm above the base; apical point small, scarcely protruding beyond the anther.

A rarely collected species, recorded in sandy areas, often in *Banksia* woodlands, on the Coastal Plain from Perth southward. Extends south to Capel, with a disjunct occurrence at the Murchison River.

Flowers September-October.

The Murchison River variant will probably be recognized as a distinct subspecies (S.D. Hopper pers. comm.). It differs in having a dull green leaf and a uniformly reddish and less prominently hairy labellum.

D. sp. A

Slender perennial herb, 120-200 mm high. Leaf grey-green, cordate, 8-20 x 7-20 mm, glabrous. Sepals and lateral petals pale brown, 12-15 x 0.5-1 mm. Labellum limb dark red-black, 12-14 x ca 3 mm, borne 14-18 mm above the base of the column; large lobe glandless, the proximal part very hairy, fairly abruptly upturned just below the apex but with the lower margin curved down to the proximal part of the lobe; small lobe 3-4 mm long, with prominent glands and some hairs. Column limb 4-5.5 mm long, borne 6-8 mm above the base; apical point 1-2 mm long, prolonged beyond the anther.

Recorded from the Mundaring area southward on the Darling Range and Scarp, usually in sand over laterite. Extends south to the Tone River and east to the Stirling Range.

Flowers September-October.

Related to *D. elastica* (S.D. Hopper pers. comm.).

D. sp. B

Slender perennial herb, 0.1-0.35 m high. Leaf grey-green with prominent dark green veins on the upper surface, cordate, 4-10 x 4-8 mm, glabrous. Sepals and lateral petals yellow-green and red, 7-10 x 0.2-0.5 mm. Labellum limb dark red to black, 5.5-7.5 x ca 3 mm, borne 8-11 mm above the base of the column; large lobe glandless, the proximal part very hairy, the apex fairly straight or slightly curved upward; small lobe ca 2 mm long, with prominent glands and some hairs. Column limb ca 3 mm long, borne ca 4 mm above the base; apical point ca 0.6 mm long, prolonged beyond the anther.

Occurs from Perth southward, in sandy soils adjacent to winter-wet depressions on the Coastal Plain. Extends along the south coast to Albany.

Flowers September-October.

Related to *D. thynniphila* A.S. George, in which it was previously included, and to *D. glyptodon* (S.D. Hopper pers. comm.).

ELYTHRANTHERA (Endl.) A.S. George

Perennial herbs, with a small tuber, commonly known as Enamel Orchids, glandular-hairy on the stem, leaf and flowers, sometimes also with simple hairs; hairs widely spreading, tapering to the base. Leaf 1, basal, often narrowly ovate. Stem bract 1, closely appressed to the stem. Inflorescence 1-4-flowered, loose; flowers pedicellate. Sepals and lateral petals almost equal, spreading, pink or purple, spotted, oblong to narrowly ovate, very glossy on the upper surface. Labellum inconspicuous, sessile, rather narrow, somewhat folded, much shorter than the sepals. Calli 2, at the base of the labellum, 1 on each side, hinged and individually movable, a similar length to the labellum. Column larger and more conspicuous than the labellum, with 2 broad wings forming a hood over the anther. 2 species, confined to the south west of W.A. Closely related to the eastern Australian genus *Glossodia* R. Br., in which it was previously included.

- | | |
|--|----------------------|
| 1. Labellum abruptly recurved in the distal third, narrowing gradually to an obtuse apex. Stem with a mixture of simple and glandular hairs near the base; simple hairs 2-4 mm long..... | E. brunonis |
| 1. Labellum doubly folded near the middle, the apex almost truncate. Stem hairs all glandular, < 1 mm long..... | E. emarginata |

E. brunonis (Endl.) A.S. George

Purple Enamel Orchid

Slender perennial herb, usually 0.15-0.4 m high. Stem with glandular hairs throughout, mixed with simple hairs at least near the base; simple hairs 2-4 mm long, very fine. Leaf usually 30-100 x 4-10 mm, reddish purple on the abaxial surface. Stem bract 8-12 mm long. Inflorescence 1-4-flowered; pedicels 5-20 mm long. Flowers somewhat cup shaped, 20-35 mm in diameter. Sepals and lateral petals white with prominent purple blotches on the abaxial surface, purple and shining above, 11-12 x 5-7.5 mm, the apex often recurved. Labellum pure white or white with purple markings, 3-4 mm long, abruptly recurved in the distal third, narrowing gradually to an obtuse apex. Calli sometimes connate at the base, linear, 3-4 mm long. Column 7-8 mm long. *Glossodia brunonis* Endl.

Widespread on the Coastal Plain and Darling Range. Occurs in near-coastal areas from Port Gregory to Israelite Bay, extending inland to Cunderdin.

Flowers mainly September-October.

The species has been known to hybridize with *Caladenia sericea*.

E. emarginata (Lindley) A.S. George

Pink Enamel Orchid

Perennial herb, 0.1-0.4 m high. Stem hairs all glandular, < 1 mm long. Leaf usually 40-120 x 5-12 mm, green on the abaxial surface. Stem bract 9-14 mm long. Inflorescence 1-4-flowered; pedicels 7-18 mm long at anthesis. Flowers 30-50 mm in diameter. Sepals and lateral petals spreading, glossy, pink to mauve or purple, 16-24 x 6-11 mm, spotted underneath. Labellum whitish, with pink-purple markings, almost linear, 6-7 mm long, doubly folded near the middle, very obtuse or truncate and usually emarginate. Calli dark-coloured, almost linear, 6-8 mm long, slightly clavate. Column 10-12 mm long. *Glossodia emarginata* Lindley, *G. intermedia* R. Fitzg.

Occurs in winter-wet depressions on the Coastal Plain, also occurring on the Darling Scarp. Extends from New Norcia to Esperance.

Flowers September-November, especially after fire.

The species has been reported to hybridize with *Caladenia sericea*.

EPIBLEMA R. Br.

Perennial herbs, with a tuber, glabrous. Leaf 1, basal, sheathing at the base, narrow. Stem bracts erect, sheathing. Inflorescence a loose raceme; pedicels long. Flowers colourful. Sepals and lateral petals spreading, all similar in size; labellum distinguished from the other perianth segments by its definite claw, with a knuckle-like thickening and cluster of narrow calli. Column 2-winged; wings separate, prominent behind the anther but not forming a hood. 1 species, endemic to the south west of W.A.

E. grandiflorum R. Br.

Babe-in-a-Cradle

Slender perennial herb, usually 0.5-0.75 m high. Leaf blade 100-200 or more x 2.5-4 mm. Stem bracts 2, much shorter than the leaf, up to ca 50 mm long. Inflorescence of 2-6 or more flowers; pedicels 20-35 mm long, slender. Sepals and lateral petals 15-20 mm long, lilac, with darker veins and blotches, the petals more blotched than the sepals; lateral sepals connate under the labellum. Labellum claw 3-4 mm long; limb ovate, 13-16 x 8-12 mm, concave, with a tuft of calli near the base. Calli ca 10, linear, 4-6 mm long, clavate. Column short; wings thin, erect, petal-like, 6-8 mm long, spotted.

Recorded from winter-wet depressions on the Coastal Plain from Gngangara to Forrestdale. Also occurs from Northcliffe to east of Esperance.

Flowers November-December.

ERIOCHILUS R. Br.

Slender herbs, with a succulent tuber. Stem hairy or sometimes glabrous; hairs simple, widely spreading, tapering. Leaf 1, basal but sometimes sheathing the lower part of the stem so that the blade appears to be cauline; blade usually broad. Stem bracts absent. Inflorescence of 1-10 or more flowers, loose; flowers pedicellate. Adaxial sepal erect, contracted in the lower part; lateral sepals clawed, spreading, longer than the other perianth segments, acute. Lateral petals narrow. Labellum with a long claw, strongly recurved, very hairy. Column not broadly winged. 3 species, endemic in Australia, 2 species occurring in W.A.

- | | |
|---|---------------------|
| 1. Leaf blade borne well above the ground. Flowers scented, white,
opening mainly April-June..... | E. dilatatus |
| 1. Leaf blade borne at ground level. Flowers not scented, usually pink,
opening mainly July-October..... | E. scaber |

E. dilatatus Lindley

White Bunny Orchid

Slender perennial herb, usually 75-300 mm high, appearing glabrous but with inconspicuous hairs on the stem, lower leaf surface and lower parts of the flowers. Stem hairs simple, < 0.5 mm long. Leaf sheathing the lower part of the stem; blade usually 10-35 x 2-7 mm. Inflorescence of 1-10 or more flowers; pedicels 2-3 mm long. Flowers usually white with yellow and reddish markings, scented. Adaxial sepal 7.5-10 mm long. Lateral sepals with a slender claw 2-3 mm long; limb 9-12 x 1.5-3.5 mm. Lateral petals slightly shorter than the adaxial sepal, linear or dilated at the apex. Labellum claw 3-4 mm long; limb ovate-oblong, 2-3.5 mm long. Column 6-8 mm long, usually green at the apex. *E. multiflorus* Lindley

Widespread on the Coastal Plain and Darling Range. Extends from Dirk Hartog Island to Israelite Bay.

Flowers mainly April-June.

This species is very variable in stature, leaf characters and flower number.

E. scaber Lindley

Pink Bunny Orchid

Slender perennial herb, usually 50-200 mm high. Stem inconspicuously hairy; hairs simple, < 0.5 mm long. Leaf basal or nearly so, 8-30 x 7-12 mm. Inflorescence 1-3-flowered; pedicels ca 1 mm long, hidden by the floral bract. Flowers pink-mauve or white, not obviously scented. Adaxial sepal 6-7.5 mm long. Lateral sepals usually 7-8 x 2-3.5 mm; claw narrow, 1-2 mm long. Lateral petals linear-spathulate, slightly shorter than the adaxial sepal. Labellum claw ca 4 mm long; limb 2-2.5 mm long, dark at the apex. Column ca 6 mm long, usually maroon at the apex. *E. tenuis* Lindley

Occurs in winter-wet depressions on the Coastal Plain. Extends from north of Gingin to east of Esperance.

Flowers July-September, after fire.

A variant occurring from Busselton to Albany flowers in October-November and tends to be less hairy.

LEPORELLA A.S. George

Perennial herbs, with an obovoid tuber, glabrous. Leaves 1 or very rarely 2, basal, broad. Stem bracts 1 or 2. Inflorescence 1-flowered or a loose few-flowered raceme. Adaxial sepal broad; lateral sepals strongly reflexed, narrow, clavate. Lateral petals erect, longer than the sepals, narrow, clavate, the club glandular-hairy. Labellum much shorter than the other perianth segments, broad, fringed, lacking calli. Column without an apical point; wings dilated in the upper part. 1 species, confined to southern Australia, previously included either in *Caladenia* R. Br. or in *Leptoceras* (R. Br.) Lindley, a genus no longer recognized.

L. fimbriata (Lindley) A.S. George

Hare Orchid

Slender perennial herb, usually 0.15-0.3 m high. Leaf almost always 1, basal; blade bluish green with red veins, usually 10-40 x 5-12 mm. Stem bract usually 1 and appressed to the stem, ca 16 mm long. Inflorescence 1-4-flowered; pedicels 6-13 mm long. Flowers yellow-green with reddish brown or purple markings. Adaxial sepal incurved, broadly ovate, 8-10 mm long, acute or slightly acuminate. Lateral sepals crossed, linear, 8-12 mm long. Lateral petals 10-13 x 1-1.5 mm, with tiny glandular hairs resembling papillae on the clubs. Labellum on a short movable claw, broader than long, 3-lobed; lateral lobes larger than the middle lobe, deeply fringed; middle lobe less deeply fringed. *Leptoceras fimbriata* Lindley

Occurs in woodlands on the Coastal Plain and Darling Range. Extends from north of Kalbarri to Esperance. Also occurs in S.A. and Vic.

Flowers April-July, especially after fire.

LYPERANTHUS R. Br.

Stout herbs, with a tuber, commonly known as Beak Orchids, glabrous. Leaf 1 (in the Perth Region). Stem bracts 1 to several, sometimes rather leaf-like. Inflorescence a many-flowered raceme. Adaxial sepal hooded over the column, broad; lateral sepals and petals narrower. Labellum shorter than the sepals, with 2 shallow lateral lobes ending well below the apex; calli present on the limb. Column wings usually narrow; apex with a point. About 12 species, occurring in Australia, New Caledonia and New Zealand, 3 species occurring in W.A.

1. Leaf blade 30-60 x 30-60 mm, almost flat on the ground. Distal part of the labellum conspicuously fringed and with few inconspicuous calli along the centre..... **L. nigricans**
1. Leaf 200-350 x 7-15 mm, erect. Distal part of the labellum not conspicuously fringed, with numerous prominent calli along the centre..... **L. serratus**

L. nigricans R. Br.

Red Beak Orchid

Stout perennial herb, 0.1-0.3 m high. Leaf almost flat on the ground, usually 30-60 x 30-60 mm, sometimes smaller. Stem bracts 2-4, rather leaf-like, loosely sheathing. Inflorescence 2-6-flowered; floral bracts sheathing, hiding the short pedicel and most of the ovary. Perianth segments white with crimson lines and a dark red-brown apex. Adaxial sepal almost horizontal, ovate, 18-25 mm long; lateral sepals and petals recurved or spreading, slightly shorter than the adaxial sepal, 1-3 mm broad. Labellum sessile, ca 10 mm long; lateral lobes erect, toothed on the distal margin; middle lobe recurved, fringed or deeply toothed. Calli few, on a longitudinal raised plate along the centre of the labellum limb, small. Column shortly pointed at the apex.

Occurs in varied habitats on the Coastal Plain and Darling Range. Extends from Shark Bay to Israelite Bay. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers mainly August-October, after fire.

Non-flowering plants are often known as Elephant's Tongues.

L. serratus Lindley

Rattle Beak Orchid

Stout perennial herb, 0.3-0.5 m high. Leaf sheathing the lower part of stem, with a large sheathing scale at the base; blade erect, 200-350 x 7-15 mm, channelled, the margins incurved. Stem bracts 1 or 2, acuminate. Inflorescence 3-6-flowered; pedicels visible, up to 20 mm long. Flowers pale green to yellow, streaked and suffused with crimson or brown. Adaxial sepal often vertical, narrowly ovate, contracted at the base, 15-20 mm long; lateral sepals and petals spreading, channelled, 20-25 x 2-3 mm. Labellum sessile, much shorter than the other perianth segments; lateral lobes entire; middle lobe recurved, toothed to shortly fringed. Calli numerous, crowded in a central band along the labellum limb, prominent, elongate. Column with a long apical point.

Recorded from woodlands on the Coastal Plain and from granitic and lateritic areas on the Darling Range from Perth southward. Extends inland to York and along the south coast to Israelite Bay.

Flowers September-October.

MICROTIS R. Br.

Perennial herbs, with a small tuber, commonly known as Mignonette or Onion Orchids, glabrous. Leaf 1, sheathing the stem for some distance above the ground; blade terete or subterete, hollow, succulent, usually nearly equal to the length of the visible portion of the stem. Stem bracts absent. Inflorescence a raceme but usually spike-like, many-flowered. Flowers small, possibly reversed in bud but not reversed at anthesis, facultatively autogamous. Adaxial sepal hooded, broad; lateral sepals as long or shorter than the adaxial sepal but narrower. Labellum sessile, often with a large compressed callus, which is generally referred to as a callosity. Column very short, with 2 small auricles behind the stigma. Extending from China to New Zealand, 10 species recorded in Australia, 8 species occurring in W.A. Reference: Bates, R. 1984. *J. Adelaide Bot. Gard.* 7: 45-89.

1. Pedicels 1-3 mm long. Lateral sepals recurved or revolute in mature flower.
2. Flowers pure white or whitish green. Tip of the labellum expanded into 2 large lobes..... **M. alba**
2. Flowers green. Tip of the labellum truncate or slightly 2-lobed.
3. Flowers closely clustered at anthesis, becoming separate in fruit.... **M. unifolia**
3. Flowers separating on the raceme before anthesis, widely spaced in fruit..... **M. rara**
1. Pedicels < 1 mm long. Lateral sepals spreading, not recurved or revolute in mature flower.
4. Flowers dark. Labellum very broad and hiding the lateral sepals..... **M. orbicularis**
4. Flowers green. Labellum longer than broad, not hiding the lateral sepals..... **M. atrata**

M. alba R. Br.

White Mignonette Orchid

Slender to robust perennial herb, 0.2-0.6 m high. Leaf with a long sheath; blade sometimes longer than the free part of the flowering stem. Raceme up to 170 mm long at maturity; pedicels 1-2 mm long. Flowers white or whitish green. Adaxial sepal prominent, 3-4.5 mm long, acute, contracted at the base; lateral sepals nearly as long as the adaxial sepal but becoming revolute at maturity. Lateral petals 2-3 mm long, much narrower than the lateral sepals. Labellum 2.5-4 mm long, narrow at the base, the distal half expanded into 2 prominent lobes, the margin undulate, with 2 large glands at the base and a large subterminal callosity.

Occurs from Perth southward, on the Coastal Plain. Extends inland to York and along the south coast to Israelite Bay.

Flowers mainly October-December.

Reported to hybridize with *M. unifolia*.

M. atrata Lindley

Swamp Mignonette Orchid

Perennial herb, usually 80-150 mm high, yellowish green. Leaf sheathing most of the stem below the inflorescence; blade erect, up to 40 mm long, usually curled over at the apex. Raceme spike-like, fairly dense, usually 15-30 mm long; pedicels < 1 mm long. Flowers yellowish green. Sepals 0.8-1.2 mm long; adaxial sepal broadly helmet shaped, 0.8-1.2 mm long; lateral sepals on each side of the labellum, spreading, not recurved, almost as long as the adaxial sepal. Lateral petals spreading, similar in shape to the lateral sepals, ca 0.5 mm long. Labellum 1-1.5 mm long, obtuse, with rows of small calli right across its breadth.

Occurs in winter-wet depressions on the Coastal Plain and Darling Range from Wanneroo southward. Extends along the south coast to the Cape Arid National Park. Also occurs in S.A., Vic. and Tas.

Flowers mainly September-October.

M. orbicularis R.S. Rogers

Dark Mignonette Orchid

Slender perennial herb, 0.1-0.3 m high. Leaf sheathing most of the stem; blade arising just below the base of inflorescence, 20-35 mm long. Raceme spike-like, up to 40 mm long; pedicels < 1 mm long. Flowers green. Adaxial sepal prominent, 1.5-2 mm long; lateral sepals not recurved, narrowly oblong, 1.2-1.5 mm long, concealed below the labellum. Lateral petals ca 1 mm long, slightly narrower than the lateral sepals, often becoming recurved to revolute. Labellum ca 2 mm long, very broad, concave, entire, without a callosity.

Occurs in winter-wet depressions on the Coastal Plain and Darling Range. Extends from Eneabba to Fitzgerald River National Park.

Flowers September-November.

M. rara R. Br.

Slender perennial herb, up to 0.3 m high. Leaf usually sheathing most of the stem below the inflorescence; blade fine. Raceme up to 15 mm long; pedicels 1-2 mm long. Flowers green, becoming separated before anthesis, widely spaced in fruit. Adaxial sepal ca 3 mm long, broad, shortly acuminate; lateral sepals recurved or revolute. Lateral petals ca 2 mm long, much narrower than the lateral sepals. Labellum ca 3 mm long, truncate, with 2 prominent basal glands and a subterminal callosity. *M. brownii* H.G. Reichb., *M. truncata* R.S. Rogers

Occurs on the Coastal Plain from Perth southward. Extends inland to York and along the south coast to Albany. Also occurs in S.A. and possibly other states.

Flowers October-December.

Reported to hybridize with *M. unifolia*.

M. unifolia (G. Forster) H.G. Reichb.

Common Mignonette Orchid

Perennial herb, usually stout, 0.2-0.5 m high. Leaf sheathing a small or large proportion of the stem; blade up to 0.3 m long but usually much shorter. Raceme usually dense, up to 100 mm long, with very numerous flowers; pedicels 1-3 mm long. Flowers green, closely clustered at anthesis, becoming separate in fruit. Adaxial sepal shortly acuminate, 3-4 mm long, broad; lateral sepals 2.5-3 mm long, becoming recurved to revolute. Lateral petals 1.7-2.5 mm long, partly concealed by the adaxial sepal, narrower than the lateral sepals. Labellum 2.5-3 mm long, with a crisped or irregular margin, obtuse or slightly 2-lobed at the apex, with 2 prominent basal glands and a subterminal callosity.

Occurs on the Coastal Plain and Darling Scarp, often in winter-wet depressions. Extends from Cue to the Great Australian Bight. Occurs in all Australian states. Extends from Japan to New Zealand.

Flowers October-January.

A very variable species as presently recognized. Reported to hybridize with *M. alba* and *M. rara*.

*MONADENIA Lindley

Perennial herbs, with an ovoid tuber, glabrous. Leaves usually numerous, all cauline and gradually reduced upward, or the lower leaves almost radical and the upper leaves reduced to a short sheath, often narrowly ovate. Inflorescence a dense spike, usually with numerous flowers. Flowers often small. Sepals free; adaxial sepal hood shaped, almost always with a descending basal spur; lateral sepals spreading or deflexed, narrower than the adaxial sepal. Lateral petals erect, entire or 2-lobed. Labellum usually small and narrow, undivided. Column short. 20 species, endemic in southern Africa, 1 species naturalized in W.A.

***M. bracteata** (Sw.) T. Durand & Schinz

Erect perennial herb, usually 0.2-0.3 m high, with a large tuber. Leaves numerous, decreasing in size progressively up the stem; lower leaves 50-150 mm long, tapering from a broad base to an acuminate apex, channelled. Spike cylindric, many-flowered, 30-200 mm long. Flower bracts leaf-like, markedly exceeding the flowers in the lower part of the inflorescence but the uppermost bracts often slightly shorter than the flowers. Sepals greenish white, with a red or red-brown apex, 3 mm long; adaxial sepal erect, 3-4 mm long, adaxially spurred; spur pendulous, reddish, 4-5 mm long, narrow; lateral sepals spreading, recurved, ca 3 mm long. Lateral petals slightly shorter than the sepals. Labellum yellow, ca 2 mm long. Ovary 5-7 mm long. *M. micrantha* Lindley

Naturalized in moist disturbed areas on the Coastal Plain and Darling Scarp from Perth southward. Extends through near-coastal areas to Esperance.

Flowers October-November.

PARACALEANA Blaxell

Slender herbs, with a dark red tuber, glabrous. Leaf 1, basal, linear to ovate-cordate. Stem bracts absent. Inflorescence 1-flowered or a loose raceme of several flowers. Flowers erect but appearing reversed, the labellum bent upward above the column. Adaxial sepal and lateral petals almost equal, linear, rather closely surrounding the column. Lateral sepals similar to the adaxial sepal and lateral petals but attached to the top of the column foot. Labellum claw linear, long, curved, movable, attached to the top of the column foot; limb irritable, peltately attached, with a basal appendage or small lobe, ovate and beaked above, tuberculate. Column the dominant feature of the flower, almost as long as the perianth segments; limb broadly winged. 2 species, 1 occurring in southern and eastern Australia and extending to New Zealand, the other occurring in W.A. Previously included within the closely related genus *Caleana* R. Br. Reference: Blaxell, D.F. 1972. Contr. New South Wales Natl. Herb. 4: 275-283.

P. nigrita (Lindley) Blaxell

Flying Duck Orchid

Perennial herb, up to 170 mm high. Leaf purplish on the abaxial surface, usually narrowly ovate, 15-30 x 3-6 mm. Flowers 1 or rarely 2, pale green with reddish brown or purplish markings; bract 3-6 mm long; pedicel 10-33 mm long. Sepals and lateral petals usually ca 10 mm long; lateral sepals arising

4-5 mm above the other segments. Labellum claw 4-6 mm long; limb 9-12 mm long; upper lobe ca twice as long as the lower lobe, tuberculate and often very dark-coloured in the upper part. Column nearly as long as the sepals; wings forming a pouch usually 5-6 mm broad. *Caleana nigrata* Lindley

Usually occurs in low-lying sandy flats on the Coastal Plain, less commonly on the Darling Range. Extends from Kalbarri to Esperance. Possibly also occurs in S.A.

Flowers August-October, also November-January outside the region.

The variant matching the type of the species extends from Perth to Bremer Bay. Another variant, more widespread but not represented in the Perth Region, has a much broader labellum with a shorter glandular-hairy beak and usually flowers later. The latter variant probably warrants recognition as a new subspecies or species (A. Brown pers. comm.).

PRASOPHYLLUM R. Br.

Perennial herbs, with a tuber, commonly known as Leek Orchids, glabrous. Leaf 1, basal but sheathing the stem for some distance; blade terete, hollow. Stem bracts absent. Inflorescence a raceme but usually spike-like, with several-numerous flowers, each subtended by a prominent bract; pedicels usually hidden, short or almost absent. Flowers usually inconspicuously coloured in green or purple or white, reversed so that the labellum is above the column. Adaxial sepal appearing abaxial; lateral sepals often as long as or longer than the adaxial sepal, often partially connate. Lateral petals not longer than the sepals. Labellum often shortly clawed, undivided, the apex strongly reflexed; limb with a longitudinal callus plate or ridge. Column very short, usually with 2 erect lateral appendages. Over 80 species, mainly in Australia but also represented in New Zealand and New Caledonia, 18 species occurring in W.A.

When using this key note that the flowers are reversed so that the adaxial sepal appears abaxial.

1. Flower pedicels 1-2 mm long, slender. Sepals 3-6 mm long or rarely up to 10 mm long.
2. Lateral sepals free or only shortly connate at the base, a similar length to the lateral petals. Leaf blade rarely reaching the base of the inflorescence.
3. Lateral sepals 5-10 mm long, adaxially swollen at the base.
 4. Stem and leaf blade vertical. Sepals and lateral petals erect to horizontal, predominantly yellowish..... **P. cyphochilum**
 4. Stem bending abruptly away from the nearly vertical leaf blade. Sepals and lateral petals drooping below the horizontal, predominantly green and brown..... **P. parvifolium**
3. Lateral sepals 3-5 mm long, not adaxially swollen..... **P. ovale**
2. Lateral sepals largely connate, much longer than the lateral petals. Leaf blade reaching or exceeding the inflorescence..... **P. macrostachyum**
1. Flower pedicels < 0.5 mm long or (in *P. regium*) 2-3 mm long, thick. Sepals 6-15 mm long.
 5. Lateral petals crenate-cripsed..... **P. hians**
 5. Lateral petals entire.
 6. Lateral sepals fully connate, prominently pouched at the base, hooded over the labellum..... **P. gibbosum**
 6. Lateral sepals usually free at the apex, not pouched, not hooded.
 7. Flower pedicels < 0.5 mm long. Margins of the callus plate spreading or incurved.
 8. Callus plate margin free and membranous only laterally, not at the apex.
 9. Labellum gradually upturning; free margins broader than the medial breadth of the callus plate.
 10. Flowers white or pale greenish cream. Margins of the labellum markedly incurved..... **P. brownii**
 10. Flowers variegated in brown, white, yellow, purple and green. Margins of the labellum spreading..... **P. giganteum**
 9. Labellum abruptly upturned ca 1/2 way along; free margins narrower than the medial breadth of the callus plate..... **P. drummondii**

8. Callus plate margin free and membranous laterally and around the apex.
11. Free margin of the callus plate crenate. Labellum almost horizontal in the lower half, strongly curved near the middle, the upper half vertical to recurved..... **P. fimbria**
11. Free margin of the callus plate not crenate. Labellum fairly erect, bowed..... **P. elatum**
7. Flower pedicels 2-3 mm long. Margin of the callus plate recurved in the upper part..... **P. regium**

P. brownii H.G. Reichb.

Robust perennial herb, 0.5-1.0 m high. Leaf usually ending below the top of the inflorescence, usually sheathing for more than half its length. Floral bracts usually 12-15 mm long. Inflorescence spike-like, rarely over 200 mm long, with numerous flowers; pedicels virtually absent in flower, enlarging to ca 1 mm long in fruit. Flowers pale greenish cream. Sepals usually 10-12 mm long; lateral sepals connate but usually free at the apex. Lateral petals shorter than the sepals. Labellum clawed, ca 8 mm long; outer membranous margin white, broad, markedly incurved, generally crisped; membranous margin of the callus plate free laterally but not at the apex, broader than the medial breadth of the callus plate. *P. ellipticum* R.S. Rogers

Recorded from near Perth, growing in winter-wet depressions on the Coastal Plain and with Jarrah on the Darling Scarp. Outside the Perth Region extends from the extreme south west corner of the state to Two Peoples Bay.

Flowers October-December.

P. cyphochilum Benth.

Pouched Leek Orchid

Slender perennial herb, 0.2-0.4 m high. Leaf sheathing for some distance; blade < 40 mm long, the apex well below the base of the inflorescence. Floral bracts 3-4 mm long. Inflorescence loose, up to 150 mm long, with several-numerous flowers; pedicels 1.5-2 mm long, slender. Flowers yellowish or whitish green with chocolate stripes down the centre of some of the perianth segments. Sepals all free, erect to horizontal, 5-7 mm long; lateral sepals adaxially swollen at the base. Lateral petals erect to horizontal, shorter than the sepals. Labellum sessile, 4-6 mm long, with a short basal pouch protruding between the sepals, the margin undulate and crenate; callus plate narrow.

Occurs on the Coastal Plain and Darling Scarp, often in winter-wet depressions. Extends from north of Northampton to Ravensthorpe.

Flowers October-November.

P. drummondii H.G. Reichb.

Swamp Leek Orchid

Fairly robust perennial herb, 0.4-0.6 m high. Leaf with a long sheath; blade up to ca 200 mm long, the apex always below the top of the mature inflorescence. Floral bracts 6-7 mm long. Inflorescence spike-like, loose, up to 200 mm long, with numerous flowers; pedicels virtually absent in flower, enlarging to ca 1 mm long in fruit. Flowers yellowish green, usually with reddish markings. Sepals 8-12 mm long; lateral sepals connate almost to the apex, the margins incurved. Lateral petals dilated, shorter than the sepals. Labellum clawed, creamy white with a greenish callus plate, 7-8 mm long, abruptly upturned about half way along; margins crisped, narrower than the medial breadth of the callus plate; membranous margin of callus plate free laterally but not at apex. *P. muelleri* C. Andrews, *P. patudosum* W.H. Nicholls

Largely restricted to winter-wet depressions on the Coastal Plain, recorded from Muchea to Harvey. Also recorded from Collie to Mt. Manypeaks.

Flowers mainly October-November, especially after fire.

P. elatum R. Br.

Tall Leek Orchid

Robust perennial herb, usually 0.5-1.0 m high. Leaf sheathing for some distance up the stem, the apex usually below the top of the mature inflorescence. Floral bracts 6-8 mm long. Inflorescence spike-like, rarely over 0.3 m long, with numerous flowers; pedicels virtually absent in flower, probably

enlarging to ca 1 mm long in fruit. Flowers varying from pale green-cream to brown and cream. Sepals 10-11 mm long; lateral sepals usually connate from the middle almost to the apex. Petals almost as long as the sepals. Labellum fairly erect, sessile, bowed, 7-9 mm long, entire at the base and with a corrugated upper margin; membranous margin of callus plate free both laterally and around the apex, crenulate.

Occurs in sand in winter-wet depressions on the Coastal Plain, with further populations occurring on the Darling Scarp. Extends in near-coastal areas from north of Geraldton to east of Esperance. Occurs in all states except N.T.

Flowers August-November, especially after fire.

***P. fimbria* H.G. Reichb.**

Fringed Leek Orchid

Slender or robust perennial herb, usually 0.3-0.7 m high, sometimes higher. Leaf sheathing for more than half of its length, the apex well below the top of the inflorescence. Floral bracts 7-10 mm long. Inflorescence spike-like, with numerous flowers; pedicels < 0.5 mm long in flower, enlarging to 1-2 mm long in fruit. Flowers green with red-brown markings or deep purplish black, fragrant. Sepals 8-12 mm long; lateral sepals free at the base and often connate above. Lateral petals shorter than sepals. Labellum clawed, glistening white, a similar length to the sepals, with crisped lateral margins, almost horizontal in the lower half, strongly recurved near the middle, the upper half vertical to recurved; membranous margin of callus plate free both laterally and around the apex, purple, broad, densely fringed. *P. gracillimum* W.H. Nicholls **Fig. 300**

Occurs in winter-wet depressions on the Coastal Plain and in varied habitats on the Darling Range. Extends around the coast from north of Geraldton to east of Esperance.

Flowers June-October, especially after fire.

Specimens from the Darling Range flower June-August and those on the Coastal Plain flower September-October.

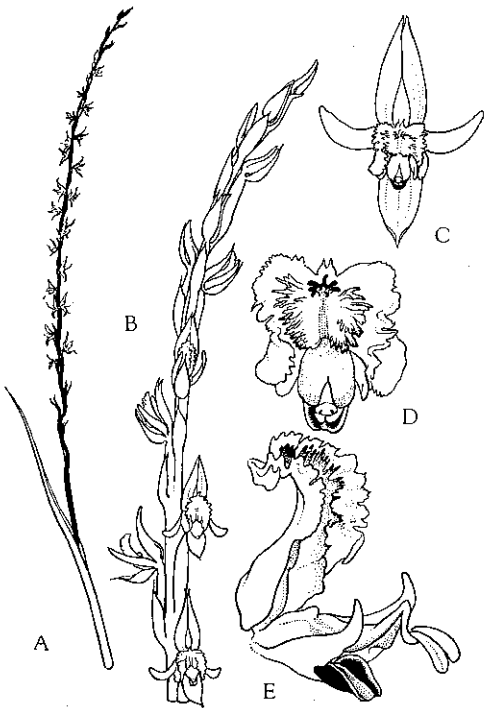


Fig. 300. *Prasophyllum fimbria*. A, Flowering stem. B, Part of inflorescence. C, Flower. D and E, Two views of labellum and column.

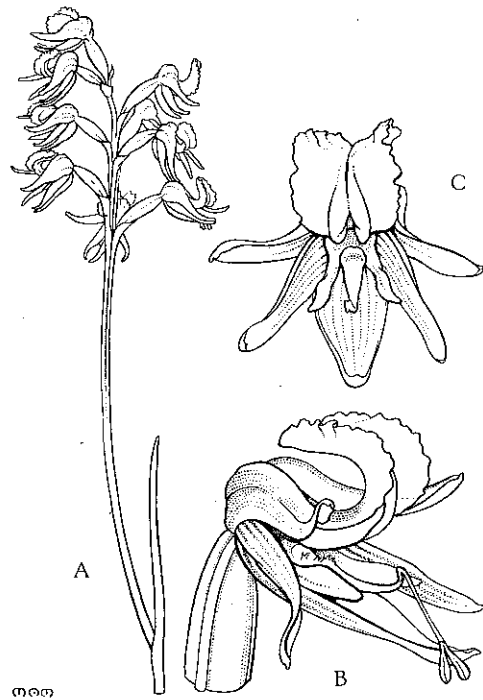


Fig. 301. *Prasophyllum parvifolium*. A, Flowering stem. B and C, Two views of flower.

P. gibbosum R. Br.

Humped Leek Orchid

Perennial herb, 100-250 mm high. Leaf only sheathing the lower part of the stem, dilated at the base. Floral bracts 3-6 mm long. Inflorescence spike-like, with few-numerous crowded flowers; pedicels virtually absent in flower, enlarging to 0.5-1 mm long in fruit. Flowers white with purple markings, sweetly scented. Sepals 5-7 mm long; adaxial sepal purple; lateral sepals connate to the apex, broadly dilated to form a hood with a basal pouch. Lateral petals 5-7 mm long. Labellum clawed, 6-9 mm long, with crisped margins. *P. cucullatum* H.G. Reichb.

Inhabits sandy winter-wet depressions on the Coastal Plain from Perth southward. Extends along the south coast to east of Esperance.

Flowers September-November, after fire.

P. giganteum Lindley

Bronze Leek Orchid

Stout perennial herb, usually 0.6-1.0 m high. Leaf usually sheathing for more than half its length, the apex usually well below the top of the inflorescence. Floral bracts 7-10 mm long. Inflorescence spike-like, rarely over 0.3 m long, with very numerous flowers; pedicels virtually absent in flower, enlarging to 1.5-2 mm long in fruit. Flowers variously coloured with green, brown, white, yellow and mauve. Sepals 10-15 mm long; lateral sepals usually connate for most of their length, free at the apex. Lateral petals slightly shorter than the sepals. Labellum clawed, 9-12 mm long; margin spreading, crisped; callus plate mostly green; membranous margin of callus plate free laterally but not around the apex, broad.

Occurs in sandy woodland areas and around winter-wet depressions on the Coastal Plain and in lateritic or granitic areas on the Darling Range. Extends in near-coastal areas from north of Geraldton to Albany.

Flowers September-November, especially after fire.

P. grimwadeanum W.H. Nicholls appears to be a synonym but the taxonomy needs to be further investigated.

P. hians H.G. Reichb.

Yawning Leek Orchid

Slender perennial herb, 0.15-0.4 m high. Leaf sheathing the lower part of the stem; blade arising well below the inflorescence, less than 150 mm long. Floral bracts 3-4 mm long. Inflorescence spike-like, up to 150 mm long, with fairly numerous flowers; pedicels virtually absent in flower, enlarging to ca 1.5 mm long in fruit. Flowers white tinged with red-brown or purplish markings. Adaxial sepal 8-11 mm long, markedly acuminate. Lateral sepals and petals connate except near the apex, 7-9 mm long, swollen at the base, tending to be acuminate. Lateral petals 9-13 mm long, crenate-crisped. Labellum sessile, ca 6 mm long, broad at the base, the margins prominently undulate; callus plate green, terminating in a thick fringe and 2 raised knuckles.

Fairly widespread in sandy soils on the Coastal Plain and associated with granite or sometimes laterite on the Darling Scarp. Extends from Mogumber to Fitzgerald River National Park, usually not occurring very far inland.

Flowers August-October, especially after fire.

P. macrostachyum R. Br.

Laughing Leek Orchid

Slender perennial herb, usually 0.1-0.4 m high. Leaf sheathing ca half the stem; blade reaching and often greatly exceeding the inflorescence, often twisted. Floral bracts 2-3 mm long. Inflorescence loose, with several-numerous flowers; pedicels 1-2 mm long, slender. Flowers pale green to olive green. Adaxial sepal 2-4 mm long. Lateral sepals connate at least at the base and usually for more than half their length, 3-7 mm long, markedly acuminate. Lateral petals 2-3.5 mm long. Labellum sessile or nearly so, 2-4 mm long, the margin crenulate; callus plate channelled, apparently entire and lacking free margins.

Recorded from winter-wet depressions on the Coastal Plain and from rocky hillsides on the Darling Range. Widespread in the south west from the Murchison River to the Great Australian Bight and inland to Coolgardie. Also occurs in S.A.

Flowers August-November.

This species has 2 varieties, both occurring in the Perth Region. Var. *macrostachyum* is generally 0.25-0.4 m high, with the mature flowers 8-10 mm apart on the raceme and the lateral sepals free distally for ca 2 mm. It extends in near-coastal areas from Jurien Bay to Esperance. More common in the region is var. *ringens* (H.G. Reichb.) A.S. George, which rarely exceeds 200 mm in height, with mature flowers ca 6 mm apart on the raceme and with lateral sepals free in distal 4-6 mm. It extends from Shark Bay to Balladonia, often occurring well inland.

P. ovale Lindley

Little Leek Orchid

Very slender perennial herb, usually 0.2-0.4 m high. Leaf sheathing for some distance; blade < 60 mm long, the apex usually well below the base of the inflorescence. Floral bracts 3-4 mm long. Inflorescence fairly loose, up to 200 mm long, with numerous flowers; pedicels 1-2 mm long, slender. Flowers pale, sometimes with dark reddish markings. Sepals 3-5 mm long; adaxial sepal broader than the other lateral sepals and petals; lateral sepals normally free. Lateral petals 2.5-4.5 mm long. Labellum sessile, 2.5-3.5 mm long, the margins slightly crenulate near the apex; callus plate smooth, shiny, conspicuous. *P. attenuatum* R. Fitzg., *P. plumaeforme* R. Fitzg.

Occurs in sand in woodlands, often surrounding winter-wet depressions, on the Coastal Plain and in laterite soils on the Darling Scarp and Range. Extends from Jurien Bay to Israelite Bay, mainly in near-coastal areas.

Flowers August-October.

The species has 2 recognized varieties, both occurring in the Perth Region. Var. *ovale* usually has sepals 5-6 mm long and up to 20 flowers spaced 10-13 mm apart on the raceme. It extends from Perth to Albany and inland to York. Var. *trigloch* H.G. Reichb. usually has sepals 3-4 mm long and 25-45 flowers spaced 4-8 mm apart on the raceme. It occurs throughout the species range. The varieties intergrade somewhat.

P. parvifolium Lindley

Autumn Leek Orchid

Slender perennial herb, 0.2-0.4 m high, the stem often markedly bent where the leaf blade arises. Leaf sheathing more than half the stem; blade 25-40 mm long, the apex rarely reaching the base of the inflorescence. Floral bracts 4-6 mm long. Inflorescence loose, 20-60 mm long, with several-numerous flowers; pedicels 1-2 mm long, slender. Flowers green with a white labellum. Sepals drooping below the horizontal, 7-10 mm long; adaxial sepal narrowly ovate, concave; lateral sepals adaxially dilated at the base and connate at the base in a short pouch, adnate to the basal projection of the column, otherwise free. Lateral petals drooping below the horizontal, 5-9 mm long, narrower than the sepals. Labellum clawed, white, 6-9 mm long, recurved, the margins crisped; callus plate nearly as broad as the limb and ending near the middle. **Fig. 301**

Occurs on the Darling Range and in woodlands or beside winter-wet depressions on the Coastal Plain. Extends from Jurien Bay to Israelite Bay in near-coastal areas.

Flowers mainly June-August.

P. regium R.S. Rogers

King Leek Orchid

Robust perennial herb, usually more than 1 m high. Leaf sheathing for more than half its length, the apex well below the top of the inflorescence. Floral bracts 12-16 mm long. Inflorescence loose, rarely over 0.4 m long, with numerous flowers; pedicels 2-3 mm long in flower, 3-4 mm long in fruit, thick. Flowers green with brown or purple markings. Sepals usually 12-15 mm long, acute; lateral sepals connate except at the extreme base and apex. Lateral petals 10-12 mm long. Labellum clawed, 11-13 mm long, with a crenulate margin; membranous margin of callus plate free laterally and around the apex, recurved in the upper part.

Occurs from Perth southward, in winter-wet depressions on the Coastal Plain. Extends in near-coastal areas to Mt. Manypeaks.

Flowers September-December, especially after fire.

PTEROSTYLIS R. Br.

Perennial herbs, with a small tuber, commonly known as Greenhood Orchids, glabrous. Leaves several to numerous, radical or cauline or both; basal leaves broad, often petiolate; upper leaves often narrowly ovate, clasping at the base or sheathing the stem. Inflorescence 1-flowered or a loose raceme of few- to numerous flowers. Flowers rather delicate, usually green or red-brown, banded with translucent white. Adaxial sepal arched and adnate at the base to the lateral petals, the 3 segments forming a hood known as the galea; galea with 1 or rarely 2 openings at the front. Lateral sepals partially connate to form a lower lip, usually markedly acuminate. Labellum often protruding through a front opening in the galea, attached by a movable claw, often irritable, small, usually inconspicuous, sometimes with an elongate basal appendage. Column concealed within the galea, elongate, broadly winged at the apex; wings hatchet shaped. About 100 species in Australia, New Guinea, New Caledonia and New Zealand, at least 20 species occurring in W.A.

- | | |
|---|---------------------|
| 1. Lateral sepals spreading or deflexed. | |
| 2. Galea with 2 openings in the front. Labellum hairs yellow, numerous, long..... | P. barbata |
| 2. Galea with 1 opening in the front. Labellum hairs not yellow, few or short. | |
| 3. Basal rosette always present; stem leaves reduced to bracts. Labellum not 2-branched..... | P. sp. A |
| 3. Rosette absent in flowering plants; stem leaves prominent. Labellum 2-branched at the apex..... | P. vittata |
| 1. Lateral sepals erect in the lower half. | |
| 4. Lateral sepals abruptly recurved almost level with the top of the galea, then narrowing to an acuminate point..... | P. recurva |
| 4. Lateral sepals not markedly recurved, the acuminate point arising well below the top of the galea. | |
| 5. Lateral sepals connate almost to the top of the dilated basal portion, then forming a broad truncate sinus with a notch at the centre. Labellum almost straight. | |
| 6. No inflexed tooth on the inner side of the sinus notch. Points of the lateral sepals not conspicuously clavate..... | P. scabra |
| 6. Inflexed tooth present on the inner side of the sinus notch. Points of the lateral sepals usually prominently clavate. | |
| 7. Basal leaves absent in flowering plants. Galea hood 9-10 mm broad..... | *P. dilatata |
| 7. Basal leaves always present. Galea hood ca 6 mm broad..... | P. nana |
| 5. Lateral sepals connate for $\frac{1}{2}$ - $\frac{3}{4}$ of the length of the dilated basal portion, then forming a V-shaped sinus. Labellum markedly recurved. | |
| 8. Galea < 25 mm long, ca 6 mm broad near base..... | P. angusta |
| 8. Galea 30 mm or more long, ca 10 mm broad near the base..... | P. rogersii |

P. angusta A.S. George

Slender perennial herb, 100-200 mm high. Basal rosette absent in flowering plants. Stem leaves 3-7, up to 30 mm long, acute. Flowers 1 or rarely 2, translucent white banded with dark brownish green. Galea 18-25 mm long, acute. Lower lip erect, 25-30 mm long; sepals connate for ca 10 mm, acuminate; sinus between the points V-shaped; points more than 15 mm long, usually bent to become almost horizontal toward the apex. Labellum recurved 10-12 mm above the base and protruding forward through the sinus of the lower lip, linear, acute, the recurved apex ca 4 mm long.

Occurs in woodlands on the Coastal Plain in the Bunbury area. Extends south to Capel, with a disjunct area of occurrence from Katanning to the Stirling Range.

Flowers June-August.

P. barbata Lindley

Bird Orchid

Perennial herb, 0.1-0.3 m high. Leaves usually numerous, crowded at the base and intergrading into the stem leaves, sheathing at the base, up to 45 mm long. Flowers 1 or very rarely 2, green with fine reticulate veins apparent. Galea usually 30-40 mm long, with 2 openings at the front, usually long-acuminate; point 3-20 mm long. Lower lip usually deflexed or spreading, 22-35 mm long; sepals connate for ca 5 mm, long-acuminate; sinus between the points V-shaped; points at least 20 mm long. Labellum filiform, 13-23 mm long, with long golden lateral hairs, terminating in a dark-coloured club. *P. turfosa* Endl.

Recorded from woodlands on the Coastal Plain and Darling Range near Perth. Extends from Wongan Hills to Albany.

Flowers September-October.

Wheatbelt specimens tend to have small flowers, mostly 25-35 mm long, with the galea point 2-5 mm long. Along the south coast, specimens tend to have large flowers up to 45 mm long, with the galea point up to 20 mm long.

***P. dilatata** A.S. George

Slender perennial herb, 50-150 mm high. Basal leaves absent in flowering plants. Stem leaves 4-7; lowest leaf bract-like; upper leaves 6-25 x 1.5-5.5 mm. Flower 1, erect, banded with green. Galea 15-24 x 9-10 mm; adaxial sepal acute or very shortly acuminate. Lower lip erect; sepals connate for 10-14 mm, then abruptly long-acuminate; sinus between the points broad, truncate at base, notched; points filiform, 10-16 mm long, slightly clavate in the distal 2-3 mm. Labellum 5-6.5 mm long, not markedly narrowed, obtuse, with a basal tuft of hairs.

In the Perth Region probably naturalized, recorded only from Gnangara Pine Plantation on the Coastal Plain. Extends from north of Eneabba to Israelite Bay, with an isolated occurrence at Point Culver.

Flowers May-August.

This species is closely related to *P. nana* R. Br. but does not produce a rosette of petiolate basal leaves in the years when it flowers. *P. dilatata* normally has larger flowers and tends to flower earlier than *P. nana*.

P. nana R. Br.

Snail Orchid

Rather slender perennial herb, 50-200 mm high. Basal leaves 3-8 in a rosette or on the lower part of the stem, petiolate; upper stem leaves 3 or more. Flowers normally 1, pale green. Galea 12-19 x ca 6 mm; adaxial sepal usually acute or shortly acuminate. Lower lip erect, 18-35 mm long; sepals connate for 8-12 mm, long-acuminate; sinus between the points truncate at base, notched; points 7-24 mm long, usually distinctly clavate. Labellum included, 6-8 mm long, obtuse, slightly curved near the apex. *P. pyramidalis* Lindley

Widespread on the Coastal Plain and Darling Range. Extends from north of Kalbarri to Israelite Bay and inland to Kalgoorlie. Also occurs in S.A., Vic., Tas., N.S.W. and New Zealand.

Flowers mainly July-September.

P. recurva Benth.

Jug Orchid

Perennial herb, usually 0.2-0.4 m high. Basal rosette absent in flowering plants. Stem leaves 5 to numerous, up to 60 mm long. Flowers 1-3, whitish with prominent longitudinal stripes. Galea 22-33 mm long, each sepal terminating in a short recurved point or narrowed apex. Lower lip erect, prominent; sepals dilated for 30-50 mm, connate for 15-25 mm, abruptly recurved level with the top of the galea, long-acuminate; sinus between the points V-shaped; points almost horizontal or pointing downward, 7-18 mm long. Labellum 22-37 mm long, abruptly narrowed in the distal third to an obtuse linear point. **Fig. 302**

Occurs in woodlands on the Coastal Plain and Darling Range. Extends from Mullewa to Israelite Bay, with an isolated record from Paynes Find.

Flowers August-September.

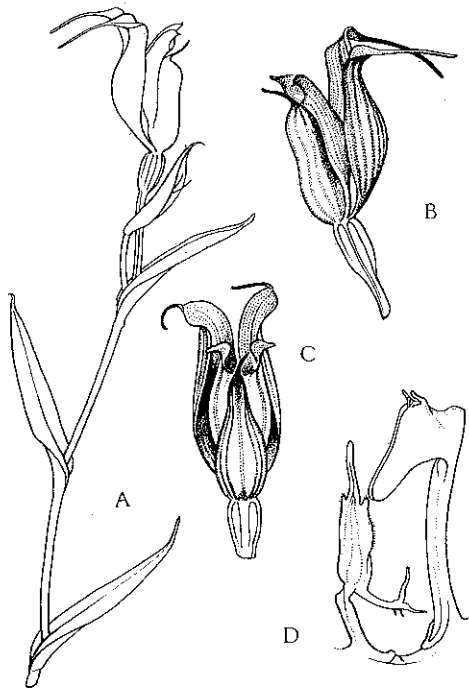


Fig. 302. *Pterostylis recurva*. A, Flowering stem. B and C, Two views of flower. D, Labellum and column.

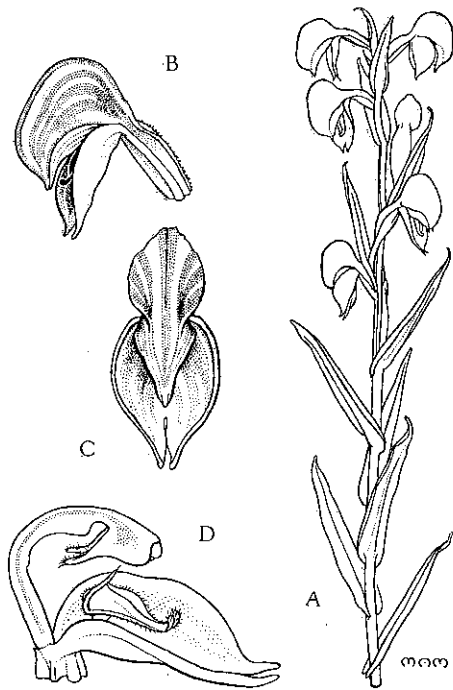


Fig. 303. *Pterostylis vittata*. A, Flowering stem. B and C, Two views of flower. D, Labellum and column.

***P. rogersii* E. Coleman**

Curled-tongue Shell Orchid

Slender perennial herb, 100-200 mm high. Basal rosette of leaves absent in flowering plants. Stem leaves 4-6, up to 45 mm long, the lower leaves bract-like. Flowers 1 or 2, red, with almost translucent longitudinal stripes on all segments and the column. Galea 26-38 mm long, acute or shortly acuminate; upper half of the galea broad. Lower lip erect, 25-47 mm long; sepals connate for 12-20 mm, long-acuminate; sinus between the points V-shaped; points erect, 8-27 mm long. Labellum 16-21 mm long, narrow, markedly recurved to revolute, obtuse, with shortly hairy margins.

Occurs from Bunbury southward, on unstable dunes under *Agonis flexuosa*. Extends along the south coast to Cape Le Grand National Park.

Flowers mainly June-July.

***P. scabra* Lindley**

Bronze Shell Orchid

Slender perennial herb, 100-200 mm high. Basal rosette of leaves absent in flowering plants. Stem leaves 4-7, up to 45 mm long, the lower leaves sometimes bract-like. Flowers 1, striped with dark green or brown on a pale green or translucent white background. Galea 21-35 mm long, the adaxial sepal acute or acuminate; upper half of the galea broad. Lower lip erect, 40-45 mm long; sepals connate for 15-19 mm, long-acuminate; sinus between the points almost truncate at base, very broad, notched; points 17-22 mm long. Labellum ca 17 mm long, almost straight, obtuse to acuminate. *P. constricta* O.H. Sargent, *P. hamiltonii* W.H. Nicholls, *P. robusta* R.S. Rogers

Occurs in coastal limestone areas and, occasionally, further inland on the Coastal Plain. Extends from Kalbarri National Park to Esperance. Also occurs in S.A., Vic. and N.S.W.

Flowers June-August.

A polymorphic species with 2 named varieties. Perth Region specimens are of var. *robusta* (Rogers) A.S. George, which extends from south of Kalbarri to Albany and occurs in other states. Var. *scabra* is more widespread in W.A. but does not occur in other states. It is usually less than 50 mm high and can usually be distinguished by the recurved apex on its labellum, which is subterminally constricted and hence appears to be clavate. However, the 2 varieties intergrade.

P. vittata Lindley

Banded Greenhood

Fairly robust perennial herb, 0.05-0.45 m high. Basal leaves 17-50 mm long but normally absent in flowering plants; stem leaves 5-13, well developed, up to ca 50 mm long, the lower leaves often small and bract-like. Floral bracts leaf-like. Inflorescence 1-15-flowered, loose. Flowers green or sometimes red-brown with green or whitish stripes or wholly red-brown. Galea 10-15 mm long, broad at the base, prominently ribbed, narrowing rather abruptly at the apex to a short point; lateral petals with many hairs on the upper inner margin. Lower lip pendulous, 9-15 mm long, broader than the galea; sepals connate for 4.5-6 mm, very shortly acuminate; sinus between the points V-shaped; points 1-2 mm long. Labellum irritable, 5-7 mm long including the claw, shortly 2-branched at the apex; limb narrowly ovate, with marginal hairs especially at the apex. **Fig. 303**

Fairly widespread on the Coastal Plain and Darling Range. Extends from north of Geraldton to Israelite Bay. Also occurs in S.A., Vic. and Tas.

Flowers June-September.

A very variable species with 2 recognized varieties, only var. *vittata* occurring in the Perth Region. Var. *subdifformis* W.H. Nicholls, which is restricted to the Boyup Brook-Cranbrook area, has dark red-brown flowers and is distinguished by the distinctly concave lateral sepals.

P. sp. A

Perennial herb, usually 0.1-0.3 m high. Leaves in a basal rosette, up to 18 x 8 mm, withering before flowering is complete. Stem leaves several, reduced and bract-like. Flowers usually 2-7. Galea green or red-brown, long-acuminate, 10-15 mm long below the point; point 5-10 mm long. Lower lip strongly reflexed, reddish, 10 mm or more long; sepals connate for 3-4 mm; sinus between the points V-shaped; points longer than the dilated part of each sepal. Labellum partly protruding, ca 4 mm long, with long green to brown hairs along the limb.

Recorded in laterite in Jarrah forest on the Darling Range east of Kelmscott. Range uncertain but extends inland into the wheatbelt.

Flowers September-October.

This species is related to several *Pterostylis* species of inland W.A., including *P. pusilla* R.S. Rogers. This group of species is related to the eastern Australian species, *P. boormanii* Rupp and *P. rufa* R. Br., and the latter name has been misapplied to W.A. taxa.

SPICULAEA Lindley

Perennial herbs, with a small tuber, glabrous. Leaf 1, basal, withering before flowering is complete. Stem bract 1, near the middle of the stem. Sepals and lateral petals very narrow; adaxial sepal incurved; other segments reflexed or spreading. Labellum articulate near the base and movable, pendulous, with a long narrow claw; limb peltately attached, hammer shaped with a narrow projection at the lower end and a reflexed point under the apex. Column elongate, narrow, incurved, the wings forming narrow projections. A monotypic genus, endemic in W.A. Reference: Blaxell, D.F. 1972. Contr. New South Wales Natl. Herb. 4: 275-283.

S. ciliata Lindley

Elbow Orchid

Perennial herb, usually 100-200 mm high. Stem rigid, golden brown or purplish, withering from the base upward, the upper part succulent and often swollen. Leaf sheathing the base of the stem; blade arising 2.5-11 mm above ground level, purplish on the abaxial surface, dark green above, broad, withering early. Stem bract spreading. Inflorescence 2-8-flowered, loose; pedicels up to 7 mm long. Flowers pale golden brown, 15-18 mm broad. Adaxial sepal 10-13 mm long; lateral sepals and petals 8-10 mm long. Labellum ca 6 mm long; limb 3-4 mm long, with a basal projection; projection 1.5-2 mm long, with red glandular cilia. Column 8-10 mm long; wings with 2 arm-like projections arising 3-4 mm below the apex, a red spot present at the elbow of each arm, with several smaller lobes at the apex.

Occurs in soil pockets on granite outcrops, often with *Borya*, on the Darling Range near Perth. Extends east to Coolgardie.

Flowers October-January.

THELYMITRA Forster & Forster f.

Perennial herbs, with an ovoid tuber, commonly known as Sun Orchids, usually glabrous. Leaf 1, radical, sheathing at the base. Stem bracts 1-3. Inflorescence 1-flowered or a raceme of 2-numerous flowers; pedicels usually long. Flowers colourful, decreasing in size up the raceme, usually opening only in strong sunshine. Sepals and petals all similar, the labellum scarcely distinguishable from the other 5 segments. Column erect, with prominent wings; wings shortly connate in front at the base, produced on each side of the anther into a lateral lobe and often extended behind and over the anther to form a hood; lateral lobes often toothed or terminating in a tuft of hairs. Probably 40-55 species, extending from the Philippines to New Zealand, concentrated in Australia, ca 20 species occurring in W.A.

1. Column produced into a hood over and largely hiding the anther, deeply fringed on the hood or with a hair tuft on each lateral lobe; lateral lobes in front of the anther.
 2. Column hood deeply fringed, lacking hair tufts.
 3. Flowers yellow and/or brown, 25-30 mm in diameter..... **T. fuscolutea**
 3. Flowers pink or reddish, 15-20 mm in diameter..... **T. sp. A**
 2. Column hood not deeply fringed, with lateral hair tufts.
 4. Leaf hairy..... **T. villosa**
 4. Leaf glabrous.
 5. Central lobe of the hood fairly erect, undivided, crested.
 6. Flowers yellow, with fine brown spots..... **T. tigrina**
 6. Flowers bluish, without brown spots.
 7. Leaves broadly elliptic. Hair tufts purple..... **T. crinita**
 7. Leaves narrowly linear. Hair tufts white or mauve..... **T. cornicina**
 5. Central lobe of the hood usually distinctly curved forward, divided or, if entire, then not crested.
 8. Flowers with dark stripes. Hood with 3 toothed lobes between the hair tufts.
 9. Flowers not campanulate. Central lobe of the column very undulate..... **T. canaliculata**
 9. Flowers campanulate. Central lobe of the column fairly flat... **T. campanulata**
 8. Flowers not striped. Hood either dilated and entire or deeply 2-lobed between the hair tufts.
 10. Hair tufts terminal on the lateral lobes, uniformly coloured.
 11. Flowers insect-pollinated, opening during warm weather, 30-40 mm in diameter..... **T. nuda**
 11. Flowers largely autogamous, very rarely opening, 20-25 mm in diameter..... **T. pauciflora**
 10. Hair tufts extending along the whole length of the lateral lobes, usually with a yellow apex and purplish base..... **T. mucida**
 1. Column not hooded over the prominent anther, not fringed, without hair tufts; lateral lobes behind the anther.
 12. Lateral lobes of the column not appearing as prominent ears.
 13. Stem markedly flexuous. Flowers yellow, suffused with red on the outside..... **T. flexuosa**
 13. Stem not markedly flexuous. Flowers white with purple blotches. **T. cucullata**
 12. Lateral lobes of the column prominent and ear-like.
 14. Stem markedly flexuous. Flowers large, yellow, suffused with red outside, the column ears brown..... **T. antennifera**
 14. Stem not markedly flexuous. Flowers variously coloured, the column ears yellow.
 15. Flowers iridescent, purple-crimson with gold borders. Column ears elongate..... **T. variegata**
 15. Flowers purple or pink. Column ears short..... **T. spiralis**

T. antennifera (Lindley) J.D. Hook.

Lemon Orchid

Slender perennial herb, 0.1-0.3 m high. Stem pinkish, wiry, strongly bent at the leaf and each stem bract. Leaf blade narrowly linear, 80-120 mm long, channelled. Stem bracts 2. Inflorescence 1-3-

flowered; pedicels up to 11 mm long. Flowers usually 25-30 mm in diameter. Sepals and lateral petals yellow inside, 11-15 x 5-6 mm, glabrous; sepals suffused with red on the outside. Column 7-8 mm long, not hooded over the prominent anther, not fringed, without hair tufts; lateral lobes behind the anther, brown, ear-like, 2.5-4 mm long; central lobe not extended.

Occurs on the Coastal Plain and Darling Range, associated with winter-wet depressions and granite outcrops. Extends from Kalbarri to the south coast and east to Coolgardie. Also occurs in S.A. and Vic.

Flowers mainly August-October.

T. campanulata Lindley

Shirt Orchid

Slender perennial herb, usually 0.2-0.5 m high. Leaf blade linear, channelled, 100-200 mm long. Stem bracts 2 or rarely 3, sheathing but for the acuminate apex. Inflorescence 2-8-flowered; pedicels up to 4 mm long in flower, up to 7 mm long in fruit. Flowers campanulate, up to 25 mm in diameter. Sepals and lateral petals pale violet-blue or blue with prominent violet longitudinal veins, 8-11 x 4.5-7 mm. Column erect, 3-5 mm long, hooded over and largely hiding the anther, stout; lateral lobes in front of the anther, pointing forward and upward, the distal 1-1.5 mm a tuft of yellow or white hairs.

Occurs in sand in woodlands on the Coastal Plain from Yarloop northward. Extends to north of Kalbarri with a disjunct distribution from Bremer Bay to Israelite Bay.

Flowers September-October.

This species has sometimes been misidentified as *T. ixioides* Sw., a species occurring in eastern Australia.

T. canaliculata R. Br.

Blue Sun Orchid

Perennial herb, usually 0.15-0.4 m high. Leaf 100-250 x 1-4 mm. Inflorescence of 1-numerous flowers; pedicels up to 6 mm long. Flowers 25-30 mm in diameter. Sepals and lateral petals brilliant blue or bluish purple with darker blue veins, 8-20 x 4-8 mm, the labellum narrower than the other segments. Column purple, 4-7 mm long, hooded over and largely hiding the anther, crested, with 3 golden toothed lobes between the lateral lobes; lateral lobes terminating in a hair tuft; hair tufts in front of the anther, pointing forward and upward, purple or white, 1-2 mm long. *T. azurea* R.S. Rogers

Occurs in winter-wet depressions on the Coastal Plain from Perth southward. Extends along the south coast to Esperance and inland to Bruce Rock. Also occurs in S.A., Vic. and Tas.

Flowers October-December, also August-October outside the region.

T. cornicina H.G. Reichb.

Lilac Sun Orchid

Slender perennial herb, 0.3-0.8 m high. Leaf blade linear, 70-150 mm long, channelled, strongly ribbed. Stem bracts 2, closely sheathing the stem. Inflorescence usually 2-6-flowered, very loose; pedicels up to 20 mm long. Flowers lilac-blue, 15-35 mm in diameter. Sepals and petals 10-20 mm long; sepals strongly marked on the abaxial surface with red-brown, up to 9 mm broad; petals narrower than the sepals. Column 4-6 mm long, hooded over and largely hiding the anther, stout; central portion fairly erect, truncate, crested; lateral lobes in front of the anther, inflated at the base, the distal 2-3 mm a dense tuft of white hairs. *T. fasciculata* R. Fitzg.

Recorded from winter-wet depressions near Perth and Coolup on the Coastal Plain. Also occurs from Busselton to the Porongurup Range.

Flowers September-October.

Hybrids have been reported with *T. crinita*.

T. crinita Lindley

Blue Lady Orchid

Robust perennial herb, 0.3-0.7 m high. Leaf blade broadly elliptic, usually 40-110 x 20-35 mm. Stem bract 1, closely sheathing. Inflorescence usually 4-12-flowered, loose; pedicels 5-15 mm long, usually completely hidden by the bracts. Flowers ca 40 mm in diameter. Perianth segments blue, 15-22 x 5-10 mm, the petals narrower than the sepals. Column 5-6 mm long, hooded over and largely hiding

the anther; central portion fairly erect, not toothed, densely crested; lateral lobes in front of the anther, pointing forward and upward, tufted; hair tufts purple, 2-3 mm long.

Occurs from Perth southward, in lateritic soil or associated with granite outcrops on the Darling Range, less frequently occurring on the Coastal Plain. Extends in near-coastal areas from Busselton to east of Esperance.

Flowers September-November.

Has been reported to hybridize with *T. cornicina*.

T. cucullata Rupp

Swamp Sun Orchid

Slender perennial herb, 0.2-0.5 m high. Leaf narrow; blade usually less than 100 mm long, channelled. Stem bracts 2. Inflorescence 2-6-flowered, very loose; pedicels up to 11 mm long in flower, up to 13 mm long in fruit. Flowers white with some green and numerous purple blotches, usually 15-20 mm in diameter, possibly autogamous. Perianth segments 6-9 x 2.5-4 mm; labellum narrower than the other segments. Column ca 5 mm long, not hooded over the prominent anther, with dark brown markings, not fringed, without hair tufts; central lobe much shorter than the lateral lobes; lateral lobes erect, behind and barely protruding beyond the anther.

In the Perth Region known only from a winter-wet depression at Canning Vale on the eastern side of the Coastal Plain near Perth. Other collections all between Nannup and Albany.

Flowers October-November.

T. flexuosa Endl.

Twisted Sun Orchid

Very slender perennial herb, 0.1-0.3 m high. Stem pinkish, wiry, bent at right angles to the leaf and each bract. Leaf terete, 50-100 mm long, narrow. Stems bracts 2, separate from the stem for most of their length. Inflorescence 1-3-flowered, very loose; pedicels 6-10 mm long in flower, up to 15 mm long in fruit. Flowers pale yellow, 10-15 mm in diameter, opening only on hot days, possibly autogamous. Sepals and lateral petals yellow; sepals suffused with red on the outside, 5-7 x 3-4 mm, broader than the petals, obtuse; labellum slightly smaller than the lateral petals. Column erect, usually 4-4.5 mm long, not hooded over the prominent anther, not fringed, without hair tufts; central lobe slightly notched, exceeded by the anther; lateral lobes behind the anther, rounded, much smaller than the central lobe.

Occurs in sandy winter-wet depressions on the Coastal Plain and in moist habitats on the Darling Range from Guildford southward. Extends along the south coast to Albany. Also occurs in S.A., Vic., and N.S.W.

T. fuscolutea R. Br.

Leopard Orchid

Robust perennial herb, 0.15-0.45 m high. Leaf blade 75-130 x 25-45 mm, smooth. Stem bracts usually 2, loosely sheathing. Inflorescence usually 4-15-flowered, loose; pedicels 5-10 mm long. Flowers 25-30 mm in diameter. Sepals and lateral petals yellow with brown blotches or uniformly golden brown, 12-25 x 4-7 mm, acute or shortly acuminate. Column 7-10 mm long, hooded over and largely hiding the anther, with a clavate adaxial appendage, deeply fringed on the 2 conspicuous wings on each side of the adaxial appendage, without definite lateral lobes; fringed portions yellow or orange, 3-5.5 mm long. *T. stellata* Lindley, *T. dedmanae* R.S. Rogers

Occurs on the Coastal Plain and associated with laterite on the Darling Scarp. Extends from near Kalbarri to Cape Arid National Park. Also occurs in S.A. and Vic.

Flowers mainly September-November.

There are 2 varieties, both occurring in the Perth Region. Var. *fuscolutea*, which extends from Kalbarri to Cape Arid, has spotted flowers with yellow column fringes and sepals usually 12-15 mm long. Var. *stellata* (Lindley) A.S. George, extending from Three Springs to Lake Grace, has more uniformly coloured flowers with bright orange column fringes and sepals usually 18-25 mm long.

T. mucida Fitzg.

Plum Orchid

Slender perennial herb, 0.2-0.4 m high. Leaf blade linear, thick, channelled, 40-160 mm long. Stems bracts 1 or 2, sheathing the stem. Inflorescence usually 1-4-flowered, loose; pedicels 7-10 mm long in flower, up to 15 mm long in fruit. Flowers, lilac-blue, 15-22 mm in diameter, probably autogamous

or apomictic. Perianth segments 7-12 x 2.5-5 mm, acute. Column 4-5 mm long, hooded over and largely hiding the anther, stout; middle lobe deeply cleft, very deeply coloured with a bloom on the surface and a yellow apex; lateral lobes in front of the anther, erect, 1.5-2 mm long, tufted; hairs along the full length of each lateral lobe, usually reddish at the base and yellow above, very rarely white.

Occurs in winter-wet depressions on the Coastal Plain. Extends around the coast to Albany. Also occurs in S.A. and Vic.

Flowers mainly October.

T. nuda R. Br.

Scented Sun Orchid

Robust perennial herb, 0.3-0.75 m high. Leaf blade usually 100-300 x 5-25 mm, channelled. Stem bracts 2 or 3, sheathing, acuminate. Inflorescence 3-15-flowered; pedicels 5-10 mm long in flower, often hidden by the bracts. Flowers pale mauve or bluish, 30-40 mm in diameter. Sepals and lateral petals 15-22 x 6-10 mm. Column erect, 6-8 mm long, hooded over and largely hiding the anther; central portion dark with a yellow rim, pointing forward, notched, dilated; lateral lobes in front of the anther, pointing upward or rarely forward, terminally tufted; tufts white or pink to mauve, 1.5-2 mm long.

Recorded near Perth, mainly occurring on the Darling Scarp associated with granite. Widespread in the south west between Paynes Find and Israelite Bay. Also occurs in Vic., Tas., N.S.W. and Qld.

Flowers September-November.

Outside the Perth Region this species is often a smaller, less robust plant and has smaller flowers.

T. pauciflora R. Br.

Slender Sun Orchid

Slender or moderately stout perennial herb, usually 0.2-0.4 m high, the stem sometimes bending away from the blade of the erect basal leaf and each bract. Leaf blade 50-200 mm long, narrow, channelled. Stem bracts 1 or 2. Inflorescence usually 2-7-flowered, loose; pedicels 5-11 mm long, hidden by the bracts. Flowers 16-28 mm in diameter, rarely opening, often autogamous. Sepals and lateral petals usually pale blue, sometimes white or pink-mauve inside, the outside often a deeper colour, 8-14 x 3-5 mm, acute or shortly acuminate; labellum smaller than the other segments. Column erect, 4-6 mm long, hooded over and largely hiding the anther, the hood usually very deeply and narrowly split; lateral lobes in front of the anther, terminally tufted; tufts directed upward, often white, sometimes mauve, 1-1.5 mm long.

Usually inhabits winter-wet depressions on the Coastal Plain but also associated with granite on the Darling Range. Extends slightly north and south of the Perth Region and east toward Coolgardie. Occurs in all states except N.T. Also occurs in New Zealand.

Flowers September-November.

T. spiralis (Lindley) F. Muell.

Curly Locks

Slender or fairly stout perennial herb, 0.15-0.3 m high. Leaf sheath often hairy; blade usually 30-60 mm high, erect or wavy to spiral. Stem bract 1, conspicuous, somewhat spreading, broad. Inflorescence 1 or 2-flowered; pedicels 12-22 mm long in flower. Flowers 25-40 mm in diameter. Perianth purplish; sepals pale-coloured and often blotched on the abaxial surface; adaxial sepal largest, 15-25 x 6.5-9 mm; labellum shorter than the other segments. Column rather stout, purplish, 6-8 mm long, not hooded over the prominent anther, not fringed, without hair tufts; lateral lobes behind the anther, erect, ear-like, yellow or brownish, 2-3 mm long, not very prominent; central lobe barely discernable.

Occurs on the Darling Range and the adjacent part of the Coastal Plain, usually growing in winter-wet clay flats. Extends from Watheroo to Two Peoples Bay. Probably also occurs in S.A., Vic. and New Zealand.

Flowers August-October.

The species is very variable in flower colour and size and these characters have been used to split it into 4 varieties. However, the varieties intergrade considerably and are not recognized here. *T. matthewsii* Cheesm., described from New Zealand material, appears to be conspecific.

T. tigrina R. Br.

Tiger Orchid

Very slender perennial herb, 0.2-0.5 m high. Leaf blade 50-120 mm long, very narrow, channelled. Stem bracts 2 or 3, small, acuminate, the apex diverging from the stem. Inflorescence of 2-4 or rarely 5 flowers; pedicels 5-7 mm long in flower, often hidden by the bracts. Flowers pale yellow with fine brown spots, ca 15 mm in diameter. Sepals and lateral petals 7-8.5 x 2.5-3 mm. Column 4-6 mm long, hooded over and largely hiding the anther, not fringed; lateral lobes ear-like, elongate, in front of the anther, projecting forward and upward, indistinctly tufted with tiny hairs; tufts yellow, 1-2 mm long; central lobe of the column not extended, crested.

Recorded from winter-wet depressions on the Coastal Plain near Perth. Also recorded from Walpole to Manypeaks.

Flowers November-December.

T. variegata (Lindley) F. Muell.

Queen of Sheba

Slender perennial herb, 0.3-0.4 m high. Stem often bending markedly at the leaf and bract. Leaves spirally twisted around the stem especially in vegetative plants; sheath often hairy; blade up to 100 mm long but very variable, usually dilated at the base, channelled. Stem bract 1, often conspicuous. Inflorescence usually 2-4-flowered; pedicels 10-20 mm long. Flowers 30-40 mm in diameter. Sepals and lateral petals brilliantly iridescent, crimson or purple, often dotted with darker markings, often with a gold margin, 17-28 x 6-9 mm. Column 9-12 mm long, not hooded over the prominent anther, not fringed, without hair tufts; lateral lobes behind and exceeding the anther, erect, conspicuous, ear-like, yellow, elongate, 4-5.5 mm long; anther long, conspicuous.

Occurs in sandy woodlands on the Coastal Plain, possibly also occurring on the Darling Range. Extends from Jurien Bay to east of Esperance.

Flowers mainly August-September, also commonly June-July outside the region.

Specimens in the Perth Region are of var. *variegata*, which has 2-4 very variegated flowers ca 40 mm in diameter. Var. *apiculata* A.S. George, which extends from Eneabba to Mogumber in lateritic areas, differs primarily in having a filiform point on each lateral lobe of the labellum. Its flowers, which tend to open in May-July, are ca 30 mm in diameter, more uniform in colour and often more numerous.

T. villosa Lindley

Custard Orchid

Robust perennial herb, usually 0.2-0.5 m high. Leaf broad, usually 40-60 x 10-35 mm, shortly hairy especially on the main veins. Stem bracts usually 2, closely sheathing, glabrous. Inflorescence usually 8-15-flowered, loose; pedicels 10-20 mm long. Flowers ca 35 mm in diameter. Sepals and lateral petals yellow, dotted with red-brown, acute; adaxial sepal usually 17-20 x 7-9 mm. Column usually 9-10 mm long, hooded over and largely hiding the anther; lateral lobes in front of the anther, tufted; tufts projecting forward, orange, ca 2 mm long; central portion fairly erect, prominent, undivided, laterally crested.

Occurs in clayey sand or sand over clay, associated with winter-wet depressions on the eastern side of the Coastal Plain. Extends from Jurien Bay to east of Esperance.

Flowers mainly October.

T. sp. A

Pink Sun Orchid

Very slender perennial herb, 0.2-0.35 m high, the stems tending to bend away from the free portions of the leaf and bracts. Leaf blade narrow, channelled, usually ca 20 mm long. Inflorescence 1-3-flowered; pedicels 5-10 mm long, up to 15 mm long in fruit. Flowers pink or reddish, 15-20 mm in diameter, rarely open. Sepals darker in colour than the petals, usually 8-10 x 4-5 mm. Column ca 6 mm long, hooded over and largely hiding the anther, larger than each lateral lobe, not fringed, without hair tufts; lateral lobes in front of the anther, slightly toothed, yellow in the distal 2-3 mm.

Rare in W.A., endemic in the Perth Region, extending from Wanneroo to Jandakot in winter-wet depressions on the Coastal Plain.

Flowers September-October.

This taxon is somewhat intermediate between 2 species of eastern Australia, *T. carnea* R. Br. and *T. rubra* Fitzg., and has sometimes been referred to the former. The group is in need of further study.

FAMILY 141 HAEMODORACEAE

T. D. Macfarlane

Perennial herbs, rhizomatous, bulbous or tuberous. Leaves mainly basal, equitant, with sheathing base and unifacial blade; stem leaves smaller or absent. Inflorescence a panicle, raceme, cyme, or cymose umbels, often a number of cymes arranged racemously. Flowers actinomorphic or zygomorphic, conspicuously hairy or glabrous. Perianth of 6 segments in 1 or 2 whorls, the tube (when present) short to long, straight or curved. Stamens 3 or 6, opposite inner segments when 3, filaments free or adnate to perianth-tube; anthers basifixed or dorsifixed, dehiscent by longitudinal slits. Ovary inferior, half-superior or superior, 3-celled (obscurely in *Phlebocarya*); ovules 1-many per cell. Style slender or stout. Fruit a loculicidal capsule or (in *Phlebocarya*) a nut. Seeds with copious endosperm.

- 1. Flowers glabrous.
 - 2. Stamens 3..... HAEMODORUM
 - 2. Stamens 6..... PHLEBOCARYA
- 1. Flowers hairy.
 - 3. Flowers actinomorphic.
 - 4. Staminal filaments broad, fleshy, produced beyond anther attachment as an appendage; appendage wider than anther..... TRIBONANTHES
 - 4. Staminal filaments slender, not or only minutely extended beyond anther attachment as appendages, which are much narrower than anther..... CONOSTYLIS
 - 3. Flowers zygomorphic, slit further on one side, often nearly to base.
 - 5. Flowers black and green. Staminal filaments 25-35 mm long. Ovule 1 per cell..... MACROPIDIA
 - 5. Flowers red and green, yellow, reddish yellow, orange or red. Staminal filaments less than 15 mm long. Ovules 2-many per cell. ANIGOZANTHOS

ANIGOZANTHOS Labill.

Herbs with a short horizontal perennial rhizome. Roots fibrous. Leaves basal with a few smaller stem leaves, each with sheathing base and laterally flattened or terete blade. Stems erect, branched or unbranched. Flowers in dense 1-sided spikes or racemes on the end of the unbranched stem or at the ends of branches of a panicle. Flowers pedicellate or sessile, densely covered externally with red, green, yellow or orange woolly hairs. Perianth strongly zygomorphic, with a long curved tube; tube slit and laid open near the top only, or for nearly the whole length; lobes 6, usually unequal, erect or strongly recurved. Stamens 6; filaments short, inserted on the tube a little below the lobes; anthers sometimes with a small apical appendage; connective long, decurrent, thickened; cells free at base. Ovary inferior, 3-celled; ovules usually many per cell (all species in the region), occasionally only 2-4. Style long, filiform; stigma apical, slightly enlarged, entire. Capsule dehiscent loculicidally in upper part, perianth persistent. Seeds angular or obloid, pitted or furrowed, reddish brown, pale brown, grey or black. *Anigosanthos*, *Anigozanthus*. 11 species, all endemic to south western Australia. References: Geerinck, D. 1970. Bull. Jard. Bot. Nat. Belg. 40: 261-276; Hopper, S.D. 1977. Austral. J. Bot. 25: 523-544; Hopper S.D. 1978. Ph.D. Thesis, University of Western Australia; Hopper, S.D. 1979. Austral. Pl. 10: 229-236; Hopper, S.D. 1980. Austral. J. Bot. 28: 659-680.

- 1. Inflorescences solitary on a single unbranched stem.
 - 2. Stamens inserted at 3 levels in the perianth..... *A. humilis*
 - 2. Stamens inserted at 1 or 2 levels in the perianth.
 - 3. Flowers entirely green or yellow-green..... *A. viridis*
 - 3. Flowers 2-coloured, ovary red or very rarely yellow and perianth green.
 - 4. Perianth 60-100 mm long, not constricted above the middle. Anthers 5-10 mm long, much longer than the filaments..... *A. manglesii*
 - 4. Perianth 35-60 mm long, clearly constricted above the middle. Anthers 3-4.5 mm long, a little shorter to a little longer than the filaments..... *A. bicolor*
- 1. Inflorescences numerous, on a branched stem..... *A. flavidus*

A. bicolor Endl.

Little Kangaroo Paw

Plants 180-700 mm tall. Leaves 3-14 mm wide, flattened. Raceme or spike 1, on a single unbranched scape (rarely the scape branched once and bearing 2 inflorescences). Perianth green with a red (rarely yellow) ovary, 35-60 mm long, clearly constricted above the middle, the lobes reflexed. Outer 2 stamens inserted a little lower in the perianth than the inner 4; anthers 3-4.5 mm long, a little shorter to a little longer than the filaments, lacking apical appendages.

Grows in winter-wet swamps and run-off areas near granite outcrops in woodland on the Darling Scarp and Range and occasionally on the eastern part of the Coastal Plain. Occurs north of the region nearly to Moora, south to the south coast and in scattered localities eastward from Albany to near Esperance.

Flowers mainly August-October.

A. flavidus Redoute & DC.

Tall Kangaroo Paw

Plants 0.5-3 m tall. Leaves 6-25 mm wide, flattened. Racemes or spikes several, in a divaricately branched panicle. Perianth usually yellow-green, occasionally suffused with orange or red, moderately curved, 24-45 mm long, broader near stamens than base when spread out, lobes not reflexed. Outer 2 stamens inserted slightly lower in the perianth than inner 4; anthers ca 3 mm long, tipped with a small appendage.

Occurs in the Jarrah forest on sandy, loamy or lateritic gravelly soils in well-watered areas such as swamps or beside streams and proliferating in roadside gutters, from Nanga Brook near Dwellingup southwards. Extends south eastwards to Cape Leeuwin and south to the south coast, eastward as far as Two Peoples Bay.

Flowers late November-December.

A. humilis Lindley

Catspaw

Plants 160-500 mm tall. Leaves 3-9 mm wide, flattened, usually hairy at least along margins. Raceme or spike 1, on a single unbranched scape. Perianth yellow-red, 25-45 mm long, not constricted above the middle, the lobes not reflexed. Stamens inserted in pairs at 3 different evenly spaced levels in the perianth; anthers 2-3.5 mm long, shorter than the filaments, lacking apical appendages. **Fig. 304**

Common in dry woodland throughout the Coastal Plain, more numerous in disturbed or recently burnt sites, populations less frequent in the south of the region. Extends north to the Murchison River and south to the south coast, eastwards as far as Hopetoun.

Flowers mainly August-October.

A. manglesii D. Don

Mangles Kangaroo Paw

Plants 0.25-1.25 m tall. Leaves 8-15 mm wide, flattened, glabrous. Raceme or spike 1, on an unbranched scape. Perianth green with a red ovary, 60-100 mm long, not constricted above the middle, the lobes reflexed. Stamens all inserted at the same level in the perianth; anthers 5-10 mm long, much longer than the filaments, lacking apical appendages.

Growing in well-drained sandy soils, often near winter-wet depressions, in woodland or coastal heathland throughout the Coastal Plain. Ranges north to Shark Bay and south to Cape Leeuwin and near Mount Barker.

Flowers mainly September-November.

A. viridis Endl.

Green Kangaroo Paw

Plants usually 300-650 mm tall, occasionally up to 1 m. Leaves 4-12 mm wide, more or less cylindrical. Raceme or spike 1, on an unbranched scape. Perianth green throughout, rarely yellowish, 40-60 mm long, slightly constricted above the middle, lobes reflexed. Outer 2 stamens inserted slightly lower in the perianth than the inner 4; anthers 4-5.5 mm long, a little longer than the filaments, lacking apical appendages. **Fig. 305**

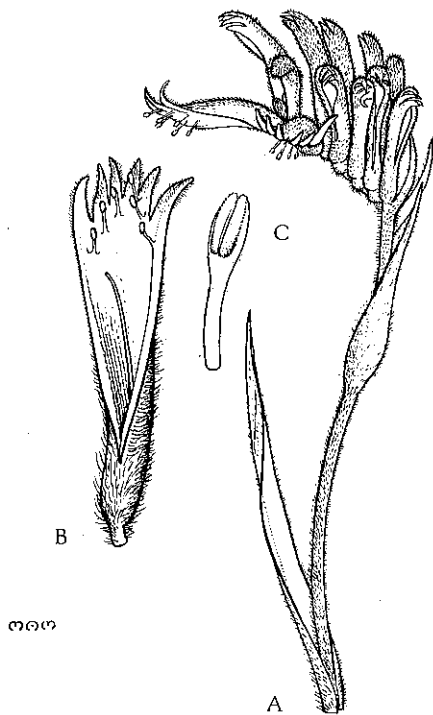


Fig. 304. *Anigozanthos humilis*. A, Flowering stem. B, Flower. C, Stamen.

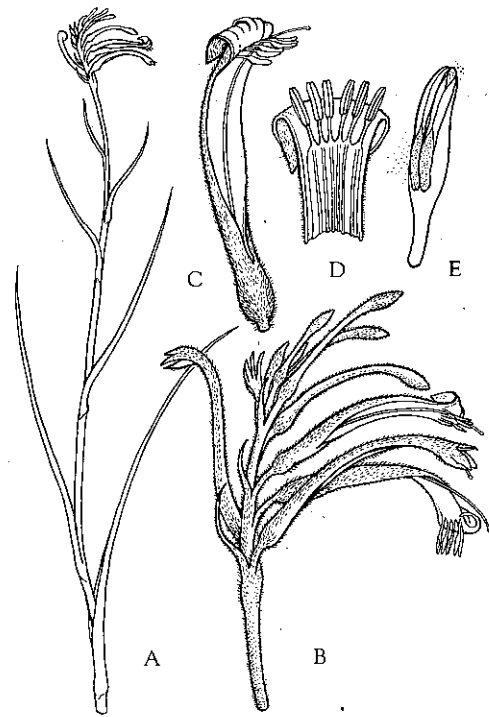


Fig. 305. *Anigozanthos viridis*. A, Flowering stem. B, Inflorescence. C, Flower. D, Part of perianth with stamens. E, Anther.

Favours seasonally water-logged sandy clay soil in depressions, associated with low shrublands or *Melaleuca-Banksia* woodland on the Coastal Plain, or with open Jarrah-Marri forest on the Darling Range. Widespread in the region and extending north to Cervantes and south to the Scott River, with outlying occurrences near Walpole.

Flowers mainly August-October.

CONOSTYLIS R. Br.

Caespitose perennial herbs. Roots fibrous. Stem short and undivided or elongated as rhizomes or stolons, or proliferous (aerial, spreading or ascending, branched or unbranched, with leaf tufts at nodes). Leaves sheathing at base and flat or terete above the base, entirely glabrous, or the margins with spines or cilia, or the surfaces also hairy. Scapes arising from the stem apex among the leaves, often several per plant, shorter than to longer than the leaves, branched or unbranched, with few, distant, sometimes leaf-like bracts. Inflorescence terminal, a simple or once-branched, dense, head-like or loose cyme, or a single flower, sometimes a second inflorescence arising from the axil of the uppermost scape bract. Flowers pedicellate, externally covered with dense, coloured, woolly hairs, slightly hairy or glabrous inside tube, usually somewhat hairy inside lobes. Perianth actinomorphic usually tubular above rarely, tube absent; segments 6, equal or 3 slightly smaller, erect or spreading. Stamens 6; filaments short, inserted nearly at top of perianth tube, in one species appendaged apically; anthers attached along most of the length or sometimes only in the middle or apically. Ovary half-inferior or fully or almost fully inferior, 3-celled; ovules in each cell numerous, covering a globular placenta or restricted to only part of the placenta. Style undivided, tapering, minutely 3-lobed at the apex, with 3 stigmatic areas. Fruit a capsule, dehiscing loculicidally, with remains of perianth and stamens persistent. Mature seeds ellipsoid or obloid, rugose or striate. A genus endemic to south western Australia, with more than 30 species. *Androstemma* Lindley, *Blancoa* Lindley. References: Green, J. W. 1961. Proc. Linn. Soc. New South Wales 85: 334-373; Geerinck, D. 1969. Bull. Jard. Bot. Nat. Belg. 39: 167-177; Hopper, S. D. 1978. Nuytsia 2: 254-264.

1. Flowers uniformly red, pendulous or horizontal. Perianth 25-35 mm long..... **C. canescens**

1. Flowers yellow, greenish yellow, pale green or creamy white, sometimes suffused with purple or red, not pendulous. Perianth usually 20 mm long or less, if more than flowers basal, erect.
2. Leaves with a dense, grey, woolly indumentum (sometimes becoming glabrous with age through abrasion)..... **C. candicans**
2. Leaves glabrous or hairy, hairs (when present) confined to margins or, if on surfaces, then not dense, grey and woolly.
3. Inflorescence 1-flowered (but several inflorescences per plant), the flower basal, subtended by 3 or 4 small brown bracts. Perianth tube 15-30 mm long; lobes 12-20 mm long, spreading..... **C. androstemma**
3. Inflorescence several-flowered, borne on a short to long but always distinct scape. Total perianth length not over 20 mm.
4. Perianth divided almost to junction with the ovary.
5. Ovules covering the placenta..... **C. serrulata**
5. Ovules on the outer or lower surfaces of placenta only..... **C. caricina**
4. Perianth with a distinct tube above junction with the ovary.
6. Anthers attached near the middle with 2 erect appendages at top of filament..... **C. aurea**
6. Anthers attached in lower third or near base by a long decurrent connective; appendages lacking.
7. Ovules attached to outer or lower surfaces of the placenta, the top being bare of ovules.
8. Anthers biseriate, the inner ones attached to the perianth distinctly lower than the outer ones..... **C. setigera**
8. Anthers uniseriate, all attached at the same level.
9. Perianth purplish cream or creamy white, 16-20 mm long, uniformly woolly inside. Leaf spines usually spreading in the same plane as the leaf surface..... **C. setosa**
9. Perianth yellow or greenish yellow, 11-12 mm long, rather densely hairy along the middle of the lobes but sparsely hairy elsewhere. Leaf spines usually spreading at right angles to the leaf surface..... **C. sp. A**
7. Ovules covering the placenta.
10. Perianth covered externally with long, rigid, simple or minutely toothed hairs. Inflorescence distinctly shorter than leaves, with 2 broad bracts subtending or almost enclosing the flowers..... **C. juncea**
10. Perianth covered externally with a dense woolly layer of branched hairs. Inflorescence of variable length, bearing 1 or more bracts along the scape but not 2 broad ones subtending or almost enclosing the flowers.
11. Leaves with rigid, hardened, sharp marginal spines or completely glabrous.
12. Leaves terete or somewhat flattened, 1-2 mm wide, glabrous or with marginal spines on part or the whole of the length..... **C. festucacea**
12. Leaves flat, 2-5 (rarely more) mm wide, glabrous or with marginal spines..... **C. aculeata**
11. Leaves with flexible, membranous marginal spines or setae..... **C. pauciflora**

C. aculeata R. Br.

Plants in distinct tufts or rhizomatous or proliferously branched. Leaves flat, usually 50-500 x 2-5 (rarely more) mm, glabrous and striate, the margins more or less prominent compared with the veins elsewhere on the blade, bearing stiff spines on part or all of the margin, or spines lacking. Inflorescence a loose cyme or panicle or compact and head-like; scape shorter to longer than the leaves. Perianth yellow, 9-12 mm long; lobes creamy yellow inside when fresh, 5-6 mm long; tube a little shorter. Anthers attached by a decurrent connective, joined in the lower third to the filaments. Ovules numerous, all over the placenta.

Widespread in the Perth Region. Extends from Shark Bay to Albany.

Flowers mainly September-October.

Six subspecies, four of them occurring in the Perth Region, have been recognized in this variable species (Green 1961, Hopper 1978). The distinctions between them are not clear, their ranges overlap, and intermediates are known. Subspecies *aculeata* is the most widespread and possesses 2-5 mm wide leaves with slightly prominent margins bearing spines along their full length and rather loose inflorescences, often much shorter than the leaves. Common in part of the metropolitan area north of the Swan River is subsp. *bracteata* (Lindley) J.W. Green, characterized by usually 4-6 mm wide leaves with spines usually restricted to the upper part of the leaf or absent and the dense head-like inflorescences borne on scapes about as long as the leaves. Subspecies *preissii* (Endl.) J.W. Green ranges southwards beyond the region from the vicinity of the Swan River, has more markedly proliferous branching, leaves rarely wider than 3 mm, with less rigid spines, and inflorescences usually shorter than the leaves and denser than those of subspecies *aculeata*. Found only a few times in the north of the region, including Perth's northern suburbs, but extending outside well to the north and north east, subsp. *bromelioides* (Endl.) J.W. Green has markedly prominent leaf margins compared with the surface veins, especially stiff and spreading or deflexed spines and a relatively loose inflorescence usually shorter than the leaves.

C. androstemma F. Muell.

Plants forming distinct clumps. Stem short, unbranched, leaves arising close to base. Leaves fine, terete, 100-300 x ca 1 mm, glabrous. Flowers basal, 1 per inflorescence but several or many inflorescences per plant, each flower subtended by 3 or 4 brownish bracts ca 5 mm long. Perianth with a very long, straight, pale yellow or pale green tube; tube (15-)20-30 mm long; lobes 12-20 mm long, spreading at flowering time. Stamens and style erect, conspicuously exerted from perianth tube by 10-20 mm. Anthers attached by a decurrent connective, joined in the lower third to the filaments. Ovules about 15, all around the rim, except upper margin, of a vertical flat-faced placenta. **Fig. 306**

Grows on lateritic soil on the Darling Range and on sand on the Coastal Plain. Also extends north to the Murchison River.

Flowers June-August.

The above description applies only to *C. androstemma* in the strict sense, i.e. subsp. *androstemma*. Another subspecies, subsp. *argentea* J.W. Green, occurs outside the region and may in future be considered a distinct species.

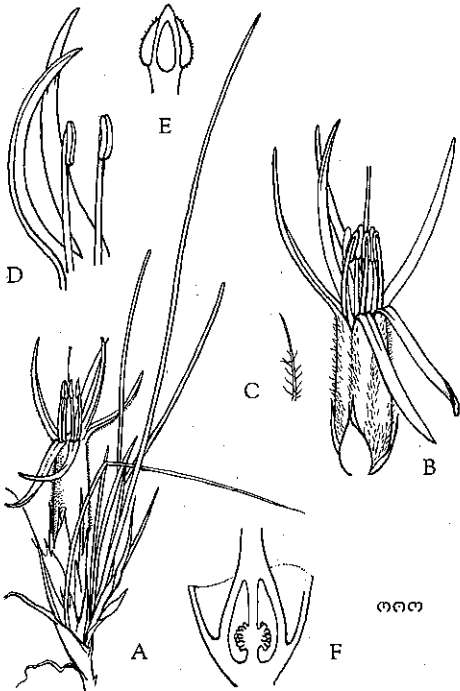


Fig. 306. *Conostylis androstemma*. A, Inflorescence. B, Flower. C, Enlargement of hair from perianth. D, Part of perianth with two stamens. E, Stigma. F, Longitudinal section of ovary.

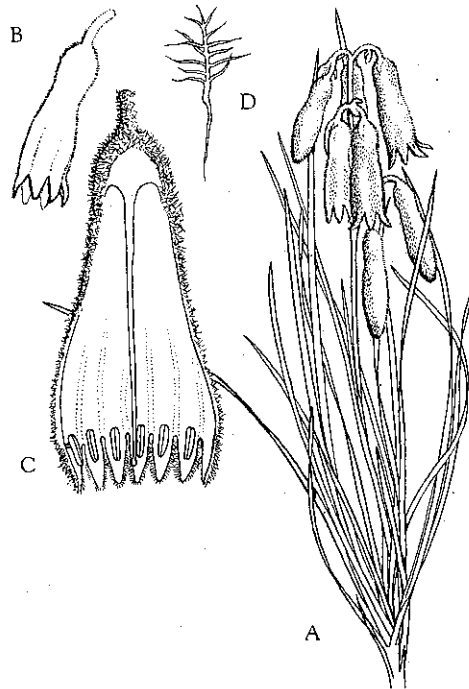


Fig. 307. *Conostylis canescens*. A, Flowering stem. B, Flower. C, Flower slit open to show anthers and style. D, Enlargement of hair from perianth.

C. aurea Lindley

Plants forming distinct tufts. Stem short, unbranched. Leaves flat, 150-300 x ca 1.5 mm, the surfaces of the blade glabrous or occasionally hairy, the margins with small appressed cilia, the blades and especially the bases often producing a resinous secretion. Inflorescence dense and head-like, nearly globular, borne on a woolly, white or golden yellow scape from one third as long to a little longer than the leaves; the bracts subtending the inflorescence small and more or less hidden. Perianth 15-20 mm long, golden or pale yellow or sometimes tinged with purplish red; lobes 5-7 mm long; the tube nearly as long or somewhat shorter. Anthers attached to filaments at the middle by a dorsal connective which bears a pair of simple or toothed, erect, dorsal appendages. Ovules many, reflexed (downwardly directed) from the placenta, the top of the placenta bare of ovules.

A common inhabitant of woodland and heathland on sandy soils on the Coastal Plain northwards from Armadale. Extends to north of the Murchison River.

Flowers mainly September-October.

C. candicans Endl.

Plants forming distinct tufts or the stem elongated, spreading, proliferous. Leaves flat, 100-500 x 2-5 mm, entirely covered at maturity by pale grey hairs, sometimes becoming nearly glabrous by abrasion with age. Inflorescence once-branched, rather loose, or dense and then appearing as a globular head; bracts beneath the inflorescence often long and leaf-like; scape usually longer than the leaves, often with a leaf-like bract near the middle and another higher up and sometimes subtending a secondary inflorescence. Perianth yellow, 11-15 mm long; lobes golden yellow inside when fresh, 5-6.5 mm long. Anthers attached by a decurrent connective, joined in the lower third to the filaments. Ovules numerous, all over placenta.

Common on the Coastal Plain, Garden and Rottneest Islands, particularly on limestone or calcareous sand, but also growing on the eastern part of the Plain and the Darling Range. Extends south of the region to the Scott River area and north to Shark Bay.

Flowers mainly August-September.

Conostylis candicans is a variable species in which some variants may in future be given the status of subspecies. In the Perth Region this would differentiate plants on the coastal dunes from those further inland.

C. canescens (Lindley) F. Muell.

Red Bugles

Plants forming distinct clumps. Stem short, up to 150 mm long, branched near base. Leaves linear, flat, 80-250 x 2-3 mm, covered with short silky hairs when young, often nearly glabrous at maturity due to abrasion. Inflorescence half as long to a little longer than leaves, loose, panicle-like, with 3 or 4 bracts along the axis subtending short branches; branches bearing clusters of 1-few flowers. Flowers pendulous or horizontal. Perianth red, 26-35 mm long, woolly-hairy externally; tube long, straight, cylindrical or slightly campanulate, adnate along angles of ovary, free between angles; lobes short, 4-5.5 mm long, spreading. Anthers attached by a decurrent connective, joined near the base to the filaments. Ovules in 2 rows on a short, vertically elongated, non-dilated placenta. *Blancoa canescens* Lindley Fig. 307

Grows in sandy soil, sometimes seasonally wet, in *Banksia* woodland on the Coastal Plain northwards from Forrestdale. Extends northwards to Eneabba.

This species has previously been placed in a separate genus but the differences from other species of *Conostylis* are now considered insufficient for separate generic status.

C. caricina Lindley

Plants forming distinct tufts. Stems very short. Leaves flat, 100-250 x 2-3 mm with prominent thickened margins, glabrous except for minute, barbed, marginal setae. Inflorescence shorter than leaves. Scape 40-80 mm long, with usually a single bract near the middle. Flowers few (ca 6-8) in a compact or rather loose head. Perianth creamy yellow, 15 mm long, the lobes ca 6 mm long and much longer than the short tube above the ovary, characteristically claw-like in fruit. Anthers attached by a decurrent connective, joined in the lower third to the filaments. Ovules numerous on the outer and lower surfaces of the placenta.

Grows in sandy or gravelly lateritic soils on the Darling Scarp and Range. Known from outside the region south east as far as Boddington, north east to Yerecoin and Dowerin and east to York.

Flowers August-September.

C. festuceacea Endl.

Plants forming distinct tufts or proliferous, with straggling stems bearing tufts of leaves at upper branch-points. Leaves narrow, terete or flattened but rather thick, 120-400 x 1-2 mm, glabrous or with sparse stiff divergent marginal spines on the upper part or along the whole length. Inflorescence head-like or a dense to rather loose cymose cluster; scape woolly, a little longer to much shorter than leaves, with 1 or 2 bracts along its length. Perianth yellow, 10-13 mm long; lobes 5-8 mm long. Anthers attached by a decurrent connective, joined in the lower third to the filaments. Ovules numerous, all over placenta. *C. filifolia* F. Muell.

Known from a few localities on the Coastal Plain near Perth where it grows in sandy, sometimes winter-wet soil, in *Banksia* woodland. Also occurs northward to Watheroo.

Flowers September-October.

C. juncea Endl.

Plants forming distinct clumps, the stems unbranched. Leaves terete or flattened and rather thick, 100-500 x 1-4 mm, usually with fairly prominent veins, glabrous, hairy on the margins, or the surface also scabrous or hairy, either toward the base only or along the full length; hairs soft, barbed. Inflorescence distinctly shorter than leaves; scape very short or 50-150 mm tall, woolly; flowers few, in a dense head-like cluster and subtended or almost enclosed by broad bracts. Perianth bright yellow or greenish yellow, 15-20 mm long, externally covered with long, rigid, simple or minutely toothed hairs rather than the woolly covering of branched hairs found in all other species; lobes equal, ca 10 mm long; tube somewhat shorter. Anthers attached by a decurrent connective, joined near the base to the filaments. Ovules numerous, all over placenta.

Common on sandy soil on the Coastal Plain from Bunbury northwards. Extends north of the region to the Hill River.

Flowers mainly September.

C. pauciflora S.D. Hopper

Plants proliferously branched, spreading. Leaves flat, up to 250 mm but usually about 150 mm long, less than 2.5 mm wide, glabrous except for the marginal spines, which are less than 2 mm but rarely more than 1 mm long, barbed, membranous and somewhat flexible. Inflorescence a dense head-like cyme of usually less than 10 flowers; scape equal to or longer than leaves. Perianth yellow, 8-15 mm long; lobes creamy yellow inside when fresh, 4-7 mm long; tube usually slightly shorter. Anthers attached by a decurrent connective, joined near the base to the filaments. Ovules numerous, all over placenta.

Known only from a near-coastal area south of Mandurah, growing on sandy soil in Jarrah, Marri and *Banksia* woodland.

Flowers August-October.

Conostylis pauciflora was studied in detail by S.D. Hopper (1977, Austral. J. Bot. 25: 395-411) who concluded that it may have originated from hybrids between *C. aculeata* and *C. candicans*.

C. serrulata R. Br.

Plants forming distinct tufts or sometimes the stem a shortly branched rhizome. Leaves flat, 200-500 x 1.5-8 mm, the veins prominent except on the margins, glabrous except for the minutely and densely ciliate to rather sparsely spiny margins. Inflorescence loose or compact; scape often very short or up to one third as long as leaves, usually with at least one broad-based brownish bract. Perianth creamy or dull golden yellow; lobes 6-10 mm long, the perianth divided nearly to the ovary. Anthers attached by a decurrent connective, joined near the base to the filaments. Ovules numerous, all over placenta.

Occurs on lateritic soil on the Darling Range and on sand on the Coastal Plain from just north of Perth southwards. Extends to the Fitzgerald River region on the south coast.

Flowers September-October.

C. setigera R. Br.

Plants forming distinct tufts. Stem short. Leaves flat, variable in size, usually 60-300 x 1-3.5 mm, nearly always glabrous except for marginal spines which are soft, spreading or appressed and usually white, rarely also hairy on the surfaces. Inflorescence head-like; scape usually shorter to a little longer than leaves, bearing 1 or 2 bracts. Perianth yellow or yellow suffused with brick red, 10-17 mm long, shortly woolly inside; lobes 4-7 mm long, in 2 whorls, the inner lobes slightly shorter. Stamens biseriate, the inner ones markedly lower on the perianth tube; anthers attached by a decurrent connective, joined near the base to the filaments. Ovules several, often pendulous, restricted to the outer or lower margins of the placenta.

Grows throughout the region on sandy soils on the Coastal Plain and lateritic soils on the Darling Range. Extends north east of the region to Moora and south east to Cape Arid east of Esperance.

Flowers mainly September-October.

C. setosa Lindley

Plants forming distinct tufts. Stem short. Leaves flat, 100-300 x 1.5-4 mm, glabrous except for 2 or more rows of long, spreading, rather soft, slender white spines on each margin. Inflorescence usually large, up to 60 mm in diameter, head-like or densely cymose; scape long, a little shorter than to rather longer than the leaves, woolly, bearing a single bract of variable position. Perianth purplish cream or creamy white, 16-20 mm long, woolly inside; lobes 8-10 mm long; tube about as long. Stamens uniseriate; anthers all borne at about the same level, attached by a decurrent connective, joined in the lower third to the filaments. Ovules several, pendulous, restricted to the outer or lower margins of the placenta. **Fig. 308**

Occurs on the Darling Range as far south as Dwellingup in gravelly or sandy lateritic soils. Extends east and a little north east of the region in Jarrah forest.

Flowers October-November.

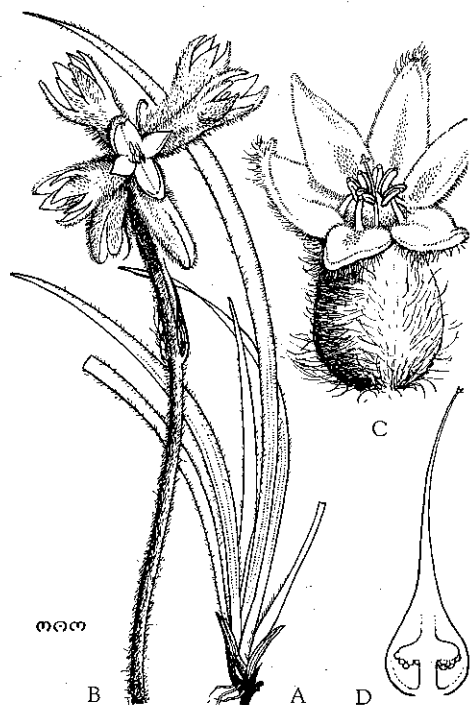


Fig. 308. *Conostylis setosa*. A, Leaves. B, Inflorescence. C, Flower. D, Style and longitudinal section of ovary.

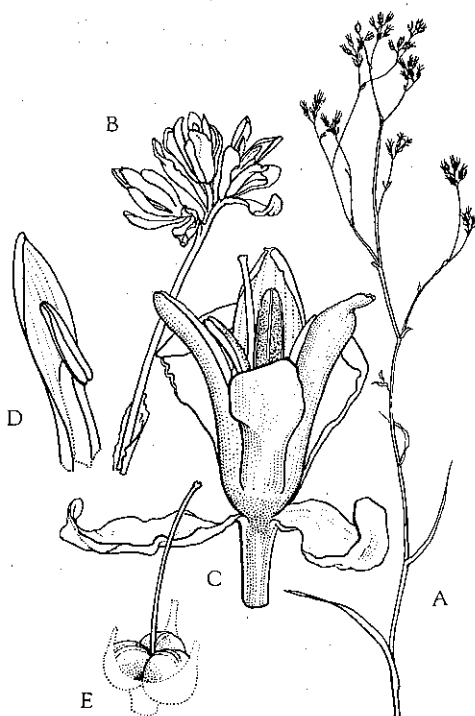


Fig. 309. *Haemodorum laxum*. A, Flowering stem. B, Flower cluster. C, Flower and bracteoles. D, Perianth segment and stamen. E, Capsule.

C. sp. A

Plants forming distinct tufts. Stem short. Leaves flat, 120-240 x 1.5-3 mm, glabrous except for marginal spines; spines in 2 dense rows on each leaf margin, stiff, slightly spreading from the margin in the plane of the leaf but strongly spreading at right angles to the leaf surface (sometimes less dense, spreading strongly in the plane of the leaf, rather soft). Leaf surface with moderately prominent ridges, the marginal vein not at all thickened or prominent. Inflorescence dense, head-like; scape a little shorter to slightly longer than leaves, with a leafy bract often near the top and another just under the flowers. Perianth yellow or greenish yellow, 11-12 mm long; lobes 4-5 mm long. Stamens uniseriate, all borne at the same level; anthers attached by a decurrent connective, joined at about one third from the base to the filaments. Ovules several, pendulous from lower margin of the placenta, placenta bare in upper half.

Known in the region only from Cannington. Also known from the Moore River northwards to Mt. Lesueur near Jurien; grows in sand or sand over laterite.

Flowers September.

This recently recognized species is related to *C. setigera*.

HAEMODORUM Smith

Bulbous perennials, bulb and subterranean part of stem orange or red in section, for which reason they are commonly known as Bloodroots, whole plant glabrous except for minute glandular hairs on inner surface of bracts, bracteoles and perianth segments. Stem erect, unbranched or branched in inflorescence region. Leaves basal and cauline, diminishing upwards, sheathing at base; sheath margins free; blade terete or laterally flattened (often appearing dorsiventrally flattened owing to twisting of the whole blade). Inflorescence compactly or loosely paniculate, head-like or a simple or cymosely branched raceme, bracteate. Flowers bisexual, blackish in south western species. Perianth actinomorphic, of 6 free segments in 2 equal or unequal whorls, persistent. Stamens 3; filaments inserted on inner perianth segments; anthers 2-celled, versatile and attached near base or basifixed with decurrent connective. Ovary inferior, the tops of the cells bulging upwards, half-inferior in the fruit following growth, 3-celled; ovules 2 per cell on a knob-like placenta. Style filiform, undivided, inserted in a depression on top of the ovary; stigma terminal, minutely capitate or minutely 3-lobed. Fruit a capsule, more or less 3-lobed, dehiscent loculicidally. Seeds approximately circular, thin, flattened, with broad membranous marginal wing, borne peltately on the greatly enlarged placenta. A genus of ca 20 species, all Australian with one extending to southern New Guinea, ca 14 species in tropical and south western W.A., all but one south western species occurring in the Perth Region. The genus is currently being revised.

1. Inflorescence a raceme, sometimes branched.
 2. Inner and outer perianth segments nearly equal..... **H. spicatum**
 2. Perianth segments unequal, the outer ones half as long as the inner. **H. brevisepalum**
1. Inflorescence a panicle, loose or the flowers in compact clusters.
 3. Basal leaves terete, often grooved in lower part.
 4. Panicle very open, flowers sparsely distributed and solitary..... **H. sparsiflorum**
 4. Panicle compact, flowers in 1-5 head-like clusters..... **H. simplex**
 3. Basal leaves flat, often grooved or slit along part of one margin.
 5. Style as long as anthers at anthesis..... **H. paniculatum**
 5. Style considerably exceeding anthers at anthesis.
 6. Basal leaves 4-12, 2-ranked, with overlapping sheaths. Panicle with few, dense, globular to cylindric clusters of 10 or more flowers..... **H. simulans**
 6. Basal leaves 1 or 2, not obviously 2-ranked nor with obviously overlapping sheaths when leaves 2. Panicle with numerous loose clusters of 2-7 flowers.
 7. Basal leaf usually 1, blade 6-20 mm wide at widest point..... **H. sp. B**
 7. Basal leaves usually 2-5, blade 1-5(-5.5) mm wide at widest point.
 8. Bracteoles membranous, their centre brown, their margins pale brown or greyish, not sharply delimited from nor strongly contrasting in texture with centre, veins conspicuous abaxially, scarcely raised adaxially, divergent, separated by several times their width..... **H. laxum**

8. Bracteoles at their centre fleshy, opaque, black, their margins membranous, white, sharply delimited and contrasting strongly in texture with centre, veins obscure abaxially, prominent adaxially, parallel, separated by 1-2 times their width..... **H. sp. A**

H. brevisepalum Benth.

Plants up to 0.3 m tall, exceptionally to 0.35 m. Basal leaf 1, terete, maximum diameter 1.5 mm or less, a little shorter to much longer than inflorescence. Stem leaves 2 or 3, the lowest similar to the basal leaves, others shorter. Inflorescence a raceme, undivided or occasionally a secondary inflorescence growing from axil of bract below lowest flowers of main axis; flowers 2 in the axil of each bract, the pedicels connate basally, parting just above base, each bearing 2 bracteoles. Bracteoles ovate or oblong, firm, without conspicuous membranous margins, the apex acute or acuminate; upper bracteole reaching to about middle of outer perianth segments. Flowers brownish black, not or faintly fragrant, 8.5-9 mm long. Outer perianth segments half as long as inner segments. Stamens unequal, one slightly longer than the other 2; anthers 1.3-1.7 mm long, borne a little below tip of perianth segments. Style reaching to middle of upper anther.

An uncommon species known from winter-wet places in the eastern Coastal Plain or on shallow soil in Wandoo woodland on the Darling Scarp. Occurs north to the Arrowsmith River south of Dongara, south to the Stirling Range area and east as far as Newdegate.

Flowers October-November.

H. laxum R. Br.

Plants 0.6-1.4 m tall. Basal leaves usually 2-5, flat, rather thick, much shorter than inflorescence, often minutely scabridulous along margins, especially near apex, width of blade at widest point 1-4 (-5.5) mm. Stem leaves 2-4, grading into blackish bracts. Inflorescence a large open panicle, with branches diverging widely; flowers in loose clusters of 2-5, mostly at top of inflorescence on extremities of branches, but 1 or 2 clusters on short branches below top. Bracteoles broadly elliptic, ovate or oblong, the apex obtuse to acute, the centre membranous, contrasting with the fleshy perianth segments, brown, the veins divergent, separated by several times their width, conspicuous abaxially, scarcely raised adaxially; margins becoming gradually thinner and paler than centre, broad, undulate, brownish or greyish; upper bracteole reaching nearly or quite to top of flower. Flowers black or brown, 9-12 mm long. Outer perianth segments $\frac{3}{4}$ to nearly as long as inner segments. Stamens equal; anthers borne about level with middle of segments, 3-4.5 mm long. Style slightly shorter to 1.5 mm longer than inner perianth segments at anthesis, rarely ca 1 mm shorter but then clearly extending beyond tips of anthers. **Fig. 309**

Common and widespread on lateritic, clay and sandy soils on the Darling Scarp and Range and the Coastal Plain, mainly in dry woodland habitats. Extends just north east of the Perth Region to Wannamal and south to Manypeaks east of Albany.

Flowers mainly November.

Plants of this species have often been misidentified as *H. paniculatum* Lindley but the differences between the two species have recently been clarified. *H. sp. A* is closely related to *H. laxum*.

H. paniculatum Lindley

Plants 0.8-1.7 m tall. Basal leaves usually 2, occasionally up to 4, flat, rather thick, much shorter than plant, width of blade at widest point 1.5-4 mm. Stem leaves 3 or more, similar to basal leaves but diminishing in length as they grade into blackish bracts. Inflorescence a narrow, elongated, rather dense panicle, the major branches erect or only slightly divergent; flowers mainly in clusters of 2-several on short scarcely divergent branches, distributed throughout the length of the panicle. Bracteoles narrowly oblong with obtuse apex, thin, greenish or brownish without conspicuous venation; margins membranous or scarious, brown or whitish, undulate; upper bracteole about as long as or distinctly longer than flower. Flowers yellowish, greenish or brownish outside (inner and outer segments often differing), blackish on inside, non-fragrant, 8.5-10 mm long. Outer perianth segments slightly shorter than inner segments. Stamens equal; anthers 3-3.5 mm long, borne level with or slightly above middle of perianth. Style reaching to middle or rarely almost to tip of anthers.

An uncommon species of sandy soils in Jarrah, Marri or Tuart woodland on the Coastal Plain and heavier soils on the Darling Scarp and Range. Extends from near Jurien to Lake Muir.

Flowers late October-December.

H. simplex Lindley

Plants 220-650 mm high. Basal leaves 1 or 2, terete or somewhat flattened, but with an open or closed groove often to above the middle, much shorter than to longer than the inflorescence, diameter at thickest point of blade about 1-1.5 mm. Stem leaves 1-4, diminishing in length upwards, grading into blackish bracts. Inflorescence consisting of a terminal, single, dense, branched head-like cluster or pair of clusters of 2-6 flowers and often 1-3 similar clusters of fewer and younger flowers on branches arising from the axils of upper scape bracts; the branches divergent, eventually attaining or exceeding the level of the terminal cluster. Bracteoles nearly as broad as long, acute to obtuse, usually $\frac{1}{3}$, occasionally $\frac{1}{2}$ as long as perianth at anthesis, firm, black or greenish black, opaque, without conspicuous venation, the scarious margins very narrow and inconspicuous. Flowers black or the outer segments partly greenish black, strongly fragrant, (7.5-)8.5-10 mm long. Outer perianth segments shorter than inner segments but more than $\frac{3}{4}$ as long. Stamens slightly unequal, with 1 longer or all 3 at slightly different levels; anthers 1.6-2.4 mm long, borne $\frac{2}{3}$ to $\frac{3}{4}$ from base of perianth. Style reaching to about middle of anthers at anthesis.

Occurs on the eastern Coastal Plain and Darling Scarp and Range in winter-wet clay soils or sand over clay, or in run-off areas on the Scarp. Extends north to Geraldton and south to the south coast east of Albany.

Flowers October to early November.

H. simulans F. Muell.

Plants 0.5-2 m tall. Basal leaves usually 4-12 or more, flat but open along upper edge for much of their length, erect, forming 2 opposite ranks, much shorter than inflorescence, 7-20 mm wide. Stem leaves several, the lower similar to the basal leaves and not always separated from them by an internode. Inflorescence a panicle, often large and open, the flowers massed into 3-many cylindric or globular clusters of usually 10 or more flowers, the clusters at various levels in the panicle. Bracteoles long, narrow, greenish, firm, the centre with obscure venation, the scarious margins narrow, inconspicuous, blackish; upper bracteoles reaching to $\frac{3}{4}$ or to top of perianth. Flowers externally greenish, yellowish brown or blackish, internally orange-tinged, not or only faintly fragrant, 12.5-14.5 mm long. Outer perianth segments a little shorter than inner segments but more than $\frac{3}{4}$ as long. Stamens equal; anthers 2-3 mm long, borne level with or slightly below middle of perianth. Style much longer than anthers and shorter than outer perianth segments.

Grows in heavy soil over granite or in clay soils along the Darling Scarp and in laterite or clay soils in the north east of the region. Ranges to north of Geraldton and south east of the region to Wagin.

Flowers November-December.

H. sparsiflorum F. Muell.

Plants 0.5-0.9 m tall. Basal leaves 2-4, subterete, sometimes slightly grooved or flattened, but then rather thick, much shorter than inflorescence, diameter or width of blade 1-2.5 mm at widest point. Stem leaves several, diminishing in length upwards. Inflorescence an open, rather few-flowered panicle, the flowers solitary at ends of branches and uniformly distributed rather than clustered. Pedicels often longer than flowers, sometimes, especially when in fruit, exceedingly so. Bracteoles firm, black, without conspicuous scarious margins, apex short and acute; upper bracteole not reaching beyond middle of flower. Flowers black, inner segments often yellowish after anthesis, strongly fragrant, 8-9.5 mm long. Perianth segments characteristically shrivelled and inrolled or recurved when dried. Outer segments shorter than inner segments but more than $\frac{3}{4}$ as long. Stamens equal; anthers 2-3 mm long, borne below tip of outer perianth segments. Style reaching to middle or occasionally to tip of anthers.

Occurs throughout the eastern Coastal Plain, especially on low-lying or swampy soils, and occasionally in swampy soils on the Darling Range. Extends southwards to Albany.

Flowers October-November.

H. spicatum R. Br.

Plants 0.56-2 m tall. Basal leaves 1 or more, rather stiff, terete, 1-2.5 mm or more in diameter, much shorter than inflorescence. Inflorescence a raceme, undivided or with 1-3 secondary racemes borne singly in axil of bracts below lowest flowers of main axis, the secondary racemes at first out-curved then erect, the whole plant often candelabrum-like; flowers 2 in axils of each bract, the pedicels connate at or just above base. Bracteoles firm and resembling outer perianth segments in texture, broad-based with acuminate tip, distinctly shorter than outer perianth segments. Flowers black, brownish black or yellowish brown, not or only faintly fragrant, 10-14 mm long. Outer perianth segments acute, more than $\frac{1}{2}$ to more than $\frac{3}{4}$ as long as the obtuse inner segments. Stamens unequal, 1 slightly longer than other 2; lower anthers 1.6-2 mm long; upper anther 1.9-2.5 mm long, the tip a little below the perianth tip. Style protruding from tip of flower at anthesis.

A common plant of sandy or clay soils, often winter-wet, of the Coastal Plain. Ranges from near Dongara to east of Esperance, never extending far inland.

Flowers November-December.

H. sp. A

Plants 0.3-1 m tall. Basal leaves up to 4, perhaps usually more than 1, flat, rather thick, much shorter than inflorescence, smooth along whole margin, width of blade at widest point 1.3-5(-6) mm. Stem leaves 1-3, grading into blackish bracts. Inflorescence an open panicle; flowers in loose clusters of 2-7 at the top of the panicle and on short side branches along the length of the major branches. Bracteoles oblong or elliptic or, especially the lower, ovate to broadly ovate, the apex obtuse to acute, the centre fleshy and similar in texture to the perianth segments, black, the veins obscure abaxially, prominent adaxially, parallel, separated by only 1-2 times their width; margins contrasting strongly with the sharply delimited centre, broad, undulate, membranous, white; upper bracteole not reaching to top of flower at anthesis, often much shorter. Flowers blackish, (8.5-)9-12 mm long. Style at anthesis much shorter than to slightly exerted from inner perianth segments, when shorter usually exceeding anther tips but occasionally 1 mm below them.

Known from several locations on the Darling Scarp and Range northwards from Harvey, growing in laterite or clay in woodland or forest. Extends north to Geraldton, east to Southern Cross and south to the south coast.

Flowers late October-December.

This recently recognized species is distinguished from its close relative *H. laxum*, with which it was until recently confused, chiefly by bracteole colour and venation and inflorescence form.

H. sp. B

Plants 0.45-1.2 m tall. Basal leaves usually 1, occasionally 2, similar in length or the upper much shorter; lowest leaf flat, procumbent, maximum width of blade 6-20 mm. Stem leaves 1 or 2, grading into blackish bracts; the lowest often just above basal leaves. Inflorescence an open panicle; flowers in clusters of 2-5, at top of inflorescence and on short branches well below top. Bracteoles similar in texture to perianth segments, oblong or ovate, the apex obtuse, the centre dark and opaque, with obscure venation; margins membranous and whitish; upper bracteoles as long or nearly as long as the flower. Flowers black or outer segments greenish or brownish black, 10-11.5 mm long. Outer perianth segments nearly as long as inner segments. Stamens equal; anthers 3.5-4(-4.5) mm long; borne about level with middle of segments. Style slightly shorter to slightly longer than inner perianth segments at anthesis.

Known in the Perth Region from Wattle Grove, growing in sand, and near Muchea, growing in lateritic soil. Extends north to Eneabba.

Flowers November.

MACROPIDIA J.L. Drumm. ex Harvey

Herbs with short horizontal perennial rhizome. Leaves basal with a few shorter ones on the stem, sheathing at base, partially open on one margin. Stems branched. Flowers in dense racemes on ends of branches of a panicle, shortly pedicellate, densely covered externally and also inside the lobes with black and green woolly hairs. Perianth strongly zygomorphic, tubular, slit in upper part, deeply lobed; lobes 6, unequal. Stamens 6; filaments curved, inserted near top of tube; anthers basifixed, the connective

long, thickened, dorsal, decurrent, the cells free at base, a small apical appendage present. Ovary inferior, 3-celled, with 1 ovule per cell. Style long, filiform, with an entire apical stigma. Fruit dry, seeds separating as 3 cocci, each carrying with it a portion of the ovary wall and the adnate perianth, the ovary septa persistent. Seeds pale brown, exterior surface bearing perianth hairs, other surfaces smooth. *Anigozanthos* sect. *Macropidia* (Drumm. ex Harv.) Geerinck. 1 species endemic to south western Australia. References: Geerinck, D. 1970. Bull. Jard. Bot. Nat. Belg. 40: 261-276; Hopper, S.D. 1979. Austral. Pl. 10: 229-236.

M. fuliginosa (Hook.) Druce

Black Kangaroo Paw

Plants 0.6-1.8 m tall. Leaves numerous, flattened, 11-14 mm wide. Panicle exceeding the leaves. Flowers green inside, the outside green except for the black ovary and lobes, the remainder sparsely sprinkled with black hairs. Perianth usually 50-60 mm long, divided to below the middle into 6 lobes; lobes reflexed, the central ones 30-45 mm long. Stamens exserted on long curved filaments; anthers 4-5 mm long; filaments 4 or more times longer than anther.

Occurs only in the north east of the region northwards from Muchea, growing in open Marri-Jarrah woodland in sandy or lateritic soil. Extends northward to Greenough south of Geraldton.

Flowers August-December.

PHLEBOCARYA R. Br.

Tufted, shortly rhizomatous perennial herbs. Leaves basal, linear, sheathing at base, the blade terete or flattened. Leaf blades and sheaths glabrous, ciliate or sparsely to very densely hairy on surfaces; hairs usually branched. Inflorescence a cymosely branched panicle on a bracteate scape. Flowers actinomorphic. Perianth glabrous, with 6 free, equal segments in 2 whorls, white, cream or bluish, persistent. Stamens 6; filaments inserted at base of segments; anthers basifixed, connective broad, flat, sometimes shortly prolonged beyond cells. Ovary inferior, 3-celled with 1 ovule per cell ascending from the base, the ovules, inner part of septa and axis adnate, the outer part of the septa intact and free but breaking down in the fruit, the ovules free in upper part of ovary. Style longer than stamens, simple with a single, terminal, minutely capitate stigma or 3-lobed near tip, with 3 stigmas. Fruit nut-like, indehiscent, 1-seeded. A genus of 3 species endemic to south western Australia.

1. Anther connective not prolonged beyond cells; hairs on back of sheath, if present, restricted to midline..... **P. ciliata**
1. Anther connective prolonged beyond cells; hairs virtually always present on back of leaf sheath away from midline (and often also on midline)..... **P. filifolia**

P. ciliata R. Br.

Leaf sheaths ciliate and/or hairy on midline of back only. Leaf blades 250-650 mm long, maximum width 1.6-3.7 mm, flat, ciliate along part or the whole length of the margins or sometimes restricted to apical or basal part, rarely entirely glabrous, surfaces glabrous. Inflorescence $\frac{1}{4}$ as long to slightly longer than leaves, usually $\frac{1}{2}$ - $\frac{2}{3}$ as long. Scape usually glabrous, occasionally hairy in the lower part. Flower-subtending bracts and pedicels glabrous. Anther connective not prolonged beyond cells. Style entire; stigma 1.

Occurs throughout the region on the Coastal Plain and occasionally in the Jarrah forest. Grows in sandy soils in seasonally wet areas or dry *Banksia* woodland. Extends north to Jurien Bay and south to Albany.

Flowers mainly September-November.

P. filifolia (F. Muell.) Benth.

Leaf sheaths glabrous or ciliate on outer margin of membranous border, hairy along midline and also elsewhere on back, especially along inner margin of membranous border. Leaf blades 250-400 mm long, maximum width 0.6-1.8 mm, flattened to terete, margins ciliate (cilia in 2 rows representing the margins on terete leaves), sometimes restricted to apical or basal portions, surfaces sparsely hairy at

least near apex or base (hairs scattered around diameter of terete leaves). Inflorescence slightly to markedly longer than leaves, occasionally only $\frac{2}{3}$ as long. Scape glabrous. Flower-subtending bracts and pedicels glabrous. Anther connective prolonged beyond cells. Style entire; stigma 1.

Known in the Perth Region only from two localities near Perth, in heathland or Marri woodland on low-lying sites. Extends north nearly to Eneabba but rarely collected.

Flowers October-December.

TRIBONANTHES Endl.

Perennials with globular tubers surrounded by chartaceous tunics. Stem simple. Leaves 1-4, basal and cauline, base sheathing and dilated, blade terete or slightly grooved. Inflorescence terminal; flowers 1 or several in a loose or dense head-like cyme; larger bracts leafy. Perianth actinomorphic, tubular basally, the inside of the tube with sparse stiff hairs; lobes 6, equal, woolly-hairy outside and at least partly inside, the tips naked and glandular. Stamens 6; filaments broad, fleshy, inserted at top of perianth tube, produced beyond anther attachment as erect, exerted, entire or lobed, coloured appendages; anthers attached near their middle on face of filament; cells free below attachment; tip sterile, acute. Ovary 3-celled, inferior or half-inferior, the summit conic; ovules 10-80 per cell. Style shorter than anthers, stout, bulging subterminally, tapering to a short blunt or obscurely 3-lobed point; stigma possibly subterminal where a broad wet yellow band covers the bulge. Capsule loculicidal, the conic apex forming 3 valves. Seeds angular, brown. A genus of 4 species, endemic in south western Australia.

1. Perianth lobes strongly reflexed, glabrous or very sparsely hairy in the basal $\frac{2}{3}$ of the inner surface **T. brachypetala**
1. Perianth lobes spreading, not reflexed, uniformly woolly hairy on inner surface.
 2. Flower 1 per plant, often partially enclosed by 2 broad bracts. Perianth lobes 4.5-6.5 mm long **T. violacea**
 2. Flowers 1-7 per plant; when 1, the flower not partially enclosed by 2 bracts. Perianth lobes 5-14 mm long, not less than 8.5 mm in 1-flowered plants.
 3. Staminal filament appendage from about equal to much longer than anther tip (rarely slightly shorter). Inflorescence of 2-7 flowers, compact, the branches concealed or, if exposed, then the longest flower-bearing (i.e. ultimate) branch 15 mm or less from axil to flower base. Perianth lobe length/maximum width ratio 2.9 or less **T. australis**
 3. Staminal filament appendage much shorter than anther tip (occasionally about equal or only slightly shorter). Inflorescence 1-flowered or 2-4-flowered, rather open, the branches usually conspicuous, the longest flower-bearing (i.e. ultimate) branch 11-60 mm long from axil to flower base. Perianth lobe length/maximum width ratio 3.1 or more **T. longipetala**

T. australis Endl.

Plants mostly 165-390 mm tall. Stem leaves 2 or 3; stem internode between lower 2 leaves usually glabrous, occasionally hairy; upper 1 or 2 internodes hairy. Flowers 2-7 in a very dense cyme with the branches not exposed, or in a somewhat open inflorescence with the longest single flower-bearing (i.e. ultimate) branch 2-15 (rarely to 35) mm from axil to base of flower, at least sometimes fragrant. Perianth lobes more or less obovate to elliptic with acute apex, 5-11 x 2.2-5.5 mm, length/maximum width ratio 1.3-2.9, occasionally up to 3; both surfaces white and densely felted. Staminal filament appendages usually longer, often much longer, than anther tips but occasionally about equal or slightly shorter. *T. variabilis* Lindley

Grows in seasonally wet places throughout the region, especially in swamps on the Coastal Plain. Ranges from near Geraldton to Albany.

Flowers August and September.

T. brachypetala Lindley

Plants 200-400 mm tall. Visible stem internodes 2 or 3, the lower 1 or 2 glabrous, the uppermost 1 or occasionally 2 woolly hairy. Leaves 3-4, 1 or 2 basal and 2 on the stem, the uppermost usually at or below middle. Flowers 3-7 in a 1-sided, dense, head-like woolly condensed cyme with a pointed leaf-like bract erect from the back; several smaller bracts among flowers; pedicels or branches more or less concealed among bracts and woolly hairs, strongly fragrant. Perianth lobes strongly reflexed, more or less ovate or triangular with acute apex, greenish, 3-7.5 x 1.5-3.3 mm, length/maximum width ratio 1.7-2.3; inner surface bearded near apex, elsewhere glabrous or sparsely hairy; outer surface woolly hairy. Staminal filament appendages large, fleshy, deeply grooved on back, much longer than anthers, forming a very conspicuous yellow corona-like structure.

Grows in seasonally wet locations with clay surface or subsoil on the eastern Coastal Plain and Range, and on shallow soils in woodland on the Darling Scarp, southwards from Perth. Extends south east of the region to Lake Muir.

Flowers July and August.

Tribonanthes brachypetala is known to hybridize with *T. australis*.

T. longipetala Lindley

Plants 65-320 mm tall. Stem leaves 2 or 3; stem internodes between leaves hairy or the lowest occasionally glabrous. Flowers either 1 or mostly 2-4 per plant in different populations; when 1, the flower subtended closely or distantly by a leaf-like bract; when several, the inflorescence conspicuously branched, open; branches with or without associated leaf-like bracts, further bracts usually present nearer flowers; longest single flower-bearing (i.e. ultimate) branch mostly 11-60 mm, occasionally less, from axil to base of flower, non-fragrant. Perianth lobes more or less linear or narrowly obovate with acute apex, usually 8.5-14 x 1.6-3.5 mm, length/maximum width ratio (2.7-)3.1-6.9; inner surface felted, white or purple-tinged; outer surface felted or woolly, often less densely so, white to purple-striped. Staminal filament appendages slightly to much shorter than anther tips, rarely about equal. *T. uniflora* Lindley **Fig. 310**

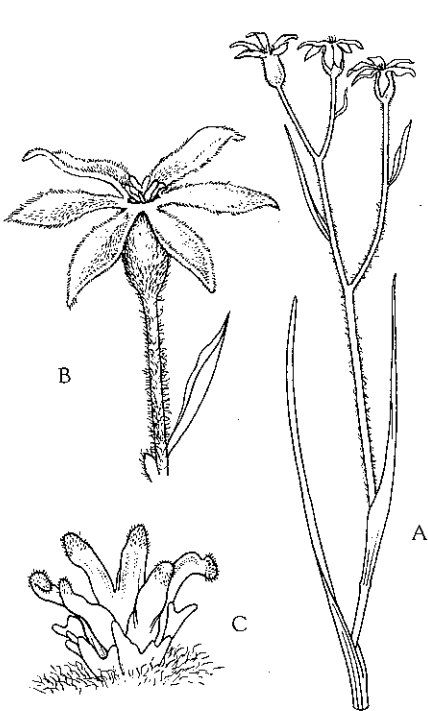


Fig. 310. *Tribonanthes longipetala*. A, Flowering stem. B, Flower. C, Top of anthers and staminal filament appendages.

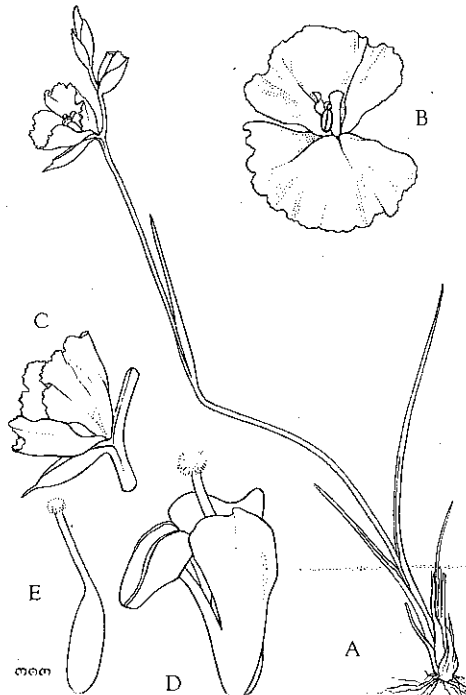


Fig. 311. *Philydrella pygmaea*. A, Habit. B and C, Flower. D, Ovary and style surrounded by stamen and lateral inner perianth segments or staminodes. E, Ovary and style.

Grows in seasonally wet soil, either swamps or shallow soils over rocks; widespread on the eastern Coastal Plain, Darling Scarp and Range. Extends to north of Moora and south east to Mount Barker.

Flowers July-September.

T. violacea Endl.

Plants usually less than 100 mm tall, occasionally up to 200 mm. Stem internodes above lowest leaf always glabrous, internode above second leaf, when present, at least partially hairy. Stem leaves usually 1, occasionally 2, the upper often bract-like and from a little to much below the flower. Flower 1, partially enclosed by the 2 (occasionally only 1) broad, overlapping, leaf-like bracts with wide purplish membranous margins. Flowers non-fragrant or faintly fragrant. Perianth lobes more or less elliptic to broadly elliptic with acute apex, often with a purple exterior stripe, 4.5-6.5 x 1.8-3.6 mm, length/maximum width ratio 1.4-2.8; surfaces both hairy, the outer sometimes sparsely so. Staminal filament appendages mostly shorter than to about equal to anther tips, sometimes a little longer.

Occurs in seasonally wet situations, usually swamps on the Coastal Plain, occasionally on the Darling Range; widespread in the region. Ranges from Geraldton to Cape Arid east of Esperance.

***FAMILY 142 PONTEDERIACEAE**

B. L. Rye

Perennial or rarely annual herbs, aquatic or semi-aquatic, rooted in the substrate or free-floating, hermaphrodite, largely glabrous. Leaves in a basal rosette or distributed along the stem, distichous or sometimes spirally arranged, usually sheathing and petiolate; blade floating or submerged, entire. Inflorescence terminal, subtended by a sheathing bract; bract usually lacking a blade. Perianth segments 6 or rarely 4, in 2 whorls, petal-like, persistent, connate in a definite basal tube or rarely almost free, usually white or blue. Stamens usually 6, rarely 3 or 1, when less than 6 some stamens sometimes replaced by staminodes; filament adnate to the perianth; anther 2-celled, longitudinally dehiscent to the inside or rarely dehiscent by terminal pores. Ovary superior, usually 3-celled but 2 cells sometimes empty, sometimes 1-celled with intruded parietal placentas; ovules many or sometimes 1 per functional cell. Style terminal, simple, slender; stigmas 1 or 3, dry. Fruit usually a capsule, sometimes a nut. About 30 species in 9 genera, widespread in the tropics and subtropics, a few species extending into northern temperate areas.

***EICHHORNIA** Kunth

Annual or perennial herbs, often free-floating, sometimes rooted at the nodes of stolons. Leaves floating or submerged or sometimes emergent, either linear or broader and petiolate. Inflorescence usually a spike, rarely a panicle. Flowers often distylous or tristylous. Perianth blue; tube funnel shaped, long or short; lobes 6, the adaxial lobe with a yellow blotch and somewhat larger than other lobes. Stamens 6, at 2 levels, the stamens of the upper whorl exserted. Ovary 3-celled; ovules numerous. Fruit a loculicidal capsule, many-seeded. About 7 species, native to the American tropics, 1 species naturalized in W.A.

***E. crassipes** (C. Martius) Solms-Laub.

Water Hyacinth

Perennial herb, free-floating, glabrous, highly stoloniferous. Leaves radical, clustered, exserted well above the water surface; petiole swollen, spongy, almost globular in young plants, long and attenuate in older plants, up to 0.3 m long; blade curved, often almost circular, usually 20-80 mm broad, with numerous fine longitudinal veins, the margin often undulate. Peduncle erect, up to 0.5 m long, stout, with 2 leafy bracts below the flowers, bending downward and submerging the inflorescence when flowering is complete. Inflorescence a spike, 3-35-flowered, up to 150 mm long. Flowers reportedly tristylous on the same or different plants, usually 40-60 mm broad. Perianth tube greenish, narrow, usually 15-20 mm long; lobes pale purple, subequal, usually 25-40 mm long; adaxial lobe with a central yellow spot bordered by blue. Stamens 6, irregularly adnate to the perianth tube near its summit. Ovary enclosed in the perianth tube. Stigma hairy, 3-branched. Seeds minute, ribbed.

Recorded from Perth and Pinjarra, in freshwater lakes or watercourses. Native to tropical South America.

Flowers January-May.

FAMILY 143 PHILYDRACEAE

B. L. Rye

Perennial herbs, usually aquatic or in marshes, erect, hermaphrodite. Stipules absent. Leaves alternate and distichous on the lower part of the stem, spirally arranged above, with a well developed sheath, not ligulate; blade linear, flat, parallel-veined. Inflorescence a simple spike or panicle, terminal. Flowers sessile, subtended by a somewhat sheathing bract, zygomorphic. Perianth segments probably 6, petal-like, persistent, with a large broad upper lip probably consisting of 2 sepals adnate to a central adaxial petal; abaxial sepal forming a large free lower lip; lateral petals 2, sometimes regarded as staminodes, smaller than the other segments. Stamen 1; filament compressed, free or adnate to the lower perianth lip; anther 2-celled, adaxially attached, longitudinally dehiscent by 2 parallel slits. Ovary superior, 3-celled and with axile placentation or 1-celled and with 3 parietal placentas projecting far into the cavity. Style simple, terminal; stigma dry. Fruit a capsule, dehiscent by 3 valves or rarely irregularly dehiscent; seeds numerous, small. 5 or 6 species in 4 genera, extending from Japan to Australia and the western Pacific.

PHILYDRELLA Caruel

Perennial herbs. Stem simple, erect. Leaves few, narrow. Inflorescence a short terminal spike; bracts concave. Perianth lips many-veined. Stamen adnate in the lower half to the 2 lateral petals or staminodes; anther abruptly reflexed outward from the summit of the filament, oblong. Ovary 3-celled. Capsule obloid, membranous, with a persistent central column. 1 species, confined to W.A.

P. pygmaea (R. Br.) Caruel

Perennial herb, 50-250 mm high, glabrous. Leaves usually 2 with 1 basal and 1 above the centre of the stem, sheathing in the lower part; blade of the basal leaf narrowly linear, 15-90 x 0.5-1.5 mm, attenuate. Inflorescence 2-10-flowered, the flowers opening from the base upward; bracts ovate, 8-15 mm long, initially erect and overlapping, becoming more distant and strongly reflexed at anthesis, returning to an erect position after flowering. Perianth nearly vertical, bright yellow; lips widely spreading, 6-10 mm long, broader than long; lateral petals or staminodes 3-4 mm long. Stamen 3-4 mm long. Style usually protruding slightly above the anther; stigma slightly enlarged. *Pritzelia pygmaea* (R. Br.) F. Muell. Fig. 311

Occurs on the eastern side of the Coastal Plain, Darling Scarp and Range, either in winter-wet depressions or associated with granite. Extends from Mingenew to east of Esperance.

Flowers mainly September-October.

FAMILY 144 TYPHACEAE

B. L. Rye

Perennial herbs, inhabiting fresh or brackish water, with a starchy rhizome, monoecious. Leaves alternate, distichous, mostly basal or near-basal, sheathing at the base. Inflorescence a dense spike; terminal, cylindrical, elongate; flowers very numerous, all or many of them subtended by a bract. Flowers small, wind-pollinated. Perianth segments absent or reduced to bristles or scales. Stamens 1-8; anther basifixed, 2-celled, dehiscent by 2 longitudinal slits. Gynoecium of 1 superior carpel, 1-celled; ovule 1, pendulous; style terminal. Fruiting stipe elongate, slender. Fruit a follicle, tardily dehiscent, wind-dispersed. 1 genus, in temperate and tropical regions.

TYPHA L.

Robust perennial herbs, partially submerged or in damp soil, commonly known as Bulrushes. Leaves: sheath long, open but closely enveloping the stem; blade linear, long, parallel-veined, often spongy. Inflorescence with 2 separated or contiguous portions, the lower portion female and the upper portion male, some of the female flowers sterile. Perianth segments of the male flowers 0-8, usually 3; perianth

segments of female flowers usually in 1-4 irregular whorls, some of them often adnate to the ovary stipe or sometimes connate. Stamens free or the filaments connate for most of their length; anther connective broad, prolonged beyond the cells. Ovary stipitate, fusiform; stipe with long basal hairs. Style filiform, expanding at the apex to the stigma; stigma shortly decurrent, linear to spatulate, dry, not papillose. Fruit longitudinally dehiscent by 1 slit, dispersed with the persistent style and hairy stipe. Seed fusiform. About 10 species, in temperate and tropical regions, 1 native and 1 naturalized species occurring in W.A. Reference: Briggs, B.G. & Johnson, L.A.S. 1968. Contr. New South Wales Natl. Herb. 4: 57-69.

1. Female spikes cinnamon brown; perianth segments numerous, interspersed with the dark narrow stigmas, broadly expanded at the apex..... **T. domingensis**
 1. Female spikes chestnut brown; perianth segments not visible or greatly outnumbered by the dark stigmas, narrowly expanded at the apex..... ***T. orientalis**

T. domingensis Pers.

Perennial herb, up to 3 m high. Stems 2.5-5 mm broad below the inflorescence. Leaves: sheath not lobed at the summit or only in the uppermost 1 or 2 leaves; blade 5-8 mm broad. Inflorescence with a 5-25 mm separation between the male and female portions, which are both cylindrical; mature female portion cinnamon brown, 6-30 times as long as broad, usually 8-15 mm broad, the colour derived from the dark-coloured stigmas interspersed with much paler perianth segments. Perianth segments of female flowers numerous, filiform, broadly expanded at the apex; apex ca 0.25 x 0.15-0.2 mm, usually with 4-8 cells visible across its breadth. Stigmas narrow, ca 0.75 mm long, usually curved or uncinat.

Recorded from a winter-wet depression on the Coastal Plain near Perth, growing intermixed with *T. orientalis*. Occurs in other scattered locations in the south west and is much more common in the north of the state. Occurs in all Australian states. Widespread in tropical and warm temperate parts of the world.

Flowering period uncertain but evidently includes summer months, perhaps extending for most of the year.

This species, alone or together with *T. orientalis*, has often been referred to as *T. angustifolia* L., a northern temperate species.

***T. orientalis** C. Presl

Broadleaf Cumbungi, Bulrush

Perennial herb, up to 4.5 m high. Stems 4-7 mm broad below the inflorescence. Leaves: sheath usually distinctly lobed at the summit in the 2-4 uppermost leaves; blade 5-14 mm broad. Inflorescence with no separation or with a separation of up to 60 mm between the male and female portions, which are both cylindrical; mature female portion usually chestnut brown, 5-18 times as long as broad, 10-30 mm broad, its colour derived from the stigmas but not the perianth segments. Perianth segments of female flowers not visible and possibly absent or greatly outnumbered by the stigmas, narrowly expanded at the apex; apex usually 3 or 4 cells broad. Stigmas brown, linear, ca 1 mm long, usually curved or uncinat.

Occurs mainly on the Coastal Plain, in winter-wet depressions and in permanent wetlands, often partially submerged during winter. Also recorded from north of Moora. Apparently introduced in W.A. where it is an aggressive coloniser of disturbed sites. Probably native to S.A., Vic., Tas., N.S.W. and Qld. Extends from the Philippines to New Zealand.

Flowers November-January.

See note under *T. domingensis*.

***FAMILY 145 CANNACEAE**

B. L. Rye

Perennial herbs, with a starchy rhizome. Leaves spirally arranged, petiolate; petiole sheathing at the base; blade simple, entire. Flowers asymmetric, obliquely orientated to the axis, each with a bracteole. Outer perianth segments 3, spirally arranged, bract-like. Floral tube consisting of the united bases of the inner perianth segments, stamens and staminodes. Inner perianth segments 3, petal-like. Stamen

1, petal-like, conspicuous; anther 1-celled, basifixed, attached well below the apex of the stamen on the more median edge of the inner surface. Staminodes 1-4, usually 2, petal-like, conspicuous, 1 staminode known as the labellum, 2 other staminodes (when present) often referred to as wings, the fourth staminode (when present) occurring behind the stamen. Style petal-like; stigma wet. Ovary inferior, 3-celled, with axile placentas; nectaries present on the septa, opening to the summit of the ovary; ovules in 2 rows per cell. Fruit a capsule. 1 genus, native to tropical and subtropical parts of the Americas.

***CANNA L.**

Perennial herbs, often stout, hermaphrodite. Leaves large; sheath short, open; blade rolled from 1 side to the other in bud, with a prominent midrib and numerous lateral veins. Inflorescence terminal, usually openly branched, often consisting of short 2-flowered cymes. Flowers usually showy. Outer perianth segments persistent, green or purplish. Inner perianth segments unequal, 1 smaller than the other 2. Stigma papillose. Capsule 3-valved or rarely indehiscent, usually papillose or tuberculate. About 50 species, with many artificial hybrids in cultivation, 2 hybrid or cultivar taxa naturalized in W.A.

1. Flowers yellow. Outer perianth segments 15-20 mm long..... **C. x generalis*
 1. Flowers red and yellow. Outer perianth segments 20-25 mm long..... **C. x orchiodes*

****C. x generalis* L. Bailey**

Erect perennial herb, up to 2.5 m high. Leaves not seen, probably similar to those of *C. x orchiodes*. Inflorescence erect, commonly 6-10-flowered. Flowers sessile or subsessile, yellow. Outer perianth segments erect, imbricate, 15-20 mm long. Floral tube usually ca 20 mm long. Inner perianth segments initially erect but becoming reflexed, ca 60 x 13 mm. Stamen similar to the staminodes but lop-sided; anther cell 12-15 mm long. Staminodes 3 or 4, obovate, the largest staminode ca 90 x 40 mm. Style exceeded by the staminodes, ca 5 mm broad. Ovary ca 10 mm long at first, densely papillose, elongating to at least 20 mm long in fruit.

Recorded from the Swan River foreshore at Maylands in black sandy mud. Of garden origin, the parent species native to tropical or subtropical America.

Flowers probably November-March.

This taxon and *C. x orchiodes* have sometimes been misidentified as *C. indica* L.

****C. x orchiodes* L. Bailey**

Orchid-flowered Canna

Erect perennial herb, commonly ca 2.5 m high. Leaves vertical, green with a brown apex; blade elliptic, commonly ca 300 mm long, acute to acuminate. Inflorescence erect, 3-many-flowered. Flowers sessile or subsessile, red and yellow, with red spots in the area where the 2 colours overlap. Outer perianth segments erect, imbricate, 20-25 mm long. Floral tube ca 30 mm long. Inner perianth segments initially erect but becoming reflexed, ca 70 x 12-18 mm. Stamen similar to the staminodes but lop-sided; anther cell ca 14 mm long. Staminodes 3; often with reddish markings radiating from the throat, obovate, the largest staminode ca 110 x 50 mm. Style exceeded by the staminodes, 4-7 mm broad, glossy. Ovary green and ca 10 mm at first, densely papillose, elongating to at least 20 mm long in fruit.

Recorded along the Canning River at Wilson. Of garden origin, the parent species from tropical or subtropical America.

Flowers probably November-March.

See note under *C. x generalis*.

FAMILY 146 COMMELINACEAE

B. L. Rye

Perennial or sometimes annual herbs, rarely twining or epiphytic, hermaphrodite. Stems swollen at the nodes, often somewhat succulent. Leaves alternate, sessile or sometimes petiolate, sheathing; sheath closed; blade parallel-veined. Inflorescence basically a cyme but sometimes apparently a spike or raceme

or rarely 1-flowered. Flowers usually actinomorphic, without nectar. Outer perianth segments 3, sepal-like, free or rarely connate at the base, usually green. Inner perianth segments usually 3, petal-like, free or sometimes connate at the base, ephemeral, usually blue or white. Stamens basically 6 in 2 whorls of 3, often some stamens absent or reduced to staminodes, rarely all but 1 stamen absent; filament often hairy; anther 2-celled. Ovary superior, 3-celled but often with 1 or 2 cells poorly developed; placentas axile; ovules 1-several per functional cell. Style simple, terminal, hollow. Fruit a loculicidal capsule or rarely indehiscent. About 700 species in 50 genera, usually tropical or subtropical.

CARTONEMA R. Br.

Perennial herbs, erect, glandular-hairy. Leaves alternate, sessile, sheathing, linear. Inflorescence a raceme or raceme-like, often appearing to be a spike when the pedicels are extremely short, terminal, each flower subtended by 1 bract and 1 bracteole. Outer perianth segments 3. Inner perianth segments 3, persistent but drying out. Stamens 6, in 2 equal whorls, glabrous; anther dehiscent by 1 longitudinal slit to the inside. Ovary superior, 3-celled; ovules usually 2 superposed or 8 per cell. Stigma capitate. Fruit a loculicidal capsule. About 6 species, 1 occurring in the south west of W.A., the remainder in northern Australia, with at least 1 recorded from Indonesia, 3 species occurring in W.A. The genus is sometimes placed alone in family Cartonemataceae.

C. philyroides F. Muell.

Perennial herb, up to 0.3 m high; glandular hairs occurring on the stems, leaves, bracts and outside of the sepals. Leaves scarcely sheathing at the base, up to 200 x ca 5 mm, becoming progressively shorter up the stem, attenuate. Raceme dense, usually 120 mm long, sometimes with short branches at the base. Pedicels probably 1-2 mm long. Outer perianth segments green, narrowly ovate, 15-20 mm long, acuminate. Inner perianth segments yellow, obovate, a similar length to the outer perianth segments. Stamens 4-6 mm long; filament broad and thin. Ovary hairy; ovules probably 2.

Occurs on the Coastal Plain from Guildford southward. Extends south to Capel. Also occurs at Kalbarri.

Flowers October-November.

Kalbarri specimens differ from the variant in the Perth Region in several respects, for example in the longer anthers and the broad translucent margins on the outer perianth segments. The northern variant may warrant recognition as a distinct species, subspecies or variety.

FAMILY 147 XYRIDACEAE

N.G. Marchant

Perennial or sometimes annual herbs mostly in damp places, with a short vertical rootstock and fibrous roots. Leaves mostly or all basal, distichous or sometimes spirally arranged, with an enlarged open brown sheath; blade narrow, flat, filiform. Inflorescence of dense, globular to cylindrical heads; bracts closely imbricate, coriaceous. Flowers sessile in the axils of the bracts. Perianth segments 6 in 2 whorls. Outer perianth segments 3, scarious or membranous, outermost segment more or less enclosing the bud, lateral segments keeled. Inner perianth segments 3, free, distinctly clawed. Stamens 3, opposite the inner perianth segments, sometimes alternating with 3 staminodes, rarely fertile stamens 6. Ovary superior, composed of 3 carpels connate to form a 1 or 3-celled ovary. Style terminal, simple or 3-branched. Over 250 species in 4 genera, widespread in the tropics.

XYRIS L.

Perennial herbs or sometimes annual in the tropics, growing in damp places. Leaves basal or nearly so, flat or filiform. Flowers sessile in the axils of brown or black, scarious, entire or lacerate bracts. Outer perianth segments almost colourless; outermost segment concave, rounded in outline; lateral segments 2, keeled and boat shaped, usually clawed, the apex glabrous or hirsute. Inner perianth

segments usually yellow, lamina circular, claw distant. Stamens 3; the filament arising from the top of the petal claw; anther cells confluent or distinct; staminodes 3 or absent. Ovary rounded, the apex hard and smooth and dehiscent at maturity. More than 250 species, ca 14 in W.A., mostly in wetter parts of the south west.

1. Flower heads 10-15 mm across, bracts circular and deeply convex; peduncle 2 mm in diameter, rigid. Anther cells confluent..... **X. lacera**
1. Flower heads 6-8 mm across, bracts elliptic, shallowly convex; peduncle 1 mm in diameter, weak. Anther cells separate..... **X. sp. A**

X. lacera R. Br.

Perennial, rootstock large. Leaves 20-30, slightly flattened, 200-350 x 1.5-2 mm, the sheath stout. Peduncles 5-10, up to 1 m tall, rigid, 2 mm in diameter; heads ovoid, 10-15 mm across; lower bracts pale-coloured, deeply lacerate; upper bracts circular in outline, deeply convex with a black, coriaceous, circular centre and a pale-coloured lacerate membranous margin. Outer perianth segments: outermost segment circular in outline; lateral segments 2-lobed at the apex, margin irregular. Anthers 3 mm long, the cells confluent and connate at the apex; staminodes absent.

Recorded from a swamp near Harvey. Also occurs in swamps from Busselton to Bremer Bay and east of Esperance.

Flowers December-March.

X. sp. A

Perennial or annual, rootstock small. Leaves 5-10, terete, 200-300 x 1-1.5 mm, the sheath stout. Peduncles 3-5, up to 1.5 m tall, weak, 1 mm in diameter; heads ovoid to globular, 6-8 mm across; lower bracts pale-coloured, somewhat lacerate; upper bracts elliptic, shallowly convex with a grey, ovate, acute centre and pale-coloured, entire or slightly lacerate membranous margin. Outer perianth segments: outermost segment circular in outline; lateral segments 2-lobed at apex. Anthers 1-2 mm long, the cells confluent but distinct at the apex; staminodes absent.

Occurs in dense thickets along perennial watercourses of the Darling Scarp from Byford south to near Brunswick Junction.

Flowers October-November.

FAMILY 148 JUNCACEAE

B. L. Rye

Perennial or annual herbs or rarely shrubs, often with a creeping rhizome, with a grass-like habit, occupying damp habitats, usually hermaphrodite. Stems hollow or sometimes solid. Leaves alternate, often all basal or near the base of the stem, simple, sheathing, often 2-lobed or ligulate at the summit of the sheath, parallel-veined; blade sometimes reduced or absent. Inflorescence basically an open cyme or a compact cluster or rarely 1-flowered. Flowers actinomorphic, small, usually wind-pollinated. Perianth segments usually 6 in 2 whorls, often green to brown or translucent. Stamens usually 6 in 2 whorls, rarely 3 or 2; anther 2-celled, basifixed, longitudinally dehiscent. Ovary superior, usually 3-celled, rarely 1-celled; ovules 3 to numerous. Styles 1 or rarely 3, when 1 usually with 3 stigmatic branches, terminal. Fruit usually a loculicidal capsule, rarely indehiscent. About 300 species in 8 genera, cosmopolitan.

1. Leaves glabrous, sometimes reduced to the sheath. Capsule 3-celled, with numerous seeds..... **JUNCUS**
1. Leaves hairy, with a flat blade. Capsule 1-celled, with 3 seeds..... **LUZULA**

JUNCUS L.

Perennial or annual herbs, commonly known as Rushes, usually with a flat rhizome producing 1 leafy shoot each year. Leaves usually radical, with a large sheathing base, sometimes reduced to the sheath, glabrous; blade (when present) narrow. Inflorescence a panicle of separate or clustered flowers or a dense head, terminal but sometimes appearing lateral; basal bract often leaf-like or continuing the stem. Flowers protogynous. Perianth segments narrowly ovate or ovate. Stamens 3-6. Ovary fully or partially 3-celled. Capsule glossy, dehiscent by 3 valves. Seeds small, numerous. About 300 species, mostly extra-tropical, 14 native and 8 naturalized species occurring in W.A.

1. Leaf blade well developed, articulate or compressed. Inflorescence normally exceeding the bracts, appearing terminal.
2. Leaf blade compressed, broader than the stems, not articulate.
 3. Annual herb. Outer perianth segments 3.5-6.5 mm long.
 4. Bracteoles present. Fruit elongate..... **J. bufonius**
 4. Bracteoles absent. Fruit almost globular..... ***J. capitatus**
 3. Perennial herb. Perianth segments 1.5-3 mm long.
 5. Stamens 6. Leaves 1.5-4 mm broad..... **J. caespiticus**
 5. Stamens 3. Leaves usually 4-10 mm broad, rarely 2.5-4 mm broad..... **J. planifolius**
2. Leaf blade terete, narrower than the stems, articulate.
 6. Basal bract usually leaf-like and much larger than the other bracts. Stems 0.6-3 mm broad.
 7. Perianth segments 2-3.5 mm long. Fruit well exceeding the perianth, beaked..... ***J. articulatus**
 7. Perianth segments 4-5 mm long. Fruit not greatly exceeding the perianth, rarely beaked..... **J. holoschoenus**
 6. Basal bract usually lacking a definite blade, often not much larger than the bract above. Stems 3-7 mm broad..... ***J. microcephalus**
1. Leaves all reduced to a basal sheath or the upper leaves with a terete non-articulate blade. Basal bract erect, continuing the stem, usually exceeding the inflorescence, which appears lateral.
 8. Stem pith continuous. Outer perianth segments distinctly longer than the inner segments.
 9. Flowers clustered, usually 3-15 per cluster. Perianth and fruit dark brown..... **J. kraussii**
 9. Flowers not clustered. Perianth and fruit pale-coloured..... **J. pallidus**
 8. Stem pith interrupted. Outer and inner perianth segments subequal.
 10. Leaf sheath terminating rather abruptly, pale to medium brown; blade often present as a small point.
 11. Largest leaves 30-110 mm long. Stems with 20-35 striations..... **J. subsecundus**
 11. Largest leaves 130-300 mm long. Stems with 40-90 striations..... **J. aridicola**
 10. Leaf sheath attenuate, dark brown at the base, paler above; blade absent..... **J. polyanthemus**

J. aridicola L. Johnson

Perennial herb, up to 1.5 m high. Stems closely tufted, terete, ca 3 mm broad, striate, with interrupted pith; striations 40-90. Leaves basal, reduced to the scale-like sheath, pale to medium brown, the largest leaves 130-300 mm long. Basal bract erect, appearing to form a continuation of the stem, up to 0.3 m long. Inflorescence a loose panicle, erect but appearing lateral, usually 65-140 mm long; flowers numerous, not clustered. Perianth segments subequal in length, straw-coloured, 2-3 mm long. Stamens 3-6, ca 1.5 mm long; anther ca 0.8 mm long. Fruit equal to or exceeding the perianth.

Recorded from Yarloop on the eastern side of the Coastal Plain. Also recorded from east of Southern Cross and east of Hyden. Occurs in all mainland states.

Flowers recorded October.

The species usually occurs in arid and semi-arid areas and may well be naturalized rather than native in the Perth Region. See note under *J. subsecundus*.

***J. articulatus L.**

Jointed Rush

Perennial herb, up to 0.4 m high. Stems arising singly along a creeping rhizome, 0.6-2.5 mm broad. Leaves basal and cauline, 90-260 mm long; sheath obtusely 2-lobed at the summit; blade terete or slightly compressed, 55-200 x 0.5-1.2 mm, hollow, prominently articulate, the articles 4-11 mm apart. Basal bract leaf-like, 13-95 mm long. Inflorescence a panicle, 20-100 mm long, with up to 30 flower clusters; clusters head-like, 2-5 mm broad, 2-12-flowered. Perianth segments almost equal in length, often dark brown, 2-3.5 mm long, acuminate. Stamens 6, 1.3-1.5 mm long; anther 0.7-0.8 mm long. Style 1.5-2 mm long. Fruit brown, exceeding the perianth, beaked.

Occurs in winter-wet depressions and along watercourses. Extends from near Gidgegannup to the Scott River. Native to Europe and Asia.

Flowers mainly November-December.

This species appears to intergrade with *J. holoschoenus*, which usually has larger stems, leaves, inflorescences and flowers.

J. bufonius L.

Toad Rush

Annual herb, usually 0.04-0.3 m high. Stems tufted, somewhat compressed or angular, 0.2-1.5 mm broad. Leaves all radical or the uppermost leaf cauline, usually 45-140 x 0.2-1.5 mm. Basal bract erect, usually 15-75 mm long. Inflorescence a panicle, with separate or clustered flowers; clusters head-like, up to 8 mm broad, enlarging in fruit, 2-6-flowered. Flowers ca 2 mm broad, reported to be cleistogamous. Bracteoles shorter than the perianth, scarious. Outer perianth segments 4-6.5 mm long, acute or acuminate, the keel becoming brown, with scarious margins; inner segments shorter than the outer segments. Stamens 3 or 6, 2-3 mm long; anther 0.7-1.2 mm long. Style up to 1.5 mm long. Fruit brown, elongate but shorter than the perianth.

Occurs in disturbed winter-wet sites on the Coastal Plain and in valleys on the Darling Scarp. Extends from Dirk Hartog Island to the south coast and inland to Southern Cross and Fraser Range. Recorded in all states except N.T. Widespread overseas.

Flowers probably August-November, sometimes continuing to January.

Specimens occurring east of the Perth Region are often only 20-35 mm high and have short leaves. The taxon as presently recognized is polymorphic in inflorescence structure, colour, stamen number and other characters; it should probably be split into 2 or more species. Some variants are believed to be native and some naturalized in Australia. In W.A., an erect variant occurring in relatively undisturbed bushland is probably native, while a low mat-forming variant in disturbed areas is presumably naturalized.

J. caespiticius E. Meyer

Grassy Rush

Perennial herb, up to 0.45 m high. Stems tufted or arising closely along a short creeping rhizome, somewhat compressed, slender. Leaves radical, 50-210 x 1.5-4 mm, flat or concave on the upper surface, tapering to a fine point. Basal bract 10-95 mm long, sometimes exceeding the inflorescence. Inflorescence an umbel or compound umbel of flower clusters; peduncles up to 35 mm long; clusters head-like, few-numerous, almost globular, usually 5-6 mm broad. Perianth segments brown, 2-3 mm long, keeled; outer segments distinctly acuminate; inner segments with translucent margins. Stamens 6, 1.2-1.5 mm long; anther 0.5-0.8 mm long, slender. Style red, 1-1.5 mm long. Fruit brown, 1.5-2 x ca 1.2 mm.

Occurs in winter-wet depressions on the eastern side of the Coastal Plain. Extends from near Gidgegannup to the south coast. Also occurs in S.A., Vic., Tas., N.S.W. and New Zealand.

Flowers mainly October-December.

This species is very close to *J. planifolius*, the only consistent difference between them being the stamen number. *J. planifolius* tends to have broader leaves and fruits longer than the perianth segments whereas in *J. caespiticius* the fruits are usually shorter than the perianth.

***J. capitatus Weigel**

Annual herb, 45-140 mm high. Stems tufted, somewhat compressed, 0.3-1 mm broad. Leaves radical, linear, 25-60 mm long, no broader than the stems. Basal bract erect, 5-30 mm long, often exceeding the inflorescence. Flower clusters head-like, either terminal or subterminal with 1 or more branches,

each bearing a further head; heads 5-9 mm broad at first, up to 13 mm broad in fruit. Bracteoles absent. Outer perianth segments 3.5-5.5 mm long, distinctly acuminate, the keel becoming brown, the remainder scarious; inner segments shorter than the outer segments, often not acuminate, scarious. Stamens 3, 1-1.5 mm long; anther 0.25-0.5 mm long. Style ca 1 mm long. Fruit almost globular, shorter than the perianth.

Recorded near Perth, in winter-wet depressions on the eastern side of the Coastal Plain and in moist habitats on the Darling Range. Extends from Bakers Hill to Albany. Native to Eurasia, Africa and possibly South Africa.

Flowers mainly September-October.

J. holoschoenus R. Br.

Jointleaf Rush

Perennial herb, up to 1 m high. Stems arising singly along a creeping rhizome, 1.5-3 mm broad. Leaves basal and cauline, up to 0.6 m long; sheath 2-lobed at the apex; blade terete or slightly compressed, up to 0.5 m long, 1-3.5 mm broad, hollow, articulate; articles usually 10-23 mm apart, often prominent. Basal bract 22-190 mm long, almost always with a well developed blade, usually much larger than the bract above. Inflorescence a loose panicle of flower clusters, usually 100-230 mm long, rarely 30-100 mm long; clusters 22-190 x 7-12 mm, the largest cluster of each inflorescence usually 12-20-flowered. Perianth segments subequal in length, usually green with a brown apex, 4-5 mm long, acuminate. Stamens 6, 1.5-2 mm long; anther 0.5-0.9 mm long. Fruit a similar length to the perianth or slightly exceeding it, lacking a beak or shortly beaked.

Occurs in winter-wet depressions on the Coastal Plain from Perth southward. Extends south to Manjimup. Recorded in all states except N.T. Also occurs in New Zealand.

Flowers September-November.

This species appears to intergrade with *J. articulatus* and to a lesser extent with *J. microcephalus*. See note under *J. articulatus*.

J. kraussii Hochst.

Sea Rush

Perennial herb, up to 1.2 m high, often forming a large clump. Stems arising singly along a creeping rhizome, terete, 2-4 mm broad, striate, with a continuous pith. Leaves few, basal or near-basal; sheath brown at the base, up to 230 mm long, lacking lobes; blade stem-like but shorter, pungent. Basal bract erect, appearing to form a continuation of the stem, usually 55-280 mm long, pungent. Inflorescence a panicle of numerous flower clusters, usually 65-125 mm long, often exceeded by the involucre bract, appearing lateral; clusters head-like, 2-6 mm broad, usually 3-15-flowered. Perianth segments usually dark brown; outer segments 2-3 mm long; inner segments somewhat shorter. Stamens 6; anther appearing sessile, largely obscuring the short filament, 0.8-1 mm long. Fruit dark brown, protruding from the perianth. Seeds usually winged. *J. maritimus* Lam. var. *australiensis* Buchenau

Occurs mainly in saline and brackish habitats on the Coastal Plain. Extends from Yuna to Cape Arid National Park. Also recorded from Millstream in the Pilbara. Occurs in all Australian states. Also occurs in New Zealand and South Africa.

Flowers mainly November-December.

South of the Perth Region the stems are often 1-1.5 mm broad and the panicles are often 35-55 mm long.

***J. microcephalus** Kunth

Perennial herb, up to 1.5 m high. Stems usually arising closely along a short creeping rhizome, terete or somewhat compressed, 3-7 mm broad. Leaves basal and cauline, up to 0.7 m long; sheath 2-lobed at the apex; blade terete, up to 0.4 m long, 3-6 mm broad, hollow, articulate; articles 10-25 mm apart, often indistinct. Basal bract usually lacking a definite blade, usually 20-45 mm long, rarely 45-100 mm long; adjacent bracts somewhat smaller but still prominent. Inflorescence a loose panicle of numerous flower clusters, usually 0.1-0.3 m long; clusters head-like, 7-8 mm broad, usually 10-17-flowered. Perianth segments subequal in length, reddish brown along the centre, 3-4 mm long, acuminate, with translucent lateral margins. Stamens 6, 1.2-2 mm long; anther 0.5-1 mm long. Fruit brown, somewhat shorter than the perianth, strongly 3-ribbed.

Occurs in moist disturbed sites on the Darling Range and Scarp from Perth southward. Extends along the south coast to Cape Riche. Native to South Africa.

Flowers November-February.

See note under *J. holoschoenus*.

J. pallidus R. Br.

Pale Rush

Perennial herb, up to 2 m high. Stems arising singly along a creeping rhizome, terete, pale green, 2-7 mm broad, finely striate, with a continuous pith. Leaves basal, reduced to a scale-like sheath or sometimes with a point-like blade, dark brown at the base, paler above, usually 120-230 mm long. Basal bract erect, appearing to form a continuation of the stem, 0.1-0.4 m long, rigid, tapering to a point. Inflorescence a panicle, erect but appearing lateral, 25-185 mm long; flowers numerous, not clustered. Perianth segments straw-coloured, acute; outer segments 2.8-4 mm long; inner segments somewhat shorter than the outer segments. Stamens 6, 1-1.5 mm long; anther 0.6-1 mm long. Fruit pale brown, shorter or longer than the perianth.

Occurs in winter-wet depressions and along watercourses on the Coastal Plain and possibly on the Darling Scarp. Extends from Dandaragan to east of Ravensthorpe. Also occurs in S.A., Vic., Tas., N.S.W. and New Zealand.

Flowers mainly October-November.

See note under *J. subsecundus*.

J. planifolius R. Br.

Broadleaf Rush

Perennial herb, up to 0.6 m high. Stems tufted, somewhat compressed, slender. Leaves radical, usually 0.15-0.45 m long, 4-10 mm or very rarely 2.5-4 mm broad, flat or rarely somewhat channelled, attenuate. Basal bract 20-80 mm long. Inflorescence a compound umbel of flower clusters, unevenly branched; peduncles up to 50 mm long; clusters head-like, usually numerous, almost globular, ca 4 mm broad, enlarging to ca 7 mm broad in fruit. Perianth segments brown, keeled, 1.5-2.2 mm long, usually with scariosus lateral margins; outer segments usually shortly acuminate. Stamens 3, ca 1.5 mm long; anther 0.3-0.5 mm long. Style ca 1 mm long. Fruit brown, 2-2.5 x 1.5-2 mm.

Occurs in winter-wet depressions on the eastern side of the Coastal Plain from Gingin southward. Extends along the south coast to Cape Riche. Also occurs in S.A., Vic., Tas., N.S.W., Qld, New Zealand and South America.

Flowers mainly October-November.

See note under *J. caespiticus*.

J. polyanthemus Buchenau

Perennial herb, up to 1.5 m high. Stems arising singly along a creeping rhizome or tufted, terete, 1.5-5 mm broad, striate, with interrupted pith. Leaves basal, reduced to the scale-like sheath, dark brown at the base, paler above, 145-250 mm long, attenuate. Basal bract erect, appearing to form a continuation of the stem, 80-210 mm long. Inflorescence a panicle, erect but appearing lateral, 20-125 mm long; flowers numerous, not clustered. Perianth segments almost equal, straw-coloured, 1.5-2.5 mm long. Stamens 3, 0.7-1.3 mm long; anther 0.3-0.7 mm long. Fruit straw-coloured, longer than the perianth.

Apparently endemic to the Perth Region, occurring in winter-wet depressions on the eastern side of the Coastal Plain from Perth to Harvey, possibly reaching Bunbury.

Flowers probably mainly October-November.

J. subsecundus Wakef.

Finger Rush

Perennial herb, up to 1 m high. Stems tufted, terete, usually 0.8-2 mm broad, rarely 2-3 mm broad, striate, with interrupted pith; striations 20-35. Leaves basal, reduced to the scale-like sheath, often with a point-like blade, yellowish or pale brown, 30-110 mm long. Basal bract erect, appearing to form a continuation of the stem, 55-180 mm long. Inflorescence a panicle, erect but appearing lateral, usually 15-75 mm long; flowers numerous, not clustered. Perianth segments subequal in length, straw-coloured, 2.2-3 mm long. Stamens 3-6, 1.3-2 mm long; anther 0.6-1 mm long. Fruit pale brown, usually exceeding the perianth.

Occurs on the Coastal Plain, Darling Scarp and Range from Perth southward, probably favouring moist habitats. Extends along the south coast to Fitzgerald River National Park and inland to Southern Cross.

Flowers September-November.

Possible hybrids with both *J. aridicola* and *J. pallidus* have been reported.

LUZULA DC.

Perennial herbs; rhizome usually flat. Leaves usually hairy; sheath closed. Inflorescence bracts small, narrowly ovate, scarious. Flowers usually subtended by 2 translucent bracteoles. Stamens usually 6. Ovary 1-celled; ovules 3, basal. Fruit 3-seeded. About 80 species, cosmopolitan, especially in temperate Eurasia, 2 species occurring in W.A.

L. meridionalis Nordensk.

Perennial herb, up to 0.4 m high. Stems somewhat compressed, ribbed, glabrous. Leaves mostly basal, the uppermost 1 or 2 leaves cauline, usually shorter than the flowering stems, flat, 1-5 mm, broad, tapering to an obtuse apex, ciliate; cilia long, soft, fine. Inflorescence an umbel or compound umbel of flower clusters, unevenly branched; peduncles up to 70 mm long; clusters head-like, dense, globular, 5-7 mm broad. Bracts and bracteoles white-translucent, shorter than the perianth, ciliate. Perianth segments brown, ovate, 3-3.5 mm long, folded, acuminate. Stamens 6, ca 1.5 mm long; anther 0.7-0.8 mm long. Style 2-3 mm long. Fruit brown, ca 2.5 x 2 mm, 3-angled and 3-ribbed. Seeds brown, ca 0.8 mm long, glossy, with a white or yellowish aril up to 0.8 mm long.

Occurs in sand on the Coastal Plain from Perth southward. Extends around the coast to near Cape Riche, and inland to York. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers August-September.

FAMILY 149. CYPERACEAE

B. L. Rye

Herbs, usually perennial, with a grass-like or rush-like habit, commonly known as Sedges, the perennials usually with a rhizome. Stems usually rather rigid, solid, usually lacking nodes below the inflorescence. Leaves often stem-like but tapering to a fine apical point, usually arising at the base of the stem; outer basal leaves dilated at the base into an open sheath or reduced to the sheath; inner basal leaves and stem leaves (when present) with a closed sheath, usually with a definite blade, sometimes with an adaxial ligule at the junction of the sheath and blade. Inflorescence usually of 1 to numerous small spike-like racemes, which for simplicity are referred to here as spikelets; spikelets usually bisexual or with both bisexual and male flowers, sometimes unisexual, usually green or brown, with overlapping scale-like bracts referred to here as glumes, the basal glumes often empty, with 1 sessile flower in the axil of each floral glume. Flowers wind-pollinated. Perianth absent or reduced to bristles or small scales. Stamens usually 1-3, rarely up to 20; filament free, filiform or slightly compressed; anther usually exerted from the spikelet, basifixed, oblong or linear, with 2 parallel cells, longitudinally dehiscent, the connective usually produced somewhat beyond the cells. Ovary 1-celled; ovule 1, erect. Style terminal, usually filiform, divided into 2 or more spreading or recurved stigmatic branches. Fruit a small nut, often compressed or 3-angled. About 90 genera and 4000 species, cosmopolitan, occurring mainly in moist habitats. Currently being studied by K.L. Wilson.

1. Monoecious herbs; spikelets unisexual or with both male and female flowers.
2. Nut enclosed in a utricle with a 2-branched beak. Inflorescence elongate..... **CAREX**
2. Utricle absent. Inflorescence a compact head..... **CHORIZANDRA**

1. Hermaphrodite or andromonoecious herbs; spikelets rarely of all male flowers, usually with 1 or more bisexual flowers, which are often accompanied by male or sterile flowers.
3. Glumes spirally arranged.
 4. Stamens 12 or more. Style branches ca 8..... **EVANDRA**
 4. Stamens 1-8. Style branches 2-5.
 5. Spikelets with several to many nuts maturing.
 6. Style not thickened at the base.
 7. Perianth segments absent..... **ISOLEPIS**
 7. Perianth segments present.
 8. Stems lacking nodes, all the leaves basal..... **SCHOENOPLECTUS**
 8. Stems noded, with leaves at the nodes..... **BOLBOSCHOENUS**
 6. Style thickened at the base.
 9. Perianth segments absent. Style base not enlarged..... **FIMBRISTYLIS**
 9. Perianth segments present. Style base enlarged in fruit..... **ELEOCHARIS**
 5. Spikelets with at most 1 nut maturing.
 10. Perianth segments absent.
 11. Branchlets short, recurved, pungent, several arising in the axil of each bract..... **CAUSTIS**
 11. Branchlets not as above.
 12. Style base thickened in fruit..... **BAUMEA**
 12. Style base not thickened..... **GAHNIA**
 10. Perianth segments present at least in the bisexual flowers.
 13. Stamens 2. Style branches 2..... **CYATHOCHAETA**
 13. Stamens 3. Style branches 3..... **LEPIDOSPERMA**
3. Glumes distichous.
 14. Style thickened and hairy at the base, persistent in fruit..... **TETRARIA**
 14. Style neither thickened nor hairy at the base, deciduous or persistent.
 15. Perianth segments 3, their broad bases enclosing the nut, abruptly acuminate and twisted in the upper part..... **MESOMELAENA**
 15. Perianth segments absent or not as above.
 16. Spikelet axis prominently flexuose and curved over each nut.... **SCHOENUS**
 16. Spikelet axis straight to slightly flexuose.
 17. Perianth segments absent..... **CYPERUS**
 17. Perianth segments short, bristle-like..... **TRICOSTULARIA**

BAUMEA Gaudich.

Perennial herbs, with clusters of few to numerous stems arising along a creeping rhizome. Stems erect, sometimes compressed, pithy. Leaves often stem-like but acute, sometimes reduced to the sheath, not ligulate. Inflorescence a panicle of spikelets; spikelets sometimes tightly clustered at each node, 1-several-flowered, all appearing bisexual but often only 1 flower in each spikelet capable of producing a seed. Glumes spirally arranged. Perianth segments absent. Stamens usually 3. Style with 3 long stigmatic branches; base thickened, persistent in fruit. Nut ovoid to obloid or ellipsoid, 3-angled or almost circular in cross-section. About 30 species, extending from Madagascar (Malagasy) to Hawaii and from Japan to New Zealand, concentrated in Australia, 10 species occurring in W.A. This genus has often been included in either *Cladium* P. Browne or *Machaerina* Vahl but is retained as a separate genus in the most recent treatment (Wilson, K.L. 1980. *Telopea* 1: 457-467). Reference: Blake, S.T. 1967. *Contr. Qld Herb. No. 8*: 1-48.

1. Leaves much reduced; blade much shorter than the sheath. Stems terete.
2. Leaves 2 or 3, widely spaced up the stem, closely sheathing except for the small blade. Stems not obviously striate..... **B. juncea**
2. Leaves several and overlapping near the base of the stem and sometimes 1 separate leaf above. Loosely sheathing in the upper half. Stems distinctly striate..... **B. vaginalis**

1. Leaves long, usually stem-like; blade longer than the sheath. Stems terete or compressed.
3. Leaves with a terete articulate blade.
 4. Leaves prominently articulate. Anthers ca 2.5 mm long..... **B. articulata**
 4. Leaf articulations not prominent. Anthers ca 1.5 mm long..... **B. arthropphylla**
3. Leaves compressed, not articulate.
 5. Panicle usually 15-30 mm long. Style base glabrous..... **B. acuta**
 5. Panicle usually 0.2-0.4 m long. Style base minutely hairy.
 6. Spikelets in dense head-like clusters. Glumes distinctly ciliate..... **B. riparia**
 6. Spikelets loosely arranged. Glume usually glabrous to sparsely ciliate, rarely distinctly ciliate..... **B. preissii**

B. acuta (Labill.) Palla

Pale Twig-rush

Perennial herb, up to 0.35 m high. Stems somewhat compressed, 1-3 mm broad, with fine longitudinal ribs. Leaves basal, compressed, rather stem-like, usually longer or sometimes slightly shorter than the stems. Panicle usually 15-30 mm long or, if longer, then with a large distance between the lowest nodes; spikelets few and closely clustered at each node, erect, 5-7 mm long. Glumes often somewhat ciliate on the upper margin. Anthers 2-2.5 mm long. Style base of the nut large, glabrous. *Cladium schoenoides* R. Br., *Machaerina acuta* (Labill.) Kern.

Occurs in winter-wet depressions on the Coastal Plain and Darling Range from Perth southward. Reported from a few widely scattered localities extending along the south coast to east of Esperance. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers September-November.

B. arthropphylla (Nees) Boeckeler

Perennial herb, up to 1 m high. Stems terete or slightly compressed, 1.5-4 mm broad, sometimes articulate. Leaves erect; basal leaves (when present) long, terete, rather distinctly articulate; stem leaves with a loose sheath and articulate blade. Panicle interrupted, usually 100-150 mm long or, if longer, then with very large distances between the branches at the lower nodes; spikelets numerous, fairly erect, 3-4 mm long. Glumes ciliate. Anthers ca 1.5 mm long. Nut shiny, apparently reddish; style base scarcely visible. *Cladium arthropphyllum* (Nees) F. Muell.

Occurs from Perth southward, on the Coastal Plain and Darling Range, in winter-wet depressions or around permanent lakes, often partially submerged. Extends south to Augusta. Recorded from all states except N.T. Also occurs in New Zealand.

Flowers recorded September-October.

B. articulata (R. Br.) S.T. Blake

Jointed Twig-rush

Perennial herb, up to 2.5 m high. Stems terete, 6-13 mm in diameter, hollow, articulate. Leaves basal, erect, stem-like, more prominently articulate than the stems. Panicle 0.2-0.4 m long, interrupted, often pendulous, the branches and peduncles clustered within each sheathing bract, the basal bract usually leaf-like but with a much shorter blade; spikelets very numerous, 3-4.5 mm long. Glumes entire or minutely denticulate, not prominently ciliate. Anthers ca 2.5 mm long. Nut whitish; style base prominent, cushion-like. *Cladium articulatum* R. Br., *Machaerina articulata* (R. Br.) Koyama

Occurs in waterlogged soil bordering lakes and pools on the Coastal Plain and Darling Range. Extends from just north of the Perth Region to Fitzgerald River National Park and has also been recorded from the southern Kimberley. Recorded from all mainland states except N.T. Also occurs in New Zealand, New Caledonia, New Hebrides and New Guinea.

Flowers recorded throughout the year but mainly September-December.

B. juncea (R. Br.) Palla

Bare Twig-rush

Perennial herb, up to 1.2 m high. Stems terete, 1-3 mm in diameter, usually 2 or 3-noded below the inflorescence, smooth. Leaves much reduced; sheath closely surrounding the stem; blade 2-10 mm long,

much shorter than the sheath. Inflorescence spike-like, usually 10-60 mm long; spikelets few, erect, 3-5 mm long, sometimes becoming smutted and enlarged. Glumes usually entire, glabrous or sometimes minutely ciliate. Anthers 2-2.5 mm long. Nut dark-coloured; style base small, hairy. *Cladium junceum* R. Br., *Machaerina juncea* (R. Br.) Koyama

Occurs in seasonally waterlogged soil bordering winter-wet depressions on the Coastal Plain. Extends in near-coastal areas from Dongara to the Recherche Archipelago. Also occurs in S.A., Vic., Tas., N.S.W., New Zealand and New Caledonia.

Flowers October-January.

B. preissii Nees

Perennial herb, up to 1 m high. Stems compressed, 1-8 mm or more broad, with fine longitudinal lines. Leaves basal, similar to the stems or broader, the upper part often broken off leaving a rather truncate apex. Panicle very loose, interrupted, usually 0.2-0.4 m long, often almost half the length of the plant; spikelets usually numerous, not clustered, 5-6 mm long. Glumes usually glabrous or sparsely ciliate, rarely distinctly ciliate. Anthers ca 2 mm long. Style base fairly prominent in fruit, hairy. *Cladium preissii* (Nees) Benth.

Occurs in seasonally waterlogged soil bordering lakes and watercourses on the Coastal Plain, Darling Scarp and Range from Perth southward. Extends along the south coast to Albany.

Flowers September-October, possibly continuing to December.

As recognized here, this species is very variable and probably includes *B. laxa* (Nees) Boeck., which extends to S.A. and Vic. Possibly the specimens with narrower leaves should be treated separately as *B. laxa* but they appeared to completely intergrade with typical *B. preissii* specimens and were therefore combined under the older name, *B. preissii*.

B. riparia (Nees) Boeckeler

Perennial herb, up to 1.5 m high. Stems much compressed, 4-10 mm broad, longitudinally striate. Leaves basal, stem-like. Panicle 0.2-0.35 m long, interrupted, with dense head-like clusters of spikelets; spikelets usually numerous, erect, 5-7 mm long. Glumes distinctly ciliate. Anthers 2-2.5 mm long. Nut whitish; style base large, hairy. *Cladium riparium* (Nees) Benth.

Occurs in seasonally waterlogged soil bordering winter-wet depressions and watercourses on the Coastal Plain, Darling Scarp and Range from Bullsbrook southward. Extends along the south coast to Albany.

Flowers September-October.

B. vaginalis (Benth.) S.T. Blake

Sheath Twig-rush

Perennial herb, up to 1.2 m high. Stems terete below the inflorescence, 2-6 mm in diameter, with rather inconspicuous longitudinal ribs when dried. Leaves very reduced, all overlapping near the base of the stem or sometimes the uppermost leaf occurring separately above, loosely sheathing in the upper part, acute or terminating in a point formed by an extension of the keel of the sheath. Panicle spike-like, usually widely interrupted, 0.05-0.3 m long; spikelets not numerous, erect, 7-9 mm long. Glumes entire or minutely ciliate in the upper part. *Cladium vaginale* Benth.

Occurs from Perth southward, in winter-wet depressions and along watercourses on the Coastal Plain and Darling Scarp. Extends along the south coast to Albany.

Flowers October-November.

BOLBOSCHOENUS (Asch.) Palla

Perennial herbs. Stems with nodes below the inflorescence. Leaves arising at nodes. Inflorescence a terminal cluster of spikelets, usually subtended by several leafy bracts; spikelets with several to many bisexual flowers. Glumes spirally arranged, all floral but the basal bracts subtending lateral spikelets

often glume-like. Perianth segments present. Stamens 3. Style 2 or 3-branched; base not enlarged. Nut compressed or 3-angled. About 16 species, widely distributed on all continents, 1 species occurring in W.A. See note under *Isolepis*. Reference: Wilson, K.L. 1981. *Telopea* 2: 153-172.

B. caldwellii (V. Cook) Sojak

Marsh Club-rush

Perennial rhizomatous herb, up to 1.2 m high. Stems arising singly along the rhizome, often very swollen at the point of attachment to the rhizome, acutely 3-angled, leafy throughout. Leaves grass-like, long, 3-12 mm broad, striate, the midrib prominent on the abaxial surface. Involucral bracts 2 or 3, unequal, much longer than the inflorescence, similar to the leaves. Inflorescence either umbel-like with many pedunculate spikelets or with few sessile spikelets; peduncles up to 70 mm long; spikelets usually 1-5, clustered at the base or on each peduncle, golden brown, ovoid, 12-20 mm long, many-flowered. Glumes notched or jagged, the keel extending into a spreading point. Perianth segments up to 3 mm long. Stamens 3; anther 4-4.5 mm long. Style branches 2. Nut compressed, ca 3 mm long, broad. *Scirpus caldwellii* V. Cook

Occurs in mud or sand along rivers and in winter-wet depressions on the Coastal Plain. Extends in near-coastal areas from the Hill River to Fitzgerald River National Park. Also occurs in S.A., Vic., Tas., N.S.W. and New Zealand.

Flowers mainly August-November.

This species was previously regarded as being the exotic species *Scirpus maritimus* L.

CAREX L.

Perennial rhizomatous herbs, monoecious. Leaves linear, grass-like, mainly radical or on the lower part of the stem, usually a similar length to the stems. Spikelets few to very numerous per stem, unisexual or bisexual; subtending bracts leaf-like or bract-like, becoming progressively smaller up the stem. Glumes spirally arranged, all floral. Perianth segments absent. Stamens usually 3. Style branches 2 or 3, filiform. Ovary enclosed in a bottle shaped or compressed sack known as the utricle, with a 2-branched beak. Nut enclosed in the somewhat enlarged persistent utricle. Over 1500 species, cosmopolitan, 6 native and 1 naturalized species occurring in W.A.

1. Spikelets numerous in a spike-like panicle, with mixed male and female flowers.
2. Inflorescence 50-100 mm long. Stems terete or slightly compressed in the lower part, obtusely 3-angled above..... **C. tereticaulis**
2. Inflorescence 100-400 mm long. Stems acutely 3-angled..... **C. appressa**
1. Spikelets 1-7 in a terminal cluster or solitary in the leaf axils, the male and female flowers on separate spikelets or on different parts of the same spikelets.
3. Male and female flowers occurring in each spikelet. Style branches 2.
4. Inflorescence not exceeded by the subtending bracts. Male and female flowers nearly equal in number, the males uppermost..... ***C. divisa**
4. Inflorescence greatly exceeded by 1 or more long leafy bracts. Female flowers more numerous than the males and uppermost..... **C. inversa**
3. Male flowers confined to the terminal and subterminal spikelets, the lowest spikelets female. Style branches usually 3.
5. Spikelets erect, the uppermost spikelets almost sessile. Glume margin almost translucent.
6. Utricle 5-6 mm long, not striped. Terminal spikelet with many female flowers below the male flowers **C. pumila**
6. Utricle 3-4 mm long, distinctly striped. Terminal spikelet male or with most flowers male..... **C. preissii**
5. Spikelets with a long pendulous peduncle. Glume margin somewhat darker than the central portion..... **C. fascicularis**

C. appressa R. Br.

Tall Sedge

Perennial herb, tufted, up to 1.8 m high. Stems acutely 3-angled, scabrous on the edges especially toward the summit, often smooth lower down. Leaves linear, 3-6 mm broad, striate, with scabrous margins. Basal bract inconspicuous. Inflorescence a spike-like panicle of numerous spikelets, 0.1-0.4 m long, narrow, with many erect branches. Spikelets 5-7 mm long, with mixed male and female flowers. Glumes acute to awned, the midrib usually paler than the remainder of the glume and usually minutely toothed in the upper part. Anthers ca 2 mm long, hairy at the apex. Utricle 2.5-3.5 mm long, minutely toothed on the margins. Style branches 2.

Occurs on the Coastal Plain from Gingin southward, in winter-wet depressions and along watercourses, sometimes partly submerged. Extends in near-coastal areas to Albany. Recorded from all states except N.T. Also occurs in New Zealand, New Guinea and New Caledonia.

Flowers September-October.

***C. divisa** Hudson

Divided Sedge

Perennial herb, less than 1 m high. Stems arising singly along a creeping rhizome, slender and wiry, acutely 3-angled, scabrous at the summit. Leaves 0.5-1.5 mm broad, almost flat or shallowly and acutely 3-angled. Basal bract with a long fine awn but usually shorter than the inflorescence, not prominent. Inflorescence a terminal cluster of 2-7 sessile spikelets, 10-20 mm long. Spikelets 6-9 mm long, usually with several male flowers above several female flowers. Glumes with a prominent pale midrib produced into an awn, brown on each side of the midrib, entire, translucent on the margins. Anthers 2.5-3 mm long, terminating in a simple point. Utricle ca 3.5 mm long, many-veined. Style branches 2.

Occurs in winter-wet depressions on the Coastal Plain from Wanneroo southward. Extends south to Cape Naturaliste. Native to Europe and Asia.

Flowers September-December.

C. fascicularis Sol. ex Boott

Tassel Sedge

Perennial herb, tufted, up to 1.5 m high. Stems acutely 3-angled, scabrous on the margins. Leaves 5-9 mm broad, flat, striate, with scabrous margins. Involucral bract leaf-like, reaching well above the inflorescence. Inflorescence usually a loose cluster of 3-6 spikelets, terminal but appearing lateral. Spikelets with a slender pendulous peduncle, cylindric, 20-60 mm long, with a terminal male flower and many female flowers below. Glumes fairly uniform in colour, with a scabrous awn. Anthers 2.5-3 mm long, terminating in a simple point. Utricle 4-7 mm long, becoming prominently veined; beak long, deeply 2-branched. Style branches 3.

Occurs on the Coastal Plain from Wanneroo southward, in winter-wet depressions and along watercourses. Extends south to Pemberton. Recorded from all states except N.T. Also occurs in New Guinea and New Zealand.

Flowers probably September-November.

The species has been misidentified as *C. pseudocyperus* L.

C. inversa R. Br.

Knob Sedge

Perennial herb, probably tufted, up to 0.75 m high. Stems slender, flat, smooth. Leaves 1-4 mm broad, flat, smooth. Involucral bracts leaf-like, 1 or more exceeding the inflorescence. Inflorescence a cluster of 1 to several spikelets, terminal but appearing subterminal, 7-35 mm long. Spikelets with a few male flowers at the base and more numerous female flowers above. Glumes with a prominent green midrib extending into an awn, usually with a whitish stripe on each side of the midrib, entire; margins broad, translucent. Anthers 1.3-2 mm long, with terminal hairs. Utricle ca 2 mm long. Style branches 2.

Occurs from Perth southward, along watercourses and in winter-wet depressions on the Coastal Plain. Extends inland to Northam and along the south coast to Fitzgerald River National Park. Recorded from all states except N.T. Also occurs in New Zealand.

Flowers September-October.

C. preissii Nees

Perennial herb, tufted, rarely more than 0.5 m high. Stems very slender, grooved, somewhat compressed, scabrous near the top. Leaves flat, 1.5-4 mm broad, usually with a fairly smooth margin. Lower bracts leaf-like, much longer than the peduncles. Spikelets solitary in the bract axils, 7-25 mm long, all female except for the terminal spikelet; lowest spikelets usually very widely spaced, long-pedunculate; uppermost female spikelet almost sessile, directly below the terminal spikelet; terminal spikelet male or of mainly male flowers. Glumes acute to acuminate; keel broad, initially green, bordered by 2 narrow whitish lines; margins broad, somewhat translucent, entire. Anthers 3-4 mm long, apparently with a few tiny terminal hairs. Utricle 3-4 mm long, distinctly striped, not toothed; beak very shortly 2-branched. Style branches usually 3.

Occurs from Perth southward, mainly on coastal sand dunes, but also recorded from a stony hillside on the Darling Range. Extends along the south coast to Cape Le Grand.

Flowers July-October.

C. pumila Thunb.

Strand Sedge

Perennial herb, up to 0.4 m high; rhizome creeping, long. Stems acutely 3-angled, with a fairly smooth margin. Leaves 2-4 mm broad, flat or V-shaped, with somewhat scabrous margins. Inflorescence usually of 3-7 spikelets; spikelets clustered or distant in the bract axils, erect; lower spikelets pedunculate, 15-25 mm long, usually with all flowers female, the subterminal spikelet almost sessile; terminal spikelet longer than the other spikelets, the lower part with female flowers and the upper part with male flowers. Glumes with a pale midrib usually produced into a short point, brown on each side of the midrib; margins rather translucent, entire. Anthers probably 3-4 mm long, with a simple apex. Utricle 5-6 mm long; beak short, 2-branched. Style branches 3.

The only record for W.A. is from the coast just north of Bunbury, probably on sand dunes. Recorded from all states except N.T. Also occurs in New Zealand, Asia and South America.

Flowering period uncertain, probably mainly September-December.

C. tereticaulis F. Muell.

Perennial herb, up to 0.7 m high, often forming a large clump. Stems terete or slightly compressed in the lower part, obtusely 3-angled and scabrous just below the inflorescence. Leaves flat, 3-5 mm broad, striate, fairly smooth-margined. Basal bract with a long fine awn, much shorter than the inflorescence. Inflorescence a narrow spike-like panicle of numerous spikelets, often rather dense, usually 50-100 mm long. Spikelets ca 5 mm long, with male and female flowers. Glumes with a pale midrib produced into a serrulate awn, brown on each side of the midrib; translucent margins broad, initially entire but tending to become lacerate. Anthers ca 2 mm long, with a hairy apex. Utricle initially ca 2 mm long and narrow, the upper margins serrulate. Style branches 2.

Recorded only from Guildford and Harvey on the Coastal Plain, probably in seasonally waterlogged soil. No other records for W.A. but occurs in S.A., Vic., Tas. and N.S.W.

Flowers September-October.

CAUSTIS R. Br.

Perennial herbs, with thick fibrous roots. Stems arising singly along a creeping rhizome. Leaves usually all reduced to a tubular sheath, several branchlets or peduncles arising within each sheath. Spikelets 1 or 2-flowered, either unisexual or with 1 bisexual flower and sometimes a male flower below; male and female spikelets (when present) occurring on separate stems. Glumes several, spirally arranged, acuminate or awned; empty basal glumes shorter than the floral glumes. Perianth segments absent. Stamens 3-6. Style with 3 or more long stigmatic branches; base persistent in fruit, thick, hard. About 6 species, confined to Australia, 2 species occurring in W.A.

C. dioica R. Br.

Perennial herb, erect, up to 0.7 m high, in a tussock up to 0.4 m in diameter. Stems erect, the top of the main stem often curved; base very enlarged, the outer surface broken and frayed; branchlets rigid, recurved, pungent. Leaves rather loosely sheathing, obliquely truncate and ciliate at the summit of the sheath; lower leaves up to 80 mm long, with a fairly stout blade; upper leaves with a long spreading

point. Flowering branchlets sometimes mixed with vegetative branchlets. Spikelets usually with a recurved peduncle, with 1 bisexual flower and 1 male flower or sometimes both flowers male, the style maturing before the stamens. Anthers 3-5 mm long, slender. Style branches usually 4 or 5.

Occurs in sand on the Coastal Plain from Bullsbrook northward. Extends from west of Three Springs to Israelite Bay and inland to Queen Victoria Spring.

Flowers mainly September-October.

CHORIZANDRA R. Br.

Perennial herbs, with erect stems arising singly along a creeping rhizome, monoecious. Leaves arising at or near the base of the stem, often resembling the stems. Involucral bracts several in a circle, persistent, flat; basal bract erect, appearing to form a continuation of the stem above the inflorescence. Inflorescence a dense head of spikelets, terminal but appearing lateral. Spikelets globular or ovoid, very reduced, resembling a single bisexual flower but actually with 1 terminal female flower surrounded by several male flowers. Perianth segments absent. Glumes spirally arranged, all floral or only the basal glume empty. Stamen 1. Style with 2 long branches. Nut with ca 8 prominent longitudinal ribs. 5 species, all Australian, with 1 species extending to New Caledonia, 3 species occurring in W.A.

- | | |
|--|---------------------------|
| 1. Stems articulate. Lower leaves usually entire; upper stem-like leaf 1 or absent..... | C. multiarticulata |
| 1. Stems not articulate. Lower leaves often becoming frayed; upper stem-like leaves usually several..... | C. enodis |

C. enodis Nees

Black Bristle-rush

Perennial herb, up to 0.8 m high. Stems slender but wiry, minutely striate, not articulate. Several upper leaves long, stem-like; lower leaves reduced to little more than the sheath, often becoming frayed and worn away. Involucral bracts glossy. Inflorescence reddish black, dense, 8-15 mm in diameter. Spikelets usually with ca 10 male flowers. Glumes reddish, toothed, ciliate. Anthers 3-4 mm long.

Occurs in winter-wet depressions and other seasonally waterlogged sites on the Coastal Plain, Darling Scarp and Range. Extends in near-coastal areas from north of Geraldton to Cape Le Grand National Park. Also occurs in S.A., Vic. and Tas.

Flowers July-November.

C. multiarticulata Nees

Perennial herb, up to 0.6 m high. Stems articulate, with fine longitudinal ribs. Leaves increasing in size from the base upward; lower leaves reduced to a loose sheath and small point-like blade, striate, usually remaining entire; uppermost leaves sometimes stem-like. Involucral bracts glossy, apparently very dark-coloured. Inflorescence dense, probably ca 10 mm in diameter. Glumes truncate to acute, somewhat ciliate. Anthers ca 3 mm long.

In the Perth Region recorded only on or near the Darling Scarp east of Perth. Elsewhere recorded only from near Pingelly and Ravensthorpe.

Flowers recorded August-September.

CYATHOCHAETA Nees

Perennial rhizomatous herbs, usually tall. Leaves mainly basal, the few cauline leaves grading into bract-like basal leaves. Inflorescence a panicle of spikelets, narrow, not or with few divisions. Spikelets narrow, with a terminal bisexual flower and a male or sterile flower below. Glumes usually 4, spirally arranged; empty basal glumes 2. Perianth segments usually 4, long, rigid, acute. Stamens usually 2. Style usually with 2 long stigmatic branches; base thickened, persistent in young fruit. Nut with a thick stipe, not ribbed. 3 species, endemic in Australia, 2 species occurring in W.A.

C. avenacea Benth.

Perennial herb, up to 1.2 m high, forming a clump up to 0.35 m broad. Stems rigid. Leaves with a rather loose sheath and a long linear point, erect, the margins incurved. Inflorescence interrupted, 0.15-0.6 m long, with 1 to several peduncles in the axil of each bract. Spikelets 1-several per peduncle, usually ca 25 mm long. Glumes acuminate or long-acuminate. Perianth segments ciliate at the base in bisexual flowers, absent in male flowers. Anthers 2, ca 15 mm long, very slender. Style branches 2.

Occurs from Perth southward, on the Coastal Plain and Darling Scarp. Extends along the south coast to Fitzgerald River National Park.

Flowers November-December.

CYPERUS L.

Perennial herbs or rarely annual herbs. Stems usually tufted, simple below the inflorescence. Leaves usually few at the base of the stem, sometimes reduced to the sheath. Involucral bracts persistent, usually leaf-like. Spikelets 1-many-flowered; flowers usually all bisexual or sometimes the terminal or lowest flower male; axis straight to slightly flexuose. Glumes distichous; involucral glumes 1 or 2, small. Perianth absent. Stamens 1-3. Style not thickened at the base, deciduous; stigmatic branches 2 or 3. Nut somewhat compressed or acutely 3-angled. About 600 species, chiefly tropical and subtropical, also occurring in temperate parts of the world, 46 native and 7 naturalized species occurring in W.A. Often divided into several similar genera, including *Kyllinga* Rottb.

- | | |
|--|-------------------------|
| 1. Leaves all reduced to the sheath or the uppermost leaf with the blade reduced to a point. | |
| 2. Ovary obtusely 3-angled; style branches 3. Uppermost leaf lacking a definite blade..... | C. gymnocaulos |
| 2. Ovary compressed; style branches 2. Uppermost leaf with a blade 10-40 mm long..... | *C. laevigatus |
| 1. Leaves with a blade, grass-like. | |
| 3. Stamen 1; style branches 2. Spikelets 1-flowered, in a condensed spike..... | *C. brevifolius |
| 3. Stamens 1-3, if 1 then style branches 3. Spikelets many-flowered, usually clustered. | |
| 4. Stamens 1 or 2. | |
| 5. Stamen 1; anther ca 1.5 mm long. Style branches 3..... | *C. eragrostis |
| 5. Stamens 2; anther ca 0.8 mm long. Style branches 2..... | *C. polystachyos |
| 4. Stamens 3. | |
| 6. Annual herbs; stems < 0.5 mm broad. Anthers < 0.5 mm long.. | *C. tenellus |
| 6. Perennial herbs; stems 1.5-7 mm broad. Anthers 1-2 mm long. | |
| 7. Spike loose, with 3-10 spikelets. Anthers 2 mm long..... | *C. rotundus |
| 7. Spike dense, with numerous spikelets. Anthers 1-1.5 mm long. | |
| 8. Largest glumes 3.5-5 mm long. Nut 1.5-2 mm long..... | *C. congestus |
| 8. Largest glumes 2-2.5 mm long. Nut < 1.5 mm long..... | *C. tenuiflorus |

***C. brevifolius** (Rottb.) Hassk.

Kyllinga Weed

Perennial herb, grass-like. Stems scattered along the rhizome or tufted, erect or spreading, acutely 3-angled, 100-400 x 0.5-1 mm, strongly ribbed. Leaves usually shorter than the stems, 2-2.5 mm broad, keeled. Involucral bracts 3 or 4, much longer than the inflorescence, spreading or fairly erect, leaf-like. Inflorescence a condensed spike of spikelets, terminal. Spikelets green or yellowish, 2-3 x ca 1 mm, nearly flat, 1-flowered. Glumes 2, greenish, as long as the spikelets, with 2-4 veins on each side; keel prominent, usually denticulate, produced into a somewhat recurved point. Stamen 1; anther ca 1 mm long. Style branches 2. Nut compressed; ca 1 mm long.

Naturalized in gardens in Perth suburbs. Probably native to Qld, Asia, Africa and the Americas.

Flowers November-April.

***C. congestus** M. Vahl

Dense Flat-sedge

Perennial herb, tufted, up to 0.6 m high. Stems 2-7 mm broad, acutely 3-angled in the upper part, ribbed. Leaves grass-like, much shorter than the stems, 3-12 mm broad. Involucral bracts several, erect or spreading, leaf-like, the lower bracts much longer than the inflorescence. Inflorescence a cluster of spikelets or compound with several pedunculate clusters arising from the base of the first cluster; clusters dense, globular to almost hemispheric. Spikelets brown, 10-50 x ca 2 mm, many-flowered; axis winged. Glumes 3.5-5 mm long, with several veins close to the keel on each side, the keel produced into a minute point. Stamens 3; anther 1.2-1.5 mm long. Style branches 3. Nut obtusely 3-angled, 1.5-2 mm long.

Occurs in moist, usually disturbed sites on the Coastal Plain, Darling Scarp and Range from Perth southward. Extends inland to York and along the south coast to Bremer Bay. Native to South Africa.

Flowers mainly October-March.

This species is readily confused with *C. tenuiflorus*, especially as the 2 species tend to grow at the same localities. Apart from the characters used in the key, *C. congestus* tends to have broader, more acutely 3-angled stems and bracts with more numerous veins.

***C. eragrostis** Lam.

Drain Flat-sedge, Umbrella Sedge

Perennial herb, tufted, up to 0.8 m high. Stems 2.5-6 mm broad, obtusely 3-angled, striate. Leaves shorter than the stems, 4-10 mm broad, usually folded and somewhat twisted. Involucral bracts several-many, leaf-like; basal bracts much longer than the inflorescence. Inflorescence a simple or compound umbel of clustered spikelets; rays up to 100 mm long; clusters compact, subglobular. Spikelets pale, 8-13 x 3-4 mm, many-flowered; axis not winged. Glumes pale, ca 2.5 mm long, keeled, acute, with 1 or no prominent veins on each side. Stamens 1; anther ca 1.5 mm long. Style branches 3. Nut obtusely 3-angled, ca 1 mm long.

Occurs in damp disturbed sites on the Coastal Plain from Harvey southward. Extends south to Margaret River. Native to South America.

Flowers recorded October-January and June-July.

C. gymnocaulos Steudel

Spiny Flat-sedge

Perennial herb, up to 1 m high, with a short stout rhizome. Stems erect or spreading, terete, 1.5-2.5 mm broad, striate. Leaves reduced to a loose membranous sheath; lowest leaf reddish; uppermost leaf by far the longest. Involucral bracts 3-6, spreading, usually 20-45 mm long, usually exceeding the inflorescence, rigid, pungent, the margins incurved. Inflorescence a dense head of spikelets or often compound with a further 1-5 pedunculate heads arising within the basal involucre. Spikelets 4-5 x ca 3 mm; axis not winged. Glumes ca 2.5 mm long, shining, acute, with a slightly spreading apex. Stamens 3; anther ca 2 mm long. Style branches 3, often very unequal. Nut obtusely 3-angled, ca 1.5 mm long. *C. vaginatus* R. Br. var. *densiflorus* Benth.

Occurs along watercourses and in winter-wet depressions on the Coastal Plain from Perth northward. Extends north at least to Kalbarri. Occurs in all mainland Australian states.

Flowers recorded September-January.

North of Kalbarri *C. gymnocaulos* appears to intergrade with *C. vaginatus* R. Br. Further study is needed on the taxonomy of this group.

***C. laevigatus** L.

Perennial herb, tufted or with stems arising singly along the rhizome, up to 0.5 m high. Stems almost 3-angled, 1-2 mm broad, rigid, striate. Leaves reduced to a membranous sheath; uppermost leaf with a narrow blade 10-40 mm long. Involucral bracts 2; basal bract erect, appearing to form a continuation of the stem, much longer than the inflorescence; upper bract glume-like. Inflorescence a terminal head of up to 12 dense spikelets or rarely of 1 spikelet; spikelets digitately spreading, usually 5-15 mm long, ca 3 mm broad, many-flowered, often curved or twisted; axis stout, 4-angled, not winged. Glumes dense, 2.5-3 mm long, rigid, concave, several-veined, the slight keel sometimes produced into a minute point. Stamens 3; anther ca 1.5 mm long. Style branches 2. Nut compressed, ca 2 mm long, convex on 1 surface.

In the Perth Region recorded from the banks of the Swan River and Canning River. Also recorded from Port Gregory and the Augusta area. Possibly native in central Australia. Cosmopolitan.

Flowers November-April.

***C. polystachyos** Rottb.

Perennial herb, tufted, up to 0.6 m high. Stems acutely 3-angled, 1.5-3 mm broad, ribbed. Leaves much shorter than the stems, grass-like, 2-4 mm broad. Involucral bracts several, leaf-like; basal bracts much longer than the inflorescence. Inflorescence a dense head-like cluster of numerous spikelets. Spikelets 10-20 x 2-2.5 mm, many-flowered; axis not winged. Glumes 2-3 mm long, with 1 prominent rib on each side of the keel, the keel usually produced into a very short point. Stamens 2; anther ca 0.8 mm long. Style branches 2. Nut compressed, ca 1 mm long, convex on both surfaces.

Occurs from Perth southward, in disturbed damp situations and in gardens on the Coastal Plain and Darling Scarp. Extends to south of Busselton. Apparently occurs naturally in N.S.W., Qld, N.T. and tropical areas outside Australia.

Flowers recorded December-February and July.

Although it has sometimes been regarded as native, *C. polystachyos* is probably naturalized in W.A. because it appears to be restricted to gardens, farmland and other disturbed sites.

***C. rotundus** L.

Nut Grass

Perennial herb, up to 0.6 m high; rhizome wiry, with prominent ellipsoid tubers. Stems acutely 3-angled, 1.5-3 mm broad, ribbed. Leaves grass-like, usually shorter than the stems, 3-6 mm broad. Involucral bracts several; basal bract a similar length to or longer than the inflorescence. Inflorescence a terminal umbel of spikes, loose, 40-80 mm long; spikes with 3-10 spikelets. Spikelets brown, usually 10-15 mm long, many-flowered; axis prominently winged. Glumes 3-4 mm long, keeled, not pointed, several-veined. Stamens 3; anther ca 2 mm long. Style branches 3. Nut rarely maturing.

Occurs in gardens and disturbed sites on the Coastal Plain from Perth northward. Extends north to the Pilbara but the recorded occurrences are very scattered. Native in northern Australia and in tropical areas outside Australia.

Flowers April-July.

W.A. specimens are of subsp. *rotundus*, which does not appear to be native in Australia.

***C. tenellus** L. f.

Tiny Flat-sedge

Annual herb, tufted, up to 120 mm high. Stems < 0.5 mm broad, minutely scabrous. Leaves basal, much shorter than the stems, minutely scabrous. Involucral bract long, often appearing to form a continuation of the stem above the inflorescence. Inflorescence of 1 spikelet or of 2 or 3 digitately clustered spikelets, terminal but often appearing lateral. Spikelets usually 3-9 mm long, 2-3 mm broad, few-many-flowered; axis not winged. Glumes fairly dense, spreading, 1.7-2 mm long, obtuse, several-veined, with a prominent incurved keel. Stamens 3; anther 0.3-0.4 mm long. Style branches 3. Nut acutely 3-angled, ca 1 mm long, with concave surfaces.

Occurs in winter-wet depressions on the Coastal Plain and Darling Scarp. Extends around the coast from north of Jurien Bay to Bremer Bay and inland to east of Southern Cross. Apparently native to South Africa.

Flowers August-November.

C. tenellus includes the variant referred to as *C. gracilis* R. Br. in Blackall & Grieve (1974). *C. gracilis* occurs in eastern Australia.

***C. tenuiflorus** Rottb.

Scaly Sedge

Perennial herb, tufted, up to 0.9 m high. Stems 1.5-3 mm broad, flat or acutely 3-angled in the upper part, ribbed. Leaves grass-like, much shorter than the stems, 3-4 mm broad. Involucral bracts several, erect or spreading, the lower bracts much longer than the inflorescence. Inflorescence a dense cluster of spikelets or often compound with several pedunculate clusters arising from the first cluster; clusters subglobular to globular or slightly elongate. Spikelets 7-20 x 1.5-2 mm, many-flowered; axis narrowly winged. Glumes 2-2.5 mm long, each side with 2 veins reaching the margin and a shorter vein below, the keel produced into a minute point. Stamens 3; anther 1-1.5 mm long. Style branches 3. Nut obtusely 3-angled, 1-1.3 mm long.

Occurs in moist, usually disturbed sites on the Coastal Plain and Darling Range from Yanchep to Bunbury. Native to southern Africa.

Flowers October-April.

See note under *C. congestus*.

ELEOCHARIS R. Br.

Annual or perennial herbs. Stems simple, tufted or in a linear series along a slender rhizome. Leaves 1 or more at the base of the stems, reduced to the sheath. Inflorescence of 1 spikelet, terminal, erect, lacking definite involucre bracts but with the lowest glume sometimes somewhat enlarged, with few to many bisexual flowers. Glumes spirally arranged; empty basal glumes 1 or 2. Perianth segments usually present, up to 10, filiform or very slender, usually with reflexed hairs. Stamens 1-3. Style deeply divided into 2 or 3 filiform stigmatic branches; base persistent and enlarged in fruit. Nut 2 or 3-ribbed. About 200 species, cosmopolitan, mainly tropical or temperate, ca 13 species occurring in W.A.

1. Stems 3-12 mm broad, usually distinctly articulate. Glumes 6-7 mm long..... **E. sphacelata**
 1. Stems 1-3 mm broad, not articulate. Glumes 3-4 mm long..... **E. acuta**

E. acuta R. Br.

Common Spike-rush

Perennial herb, up to 0.7 m high. Stems borne in tufts at intervals along a slender rhizome, terete, 1-3 mm broad, ribbed. Leaves basal; uppermost leaf with a small point, the orifice horizontal or slightly oblique. Spikelets linear or narrowly ovate in outline, usually 15-30 mm long, almost acute, usually dark brown or variegated with brown. Glumes 3-4 mm long, acute or slightly obtuse, with broad translucent margins. Perianth segments ca 6, longer than the nut. Stamens 3; anther 2.5-3 mm long. Nut somewhat compressed, probably 1.5-2 mm long, laterally thickened, smooth.

In the Perth Region, recorded only from east of Bullsbrook, probably in a winter-wet depression. Extends from Mingenew to Cape Arid National Park. Recorded in all states except N.T. Also occurs in New Zealand.

Flowers September-December.

E. sphacelata R. Br.

Tall Spike-rush

Perennial herb, up to 2 m high. Stems close together, arising from a very stout rhizome, appearing terete, 3-12 mm broad, usually distinctly articulate, hollow. Leaves very thin, with an oblique orifice, tending to become worn. Spikelets linear to narrowly ovate in outline, 35-60 mm long, initially acute. Glumes 6-7 mm long, broad, stiff, obtuse, usually pale with a dark stripe on each side; translucent margins narrow, bordered on the inside by the dark stripe. Perianth segments 6-10, usually reaching to the style base. Stamens 2 or 3; anther 4-5 mm long.

Recorded from swamps near Perth on the Coastal Plain. Also recorded from east of Esperance and the Kimberley. Occurs in all states except Vic. Also occurs in New Zealand and New Guinea.

Flowers recorded October.

EVANDRA R. Br.

Perennial herbs. Stems erect, leafy throughout or only at the base. Inflorescence a panicle of spikelets or a cluster of few spikelets. Spikelets 2 or 3-flowered, the flowers all bisexual or the lower flowers male. Glumes spirally arranged; empty basal glumes many. Perianth segments absent. Stamens 12-20 or more. Style with ca 8 filiform stigmatic branches; base persistent and swollen in fruit. 2 species, confined to the south west of W.A.

E. pauciflora R. Br.

Perennial herb, tufted, up to 1.5 m high. Stems very slender, finely ribbed. Leaves basal, long; sheath open, tapering to the blade, striate; blade linear, 1-2.5 mm broad, usually curled and twisted. Involucre bracts long, slender; basal bract appearing to form a continuation of the stem, much longer than the inflorescence; second bract widely spreading, usually exceeding the inflorescence. Inflorescence a cluster of 2-5 spikelets, fairly loose. Spikelets ca 10 mm long. Glumes numerous, acute, some or all partially hairy. Stamens 12 or more; anther ca 5 mm long. Nut 5-6 mm long including the style base, cylindrical, with ca 10 longitudinal lines.

Occurs from Forrestdale southward, in sand on the Coastal Plain. Extends along the south coast to Albany.

Flowers probably September-December.

FIMBRISTYLIS Vahl

Annual or perennial herbs, tufted. Leaves all basal, sometimes reduced to the sheath. Involucral bracts several, similar to the leaves, usually not exceeding the inflorescence. Inflorescence of 1 or more spikelets, the spikelets in a head or irregular umbel. Spikelets with several to many bisexual flowers. Glumes usually spirally arranged; empty basal glumes 1-4. Perianth segments absent. Stamens 1-3. Style with an enlarged but usually deciduous base; stigmatic branches 2 or 3, filiform. Nut often much contracted at the base. About 300 species, from tropical and warm regions, especially from south east Asia to Australia, 58 species occurring in W.A.

F. velata R. Br.

Annual herb, densely tufted, up to 150 mm high. Stems prominently ribbed. Leaves about half as long as the stems, linear, tapering to a point, hairy on 1 or both surfaces. Involucral bracts usually much shorter than the inflorescence. Inflorescence a compound umbel of spikelets; peduncles slender. Spikelets ovoid, 5-7 mm long, usually rather hairy. Glumes with a very prominent keel produced into an erect point, with a longitudinal rib on each side of the keel. Stamen 1; anther ca 0.75 mm long. Style with long hairs occurring up to the lower part of the 2 stigmatic branches, the branches becoming widely separated and recurved; enlarged base with very long reflexed hairs, which cover much of the ovary. Nut obovoid, convex on both surfaces.

Occurs along watercourses and in winter-wet depressions on the Coastal Plain near Perth. Also recorded from the Blackwood River. Occurs in all mainland states except S.A. Extends from Asia to Polynesia.

Flowers December-March.

GAHNIA Forst. & Forst. f.

Perennial herbs, with a short woody rhizome, often forming large tussocks. Stems erect, leafy. Leaves sheathing at the base; blade long, with involute margins. Bracts similar to the leaves but becoming progressively shorter up the stem. Inflorescence a panicle of spikelets, large and pendulous or erect and spike-like. Spikelets brown or black, with 1 terminal bisexual flower and often 1 male flower below. Glumes spirally arranged; empty basal glumes 3 or more; upper glumes usually small and thin. Perianth segments absent. Stamens 3-6; filament often persistent and supporting the fruit. Style 3-5-branched, not thickened at the base. Nut usually shining when ripe. About 30 species extending from south east Asia to New Zealand and the Pacific Islands, 9 species occurring in W.A.

- 1. Spikelets densely clustered on spike-like branchlets in the axil of each bract. Terminal glume not embracing the nut, not ciliate..... **G. trifida**
- 1. Spikelets in a loose, distinctly branching and sometimes pendulous panicle. Terminal glume embracing the nut, laterally ciliate..... **G. decomposita**

G. decomposita (R. Br.) Benth.

Perennial herb, up to 3 m high, in a dense tussock 1.5 m or more in diameter. Leaves: blade point-like, with strongly inrolled margins, pendulous, scabrous. Panicle loose, spreading and often pendulous, up to 1 m long, with very numerous spikelets, the branching pattern and individual spikelets distinctly visible. Bracts subtending each spikelet with a prominent, often recurved point. Terminal glume concave and almost hood shaped, embracing the nut, laterally ciliate. Stamens 6; anther not seen. *G. preissii* Nees

Occurs in seasonally waterlogged soil in winter-wet depressions on the Coastal Plain from Perth southward. Extends along the south coast to east of Esperance.

Flowering period uncertain, the only record being for September.

G. trifida Labill.

Coast Saw-sedge

Perennial herb, 1.5 m or more high, in a dense tussock commonly ca 1 m in diameter. Leaves: blade point-like, pendulous, with inrolled margins, scabrous at least in the upper part. Panicle erect, interrupted, up to 0.4 m long, with short dense spike-like branchlets arising in the axils of the main bracts, each branchlet with numerous spikelets in a number of tight clusters. Bracts subtending each spikelet with an erect or spreading point. Terminal glume somewhat concave but not hood shaped, sometimes shortly awned, not ciliate. Stamens 4-6; anther ca 1.5 mm long.

Occurs on the Coastal Plain, in sand, along watercourses and in winter-wet depressions. Extends in near-coastal areas from Kalbarri to Cape Arid National Park. Also occurs in S.A., Vic. and Tas.

Flowers mainly August-October.

ISOLEPIS R. Br.

Herbs, usually either annuals or slender aquatic perennials, tufted or with a creeping rhizome. Stems in terrestrial species without nodes, the leaves few and basal; stems in aquatic species with leaves arising at nodes. Involucral bracts 1 or more; basal bract often erect and appearing to form a continuation of the stem above the inflorescence. Inflorescence of 1 or clustered spikelets, terminal but often appearing lateral. Spikelets with several to many bisexual flowers. Glumes spirally arranged; empty basal glumes few or absent. Perianth segments absent. Stamens 1-3. Style with 2 or 3 long stigmatic branches; base scarcely thickened but persistent in fruit. About 70 species, cosmopolitan, concentrated in southern Africa and Australia, 14 native and 1 naturalized species occurring in W.A. *Isolepis*, *Bolboschoenus* and *Schoenoplectus* were previously included in *Scirpus* L. Reference: Wilson, K. L. 1981. *Telopea* 2: 153-172.

- | | |
|---|------------------------|
| 1. Stems weak and floating, noded, leafy. Spikelets solitary, long-pedunculate..... | I. producta |
| 1. Stems erect, lacking nodes, the leaves basal. Spikelets clustered or sessile. | |
| 2. Style branches 2. Stamens 2. | |
| 3. Nut compressed. Spikelets 5-12 mm long. | |
| 4. Involucral bract persistent, usually as long as or longer than the inflorescence. Nut obovate to elliptic in outline..... | I. cyperoides |
| 4. Involucral bract caducous, usually shorter than the inflorescence. Nut almost circular in outline..... | I. oldfieldiana |
| 3. Nut obtusely 3-angled. Spikelets 2.5-4 mm long..... | I. setiformis |
| 2. Style branches 3. Stamens 3 or 1. | |
| 5. Stamen 1; anther ca 0.3 mm long. Spikelets up to 8, in a stellately spreading cluster..... | I. stellata |
| 5. Stamens 3; anther 0.5-2 mm long. Spikelets rarely as above. | |
| 6. Annual herbs, with stems <1 mm broad. Anthers 0.75-1 mm long. | |
| 7. Spikelets 1 or rarely 2, not angular, usually shorter than the involucral bract..... | I. cernua |
| 7. Spikelets 1-6, prominently angular, much shorter than the involucral bract..... | I. marginata |
| 6. Perennial herbs, with stout stems 1-4 mm broad. Anthers 1-2 mm long. | |
| 8. Involucral bracts spreading, concealed below the inflorescence. Basal leaf 1..... | *I. prolifera |
| 8. Involucral bract erect, appearing to form a continuation of the stem well above the apparently lateral head. Basal leaves several..... | I. nodosa |

I. cernua (M. Vahl) Roemer & Schultes

Nodding Club-rush

Annual herb, up to 200 mm high. Stems tufted, usually rigid, terete or slightly compressed, < 1 mm broad, minutely ribbed. Leaves basal; sheath reddish, with an oblique orifice; blade reduced to a small point. Involucral bract 1, erect or spreading, appearing to form a continuation of the stem but somewhat bract-like at the base, usually not exceeding the inflorescence. Spikelets 1 or very rarely 2, usually dark

brown, broadly ovoid, usually 2-5 mm long. Glumes tightly appressed, almost circular; midrib not produced into a point; sides brown, with several narrow pale veins; translucent margins broad. Stamens 3; anther 0.75-1 mm long. Style branches 3. Nut dark, distinctly 3-ribbed, shallowly triangular in cross-section, ca 1 mm long. *Scirpus cernuus* Vahl

Occurs in mud or sand in winter-wet depressions on the Coastal Plain from Wanneroo southward. Extends along the south coast to Cape Arid National Park. Recorded in all states except N.T. Occurs in most parts of the world.

Flowers mainly October-December.

On the south coast specimens are up to 0.3 m high and a few specimens have elongate spikelets up to 10 mm long.

I. cyperoides R. Br.

Annual herb, up to 0.3 m high. Stems tufted, compressed, usually ca 1 mm broad. Leaves basal, 1 per stem; sheath loose, the orifice almost horizontal; blade linear, stem-like but usually shorter than the stems. Involucral bract 1, erect or spreading, as long as or exceeding the inflorescence. Inflorescence of 1 spikelet or a terminal cluster of 2-5 spikelets. Spikelets 8-12 mm long. Glumes broad; midrib sometimes produced into a very short point; sides brown, several-veined; translucent margins broad. Stamens 2; anther ca 0.8 mm long. Style branches 2. Nut ca 1.5 mm long, compressed, obovate or elliptic in outline, convex on 1 surface. *Scirpus brunonianus* S.T. Blake

Occurs in winter-wet depressions on the Darling Range near Perth. Also recorded from Manjimup to Cape Riche.

Flowers mainly October-December.

The species has sometimes been misidentified as *Scirpus cyperoides* L.

I. marginata (Thunb.) A. Dietr.

Coarse Club-rush

Annual herb, tufted, 20-200 mm high. Stems < 1 mm broad, minutely ribbed. Leaves usually well developed, shorter than the stems; basal sheath usually reddish. Involucral bract erect or spreading, much longer than the inflorescence. Spikelets 1-6 in a terminal cluster, ovoid or more elongate, 2-7 mm long, prominently angular, few-many-flowered. Glumes folded; sides shiny, brown or partly brown or reddish, with 4-6 curved veins. Stamens 3; anther 0.5-0.75 mm long. Style branches 3. Nut dark golden brown, obtusely 3-angled, 1-1.25 mm long. *Scirpus marginatus* Thunb.

Occurs along watercourses and in winter-wet depressions on the Coastal Plain. Extends from the Arolhos Islands to Israelite Bay. Also occurs in S.A., Vic., Tas., N.S.W., New Zealand and South Africa.

Flowers July-October.

The species has been misidentified as *Scirpus antarcticus* L.

I. nodosa (Rottb.) R. Br.

Knotted Club-rush

Perennial rhizomatous herb, up to 0.9 m high. Stems densely tufted, rigid and rather stout, fairly erect, 1-25 mm broad, somewhat compressed in the upper part, sometimes terete below, finely ribbed. Leaves basal, reduced to the sheath, brown or reddish, with an oblique orifice. Involucral bract erect, appearing to form a continuation of the stem well above the inflorescence. Inflorescence a dense head of numerous spikelets, 5-25 mm in diameter. Spikelets brown. Glumes broadly ovate; sides brown or partly brown, with pale longitudinal stripes; translucent margins rather narrow. Stamens 3; anther 1.5-2 mm long. Style branches 3. Nut smooth, obtusely 3-angled, ca 1 mm long. *Scirpus nodosus* Rottb.

Occurs on sand dunes close to the coast and in sand along rivers. Extends around the coast from Geraldton to the Recherche Archipelago. Occurs in all Australian states except N.T. Widespread in temperate regions of the southern hemisphere.

Flowers mainly November-March.

I. oldfieldiana (S.T. Blake) K.L. Wilson

Annual herb, tufted, up to 200 mm high. Stems compressed. Leaves basal or arising in the lower part of the stem, loosely sheathing; blade long but shorter than the stems, 0.3-1 mm broad. Involucral bract 1, erect, usually shorter than the inflorescence and caducous. Spikelets solitary, ovoid, 5-10 mm long, many-flowered. Glumes usually shortly mucronate; sides initially brownish with pale longitudinal ribs. Stamens 2; anther ca 0.75 mm long. Style branches 2. Nut greyish, nearly circular, compressed, ca 1.75 mm long. *Scirpus oldfieldianus* S.T. Blake

Occurs in winter-wet depressions and along watercourses on the Coastal Plain from Perth southward. Extends south to Manjimup.

Flowers August-January.

I. producta (C.B. Clarke) K.L. Wilson

Perennial or annual herb, aquatic. Stems filiform, weak, floating, usually long. Leaves filiform, arising at nodes along the stems. Inflorescence of 1 spikelet, on a peduncle arising from a tuft of leaves. Spikelet ca 3 mm long, slender, rather few-flowered. Glumes usually dark red-brown, with many fine longitudinal ribs. Stamens 3; anther 1.5-2.5 mm long. Style branches 2. Nut with ribbed margins, not broad. *Scirpus productus* C.B. Clarke

Recorded from just north of the Perth Region, in a winter-wet depression west of Gingin. Extends in near-coastal areas mainly from Busselton to Cape Le Grand. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers recorded December-January.

***I. prolifera** (Rottb.) R. Br.

Budding Club-rush

Perennial herb, up to 0.6 m high, reproducing asexually by budding new individuals at the ends of the stems. Stems tufted, somewhat compressed, 1.5-4 mm broad. Leaf 1, basal, reduced to the sheath, usually reddish in the lower part, with an oblique orifice. Involucral bracts short, glume-like, concealed below the inflorescence. Inflorescence a cluster of many spikelets or often compound with several further pedunculate clusters arising from the base of the first cluster. Spikelets usually 5-15 x 1-2 mm, pale-coloured, many-flowered. Glumes ovate, usually acute, brown or partly brown on each side of the midrib, with pale longitudinal lines. Stamens 3; anther 1-1.5 mm long. Style branches 3. Nut prominently 3-angled, ca 1 mm long. *Scirpus prolifer* Rottb.

Occurs in man-made and natural wetlands on the Coastal Plain from Perth southward. Extends along the south coast to Bremer Bay. Native to South Africa.

Flowers recorded October-January and April.

I. setiformis (S.T. Blake) K.L. Wilson

Annual herb, tufted, up to 0.3 m high. Stems somewhat compressed, ribbed. Leaves basal, much shorter than the stems; sheath reddish, the orifice only slightly oblique; blade linear, sometimes very short. Involucral bract 1, erect, appearing to form a continuation of the stem, usually well exceeding the inflorescence. Inflorescence of 1-3 terminal spikelets. Spikelets ovoid, 2.5-4 mm long. Glumes red-brown with conspicuous fine paler veins; midrib usually not produced into a point. Stamens 2; anther probably 0.5-0.75 mm long. Style branches 2. Nut ca 1 mm long, shallowly triangular in cross-section. *Scirpus setiformis* (Benth.) S.T. Blake

Occurs in seasonally waterlogged soil on the Coastal Plain from Gingin to Perth. Extends south-east to Jerramungup.

Flowers September-November.

I. stellata (C.B. Clarke) K.L. Wilson

Star Club-rush

Annual herb, tufted, up to 100 mm high. Stems very slender, almost terete, ribbed. Leaves basal; sheath loose, with an almost horizontal orifice; blade linear, much shorter than the stems, sometimes reduced to a point. Involucral bract 1, erect or somewhat displaced, well exceeding the inflorescence.

Inflorescence a dense terminal cluster of up to 8 spikelets. Spikelets stellately spreading, several-flowered, 2-3 mm long. Glumes ca 1.5 mm long; keel produced into a short point; sides brown, each with 1-3 veins; translucent margins broad. Stamen 1; anther ca 0.3 mm long. Style branches 3. Nut prominently 3-ribbed, shallowly triangular in cross-section, ca 0.8 mm long. *Scirpus stellatus* C.B. Clarke

Occurs on the Coastal Plain from Perth southward. Extends along the south coast to Bremer Bay. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers October-January.

LEPIDOSPERMA Labill.

Perennial herbs, with a rhizome. Stems tufted, often somewhat compressed. Leaves all basal, distichous, almost equal, stem-like but often more compressed, acute. Basal bract erect, with a leaf-like but short blade, rarely exceeding the inflorescence; upper bracts under the primary branches more reduced. Inflorescence a panicle of sessile spikelets, sometimes reduced to a simple or branched spike. Spikelets with 1 bisexual flower and 1-3 or rarely more male flowers, the bisexual flower terminal or rarely basal. Glumes spirally arranged; empty basal glumes 1-4, smaller than the floral glumes. Perianth segments 6, usually small and translucent in flower, enlarged and white in fruit, ovate or narrowly ovate, often acuminate. Stamens 3. Style with 3 long stigmatic branches; base persistent and thickened in fruit but often scarcely distinguishable from the nut below. Nut usually obtusely 3-angled. Over 50 species in Australia, a further 4 species occurring in south eastern Asia, New Caledonia and New Zealand, over 30 species occurring in W.A. The genus is greatly in need of revision.

1. Stems acutely 4-angled..... **L. tetraquetrum**
1. Stems compressed or terete.
 2. Stem and leaf margins with prominent resinous hairy tubercles **L. tuberculatum**
 2. Stem and leaf margins not tuberculate.
 3. Stems compressed (very rarely subterete in *L. angustatum*), often convex on 1 or both surfaces in the central portion, the edges usually compressed.
 4. Stems 13-22 mm broad..... **L. gladiatum**
 4. Stems 1-10 mm broad.
 5. Panicle 0.25-1 m long. Anthers 2-2.5 mm long..... **L. effusum**
 5. Panicle < 0.2 m or, if 0.2-0.3 m long, then the anthers 3-5 mm long.
 6. Stems 4-9 mm broad. Panicle narrow or compact, not spreading.
 7. Stems very slightly convex-concave or flat; margins brown or reddish, scabrous just below the inflorescence..... **L. drummondii**
 7. Stems convex on both surfaces; margins not very distinctively coloured, smooth..... **L. longitudinale**
 6. Stems 1-5 mm broad, if 4-5 mm then the panicle with widely spreading branches.
 8. Stems usually 4-5 mm broad, convex on both surfaces. Panicle 90-150 x 45-90 mm..... **L. sp. A**
 8. Stems 1-5 mm broad, if 4-5 mm then the stems concave-convex or flat. Panicle 15-90 x 7-60 mm.
 9. Panicle branches widely spreading, with many rather loosely arranged spikelets. Stems 2.5-5 mm broad.
 10. Stems concave-convex or flat. Leafy shoots not tapering at the base..... **L. squamatum**
 10. Stems convex on both surfaces in the centre. Leafy shoots tapering to a slender base..... **L. sp. B**
 9. Panicle often dense or with short branches. Stems 0.7-3 mm broad.
 11. Panicle fairly erect, 20-60 x 12-25 mm; branches short but bearing very dense spikelets..... **L. angustatum**
 11. Panicle not as above.
 12. Panicle usually ovate-triangular in outline and 20-50 x 15-35 mm, often turned toward 1 side..... **L. sp. C**

12. Panicle usually either *elongate and very loose or compressed and < 25 mm long, always fairly erect.
13. Panicle 30-80 mm long, slender, usually very loosely arranged. Recorded on the Coastal Plain but not on coastal dunes or limestone..... **L. costale**
13. Panicle usually squat and ca 20 mm long or, if elongate, then quite dense. Confined to coastal dunes and limestone..... **L. sp. D**
3. Stems terete or slightly compressed at least just below the inflorescence (see also *L. angustatum* and *L. sp. C*).
14. Stems smooth or indistinctly ribbed.
15. Panicle narrow and spike-like; branches erect, with dense spikelets..... **L. sp. E**
15. Panicle with widely spreading branches; spikelets loosely arranged.
16. Involucral bracts usually 20-70 mm long. Uppermost leaves with a well developed blade resembling the stems but shorter..... **L. leptostachyum**
16. Involucral bracts up to 15 mm long. Leaves with a very reduced blade..... **L. sp. F**
14. Stems distinctly ribbed..... **L. scabrum**

L. angustatum R. Br.

Perennial herb, up to 0.8 m high. Stems 1-3 mm broad, usually compressed with quite flat margins, rarely elliptic to circular in cross-section, smooth. Leaves: sheath tapering to the blade or somewhat constricted; blade stem-like but shorter and usually more compressed. Panicle rather dense, fairly erect, tending to be cylindric or conic, 20-60 x 12-25 mm; branches short, with dense spikelets. Spikelets narrowly ovoid, 5-7 mm long, with at least 2 bisexual flowers. Bracts ca 7, ciliolate, the keel produced into a short point. Perianth segments: 1.25-1.75 mm long, acute or acuminate, usually with a terminal tuft of hairs. Anthers 2.5-3 mm long. Nut shortly cylindric or ellipsoid, 2.5-3 mm long.

Occurs in varied habitats on the Coastal Plain, Darling Scarp and Range. Extends from Badgingarra to Collie.

Flowers recorded March-July and October-November.

The inflorescence is either shortly cylindric or more or less conic. These appear fairly distinct but do not appear to be associated with any other character differences.

L. costale Nees

Perennial herb, up to 0.6 m high. Stems 1-1.25 mm broad, compressed, sometimes twisted; central part convex on both surfaces; margins flat. Leaves more compressed than the stems, usually shorter and narrower than the stems. Panicle rather open, 30-80 x 10-17 mm; branches short, with few spikelets. Spikelets narrowly ovoid, ca 6 mm long. Glumes ca 6, ciliolate, the keel produced into a short point. Perianth segments usually ca 1.5 mm long, acuminate, with terminal teeth or hairs. Anthers ca 2.5 mm long. Nut almost ellipsoid, ca 2.5 mm long.

Occurs from Perth northward, often in sand fairly close to the coast, also occurring on the eastern side of the Coastal Plain. Extends from Mingenew to Fitzgerald River National Park.

Flowers April-May.

Outside the Perth Region the species tends to have a larger inflorescence, sometimes with long branches. See note under *L. angustatum*.

L. drummondii Benth.

Perennial herb, up to 0.8 m high, forming a clump up to 1 m in diameter. Stems 4-9 mm broad, almost flat or slightly convex-concave; margins acute; scabrous just below the inflorescence, often with a brown or reddish line. Leaves frequently more compressed and slightly broader than the stems and always shorter, usually dark at the apex. Panicle erect, interrupted, up to 170 mm long, rather narrow;

axis obtusely 3-angled. Spikelets 6-8 mm long, 2-flowered. Glumes 6-7, acuminate, scabrous; empty basal glumes 2 or 3. Perianth segments acuminate, not ciliate. Anthers 3-3.5 mm long. Nut ovoid, 3-4 mm long.

Occurs on the Darling Scarp and Range east of Perth, probably along watercourses and in winter-wet depressions. Also extends from Bruce Rock to the Fraser Range and south to the Oldfield River.

Flowers May-July.

The species appears to have a large disjunction in its range with a western variant occurring in the Perth Region and an inland or eastern variant outside the region. The former appears to intergrade with *L. longitudinale* on the Darling Range. The latter tends to have more compressed stems with more prominent marginal lines, spikelets ca 5 mm long and nuts ca 2 mm long. The 2 variants should probably be recognized as subspecies.

***L. effusum* Benth.**

Spreading Sword-sedge

Perennial herb, up to 1.5 m high. Stems 5-10 mm broad, compressed but slightly convex on both surfaces, sometimes with a dark reddish line along each margin. Leaves similar to the stems but more compressed. Panicle loose or very interrupted, 0.25-1 m long, several branches arising in each sheathing bract. Spikelets 4-6 mm long, 2 or 3-flowered. Glumes ca 6, very shortly acuminate, sometimes ciliate. Perianth segments acuminate. Anthers 2-2.5 mm long. Nut ellipsoid, at least 2 mm long.

Occurs from Wanneroo southward, in winter-wet depressions on the Coastal Plain and Darling Scarp. Extends along the south coast to the Porongurup Range.

Flowers September-November.

In the Perth Region *L. effusum* is quite distinct in its morphology and habitat from *L. gladiatum* but, south of the region, the 2 species appear to intergrade. Southern specimens of *L. effusum* tend to have much broader stems, with a distinctly thickened central portion, and sometimes have a much shorter, denser inflorescence with larger spikelets.

***L. gladiatum* Labill.**

Coast Sword-sedge

Perennial herb, up to 1.5 m high, commonly forming a broad clump. Stems rigid, dark at the base, 13-22 mm broad; centre convex on both surfaces, 5-7 mm broad; margins broad, very flat. Leaves similar to the stems but more compressed, the lower part convex on 1 or both surfaces, the upper part completely flat. Panicle 110-220 mm long or interrupted and up to 0.5 m long, dense and thick throughout or with the lower branches spreading, each branch dense. Spikelets 7-9 mm long, 1 or 2-flowered. Glumes 5-7, ovate, acute or very shortly acuminate, minutely hairy. Perianth segments ciliate-denticulate at the apex, sometimes acuminate. Anthers 4.5-6 mm long. Nut ovoid, probably ca 3 mm long.

Occurs on coastal sand dunes. Extends around the coast from Leeman to Cape Arid National Park. Also occurs in S.A., Vic., Tas., and N.S.W.

Flowers November-January.

See note under *L. effusum*.

***L. leptostachyum* Benth.**

Perennial herb, up to 0.65 m high. Stems terete or slightly compressed, 0.5-1.5 mm broad, rather smooth. Leaves: sheath lobed at the summit or rather abruptly narrowing to the blade; blade of the uppermost leaves usually stem-like but much shorter and narrower than the stems. Involucral bract usually 20-70 mm long. Panicle rather loose, 50 x 20 mm or smaller, often bent almost at right angles at the summit of the involucral bract but tending to become more erect at maturity; branches widely spreading. Spikelets 4.5-6 mm long, with 1 bisexual flower. Glumes 5 or 6, covered by short hairs, ciliate, the keel produced into a short point. Perianth segments much shorter than the nut, somewhat hairy at the summit. Anthers not seen. Nut cylindrical to ellipsoid, 2-3 mm long.

Occurs near Perth, recorded from lateritic soils on the Darling Range, probably also occurring on the eastern side of the Coastal Plain. Extends to the south coast and east to the Albany area.

Flowering period not known.

As recognized here this species may include 2 distinct variants but it is difficult to draw any conclusions because most of the specimens are only in bud. The variation in size of the specimens may simply reflect the age or habitat of the plants. See note under *L. sp. F.*

***L. longitudinale* Labill.**

Pithy Sword-sedge

Perennial herb, up to 2 m high. Stems 4-7 mm broad, convex on both surfaces; margins often compressed, acute, quite smooth. Leaves shorter and more compressed than the stems and often broader, usually reddish or yellowish at the base; apex acute, dark. Panicle 90-300 mm long, often interrupted, rather narrow, the spikelets sometimes forming very dense broad clusters and sometimes more spike-like clusters; axis obtusely 3-angled. Spikelets erect, 5-7 mm long, 2 or 3-flowered. Glumes ca 6, obtuse or shortly pointed, smooth or somewhat scabrous; empty basal glumes 3 or 4. Perianth segments acuminate, not ciliate. Anthers 3-3.5 mm long. Nut ovoid, 3-4 mm long.

Occurs in winter-wet depressions and along watercourses on the Coastal Plain and, less frequently, on the Darling Scarp and Range. Probably extends from Watheroo to the south coast. Occurs in all states except N.T.

Flowers recorded May-June and October.

See note under *L. drummondii*.

***L. scabrum* Nees**

Perennial herb, up to 1.5 m high. Stems terete, 1-3 mm broad, distinctly ribbed. Uppermost leaves usually with a long stem-like blade, but shorter and narrower than the stems. Panicle fairly open, usually 30-120 x 25-70 mm; branches widely spreading. Spikelets 5-6 mm long, 2-flowered. Glumes 5 or 6, usually minutely denticulate, the keel produced into a short point. Perianth segments acute, hairy at the summit. Anthers 3-5 mm long. Nut almost ovoid, 2.5-3 mm long.

Occurs from Perth northward, in sand on the Coastal Plain and in stony or damp loamy soil on the Darling Scarp and Range. Extends north to the Murchison River and inland to Wubin.

Flowers April-May.

The variant occurring in the Perth Region extends to Eneabba. Specimens from the Murchison River to Wubin have a small inflorescence of few spikelets.

***L. squamatum* Labill.**

Perennial herb, up to 0.7 m high. Stems somewhat convex-concave or flat, (2.5-)3.5-4(-5) broad. Leaves flat, shorter or longer than the stems and a similar breadth. Panicle usually 40-90 x 35-60 mm, often turned toward 1 side; branches widely spreading, with many, rather loosely arranged spikelets. Spikelets narrowly ovoid, 7-9 mm long. Glumes ca 6, dark-coloured, the keel produced into a small point. Perianth segments usually 2-2.5 mm long, acuminate, often hairy at the summit, the point sometimes breaking off. Anthers usually 3-4 mm long. Nut ca 3 mm long.

Occurs in sand on the Coastal Plain and probably in laterite on the Darling Range. Extends through near-coastal areas from the Gairdner Range to Cape Arid National Park.

Flowers March-August.

***L. tetraquetrum* Nees**

Perennial herb, up to 3 m high, commonly forming a large clump. Stems stout, 4-6 mm broad, square or rectangular in cross-section, the 4 margins raised and acute, often with further definite ribs at the centre of each surface. Leaves similar to the stems but tapering to a compressed apex, dilated into a broad basal sheath. Panicle loose, 0.1-0.4 m long; branches spreading. Spikelets 6-8 mm long, probably mostly 2-flowered. Glumes acuminate, often laterally ciliate or denticulate. Perianth segments acuminate. Anthers 3-4 mm long. Nut ovoid, 3-3.5 mm long, sometimes constricted; lower part usually dark brown, longer than the upper part; upper part whitish. **Fig. 312**

Occurs along watercourses and in winter-wet depressions on the Darling Range from Perth southward. Extends along the south coast to Albany.

Flowers August-January.

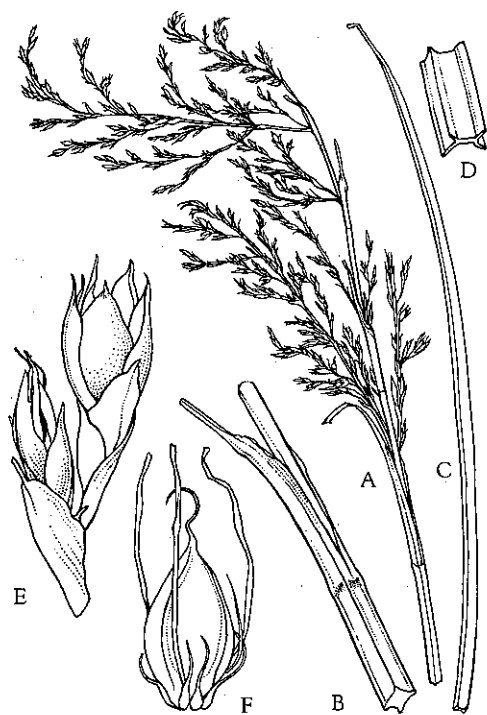


Fig. 312. *Lepidosperma tetraquetrum*. A, Flowering stem. B, Stem and leaf base. C, Leaf. D, Part of stem showing transverse section. E, Spikelets. F, Flower.

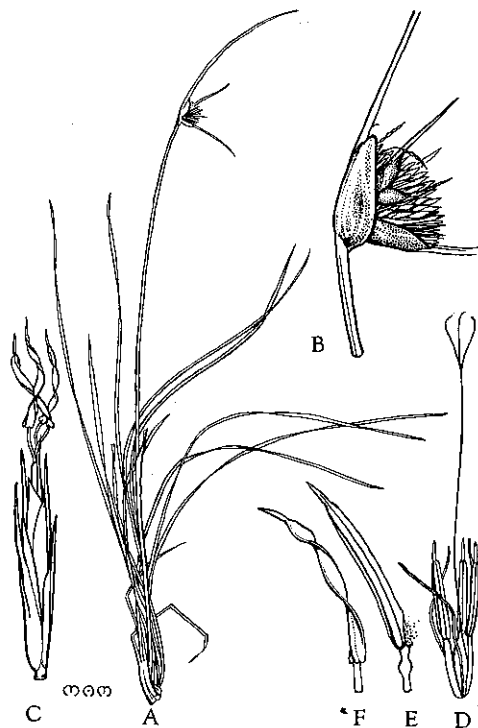


Fig. 313. *Mesomelaena tetragona*. A, Habit. B, Flower head. C, Flower. D, Perianth segments, stamens, ovary and style. E and F, Anthers.

L. tuberculatum Nees

Perennial herb, up to 0.8 m high, commonly forming a large clump. Stems 4-7 mm broad, flat or very slightly concave-convex; margins with prominent resinous hairy tubercles separated by smaller tubercles and minute hairs. Leaves similar to the stems. Panicle rather loose, usually 70-200 mm long. Spikelets 7-9 mm long. Perianth segments acuminate; point ciliolate. Anthers probably 3.5-4 mm long. Nut whitish, narrowly ovoid, ca 3 mm long, acute, glossy.

Occurs in the Darling Range near Perth. Extends from Jurien Bay to east of Esperance.

Flowering period uncertain but includes April.

Outside the Perth Region the tubercles are often less prominent, the inflorescence denser and the stem breadth and other characters are more variable.

L. sp. A

Perennial herb, up to 0.7 m high. Stems 4-5 mm broad, compressed; central part convex on both surfaces; margins yellowish or golden brown, striate. Leaves flat, usually a similar length to but slightly broader than the stems. Panicle rather open, 90-150 x 45-90 mm; branches widely spreading. Spikelets ovoid, 6-7 mm long, with 1 bisexual flower. Glumes usually 4, ovate, entire or minutely denticulate, the keel produced into a short dark point. Perianth segments 1.5-2 mm long, acuminate; point denticulate. Anthers ca 3 mm long. Nut shortly cylindric or ellipsoid, ca 3 mm long.

Recorded only from the Darling Scarp and close to the scarp near Perth.

Flowers recorded June.

L. sp. B

Perennial herb, up to 0.6 m high, the leafy shoots tapering to a slender base. Stems 2.5-3.5 mm broad; central portion convex on both surfaces; margins flat. Leaves flat, similar in breadth to the stems, up to 0.75 m long but sometimes shorter than the stems. Panicle often quite dense, usually 35-45 x 25-

50 mm; branches widely spreading. Spikelets usually narrowly ovoid, 5-7 mm long. Glumes usually 6, dark-coloured, the keel produced into a small point. Perianth segments 1-1.5 mm long, acute or acuminate, hairy at the summit. Anthers probably ca 3 mm long. Nut ca 2.5 mm long.

Occurs along the coast on dunes and limestone soils from Yanchep southward. Extends around the coast to Israelite Bay.

Flowering period not known.

This species is apparently related to *L. squamatum*. Apart from the morphologic differences given in the key, *L. sp. B* differs from *L. squamatum* in its shorter spikelets. The 2 species also differ in habitat.

L. sp. C

Perennial herb, up to 0.7 m high. Stems 0.7-2 mm or rarely up to 3 mm broad, sometimes distinctly ribbed; central portion convex on both surfaces; margins flat, narrow. Leaves narrower or broader than the stems, sometimes distinctly ribbed. Panicle usually ovate-triangular in outline, usually 20-50 x 15-35 mm, often turned toward 1 side; branches widely spreading. Spikelets narrowly ovoid, 5-7 mm long. Glumes ca 6, dark-coloured, the keel produced into a short point. Perianth segments acuminate or acute, 1.5-3 mm long; point often ciliate at least at the summit. Anthers ca 3 mm long. Nut 2-3 mm long.

Occurs near Perth on the Coastal Plain and in lateritic areas on the Darling Range. Geographic range outside the Perth Region not known.

Flowering period uncertain but includes October.

The specimens included here are very heterogeneous but could not be readily divided into distinct species. The assemblage is greatly in need of further study.

L. sp. D

Perennial herb, up to 0.35 m high, commonly forming a large clump. Stems 1-1.5 mm broad; central portion convex on both surfaces; margins flat, acute. Leaves flat, a similar breadth to the stems or broader, ribbed. Panicle erect, fairly dense, 15-45 x 7-20 mm, usually <25 mm long. Spikelets narrowly ovoid or ovoid, 5-7 mm long. Glumes ca 6. Perianth segments 1-1.5 mm long, glabrous or with a few short terminal hairs. Anthers not seen. Nut 2-3 mm long.

Occurs along the coast on dunes and in limestone areas. Extends from Geraldton at least to Margaret River.

Flowering period not known.

L. sp. E

Perennial herb, up to 1 m high. Stems 0.5-3 mm broad, terete or slightly elliptic in the upper part, sometimes more compressed toward the base, rather smooth. Leaves: sheath usually grey-brown, tending to become worn, narrowing fairly abruptly at the base of the blade; blade similar to the stems. Panicle narrow and spike-like, usually ca 90 mm long; branches erect, each rather dense but sometimes well separated from other branches of the panicle. Spikelets ca 7 mm long, probably 2-flowered. Glumes ca 6, acuminate or acute, sometimes ciliate. Perianth segments acuminate, much shorter than the nut, apparently glabrous. Anthers ca 3.5 mm long.

Occurs in sand on the Coastal Plain near Perth. Probably extends north at least to Jurien Bay and possibly through much of the wheatbelt.

Flowers February-March.

This species is not typical of *Lepidosperma* because it has an unusually large style base in fruit and a more spike-like inflorescence than is usual for the genus. Further study is needed to determine whether it is correctly placed in the genus.

L. sp. F

Perennial herb, up to 1 m high. Stems terete or slightly compressed, 0.5-2 mm broad, smooth or striate. Leaves reddish brown, up to 120 mm long; sheath tapering to the blade; blade reduced to a point, much shorter than the sheath. Involucral bracts up to 15 mm long. Panicle loose, usually 50-90 x 10-90 mm; branches usually several, widely spreading. Spikelets 6-8 mm long, with 1 bisexual flower.

Glumes 5 or 6, ciliolate on the upper lateral margins, the keel produced into a short point. Perianth segments acuminate, 1.5-2 mm long; point denticulate. Anthers ca 4 mm long. Nut ellipsoid, ca 3 mm long.

Occurs in gravelly soils on the Darling Scarp and Range. Extends from Three Springs to east of Esperance.

Flowers April-May.

This species is closest to *L. leptostachyum*. Apart from the characters given in the key, *L. sp. F* usually has larger spikelets and panicles than *L. leptostachyum*.

MESOMELAENA Nees

Perennial herbs, tufted or occasionally with a very short creeping rhizome, hermaphrodite. Stems numerous, rigid, simple. Leaves basal; sheath tightly encircling the stem, with a membranous or chartaceous ligule; blade rigid, channelled, pungent. Inflorescence a head, subtended by 1-3 long, rigid, involucre bracts, usually with several spikelets. Spikelets sessile, 2-several-flowered; axis short, straight. Glumes 5-10, distichous, keeled, with a long awn; empty basal glumes present. Perianth segments 3, all alike, brown to black in the upper part, paler below, initially slender, with a broadened base and loosely enclosing the nut at maturity, abruptly acuminate and twisted above. Stamens 3. Style with 3 long branches, not persistent in fruit. Nut usually ovate in outline, 3-angled with very obtuse angles, usually on a cup shaped stipe. 5 species, confined to the south west of W.A. Reference: Wilson, K.L. 1981. *Telopea* 2: 181-195.

1. Stems 1-noded. Leaf sheath compressed; blade 200-550 mm long..... **M. tetragona**
1. Stems without nodes. Leaf sheath not compressed; blade up to 150 mm long.
 2. Involucral bracts subequal, both longer than the inflorescence. Ligule brown, chartaceous..... **M. pseudostygia**
 2. Involucral bracts unequal, only the lower bract exceeding the inflorescence. Ligule whitish, membranous.
 3. Inflorescence usually 7-14 mm in diameter. Spikelets 5.5-10 mm long.
 4. Leaf sheath very shiny, remaining intact. Nut 3-3.5 mm long..... **M. stygia**
 4. Leaf sheath usually dull, breaking up with age. Nut 2-2.5 mm long..... **M. preissii**
 3. Inflorescence ca 3 mm in diameter. Spikelets 12-18 mm long..... **M. graciliceps**

M. graciliceps (C.B. Clarke) K.L. Wilson

Perennial herb, initially erect but becoming decumbent, 0.2-0.7 m high. Stems without nodes, pale yellow-green, 0.5-1.3 mm in diameter. Leaves: sheath red-brown, becoming grey-brown with age, somewhat shining, remaining intact; ligule up to 15 mm long, membranous; blade often reduced, rarely up to 150 mm long. Involucral bracts 2, opposed, with a broadened base and narrow membranous margins which envelope the inflorescence except at maturity; basal bract 25-55 mm long, exceeding the inflorescence; upper bract with a short blade up to 5 mm long. Inflorescence narrowly ellipsoid, 10-20 x ca 3 mm, with 1-5 spikelets. Spikelets 12-18 mm long. Glumes 4-6, with a short straight awn. Anthers ca 5 mm long, with an appendage ca 1.5 mm long. Nut 5-8 mm long. *Carpha graciliceps* C.B. Clarke

Occurs in sand or gravel in winter-wet depressions or on low-lying flats on the Coastal Plain, Darling Scarp and Range. Extends around the coast from Badgingarra to Cape Le Grand National Park.

Flowers March-June.

M. preissii Nees

Perennial herb, erect, 0.2-0.7 m high. Stems without nodes, grey-green, terete, 1-2 mm broad, appearing smooth. Leaves: sheath pink-brown, becoming grey-brown, usually dull, breaking up with age; ligule obvious, whitish, up to 15 mm long, membranous; blade up to 35 mm long. Involucral bracts 2, opposed, with broad translucent margins; basal bract 30-80 mm long, exceeding the inflorescence;

upper bract with a short awn. Inflorescence globular or subglobular, 9-14 mm in diameter. Spikelets 8-10 mm long. Glumes 6 or 7, with an excurved awn. Anthers 2.5-4 mm long, with an appendage 1-1.7 mm long. Nut 2-2.5 mm long.

The only recorded occurrence in the Perth Region is Wooroloo on the border of the region and was collected early in the century.

Flowers July-October.

M. pseudostygia (Kuek.) K.L. Wilson

Perennial herb, erect, 0.25-0.75 m high. Stems without nodes, pale yellow-green, terete, 0.7-1.5 mm broad. Leaves: sheath pink-brown, becoming grey-brown, not shining, breaking up with age; ligule a narrow band, red-brown, chartaceous; blade up to 40 mm long. Involucral bracts 2, opposed, subequal, 20-55 mm long, longer than the inflorescence; basal bract erect; upper bract at ca 90 degrees to the stem. Inflorescence globular to subglobular, 7-12 mm in diameter. Spikelets 8-10 mm long. Glumes 6-7, with a straight to recurved awn. Anthers 2-3 mm long, with an appendage 1.2-1.8 mm long. Nut 3-4 mm long.

Occurs from Pinjarra northward, in sand on the Coastal Plain and in valleys on the Darling Scarp. Extends north to Kalbarri.

Flowers mainly April-June.

M. stygia (R. Br.) Nees

Perennial herb, erect, 0.1-0.35 m high. Stems without nodes, pale yellow-green, terete, 0.7-1.5 mm in diameter, finely ridged. Leaves: sheath yellow-brown, shining, remaining intact; ligule up to 5 mm long, membranous; blade up to 30 mm long. Involucral bracts 2, opposed; basal bract erect, exceeding the inflorescence, 15-55 mm long; upper bract with a broad base and short awn. Inflorescence subglobular, usually 5-12 mm in diameter, occasionally reduced to 1 spikelet. Spikelets 5.5-7 mm long. Glumes 5-10, with an excurved or recurved awn. Anthers ca 3 mm long, with an apical appendage 1-1.5 mm long. Nut 3-3.5 mm long. *M. uncinata* (Nees) C.B. Clarke

Occurs in sand on the Coastal Plain from North Dandalup southward. Extends along the south coast to Israelite Bay, also occurring from Arrino to south of Eneabba.

Flowers March-July.

Specimens in the Perth Region are all of subsp. *stygia*, which extends from North Dandalup to Israelite Bay. Subsp. *deflexa* (Kuek.) K.L. Wilson, which extends from Arrino to south of Eneabba, is very distinct. It differs in having the long involucral bract deflexed at ca 90 degrees to the stem, stems 0.5-0.7 mm in diameter, nuts ca 2.5 mm long, and less shiny leaf sheaths.

M. tetragona (R. Br.) Benth.

Semaphore Sedge

Perennial herb, erect, 0.3-0.8 m high. Stems 1-noded, yellow-green, obtusely 3-angled, ca 2.5 mm broad. Leaves: sheath pink or yellow-brown, becoming black-brown, shining, remaining intact; ligule a narrow band, brown-black, shining, chartaceous; blade 0.2-0.55 m long, channelled. Involucral bracts 2 or 3, more than 3 times as long as the inflorescence, broad at the base. Inflorescence large, somewhat compressed, 15-30 mm broad. Spikelets ca 10 mm long. Glumes ca 6, with an erect awn. Anthers 2.5-4 mm long, with an appendage ca 1 mm long. Nut 5-6 mm long. **Fig. 313**

Occurs in sand on the Coastal Plain and in lateritic soils on the Darling Scarp and Range. Extends around the coast from south of Geraldton to Cape Arid National Park.

Flowers April-November.

SCHOENOPLECTUS Palla

Perennial herbs, erect. Stems fairly stout, lacking nodes. Leaves (in the Perth Region) basal, with a very reduced blade. Outer involucral bract erect, appearing to form a continuation of the stem. Spikelets terminal but often appearing lateral, with several to many bisexual flowers. Glumes spirally

arranged, usually all subtending flowers. Perianth segments present (in the Perth Region). Stamens 2 or 3. Style with 2 or 3 long stigmatic branches; base not enlarged. About 60 species, widely distributed on all continents, 9 species occurring in W.A. See note under *Isolepis*. Reference: Wilson, K.L. 1981. *Telopea* 2: 153-172.

1. Stems acutely 3-angled. Spikelets 1-5, sessile in a head..... **S. pungens**
1. Stems terete or obtusely 3-angled. Spikelets numerous, in a compound umbel-like inflorescence.
 2. Perianth segments 5 or 6, bristle-like, scabrous. Leaves without a blade..... **S. validus**
 2. Perianth segments 3-5, compressed, fringed. Leaves with a well developed blade usually 5-9 mm broad..... **S. litoralis**

S. litoralis (Schrader) Palla

Perennial herb, up to 2 m high. Stems stout, obtusely 3-angled below the inflorescence, often terete lower down, usually 2.5-6 mm broad. Leaves 0.2-1 m long; blade usually 5-9 mm broad, thin, tapering to a point. Outer involucre bract often shorter than the inflorescence. Inflorescence resembling an irregularly compound umbel, with numerous spikelets. Spikelets narrowly ovoid, 10-15 mm long, many-flowered; peduncle usually 7-20 mm long. Glumes broadly ovate, 2.5-3.5 mm long, with broad scarious margins, often ciliate at the summit. Perianth segments 3-5, compressed, 2-3 mm long, fringed. Stamens 3; filament very compressed; anther 2-3 mm long, initially with an apical tuft of hairs. Style branches 2. Nut compressed, somewhat shorter than the perianth segments, smooth. *Scirpus litoralis* Schrader

Doubtful in the Perth Region. There is an old record from "near Perth" but no other records for the species south of Geraldton. Occurs in northern W.A. Recorded in all mainland states except Vic. Also occurs in the Mediterranean Region, Africa and Asia.

Flowers August-October, also recorded May.

S. pungens (M. Vahl) Palla

Sharpleaf Rush

Perennial herb, up to 1 m high. Stems rather stout, acutely 3-angled, ca 3 mm broad. Leaves much shorter than the stems, with a long sheath. Outer involucre bract much exceeding the inflorescence, 30-110 x 1.5-2.5 mm, flat. Inflorescence of 1-5 sessile spikelets, terminal but appearing lateral. Spikelets brown, narrowly ovoid or ovoid, up to 12 mm long. Glumes broadly ovate, 2-lobed at the apex, scarious except for the stout midrib which is produced into a point at the apex, laterally ciliate. Perianth segments bristle-like, up to 2.5 mm long, slender, the margins with short stiff hairs. Stamens 3; anther 2-2.5 mm long. Style branches 2 or 3. Nut somewhat compressed, smooth. *Scirpus pungens* Vahl

In the Perth Region recorded only from Bunbury, rooted in black mud with the lower part of the stem submerged. Extends south to Manjimup. Also occurs in S.A., Vic., Tas., N.S.W., New Zealand, Europe and the Americas.

Flowers probably November-February.

This species has previously been incorrectly known as *Scirpus americanus* Pers., now *Schoenoplectus americanus* (Pers.) Volkart, which occurs in North and central America.

S. validus (M. Vahl) A. Love & D. Love

Lake Club-rush

Perennial herb, up to 2 m high. Stems stout, terete, 3-8 mm broad, usually with fairly obvious longitudinal grooves. Leaves reduced to the sheath, loose, thin, acute, with a long oblique orifice. Involucre bract appearing to form a continuation of the stem, erect, shorter than the inflorescence, tapering to a point. Inflorescence resembling an irregularly compound umbel, terminal but appearing lateral, with numerous spikelets. Spikelets ovoid, 6-14 mm long, many-flowered. Glumes broadly ovate, ciliate or dentate on the upper margins, brown or partially brown on each side of the midrib, the midrib produced into a point. Perianth segments 5 or 6, bristle-like, ca 3 mm long, longer than the nut. Stamens 3; anther ca 2 mm long. Style branches 2. Nut somewhat compressed, fairly smooth. *Scirpus validus* Vahl, *S. lacustris* L. subsp. *validus* (Vahl) Koyama

Occurs in winter-wet depressions and estuaries on the Coastal Plain from Yanchep southward. Extends south to the Blackwood River. Occurs in all Australian states. Also occurs in other countries bordering the Pacific Ocean, New Caledonia and New Hebrides.

Flowers December-January.

SCHOENUS L.

Perennial or sometimes annual herbs. Stems tufted or rarely arising singly along a creeping rhizome. Leaves usually all basal, sometimes reduced to the sheath. Spikelets usually narrowly ovoid or more compressed, usually 1-6-flowered, the uppermost flowers often male or sterile; axis prominently flexuose between the flowers, curved over each ovary or nut. Glumes distichous but the lower glumes sometimes somewhat twisted if the spikelets are crowded; empty basal glumes 0-5 or more. Perianth segments absent or up to 6. Stamens usually 3, rarely 1 or 6. Style branches 3. Nut usually obtusely 3-angled, usually 3-ribbed or distinctly 3-striate. About 100 species, in Europe, Asia, Australasia and South America, ca 60 species occurring in W.A.

1. Annual herbs (see also *S. nitens*), glabrous. Anthers usually 0.5-3 mm long.
 2. Plants aquatic or semi-aquatic. Leaves lax, filiform.
 3. Spikelets 1-flowered. Stamen 1 **S. capillifolius**
 3. Spikelets 2-flowered. Stamens 3 **S. natans**
 2. Plants terrestrial. Leaves not lax, rarely filiform.
 4. Involucral bract ovate, lacking a blade. Leaves much narrower than the stems **S. tenellus**
 4. Involucral bract elongate, with a well developed blade. Leaves a similar breadth to the stems.
 5. Inflorescence borne below the top of the leaves, with 1 spikelet. Spikelets 8-10 mm long, with no empty basal glumes **S. discifer**
 5. Inflorescence almost always borne above the leaves, usually (except in *S. sculptus*) with several spikelets. Spikelets 3-8 mm long, with empty basal glumes.
 6. Anthers 0.5-1 mm long.
 7. Perianth segments absent or minute. Spikelets 1-3 in each bract axil; bracts 2-4, rather distant **S. sculptus**
 7. Perianth segments hair-like, ciliate, the longest usually just exceeding the nut. Spikelets 2-6 in a single cluster or rarely solitary **S. nanus**
 6. Anthers 1.5-3 mm long.
 8. Nut smooth between the ribs. Perianth segments 6, longer than the nut **S. pennisetis**
 8. Nut prominently reticulate between the ribs. Perianth segments absent or tiny.
 9. Spikelets 3-5 mm long. Stems ca 0.3 mm broad **S. odontocarpus**
 9. Spikelets 6-8 mm long. Stems 0.5-1 mm broad **S. elegans**
1. Perennial herbs, sometimes ciliate or bearded on the leaf sheaths or bracts. Anthers usually 3-10 mm long.
 10. Stems <0.5 mm broad or reaching only to the soil surface.
 11. Spikelets borne at ground level. Perianth segments 3 **S. latitans**
 11. Spikelets borne well above ground level. Perianth segments 0 or 6.
 12. Stamens 3. Spikelets 3-5 mm long **S. nitens**
 12. Stamens 6. Spikelets 8-9 mm long **S. pleiostomoneus**
 10. Stems 0.5-5 mm broad.
 13. Stems obtusely 3-angled, leafy throughout **S. grandiflorus**
 13. Stems almost terete or compressed; leaves all basal or only 1 cauline.
 14. Inflorescence a narrow elongate panicle with prominent bracts each subtending 1 to several spikelets.
 15. Spikelets 21-32 mm long, with 4-6 empty basal glumes **S. rigens**

15. Spikelets 8-17 mm long, with 0-3 empty basal glumes.
 16. Glumes glabrous. Perianth segments absent.
 17. Leaf sheath ciliate. Basal glume not subtending a flower..... **S. grammatophyllus**
 17. Leaf sheath glabrous. Basal glume subtending a flower..... **S. asperocarpus**
 16. Glumes ciliate. Perianth segments small..... **S. andrewsii**
14. Inflorescence varied, the spikelets sometimes solitary or long-pedunculate, sometimes in a head or clustered.
 18. Spikelets solitary or loosely arranged or clustered or, if in a head, then with only 1 major bract and the spikelets not at all crowded. Nut glabrous (except in *S. globifer*).
 19. Perianth segments 6, triangular. Spikelets solitary or loosely arranged, 12-25 mm long, with 1 or 2 flowers and ca 5 empty basal glumes.
 20. Glumes glabrous. Leaf sheath glabrous..... **S. rodwayanus**
 20. Glumes ciliate. Leaf sheath bearded..... **S. pedicellatus**
 19. Perianth segments often absent, not triangular. Spikelets not as above.
 21. Spikelets 20-30 mm long. Stamens ca 9 mm long..... **S. unispiculatus**
 21. Spikelets 5-15 mm long. Stamens up to 6 mm long.
 22. Basal bract lacking a blade, much shorter than the inflorescence..... **S. subfascicularis**
 22. Basal bract with at least a short blade, sometimes longer than the inflorescence.
 23. Leaf sheath bearded or ciliate at the summit. Basal bract usually much longer than the inflorescence.
 24. Empty basal glume 1. Perianth segments point-like or absent.
 25. Glumes woolly-ciliate. Perianth segments longer than the nut..... **S. lanatus**
 25. Glumes usually ciliate, not woolly. Perianth segments absent..... **S. subbarbatus**
 24. Empty basal glumes ca 5. Perianth segments flat, < 0.5 mm long..... **S. brevisetis**
 23. Leaf sheath glabrous or denticulate. Involucral bract often short (except in *S. benthamii*).
 26. Spikelets loosely arranged or solitary. Glumes ciliate at the summit.
 27. Spikelets ca 5-flowered. Stems ribbed..... **S. bifidus**
 27. Spikelets usually 2-flowered. Stems smooth..... **S. laevigatus**
 26. Spikelets in a dense head or rarely solitary. Glumes glabrous or almost so.
 28. Empty basal glumes 1 or 0. Perianth segments flat, 2.5-3 mm long..... **S. benthamii**
 28. Empty basal glumes ca 4. Perianth segments absent or small and narrow..... **S. globifer**
18. Spikelets in a head subtended by several long curved or curly bracts, often densely packed. Nut hairy at the summit.
 29. Perianth segments absent. Spikelets 10-13 mm long..... **S. subflavus**
 29. Perianth segments present. Spikelets 5-8 mm long.
 30. Flower head rather pale brown. Perianth segments hair-like, ca 0.5 mm long..... **S. subbulbosus**
 30. Flower head dark brown or black. Perianth segments flat, ciliate, 1.5-2 mm long..... **S. curvifolius**

S. andrewsii W. Fitzg.

Perennial herb, up to 0.35 m high. Stems terete, ca 1 mm broad, strongly ribbed. Leaves basal, narrower and much shorter than the stems; sheath dark red-black in the lower part, yellow or reddish above, open, the upper margins each produced into a small lobe and sometimes minutely ciliate. Basal bract leaf-like but usually shorter than the inflorescence; sheath close and black at the base, 3-veined; orifice pale, somewhat 2-lobed, minutely denticulate-ciliate. Inflorescence a narrow panicle, 35-60 mm

long, of few spikelets, with 1 or 2 spikelets arising in each bract axil. Spikelets 8-13 mm long, usually 2-flowered. Glumes with large cilia on the margins, the keel produced into a prominent point; empty basal glumes 2 or 3. Perianth segments much shorter than the nut, hair-like or flat and hairy. Stamens 3; anther 3.5-5 mm long. Nut ca 1.5 mm long, 3-ribbed or 3-angled.

Occurs in winter-wet depressions on the Coastal Plain from Perth northward. Extends north to Carnamah.

Flowers December-February.

S. asperocarpus F. Muell.

Poison Sedge

Perennial herb, up to 1 m high. Stems tufted, compressed, 1-2 mm broad, finely ribbed. Leaves all basal or the uppermost leaf cauline and more bract-like; sheath open, reddish or pale brown, glabrous, with broad scabrous margins, which often become enlarged into a broad lobe at the summit; blade shorter and narrower than the stems. Bracts leaf-like but the blade becoming progressively shorter up the stem; sheath initially pale brown, becoming deep red, many-veined or ribbed. Inflorescence narrow, usually 50-100 mm long, with 1 to several spikelets arising in each bract axil. Spikelets erect, 11-15 mm long, 2-4-flowered. Glumes all subtending a flower, acute, glabrous, the prominent keel scabrous. Perianth segments absent. Stamens 3; anther ca 4 mm long. Nut 1.5-2 mm long, 3-ribbed, rugose.

Occurs in sand, sometimes in winter-wet depressions on the Coastal Plain. Extends from Kalbarri to the Scott River, also recorded in the Salmon Gums area.

Flowers mainly September-October.

S. benthamii F. Muell.

Perennial herb, up to 0.45 m high. Stems compressed, 1-2 mm broad, distinctly ribbed. Leaves basal, narrower and usually shorter than the stems, but sometimes reaching the lowest inflorescence; sheath open, glabrous. Basal involucral bract leaf-like, erect, up to 220 mm long, appearing to form a continuation of the stem, usually to well above the inflorescence, glabrous; opposed bract a similar length to the spikelets. Inflorescence of 1 spikelet or a dense terminal head of up to 10 spikelets, erect but usually appearing lateral. Spikelets 13-17 mm long, narrow, 3 or 4-flowered. Upper glumes with the upper margins produced into 2 long lobes exceeding the very prominent keel, entire or minutely denticulate; empty basal glumes 1 or absent. Perianth segments 6, white, 2.5-3 mm long, compressed, plumose. Stamens 3; anther 5-6 mm long. Nut 1-1.5 mm long, 3-ribbed, rugose.

Occurs on the Coastal Plain and Darling Range, probably in winter-wet depressions. Extends from Mogumber to east of Walpole.

Flowers October-November.

S. bifidus (Nees) Boeckler

Perennial herb, up to 0.4 m high. Stems 0.5-1 mm broad, ribbed. Leaves basal, fairly numerous; sheath open, glabrous, the somewhat scarious margins denticulate and usually tapering to the blade; blade shorter and narrower than the stems, flexuose or curved. Involucral bracts erect or curved, never exceeding the inflorescence, glabrous; sheath red-black, closed, 8-22 mm long, 3-veined, the upper margin produced into 2 lobes; blade leaf-like. Inflorescence of 1 spikelet or a loose panicle of few spikelets, 1 or 2 peduncles arising in each bract axil. Spikelets erect, black, compressed ovoid, 8-14 mm long, with ca 5 flowers. Glumes ciliate on the upper margins; empty basal glumes 2-4; uppermost floral glumes often with a terminal tuft of hairs. Perianth segments tiny, glabrous. Stamens 3; anther at least 5 mm long. Nut dark-coloured, ca 1.5 mm long, 3-ribbed, rugose. *S. jamesonianus* W. Fitzg.

Occurs from Perth southward, in winter-wet depressions and along watercourses on the Coastal Plain, Darling Scarp and Range. Extends inland to Bruce Rock and south to Manjimup.

Flowers mainly August-October.

S. brevisetis (R. Br.) Benth.

Perennial herb, up to 0.4 m high. Stems terete or slightly compressed, 0.5-1 mm broad, rather smooth. Leaves all basal; sheath open, deep reddish black in the lower part, the upper margins fringed with long fine hairs; blade narrower and much shorter than the stems. Involucral bract erect, appearing to form a continuation of the stem usually to well above the inflorescence, 10-60 mm long. Inflorescence of 1 spikelet or a terminal cluster of up to 6 spikelets, erect but usually appearing lateral. Spikelets sessile or almost so, 8-10 mm long, usually 2-flowered. Glumes with the keel produced into a short point, the margins ciliate at the summit; empty basal glumes ca 5. Perianth segments 6, <0.5 mm long, flat, ciliate. Stamens 3; anther 4-5.5 mm long. Nut ca 1.5 mm long, obtusely 3-angled or 3-ribbed, rather smooth. *S. cygneus* Nees

Occurs on the Coastal Plain, probably in seasonally waterlogged sites. Extends from Eneabba at least to Kulin.

Flowers October-December.

Outside the Perth Region the species sometimes has leaves with a very reduced blade and the margins of the glumes are sometimes ciliate for most of their length. K.L. Wilson (pers. comm.) considers *S. brevisetis* and *S. caespititius* W. Fitzg., which are combined here under the older name *S. brevisetis*, to be distinct species, both occurring in the region. Typical *S. brevisetis* has a glabrous involucral bract much longer than the inflorescence whereas *S. caespititius* usually has an involucral bract with a hairy orifice and shorter than the inflorescence. However, they appear to intergrade.

S. capillifolius D.A. Cooke

Annual herb, semi-aquatic, glabrous. Main stem very short, repeatedly branching to form dense leafy tufts at the surface of the soil. Leaves basal; sheath open, up to 3 mm long; blade filiform, up to 100 x 0.2 mm, lax, supported by the water. Spikelets solitary, sessile in the leaf tufts or terminating the ultimate branches of the stem, 1-flowered. Glumes 2, opposite, linear, closely sheathing to form a tube around the flower, supporting the stigmas and anther above water level; empty basal glume 7-10 mm long. Perianth segments 6, ca 3 mm long. Stamen 1; anther ca 2 mm long. Nut 1-1.3 mm long, fragile.

Apparently endemic to the Perth Region, recorded only from the eastern side of the Coastal Plain in the Upper Swan area, in winter-wet depressions with sandy soil over clay.

Flowering period uncertain but includes November.

S. curvifolius (R. Br.) Benth.

Perennial herb, up to 0.4 m high. Stems arising from a bulb-like underground base or cluster of bases, terete or compressed, 0.5-1.5 mm broad. Leaves basal, much shorter than the stems, tapering to a fine point, usually markedly curved; sheath initially ciliolate at the summit, becoming worn. Major involucral bracts several, 25-100 mm long, the base broadly ovate; basal part of each margin broad, often black or translucent. Inflorescence a terminal head, dark brown or black, subglobular, usually with numerous spikelets and 8-15 mm across, rarely with few spikelets and narrower. Spikelets 5-7 mm long, 1 or 2-flowered. Glumes acute or attenuate, ciliate or denticulate on the margins; empty basal glumes ca 5. Perianth segments 6, 1.5-2 mm long, flat, ciliate. Stamens 3; anther ca 3 mm long. Nut 1-1.75 mm long, hairy at the summit.

Occurs in sand, often in *Banksia* woodland or in winter-wet depressions, on the Coastal Plain from Jandakot northward. Extends from Geraldton to east of Esperance.

Flowers mainly July-September.

S. discifer Tate

Annual herb, up to 60 mm high. Stems shorter than the leaves, up to 1 mm broad, ribbed, glabrous; sheath reddish, open, somewhat 2-lobed at the summit; blade with definite longitudinal lines or ribs. Involucral bract erect, leaf-like, much longer than the spikelets; sheath prominently several-veined. Inflorescence appearing lateral, with 1 terminal spikelet and sometimes with a second spikelet below, always exceeded by the leaves and sometimes close to the ground. Spikelets 8-10 mm long, 3-5-flowered. Glumes all subtending a flower, glabrous, the margins often exceeding the keel at the summit. Perianth segments absent. Stamens 3; anther ca 2 mm long. Nut ca 2 mm long, prominently 3-ribbed, smooth between the ribs.

Occurs in sandy winter-wet depressions on the Coastal Plain near Perth. Extends south to Manjimup. Also occurs in S.A., Vic., Tas. and New Zealand.

Flowers August-October.

The species was described from eastern Australian material which is smaller in all its parts compared with W.A. specimens. W.A. material may be sufficiently distinct to be recognized as a new subspecies.

***S. elegans* S.T. Blake**

Annual herb, up to 0.3 m high. Stems erect, somewhat compressed, 0.5-1.5 mm broad, ribbed. Leaves basal, much shorter than the stems, glabrous; sheath reddish, often 2-lobed at the summit; blade usually narrow. Basal bract leaf-like, usually shorter than the inflorescence; sheath closed, reddish, tapering to the blade. Inflorescence 35-110 mm long, interrupted, with up to 7 spreading spikelets at each node. Spikelets 6-8 mm long, 3 or 4-flowered. Glumes yellow or reddish, glabrous; empty basal glumes 1 or 2. Perianth segments absent. Stamens 3; anther ca 3 mm long. Nut ca 1.2 mm long, 3-ribbed, prominently reticulate between the ribs.

Occurs in winter-wet depressions and other seasonally waterlogged sites on the Coastal Plain and Darling Scarp from Perth southward. Extends south to the Scott River.

Flowers probably August-October.

***S. globifer* Nees**

Perennial rhizomatous herb, up to 0.45 m high. Stems erect, terete, 0.5-1 mm broad, smooth. Leaves much reduced, basal; uppermost leaf with a long reddish or brown sheath and a point-like blade, the upper margins of the sheath produced into a glabrous lobe on each side, the blade 5-40 mm long. Basal involucre bract erect or deflected by the inflorescence, up to 25 mm long but sometimes shorter than the inflorescence; base almost oblong, 3-ribbed, glabrous, with broad scarious margins each produced into an apical lobe; blade compressed, incurved. Inflorescence a terminal head of several to numerous spikelets, usually subglobular, up to 15 mm broad. Spikelets 7-12 mm long, acute, probably 2 or 3-flowered. Glumes brown, acute or acuminate, shiny, often minutely denticulate; empty basal glumes ca 4. Perianth segments (when present) 3, alternate to the stamens, filiform, 0.5-2 mm long. Stamens 3; anther 3-5 mm long. Nut ca 2 mm long, 3-angled, hairy at the summit.

Occurs in lateritic soil on the Darling Scarp near Perth, possibly associated with watercourses. Extends from Kalbarri to Esperance and inland to Cundeleele.

Flowers mainly August-October.

A very variable species, varying particularly in the size of the spikelets and inflorescence, in the hairiness of the nut, and in the perianth segments. Specimens from the Perth Region appear to lack perianth segments and to have glabrescent nuts while collections from the east and south usually have perianth segments and the nuts tend to be very hairy with long hairs at the summit.

***S. grammatophyllus* F. Muell.**

Perennial herb, up to 0.3 m high. Stems arising from a short broad rhizome or enlarged base, terete or somewhat compressed, 0.5-1.5 mm broad, ribbed. Leaves all basal or the uppermost leaf cauline and bract-like, up to 150 mm long, more compressed and slightly broader than the stems; sheath open, the upper margins ciliate. Involucral bracts with a shorter more acutely 3-angled blade than the leaves; sheath black at the base, reddish above, prominently 3-ribbed, with broad translucent margins, laterally ciliate, the cilia long and silky. Inflorescence very narrow and spike-like, 70-130 mm long, with 1 or 2 spikelets arising in each bract axil. Spikelets erect, 12-17 mm long, 2 or 3-flowered. Glumes with a small point often flanked by 2 longer lobes, glabrous; empty basal glume 1. Perianth segments absent. Stamens 3; anther ca 5 mm long. Nut 1.5-2 mm long, distinctly 3-ribbed, rugose.

Occurs near Perth in sandy winter-wet depressions on the Coastal Plain and associated with granite on the Darling Scarp and Range. Probably extends north to the Gairdner Range.

Flowers recorded June-July, October.

This taxon is very similar to, and should perhaps be regarded as a subspecies of, *S. obtusifolius* (Nees) Boeckeler which extends from Busselton to Israelite Bay. *S. grammatophyllus* has a bearded upper margin on its outer involucre bracts whereas *S. obtusifolius* has a denticulate upper margin.

***S. grandiflorus* (Nees) F. Muell.**

Perennial herb, up to 1.5 m high; rhizome thick. Stems stout, leafy, arising singly from an enlarged base, obtusely 3-angled, 2.5-5 mm broad, usually scabrous. Leaves becoming smaller up the stem and grading into the bracts; sheath of the upper leaves very scabrous, loose, the upper margin almost horizontal and ciliate with stout brown hairs; blade linear, flat or folded, 150-400 x 5-15 mm in the lowest leaves, with scabrous margins and midrib. Inflorescence narrow, 0.2-0.8 m long, of numerous spikelets, several to many spikelets arising in each bract axil. Spikelets brown, very narrowly ovoid, 18-22 mm long, 2-4-flowered. Glumes acute; empty basal glumes 8-10, becoming acuminate. Perianth segments absent. Stamens 3; anther 7-10 mm long. Nut not seen.

Occurs close to the coast on consolidated sand dunes and in limestone areas. Extends around the coast from Geraldton to Fitzgerald River National Park.

Flowers mainly April-July.

***S. laevigatus* W. Fitzg.**

Perennial herb, up to 0.4 m high. Stems erect, terete or slightly compressed, 1-1.5 mm broad, rather smooth. Leaves all basal or the uppermost leaf cauline, very reduced; sheath golden brown, glabrous; blade point-like, up to 40 mm long. Basal bract leaf-like, much shorter than the inflorescence. Inflorescence flexuose, interrupted, usually 40-100 mm long, of few to many spikelets, up to 5 spikelets arising in each bract axil. Spikelets long-pedunculate, ovate or narrower, 9-10 mm long, usually 2-flowered. Glumes brown, ciliate at the summit; empty basal glumes 2 or 3. Perianth segments point-like, shorter than the nut, sometimes very reduced. Stamens 3; anther not seen. Nut 1.5-2 mm long, 3-ribbed.

In the Perth Region recorded only from Bayswater, presumably growing in a winter-wet depression. Also occurs south of Busselton, probably extending along the south coast to Israelite Bay.

Flowers September-October.

***S. lanatus* Labill.**

Perennial herb, up to 0.35 m high. Stems terete or slightly compressed, 0.5-1 mm broad, smooth. Leaves basal, shorter than the stems; sheath reddish brown, open, bearded at the summit; blade more compressed but not broader than the stems. Involucral bract erect, leaf-like, up to 100 mm long, appearing to form a continuation of the stem well above the inflorescence; sheath narrow, closely sheathing the stem at the base, bearded at the summit. Inflorescence a close cluster or head of up to 6 spikelets, terminal. Spikelets brown, 8-15 mm long, 3-5-flowered. Glumes laterally woolly-ciliate; empty basal glume 1. Perianth segments longer than the nut, narrow, plumose. Stamens 3; anther 4-5.5 mm long. Nut ca 2 mm long, rather smooth.

Occurs close to the coast, in sand, often associated with limestone. Extends around the coast from Leeman to Cocklebidy.

Flowers May-December.

***S. latitans* S.T. Blake**

Perennial herb, forming a dense mat up to 150 mm in diameter, almost stemless, often with only the leaf blades projecting above the surface of the soil. Leaves 2-lobed and ciliate at the summit of the sheath; blade pale green, 20-35 mm long, 0.3-0.5 mm broad, curved or twisted, minutely scabrous. Inflorescence of 1 spikelet, erect, partly hidden below the soil surface. Spikelet at least 10 mm long, 2 or 3-flowered. Glumes acute, glabrous except near the summit which usually has a dense tuft of hairs; empty basal glume 1. Perianth segments 3, much longer than the nut, ciliate. Stamens 3; anther 3-3.5 mm long. Styles ca 17 mm long. Nut ca 1.5 mm long, hairy.

In the Perth Region, recorded only from Perth and Jandakot, growing in sand on the Coastal Plain. Also recorded from Kalbarri and Northampton.

Flowers April-May, possibly continuing to September.

This species is vegetatively very similar to *S. clandestinus* S.T. Blake and can be distinguished mainly by its much longer styles, those of *S. clandestinus* being only 3-3.5 mm long. A vegetative specimen from Jandakot, which has been included here as *S. latitans*, could possibly be *S. clandestinus*.

S. nanus (Nees) Benth.

Annual herb, up to 55 mm high. Stems almost terete, 0.2-0.5 mm broad, ribbed or winged. Leaves basal, setaceous, shorter than the stems, glabrous; sheath reddish. Involucral bracts erect, glabrous; sheath rather small; blade usually much longer than the inflorescence. Inflorescence usually a cluster of 2-6 spikelets, rarely of 1 spikelet, terminal. Spikelets usually 5-8 mm long, 3-6-flowered. Glumes glabrous; empty basal glume 1; upper glumes with 2 terminal lobes exceeding the keel. Perianth segments hair-like, ciliate at the base, the longest segments usually just exceeding the nut. Stamens 3; anther 0.7-1 mm long. Nut ca 1 mm long, 3-ribbed. Fruit prominently reticulate between the ribs.

In the Perth Region recorded only from 2 localities near Perth, apparently on or close to the Darling Scarp. Extends from north of Geraldton to Esperance, both in near-coastal areas and well inland.

Flowers August-November.

S. natans (F. Muell.) Benth.

Glabrous annual herb, aquatic. Stems branched, leafy, filiform, forming a floating mass, probably up to 0.3 m long. Leaves filiform. Inflorescence with 1 terminal spikelet and sometimes another spikelet below. Spikelets pale brown, narrowly linear in outline, 2-flowered. Glumes narrow; empty basal glume 1, rather shorter than the floral glumes. Perianth segments 6 or less, longer than the nut, plumose. Stamens 3. Nut prominently 3-ribbed, sometimes with a minute hairy point at the apex.

Apparently endemic to the Perth Region and possibly now extinct, occurring in winter-wet depressions on the eastern side of the Coastal Plain near Perth.

Flowering period probably October.

S. nitens (R. Br.) Poiret

Perennial herb, tending to resemble the annual species in habit, up to 0.3 m high; rhizome rather slender, covered by shiny brown scales. Stems tufted or distant, usually rigid, subterete, < 0.5 mm broad. Leaves few at the base of each stem, similar to the stems but usually shorter; sheath glabrous, shiny. Basal involucral bract erect, 5-85 mm long, appearing to form a continuation of the stem usually well above the inflorescence; second involucral bract sometimes conspicuous. Inflorescence sometimes of 1 spikelet, usually a head with 2-6 or rarely more spikelets, terminal but appearing lateral. Spikelets brown, ovoid, 3-5 mm long, shiny, 1-3-flowered. Glumes shiny, glabrous; empty basal glumes 2 or 3. Perianth segments 6, 2-2.5 mm long, densely plumose in the lower part. Stamens 3; anther not seen. Nut 1.5-2 mm long, 3-angled, rather smooth.

Occurs in winter-wet depressions from Rockingham southward. Extends along the south coast to Fitzgerald River National Park. Occurs in all states except N.T. Also occurs in New Zealand, New Guinea and South America.

Flowers October-December.

S. odontocarpus F. Muell.

Annual herb, up to 160 mm high. Stems almost terete, ca 0.3 mm broad, ribbed. Leaves basal, shorter and a similar breadth to the stems, glabrous; sheath reddish, several-ribbed. Basal bract leaf-like, usually shorter than the inflorescence. Inflorescence interrupted, with up to 6 spreading spikelets arising at each node, up to 45 mm long; peduncles of some spikelets long. Spikelets dark-coloured, 3-5 mm long, 2-5-flowered. Glumes glabrous; empty basal glumes 1 or 2, pointed; upper glumes with 2 terminal lobes exceeding the keel. Perianth segments absent or tiny. Stamens 3; anther 1.5-2.5 mm long. Nut ca 1 mm long, 3-ribbed or winged, prominently reticulate between the ribs; ribs protruding and often toothed at the upper rim of the nut, not grading into the style.

Occurs on the eastern side of the Coastal Plain from Bullsbrook southward. Extends along the south coast to east of Esperance and inland to Pingelly.

Flowers September-October.

S. pedicellatus (R. Br.) Benth.

Perennial herb, up to 0.55 m high, forming a large clump. Stems terete, 0.5-1.5 mm broad, smooth. Leaves basal, very reduced; sheath closely sheathing, reddish, with an oblique bearded orifice; blade usually 10-35 mm long but sometimes absent, very slender, curved. Basal bract usually shorter than the spikelets; base closely sheathing in the lower part, open above, minutely ciliate at the summit; blade longer than the sheath. Inflorescence of 1-4 loosely arranged spikelets, with 1 or 2 spikelets arising in each bract axil. Spikelets pedunculate, 12-20 mm long, 1 or 2-flowered. Glumes ciliate on the upper margins, the keel produced into a point; empty basal glumes ca 5. Perianth segments 6, tiny, triangular, denticulate-ciliate. Stamens 3; anther not seen. Nut obtusely 3-angled or 3-ribbed, probably at least 2.5 mm long, smooth.

Occurs in sandy soil, sometimes along watercourses, on the Coastal Plain from Perth northward. Extends north to Eneabba.

Flowers October-January.

This taxon appears to have 2 variants which should possibly be considered distinct species. The more common variant has spikelets 16-20 mm long and bracts shorter than the spikelets or inflorescence. The second variant, recorded only from South Perth and Eneabba, appears to have spikelets ca 12 mm long and much exceeded by the involucre bract.

S. pennisetis S.T. Blake

Annual herb, green to purplish, up to 130 mm high. Stems almost terete, ca 0.3 mm broad, ribbed. Leaves basal, shorter and a similar breadth to the stems, glabrous; sheath reddish, several-ribbed. Basal bract leaf-like, usually shorter than the inflorescence. Inflorescence rather loose, of several spikelets. Spikelets black or dark purplish, 4.5-6.5 mm long, 1 or 2-flowered. Glumes glabrous; empty basal glumes ca 3, attenuate; floral glumes with 2 terminal lobes exceeding the keel. Perianth segments 6, longer than the nut, densely plumose-ciliate on the lower $\frac{2}{3}$, attenuate. Stamens 3; anther ca 2.5 mm long. Nut ca 1.25 mm long, 3-winged, the wings entire and raised uniformly to the base of the style, rather smooth between the ribs.

Occurs in winter-wet depressions on the eastern side of the Coastal Plain near Perth. Also recorded from near Dongara and Wongan Hills.

Flowers August-September.

S. pleiostemoneus F. Muell.

Perennial herb, up to 0.3 m high. Stems wiry, terete, up to 0.5 mm broad, usually flexuose, rather smooth. Leaves very reduced; sheath deep red, closed, the orifice often densely bearded with white hairs; blade small, point-like. Involucral bract not exceeding the inflorescence, attenuate, 3-veined, glabrous. Inflorescence of 1 terminal spikelet, sometimes with a second spikelet below. Spikelets erect, ovoid, 8-9 mm long, 2-4-flowered. Glumes brown, glabrous, usually 2-lobed at the summit; empty basal glume 1. Perianth segments absent. Stamens 6; anther 3.5-4.5 mm long. Nut 1-2.5 mm long, scarcely ribbed.

Recorded from just north of the Perth Region, growing in sand close to the coast. Extends north to Kalbarri and also occurs in the Newdegate-Beaufort Inlet area.

Flowers March-April, also recorded August.

S. rigens S.T. Blake

Perennial herb, up to 0.6 m high. Stems 1.5-3.5 mm broad, ribbed. Leaves basal; sheath deep reddish to black, shortly ciliate in the upper part; blade narrower and much shorter than the stems. Inflorescence narrow, very interrupted, 1 or 2 spikelets arising in each bract axil, usually with few spikelets overall, occupying half or more of the stem. Spikelets erect, 21-32 mm long, usually 3-5-flowered. Glumes acute, laterally ciliate; empty basal glumes 4-6. Perianth segments 4-6, filiform, usually much shorter than the nut, minutely ciliate. Stamens 3; anther not seen. Nut dark-coloured, 3-3.5 mm long, 3-ribbed, rugose. *S. calostachyus* (R. Br.) Poir. var. *distans* (F. Muell.) Benth.

Occurs in sandy soil in winter-wet depressions on the Coastal Plain. Extends from the Murchison River to Busselton.

Flowering period uncertain but includes March and August.

S. rodwayanus W. Fitzg.

Perennial herb, up to 1 m high. Stems erect, terete or somewhat compressed, 0.5-1.5 mm broad, fairly smooth. Leaves basal, very reduced, green or reddish, glabrous; orifice oblique; blade point-like, short. Bracts (if several spikelets) similar to the leaves but smaller, 15-26 mm long, 3-veined, glabrous. Inflorescence either of 1 spikelet or of several loosely arranged spikelets arising in the axils of 1 or 2 large bracts. Spikelets long-pedunculate, 15-25 mm long, 1 or 2-flowered. Glumes black along the centre, glabrous; empty basal glumes ca 5. Perianth segments 6, tiny, triangular, glabrous. Stamens 3; anther not seen. Nut 2.5-3 mm long, 3-lined, smooth.

Occurs in sandy winter-wet depressions on the Coastal Plain from Perth southward. Extends along the south coast to East Mt. Barren.

Flowers September-November.

S. sculptus (Nees) Boeckeler

Gimlet Bog-rush

Annual herb, up to 250 mm high but sometimes tiny. Stems up to 1 mm broad, ribbed. Leaves usually shorter than the stems, glabrous; sheath reddish, somewhat 2-lobed at the summit. Bracts usually 2-4, rather distant, leaf-like; basal bract much longer than the spikelets and sometimes exceeding the inflorescence. Spikelets 1-3 in the axil of each bract, 4-7 mm long, 2-4-flowered. Glumes all subtending a flower, glabrous or scabrous on the keel; upper glumes with 2 terminal lobes exceeding the keel. Perianth segments absent or few and minute. Stamens 3; anther 0.5-1 mm long. Nut ca 1.5 mm long, prominently 3-ribbed, prominently reticulate between the ribs.

Occurs in winter-wet depressions on the Coastal Plain from Perth southward. Extends inland to Southern Cross and along the south coast to Israelite Bay. Also occurs in S.A. and Vic.

Flowers September-October.

S. subbarbatus Kuek.

Bearded Bog-rush

Perennial herb, up to 0.4 m high. Stems terete or somewhat compressed, 0.5-1.5 mm broad, rather smooth. Leaves basal; sheath closed, reddish, densely bearded at the orifice; blade shorter and a similar breadth to the stems, usually curved, rarely flexuose. Involucral bract erect, appearing to form a continuation of the stem above the inflorescence, 18-75 mm long; sheath open, 3-12 mm long, 3-ribbed, bearded at the summit; blade leaf-like. Inflorescence of 1 spikelet or a head of 2-4 spikelets, terminal but appearing lateral. Spikelets erect, brown, 8-11 mm long, 2 or 3-flowered. Glumes usually ciliate at the summit; empty basal glume 1. Perianth segments absent. Stamens 3; anther 3.5-4.5 mm long. Nut 3-ribbed, rugose. *S. barbatus* Boeckeler

Occurs on the eastern side of the Coastal Plain. Extends around the coast from Eneabba to Fitzgerald River National Park.

Flowers September-December.

South of the Perth Region the species tends to have smaller perianth segments and shorter less tightly grouped spikelets, the spikelets 6-8 mm long.

S. subbulbosus Benth.

Perennial herb, up to 0.35 m high. Stems arising from a bulb-like underground base or cluster of bases, terete or compressed, 1-2.5 mm broad. Leaves basal, much shorter than the stems, spiralled or curly in the distal part. Major involucral bracts several, spreading, very curly, usually 20-50 mm long; base brown, ovate, strongly ribbed, ciliate. Inflorescence of numerous spikelets in a terminal head, erect, rather pale brown, subglobular, usually 10-14 mm broad. Spikelets 5-8 mm long. Glumes acute, laterally ciliate; empty basal glumes 5 or more, acuminate. Perianth segments hair-like, ca 0.5 mm long. Stamens 3; anther not seen. Nut dark with 3 prominent whitish ribs, ca 1.5 mm long, hairy at the summit of the ribs. *S. capitatus* (Nees) F. Muell.

Occurs in sandy winter-wet depressions on the Coastal Plain from Perth southward. Extends along the south coast to Bremer Bay.

Flowering period uncertain but includes March-April.

S. subfascicularis Kuek.

Perennial herb, up to 1 m high. Stems terete or slightly compressed, 0.5-2 mm broad, grooved. Leaves basal, much reduced; sheath closed, reddish brown; orifice sometimes horizontal, usually ciliate or bearded; blade point-like, up to 20 mm long. Involucral bracts lacking a blade, the basal part closely sheathing the stem; upper part a similar length to the spikelets, thick, usually obtuse. Inflorescence of few to numerous spikelets, 15-90 mm long. Spikelets brown, ovoid or narrower, 6-11 mm long, several-flowered. Glumes dark purplish red, not pointed, laterally ciliate, often bearded at the summit; empty basal glumes 4-12. Perianth segments absent. Stamens 3; anther 3-4 mm long. Nut 3-ribbed, rather smooth between the ribs. *S. fascicularis* Nees

Occurs in winter-wet depressions on the Coastal Plain from Wanneroo southward. Extends along the south coast to the Oldfield River.

Flowers July-December.

As recognized here, this species is very variable. The orifice of the leaf sheath ranges from horizontal and glabrous to very oblique and bearded. Most specimens have spikelets 6-7 mm long and a few empty basal glumes. However, a variant occurring at one location on the Swan River and also near the Stirling Range has spikelets 9-11 mm long and numerous empty basal glumes.

S. subflavus Kuek.

Yellow Bog-rush

Perennial herb, up to 0.3 m high. Stems somewhat compressed, ca 1 mm broad, ribbed. Leaves basal, ciliate; sheath glossy, reddish brown with scarious margins, 20-50 mm long, 2-lobed and often ciliate at the summit; blade curled, up to 120 x 1 mm, more compressed than the stems, often shortly hairy on the upper surface. Involucral bracts usually curled, 20-130 mm long; sheath broad, 3-5 mm long, 2-lobed and hairy at the summit; blade leaf-like. Inflorescence a head of 3-6 spikelets, erect. Spikelets 10-13 mm long, with ca 4 flowers. Glumes all floral, yellowish, 8-11 mm long, keeled, glossy, glabrous except for cilia along the upper margins, 2-lobed at the summit. Perianth segments absent. Stamens 3; anther 4-5 mm long. Nut 3-ribbed, hairy at least in the upper half, rugose. *S. flavus* (Nees) Boeckeler

In the Perth Region, recorded only from Serpentine, in the Darling Range. The variant described here extends from Eneabba to Pingelly. Another variant occurs mainly along the south coast from Ongerup to east of Esperance.

Flowers mainly September-November.

Specimens from the south coast tend to have longer leaves with a yellowish brown sheath, shorter anthers and a number of other differences. Possibly, all or some of them should be recognized as a distinct species.

S. tenellus Benth.

Annual herb, up to 100 mm high. Stems terete, sometimes red, ca 0.3 mm broad, ribbed. Leaves basal, much narrower and shorter than the stems, glabrous; sheath reddish, tapering to the blade. Involucral bract reduced to the sheath, ovate, often shorter than the spikelets, 3-ribbed, glabrous. Inflorescence spike-like, interrupted, usually with 1 erect spikelet at each node, up to 25 mm long. Spikelets 4-5 mm long, 2-4-flowered. Glumes all floral, glabrous, with 2 terminal lobes exceeding the keel. Perianth segments absent. Stamens 3; anther 0.7-1.2 mm long. Nut ca 1 mm long, somewhat 3-ribbed, otherwise smooth. *S. fluitans* J.D. Hook. var. *tenellus* (Benth.) Kuek.

Occurs from Perth southward, on the Coastal Plain, probably in winter-wet depressions. Extends south to Manjimup.

Flowers September-October.

S. unispiculatus F. Muell. ex Benth.

Perennial herb, up to 0.45 m high. Stems terete or slightly compressed, 1-1.5 mm broad, ribbed. Leaves all basal or the uppermost leaf cauline and smaller; sheath reddish toward the base, the orifice bearded; blade narrower and shorter than the stems. Involucral bract leaf-like, erect, longer than the spikelets, 3-veined. Inflorescence of 1 terminal spikelet and sometimes a second subterminal spikelet. Spikelets 20-30 mm long, 2-5-flowered. Glumes narrow; empty basal glume 1, with a short blade, similar to the

involucral bract; floral glumes without a blade, bearded at the summit, often laterally ciliate. Perianth segments hair-like, usually unequal, up to 2.5 mm long but sometimes minute. Stamens 3; anther probably ca 9 mm long. Nut 2-3 mm long, obscurely 3-angled or 3-ribbed, rugose.

Occurs on the Darling Scarp and Range. Extends from north of Northampton to Manjimup.

Flowers mainly August-September.

TETRARIA Beauv.

Perennial rhizomatous herbs. Stems tufted, erect, terete or obtusely 3-angled, often noded below the inflorescence. Leaves mainly or all basal; cauline leaves (when present) 1 per node. Inflorescence a spike-like panicle, usually long and narrow, with 1-several spikelets arising at each node. Spikelets usually 2-flowered, sometimes 1 or 3-flowered, usually with only 1 flower fully fertile. Glumes distichous; empty basal glumes 3-5. Perianth segments often absent. Stamens 3-8. Style branches 3-8; base enlarged, persistent in fruit, with short hairs (at least in the Perth Region). Over 35 species, concentrated in temperate South Africa, the 4 or 5 Australian species all occurring in the south west of W.A., with 1 species extending to eastern Australia.

1. Leaf blade < 1 mm broad. Perianth segments present.
 2. Stems terete, smooth. Leaf blade reduced to a long fine point **T. capillaris**
 2. Stems somewhat compressed in the lower part, ribbed. Leaf blade stem-like but much shorter **T. sp. A**
1. Leaf blade 2-5 mm broad. Perianth segments absent.
 3. Style branches 3. Spikelets ca 8 mm long **T. australiensis**
 3. Style branches 4 or more. Spikelets 10-15 mm long **T. octandra**

T. australiensis C.B. Clarke

Perennial herb, up to 1 m high. Stems terete, with 3 or 4 distant nodes. Basal leaves numerous, much shorter than the stem, 4-5 mm broad; cauline leaves becoming shorter up the stem and grading to the leafy bracts, the sheath dark brown. Inflorescence 0.15-0.3 m long. Spikelets compressed, ca 8 mm long. Glumes ca 5, shortly pointed or obtuse. Perianth segments not seen. Stamens 6 in the lower flower, 3 in the upper flower; anther probably > 5 mm long. Style branches 3.

Apparently endemic to the Perth Region, occurring on the eastern side of the Coastal Plain, extending from near Perth to the Serpentine River.

Flowers recorded December.

T. capillaris (F. Muell) J. Black

Hair Sedge

Perennial herb; up to 0.7 m high, forming a clump up to 0.75 m in diameter. Stems terete, up to 1 mm in diameter. Leaves basal; blade reduced to a fine point, 5-16 mm long, < 0.5 mm broad, ciliate. Inflorescence up to 75 mm long, with up to 10 spikelets; bracts erect, rather inconspicuous, usually shorter than the branch subtended. Spikelets erect, usually prominently pedunculate, narrowly ovate in outline or with the glumes spreading at maturity, 6-9 mm long. Glumes acuminate, laterally ciliate. Perianth segments 3-5, bristle shaped, shorter than the nut. Stamens 3; anther 3.5-5 mm long. Style branches 3. Nut constricted below the style base, 4.5-6 mm long including the style base; style base narrower and often longer than the nut, prominently ribbed, shortly hairy.

Occurs in gravelly soils in Jarrah woodlands on the Darling Range or Scarp from Perth southward. Extends along the south coast to Fitzgerald River National Park. Recorded in all states except N.T. Also occurs in New Zealand.

Flowers probably all year round but mainly March-June.

T. octandra (Nees) Kuek.

Perennial herb, up to 1.2 m high. Stems 1-3 mm broad, terete at the base but very obtusely 3-angled below and within the inflorescence, ribbed. Leaves mainly or all basal but the bracts leaf-like so that the stems appear leafy, the leaves and bracts becoming progressively smaller up the stem; blade long,

2-4 mm broad, often twisted or curved. Inflorescence up to 250 mm long. Spikelets clustered in the bract axils, some long-pedunculate and others subsessile, 10-15 mm long. Glumes ca 7; empty basal glumes acuminate. Perianth segments absent. Stamens 6-8 or rarely 4; anther ca 6 mm long. Style branches 4 or rarely 5. Nut ca 5 mm long including the style base, not constricted below the style base, strongly 4-ribbed; style base ca 2 mm long. *Tetrariopsis octandra* (Nees) C.B. Clarke

Occurs in sand on the Coastal Plain and on rocky hillsides on the Darling Scarp. Extends in near-coastal areas from Eneabba to Albany.

Flowers June-November.

T. sp. A

Perennial herb, 0.2-0.3 m high. Stems 0.75-2 mm broad, terete and distinctly ribbed in the upper part, usually more compressed in the lower part. Leaves: sheath pale brown or whitish, the upper margins almost translucent, tending to become worn; blade much shorter and narrower than the stems. Inflorescence spike-like, very narrow, ca 40 mm long, with few spikelets. Spikelets erect, alternate, ca 6 mm long, 2-flowered. Glumes 4 or 5, acute or acuminate. Perianth segments, ca 1 mm long, acute, glabrous. Anthers not seen. Fruit pyriform, ca 3 mm long, narrowing rather suddenly to the style base immediately above a transverse ridge, with 6 broad longitudinal lines; style base ca 1 mm long, hairy. *Lepidosperma rostratum* S.T. Blake

Apparently endemic to the Perth Region, recorded from only 1 location, in sand in a winter-wet depression on the eastern side of the Coastal Plain near Perth.

Fruits recorded August.

TRICOSTULARIA Nees

Perennial herbs with a short rhizome. Stems tufted, erect, terete. Leaves usually all basal but sometimes the uppermost 1 or 2 leaves cauline, often very reduced. Inflorescence a panicle of spikelets, often spike-like, the spikelets solitary or clustered in the axils of sheathing bracts. Spikelets sessile or pedunculate, with 1-3 flowers, the upper flower bisexual, the lower flowers (when present) apparently male; axis straight to slightly flexuose. Glumes distichous, membranous, pale brown; empty basal glumes 2-4. Perianth segments 6 or fewer, short, slender, usually unequal. Stamens 3. Style with 3 long stigmatic branches; base not thickened, deciduous. Nut obtusely 3-angled. Probably 3-5 species, at least 3 species in southern Australia and possibly a further 1 or 2 species in northern Australia and south east Asia, 2 species occurring in W.A.

T. neesii Lehm.

Perennial herb, up to 0.75 m high, forming a clump up to 0.75 m in diameter. Stems usually < 1 mm in diameter. Leaves very reduced, mostly occurring at the base of the stem but often the uppermost 1 or 2 leaves cauline; sheath oblique at the orifice, tapering to an erect point. Inflorescence consisting of 1 to several compact clusters of spikelets, 10-50 mm long. Spikelets sessile or shortly pedunculate, brown, 6-9 mm long, narrowly ovate in outline, 2-flowered. Glumes usually with the keel produced into a short point, laterally ciliolate. Perianth segments very short. Anthers probably 4-4.5 mm long. Nut obovoid, with 3 ribs on the top, contracted at the base, often hairy.

Occurs in sand on the Coastal Plain from Yanchep to Perth. Also occurs along the south coast from Bow River to Israelite Bay.

Flowers October-December.

Perth specimens are of var. *neesii*, which occurs throughout the species range. Var. *elatior* Benth. extends from Albany to Fitzgerald River National Park. It differs in its narrower inflorescence, which has few erect spikelets at each node rather than dense clusters of spikelets, and probably tends to flower later in the year.

FAMILY 150 HYDATELLACEAE

B. L. Rye

Annual herbs, aquatic or semi-aquatic, submerged or partly emergent in fresh water, minute, monoecious or dioecious. Leaves tufted, lacking a definite sheath, filiform, thin, 1-veined. Inflorescence a head or head-like, terminal, many-flowered but resembling a single flower; subtending bracts 2-4 or rarely up to 6, translucent; floral bracts and bracteoles absent. Flowers minute, hydrophilous or autogamous. Perianth absent. Stamen 1; filament stout; anther 2-celled, basifixed. Gynoecium stipitate; ovary 1-celled, utricle-like; ovule 1, pendulous; stigma apparently sessile and consisting of a number of enlarged articulate papillae but these may also be interpreted as being reduced styles. Fruit dry, small, 1-seeded. 8 species in 2 genera, confined to southern Australia and New Zealand.

1. Inflorescence either male or female. Fruit not ribbed, indehiscent..... **HYDATELLA**
 1. Inflorescence bisexual. Fruit 3-ribbed, dehiscent..... **TRITHURIA**

HYDATELLA Diels

Annual herbs, aquatic, monoecious or dioecious. Stems filiform. Leaves radical, filiform, exceeding or rarely a similar length to the flowering stems. Inflorescence unisexual, with crowded flowers; bracts 2 or rarely 4. Stigmatic papillae indefinite, unequal. Fruit indehiscent, shed entire, lacking definite ribs. Seed testa smooth, thin. 5 species, 3 occurring in the south west of W.A., 1 in Tasmania and 1 in New Zealand.

H. dioica D.A. Cooke

Annual herb, up to 50 mm high, dioecious, glabrous. Leaves 15-37 mm long. Bracts 2, overlapping, folded, closely enclosing the lower parts of the flowers, narrowly ovate, 6-8 mm long. Male inflorescence usually 8-10-flowered, the flowers maturing 1 at a time; female inflorescence not seen. Stamen filament 8-11 mm long; anther narrowly linear in outline, 3-3.5 mm long.

Recorded only from Midland Junction and Ellen Brook, in muddy clay pans on the eastern side of the Coastal Plain.

Flowers September-November.

TRITHURIA J.D. Hook.

Annual herbs, aquatic or semi-aquatic, monoecious. Stems filiform. Inflorescence bisexual; flowers crowded, the female flowers more numerous than the male flowers. Stamen filament long; anther linear. Stigmatic papillae usually 3. Fruit 3-ribbed, often dehiscent by 3 slits, sometimes indehiscent. Seed testa thick and sculptured when in a dehiscent fruit, otherwise smooth and thin. 3 species, confined to Australia, 2 species occurring in W.A.

1. Flower head almost basal on a short peduncle. Bracts 2 but often barely distinguishable, 2.5-3.5 mm long..... **T. bibracteata**
 1. Flower head borne above the leaves on a long stem. Bracts 4-8 per head, 1.5-2.5 mm long..... **T. submersa**

T. bibracteata Stapf ex D.A. Cooke

Annual herb, reddish, up to 20 mm high, glabrous. Leaves 5-20 mm long. Bracts 2 but often barely distinguishable from the leaves, narrowly ovate, 2.5-3.5 mm long, folded, acute. Inflorescence almost basal, on a short peduncle, usually with 1 or 2 male flowers and several female flowers. Stamen filament 2.5-2.8 mm long; anther 0.5-0.7 mm long. Stigmatic papillae 6-10, filiform, up to 2 mm long. Fruit dehiscent, ca 0.5 mm long.

Occurs in clay in winter-wet depressions on the eastern side of the Coastal Plain from Perth southward. Extends south to Manjimup.

Flowers October-November.

T. submersa J.D. Hook.

Annual herb, often reddish, up to 45 mm high, glabrous. Leaves basal, 5-25 mm long. Bracts 4-8, narrowly ovate or ovate, 1.5-2.5 mm long. Inflorescence borne above the leaves on a long peduncle, with few male flowers surrounded usually by 10 or more female flowers; flowers shorter than the bracts. Stamen filament probably < 1 mm long; anther 0.5-1 mm long. Stigmatic papillae probably 0.5-0.8 mm long. Fruit dehiscent, 3-angled, up to 1 mm long, the stipe elongating as the fruit matures.

Occurs in clay in winter-wet depressions on the eastern side of the Coastal Plain from Perth southward. Extends south to Manjimup. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers September-November.

FAMILY 151 RESTIONACEAE

B. L. Rye

Perennial or rarely annual herbs, with a rush-like or sedge-like habit, either with a tufted base or spreading by a creeping rhizome, usually dioecious; rhizome usually covered by closely imbricate scales. Leaves rarely radical, usually several and imbricate near the base of the stem and distant above, usually reduced and scale-like, sheathing; blade usually represented by a short appendage at the summit of the sheath. Inflorescence usually a spikelet or group of spikelets; spikelets usually with a few involucre bracts, each flower subtended by a floral bract; bracts of the spikelets often referred to as glumes, imbricate, rigid. Perianth segments usually 6 in 2 whorls, rarely 3-5, bract-like or scarious. Stamens 3 or rarely 6; anther adaxially attached, with 1 or 2 oblong cells, longitudinally dehiscent. Staminodes sometimes present in female flowers. Styles or style branches 1-3, usually filiform. Ovary superior, of 1-3 carpels, 1-3-celled; ovules 1 per cell, pendulous. Fruit a capsule or nut, often hard, usually small. Over 300 species in at least 30 genera, widely distributed in the southern hemisphere, concentrated in South Africa and Australia. The boundaries of the Australian genera are under review and a number of changes, noted under certain genera in this treatment, are likely to occur when studies by L.A.S. Johnson and B.G. Briggs are completed. Reference: Johnson, L.A.S. & Briggs, B.G. 1983. in Morley & Toelken (eds), Flowering Plants in Australia, pp. 371-373.

1. Anthers 2-celled. Ovary 3-celled.
 2. Stamens free. Leaves with a long stem-like blade..... ANARTHRIA
 2. Stamens connate for most of the length of the filament. Leaves with a very reduced blade or no blade..... LYGINIA
1. Anthers 1-celled, Ovary usually 1 or 2-celled, rarely 3-celled.
 3. Female flowers basal, with only the styles protruding above ground level. Leaves short, loose..... ALEXGEOGEEA
 3. Female flowers borne well above the ground. Leaves rarely as above.
 4. Fruit a 2 or 3-celled capsule. Styles or style branches 2 or 3.
 5. Perianth segments longer than the bracts, the bracts not closely imbricate. Flowers in a narrow branched inflorescence, the male and female inflorescences similar..... LEPYRODIA
 5. Perianth segments not exceeding the imbricate bracts. Flowers in spikelets, crowded or loosely arranged, the male and female spikelets often quite different..... RESTIO
 4. Ovary and fruit 1-celled. Styles or style branches 1-3.
 6. Male spikelets terminal or sessile to subsessile. Stamens exerted.
 7. Leaves with a persistent annular base, the distal portion open and deciduous. Male spikelets with > 20 flowers..... LEPIDOBOLUS

7. Leaves not as above. Male spikelets with < 20 flowers.
8. Female spikelets 1-flowered. Styles or style branches 1-3.
9. Female spikelets pedunculate. Male and female perianth segments 6..... **EMPODISMA**
9. Female spikelets terminal or sessile. Perianth segments 5 in male flowers, absent or tiny in female flowers..... **LOXOCARYA**
8. Female spikelets 2-several-flowered. Style simple..... **HARPERIA**
6. Male spikelets with a definite slender peduncle. Stamens not exerted.
10. Female flowers zygomorphic, with 2 long-acuminate bracteoles. Anthers almost basifixed..... **MEEBOLDINA**
10. Flowers not as above. Anthers distinctly dorsifixed.
11. Female spikelets 1-flowered.
12. Female spikelets crowded into a terminal cluster. Style simple..... **CHAETANTHUS**
12. Female spikelets well spaced. Styles or style branches 3..... **HYPOLAENA**
11. Female spikelets several-flowered..... **LEPTOCARPUS**

ALEXGEORGEA Carlq.

Perennial herbs, dioecious; rhizome creeping. Stems rigid, with flexuose mucronate branchlets, hairy below the ground. Leaves reduced and scale-like, persistent, convolute, rigid, hairy, mucronate. Male spikelets usually solitary, terminal or sessile at the nodes, several-flowered; female spikelets 1-flowered, sessile in the axils of rhizome scales, with only 1 fertile rhizomatous stem produced each year, the erect stems all vegetative. Perianth segments 6 or rarely less, more or less scarious. Stamens 3; anther exerted, 1-celled, oblong, adaxially attached at the centre. Ovary 1-celled. Styles 3 or rarely 2, pink-purple, connate at the base, filiform, very long, the only part of the female flower other than the apices of the innermost bracts to appear above ground. Fruit a nut, large. 3 species, confined to the south west of W.A.

A. sp. A

Perennial herb, 0.15-0.3 m high; rhizome scales brown, shiny. Stems borne singly or in fascicles along the rhizome, sometimes flexuose, usually subterete, ca 1 mm in diameter, often galled so that the vegetative branchlets appear to be in fruit. Leaves 2-6 mm long, loose, the lower leaves mucronate. Male spikelets fusiform, ca 6 mm long; bracts ca 3 mm long including the point. Perianth segments of male flowers ca 2 mm long. Styles 25-30 mm long. Fruiting perianth segments brownish, 15-20 mm long, acute. Nut obpyriform, ca 15 mm long. *Restio nitens* Nees, *A. arenicola* Carlq.

Occurs in sand, sometimes associated with winter-wet depressions, on the Coastal Plain and Darling Scarp. Extends from Eneabba to Margaret River and inland to Pingelly.

Flowers April-May.

ANARTHRIA R. Br.

Perennial herbs, usually dioecious, rarely monoecious; rhizome creeping. Stems often compressed, often not segmented below the inflorescence. Leaves long, radical or sheathing at the base of the stem, with definite upper and lower surfaces, tapering to a point. Bracts subtending the branches leaf-like, long. Inflorescence narrow or spike-like, the flowers not aggregated into spikelets; bracts not closely imbricate, shorter than the perianth. Bracteoles 2. Perianth segments 6, bract-like, folded. Stamens 3; anther exerted, 2-celled, adaxially attached at the centre. Staminodes absent. Ovary 3-celled. Styles 3, elongated, free, stigmatic almost throughout. Fruit a capsule, 3-angled or 3-lobed, dehiscent at the angles. 6 species, confined to the south west of W.A.

1. Stems many-branched. Leaves broader and much shorter than the stems..... **A. prolifera**
1. Stems not branched below the inflorescence. Leaves all radical, similar to the stems.

2. Stem and leaves 0.5-2 mm broad. Outer perianth segments > 5 mm long.
3. Stems usually < 1 mm broad. Male inflorescence loose, with 1 lateral branch at each node..... **A. humilis**
3. Stems 1-2 mm broad. Male inflorescence usually with 2 or 3 branches at each node..... **A. gracilis**
2. Stems 3.5-6 mm broad. Outer perianth segments < 5 mm long..... **A. laevis**

A. gracilis R. Br.

Perennial herb, 0.2-0.8 m high. Stems simple, 1-1.5 mm broad, slightly compressed, finely grooved. Leaves usually shorter than the stems but similar in breadth. Inflorescence 6-35-flowered, 20-55 mm long; male inflorescence usually with 2 or 3 lateral branches arising at each node, each branch usually with several spikelets. Perianth segments of male flowers pale brown, narrowly ovate, acute; outer segments usually 6-8 mm long; inner segments equal or slightly shorter than the outer segments. Outer perianth segments of female flowers narrowly ovate, usually 3.5-5 mm long, acute; inner segments ovate, shorter, 2-2.5 mm broad, with scarious margins. Stamen filaments 1.5-2 mm long.

Occurs in sandy winter-wet depressions on the eastern side of the Coastal Plain near Perth. Extends around the coast from Jurien Bay to Esperance.

Flowers mainly August-October.

A. humilis Nees

Perennial herb, up to 0.3 m high. Stems simple, up to 1 mm broad, slightly compressed, finely grooved. Leaves usually 0.1-0.35 m long, similar to the stems. Inflorescence usually 3-9-flowered, branching, 10-30 mm long, each branch 2 or 3-flowered and arising singly at a node; male inflorescence appearing rather loose. Perianth segments of male flowers pale brown, narrowly ovate, acute or acuminate; outer segments 6-7.5 mm long, usually exceeding the inner segments by ca 1 mm. Perianth segments of female flowers more erect and broader than in male flowers; outer segments 4-4.5 mm long; inner segments shorter than the outer segments, with scarious margins. Stamen filaments 2-2.5 mm long.

In the Perth Region, recorded only from the Helena Valley growing in a gorge, probably associated with granite. Extends from north of Jurien Bay to east of Esperance, often occurring on lateritic breakaways.

Flowers August-October.

On the south coast the species sometimes has broader stems and leaves, both 1-1.5 mm broad.

A. laevis R. Br.

Perennial herb, usually 0.25-0.45 m high. Stems simple, 3.5-6 mm broad, flat, finely grooved, rigid. Leaves similar to the stems. Inflorescence with numerous flowers, dense, 50-110 mm long, usually with 2-6 lateral branches arising at each node. Perianth segments brown, narrowly ovate, 2.5-4.5 mm long, the inner and outer segments similar in length but all tending to be slightly larger in male flowers than in female flowers. Stamen filaments ca 1.5 mm long.

Occurs on the Darling Scarp and on the eastern side of the Coastal Plain near Perth, growing in sand in winter-wet flats or depressions. Extends along the south coast to east of Esperance.

Flowers July-March, possibly all year round.

A. prolifera R. Br.

Perennial herb, usually 0.25-0.6 m high. Stems 1.5-4 mm broad, divided from near the base into flexuose or curved branches, usually with several branches arising at each node, flat, finely grooved. Leaves broader and shorter than the stems, gradually reduced progressively up the stem to sheathing bracts under each branch, the upper bracts with broad open bases. Inflorescence 2-7-flowered, usually loose. Perianth segments brown, narrowly ovate, 6-9 mm long, acute, the inner and outer segments almost equal. Stamen filaments ca 4 mm long.

Occurs in sand in winter-wet depressions from Dwellingup southward. Extends along the south coast to east of Esperance.

Flowers August-November.

CHAETANTHUS R. Br.

Perennial herbs, dioecious. Stems simple, erect. Leaves reduced and scale-like, persistent, closely appressed. Male inflorescence a loose panicle of spikelets; spikelets on a slender peduncle, with imbricate bracts, few-flowered. Female spikelets small, crowded into a terminal cluster, 1-flowered. Perianth segments 6; segments of male flowers small, hidden within the bracts; outer 3 segments of female flowers narrow, the inner 3 segments much shorter and hair-like. Stamens 3, not exserted; anther erect, almost sessile, 1-celled, adaxially attached below the middle. Ovary 1-celled. Style simple, much longer than the perianth segments, filiform, stigmatic from below the middle, the tip protruding from the bracts. Fruit a capsule. 1 species, confined to the south west of W.A. 3 further species are likely to be transferred to the genus, including *Leptocarpus aristatus* and probably *L. sp. A* (B.G. Briggs pers. comm.). The addition of these species would alter the genus description from that given here. Another possibility is that the genus will be transferred to *Leptocarpus*.

C. leptocarpoides R. Br.

Perennial herb, 0.2-0.35 m high, densely tufted. Stems 0.5-1 mm broad, not compressed. Leaves 2-4 on each stem below the inflorescence, dark brown, up to 15 mm long, with a long fine point, often with broad translucent borders below the apex. Male spikelets ca 6 mm long. Female spikelets numerous, reddish or red-brown, drying dark brown; cluster branched but compact, ca ovoid, 7-10 mm broad. Outer female perianth segments tapering slightly to the summit, 1.5-2 mm long, the margins minutely toothed.

Recorded from Serpentine and the Murray district, at the latter locality growing in a sandy somewhat humid area with Jarrah. Extends to the south coast and east to Denmark.

Flowers mainly November-December.

EMPODISMA L. Johnson & D. Cutler

Perennial herbs, dioecious; rhizome with multicellular hairs. Stems many-branched, wiry, flexuose, forming dense tangles. Leaves reduced, scale-like, persistent. Spikelets lacking bracteoles; bracts awned, longer than the perianth; male spikelets several-flowered, occurring singly or 2 together at widely spaced nodes; female spikelets 1-flowered. Perianth segments 6, small, pale, membranous; segments of male flowers subequal; outer segments of female flowers longer than the inner segments, somewhat awned. Stamens 3, exserted; filament compressed; anther 1-celled. Staminodes absent. Ovary 1-celled. Style branches 2 or 3. Fruit a nut, pale-coloured, smooth. 2 species, 1 confined to the south west of W.A., the other occurring in all the other Australian states and New Zealand. Reference: Johnson, L.A.S. & Cutler, D.F. 1974. Kew Bull. 28: 381-385.

E. gracillimum (F. Muell.) L. Johnson & D. Cutler

Perennial herb, up to 0.7 m high, probably tufted. Stems many-branched, often decumbent, flexuose, 0.5-1 mm broad. Lower leaves up to 15 mm long, appressed for most of their length; upper leaves and floral bracts shorter, the upper half a widely spreading or reflexed point. Male inflorescence of 2-12 widely spaced spikelets; spikelets 1 or rarely 2 within a bract at each node, sessile or subsessile, 3-4 mm long. Female inflorescence of 1 or 2 spaced spikelets, each spikelet protruding from the bract on a long peduncle. Perianth segments of male flowers pale, membranous, ca 2.5 mm long; segments of female flowers broadly ovate, ca 1 mm long. Stamen filaments ca 2.5 mm long, rather broad, thin. *Calorophus gracillimus* F. Muell., *Hypolaena gracillima* (F. Muell.) Benth.

Occurs in winter-wet depressions on the Coastal Plain from Perth southward. Extends along the south coast to Albany.

Flowers September-February.

HARPERIA W. Fitzg.

Perennial herbs, dioecious. Leaves reduced and scale-like, persistent but often becoming rather weathered. Spikelets axillary and terminal, sessile, the male and female spikelets similar except that the males usually have ca 6 flowers and the females 2 or rarely more flowers. Perianth segments 5,

translucent. Stamens 3; filament filiform; anther exerted, 1-celled. Staminodes absent. Ovary 1-celled. Style simple. Fruit a nut. 1 species, confined to the south west of W.A. A further species could possibly be transferred to this genus (B.G. Briggs pers. comm.).

H. lateriflora W. Fitzg.

Perennial herb, up to 0.2 m high, forming a clump up to 2 m broad; rhizome creeping. Stems numerous, simple, flexuose, terete, 1-1.5 mm broad, smooth or slightly scabrous. Basal leaves loosely appressed, up to 25 mm long, membranous, striate, mucronate; upper scales each subtending a spikelet, spreading, becoming shorter up the stem. Male spikelets pale brown, narrowly ovoid, 5-7 mm long; bracts narrowly ovate, ca 3 mm long, mucronate. Female spikelets dark brown, ovoid, 7-8 mm long; bracts ovate, 3-4 mm long, woolly-hairy on the outer surface. Perianth segments of male flowers all equal, probably 1.5-2 mm long. Perianth segments of female flowers probably 2-3 mm long, the outer segments broader than the inner segments. Anthers ca 1 mm long. Nut ovoid, ca 2 mm long.

Recorded from winter-wet depressions on the eastern side of the Coastal Plain and on the Darling Range near Perth. Extends from Eneabba to Cape Arid National Park.

Flowers probably March-May.

HYPOLAENA R. Br.

Perennial herbs, dioecious; rhizome creeping. Stems usually many-branched, often flexuose. Leaves reduced to sheathing scales, persistent. Spikelets lacking bracteoles; male spikelets with a slender peduncle, arranged in a small panicle, with flowers in all but the lowest bracts; female spikelets usually solitary at the ends of the branchlets, with a solitary flower above many empty bracts. Perianth segments 6, small, hidden within the bracts. Stamens 3, not exerted; anther erect, almost sessile, 1-celled. Staminodes absent. Ovary 1-celled. Style branches 3, stigmatic from below the middle. Fruit a nut, small, hard. 4 species, all occurring in W.A. and 1 extending to all other states except N.T.

1. Male inflorescence with 1-7 spikelets. Stems markedly flexuose, minutely banded, the white bands almost as broad as the green bands..... **H. fastigiata**
1. Male inflorescence often with > 7 spikelets. Main stems not flexuose, the minute white bands usually much narrower than the green bands; branchlets sometimes flexuose..... **H. exsulca**

H. exsulca R. Br.

Perennial herb, erect, 0.25-0.75 m high. Stems branched, sometimes with flexuose branchlets, 1-2 mm broad, minutely striate, with very fine, whitish scaly lines usually alternating with much broader green bands. Leaves appressed, all but the basal leaves < 20 mm long, with an erect or curved point, the margins becoming worn. Male inflorescence with numerous (usually 10-40) spikelets, each spikelet 4-7 mm long. Female spikelets solitary or 2 together terminating the branchlets, 10-15 mm long, initially slender, becoming broad when in fruit.

Widespread on the Coastal Plain, Darling Scarp and Range, usually in sand, sometimes in winter-wet depressions. Extends around the coast from Eneabba to east of Esperance.

Flowers September-December.

H. fastigiata R. Br.

Bundled Rope Bush

Perennial herb, 0.15-0.3 m high. Stems many-branched, markedly flexuose especially on the branchlets, 1-1.5 mm broad, minutely striate, with whitish scaly bands alternating with somewhat broader green bands. Leaves dark-coloured, appressed, with an erect or curved point, up to 13 mm long, the margins becoming worn. Male spikelets 1-7, ca ovoid, 5-8 mm long. Female spikelets usually solitary, rarely with a second spikelet arising in the node below the terminal spikelet, turbinate, 8-12 mm long.

There is some doubt that this species occurs in the Perth Region because there is only 1 record from an inner Perth suburb. Otherwise the species extends from near Busselton to east of Esperance. Occurs in all states except N.T.

Flowers September-October and possibly later.

LEPIDOBOLUS Nees

Perennial herbs, dioecious. Stems simple, erect or flexuose. Leaves reduced and scale-like, open for most of their length, the open part deciduous, leaving a persistent annular base. Spikelets solitary and terminal or with 1-several others sessile below, lacking bracteoles, several-many-flowered. Perianth segments 5 or 6, narrow, bract-like or scarious. Stamens 3, exserted; anther 1-celled. Staminodes absent. Ovary 1-celled. Style simple, filiform, stigmatic from below the middle. Fruit a nut, small. About 5 species, occurring in southern W.A., 1 species extending to S.A. and Vic.

L. preissianus Nees

Perennial herb, 0.15-0.4 m high; rhizome creeping. Stems simple, often flexuose or curved, 0.5-1.25 mm broad. Scale leaves rather deciduous, sheathing only at the base, brown and rather glossy on the outside, pale inside, with entire scarious margins, usually oblong, 13-25 mm long, with a small erect point. Male spikelets with numerous flowers, solitary and terminal or with a second spikelet below, ovoid, 10-25 mm long. Bracts terminating in a long point, the upper margins usually ciliate. Female spikelets similar to the males but narrower and with fewer flowers. Stamen filaments ca 5 mm long; anther 2.5-3 mm long, well exserted.

Occurs on the Darling Scarp and Range, sometimes associated with granite, and on the Coastal Plain. Apparently extends from Dirk Hartog Island to Ravensthorpe.

Flowers mainly August-October.

Outside the Perth Region, there is a variant with the inflorescence of several spikelets. This taxon should probably be recognized as a distinct species.

LEPTOCARPUS R. Br.

Perennial herbs, dioecious, tufted or with a creeping rhizome. Stems erect, usually simple below the inflorescence branches. Leaves reduced and scale-like, persistent, usually closely appressed, initially with broad translucent margins on each side of a point, the upper part usually becoming worn. Male inflorescence a panicle of spikelets; spikelets with a slender peduncle, several-flowered, lacking bracteoles. Female spikelets several-flowered (in the Perth Region), usually more erect and compact than the males. Perianth segments 6 or less. Stamens 3, not exserted; filament usually very short; anther 1-celled. Staminodes 3 in female flowers or absent. Ovary 1-celled. Styles 3, usually shortly connate in the lower part. Fruit a capsule, narrow or ovoid, small, dehiscent along 1 side or at the angles. As recognized here, the genus contains 22 Australian species, ca 15 of which occur in W.A., but the boundaries of this and related genera are under review (B.G. Briggs pers. comm.). The genus is also represented in Indonesia and nearby areas, New Zealand and southern Chile.

1. Perianth segments of female flowers acuminate or awn shaped, 2.5-10 mm long. Female flowers in a head-like terminal cluster subtended by large bracts, sometimes with further clusters below.
2. Perianth segments of female flowers 6-10 mm long, densely hairy in the lower half. Leaves with a broad translucent upper margin marked by prominent parallel lines..... **L. aristatus**
2. Perianth segments of female flowers 2.5-3 mm long, not hairy. Leaves not as above..... **L. sp. A**
1. Perianth segments of female flowers at most shortly acuminate, 1-3.5 mm long. Female inflorescence not as above.
3. Styles 1.5-6 mm long, connate at the base. Male panicle usually longer than the adjacent internodes.
4. Perianth segments of female flowers 2-3.5 mm long. Bracts of female spikelets stiff, widely spreading.
5. Perianth segments of female flowers 3-3.5 mm long. Female spikelets usually 12-15 mm long; male spikelets 6-7 mm long..... **L. sp. B**
5. Perianth segments of female flowers 2-2.5 mm long. Female spikelets ca 8 mm long; male spikelets 4-6 mm long..... **L. sp. C**
4. Perianth segments of female flowers 1-1.5 mm. Bracts of female spikelets somewhat flexible, erect to spreading.

6. Female spikelets longer than male spikelets; floral bracts 4-6 mm long..... **L. scariosus**
6. Female spikelets rarely exceeding male spikelets; floral bracts 1-3 mm long.
7. Female spikelets 1 or 2-flowered; bracts 1.2-1.5 mm long, dark brown with pale margins..... **L. sp. D**
7. Female spikelets several-flowered; bracts 2-3 mm long, not prominently 2-toned.
8. Stems minutely striate..... **L. coangustatus**
8. Stems not striate..... **L. sp. E**
3. Styles 1-1.5 mm long, free. Male panicle much shorter than the internodes..... **L. canus**

L. aristatus R. Br.

Bearded Twine-rush

Perennial herb, up to 0.8 m high, densely tufted. Stems 0.3-1 mm broad. Leaves 7-11 mm long, unusual in that the portion below the point is somewhat translucent and marked with several parallel lines. Male spikelets clustered at each node, spreading or pendulous, 6-15 mm long; bracts acuminate to slightly awned, the lower part of the point bordered by broad translucent margins. Female spikelets sessile, solitary or in a terminal cluster of 2 or 3, sometimes with 1 or 2 spikelets further down, 7-15 mm long, becoming almost turbinate; floral bracts ovate, acute, often with rather conspicuous parallel lines; bracts awned, ovate, the scarios margins very narrow. Perianth segments of female flowers awn shaped, 6-10 mm long, protruding above the bracts, densely hairy in the lower part. Styles 2.5-5 mm long, free to half-connate.

Occurs in winter-wet depressions in sand or clay on the Coastal Plain. Extends around the coast from Jurien Bay to Bremer Bay.

Flowers July-September.

This species may need to be transferred to *Chaetanthus* as it shows affinity to *C. leptocarpoides* (B.G. Briggs pers. comm.).

L. canus Lindley & Nees

Hoary Twine-rush

Perennial herb, up to 1 m high, tufted. Stems often greyish, 1-2 mm broad. Leaves up to 15 mm long. Male panicle much shorter than the internodes. Male spikelets few to numerous, clustered in the axils of distant sheathing bracts, shining brown, 6-12 mm long; bracts ca 2.5 mm long, with translucent margins. Female spikelets grey, almost sessile in the axils or occurring along short axillary shoots, the leaves widely spaced so that the clusters appear quite distinct; bracts shorter than the perianth segments. Perianth segments of female flowers almost elliptic, 1.5-2 mm long, densely ciliate, appearing furry-white. Styles free and stigmatic almost from the base, 1-1.5 mm long.

Occurs in winter-wet depressions, mainly in sand over clay, on the Coastal Plain. Extends around the coast from the Moore River to Fitzgerald River National Park.

Flowers July-September.

See note under *L. sp. E*.

L. coangustatus Nees

Perennial herb, up to 1 m high; with a short creeping rhizome. Stems 1-2.5 mm broad, minutely striate with few to many lines. Leaves 10-15 mm long, the scarios lobes not very prominent or persistent. Male panicle longer than the adjacent internodes. Spikelets usually numerous, with 1 or several groups arising at each node; male spikelets 3-6 mm long; female spikelets sessile, more densely clustered than the male spikelets, 3-7 mm long. Male bracts 3-3.5 mm long not including the awn, which is 0.3-0.5 mm long. Perianth segments of male flowers 1.5-1.8 mm long; segments of female flowers ca 1.5 mm long, broad, blunt, often densely white-ciliate with long hairs on the upper margin, sometimes just minutely ciliate to toothed. Styles ca 2 mm long, usually partly connate, 1 often arising below the other 2.

Occurs on the Coastal Plain, Darling Scarp and Range, sometimes in winter-wet depressions. Extends from north of the Hill River to Nannup.

Flowers August-October.

See note under *L. sp. E*.

L. scariosus R. Br.

Perennial herb, erect, up to 1 m high, tufted. Stems 1.5-3 mm broad. Leaves up to 30 mm long. Inflorescence usually of numerous spikelets, usually with several panicles arising in each node; male panicles longer than the adjacent internodes, with long slender branches, which are spreading or pendulous. Male spikelets 4-5 mm long; main branches of the panicle long and slender; bracts smaller than in female spikelets. Female spikelets usually sessile, dense (at least on the individual panicles), rigid, 5-8 mm long, broader than the male spikelets; bracts brown, with translucent margins, acuminate, 4-6 mm long, glabrous. Female perianth segments narrow, ca 1.5 mm long, acute, ciliate. Styles ca 3 mm long, connate at the base, 1 branch often arising slightly below the other 2, stigmatic in the upper half or to the base of the branches.

Occurs in winter-wet depressions on the Coastal Plain from Muchea southward. Extends inland to Northam and along the south coast to Cape Riche.

Flowers September-May.

L. sp. A

Perennial herb, up to 0.45 m high, probably with a creeping rhizome. Stems ca 1 mm broad, greyish. Leaves ca 12 mm long, acuminate, with narrow translucent margins. Male spikelets few, spreading, 5-9 mm long; bracts reddish brown, 3.5-5.5 mm long, acuminate. Female flowers in a terminal head-like cluster, ca 8 mm long; involucre bracts 5-6 mm long, ciliolate to minutely toothed, the inner bracts more perianth-like; floral bracts broadly ovate, shortly acuminate. Perianth segments of female flowers 2.5-3 mm long, acuminate, ciliate to toothed along the upper margins and keel; point 0.5-1 mm long. Style at least 3 mm long.

Recorded from Yarloop, growing in sandy soil. Range unknown but probably extends south of the Perth Region.

Flowers October.

L. sp. B

Perennial herb, up to 1 m high, tufted. Stems pale grey-green when dried, 2-3 mm broad, smooth. Leaves acuminate, initially with broad translucent margins on each side of the point, which is up to 70 mm long, the basal scales usually 15-25 mm long. Male inflorescence of numerous spikelets, several panicles of spikelets arising at each node, the panicles longer than the adjacent internodes; spikelets usually spreading, ovoid, 6-7 mm long; bracts acuminate, with broad scarious margins, the lowest bracts 5-6 mm long. Female inflorescence of few to many erect spikelets, with up to 4 panicles or branches arising at each node, each branch with a spikelet; spikelets usually 12-15 mm long, broad; main bracts 7-10 mm long, acuminate, the points spreading and prominent, the margins smooth and translucent; inner bracts or bracts thickened and keeled, concave. Perianth segments of female flowers narrowly elliptic, 3-3.5 mm long, with long cilia on the lower margins, the upper margins with shorter cilia or teeth. Styles at least 5-6 mm long, connate for ca 2 mm at the base.

Recorded from Perth and Bunbury on the Coastal Plain. Extends south to the Scott River.

Flowers October.

L. sp. C

Perennial herb, up to 1.5 m high, tufted. Stems 1-2.5 mm broad. Leaves 15-21 mm long, acute. Male inflorescence of very numerous spikelets, with several panicles of them arising at each node, the panicles longer than the adjacent internodes; spikelets spreading, 4-6 mm long; bracts 3-3.5 mm long, acuminate, with broad scarious margins below the points. Female spikelets erect, usually sessile, ca 8 mm long, usually fewer than the males, but forming several panicles at each node; bracts 3.5-5 mm long, acuminate, the tips spreading or recurved, the lower margins scarious. Perianth segments of female flowers 2-2.5 mm long, acute; margins translucent, ciliate at least in the lower half, tending to become worn. Styles 2.5-4 mm long, connate at the base. *Restio diffusus* Spreng.

Occurs in sand on the Coastal Plain from Perth southward. Extends along the south coast to Albany.

Flowers December-March.

This taxon was named *Restio diffusus* then reduced by Bentham (1878) to a synonym of *Leptocarpus tenax* R. Br. Male spikelets are practically indistinguishable from those of *L. tenax* but the species can be readily distinguished by habit, *L. sp. C* being tufted whereas *L. tenax* has long rhizomes, and by the female spikelets.

L. sp. D

Perennial herb, up to 1 m high; rhizome probably tufted or shortly creeping. Stems 1-3 mm broad. Leaves usually 8-25 mm long. Male panicle longer than the adjacent internodes. Male spikelets spreading, 3-4 mm long; bracts 1.5-2 mm long. Female spikelets 1 or 2-flowered, borne separately at the nodes of a many-branched inflorescence; bracts 1.2-1.5 mm long, dark brown with pale margins. Perianth segments of female flowers ca 1 mm long. *Hypolaena ramosissimus* Gilg

In the Perth Region recorded only from Bunbury. Extends to the south coast and east to Albany.

Related to *L. scariosus*.

L. sp. E

Perennial herb, up to 2 m high, tufted. Stems 2-3 mm broad. Leaves up to 25 mm long; scarious lobes prominent, persistent. Male inflorescence of numerous loosely arranged spikelets, several panicles arising at each node, the panicles longer than the adjacent internodes; spikelets usually 4-8 mm long; bracts acute or acuminate, 1.7-2.8 mm long below the awn, which is 0.1-0.4 mm long. Female inflorescence of numerous spikelets, with 1-several dense clusters arising at each node, the clusters usually elongated; spikelets almost globular, usually ca 3 mm long; bracts 1.5-2 mm long, acuminate, with translucent margins below the point. Perianth segments of male flowers 1.3-1.5 mm long; female segments 1-1.5 mm long, narrow, acute, densely ciliate with long hairs on the upper margin or minutely ciliate to toothed. Style ca 2.5 mm long, divided into 3 long branches.

Occurs mainly in winter-wet depressions on the Coastal Plain from Perth southward. Extends to Nornalup on the south coast.

Flowers mainly September-December.

This species appears to intergrade with *L. coangustatus* and, to a lesser extent, with *L. canus*. Some specimens appearing intermediate between *L. sp. C* and *L. canus* are recorded as possible hybrids. The group is in need of further study.

LEPYRODIA R. Br.

Perennial herbs, usually dioecious, rarely monoecious or hermaphrodite, tufted or with a creeping rhizome. Leaves reduced and scale-like. Male and female inflorescences rather similar, narrow, branched, the flowers not aggregated into spikelets; bracts not closely imbricate, shorter than the perianth segments. Bracteoles usually 2. Perianth segments 6, bract-like or thin and almost translucent. Stamens 3, exserted above or outside the perianth; anther 1-celled. Staminodes usually 3 in the female flowers. Ovary 3-celled. Styles 3, stigmatic from the middle or the base upward. Fruit a capsule, dehiscent at 3 angles. About 16 species, confined to extra-tropical Australia, ca 7 species occurring in W.A.

- | | |
|--|--------------------------|
| 1. Styles stigmatic only in the upper half. Outer perianth segments awned..... | L. glauca |
| 1. Styles stigmatic throughout. Perianth segments acute, not awned. | |
| 2. Dioecious. Female flowers with staminodes. | |
| 3. Female inflorescence with 1 or 2 flowers. Stems simple, somewhat flexuose..... | L. heleocharoides |
| 3. Female inflorescence with numerous flowers. Stems sometimes branched, not flexuose..... | L. muirii |
| 2. Monoecious or hermaphrodite. Staminodes absent. | |
| 4. Monoecious. Bracts subtending the inflorescence usually 1.5-2 mm broad..... | L. macra |
| 4. Hermaphrodite. Bracts subtending the inflorescence 2.5-4.5 mm broad..... | L. sp. A |

L. glauca (Nees) F. Muell.

Perennial herb, up to 1.3 m high, dioecious. Stems erect, stout, simple or with narrow erect branches, 3-6 mm broad. Leaves and bracts loose, forming a complete sheath only at the base, initially often pointed at the tip, becoming worn, sometimes only the base remaining, the lowest leaves usually 35-45 mm long. Inflorescence narrow, interrupted, with numerous tiny flowers, 40-150 mm long; bracteoles usually absent. Outer perianth segments with a fine point or short awn; inner segments of male flowers longer than the outer segments, acute, lacking an awn; inner segments of female flowers shorter than the outer segments, acuminate. Anthers 1-2 mm long. Styles 1-1.5 mm long, stigmatic in the upper half; stigmas reddish, recurved.

Occurs in sand or clay, often associated with winter-wet depressions on the Coastal Plain and Darling Range from Perth southward. Extends south to Donnybrook and inland to east of Darkan.

Flowers October-December.

L. helecharoides Gilg

Perennial herb, up to 0.25 m high, tufted, dioecious. Stems simple, erect, ca 1 mm broad, somewhat compressed and flexuose. Leaves closely sheathing, initially terminating in a point, 10-15 mm long. Inflorescence few-flowered, the males with several flowers at 1 or 2 nodes, the females with only 1 or 2 flowers; bracteoles 2 per flower. Inner and outer perianth segments similar. Anthers 1.5-2 mm long. Staminodes ca 1 mm long. Styles probably 2-3 mm long, stigmatic to the base.

Apparently endemic to the Perth Region, known only from Parkerville on the Darling Range.

Flowers December.

L. macra Nees

Perennial herb, 0.15-0.35 m high, monoecious and apparently with most plants female; rhizome usually tufted, rarely shortly creeping or ascending. Stems erect or ascending, usually simple, 0.5-1.5 mm broad, terete or slightly compressed. Leaves usually loose, usually deciduous leaving an annular scar; lowest scales often long and leaf-like. Inflorescence interrupted, with few to numerous flowers; subtending bracts usually 1.5-2 mm broad; bracteoles 2 per flower. Perianth segments brown, narrowly ovate, 2.4-3.3 mm long, rigid. Anthers 1-2 mm long. Styles stigmatic to the base, usually 3.5-4.5 mm long, sometimes shorter.

Occurs in somewhat sandy winter-wet depressions on the eastern side of the Coastal Plain. Scattered records from Jurien Bay to Cape Arid.

Flowers probably all year, especially January-April.

L. muirii F. Muell.

Perennial herb, up to 1.2 m high. Stems erect, rigid, simple or with narrow erect branches, 1-6 mm broad. Leaves and bracts closely appressed, initially pointed, becoming worn, the lowest leaves usually 12-30 mm long. Inflorescence narrow, interrupted, with numerous tiny flowers, usually 0.1-0.5 m long; bracteoles 2 per flower. Perianth segments acute, the inner segments longer than the outer segments. Anthers 1.5-2 mm long. Staminodes ca 1 mm long. Styles 2-3 mm long, stigmatic to the base.

Occurs in winter-wet depressions or along watercourses on the Coastal Plain, Darling Scarp and Range from Gnangara southward. Extends along the south coast to Albany.

Flowers September-November.

L. sp. A *tipana*

Perennial herb, 0.15-0.3 m high, hermaphrodite; rhizome usually tufted, rarely shortly creeping or ascending. Stems erect or ascending, pale green to yellowish green, terete to slightly compressed, 1-2 mm broad. Leaves usually loose; lowest scales often long and leaf-like. Bracts subtending the inflorescence 2.5-4.5 mm broad; bracteoles 2 per flower. Perianth segments brown, narrowly ovate, 2-3 mm long, rigid, concave. Anthers 1-1.2 mm long. Styles stigmatic to the base.

Occurs in winter-wet depressions on the Darling Range east of Perth. Extends from west of Beverley to Collie.

Flowers July-September.

Related to *L. macra*.

LOXOCARYA R. Br.

Perennial herbs, dioecious. Stems usually many-branched, often flexuose, the branches often densely clustered. Leaves reduced and scale-like, usually persistent, initially terminating in a long point. Spikelets usually terminal or sessile in rather distant axils, with imbricate bracts, lacking bracteoles; male spikelets 1-several-flowered; females 1-flowered. Perianth segments of male flowers 5; female segments absent or 3-6, very thin. Stamens 3; filament filiform or compressed; anther exerted, 1-celled, adaxially attached below the centre. Staminodes absent. Style usually simple, filiform, stigmatic from below the middle. Ovary 1-celled. Fruit either a small nut or dehiscent. Between 5 and 12 species, all occurring in southern W.A., with 1 species extending to S.A. This genus includes a number of species which are to be recognized as a new genus by L.A.S. Johnson and B.G. Briggs.

1. Style divided into 3 stigmatic branches.
 2. Perianth segments of male flowers 1-1.5 mm long..... **L. pubescens**
 2. Perianth segments of male flowers ca 3 mm long..... **L. sp. A**
1. Style undivided.
 3. Perianth segments of male flowers 2-3 mm long. Branchlets dividing, with 1 to several sessile spikelets in male plants.
 4. Stems minutely grooved; tubercles distant. Anthers 1.3-2 mm long.
 5. Plants tufted. Male spikelets 1 terminating each branchlet..... **L. flexuosa**
 5. Plants with an elongated hairy rhizome. Male spikelets 2-6 per branchlet..... **L. cinerea**
 4. Stems not grooved, densely tuberculate. Anthers 1-1.3 mm long... **L. sp. B**
 3. Perianth segments of male flowers ca 4 mm long. Branchlets simple, in dense clusters, leaf-like or with 1 terminal spikelet.
 6. Rhizome long, creeping..... **L. fasciculata**
 6. Plants tufted.
 7. Leaves yellow-brown. Male spikelets 7-10 mm long, on branchlets 30-60 mm long..... **L. sp. C**
 7. Leaves usually reddish brown. Male spikelets 3-5 mm long, on branchlets < 30 mm long at anthesis..... **L. sp. D**

L. cinerea R. Br.

Perennial herb, up to 0.35 m high; rhizome long, creeping, hairy. Stems usually grey-green, 1-2.5 mm broad, striate but not scabrous, the vegetative stems many-branched, with 1 or rarely 2 flexuose branchlets arising at each node, the flowering stems longer and less branched. Leaves and bracts 10-18 mm long including a long point. Spikelets sessile; male spikelets 2-6 per flowering branchlet, ca 5 mm long; female spikelets 1 or 2 per branchlet, 7-15 mm long, often with distinctly bearded bracts. Perianth segments of male flowers 2-3 mm long; segments of female flowers absent. Anthers 1.5-2 mm long. Style simple, ca 6 mm long, the upper part stigmatic.

Occurs in damp habitats on the Darling Range from Wooroloo southward. Extends along the south coast to Albany.

Flowers September-October.

L. fasciculata (R. Br.) Benth.

Perennial herb, up to 0.25 m high; rhizome creeping, long. Stems erect, straight or curved but not flexuose, 0.5-1 mm broad, usually with a few long hairs. Leaves and bracts pale-coloured, usually 8-25 mm long, broad, all or most enclosing a dense cluster of leaf-like branchlets; branchlets simple, often curved, up to 25 mm long. Male spikelets solitary and terminal, 4-5 mm long; flowering branchlet simple, usually longer than the sterile branchlets in the same cluster. Female spikelets terminal on a simple branchlet but often appearing axillary in a bract, usually several in a cluster, 2.5-4 mm long not including the styles; flowering branchlet 1-8 mm long, much shorter than the vegetative branchlets of the same cluster. Perianth segments of male flowers ca 4 mm long, narrow; segments of female flowers apparently absent. Anthers 2-3 mm long. Style simple, 6-13 mm long, stigmatic throughout.

Occurs in sand or peaty sand, often in intermittently waterlogged sites, rarely on laterite, on the Coastal Plain and Darling Range. Extends from Kalbarri to east of Esperance. Also occurs in S.A.

Flowers August-December.

See notes under *L. sp. C* and *L. sp. D*.

L. flexuosa (R. Br.) Benth.

Perennial herb, up to 0.3 m high, tufted, often forming an intricate mat, usually hairy on the branchlets but not at the base of the plant, the main stems often prostrate, with 1-5 or more branches arising at each node. Stems green, flexuose, 0.5-2 mm broad, striate but not scabrous. Leaves or bracts usually 7-15 mm long, longitudinally ribbed, often with a fringe of long hairs at the summit of the sheath. Spikelets 1 terminating each branchlet, sessile, 5-7 mm long. Male perianth segments translucent, narrow, acute, 2-2.5 mm long; segments of female flowers absent. Anthers usually 1.3-1.5 mm long. Style simple, ca 7 mm long, stigmatic throughout.

Occurs in sand, usually in *Banksia* woodlands, on the Coastal Plain. Extends in near-coastal areas from Coorow to Israelite Bay.

Flowers September-October.

Specimens from the east of the species range tend to have glabrous stems. This species is very similar in gross morphology to *L. sp. B*, apparently differing mainly in the texture of the stems. In *L. sp. B* the surface of the stem consists of densely packed tubercles whereas *L. flexuosa* has longitudinal grooves and very small, well spaced tubercles.

L. pubescens (R. Br.) Benth.

Perennial herb, up to 1 m high; rhizome tufted to very shortly creeping. Stems erect, rarely branching below the inflorescence, usually 1-2 mm broad, with spreading loose hairs, finely grooved; branchlets flexuose, up to 5 arising at each node. Leaves or bracts closely sheathing, 15-25 mm long. Male spikelets 3-5 mm long, numerous, with several on each branchlet; female spikelets narrower and slightly longer than the males. Male perianth segments 1-1.5 mm long, the inner segments translucent; segments of female flowers 6, scale-like, shorter than the ovary, obtuse or truncate. Anthers 0.5-1 mm long. Style 7-10 mm long, divided to just below the middle into 3 stigmatic branches.

Occurs on the Coastal Plain in both sandy and clayey soils. Extends in near-coastal areas from north of Gingin to Albany.

Flowers January-March.

This species may possibly be transferred to a new genus to be described by L.A.S. Johnson and B.G. Briggs.

L. sp. A

Perennial herb, up to 2 m high, probably tufted. Stems 2-6 mm broad, ribbed. Male spikelets 1-3 at each node or terminating the branchlets, sessile, several-flowered, 4-5 mm long when not galled, often galled and 20-27 x 8-11 mm. Female spikelets in the upper bract axils, forming an elongated interrupted inflorescence. Perianth segments of male flowers ca 3 mm long; segments of female flowers absent. Anthers ca 1.5 mm long, with an adaxial wing-like appendage. Styles at least 8 mm long; branches 3, arising almost at the base, compressed but slender.

Recorded from the Dwellingup area. Otherwise known from Busselton to Kent River, on the banks of watercourses and in winter-wet depressions.

Flowers September-December.

This species is included in a proposed new genus to be described by L.A.S. Johnson and B.G. Briggs.

L. sp. B

Perennial herb, up to 0.5 m high; rhizome creeping, long, usually hairy. Stems flexuose, sometimes forming an intricate network, 0.3-1 mm broad, scabrous, not striate, minutely tuberculate, usually inconspicuously hairy, 1-5 or more branchlets arising at each node. Leaves and bracts usually 7-25 mm long. Male spikelets sessile, borne singly or in pairs, usually 2-7 per branchlet, widely spaced, 5-6 mm long; female spikelets ca 4 mm long (not including the styles). Male perianth segments ca 2 mm long; segments of female flowers absent. Anthers 1-1.3 mm long. Style 7 mm or more long, simple. *Calorophus asper* Nees

Occurs in limestone or sandy soils on the Coastal Plain and on granite slopes on the Darling Scarp. Extends from Shark Bay to near Esperance.

Flowers September-October, and earlier north of the Perth Region.

See note under *L. flexuosa*, with which this species is most closely related.

L. sp. C

Perennial herb, up to 0.35 m high, tufted. Stems fairly erect, 1-1.5 mm broad. Leaves yellow-brown, usually 15-20 mm long, broad, all or most enclosing a dense cluster of leaf-like branchlets; branchlets simple, often curved, 30-60 mm long, the flowering leaves a similar length to the vegetative leaves. Male spikelets 7-10 mm long. Female spikelets not seen. Anthers ca 2 mm long.

Occurs on the Coastal Plain near Gingin. Extends north to Eneabba.

Flowers recorded September.

Related to *L. fasciculata* and *L. sp. D*.

L. sp. D

Perennial herb, usually 0.1-0.25 m high, tufted. Stems erect, 0.5-1 mm broad. Leaves usually reddish brown, 8-20 mm long, broad, all or most enclosing a dense cluster of leaf-like branchlets; branchlets simple, often curved, up to 50 mm long. Male spikelets solitary and terminal, 3-5 mm long; branchlets usually 5-20 mm long when in flower, elongating in fruit. Female spikelets terminal but often appearing axillary in a bract, up to 4 mm long not including the styles; branchlets usually 1-2 mm long, shorter than the vegetative branchlets of the same cluster. Anthers 1.25-2 mm long. Styles 6-12 mm long.

Occurs from Serpentine southward, on sand or laterite. Extends south to the south coast.

Flowers September-October.

Related to *L. fasciculata* and *L. sp. C*.

LYGINIA R. Br.

Perennial herbs, dioecious; rhizome covered by brown scales. Stems simple. Leaves distant, often with long bristly hairs on the margins. Male spikelets sessile, with imbricate bracts, several-flowered. Female spikelets often solitary, 1-flowered, with an involucre of imbricate bracts. Perianth segments 6, bract-like, not exceeding the bracts. Stamens 3, well exerted, their filaments connate almost to the top; anther of 2 distinct cells, adaxially attached at the centre. Staminodes absent. Ovary 3-celled. Style divided to below the middle into 3 long stigmatic branches. Fruit a capsule, 3-angled, dehiscent at the angles. 1 species, confined to the south west of W.A.

L. barbata R. Br.

Perennial herb, up to 0.7 m high; rhizome tufted or very shortly creeping. Stems erect, usually straight, rarely flexuose in the upper part, terete, 1-2 mm broad. Leaves tapering to a long free point, the closely sheathing base 7-20 mm long. Male inflorescence with 3-14 spikelets, the spikelets clustered in the upper part and more widely spaced below, each spikelet borne in a large glossy acuminate bract. Female inflorescence with 1-3 spikelets. Anthers 3-5 mm long. Stigmatic branches ca 10 mm long.

Occurs in sand, usually associated with winter-wet depressions, on the Coastal Plain and in valleys on the Darling Scarp. Extends from the Murchison River to Israelite Bay.

Flowers August-February.

Two variants occur in the Perth Region. The typical variant has a long rhizome, stout flexuose stems and the sheath margins fringed with long hairs. The other variant has a short rhizome, straight more slender stems and few or no hairs on the sheaths. These variants are possibly sufficiently distinct to be recognized as species or subspecies.

MEEBOLDINA Suesseng.

Perennial herbs, dioecious with a rhizome. Stems simple, erect. Leaves reduced and scale-like, persistent, appressed. Male inflorescence a slender panicle of spikelets; spikelets with a slender peduncle; bracteoles absent. Male flowers usually with 5 thin perianth segments. Female flowers zygomorphic, with 2 long-acuminate bracteoles and 6 perianth segments, the 2 lateral outer segments larger than the other segments. Stamens 3, not exerted; filament very short; anther 1-celled, erect, attached almost at the base. Ovary 1-celled. Style divided from just below the middle into 3 long stigmatic branches. 1 species, confined to the south west of W.A. This genus is closely related to *Leptocarpus* and may not be sufficiently distinct to be retained as a separate genus (B.G. Briggs pers. comm.).

M. denmarkica Suesseng.

Perennial herb, up to 0.3 m high, tufted. Stems pale grey-green, the base purplish, terete, 0.2-0.5 mm broad, minutely scaly. Cauline leaves coloured or inconspicuous, usually 3-18 mm long, initially with broad translucent upper margins on each side of a narrow point. Male inflorescence usually with numerous spikelets; spikelets 5-8 mm long, narrow. Female inflorescence with 3-15 crowded spikelets; spikelets up to 15 mm long. Stamens ca 1 mm long. Style extremely fine; stigmatic branches reddish, 2.5-3 mm long.

In the Perth Region, recorded only from Bunbury, in sand on the Coastal Plain. Extends along the south coast to Denmark.

Flowers November-January.

RESTIO L.

Perennial herbs, dioecious or monoecious; rhizome often woolly. Stems erect, usually simple below the inflorescence. Leaves reduced to sheathing scales, usually persistent. Spikelets with imbricate bracts, lacking bracteoles; male spikelets few-many-flowered; female spikelets 1-many-flowered. Perianth segments 4-6, not exceeding the bracts, bract-like or the inner segments almost translucent. Stamens 3 or rarely 2; anther 1-celled. Staminodes 1 or absent in female flowers. Ovary 2 or 3-celled. Styles or style branches 2 or 3. Fruit dehiscent at 2 or 3 angles. In its strict sense, this genus is confined to southern Africa where there are over 70 species. Australian species are quite distinct from the African species and will eventually be transferred to at least 2 new genera, which are given informal names by Johnson & Briggs (1983). Perth Region species all belong to the genus referred to informally by Johnson and Briggs as '*pseudo-Restio b*', which includes the species originally described under the generic names *Megalotheca* F. Muell. and *Dielsia* Gilg. This group contains 25 species, all confined to south western Australia except for 1 species from eastern Australia. A further 11 species, 1 from W.A. and the remainder from eastern Australia, belong to another genus referred to informally by Johnson and Briggs as '*pseudo-Restio a*'.

1. Style ca 2.5 mm long, divided into 3 recurved stigmatic branches. Spikelets elongate, with many flowers..... **R. stenostachyus**
1. Styles or style branches 2, 3-10 mm long. Spikelets compact or, if not, then few-flowered.
2. Male spikelets on long spreading or pendulous peduncles. Anthers not exerted.
3. Stems rather compressed, 3-6 mm broad. Male spikelets ca globular, 4-6 mm long..... **R. tremulus**
3. Stems almost terete, 0.5-2.5 mm broad. Male spikelets campanulate, 6-10 mm long.
4. Styles free and stigmatic almost from the base. Female spikelets 1-3-flowered..... **R. sp. A**
4. Style entire and not stigmatic in the lower third. Female spikelets several-flowered..... **R. leptocarpoides**
2. Male spikelets erect, terminal or sessile. Anthers well exerted.
5. Female spikelets several-flowered, probably similar in size to the males..... **R. sp. B**
5. Female spikelets 1-flowered, longer than the males and becoming much enlarged in the fruit..... **R. sp. C**

R. leptocarpoides Benth.

Perennial herb, up to 0.5 m high, tufted. Stems erect, terete, 0.5-1.5 mm broad, with numerous, very fine, longitudinal lines. Leaves tapering to a fine erect point, glabrous, the margins usually entire. Male inflorescence with 1-several spikelets clustered in the bract axils; peduncles spreading or pendulous, up to 40 mm long, slender; spikelets several-flowered, campanulate, ca 10 mm long. Female spikelets erect, almost sessile or on a stiff erect peduncle, probably similar in size to the males, or slightly smaller prior to fruiting. Stamens 3; filament short; anther hidden within the perianth segments and bracts, erect, ca 2 mm long. Style ca 5 mm long, divided to below the middle into 2 stigmatic branches.

Occurs in sandy winter-wet depressions on the eastern side of the Coastal Plain from Muecha southward. Extends along the south coast to the Stirling Range.

Flowers January-February.

R. stenostachyus W. Fitzg.

Perennial herb, up to 0.6 m high; rhizome creeping, furry. Stems erect, sometimes flexuose; up to 2 mm broad, longitudinally striate with several, fine, coloured ribs. Leaves glabrous, the margins usually remaining entire. Spikelets solitary and terminal or with several other sessile spikelets below at the uppermost nodes, many-flowered, 8-30 x 2-4 mm, broadest toward the base. Stamens 3; anther exserted, ca 1.2 mm long. Style ca 2.5 mm long, the distal $\frac{2}{3}$ divided into 3 recurved stigmatic branches. *Dielsia cygnorum* Gilg

Possibly endemic to the Perth Region, recorded from Gingin to Perth, in sandy winter-wet depressions and along watercourses on the Coastal Plain.

Flowers February-May.

R. tremulus R. Br.

Quiverry Cord Rush

Perennial herb, up to 1 m high, tufted. Stems usually 3-6 mm broad, rather compressed, with numerous, fine, longitudinal ridges. Leaves closely appressed, the upper margins often ciliate. Male inflorescence with spikelets clustered in the axil of each bract; peduncles spreading or pendulous, 10-25 mm long; spikelets many-flowered, almost globular, 4-6 mm long. Female spikelets erect, narrower and with fewer flowers than the males; peduncle shorter and more rigid than in the male spikelets, often 2-branched. Stamens 3; filament short; anther hidden within the perianth segments and bracts, erect, 1.2-1.5 mm long. Styles 2, 3-4 mm long, free, stigmatic almost to the base.

Occurs in sandy winter-wet depressions on the eastern side of the Coastal Plain near Perth. Elsewhere recorded from Augusta to Albany.

Flowers mainly November-February.

R. sp. A

Perennial herb, up to 0.7 m high; rhizome tufted to very shortly creeping. Stems erect, terete, rarely flexuose, 1.5-2.5 mm broad, with few to many, fine, longitudinal ribs. Leaves with a rather short point, the upper margins tending to become irregular. Male inflorescence a loose panicle, with few to many spikelets; peduncles 3-6 mm long, spreading or pendulous, very slender; spikelets several-flowered, campanulate, 6-10 mm long. Female spikelets erect, 1-3-flowered, forming a similar inflorescence to the males, but with many of the spikelets almost sessile, initially tending to be smaller than the males. Stamens 3; filament short; anther tending to be exposed to view between the spreading bracts, erect, 2.5-3 mm long, narrow. Styles 2, free and stigmatic to the base, probably at least 4 mm long.

Occurs in sand, often in *Banksia* woodlands, on the Coastal Plain from Gngangara northward. Extends north to Badgingarra.

Flowers April-May.

R. sp. B

Perennial herb, up to 0.4 m high; rhizome creeping, furry. Stems 1-1.5 mm broad, with numerous fine striations, the branchlets flexuose. Leaves rather loose in the upper part, the upper margins becoming irregular. Male and female inflorescences similar, of 1 terminal spikelet or with 1-3 further spikelets

sessile at the uppermost nodes; spikelets erect, several-flowered, 9-12 mm long, but often galled and much enlarged. Stamens probably 3 and well exerted. Style ca 8 mm long, divided to below the middle into 2 long stigmatic lobes.

In the Perth Region recorded from several Perth suburbs, growing in sand on the Coastal Plain. Extends north to the Arrowsmith River.

Flowers June-July.

This species is closest in morphology to *R. sphacelatus* R. Br., which extends from north of Lake Grace to Israelite Bay.

R. sp. C

Perennial herb, up to 0.6 m high; rhizome creeping. Stems erect, 1-1.5 mm broad, finely tuberculate and striate, sometimes densely or sparsely hairy, the branchlets flexuose and sometimes intricate. Upper margin of the leaves usually remaining entire. Male inflorescence usually narrow, twisting, the spikelets solitary and sessile within the bracts or terminating short lateral branchlets; spikelets erect, 2-several-flowered, 5-8 mm long. Female spikelets usually solitary and terminal, rarely with a second sessile spikelet below, erect, 1-flowered, ca 10 mm long, narrow, becoming much enlarged in the fruit to ca 7 mm broad. Stamens 3; anther well exerted, 1.5-2 mm long. Style probably 8-10 mm long, divided to below the middle into 2 stigmatic branches, most of the entire portion hidden within the bracts.

Occurs in gravel or sandy clay on the Darling Scarp and Range from Perth to south of Dwellingup. Extends from Bakers Hill to Jerramungup.

Flowers July-September.

This species has been referred to as *R. megalotheca* F. Muell. ex Benth. but the name is illegitimate (B.G. Briggs pers. comm.).

FAMILY 152 CENTROLEPIDACEAE

B. L. Rye

Annual or perennial herbs, with sedge-like or grass-like habit, small. Leaves alternate, sheathing, sessile, parallel-veined; sheath open. Inflorescence a terminal spike or head, with 2-numerous distichous bracts; flowers unisexual, very reduced, often closely clustered so that the whole inflorescence resembles a single flower. Perianth absent. Stamen 1; filament often somewhat twisted; anther dorsifixed, 1-celled, longitudinally dehiscent. Style simple, filiform, sometimes connate with the styles of adjacent flowers; stigma linear. Carpel 1, usually stipitate; ovule 1, pendulous. Fruit a membranous follicle. About 40 species in 3 genera, extending from south east Asia to New Zealand, also represented in South America and the Falkland Islands.

- | | |
|--|--------------------|
| 1. Inflorescence compressed, with several to many conspicuous bracts,
all bracts subtending flowers..... | APHELIA |
| 1. Inflorescence terete, with 2 conspicuous basal bracts, the lower bract
empty; floral bracts absent or inconspicuous..... | CENTROLEPIS |

APHELIA R. Br.

Annual herbs, tufted, monoecious. Stems filiform. Leaves: sheath scarious; blade linear. Inflorescence a condensed spike, flat, usually with folded bracts; basal 1 or 2 bracts largest, usually subtending 1-8 male flowers, rarely subtending 1 male and 1 female flower; upper bracts usually subtending 1 female flower, rarely subtending 1 male and 1 female flower. Anther 1-celled. Style not connate with the styles of adjacent flowers. About 6 species, in temperate Australia, 4 species occurring in W.A.

- | | |
|--|----------------------|
| 1. Bracts with large hairs on each side of the keel, all 2-flowered, 1 flower
male and 1 flower female..... | A. cyperoides |
| 1. Bracts with hairs or outgrowths on the keel or margins; basal 2 bracts
with 1-8 male flowers; upper bracts with 1 female flower. | |

2. Inflorescence erect, pale yellowish green..... **A. brizula**
 2. Inflorescence horizontal to pendulous, dark-coloured at least at the base.
 3. Upper bracts not ciliate, with prominent outgrowths on the keel. Inflorescence almost horizontal..... **A. drummondii**
 3. Upper bracts ciliate, the keel smooth. Inflorescence pendulous..... **A. nutans**

A. brizula F. Muell.

Annual herb, up to 65 mm high. Leaves usually 10-25 mm long; sheath persistent, often with 2 long apical lobes, glabrous. Inflorescence erect, pale yellowish green, broadly ovate, 4-9 mm long. Basal bract 3-9 x 1-2 mm, often long-acuminate, with broad scarious margins, subtending 2 or 3 male flowers. Second lowest bract similar to the basal bract but shorter. Upper bracts 5-13, broader than the basal bracts, subtending 1 female flower, acute, ciliate on the lower margins, prominently veined, the keel with prominent multicellular hairs; hairs up to 0.5 mm long, with a broad base and longer filiform portion above. Stamen filament 2.5-3 mm long; anther ca 0.75 mm long. *Brizula muelleri* Hieron.

Recorded from Wagerup northward, mainly growing in soil pockets in granite rocks on or near the Darling Scarp. Extends from Badgingarra to east of Esperance.

Flowers August-October.

A. cyperoides R. Br.

Annual herb, up to 110 mm high. Leaves usually 10-60 mm long; sheath often somewhat hairy. Inflorescence erect, broadly ovate to ovate in overall outline but with gaps between the bracts, 6-15 mm long, with 1 male and 1 female flower in the axil of each bract. Basal bract 5-12 x 0.8-1.2 mm; sheath scarious with pinkish margins, usually with large multicellular hairs occurring on each side of the normally glabrous keel, the lower margins ciliate; blade linear, 3-8 mm long, glabrous. Upper bracts up to 16, similar but smaller and more hairy than the basal bract, the keel usually completely glabrous. Stamen filament 2-3 mm long; anther 0.7-1.5 mm long.

Occurs on the Coastal Plain and Darling Scarp, mainly in winter-wet depressions. Extends from Eneabba to Israelite Bay.

Flowers September-November.

A. drummondii (Hieron.) Benth.

Annual herb, up to 70 mm high. Leaves usually 15-40 mm long; sheath tending to become torn, glabrous. Inflorescence almost horizontal, broadly ovate, 3-6 mm long. Basal bract erect, continuing the stem, dark green, 2-4 x 1.5-2 mm, acuminate, glabrous, with a broad scarious margin, subtending several male flowers, with a scale under each stamen. Second lowest bract smaller than the basal bract and with fewer flowers, tending to have prominent outgrowths on the keel. Upper bracts up to 22, pale-coloured, subtending 1 female flower in a rather broad scale, the keel with prominent outgrowths, which may be described as broad 1-celled hairs. Stamen filament 4-6 mm long; anther 1-1.5 mm long. *Brizula drummondii* Hieron.

Occurs from Bullsbrook southward in winter-wet depressions on the eastern side of the Coastal Plain and on damp granite areas on the Darling Scarp. Extends south to Manjimup.

Flowers September-December.

A. nutans J.D. Hook. ex Benth.

Annual herb, 12-25 mm high. Leaves 5-13 mm long; sheath 2-3 mm long, glabrous. Inflorescence pendulous, predominantly reddish or brown-green, narrowly ovate to narrowly oblong, 4-6.5 x 2.5-3 mm. Basal bract 1.3-1.7 x 0.7-1 mm, scarcely acuminate, subtending 2 or 3 male flowers, glabrous, 3-ribbed. Second lowest bract similar to the basal bract. Upper bracts usually 8-18, similar in length but narrower than the basal bracts, subtending 1 female flower, 3-ribbed; translucent margins 0.2-0.3 mm broad, with long cilia. Stamen filament 1.5-2 mm long; anther 0.6-0.8 mm long. *Brizula nutans* (J.D. Hook. ex Benth.) C. Gardner

Recorded from a granite outcrop on the Darling Range south east of Perth. Also recorded from near Pingelly, Busselton and Young River.

Flowers September-October.

CENTROLEPIS Labill.

Annual or perennial herbs, tufted. Leaves with a scarious basal sheath tapering to a linear blade, the uppermost leaf often reduced to a large sheath. Inflorescence a head, compound but not obviously so, enclosed by 2 or rarely 3 almost opposite bracts, the outer bract partly sheathing the inner bract; inflorescence units known as pseudanthia, 1-4 per head, very condensed, resembling a bisexual flower but actually consisting of 1 or rarely no basal male flower and 1-many female flowers in a compound gynoeceum, the 2 basal flowers sometimes each subtended by a small translucent bract referred to as a scale. Anther 1-celled. Styles of adjacent flowers initially separate but usually becoming connate. About 24 species, extending from south eastern Asia to New Zealand, concentrated in Australia, 16 species occurring in W.A. Reference: Cooke, D.A. 1980. Muelleria 4: 265-272.

1. Flower head sessile or subsessile, exceeded by the leaves.
2. Flower head with 2-5 pseudanthia; scales 2 per pseudanthium..... **C. inconspicua**
2. Flower head with 1 pseudanthium; scales absent..... **C. caespitosa**
1. Flower head distinctly pedunculate, usually exceeding the leaves.
3. Flower head with 1-5 pseudanthia; scales absent except in *C. alepyroides*.
4. Scales absent. Inner bract lacking a definite blade or the blade not exceeding the lobes of the sheath.
5. Head with 1 pseudanthium. Outer bract sheath dark brown, glossy..... **C. polygyna**
5. Head with 3-5 pseudanthia. Outer bract sheath red and/or green, not glossy.
6. Outer bract sheath ciliolate. Inner bract 3-4 mm long..... **C. mutica**
6. Outer bract sheath not ciliolate. Inner bract < 3 mm long..... **C. glabra**
4. Scales 1 per pseudanthium. Inner bract with a definite blade exceeding the sheath lobes..... **C. alepyroides**
3. Flower head with 6-20 pseudanthia; scales 1-3 per pseudanthium.
7. Bracts hairy at least at the base, almost equal. Stamen filament < 6 mm long.
8. Bract sheath hairy throughout, 2.5-3 mm long. Pseudanthia all bisexual..... **C. pilosa**
8. Bract sheath glabrous in the upper part, 3-4.5 mm long. Inflorescence with bisexual and female pseudanthia..... **C. drummondiana**
7. Bracts glabrous, the outer bract longer. Stamen filament usually 10-15 mm long..... **C. aristata**

C. alepyroides (Nees) Walp.

Annual herb, up to 50 mm high, glabrous. Stems often reddish, filiform. Leaves usually 2 or 3 per stem, basal; sheath 4-5 mm long; blade filiform, 8-16 mm long. Bracts erect, reddish or bronze, with scarious margins; outer bract 8-11 mm long, with a filiform blade 5-8 mm long; inner bract 3.5-7 mm long, with the blade short but exceeding the sheath lobes. Inflorescence a solitary terminal, pedunculate head exceeding the leaves, ca 1 mm broad, with 1 or 2 pseudanthia; scales 1 per pseudanthium, 2-3 mm long, translucent. Stamen filament 3-4 mm long; anther ca 1 mm long. Carpels ca 3 per pseudanthium; styles ca 2.5 mm long, connate for about half their length.

In the Perth Region recorded only near Karragullen on the Darling Range east of Perth, growing in damp shallow sand on a granite outcrop. Also recorded from near Busselton, Kent River and Pingelly.

Flowers September-November.

C. aristata (R. Br.) Roemer & Schultes

Annual herb, erect, usually 50-175 mm high, glabrous. Stems often deep red at the base, compressed, expanded at the base of the inflorescence, 0.3-1 mm broad below. Leaves basal; sheath pale brown or reddish, 6-15 mm long; blade linear, 10-40 mm long, a similar breadth to the stems. Bracts fairly erect; sheath pale brown, 5-6 mm long, with translucent margins; blade 20-30 mm long in the outer bract, shorter in the inner bract. Inflorescence a solitary terminal head, pedunculate, exceeding the leaves,

usually with 10-20 pseudanthia; scales 3 per pseudanthium, slender, the largest scale sheathing and 4.5-6 mm long, the other scales sheathless and 2-3 mm long. Stamen filament enclosed at the base in the sheathing scale, usually 10-15 mm long per pseudanthium; anther 2-4 mm long. Carpels usually 5 or 6 per pseudanthium; styles ca 1 mm long, connate for ca 1 mm at the base.

Occurs in winter-wet depressions, soil pockets on rock outcrops and other seasonally moist sites on the Coastal Plain, Darling Scarp and Range. Extends from north of Geraldton to east of Esperance and inland to Norseman. Also occurs in S.A., Vic. and Tas.

Flowers September-December.

C. caespitosa D.A. Cooke

Annual herb, densely tufted, forming a rounded cushion up to 250 mm in diameter, glabrous. Stem repeatedly branching from the axils of the lower leaves; internodes 0.5-2 mm long. Leaves: sheath up to 2 mm long, narrow; blade filiform, dark-coloured in dried material, linear, up to 9 x 0.2 mm. Outer bract erect; sheath translucent, 1.5-3 mm long; blade 2.5-4 mm long. Inner bract erect, 1.5-2 mm long, narrow, keeled, translucent, with a recurved apex up to 0.6 mm long. Inflorescence a solitary head, sessile or subsessile, exceeded by the leaves, cylindrical, ca 0.5 mm broad, with 1 pseudanthium, lacking scales. Stamen filament 3-4 mm long; anther ca 0.5 mm long. Carpels 3-6 per pseudanthium; styles 1-2 mm long, becoming connate for up to half their length.

Apparently endemic to the Perth Region, known only from 1 locality on the Coastal Plain east of Perth.

Flowers recorded November.

C. drummondiana (Nees) Walp.

Annual herb, up to 120 mm high. Stems usually reddish, filiform. Leaves basal; sheath 2-6 mm long, hairy in the upper part; blade filiform, 7-25 mm long, with a few hairs toward the base. Bracts erect, green, often with red portions, 4-6.5 mm long; sheath 3-4.5 mm long, with a broad scarious margin and a few hairs toward the base. Inflorescence a solitary terminal head, pedunculate, exceeding the leaves, 1-3 mm broad, with 6-12 pseudanthia, of which 4-8 are bisexual and the remainder female; scales 2 per pseudanthium, scarious, the larger scale 3.5-5 mm long. Stamen filament 3-5.5 mm long; anther 1-2 mm long. Carpels 3-7 per pseudanthium; styles ca 3 mm long, connate in the lower 2 mm, the free parts curled.

Occurs on the Coastal Plain and Darling Scarp in damp sites, sometimes in soil pockets on rocks. Extends from west of Mount Magnet to the extreme south west and the Recherche Archipelago. Also occurs in S.A.

Flowers mainly September-October.

C. glabra (F. Muell. ex Sonder) Hieron.

Annual herb, 10-90 mm high, glabrous. Stems reddish, filiform, the inflorescence borne 10-25 mm above ground level. Leaves basal; lower sheath loose, with scarious margins, 1-3 mm or rarely up to 5 mm long; blade filiform, usually 3-13 mm long, rarely up to 90 mm long. Bracts initially erect, tending to spread in fruit, reddish, with broad translucent margins on the sheath; outer bract 2-4.5 mm long, the blade 0.5-2.5 mm long; inner bract 1.5-2.7 mm long, lacking a blade or rarely with a minute blade. Inflorescence a solitary terminal head, pedunculate, usually exceeding the leaves, 0.5-1 mm broad, usually with 4 pseudanthia, lacking scales. Stamen filament 1.5-2.5 mm long; anther 0.5-1.5 mm long. Carpels 4-7 per pseudanthium; styles 0.7-2 mm long, connate only at the base.

Occurs in winter-wet depressions, often in clay soils, on the Coastal Plain. Extends from north of Badgingarra to the south coast, probably extending east to the Recherche Archipelago. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers September-November.

A variant with very long leaves, much exceeding the flower heads, has been recorded from Midland Junction, near Perth and possibly near Manjimup. It has a minute blade on the second bract of most flower heads.

C. inconspicua W. Fitzg.

Annual herb, forming a cushion up to 250 mm in diameter, glabrous. Stem very short, unbranched. Leaves 2-5, basal, distichous, erect; sheath 3-4 mm long, scarios, often becoming lacerate; blade linear, 4-28 mm long, obtuse. Bracts somewhat gaping when the flowers mature, similar to the leaves but shorter, 4-16 mm long, the outer bract slightly longer than the inner bract; sheath 1.5-3 mm long, with membranous margins. Inflorescence of 1 terminal sessile head or rarely with 1 or more additional heads in the axils of the upper leaves; heads 1.5-3 x 1-2 mm, with 2-5 pseudanthia; scales 2 per pseudanthium, often with further smaller scales between the pseudanthia; larger scales 2-3 mm long, translucent. Stamen filament 2-4 mm long; anther 0.8-1 mm long. Carpels 1-5 per pseudanthium, usually 2; styles ca 2 mm long, becoming connate at the base only.

In the Perth Region recorded only from Armadale on the Darling Range near Perth, probably in a moist site. Extends from north of Geraldton to south of the Stirling Range.

Flowers August-October.

C. mutica (R. Br.) Hieron.

Annual herb, tufted, up to 70 mm high. Stems filiform, reddish at the base. Leaves glabrous; lower sheath 1.5-2 mm long, scarios, sometimes reddish; blade filiform, 5-10 mm long. Outer bract erect; sheath 3-4 mm long, with broad scarios margins, ciliolate; blade 0.5-1 mm long. Inner bract erect, virtually reduced to a sheath 3-4 mm long, glabrous or minutely toothed. Inflorescence a solitary terminal head, pedunculate, exceeding the leaves, 1-2 mm broad, with 3-5 pseudanthia, lacking scales. Stamen filament 2.5-4 mm long; anther 0.5-1 mm long. Carpels 5-8 per pseudanthium; styles 1.5-2 mm long, connate for ca 0.5 mm.

In the Perth Region, recorded only from Bayswater, a suburb of Perth on the Coastal Plain, probably in a damp habitat. Extends around the coast to Albany.

Flowers November-December.

C. pilosa Hieron.

Annual herb, up to 95 mm high. Stems reddish, filiform. Leaves basal, 3 or more per stem; sheath 2.5-5 mm long, scarios, with a few large hairs at the summit; blade filiform, 6-17 mm long, curved, uniformly ribbed, terminating in a soft point, the lower part with large hairs. Bracts erect or slightly spreading, subequal, red and/or green; sheath 2.5-3 mm long, with broad scarios margins, with spreading multicellular hairs 1-1.5 mm long; blade slender, 2-4 mm long. Inflorescence a solitary terminal head, pedunculate, exceeding the leaves, 2-3 mm broad, with 8-16 pseudanthia, 4-8 pseudanthia subtended by each bract; scales 1 per pseudanthium, 3-3.5 mm long, enclosing the stamen filament. Stamen filament 3-3.5 mm long; anther 1-1.2 mm long. Carpels 5-8 per pseudanthium; styles 2-2.5 mm long, connate except for the distal 0.5-1 mm, the free part often curled.

In the Perth Region, recorded only from Helena Valley on the Darling Range near Perth, growing in shallow soil over granite. Extends from Geraldton to the Stirling Range area.

Flowers September-October.

C. polygyna (R. Br.) Hieron.

Wiry Centrolepis

Annual herb, up to 65 mm high, glabrous. Stems reddish toward the base. Lower leaf sheath scarios, 1-3 mm long; blade narrowly linear, 4-12 mm long, often curved. Outer bract erect; sheath dark brown, 4-5.5 mm long, somewhat glossy; blade filiform, 5-13 mm long. Inner bract erect, brown, 4-4.5 mm long, lacking a blade. Inflorescence a solitary terminal head, pedunculate, exceeding the leaves, 0.7-1 mm broad, with 1 pseudanthium, lacking bracts. Stamen filament 4-5 mm long; anther 1-2 mm long. Carpels 5-27 per pseudanthium; styles ca 2.5 mm long, connate for 0.5-1 mm.

In the Perth Region recorded only at Cannington, near Perth, on the eastern side of the Coastal Plain, growing in dark sand in a winter-wet depression. Extends inland to the W.A. border. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers mainly September-November.

The variant occurring in the Perth Region extends from Bakers Hill to the extreme south west and Israelite Bay. Another variant, which will probably be described as a new subspecies (D.A. Cooke pers. comm.), occurs further inland and differs in having broader paler bracts.

FAMILY 153 POACEAE (GRAMINEAE)

E. M. Bennett (except where otherwise credited)

Annual or perennial herbs, tufted or rhizomatous, rarely woody or arborescent. Stems (culms) erect, or prostrate and creeping, usually branching at the base, terete, articulate, with hollow or solid internodes and solid nodes. Leaves distichous or rarely spirally arranged, consisting of sheath, ligule and blade; sheath encircling the culm and split down one side at maturity; ligule a tongue-like membrane or fringe of hairs at the junction of the sheath and blade, sometimes absent; blade parallel-veined, long and narrow, passing more or less gradually into the sheath. Flowers frequently bisexual, sometimes unisexual, small and inconspicuous, arranged in 1-many-flowered spikelets which are arranged in a determinate or mixed secondary inflorescence that is usually a panicle, but sometimes spike-like or raceme-like; spikelets usually with a pair of almost opposite, small bracts (glumes) at the base and 1 to several or many florets alternating on opposite sides of the axis (rachilla) above the glumes. Flowers, referred to as florets, include the enclosing or subtending pair of almost opposite bracts, the outer bract known as the lemma and the inner as the palea, together with 2 or rarely 3 much smaller scales within known as lodicules. Stamens 1-6, usually 3; filaments delicate; anthers 2-celled, opening by longitudinal slits. Ovary 1-celled; usually glabrous, sometimes hairy at apex or over whole surface; ovule 1. Styles 2, with plumose stigmas. Occasionally glumes, lemma and/or palea may have the midrib excurrent as a short or elongate dorsal or terminal awn. Fruit a caryopsis, usually tightly enclosed by the persistent lemma and palea, indehiscent, usually dry, seldom fleshy. One of the largest families of flowering plants, with over 500 genera and 8000 species, cosmopolitan.

CLASSIFICATION

T.D. Macfarlane

The generic descriptions in Poaceae are presented in alphabetic order, as in all other families. However, for this family, relationships between genera have been particularly well researched and modern classifications are available. In addition, grass taxa are numerically important in the flora of the region. Consequently a classification of the genera is presented below as a useful accompaniment to the descriptive text.

The classification of grasses is a continually progressing subject and there are several modern schemes of classification available. They all agree substantially on the grouping of genera into tribes but differ somewhat on the placement of tribes into subfamilies. The scheme adopted here, where there are fewer subfamilies accepted than in most schemes, follows that of Wheeler et al. except for the subdivision of the subfamily Pooideae, which follows Macfarlane & Watson. The Wheeler et al. scheme has an advantage over otherwise acceptable alternatives in that all the subfamily names have been validly published previously. While all the subfamilies of the full classification are listed in this scheme, only those tribes represented by genera in the Perth Region are listed: numbers of omitted tribes are ascertainable by reference to the total number of tribes given for each subfamily.

The references cited here contain further information on Australian grasses, more detailed descriptions and illustrations of grass structure (especially Wheeler et al.; Clifford & Watson; Watson & Dallwitz), on the characteristics of grasses used for classification as distinct from identification (Gould; Clifford & Watson), and provide an entry to the extensive grass taxonomic literature.

References: Calderon, C.E. & Soderstrom, T.R. 1980. Smithsonian Contrib. Bot. No. 44; Clayton, W.D. 1978. Poaceae. In Heywood, V.H. (ed.) Flowering Plants of the World; Clifford, H.T. & Watson, L. 1977. Identifying Grasses: Data, Methods and Illustrations; Gardner, C.A. 1952. Flora of Western Australia. Vol. 1, Part 1; Gould, F.W. 1968. Grass Systematics; Macfarlane, T.D. & Watson, L. 1982. Taxon 31: 178-203; Simon, B.K. 1978. A preliminary checklist of Australian grasses. Technical Bulletin No. 3, Botany Branch, Queensland Dept. Primary Industries; Watson, L. & Dallwitz, M.J. 1980. Identifying Grass Genera, Anatomy, Morphology and Keys; Wheeler, D.J.B., Jacobs, S.W.L. & Norton, B.E. 1982. Grasses of New South Wales.

CLASSIFICATION OF POACEAE IN THE PERTH REGION

SUBFAMILY PANICOIDEAE (4 tribes)

Tribe Andropogoneae *Cymbopogon*, *Hemarthria*, **Hyparrhenia*, **Miscanthus*,
**Sorghum*, *Themeda*

Tribe Paniceae **Axonopus*, **Brachiaria*, **Cenchrus*, **Digitaria*, **Echinochloa*,
**Melinis*, **Neurachne*, **Panicum*, **Paspalum*, **Pennisetum*, **Rhynche-*
lytrum, **Setaria*, **Spinifex*, **Stenotaphrum*

SUBFAMILY CHLORIDOIDEAE (ca 7 tribes)

Tribe Eragrostideae **Dactyloctenium*, **Eleusine*, **Eragrostis*
Tribe Chlorideae **Chloris*, **Cynodon*
Tribe Sporoboleae **Crypsis*, **Sporobolus*

SUBFAMILY ARUNDINOIDEAE (ca 4 tribes)

Tribe Arundineae **Arundo*, **Cortaderia*, **Danthonia*, **Lasiochloa*, **Pentaschistis*,
**Plagiochloa*, **Spartochloa*

SUBFAMILY POOIDEAE (8 tribes)

Supertribe Poanae

Tribe Agrostideae **Agrostis*, **Aira*, **Alopecurus*, **Ammophila*, **Anthoxanthum*,
**Avellinia*, **Deyeuxia*, **Dichelachne*, **Gastridium*, **Holcus*, **Lagurus*,
**Phalaris*, **Polypogon*, **Trisetaria*
Tribe Aveneae **Amphibromus*, **Arrhenatherum*, **Avena*
Tribe Meliceae **Glyceria*
Tribe Poeae **Briza*, **Catapodium*, **Cynosurus*, **Dactylis*, **Festuca*, **Hainardia*,
**Lolium*, **Parapholis*, **Poa*, **Puccinellia*, **Vulpia*

Supertribe Triticanae

Tribe Triticeae **Agropyron*, **Hordeum*, **Secale*, **Triticum*
Tribe Brachypodieae **Trachynia*
Tribe Bromeae **Bromus*

SUBFAMILY BAMBUSOIDEAE (ca 11 tribes)

Tribe Stipeae **Amphipogon*, **Piptatherum*, **Stipa*
Tribe Ehrharteae **Ehrharta*, **Microlaena*, **Tetrarrhena*

KEY TO GENERA

1. Spikelets 2-flowered with upper floret unisexual or bisexual and lower floret male or empty, if floret empty often reduced to lemma; falling entire at maturity, disarticulating below glumes.
2. Spikelets solitary or rarely paired, usually bisexual, rarely unisexual. Glumes membranous, lower smaller, upper about the same length as spikelet.
3. Ligule membranous or absent, not ciliate.
 4. Lower glume present, may be a small and membranous scale or up to half the length of the spikelet.
 5. Ligule absent. Inflorescence a panicle..... ECHINOCHLOA
 5. Ligule present. Inflorescence a more or less digitately arranged spike-like raceme or panicle..... *DIGITARIA
 4. Lower glume absent..... *PASPALUM
3. Ligule usually a short rim, ciliate.
 6. Spikelet subtended by an involucre of 1 or more bristles.

7. Bristles thick, barbed, connate at base or higher to form a burr-like involucre..... ***CENCHRUS**
7. Bristles slender, naked or plumose, not connate.
8. Bristles persisting on axis after spikelets have fallen. Lemma and palea of bisexual floret transversely rugose..... ***SETARIA**
8. Bristles falling with the spikelets. Lemma and palea of bisexual floret smooth..... ***PENNISSETUM**
6. Spikelets without an involucre.
9. Upper glume and lower lemma not 2-lobed, unawned.
10. Florets unisexual, racemes arranged in a globular or hemispherical inflorescence. Plants monoecious or dioecious..... **SPINIFEX**
10. Florets bisexual, arranged in solitary or scattered spike-like racemes. Plants monoecious.
11. Glumes longer than spikelet, of firmer texture than lemma, sericeous in lower third..... **NEURACHNE**
11. Glumes shorter than or equal in length to spikelet, similar in texture to lemma, glabrous or scabrous.
12. Spikelets pedicellate.
13. Inflorescence of 2 to many spike-like racemes..... ***PANICUM**
13. Inflorescence a panicle of racemes..... ***BRACHIARIA**
12. Spikelets sessile or nearly sessile.
14. Spikelets embedded in notches. Upper glume 7-ribbed, lower glume small and scale-like..... ***STENOTAPHRUM**
14. Spikelets not embedded in notches. Upper glume 2-4-ribbed, lower glume absent..... ***AXONOPUS**
9. Upper glume and lower lemma 2-lobed, finely awned or mucronate from sinus.
15. Spikelets 2.5-6 mm long. Upper glume and lower lemma gibbous at or below the middle..... ***RHYNCHELYTRUM**
15. Spikelets 1.5-2 mm long. Upper glume and lower lemma not gibbous..... ***MELINIS**
2. Spikelets paired, with one sessile and usually fertile, the other pedicellate and usually male or sterile, or in 3's with 2 sessile and 1 pedicellate. Glumes firm in texture, as long as spikelets and enclosing the florets.
16. Inflorescence a raceme, each raceme subtended by a spathe.
17. Rachis of inflorescence hollowed on inner face, sessile spikelets sunken in these prominent concavities..... **HEMARTHRIA**
17. Rachis of inflorescence not hollowed on either face.
18. Inflorescence silky. Palea absent. Fertile spikelet without an involucre of male or sterile spikelets.
19. Inflorescence silky-villous, almost concealing spikelets and awns; awns up to 8 mm long..... **CYBOPOGON**
19. Inflorescence villous, spikelets apparent, awns 15-25 mm long..... ***HYPARRHENIA**
18. Inflorescence glabrous or minutely scabrous. Palea present. Fertile spikelet with an involucre of male or sterile spikelets..... **THEMEDA**
16. Inflorescence a spike or panicle without spathes.
20. Spikelets distinctly awned.
21. Spikelets all pedicellate..... ***MISCANTHUS**
21. Spikelets with one of each pair sessile, other pedicellate..... ***AXONOPUS**
20. Spikelets awnless..... ***SORGHUM**
1. Spikelets with 1 to many unisexual or bisexual flowers, but if 2-flowered both florets or lower one bisexual; breaking up at maturity above more or less persistent glumes, or if falling entire then not 2-flowered.
22. Spikelets sessile or very shortly pedicellate. Spikes solitary, digitate or whorled or in spike-like racemes.
23. Spikes digitate.
24. Spikelets with 3-8 florets, all bisexual.

25. Rachis of spike ending in rigid point..... *DACTYLOCTENIUM
 25. Rachis of spike ending in a fertile spikelet..... *ELEUSINE
24. Spikelets with 1, rarely 2 bisexual florets, often with further male or empty florets above.
26. Florets 1 or 2, bisexual. Lemma unawned..... *CYNODON
 26. Florets 2-8, lowest bisexual, upper ones male and/or empty. Lemma awned..... CHLORIS
23. Spikes not digitate.
27. Spikelets occurring at nodes in groups of 3, groups falling as a unit..... *HORDEUM
27. Spikelets solitary at each node of the rachis.
28. Spikelets subtended by 1 glume except for terminal spikelet with 2 glumes.
29. Lemma 5-9-ribbed..... *LOLIUM
 29. Lemma 3-ribbed..... *HAINARDIA
28. Spikelets subtended by 2 glumes.
30. Floret 1, bisexual.
31. Spikelets embedded in concavities of rachis. Lemma unawned..... *PARAPHOLIS
 31. Spikelets not embedded in rachis. Lemma awned..... AMPHIPOGON
30. Florets 2 or more, all bisexual or uppermost 1 or 2 empty.
32. Lemma 5-ribbed. Florets all bisexual.
33. Inflorescence a loose spike. Florets 3-12..... AGROPYRON
 33. Inflorescence a dense cylindric spike. Florets 2, rarely 3..... *SECALE
32. Lemma 7-many-ribbed. Florets all bisexual or uppermost 1 or 2 empty.
34. Lemma 7-ribbed. Florets 7-15, bisexual..... *TRACHYNIA
 34. Lemma many-ribbed. Florets 2-5, bisexual or uppermost 1 or 2 empty..... *TRITICUM
22. Spikelets pedicellate, often shortly so. Spike-like panicles open or contracted.
35. Spikelets with 1 (rarely 2) bisexual floret(s) with or without 1 or 2 male or empty florets below.
36. Spikelets with 1 or 2 bisexual floret(s).
37. Lemmas more or less hardened at maturity, terete, or slightly dorsally compressed, with margins inrolled, awns, when present, terminal.
38. Lemma awned; awn arising from apex of lemma and persistent..... STIPA
 38. Lemma unawned, or with awn arising from minute sinus and readily broken..... *PIPTATHERUM
37. Lemmas membranous at maturity, rarely hardened, if hardened then laterally compressed, awnless or awned from low down on back.
39. Glumes longer and firmer than translucent lemma or, if shorter, then lemma herbaceous and dull.
40. Glumes awned or produced into plumose bristles.
41. Leaves softly hairy. Panicle ovoid, sericeous, 20-30 mm long..... *LAGURUS
 41. Leaves glabrous or scabrous. Panicle cylindric, 10-100 mm long.
42. Ligule translucent, glabrous, lacerated..... *GASTRIDIMUM
 42. Ligule scarious, ciliate or hirsute on outer surface..... POLYPOGON
40. Glumes unawned but apex sometimes acuminate.
43. Awn of lemma arising near apex or lemma awnless.
44. Awn of lemma less than 1 mm long..... *AMMOPHILA
 44. Awn of lemma 20-40 mm long..... DICHELACHNE
43. Awn of lemma arising near middle or base of lemma.
45. Glumes connate by margins for $\frac{1}{3}$ to $\frac{1}{2}$ of lower edge..... *ALOPECURUS
 45. Glumes not connate by margins.
46. Panicle dense and spike-like, narrow, cylindric. Ligule lacinate, glabrous..... DEYEUXIA

46. Panicle loose with much divided thin branches at first erect, later spreading. Ligule entire, scabrous or shortly ciliate..... **AGROSTIS**
39. Glumes as long as or longer than lemma, similar in texture, membranous, shining.
47. Inflorescence enclosed at base by 2 inflated leaf sheaths, supporting culm hidden..... ***CRYPISIS**
47. Inflorescence not enclosed by leaf sheath, supporting culm visible..... **SPOROBOLUS**
36. Spikelets with 3 florets, terminal floret bisexual, lower 2 florets male or empty.
48. Glumes as long as or longer than florets.
49. Glumes of unequal size; keel not winged. Empty lemmas awned..... ***ANTHOXANTHUM**
49. Glumes of equal size; keel often winged. Empty lemmas reduced to scales..... ***PHALARIS**
48. Glumes shorter than florets.
50. Lemmas of bisexual and empty florets equal in size..... **TETRARRHENA**
50. Lemma of bisexual floret much smaller than lemma of empty floret.
51. Glumes minute. Lemma of empty floret with awns longer than length of body..... **MICROLAENA**
51. Glumes $\frac{1}{3}$ to as long as body of lemma of empty floret. Lemma of empty floret unawned or awn less than length of body..... ***EHRHARTA**
35. Spikelets with 2 or more bisexual florets or 1 bisexual floret with empty florets above, or 2 or 3 unisexual florets with no bisexual florets.
52. Lemma and rachilla joints bearing long silky hairs enveloping the lemma. Tall grass more than 2 m tall with plume-like panicle more than 30 mm tall.
53. Leaves in two rows along culms. Spikelets bisexual..... ***ARUNDO**
53. Leaves tufted at base of culms. Spikelets male or female..... ***CORTADERIA**
52. Lemma or rachilla glabrous or hairy but hairs not enveloping lemma. Not a tall grass with plume-like panicle.
54. Glumes or at least upper glume from $\frac{2}{3}$ to as long as lowest floret (excluding awns); florets usually enclosed. Lemma awned from back or from sinus of 2-lobed apex.
55. Lemma awned from back or awnless. Ligule membranous.
56. Lemma with terminal awn..... ***HOLCUS**
56. Lemma with dorsal awn.
57. Perennials.
58. Florets 2; upper one bisexual, lower one male. Prominent bulbous swellings at base of culm..... ***ARRHENATHERUM**
58. Florets 3-7; all bisexual or upper ones male. No bulbous swellings at base of culm..... **AMPHIBROMUS**
57. Annuals.
59. Glumes 5 mm or less long.
60. Glumes nearly equal.
61. Glumes glabrous..... ***AIRA**
61. Glumes hairy..... ***TRISSETARIA**
60. Glumes very unequal, lower very small..... ***AVELLINIA**
59. Glumes 20 mm or more long..... ***AVENA**
55. Lemma awned or with mucro from sinus of 2-lobed apex, or awnless. Ligule reduced to row of hairs, or if membranous then jagged ciliate on margins.
62. Spikelets with 2 rarely 3 florets. Lemma glabrous or with hairs on ribs..... ***PENTASCHISTIS**
62. Spikelets with 3 or more florets. Lemma villous or tuberculate-hairy.

63. Glumes glabrous. Lemmas villous with rows of hairs present at sinus of lobes, often another row of hairs at base of lemma..... **DANTHONIA**
63. Glumes with scattered tubercle-based hairs. Lemmas ciliate, without distinct rows of hairs..... ***LASIOCHLOA**
54. Glumes usually $\frac{2}{3}$ length or shorter than lowest floret; upper florets exerted, beyond glumes. Lemma awnless or with awn from entire or 2-lobed apex, or lemma several-awned.
64. Lemma 1-3-ribbed..... **ERAGROSTIS**
64. Lemma 5-many-ribbed, sometimes obscurely so.
65. Lemma awnless.
66. Lemmas prominently keeled on back.
67. Inflorescence a spike, spikelets arranged in two rows along rachis..... ***PLAGIOCHLOA**
67. Inflorescence a panicle, spikelets solitary..... **POA**
66. Lemmas rounded on back, or with short keel near apex.
68. Annuals.
69. Lemmas as broad as long. Spikelets drooping..... ***BRIZA**
69. Lemmas longer than broad. Spikelets erect..... ***CATAPODIUM**
68. Perennials (remains of old stems visible at base).
70. Leaves less than 10 mm long..... **SPARTOCHLOA**
70. Leaves more than 10 mm long.
71. Ribs of lemma indistinct. Plants growing in saline areas..... ***PUCCINELLIA**
71. Ribs of lemmas prominent. Plants growing in fresh water areas..... **GLYCERIA**
65. Lemma awned.
72. Spikelets of 2 kinds; sterile spikelets which consist of empty bracts and fertile spikelets of 1-6 bisexual florets..... ***CYNOSURUS**
72. Spikelets all alike.
73. Awn up to 4 mm long.
74. Lemma keeled on back..... ***DACTYLIS**
74. Lemma rounded on back..... ***FESTUCA**
73. Awn more than 5 mm long.
75. Awns terminal to lemma; lower glume minute or missing..... ***VULPIA**
75. Awn arising from below 2-lobed apex of lemma; glumes subequal..... **BROMUS**

AGROPYRON Gaertner

Tufted perennials, often with long creeping rhizomes; culms erect. Leaf blades flat or convolute; ligule scarious. Inflorescence a simple spike. Spikelets solitary, rarely in pairs, sessile, with flattened side towards hollows of rachis; rachilla breaking away between lemmas. Florets 6-12, bisexual. Glumes rigid, persistent. Lemmas rounded on back. Paleas 2-keeled, ciliate. Lodicules 2, large, densely ciliate. Ovary with villous apex; styles almost absent. Caryopsis linear to oblong in outline. Over 100 species in temperate areas. 1 native and 2 introduced in W.A.

A. scabrum (Labill.) P. Beauv.

Common Wheatgrass

Tufted perennial with stiff, slender culms, 0.3-1 m tall; culms sulcate-striate. Leaf sheaths hirsute, occasionally glabrous; blades flat, 50-80 x 2-4 mm, striate, scabrous on surface and edges; ligule a short rim. Spike loose, elongated, of 2-12 distant spikelets. Spikelets 50-70 mm long including awn; rachis scabrous, angular-sulcate. Florets 6-12. Glumes narrowly ovate, scabrous; lower glume 3-ribbed, 4-8 mm long; upper glume 3-5-ribbed, 8-15 mm long. Lemma narrowly ovate, rigid, scabrous, faintly ribbed; body 8-12 mm long, margins incurved, tapering into a slender awn 20-40 mm long. Palea 8 mm long, 2-keeled, keels scabrous.

Recorded only from Swan View in the Perth Region, but widespread elsewhere within the south west occurring south of Bunbury and as far east as Kalgoorlie. Occurs in all states except N.T.

Flowers July-December.

AGROSTIS L.

Annuals or perennials. Leaf blades flat and flaccid, rarely involute or convolute. Inflorescence a loose or contracted panicle. Spikelets pedicellate; rachilla disarticulating above the glumes. Floret 1, bisexual. Glumes 2, keeled, awnless. Lemma equal to or shorter than the glumes, membranous, broadly oblong, usually truncate or obtuse; callus very small, glabrous or minutely hairy, often bearded. Palea translucent, sometimes minute or missing. Caryopsis obloid, subterete, grooved in front. Over 200 species, native to temperate regions of both hemispheres. 6 native and 3 introduced in W.A. Reference: Vickery, J.W. 1941. *Cont. New South Wales Natl. Herb.* 1: 101-119.

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|---|------------------------|
| 1. Lemma distinctly awned. | |
| 2. Lemma 4-lobed for up to 1/2 length, 2 outer lobes ca 1.5 mm long.... | A. plebeia |
| 2. Lemma 4-lobed at apex, lobes less than 0.5 mm long. | |
| 3. Spikelets 6-8 mm long, lemma ca 3 mm long..... | A. drummondiana |
| 3. Spikelets 2-4 mm long, lemma 1-2 mm long..... | A. avenacea |
| 1. Lemma not awned, rarely with a short awn from apex..... | *A. stolonifera |

A. avenacea J. Gmelin

Blowngrass

Glabrous, tufted annual, 0.15-0.7 m tall; culms slender or stout, more or less scabridulous, very scabrous below the panicle. Leaf sheaths more or less densely scabridulous, often becoming loose from culm in upper part; blades linear, 80-350 x 2-4 mm, slightly to densely scabrous on ribs of both surfaces, acute or acuminate; ligule membranous, obtuse, scabrous, 3-10 mm long. Panicle large, divaricately spreading, when young enclosed in uppermost sheath; rachis, branches and pedicels scabrous; pedicels 1-5 mm long, clavate. Spikelets rather numerous towards the ends of the branches, greenish or straw-coloured, sometimes tinged purple, 2-4 mm long, laterally compressed; rachilla produced into short hairy bristles. Glumes narrowly divergent, acute or acuminate, 1-ribbed, keeled, scabrous on keels, usually glabrous on sides. Lemma 1-2 mm long, membranous, villous, 4-ribbed, ribs apparent above middle, 4-lobed; awn exserted, fine, bent; callus barbed with short hairs. Palea slightly shorter than or almost equal in length to lemma, very thin, membranous, 2-lobed.

Occurs on the Coastal Plain, mainly around swamps or lakes. Occurs throughout the south west and inland as far as Meekatharra and Kalgoorlie. Also in all Australian states and New Zealand.

Flowers August-January.

A. drummondiana (Steudel) Vick.

Erect, tufted, glabrous annual, 0.4-0.6 m tall; culms glabrous, scabrous below panicle. Leaf sheaths loose, scabrous between ribs; blades flat at base, becoming convolute in upper part when dry, 30-150 x 1-3 mm, shallowly grooved; ligule membranous, 3-7 mm long, obtuse or acute, sometimes scabrous. Panicle loosely contracted, lower part enclosed in uppermost sheath, 150-250 mm long, at length shortly exserted, somewhat spreading; rachis, branches and pedicels glabrous; rachilla produced into bristle ca 0.5 mm long, bearing hairs up to 1 mm long. Spikelets yellowish green, ca 5-6 mm long, laterally compressed. Glumes unequal, about twice as long as lemma, lower longer than upper, keeled; keels scabrous, margins membranous, acute, bearing hairs up to 1 mm long. Lemma ca 3 mm long, membranous, villous, apex 4-lobed, lateral lobes 0.5 mm long, dorsal lobes short, awned from about middle; awn 7-10 mm long, bent, strong and twisted in lower part. Palea membranous, thin, 2-2.5 mm long, minutely 2-lobed at apex.

Vickery (1941) cited a collection from Bassendean but there are no collections from the Perth Region in the W.A. Herbarium. Also recorded from the Vasse River.

Flowering period unknown.

A. plebeia R. Br.

Slender tufted annual, 200-300 mm tall; culms more or less glabrous. Leaf sheaths tight or lower ones loose; blades flat or loosely convolute, linear, almost filiform, 20-70 x 5-10 mm; ligule membranous, 2-3 mm long, obtuse. Panicle shortly exserted or base enclosed in uppermost sheath, contracted, 40-120 mm long, with erect unequal branches; rachis glabrous, branches and pedicels more or less scabrous, 2-5 mm long. Spikelets 3-4 mm long, laterally compressed. Glumes scabrous on keels, subequal, lower glume longer than upper glume, acute. Lemma membranous, 3-4.5 mm long including lobes, villous,

apex 4-lobed, lateral lobes ca 1.5 mm long, body awned from near the base; dorsal awn about twice as long as glumes, bent, twisted below bend. Palea membranous, shorter than lemma, 1.5 mm long.

Within the region there are collections from the Peel Inlet. An early collection is listed for Bayswater. Also occurs near Busselton.

Flowers October-November.

***A. stolonifera L.**

Marsh Bent, Creeping Bent

Tufted perennial, 80-400 mm tall, spreading by stolons; culms erect from bent or prostrate base, rooting from lower nodes. Leaf sheaths rounded, mostly glabrous; blades 10-100 x 0.5-50 mm, rolled when young, afterwards flat, minutely scabrous, acute; ligule blunt, 1-6 mm long, membranous, shortly ciliate or scabrous on outer surface. Panicle whitish or purple, linear to narrowly ovate, 10-130 mm long; branches clustered, pedicels 0.5-2 mm long. Spikelets densely clustered, narrowly ovate to narrowly oblong, 2-3 mm long. Glumes persistent, equal or slightly unequal, narrowly ovate, membranous, 1-ribbed, scabrous upwards on keels. Lemma 1.5-2 mm long, ovate or oblong, finely 5-ribbed, thin, usually awnless, rarely with a short awn from apex. Palea 1-1.5 mm long.

Recorded from Yarloop. Naturalized between Busselton and Albany. Native throughout Europe, temperate Asia and North America.

Flowers December and January, one collection with flowers in July.

***AIRA L.**

Annuals; culms slender. Leaf blades narrow, slender; ligule membranous or translucent. Inflorescence a spreading panicle. Spikelets solitary, pedicellate, laterally compressed; rachilla breaking above glumes and between lemmas. Florets 2, both bisexual. Glumes persistent, glabrous, membranous, 1-ribbed, keeled. Lemmas finely 2-lobed; lower lemma unawned, occasionally awned; upper lemma awned; awn dorsal, exceeding lemma, bent, inconspicuously twisted. Paleas 2-lobed. Caryopsis narrow, longitudinally sulcate on one side. 12 species from Europe, Asia and Africa. 4 introduced in W.A.

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|---|-------------------------|
| 1. Glumes 2-3.5 mm long. Lemmas (excluding translucent lobes) $\frac{3}{4}$ as long as glumes..... | *A. caryophyllea |
| 1. Glumes 1.75-2 mm long. Lemmas (excluding translucent lobes) $\frac{1}{2}$ - $\frac{2}{3}$ as long as glumes..... | *A. cupaniana |

***A. caryophyllea L.**

Silvery Hairgrass

Small erect annual, 70-400 mm tall; culms solitary or tufted. Leaf sheaths loose, distinctly striate, glabrous or scabrous; leaf-blades narrow, inrolled, 30-120 x 0.25-1 mm; ligule 2.5-4 mm long, membranous. Panicle loose, with long, thin, spreading branches, 100-200 mm long; pedicel tip pyriform. Glumes 2-3.5 mm long, concave, glabrous, white and shining, acute or acuminate. Upper lemma 1.5-2.5 mm long, glabrous to scabrous with 2 sharp lobes at summit; awn arising near base, 2.5-4 mm long; lower lemma 1.5-2.5 mm long, glabrous, with 2 lobes at summit, usually awnless, awn when present 2.5-3.5 mm long, few scabrous hairs below apex; callus bearded. Palea translucent, 1.25-1.75 mm long.

Naturalized in the Perth metropolitan area and southern areas of the region. Also found from Augusta to Esperance. Native to Europe, Africa and Asia.

Flowers October and November.

***A. cupaniana Guss.**

Silvery Hairgrass

Small erect annual, 100-400 mm tall; culms solitary or tufted. Leaf sheaths loose, distinctly striate, glabrous or scabrous; leaf blades narrow, 20-110 x 0.25-1 mm; ligule translucent, 5 mm long, long-acuminate. Panicle loose, 30-300 mm long; branches long, thin, spreading; pedicel tip expanded into an annular cushion. Glumes 1.75-2 mm long, concave, glabrous, ciliate, white and shining, sometimes purple, occasionally denticulate along midline, obtuse, often cut at apex. Upper lemma 1.25-1.5 mm long, scabrous or glabrous in lower part, apex with 2 sharp translucent lobes; awn arising near base, sometimes purple, 2.25-2.5 mm long; lower lemma with 2 lobes at summit 1.25-1.75 mm long, scabrous becoming glabrous in lower part, usually awnless; awn when present 2.25-2.5 mm long, scabrous; callus glabrous. Palea translucent, 1 mm long.

Widespread in the Perth metropolitan area, and southern areas of the region. Occurs from Northam to Esperance. Native to southern Europe.

Flowering September-November.

This species and *A. caryophyllea* intergrade. From the collections made, this species appears to be more common than *A. caryophyllea*.

*ALOPECURUS L.

Perennials or annuals, usually glabrous. Leaf sheaths flat, usually flaccid, convolute when young; ligule membranous, obtuse. Inflorescence a dense, soft, spike-like panicle. Spikelets pedicellate or subsessile, falling entire. Floret 1, bisexual. Glumes equal, keeled, 3-ribbed, awnless. Lemma equal to or shorter than glumes, keeled, obtuse, margins connate near base; awn dorsal, slender, erect or bent. Palea absent. Caryopsis ovoid, somewhat flattened, free from but included in dehiscent lemma. About 50 species from temperate regions of the northern hemisphere. 3 introduced in W.A.

**A. myosuroides* Hudson

Slender Foxtail

Glabrous annual, 0.15-0.6 m tall. Leaf sheaths glabrous, green or purplish, uppermost somewhat inflated; blades flat, 30-160 x 2-8 mm, scabrous on both sides; ligule membranous 1.5-5 mm. Panicle spike-like, dense, 40-90 mm long, narrowly cylindrical, tapering upwards; pedicels 0.5-2 mm long. Spikelets narrowly oblong, 4.5-7 mm long, laterally flattened. Glumes narrowly oblong to ovate, 4.5-7 mm long, with 3 prominent ribs, narrowly winged and shortly ciliate on keels, margins ciliate, connate for $\frac{1}{3}$ to $\frac{1}{2}$ length. Lemma subequal to glumes, 4.5-6.5 mm long, ovate, keeled, membranous, 4-ribbed, glabrous, margins connate for the lower $\frac{1}{3}$, awned on back from near base, awn exceeding lemma. *A. agrestis* L.

Only one collection has been made from Belmont within the region. Two further localities Ludlow and Wonnerup are recorded just south of the region, and another from Muresk to the east of the region. Native to Europe and Asia.

Flowers September-January.

*AMMOPHILA Host

Tall stoloniferous perennials; culms erect with scaly rhizomes and deep roots. Leaf blades long, linear, involute; ligule translucent, long and large. Inflorescence a narrow, dense, spike-like panicle. Spikelets compressed, pedicellate; rachilla disarticulating above the glume and produced as short bristle beyond palea. Floret 1, bisexual. Glumes almost equal, keeled, acuminate. Lemma acute or subacute; callus bearded with long sericeous hairs. Palea 2-keeled, 2-lobed, deeply sulcate between keels. Stamens 3. 2 species in northern America, north Africa and Europe. 1 naturalized in W.A.

**A. arenaria* (L.) Link

Marram Grass

Erect perennial with creeping rhizome, 0.5-1.2 m tall, forming compact tufts; culms stout. Leaves greyish green, sheaths overlapping, glabrous; blades 100-600 mm long, tightly inrolled, pungent; ligule 10-30 mm long. Panicle 70-250 mm long, narrowly cylindrical, tapering upwards; pedicels 1-4 mm long. Spikelets laterally compressed, 10-16 mm long, closely overlapping. Glumes persistent, 10-16 mm long, narrow, equal or subequal, chartaceous, minutely scabrous on keels; lower glume usually 1-ribbed; upper glume 3-ribbed. Lemma narrowly ovate, keeled, 8-12 mm long, chartaceous, 5-7-ribbed, acute; awn stout, subterminal, less than 1 mm long; callus bearded with fine white hairs ca 3 mm long. Palea 7-10 mm long, 2-4-ribbed, with 2 ribs close together.

Planted extensively as a sand binder in the littoral sand dunes of the region, especially in the Perth metropolitan area and Bunbury. Also collected from Augusta and Albany. Native to the European coasts from Norway south to the Mediterranean Region.

Flowers October-January.

AMPHIBROMUS Nees

Perennials; culms slender, erect. Leaf blades linear, flat or convolute; ligule elongated and prominent, translucent, becoming lacerated with age. Inflorescence an elongated panicle with flexuose branches. Spikelets pedicellate; rachilla elongated, slender, breaking above the glumes and between the lemmas, produced into a bristle above uppermost lemma. Florets 3-7, all bisexual or uppermost male. Glumes persistent; lower glume 3-ribbed; upper glume 5-ribbed. Lemmas translucent, apices usually 2-4-lobed; awn arising from about or slightly above middle of dorsal surface of lemma, slightly bent but not closely twisted; uppermost lemma reduced; callus silky-villous. Paleas 2-keeled, keels ciliate, shortly 2-lobed with acute points. Caryopsis oblong in outline, glabrous, pallid, deeply grooved. 9 species occurring in South America, New Zealand and Australia. 1 in W.A.

A. neesii Steudel

Swamp Wallaby Grass

Culms 0.4-1 m tall, weak, slender. Leaf blades flat and narrow or filiform to involute, 50-250 x 1-2 mm, scabrous above. Panicle narrow, very loose, 150-300 mm long, with distant erect branches, lower branches 20-100 mm long; pedicels slender, 4-20 mm long, scabrous. Spikelets 10-15 mm long excluding the awns, (2)4-7-flowered, the lowest lemma 5-8.5 mm long and upper lemmas becoming progressively shorter. Glumes translucent, upper margins with jagged edges; lower glume 4-6 mm long, upper glume 5-7 mm long. Lemma 5-7-ribbed, ciliolate, lower part of back minutely papillose; apex jagged with 2 or 4, very short, obtuse or acute central lobes; awn 12-20 mm long, attached above middle. Palea 7 mm long, acute, curved, ciliate in upper half.

Occurs in swampy areas throughout the Perth Region and the south west. One additional collection has been made from near Paynes Find. This species is confined to Australia and occurs in all states except Qld and N.T.

Flowers September-November.

AMPHIPOGON R. Br.

Tussocky or tufted perennials. Leaf blades convolute; ligule a fringe of hairs. Inflorescence a panicle. Spikelets shortly pedicellate or subsessile, subterete or slightly dorsally compressed; rachilla disarticulating above the glumes. Floret 1, bisexual. Glumes persistent, outermost few often reduced to empty glumes subtending the inflorescence; fertile glumes concave, 3-ribbed, upper glume usually thinner in texture than lower glume. Lemma almost convolute, divided into 3-awned lobes; callus sericeous. Palea translucent, convolute, 2-lobed or awned. Styles connate towards base in lower half, terminally exserted. Caryopsis cylindrical, turbinate or obloid, enclosed by, but free from, lemma and palea. 7 species all occurring in W.A., 4 are endemic to the south west. Reference: Vickery, J.W. 1950. Contr. New South Wales Natl. Herb. 1: 281-295.

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|--|---------------------------|
| 1. Glumes narrowing into acuminate or bristle-like point, point at least $\frac{1}{4}$ the length of the glumes. | |
| 2. Outer glume 12-13 mm long, inner 10.5-11 mm long, grey with dense white hairs..... | A. turbinatus |
| 2. Outer glume 5-7 mm long, inner 4.5-6.5 mm long, straw or grey-coloured. | |
| 3. Lemma not or scarcely awned, shorter than glumes..... | A. amphipogonoides |
| 3. Lemma produced into setaceous bristle, much exceeding the glumes..... | A. laguroides |
| 1. Glumes acute or shortly pointed, if pointed point less than $\frac{1}{8}$ the length of the glumes. | |
| 4. Glumes 3-lobed..... | A. debilis |
| 4. Glumes entire..... | A. strictus |

A. amphipogonoides (Steudel) Vick.

Perennial, 250-300 mm tall, with numerous culms from a rhizome; culms erect, somewhat bent at nodes, vaguely striate, glabrous or scabridulous; scales at base of culms glabrous. Leaf sheaths glabrous or sparsely hirsute; blades inrolled, setaceous, finely pointed, scabridulous on outer surface, 50-150 x 0.5-1 mm, upper leaves shorter than lower; ligule shortly ciliate. Spike much exserted, ovoid, 10-15

mm long; rachis glabrous, pedicels absent or minute. Glumes narrowly ovate, narrowing into a long acuminate point; outer glume 5-7 mm long, with spreading white hairs; inner glume 4.5-6.5 mm long, sericeous, not as acuminate as outer glume. Lemma oblong in outline, much shorter than glumes, 3.5-4 mm long, firm, lower half sericeous, upper half divided into 3 scabrous lobes; lobes acuminate, not or scarcely awned, central lobe often slightly longer and broader. Palea 3-3.5 mm, of similar texture to lemma, sericeous, 2 acuminate lobes with ciliate membranous margins produced into 2 dorsal lobes.

Collected from Bayswater. Also from Margaret River to Albany. This species is restricted to the south west.

Flowers September-October.

A. debilis R. Br.

Ascending, slender perennial, 250-350 mm tall, bent at the lower nodes; culms erect and rigid in habit; scales at base of culms with few long hairs. Leaf sheaths mostly glabrous, ribbed, enclosing the culms, small or very shortly scabridulous; blades 10-120 x 0.5-1 mm, finely inrolled-setaceous, stiff, glabrous to scabridulous on outer surface; ligule ciliate, cilia ca 0.5-1 mm long. Panicle oblong, spike-like, usually 15-27 mm long, compact, much exerted. Spikelets pale-coloured, 9-10 mm long. Glumes unequal, 3-lobed, 3-ribbed, lateral lobes and margins more or less translucent; lower glumes 5.5-8 mm long, scabrous on back, with lateral lobes equal to or up to 2 mm shorter than central lobe; upper glume 4.5-7 mm long, with central lobe slightly exceeding lateral lobes. Lemma 9-10 mm, finely scabrous, ribs obscure, 3-lobed from middle, lobes narrowing into awn-like points; callus very short bearing a ring of erect cilia. Palea very narrow, slightly shorter than lemma, 8-9 mm long, scabridulous, 2-lobed for $\frac{2}{3}$ of awn length.

Within the region, occurs between the Perth metropolitan area, Wooroloo and Harvey. Extends east to the Fitzgerald River National Park.

Flowers November-December.

A. laguroides R. Br.

Erect, rigid perennial, 250-300 mm tall, tufted from a rhizome; scales with a few hairs; culms faintly to deeply striate, typically glabrous or with scattered tubercle-based hairs. Leaf sheaths tight, faintly striate, scabridulous, glabrous or sparsely hirsute with tubercle-based hairs; blades 30-200 x 0.5-2 mm, progressively shorter up the culm, usually convolute, rigid, finely pungent, outer surface scabridulous, inner surface ribbed; ligule shortly ciliate. Panicle shortly exerted, capitate, dense, ovoid or globular to obovoid, 10-15 mm long. Spikelets subsessile; outer spikelets whorled, narrow and empty. Glumes narrowly ovate, thin, tapering into fine points; outer glume 5.5-6.5 mm long, with several long tubercle-based hairs; inner glume 5-6 mm long with a few long hairs near tip. Lemma 7-11 mm long (including awns), narrowly ovate, 7-ribbed, ribs not conspicuous, sericeous between ribs in lower part, margins thickened, 3-lobed, broader parts of lobes scarious on outer surface, apex produced into long scabrous bristles, central bristle usually longest. Palea 6.5-10.5 mm long, of similar texture to lemma, hairy on back, deeply 2-lobed, lobes produced into long bristles.

Within the region fairly common between Gnangara and Boyanup. A few other collections are from Denmark and Albany in the south west.

Flowers September-December and March-April.

A variant from Mundaring with awns up to 25 mm long and a paler coloured lemma is included under this species. Further studies are needed before a decision can be made on the status of this variant.

A. strictus R. Br.

Greybeard Grass

Perennial, 250-350 mm tall; culms slender, arising singly from a rhizome. Leaf sheaths tight around culms, glabrous or minutely scabridulous or with few scattered hairs or hirsute; blades stiffly inrolled to middle, 10-150 x 0.5-1 mm, pungent; ligule ciliate. Panicle capitate, spike-like, rather dense, ovoid, 10-20 mm long; rachis and pedicels scabrous. Spikelets often dark-coloured, 8-12 mm long. Glumes 3-ribbed, unequal, entire, ovate, enfolding lower part of lemma, distantly scabrous, sometimes with few tubercle-based cilia in upper part, ciliolate near apex, apex shortly acuminate; lower glume 5-7 mm long; upper glume 6-8 mm long. Lemma 7-12 mm long, indurate, rugose, with 2 dorsal vertical bands of sericeous hairs, 3-lobed, narrowed into erect or slightly divergent bristles, margins thickened, with short cilia. Palea 2-lobed, almost as long as lemma, glabrous, narrow, with membranous margins produced into translucent lobes.

Within the region collected from Gingin, Maddington and Helena Valley. Occurs from Northampton in the north to Ravensthorpe in the south. Also occurs in N.S.W. and Qld.

Flowers October-December.

Four varieties have been described for this species, 2 of which occur in the region. Var. *hirsutus* Vick. has glabrous glumes, lemma lobes about twice as long as the body, and slender, hirsute leaf blades up to 150 mm long. Var. *setifera* Benth. has glumes with many long hairs on outer surface, lemma lobes more than twice the length of the body, and leaf blades more or less glabrous and less than 80 mm long. The typical variety occurs in N.S.W. and Qld.

A. turbinatus R. Br.

Tufted perennial, 250-350 mm tall with a thick, horizontal, glabrous, sericeous or nearly woolly rhizome; culms erect, rigid. Leaf sheaths striate, tight; blades convolute, setaceous, 30-130 x 0.5-1 mm, usually rigid, curved or recurved, surface glabrous or with scattered long hairs, orifice with white hairs; ligule a fringe of hairs, nearly 1 mm long. Panicle much exerted, subcapitate, obovoid, dense, 10-25 x 15-30 mm, outer spikelet empty forming an involucre. Glumes firmly membranous, narrowly obovate, dark grey, hairy with dense white hairs, gradually narrowed towards base, apex attenuated into an acuminate bristle-like point, up to 20 mm long; outer glume 12-13 mm long, ciliate on back; inner glume 10.5-11 mm long, ciliate on upper margin. Lemma 14-17 mm long, densely white-sericeous, 3-lobed; lobes narrow, tapering into fine awn-like points; lateral lobes with a broad translucent margin soon separating into linear acuminate accessory lobes; callus slender, stalk-like, sericeous, 2.5-3 mm long. Palea 14-17 mm long, with translucent margins, produced into acuminate lateral accessory lobes.

Common native grass throughout the region. Occurs from Geraldton in the north to Israelite Bay in the south east of the state.

Flowers September-November.

***ANTHOXANTHUM L.**

Sweetly scented perennials or annuals. Leaf blades flat; ligule membranous. Inflorescence a spike-like panicle or raceme. Spikelets shortly pedicellate, slightly compressed; rachilla disarticulating above the glumes. Florets 3, with uppermost floret bisexual, 2 lower florets male or empty. Glumes persistent, keeled, upper one longer than lower. Lower 2 lemmas equal, upper one much shorter, keeled, emarginate, sometimes 2-lobed, hairy, with a dorsal awn; awn of upper lemma longer than awn of lower lemma. Lower 2 paleas, when present, 2-keeled; upper palea 1-ribbed. Stamens 3 in male floret, 2 in bisexual floret. Caryopsis ovoid, slightly laterally compressed. About 20 species from Europe, Africa and Asia. 1 naturalized in W.A.

***A. odoratum L.**

Sweet Vernal Grass

Perennial with tufted culms, 0.3-0.6 m tall. Leaf sheaths glabrous or softly hairy; blades 15-50 x 2-8 mm, glabrous to sparsely hairy; ligule up to 4 mm long, truncate. Panicle 10-90 mm long, cylindrical, dense. Spikelets oblong to narrowly ovate, 7-10 mm long. Glumes translucent with green keel, ovate, sometimes hairy; upper glume exceeding the florets and enfolding them, 8-10 mm long, acuminate; lower glume 3.5-4.5 mm long. Lemma of empty florets golden to brown with broad, sericeous hairs in lower part; lowest lemma 3-4 mm long with dorsal awn 3-3.5 mm long; upper lemma 3-3.5 mm long, with a bent awn 7-8 mm long, attached near to base. Lemma of fertile floret golden-brown, almost circular, 2 mm long.

Recorded from Harvey in the region. Widespread between Augusta, Pemberton and Albany. Native to Europe and Asia.

Flowers November-January with occasional flowers in September.

***ARRHENATHERUM P. Beauv.**

Tall slender perennials. Leaf blades linear; ligule translucent. Inflorescence a loose, 1-sided panicle. Spikelets pedicellate; rachilla very short, glabrous, breaking above glumes. Florets 2, lower floret male, upper floret bisexual. Glumes persistent. Lemmas slightly longer than glumes; lower lemma awned,

upper lemma awnless; awn bent, twisted below bend. Paleas 2-keeled, minutely 2-lobed. Lodicules large, ovate to triangular. Ovary densely villous towards apex, poorly developed in lower floret. About 6 species from Europe and the Mediterranean Region. 1 naturalized in W.A.

***A. bulbosum** (Willd.) C. Presl

Onion Twitch, False Oat Grass

Erect, glabrous perennial to over 1 m tall, with bulbous swellings at the base of the culm. Leaf blades flat; ligule 1 mm long, truncate, membranous. Panicle narrow, loose, 120-300 mm long. Spikelets pedicellate, solitary, compressed laterally, 7-11 mm long. Glumes broad, membranous, acute, rounded on back; lower glume 6-7 mm long, 1-ribbed; upper glume 9-10 mm long, 3-ribbed. Lemmas 7-10 mm long, 5-9-ribbed, hairy at base, rounded on back, firm, margins translucent; lower lemma with twisted awn 10-17 mm long, arising near base; upper lemma awnless or with a short bristle near apex. Palea narrower than lemma, 6-8 mm long, hairy on keels. *A. elatius* (L.) P. Beauv. var. *bulbosum* Koch

Naturalized in the Perth metropolitan area, and at Harvey. Recorded from Manjimup, Northcliffe and Denmark. Native to Europe and Asia.

Flowers November-December.

***ARUNDO** L.

Perennials with horizontal, usually thick rhizomes; culms tall, stout, almost woody. Leaf blades flat; ligule very short, membranous. Inflorescence a contracted or spreading panicle. Spikelets pedicellate; rachilla breaking off at maturity above the glumes and between the lemmas. Florets 2-7, bisexual. Glumes glabrous, keeled, acute. Lemmas hairy on back; lower lemma enclosing bisexual floret; upper lemma usually empty. Paleas translucent, 2-keeled. Caryopsis obloid, free, enclosed by lemma and palea. About 12 tropical and temperate species. 1 naturalized in W.A.

***A. donax** L.

Giant Reed

Culms stout, bamboo-like, occurring in large masses, 2-6 m tall, branching from thick rhizomes. Leaf blades flat, evenly spaced in 2 rows along the culms, 200-600 x 50-70 mm, margins scabrous. Panicle large, plume-like, terminal, dense, erect, 300-600 mm long; rachilla glabrous. Florets successively smaller towards apex of spikelet, uppermost usually empty. Glumes 8-11 mm long, subequal, narrow, 3-ribbed. Lemma up to 12 mm long, thin, broader than glumes, 3-9-ribbed, softly hairy, tapering at summit, ribs ending in 2 slender lobes with a short, straight awn arising between them. Palea shorter than lemma, apex truncate, margins and apex ciliate.

Common along water courses or in moist areas of the outer metropolitan area of Perth, and along the river at Crawley and South Perth. Also from Albany in the south west of W.A. Originally introduced and cultivated as an ornamental plant. Native to the Mediterranean Region.

Flowers April-June.

This species is often incorrectly called Bamboo.

***AVELLINIA** Parl.

Annuals. Leaves narrow; ligule translucent. Inflorescence a narrow erect panicle. Spikelets pedicellate; rachilla slender, breaking above glumes and between lemmas. Florets 3 or 4. Glumes very unequal, acuminate. Lemmas deeply concave, rounded on back. Paleas translucent, 2-lobed, 2-keeled. Caryopsis narrow, subterete, included in lemma but free from the lemma and palea. A monotypic genus from the Mediterranean Region, naturalized in W.A.

***A. michelii** (Savi) Parl.

Slender annual, 50-400 mm tall; culms hairy. Leaves occurring towards base of plant, 20-35 x 0.5 mm, sheaths and blades hairy. Panicle loose, 10-140 x 5-30 mm, florets greenish. Glumes narrowly ovate, margins translucent; lower glume setaceous, 1-1.25 mm long; upper glume 4-4.5 mm, 3-ribbed, scabrous along ribs. Lemma narrowly linear to ovate, 3-4 mm long, inconspicuously 1-3-ribbed, with 2 minute setaceous lobes and a fine setaceous awn from the sinus; awn scabrous, 2-2.5 mm long, straight. Palea translucent, 1-1.5 mm long, narrowly cuneate, shortly 2-lobed, ciliate.

Recorded from South Perth. Widespread in the south west, particularly between Augusta and the Fitzgerald River National Park, one collection recorded from Geraldton. Native to the Mediterranean Region.

Within the region flowering in August, at Geraldton in September and along the south coast in October.

*AVENA L.

Annuals. Leaf blades linear, flat; ligule translucent. Inflorescence a loose panicle. Spikelets pedicellate, pendulous; rachilla hairy or glabrous, breaking between lemmas. Florets 1 or 2, rarely 3, all bisexual or upper 2 or 3 male. Glumes persistent, scarious, acute or acuminate. Lemmas with dorsal awn arising from or slightly above middle, bent, twisted. Paleas 2-keeled, 2-lobed. Ovary densely villous from base; style free, short or lacking. Caryopsis pale-coloured, shortly cylindrical to ellipsoid, subterete, grooved, hairy. About 70 species, now cosmopolitan, originally native to the Mediterranean Region and Asia. 6 species introduced in W.A.

- 1. Lemma glabrous, awn scarcely twisted *A. sativa
- 1. Lemma covered with silky hairs, awn twisted.
 - 2. Lemma with 2 bristles, each 3-12 mm long *A. barbata
 - 2. Lemma shortly 2-lobed, each with a bristle less than 3 mm long *A. fatua

*A. barbata Link

Bearded Oat

Annual, 0.3-1 m tall. Leaf sheaths loose, scabrous, striate; blades flat, 120-600 x 3-15 mm, glabrous, rough, sparsely hairy to ciliate; ligule membranous, 2-7 mm long. Panicle loose, 1-sided. Spikelets 18-30 mm long. Florets 2 or 3. Glumes 30-35 mm, subequal, 9-ribbed, glabrous. Lemma narrowly ovate, 12-21 mm long, villous with long white hairs up to the insertion of the awn, apex 6-ribbed, with 2 long scabrous bristles each 3-12 mm long; awn scabrous, 30-60 mm long. Palea 9-14 mm long, with 2 ciliate keels.

Widespread and naturalized throughout the region. Widespread throughout the south west, from Northampton to Salmon Gums. A very common weed of disturbed areas. Native to the Mediterranean Region and south west Asia.

Flowers August-October.

*A. fatua L.

Wild Oat

Annual. Leaf sheaths loose; blades flat, 100-300 x 3-6 mm, glabrous, rough. Panicle loose, pyramidal, 200-350 mm long, with slender pendulous pedicels. Spikelets 18-30 mm long, very open; rachilla villous. Florets 2 or 3, all or the lower 2-awned. Glumes subequal, 18-25 mm long, prominently 9-ribbed, glabrous. Lemma tough, 14-18 mm long, hairy with reddish brown hairs, ending in 2 short scarious bristles, 6-7-ribbed near apex; awn ca 27 mm long, twisted in lower part, bent near middle. Palea 12 mm long, densely ciliate along the 2 keels. Ovary with few long white hairs on surface.

A common weed of cultivated and waste lands in the region. Naturalized in all settled areas of the south west. Native to the Mediterranean Region and south west and southern Asia.

Flowers August-December.

*A. sativa L.

Common Oat, Cultivated Oat

Annual 0.3-0.6 m tall. Leaf sheaths loose; blades flat, 200-700 x 9-12 mm, glabrous, rough; ligule translucent, ca 3 mm long, lacinate on margin. Panicle loose, pyramidal, 50-200 mm long. Spikelets with 2 florets; rachilla glabrous or hairy below first floret; second floret not readily breaking off. Glumes 25-30 mm long, margins translucent; lower glume with 9-11 prominent ribs; upper glume 11-ribbed. Lemma glabrous, 17-19 mm long, prominently 8-9-ribbed in upper $\frac{1}{3}$, shortly 2-lobed at apex; lower lemma with dorsal awn; awn ca 40 mm long, scarcely twisted, not bent; second floret awned or awnless, remaining florets awnless. Palea 11-12 mm long, ciliate on the 2 prominent keels. Ovary golden-hairy.

This is a cultivated species but occasional plants occur spontaneously, especially beside railways and major grain routes. Within the Perth Region only 2 collections have been made, one from Bunbury and one from Kwinana, but is commonly seen along major roads. Native to Europe. Cultivated throughout the world.

Flowers June and July.

***AXONOPUS P. Beauv.**

Stoloniferous perennials, rarely annuals. Leaf blades linear, flat or folded; ligule narrow, membranous. Inflorescence of 2 to many spike-like racemes, digitate or racemose. Spikelets alternate in 2 rows on 1 side of a 3-angled axis, subsessile, falling entire from rudimentary pedicels. Florets 2; lower floret empty and reduced to lemma; upper floret bisexual. Lower glume absent; upper glume equal to spikelets. Lemma of bisexual floret obtuse, faintly 4-ribbed with firm involute margins tightly embracing the palea. Palea equal or almost equal in length to lemma. Caryopsis tightly enclosed by hardened lemma and palea. About 35 species, mostly in tropical America, 1 also in Africa and introduced into other parts of the tropics. 2 species introduced into Australia. 1 naturalized in W.A.

***A. compressus (Sw.) P. Beauv.**

Broadleaf Carpet Grass

Glabrous perennial, 0.15-0.6 m tall, with conspicuous, creeping, rooting stolons; culms slender or in tufts, 1-3-noded; nodes more or less densely villous. Leaf sheaths conspicuously compressed, strongly keeled, glabrous, striate, often purplish, margins translucent; blades flat or keeled, narrowly ovate to linear, striate; ligule a short rim, firmly membranous, minutely ciliolate. Spikes 2 or 3(-5), sessile, slender, erect or spreading, 40-100 x 1-15 mm; rachis triquetrous. Spikelets solitary, ovate to elliptic, green or purplish, erect. Upper glume the same shape and size as spikelets, 2-4-ribbed, the ribs submarginal, middle thinly membranous. Empty lemma very similar to glume. Bisexual floret distinctly shorter than spikelet, elliptic to oblong, obtuse, lemma and palea thinly crustaceous.

Naturalized in the Perth metropolitan area and near Bunbury. Common elsewhere in the south west. Native to south east United States of America and tropical America.

Flowers October-March.

***BRACHIARIA (Trin.) Griseb.**

Perennials or annuals. Leaf blades usually flat; ligule minute, ciliate. Inflorescence of 2 to many spike-like racemes, enclosed when young in loose leaf-sheaths, afterwards exserted. Spikelets more or less dorsally compressed, falling entire at maturity, shortly pedicellate or subsessile. Florets 2; lower floret male or empty; upper floret bisexual. Glumes membranous; lower glume shorter and adjacent to rachis. Lemmas obtuse, margins firm, narrowly involute. Lower palea reduced or absent; upper palea almost as long as lemma. Caryopsis tightly enclosed, obloid or ellipsoid, dorsally compressed. About 100 species in the warm parts of both hemispheres, especially Africa. 3 native and 9 introduced in W.A.

***B. mutica (Forsskal) Stapf**

Paragrass

Stoloniferous perennial, 0.8-2 m tall with a long, prostrate and rooting stolon; culms bent, stout, terete, usually many-noded, glabrous, shallowly striate; nodes densely bearded. Leaf blades narrowly ovate, flat, 150-300 x 6-20 mm, rigid, glabrous or sometimes hirsute, apex acuminate. Inflorescence oblong to narrowly ovate in outline, loose, 80-200 mm long, common axis deeply grooved and angular; racemes greenish or purple tinted, numerous, alternate, sometimes paired or in false whorls, subsessile or lowest on short pedicels, spreading, 20-80 mm long, lower often branching and then somewhat interrupted. Spikelets oblong, 3-3.5 mm long, acute, glabrous. Lower glume membranous, broadly ovate, $\frac{1}{3}$ to $\frac{1}{2}$ length of spikelet, faintly 3-5-ribbed, obtuse; upper glume herbaceous, 5-7-ribbed. Lower lemma similar to upper glume in shape, size and texture, 5-ribbed, subtending a narrowly oblong palea. Bisexual floret slightly shorter than spikelet, oblong, subacute, crustaceous, very finely rugose to almost glabrous.

Perennial grass naturalized along lake edge at Yanchep National Park. Also naturalized around the Ord River in the Kimberley Region. Native to tropical America and Brazil.

Flowers August.

***BRIZA L.**

Loosely tufted annuals; culms erect or slightly bent at base. Leaf blades flat, minutely rough on margins; ligule membranous, obtuse. Inflorescence a panicle with pendulous spikelets. Spikelets pedicellate, pedicels usually slender. Florets 4-20, bisexual, decreasing gradually in size towards apex of spikelet. Glumes persistent, concave, spreading horizontally. Lemmas closely overlapping, scarious, broad, deeply concave. Paleas 2-keeled, keels often winged and minutely hairy. About 20 species from northern temperate areas and South America. 2 naturalized in W.A.

1. Spikelets 10-20 mm long. Glumes 7-9-ribbed..... ***B. maxima**
 1. Spikelets 2-5 mm long. Glumes 3-ribbed..... ***B. minor**

***B. maxima** L.

Blowfly Grass, Quaking Grass

Glabrous annual 0.3-0.6 m tall. Leaf sheaths glabrous, rather loose; blades linear, 40-200 x 4-6 mm, acute; ligule oblong, 2-5 mm long. Panicle oblong with pendulous spikelets, loosely branched, branches distant. Spikelets ovate, 10-25 mm long. Florets 7-12, closely imbricate. Glumes broadly ovate, 7-9-ribbed, obtuse; lower glume 5-6.5 mm long; upper glume 7-8.5 mm long. Lemma 6-8 mm long, broadly ovate, 7-9-ribbed, obtusely acuminate; lower lemma glabrous or sparsely hairy near base with clavate tipped hairs; upper lemma sericeous. Palea broadly obovate, 3-4 mm long, translucent, wings densely ciliolate, apex truncate.

Common naturalized grass of the sandy soils of the region, especially the populated areas. Also collected from York, Merredin, Collie, Cape Naturaliste and Bremer Bay. Native to the Mediterranean Region.

Flowers September and October.

***B. minor** L.

Shivery Grass, Lesser Quaking Grass

Glabrous tufted annual, 0.15-0.5 m tall; culms erect or bent. Leaf sheaths loose, glabrous, striate; blades 40-150 x 3-9 mm; ligule oblong, 4-6 mm long. Panicle broadly obovate, 50-100 mm long, erect, branches spreading with very fine branchlets and pendulous spikelets. Spikelets ovate to triangular, 2.5 x 3-5 mm, obtuse. Florets 4-7. Glumes green or purplish green, subequal, thinly scarious, horizontally spreading, 3-ribbed, 2-3 mm long, obtuse or subacute. Lemma broadly ovate, gibbous below, 2-3 mm long, glabrous, 7-ribbed, broad, margins translucent, obtuse, apices inflexed. Palea elliptic, 1.5 mm long, winged, the wings minutely ciliolate. **Fig. 314**

Occurs on sandy soils, especially in the Perth metropolitan area, also on Garden Island. Widespread from Dirk Hartog Island to Cape Naturaliste and east to Balladonia. Native to the Mediterranean Region, southern U.S.S.R. and south west Asia.

Flowers September-November.

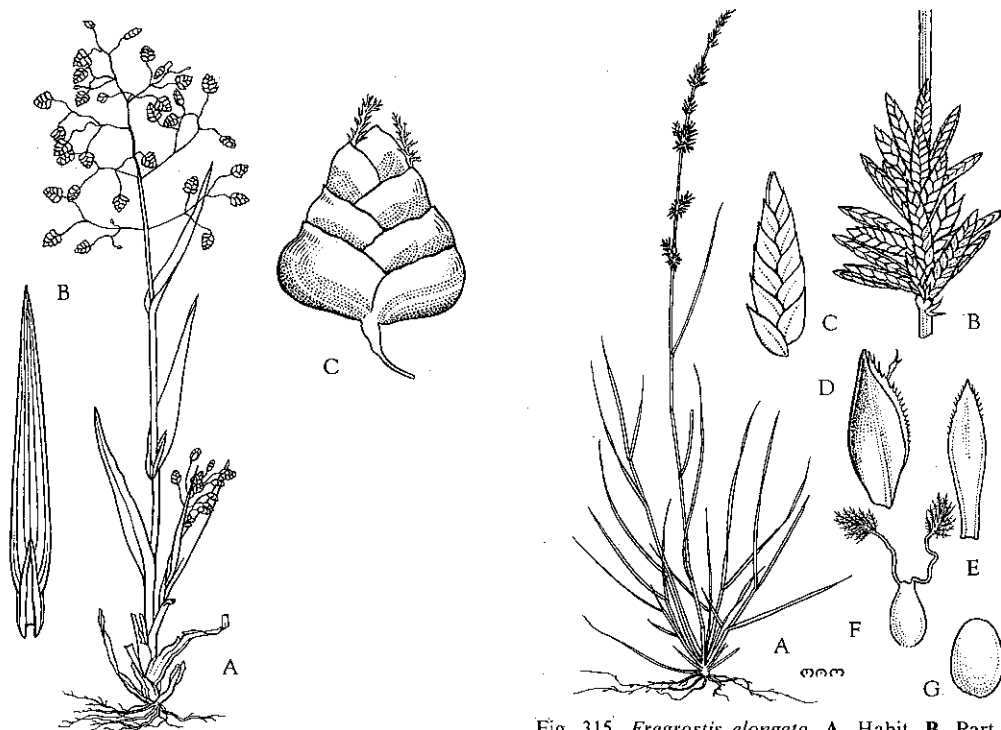


Fig. 314. *Briza minor*. A, Habit. B, Leaf showing ligule. C, Spikelet.

Fig. 315. *Eragrostis elongata*. A, Habit. B, Part of panicle with clustered spikelets. C, Spikelet without glumes. D, Floret. E, Palea. F, Ovary and styles. G, Caryopsis.

BROMUS L.

Tufted annuals, biennials or perennials, occasionally rhizomatous. Leaf sheaths hairy; blades linear often hairy; ligule membranous. Inflorescence a dense or loose panicle. Spikelets erect or pendulous, laterally or dorsally compressed, pedicellate; rachilla breaking between the lemmas. Florets several, bisexual, uppermost floret sometimes empty. Glumes persistent. Lemmas rounded or keeled on back, usually awned, lemma of uppermost floret often sterile; awn terminal or dorsal, straight, bent or recurved. Paleas 2-keeled, ciliate or scabrous. Stamens 3, rarely 2. Ovary with terminal, hairy appendage. *Ceratochloa* DC., *Serrafalcus* Parl. This genus is in need of a revision. Some authors divide it into 3 genera: *Bromus*, *Ceratochloa* and *Serrafalcus*, (see Gardner 1952; Black 1978). About 100 species from the temperate regions particularly the northern hemisphere. Some are useful pasture grasses, others are weeds. 1 native and 7 introduced in W.A. Reference: Smith, P.M. 1970. Notes Roy. Bot. Gard. Edinburgh 30: 361-375.

1. Lower glume 1-ribbed, upper glume 3-ribbed.
 2. Lemma 20-30 mm long with scabrous awn 40-60 mm long..... *B. diandrus
 2. Lemma 11-16 mm long with scabrous awn 12-25 mm long.
 3. Culm below panicle hairy with short hairs. Spikelets with cluster of empty lemmas..... *B. rubens
 3. Culm below panicle glabrous. Spikelets without cluster of empty lemmas..... *B. madritensis
1. Lower glume 3-5-ribbed, upper glume 5-7-ribbed.
 4. Awn terete or scarcely flattened at base, up to 7 mm long.
 5. Glumes prominently keeled on back, lower glume 9-12 mm long, upper 13-14 mm long..... *B. catharticus
 5. Glumes rounded on back, lower glume 4-7 mm long, upper glume 5-8 mm long..... *B. hordeaceus
 4. Awn flattened at base, more than 7 mm long.
 6. Panicle dense. Spikelets loosely pilose, pedicels of spikelet short... *B. alopecuroides
 6. Panicle loose. Spikelets scabridulous to hairy, distinctly pedicellate..... B. arenarius

***B. alopecuroides** Poir.

Erect annual to 0.4 m tall. Leaf sheaths and blades with scattered hairs, blades 40-120 x 1-3 mm. Panicle erect, 60-100 x 15-25 mm, dense, often interrupted near base, branches rigid, short, appressed. Spikelets dorsally compressed, narrowly ovate, ca 15 mm long, loosely hairy. Florets 8-15. Glumes loosely pilose, especially on ribs, acuminate, margins broad, translucent; lower glume 3-ribbed, 6-7 mm long; upper glume 5-ribbed, 9-10 mm long. Lemma narrowly oblong to ovate, 10-12 mm long, 7-ribbed, rounded on back, loosely hairy, margins incurved, membranous; apex membranous, acutely 2-lobed; awn 7-15 mm long, arising dorsally from 2.5-4 mm below sinus, erect, becoming twisted and spreading, flattened at base. Palea 9-10 mm long, distantly ciliate on 2 keels. *Serrafalcus alopecuroides* (Poir.) C. Gardner

Naturalized at Belmont. Elsewhere within the south west has been collected from Yerecoin, York and Kojonup. A native of the Mediterranean Region.

Flowers October-January.

B. arenarius Labill.

Sand Brome

Annual 0.3-0.4 m tall, with erect culms, usually hairy. Leaves softly hairy to nearly glabrous; blades 40-150 x 1-4 mm. Panicle loose, 80-150 mm long, branches divergent or horizontally spreading, pendulous. Spikelets narrowly ovate, laterally compressed, 20-30 mm long, narrowed towards apex. Florets 5-14. Glumes scabridulous, convex on back, acute; lower glume 6-8 mm long, 3-4-ribbed; upper glume 8-11 mm long, 5-7-ribbed. Lemma oblong to narrowly ovate in outline, 12-15 mm long, scabrous, occasionally hirsute, strongly 7-ribbed, margins membranous, apex 2-lobed and membranous; awn rigid, straight or slightly curved, scabrous, 10-17 mm long, dorsally inserted below sinus, flattened at base. Palea 8-11 mm long, keels distantly ciliate.

Flowers August-October.

Relatively common on the sandy soils of the Coastal Plain. Recorded from Carnarvon in the north to Bremer Bay in the south and east as far as Mundrabilla. Probably native to all mainland states except N.T. Also in New Zealand. Some authors regard this species as an introduction to Australia however the Type specimen was collected in southern Australia before 1805.

There is a large degree of variation between plants in the amount of hairiness on the lemma, glumes and palea, the point of attachment of the awn, and the length of the lemma. On these characters it is possible to separate three variants, 2 of which occur in the region.

***B. catharticus** M. Vahl.

Prairie Grass

Annual or biennial up to 1 m tall. Leaf blades 50-420 x 2-7 mm, glabrous or sparsely hairy, scabrous especially along margins and ribs. Panicle open, up to 200 mm long, or reduced to a raceme. Spikelets 20-35 mm long. Florets 6-8, closely imbricate. Glumes acuminate, prominently keeled, scabrous on keel; lower glume 9-12 mm long, 5-ribbed; upper glume 13-14 mm long, prominently 7-ribbed. Lemma 11-17 mm long including awn, glabrous, scarios especially along ribs, occasionally hairy, 11-ribbed, acuminate, closely imbricate, awnless or with awn or mucro 1-3 mm long. Palea 9-10 mm long, scabrous along keels. *Ceratochloa cathartica* (M. Vahl) Henr., *C. unioloides* DC.

Recorded from the Perth metropolitan area and from Harvey. Also collected from Muresk, Warren district and Denmark. Native to South America.

Flowers September-November with occasional flowers in January.

***B. diandrus** Roth

Great Brome

Annual, stems erect. Leaf sheaths and blades softly hairy, 50-320 x 3-6 mm; ligule membranous, 3-4 mm long, jagged. Panicle open and loose, branches spreading or pendulous, 60-120 mm long. Spikelets scabrous, 60-100 mm long including awns. Florets 6-10. Lower glume 15-20 mm long, with 1 prominent rib; upper glume 25-30 mm long, with 3 prominent ribs. Lemma 20-30 mm long, scabrous on back, especially along ribs, prominently 7-ribbed, margins thinly membranous, lobes acuminate; awn straight, scabrous, 40-60 mm long. Palea 12-14 mm long, with scattered hairs on back and along margins. *B. gussonii* Parl.

A naturalized plant common from Yanchep to the Perth metropolitan area, and also on Garden Island. Extends from Dirk Hartog Island to the Stirling Range. Native to the Mediterranean Region.

Flowers September-November.

***B. hordeaceus** L.

Soft Brome

Erect annual, 100-300 mm tall. Leaf sheaths and blades pilose. Panicle erect, 20-120 mm long, usually short and compact, when longer then interrupted near base with elongated branches. Spikelets 12-20 mm long, narrowed towards tip. Florets 8-10. Glumes ovate, loosely hairy, margins thinly membranous, obtuse; lower glume 4-6.5 mm long, 5-ribbed; upper glume 5-7.5 mm long, 7-ribbed. Lemma 8-11 mm long, rounded on back, obovoid, 9-ribbed, dorsal surface shortly and sparsely scabrous hairy in upper half, 2-lobed at membranous apex, margins translucent, ciliolate; awn 1-7 mm long, erect, slender, scabrous or scabridulous, arising from sinus or immediately below. Palea 6-7.5 mm, distantly ciliate. *Serrafalcus hordeaceus* (L.) Green & Godr.

Common in disturbed areas from Yanchep to Harvey. Widespread in the south west from Collie to Bremer Bay. Native throughout almost all of Europe.

Flowers August-October with occasional flowers in November.

A valued pasture species.

***B. madritensis** L.

Madrid Brome, Lesser Brome

Annual, 100-400 mm tall. Leaf sheaths and blades hairy or almost glabrous, rather scabrous, blades 30-240 x 1-3 mm. Panicle becoming purplish, 70-140 mm long, rather loose, branches short, erectly spreading. Spikelets 30-60 mm long including awns. Florets 7-12. Glumes hairy or glabrous; lower glume 7.5-9 mm long, 1-ribbed; upper glume 13-15 mm long, 3-ribbed. Lemma 14-18 mm long excluding awn, glabrous or hairy, faintly 5-7-ribbed, 2 marginal ribs close together, distantly spaced from midrib; awn scabrous, 14-25 mm. Palea membranous, sometimes golden brown, 7-14 mm long, keels with sparse hairs.

Within the region naturalized in the sandy soils of the metropolitan area, Rottnest Island and Yarloop. Naturalized at Donnybrook, Cape Naturaliste, Mt. Barker, Narrogin and Albany. Native to Europe, northern Africa and south west Asia.

Flowers October and November.

***B. rubens L.**

Red Brome

Annual with erect stems, 150-400 mm tall, hairy below inflorescence. Leaf sheaths and blades hairy. Panicle purplish, erect, compact, ovoid, 40-80 mm long. Spikelets 200-300 mm long. Florets 4-11. Glumes often red, with broad translucent margins; lower glume 6-9 mm long, 1-ribbed, scabrous; upper glume 9-12 mm long, 3-ribbed, scabrous. Lemma 12-16 mm long, scabrous or hairy, apex distinctly 2-lobed, lobes 4-5 mm long, acuminate, almost setaceous-pointed, the lower ones often red; awn 18-25 mm long, more or less spreading at maturity. Palea 8-11 mm long, keels sparsely ciliate.

Recorded from Garden Island. Widespread from Geraldton to Oldfield River. Native to the Mediterranean Region, south west Europe and south west Asia.

Flowers August-October.

This and the preceding species are very alike in general appearance, but *B. rubens* has a cluster of empty, awned lemmas at the end of each spikelet which is lacking in *B. madritensis*.

***CATAPODIUM Link**

Annuals or perennials; culms tufted or solitary. Leaf blades narrow, erect; ligule broad and translucent. Inflorescence a panicle or raceme. Spikelets shortly pedicellate, narrow, slightly laterally compressed; rachilla breaking between florets. Florets 6-10, bisexual. Glumes persistent, often scarious at apex, convex on back. Lemmas firm, scarious at apex, uppermost lemma or lemmas usually empty. Paleas 2-keeled, shortly 2-lobed. 2 species from Europe. 1 naturalized in W.A.

***C. rigidum (L.) C.E. Hubb. ex Dony**

Rigid Fescue

Erect glabrous annual, 150-400 mm tall; culms glabrous, slender. Leaf blades inrolled or flat, finely ribbed, scabrous, 30-250 x 0.5-2 mm, finely pointed; ligule membranous, 3 mm long. Panicle 1-sided, loose to dense, 50-120 mm long, branched in lower part. Spikelets appressed to 1 side of axis, 4-8 mm long. Glumes glabrous, scabrous on ribs; lower glume 1-2 mm long, 1-3-ribbed; upper glume 1.5-2.25 mm long, 3-ribbed. Lemma exerted from glumes, 2-3 mm long, obtuse, rounded on back, faintly 5-ribbed, almost glabrous, membranous on margins, minutely denticulate at apex. Palea almost equal in length to lemma, 2-3 mm long, keels scabrous. *Puccinellia stricta* (Hook. f.) Blom., *Glyceria stricta* Hook. f., *Scleropoa rigida* (L.) Griseb.

Recorded as naturalized at Yanchep and in the Perth metropolitan area. Collected from Busselton, Tambellup and Bremer Bay. Native to the Mediterranean Region and south west Asia.

Flowers October and November.

***CENCHRUS L.**

Annuals or occasionally biennials or perennials, with solid culms, nodes glabrous. Leaf sheaths compressed; blades flat, or rigidly convolute; ligule a ciliate rim. Inflorescence a simple terminal spike or raceme; spikelets solitary or few together, surrounded by a spiny burr composed of numerous coalescing bristles termed an "involucre"; bristles antrorsely or retrorsely scabrous, connate only at base or for some distance above base to form a cup-like receptacle. Spikelets dorsally compressed, sessile, deciduous with the involucre. Florets 2, the lower floret male or empty and reduced to the lemma, the upper floret bisexual. Glumes translucent, subequal or with lower glume missing, acute or obtuse. Stamens 3, free or connate near base. Caryopsis ellipsoid to obloid or obovoid, dorsally compressed. About 30 species mainly in warm dry regions of America and Africa, a few in India, south west Asia, Polynesia and Australia. 1 native and 6 introduced in W.A. Several species are common weeds and may become undesirable pests on account of the barbed spines of their involucre. Reference: Weston, A.S. 1974. Nuytsia 1,4: 375-380.

1. Involucre with a ring of slender bristles at the base; spines of involucre pointing upwards or outwards..... ***C. echinatus**
1. Involucre without a ring of bristles at base, lower spines often missing or reduced to tubercles; spines often attached obliquely, spreading in all directions..... ***C. incertus**

***C. echinatus L.**

Mossman River Grass, Burrgrass

Annual with ascending culms from bent or decumbent base, sometimes rooting at lower nodes; culms 0.15-0.9 m tall. Leaf sheaths keeled, glabrous or pilose along margins; blades linear to narrowly ovate, 50-250 x 3-12 mm, flat, usually rather stiff, glabrous to hairy, glabrous on lower surface except for involute scabrous pungent apex. Panicle spike-like, loose to rather dense, 20-100 x 8-18 mm, becoming pale brown or tinged with green or purple; rachis angular, flexuose, scabrous along angles; involucre subsessile or minutely stalked, often more or less truncate at base, more or less globular, 4-10 x 3.5-6 mm, very hard and rigid, bristles retrorsely scabrous; basal bristles slender, erect; intermediate bristles more rigid, spine-like and spreading; inner bristles connate for half their length, shortly hairy, ciliolate. Spikelets in clusters of 2-3(-6) within the involucre, sessile, 4.5-7 mm long, ovate, acuminate. Glumes thinly membranous, ovate, acute or obtuse; lower glume 1.5-4 mm long, 1-ribbed; upper glume 3.5-7 mm long, 3-5-ribbed, puberulous. Lower floret empty or rarely male; lemma similar to upper glume, 3-6.5 mm long, 5-ribbed; palea linear-ovate, obtuse about as long as lemma, puberulous, 2-keeled, keels scabrous. Upper floret ovate, acuminate; lemma, when flattened, broadly ovate, usually 4.5-7 mm long, thinly membranous, 5-ribbed; palea as long as lemma.

Only collected at Murdoch and Belmont but probably more widespread, especially within the Perth metropolitan area. Also occurs near Wagin and in scattered localities from Three Springs north to the Kimberley Region. A troublesome weed. Native to the warmer regions of the southern United States of America, central and South America.

Flowers March-August with occasional flowers in January.

***C. incertus M. Curtis**

Spiny Burrgrass

Annual or occasionally biennial, forming spreading clumps, much-branched from base; culms decumbent or erect, branching, 0.05-0.8 m tall, glabrous. Leaf sheaths glabrous or sparsely pilose; blades 20-180 x 2-6 mm, flat or folded, glabrous or finely scabrous, especially on upper surface and margins, gradually tapering to a point. Panicle spike-like, not dense, 20-85 x 8-20 mm, glabrous or scabrous; burrs ovoid to globular, hairy; spines 8-40, retrorsely barbed, variable in shape, from long and slender to short, broad and more or less deltate, 2-5 mm long, some of the intermediate spines attached very obliquely to body of burrs, lower spines sometimes reduced to tubercles or callosities. Spikelets sessile, 2-4 in each burr, 3.5-6 mm long, not usually conspicuously protruding beyond body of burr. Lower glume 1-6 mm long, 1-ribbed; upper glume 2.5-5 mm long, 5-7-ribbed. Lower floret empty; lemma 4-7-ribbed; palea 3.5-6 mm long, scabrous. Upper floret 3-6 mm long; lemma 3-ribbed.

Collected from Perth metropolitan area, Bunbury and Burekup. Native to tropical and warm temperate America.

Flowering period unknown.

***CHLORIS Sw.**

Tufted or stoloniferous perennials or annuals, culms usually branched, up to 1.2 m tall. Leaf sheaths glabrous, striate; blades flat or folded; ligule a ciliate membranous rim. Inflorescence a terminal umbel or raceme of erect or spreading spikes; rachis slender, with crowded spikelets in 2 rows. Spikelets laterally compressed, sessile; rachilla breaking above glumes. Florets 2-8, lowest floret bisexual, the upper florets male or empty. Glumes keeled. Lemmas with central rib produced into awn. Caryopsis narrowly ovate in outline, 3-sided. About 40 species from warm and temperate areas. 5 native and 3 introduced in W.A. Reference: Lazarides, M. 1972. Aust. J. Bot., Suppl. Ser. 5: 1-52.

1. Lemma of lowest floret ciliate or sparsely hairy on lower part of margins..... ***C. gayana**
 1. Lemma of lowest floret glabrous on lower part of margins..... ***C. truncata**

***C. gayana Kunth**

Rhodes Grass

Perennial, 0.45-1.2 m tall. Leaf sheaths loose, bearded on upper margins; blades 60-280 x 3-6 mm, acuminate, scabrous on upper surface. Spikes 8-17, erect, loosely appressed, 70-100 mm long. Florets

3 or 4, loosely appressed, lowest floret bisexual, second lowest floret male; other florets empty and reduced. Glumes persistent, membranous or translucent, usually scabrous; upper glume 2.5-3.5 mm long, 3-ribbed, cuspidate or aristate; lower glume 1.5-2 mm long, awnless. Lowest lemma ca 3 mm long, cartilaginous, smooth or obscurely grooved between margin and midrib, sparsely hairy on submarginal rib in lower part, ciliate above with stiff white hairs up to 1 mm long, otherwise glabrous, awned; awn 2-5 mm long, more or less terminal; second lemma similar to lowest but considerably smaller; third and fourth lemmas unawned. Palea 2-3 mm long, scarious, acute.

Occurs on the Coastal Plain between Bullsbrook and Bunbury. Extends south to Albany and Jerramungup. Also occurs in the Kimberley Region near the Ord River. Native to tropical Africa.

Flowers January-March.

***C. truncata** R. Br.

Windmill Grass

Perennial, 160-450 mm tall. Leaf sheaths glabrous and smooth; blades 50-140 x 1-2.5 mm, scabrous or scabridulous; ligule 0.5 mm long. Racemes 6-9, spike-like, hairy at base, spreading or divaricate, 90-130 mm long; pedicels ca 1 mm long. Florets 2, rarely 3, often black, lower bisexual, upper floret(s) empty. Glumes membranous, acuminate, cuspidate, scabrous on keel; lower glume 1-2 mm long; upper glume 3-4 mm long. Lower lemma 3-4 mm long, cartilaginous, inflated, hairy on upper margins, otherwise glabrous or scabrous, with 2 minute apical lobes, awn 11-14.5 mm long and more or less terminal; upper lemma obtriangular, 1-2 mm long, inflated, truncate, usually appressed to lower lemma, notched, awned, awn 6-9 mm long and filiform. Palea equal to lemma, obtuse.

Not recorded for the region but widespread in the south west and is almost certain to occur near Perth. Occurs from Coorow to Laverton and south to Mt. Ragged, and is likely to occur in the region. Native to eastern Australia. Occurs in S.A., Vic., N.S.W. and Qld.

Flowers March-July with occasional flowers in December.

***CORTADERIA** Stapf

Tussocky, dioecious perennials. Leaves tufted at base of culms; blades long and narrow, tapering into slender point, harshly scabrous on margins. Inflorescence a silvery, sericeous panicle in the female plant and glabrous panicle in the male plant, usually large and plume-like. Rachilla disarticulating near base of internodes, lower shorter part glabrous, upper longer part bearded with long sericeous hairs and forming stipe to floret. Florets 2 or 3. Glumes chartaceous. Lemmas glabrous in male, long-sericeous in female. 15 South American species. 1 naturalized in W.A.

***C. selloana** (Schultes & J.H. Schultes) Asch. & P. Graebner

Pampas Grass

Culms erect, 2-4 m tall. Leaf blades crowded at base of culms; blades about 1 m x 5-7 mm, strongly striate, glabrous or minutely hairy, tapering to a fine point, margins knife-sharp. Panicle feathery, silvery-white to pink, 0.3-1 m long, female panicle sericeous, male panicle glabrous. Spikelets solitary; female sericeous; male glabrous. Glumes longer than lemma, chartaceous, white, subulate, 10-14 mm long, 1-ribbed, slender, glabrous. Lemmas 1-ribbed, soft, tapering into a long slender awn. *C. argentea* Stapf

Mainly cultivated in gardens in the region and south west of W.A. Naturalized in a few places in the Perth metropolitan area and at Albany and Bunbury. Native of South America.

Flowers recorded for June and September.

***CRYPISIS** Aiton

Annuals with prostrate culms becoming erect. Leaf blades flat. Inflorescence a spike-like panicle of shortly pedicellate spikelets, usually closely subtended by the enlarged sheaths of the uppermost leaves. Spikelets compressed laterally. Floret 1, bisexual; rachilla breaking above glumes. Glumes persistent, membranous. Palea 2-keeled. Stamens 2 or 3. Caryopsis oblong or elliptic in outline, laterally compressed. About 12 species from the Mediterranean Region, northern China and tropical Africa. 1 naturalized in W.A.

***C. schoenoides (L.) Lam.**

Annual, much-branched at base; culms at first prostrate, finally ascending, less than 300 mm tall. Leaf sheaths glabrous, upper inflated; blades narrowly ovate, 20-100 x 2-4 mm, glaucous, glabrous or sparsely hairy on both surfaces. Panicle longer than broad, ellipsoid or ovoid, 10-40 x 8-10 mm, enclosed at base by 2 inflated leaf sheaths. Spikelets 2-3.5 mm, with short pedicels. Glumes narrowly ovate, nearly equal, laterally compressed, ciliate to serrulate on keel, acute. Lemma longer than glumes, ovate, acute. Palea 2-ribbed, ovate, truncate.

Occurs on the Coastal Plain from Coolup south to Capel. Native to Europe, Africa and south west and tropical Asia.

Flowers March-May.

CYMBOPOGON Sprengel

Densely tufted perennials, usually aromatic; culms simple or branched. Inflorescence of 2 or 3 terminal racemes supported by a spathe, often grouped into panicles; rachis many-noded, disarticulating. Spikelets in pairs, 1 sessile, the other pedicellate. Florets 2, lower floret reduced to an empty lemma in both sessile and pedicellate spikelets, upper floret bisexual in sessile spikelets, male or rarely empty in the pedicellate spikelets. Sessile spikelets dorsally or rarely laterally compressed, usually awned; lower glume flat or slightly depressed or narrowly grooved on the back, 2-keeled, with sharply inflexed margins in upper part; or narrowly grooved on back; lemmas ciliate or ciliolate, the lower lemma entire or 2-lobed and translucent; paleas absent. Pedicellate spikelets never grooved on back; lower lemma 2-ribbed. Caryopsis obloid, subterete to plano-convex. About 60 species in the tropical and subtropical regions of the Old World. 4 native species in W.A. Reference: Blake, S.T. 1974. Contr. Queensland Herb. 17: 1-70.

C. obtectus S.T. Blake

Silkyheads

Tufted perennial; culm 0.3-1 m tall. Leaf sheaths terete, glabrous, scabrous, or with scattered hairs; blades flat or folded when dry, scabridulous or scabrous, margins scabrous; ligule oblong, 3-5 mm long, membranous, glabrous. Panicle usually elongated, dense and almost spike-like, 50-150 mm long, branches short and erect, nodes bearded. Spathes leaf-like, green, narrowly ovate, 20-25 mm long, deflexed at maturity, 15-25 mm long; pedicels 1-2 mm long; rachis and pedicels densely villous all over with white sericeous hairs which conceal the spikelets. Sessile spikelet 5-6 mm long, broadly ovate or oblong, obtuse or acute; glumes chartaceous; lower glume 4 or 5-ribbed, entire or 2-lobed, 2-keeled, keels and margins glabrous; upper glume 5-7-ribbed, keeled towards apex, keel and margins scabridulous, acute; lower lemma shorter than glumes, oblong-ovate acute, translucent, 2 or 3-ribbed, ciliate; upper lemma linear or narrowly ovate, 3-4 mm long, lobed above middle, lobes translucent, acute, shortly ciliate, awn up to 8 mm long, glabrous or scabridulous. Pedicellate spikelet 3-4 mm long, narrowly ovate; lower glume 7-9-ribbed; upper glume 3-4 mm long or absent; lemma oblong or ovate, 2 mm long, translucent margins ciliate or absent. *C. bombycinus* auct. non (R. Br.) Domin

Recorded in the Darling Range from the Chittering Valley to Darlington. Extends north to the Kimberley Region and inland to the S.A. and N.T. borders. Native to all states except Tas.

Flowers November-January.

***CYNODON Rich.**

Stoloniferous or rhizomatous perennials. Leaf sheaths chartaceous with scarious margins; blades flat, strongly ribbed, margins scabrous; ligule a membranous or ciliate rim. Inflorescence a terminal umbel of 2-6 spreading, sessile spikes, imbricate on 1 side of rachis, alternately in 2 rows; rachis 3-sided. Spikelets laterally compressed. Florets 1, rarely 2, bisexual. Glumes persistent. Lemma(s) membranous, ciliate on keel, margins scarious, awnless. Palea(s) with distinct keels. Caryopsis obloid to subterete, laterally compressed, glabrous. About 10 species mostly from Africa. 1 naturalized in W.A.

***C. dactylon (L.) Pers.**

Couch

Stoloniferous or rhizomatous perennial; culms prostrate or ascending to 300 mm long. Leaf sheaths at first tight, becoming loose; blades 10-70 x 1-4 mm, flat or folded, glabrous or scabridulous, acute to pungent; ligule ca 0.25 mm long. Spikes 4-7, digitate, spreading, often purple, mostly straight, 20-

55 mm long; rachis slender. Glumes 1.25-1.5 mm long, narrowly ovate; lower glume 1-ribbed; upper glume 1-3-ribbed, acute or acuminate, with a scabrous thickened keel. Lemma obliquely ovate, 1.5-2.5 mm long, membranous, 3-ribbed, keeled, membranous, glabrous or sometimes scabridulous towards apex, obtuse, ciliate on keel. Palea narrow, 1.5-2.5 mm long, glabrous, scabrous on keels.

Cosmopolitan and widespread in Australia. Commonly cultivated as a lawn grass, readily naturalized in temperate regions. Naturalized throughout the region. Common in the south west, Pilbara and Kimberley regions of W.A. Native to Europe but now widely dispersed.

Flowers October and November.

*CYNOSURUS L.

Annuals or perennials. Leaf blades flat, often flaccid; ligule translucent. Inflorescence usually a dense spike-like panicle. Fertile spikelets shortly pedicellate or sessile, sterile spikelets lower, usually surrounding fertile spikelets; rachilla disarticulating. Fertile spikelets with 1-6 bisexual florets; glumes subulate to narrowly ovate; lemmas membranous, rounded on back, uppermost lemmas sometimes empty; paleas 2-keeled, 2-lobed. Sterile spikelets: glumes similar to those of fertile spikelets with a number of bracts arranged on tough, elongated rachilla; lower bracts narrow and spreading, upper bracts broader, all or lower bracts passing into bristle-like awns. 3 or 4 species native to Europe, western Asia and northern Africa. 2 introduced in W.A.

**C. echinatus* L.

Rough Dogstail

Erect glabrous annual. Leaf sheaths loose, striate; blades flat, 100-400 x 4-12 mm, glabrous, rough, or scabrous along ribs; ligule 8-12 mm long. Panicle ovate or oblong, 15-80 mm long, dense, very bristly. Fertile spikelets with 2 or 3 bisexual, awned florets, surrounded by sterile spikelets. Sterile spikelets consisting of numerous, rigid, narrowly ovate, awned glumes and lemmas, arranged in 2 opposite rows. Glumes membranous, 10.5-12.5 mm long, 1-ribbed, rib continuing into mucro or short awn. Lemma of bisexual floret narrowly ovate, 5-7 mm long, 5-ribbed, with awn 10-18 mm long, hairy near apex, 2-lobed.

Naturalized at Harvey, and at Mt. Barker, Denmark, Manjimup and Cape Riche. Native to southern Europe and western Asia.

Flowers November and December.

*DACTYLIS L.

Tufted perennials with compressed culms. Leaf blades flat; ligule long, scarious. Inflorescence a short, crowded panicle. Spikelets compressed laterally, densely crowded in thick, 1-sided clusters; rachilla disarticulating between the lemmas. Florets 3-7, bisexual. Glumes persistent, rigid, keeled. Lemmas rigid, keeled, the keel ciliolate and produced into mucro or short awn; upper lemma sometimes empty. Paleas 2-keeled. Caryopsis compressed dorsally, concave or broadly sulcate on face. 5 species from Europe, northern Africa and Asia. 1 naturalized in W.A.

**D. glomerata* L.

Cocksfoot

Densely tufted perennial to 1.4 m tall; culms erect or spreading. Leaf sheaths rough, glabrous or shortly hairy; blades 200-500 x 3-6 mm, at first folded, flat, with boat shaped apex; ligule membranous, 2-10 mm long, apex jagged. Panicle short, erect, contracted, oblong to ovate, spreading at anthesis; rachis scabrous. Spikelets 5-7 mm long, nearly sessile in dense, 1-sided clusters at the ends of branches. Florets 2-5, compressed. Glumes 1-3-ribbed, membranous, with ciliolate keel; lower glume 5.5-6 mm; upper glume 4.5-5 mm. Lemma 5.5-6.5 mm long, 5-ribbed, closely overlapping, laterally compressed, firm except for translucent margins; awn 1-1.5 mm long. Palea shorter than lemma, keels minutely hairy or rough.

Recorded from Gingin. Naturalized in the south west extending south to Albany and east to Muresk. Native to Europe, northern Africa and Asia.

Flowers January-March.

***DACTYLOCTENIUM Willd.**

Annuals or perennials. Leaf blades flat; ligule membranous, short. Inflorescence an umbel of 2-6 erect or spreading spikes; rachis flattened, produced beyond spikelets as a short but distinct spine. Spikelets solitary, sessile, laterally compressed, dense, closely overlapping; rachilla breaking above glumes. Florets 2-4, bisexual. Glumes strongly keeled: lower glume persistent, acute; upper glume deciduous, mucronate or awned. Upper lemma empty. Paleas 2-keeled. Caryopsis subglobular, slightly laterally compressed, not grooved or hollowed, rugose or punctate. About 10 species from warm regions of Africa and India. 1 native and 2 naturalized in W.A.

***D. australe Steudel**

Sweet Smother Grass

Stoloniferous perennial up to 0.5 m tall. Leaf sheaths loose, markedly striate, margins translucent, with few long hairs; blades 30-120 x 1-4 mm, with few scattered hairs, midrib prominent, margins undulate. Spikes 2-5, digitate, 20-40 mm long. Spikelets 2.5-4 mm long, sessile. Glumes unequal, 1-ribbed, strongly keeled, shorter than florets; lower glume 1-15 mm long, thin, ovate; upper glume 2-3 mm, firm, obtuse, mucronate to shortly awned. Lemma keeled, 3-ribbed, 2.5-4 mm long, ovate, shortly awned, scabrous along awn and midrib. Palea 1.75-3.5 mm long.

Within the region sometimes naturalized near lawns, but probably more widespread. Native of South Africa.

Flowers March.

DANTHONIA DC.

Tufted perennials. Leaf blades inrolled or flat, usually narrow; ligule a ciliate rim. Inflorescence a compact or loose panicle, rarely reduced to a raceme of spikelets; rachilla disarticulating between florets. Florets 3-10, all bisexual or uppermost male or empty. Glumes narrowly ovate, translucent, scarious, keeled, acute or acuminate. Lemmas rounded on back, dorsal surface wholly or partly sericeous, 2-lobed, lobes acute or acuminate, frequently produced into an awn-like point, awned from sinus; awn twisted in lower part, bent above. Paleas 2-keeled, ciliate on keels, entire or shortly 2-lobed. Caryopsis obloid, obovoid or ellipsoid.

Zotov (1963) and Blake (1972) consider the genus *Danthonia* to occur only in the northern hemisphere. Zotov described 4 new genera for New Zealand and Blake reinstated 2 for Australia. The only W.A. species listed by Zotov are placed in the genus *Notodanthonia*. The 2 genera reinstated by Blake do not occur in the region. The necessary combinations were made by Veldkamp (1980), but because some workers do not accept *Notodanthonia*, this Flora treatment will follow recent taxonomic treatments and regard *Danthonia* as a genus of about 150 species with 6 species native in W.A. A large number of the Australian species are of importance as natural pasture grasses. References: Blake, S.T. 1972. Contr. Queens. Herb. No. 14; Jacobs, S.W.L. 1982. Taxon 31: 737-743; Veldkamp, J.F. 1980. Taxon 29: 293-298; Vickery, J.W. 1956. Contr. New South Wales Natl. Herb. 2: 249-325; Zotov 1963. New Zealand Journ. Bot. 1: 7-136.

(When using this key and descriptions the lemma measurement is taken from the bottom of the callus to the sinus.)

1. Ring of hairs absent at base of lemma, present at sinus of lobes; lemma sericeous over remaining surface **D. occidentalis**
1. Ring of hairs present at base and at sinus of lobes of lemma; remaining surface glabrous.
 2. Upper ring of hairs in 4 discontinuous tufts.
 3. Panicle 40-50 mm long. Glumes longer than spikelets. Lobes of lemma with setae much longer than expanded part **D. pilosa**
 3. Panicle 50-150 mm long. Glumes shorter than spikelets. Lobes of lemma and setae of equal length **D. racemosa**
 2. Upper ring of hairs in many tufts forming a continuous row.
 4. Lemma (4-)8-11 mm long, lobes longer than upper ring of hairs **D. caespitosa**
 4. Lemma up to 5 mm long, lobes equal to or less than length of upper ring of hairs.

5. Glumes 15-25 mm long. Expanded part of lemma lobes just exceeding top ring of hairs **D. acerosa**
 5. Glumes 8-14 mm long. Expanded part of lemma lobes equal in length or shorter than ring of hairs..... **D. setacea**

D. acerosa Vick.

Erect, tufted perennial to 0.6 m tall. Leaf sheaths finely striate, scabridulous between ribs otherwise glabrous; blades inrolled, 50-150 x 0.5-2 mm, densely hirsute with tubercle-based hairs, sometimes almost glabrous, deeply ribbed on lower surface. Panicles much exserted, shining, more or less narrowly ovate, loose; rachis and pedicels slender, scabrous to pilose. Florets 3-6, shorter than glumes, awns shortly exserted. Glumes usually purplish, narrowly ovate, subequal, 15-25 mm long, shining, narrow, thin, 3-5-ribbed, sometimes shortly scabridulous especially on ribs, tapering into long, acuminate points. Lemma linear with 2 rows of hairs, glabrous between, lower row nearly reaching upper row, upper hairs tufted and ca 4 mm long; body of lemma 2.5-3.5 mm long; lateral lobes 10-12 mm long (including awns), narrow and membranous at base, tapering into capillary awns; central awn 13-18 mm, brown and twisted at base. Palea narrowly oblong to linear, slightly exceeding sinus, 2.75-3 mm long, glabrous, minutely ciliolate on keels, obtuse, minutely 2-lobed.

Recorded from near Pinjarra and in the Perth metropolitan area. Also recorded from scattered localities elsewhere in the south west.

Flowers October-December.

D. caespitosa Gaudich.

Ringed Wallaby Grass, Common Wallaby Grass

Erect, tufted perennial, 0.2-0.9 m tall. Leaf sheaths prominently ribbed, glabrous or rather densely hairy with tubercle-based hairs to 2 mm long; blades flat or loosely involute, 100-350 x 1-4 mm, strongly ribbed, glabrous or hairy. Panicle shortly to greatly exserted, with 10-30 spikelets. Spikelets often pale, usually shorter than glumes. Florets 4-9. Glumes subequal, 14-24 mm long, faintly to strongly 5-7-ribbed, margins translucent and often purple tinged. Lemma pale, (4-)8-11 mm long, narrowly ovate with 2 horizontal rows of hairs on back and glabrous between; lateral lobes 8-11 mm long, with narrow membranous margins, tapering into awns; central awn 15-25 mm long, strongly exserted from glumes. Palea narrowly ovate, usually exceeding sinus, 4-5 mm long, glabrous on back, 2-lobed. *Notodanthonia caespitosa* (Gaudich.) Zotov

Recorded from a few localities in the Perth metropolitan area. Widespread throughout the south west and goldfields area. Widespread throughout S.A., Vic. and N.S.W.

Flowers October and November.

The smaller flowered variant is very similar to *D. acerosa*, but *D. caespitosa* is prominently 3-ribbed and has wider lateral lobes.

D. occidentalis Vick.

Erect, tufted perennial, 0.25-0.6 m tall; culms slightly striate, glabrous except for hairs just below panicle. Leaf sheaths glabrous; blades inrolled, 50-300 x 0.5-2 mm, almost glabrous to densely hirsute. Panicle greenish or purple, much exserted, dense, narrowly ovate; rachis and pedicels pilose, often with a tuft of hairs below each spikelet. Florets 3 or 4, loose, about half as long as glumes except for exserted awns. Glumes subequal, 16-22 mm long, very narrow, 5-7-ribbed at base, margins narrow and membranous, apex acuminate and produced into awn-like points. Lemma linear, body 4-4.5 mm long (including callus), fairly uniformly pilose on back with short hairs 0.5 mm long, with band of long hairs 3-4 mm long below sinus; lateral lobes narrow, 7-10 mm long, flat and membranous at base, apex narrowed into fine setae; central awn golden and twisted at base, 12-17 mm long; callus 1.5 mm long, pilose. Palea narrowly ovate, exceeding sinus, truncate or 2-lobed, minutely ciliolate in upper half.

Widespread from Wanneroo to Pinjarra and Bunbury. Also recorded from Cape Naturaliste. Commonly found growing in sandy soil.

Flowers September-November.

D. pilosa R. Br.

Smoothflower Wallaby Grass

Erect, tufted perennial, up to 0.5 m tall; culms finely striate. Leaf sheaths pilose with tubercle-based hairs; blades flat, 50-150 x 0.5-1 mm, loosely inrolled, pilose. Panicle exserted, 40-50 mm long, spikelets crowded and overlapping, branches scabrous. Florets 7-9, usually straw-coloured, rarely exceeding glumes except for long exserted central awns. Glumes subequal, 9-13 mm long, membranous, narrow, scabridulous on ribs, margins narrowing into acuminate points; lower glume 5-7-ribbed; upper glume 5-ribbed. Lemma body 4-6 mm long (including callus), firm, shining, faintly 9-ribbed, glabrous except for row of hairs above callus and 2 marginal and 2 dorsal tufts of hairs about 1.5 mm below sinus; lateral lobes narrow, firm, membranous, margins narrow, inconspicuous, tapering evenly into setae 6-8 mm long; central awn much larger than lateral setae, twisted and golden brown below joint; callus ca 1 mm long, hairy. Palea only shortly exceeding sinus, minutely 2-lobed at apex, minutely ciliate on keels.

Recorded from Jarrahdale and Byford. Also collected from Pemberton, Nannup and Bremer Bay. Native also to S.A., Vic., Tas. and N.S.W.

Flowers November and December.

D. racemosa R. Br.

Wallaby Grass

Variable, erect, tufted perennial, 0.2-0.6 m tall; culms glabrous, faintly striate. Leaf sheaths striate, usually glabrous or with scattered tubercle-based hairs; blades narrow, usually inrolled, 50-150 x 1-2 mm, more or less loosely pilose with tubercle-based hairs. Panicle greatly exserted, 50-150 mm long, few-many-flowered; rachis and pedicels scabrous. Spikelets pale green to straw-coloured. Florets 6-10, usually exceeding glumes. Glumes subequal, narrowly ovate, 7-16 mm long, narrowly divergent, 5-7-ribbed, scabridulous on ribs, margins membranous. Lemma linear to obovate, pilose with 1-2 mm long hairs at base and 2 dorsal and 2 marginal tufts of hairs placed below level of sinus; body of lemma pale, 4.5-5.5 mm long (including callus), smooth; lateral lobes often broad at base, with membranous margins narrowing abruptly into fine setae, ca 7 mm long; central awn much exserted, ca 14 mm long, brown and twisted in lower part; callus prominent, 1.5-2 mm long, sides hairy at base, glabrous above. Palea 4-5 mm long, much exceeding sinus, obtuse, minutely 2-lobed. *D. penicillata* (Labill.) F. Muell.

Recorded from Darlington and Harvey. Also from Collie. Also in S.A., Vic., Tas., N.S.W. and Qld.

Flowers November and December.

D. setacea R. Br.

Smallflower Wallaby Grass

Erect, densely tufted perennial, 0.15-0.6 m tall; culms glabrous, hairy immediately below panicle. Leaf sheaths tight, glabrous or hirsute with tubercle-based hairs, sometimes minutely scabridulous on sides of ribs; blades mostly inrolled, filiform, 50-200 x 1-2 mm, usually glabrous or often hirsute, ribbed. Panicle much exserted, linear, 30-90 mm long, branches and pedicels short, scabrous. Spikelets pale or purplish. Florets 4-10, $\frac{1}{2}$ to $\frac{2}{3}$ as long as glumes. Glumes linear, 8-14 mm long, subequal, obscurely 3-5-ribbed, membranous, acute to acuminate, margins narrow and glabrous or scabridulous towards tip. Lemma pale, narrowly ovate, thinly indurate, obscurely striate; body 2-3 mm long, glabrous except for 2 rows of hair tufts; lateral lobes 6-10 mm long, narrow, thin, tapering within 2-3 mm into setae, central awn 9-16 mm long, twisted, light yellowish brown. Palea shortly exceeding sinus, obovate, ciliate on keels.

Collected from the Perth metropolitan area and Dardanup. Widespread throughout the south west from Geraldton in the north to Esperance in the east, extending further eastwards to the state border. Occurs in S.A., Vic., Tas. and N.S.W.

Flowers October-December.

Only var. *setacea* occurs in the region. Var. *brevisetata* Vick. occurs outside the region near Collie and Wagin and differs in having lateral setae 1-1.5 mm long and smaller spikelets.

DEYEUXIA Clarion ex P. Beauv.

Tufted perennials. Leaf blades flat or convolute; ligule white, membranous, entire or jagged. Inflorescence a terminal dense panicle, usually cylindrical and spike-like. Spikelets pedicellate; rachilla disarticulating above the glumes and below the lemma, not or only shortly produced; pedicels short.

Floret 1, bisexual. Glumes membranous, acuminate, awnless. Lemma chartaceous to strongly indurate, usually densely scabridulous, entire or lobed, with a stout dorsal awn; callus small, glabrous or hairy. Palea 2-ribbed and 2-keeled. About 200 species from temperate regions. 3 native in W.A.

D. quadriseta Benth.

Reed Bentgrass

Tufted perennial, 0.15-1 m tall, with slender or robust culms. Leaf sheaths striate; blades linear, flat or loosely involute, 2.5-7 mm broad; ligule membranous, lacinate, 4-7 mm long. Panicle dense, narrowly cylindrical, 50-150 mm long; rachis scabridulous; pedicels scabrous, 1-3 mm long. Spikelets 3-6 mm long, strongly laterally compressed. Glumes unequal, narrowly ovate, 1-ribbed, keeled, scabrous on keels, margins membranous, acute or acuminate; lower glume 4-5 mm long; upper glume narrowly ovate, 3-4 mm long. Lemma ca 3 mm long, scabridulous, 4-ribbed, 2 or 4-lobed at apex; dorsal awn almost basal, 5-6 mm long, bent and twisted below; callus shortly hairy. Palea membranous, ca 2.5 mm long, obscurely 2-lobed.

Collected from several localities in the Perth metropolitan area. Also collected from the south west, the most eastern location being the Porongurup Range. Occurs in S.A., Vic., Tas. and N.S.W.

Flowers October-December.

DICHELACHNE Endl.

Tufted perennials up to 1.3 m tall. Leaf-blades flat or convolute, usually scabrous, often hairy; ligule membranous, translucent, 1 mm long. Inflorescence a dense spike-like or loose to open panicle. Spikelets solitary, pedicellate, laterally compressed; rachilla disarticulating above glumes. Florets 1 or rarely 3, bisexual. Glumes membranous, keeled. Lemma(s) rounded on back or keeled, apex entire or 2-lobed, awn arising from below apex of lemma or from sinus of lobes, straight or flexuose and spirally twisted; callus short, blunt, hairy. Palea(s) narrow, translucent. Stamens 1-3. Caryopsis narrow, pale, shining, subterete. A genus of 3 species indigenous to Australia and New Zealand. 2 native in W.A. Veldkamp, J.F. 1974. *Blumea* 22: 5-12.

D. crinata (L. f.) J.D. Hook.

Longhair Plumegrass

Culms erect, 0.3-0.5 m tall. Leaves flat, 150-350 x 2-5 mm, glabrous or hairy; ligule truncate, ciliate, occasionally hairy on outer surface. Panicle very dense and spike-like, 100-200 mm long. Spikelets dense, almost concealed by numerous awns, giving the panicle a hairy appearance. Glumes very narrow, translucent, 6-12 mm long, acuminate, keel scabrous. Lemma 4-5 mm long, almost glabrous, faintly 5-ribbed, translucent, apex 2-lobed, lobes about 1.5 mm long; awn dorsal from sinus between lobes, 20-40 mm long, very slender, sometimes flexuose, usually twisted in lower half, scabrous. Palea membranous, 3.5-4 mm long.

Collected from the Perth metropolitan area and Pinjarra. Also found near Augusta and Manjimup. Occurs in New Guinea and all Australian states except N.T.

Flowers September-November.

***DIGITARIA** Heister ex Fabr.

Annuals or perennials. Leaf sheaths often loose; blades occasionally infolded; ligule membranous. Inflorescence of 2 to several, more or less digitately arranged, spike-like racemes; rachis triquetrous. Spikelets pedicellate, usually in clusters of 2 or 3 along 1 side of rachis. Florets 2; lower floret reduced to lemma, sometimes with a very rudimentary palea; upper floret bisexual. Glumes dissimilar; lower glume a small, membranous scale; upper glume membranous, usually as long as lemma. Lemmas with thin translucent margins embracing palea. Palea(s) more or less equal to and each enclosed by the lemma of bisexual floret, faintly 2-ribbed and hardening when ripe. Caryopsis obloid, tightly enclosed by lemma and palea. A large genus of 330 species mostly distributed over the warmer parts of both hemispheres. 10 native and 4 introduced in W.A. Some are weeds, others are useful fodder plants.

1. Annual. Margins of leaf blades undulate.
2. Nodes glabrous. Bisexual lemma dark in colour, brown or black. Lower lemma and upper glume sometimes purple..... ***D. violascens**
2. Nodes ciliate. Bisexual lemma, lower lemma and upper glume green or straw-coloured.
3. Upper glume $\frac{1}{3}$ to $\frac{1}{2}$ as long as lemma. Lower lemma scabridulous..... ***D. sanguinalis**
3. Upper glume $\frac{1}{2}$ to $\frac{3}{4}$ as long as lemma. Lower lemma puberulous or sericeous and densely long-ciliate..... ***D. ciliaris**
1. Perennial. Margins of leaf blades infolded..... ***D. didactyla**

***D. ciliaris (Retz.) Koeler**

Summer Grass

Annual, stems creeping, 0.02-1 m tall. Leaf sheaths distinctly striate, lower sheaths ciliate with tubercle-based hairs; leaf blades 30-60 x 3-8 mm, scabridulous, few tubercle-based hairs behind ligule, margins undulate; ligule truncate 1-2 mm long; nodes ciliate. Racemes 2-12, more or less digitate, 60-220 mm long, axis of raceme distinctly 3-angled. Spikelets in pairs, 2.5-3.5 mm long, sharply acute, loosely or closely imbricate; pedicels of unequal length. Lower glume distinct, 0.2-0.5 mm long, triangular; upper glume $\frac{1}{2}$ - $\frac{3}{4}$ as long as the spikelet, 3-ribbed, ciliate. Lower lemma as long as spikelet, 7-ribbed, with 6 lateral ribs submarginal and distant from midrib, appressed puberulous or sericeous, often with ciliate frill; upper lemma almost equal to lower lemma, up to 3 mm long, acuminate, smooth. Palea almost equal in length to lemma, acuminate.

Summer weed common within the region. Occurs in the south west and Kimberley Region of W.A. Native to tropical and subtropical areas of both hemispheres.

Flowers November-March.

Often confused with, and previously included under *D. sanguinalis*, Crab Grass.

***D. didactyla Willd.**

Queensland Blue Couch

Slender perennial, 0.1-0.7 m tall, stems creeping and rooting; culms many-noded with short internodes; nodes hairy. Leaf sheaths distinctly striate; blades linear, infolded, 40-120 x 1-2 mm, glabrous or with a few scattered hairs; ligule truncate, ca 1 mm long. Peduncle exerted from sheath by 50-150 mm. Racemes 2 or 3(4), digitate, sessile, 40-55 mm long; rachis slightly flexuose, angular, glabrous on margins. Spikelets in pairs, 2-3 mm long, loosely imbricate, pedicels of unequal length. Lower glume minute, less than 0.5 mm long, rounded; upper glume 1.5-2 mm long, 3-5-ribbed, with fine white hairs on margins, sometimes also on surface. Lower lemma 2-3 mm long, 5-ribbed or faintly 7-ribbed, scabrous between ribs and along margins; upper lemma almost equal to lower lemma, glabrous, narrowly ovate, acuminate. Palea subequal to lemma, acuminate.

Widely cultivated as a lawn in gardens and sometimes established in disturbed sites. Native to the Canary Islands.

Flowers January-March.

***D. sanguinalis (L.) Scop.**

Crab Grass, Summer Grass

Annual, stems creeping often rooting at the nodes, 15-70 mm tall; nodes ciliate. Leaf sheaths distinctly striate; leaf blades narrowly ovate, flat, 50-150 x 3-7 mm, usually with few, scattered, tubercle-based hairs, margins often undulate; ligule truncate 1-2 mm long. Racemes 3-10, digitate at apex of culm, spreading at maturity 20-160 mm long; rachis distinctly 3-angled. Spikelets in pairs or triads, 2-3.5 mm long, loosely or closely imbricate; pedicels unequal in length. Lower glume minute, less than 0.5 mm long, acute; upper glume ca 2 mm long, 3-ribbed, often villous, ciliate. Lower lemma 2-3.5 mm long, 5-7 ribbed, scabridulous, the 4-6 lateral ribs submarginal and distant from the midrib, without a palea or floret. Upper lemma almost equal in length to lower lemma, acuminate, glabrous, up to 3 mm long. Palea almost equal to lemma, acuminate.

Common summer weed in the Perth metropolitan area and the south west. Native to the Mediterranean Region.

Flowers December-May.

***D. violascens** Link

Ascending or suberect annual, sometimes rooting at the nodes, 15-500 mm tall; nodes glabrous. Leaf sheaths green or purple, loose, sharply keeled, striate, glabrous or lower part sprinkled with hairs especially towards margins; blades 30-200 x 2-5 mm, flat, scabridulous, margins sometimes undulate; ligule membranous, 1-2 mm long, truncate. Panicle at length greatly exserted on slender peduncle, consisting of 2-13 racemes, the lowest raceme sometimes solitary and a little remote, corymbose; racemes subequal, 50-100 mm long. Spikelets in triads, in 2 rows on 1 side of flattened or winged rachis; pedicels short of unequal length, scabrous. Spikelets 1.5-2 x 0.7 mm, broadly elliptic, compressed, acute. Lower glume minute or absent; upper glume sometimes purple, sometimes shorter and narrower than spikelet, 3-ribbed, puberulous between ribs with short crinkled hairs. Lower lemma empty, sometimes purple, equal in length to spikelet, 5-7-ribbed with the 3 central ribs closer together than lateral ribs, puberulous between ribs; upper lemma conspicuously black or brown from early in development, shining, almost as long as spikelet. Palea almost equal to lemma, acuminate.

Weed collected from the Perth metropolitan area. Native to the tropical regions of America and Asia.

Flowers October-March with occasional flowers in May.

***ECHINOCHLOA** P. Beauv.

Annuals or perennials. Leaf blades linear; ligule absent or a transverse fringe of hairs. Panicle of crowded or loosely arranged 4-rowed, spike-like, racemes. Spikelets very convex on back, 2 or 3 together or clustered on 1 side of the triquetrous rachis, falling entire at maturity. Florets 2; lower floret male or empty; upper floret bisexual, more or less hispid on ribs of glumes and lower lemma, rarely glabrous. Glumes membranous, often hispid. Lower floret: lemma often with pronounced cusp or awn; palea reduced or absent, translucent, finely 2-keeled. Upper floret: lemma convex on back, crustaceous, glabrous and shining; palea almost equal to lemma and similar in texture. Caryopsis broadly elliptic in outline, dorsally more or less flattened. 30 species distributed in tropical and temperate regions of the world. 3 native and 9 introduced in W.A.

- | | |
|--|-------------------------|
| 1. Upper glume shortly stipitate..... | *E. crus-pavonis |
| 1. Upper glume not stipitate. | |
| 2. Upper glume 2-3 mm long. Lower lemma with cusp up to 1 mm long..... | *E. crus-galli |
| 2. Upper glume 5-7 mm long. Lower lemma awned, awn 10-40 mm long..... | *E. telmatophila |

***E. crus-galli** (L.) P. Beauv.

Barnyard Grass

Annual 0.25-0.9 m tall, glabrous; culms often branching from lower nodes. Leaf sheaths loose, glabrous, striate and strongly compressed, glabrous; basal one occasionally slightly hairy; blades flat, linear, 70-350 x 4-25 mm, soft, glabrous or slightly hairy, tapering to an acute point, margins narrowly thickened; ligule absent. Panicle erect, at length exserted, 60-220 x 10-30 mm, with 9-15 racemes. Spikelets crowded in 3 irregular rows on one side of the narrow, triquetrous, scabrous rachis; pedicels with 2 or 3 spikelets. Spikelets ovate to elliptic, acute, cuspidate or awned. Lower glume very broadly ovate, 1-1.5 mm long, 3-5-ribbed, scabrous. Upper glume broadly ovate to oblong, 2-3 mm long, convex on back, scabrous with tubercle-based hairs. Lower floret empty; lemma similar to upper glume, 5-7-ribbed, with a cusp up to 1 mm long. Upper floret bisexual, broadly ovate to elliptic, 2-3 mm including cusp, glabrous and shiny; lemma thinly crustaceous, convex on back, shortly cuspidate with scabridulous cusp; palea almost as long as lemma, margins thinner.

Weed in the Perth metropolitan area and southern areas of the region. Native to the temperate and tropical regions of the world.

Flowers December-March.

Collections from other Australian states have the lemma and sometimes the upper glume produced into an awn up to 40 mm long. It is a polymorphic weed of warm temperate and subtropical regions with numerous intergrading races, apparently the consequence of cleistogamous self-pollination.

***E. crus-pavonis** (Kunth) Schultes

South American Barnyard Grass

Coarse annual to 1.3 m tall, branching from base, erect; culms sometimes decumbent and rooting from lower nodes. Leaf sheaths keeled upwards, glabrous, striate, often purplish towards base; blades flat, linear, 120-400 x 8-15 mm, glabrous, except for few tubercle-based hairs on margins; ligule absent. Panicle up to 180 x 70 mm, soft, more or less pendulous with loosely spreading compound branches; racemes often distant below, lower up to 40(80) mm long, mostly pale green, about 3.5 mm long. Spikelets 2 or 3 together or fascicled, on short scabrous pedicels. Glumes membranous to herbaceous; lower glume ca 1.5 mm long, acute to acuminate, scabrous, very shortly spinulose on ribs, shortly hairy to scabrous between them; upper glume elliptic, 3-4 mm long, convex on back, acuminate to cuspidate, 5-ribbed, shortly spinulose on ribs, apex acuminate to cuspidate. Lower floret empty; lemma similar to upper glume, 3-15 mm long, usually terminating in a slender flexuose awn, 7-ribbed; palea broadly elliptic. Upper floret bisexual; brownish at maturity; lemma ovate to elliptic, ca 3 x 1.5 mm, thinly crustaceous, shiny, indistinctly 5-ribbed, tapering into a long lightly scabrous cusp; palea similar to lemma in texture, flat on back, with glabrous recurved sides, narrow margins translucent.

Weed species of the Perth metropolitan area. Native to South America extending northwards into southern United States of America.

Flowers January-April.

***E. telmatophila** P.W. Michael & Vick.

Swamp Barnyard Grass

Erect, robust annual to 1.8 m tall, sometimes rooting at lower nodes; culms often stout, up to 10 mm diameter towards base, glabrous, smooth, lightly striate. Leaf sheaths usually glabrous or lower part with tubercle-based hairs, striate, keeled upwards; blades flat, linear, 200-380 x 8-18 mm, glabrous except for few tubercle-based hairs on margins near base; ligule absent. Panicle purple or green, 200-350 mm long, erect or slightly pendulous with numerous appressed to erect spreading branches; branches distant, 20-100 mm long, usually with dense, long-awned spikelets. Spikelets usually appressed, 2 to 3 together. Glumes membranous to herbaceous; lower glume ca 2 mm long, 3-5-ribbed, scabrous; upper glume 5-7 mm long including awn or cusp, convex on back, 5-ribbed, spinulose on ribs especially lateral ribs, scabrous between the ribs. Lower floret empty; lemma similar to upper glume, 7-ribbed, nearly always awned; awn often purplish, 10-40 mm long; palea narrowly oblong to ovate, narrowing towards apex, translucent. Upper floret bisexual; lemma narrowly elliptic, 3-4 x 1.25-1.5 mm, rather long-cuspidate, convex on back, thinly crustaceous, obscurely 5-ribbed; palea similar in texture, almost as long but flat, thinner margins embracing caryopsis.

Collected from localities in the Perth metropolitan area.

Flowers February and March.

***EHRHARTA** Thunb.

Perennials or annuals. Leaf blades flat or convolute, sometimes reduced or entirely suppressed; ligule membranous, usually short or reduced to a narrow rim. Inflorescence a panicle or raceme. Spikelets solitary, pedicellate, laterally compressed, awnless or lemmas of empty florets with short terminal awn; rachilla disarticulating above glumes, obscurely produced. Florets 3; uppermost floret bisexual; 2 lower florets empty. Glumes persistent, equal or unequal, membranous, usually shorter than floret. Lower 2 lemmas usually exceeding the glumes, cartilaginous, sometimes bearded, sometimes transversely rugose or tuberculate, entire, awnless or tapering into a short terminal awn; upper lemma with a callus appendage at the base, smaller than empty lemmas, usually thinner, awnless or tapering into awn-like points. Paleas narrow, keeled. Stamens 6 or 3. Caryopsis elliptic in outline, greatly compressed. About 27 species in Africa, 1 occurs in India. 6 introduced in W.A.

1. Lemmas of empty florets with long soft hairs.
2. Spikelets 12-15 mm long..... ***E. villosa**
2. Spikelets 8 mm long or less.
3. Perennial. Lemma of inner empty floret ca 1 mm shorter than outer empty lemma..... ***E. calycina**
3. Annual. Lemma of inner empty floret ca 2 mm shorter than outer empty lemma..... ***E. brevifolia**
1. Lemma of empty florets glabrous with tufts of hairs at base..... ***E. longiflora**

***E. brevifolia** Schrader

Annual; culms, bent, erect, up to 300 mm tall, simple or branched, glabrous. Leaf sheaths loose, glabrous; blades blue-green, linear, glabrous, flaccid, 30-90 x 1-2 mm, margins minutely scabrous; ligule very short, truncate, lacinate or ciliate on margins. Panicle very slender, up to 80 mm long, branches in distant groups, scabridulous; rachis filiform, flexuose, glabrous or scabridulous; pedicels up to 8 mm long. Spikelets greenish, erect, 2-5 mm long. Glumes subequal, narrowly ovate, very thin, 5-7-ribbed, acute; outer glume 3-4.5 mm long; inner glume 2.5-5 mm long. Lower lemmas very unequal, lowermost narrowly oblong, 1-2.5 mm long, 1-ribbed, loosely hairy, shortly bearded at base, obtuse; upper of the 2 lower lemmas oblong, 3-5 mm long, mucronate, 5-ribbed, loosely hairy, with 2 unequally lobed appendages at the base, obtuse. Upper lemma elliptic-oblong, 2.5-3.5 mm long, loosely hairy, 1 or obscurely 3-5-ribbed, subobtuse. Palea ribless, 1.5-2.5 mm long.

Widespread in the northern part of the region, most collections being from the Perth metropolitan area, others from Pinjarra and Gingin. Also occurs north as far as Dirk Hartog Island. Native of South Africa.

Flowers August and September.

***E. calycina** Smith

Perennial Veldtgrass

Tufted perennial; culms slender, 0.3-0.6 m tall, glabrous. Leaf sheaths glabrous, tight; blades pale-coloured, linear, flaccid, flat or rolled, 20-90 x 2-6 mm, glabrous or hairy, margins undulate; ligule truncate, jagged. Panicle narrow, 70-220 mm long, branches slender, flexuose, simple or few-branched. Spikelets purplish, oblong, 4-8 mm long. Glumes subequal, narrowly oblong, acute or rather obtuse, 7-ribbed; outer glume 5-6 mm long, inner glume 4.5-5.5 mm long. Empty lemmas unequal, loosely villous; lower lemma 4-4.5 mm long, acute; upper lemma oblong, 5.5-6 mm long, acute or mucronate, 5-ribbed with 2 appendages at the base, beardless. Lemma of bisexual floret oblong, 4-4.5 mm long, slightly shorter than the lemma of upper empty floret, glabrous or sparsely hairy, obtuse. Palea 3.5-4 mm long, glabrous, translucent.

Common introduction in the Perth metropolitan area. Recorded from scattered locations from Woodleigh Station south of Carnarvon to Esperance. Native to South Africa.

Flowers March and April, also August and September.

***E. longiflora** Smith

Annual Veldtgrass

Annual; culms 0.3-0.6 m tall, usually simple, glabrous. Leaves in tufts; sheaths loose, glabrous; blades dark green, linear, 80-150 x 4-10 mm, with clasping bases fringed with few hairs, softly hairy or glabrous, margins undulate; ligule 1-2 mm long, truncate, lacinate. Panicle narrow, up to 150 mm long, branches and pedicels slender, scabrous. Spikelets oblong, 7 mm long. Glumes sometimes purple, 4-6 mm long, ciliate; lower glume 2-4.5 mm long, 5-ribbed; upper glume 4-6 mm long, 7-ribbed. Empty lemmas oblong, cuspidate with the point scabrous or produced into short straight terminal awn; lower lemma with a minute beard in front and two tufts of hairs on back at base, scabrous on both surfaces, (10-)17-22 mm long; upper lemma (11-)18-21 mm long, with a pair of inconspicuous bearded ridges at the base, scabrous on outer surface, keeled. Lemma of bisexual floret oblong, 4-7 mm long, acute, 7-ribbed. Palea keeled, 4-6 mm long.

Widespread throughout the Perth metropolitan area and Garden Island. Widespread in the south west of W.A. Native to the coast region of South Africa.

Flowers July-November.

***E. villosa** J.H. Schultes ex Schultes & J.H. Schultes

Pygrass

Perennial; culms to 1 m tall, rooting at lower nodes. Leaf sheaths rather firm, lowest bladeless and withering away at maturity, upper sheaths tight and glabrous; blades linear, 40-70 x 1-4 mm, glabrous below, scabrous above, flat or rolled; ligule a ciliate rim. Panicle narrow, 60-200 mm long, often reduced to a raceme; branches and pedicels slender, flexuose. Spikelets usually pendulous, ovate-oblong, 12-15 mm long. Glumes unequal, oblong, acute, glabrous with ciliate margins, 5-7-ribbed; outer glume 10-11 mm long; inner glume 11-13 mm long. Lemmas of empty florets subequal, linear-oblong, coriaceous, densely ciliate and villous all over, 5-7-ribbed, mucronate to shortly awned with an awn 1-2 mm long; outer lemma 12-14 mm long; inner lemma 11.5-14 mm long. Bisexual lemma 10-11 mm long, villous. Palea 9.5-10 mm long, glabrous.

Recorded from Guilderton and the Perth suburb of Murdoch. Another location is Margaret River, where it was planted as a sand-binding plant at the estuary. Native to the coast and central regions of South Africa.

Flowers October and November.

*ELEUSINE Gaertner

Tufted annuals or perennials. Leaf sheaths keeled; blades flat or folded; ligule membranous or a ciliate membranous rim. Inflorescence an umbel of 2-6 digitate or almost digitate spikes; rachis flattened, ending in a spikelet. Spikelets sessile or subsessile, alternately unilateral, densely imbricate, laterally compressed; rachilla breaking between lemmas, or tough, sometimes terminating in rudimentary lemma. Florets 3-6, bisexual. Glumes subequal, lower glume membranous, with a crested rigid keel. Lemmas similar to glumes. Paleas 2-keeled, keels winged. Caryopsis obloid to globular, broadly grooved. 9 species mostly from Africa. 2 introduced in W.A.

1. Spikes usually 6-9. Spikelets 5-7-flowered..... *E. coracan
 1. Spikes usually 2-6. Spikelets 3-5-flowered..... *E. indica

*E. coracan (L.) Gaertner

Indian Millet

Robust annual to 1.5 m tall. Leaf sheaths very loose, glabrous; blades striate, 400-600 x 4-8 mm, tapering to an acute point. Spikes usually 6-9, digitate, 35-80 mm long, with 1 usually lower on culm; rachis flattened on 1 side. Spikelets 4-9 mm long. Florets 5-7. Glumes 3-5 mm long, with prominent keel, acute. Lemma narrowly ovate, 3-5 mm long, keeled, scabrous along keel, acute. Palea 2.5-3 mm long, scabrous along keels.

This species has mainly been cultivated but occasionally occurs spontaneously. Collected from Kenwick and Drakesbrook and in the south west from Busselton. Native to tropical and subtropical countries.

Flowers February-May.

*E. indica (L.) Gaertner

Crowsfoot Grass

Annual or perennial, to 0.9 m tall. Leaf sheaths and bases of blades with few long hairs; blades 60-300 x 1.5-4 mm, scabrous, sparingly hairy below, tapering to an acute point. Spikes usually 2-6, digitate, sessile, 40-150 mm long, with 1 usually lower on culm; rachis prominently flattened with spikelets loosely imbricate and secund. Spikelets 3-6 mm long. Florets 3-5. Glumes 2-6 mm long, unequal; lower glume narrowly oblong, 1-ribbed and winged along keel, or 3-ribbed, obtuse; upper glume broadly ovate, 3-5-ribbed, acute. Lemma narrowly ovate, keeled, 3-5 mm long, scabrous along keel, acute. Palea 1.5-3 mm long, scabrous along keels.

Found in the Perth metropolitan area and at Bullsbrook. Occurs at Carnarvon and in the Kimberley Region. Native to tropical and subtropical countries.

Flowers February-June.

ERAGROSTIS Wolf

M. Lazarides

Perennials or annuals, often glandular especially on leaf sheaths and inflorescence. Leaf blades linear; ligule a ciliate membrane or ciliate fringe of short to minute hairs. Inflorescence a terminal or axillary spike-like panicle. Spikelets pedicellate, awnless; rachilla glabrous, disarticulating above the glumes and between the florets, or tough and persistent. Florets 3 to many, bisexual or the uppermost reduced, usually maturing upwards from the base of spikelet. Glumes persistent or deciduous, keeled, membranous and glabrous. Lemmas deciduous or rarely persistent, membranous or coriaceous, glabrous. Paleas membranous to translucent, keels glabrous or scabridulous or hairy. Stamens 2 or 3. Caryopsis compressed or turgid, terete-subulate or globular or obtusely triquetrous, often concave or grooved, smooth to reticulate. 300 species in tropical and subtropical regions of the world. 27 native and 3 introduced in W.A. The species include a few of economic importance, ornamentals, and many widespread weeds.

1. Leaf sheaths usually glabrous; blades with acute or acuminate apices. Rachilla fragile, flexuose.
2. Lemma granular. Panicle contracted and usually spike-like. Stamens 2 (rarely 3)..... *E. elongata*
2. Lemma glabrous. Panicle usually open and decompound. Stamens 3..... *E. benthamii*
1. Basal leaf sheaths usually pilose to hirsute; blades with capillary leaf apices. Rachilla persistent, more or less straight..... **E. curvula*

***E. benthamii* Mattei**

Erect perennial, 0.2-0.6 m tall, leafy and compact near the base. Leaves usually glabrous; sheaths usually bearded at the orifice; blades flat, 1.5-2.5 mm wide, usually inrolled; ligule a densely ciliate membrane, ca 0.3 mm long. Panicle usually open and decompound, with filiform primary branches up to 80 mm long, spikelets distant. Spikelets narrowly oblong to ovate, 7-9 x 1.5-2 mm, 8-16-flowered; rachilla breaking close to node. Florets 8-16. Glumes subequal or somewhat unequal; lower glume 1.3-1.6 mm long; upper glume 1.3-1.9 mm long. Lemma deciduous, narrowly ovate, 1.8-2.3 mm long, glabrous, the lateral ribs slightly closer to the margins than the midrib, acuminate. Palea persistent, from $\frac{3}{4}$ to as long as the lemma, the keels closely scabridulous almost from their base. Anthers 3, purple, 0.4-0.5 mm long. *E. brownii* Nees ex Steudel

Collected from Jarrahdale, and in the south west from Donnybrook, Northcliffe, Nannup and Warren areas. Also in S.A., Vic., N.S.W. and Qld.

Flowering period unknown.

****E. curvula* (Schrader) Nees**

African Lovegrass

Densely tufted perennial, 0.3-1.2 m tall, often purple near base. Leaves glabrous or pilose with tubercle-based hairs; basal sheaths often coriaceous, yellowish, strongly keeled, pilose to hirsute with appressed hairs; blades up to 300 x ca 3 mm, usually convolute, filiform and curly, with capillary, often curved or curly apices; ligule ciliate with hairs ca 1 mm long. Panicle 60-300 x up to 200 mm, dense or open; primary branches up to 150 mm long; lowest branches often whorled, pilose or bearded in the axils. Spikelets linear, 4-10 x 1-1.5 mm; rachilla persistent, slightly flexuose. Florets 4-13, loosely imbricate. Glumes deciduous, keeled, scabridulous upwards on the keel, otherwise glabrous, unequal; lower glume ovate, 1-1.8 mm long; upper glume narrowly ovate, 1.5-3 mm long. Lemma ovate-elliptic, 1.8-2.8 mm long, deciduous, obtuse, sometimes scabrous. Palea as long as lemma or almost so, persistent; keels minutely scabridulous upwards or glabrous. Anthers 3, purple, 0.8-1.3 mm long.

Naturalized in the Perth metropolitan area, Bunbury and Waroona. Also recorded from Three Springs and Dwarda. A South African species introduced into Australia as a forage grass, often occurring as an escape.

Flowers December-May (August).

***E. elongata* (Willd.) J.F. Jacq.**

Clustered Lovegrass

Densely tufted perennial, 0.3-0.7 (0.2-0.9) m tall, often leafy and compact near base. Leaf sheaths pilose at the orifice; blades usually 100-210 x up to 4 mm, glabrous, involute-convolute, sometimes flat, finely pointed, scabridulous on upper surface and margins; ligule 0.3-0.4 mm long. Panicle terminal, axillary spikelets sometimes present; terminal panicles 80-230 x 7-40 mm, contracted, often spike-like upwards; primary branches up to 60 mm long, much divided from base. Spikelets ovate to oblong, 3-12 x 1.5-2.5 mm, often glaucous; rachilla readily disarticulating close below the nodes, flexuose. Florets 6-27, loosely imbricate, with adaxial furrow, rather distant and partly exposing the rachilla. Glumes linear to ovate, ca 2 mm long, subequal, deciduous, with prominent scabrous keel, acuminate. Lemma ovate or elliptic, 1.5-1.8 mm long, deciduous, indurate, acute to subacute, often strongly granular, ribs prominent, the midrib sometimes excurrent as a minute mucro. Palea from $\frac{3}{4}$ as long as the lemma to slightly longer, persistent, granular, keels closely scabrous. Anthers 2 or rarely 3. **Fig. 315**

Widespread from Gingin to Dandalup, and within the south west recorded from Burekup, Bridgetown and Wongawal Station. Widespread in all mainland states.

Flowers January, May.

***FESTUCA L.**

Tufted or rhizomatous perennials; culms erect or spreading. Leaf blades flat, with bristly hairs at base of blade; ligule membranous, usually short. Inflorescence a panicle. Spikelets pedicellate; rachilla breaking between the florets. Florets few to several, uppermost florets reduced. Glumes narrow, acute. Lemmas rounded on back, membranous or stiff. Paleas 2-keeled. Ovary glabrous or minutely hairy at apex. Caryopsis obloid, glabrous, grooved or concave in front. A widespread genus of about 80 species, from the temperate regions of both hemispheres and the mountain areas of the tropics. 1 native and 3 introduced in W.A.

***F. rubra L.**

Red Fescue

Loosely tufted perennial, plants forming a turf. Leaves mostly basal, blades sometimes flat, usually terete, 25-70 x 0.25-0.75 mm; ligule short with small lateral lobes. Panicle contracted or spreading, 30-150 mm long, with solitary branches. Spikelets 8-12 mm long; rachilla flexuose. Florets 6-8. Glumes glabrous with translucent margins; outer glume 2-4 mm long, 1-ribbed; inner glume 3-5 mm long, 3-ribbed. Lemma 5-6 mm long, terminating in a scabrous awn 1-3.5 mm long. Palea 4-5 mm long, 2-lobed, scabrous along keels.

Recorded from the Perth metropolitan area. Also collected from Geraldton and Manjimup. Native to Europe, Asia and North America.

Flowers September-November.

***GASTRIDIDIUM P. Beauv.**

Tufted annuals. Leaf blades flat, narrow; ligule translucent. Inflorescence a simple, cylindric, spike-like panicle. Spikelets solitary, pedicellate; rachilla produced behind the palea as a minute bristle, disarticulating above glumes. Floret 1, bisexual. Glumes narrow, concave or almost saccate at base, keeled above. Lemma thinly translucent, truncate, dentate, with mucro, awned or awnless; awn when present, slender and bent, attached below the apex of the lemma. Palea narrow, 2-keeled and notched. 2 species from Europe and northern Africa. 1 introduced in W.A.

***G. phleoides (Nees & Meyen) C.E. Hubb.**

Nitgrass

Glabrous annual; culms slender to 0.5 m high. Leaf blades rough on margins; ligule narrowly ovate. Panicle spike-like, dense, narrowly cylindric, 40-100 x 5-8 mm, tapering at each end. Glumes glabrous especially along keel, acute; lower glume 5-6 mm long; upper glume 3-4.5 mm long. Lemma 1.25 mm long, hairy, usually with a short fine awn arising from below apex; awn ca 4 mm long. Palea 1.25 mm long, translucent, glabrous. *G. ventricosum* auct. non (Gouan) Schinz. & Thell.

Only recorded from Waroona and Glen Forrest in W.A. Native to south east Asia and north Africa. It is a weed of disturbed land.

Flowers April and May.

GLYCERIA R. Br.

Perennials with creeping rhizomes. Leaf blades flat; ligule translucent, lacerated. Inflorescence an open or contracted panicle. Spikelets solitary, pedicellate, slightly compressed; rachilla disarticulating between florets. Florets 4-14, bisexual. Glumes herbaceous or translucent. Lemmas convex on back, firm, exerted from glumes, upper lemma often empty. Paleas 2-keeled. Caryopsis obloid. About 40 species of temperate regions, usually marsh or aquatic plants. 2 native and 1 introduced in W.A.

1. Lemma 5-8 mm long. Palea 2-lobed, 5-8 mm long..... **G. australis**
 1. Lemma 2.5-3 mm long. Palea obtuse, 2.5-3 mm long..... ***G. maxima**

G. australis C.E. Hubb.

Mannagrass

Glabrous perennial, 0.4-1 m tall. Leaf blades 30-120 x 2-7 mm, longitudinally striate, glabrous or shortly scabrous on veins; ligule oblong, 5-6 mm long. Panicle narrow, loose, 1-sided, 150-250 mm long, sometimes partly included in uppermost leaf sheath; branches slender, stiff, solitary or in pairs. Spikelets 100-300 mm long. Florets 6-14. Glumes glabrous, translucent; lower glume 2-2.5 mm long; upper glume 3-5 mm long. Lemma 5-8 mm long, 7-ribbed, thin, obtuse at apex, minutely scabrous. Palea 5-8 mm long, acuminate. *G. fluitans* auct. non (L.) R. Br.

Grows around freshwater swamps and watercourses. Occurs at Harvey and between Busselton and Albany. Also in S.A., Vic. and N.S.W.

Flowers August-December.

***G. maxima** (Hartman) O. Holm.

Reed Sweetgrass, Water Meadowgrass

Erect ascending perennial with culms to 1 m tall. Leaf sheaths scabridulous; blades up to 12 mm wide, glabrous above, scabrous beneath with 2 pale brown, triangular spots at base of lower surface, upper leaves indistinctly cross-veined; ligule 3-5 mm long. Panicle 100-400 mm long, dense. Spikelets green, 3-5 mm long, obtuse. Florets 4-8. Glumes elliptic, obtuse, membranous; lower glume 2-3 mm long; upper glume 3-4 mm long. Lemma 2.5-3 mm long, scabrous, 7-ribbed, obtuse. Palea 2.5-3 mm long, obtuse. *G. aquatica* (L.) Vahl

Collected from Gingin. Naturalized at Albany and Donnybrook within the south west. Native to Europe.

Flowering time unknown.

***HAINARDIA** Greuter

Slender glabrous annuals. Leaf blades flat or involute; ligule short. Inflorescence a slender spike. Spikelets sessile, distichous and half-embedded in alternate notches of the spike rachis, each falling entire attached to joint of rachis. Floret 1, bisexual. Glumes 2 and rigid in terminal spikelet, closing cavity of rachis in other spikelets. Lemma translucent. Palea 2-ribbed. Caryopsis narrowly oblong in outline, dorsally compressed. *Monerma* P. Beauv. A monotypic genus occurring from the Mediterranean Region to western Asia. Naturalized in W.A.

***H. cylindrica** (Willd.) Greuter

Common Barbgrass

Erect tufted annual to 0.4 m tall; culms smooth, nodes exerted from leaf sheaths. Leaf blades flat to involute, 45-70 x 1-2 mm, glabrous; ligule membranous, to 1 mm long. Spike rigid, cylindric, 40-160 mm long, straight or slightly curved. Spikelets 5-8 mm long. Glume solitary, narrowly ovate, 5-6 mm long, acuminate, 5 or 7-ribbed. Lemma translucent, narrowly ovate, 4-6 mm long, finely 3-ribbed, acute, back of lemma placed against rachis. Palea 4-6 mm long, thin. *Monerma cylindrica* (Willd.) Cosson & Durieu

Usually found on saline soils. Collected from Byford. Also collected from Busselton and Harrismith. Native to southern Europe and south west Asia.

Flowers October-December.

HEMARTHRIA R. Br.

Decumbent or ascending perennials; culms branched. Leaf blades linear, flat; ligule short, membranous, sometimes ciliate. Inflorescence spike-like, of compressed, often curved racemes; each raceme supported by a spathe. Spikelets in pairs, one sessile, other pedicellate but appearing sessile as pedicel is adnate to adjacent internode; sessile spikelets sunken in concave hollows on inner face of rachis. Florets 2; lower floret empty and reduced to lemma; upper floret bisexual, awnless. Glumes subequal or equal; lower glume flat, 2-keeled, more or less coriaceous, narrowly inflexed along margins; upper glume membranous, adhering to inner face of cavity. Lemmas translucent. Paleas translucent, small, ribless, exerted. Caryopsis obloid, slightly dorsally compressed. About 8 species in the warmer regions of the old world. 1 native in W.A.

H. uncinata R. Br.

Matgrass

Rather rigid, ascending perennial; culms erect from a decumbent rooting base, 0.2-0.8 m tall, slightly compressed, glabrous. Leaf sheaths rather loose, glabrous or occasionally sparsely hirsute on margins of upper part, upper margins translucent, striate; blades flat or folded, 50-150 x 1.5-5 mm, usually glabrous except for few hairs near ligule; ligule extremely short, truncate with apically ciliate rim. Racemes terminal, solitary, rigid, 60-140 mm long with spikelets closely appressed to rachis, glabrous. Sessile spikelets 5-10 mm long; pedicellate spikelets slightly longer, 7-12 mm long. Lower glume oblong, 6-10 mm long, faintly 5-7-ribbed, acute or acuminate, or prolonged into short straight point; upper glume often more or less adnate to rachis, 7-10.5 mm long, apex straight or uncinata. Lower lemma 2-ribbed, empty; upper lemma usually ribless.

Common in the region and in the south west from Geraldton to Esperance. Also in S.A., Vic., Tas., N.S.W. and Qld.

Flowers December-April.

***HOLCUS L.**

Annuals or perennials. Leaf blades flat; ligule membranous. Inflorescence a soft, usually dense, contracted panicle. Spikelets pedicellate, laterally compressed, falling entire. Florets 1 or 2, both bisexual or upper one male. Glumes keeled, ciliate on keel; lower glume usually mucronate; upper glume obtuse with a fine, short, terminal, setaceous point or awn. Lower lemma awnless; upper lemma with rigid curved awn. Paleas 2-keeled. Caryopsis laterally compressed. 8 species from Europe, Asia and Africa. 2 introduced in W.A.

1. Upper glume with awn up to 1 mm long, lower glume acute or mucronate..... ***H. lanatus**
 1. Both glumes distinctly awned, awn greater than 2 mm long..... ***H. setiger**

***H. lanatus** L.

Yorkshire Fog

Tufted perennial, 0.3-0.45 m tall, softly hairy below panicle, rarely glabrous; culms downy, erect or ascending from bent base. Leaf sheaths with reflexed hairs, rounded on back, softly hairy; blades 40-200 x 3-10 mm, flat, narrowed to fine point; ligule 1-10 mm long. Panicle erect, white, pink or purplish, oblong, 50-150 mm long; rachis branches and pedicels hairy; pedicels 1-4 mm long. Spikelets crowded, oblong to elliptic in outline, compressed, 4-6 mm long. Florets 2, lower floret bisexual, upper floret usually male. Glumes equal or upper glume longer and broader, as long as spikelet, chartaceous, stiffly hairy on keels and ribs; lower glume narrowly ovate, 3.5-4.5 mm long, 1-ribbed; upper glume ovate, 4.5-5 mm long, tipped with awn 1 mm long, 3-ribbed. Lemma 2-2.5 mm long, shining, keeled upwards, obscurely 3-5-ribbed; lower lemma boat shaped, awnless with palea of equal length; upper lemma narrower, longer than its palea, awned on back near apex; awn up to 2 mm long, becoming curved on drying.

Common between Yanchep and Harvey. Also occurs from Busselton to Warren and Albany. Naturalized in all Australian states except N.T. Native to temperate areas of Europe.

Flowers October-January with occasional flowers in August.

***H. setiger** Nees

Annual Fog

Annual; culms slender, glabrous. Leaf sheaths hairy or glabrous; blades 2-4 mm wide, softly hairy. Panicle contracted, almost spike-like, 20-50 mm long; rachis scabrous; branches and pedicels hairy. Spikelets ovate in outline, 2-3 mm long, pale. Florets 2, lower floret bisexual, upper floret male. Glumes scabrous, keels pectinate-ciliate, margins ciliolate below apices; lower glume 4-6 mm long, narrow and subulate-aristate; upper glume broader and awned; awn terminal, straight, 7-9 mm long. Lower lemma ovate, 1.5 mm long, glabrous, shining, callus with few long hairs; upper lemma small, thin; awn subterminal, fine, often bent, shortly exerted, shorter than awn of glumes. Palea equal to lemma.

Recorded from Wooroloo, Coolup and Harvey. Also recorded from Margaret River and Mt. Barker in the south west. Native to South Africa.

Flowers October and November.

***HORDEUM L.**

Erect or decumbent annuals or perennials up to 1 m tall. Leaf sheaths glabrous, rounded on back; blades flat; ligule short, membranous, translucent. Inflorescence a dense cylindrical spike. Spikelets arranged in triads in alternate notches of the axis; central spikelet sessile, 2 lateral spikelets pedicellate; rachilla often prolonged; triad falling entire. Floret 1, bisexual in central spikelet, empty, male or rarely bisexual in lateral spikelets. Glumes persistent, hardened, apex extended into scabrous awn. Lemma hardened, broadly rounded on back, 5-ribbed with terminal, bristle-like awn. Palea as long as lemma, narrow, 2-keeled, deeply folded between keels. Ovary villous in upper part. Stigmas plumose, laterally exerted. Caryopsis obloid, grooved in front. About 200 species from the temperate regions, mainly central Asia and the Mediterranean Region. 4 introduced in W.A. Includes the cereal crop, Barley. Reference: Cocks, P.S. 1976. Aust. J. Bot. 24: 651-662.

1. Spike not breaking up at maturity. Awn of lemma of central spikelet at least 50 mm long..... ***H. vulgare**
1. Spike breaking up into triads at maturity. Awn of lemma of central spikelet 40 mm long or less.
 2. Lemmas of lateral spikelets (incl. awns) much longer than glumes (incl. awns).
 3. Anthers of central floret remaining within floret at maturity, usually black, less than 0.6 mm long; anthers of lateral florets at least three times as long as those of central floret..... ***H. glaucum**
 3. Anthers of central floret exerted at maturity, pale, sometimes brown, more than 1 mm long; anthers of lateral florets equal in length to those of central floret..... ***H. leporinum**
2. Lemmas of lateral spikelets (incl. awns) much shorter than glumes (incl. awns)..... ***H. geniculatum**

***H. geniculatum** All.

Mediterranean Region Barley Grass

Annual to 0.2 m tall. Leaf sheaths glabrous or hairy, uppermost sheath often swollen; blades minutely hairy. Spike 20-45 mm long, bristly; central spikelet bisexual; lateral spikelets empty. Glumes bristle-like, slightly widened and scabrous in lower part. Lemma narrowly ovate, 6-7 mm long, with a straight terminal awn 12-20 mm long, shorter than glumes. *H. hystrix* Roth

A weed of disturbed ground. Only 2 records for the region, from near Capel and Harvey, but probably much more widespread on the Coastal Plain. Native to the Mediterranean Region and south west Asia.

Flowers September and October.

H. marinum Huds, which is closely related to this species, has not been recorded in the Perth Region but occurs elsewhere in the south west.

***H. glaucum** Steudel

Northern Barley Grass

Annual, 0.15-0.3 m tall with ascending or erect culms. Lower leaf sheaths usually hairy, the upper sheaths glabrous. Spike 30-70(-100) mm long, compact; rachis compressed, ciliate on angles, with 20-30 groups of spikelets. Spikelets 3, central one bisexual, lateral spikelets empty. Lateral spikelets: glumes linear to subulate, attenuated in a rigid, scabrous awn 15-40 mm long (longer than awns of central spikelet); lemma narrowly ovate, 3-4 mm long, with scabrous awn 5 mm long; palea rigid, narrow, shortly 2-lobed. Central spikelet: glumes 16 mm long, ciliate, with 2 subulate, scabrous awns; lemma narrowly ovate, 8-9 mm long, subequal to glumes, indurate or coriaceous, narrowed at base, apex tapering into terminal awn 15-40 mm long; palea as long as lemma, narrow, minutely 2-lobed. Anthers included at anthesis, usually black, sometimes pale, less than 0.6 mm long, anthers of lateral florets at least 3 times those of central floret. *H. leporinum* subsp. *glaucum* (Steudel) Booth & Richards

Recorded from South Perth and Kwinana. Also occurs from Kalgoorlie eastwards to Mundrabilla Station and northwards to Geraldton. Native to southern Europe and Asia.

Flowers July-November.

***H. leporinum** Link

Barley Grass

Annual to 0.3 m tall. Leaf sheaths glabrous, uppermost swollen; leaf blades 40-100 x 1.5-8 mm, scabrous-ciliate to villous. Spike 30-100 mm long, bristly. Central spikelet; glumes capillary, slightly widened, more or less channelled and conspicuously ciliate on lower part; lemma narrowly ovate, 8-10 mm long, with straight terminal awn 20-40 mm long. Lateral spikelets similar, rather longer and empty; glumes narrow for whole length or inner one widened and ciliate; lemma much longer than glumes. Anthers of central floret usually pale, sometimes brown, more than 1 mm long, usually exerted at maturity; anthers of lateral florets about the same length as those of central floret, occasionally twice as long.

A common weed of the Coastal Plain in the Perth metropolitan area. Occurs from Houtman's Abrolhos south to Cape Naturaliste and east as far as Salmon Gums. Native to southern Europe and south west Asia.

Flowers September and October.

When fruiting, each triad breaks away, the barbellate awns and glumes attaching to anything which passes near.

***H. vulgare** L.

Barley

Annual to 1 m tall. Spike often 100 mm or more long, not breaking up at maturity, spikelets persistent; lateral spikelets empty or bisexual, awn absent or up to 100 mm long.

Two varieties are cultivated, and occasionally occur as an escape.

Flowers May-September.

The 2 varieties may be distinguished by the lateral spikelets, which are empty in var. *distichon* J.D. Hook. (Two-rowed Barley) and bisexual in var. *hexastichon* (L.) Aschers (Six-rowed Barley). Barley is widely grown for use as human and animal food and for the production of malt for the brewing industry.

***HYPARRHENIA** Andersson ex Fourn.

Perennials or annuals. Leaf blades flat; ligule membranous. Inflorescence of paired racemes terminating the culms, branches subtended by spathes. Inflorescence of few-many-jointed, paired racemes. Each raceme pair on a slender peduncle and subtended by a leaf-like spathe. Spikelets in pairs, 1 sessile, 1 pedicellate on a jointed fragile rachis. Sessile spikelet with 2 florets, lower floret male, upper bisexual; glumes equal, mostly thin, lower glume truncate or 2-lobed, with short or obscure keels, upper glume finely keeled towards apex; lower lemma translucent, upper lemma stalk-like with translucent base, margins and lobes, awned from between the lobes with a bent hairy awn; callus hairy; palea usually not present. Pedicellate spikelets male, slightly longer than the sessile spikelet, acute; upper lemma, awnless. Caryopsis obloid. About 60 species in tropical Africa, few in the Mediterranean Region, temperate South Africa, tropical America, Asia and Australia. 1 introduced in W.A.

***H. hirta** (L.) Stapf

Coolatai Grass, Tambookie Grass

Densely tufted perennial 0.4-1 m tall. Lower leaf sheaths somewhat compressed, upper more or less terete, glabrous; blades linear, 100-300 x 1-3 mm, glabrous or with few, scattered, long hairs, flat or margins revolute or involute, midrib whitish, tapering to a fine point. Inflorescence an elongated panicle, loose, 150-300 mm long; spathe narrowly ovate, 30-80 mm long, glabrous or with fine long scattered hairs which turn reddish, long-attenuate into fine points. Racemes straight or curved, erect or pendulous, 15-40 mm long, whitish or greyish-villous, one of each pair sessile, the other on a villous pedicel, with a pair of male spikelets at the base of lower or both racemes. Sessile spikelets narrowly oblong, 5-6 mm long; lower glume 9-11-ribbed, loosely villous; upper glume thinner, 3-ribbed, mucronulate, ciliate; lower lemma narrowly oblong, almost as long as glumes, translucent, 2-ribbed, obtuse, ciliate; upper lemma linear, 4 mm long with 2 short sparingly ciliate lobes; awn slender, 15-25 mm long. Pedicellate spikelets greenish or reddish, linear to narrowly oblong, 5-6 mm long, more or less loosely villous, acute; glumes equal, similar to those of sessile spikelet; lower glume more or less herbaceous, acute to mucronulate; upper glume thinner; lemma narrowly oblong, translucent, ciliate, lower lemma 2-ribbed, upper lemma 1-ribbed or reduced.

Recorded from South Perth, Kelmscott and Rockingham. Native to the Mediterranean Region, Africa and south west Asia.

Flowers November-March with occasional flowers in July.

***LAGURUS L.**

Annuals. Leaf blades flat, soft; ligule membranous. Inflorescence a dense spike-like or capitate panicle, softly villous, long-bristly from plumose glumes and long-awned lemmas. Spikelets pedicellate or sessile, laterally compressed; rachilla disarticulating above the glumes, often continued beyond the lemma, with or without a terminal, rudimentary lemma. Florets 1 or rarely 2, bisexual. Glumes acuminate, central rib very firm and produced into a densely plumose bristle, sparsely covered with long hairs. Lemmas with a slender dorsal awn, apex with 2 shorter awns; callus small, sericeous. Paleas narrow, ciliolate at apex and along margins. Caryopsis narrowly oblong in outline, laterally compressed, soft. Monotypic genus from the Mediterranean Region.

***L. ovatus L.**

Hare's Tail Grass

Erect annual; culms 100-300 mm tall. Leaf blades narrowly ovate, flat, 30-80 x 2.5-7 mm, softly hairy, the uppermost sheaths swollen; ligule 1.5 mm long, densely ciliate on outer surface. Inflorescence a dense, ovoid, silky white, spike-like panicle, 20-40 x 10-20 mm. Spikelets 8-10 mm long. Glumes equal, 9-11 mm long (including awn), tapering into a plumose awn. Lemma(s) membranous, 10-22 mm long (including awns), with 2 terminal awns and 1 bent dorsal awn 10-18 mm long. Palea(s) 3.5-5 mm long, membranous.

Common weed of the Coastal Plain. Also occurs in sandy areas between Busselton, Cape Naturaliste and Bremer Bay. Native to the Mediterranean Region.

Flowers August-December with occasional flowers in March.

***LASIOCHLOA Kunth**

Tufted annuals or perennials. Leaves flat or folded; ligule a ciliate rim. Inflorescence a dense spike-like head, often lobed or branched at base. Spikelets with rachilla breaking above glumes and between lemmas. Florets bisexual; upper floret greatly reduced, not exerted from glumes. Glumes firmly membranous. Lemmas boat shaped. Paleas translucent. 4 species from South Africa. 1 introduced in W.A.

***L. echinata (Thunb.) Henrard**

Tufted annual, 100-250 mm tall, glabrous. Leaf sheaths tight, glabrous or hispid with fine tubercle-based hairs; blades linear, flat, 40-100 x 1-3 mm, tapering to an acute point; ligule a ciliate rim with cilia 3-4 mm long. Panicle ovate to oblong, 80-250 x 5-12 mm, usually embraced at base by 2 uppermost sheaths. Spikelets greenish, broadly obovate. Glumes ovate, 5-7 mm long, covered with tubercle-based hairs, margins broadly membranous, apex acuminate or mucronate to shortly awned. Lemma 3-3.5 mm long, 7-ribbed, ciliate, mucronate. Palea 3 mm long, 2-keeled.

Only recorded from Kelmscott. Native to South Africa.

Flowers October.

***LOLIUM L.**

Glabrous annual or perennial herbs. Leaf blades linear, flat; ligule membranous. Inflorescence a terminal spike. Spikelets solitary, sessile, appressed to and distichous in alternate notches of the rachis of the spike. Florets 3-12. Glumes 2 in terminal spikelets, 1 in other spikelets. Lemmas glabrous, minutely 2-lobed, with or without awn. Paleas almost or equal in length to lemma, 2-keeled. 12 species from temperate parts of Europe and Asia. 5 introduced in W.A. References: Kloot, P.M. 1983. Austral. J. Bot. 31: 421-435; Terrell, E.E. 1968. U.S. Dept. of Agric. Tech. Bull. No. 1392.

1. Glumes shorter than spikelets.
2. Spikelets with 11 or more bisexual florets..... ***L. multiflorum**
2. Spikelets with 10 or less bisexual florets.
3. Annual. Culms reddish to straw-coloured..... ***L. perenne x
L. rigidum**

3. Biennial or perennial. Culms green to straw-coloured.
4. Outer glume $\frac{1}{4}$ to $\frac{1}{2}$ length of spikelet..... ***L. multiflorum x L. perenne**
4. Outer glume at least $\frac{1}{2}$ length of spikelet..... ***L. perenne**
1. Glumes almost as long as or much longer than spikelets.
5. Florets becoming swollen in fruit. Glumes much longer than spikelets..... ***L. temulentum**
5. Florets not becoming swollen in fruit. Glumes nearly equal in length to spikelets.
6. Lemmas 3.5-6 mm long. Ligule truncate, ca 2.5 mm long..... ***L. remotum**
6. Lemmas 5-16 mm long. Ligule rounded to truncate, 1.5 mm long. ***L. rigidum**

***L. multiflorum** Lam.

Italian Ryegrass, Westerwolds Ryegrass

Annual or short-lived perennial, 0.7-1 m tall; culms erect or spreading. Basal leaf sheaths green or purplish, glabrous; blades 110-220 x 2-8 mm, many-ribbed; ligule rounded, truncate or jagged, 4 mm long. Spikes straight or slightly curved, 170-300 mm long, with 6-38 spikelets; rachis slender, straight or flexuose. Spikelets 8-31 mm long, lying against concavities. Florets 11-22, all bisexual or occasionally 1 empty. Glumes narrowly ovate, 5-14 mm long, rounded on back, 3-7-ribbed, glabrous. Lemma narrowly ovate, 4-8 mm long, rounded on back, 3-5-ribbed, slightly 2-lobed or jagged at translucent apices, usually awned; awn straight, slender, up to 15 mm long, attached 0.25-0.75 mm below tip. Palea similar to lemma, keels minutely denticulate.

Only 2 collections of this species have been made, one from the Perth metropolitan area and one from outside the region at Denmark. Native to southern Europe and south west Asia.

Flowers November and December.

***L. multiflorum** Lam. x **perenne** L.

Short-lived perennial, up to 1.2 m tall. Leaf sheaths glabrous; blades 120-200 x 4-8 mm, glabrous, shining; ligule up to 2 mm long. Spike 100-300 mm long; rachis slender, flexuose, often branched. Spikelets 5-25 mm long, unawned or awned. Florets slender, 6-14. Glumes narrowly ovate or narrowly oblong, 5-14 mm long, rounded on back, 5-11-ribbed. Lemma oblong to broadly ovate, 3-7 mm long, 3-5-ribbed, unawned or with awn up to 5 mm long. Palea similar to lemma, keels scabrous.

Recorded from South Perth and Brunswick and within the south west from Margaret River, Wagin and Merredin.

Flowers October.

***L. perenne** L.

Perennial Ryegrass

Biennial or short-lived perennial, 0.08-0.9 m tall. Leaf sheaths glabrous; blades 50-140 x 2-4 mm, glabrous, shining beneath, flat or folded, acute; ligule up to 2.5 mm long. Spike 7-250 mm long, rachis straight or flexuose, slender, glabrous or scabrous on angles. Spikelets unawned, 5-23 mm long, lying against concavities of rachis. Bisexual florets 2-10, occasionally 1 or 2 empty florets also present. Glumes narrowly to broadly ovate, 3.5-15 mm long, rounded on back, 3-9-ribbed. Lemma oblong to broadly ovate, 3.5-9 mm long, 3-5-ribbed, unawned or sometimes with subtending awns up to 8 mm long. Palea similar to lemma in size and shape or sometimes 1 mm shorter, keels minutely denticulate.

Naturalized in the Perth metropolitan area and at Yanchep, Byford and Harvey. Extends southwards to Augusta and Mt. Barker. Native to Europe, northern Africa and temperate Asia.

Flowers September-December.

***L. perenne** L. x **rigidum** Gaudin

Annual to 1.2 m tall; culms straw-coloured to reddish. Leaf sheaths glabrous; blades 100-200 x 3-8 mm, glabrous to scabrous above; ligule to 3 mm long. Spike 50-250 mm long; rachis flexuose, slender to slightly rigid. Spikelets 5-20 mm long. Florets 3-10 bisexual and up to 3 empty. Glumes ovate to narrowly oblong, 8-10 mm long, rounded on back, 5-9-ribbed. Lemma oblong to broadly ovate, 4-6 mm long, usually unawned occasionally with awn up to 5 mm long. Palea similar to lemma.

Found within the Perth metropolitan area south to Rockingham.

Flowers October and November.

***L. remotum** Schrank

Hardy Ryegrass

Annual 0.2-1 m tall; culms erect, slender. Leaf sheaths glabrous; blades 120-230 x 1-6.5 mm long, many-ribbed; ligule truncate, ca 2.5 mm long. Spikes straight, 20-230 mm long, with 3-20 spikelets; rachis slender. Spikelets 5-16 mm long, lying against concavities. Florets 2-10 bisexual, sometimes 1 or 2 empty. Glumes narrowly ovate, 5-16 mm long, 3-7-ribbed, glabrous. Lemma ovate, 3.5-5 mm long, usually rounded on back, 3-7-ribbed, apex translucent, jagged; awn absent or if present less than 10 mm long, attached 0.25-1 mm below tip. Palea similar to lemma in size and shape or up to 1 mm shorter, translucent, keels minutely denticulate, apex obtuse or jagged.

Within the region one collection was made by Helms in 1897 from the Lower Swan River. Later collections (in 1940s) have been made from Beverley. This species is now believed to have disappeared with the cessation of the flax industry in W.A. Origin uncertain.

Flowers September-December.

***L. rigidum** Gaudin

Annual Ryegrass, Wimmera Ryegrass

Annual 0.3-1 m tall; culms erect or spreading. Leaf sheaths green or purple, glabrous, becoming loose; blades 30-120 x 0.5-2 mm, many-ribbed; glabrous or scabrous above; ligule rounded to truncate 1.5 mm long. Spikes straight or curved, 30-300 mm long, with 2-19 spikelets; rachis slender, flexuose. Spikelets lying against concavities and more or less sunken in rachis, partly concealed by glumes. Florets 2-8 bisexual and sometimes 1 empty. Glumes tightly appressed, narrowly ovate, 5-18 mm long, rounded on back, thick, 3-7-ribbed. Lemma narrowly ovate, (3-)6-7 mm long, rounded on backs, apex translucent, ciliate; awn, when present, 1-1.5 mm long. Palea similar to lemma, keels minutely denticulate.

Within the region naturalized in the sandy soils of the Perth metropolitan area, other urban areas and Garden Island. Extends from Dirk Hartog Island in the north to Bruce Rock in the east and Cape Naturaliste in the south. Native to southern Europe, south west and southern Asia.

Flowers September-November.

Distinct ecotypes are recognizable in *L. rigidum*, but gradations occur between them. This is the most widespread of the Ryegrass species. 2 subspecies occur in the region, differing in length and texture of the glumes. Subsp. *rigidum* has herbaceous glumes shorter than the spikelets, and subsp. *lepturoides* (Boiss.) Sennen & Maur. has indurate glumes longer than spikelets.

***L. temulentum** L.

Darnel, Drake

Annual, 0.2-1 m tall; culms erect or decumbent. Leaf sheaths glabrous; blades 55-270 x 2-10 mm, many-ribbed, scabrous above; ligule truncate, 0.5-3 mm long. Spike straight, 50-400 mm long, with 5-26 spikelets; rachis stiff, thickened. Spikelets 8-28 mm long, in concavities of rachis. Florets 2-10 bisexual, sometimes 1-4 empty. Glumes narrowly ovate, 7-30 mm long, rounded on back, thickened or indurate, 3-11-ribbed, glabrous. Lemma ovate or oblong, 5-8.5 mm long, rounded on back, glabrous or scabridulous, slightly 2-lobed or jagged at more or less translucent apices; awn present or absent, 3-17 mm long, straight, minutely scabridulous, attached 0.5-2 mm below apex. Palea similar to lemma in size and shape, apex translucent, keels minutely denticulate.

There are only 2 collections from the Perth metropolitan area. Recorded from Geraldton south to Augusta and east to Esperance. Naturalized in all Australian states except N.T. Native to Europe, south west and southern Asia.

Flowers October-December.

There are two varieties recognized. Var. *temulentum* has awned lemmas and is the only one in the region.

***MELINIS** P. Beauv.

Annuals or perennials; culms ascending from a slender, many-noded, branched base. Leaf sheaths finely tuberculate; blades flat; ligule a ciliate rim. Inflorescence a contracted and narrow, or open and spreading panicle, with slender branches. Spikelets usually purple, pedicellate, laterally compressed, falling entire. Florets 1 or 2, upper floret bisexual, lower floret, when present, male. Glumes very dissimilar; lower glume reduced to a minute scale; upper glume as long as spikelet. Lower lemma like upper glume but more deeply lobed; upper lemma smaller than lower floret. Paleas obscurely 2-ribbed. Caryopsis greenish yellow to brown, cylindrical to obloid. 11 species from tropical and South Africa, 1 species introduced throughout the tropics. 1 naturalized in W.A.

***M. minutiflora** P. Beauv.

Molasses Grass

Perennial; culms ascending, often matted, up to 1 m tall. Leaf sheaths hairy with tubercle-based hairs; blades flat, 50-150 x 5-10 mm, softly pilose with hairs which are often viscid, often with a sweet odour. Panicle often purplish, narrowly ovate, 100-200 mm long, dense; pedicels minutely scabrous (rarely with a few long hairs). Spikelets narrowly oblong, 1.5-2 mm long, glabrous or sometimes hairy. Floret 1. Lower glume an oblong scale, 0.2-0.5 mm long, occasionally absent; upper glume glabrous or minutely puberulous, prominently 7-ribbed, obtusely 2-lobed, with or without mucro up to 0.5 mm long; lower glume empty. Lower lemma prominently 5-ribbed, 2-lobed, with delicate awn, 1-10 mm long from sinus; upper lemma as long as palea, membranous, chartaceous, minutely 2-lobed, obscurely 1-3-ribbed.

Cultivated at Boyanup. Naturalized in moist places, usually on banks of streams or swamps in the Kimberley and south west. Native to Africa.

Flowers March-June.

MICROLAENA R. Br.

Perennials with loose or tufted habit. Leaf blades flat or convolute; ligule reduced to a short translucent rim, fringed with a few long, caducous sericeous hairs. Inflorescence a simple, subracemose panicle or simple raceme. Spikelets pedicellate, laterally compressed, awned; rachilla disarticulating above the glumes. Florets 1 bisexual and 2 empty and reduced to lemmas. Glumes persistent; lower glume small; upper glume twice as long. Lower lemma laterally compressed, scabrous along keel and tapering into a long, terminal, slender, scabrous awn; callus bearded with long silky hairs. Lemma of bisexual floret strongly laterally compressed, acutely keeled, tapering to acute point or scabrous awn, strigose-ciliate along keel in upper half. Palea thinly membranous. Stamens 4. Caryopsis narrowly linear in outline, compressed. About 10 species in south east Asia, New Zealand and Australia. 1 in W.A.

M. stipoides (Labill.) R. Br.

Weeping Grass, Meadow Ricegrass

Perennial with creeping rhizome and often prostrate stems; culms to 0.6 m tall. Leaf blades flat or rolled, 20-100 x 1-4 mm, glabrous or slightly hairy. Inflorescence a panicle or simple raceme, 70-170 mm long, branches and pedicels erect, often elongated; rachis flexuose. Spikelets usually green, occasionally purple, narrow, 8-10 mm long excluding awn. Glumes minute, rigid, very unequal, ovate; lower glume 1-3 mm long, 1-ribbed; upper glume 1.5-3.5 mm long. Lowest lemma narrow, 20-45 mm long (including awn), rigid, prominently 3-5-ribbed, with tuft of hairs at base; middle lemma 30-50 mm long including awn; upper lemma 9-10 mm long, 5-ribbed, rigid, acute, unawned, tapering into acute or acuminate point, sometimes shortly mucronate. Palea membranous, 4-8 mm long, scabrous along rib in upper third.

Occurs on Coastal Plain and Darling Range between Yanchep and Capel. Common in the Warren area extending to Bremer Bay. Occurs in all states except N.T.

Flowers September-November.

***MISCANTHUS** Andersson

Robust perennials. Leaf blades flat, relatively narrow; ligule ciliolate at apex. Inflorescence a large, fan shaped or corymbiform panicle of more or less sessile racemes; racemes long with many spikelets; rachis inarticulate, tough, glabrous. Spikelets 2, unequally pedicellate, eventually separating from pedicel, surrounded by involucre of long, fine hairs. Florets 1 bisexual and 1 empty and reduced to lemma. Glumes awnless; lower glume with narrow margins loosely inflexed; upper glume 1-5-ribbed. Lemma of empty floret translucent; lemma of bisexual floret translucent, smaller than lemma of empty floret, 2-lobed at apex extending into a delicate bent and flexuose awn, or rarely entire or awnless. Palea small, translucent, ribless. About 7 species in eastern Asia, India and Polynesia. 1 introduced in W.A.

***M. sinensis** Andersson

Eulalia

Culm robust, in large tussocks, 1-2 m tall, more or less glabrous except below panicle and at nodes. Leaf sheaths close around culms, somewhat keeled upwards; blades linear, 500-800 x 5-10 mm, tapering upwards into long slender points, margins minutely serrate, lower surface sparsely hairy, hirsute near ligule; ligule short, truncate. Panicle erect; racemes 100-250 mm long; rachis slender; short pedicels 1-3.5 mm long, longer pedicels 2.5-7 mm long, both slender, erect or slightly spreading, minutely hirsute. Spikelets straw-coloured, somewhat brownish, 4.5-5 mm long, as long as or a little shorter than the soft, white, spreading, involucre hairs. Lower glume acuminate, rounded on back, finely 3-ribbed, margins narrow, loosely inflexed; upper glume 1-ribbed, acuminate. Lower lemma oblong, obtuse or acute, sometimes minutely dentate or with fine marginal cilia; upper lemma translucent, often 2-lobed with 2 capillary lobes, awn slender and 7-10 mm long. Palea $\frac{1}{4}$ to $\frac{1}{2}$ as long as lemma.

Only collected from roadside at Armadale. Native to eastern Asia.

Flowers December-February.

NEURACHNE R. Br.

Tufted or stoloniferous perennials. Leaf blades flat, rigid and often ciliate; ligule a rim of short hairs. Inflorescence a short, dense, spike-like panicle; rachis persistent, spikelets densely crowded on very short branches. Spikelets sessile or distinctly but shortly pedicellate, laterally or slightly dorsally compressed, falling entire. Florets 2, the upper floret bisexual, the lower floret male or empty. Glumes differing in texture or indumentum. Lower floret: lemma usually narrow, shorter and thinner in texture than glumes, with or without palea. Upper floret: lemma translucent, much shorter than glumes and usually shorter than lower lemma; palea usually as long as lemma, more or less 2-keeled with inflexed margins. Caryopsis oblong in outline, free from lemma and palea. 5 or 6 species endemic to Australia. 4 in W.A. Reference: Blake, S.T. 1972. *Contr. Queensland Herb.* 13: 1-53.

N. alopecuroidea R. Br.

Foxtail Mulga Grass

Densely tufted perennial, erect from a short, branched, stocky rhizome; culms to 0.4 m tall; nodes hairy. Leaf sheaths coarsely striate, usually glabrous but sometimes with scattered tubercle-based hairs; blades flat or sometimes twisted, 30-80 x 2-4.5 mm, striate, glabrous or with scattered setulose, tubercle-based hairs along margins. Panicle erect, oblong, (12.5-)20-30 mm long, with densely crowded spikelets; rachis angular. Spikelets almost sessile, 6-10 mm long, hairy. Glumes narrow, unequal, densely sericeous, margins translucent towards base; lower glume narrowly ovate, 6-8 mm long, 3-5-ribbed, tapering to an acuminate point; upper glume longer than lower glume, broadly ovate, 11-15-ribbed; callus densely sericeous. Lower floret male; lemma oblong to ovate, shorter than upper glume, of similar texture, 5-7-ribbed, oblong to ovate, glabrous or hairy upwards with woolly ciliate margins; palea translucent, half length of lower lemma. Upper floret bisexual; lemma translucent, oblong, 10-11 mm long, 3-ribbed, scarcely acute, ciliate; palea of nearly equal length and texture to lemma, 2-ribbed, sparsely ciliate in upper $\frac{1}{3}$. **Fig. 316**

Common in undisturbed areas of the region. Occurs throughout the south west and inland areas of W.A.. Also in S.A. and Vic.

Flowers August-November.

***PANICUM L.**

Perennials or annuals. Leaf blades linear to narrowly ovate; ligule various. Inflorescence of 2 to many spike-like racemes. Spikelets unequally pedicellate, falling entire, pedicels often elongated. Florets 2 or 1, upper floret bisexual, lower floret, when present, male or empty. Glumes herbaceous to membranous; lower glume often much shorter than upper, rarely 3 or 4-lobed; upper glume as long as spikelet. Lemma of lower floret usually similar to upper glume. Lemma of upper floret more or less unequally biconvex, more or less coriaceous with firm margins, usually smooth, rarely transversely rugulose, more or less faintly ribbed. Paleas subequal to lemmas and of similar texture. Caryopsis tightly enclosed by hardened lemma and palea, dorsally compressed. Over 300 species from tropical and subtropical regions of both hemispheres, extending into warm temperate areas. 11 native and 5 introduced in W.A.

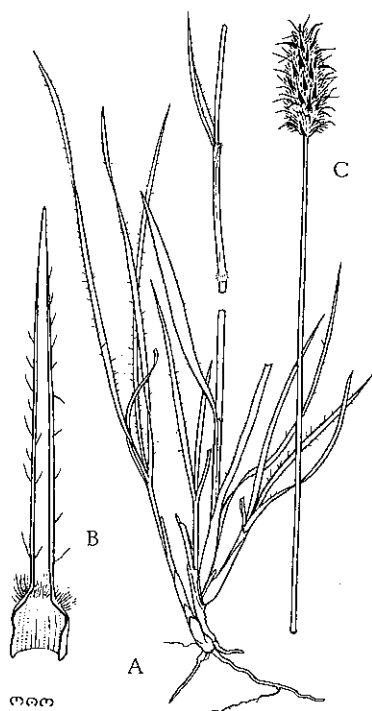


Fig. 316. *Neurachne alopecuroidea*. A, Habit. B, Leaf showing ligule. C, Spike-like panicle.

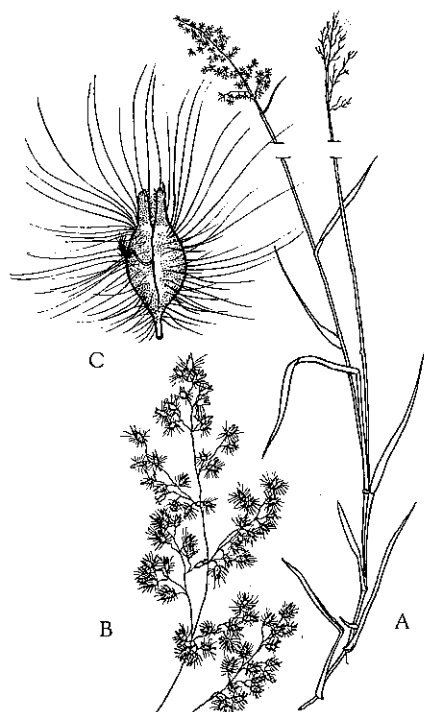


Fig. 317. *Rhynchelytrum repens*. A, Flowering stem with old and current panicles. B, Panicle. C, Spikelet.

- | | |
|---|-----------------------|
| 1. Pedicels 8-20 mm long. Spikelets solitary..... | * <i>P. capillare</i> |
| 1. Pedicels 1-5-(8) mm long. Spikelets in loose racemes. | |
| 2. Lemma and palea of upper floret finely but markedly transversely rugose. Upper glume obtuse..... | * <i>P. maximum</i> |
| 2. Lemma and palea of lower floret obscurely ribbed. Upper glume apiculate..... | * <i>P. miliaceum</i> |

**P. capillare* L.

Witchgrass

Erect or ascending, tufted annual, 0.2-0.8 m tall; culms erect, simple or branching, papillose, hispid to almost glabrous. Leaf sheaths often becoming loose, closely hirsute with tubercle-based hairs, strongly striate with prominent ribs; blades linear, 90-250 x 5-18 mm, sprinkled on both surfaces with tubercle-based hairs, gradually narrowed into acuminate apex; ligule membranous, densely ciliate with cilia ca 1 mm long. Panicle very diffuse, often half the length of the entire plant, the base included in the uppermost sheath until near maturity, finally divaricately spreading; rachilla sparsely pilose; pedicels scabrous, 8-20 mm long. Spikelets 2-3 mm long, elliptic, glabrous, apex acute or acuminate. Lower glume slightly less than half the length of the spikelet, triangular, 1 mm long, acute, 5-ribbed. Upper glume as long as spikelet, 2 mm long, 7-9-ribbed, convex on back, acute to acuminate. Lower floret: lemma similar to upper glume; palea absent. Upper floret: lemma plano-convex, thinly crustaceous, elliptic, 1.5-2 x 0.8 mm, pale, shortly acute, glabrous and shiny; palea of similar texture to lemma, inflexed margins slightly thinner.

A weed in Gosnells and Forrestdale, also at Bunbury. Also occurs elsewhere in the south west of W.A. Native to North America.

Flowers January-March with occasional flowers in November and May.

**P. maximum* Jacq.

Guinea Grass

Perennial, 1-3 m tall with short stout rhizomes; culms erect, rooting at lower nodes, usually glabrous, rarely more or less hirsute and rough with tubercle-based hairs. Leaf sheaths terete and tight, more or less striate, glabrous to hirsute; blades linear, 150-700 x 5-18 mm, flat, glabrous, softly hairy, or coarsely hirsute with tubercle-based hairs, especially on upper surface at base; ligule membranous, 1.5-

6 mm long, stiff and densely ciliate, usually with a dense row of hairs behind. Panicle contracted or open, 150-500 mm long, at length much exerted, rather densely flowered; branches filiform, angular and scabrous, lower branches whorled, erect or spreading; rachis slender, glabrous, terete; pedicels 1-5 mm long, very slender, scabrous. Spikelets green or tinged with purple, oblong, 2.5-4 x 1-1.25 mm, glabrous, obtuse. Glumes dissimilar, faintly ribbed, thin; lower glume about $\frac{1}{4}$ to $\frac{1}{3}$ the length of the spikelet, 1 mm long, translucent, 1-3-ribbed or apparently ribless, very obtuse and rounded to shortly acute; upper glume corresponding in shape and size to spikelet, 3-5 mm long, membranous, 5-ribbed. Lower floret male; lemma similar to upper glume, 4 mm long, 5-7-ribbed; palea oblong, ca 3 mm long, obtuse, membranous on back with narrow translucent wings on firmer keels, translucent margins broad towards base. Upper floret bisexual; whitish, oblong to elliptic, 2-2.5 mm long; lemma thinly crustaceous, finely transversely rugulose, shortly acute; palea of similar texture to lemma, more finely rugulose on back, glabrous and shining on curved sides, narrow translucent margins broadest towards base.

Collected from Queens Park, a possible escape from cultivation. Also collected from Kendenup in the south west. Native to the tropics and warm temperate regions of tropical Africa and southern Asia.

Flowers January to March.

***P. miliaceum L.**

Broom Millet, Millet Panic

Tufted, leafy annual, 0.2-1.2 m tall; culms terete or somewhat grooved, stout, up to 8 mm diameter, slender, simple or sparsely branched, sometimes more or less softly hirsute upwards. Leaf sheaths terete, somewhat loose, hirsute with spreading, conspicuously tubercle-based hairs; blades linear, flat, 150-300 x 8-25 mm, glabrous or loosely hairy with tubercle-based hairs tapering to a slender point, margins scabrous often undulating; ligule a narrow, ciliate rim, 1-4 mm long. Panicle dense or open, up to 300 mm long, often with base enclosed in uppermost sheath or shortly exerted; branches filiform, angular and scabrous. Spikelets in loose racemes of 3, green or greenish brown, 5-6 mm long, narrowly ovate to ovate, turgid, glabrous. Glumes and lower lemma thinly membranous with prominent ribs; lower glume broadly ovate, 3.5 mm long, 5-7-ribbed; upper glume the same shape as spikelet, 4.5 mm long, broadly rounded on back, 11-13-ribbed, apiculate to shortly rostrate. Lower floret empty; lemma similar to upper glume and nearly equal in length; palea ovate to narrowly ovate, up to $\frac{1}{3}$ length of lemma, translucent, truncate or emarginate. Upper floret bisexual; lemma white, yellow, red, brown or black, crustaceous, smooth and shiny; palea similar in texture to lemma.

Cultivated in the region but does occur spontaneously in gardens, waste and fallow land in the south west of W.A. Native to China and central Asia.

Flowers January, April, and August.

***PARAPHOLIS C.E. Hubb.**

Annuals. Leaf blades flat; ligule translucent. Inflorescence a slender or curved spike; rachis tough, readily breaking at nodes. Spikelets solitary, sessile, partly sunken in hollows of the rachis. Floret 1, bisexual. Glumes persistent, rigid, subequal, narrow, placed with sides against rachis, acute. Lemma almost as long as glumes, translucent, lateral ribs short. Palea as long as lemma. Caryopsis narrow. 4 species from Europe, northern Africa and Asia. 1 naturalized in W.A.

***P. incurva (L.) C.E. Hubb.**

Coast Barbgrass

Annual up to 300 mm tall; culms numerous, erect, glabrous, much-branched. Leaf sheaths loose; blades flaccid, 25-85 x 1-3 mm, flat, lower surface smooth, upper surface and margins rough; ligule translucent, short, truncate, usually jagged. Spike 50-150 mm long, straight or curved; rachis thick or tough, slowly breaking between the spikelets. Rachilla continued as minute bristle beyond palea. Spikelets embedded in alternate cavities of rachis. Glumes narrowly ovate, equal or subequal, 5-7 mm long, rigidly coriaceous, 5-ribbed, those of terminal spikelets opposite, those of lateral spikelets placed side by side in front of cavity of the rachis, overlapping at base. Lemma narrowly ovate, 3.5-4 mm long, translucent, indistinctly 1-3-ribbed, acute. Palea almost equal to lemma.

Recorded near Pinjarra. Widespread from Kalbarri to Busselton, eastwards to Norseman and Esperance. Native to Europe and Asia.

Flowers September-November.

***PASPALUM L.**

Annuals or perennials. Leaf sheaths loose, distinctly striate; blades flat, distinctly striate with finer striae between; ligule membranous, short. Inflorescence of spike-like racemes. Racemes solitary, paired, digitate or racemose on a common axis. Spikelets solitary or paired, falling entire at maturity, shortly pedicellate in 2 rows on 1 side of narrow axis of spike-like racemes. Florets 2, dissimilar; lower floret empty and reduced to lemma; upper floret bisexual. Lower glume absent, rarely a small scale; upper glume more or less equal in length to the spikelet. Lower lemma usually similar to upper glume; upper lemma with narrow, finer, involute margins; back of lemma facing rachis. Palea almost equal to lemmas and similar in texture. Caryopsis tightly enclosed by lemma and palea. Over 200 species, confined to the warmer regions of both hemispheres, the majority American. 1 native and 6 introduced in W.A.

1. Spikelets solitary, margins not fringed.
2. Spikelets sessile; upper glume glabrous..... ***P. vaginatum**
2. Spikelets shortly pedicellate; upper glume minutely appressed-hairy..... ***P. distichum**
1. Spikelets in pairs, occasionally 3 together, margins fringed with long sericeous hairs.
 3. Upper glume slightly longer than lower lemma. Racemes mostly 2-11 per panicle..... ***P. dilatatum**
 3. Upper glume and lower lemma of equal length. Racemes mostly 12-18 per panicle..... ***P. urvillei**

***P. dilatatum Poiret**

Paspalum

Perennial; culms erect or ascending from a decumbent base, 0.4-1.75 m tall, sparingly branched from lower nodes, glabrous except for spikelets and base of leaf blades. Leaf sheaths compressed, loose; blades flat, ascending or spreading, linear, 60-450 x 3-12 mm; ligule membranous, 2-4 mm long, truncate. Panicle erect or somewhat pendulous, 70-250 mm long, with 2-11 ascending, spreading or pendulous 1-sided racemes; racemes 25-110 mm long, dense; rachis narrowly winged, margins scabrous, fringed with long hairs where racemes arise. Spikelets paired, in 4 rows, shortly pedicellate, closely imbricate, green or sometimes purple, broadly elliptic to ovate, 3 mm long. Lower glume absent; upper glume slightly exceeding the lower lemma, 5-9-ribbed, lateral ribs often obscure, sparsely hairy, fringed with fine, long, sericeous hairs. Lower lemma sometimes sparsely fringed with long sericeous hairs; upper lemma very broadly elliptic, crustaceous, minutely papillose-striate. Palea circular.

Naturalized throughout the Coastal Plain especially in moist areas. Also collected from the Ord River. Native of South America from Brazil to Argentina. A weed in lawns.

Flowers October-April.

***P. distichum L.**

Water Couch

Perennial; culms 0.05-0.5 m tall, erect or ascending from creeping base and rooting at the nodes, usually stout, often long and branching; nodes dark, glabrous or with few ascending hairs. Leaf sheaths often longer than the internodes, becoming loose, keeled; blades linear, 30-150 x 2-7 mm, flat when fresh, often folded and keeled when dry, glabrous, often minutely hairy, acute; ligule membranous, ca 0.5 mm long, truncate, with a few hairs behind. Peduncles usually short, often included in uppermost sheath. Racemes 2 or rarely 3 together, at first erect, later spreading and reflexed, 15-70 mm long. Spikelets usually solitary, occasionally paired near the middle of the raceme, imbricate, shortly pedicellate. Lower glume sometimes developed as a minute scale; upper glume and lower lemma equal in length to each other and to the spikelet, 3-3.5 mm long, 3-5-ribbed with midrib fairly prominent, thinly membranous, the glume minutely and rather obscurely appressed-hairy.

Common in Perth metropolitan area and in the wetter southern areas of the Perth Region. Occurs in the higher rainfall areas of the south west. Native to tropical and subtropical areas of the world. A weed of cultivated land, especially wet areas.

Flowers December-April.

***P. urvillei** Steudel

Vasey Grass

A densely tufted perennial forming dense clumps, 0.75-2.5 m tall, villous at the base; culms erect, glabrous, sometimes branching from lower nodes. Leaf sheaths equal in length to internodes, keeled upwards, lower part loose and coarsely hairy, upper part nearly glabrous, ciliate; leaf blades flat, linear, 120-500 x 3-15 mm, long-pilose on upper surface behind ligule, margins scabrous, often undulate, apex a fine point; ligule membranous, 3-8 mm long, obtuse, occasionally with scattered hairs on outer surface. Panicle erect, common axis angled, 100-400 mm long; racemes (6)12-18(30), suberect or ascending, mostly 1-sided, dense, 60-140 mm long, uppermost becoming gradually shorter; rachis narrowly winged with scabrous margins; pedicels slender, flattened, ca 2-2.5 mm long. Spikelets green or purplish, paired (raceme appearing 4-rowed), imbricate, broadly ovate to elliptic, ca 2 mm long. Lower glume absent; upper glume and lower lemma equal in length to each other and to the spikelet, 3-5-ribbed, both fringed with long sericeous hairs, glume sparsely clothed with appressed sericeous hairs throughout, lemma glabrous or almost so on back. Bisexual floret very broadly elliptic, thinly crustaceous, pale, nearly glabrous.

Generally in moist or disturbed areas where the soil is moist throughout summer. Has not been collected out of the region. Native to South America from Brazil to Argentina.

Flowers August-March.

***P. vaginatum** Sw.

Salt Water Couch, Seashore Paspalum

Perennial with long creeping stolons; culms ascending, 0.1-0.6 m tall. Leaf sheaths longer than internodes, glabrous; blades linear, 30-150 x 1-3 mm, acute; ligule short, obtuse. Racemes usually 2 or 3, 20-40 mm long, at first erect and appressed, finally spreading. Spikelets solitary, oblong, 3-4 mm long, dorsally compressed, sessile or mostly so in 2 rows along 1 side of flattened rachis. Lower glume absent; upper glume firmly membranous, equal to spikelet, 5-ribbed, midrib obscure, glabrous. Lower lemma similar to upper glume, 2-2.5 mm long; upper lemma coriaceous to crustaceous, ca 2 mm long, 5-ribbed. Bisexual floret narrowly obovate.

Collected from Perth metropolitan area. Also collected along the south coast. Native to the tropics.

Flowers December-March.

***PENNISSETUM** Rich. ex Pers.

Tufted or stoloniferous perennials or annuals; culms simple or profusely branched. Leaf blades linear to narrowly ovate; ligule reduced to a ciliate rim, rarely membranous. Inflorescence usually a dense spike-like panicle, branches very short. Spikelets frequently gaping, sessile or shortly pedicellate, solitary or in fascicles of 2-5, surrounded by and deciduous with an involucre of few to many naked or hairy bristles. Involucral bristles slender, free, rarely connate at base into a minute disc, simple, outermost bristles shorter, inner bristles longer and subequal but often 1 stouter and exceeding the rest. Florets 2; lower floret male or empty, rarely bisexual; upper floret bisexual, often male in lateral spikelets. Glumes narrowly ovate or oblong, membranous. Lemma in empty florets sometimes reduced to a minute, translucent scale. Paleas narrow, 2-keeled, rarely absent. Caryopsis enclosed between lemma and palea, mostly oblong in outline and dorsally compressed, obovoid or subglobular. About 70 species in the tropics and subtropical regions. 1 species extends from India to N.S.W., 3 others are native to northern Australia. 9 in W.A. Several have been introduced as ornamentals or fodder plants, a few of which have become naturalized.

1. Inflorescence a cluster of 2-4 spikelets usually enclosed in the upper leaf sheaths..... ***P. clandestinum**
1. Inflorescence a well developed, terminal, pedunculate spike-like panicle.
 2. Annual. Spikelets crowded and at maturity gaping and exposing the caryopsis. Bristles of involucre scarcely exceeding the spikelets..... ***P. glaucum**
 2. Perennial. Spikelets not gaping and exposing the caryopsis. Bristles of involucre the same length or exceeding the spikelets.
 3. Inner bristles of involucre conspicuously plumose, giving the panicles a feathery appearance.
 4. Panicle narrowly cylindrical, 100-250 mm long, straw-coloured but usually conspicuously purple; involucre bristles 16-40 mm long, mostly 16-26 mm long..... ***P. setaceum**

4. Panicle shortly cylindrical to oblong, 30-100 mm long, usually pallid, occasionally purple; outer involucral bristles ca 30 mm long, inner ones 40-50 mm long..... ***P. villosum**
3. Inner bristles of involucre scabrous or with one or a few sparingly plumose towards base.
5. Bristles same length as spikelet except for one which is stouter and longer (8-15 mm long), all scabrous..... ***P. macrourum**
5. Bristles longer than spikelet, one stouter and (12-40 mm long) than the others, mostly scabrous, except for few inner ones which are sparingly plumous towards base..... ***P. purpureum**

***P. clandestinum** Hochst. ex Chiov.

Kikuyu Grass

A low, closely matting perennial with numerous stolons; culms 70-150 mm tall, and forming long, much-branched stolons which are appressed to ground. Leaf sheaths closely imbricate, almost membranous, usually hairy, especially along margins; blades linear, 10-300 x 3-7 mm, glabrous or sprinkled with tubercle-based hairs. Inflorescence reduced to a cluster of 2-4 spikelets, enclosed for greater part in uppermost leaf sheaths, each subtended by involucre of up to 15 unequal, delicate bristles up to $\frac{3}{4}$ length of spikelet. Spikelets bisexual or functionally unisexual, subsessile or the terminal one shortly pedicellate, narrowly ovate, 10-20 mm long, glabrous, whitish below, greenish upwards. Lower glume minute or absent, translucent, ribless; upper glume ovate, up to 2 mm long, translucent, usually ribless or obscurely few-ribbed. Lower floret empty; lemma narrowly ovate, tapering, as long as spikelet, thinly membranous, 8-13-ribbed; palea absent. Upper floret appearing bisexual but either functionally female with rudimentary stamens or functionally male with rudimentary ovary; lemma similar to that of lower floret but slightly shorter; palea narrowly ovate, very thin, 2-4-ribbed, long-acuminate.

Commonly cultivated as a hard-wearing lawn but has become naturalized in several areas in the region, particularly where water is abundant. Native to tropical east Africa.

Flowers October-March.

***P. glaucum** (L.) R. Br.

Pearl Millet

Annual; culms stout, erect, 1-2 m tall, glabrous except for ring of dense hairs at upper nodes and dense hairs towards inflorescence. Leaf sheaths often loose, ciliate, glabrous or loosely to densely hirsute with stiff, tubercle-based hairs; blades flat, linear to narrowly ovate, 150-600 x 9-50 mm, rounded at the base, glabrous, loosely hirsute or scabrous, acute. Panicle brown or purple, very dense, stiff, erect, cylindrical, tapering towards base, 60-400 x 12-40 mm, pallid, rachis densely villous. Involucres: stalks 1-10 mm long; bristles 25-70, slender, outer bristles short and scabridulous; inner bristles slightly stouter, subequal, 4-7 mm long, sparsely plumose below. Spikelets 1-7 per cluster, obovate to elliptic or oblong, 3.5-5 mm long; pedicels 1-2 mm long. Glumes unequal, truncate or obtuse, ciliolate at apex; lower glume 0.5-1.5 mm long, ribless; upper glume 0.5-2.5 mm, ribless or 3-ribbed. Lower floret male or empty; lemma elliptic to oblong, 1-4 mm long, membranous, obscurely 1-7-ribbed, minutely puberulous near apex and ciliolate at apex, apex truncate or emarginate, sometimes mucronulate; palea narrowly oblong, about as long as lemma, scabridulous on keels or more or less hairy. Upper floret bisexual, frequently separating from rest of spikelet on maturity; lemma ovate to elliptic, as long as spikelet, indurate, 5-7-ribbed, glabrous and shining on back below strongly ribbed apex, apex obtuse or abruptly pointed, sometimes mucronate, minutely hairy or scabridulous to long-ciliate near margins; palea narrowly ovate, truncate, glabrous and smooth on back, minutely hairy on sides, sometimes villous on margins. *P. typhoides* (Burm.) Stapf & C.E. Hubb.

Cultivated in some places but may occasionally be naturalized. Recorded from Fremantle and Waroona. Widely cultivated for grain and forage for cattle in various parts of the world, probably native to America, Africa and India.

Flowers September and October with occasional flowers in March.

***P. macrourum** Trin.

African Feather Grass

Densely tufted perennial with creeping, often stout rhizome; culms ca 1 m tall, erect, rather stout especially towards base, glabrous except where scabrous below panicle. Leaf sheaths rounded on back, firmly chartaceous, striate; blades linear, 400-750 x 4-12 mm, smooth beneath, finely scabrous above, tapering to a fine or setaceous flexuose apex, coarsely scabrous on margins. Panicle spike-like, cylindrical,

erect, 80-300 x 8-12 mm, dense, usually pallid, rarely brown or purple, main axis scabridulous. Involucres subsessile, more or less appressed to the axis or erectly spreading, consisting of numerous unequal, slender, scabrous bristles, shorter to slightly longer than spikelets, except one which is 8-15 mm long and stouter than others. Spikelets solitary or paired towards base of panicle, sessile, narrowly ovate, acute to acuminate, 4-6 mm long, pallid, glabrous. Lower glume minute or absent, translucent, 1-ribbed or ribless. Upper glume 1-3 mm long, translucent, 1-ribbed or ribless, ovate or rounded, acute to acuminate. Lower floret empty and reduced to a lemma; lemma 5-ribbed, sometimes ribs purple, firmly translucent-membranous, acute to narrowly acuminate, shortly awned; palea absent. Upper floret bisexual; lemma similar to lower glume, palea narrowly ovate.

Naturalized in the Perth metropolitan area, Waroona and Boyanup. Native to South Africa.

Flowers October-February.

***P. purpureum** Schum.

Elephant Grass, Napier Grass

Robust perennial, often forming large clumps 1-4 m tall, sometimes spreading by long stolons; culms erect, stout at base, up to 25 mm in diameter, terete or compressed towards base. Leaf sheaths terete, usually glabrous, sometimes more or less hirsute with tubercle-based hairs; blades linear, 300-1200 x 10-37 mm, flat, more or less hairy on upper surface particularly towards base, midrib stout, with 7 primary ribs on each side, tapering to a fine point, margins whitish, thickened, scabrous. Panicle dense, 80-300 x 14-30 mm, yellow or brownish to purple, upper 1/4 of panicle of empty florets, main axis densely pilose with minute stumps of deciduous involucres. Involucres subsessile, at length becoming reflexed; bristles numerous, unequal, scabrous except for one or more of innermost which are sparingly plumose towards base, most 10-16 mm long but one larger bristle 12-40 mm long. Spikelets solitary within the involucre or in clusters of 2-5. Lower glume very minute, translucent and ribless; upper glume ovate, 0.5-1 mm long, thin, 1-ribbed or ribless, acute or obtuse. Lower floret male or empty; lemma narrowly ovate, from short to as long as spikelet, 1-3(-7)-ribbed, acute or acuminate; palea shorter than lemma and narrowly ovate or lacking. Upper floret bisexual or male; lemma as long as spikelet, narrowly ovate, acuminate, glabrous below, minutely scabridulous upwards, 5(-7)-ribbed with ribs more or less prominent towards apex; palea shorter than lemma, narrow.

Cultivated in the Perth metropolitan area but naturalized at Swanbourne, Maida Vale and along the banks of the Swan River at Alfred Cove. Native to tropical Africa.

Flowers March-August.

***P. setaceum** (Forsskal) Chiov.

Fountain Grass

Densely tufted perennial; culms loosely tufted, erect, up to 1 m tall, terete or compressed in upper part. Leaf sheaths striate or slightly keeled upwards; ciliate; blades narrowly linear, 100-300 x 2-35 mm, convolute, prominently ribbed, scabrous, glabrous with few hairs towards base, scabrous on upper surface and margins, apex an almost setaceous point. Panicle spike-like, straw-coloured to purple, moderately dense, erect or pendulous, narrowly cylindrical, 100-250 x 12-16 mm, conspicuously plumose; rachis striate, loosely pilose and scabridulous. Involucres spreading, each with a villous stalk up to 3 mm long; bristles up to 25 in each involucre, becoming purplish, slender, unequal, 16-40 mm long, most up to 26 mm long but one usually stouter and longer than the others, free to base, straight, loosely plumose, with long tubercle-based hairs, scabridulous. Spikelets narrowly ovate, 4.5-6.5 mm long, glabrous or minutely bearded at base, solitary or in clusters of 2 or 3. Lower glume a translucent, obtuse scale up to 1 mm long or absent; upper glume ovate or narrowly ovate, membranous, up to 5 mm long, 1-ribbed, acute or slightly acuminate, usually mucronate. Lower floret empty, rarely male; lemma ovate, 4-6 mm long, 1-3(-5)-ribbed, scabridulous on ribs, acute or slightly acuminate, usually mucronate; palea absent or if present ovate. Upper floret bisexual, or male in lateral spikelets of cluster; lemma ovate to oblong, as long as spikelet, membranous, usually 5-ribbed, acute or mucronate with mucro up to 1 mm long, scabridulous at apex, rarely the upper margins ciliate; palea slightly shorter than lemma.

Common in disturbed areas of the Perth metropolitan area. Also recorded from Geraldton, Karratha and Port Hedland. Native of north east Africa.

Flowers July-November with occasional flowers in March.

***P. villosum** R. Br. ex Fresen.

Feathertop

Perennial; culms ascending, 0.3-0.6 m tall, hairy below the panicle, glabrous or scattered scabrous. Leaf sheaths loose, glabrous and striate, keeled, ciliate in upper part with sericeous hairs; blades linear, 70-350 x 1-5 mm, convolute or flat, glabrous or with scattered hairs, attenuate into a setaceous apex. Panicle yellowish or purple, ovoid or oblong, 30-100 x 10-15 mm, dense and feathery; rachis hairy. Spikelets in groups of 3 to 5, pedicellate. Involucre of 20-55 unequal bristles; outer bristles ca 30 mm long, simple, scabrous; inner bristles 40-50 mm long, with plumose, tubercle-based hairs. Spikelets 10-12 mm long, narrowly ovate, glabrous, acuminate. Lower glume translucent, circular, minute; upper glume narrowly ovate, less than half the length of the spikelet, 2.5-4 mm long, membranous, 1-ribbed, acuminate. Lower floret male or empty; lemma narrowly ovate, 8 mm long, scabrous, 7-9-ribbed; palea similar, 7 mm long, 2-lobed, 2-keeled. Upper floret bisexual; lemma narrowly ovate, acuminate, margins translucent, 5-ribbed upwards; palea almost as long, acuminate, and shortly 2-lobed.

A species cultivated in gardens but also a weed of disturbed localities around the Perth metropolitan area. Also occurs at Donnybrook, Bridgetown and Geraldton. Native to north east Africa.

Flowers February-October.

***PENTASCHISTIS** (Nees) Spach

Perennials or annuals. Ligule a ring of short hairs. Inflorescence of open or contracted panicles. Spikelets pedicellate, laterally compressed; rachilla disarticulating between lemmas, produced as a minute bristle. Florets 2 or rarely 3, bisexual. Glumes equal or subequal, narrowly ovate, translucent, keeled. Lemmas membranous, 2-lobed (rarely 3 or 4-lobed), awnless or awned from sinus, lobes having fine bristles. Paleas 2-keeled, 2-lobed. Caryopsis obloid, terete or subterete with shallow groove. About 60 species from Africa and Madagascar (Malagasy). 2 introduced in W.A.

- | | |
|--|-----------------------|
| 1. Annual. Lemma glabrous..... | *P. airoides |
| 1. Perennial. Lemma villous near base, sometimes sparsely so along ribs and margins..... | *P. thunbergii |

***P. airoides** (Nees) Stapf

False Hairgrass

Delicate annual, 50-160 mm tall. Leaf sheaths loose, striate, scabrous with tubercle-based hairs; blades 9-20 x 0.5-1 mm, inrolled or flat, scabrous; ligule 0.25 mm long. Panicle narrow, 20-40 mm long, becoming loose. Glumes 1.5-3 mm long, keeled, keel minutely scabrous, apex 2-lobed, acute. Lemma 1.5-2 mm long, glabrous, central awn 5-6 mm long; 2 lateral lobes 1-2 mm long including awns.

Only 1 collection has been made from the region although it occurs at several localities just outside. It is widespread throughout the south west from Geraldton to Esperance and into the goldfields, as far east as Fraser Range. Native to southern Africa.

Flowers September-December.

***P. thunbergii** Stapf

Perennial, 0.1-0.5 m tall, glabrous. Leaf sheaths striate, hirsute; blades flat, 30-200 x 0.5-5 mm, villous; ligule 1 mm long. Panicle golden brown, dense, ovate, 20-50 mm long. Spikelets numerous. Glumes 3.5-5 mm long, translucent, suffused with purple, keel green with few scabrous hairs. Lemma 1.75-2.5 mm long, with tuft of villous hairs at base and often a few villous hairs along margins and ribs, apex 3-5-ribbed, central awn 5-9 mm long, 2 lateral awns ca 2 mm long. Palea linear, 1.5-1.75 mm long.

This species is common in the Perth metropolitan area. Also recorded near Collie. Native to southern Africa.

Flowers August-November.

***PHALARIS L.**

Annuals or perennials, with short contracted rhizomes forming dense crowns or with elongated rhizomes; culms erect, terete. Leaf sheaths more or less dilated; blades flat, linear; ligule membranous, truncate or jagged. Inflorescence a terminal, rigid, spike-like panicle, subcapitate, cylindric or interrupted and lobed. Spikelets shortly pedicellate, laterally compressed; rachilla disarticulating above glumes. Florets 3, 1 bisexual and 2 empty. Glumes equal, laterally compressed, strongly keeled with keel often winged, wing entire, irregularly lobed or denticulate. Empty lemmas thin and chaffy, usually hairy upwards from minute, glabrous, thickened base; lemma of bisexual floret thin or crustaceous, acute. Palea almost as long as lemma. Caryopsis compressed, ovate in outline, enclosed by lemma and palea. About 20 species from the Mediterranean Region and America. 6 introduced in W.A. Several have been introduced into many parts of the world as weeds of cultivation, fodder grasses or small grain for birds.

1. Spikelets in groups of 7, with one bisexual and 6 sterile spikelets falling as an entire group..... ***P. paradoxa**
1. Spikelets all alike, not in groups, falling separately.
 2. Perennials with a rhizome.
 3. Glumes tapering into a long acute point, keel not or obscurely winged towards apex, serrulate..... ***P. arundinacea**
 3. Glumes acute but not tapering into a long point, keel narrowly winged over upper $\frac{2}{3}$, entire or serrulate..... ***P. aquatica**
 2. Annuals.
 4. One of empty florets lacking or reduced to a minute scale..... ***P. minor**
 4. Both empty florets present.
 5. Spikelets 8-10 mm long, broadly ovate, keel broadly winged in upper part, entire..... ***P. canariensis**
 5. Spikelets 3-5.5 mm long, narrowly oblong, keel narrowly winged towards apex, serrulate..... ***P. angusta**

***P. angusta** Nees ex Trin.

Annual, up to 1.5 m tall; culms slender, erect. Leaf sheaths tight around the culms, striate; blades 40-300 x 3-11 mm, almost glabrous or sparsely scabrous; ligule 3-5 mm long. Panicle green, sometimes purple, dense, cylindric, narrow, 25-170 x 5-15 mm, base enclosed by uppermost sheath, at length exerted; peduncle sparsely scabrous to glabrous. Spikelets densely imbricate. Glumes narrowly oblong, 3-5.5 mm long, scabrous on ribs for most of length, keel narrowly winged towards summit; wing greenish except for a narrow, whitish, scabrous margin. Empty lemma subulate, 0.5-1.5 mm long, with tuft of hairs above scale-like base, acuminate; lemma of bisexual floret ovate, 2-3 mm long, appressed-hairy, shining, becoming brown at maturity. Palea 2-3 mm long, obscurely 2-ribbed, sparsely hairy on keel, laterally glabrous or appressed-hairy over whole surface.

Collected from Bassendean, Forrestfield and Gosnells. Native to southern South America.

Flowers November-February.

***P. aquatica** L.

Phalaris, Toowoomba Canary Grass

Erect tufted perennial; culms 0.3-0.6 m tall, stout, occasionally rooting at lower nodes. Leaf sheaths glabrous, rounded on back; blades 30-450 x 2-14 mm, prominently striate; ligule 6-12 mm long. Inflorescence a spike-like panicle, dense, 15-150 x 10-25 mm, cylindric or sometimes narrowly ovoid, occasionally lobed at base, spikelets often arising in pairs. Spikelets pallid or greenish. Glumes persistent, subequal, 4.5-7.5 x 1-2 mm, glabrous or rarely hirsute, narrowly winged over upper $\frac{2}{3}$ and attenuated at each end, serrulate or entire. Empty lemma 1.5-2.5 mm long, hirsute, appressed to bisexual lemma; lemma of bisexual floret thinly chartaceous, 3-4.5 mm long, appressed-hairy, 5-ribbed, more or less shining. Palea 2.5-4 mm long, 2-ribbed, hairy on keel, glabrous on sides. *P. tuberosa* L.

This species is used as a pasture grass but has occasionally become naturalized. Naturalized at Benger and Boyanup and outside the region at Narembeen, Muresk, Bindoon and Bridgetown. Native to the Mediterranean Region.

Flowers September-December.

***P. arundinacea L.**

Reed Canary Grass

Perennial with scaly creeping rhizome, 0.5-1.2 m tall; culms stout, erect or bent at base, sometimes rooting at lower nodes. Leaf sheaths glabrous, rounded on back; blades 100-350 x 6-25 mm, glabrous but scabrous in upper part; ligule 2.5-16 mm long. Panicle erect, somewhat pendulous, dense and spike-like, 50-400 x 10-40 mm, somewhat loose, interrupted and lobed below, branches spreading at anthesis. Spikelets densely crowded, green, purple or white, oblong, 3.5-7.5 mm long, laterally compressed. Glumes persistent, subequal, narrowly ovate, tapering into a long acute point, firm, minutely scabrous, acute, 3-ribbed, keeled, the keel wingless or with very narrow obscure wing. Empty lemma subequal, subulate, 1-2.5 mm long, shortly hairy throughout; lemma of bisexual floret 2.5-4.5 mm long, keeled, firm, 5-ribbed, with appressed scattered hairs. Palea 4-5 mm long, 2-ribbed, hairy on keel, glabrous on sides.

Collections have been made from Roleystone and Spearwood. Also recorded from Busselton and Narrikup. Native to Europe, Africa, Asia and North America.

Flowers December-April.

***P. canariensis L.**

Canary Grass

A tufted annual, 0.15-0.2 m high; culms erect or bent at base, slender to moderately stout, stiff, glabrous. Leaf sheaths glabrous or slightly scabrous, rounded on back; blades 50-300 x 4-12 mm, glabrous or scabrous, tapering to a fine point, abruptly narrowed into sheath; ligule 3-8 mm long. Panicle spike-like, ovate to narrowly ovate, 15-70 x 12.5-25 mm, erect, dense, white with prominent green ribs. Spikelets all alike, laterally compressed, imbricate, broadly ovate, 8-10 mm long, deciduous above the glumes at maturity. Glumes pale green or white with a prominent green keel, narrowly obovate, 8.5-10 mm long, persistent, abruptly acute, broadly winged on the keel in the upper part, minutely strigose or glabrous on sides, firm, 3-5-ribbed, slightly hairy, wing entire. Empty lemma 2-4.5 mm long, broad, chartaceous except for minute scale-like base, sparsely hairy or almost glabrous; lemma of bisexual floret 4.5-6.5 mm long, acute, keeled, densely appressed hairy, tough, becoming glabrous and glossy. Palea 5.5 mm long, 2-ribbed, hairy along keel in upper half.

This plant is commonly cultivated for seed for caged birds and is an occasional weed. One collection has been made from the Perth metropolitan area and outside the region it has been collected from near Geraldton and Manjimup. Native to the Canary Islands and north west Africa.

Flowers September and October.

***P. minor Retz.**

Lesser Canary Grass

Erect, tufted, leafy annual 0.1-1 m tall; culms erect or bent at base, glabrous. Leaf sheaths mostly close around culms, glabrous; blades 20-300 x 4-13 mm, glabrous or scabridulous; ligule 8-10 mm long. Panicle spike-like, dense, soft, ovate to oblong, 10-90 x 10-20 mm, branches and pedicels short, scabrous. Spikelets often spreading, imbricate, laterally compressed. Glumes persistent, narrowly oblong, 4-6.5 mm long, winged on keels in upper $\frac{1}{3}$ to apex, wings crescent shaped, scabrous or irregularly lobed, 3-ribbed. Bisexual floret compressed, ovate, 2.75-4 mm long, hairy, firstly pallid becoming greyish brown. Lemma 2.75-4 mm long, indistinctly 5-ribbed. Palea 2.5-3.5 mm long, hairy on keel, glabrous on sides.

Common in the Perth metropolitan area extending southwards to Benger. Widespread in the south west from Geraldton to Esperance. Native to the Mediterranean Region and western Europe.

Flowers August-November.

***P. paradoxa L.**

Paradoxa Grass

Glabrous, tufted annual, 0.2-0.5 m tall; culms erect, simple or branched. Leaf sheaths striate, scabridulous; blades 100-200 x 2-9 mm, scabrous, acuminate; ligule thinly membranous, 3-5 mm long, obtuse. Panicle obloid or obovoid, rarely cylindrical, 20-90 x ca 20 mm, only shortly exerted from uppermost sheath. Spikelets falling in groups of 7, each group consisting of 6 pedicellate, sterile spikelets clustered around a single, sessile, bisexual spikelet, 2 of the sterile spikelets usually larger than others; peduncle scabrous; pedicel glabrous. Sterile spikelets empty or enclosing an abortive anther; glumes 3-6 mm long. Glumes of bisexual spikelet firm, 5.5-8 mm long, up to 7-ribbed, with ribs prominent,

acuminate, shortly awned, keel with sickle shaped, tooth-like wing near or above middle. Lemma indurate, pallid, glabrous, shining; lemma of empty floret scale-like, glabrous projections closely appressed to base of bisexual lemma; lemma of bisexual floret ovate to elliptic, 2.5-3.5 mm long.

Collected from Bassendean, Baldvis and Garden Island. Also occurs at Collie and Gnowangerup. Native to the Mediterranean Region and south west Europe.

Flowers October and November.

***PIPTATHERUM** P. Beauv.

Tufted perennials with tough culms. Leaf blades linear, flat or narrow and convolute; ligule membranous. Inflorescence a loose or contracted panicle with pendulous spikelets. Spikelets pedicellate; rachilla disarticulating above glumes. Floret 1, bisexual. Glumes persistent, longer than lemma, thin, acute to acuminate. Lemma rigidly membranous to coriaceous, (3-)5-ribbed, apex obscurely 2-lobed; awn when present arising from minute sinus, bristle-like, readily breaking off from lemma, glabrous. Palea shorter than lemma. Caryopsis obloid or ovoid, terete. *Oryzopsis* Michx. About 50 species widespread in tropics and northern temperate areas. 1 introduced in W.A.

***P. miliaceum** (L.) Cosson

Rice Millet

Glabrous perennial to 1 m tall. Leaf blades flat, to 300 x 4-7 mm, glabrous or scabrous; ligule 2 mm long. Panicle open with many whorled branches, 300-400 mm long, spikelets occurring at the ends of branches. Spikelets 4-5 mm long (including awn), shortly pedicellate. Glumes often purple, nearly equal, 3 mm long, acuminate, 3-9-ribbed. Lemma 1-2 mm long (excluding awn), shiny, hardened, apex with 2 small lobes and a straight, terminal, deciduous awn; awn 3-5 mm long.

Occurs at scattered localities within the region, and elsewhere in the south west. Native to the Mediterranean Region.

Flowers October-January with occasional flowers in July.

***PLAGIOCHLOA** Adamson & Sprague

Perennials. Leaf blades expanded, inrolled; ligule a hairy rim. Inflorescence a spike, spike-like panicle or raceme. Spikelets sessile, usually in 2 rows, placed obliquely to rachis. Florets 3-14, bisexual. Glumes shorter than spikelets, shortly awned or awnless, glabrous or hairy. Lemmas hairy with clavate hairs, awnless or shortly awned. About 7 species from South Africa. 1 introduced in W.A.

***P. uniolae** (L. f.) Adamson & Sprague

A slender, straggly perennial, 100-300 mm tall. Leaf blades flat or inrolled, 40-320 x 0.5-3 mm; glabrous or hairy. Panicle spike-like, 10-40 mm long. Spikelets 4-5 mm long. Florets 5 or 6. Glumes narrowly ovate, 6-7 mm long, subequal, acute, acuminate or minutely awned, glabrous or occasionally with few hairs on keels and margins, 5-ribbed. Lemma narrowly ovate, 6-7 mm long, acute, with bulb shaped hairs on lower third or between ribs, keeled, markedly so in upper third, 7-ribbed, often with purple colouration at apices. Palea glabrous, 5-6 mm long.

Several collections from the Perth metropolitan area. Also collected at Esperance. Native to South Africa.

Flowers October-December.

POA L.

Tufted annuals or perennials often forming large tussocks, sometimes rhizomatous or stoloniferous; culms erect or prostrate. Leaf blades, flat, convolute, involute or folded, often narrow and bristle-like, keeled; ligule membranous or reduced to a ciliate rim. Inflorescence an open or contracted panicle. Spikelets pedicellate, laterally compressed; rachilla breaking between the glumes and between lemmas. Florets 2-several, bisexual, uppermost floret empty. Glumes unequal, acute, keeled. Lemmas keeled,

hairy on back towards base. Paleas scabrous or ciliate on 2 keels. Caryopsis ovoid to obloid, often grooved. About 200 species occurring in temperate and cold climates and extending into the upland tropics. 7 native and 4 introduced in W.A. Reference: Vickery, J.W. 1970. Contr. New South Wales Natl. Herb. 4: 145-243.

1. Annuals up to 300 mm tall.
 2. Lower panicle branches spreading or reflexed after flowering; florets closely imbricate..... ***P. annua**
 2. Lower panicle branches not reflexed after flowering; florets distant, scarcely overlapping..... ***P. infirma**
1. Perennials up to 1 m tall.
 3. Plant with 1-3 globular bulbous internodes at base of culms **P. drummondiana**
 3. Plant without globular swellings at base of culms.
 4. Lemma minutely scabrous to distinctly hairy on keel, without hairs on lateral ribs.
 5. Lemma minutely scabrous. Callus glabrous..... **P. serpentum**
 5. Lemma hairy on keel. Callus hairy..... **P. porphyroclados**
 4. Lemma hairy on keels and lateral ribs.
 6. Plants with rhizomes.
 7. Internodes strongly compressed and 2-sided. Callus glabrous... **P. homomalla**
 7. Internodes terete. Callus with many long wrinkled hairs..... ***P. pratensis**
 6. Tufted perennials, without rhizomes.
 8. Panicle contracted, more or less linear. Restricted to coastal areas with salt spray..... **P. poiformis**
 8. Panicle eventually spreading. Not found in coastal areas with salt spray..... **P. porphyroclados**

***P. annua L.**

Winter Grass, Annual Poa

An erect, tufted annual, 20-300 mm tall; sometimes rooting from lower nodes. Leaf sheaths compressed, keeled, striate, glabrous; blades flat or folded, 5-120 x 1-5 mm, smooth or minutely scabridulous, often transversely wrinkled, margins often minutely scabrous; ligule thinly membranous, 2-3 mm long. Panicle 10-80 mm long, spreading or compact, branches spreading or deflexed after flowering. Spikelets narrowly ovate, 3-5 mm long. Florets 3-5, closely imbricate. Glumes herbaceous, margins translucent; lower glume 2-3 mm long, 1-ribbed; upper glume 2.5-3.5 mm long, 3-ribbed. Lemma ovate, 2-3 mm long, 5-ribbed, glabrous or hairy on ribs towards base, margins and apex obtuse, broad and translucent. Palea 1.75-2.75 mm long.

Commonly occurs as a weed of lawn, cultivated land and disturbed areas. Common in the Perth metropolitan area, and in urban areas of the south west. Collected from Dirk Hartog Island to Cape Naturaliste. Native of Europe.

Flowers August-October.

Flourishes during winter and spring months but may be found at any time of the year when temperature and moisture conditions are favourable.

P. drummondiana Nees

Knotted Poa

Perennial with branched rhizome, 0.25-0.5 m tall; culms often supported by 1-3 globular, bulbous, swollen internodes. Leaf sheaths closed, often purplish towards base, sometimes margins sparsely scabrous; blades linear, 50-300 x 2-4 mm, flat or folded, scabrous; ligule thinly membranous, 2-6 mm long, often jagged, glabrous to minutely scabrous on back. Panicle much exserted, with spreading branches, up to 200 mm long. Spikelets green or purplish, slightly to markedly compressed, ovate when young becoming broadly ovate at maturity, 7-12 x 6-10 mm, pendulous. Florets 3-8, imbricate. Glumes 3-5 mm long, 3-5 ribbed, firmly herbaceous with thinner margins, from almost glabrous to strongly scabrous on keels and sides. Lemma ovate, 3-7 mm long, 5-7-ribbed, scarious and obtuse at apex and on upper margins, indurate at maturity, rather densely hairy between lateral ribs and margins. Palea 5-6 mm long, minutely to distinctly scabrous on keels.

Occurs from Yanchep south to Waroona. Widespread throughout the south west from Cockleshell Gully in the north, also extending to Eucla. Also occurs in S.A. and Vic.

Flowers September-November.

P. homomalla Nees

Perennial, arising from scaly rhizome; culms 0.3-0.75 m tall, strongly compressed, leafy, mostly concealed by sheaths, faintly to strongly scabrous. Leaf sheaths strongly compressed, strongly striate, glabrous to scabrous; blades flat, 40-200 x 1.5-4 mm, midrib and margins thickened; ligule membranous, up to 7 mm long, faintly puberulous on back. Panicle narrow, 50-200 mm long, shortly exerted. Spikelets compressed, 3-5 mm long, rather crowded, more or less appressed to branches. Florets 2-6. Glumes ovate, 2.5-3 mm long, 3-ribbed, more or less glabrous. Lemma 2.25-4.5 mm long, prominently 5-ribbed, obtuse and scarios at apex, hairy towards base of keel and lateral ribs, otherwise glabrous. Palea 2-4 mm long, scabrous on keels above, finely ciliate below, hairy or glabrous on back.

Recorded from 2 localities on the Darling Scarp. Also collected from Manjimup. Also in Vic. and N.S.W.

Flowers October and November.

***P. infirma** Kunth

Similar to *P. annua* L., differing in the small elliptic and oblong panicle with branches not reflexed after flowering. Spikelets of 5-6 florets, florets distant or overlapping. Unopened anthers 0.5 mm long, about as long as broad.

This species has only been recorded once for the region probably because it is readily confused with *P. annua*, but may well be common. Native of southern and western Europe.

P. poiformis (Labill.) Druce

Blue Tussock Grass, Coastal Poa

Densely tufted perennial, 0.2-0.9 m tall. Leaf sheaths glabrous, lower sheaths loose, pale coloured; blades usually strongly convolute and terete or angular, 150-450 x 0.25-1.5 mm, glaucous, outer surface glabrous, inner scabrous; ligule truncate, 0.25-1.25 mm long, densely, minutely ciliate at apex and on back. Panicle 80-300 mm long, contracted; rachis terete, glabrous. Spikelets pale greenish or straw-coloured, compressed, 6-10 mm long. Florets 2-7. Glumes narrowly ovate, 2.5-5 mm long, firm, distinctly 3-ribbed (rarely lower glume 1-ribbed), more or less scabrous on keels, minutely scabrous on upper margins. Lemma narrowly ovate, 3-6 mm long, keeled, compressed, 5(-7)-ribbed, firm, upper margins and apex narrowly membranous, keels, lateral ribs and margins hairy in lower half. Callus hairs long and dense. Palea narrow, sparsely to very densely scabrous or scabrous-ciliate on upper keels, and glabrous towards base, glabrous to hairy or scabrous on back.

Collected from Garden and Rottne Islands, and along the coast from Triggs to Myalup Beach. Occurs along the coast from Geraldton to Israelite Bay and on islands of the Recherche Archipelago. Occurs in all states except Qld and N.T.

Flowers October and November.

This species is restricted to coastal areas and estuaries of the southern part of Australia. Vickery (1970) commented that this species rarely occurred beyond the influence of the winds carrying ocean spray or at least its salt content.

P. porphyroclados Nees

Tufted perennial, 0.45-0.9 m tall; young shoots enclosed in broad scales; culms terete, lightly striate. Leaf sheaths minutely scabridulous; blades inrolled or more or less terete, 130-140 x 0.3-0.4 mm; ligule short, firm, minutely scabridulous. Panicle 100-220 mm long, loose, with thin, scabrous branches and pedicels. Spikelets light green or purplish, very compressed. Florets 3 or 4. Glumes narrowly ovate to narrowly oblong, 3-ribbed, minutely scabrous on keels upwards; upper glume 2-4 mm long; lower glume 2.5-4.5 mm long. Lemma narrowly oblong, 2-5 mm long, 5-ribbed, slightly to distinctly hairy on keel, obtuse to subacute. Callus with dense to sparse hairs. Palea linear, 2-3 mm long, finely scabrous on keels in upper $\frac{2}{3}$ to $\frac{3}{4}$, glabrous or scabrous on back, margins translucent.

Collected from the Perth metropolitan area, Woodman Point and Harvey. Extends south of the Perth Region and as far east as Esperance.

Flowers October and November.

This species is only recorded from W.A. but is closely related to *P. labillardieri* Steudel which occurs in all the other Australian states except N.T. Vickery (1970) stated that after further field observations these two species may be combined, but the name *P. porphyroclados* would have priority.

***P. pratensis L.**

Kentucky Bluegrass

Perennial with slender creeping rhizomes, 0.1-1 m tall, forming loose to compact tufts or turf. Leaf sheaths compressed, smooth, lower ones keeled; blades flat or folded, 90-300 x 1-4 mm, abruptly narrowed into keel or pointed at apex; ligule membranous, 1-3 mm long, glabrous, scabrous or minutely hairy, sometimes jagged. Panicle dense to open; branches thin, often flexuose. Spikelets green occasionally purple tinted, ovate to oblong, compressed, 2.5-6 mm long. Florets 2-5. Glumes acute to acuminate, sparsely scabrous on upper part of keel, glabrous on sides; lower glume 1.5-3.5 mm long, 1-3-ribbed; upper glume 2-4 mm long, 3-5-ribbed. Lemma narrowly ovate to narrowly oblong, 2-4 mm long, herbaceous and not indurate, thinly to densely hairy on keel and marginal ribs up to about middle, distinctly 5-ribbed, apices and margins translucent. Callus with many long crinkled hairs. Palea scabrous on keels, glabrous on back.

Recorded from the Perth metropolitan area. Also recorded from Busselton and Manjimup. Occurs throughout Europe.

Flowers November and December.

Commonly cultivated as a lawn grass and to a lesser extent as a pasture grass in the wetter areas of the south west. When mown it forms a close turf but if left ungrazed will grow to 1 m tall.

P. serpentum Nees

Coarse, densely tufted, glabrous perennial, 0.5-1 m tall. Leaf sheaths glabrous, slightly scabrous, striate; blades usually inrolled, 200-500 x 1-2 mm, glabrous on outer surface, scabrous on side of grooves on inner surface; ligule short, truncate, ciliate at apex. Panicle much exerted at maturity, 150-250 mm long, loose with fine branches. Spikelets pale greenish purple or straw-coloured, compressed, ovate, 4-6 mm long. Florets 2-6. Glumes subequal, 2.5-4 mm long, keeled, slightly scabrous on keels, glabrous on sides; lower glume 1-3-ribbed; upper glume 3-ribbed. Lemma 2.75-4 mm long, obtuse, 5 or faintly 7-ribbed, glabrous but minutely scabrous on keel, rarely slightly scabridulous on sides. Callus glabrous. Palea 2-3.5 mm long, scabrous to ciliate on keels above, glabrous below, glabrous to scabrous on back.

Recorded from Burns Beach, Cannington and the Darling Range. Occurs throughout the south west from Chittering in the north to Esperance in the east.

Flowers October-December.

POLYPOGON Desf.

Annuals or perennials. Leaf blades flat; ligule scarious. Inflorescence a dense, spike-like, cylindric or open loose panicle. Spikelets pedicellate or subsessile, falling entire. Floret 1, bisexual. Glumes awned from entire or 2-lobed apex. Lemma thinly membranous, truncate or 2-lobed, rounded on back, translucent apices glabrous; awn from obtuse or retuse apex or sinus of lobes or dorsal, persistent or deciduous, sometimes reduced to a mucro. Palea delicate, 2-keeled. Stamens 1-3. Caryopsis cylindric, sometimes grooved. 15 species, native to the temperate regions. 1 native and 3 introduced in W.A., the only indigenous species is endemic to south west Australia.

- | | |
|--|--------------------------|
| 1. Awn of lemma stout, much exceeding awns of glumes..... | P. tenellus |
| 1. Awn of lemma absent, or if present fine and not exceeding awns of the glumes. | |
| 2. Glumes with 2 long lobes ca $\frac{1}{4}$ length of glumes. Lemma awnless.... | *P. maritimus |
| 2. Glumes emarginate with 2 short lobes less than $\frac{1}{10}$ length of glumes. Lemma with a fine capillary awn | *P. monspeliensis |

***P. maritimus Willd.**

Coast Beardgrass

Annual; culms erect or spreading, 100-300 mm tall. Leaf blades 15-50 x 2-4 mm; ligule 2-6 mm long, membranous, hairy on outer surface. Panicle dense, bristly, 10-60 mm long. Glumes 2-2.5 mm long, hispidulous in the lower half, divided halfway to the middle into 2 rather acute, ciliate lobes; awn arising from the sinus, 7-10 mm long. Lemma membranous, less than 1 mm long, awnless, glabrous. Palea membranous, less than 1 mm long, glabrous.

Collected from Rottnest Island. Native to the Mediterranean Region, western Europe and south west Asia.

Flowers recorded in November.

***P. monspeliensis** (L.) Desf.

Annual Beardgrass

Tufted annual, 0.15-0.6 m tall, with glabrous, erect culms. Leaf sheaths glabrous; blades 50-200 x 4-6 mm, glabrous; ligule 5-8 mm long, scarious, oblong, shortly hirsute on outer surface. Panicle spike-like, pale green or straw-coloured, 20-150 x 10-20 mm, dense, with numerous short scabridulous branches; pedicels very short. Spikelets 2 mm long. Glumes narrowly oblong, subequal, 1-2.5 mm long, glabrous, apex emarginate or shortly lobed, awned, ciliate or ciliolate, lower portion or whole of outer surface shortly hispid; awn scabrous, 4-7 mm long. Lemma 1-2.5 mm long, almost equal to glumes, glabrous and shining, 2-4-lobed, ribs very obscure; awn delicate, capillary. Palea 2-lobed, almost equal to lemma.

A common weed throughout the region, especially in moist areas. Also naturalized throughout the south west. Recorded from scattered localities from Carnarvon to Wiluna and almost to the S.A. border near the Trans-Australian railway line.

Flowers May-November.

P. tenellus R. Br.

Tufted annual with erect culms, 0.3-0.5 m tall. Leaf sheaths glabrous; blades flat, 15-150 x 0.5-4 mm, flaccid, scabrous; ligule ovate-oblong, scarious, hirsute on outer surface. Panicle spike-like, cylindric, 50-120 mm long; branches numerous, scabridulous. Spikelets 2.5 mm long. Glumes narrowly ovate, subequal, 2-3 mm long, densely hirsute in lower $\frac{2}{3}$, acuminate, tapering into long slender flexuose awn 2-9(13) mm long. Lemma translucent, ovate, 1.5-3 mm long, laterally compressed, acute or slightly notched; awn dorsally attached near middle and twisted in lower part, bent below middle, 10-12(19) mm long. Palea translucent, very narrow.

Collected from near Pinjarra and Rottneest Island. Extends from Abrolhos Islands in the north to Margaret River and Albany in the south.

Flowers October and November.

***PUCCINELLIA** Parl.

Annuals or perennials. Leaf blades narrow or setaceous, erect; ligule broad and translucent. Inflorescence a rigid, erect, contracted panicle. Spikelets shortly pedicellate, narrow; rachilla elongated, breaking between lemmas. Florets 5-12, bisexual but uppermost floret(s) empty. Glumes firm, acute or obtuse, scarious at apex, convex on back. Lemmas firm, scarious at apex, ribs not extending to apex. Paleas nearly as long as lemmas, 2-keeled. Caryopsis oblong in outline, dorsally compressed. About 100 species from temperate areas. 1 native and 1 introduced in W.A.

***P. ciliata** Bor

Puccinellia, Menemen

A loosely to compactly tufted perennial; culms erect, sometimes spreading or prostrate. Leaves greyish green; sheaths glabrous, rounded on back; blades 20-120 x 1-2 mm, scabrous above; ligule 0.5-3 mm long, membranous. Panicle green, linear to broadly ovate, 20-120 mm long; branches erect, 2 or 3 together, lower ones spreading. Spikelets narrowly oblong, 3.5-9 mm long, breaking at maturity beneath each lemma. Florets 2-8. Glumes persistent, ovate to oblong, unequal; lower glume ovate, 1-2 mm long, 1-ribbed; upper glume oblong, 1.5-3 mm long, 3-ribbed. Lemma oblong, 2-3 mm long, rounded on back, minutely hairy at base and on ribs near base, margins membranous, apex obtuse and membranous. Palea narrowly oblong, 1.75-2.75 mm long, keels minutely hairy.

Collected from Harvey. Native to Turkey, introduced in mid-1950s as a pioneer plant for the reclamation of salty land.

Flowers October and November.

***RHYNCHELYTRUM** Nees

Annuals or perennials. Leaf blades linear or filiform; ligule a ciliate rim. Inflorescence an open or contracted panicle. Spikelets pedicellate, laterally compressed and keeled, more or less gaping, falling entire, often completely enveloped by soft shining hairs. Florets 1 or 2, the upper floret bisexual, the lower floret when present male. Lower glume a small, obtuse scale or reduced to an annular, microscopic,

ciliate rim; upper glume emarginate or 2-lobed, rarely entire, mucronate or awned from the sinus. Lower floret; lemma similar to upper glume; palea linear, almost equal to lemma, rarely absent, thinly to firmly membranous, 2-keeled. Upper floret smaller than lower floret; lemma truncate, emarginate or minutely 2-lobed, membranous to thinly chartaceous; palea almost equal to lemma, 2-ribbed. Caryopsis obloid to ellipsoid, closely embraced by lemma and palea. About 35 species chiefly in tropical and South Africa, 1 species naturalized in W.A.

***R. repens** (Willd.) C.E. Hubb.

Red Natal Grass

Tufted annual or perennial, 0.3-1.2 m tall, simple or branching, glabrous or hairy to pilose, the hairs arising from minute tubercles; often rooting at the lower nodes. Leaf blades linear, 50-300 x 2-10 mm, tapering to acuminate apex; ligule a minutely ciliate rim up to 2 mm long. Panicle loose, silvery white to pink or purplish, obloid, ovoid or pyramidal, 50-200 x 20-100 mm, branchlets and pedicels often very flexuose; pedicels 1-10 mm long, usually with several sericeous hairs towards apex. Spikelets ovate to broadly oblong, 2.5-6 x 1.5-2 mm, at first appressed, eventually spreading, glabrous or densely tuberculate. Glumes separated; lower glume oblong, 0.5-1.5 mm long, membranous, obtuse, truncate or emarginate, pilose and densely bearded at base; upper glume narrowly ovate to ovate, 2.5-6 mm long, usually conspicuously gibbous below middle, firmly chartaceous, 5-ribbed, densely pilose to villous with hairs increasing in length from base to just above middle and exceeding tip by up to 5 mm, remainder glabrous except for ciliate margin, tapering into long or short obtusely 2-lobed apex, mucronate or with awn up to 4 mm long. Lower floret male or empty; lemma similar to upper glumes but narrower or less gibbous; palea ovate, 2.25-2.75 mm long, membranous with ciliate keels. Upper floret bisexual: lemma elliptic to oblong, 2-2.5 mm long, thinly chartaceous, obscurely 5-ribbed, emarginate; palea similar in texture to lemma, glabrous. **Fig. 317**

A weed species common in the metropolitan area of Perth. Also collected from the road verge near Three Springs. Native to South Africa.

Flowers July-April.

***SECALE L.**

Annuals, biennials or perennials. Leaf blades flat; ligule membranous, short, truncate. Inflorescence a dense cylindrical spike, the rachis readily disarticulating except in cultivated variants. Spikelets sessile, laterally compressed, distichously imbricate, falling entire with an internode of the rachis. Florets 2 or rarely 3, bisexual. Glumes linear to subulate, strongly compressed. Lemmas just exerted from the glumes, 5-ribbed, firmly membranous, strongly compressed, keeled, tapering into a straight awn; callus absent. Paleas narrow, 2-lobed, 2-keeled. Ovary obovoid, densely hairy in the upper part. Caryopsis obloid, subterete, grooved in front. 2 species from Europe, Asia and Africa. 1 introduced in W.A.

***S. cereale L.**

Rye

Erect annual 1-1.5 m tall; culms usually hairy below the spike, otherwise glabrous, usually glaucous. Leaf blades scabrous; ligule a membranous rim, ca 1 mm long. Inflorescence a bearded spike, 70-150 mm long, erect, finally pendulous. Spikelets with 2 bisexual florets. Glumes awl shaped, equal, 7-10 mm long, 1-ribbed, keeled, compressed, scabrous. Lemma exerted from glumes, narrowly oblong to ovate, 12-15 mm long, stiff, ciliate along prominent keel and margins, tapering to long straight awn ca 20 mm long. Palea equal to lemma, narrow, awnless.

Recorded as a spontaneous weed from Osborne Park and Safety Bay. One other collection has been made from New Norcia. This species is thought to be derived from *S. montanum* Guss., a perennial, native to southern Europe and south western Asia.

Flowers July-October.

Cultivated species mainly used for binding sand. Also grown for bread making.

***SETARIA P. Beauv.**

Perennials or annuals. Leaf blades flat or rolled, often minutely scabrous; ligule usually a ciliate rim. Inflorescence a dense, spike-like, cylindrical panicle, with solitary or clustered spikelets, subtended by 1 or more persistent scabrous bristles. Florets 2; lower floret male or empty, sometimes reduced to a lemma; upper floret bisexual. Glumes membranous. Lower floret: lemma membranous; palea almost long as lemma, acute. Upper floret: lemma convex on back, finely pitted, often transversely rugose;

palea similar in texture to lemma. Caryopsis enclosed by hardened lemma and palea, oblong or elliptic in outline. About 100 species mostly in the warm regions of the world, a few species common as weeds in the more temperate regions. 5 native and 7 introduced in W.A.

1. Bristles of inflorescence with tooth-like projections directed away from the spikelets..... *S. *verticillata*
1. Bristles of inflorescence with tooth-like projections directed towards the spikelets.
 2. Leaf blades broad, palm-like, 30-120 mm wide. Bristles absent below many of the spikelets..... *S. *palmifolia*
 2. Leaf blades more or less flat, less than 20 mm wide. At least one bristle present below each spikelet.
 3. Plants annual.
 4. Leaf sheaths ciliate on margins. Bisexual floret deciduous above persistent glumes and involucre..... *S. *italica*
 4. Leaf sheaths translucent on margins. Bisexual florets falling from pedicel enclosed by glume, involucre persistent..... *S. *pumila*
 3. Plants perennial.
 5. Spikelets solitary on primary branch; bristles 4-12, yellowish to purple..... *S. *gracilis*
 5. Spikelets 1-4 on primary branch, sometimes 1 or 2 abortive; bristles 6-10, pale yellow..... *S. *sphacelata*

***S. gracilis** Kunth

Slender Pigeon Grass

Tufted perennial with short rhizomes; culms erect, spreading or ascending, 0.1-1.2 m long, scabrous for short distance below inflorescence, otherwise glabrous. Leaf sheaths compressed, keeled; blades flat, 100-250 x 4-8 mm, tapering to an acute apex, upper surface scabrous, often with few long hairs towards base, lower surface glabrous and somewhat scabrous; ligule short, densely ciliate. Panicle long-exserted, evenly cylindric, 10-100 x 2-8 mm, main axis and branches densely and softly scabrous, each bearing a single spikelet subtended by fascicle of irregular branchlets which are almost immediately divided into 4-12 bristles; bristles yellowish to purple, 2-12 mm long, antrorsely scabrous. Spikelets ovoid, 2-3 mm long. Glumes and lower lemma chartaceous, membranous; lower glume broadly ovate to triangular, 1.5-2 mm long, 3-ribbed; upper glume convex on back, 2-3 mm long, 5-ribbed. Lower floret male or empty; lemma as long as spikelet, 5-7-ribbed; palea well developed, as long as lemma, broad, translucent. Upper floret bisexual; lemma almost as long as spikelet, transversely rugose, convex on back, at first green becoming purple-tipped at maturity; palea almost equal in length to the lemma, back flat, similar in texture and markings. *S. geniculata* (Lam.) P. Beauv.

A weed of roadsides and other disturbed sites around the Perth metropolitan area. Also found elsewhere in the south west. Native to the warmer parts of North and South America.

Flowers January-March.

***S. italica** (L.) P. Beauv.

Italian Millet, Foxtail Millet

Tufted annual up to 1.5 m tall; culms simple, rarely branching, glabrous, scabrous below inflorescence. Leaf sheaths terete, tight, glabrous except for ciliate margins; blades linear to narrowly ovate, 150-450 x 6-20 mm, tapering to a setaceous point, flat, soft to flaccid, scabrous on upper surface and margins, glabrous on lower surface. Panicle spike-like, dense, green or yellowish when mature, cylindric, 25-300 x 8-30 mm; main axis stout, ribbed, more or less villous and rough on the ribs; branches spirally arranged, branches and branchlets with sessile or subsessile involucre of bristles, subtending clusters of 2-4 mostly bisexual spikelets; bristles 1-5 per cluster, green or purplish upwards, 4-15 mm long, scabrous; pedicels very short. Spikelets persistent, broadly oblong to broadly elliptic, 2-3.5 x 1.5-2 mm. Glumes thinly membranous or lower one translucent; lower glume broadly ovate, ca 1 mm long, 1-3-ribbed; upper glume elliptic, 2-3 mm long, 5-7-ribbed. Lower floret empty; lemma 2-3 mm long, similar to upper glume, 5-ribbed; palea a translucent scale or absent. Upper floret bisexual, shining, becoming yellow to reddish, or brown or black at maturity, breaking above rest of spikelet, turgid and longer than lower floret at maturity; lemma oblong to broadly elliptic, 2.5-3.5 mm long, crustaceous, glabrous, sometimes rugulose; palea similar to lemma in texture and markings.

Naturalized near Jarrahdale. Widespread in south west. An early collection, in 1898, was made from the De Grey river but there are no recent collections from that area. The origin of this species is unknown but it is probably derived from *S. viridis* (L.) P. Beauv. of southern Europe.

Flowers November-March.

Cultivated for grain and fodder throughout the warmer parts of both hemispheres.

***S. palmifolia** (Koenig) Stapf

Palm Grass

Perennial, 0.9-1.5 m tall, usually erect, sometimes prostrate and rooting from the nodes; culms very robust, terete, striate, branching, hairy at the nodes. Leaf sheaths terete or slightly keeled, striate, glabrous below but with tubercle-based hairs in the upper half, densely ciliate on margins; blades large, palm-like, narrowly elliptic, 300-900 x 30-120 mm when expanded, glabrous or softly hairy on both surfaces or with tubercle-based cilia at the base, scabrous towards apex and on margins. Panicle up to 800 x 400 mm; main axis straight or pendulous, sulcate on side from which branches originate, increasingly scabrous upwards; pedicels short, 1-3 together, some with scabrous bristles below the spikelet. Spikelets elliptic, 2.5-3.5 mm long. Glumes membranous, 5-ribbed; lower glume ovate, 1.5-2.5 mm long, acute or obtuse, glabrous; upper glume ovate, 2.5-3.5 mm long. Lower floret empty; lemma similar to upper glume, 2.5-3.5 mm long, 5-ribbed; palea 1-2 mm long or absent. Upper floret bisexual, elliptic; lemma 2.5-3.5 mm long, finely transversely rugose, pallid; palea similar in texture to lemma on back.

Mainly cultivated as an ornamental in Perth gardens but has become naturalized in the southern areas of the region. Widely distributed in the tropics. Native to India.

Flowers April, June and October.

***S. pumila** (Poiret) Roemer & Schultes

Pale Pigeon Grass

Annual 0.3-0.6 m tall, branching at base; culms erect or ascending, compressed, simple or branched. Leaf sheaths glabrous, keeled, margins translucent; blades linear or narrowly ovate, 90-150 x 4-8 mm, flat, loosely spirally twisted, hairy towards base on upper surface, tapering to an acuminate point, margins scabrous; ligule short, truncate, ciliate. Panicle long-exserted, spike-like, erect, golden-yellow to brownish, dense, linear to cylindrical, 1-150 x 6-8 mm; rachis slender, terete or somewhat angular, densely hairy; branches less than 1 mm long, reduced to a sessile involucre subtending a bisexual spikelet and sometimes 1 or more abortive spikelets; bristles usually 4-12 in each involucre, pale at base becoming yellow, golden, brownish or reddish upwards, unequal, 3-10 mm long, finely antrorsely scabrous. Spikelets broadly oblong or ovate, 3-3.5 x 1.5-2 mm, acute or obtuse, turgid on convex side at maturity. Glumes membranous; lower glume 3-5-ribbed; upper glume broadly ovate, 2.5-3 mm long, convex on back, 5-9-ribbed below. Lower floret usually empty, rarely male; lemma 3-3.5 mm long, membranous, flat 5-ribbed; palea nearly equal to lemma, firm, translucent. Upper floret broadly boat shaped, convex on back as long as spikelet; lemma yellowish to light brown, rarely dark brown, crustaceous, 3-3.5 mm long, strongly transversely rugose; palea flat, as long as lemma, similar in texture and markings. *S. glauca* (L.) P. Beauv., *S. lutescens* (Weigel) C.E. Hubb.

Recorded from Harvey and Bedforddale. Also occurs in the Pilbara. Occurs throughout the warmer parts of the north temperate zone.

Flowers April to September with occasional flowers in February.

***S. sphacelata** (Schum.) Stapf & C.E. Hubb.

South African Pigeon Grass

Densely to compactly tufted perennial, 0.45-1.8 m tall, with a short rhizome; culms more or less erect, simple or branching from lower and occasionally intermediate nodes, scabrous below inflorescence. Leaf sheaths glaucous, firm, the lowest sheath loose, acutely keeled, tight, glabrous or more or less hairy and tuberculate; blades linear, 150-300 x 3-6 mm, flat, glabrous or loosely softly hairy towards the base, margins scabrous; ligule ca 1.5 mm long. Panicle erect, spike-like, golden, green or purple, dense, cylindrical, 70-300 x 6-8 mm; rachis terete, finely hairy; branches sessile, each supporting 1-4 spikelets (often some spikelets abortive) and subtended by an involucre of 6-10 bristles; bristles 4-6 mm long, fine, antrorsely scabridulous; pedicels short. Spikelets elliptic to oblong, ca 3 x 1-1.3 mm, pallid tinged with purple. Glumes membranous to chartaceous, thin, slightly unequal; lower glume ca 1 mm long, 3-ribbed; upper glume 1.5-2 mm long, 5-ribbed, convex on back. Lower floret usually male;

lemma similar in texture to glumes, flat or shallowly depressed on back, 5-ribbed; palea elliptic to oblong, as long as lemma. Upper floret bisexual, almost equal to spikelet; lemma ca 3 mm long, indurate, convex on back, finely transversely rugose; palea flat and similar in texture and markings to the lemma on the back.

A weed in the orchards of the outer metropolitan area of Perth. Also occurs elsewhere in the south west. Native to tropical Africa, now cultivated as a pasture grass in the warmer parts of a number of countries.

Flowers November-April.

***S. verticillata** (L.) P. Beauv.

Whorled Pigeon Grass

Loosely tufted annual, 0.1-1 m tall; culms erect, usually bent at base, simple or branching in lower part, glabrous or scabrous below panicle. Leaf sheaths keeled upwards, hairy or glabrous, margins sometimes ciliate; blades flat, linear or narrowly ovate, 20-300 x 3-12 mm, glabrous to scabrous; ligule short, ca 1 mm long, membranous, densely ciliate. Panicle spike-like, cylindric, 15-150 x 4-24 mm, bristly, erect or curved, dense, somewhat tapering upwards, with whorled or almost whorled branches 2-10 mm long, the panicles sometimes cohering together in a tangled mass at maturity; rachis striate, with bristles along ribs, branches more or less deeply angled, retrorsely hispid on the angles. Spikelets clustered on short branchlets, sometimes 1 or 2 of the clusters empty, with a bristle below each spikelet; bristles 4-8 mm long, retrorsely scabrous, spikelets falling entire, leaving bristle. Spikelets oblong to elliptic, 2-2.2 mm long. Lower glume broadly ovate, ca 1 mm long, obtuse, 1-3 ribbed; upper glume ca 2 mm long, 5-7-ribbed. Lower floret empty; lemma similar to upper glume, ca 2 mm long, 5-ribbed; palea ca 1 mm long, sometimes absent. Upper floret bisexual, elliptic; lemma finely transversely rugose, pallid; palea similar in texture to lemma on the back. *S. carnei* A. Hitchc.

A weed in the Perth metropolitan area. Also occurs near Three Springs and in the Pilbara and Kimberley areas of W.A. Native to tropical and temperate regions.

Flowers December-May.

Chiefly a weed of cultivated areas easily distributed because the retrorsely scabrous bristles cause the panicle or parts of it to adhere to clothing or animal fur.

*SORGHUM Moench

Annuals or perennials, often robust. Leaf blades usually flat, often large; ligule membranous, sometimes ciliate. Inflorescence an erect or pendulous panicle, with whorled or scattered branches. Spikelets in pairs along inflorescence branches, but the terminal group a triad, 1 spikelet sessile, other 1 or 2 pedicellate; rachis disarticulating and sometimes falling with the adjacent internode. Florets 2; lower floret reduced to an empty lemma; upper floret bisexual in the sessile spikelet, male, empty or absent in the pedicellate spikelet(s). Sessile spikelets: glumes equal; lower glume with involute margins and narrowly inflexed towards the apex; upper glume keeled upwards with narrow margins, usually ciliolate upwards; lower lemma awnless; upper lemma 2-lobed, with bent or variously reduced awn or mucro arising from sinus, rarely entire or mucronate; palea absent or minute. Pedicellate spikelets sometimes reduced to both or one glume, awnless; glumes herbaceous. Caryopsis usually obloid or obovoid, dorsally compressed. About 50 species with cultivated forms and varieties, mostly tropical and subtropical, a few extending into the temperate zones. 4 native and 4 introduced in W.A. References: de Wet, J.M.J. 1978. *Amer. J. Bot.* 65,4: 477-484; Snowden, J.D. 1936. *The Cultivated Races of Sorghum*.

1. Annuals, without rhizomes.
 2. Glumes becoming glabrous and shining, with scattered appressed hairs when young..... *S. sudanense
 2. Glumes with persistent spreading hairs, especially in upper third..... *S. bicolor
1. Perennials, culms arising from elongated rhizomes..... *S. halepense

***S. bicolor (L.) Moench**

Grain Sorghum, Forage Sorghum

A tall, coarse annual with stout culms to 4 m tall. Leaf sheaths glabrous, prominently striate, margins white, thinner; blades 150-400 x 30-50 mm, glabrous on both surfaces except for a villous area on upper surface near ligule. Panicle 150-280 mm long, contracted, spikelets dense or sparse; rachis and suberect branches villous along ridges, hirsute or coarsely ciliate near nodes. Racemes 30-40 mm long; pedicels 0.5-1.5 mm long, shortly ciliate. Sessile spikelets obovate to elliptic, 4-6 x 3-4.5 mm; glumes ovate to elliptic or obovate, equal to subequal, coriaceous except for thinner apex; lower glume often persistently hairy, tipped with 14-16 indistinct ribs, usually minutely 3-lobed, scabrous on keels, margins strongly incurved and ciliate; upper glume 7-9-ribbed, obscurely keeled near apex, margins ciliate; lemma translucent, finely ciliate, lower lemma awnless, upper lemma often awned; awn 6-7 mm long. Pedicellate spikelets empty or male, mostly reddish or purple in colour; glumes narrowly ovate, 3-5 mm long, persistent; lower glume 9-12-ribbed; upper glume 7-10-ribbed. *S. vulgare* Pers.

Occasionally found growing spontaneously but more commonly a cultivated crop. Collections recorded from Rottnest, Kewdale and Fremantle. Native to tropical Africa.

Flowers May.

This species has been cultivated from prehistoric times for the seed which is used for food, for the sweet juice of the culms, and forage. There are many varieties but distinctions between them are unclear due to intercrossing.

***S. halepense (L.) Pers.**

Johnson Grass

More or less glabrous perennial; culms 0.5-1.5 m tall, arising from an extensive creeping and rooting, scaly rhizome; nodes glabrous or finely hairy. Leaf sheaths broad, loose, striate, glabrous; blades 150-700 x 5-30 mm, margins white and scabrous, often undulate; ligule scarious, truncate, jagged and ciliolate. Panicle 100-400 mm long, more or less contracted and somewhat spreading, spikelets dense or sparse, often hairy at nodes; branches divided, angular, scabrous on angles. Racemes appressed to rachis, 10-25 mm long, fragile, joints and pedicels hirsute with pallid hairs, sometimes nearly glabrous, apex of joints cupular. Sessile spikelet bisexual, distinctly articulate, readily deciduous with accompanying pedicellate spikelet, mostly pale green, sometimes brown or reddish, 4.5-5.5 mm long, subacute, awned or awnless; glumes coriaceous, narrowly ovate, with short, pale, more or less appressed hairs, at length glabrous and shining; lower glume with 5 ribs near tip; lemma translucent, distinctly awned, awn ca 10 mm long; upper glume, lemma and palea ciliate. Pedicellate spikelet(s) pale greenish or purplish, narrowly ovate, 5-7 mm long; outer glume 7-ribbed, acute.

Naturalized in the Perth metropolitan area and southern areas of the region. Occurs throughout the south west, and in the Kimberley. Native of northern Africa and south west Asia, possibly to the eastern Mediterranean Region and some tropical countries.

Flowers November-June.

***S. sudanense (Piper) Stapf**

Sudan Grass

This species resembles *S. halepense* but differs from it in its annual tufted habit. Also when the raceme breaks up the joints fracture between the sessile spikelets, leaving a fragment of the joint attached to the callus.

Naturalized in the Perth metropolitan area and southern areas of the region. Native of Sudan. Introduced as a fodder crop into warm temperate and tropical regions throughout the world.

Flowers November to June.

SPARTOCHLOA C.E. Hubb.

Tufted perennials; culms rush-like. Leaves consisting of sheathing bases with very short blades; ligule a ciliate rim. Inflorescence an elongated panicle, branches short, erect. Spikelets ovate to oblong, compressed, pedicellate; rachilla disarticulating above the glumes. Florets 3-7, bisexual. Glumes persistent, oblong or narrowly ovate, subequal, obtuse or acute, back convex, chartaceous. Lemmas overlapping, ovate, broad at base, apex mucronate, margins scarious. Paleas narrowly oblong or elliptic, shorter than or almost equal in length to lemmas, obtuse, firm. Stamens 3. Stigmas dark purple, plumose, laterally compressed. L. A monotypic genus, endemic to W.A.

S. scirpoidea (Steudel) C.E. Hubb.

Erect, tufted perennial 0.3-1 m tall; culms arising from a short, thick rhizome, without leaves except for appressed sheathing scales at base. Leaf blades brown, 5-15 x 0.5-1 mm, prominently ribbed. Panicle narrow, spike-like. Spikelets up to 6 at each node, 5-12 mm long, shortly pedicellate; pedicels 0.4-1.4 mm long, slender. Florets 6-7. Glumes subequal, 4-5 mm long, 1-3-ribbed. Lemma 4-6 mm long, obtuse, minutely scabridulous, 7-11-ribbed, keeled above middle, rounded on back below middle. Palea 4-5 mm long, scabrous on 2 keels. *Festuca scirpoidea* (Steudel) F. Muell.

One collection has been made from Canning Dam. Common within the eastern and south eastern parts of the south west and in the goldfields of W.A.

Flowers August-November.

SPINIFEX L.

Tussocky or creeping perennials, plants dioecious or polygamous. Leaf sheaths short, broad, loose; blades flat or convolute; ligule a row of cilia. Male and female or bisexual inflorescence dissimilar, both globular or hemispherical, consisting of clusters of many to few spikes, subtended by large bract-like spathes. Individual spikes subtended by smaller, 2-keeled bracteoles; male spike terminating in a bristle; bisexual or female spike reduced to single spikelets with rachis continued as a very long scabrous bristle. Male spikelet: florets 1 or 2; glumes convex on the back, more or less chartaceous; lemma(s) similar, subtending a male flower, deeply convex and rounded on back; palea(s) strongly 2-keeled with thin inflexed margins; stamens 3 in each floret; ovary rudimentary. Female or fertile spikelet: florets 1 or 2; glumes chartaceous, rounded on back, entire; lemmas equal or unequal, more or less chartaceous; palea of lower floret sometimes absent, palea of upper floret about as long as lemma and of similar texture; stamens 3 per floret, or absent, filaments flattened; styles with long plumose stigmas exerted from apex of spikelet. Caryopsis enclosed in, but free from hardened lemma and palea. A genus of 5 species in south east Asia, Australia and Pacific regions. 3 species and 1 hybrid in W.A. Reference: Craig, G.F. 1984. *Nuytsia* 5,1: 67-74.

- | | |
|--|---------------------------|
| 1. Leaves glabrous on both surfaces or glabrous above and villous below, midrib distinct and up to $\frac{1}{3}$ width of blade. | |
| 2. Leaves glabrous on both surfaces..... | S. longifolius |
| 2. Leaves glabrous above, villous below..... | S. x alterniflorus |
| 1. Leaves villous on both surfaces, midrib not distinct. | |
| 3. Leaf blades flat, both surfaces grey to white-sericeous..... | S. hirsutus |
| 3. Leaf blades with involute margins, inner surface green with few hairs, outer surface grey to white-sericeous..... | *S. sericeus |

All these species are known to hybridize with each other in the Perth Region. Hybrids have been reported between *S. longifolius* and *S. sericeus*, *S. hirsutus* and *S. sericeus*, and *S. longifolius* and *S. hirsutus*.

S. x alterniflorus Nees

Tussock-forming, with short creeping culms. Leaf blades thick, 3-7 mm broad, villous below, glabrous above, midrib broad nearly $\frac{1}{3}$ width of leaf, with 4-6 ribs on each side, margins flattened. Male inflorescence 90-120 mm in diameter; outer spathes leaf-like; inner spathes subtending racemes narrowly ovate, shorter than racemes, ciliate, distinctly keeled; rachis angular and scabrous, terminating in a bristle; spikelets 10-12 mm long; pedicels stout, 1 mm or less long; lower glume 7-8 mm long, scabrous, 3(-5)-ribbed, upper glume 8.5-9.5 mm long, scabrous, 5(-7)-ribbed; lemma 10-11 mm long, 3-ribbed, margins translucent; palea 9-10 mm long, 2-keeled, keels scabrous, margins translucent. Female or bisexual inflorescence globular, up to 350 mm in diameter, consisting of numerous divergent spikes each reduced to a solitary sessile spikelet; rachis ending in point or bristle up to 45 mm long, each spikelet surrounded by narrowly ovate bracts; spikelets 10-12 mm long; glumes 9-10 mm long, coriaceous, 3-ribbed, scabrous; lower lemma without palea; upper lemma ca 10 mm long, subtending a female or bisexual flower; palea 2-keeled, coriaceous with translucent margins.

Occurs only in the region, from City Beach to Bunbury. It is a naturally occurring, apparently stabilised hybrid, between *S. hirsutus* and *S. longifolius*, having the same general appearance as *S. longifolius*. It was first recorded in 1833.

Flowers August-January.

S. hirsutus Labill.

Hairy Spinifex

Perennial, with greyish green to silvery grey hairs, with short, creeping culms, rooting at the nodes, old culms covered by sheathing leaf bases. Leaf sheaths broad, loose, scarcely keeled, striate, hairy on outside and densely ciliate on upper margins; blades flat, 100-400 x 9-17 mm, densely sericeous on both surfaces, ribs obscure, midrib tending to make leaf keeled; ligule up to 7 mm long. Male inflorescence hemispherical, 50-70 mm diameter with erect or spreading spikes; spikes 15-80 mm long, spikelets 8-12 mm long, loosely sericeous in upper half; glumes subequal, firmly membranous to thinly chartaceous, upper glume longer and 5-ribbed, lower glume 5-7-ribbed; lemma firmly membranous to more or less chartaceous, faintly 5-ribbed, glabrous on back; palea almost as long as lemma and similar in texture; anthers 5-7 mm long. Female or bisexual inflorescence globular, up to 300 mm in diameter, often breaking loose and rolling before the wind, consisting of numerous divergent spikes; spikelets narrowly ovate, 12-16 mm long; glumes nearly equal, as long as spikelet, firmly membranous to thinly chartaceous, upper glume 7-9-ribbed, lower glume 5-ribbed; lower floret empty, occasionally female; lemma almost equal to glumes; palea present, sometimes reduced or absent; upper floret female or occasionally bisexual; lemma and palea thinly chartaceous, smooth, glabrous.

Along the coastal areas of the region and the south coast.

Flowers October-January.

S. longifolius R. Br.

Loosely caespitose, dioecious or polygamous; culms terete, stout, fasciculately branched, creeping at base and forming large tussocks. Leaf sheaths broad, rigid, loose, with membranous margins, truncate, finely striate; leaf blades 150-300 x 1.5-3 mm, rigid, subterete, deeply channelled above, scarcely convolute. Male inflorescence 100-160 mm in diameter; outer spathes leaf-like; inner spathes subtending racemes, linear to narrowly ovate, shorter than racemes with scabrous keels; spikelets solitary, 6-7 mm long on very short stout pedicels; upper glume 3.5-4.5 mm long, ovate, coriaceous, 5-ribbed; lower glume 3-ribbed, shorter than upper glume; lemma firmly coriaceous, ovate, ca 6 mm long, faintly 5-ribbed. Female or bisexual inflorescence globular, up to 200 mm in diameter, consisting of numerous divergent spikes; rachis ending in a long subulate point or stout bristle up to 50 mm long; spikelets ovate, 6-6.5 mm long, surrounded by narrowly ovate to subulate bracts; glumes subequal, as long as spikelet, finely membranous, 3-ribbed; lemma subequal to glumes, lower lemma without palea, upper lemma with coriaceous and acutely keeled palea.

Common along coastal areas of the region. Occurring along the coast from Albany northwards, and into Qld and N.T. Also in New Guinea and Indonesia.

Flowers July-January.

***S. sericeus** R. Br.

Culms creeping, forming long, stout, above ground runners extending up to 2 m; sheathing leaf bases absent. Leaf blades flat, linear, 100-380 x 5-10 mm, inner surface green, moderately sericeous to glabrous, outer surface densely grey to white-sericeous, ribs obscure, margins involute, often tightly. Male inflorescence of clustered, pedicellate racemes, forming a terminal pseudo-head with a few fasciculate racemes some distance below; spikelets 9.5-10.5 mm long; lower glume 7-9 mm long, 7-9-ribbed; upper glume 8-10 mm long, 6-10-ribbed; lower lemma 9-10 mm long, 5-7-ribbed; upper lemma 9.5-10.5 mm long, 5-ribbed. Female inflorescence globular, reduced to 1 or 2 spikelets surrounded by bracts; spikelets 13-18 mm long, glabrous or nearly so at base; glumes equal in length to spikelet; lower lemma 9-15 mm long, 5-9-ribbed; upper lemma 7-13 mm long; lower palea present; upper palea subtending a female floret; stamens rudimentary.

Introduced to some Perth metropolitan and south west beaches to help with sand stabilization. Naturalized at City Beach, Port Beach and Bunbury and outside the region at Peaceful Bay. Occurs naturally in S.A., Vic., Tas., N.S.W. and Qld.

No record of the flowering times in W.A.

SPOROBOLUS R. Br.

Annuals or more often perennials. Leaf blades narrow, flat or convolute; ligule usually a short fringe of hairs. Inflorescence a spike-like or open panicle, sometimes spreading. Spikelets small, pedicellate, glabrous; rachilla breaking above the glumes. Floret 1, bisexual. Glumes persistent or caducous, upper glume often as long as the spikelet. Lemma as long as or exceeding the glumes, membranous. Palea as long as or slightly shorter than lemma, 2-ribbed, channelled, often readily splitting between the two ribs; apex obtuse, truncate or emarginate. Stamens 2 or 3. Caryopsis falling entire, the pericarp free from the seed. About 150 species from tropical and subtropical areas. 6 native and 1 introduced in W.A.

1. Upper glume shorter than lemma. Panicle dark green..... ***S. indicus**
 1. Upper glume equal in length to lemma. Panicle dark grey..... **S. virginicus**

***S. indicus** (L.) R. Br.

Paramatta Grass, Rat's Tail Grass

Tufted perennial; culms glabrous, 0.15-0.5 m tall. Leaves mostly basal; sheaths glabrous with the orifice ciliate; blades awl shaped, 70-300 x 2-3 mm, convolute or flat. Panicle spike-like, sometimes slightly interrupted near base, dark-green, 60-200 x 4-7 mm long. Spikelets 1.9-2.6 mm long. Glumes unequal; lower glume oblong to elliptic, 0.5-0.8 mm long, obtuse; upper glume ovate, 1.5 mm long, usually 1-ribbed, acute. Lemma narrowly oblong to narrowly ovate, ca 2 mm long, 1-ribbed, subacute. Palea slightly shorter than lemma. *S. capensis* (Willd.) Kunth

Weed, mainly on the Coastal Plain. Collected from the Perth metropolitan area and Pinjarra. Outside the region collected from Bremer Bay and Albany. Native to the tropical and subtropical regions of the world.

Flowers September-November, March and June.

S. virginicus (L.) Kunth

Marine Couch

Perennial with numerous thick, creeping, scaly rhizomes; culms erect, 0.1-0.4 m tall. Leaf sheaths overlapping, hairy at orifice; blades up to 50 mm long, spreading, rigid, inrolled, appearing opposite due to alternately long and short nodes; ligule membranous with a ciliate rim. Panicle spike-like, dark grey, rarely pale, 10-60 x 4-6 mm long. Spikelets dark-grey, 2-2.5 mm long. Glumes subequal, keeled, 1-ribbed; outer glume 2 mm long; inner glume 3 mm long. Lemma similar to and nearly equal to inner glume. Palea about as long as lemma, with 2 ribs very close together.

Occurs in salt marshes and close to the coast. Recorded from the Perth metropolitan area, Chittering, Bullsbrook, Mandurah and Bunbury. Widespread throughout the south west, Pilbara and Kimberley Regions of W.A. Occurs in all Australian states and temperate continents.

Flowers throughout the year.

***STENOTAPHRUM** Trin.

Creeping or prostrate perennials. Leaf sheaths compressed; blades acute or obtuse; ligule ciliate with short hairs. Inflorescence a narrow spike-like panicle. Spikelets solitary or in fascicles of 2-5, subsessile, adaxial, more or less sunken in hollows on the triquetrous rachis, in very short spike-like racemes. Florets 2, lower floret male or empty and upper floret bisexual. Glumes dissimilar, rarely both the glumes similar then small and scale-like; lower glume minute and scale-like; upper glume almost equal in length to the spikelet. Lower floret: lemma chartaceous to coriaceous; palea if present, 2-keeled. Upper floret: lemma chartaceous to coriaceous with firm involute margins; palea similar in texture, obscurely 2-ribbed. Caryopsis broadly elliptic to oblong in outline, dorsally compressed. 7 species from tropical and subtropical regions. 1 naturalized in W.A.

***S. secundatum** (Walter) Kuntze

Buffalo Grass

Culms stoloniferous, decumbent, branched, flowering shoots 100-300 mm or more tall, glabrous. Leaf sheaths keeled, firm, pallid; blades 10-150 x 4-9 mm, flat with inrolled margins, lower blades often spreading at right angles to the culm, smooth except margins which are scabrous towards the apex;

ligule ca 0.5 mm long. Panicle erect, stout, straight or curved, 20-80(-100) mm long, on stout glabrous peduncles, permanently enclosed or shortly exerted from the uppermost sheaths. Glumes very dissimilar; lower glume whitish, ovate, ca 1 mm long, ribless, membranous to chartaceous, glabrous or finely scabrous; upper glume convex, 4-5 mm long, acute, membranous, 7-ribbed, glabrous. Lower floret male; lemma 7-9-ribbed; palea slightly shorter than or almost equal to lemma, thickened on keels, with broad translucent margins. Upper floret bisexual; lemma smooth with broad, translucent margins.

Widely cultivated as a lawn, very hardy in seaside situations. In many areas has become naturalized. Native to tropical and subtropical regions.

Flowers September-April.

Sterile in W.A.

STIPA L.

Tufted perennials, rarely annuals; leaf blades convolute or rarely flat, often terete; ligule membranous or short and ciliate. Inflorescence a narrow, contracted or effuse panicle. Spikelets pedicellate; rachilla disarticulating above the glumes. Floret 1, bisexual. Glumes membranous, persistent, usually narrow. Lemma convolute, cylindrical, rigid, acute or minutely 2-lobed, awned; awn terminal or between 2 minute lobes, simple, straight, flexuose or bent, lower part known as the 'column' twisted, usually hairy. Palea 2-ribbed, enclosed in and shorter than lemma. Stamens 2 or 3; anthers sometimes barbellate at apex. Caryopsis narrow, terete or subterete. About 300 species, widely distributed over the temperate and warm temperate regions. 34 native in W.A.

- | | |
|--|-------------------------|
| 1. Ligule membranous, 3-10 mm long. | |
| 2. Branches of panicle and pedicel of spikelet plumose with spreading hairs..... | <i>S. elegantissima</i> |
| 2. Branches of panicle and pedicel of spikelet scabrous..... | <i>S. compressa</i> |
| 1. Ligule ciliate, ca 1 mm long. | |
| 3. Glumes with scattered long or short hairs on outer surface. | |
| 4. Awn with plumose hairs in lower half, scabrous in upper half..... | <i>S. semibarbata</i> |
| 4. Awn scabrous throughout length..... | <i>S. flavescens</i> |
| 3. Glumes glabrous..... | <i>S. campylachne</i> |

S. campylachne Nees

Erect, robust, densely tufted perennial, 0.4-0.6 m tall; culms numerous, dense, slender but rigid; nodes densely ciliate. Leaf sheaths long, scabrous; leaf blades erect, 10-25 x 0.5-1.5 mm, convolute, hispid with short white hairs, at length glabrous; ligule ciliate, ca 1 mm long. Panicle oblong, elongated, up to 300 mm long, the base often enclosed in uppermost leaf sheath, eventually exerted; branches almost whorled, erect; pedicels 3.5-10 mm long. Glumes subequal, thin, shining, narrowly ovate, acuminate; lower glume 18-22 mm long, 3-ribbed, translucent; upper glume 17-19 mm long, 3-5-ribbed, translucent. Lemma (including callus) 8-9 mm long, densely sericeous; awn plumose, 35-55 mm long, twice bent, slender, white-hairy in lower part, scabrous upwards, column 10-12 mm long; callus ca 2.5 mm long, densely white-hairy. Palea almost equal to lemma, 6 mm long, ciliate along middle third.

This species is endemic within the region. A few collections have been made from the Darling Range near Perth and at Harvey, Capel and Pinjarra.

Flowers August-October.

S. compressa R. Br.

Tufted annual up to 0.45 m tall, glabrous. Leaf sheaths of lower leaves loose, striate; blades narrow or almost setaceous, 50-600 x 0.5-3 mm, involute, striate, glabrous on outer surface, scabrous inside especially near ligule, the uppermost leaf sometimes with a loose sheath and broad blade embracing base of panicle; ligule thinly membranous, 5-10 mm long, glabrous, lacerated or deeply 2 or 3-lobed, lobes acuminate. Panicle scarcely exerted from uppermost sheath, 150-250 mm long; branches almost whorled, scabrous; pedicels scabrous. Glumes unequal, membranous at apex and along margins; lower glume 11-16 mm long, 5-ribbed; upper glume 9 mm long, 3-5-ribbed. Lower lemma 5-8 mm long, shortly sericeous; awn up to 130 mm long, twice bent and together with column minutely golden-hairy; callus 3 mm long. Palea as long as lemma, translucent, sometimes shortly hairy in middle on back, translucent on margins.

Widespread throughout the region. Common within the south west, from Kalbarri in the north to Ongerup in the south.

Flowers September-December.

S. elegantissima Labill.

Feather Speargrass

Perennial; culms arising from a horizontal rhizome, slender, branched upwards, 2-3 m tall. Leaf sheaths scabridulous; blades narrow, 50-150 x 1-3 mm, flat at base, convolute upwards; ligule membranous, 3-5 mm long, becoming lacerated. Panicle open and loose, 150-250 mm long; branches whorled, finally divaricately spreading and together with elongated pedicels, plumose, with spreading hairs. Glumes unequal, 3-ribbed, glabrous, chartaceous, or with a few long scattered hairs; outer glume 10-14 mm long; inner glume 8-10 mm long. Lemma 6-8 mm long, hairy only towards base, muricate upwards; awn 3-5.5 mm long, bent, column 15 mm long, plumose; callus 1 mm long, acute, villous. Palea 2 mm long, scarios, muricate down middle.

Widespread throughout the region. Occurs from Shark Bay in the north to Kalgoorlie in the east and Esperance in the south. Occurs also in S.A., Vic. and N.S.W.

Flowers August-January.

S. flavescens Labill.

Tufted perennial up to 0.6 m tall; culms usually slender. Leaf sheaths glabrous or with scattered hairs, margins ciliate; leaf blades erect, narrow and convolute, 250-550 x 1-3 mm, glabrous; ligule ca 0.5 mm long, ciliate. Panicle narrow, 100-400 mm long, often exserted from sheath, dense, branches erect. Spikelets narrow, sometimes gaping after flowering. Glumes straw-coloured with scattered hairs, translucent, acuminate; outer glume 9-14 mm long, prominently 3-ribbed; inner glume 8-15 mm long, prominently 3-ribbed with the 2 outer ribs shorter. Lemma 8-9 mm long (including callus), white-sericeous; awn up to 80 mm long, twice bent, scabrous, column 10-15 mm long; callus 2-3 mm long. Palea almost equal to lemma, 4-5 mm long, white-sericeous along midrib, margins translucent and becoming inrolled.

A near-coastal plant being recorded from Woodman Point. Also recorded north of the region at Cockleshell Gully and Moore River mouth. Occurs in S.A., Vic., Tas. and N.S.W.

Flowers September and October.

S. semibarbata R. Br.

Bearded Speargrass, Fibrous Speargrass

Tufted perennial, 0.3-0.6 m tall; culms usually slender. Leaf sheaths, especially the lower, hispid with short spreading hairs; leaf blades erect, narrow and convolute, 150-550 x 1-5 mm, glabrous or hairy; ligule very short and ciliate, with ring of white hairs on inner surface of leaf behind ligule. Panicle narrow, 200-320 mm long, often exserted from sheath, usually dense, branches erect. Spikelets narrow, sometimes gaping after flowering. Glumes green or purplish, minutely scabrous, translucent, acuminate; outer glume 15-21 mm long, prominently 3-ribbed; inner glume 13-18 mm long, prominently 3-ribbed with 2 of the ribs shorter. Lemma 7-10 mm long (including callus), white-sericeous; awn 60-100 mm long, twice bent, column rather stout and 20-40 mm long, plumose. Palea almost equal to lemma, 5-6 mm long, white-sericeous along midrib, margins translucent, becoming inrolled.

This species has been collected from only two localities in W.A., South Perth and Harvey, both of which are in the region. Also occurs in S.A., Vic., Tas. and N.S.W.

Flowers August-November.

TETRARRHENA R. Br.

Perennials, tufted, with creeping rhizomes. Leaves flat, glabrous; ligule a very short, finely ciliate rim. Inflorescence a narrow raceme. Spikelets pedicellate, laterally compressed, awnless; rachilla disarticulating above the glumes. Florets 3, the uppermost bisexual, the lower 2 empty. Glumes persistent, keeled, entire. Lemmas of empty florets unawned, faintly ribbed; lemma of bisexual floret like upper empty lemma in size, shape and texture, with a knob-like process at base forming a hinge with the appendage of the upper empty lemma. Palea narrow, acute, membranous, keeled. Stamens 4. Stigmas exserted laterally. Caryopsis elliptic to oblong in outline, compressed, enclosed in hardened lemma but free from lemma and palea. 4 species confined to Australia. 1 in W.A.

T. laevis R. Br.

Forest Ricegrass

Perennial, 0.3-0.6 m tall; culms arising from a stout, creeping or horizontal rhizome; leaf sheaths tight; blades bright green, flat, 70-180 x 3-5 mm, glabrous or scabridulous. Raceme 50-80 mm long; rachis scabrous; pedicels erect, thickened upwards. Glumes rigidly membranous, rather acute; lower glume 3-4.5 mm long, faintly 5-ribbed; upper glume 4-5 mm long, prominently 5-ribbed. Empty lemma ovate-oblong, rigid, obtuse, faintly 5-ribbed, lower lemma 5-6 mm long, upper lemma 5.5-6 mm long; lemma of bisexual floret 5-6 mm long, resembling empty lemma but more indurate and laterally compressed, with a knob-like process at base. Palea 4.5-5.5 mm long, translucent with 1 prominent rib.

Recorded from the Darling Range near Perth and at Waroona. Also recorded from Bluff Knoll in the Stirling Range.

Flowers September-November.

THEMEDA Forsskal

Annuals or perennials. Ligule scarious or membranous. Inflorescence of groups of apparent spikelets (racemes) subtended by a spathe, 1 or more of such racemes subtended by a common spathe, the whole forming a loose panicle; rachis tough, disarticulating between like pairs and readily disarticulating below fertile spikelets, leaving the 4 male or sterile involucre spikelets. Apparent spikelet consisting of 2 pairs of sessile male or sterile spikelets surrounding and forming a false involucre about a short rachis which bears 1 or more bisexual sessile spikelets and 1 or 2 pedicellate male or sterile spikelets, all subtended by a spathe. Fertile spikelet terete; callus usually acute or pungent, densely bearded; lower glume tightly involute, not keeled; upper glume with a deep longitudinal groove on each side; lower lemma translucent, awnless or awned; palea small or absent. Upper pedicellate and lower sessile spikelets alike, dorsally compressed, awnless; lower glume herbaceous; upper glume membranous, rarely suppressed; lemma, if present, translucent, upper lemma with or without palea. Caryopsis narrowly obovoid, subterete, grooved on face. About 16 species in the tropical and subtropical regions, mostly south east Asia and in Australia. 4 native in W.A.

T. australis (R. Br.) Stapf

Kangaroo Grass

Tufted perennial; culms up to 1 m tall. Leaf sheaths loose, keeled, coarsely striate, glabrous, margins translucent; blades with ciliate auricles, linear, keeled, flat or folded; ligule short and broad, rounded truncate or notched, ciliate. Panicle loose, often pendulous, branches slender and glabrous; spathes herbaceous, narrowly ovate, 25-45 mm long, acuminate, keeled, striate, green becoming reddish brown at maturity; racemes 12-15 mm long. Involucral spikelets narrowly ovate, ca 10 mm long, acute or acuminate, green becoming reddish with age; lower glume finely chartaceous, 9-11-ribbed, glabrous or with scattered tubercle-based hairs, acuminate, keeled near narrowly membranous margins; upper glume slightly shorter than lower, narrowly ovate, translucent, 2-keeled, acuminate, ciliate; lemma 6-7 mm long, translucent, obtuse, 1-ribbed, 2-keeled upwards with broad inflected margins. Sessile spikelets bisexual, 2-3 mm long, often pungent at base, margins and back densely bearded with reflexed sericeous hairs; lower glume 5-10 mm long, finely 7-ribbed, and shining glabrous except for upper third which may be coarsely and softly hairy, obtuse or emarginate; upper glume glabrous or scabrous upwards; lower lemma shorter than glumes, narrowly ovate, glabrous, translucent; upper lemma linear; awn 50-70 mm long, hairy, usually twice bent and loosely twisted. Pedicellate spikelets on glabrous pedicels resembling involucre spikelets. *T. triandra* auct. non Forsskal

Widely distributed within the region. Occurs throughout the south west and northern parts of the state, usually associated with rocks. Native to all states of Australia.

Flowers July-December with occasional flowers in May.

***TRACHYNIA** Link

Annuals, glaucous. Leaf blades flat. Inflorescence a compound, spike-like raceme of few spikelets. Spikelets solitary, shortly pedicellate, becoming laterally compressed. Florets 7-15, bisexual. Glumes firm, strongly ribbed. Lemmas firmly coriaceous, rounded on back, at first closely overlapping, narrowed into straight terminal awn. Paleas rather broad, obtuse, 2-keeled, keels rigidly ciliate. *Brachypodium* P. Beauv. A monotypic genus occurring from the Mediterranean Region to central Asia.

***T. distachya** (L.) Link

False Brome

Small annual with bent culms, 100-250 mm tall, nodes hairy. Leaf blades scarious, 30-120 x 2-6 mm; ligule 1 mm long, densely ciliate over surface and margins. Raceme solitary, terminal, of 2-4 shortly pedicellate but apparently sessile, distant spikelets. Spikelets 20-30 mm long. Glumes 5.5-7 mm long; upper glume strongly 7-ribbed; lower glume 5-ribbed, glabrous except along the translucent margins. Lemma stiff, 8-10 mm long, 5-7-ribbed, margin with distant narrowly conical hairs in upper half, ciliate in lower half with scattered hairs on back, usually densely hairy along sides; awn straight, 6-14 mm long, scabrous. Palea 8-10 mm long. *Brachypodium distachyon* (L.) P. Beauv.

Recorded from Bellevue, Mt. Henry and Nedlands. Occurs in scattered localities throughout the south west from Geraldton in the north to Kojonup in the south. Native of southern Europe and south west and central Asia.

Flowers November-January.

***TRisetaria** Forsskal

Annuals. Leaf blades usually narrow; ligule translucent. Inflorescence a dense, spike-like panicle. Spikelets solitary, pedicellate, laterally compressed; rachilla breaking between lemmas. Florets 2-6, all bisexual, except the uppermost which is usually empty. Glumes persistent, keeled. Lemmas exceeding glumes, awned from sinus. Paleas narrowly ovate, 2-keeled with 2 short setaceous lobes or points. Caryopsis oblong in outline, laterally compressed. *Lophochloa* Reichen., *Koeleria* Pers. 2 species occurring in the eastern Mediterranean Region. 1 naturalized in W.A.

***T. cristata** (L.) Kerguelen

Annual Cat's Tail

Annual, 150-300 mm tall. Leaf sheaths and blades sparsely hairy, 30-120 x 1-2 mm; ligule membranous, jagged, ca 0.25 mm long. Panicle dense, spike-like, 20-70 mm long. Spikelets 2-4 mm long, strongly laterally compressed. Florets 4-5. Glumes acute, papillose-hispid on back; lower glume 3 mm long, 3-ribbed; upper glume 2 mm long, 2-5-ribbed. Lemma 2-3 mm long, papillose-hispid on back, keeled, 5-ribbed, margins narrow and scarious, apex 2-lobed with a straight or curved awn 0.5-1.5 mm long. Palea membranous, 1.5-2.5 mm long. *Koeleria phleoides* (Vill.) Pers., *Lophochloa cristata* (L.) Hylander

Common within the Perth metropolitan area, at Garden Island and Yanchep. Naturalized at scattered locations from Dirk Hartog Island to Esperance. Native to southern and central Europe.

Flowers September-November.

***TRITICUM** L.

Annuals or biennials. Leaf blades flat, somewhat flaccid, auriculate at base; ligule translucent. Inflorescence a spike, the rachis somewhat flexuose. Spikelets solitary, alternate in each excavation of the spike; rachilla disarticulating above the glumes and between the florets or continuous. Florets 2-5, bisexual or the uppermost 1 or 2 empty. Glumes rigid, keeled. Lemmas exerted from the glumes, broad, keeled, very asymmetric. Paleas 2-keeled, keels ciliate. Ovary hairy or villous at apex. Caryopsis ovoid or obloid, subterete, grooved, free or adhering to both lemma and palea, hairy at apex. About 20 species in Europe and Mediterranean Region. 1 introduced in W.A.

***T. aestivum** L.

Wheat

Annual 0.6-1 m high; culms erect, branching at base. Leaf blades 10-20 mm broad. Spike somewhat 4-angled; rachis 50-120 mm long. Spikelets broad, glabrous or hairy, long-awned or awnless. Glumes oblong, equal, convex, 7-ribbed, mucronate or awned, hard and shiny in fruit. Florets 2-5, upper 1 or 2 usually empty. Lemma sometimes awned, many-ribbed, hard and shiny in fruit. Caryopsis obloid, 6-7 mm long. *T. vulgare* Host.

Cultivated, occasional escape especially on roadsides where it does not persist. Within the region collected from Yanchep and Kwinana, but often seen as scattered plants along major roads. Also collected from the Abrolhos Islands and widespread in agricultural areas.

Flowers September-May.

***VULPIA C. Gmelin**

Slender annuals. Leaf blades linear, usually setaceous; ligule membranous. Inflorescence a narrow, secund panicle. Spikelets pedicellate, laterally compressed; rachilla slender, breaking up between lemmas. Florets 5-10, bisexual, often cleistogamous, uppermost often empty. Glumes very unequal; lower glume minute or almost obsolete, 1-ribbed; upper glume 3-ribbed. Lemmas rounded on back, faintly 5-ribbed, produced into terminal awn; Paleas entire or minutely 2-lobed, 2-keeled. Caryopsis linear in outline, compressed, concave. About 30 species from America and the Mediterranean Region. 3 introduced in W.A.

- 1. Lower glume at least half length of upper glume. Panicle exceeding leaf sheath..... ***V. bromoides**
- 1. Lower glume less than half length of upper glume. Panicle partly enclosed within leaf sheath.
 - 2. Upper glume awned, 12-18 mm long..... ***V. membranacea**
 - 2. Upper glume unawned, 3-8 mm long..... ***V. myuros**

***V. bromoides (L.) Gray**

Squirrel Tail Fescue

Loosely tufted annual, 50-600 mm tall. Leaf sheaths rounded on back; blades 10-140 x 0.5 mm, minutely hairy above, rough near apex and on margins; ligule 0.5 mm long. Panicle long-exserted from uppermost sheath, erect, rather loose to compact, 1-sided, 10-100 mm long, sometimes reduced to a single spikelet. Spikelets 7-14 mm long. Florets 5-10. Glumes persistent, finely pointed; lower glume 1.5-4.5 mm long, narrowly ovate; upper glume narrowly ovate to narrowly obovate, 3.5-8 mm long. Lemma 5-9 mm long, margins finally incurved, narrowed into fine rough awn up to 13 mm long. Palea 4-7 mm long, keels scabrous.

Common in sandy soils of the region, recorded from the Perth metropolitan area and Harvey. Extends from Geraldton in the north to the Stirling range in the south. Native to south west and central Europe.

Flowers October-December.

***V. membranacea (L.) Dumort.**

One-glume Fescue

Tufted annual, 100-600 mm tall. Leaf sheaths glabrous, rounded on back; blades 10-100 x 1-3 mm, inrolled, minutely hairy on prominent ribs. Panicles erect, green or purplish, dense, 20-120 mm long, 1-sided. Spikelets 12-16 mm long (excluding awns). Florets 5-7, the basal 2 or 3 bisexual, the others empty, breaking up at maturity or falling with pedicel attached. Lower glume 0.25-1.5 mm long; upper glume narrowly ovate, 12-18 mm long (including rough awn), keeled, firm except for membranous margins. Lemma of bisexual floret narrowly ovate, 8-16 mm long, keeled, with fine, straight to rough awn up to 25 mm long; empty lemma smaller and narrower. Palea 7-9 mm long, keels scabrous.

One collection from South Perth, but it is relatively widespread within the south west of W.A. from Busselton to Cape Le Grande. Native to western Europe.

Flowers October and November.

***V. myuros (L.) C. Gmelin**

Rat's Tail Fescue

Annual, 100-700 mm tall. Leaf sheaths glabrous, rounded on back; blades 20-150 x 0.5-3 mm, rough on margins, shortly hairy above. Panicle linear, contracted, usually curved or pendulous, 50-300 mm long, green or purplish. Spikelets 6-10 mm long (excluding awns). Florets 3-7, breaking at maturity beneath each lemma. Glumes persistent, finely pointed; lower glume 1-2 mm long; upper glume 3-8 mm long. Lemma 14-30 mm long, scabrous especially near apex, margins becoming incurved, apex narrowed into a fine, straight, scabrous awn. Palea equal to lemma, 5-7 mm long.

Recorded from the Perth metropolitan area, Gosnells, Rockingham and Garden Island. Widespread between Kalbarri, Norseman and Esperance. Native to central Europe, south west and southern Asia.

Flowers July-November.

Two varieties are recognized, both occurring in the region, being distinguished by the differences in their lemmas. Var. *myuros* has lemmas with scabrous or glabrous margins whereas var. *hirsuta* Hack. has scabrous rather than ciliate lemmas with glabrous margins. The latter variety is sometimes treated as a distinct species, *V. megalura* (Nutt.) Rydb., which is commonly known as Foxtail Fescue.

GLOSSARY

abaxial: away from the axis. cf. **adaxial**.

abscission: the normal shedding from a plant of an organ that is mature or aged. adj. **abscissile**.

achene: a dry, 1-seeded, indehiscent fruit formed from an inferior ovary. Used to describe the fruit of the Asteraceae, following the definition given by De Candolle; equivalent to the term cypsela. Also used for the segments of a fruit formed from separate carpels. e.g. the achenes of Ranunculaceae.

acicular: needle shaped, very slender, usually rounded in cross section and not compressed.

actinomorphic: having radially arranged floral segments which are more or less equal in size and shape, referring to a flower, calyx or corolla. cf. **zygomorphic**.

aculeate: covered in prickles.

acuminate: tapering gradually to a protracted point. cf. **attenuate**.

acute: terminating in a distinct but not protracted point, the converging edges forming an angle of less than 90 degrees. cf. **obtuse**.

adaxial: towards the axis. cf. **abaxial**.

adherent: touching without organic fusion, referring to parts normally separate, e.g. floral parts of different whorls. cf. **adnate**, **coherent**, **connate**.

adnate: fused to an organ of a different kind, e.g. a stamen fused to a petal or an anther fused for its whole length to the filament. cf. **adherent**, **coherent**, **connate**.

adventitious: arising in abnormal positions, e.g. roots arising from the shoot system, buds arising elsewhere than in the axils of leaves.

agamospecies: an apomictic population whose members are of common origin. Sometimes referred to as a microspecies.

agamospermy: a form of apomixis (see **apomict**) in which fertilisation is bypassed and reproduction proceeds via an asexually produced embryo and seed.

alternate: borne singly and spaced around and along the axis, applied to leaves or other organs on an axis. Also used to describe the position of floral parts of different whorls on different radii, e.g. stamens with respect to petals. cf. **opposite**.

alveolate: a surface having the appearance of a honeycomb, with shallow, angular depressions, often more or less hexagonal in outline.

amphibious: capable of living on or in water or on drying soil. Frequently an amphibious plant has a different form in the different habitats.

amplexicaul: clasping the stem.

anastomosing: connecting with one another, particularly applied to veins.

androdioecious: having male flowers and bisexual flowers on separate plants. cf. **gynodioecious**.

androecium: the male part of a flower; a collective term for the stamens of one flower.

andromonoecious: having male flowers and bisexual flowers on the same plant. cf. **gynomonoecious**.

angiosperm: a division of seed plants with the ovules borne in an ovary. cf. **gymnosperm**.

annual: completing the full cycle of germination to fruiting within a single year and then dying. cf. **biennial**, **perennial**.

annular: arranged in or forming a ring.

annulus: a ring of hygroscopic, thickened cells enabling dehiscence of a sporangium as in ferns.

anther: that part of the stamen in which the pollen is produced.

antheridium: an organ or receptacle in which the male sex cells are produced in non-flowering plants. cf. **archegonium**.

- anthesis:** the period that a flower is open, i.e. between the opening of the bud and the onset of withering.
- antipetalous:** inserted in front of the petals, e.g. stamens in some Rutaceae. cf. **antisepalous**.
- antisepalous:** inserted in front of the sepals, e.g. the stamens in some Rutaceae. cf. **antipetalous**.
- antrorse:** directed upwards. cf. **retorse**.
- apetalous:** lacking a corolla.
- apiculum:** a short, sharp, flexible point. adj. **apiculate**.
- apomict:** a plant, variant or taxon reproducing from seed which has developed without sexual fusion of gametes. adj. **apomictic**.
- appressed:** pressed closely to another organ but not united.
- aquatic:** a plant living in or on water for all or a substantial part of its life span. cf. **terrestrial**.
- arborescent:** resembling a tree; applied to non-woody plants attaining tree height and to shrubs tending to become tree-like in size.
- archegonium:** an organ or receptacle in which the female sex cells are produced in non-flowering plants. cf. **antheridium**.
- areole:** a well-defined area on an otherwise flat surface, e.g. the raised portion of the cladodes of *Opuntia* which supports a tuft of hairs or spines. adj. **areolate**.
- aril:** a fleshy to hard structure which develops from the funicle or ovule after fertilisation and encloses all or part of the seed. adj. **arillate**.
- aristate:** having a stiff, bristle-like tip.
- articulate:** jointed; usually fracturing easily at the nodes or point of articulation into segments or articles.
- ascending:** arched upwards in the lower part and becoming erect in the upper part. cf. **decumbent**, **procumbent**.
- attenuate:** tapering gradually. cf. **acuminate**.
- auct.:** auctorum; Latin for "of authors" e.g. *Daviesia pectinata* auct. non Lindley indicates that this name has been misapplied by various authors to a plant correctly known as *D. decurrens*.
- auricle:** an ear shaped appendage at the base of a leaf, leaflet or corolla lobe; or an ear-like outgrowth at the base of the sheath of some grasses and other monocots. adj. **auriculate**, also used to describe a leaf base which has lobes on both sides of the petiole.
- autogamous:** self fertilised.
- autotrophic:** self feeding, not depending on parasitism or entirely on organic matter. cf. **heterotrophic**.
- awn:** a slender, bristle-like projection, e.g. from the back or tip of the glumes and lemmas in some grasses and on the fruit of some Geraniaceae. adj. **awned**.
- axil:** the angle between one part of a plant and another part, e.g. a branch and a leaf. adj. **axillary**.
- axile:** on an axis, usually used to describe the type of arrangement of ovules where there is a central axis in the ovary.
- axis:** main stem of the plant or the flower-bearing portion of an inflorescence or the ovule-bearing structure in ovaries with axile placentation.
- barbate:** bearded, having tufts of hairs.
- barbellae:** short, stiff, hair-like bristles. adj. **barbellate**.
- basal placentation:** an arrangement in which the ovules are attached to the bottom of the ovary cavity.
- basifixed:** attached at or by the base, e.g. of anthers attached by the base of the connective. cf. **dorsifixed**.
- beak:** a prominent terminal projection, especially of a carpel or fruit. adj. **beaked**.
- berry:** a fleshy or pulpy indehiscent fruit with the seed(s) embedded in the fleshy tissue of the pericarp.
- biennial:** completing the full cycle of germination to fruiting in more than one, but not more than two years, and then dying.

- bilabiate:** 2-lipped; a zygomorphic corolla where the lobes are in two groups as in the Lamiaceae in which two lobes form one lip and three form the other.
- bipinnate:** twice pinnately divided.
- bipinnatisect:** with pinnatisect lobes.
- biserrate:** doubly serrate; with smaller regular, asymmetric teeth on the margins of larger teeth.
- bisexual:** having both sexes, as in a flower bearing both fertile anthers and a fertile ovary. cf. **unisexual**.
- blade:** lamina; part of the leaf above the sheath or petiole.
- bract:** a leaf-like structure, different in form from the foliage leaves, associated with an inflorescence or flower. adj. **bracteate**.
- bracteole:** a small bract-like structure borne singly or in a pair on the pedicel or calyx of a flower. adj. **bracteolate**.
- broadly:** having a length : breadth ratio between 6 : 5 and 1 : 1; if the ratio is less then the shape is described as very broadly. cf. **narrowly**. Fig. 318
- bulb:** a modified underground axis that is short and crowned by a mass of usually fleshy, imbricate scales. adj. **bulbous**.
- bulbil:** a small bulb produced on aerial parts such as a leaf axil or an inflorescence.
- bulla:** a blister or wart-like protuberance. pl. **bullae**.
- bullate:** with bullae on the surface.
- caducous:** falling early before associated organs are mature. cf. **deciduous**, **persistent**.
- caespitose:** growing densely in tufts; having short, closely packed stems.
- callus, callosity:** a thickened, raised mass of hardened tissue, often formed after an injury but sometimes a normal feature, e.g. the glandular wart-like structures on the labellum of some orchids, or in grasses, the hardened, usually hairy base of the dispersal unit, usually a floret or whole spikelet. pl. **calli, callosities**. adj. **callose**.
- calyx:** the outermost floral whorl usually consisting of sepals or a calyx tube and calyx lobes. adj. **calycine**.
- calyx lobe:** one of the free upper parts of the calyx which may be present when the lower part is united into a tube.
- calyx tube:** the tubular, often cup shaped or bell shaped, fused part of the calyx when it is free from the corolla. cf. **floral tube**.
- campanulate:** a 3-dimensional shape; bell shaped. Fig. 319
- capitate:** growing together in a head. Also meaning head-like as in some stigmas.
- capitulum:** a dense cluster of sessile, or almost sessile, flowers or florets.
- capsule:** a dry fruit formed from two or more united carpels and dehiscing at maturity to release the seeds. adj. **capsular**.
- carinate:** keeled; with a distinct longitudinal ridge often on the adaxial surface.
- carpel:** an organ, generally believed to be leaf-derived, which bears 1 or more ovules, a stigma and sometimes a style. Often much modified in a syncarpous ovary. adj. **carpellary**.
- carphophore:** the central axis of a schizocarp, separating the individual fruits (mericarps).
- caruncle:** an outgrowth near the hilum (the scar at the point of attachment) of a seed. adj. **carunculate**.
- caryopsis:** the grass fruit, which has the seed coat united with the ovary wall.
- cataphyll:** a rudimentary scale-like leaf sometimes present on seedlings or, in the case of *Macrozamia*, on the mature frond.
- caudate:** having a narrow tail-like appendage.
- caulescent:** having an obvious aerial stem.
- cauline:** borne on the aerial part of a stem. cf. **radical**.

- chartaceous:** papery.
- ciliate:** fringed with hairs.
- ciliolate:** minutely ciliate.
- cilium:** a straight, usually erect hair on a margin or ridge. pl. **cilia**.
- circinate:** spirally coiled, with the tip innermost.
- circumscissile:** opening by a transverse line around the circumference.
- cladode:** the modified photosynthetic stem of a plant whose foliage leaves are absent or much reduced. cf. **phyllode, phylloclade**.
- clavate:** a 3-dimensional shape; club shaped; thickened at one end.
- claw:** the conspicuously narrowed basal part of a flat organ.
- cleistogamous:** describing flowers which are self pollinating and set fertile seed without the flower opening.
- cline:** a character gradient over a geographical area where one or several morphological features gradually change over a part or over the whole distribution area. adj. **clinal**.
- coccus:** one of the segments of a distinctly lobed fruit which becomes separate at maturity. Sometimes called a mericarp. pl. **cocci**.
- coherent:** touching without organic fusion, referring to parts normally together, e.g. floral parts of the same whorl. cf. **adherent, adnate, connate**.
- column:** a structure formed by the united style, stigma and stamen(s), as in the Asclepiadaceae, Stylidiaceae and Orchidaceae.
- coma:** a tuft of hairs. adj. **comose**.
- commissure:** a join or seam; the interface of two fused carpels in an ovary.
- complicate:** **conduplicate** q.v.
- compound:** consisting of two or more anatomically or morphologically equivalent units.
- compressed:** flattened.
- concolorous:** uniformly coloured, as in upper and lower surfaces. cf. **discolorous**.
- concrecence:** a result of growing together and fusing, e.g. the base of some spines.
- conduplicate:** folded together lengthwise.
- cone:** a reproductive structure composed of an axis (branch) bearing sterile bract-like organs and seed or pollen bearing structures. Strictly refers to the Gymnospermae or Lycopodiales but frequently used for the fruiting spike in Casuarinaceae and flowering and fruiting structure in some Proteaceae.
- confluent:** merging or blending together.
- conic:** a 3-dimensional shape; cone shaped.
- connate:** fused to another organ of the same kind. cf. **adherent, adnate, coherent**.
- connective:** the tissue separating two lobes of an anther.
- connivent:** converging, arching over so as to come into contact.
- conspecific:** within or belonging to the same species.
- contiguous:** neighbouring parts being in contact but not fusing.
- convolute:** an arrangement of petals in a bud where each has one side overlapping the neighbouring petal.
- cordate:** a 2-dimensional shape which is heart shaped in outline, i.e. having the base broad and distinctly notched.
- coriaceous:** leathery.
- corm:** a very short, broad, firm-fleshed, subterranean stem which produces aerial stems, leaves and flowers. adj. **cormous**.

- cormel:** a miniature corm produced in leaf axils, e.g. in some Iridaceae.
- corniculate:** bearing or terminating in a small horn-like protuberance or process. cf. **ecorniculate**.
- corolla:** the floral whorl inside the calyx, usually consisting of petals or a corolla tube and corolla lobes. adj. **corolline**.
- corona:** a ring of tissue arising from the corolla or perianth of a flower and standing between the perianth lobes and the stamens. adj. **coronal**.
- coroniform:** crown shaped, as in the pappus of Asteraceae which may be coroniform when the membranous scales are connate.
- corymb:** an inflorescence, usually a raceme, in which the flowers, through unequal pedicels, are in one horizontal plane. adj. **corymbose**.
- costa:** a thickened, linear ridge or the midrib of the pinna in ferns. adj. **costate**.
- cotyledon:** the primary ("seed") leaf, each seedling having one or two, rarely more.
- crenate:** with obtuse or rounded teeth which either point forwards or are perpendicular to the margin.
- crenulate:** minutely crenate.
- crisped:** very strongly undulate; margins which are wavy in a vertical plane, the waves themselves with secondary waves. cf. **undulate**.
- crustaceous:** hard, thin and brittle.
- culm:** the aerial stem of grasses, sedges, rushes and other monocots, bearing the cauline leaves and the inflorescence.
- cultivar:** cultivated variety; an assemblage of cultivated individuals distinguished by any characters significant for the purposes of agriculture, forestry or horticulture, and which, when reproduced, retains its distinguishing features.
- cuneate:** a 2-dimensional shape; obtriangular i.e. wedge shaped.
- cuneiform:** a 2-dimensional shape; obtriangular i.e. wedge shaped but with rounded angles.
- cup:** used here to describe the cup shaped part of the perianth formed by the bases of the segments in the flower of Iridaceae.
- cupular:** cup-like.
- cuspid:** an elongated, usually rigid, acute point. cf. **muco**.
- cuspidate:** somewhat abruptly and sharply concave and constricted into a cusp. cf. **mucronate**.
- cyathium:** an inflorescence of unisexual flowers surrounded by involucre bracts, as in *Euphorbia*.
- cylindric:** tubular or rod shaped; a 3-dimensional shape with a length : breadth ratio of 2 : 1 to 3 : 2. cf. **narrowly, broadly**.
- cyme:** an inflorescence in which each flower, in turn, is formed at the tip of a growing axis, further flowers being formed on branches arising below. adj. **cymose**.
- deciduous:** falling at the end of the growth period or at maturity. cf. **caducous, persistent**.
- declinate:** inclined downwards or to one side.
- decompound:** several times divided or compounded, e.g. a leaf or frond which is bipinnate or ternately compound.
- decumbent:** spreading horizontally with the apex growing upwards, referring to stems. cf. **ascending, procumbent**.
- decurrent:** having the leaf base prolonged down the stem as a winged expansion or rib.
- decussate:** having paired organs with successive pairs at right angles to give four rows.
- deflexed:** bent downwards.
- dehiscent:** breaking open at maturity to release the contents. cf. **indehiscent**.
- deltate:** a 2-dimensional shape; very broadly triangular with a length : breadth ratio of 5 : 6. Fig. 318
- dendritic:** branching from a main stem or axis; resembling the branching of a tree.

- dentate:** with sharp, spreading, rather coarse teeth standing out from the margin.
- denticulate:** finely dentate.
- depressed:** flattened as if pressed down from the top or end; applied to 2 or 3-dimensional shapes, e.g. ovate and obovate or ovoid and obovoid which have a length : breadth ratio of less than 2 : 3. Fig. 318
- determinate:** an inflorescence in which the terminal or central flower develops first and thereby arrests further growth of the primary axis. cf. **indeterminate**.
- diadelphous:** having the stamens formed in two groups, the members of each group having connate filaments. In some Papilionaceae 9 stamens are united in one group and there is a single, free stamen.
- dichasium:** a cyme in which the branches are opposite and approximately equal. pl. **dichasia**. adj. **dichasial**.
- dichotomous:** divided almost equally into two parts.
- didynamous:** describing stamens, four in number, two being distinctly longer than the other two.
- digitate:** having parts arranged like the fingers on a hand.
- dimidiate:** having one half distinctly smaller than the other; usually applied to a leaf or frond segment in which the midrib is close to one margin.
- dimorphic:** with two forms, e.g. having stamens of two different lengths or having two kinds of leaves. cf. **uniform**.
- dioecious:** having male and female unisexual flowers on different plants. cf. **monoecious**.
- diploid:** used here to describe the common situation in species or variants in which each type of chromosome (except the sex chromosomes if present) are represented twice (one set maternal the other paternal).
- disarticulating:** fracturing or separating at nodes or points of articulation.
- disc:** the usually disc shaped receptacle of the head in Asteraceae. Also the fleshy nectariferous organ which is sometimes annular or lobed and developed usually between the stamens and ovary. Also used for the enlarged style-end in Proteaceae.
- disc floret:** a tubular 4 or 5-toothed or lobed floret on the disc of an inflorescence, i.e. head, of Asteraceae.
- disciform:** describing an inflorescence, i.e. head, of Asteraceae with central disc florets and marginal female florets which have a reduced inconspicuous slender tubular corolla without a ligule; or an inflorescence with only such reduced female florets. cf. **discoïd**, **radiate**.
- discoïd:** resembling a disc; a solid structure with two convex faces. Used in the Asteraceae to describe a head which has only disc florets present. cf. **disciform**, **radiate**.
- discolorous:** having two colours, e.g. the lower leaf surface distinctly different in colour from the upper. cf. **concolorous**.
- dissepiment:** septum; the partition found in some ovaries or, rarely, in a carpel.
- distal:** end of any structure farthest from the point of attachment. cf. **proximal**.
- distichous:** two ranked, arranged in two diametrically opposite rows.
- divaricate:** widely spreading.
- dorsifixed:** having the filament attached to the back of the anther. cf. **basifixed**.
- dorsiventral:** refers to a leaf in which the surface appearance or internal structure of the abaxial side is different from that of the adaxial side.
- drupe:** a 1-celled fruit with one or two seeds enclosed by a stony layer (endocarp) which is embedded in succulent tissue (mesocarp) surrounded by a thin outer skin (epicarp). adj. **drupaceous**.
- ebracteate:** without bracts.
- ebracteolate:** without bracteoles.
- ecallose:** without a callus.
- echinate:** bearing stiff, stout, prickly hairs.

- ecorniculate:** without a small horn-like protuberance or process. cf. **corniculate**.
- ecotype:** a local race or variant adapted to a particular habitat.
- eglandular:** without glands. cf. **glandular**.
- ellipsoid:** a 3-dimensional shape; elliptic in outline and with a length : breadth ratio between 3 : 2 and 2 : 1. cf. **narrowly, broadly**.
- elliptic:** a 2-dimensional shape; oval in outline and with a length : breadth ratio between 3 : 2 and 2 : 1. cf. **narrowly, broadly**. Fig. 318
- elongate:** lengthened; stretched out.
- emarginate:** having a broad, shallow notch at the apex. cf. **retuse**.
- endemic:** having a natural distribution confined to a particular geographical region.
- endocarp:** the innermost layer of the fruit wall, derived from the innermost layer of the carpel wall. cf. **exocarp, mesocarp, pericarp**.
- endosperm:** nutritive tissue in a seed. adj. **endospermic**.
- entire:** without any incisions or teeth.
- epappose:** without a pappus; refers to the fruit of Asteraceae.
- ephemeral:** short-lived.
- epicalyx:** a whorl of bracts, just below or joined to the calyx, resembling a second calyx.
- epigynous:** borne on or arising from the ovary. Used to describe the flower structure when the ovary is inferior and thus the floral whorls are inserted above the ovary. cf. **hypogynous, perigynous**.
- erect:** upright; perpendicular.
- erose:** appearing eroded, gnawed or irregularly toothed.
- excentric:** to one side; off centre.
- excurrent:** extending beyond the margin or tip. Usually refers to a midvein developed into an awn or mucro.
- exocarp:** the outermost layer of the fruit wall, derived from the outermost layer of the carpel wall. Sometimes called epicarp. cf. **endocarp, mesocarp, pericarp**.
- exserted:** protruding beyond some enclosing organ, e.g. referring to stamens which project beyond the corolla or perianth or to valves which extend beyond the rim of a capsular fruit. Sometimes the stamens are not actually longer than the corolla or perianth but are exserted due to the spreading of the segments. cf. **included**.
- exstipellate:** without stipellae. cf. **stipellate**.
- exstipulate:** without stipules. cf. **stipulate**.
- extra-floral:** not within a flower; usually applied to nectariferous glands, e.g. those on the petiole of *Ricinus* or the phyllodes of some *Acacia*.
- extrorse:** turned outwards or away from the axis. In the case of anthers, dehiscing longitudinally outwards. cf. **introrse, latrorse**.
- eye:** a distinctly pigmented area, e.g. a brightly coloured spot, usually near the centre of the standard of some flowers of Papilionaceae; also refers to the scale-like leaves and dormant axillary buds of a tuber.
- falcate:** sickle shaped.
- fascicle:** a cluster. adj. **fasciculate**.
- fenestra:** a window, either perforated or with a translucent appearance. adj. **fenestrated**.
- ferruginous:** rust coloured.
- fertile:** provided with functional sexual parts which are capable of fertilisation and seed production. cf. **sterile**.
- filament:** the stalk of a stamen below the point of attachment to the anther.

- filiform:** thread-like.
- fimbriate:** fringed.
- flabellate:** fan shaped.
- flaccid:** limp and weak.
- flexuose:** zig-zagging, often referring to a stem.
- floccose:** covered with tufts of soft woolly hairs that usually rub off readily.
- floral tube:** the part of the flower enveloping an ovary and formed by the fusion of the calyx tube, corolla tube and sometimes stamen filaments and receptacle. Various referred to elsewhere as calyx tube, perigynium or hypanthium.
- floret:** one of the small individual flowers of the Asteraceae or the reduced flower of the grasses, including the lemma and palea.
- flower:** the sexual reproductive structure of the angiosperms, typically consisting of gynoecium, androecium and perianth or calyx and/or corolla and the axis bearing these parts.
- floral segment:** a free part of a flower which is not clearly differentiated into a calyx or corolla. The term is used here when the origin of the whorl, i.e. whether calycine or petaline, is unknown.
- foliaceous:** leafy; leaf-like in texture or shape.
- foliolate:** used with a number prefix to denote the number of leaflets.
- follicle:** a dry fruit, derived from a single carpel and dehiscing along one suture.
- foveolate:** having regular, small depressions on the surface.
- frond:** the leaf of a fern or cycad.
- fruticose:** shrubby or shrub-like.
- funicle:** the stalk of an ovule or, after fertilisation, the stalk of the seed.
- fusiform:** spindle shaped; i.e. a 3-dimensional shape which is circular in cross section and tapers at both ends.
- galea:** a helmet shaped petal or perianth segment or other organ. adj. **galeate**.
- geniculate:** bent like a knee.
- geophyte:** a plant with an underground storage organ, e.g. a tuber, bulb or rhizome, and with an annually renewed aerial shoot.
- gibbous:** with a large inflation or gibbosity on one side; usually refers to a corolla.
- glabrescent:** becoming glabrous.
- glabrous:** without hairs.
- gland:** a secretory structure, e.g. a nectary, extra-floral nectary or a gland tipped, hair-like or wart-like organ. adj. **glandular**. cf. **eglandular**.
- glaucous:** blue-green in colour, with a whitish bloom.
- globular:** a 3-dimensional shape; spherical or orbicular; circular in outline.
- glomerule:** a compact cluster of flowers or florets.
- glume:** one of the two bracts at the base of the grass spikelet, called the lower and upper glumes, due to their position on the rachilla. Also used in Cyperaceae for the very small bracts on the spikelet in which each flower is subtended by one floral glume and in which there are often several empty glumes at the base. adj. **glumaceous**.
- gymnosperm:** a member of the division of seed plants with the ovules and hence seeds, borne on a sporophyll or cone scale, and not borne in an ovary. cf. **angiosperm**.
- gynobasic:** arising from near the base of the female organ of a flower; used to describe a style which arises from near the base of a carpel or ovary.
- gynodioecious:** having bisexual flowers and female flowers on separate plants. cf. **androdioecious**.
- gynoecium:** the female part of a flower; a collective term for the carpel or carpels.

gynomonoecious: having female flowers and bisexual flowers on each individual plant. cf. **andromonoecious**.

gynophore: a stipe supporting the ovary or fruit.

habit: the growth form of a plant, comprising its size, shape, texture and stem orientation.

halophyte: a plant adapted to living in highly saline habitats; a plant that accumulates high concentrations of salt in its tissues. adj. **halophytic**.

hastate: with a pair of basal lobes which flare outwards; refers to a flat organ, most commonly a leaf.

haustorium: the absorbing organ of some parasitic and hemiparasitic plants. pl. **haustoria**. adj. **haustorial**.

hemiparasite: a plant which is capable of photosynthesis but relies on host plants for water and minerals.

herb: a plant which is non-woody or woody at the base only, the above ground stems usually being ephemeral. adj. **herbaceous**, q.v.

herbaceous: herb-like; often applied to bracts, bracteoles or floral parts that are green and soft in texture.

heterochromous: of different colours; usually used to describe those Asteraceae that bear two colours of floret in an inflorescence, i.e. head, the disk florets differing in colour from the ray florets. cf. **homochromous**.

heterogamous: bearing separate male and female flowers or florets in an inflorescence or flower head, e.g. some Asteraceae in which the ray florets may be neuter or unisexual and the disk florets may be bisexual. cf. **homogamous**.

heterosporous: producing spores of 2 sizes, the larger giving rise to megagametophytes (female), the smaller giving rise to microgametophytes (male). Applied to the ferns and fern allies. cf. **homosporous**.

heterostylous: having 2 types of flowers, the styles either short or long; referring to an individual plant or taxon. cf. **tristylous**.

hilum: the scar on the ovule or the seed marking the point of attachment to the funicle.

hirsute: with long and rather coarse or stiff hairs, the hairs being less rigid and erect than when referred to as **hispid**.

hispid: with stout, rigid or bristly, erect hairs.

hispidulous: minutely hispid.

hoary: covered with a greyish layer of very short, closely interwoven hairs.

homochromous: of the same colour; usually used to describe those Asteraceae that bear a 1-coloured inflorescence, i.e. head, the disk and ray florets being the same colour. cf. **heterochromous**.

homogamous: bearing one kind of flower unit rather than separate male and female flower units, e.g. some Asteraceae where all of the florets in an inflorescence or flower head are bisexual. cf. **heterogamous**.

homosporous: producing spores of the same size and sex. Applied to the ferns and fern allies. cf. **heterosporous**.

hybrid: the offspring of the sexual union of plants belonging to different taxa.

hydrophilous: water loving; requiring water in order to be fertilized, referring to many aquatic plants.

hypanthium: see floral tube.

hypogynous: borne below the ovary; used to describe the flower structure when the ovary is superior and thus the floral whorls and stamens are inserted below the ovary. cf. **epigynous**, **perigynous**.

imbricate: closely packed and overlapping. cf. **valvate**.

imparipinnate: pinnately compound with a single terminal leaflet and hence with an odd number of leaflets. cf. **paripinnate**.

imperfect: unisexual, referring to a flower or floret lacking either male or female parts. cf. **perfect**, **neuter**.

incised: cut jaggedly with very deep teeth.

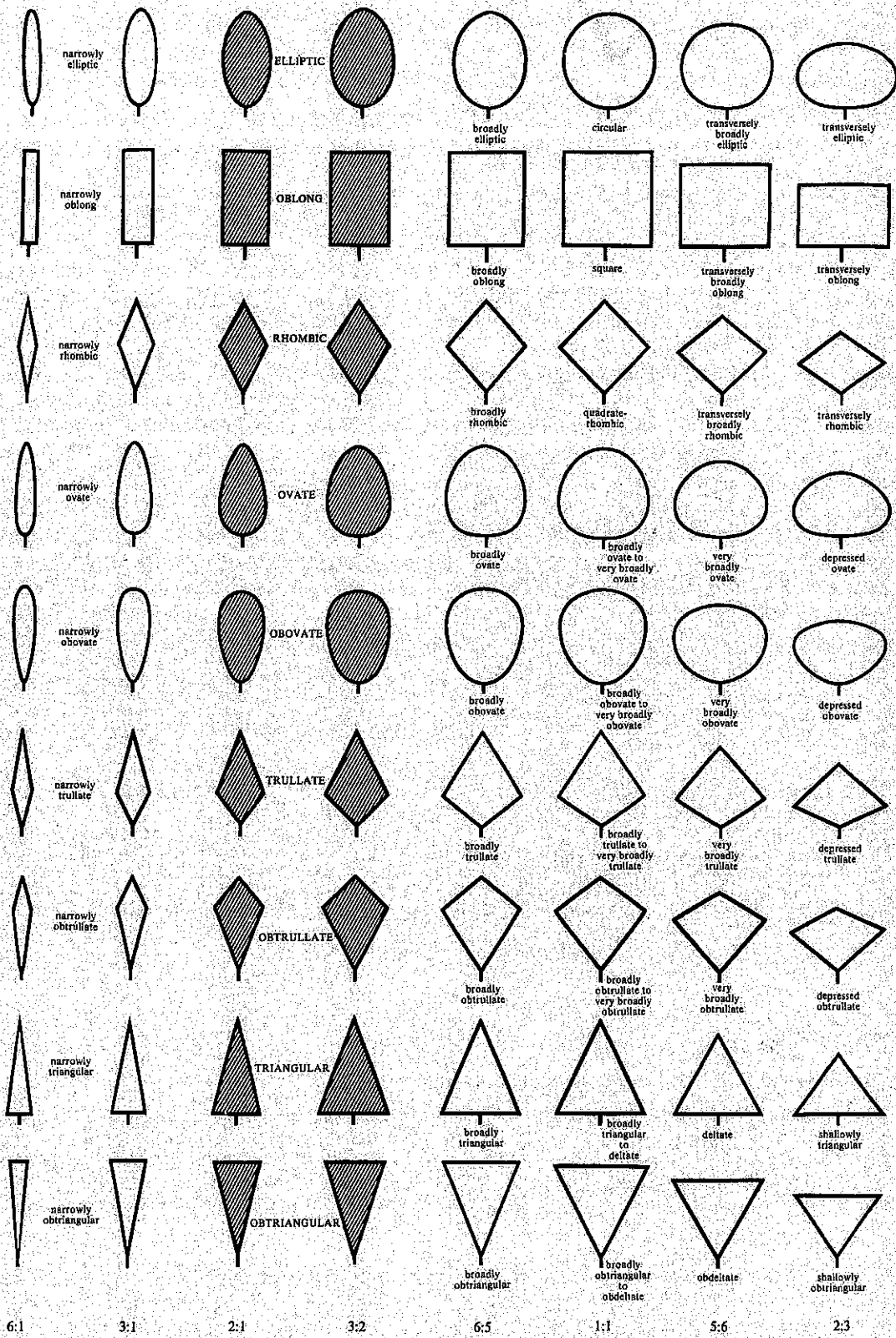
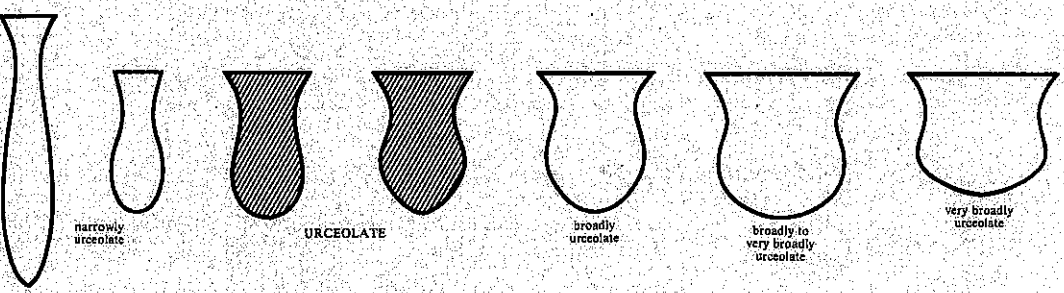
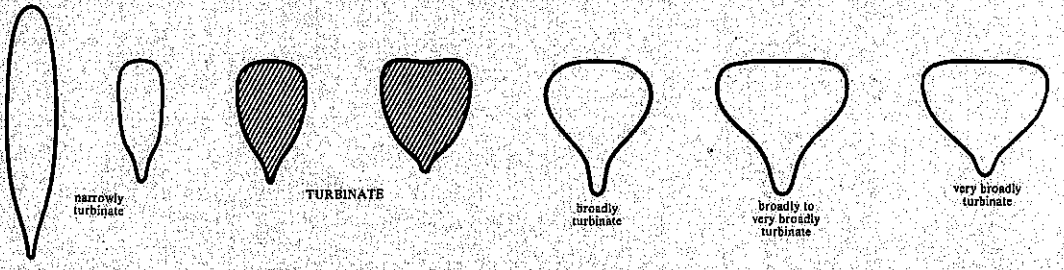
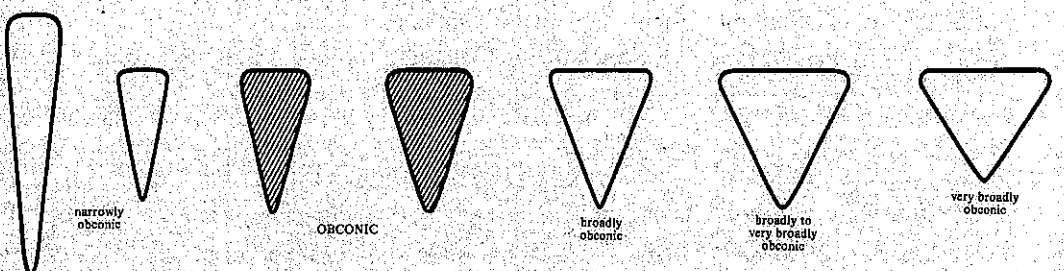
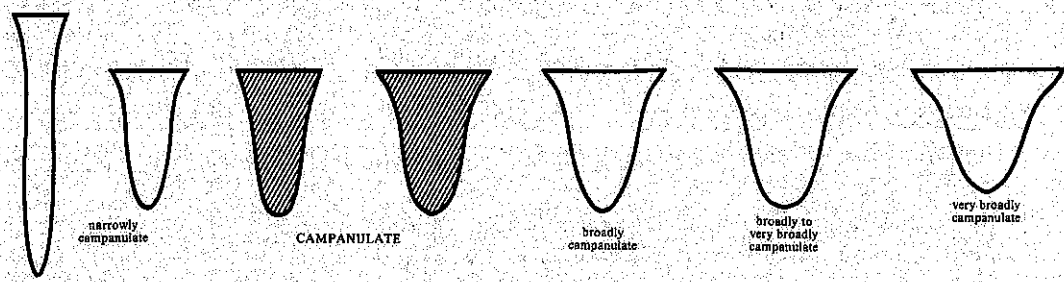


Fig. 318. Terminology of simple symmetric plane shapes.



length/
breadth ratio 6:1 3:1 2:1 3:2 6:5 1:1 5:6

Fig. 319. Terminology of simple symmetric three-dimensional figures with a truncate apex.

- included:** not protruding beyond some enclosing organ, e.g. stamens which do not project beyond the corolla or to valves which do not extend beyond the rim of a capsular fruit. cf. **exserted**.
- indefinite:** numerous and often variable in number.
- indehiscent:** not opening or splitting to release the contents at maturity. cf. **dehiscent**.
- indeterminate:** not terminated absolutely, e.g. an inflorescence in which no flower ends the axis. cf. **determinate**.
- indumentum:** the type of hairiness commonly found on external parts of plants. cf. **vestiture**.
- indurate:** hardened, often the hardening developed only at maturity.
- indusium:** tissue covering the sorus of a fern. Also used for the modified style end or pollen-cup of some Goodeniaceae. adj. **indusiate**.
- inferior:** a flower in which the ovary is fused with the floral tube and the sepals, petals and stamens are inserted above most of the ovary. cf. **superior**.
- inflated:** enlarged and hollow except in the case of a fruit which may contain a seed. cf. **swollen**.
- inflorescence:** the arrangement of flowers in relation to the axis and to each other.
- infructescence:** the inflorescence in the fruiting stage.
- internode:** the part of an axis between two successive nodes, joints or point of attachment of the leaves.
- interrupted:** unevenly distributed with conspicuous gaps.
- intramarginal:** situated inside but close to the margin, e.g. a vein in the leaf of some *Eucalyptus* species.
- intricate:** entangled.
- introduced:** not indigenous; not native to the area in which it now occurs.
- introgression:** the transfer and incorporation of genetic material and hence morphological characters from one variant or taxon to another by hybridisation and backcrossing.
- introrse:** turned inwards or towards the axis. In the case of anthers, dehiscing longitudinally inwards. cf. **extrorse**, **latrorse**.
- involute:** a whorl of bracts on a branch of an inflorescence. A secondary involucre.
- involucre:** a large bract or whorl of bracts surrounding a flower or an entire inflorescence.
- involute:** with the margins inrolled on the upper (adaxial) surface, referring to a leaf or other flat organ.
- irritable:** having the physiological ability and special cell structure to respond rapidly to a touch stimulus, e.g. the labellum of some Orchidaceae and the column of some Styliaceae.
- isobilateral:** when the adaxial and abaxial sides of a leaf have the same anatomical structures.
- juvenile:** young or immature, used here for leaves formed on a young plant which are different in morphology from those formed on an older plant.
- keel:** a boat shaped structure, with a prominent longitudinal ridge, or, in the Papilionaceae, the part of the corolla formed by the fusion of the lower edge of the two abaxial petals. adj. **keeled**. cf. **standard**, **wing**.
- labellum:** the usually modified, adaxial, inner perianth segment of the orchid flower which by torsion of the ovary is usually abaxial.
- lacinate:** fringed; having slender, narrow, pointed lobes.
- lacrimiform:** shaped like a tear drop.
- lacuna:** a gap, cavity or depression, especially when numerous and resulting in a pitted surface. May also refer to the tissue between leaf veins. pl. **lacunae**. adj. **lacunate**.
- lamina:** the usually flattened blade of a leaf or frond. Also used here for the limb, the flattened part of the ligulate floret of Asteraceae. pl. **laminae**.
- lanate:** covered with long hairs which are loosely curled together like wool.
- latex:** a milky, clear or sometimes coloured sap of diverse composition found in some plants.

latrorse: turned sideways i.e. not towards or away from the axis. In the case of anthers, dehiscing longitudinally on the side. cf. **extrorse**, **introrse**.

leaflet: one of the ultimate segments of a compound leaf.

lemma: the lower of two bracts of a grass floret, usually enclosing the palea, lodicules, stamens and ovary.

lenticular: shaped like a biconvex lens.

lepidote: covered with minute scales.

liane: a woody climbing or twining plant.

lignotuber: a woody usually underground rootstock often giving rise to numerous aerial stems.

ligulate: small tongue shaped or with a little tongue shaped appendage or **ligule**, q.v. Also applied to the florets of the Asteraceae which have a single small tongue shaped corolla lobe.

ligule: outgrowth from the inner junction of the grass leaf sheath and blade, often membranous, sometimes represented by a fringe of hairs. Also a small, membranous, triangular organ on the adaxial side of the fertile leaf base in *Isoetes* or the narrow, upper part of a reduced petal in some Sterculiaceae or the single corolla lobe of a floret of Asteraceae. cf. **ligulate**.

limb: the expanded portion of a flat organ above the claw. Also used here for the expanded portion of the calyx tube or the corolla tube, e.g. in the Apiaceae and Solanaceae.

linear: a 2-dimensional shape which has parallel sides and a length : breadth ratio of at least 12 : 1.

linguiform: tongue shaped.

littoral: growing in shallow water near the shore.

lobe: a usually rounded or pointed projecting part, usually one of two or more, each separated by a fissure or sinus. The terms calyx lobe, corolla lobe and floral lobe are used here for the projections of the calyx, corolla or floral tube. cf. **segment**.

loculicidal: a type of fruit dehiscence where slits occur along the outer wall of the carpels and not coinciding with the partitions between the carpels or cells. cf. **septicidal**.

lodicule: a minute scale, usually two together, outside the stamens and ovary in the grass flower; probably the vestiges of the perianth and functioning to open the spikelet for extrusion of stamens and stigmas.

loose: lax or not crowded; with distant or scattered units.

lorate: strap shaped, flattened and flexuose and the apex obtuse or acute but not tapering to a point.

lunate: crescent shaped.

lyrate: pinnately lobed, with the terminal lobe the largest and the laterals progressively smaller towards the base.

mallee: a growth habit in which several to many woody stems arise separately from a lignotuber; usually applied to certain low-growing species of *Eucalyptus*.

massula: a mass of microspores in a sporangium of certain aquatic ferns.

megasporangium: the sporangium containing megaspores. cf. **microsporangium**.

megaspore: the large spore which may develop into the female gametophyte in heterosporous ferns and fern allies. cf. **microspore**.

mericarp: a 1-seeded portion of an initially syncarpous fruit which splits apart at maturity, e.g. in the Apiaceae. Sometimes called a **coccus**, q.v.

-merous: used with a number prefix to denote the basic number of the 3 outer floral whorls, e.g. a 5-merous flower may have 5 sepals, 10 petals and 15 stamens.

mesocarp: the middle layer of the fruit wall derived from the middle layer of the carpel wall. cf. **endocarp**, **exocarp**, **pericarp**.

microsporangium: the sporangium containing microspores. cf. **megasporangium**.

microspore: a small spore which gives rise to the male gametophyte in heterosporous pteridophytes. Also used by some authors for a pollen grain. cf. **megaspore**.

- midvein:** the main vascular supply of a simple leaf blade or lamina.
- minni ritchi bark:** reddish bark exfoliating in narrow, curled strips. Usually only applied to certain species of *Acacia*.
- monad:** an individual cell produced by a pollen mother cell in place of a tetrad. e.g. the pollen grains of some *Oenothera*.
- monadelphous:** having the stamens united by their filaments into a closed or open tube.
- moniliform:** constricted at regular intervals, with the appearance of a chain of beads.
- monoecious:** having both male and female unisexual flowers on the same individual plant. cf. **dioecious**.
- monopodial:** with a persistent terminal growing point producing many lateral organs progressively. cf. **sympodial**.
- monotypic:** of a genus with one species or a family with one genus; in general, applied to any taxon with only one immediately subordinate taxon.
- mucilage:** a soft, moist, viscous secretion. adj. **mucilaginous**.
- mucous:** slimy.
- micro:** a stiff or sharp, short, awn-like projection of the midvein abruptly terminating an organ. cf. **cuspidate**.
- mucronate:** abruptly tipped with a micro, accompanied or not by a small amount of leaf tissue. cf. **cuspidate**.
- mucronulate:** with a very small micro; diminutive of **mucronate**.
- muricate:** with numerous short hard outgrowths. cf. **papillose**.
- narrowly:** having a length : breadth ratio between 3 : 1 and 6 : 1; if the ratio is more than 6 : 1 then the shape is described as very narrowly, except in the case of very narrowly oblong which is termed linear. Fig. 318
- navicular:** boat shaped with an acute apex.
- nectary:** a secretory organ producing nectar; commonly in a flower, sometimes on leaves, fronds or stems.
- nectariferous:** having one or more nectaries.
- neuter:** having neither stamens nor ovary, referring to a flower or floret. cf. **perfect, imperfect**.
- nomen nudum:** a name applied to a taxon but not accepted by the International Code of Botanical Nomenclature because it was published without a description or diagnosis or reference to either.
- nut:** dry indehiscent 1-celled fruit with a hard pericarp.
- ob-:** prefix meaning inversely or opposite to.
- obconic:** a 3-dimensional shape; cone shaped, attached at the narrower end. Fig. 319
- obcordate:** a 2-dimensional shape; broad and notched at the tip; heart shaped but attached at the pointed end.
- obdeltate:** a 2-dimensional shape; deltate with the broadest part at the apex. Fig. 318
- obloid:** a 3-dimensional shape; a parallelepiped (i.e. brick shaped) with rounded corners and edges. N.B. the term obloid, as used in North America, is here replaced by transversely broadly ellipsoid.
- oblong:** a 2-dimensional shape; rectangular with a length : breadth ratio between 3 : 2 and 2 : 1. cf. **narrowly, broadly**. Fig. 318
- obovate:** a 2-dimensional shape which is similar to ovate but attached at the narrower end and with a length : breadth ratio between 3 : 2 and 2 : 1. cf. **narrowly, broadly**. Fig. 318
- obovoid:** a 3-dimensional shape; obovate in outline.
- obpyramidal:** a 3-dimensional shape resembling a 4-sided pyramid attached at the apex with the square base facing away from the attachment.
- obpyriform:** a 3-dimensional shape resembling a pear which is attached at the narrower end. cf. **pyriform**.

- obspathulate:** a 2-dimensional shape resembling a spoon attached at the broadest end and with a length : breadth ratio between 3 : 2 and 2 : 1. cf. **spathulate**.
- obtriangular:** a 2-dimensional shape; triangular, attached at the apex and with a length : breadth ratio between 3 : 2 and 2 : 1. cf. **triangular**. Fig. 318
- obtrullate:** a 2-dimensional shape resembling a trowel blade with the broadest axis above the middle and a length : breadth ratio between 3 : 2 and 2 : 1. cf. **narrowly, broadly, trullate**. Fig. 318
- obtuse:** blunt or rounded at the apex, the converging edges separated by an angle greater than 90 degrees. cf. **acute**.
- ochrea:** a sheathing stipular growth subtending leaves and swollen nodes in the Polygonaceae. pl. **ochreae**.
- ochreola:** a sheathing stipular growth subtending the groups of flowers of the inflorescence in the Polygonaceae.
- oid:** suffix denoting a 3-dimensional shape.
- operculum:** a lid or cover becoming detached at maturity by abscission, e.g. in *Eucalyptus*, a cap covering the bud and formed by fusion or cohesion of sepals and/or petals.
- opposite:** describing leaves or other organs which are borne at the same level but on opposite sides of the stem; of floral parts, on the same radius. cf. **alternate**.
- order:** a classificatory rank intermediate between class and family. i.e. a group of families believed to be closely related or sometimes a single family with no apparent close relatives.
- orifice:** an opening or aperture such as that of a cup shaped receptacle or the summit of a leaf sheath in grasses and sedges.
- orthotropous:** with the micropyle at the end away from the hilum, referring to ovules which are straight.
- ovary:** the basal portion of a carpel or group of fused carpels, enclosing the ovule(s).
- ovate:** a 2-dimensional shape resembling a section through the long axis of an egg, attached near the broader end and with a length : breadth ratio between 3 : 2 and 2 : 1. cf. **narrowly, broadly**. Fig. 318
- ovoid:** a 3-dimensional shape; ovate in outline.
- ovule:** the organ in the ovary which becomes a seed after fertilisation. adj. **ovular**.
- ovulode:** a sterile reduced ovule borne on the placenta, commonly occurring in Myrtaceae.
- palate:** a projection or intruding fold that partially closes the throat of a corolla tube, characteristic of some families, e.g. Lentibulariaceae.
- palea:** the upper of the two bracts of a grass floret, usually enclosing the lodicules, stamens and ovary. pl. **paleae**. cf. **lemma**.
- pallid:** pale.
- palmate:** describing a leaf which is divided into several leaflets which arise from the same point. adj. **palmately**.
- panduriform:** a 2-dimensional shape; fiddle shaped.
- panicle:** a compound raceme; an indeterminate inflorescence in which the flowers are borne on branches of the main axis or on further branches of these. adj. **paniculate**.
- paniculiform:** resembling a panicle.
- papilionaceous:** pea-flowered; flowers which are zygomorphic with imbricate petals, one broad upper one, two narrower lateral ones and two narrower lower ones, the latter usually coherent or connate by their margins; the flowers of Papilionaceae.
- papilla:** a small protuberance on the surface of an organ being an extension of one epidermal cell. adj. **papillose**.
- pappus:** a tuft (or ring) of hairs, bristles or scales borne above the ovary and outside the corolla in Asteraceae and possibly representing the calyx; often persisting as a tuft of hairs on a fruit. adj. **pappose**.

- parietal:** attached to the margins of a structure; of placentation, having the ovules attached to placentas on the wall of the ovary.
- paripinnate:** pinnate with an even number of leaflets and without a terminal leaflet. A tendril may be terminal on the leaf. cf. **imparipinnate**.
- partite:** divided almost to the base into segments, the number of segments given as a prefix.
- patent:** spreading, diverging from the axis almost at right angles.
- pectinate:** pinnatifid with narrow segments set closely like the teeth of a comb.
- pedicel:** the stalk of an individual flower. In a single-flowered inflorescence, may refer to a peduncle, or both peduncle and pedicel when undifferentiated. Also used here for the stalk of a spikelet in Poaceae. adj. **pedicellate**.
- peduncle:** the stalk of an inflorescence. adj. **pedunculate**.
- pellicle:** a membranous covering, e.g. on the achene of some Asteraceae.
- pellucid:** clear, transparent or nearly so.
- peltate:** attached to the stalk at a point within the margin i.e. on the lower surface.
- pendulous:** drooping; of ovules, attached at the top of the ovary and hanging downwards from an apical placenta.
- penicillate:** tipped with hairs; resembling a camel-hair brush.
- penniveined:** pinnately veined.
- pepo:** a 1-celled, many-seeded, fleshy fruit developed from an inferior ovary. Characteristic of the Cucurbitaceae.
- perennial:** with a life span extending over more than two growing seasons. cf. **annual**, **biennial**.
- perfect:** bisexual, referring to a flower or floret containing both male and female parts. cf. **imperfect**, **neuter**.
- perfoliate:** with basal lobes united and encircling the stem, commonly referring to a leaf where the stem runs through the leaf base.
- perianth:** the outer floral whorl or whorls of a monocotyledonous flower, sometimes divisible into outer and inner perianth segments. Sometimes used by other authors to describe the floral whorl of a dicotyledonous flower when it is uncertain if the whorl is calycine or corolline in origin or used as a collective term for calyx and corolla.
- pericarp:** the wall of a fruit developed from the ovary wall. Composed of the exocarp, mesocarp and endocarp.
- perigynium:** see floral tube.
- perigynous:** borne around the ovary. Describing the flower structure when floral whorls and stamens arise from the rim of a cup shaped floral tube. cf. **epigynous**, **hypogynous**.
- persistent:** remaining attached; not falling off. cf. **caducous**.
- petal:** free segment of the corolla. adj. **petaline**. cf. **lobe**.
- petiole:** the stalk of a leaf. adj. **petiolate**.
- petiolule:** the stalk of a leaflet. adj. **petiolulate**.
- phylloclade:** a cladode which is green and leaf-like with the true leaves represented by scales.
- phyllode:** a leaf whose blade is much reduced or absent and whose petiole has assumed the functions of the whole leaf. cf. **cladode**.
- piliferous:** bearing or producing hair, usually referring to an organ with the apex having long, hair-like extensions.
- pilose:** with slightly stiffened distinct hairs ascending from the surface.
- pinna:** a primary segment of the blade of a compound leaf or frond. pl. **pinnae**.
- pinnate:** with the same arrangement as a feather; divided into pinnae; once-compound.

- pinnatifid:** lobed approximately halfway to midrib. If divided almost to the midrib, then described as deeply pinnatifid or **pinnatisect**, q.v.
- pinnatisect:** lobed almost to base or midrib.
- pinnule:** a leaflet of a bipinnate leaf.
- pistillode:** a rudimentary or vestigial gynoecium present in some male, unisexual flowers.
- placenta:** the region within an the ovary to which ovules are attached.
- placentation:** the disposition of placentas.
- plano-:** a prefix meaning level; flat.
- plicate:** folded like a fan.
- plumose:** like a feather; with fine hairs arising laterally from a central axis.
- pneumatophore:** modified root which allows gaseous exchange in mud-dwelling shrubs, e.g. mangroves.
- pod:** a dry 1-many-seeded dehiscent fruit. Commonly applied to the fruits of Caesalpiniaceae, Mimosaceae and Papilionaceae.
- pollinium:** a pollen body formed from all the pollen in an anther cell, e.g. in Asclepiadaceae and Orchidaceae. pl. **pollinia**.
- polygamous:** with unisexual and bisexual flowers on the same or on different individuals of the same species.
- polymorphic:** with many morphological variants.
- probract:** a leaf-like bract at the base of an inflorescence in Cucurbitaceae, usually opposite a tendril.
- procumbent:** trailing or spreading along the ground but not rooting at the nodes, referring to stems. cf. **ascending**, **decumbent**, **erect**.
- prophyll:** a bract-like organ or vestigial leaf. e.g. on the lower part of the stem of some *Drosera* species.
- prostrate:** lying flat on the ground.
- prothallus:** the haploid gametophyte, e.g. in the ferns and fern allies, the generation which bears the sex organs and produces the gametes.
- protandrous:** having the male sex organs maturing before the female organs, the pollen being shed before the stigma is receptive. cf. **protogynous**.
- protogynous:** having the female sex organs maturing before the male organs, the stigma being receptive before the pollen is shed. cf. **protandrous**.
- proximal:** end of any structure closest to the point of attachment. cf. **distal**.
- pruinose:** with a frosty surface; having a thick, waxy, powdery coating.
- pseudanthium:** several flowers simulating a simple flower, e.g. the unisexual flowers of Centrolepidaceae aggregated into bisexual structures with several stamens and carpels.
- pseudocarp:** a false fruit, largely made up of a fleshy receptacle.
- pteridophyte:** a vascular plant which reproduces by spores; the ferns and fern allies.
- puberulent, puberulous:** covered with very short fine straight erect hairs.
- pulvinus:** an enlargement below the base of a leaf or leaflet in which changes of turgidity enable the leaf or leaflets to droop or fold.
- punctate:** marked with dots, e.g. the clear-coloured oil glands of a leaf of Rutaceae and Myrtaceae.
- pungent:** ending in a rigid, sharp point.
- putamen:** the hardened endocarp of a stone fruit.
- pyrene:** the "stone" or "pit" of a drupe, consisting of the hardened endocarp and seed.
- pyriform:** a 3-dimensional shape, resembling a pear, attached at the broader end. cf. **obpyriform**.
- quadrate-rhombic:** a 2-dimensional shape; square with one corner forming the apex and the opposite corner forming the base. cf. **rhombic**. Fig. 318

raceme: an indeterminate inflorescence with a simple, elongated axis and pedicellate flowers. adj. **racemose**.

rachilla: the main axis of a grass spikelet.

rachis: the main axis of the spike or other inflorescence of grasses; the axis of a pinna in a bipinnate leaf.

radiate: arranged around a common centre; used here especially to describe an inflorescence of Asteraceae with marginal, female or neuter, ligulate ray-florets and central, perfect or functionally male, tubular, disc florets. cf. **disciform**, **discoid**.

radical: arising from the root; borne near the ground, in a rosette or whorl. cf. **cauline**.

radicle: the rudimentary root of the embryo.

radicular lobe: a rounded extension of a seed coat which covers the primary root or radicle before germination.

raphe: the part of a funicle adnate to the integument; visible as a ridge on the seed.

ray: the marginal portion of the inflorescence of Asteraceae, Apiaceae and *Actinodium* (Myrtaceae) when distinct from the disc. Also, the axis or branches of a compound umbel in some Apiaceae or each group of three flowers in the inflorescence of Loranthaceae.

receptacle: the region at the end of a pedicel or on an axis which bears one or more flowers. In the Asteraceae the receptacle may be quite large. adj. **receptacular**.

recurved: curved outward or downward.

reflexed: bent or turned downward.

reniform: a 2-dimensional shape; kidney shaped in outline.

repand: with shallow wave-like indentations in a horizontal plane along the margin. cf. **sinate**.

reticulate: forming a network or reticulum.

retorse: bent or directed downwards or backwards. cf. **antrorse**.

retuse: with a very blunt and slightly notched apex. cf. **emarginate**.

revolute: with the margins inrolled on the lower (abaxial) surface.

rhizome: a creeping stem, usually below ground, consisting of a series of nodes and internodes with adventitious roots. adj. **rhizomatous**.

rhizophore: a stilt-like extension of the stem which branches into roots on contact with the substrate.

rhombic: a 2-dimensional shape, diamond shaped in outline with the broadest axis in the middle and with a length : breadth ratio between 3 : 2 and 2 : 1. cf. **quadrate-rhombic**, **narrowly**. Fig. 318

rib: a distinct vein or linear marking, often raised as a linear ridge.

rosette: a tuft of leaves or other organs resembling the arrangement of petals in a rose, ranging in form from a hemispherical tuft to a flat whorl. adj. **rosetted**, **rosulate**.

rostellate: diminutive of rostrate.

rostrate: beaked; the apex narrowed into a slender, usually obtuse point.

rotate: wheel shaped; applied to a corolla with a very short tube and a broad upper part which is flared at right angles to the tube. cf. **salverform**.

ruderal: a plant peculiar to rubbish heaps or man-made waste places.

rugose: deeply wrinkled.

rugulose: finely wrinkled; a diminutive of rugose.

runcinate: a 2-dimensional shape; obovate or spatulate in outline with the margins very coarsely cut with the teeth pointing towards the leaf base.

saccate: pouched.

sagittate: arrow shaped, with a pair of large, acute or rounded, usually overlapping lobes.

- salverform:** trumpet shaped; applied to a corolla with a long tube and an upper part which is flared at right angles to the tube.
- samara:** an indehiscent, winged, dry fruit.
- scabridulous:** minutely scabrous; somewhat rough to the touch.
- scabrous:** rough to the touch.
- scape:** the stem-like flowering stalk of a plant with radical leaves. adj. **scapose**.
- scarious:** dry and membranous.
- schizocarp:** a usually dry fruit which splits longitudinally into indehiscent or tardily dehiscent parts (mericarps or cocci).
- sclereid:** a thick-walled cell of variable form sometimes found in leaves or other soft parts of plants. The internal walls may be spirally thickened.
- scorpioid:** of a cymose inflorescence, branching alternately on one side and then the other. cf. **helicoid**.
- scurf:** small bran-like scales on the epidermis. adj. **scurfy**.
- secund:** 1-sided or seemingly so.
- segment:** a free or almost free part or subdivision of an organ. Calyx and corolla segments are called sepals and petals respectively. In the case of undifferentiated dicotyledonous flowers, the segments are called floral segments. cf. **lobe**.
- semitrullate:** a 2-dimensional shape resembling one half of a trowel blade which has been divided vertically. i.e. a flat organ which is acuminate, broadest below the middle at some distance above the base, and angled on the adaxial margin only.
- sepal:** free segment of the calyx. adj. **sepaline**.
- septicidal:** a type of fruit dehiscence where the splits occur along lines coinciding with the partitions between the carpels or cells. cf. **loculicidal**.
- septum:** a partition or cross wall. A term for the sterile structure separating the seeds in a mature fruit of *Banksia*.
- sericeous:** silky; covered with close-pressed, fine, straight silky hairs.
- serrate:** toothed so as to resemble a saw; with regular, asymmetric teeth pointing forward.
- serrulate:** serrate with minute teeth.
- sessile:** without a stalk.
- seta:** a bristle or stiff hair. pl. **setae**. adj. **setose**, **setaceous**.
- sheathing:** clasping or enveloping the stem.
- shrub:** a woody plant usually less than 5 m high and many-branched without a distinct main stem except at ground level. cf. **undershrub**.
- sigmoid:** "S"-shaped.
- silicula:** a broad, dry, dehiscent fruit derived from two or more carpels which dehisce along two sutures and which has a persistent partition after dehiscence. cf. **siliqua**.
- siliqua:** a silicula which is at least twice as long as broad.
- simple:** not divided, e.g. applied to a leaf not divided into leaflets. cf. **compound**.
- sinuate:** with deep wave-like indentations in a horizontal plane along the margin. cf. **repand**.
- sinus:** the notch or recess between two projecting parts of an organ or teeth on a margin.
- solitary:** usually used to describe flowers which are borne singly, and not grouped into an inflorescence.
- sorus:** a discrete aggregate of sporangia in ferns.
- spadix:** a spike-like inflorescence with an unbranched, usually thickened axis and small embedded flowers, the whole structure often surrounded by a spathe.
- spathe:** a large bract ensheathing an inflorescence or its peduncle. adj. **spathaceous**.

- spathulate:** spoon shaped; broad at the tip and narrowed towards the base.
- spike:** an unbranched inflorescence of sessile flowers or spikelets. adj. **spicate**.
- spikelet:** the grass flowerhead, generally composed of 2 glumes and one or more florets. Also used for the spike-like inflorescence commonly found in Cyperaceae and Restionaceae.
- spine:** a stiff, sharp, pointed structure, formed by modification of a plant organ. adj. **spinose**.
- spinescent:** ending in a spine; modified to form a spine.
- spinulose:** with small spines over the surface.
- sporangium:** a spore bearing structure used here particularly for ferns, fern allies and gymnosperms. pl. **sporangia**. adj. **sporangial**.
- sporophyll:** a leaf or bract which bears or subtends sporangia in the fern allies, ferns and gymnosperms.
- spur:** a pouch-like short to slender, usually hollow extension of some part, usually of a flower.
- squamulose:** covered with small scales.
- squarrose:** with spreading rigid processes, e.g. the tips of bracts or leaves.
- stamen:** one of the male organs of a flower, consisting typically of a stalk (filament) and a pollen-bearing portion (anther). adj. **staminate**.
- staminode:** a stamen without pollen; often lacking an anther, often reduced in size, sometimes elaborated in structure.
- staminophore:** the raised rim which bears the stamens in some Myrtaceae.
- standard:** the usually adaxial petal in the flower of Papilionaceae. cf. **keel**, **wing**.
- stellate:** star shaped, usually referring to hairs with radiating branches.
- stem:** the main axis or a branch of the main axial system of a plant, developed from the plumule of the embryo and typically bearing leaves.
- sterome:** the thickened lower part of the involucre bract in Asteraceae; often straw coloured or green when dry and contrasting with the thin lamina and pellucid margins.
- sterile:** lacking any functional sexual parts which are capable of fertilisation and seed production. cf. **fertile**.
- stigma:** the usually papillate or glandular part of the style which receives the pollen. adj. **stigmatic**.
- stipe:** a stalk or support such as the petiole of a frond or the stalk of an ovary or fruit.
- stipel:** stipule-like appendage at the base of a leaflet (in unifoliate leaves, inserted on the petiole, not on the stem). pl. **stipellae**. adj. **stipellate**.
- stipitate:** having a stalk or stipe, usually of an ovary or fruit. cf. **sessile**.
- stipule:** one of a pair of leaf-like, scale-like or bristle-like structures inserted at the base or on the petiole of a leaf or phyllode. adj. **stipulate**.
- stolon:** the creeping stem of a rosetted or tufted plant, giving rise to another plant at its tip, or in *Drosera* a vertical underground stem connecting the tuber with the above ground parts and bearing adventitious roots. adj. **stoloniferous**.
- striae:** parallel longitudinal lines or ridges. adj. **striate**.
- strigillose:** minutely strigose.
- strigose:** rough and almost prickly, on account of the strong, sharp, rather flattened hairs which lie along the surface in the same direction.
- strobilus:** a cone-like structure formed from sporophylls or sporangiophores.
- style:** the usually narrowed, elongated part of a carpel or group of fused carpels, between the ovary and stigma.
- stylopodium:** a disc-like enlargement of the base of the style.
- sub-:** a prefix meaning nearly or almost, as in subcapitate or subequal.

subspecies: taxon differing in minor morphological characters such as size or shape of parts, and either partially or completely isolated by means of geographic, ecologic or other barriers.

subulate: narrow and tapering gradually to a fine point.

succulent: fleshy, juicy, soft in texture and usually thickened.

suffrutescent: a small shrub which produces leafy and flowering shoots each year from a woody underground rootstock. adj. **suffruticose**.

sulcate: grooved; furrowed.

superfluous name: a name applied to a taxon for which another name was already available. Superfluous names are illegitimate and must be rejected according to the International Code of Botanical Nomenclature.

superior: a flower in which the ovary is free and mostly above the level of insertion of the sepals, petals and stamens. cf. **inferior**.

suture: a line, mark or groove marking a natural division or union of parts of an organ.

swollen: enlarged and solid. cf. **inflated**.

sympetalous: having united petals.

sympodial: with a growing point which either terminates in an inflorescence or dies each year, the growth being continued by a new lateral branch. cf. **monopodial**.

syncarp: an ovary of two or more united carpels with a single style. adj. **syncarpous**.

taxon: a classificatory group of any rank, e.g. a family, genus, species or any infraspecific category. pl. **taxa**.

tendril: a slender organ formed from a modified stem, leaf or leaflet which, by coiling around objects, supports a climbing plant.

terete: circular in cross section.

terminal: at the apex or distal end.

ternate: in threes.

tessellate: with colours or shades arranged in small squares so as to give a chequered appearance.

testa: a seed coat.

tetrad: a group of four; used to describe the 4-flowered units of the inflorescence in Loranthaceae. Also a quartet of cells produced by a pollen mother cell, the daughter cells usually separate at maturity.

tetragonous: four angled.

tetraploid: a variant or species having twice the usual number of chromosome pairs. cf. **diploid**.

thyrs: an inflorescence of compound dichasia arising from a primary axis of indeterminate growth. adj. **thyrsoid**.

tomentose: covered with not very long cottony hairs, more or less felted together, shorter and less dense than lanate.

transverse: broader than long; applied to 2 or 3-dimensional shapes, e.g. elliptic and oblong or ellipsoid and obovoid which have a length : breadth ratio of less than 5 : 6. Fig. 318

trapeziform: a plane, asymmetric shape with four straight sides of unequal length.

tree: a woody plant usually over 5 m high and with an unbranched lower axis.

tremulous: freely moving; used here to describe the labellum of some species of Orchidaceae.

triad: a group of three; used to describe the 3-flowered umbels found in some Loranthaceae.

triangular: a 2-dimensional shape; 3-angled and 3-sided with a length : breadth ratio between 3 : 2 and 2 : 1. cf. **narrowly**, **broadly**, **deltate**. Fig. 318

tribe: a category intermediate in rank between subfamily and genus.

trichotomous: divided almost equally into three parts.

trifoliate: having three leaves.

- trifoliolate:** a leaf having three leaflets.
- trifurcate:** with 3 terminal, long lobes.
- trigonous:** obtusely 3-angled; triangular in cross section with plane faces.
- triquetrous:** acutely 3-angled; triangular in cross section with concave faces and each corner projected outwards so that the organ has three distinct longitudinal ridges.
- tristylous:** having 3 types of flowers, the styles short, medium or long; referring to an individual plant or taxon. cf. **heterostylous**.
- trullate:** a 2-dimensional shape resembling a trowel blade i.e. with 4 straight sides with the axis broadest below the middle and a length : breadth ratio between 3 : 2 and 2 : 1. cf. **narrowly**, **broadly**, **obtrullate**. Fig. 318
- truncate:** with an abruptly transverse end as if cut off.
- tuber:** a stem, usually underground, enlarged as a storage organ and with minute scale-like leaves and buds or "eyes". Some monocotyledons e.g. *Thysanotus* develop thickened roots called tuberous roots. adj. **tuberous**.
- tubercle:** a wart-like protuberance. adj. **tuberculate**.
- tuft:** a densely packed cluster arising from an axis. adj. **tufted**.
- tunic:** a thin, membranous or chartaceous covering of a bulb.
- turbinate:** top shaped; inversely conic. Fig. 319
- turgid:** swollen.
- typical variant:** the variant of a species to which belongs the type specimen of that species.
- umbel:** an inflorescence in which the pedicels originate from one point on top of the peduncle and are usually of equal length. adj. **umbellate**.
- umbellule:** a partial umbel, part of a compound umbel.
- umbilicate:** a solid form, e.g. a disc which has a navel-like depression in the centre of the upper part.
- umbo:** a small rounded to conic projection. adj. **umbonate**.
- unarmed:** not spiny.
- uncinate:** hooked at the apex.
- undershrub:** subshrub; a small, usually sparsely branched woody shrub less than 1 m high. cf. **shrub**.
- undulate:** with an edge or edges wavy in a vertical plane; may vary from weakly to strongly undulate or crisped. cf. **crisped**.
- uniseriate:** arranged in one line or at one level.
- unifoliolate:** a compound leaf which has been reduced to a single, usually terminal leaflet.
- uniform:** with one form, e.g. having stamens of a similar length or having one kind of leaf. cf. **dimorphic**.
- unisexual:** with one sex only, either bearing the anthers with pollen, or an ovary with ovules, referring to a flower, inflorescence or individual plant. cf. **bisexual**.
- urceolate:** urn shaped. Fig. 319
- utricle:** a bag; usually referring to a 1-seeded, usually small, bladderly fruit.
- valvate:** meeting without overlapping, usually referring to sepals or petals in bud. cf. **imbricate**.
- valve:** one of the parts produced by the splitting of a capsule when ripe or a part of the specialised opening of a capsular fruit.
- variant:** any definable individual or group of individuals which may or may not be regarded as representing a formal taxon after scrutiny.
- variegate:** diverse in colour or marked with irregular patches of different colours.
- variety:** a classificatory rank below that of subspecies.
- vein:** a strand of vascular tissue.

- velum:** a flap of tissue covering the sporangium in *Isoetes*.
- velutinous:** covered with a close silky coating of short fine hairs which are erect and of even length. cf. **sericeous**.
- venation:** the arrangement of veins in a leaf.
- vernation:** the arrangement of young leaves or fronds in a bud or at a stem apex e.g. **erect** or **circinate**, q.v.
- verrucose:** warty.
- versatile:** of anthers, swinging freely about the point of attachment to the filament.
- verticillaster:** a false whorl of flowers, composed of a pair of opposed cymes, e.g. the inflorescence of some Lamiaceae.
- verticillate:** whorled; arranged in one or more whorls.
- vesicle:** a small bladderly sac or cavity filled with air or fluid. adj. **vesicular**.
- vestigial:** the remaining trace or remnant of an organ which was probably fully developed in some evolutionary predecessor.
- vestiture:** covering; the type of hairiness, scaliness or other covering commonly found on the external parts of plants. cf. **indumentum**.
- vexillary:** positioned near the uppermost petal of the flower of Papilionaceae.
- villous:** with long, soft hairs sometimes lying on the surface, finer than in pilose.
- virgate:** with a broom-like habit, more or less densely branched with stiff, more or less erect branches, leaves usually small.
- viscid:** sticky on the surface; coated with a thick, syrup-like secretion.
- vittae:** oil channels of the mericarps of some Apiaceae.
- viviparous:** having the seeds germinate on the parent plant or, in the case of ferns, having new plants develop on the fronds.
- wing:** any flat, often membranous expansion or flange, e.g. on a seed, stem or one of the two lateral petals of a papilionaceous flower or one of the petal-like sepals of Polygalaceae. cf. **keel**, **standard**.
- xerophyte:** a plant which naturally grows in dry regions and is often structurally modified to withstand dry conditions.
- zygomorphic:** having only one plane of symmetry, usually the vertical plane, referring to a flower, calyx or corolla. cf. **actinomorphic**.

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