



Flora of South Australia

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ASTERACEAE (COMPOSITAE) (PARTLY)¹

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Treatments of Asteraceae presented here include tribes Cardueae, Cichorieae (formerly Lactuceae), Helenieae and Tageteae. Other groups are in preparation, as well as more illustrations, and will be published once finalised. — Ed.

TRIBE CARDUEAE CASS.

A.R. Bean

Robust, often monopodial, spiny or unarmed herbs; stems longitudinally striate or terete, often winged due to decurrent leaf bases, or occasionally stems absent; leaves alternate, rarely rosulate, often extending (with reduced size) to the base of the capitulum, margins often spinose. **Capitula** solitary or corymbose, rarely in secondary heads (not in S.A.: *Echinops* L.), discoid or disciform, homogamous or heterogamous; involucre bracts multiseriate, imbricate, inner ones usually longer and thinner; receptacle mostly epaleate, usually bearing long setae, rarely alveolate; florets actinomorphic, 5-lobed, all tubular and fertile, or outer florets ray-like and sterile; anthers calcarate and distinctly caudate, united laterally, with long sterile apical appendages; style linear, dorsally papillose-pilose; style branches short, with a thickened pilose basal annulus. **Achenes** usually glabrous with distinct apical rim; pappus with plumose or barbellate, capillary or ensiform bristles, or rarely scales.

83 genera and around 2500 species, predominantly indigenous to Europe and Asia, but also North America and Africa. A handful of species are indigenous to South America and Australia. Of the 38 species present in Australia, 36 are naturalised and two are indigenous. Represented in S.A. only by naturalised weeds.

This tribe comprises the thistles and knapweeds, and in Australia, includes a number of pernicious and invasive weeds. A few species have been, or are currently cultivated as ornamental plants. *Crupina* (Pers.) DC. is not included in this account. *Crupina vulgaris* Pers. ex Cass. was recorded from Hope Valley, S.A. It has not been collected since 1936, and is presumably no longer present in Australia.

Reference: Dittrich (1977), Greuter (2003), Scott (1990).

1. Leaf margins without spines
 2. Median involucre bracts terminating in a sharp spine 3. **Centaurea**
 - 2: Median involucre bracts not spinose or recurved
 3. Leaf margins with multicellular glochidiate hairs **Crupina**
 - 3: Leaf margins lacking multicellular glochidiate hairs
 4. Appendages of median involucre bracts entire or erose, without conspicuous cilia.... 8. **Rhaponticum**
 - 4: Appendages of median involucre bracts with conspicuous cilia 3. **Centaurea**

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- 1: Margins of leaves with spines, 2–30 mm long
- 5: Stem extremely short, flowers borne at ground level 6. **Onopordum**
- 5: Stem elongate, flowers aerial
- 6: Stem with spinose wings formed by decurrent leaf bases
- 7: Upper surface of leaves with many stiff spinules, mostly 0.8–2 mm long on cauline leaves (often longer on rosette leaves)..... 4. **Cirsium**
- 7: Upper surface of leaves without spinules
- 8: Reduced cauline leaves surrounding and exceeding capitula; outer and median involucre bracts with pinnatisect terminal appendage; leaf marginal spines yellow to golden, 6–13 mm long 7. **Picnemon**
- 8: No cauline leaves surrounding capitula; outer and median involucre bracts without terminal appendage; leaf marginal spines white to yellow-brown, 2–7 (–10) mm long
- 9: Receptacle not alveolate, setae dense and obvious 1. **Carduus**
- 9: Receptacle deeply alveolate, without setae 6. **Onopordum**
- 6: Stem not winged, not spinose
- 10: Leaves pinnatisect, segments divided almost to midrib, undersides densely white-tomentose 5. **Cynara**
- 10: Leaves lobed but never pinnatisect; undersides of leaves glabrous or hairy, but never white-tomentose
- 11: Leaf upper surface variegated (with a network of white markings); bases of cauline leaves auriculate; filaments connate (forming a tube) 9. **Silybum**
- 11: Leaf upper surface uniform in colour, or sometimes with pale mid-vein; bases of cauline leaves not auriculate; filaments free throughout
- 12: Cauline leaves almost indistinguishable from the outer involucre bracts 2. **Carthamus**
- 12: Cauline leaves readily distinguishable from involucre bracts 4. **Cirsium**

1. **CARDUUS L.**

Sp. Pl. 2: 820 (1753).

(Latin *Carduus*, the ancient name applied to these thistles.)

Annual or biennial herbs; stems erect, sparsely to strongly branched, longitudinally striate; wings present, spinose; leaves oblong, pinnatilobed, margins with numerous spine-tipped lobes and lobules. **Capitula** pedunculate or sessile, homogamous; involucre bracts spine-tipped, margins entire or rarely pectinate (not in Australia); receptacle flat or convex, not alveolate, densely setose; corollas purple; tube filiform; lobes linear; anther tails conspicuous, entire or lacinate; filaments free, pilose; style branches connate, erect. **Achenes** glabrous, oblong-obovoid, smooth, with narrow apical rim; carpodium basal; pappus deciduous, of numerous barbellate capillary bristles, united in a ring at their bases; fibrillas rare or absent. **Thistles.**

A genus of about 120 species, distributed in Europe, the Mediterranean, central Asia and eastern Africa. Five species have been recorded as naturalised in Australia; two naturalised species in S.A.

Two undetermined specimens collected from Fulham (a suburb of Adelaide) in 1910 appear to be close to *C. nutans*, but are quite unlike material from elsewhere in Australia.

Reference: Parsons (1979).

1. Leaf undersides glabrous or with multicellular hairs only along midrib and main veins; involucre diam. equal to or exceeding length **C. ?nutans**
- 1: Whole of underside of leaf densely arachnoid-tomentose; involucre longer than broad
2. Capitula in clusters of 1–4; stems with narrow wings (to 6 mm wide), almost lacking below inflorescence; median involucre bracts conspicuously arachnoid, without scarious margins; corollas mostly longer than involucre bracts 1. **C. pycnocephalus**

2: Capitula in clusters of 3–10; stems with broad wings (to 10 mm wide), extending up to base of inflorescence; median involucre bracts sparsely arachnoid or glabrous, with scarious margins; corollas mostly shorter than involucre bracts..... 2. **C. tenuiflorus**

1. ***Carduus pycnocephalus** L., *Sp. Pl.* ed. 2, 2: 1151 (1763). — **Illustr.:** F.J. Richardson *et al.*, *Weeds S.E. Identif. Guide Austral.* 121 (2006).

Annual or biennial to 1.2 m high; stems arachnoid-hairy, wings 2–6 mm wide; leaves grey, moderately arachnoid-tomentose above, densely arachnoid-tomentose below, glands absent; marginal spines white to pale brown, 2–6 mm long. **Capitula** in sessile to subsessile terminal clusters of 1–4; involucre cylindrical, 17–23 × 8–11 mm, excluding patent bracts, deciduous at fruiting stage; median involucre bracts erect to patent, narrowly deltate, 13–17 mm long, 2–3 mm wide at base, sparsely to densely arachnoid-hairy, with entire herbaceous margins; corolla tube 8.5–11 mm long; lobes linear, 4.5–5.5 mm long; anthers 5–6 mm long. **Achenes** ellipsoidal, 4.8–5.3 mm long, pale brown with darker longitudinal streaks, smooth; pappus bristles 167–190 per fruit, each 14–16 mm long; fibrillas absent. **Slender thistle. Pl. 1A.**

S.A.: *FR, *EP, *SL, *SE; *W.A.; *Qld; *N.S.W.; *Vic.; *Tas. Indigenous to southern and south-eastern Europe. Widely naturalised throughout southern Australia in pastoral and grazing districts, where it occurs on a wide range of soils. Flowers: Sep.–Jan.

This species and *C. tenuiflorus* are very similar, and some specimens are hard to place. Parsons (1979) outlined the most reliable differences between the taxa in Australia.

2. ***Carduus tenuiflorus** Curtis, *Fl. Londin.* fasc. 6, t. 55 (1789). — **Illustr.:** *Pl. W. N.S.W.* 724 (1981); F.J. Richardson *et al.*, *Weeds S.E. Identif. Guide Austral.* 121 (2006).

Annual or biennial to 1.2 m high; stems arachnoid-hairy, wings 2–10 mm wide; leaves grey, moderately arachnoid-tomentose above, densely arachnoid-tomentose below, glands absent; marginal spines white to pale brown, 2–5 mm long. **Capitula** in sessile terminal clusters of 3–10; involucre cylindrical, 15–20 × 7–11 mm, excluding patent bracts, deciduous at fruiting stage; median involucre bracts erect to patent, narrowly deltate, 12–16 mm long, 2–3 mm wide at base, glabrous or sparsely arachnoid-hairy, with entire scarious margins; corolla tube 7–9.5 mm long; lobes linear, 4–5 mm long; anthers 5–6 mm long. **Achenes** ellipsoidal, 4–4.5 mm long, pale brown with darker longitudinal streaks, smooth; pappus bristles 147–195 per fruit, each 11–13 mm long; fibrillas absent. **Slender thistle. Pl. 1B–G.**

S.A.: *FR, *EA, *EP, *NL, *MU, *YP, *SL, *KI, *SE; *W.A.; *Qld; *N.S.W.; *Vic.; *Tas. Indigenous to western Europe, including Great Britain. Widely naturalised in southern Australia. Flowers: Oct.–Jan.

An economically important weed in pastoral and grazing districts, on a wide range of soil types. This species is a Declared Plant in South Australia (control required in part of the state only).

2. **CARTHAMUS** L.

Sp. Pl. 2: 830 (1753).

(A medieval Latin name, derived from the Arabic name for Safflower, *C. tinctorius*.)

Kentrophyllum Neck. ex DC., *Ann. Mus. Natl. Hist. Nat.* 16: 158 (1810).

Annual herbs; stems erect, strongly branched in upper half, longitudinally striate; wings absent; leaves ovate to pinnatilobed, margins with several spine-tipped lobes. **Capitula** terminal, homogamous; involucre bracts spine-tipped; outer bracts leaf-like, patent, margins mostly spiny-lobed; receptacle convex, not alveolate, with numerous setae; corolla orange, yellow or pink-purple; tube linear, but with expanded limb marked with longitudinal black lines; lobes linear; anther tails inconspicuous, entire; filaments free, pilose; style branches connate, erect. **Achenes** glabrous, ovoid-truncate, smooth, slightly 4-angular, without apical rim; carpodium lateral; pappus persistent (or mostly absent in one species), of numerous barbellate, ensiform bristles, outer ones much shorter than inner, pale brown, free to base; fibrillas absent.

A genus of about 16 species distributed from the Canary Is. to south-western Asia, but with highest diversity in the countries of the eastern Mediterranean; four species naturalised in Australia; three species naturalised in S.A.

Reference: Davis (1975), Meikle (1985).

1. Leaves and involucre bracts more or less entire, with spiny marginal teeth 1–2.5 mm long; stems glabrous 3. **C. tinctorius**
- 1: Leaves and outer involucre bracts deeply lobed, with long-spinose margins; indumentum present on stems
 2. Flowers pink-purple; crisped and arachnoid indumentum very sparse or absent on stems; involucre 8–10 mm across at anthesis (excluding patent involucre bracts); stems white; outer involucre bracts 2–3 times length of inner ones 2. **C. leucocaulos**
 - 2: Flowers yellow; multicellular hairs moderately dense to dense on stems, arachnoid indumentum sparse to dense on stems; involucre 15–20 mm across at anthesis (excluding patent involucre bracts); stems yellowish to straw-coloured; outer involucre bracts 1.2–1.8 times length of inner ones 1. **C. lanatus**

1. ***Carthamus lanatus** L., *Sp. Pl.* 2: 830 (1753). — *Kentrophyllum lanatum* (L.) DC. & Duby, *Bot. Gall.* 1: 293 (1828). — **Illustr.:** *Pl. W. N.S.W.* 722 (1981); A.Clemson, *Honey Pollen Fl.* 213 (1985); F.J.Richardson *et. al.*, *Weeds S.E. Identifi. Guide Austral.* 122 (2006).

Herb to 1.3 m high; stems yellowish to straw-coloured, thinly to densely pilose with mixed arachnoid and multicellular hairs, and yellow to white glandular hairs up to 0.15 mm long; wings absent; leaves pinnatifid, green above and below, ± sessile glands present on both surfaces; marginal spines yellow to brown distally, 3–8 mm long. **Capitula** solitary at the ends of 5–25 cm long branches; involucre ovoid, 15–20 mm diam. at anthesis, excluding patent bracts; outer involucre bracts 1.2–1.8 times length of inner; median bracts suberect, 22–33 mm long, 4–7 mm wide at base, glandular, margins entire or spinose, apex spinose; corolla yellow; tube 19–24 mm long; lobes 5–6.5 mm long; anthers 5–5.5 mm long. **Achenes** obpyramidal, 4.5–5.7 mm long, grey to brown, smooth; pappus bristles 93–123, longest ones 6.5–11 mm long. **Saffron thistle. Pl. 1H–L.**

S.A.: *?LE, *NU, *GT, *FR, *EA, *EP, *NL, *MU, *YP, *SL, *SE; *W.A.; *N.T.; *Qld; *N.S.W.; *Vic.; *Tas. Indigenous to most countries bordering the Mediterranean Sea, and eastwards to central Asia. Widely naturalised in southern Australia, particularly in lower rainfall areas. It grows on a wide range of soil types. The only specimen from the LE region was collected in 1950; the presence of the species in that region needs to be confirmed. Flowers: Nov.–Mar.

It does not seem possible, from Australian material, to recognise meaningful subspecific taxa in *C. lanatus*. A widespread and serious weed of pastures and cereal-crops.

2. ***Carthamus leucocaulos** Sm. in Sibth. & Sm., *Fl. Graec. Prodr.* 2: 160 (1813). — *Carthamus glaucus* auct. non M.Bieb.: J.H.Willis, *Handb. Pl. Victoria* 2: 766–767 (1972); D.A.Cooke in Jessop & Toelken (eds), *Fl. S. Austral.* 3: 1630 (1986). — **Illustr.:** W.T.Parsons & E.G.Cuthbertson, *Noxious Weeds Austral.* 198 (1992).

Herb to 0.7 m high; stems white, thinly arachnoid-pilose with yellow to white glandular hairs up to 0.15 mm long; wings absent; leaves pinnatifid, green above and below, ± sessile glands present on both surfaces; marginal spines yellow-brown distally, 3–6 mm long. **Capitula** solitary at the ends of 4–20 cm long branches; involucre ovoid, 8–10 mm diam. at anthesis, excluding patent bracts; outer involucre bracts 2–3 times length of inner; median bracts suberect, 12–15 mm long, 3.5–4.5 mm wide at widest point, glandular, entire, apex rigidly spinose; corolla pink-purple; tube 10–13 mm long; lobes 2.5–3 mm long; anthers 2.5–3 mm long. **Achenes** obpyramidal, 3–3.5 mm long, grey, smooth; pappus bristles 87–108, longest ones 4.5–5.3 mm long. **Glaucous star thistle.**

S.A.: *KI, *SE; *W.A.; *Vic. Indigenous to Greece, the islands in the Aegean Sea between Greece and Turkey, and on Crete. Naturalised sporadically in western Victoria, south-eastern S.A. and southern W.A. Habitat for one specimen is given as shallow soil over limestone. Flowers: Jan.–Apr.

3. ***Carthamus tinctorius** L., *Sp. Pl.* 2: 830 (1753). — **Illustr.:** *Pl. W. N.S.W.* 721 (1981); F.J.Richardson *et. al.*, *Weeds S.E. Identifi. Guide Austral.* 122 (2006).

Herb to 1.5 m high; stems white to straw-coloured, glabrous; wings absent; leaves ovate, green above and below, glabrous; marginal spines pale brown, 1–2.5 mm long. **Capitula** solitary at the ends of 5–25 cm long branches; involucre subglobose, 21–27 mm diam. at anthesis, excluding patent bracts; outer involucre bracts 0.9–1.2 times length of inner; median bracts erect, 21–24 mm long, 6–7 mm wide at base, not constricted, margins entire or shortly toothed, apex spinose; corolla orange or yellow; tube 16–24 mm long; lobes 5.5–7 mm long; anthers

5–5.5 mm long. **Achenes** obovoid, 6.5–8 mm long, white to grey, smooth; pappus up to 6 mm long on inner achenes, otherwise absent. **Safflower.**

S.A.: ?*GT, ?*EA, ?*NL, ?*YP, ?*SL; *W.A.; *N.T.; *Qld; *N.S.W.; *Vic.; *Tas. Originating in Europe; sporadically naturalised in Australia, although it seems that it has never become permanently established anywhere. It is questionably established in the SL region. Prefers fertile clay-loams. Flowers: Oct.–May.

The original native wild occurrence of this species is unknown. Formerly cultivated over a large part of Europe for its red and yellow flower-pigments used in dyeing; now cultivated widely (including in Australia) for the oil derived from the achenes.

3. CENTAUREA L.

Sp. Pl. 2: 909 (1753), *nom. cons.*

(From the Greek *kentauros*, a centaur, half man, half horse; the name was used by Pliny for a medicinal herb associated with the centaur Chiron, the legendary founder of medicine.)

Cnicus L., *Sp. Pl.* 2: 826 (1753), *nom. cons.*

Annual or biennial herbs; stems erect, strongly branched, longitudinally striate; wings present or absent; leaves entire to pinnatisect. **Capitula** sessile or pedunculate, ovoid, heterogamous, rarely homogamous; involucre bracts adpressed, imbricate, often spine-tipped with one or more spines, otherwise margins entire to pectinate; receptacle flat, not alveolate, densely setose; inner florets fertile, bisexual; tube slender; lobes linear; anthers sagittate-caudate; style branches connate or separated, erect; outer florets sterile, spreading. **Achenes** cylindrical to ellipsoidal, slightly compressed; carpodium lateral; pappus sometimes absent, otherwise persistent, of numerous barbellate ensiform bristles (rarely awns), free to base; fibrillas absent. **Knapweeds.**

A genus of 500–700 species distributed mainly in southern Europe and south-western Asia, but also northern Africa, India, China; 13 species naturalised in Australia; nine species naturalised in S.A.

C. ragusina L. is not considered further in this treatment. It has been collected just once from Normanville in 1992. *C. nigrescens* Willd. subsp. *nigrescens* listed by Barker *et al.* (2005) is only represented by specimens collected in 1936 from the lower SE region, with one annotated as coming from a “70 year old garden”. The status as a wild occurrence in S.A. of both these species is regarded as uncertain.

Reference: Meikle (1985), Petit (1997).

1. Involucral bracts with spreading spines
 2. Stems not winged, i.e. leaves not decurrent on stem
 3. Leaves silvery; corolla yellow; involucre 20–25 mm diam..... **C. ragusina**
 - 3: Leaves green to grey-green; corolla purple; involucre 6–10 mm diam.
 4. Central spine of involucral bracts 8–24 mm long, lateral spines much shorter 2. **C. calcitrapa**
 - 4: Involucral bracts with 3–5 subequal spines, each 1.5–3 mm long 1. **C. aspera**
 - 2: Stems winged, i.e. leaves decurrent on stem
 5. Spines of involucral bracts 12–26 mm long, spinules all near base of spine; corolla without glands..... 9. **C. solstitialis**
 - 5: Spines of involucral bracts 5–13 mm long, one pair of spinules c. halfway along spine; corolla glandular
 6. Leaves without arachnoid hairs; spines of involucral bracts 3–7 mm long; involucre 7–11 mm diam. at anthesis 5. **C. melitensis**
 - 6: Leaves with arachnoid hairs; spines of involucral bracts 8–13 mm long; heads 17–20 mm diam. 4. **C. eriophora**
- 1: Involucral bracts variously dissected or pectinate, but not spinose
 7. Most or all cauline leaves pinnatifid to pinnatisect
 8. Involucre ellipsoidal, 4–7.5 mm diam..... 8. **C. paniculata**
 - 8: Involucre hemispherical to globose, 11–22 mm diam. 3. **C. cineraria**
 - 7: All cauline leaves entire

9. Flower heads discoid (all flowers anther-bearing); involucre appearing almost black..... 7. **C. nigra**
 9: Flower heads radiate (outer flowers sterile); involucre only speckled with black,
 or entirely pale to dark brown..... 6. **C. ×moncktonii**

1. ***Centaurea aspera** L., *Sp. Pl.* 2: 916 (1753).

Annual or biennial to 0.6 m high; stems with adpressed arachnoid hairs, glabrescent; wings absent; cauline leaves narrowly ovate to linear, pinnatifid (lower) to entire (upper), green to grey-green above and below, with sparse scabrid and arachnoid hairs, sessile glands present. **Capitula** solitary; involucre cylindrical to ovoid, 8–10 mm diam. at anthesis; median involucral bracts elliptical to ovate, 5–8 × 2.5–3.5 mm, glabrous; appendages comprising 3–5 straight, patent, pungent spines, each 1.5–3 mm long; corolla pink to mauve; inner (fertile) florets with tube 10–12 mm long, glandular; lobes linear, 4–4.5 mm long; sterile florets about same length as fertile florets; anthers 6.5–7.5 mm long. **Achenes** ellipsoidal, 3.8–4.3 mm long, glabrous, streaked brown and grey; longest pappus bristles 0.8–1.5 mm long, white. **Rough star-thistle.**

S.A.: *SL (Hindmarsh Is.). Indigenous to western Europe (Portugal, Spain, France and Italy) and Morocco. It is sparingly naturalised in Great Britain, the Channel Islands and Australia. In Australia, it is apparently confined to Hindmarsh Island in S.A., where it has existed since at least 1930. One specimen includes the note that it grows mainly on limestone. Flowers: Oct.–Dec.

2. ***Centaurea calcitrapa** L., *Sp. Pl.* 2: 917 (1753) — **Illustr.:** *Pl. W. N.S.W.* 721 (1981); B.A.Auld & R.W.Medd, *Weeds - Illustr. Guide Weeds Austral.* 90–91 (1987); F.J.Richardson *et al.*, *Weeds S.E. Identifi. Guide Austral.* 124 (2006).

Annual or biennial to 1 m high; stems with adpressed arachnoid hairs, glabrescent; wings absent; cauline leaves ovate to lanceolate, pinnatifid (lower) to entire (upper), green to grey-green above and below, with sparse scabrid and multicellular hairs, sessile glands present. **Capitula** solitary; involucre ovoid, 6–8 mm diam. at anthesis; median involucral bracts elliptical to ovate, 5–7 × 3–5.5 mm, glabrous; appendages comprising a straight, patent, pungent, terminal spine 8–24 mm long with 1–3 pairs of spinules at the base; corolla pink to mauve; inner (fertile) florets with tube 10.5–14 mm long, glandular; lobes linear, 2.5–4.5 mm long; sterile florets about same length as fertile florets; anthers 5–7.5 mm long. **Achenes** ellipsoidal, 3–3.7 mm long, glabrous, streaked brown and grey; pappus absent or present, with longest bristles c. 1.5 mm long. **Star thistle. Pl. 2A–C.**

S.A.: *NU, *FR, *EP, *NL, *MU, *YP, *SL, *SE; *W.A.; *?Qld; *N.S.W.; *Vic.; *?Tas. Indigenous to southern Europe, south-western Asia and northern Africa. Naturalised in parts of northern Europe, North America, South Africa, New Zealand and South America. Widely naturalised in southern Australia, mostly where annual rainfall is above 400 mm. Previously naturalised in Qld, but not recorded since 1966. Recorded from Tas. in 1947, but currently not known from that state. Flowers: Oct.–June.

3. ***Centaurea cineraria** L., *Sp. Pl.* 2: 912 (1753). — **Illustr.:** Anon., *Botanica's Pocket Ann. & Perenn.* 208 (1999).

Annual or biennial to 0.9 m high; stems with dense adpressed arachnoid hairs; wings absent; cauline leaves elliptical, pinnatisect to bipinnatisect, silvery-grey above and below, with dense persistent adpressed arachnoid hairs, sessile glands present. **Capitula** solitary; involucre hemispherical to globose, 11–15 mm diam. at anthesis; median involucral bracts broadly-elliptic, 5–9 × 2.5–4 mm, with sparse arachnoid hairs; appendages 1–1.5 mm long, brown, with 5–8 pairs of stiff marginal cilia; corolla purple; inner (fertile) florets with tube 13–15 mm long, glandular; lobes linear, 4–5.5 mm long; sterile florets longer than fertile florets; anthers 7.5–8.5 mm long. **Achenes** ellipsoidal, 3.6–4.3 mm long, sparsely tomentose, grey; longest pappus bristles 2–2.5 mm long, white. **Dusty miller. Pl. 2D–I.**

S.A.: ?*YP, ?*NL, ?*SL. Indigenous to Italy. Sparingly naturalised at several localities in S.A., mostly in sandy soils close to the ocean. Flowers: Jan.

Commonly cultivated as an ornamental in Australia and elsewhere.

4. ***Centaurea eriophora** L., *Sp. Pl.* 2: 916 (1753).

Annual or biennial to 0.8 m high; stems with dense persistent arachnoid hairs; wings present; cauline leaves lanceolate to spatulate, dentate to pinnatifid (lower) or entire (upper), grey above and below, with dense scabrid

and arachnoid hairs, sessile glands present. **Capitula** solitary; involucre broadly-ovoid to globose, 17–20 mm diam. at anthesis; median involucral bracts elliptical, 8–10 × 4–5.5 mm, with sparse to dense arachnoid hairs; appendages comprising a straight, patent, pungent, terminal spine 8–13 mm long with 3–4 pairs of lateral spinules, the distal pair about halfway along spine; corolla greenish-yellow; inner (fertile) florets with tube 15–16 mm long, glandular; lobes linear, 2.5–3 mm long; sterile florets shorter than fertile florets; anthers 5.5–6 mm long. **Achenes** cylindrical, 4–4.5 mm long, sparsely hairy, brown and yellow in streaks; longest pappus bristles 6–7.5 mm long, dark brown. **Woolly cockspur**.

S.A.: *MU. Indigenous to Spain, Portugal, northern Africa, and Israel. Sparingly naturalised in Australia; known in S.A. from two localities around Cambrai and Sedan, with collections in 1984 and 1996. Flowers: Nov.

5. ***Centaurea melitensis** L., *Sp. Pl.* 2: 917 (1753). — **Illustr.:** B.A.Auld & R.W.Medd, *Weeds - Illustr. Guide Weeds Austral.* 91 (1987); F.J.Richardson *et. al.*, *Weeds S.E. Identifi. Guide Austral.* 125 (2006); *Pl. W. N.S.W.* 720 (1981).

Annual or biennial to 0.8 m high; stems with sparse arachnoid and short scabrid hairs, glabrescent; wings present; cauline leaves linear to narrowly-lanceolate, entire, green above and below, sparsely to densely scabrid, sessile glands present. **Capitula** solitary or occasionally two together; involucre ovoid to globose, 7–11 (–13) mm diam. at anthesis; median involucral bracts elliptical to ovate, 4–7 × 2.5–3 mm, with arachnoid hairs; appendages comprising a straight, patent, pungent, terminal spine 3–7 mm long with (2–) 3 pairs of lateral spinules, the distal pair about halfway along spine; corolla yellow; inner (fertile) florets with tube 7–10 mm long, glandular; lobes linear, 1.3–2 mm long; sterile florets about same length as fertile florets; anthers 3–3.5 mm long. **Achenes** cylindrical, 2.5–3 mm long, sparsely hairy, brown; longest pappus bristles 2–2.5 mm long, white. **Malta thistle, maltese cockspur. Pl. 2J–L, 3A–B.**

S.A.: *NW, *LE, *NU, *GT, *FR, *EA, *EP, *NL, *MU, *YP, *SL, *KI, *SE; *W.A.; *N.T.; *Qld; *N.S.W.; *Vic.; *Tas. Indigenous to southern Europe and northern Africa. Naturalised in Zimbabwe, U.S.A., Brazil, Peru, Argentina, South Africa, New Zealand and Australia. Widely naturalised in extra-tropical Australia. Flowers: Sep.–June.

6. ***Centaurea xmoncktonii** C.E.Britton, *Rep. Bot. Exch. Club Brit. Isles 1920*, 6: 172 (1921). — *C. xpratensis* Thuill., *Fl. Env. Paris* 444 (1799), *nom. illeg. non* Salisb. (1796). *C. nigra* auct. non L.: D.A.Cooke in Jessop & Toelken, *Fl. S. Austral.* 3: 1632 (1986). — **Illustr.:** W.T.Parsons & E.G.Cuthbertson, *Noxious Weeds Austral.* 262–264 (1992), as *C. nigra*.

Annual or biennial to 0.7 m high; stems with short scabrous and adpressed arachnoid hairs; wings absent; cauline leaves lanceolate to narrowly elliptic, entire, green above and below, with short scabrous and long arachnoid hairs, sessile glands absent. **Capitula** solitary; involucre broadly-ovoid, 15–20 mm diam. at anthesis; median involucral bracts narrowly-elliptic, 2–4.5 × 1.5–2.5 mm, glabrous or with sparse arachnoid hairs; appendages 3.5–5 mm long, pale to dark brown or speckled with black, with 3–12 pairs of marginal cilia or broad divisions; corolla purple; inner (fertile) florets with tube 8–10 mm long, not glandular; lobes linear, 4–5 mm long; sterile florets longer than fertile florets; anthers 5.5–7 mm long. **Achenes** obovoid, 3–3.5 mm long, sparsely tomentose, grey to brown; longest pappus bristles c. 0.5 mm long, white. **Meadow knapweed, protean knapweed.**

S.A.: ?*NL^{u50}, *SL, *SE; *Vic.; *Tas. Originating in Europe, but now widespread in North America as a naturalised plant. In Australia, it is confined to Vic., S.A. and Tas. Flowers: Nov.–Mar.

Widely considered to be a hybrid between *C. jacea* L. and *C. nigra*. It is particularly variable in the extent of division of the phyllary appendages. Most Australian specimens were formerly determined as *C. nigra*. It differs from that species by the presence of radiate florets and the brown (rather than black) appendages of the involucral bracts.

7. ***Centaurea nigra** L., *Sp. Pl.* 2: 911 (1753). — *C. nigrescens* subsp. *nigrescens* auct. non Willd.: H.P.Vonow in W.R.Barker *et al.*, *J. Adelaide Bot. Gard. Suppl.* 1: 140 (2005), partly (MU record). — **Illustr.:** F.J.Richardson *et. al.*, *Weeds S.E. Identifi. Guide Austral.* 125 (2006); *Fl. Victoria* 4: 678, fig. 129k (1999).

Annual or biennial to 0.8 m high; stems with short scabrous and adpressed arachnoid hairs; wings absent; cauline leaves lanceolate to elliptical, entire, green above and below, with short scabrous and longer multicellular hairs, sessile glands present but very sparse. **Capitula** solitary; involucre broadly-ovoid, 10–13 mm diam. at anthesis; median involucral bracts narrowly-elliptic, 4–7 × 1.3–2 mm, glabrous or with sparse arachnoid hairs; appendages 3.5–5 mm long, dark brown to black, with 7–12 pairs of stiff marginal cilia; corolla purple; all florets fertile, tube

7–9 mm long, not glandular; lobes linear, 3.5–5 mm long; anthers 6–6.5 mm long. **Achenes** obovoid, 3–3.5 mm long, sparsely tomentose, grey; longest pappus bristles c. 0.5 mm long, white. **Black knapweed.**

S.A.: ?*MU; *Vic. Indigenous to western Europe, including Great Britain, and Morocco in Africa. It is naturalised in Canada, U.S.A., New Zealand and Australia. In Australia, it is known only from two localities in Vic., and one in S.A. Flowers: Jan.–Mar.

In Australia, *C. nigra* has for many years been confused with *C. ×moncktonii*.

8. ***Centaurea paniculata** L., *Sp. Pl.* 2: 912 (1753). — **Illustr.:** *Fl. Victoria* 4: 678, fig. 1291 (1999).

Annual or biennial to 0.8 m high; stems with short scabrous and adpressed woolly hairs; wings absent; cauline leaves linear, pinnatisect or entire, grey-green above and below, with short scabrous hairs, sessile glands present. **Capitula** solitary; involucre narrowly-ovoid, 4–7.5 mm diam. at anthesis; median involucre bracts narrowly-elliptic, 6–8 × 1.3–2 mm, glabrous or with sparse arachnoid hairs; appendages c. 1.5 mm long, brown, with 4–6 pairs of stiff marginal cilia; corolla purple; inner (fertile) florets with tube 7–7.5 mm long, glandular; lobes linear, 2.5–3 mm long; sterile florets longer than fertile florets; anthers 5–5.5 mm long. **Achenes** ellipsoidal, c. 3.5 mm long, sparsely tomentose, pale brown; longest pappus bristles 1.5–2 mm long, white.

S.A.: ?*SL^{u50}; *Vic. Indigenous to south-western Europe (Portugal, Spain, France, Italy). In Australia, it is infrequently naturalised in north-eastern Vic. and south-eastern S.A. Flowers: Jan.–Mar.

Not recorded in Australia since 1955, and it is doubtful whether it is still present. Closely related to *C. stoebe* L., which has been found in the A.C.T.

9. ***Centaurea solstitialis** L., *Sp. Pl.* 917 (1753). — **Illustr.:** *Pl. W. N.S.W.* 720 (1981); A.Clemson, *Honey Pollen Fl.* 213–214 (1985); F.J.Richardson *et. al.*, *Weeds S.E. Identifi. Guide Austral.* 126 (2006).

Annual or biennial to 0.8 m high; stems with dense adpressed arachnoid persistent hairs; wings present; cauline leaves narrow lanceolate to linear, entire, grey above and below, with adpressed arachnoid hairs, sessile glands present. **Capitula** solitary; involucre ovoid to globose, 8–11 mm diam. at anthesis; median involucre bracts elliptical to ovate, 4–7.5 × 3–4 mm, with arachnoid hairs; appendages comprising a straight, patent, pungent, terminal spine 12–26 mm long with 2 pairs of lateral spinules near base of spine; corolla yellow; inner (fertile) florets with tube 10–14 mm long, not glandular; lobes linear, 3–4.5 mm long; sterile florets shorter than fertile florets; anthers 5.5–7 mm long. **Achenes** cylindrical, 2.5–3 mm long, glabrous, brown; longest pappus bristles 3–4 mm long, white. **St Barnaby's thistle, yellow star thistle. Pl. 3C.**

S.A.: *FR, *NL, *MU, *SL; *W.A.; ?*N.T.; *Qld; *N.S.W.; *Vic. Indigenous to nearly all countries that border on the Mediterranean Sea, and into south-western Asia. A widespread weed of south-eastern mainland Australia. It has not been collected in W.A. since 1969. Flowers: Oct.–Apr.

4. CIRSIIUM Mill.

Gard. Dict. Abr. ed. 4 (1754).

(From the Latin *cirsion*, thistle, used by Dioscorides, from *keirsos* or *cirsos*, a swollen vein, which it was said to cure.)

Annual, biennial or perennial herbs; stems erect, strongly branched, longitudinally striate, or plants acaulescent (not in Australia); leaves oblong, pinnatifid, with numerous spine-tipped lobes and lobules. **Capitula** pedunculate, homogamous, sometimes unisexual (dioecious); involucre bracts spine-tipped, margins entire; receptacle flat to subconic, not alveolate, densely setose; corolla purple, white or yellow; tube filiform, linear; anthers sagittate-connate, the tails lacinate; filaments free, pilose; style branches connate, erect. **Achenes** glabrous, oblong, smooth, with narrow apical rim; carpodium basal; pappus deciduous, of numerous plumose, capillary bristles, united in a ring at their bases.

A genus of 250–350 species distributed through the temperate parts of North America, northern Africa, Europe and Asia. Two species are naturalised in Australia and S.A., mainly in temperate higher-rainfall areas. They are both economically important as weeds of paddocks and pasture.

Reference: Davis (1975), Moore & Frankton (1974).

1. Spinose stem wings continuous; leaf upper surface with many stiff spinules, mostly 0.8–2 mm long on cauline leaves; flowering heads 25–40 mm diam., bisexual..... 2. **C. vulgare**
- 1: Spinose stem wings absent or very short; leaf upper surface glabrous or very sparsely arachnoid-hairy, lacking spinules; flowering heads 8–14 mm diam., functionally unisexual 1. **C. arvense**

1. ***Cirsium arvense** (L.) Scop. var. **arvense**, *Fl. Carniol.* ed. 2, 2: 126 (1772). — *Serratula arvensis* L., *Sp. Pl.* 2: 820 (1753) — **Illustr.:** C.Lamp & F.Collet, *Field Guide Weeds Austral.* ed. 3, no. 78 (1989); W.T.Parsons & E.G.Cuthbertson, *Noxious Weeds Austral.* 205 (1992); F.J.Richardson *et. al.*, *Weeds S.E. Identif. Guide Austral.* 129 (2006).

Herb to 1 m high; rhizomes present, forming aerial shoots; stems glabrous or sparsely hairy; wings absent or very short; leaves green above, glabrous to sparsely hairy below, spinules and sessile glands absent from lamina; marginal spines yellow-brown, 1–6 mm long. **Capitula** 2–7 at the ends of 5–10 cm long side-branches; involucre obovoid-cylindric, 8–14 mm diam. at anthesis; median involucral bracts erect, tapering, 4–10 × 1.5–2.5 mm at base, usually glabrous, with entire margins and a recurved spinose apex; corolla purple; tube 10–16 mm long; female flowers with lobes 2.7–3.7 mm long; male flowers with lobes 4.5–6.2 mm long; anthers 4–5 mm long. **Achenes** narrowly ellipsoidal, 2.5–3.5 mm long, straw coloured, smooth; pappus bristles 57–80 per fruit, each 15–22 mm long. **Perennial thistle, California thistle.**

S.A.: *SL, *SE; *W.A.; *N.S.W.; *Vic.; *Tas. Indigenous to many parts of Europe, also Russia and Ukraine. In Australia, naturalised in non-arid parts of south-eastern Australia, particularly in Tas. It grows in pastures, cultivated land, on roadsides and other disturbed sites. Perhaps no longer in S.A. due to eradication programs. Flowers: Oct.–Mar.

This is now one of the most widespread and important agricultural weeds in temperate climatic areas of the world. It spreads very efficiently by rhizomes. This species is a Declared Plant in South Australia (notifiable throughout the State).

2. ***Cirsium vulgare** (Savi) Ten., *Fl. Napol.* 5: 209 (1835–36). — *Carduus vulgaris* Savi, *Fl. Pis.* 2: 241 (1798); *Carduus lanceolatus* L., *Sp. Pl.* 821 (1753); *Cirsium lanceolatum* (L.) Scop., *Fl. Carniol.* ed. 2, 2: 130 (1772), *nom. illeg., non* Hill (1769); — **Illustr.:** A.Clemson, *Honey Pollen Fl.*, 214 (1985); C.Lamp & F.Collet, *Field Guide Weeds Austral.* ed. 3, no. 77 (1989); W.T.Parsons & E.G.Cuthbertson, *Noxious Weeds Austral.* 209, 211 (1992).

Herb to 1.5 m high; rhizomes absent; stems thinly pilose with mixed arachnoid and multicellular hairs; wings present, 1–3 mm wide, spinose; leaf lamina green above with numerous stiff 0.8–2 mm long spinules, densely white-tomentose below, sessile glands absent; marginal spines pale yellow, 1–5 mm long. **Capitula** 1–3 at the ends of 8–25 cm long side-branches; involucre globose, 25–40 mm diam. at anthesis, excluding patent bracts; median involucral bracts suberect, subulate, 12–20 × 1–2.5 mm at base, arachnoid dorsally, with entire margins and a rigidly spinose apex; corolla purple; tube 20–25 mm long; lobes 5–9 mm long; anthers 6–7 mm long. **Achenes** ellipsoidal, 3.5–4.5 mm long, yellowish with dark streaks, smooth; pappus bristles 38–85 per flower, each 19–28 mm long. **Spear thistle, Scotch thistle. Pl. 3D–F.**

S.A.: *²GT, *FR, *EA, *EP, *NL, *MU, *YP, *SL, *KI, *SE; *W.A.; *²N.T.; *Qld; *N.S.W.; *Vic.; *Tas. Common and widespread in eastern, south-eastern and south-western Australia. It grows in disturbed areas, especially paddocks and pastures, on a wide range of soils. It is known only from one record in GT. Flowers: mainly Sep.–Mar.

Originally from Europe, this weed is now found world-wide in temperate to sub-tropical climatic areas. It has a very broad ecological and geographical range in Australia, occurring from around Perth, W.A., to southern Tas. and as far north as Tolga in Qld. This species is a Declared Plant in S.A. (control required in part of the State only).

5. CYNARA L.

Sp. Pl. 2: 827 (1753).

(From an ancient Greek name for the globe artichoke.)

Annual or biennial herbs; stems erect, strongly branched, longitudinally striate; wings absent; leaves broad, bipinnatifid to pinnatifid, with numerous spine-tipped lobes. **Capitula** pedunculate, homogamous; involucral bracts spine-tipped or rarely unarmed, margins entire; receptacle concave to convex, not alveolate, densely setose; corolla purple or white;

tube filiform; lobes linear; anther tails conspicuous, fimbriate; filaments free, glandular; style branches connate except near tip, erect. **Achenes** glabrous, compressed-obovate, smooth or faintly ribbed, apical rim indistinct; carpodium basal; pappus deciduous, of numerous plumose, capillary bristles, united in a ring at their bases.

A genus of eight species distributed mainly in the countries surrounding the Mediterranean Sea, but also the Canary Is., Portugal and Iran. One taxon is naturalised in Australia and S.A.

Reference: Wiklund (1992).

1. ***Cynara cardunculus** L., *Sp. Pl.* 2: 825 (1753), subsp. **flavescens** Wiklund, *Bot. J. Linn. Soc.* 109: 120 (1992). — **Illustr.:** J.G.Vaughan & C.A.Geissler, *New Oxford Book Food Pl.* 175 (1997); W.T.Parsons & E.G.Cuthbertson, *Noxious Weeds Austral.* 213–214 (1992); F.J.Richardson *et. al.*, *Weeds S.E. Identif. Guide Austral.* 134 (2006).

Herb to 1.2 m high; stems thinly pilose with arachnoid hairs; wings absent; leaf lamina green above, glabrous or sparsely pilose, densely white-tomentose below, sessile glands numerous on both surfaces; spines yellow to orange, 8–30 mm long. **Capitula** solitary at the ends of 5–30 cm long branchlets; involucre globose, 35–70 mm diam. at anthesis, excluding patent bracts; median involucral bracts suberect, deltate, 30–45 × 9–16 mm at base, glabrous, with entire margins and a rigidly spinose apex; corolla purple or white; tube 37–49 mm long; lobes linear, 8–11 mm long; anthers 8–12 mm long. **Achenes** compressed-obovoid, 4.8–7 mm long, grey to yellowish with darker streaks, smooth or with faint longitudinal ribs; pappus bristles 66–93 per fruit, each 26–35 mm long. **Artichoke thistle, wild artichoke, cardoon. Pl. 3G–I.**

S.A.: *FR, *EA, *NL, *MU, *YP, *SL; *W.A.; *Qld; *N.S.W.; *Vic.; *Tas. Natural distribution includes Portugal, Canary Is., Spain, southern France and Morocco. Naturalised on fertile soils in non-arid parts of southern Australia, particularly in Vic. and southern S.A. Flowers: Sep.–Feb.

This species is a Declared Plant in S.A. (control required in part of the state only). The globe artichoke is a cultivar of *C. cardunculus* subsp. *flavescens*, bred for lack of spines and fleshy involucral bracts. It is propagated vegetatively; progeny derived from seed tend to revert to wild forms.

6. ONOPORDUM L.

Sp. Pl. 827 (1753); *Gen. Pl.* ed. 5, 359 (1754).

(Latinised from the ancient Greek name of the plant, *onopordon*, from *onos*, donkey and *porde*, flatulence; Pliny stated that it caused flatulence in donkeys.)

Onopordon Fresen., *Mus. Senckenberg.* 1: 85 (1833), *orth. var.*

Biennial herbs; stems either lacking or well-developed, erect, sparsely branched, longitudinally striate, wings present, spinose; leaves oblong to ovate, pinnatifid, margins with numerous spine-tipped lobes and lobules. **Capitula** sessile or pedunculate, homogamous; median involucral bracts spine-tipped, margins entire or serrulate; receptacle almost flat, prominently alveolate, glabrous (without setae); corolla purple or white; tube filiform; lobes linear, glabrous or glandular; anther tails conspicuous, fimbriate; filaments free, pilose; style branches connate, erect. **Achenes** glabrous, obovoid, angular, transversely rugulose, apical rim absent or rudimentary; pappus deciduous, of numerous barbellate or plumose (not in Australia) capillary bristles, united in a ring at their bases; fibrillas absent. **Thistles.**

A genus of about 60 species occurring throughout Mediterranean Europe, as well as northern Africa and western Asia. Four species naturalised in Australia; all occurring in S.A.

Reference: Dress (1966), Gonzáles Sierra *et al.* (1992).

1. Prostrate plant; flowers white, borne at ground level..... 2. **O. acaulon**
- 1: Erect plant; flowers pink to purple, borne at ends of branches
 2. Leaves green with many glandular hairs..... 4. **O. tauricum**
 - 2: Leaves grey, due to dense arachnoid indumentum, glandular hairs absent
 3. Median involucral bracts 1.5–3 mm broad at base; corolla 19–25 mm long, lobes glandular 1. **O. acanthium**
 - 3: Median involucral bracts 4.5–7 mm broad at base; corolla 30–38 mm long, lobes glandular 3. **O. illyricum**

1. ***Onopordum acanthium** L., *Sp. Pl.* 2: 827 (1753). — **Illustr.:** A.Clemson, *Honey Pollen Fl.*, 215 (1985); *Fl. N.S.W.* 3: 324 (1992); F.J.Richardson *et. al.*, *Weeds S.E. Identif. Guide Austral.* 149 (2006).

Herb to 1.8 m high; stems densely arachnoid tomentose; wings 5–20 mm wide; leaves grey, with moderate to dense arachnoid tomentum on both surfaces, stalked glandular hairs absent, sessile glands absent; marginal spines creamy to yellowish, 4–7 mm long. **Capitula** solitary on 15–30 cm long peduncles; involucre oblate to globose, 25–45 mm diam. excluding patent bracts; median involucral bracts erect, linear, 14–21 × 1.5–3 mm, arachnoid-tomentose, margins entire or serrulate; corolla purple, tube 14–18 mm long; lobes linear, 5–7 mm long, glabrous; anthers 6.5–8 mm long. **Achenes** cuneiform, 4.1–5 mm long, brown or brown with black dapples, obscurely 4-angled, with numerous prominent transverse wrinkles; pappus bristles barbellate, 73–119 per fruit, each 9–11 mm long. **Scotch thistle, cotton thistle.**

S.A.: *EP, *NL, *SL; *N.S.W.; *Vic.; *Tas. Indigenous to most of Europe and to central Asia. In Australia, naturalised mainly in central to southern N.S.W. and eastern Vic., but also present in Tas. and S.A. It grows in paddocks and pasture, in fertile clayey soils. Flowers: Nov.–Feb.

This species was first collected in South Australia by F. Mueller in 1848. An economically important weed, particularly in New South Wales, where it is declared noxious in several shires.

2. ***Onopordum acaulon** L., *Sp. Pl.* ed. 2, 2: 1159 (1763). — **Illustr.:** *Pl. W. N.S.W.* 726 (1981); B.A.Auld & R.W. Medd, *Weeds - Illustr. Guide Weeds Austral.* 109 (1987); F.J.Richardson *et. al.*, *Weeds S.E. Identif. Guide Austral.* 150 (2006).

Prostrate herb to 0.8 m diam.; stems rudimentary; leaf lamina grey on both sides, densely arachnoid-tomentose, stalked glandular hairs absent, sessile glands absent; spines yellow to yellow-brown, 2–8 mm long. **Capitula** in sessile clusters of 1–7 surrounded by leaf rosette; involucre globose, 28–40 mm diam. at anthesis, excluding patent bracts; median involucral bracts erect, deltate, 18–25 × 3–4 mm at base, glabrous, with entire margins and a rigidly spinose apex; corolla white; tube 16–20 mm long; lobes linear, 2.7–3.5 mm long, glabrous; anthers 6–6.5 mm long. **Achenes** obovoid, 4–4.5 mm long, brown, obscurely to obviously 4-angled, with faint longitudinal ribs, and numerous transverse wrinkles; pappus bristles barbellate, 135–164 per fruit, each 20–25 mm long. **Stemless thistle. Pl. 3J–L, 4A–C.**

S.A.: *FR, *EA, *EP, *NL, *MU, *YP, *SL, *KI, *SE; *W.A.; *N.S.W.; *Vic. Indigenous to Spain, France, Algeria and Morocco. A serious weed in drier agricultural areas of western Vic. and adjacent parts of S.A. and N.S.W. Also occurs sporadically in southern W.A. Flowers: Sep.–Dec.

This is the only prostrate thistle occurring in Australia.

3. ***Onopordum illyricum** L., *Sp. Pl.* 2: 827 (1753). — **Illustr.:** W.T.Parsons, *Noxious Weeds Victoria* 80 (1973); *Fl. N.S.W.* 3: 325 (1992); F.J.Richardson *et. al.*, *Weeds S.E. Identif. Guide Austral.* 150 (2006).

Herb to 2 m high; stems densely arachnoid tomentose; wings 3–15 mm wide; leaves grey, with dense arachnoid tomentum on both surfaces, stalked glandular hairs absent, sessile glands absent or obscured; marginal spines yellow-brown, 4–10 mm long. **Capitula** solitary on 5–25 cm long peduncles; involucre oblate to globose, 30–60 mm diam. excluding patent bracts; median involucral bracts patent, deltate, 25–40 × 4.5–7 mm, glabrous, margins entire; corolla purple, tube 21–26 mm long; lobes linear, 9–12 mm long, glandular; anthers 12–14 mm long. **Achenes** cuneiform, 4.1–6.5 mm long, brown, 4-angled, without longitudinal ribs, but with numerous prominent transverse wrinkles; pappus bristles barbellate, 61–93 per fruit, each 6–11 mm long. **Illyrian thistle.**

S.A.: *NL, *MU; *N.S.W.; *Vic. Indigenous throughout southern Europe from Portugal to Bulgaria. Commonly naturalised in the central and southern tablelands of N.S.W., and very sporadically in Vic. and S.A. It grows in pastures and paddocks and disturbed areas. Flowers: Nov.–Jan.

4. ***Onopordum tauricum** Willd., *Sp. Pl.* 3(3): 1687 (1803). — *Carduus nutans auct. non L.*: D.A.Cooke in Jessop & Toelken, *Fl. S. Austral.* 3: 1628 (1986).

Herb up to 2 m; stems with dense erect glandular hairs; wings 3–10 mm wide; leaves green, with stalked glandular hairs on both surfaces; marginal spines yellow-brown, 3–6 mm long. **Capitula** solitary, terminal, on short peduncles; involucre sub-globose, 27–50 mm diam. excluding patent bracts; median involucral bracts patent, deltate, 18–35 × 3–6 mm, glandular-hairy, margins entire; corolla purple, tube 18–25 mm long; lobes linear,

7–10.5 mm long, glabrous; anthers 8.5–11 mm long. **Achenes** cuneiform, 4.1–4.7 mm long, brown, obscurely 4-angled, without longitudinal ribs, but with numerous prominent transverse wrinkles; pappus bristles barbellate, 55–84 per fruit, each 9–11 mm long. **Taurian thistle**.

S.A.: *FR; *Vic. Indigenous to south-eastern Europe and Turkey. Rarely naturalised in south-eastern Australia. Flowers: Nov.–Jan.

This species has been the target of an eradication program, so that it is probably now extinct in Australia.

7. PICNOMON Adans.

Fam. Pl. 2: 116, 590 (1763).

(A classical name probably derived from the Greek *pyknos*, dense, compact, and *nomos*, an abode or a pasture, perhaps in reference to its bushy growth habit.)

Annual herbs; stems erect, strongly branched, terete or obscurely longitudinally striate; wings present, spinose; leaves linear-oblong, obscurely pinnatifid, margins with long spines interspersed by many short spinules. **Capitula** sessile, homogamous, surrounded and exceeded by reduced leaves; involucre bracts with a pinnately dissected spiny terminal appendage; receptacle almost flat, not alveolate, densely setose; corolla purplish; tube filiform; lobes linear; filaments free, glabrous or glandular; style branches connate, erect. **Achenes** glabrous, compressed-obovoid, smooth, with narrow apical rim; carpopodium basal; pappus deciduous, of numerous plumose, capillary bristles, united in a ring at their bases.

A monotypic genus distributed from Spain to Afghanistan, naturalised in Australia (Vic. and S.A.).

Closely related to *Cirsium* and sometimes included with it.

Reference: Davis (1975).

1. ***Picnomon acarna** (L.) Cass. in F.Cuvier, *Dict. Sci. Nat.* 40: 188 (1826). — *Carduus acarna* L., *Sp. Pl.* 2: 820 (1753); *Cnicus acarna* (L.) L., *Syst. Nat.* ed. 10, 1201 (1759); *Cirsium acarna* (L.) Moench, *Suppl. Meth.* 226 (1802). — **Illustr.:** B.A.Auld & R.W.Medd, *Weeds - Illustr. Guide Weeds Austral.* 109 (1987); W.T.Parsons & E.G.Cuthbertson, *Noxious Weeds Australia* 223–224 (1992); F.J.Richardson *et. al.*, *Weeds S.E. Identif. Guide Austral.* 152 (2006).

Herb to 0.6 m high; stems densely pilose with arachnoid hairs; wings present, 1–2.5 mm wide, spinose; leaf lamina grey-green above with arachnoid hairs, densely white-tomentose below, sessile glands absent; spines yellow or golden, 6–13 mm long. **Capitula** 1–3 at the ends of 5–20 cm long side-branches; involucre ovoid to cylindrical, 6–12 mm diam. at anthesis; median involucre bracts erect, narrowly-oblong, 9–13 × 1.2–2 mm at base, densely arachnoid dorsally, with a pectinate-spinose apical appendage 3–7 mm long; corolla purple; tube 10–12 mm long; lobes linear, 3–5 mm long; anthers 5–6 mm long. **Achenes** compressed-obovoid, 4.5–5.6 mm long, brown, smooth; pappus bristles 95–105 per fruit, each 13–17 mm long; fibrillas absent. **Soldier thistle**.

S.A.: *NL, *MU, *YP, *SL, *KI, *SE; *Vic. Naturalised in semi-arid western Vic. and adjacent areas of S.A., on roadsides, neglected areas or in cereal crops. Flowers: Dec.–Mar.

Distinctive by virtue of its small stature, bushy habit, and leaves with long yellow or golden spines. This species is a Declared Plant in S.A. (control required in part of the State only).

8. RHAPONTICUM Vail.

Königl. Akad. Wiss. Paris Phys. Abb. 5: 177 (1754).

(Thought to be derived from the Greek *Rha*, of the Volga river, and the Latin *ponticus*, pertaining to Pontus, the old name for an area near the Black Sea.)

Acroptilon Cass., *Dict. Sci. Nat.* ed. 2, 50: 464 (1827).

Annual to perennial herbs; stems erect, sparsely branched, longitudinally striate; wings absent; leaves without spines, elliptical to lanceolate, ± entire to lyrate-pinnatifid. **Capitula** pedunculate, homogamous; involucre bracts adpressed, outer and median with distinct terminal concave, scarious appendage, entire or lacerate, never spinose; receptacle flat, not alveolate, densely setose; corolla purple-pink or yellow (not in Australia); tube filiform, lobes linear; anthers with short appendages at base; filaments free, finely verrucose; style branches connate, erect. **Achenes** obovoid, slightly compressed; apical rim toothed; carpopodium basal; pappus deciduous, comprising numerous plumose or barbellate

(not in Australia) capillary bristles, outer ones shorter than the inner, united in a ring at their bases, or free and individually deciduous; fibrillas absent.

A genus of 20 species, distributed throughout the former U.S.S.R., also Mongolia, Iran, Turkey, southern Europe, northern Africa and Australia; two species in Australia, one endemic and one naturalised; one species naturalised in S.A.

Reference: Greuter (2003), Greuter *et al.* (2005).

1. ***Rhaponticum repens** (L.) Hidalgo, *Ann. Bot. (Oxford)* 97: 714 (2006). — *Centaurea repens* L., *Sp. Pl.* ed. 2, 2: 1293 (1763); *Acroptilon repens* (L.) DC., *Prodr.* 6: 663 (1837). *Centaurea picris* Pall. ex Willd., *Sp. Pl.* 3(3): 2302 (1803). — **Illustr.:** *Pl. W. N.S.W.* 719 (1981).

Branched rhizomatous herb to 0.4 m high; stems sparsely arachnoid tomentose, glabrescent; cauline leaves ovate to lanceolate, dentate or lyrate-pinnatifid (lower) or entire (upper), grey-green on both surfaces, sparsely arachnoid-tomentose or glabrous; sessile glands numerous. **Capitula** solitary; involucre globose to broadly ovoid, 4.5–10 mm diam. at anthesis; median involucral bracts erect, broadly ovate, 2–4 × 2–3 mm, glabrous or with sparse arachnoid hairs; appendage 0.5–1.5 mm long, membranous, translucent, margins entire or lacerate, apex obtuse; corolla purple-pink; tube 6.5–9.5 mm long; lobes linear, 2.5–3 mm long; anthers 4–5 mm long. **Achenes** ellipsoidal, 3–4 mm long, creamy, faintly longitudinally striate, sparsely tomentose; pappus bristles deciduous, sub-plumose, longest ones 8–10 mm long, all free. **Russian knapweed, hard heads.**

S.A.: ?*FR, *EP, *NL, *MU, *YP, *SL, *KI; *W.A.; ?*Qld; *N.S.W.; *Vic. Indigenous from eastern Europe to Mongolia, and including Russia, parts of Siberia, Iran and Turkey. It is a serious weed in the U.S.A. and southern Canada. In Australia, it is widely naturalised in S.A., N.S.W. and northern Vic. It grows in heavy soils, and is most often recorded from cropping areas. Flowers: Oct.–Apr.

This species is a Declared Plant in S.A. (notifiable throughout the State).

9. **SILYBUM** Adans.

Fam. Pl. 2: 116, 605 (1763), *nom. cons.*

(A latinised version of the Greek *silybos* or *silybon*, meaning milk-thistle.)

Annual or biennial herbs; stems erect, strongly branched, longitudinally striate; wings absent; leaves oblanceolate, coarsely sinuate with spine-tipped lobes; upper leaves auriculate. **Capitula** pedunculate, homogamous; involucral bracts spine-tipped, margins pectinate, spinose; receptacle flat to slightly convex, not alveolate, densely setose; corolla purple; tube filiform; limb conspicuously expanded; lobes linear; anther tails short, not lacinate; filaments connate, glandular; style branches connate, erect. **Achenes** glabrous, obovoid, smooth, with narrow apical rim; carpodium sub-basal; pappus deciduous, of numerous barbellate capillary bristles, united in a ring at their bases; fibrillas present.

A genus comprising two species, both indigenous to the Mediterranean area. One species is naturalised in Australia and S.A.

Chemicals called flavonolignans, extracted from *Silybum*, are of considerable interest in the field of medicine.

Reference: Bremer (1994), Davis (1975).

1. ***Silybum marianum** (L.) Gaertn., *Fruct. Sem. Pl.* 378, t. 162 (1791). — *Carduus marianus* L., *Sp. Pl.* 2: 823 (1753). — **Illustr.:** *Pl. W. N.S.W.* 725 (1981); C.Lamp & F.Collet, *Field Guide Weeds Austral.* ed. 3, no. 270 (1989); F.J.Richardson *et al.*, *Weeds S.E. Identif. Guide Austral.* 159 (2006).

Herb to 2 m high; stems glabrous or thinly pilose with arachnoid hairs; wings absent; leaf lamina mostly green above with a network of white areas, glabrous; glabrous or sparsely tomentose below, sessile glands absent; spines white to pale yellow, 2–6 mm long. **Capitula** solitary at the ends of 8–25 cm long side-branches; involucre globose, 25–45 mm diam. at anthesis, excluding patent bracts; median involucral bracts patent, subulate, 20–45 × 6–10 mm at widest point, glabrous dorsally, with pectinate margins and a rigidly spinose apex; corolla purple; tube 20–28 mm long; lobes linear, 5.5–7 mm long; anthers 5.5–6 mm long. **Achenes** oblong to ellipsoidal, 5.6–6.7 mm long, brown with dark streaks, smooth; pappus bristles distinctly flattened, 126–167 per fruit, each 15–20 mm long. **Variegated thistle. Pl. 4D–F.**

S.A.: *FR, *EA, *EP, *NL, *SL, *SE; *W.A.; *Qld; *N.S.W.; *Vic.; *Tas. Originating from the Mediterranean region, and eastwards to Iran and Afghanistan. It is naturalised in pastures and paddocks in non-arid parts of southern Australia, and is an economically important weed in many areas. Flowers: Sep.–Jan.

All parts of plant are toxic if ingested, and can cause heavy losses of cattle and sheep. The leaves contain high levels of nitrates. This species is a Declared Plant in S.A. (control required in part of the State only).

CICHORIAE LAM. & DC.

Ian R. Thompson (unless otherwise indicated), David A. Cooke (*Microseris*), S. (Avi) Holzapfel (*Picris*, *Helminthotheca*) & Neville Scarlett (*Taraxacum*)

Herbs, or rarely (not in Australia) shrubs, trees and vines, mostly taprooted; latex abundant; hairs glandular or eglandular, sometimes 2–5-furcate or anchor-shaped, rarely stellate; leaves alternate and/or rosulate, pinnate-veined, or parallel-veined in *Tragopogon*, not glandular. **Inflorescences** terminal; capitula ligulate, with all florets perfect, pedunculate, less often sessile to sub-sessile; involucre bracts uni-, bi- or multiseriate, free or nearly so, sometimes with outgrowths; receptacle epaleate except in *Hypochaeris* (in Australia), usually \pm flat; florets: ligule commonly yellow (adaxial surface), also of other colours, with apex truncate, 5-lobed; tube generally pilose at least at summit; anthers calcarate and caudate, with apical appendage thin, obtuse to rounded; style with acute hairs, \pm evenly distributed; style-branches generally long, tapering, with a single stigmatic area. **Achenes** homomorphic or dimorphic, terete or compressed, beaked or not, with ribs ornamented or smooth; papillose hairs lacking; pappus sometimes dimorphic, rarely absent, comprising bristles or scales; bristles/scales sometimes of two types within a pappus, smooth, scabridulous, barbellate, or plumose.

A tribe of c. 98 genera readily recognised by the presence of abundant latex (hence the former name Lactuceae) and the ligulate capitula. Twenty-three genera and c. 50 species in Australia, including 16 genera entirely of introduced species. Many species are widespread and common weeds of urban environments, wasteland and agricultural land. Two genera are represented by a mixture of native and introduced species, and five genera are represented by only native species. The native *Launaea sarmentosa* and the introduced *Hieracium aurantiacum* are stoloniferous, while *Actites megalocarpus* is rhizomatous.

Achenial dimorphism, where the generally small proportion of achenes located peripherally on the receptacle differ from those located centrally, occurs in several genera. Sometimes these marginal achenes are concealed within the concavity of the adjacent hardened involucre bract. The term ‘beak’ is used to refer to the prolonged distal tapering seen in achenes of some species; if beak-shape is described further, the terms ‘cuspidate’ and ‘rostrate’ are used (Holzapfel 1994). ‘Anchor hairs’ are furcate hairs with recurved prongs and occur only in *Picris* and *Helminthotheca*. The ligules of members of the Cichorieae are thin and have a truncate, distinctly 5-lobed apex. The ligule is most often yellow, although the abaxial surface often has a pale or variously coloured stripe. Another feature is the clumping of withered corollas so that they fall away from the capitulum en masse. In all descriptions below, the diameter of the involucre is the diameter in unpressed specimens measured c. mid-involucre.

Reference: Thompson (2007).

1. Pappus of at least central florets with plumose bristles (i.e. bristles with long, extremely fine branches)
2. Involucre bracts uniseriate (rarely an isolated outer bract present); achenes 10–50 mm long
 3. Leaves grass-like, parallel-veined, glabrous; peduncle not setose; ligule pale to dark purplish, or if yellow much shorter than involucre; achenes with a smooth transition into beak 26. **Tragopogon**
 - 3: Leaves not grass-like, pinnate-veined, with scattered hairs on both surfaces; peduncle setose, sometimes minutely; ligule yellow, exceeding involucre; achenes with an abrupt junction between body and beak sections 27. **Urospermum**
- 2: Involucre bracts bi- or multiseriate; achenes 3–15 mm long
 4. Receptacular paleae attending each floret 15. **Hypochaeris**
 - 4: Receptacular paleae absent
 5. Spreading hairs absent; achenes pale, without transverse ridges, not beaked or tapering distally, slightly inflated and whitish in proximal third 22. **Scorzonera**

- 5: Spreading furcate hairs or anchor hairs present; all or most achenes orange-brown with transverse scale-like ridges and beaked or at least tapering distally
6. Plants scapose; hairs on stems and leaves bifurcate, with prongs not recurved; pappus of marginal achenes a corona of bristles to 1 mm long..... 18. **Leontodon**
- 6: Plants usually with cauline leaves; hairs on stems and leaves 2–5-pronged anchor hairs; pappus of marginal achenes not as above
7. Outer involucre bracts usually 5, in single row, inner involucre bracts with conspicuous feather-like appendage; achenes heteromorphic, tapering into a filiform, long rostrum, outer achenes pilose, white; pappus pure white, style branches black; indumentum of 2-, 3-, 4- and 5-hooked anchor hairs, hairs on radical and cauline leaves often with conspicuously raised base..... 14. **Helminthotheca**
- 7: Outer involucre bracts more than 5, in 2–4 rows; inner involucre bracts without featherlike appendage; achenes homomorphic, cuspidate; pappus cream-white, style branches yellow; indumentum of mainly 2-hooked anchor hairs, hair base extended but without conspicuously raised base..... 20. **Picris**
- 1: Pappus never containing plumose bristles (bristles either scabrid-barbellate or \pm smooth) or pappus absent
8. Achenes beaked (zone of distal narrowing > 1 mm long)
9. Plants scapose; capitulum solitary..... 24. **Taraxacum**
- 9: Plants with stem leaves and/or branches; capitula few to numerous
10. Achenes strongly compressed 16. **Lactuca**
- 10: Achenes not or only slightly compressed
11. Stem leaves present at anthesis; all capitula distinctly pedunculate; bracts with spreading setose or glandular hairs; achenes \pm gradually tapering, with ring of scales absent 13. **Crepis**
- 11: Stems often leafless at anthesis; capitula in \pm sessile clusters along branches; bracts lacking setose or glandular hairs; achenes with a prominent ring of scales at the abrupt transition from body to beak 11. **Chondrilla**
- 8: Achenes not beaked (achenes not narrowing distally or zone of distal narrowing < 1 mm long)
12. Stem leaves generally no more than 4; inner involucre bracts firm, strongly convex, at maturity; marginal and central achenes markedly different and/or their pappus very different in length
13. Leaf hairs simple; outer involucre bracts shorter or longer than inner bracts; achenes 1.3–2.0 mm long 25. **Tolpis**
- 13: Leaf hairs furcate; outer and intermediate involucre bracts shorter than inner bracts; achenes 4.5–9 mm long..... 18. **Leontodon**
- 12: Stem leaves few to many; inner involucre bracts not firm or convex at maturity; achenes and/or pappus all similar
14. Ligule of florets entirely blue, rarely white or pink; pappus of minute scales..... 12. **Cichorium**
- 14: Ligule of florets yellow; pappus of bristles or hairs or pappus absent
15. Pappus absent (leaves divided with terminal lobe/segment markedly larger than lateral lobes) 17. **Lapsana**
- 15: Pappus > 3 mm long
16. Achenes all somewhat compressed; pappus of somewhat persistent fine hairs and an inner series of early caducous bristles
17. Non-rhizomatous annuals or biennials; involucre to c. 12 mm long; achenes < 4 mm long..... 23. **Sonchus**
- 17: Rhizomatous perennial; involucre mostly > 12 mm long; achenes > 4 mm long..... 10. **Actites**

- 16: Achenes not compressed; pappus not of two types of bristles as above
- 18: Plants scapose; pappus of long scales or bristles that are broader basally 19. **Microseris**
- 18: Plants with stem leaves; pappus of bristles that are not broader basally
- 19: Plants glabrous; outer involucre bracts broad-ovate to ovate, with a hyaline margin 0.3–2 mm wide..... 21. **Reichardia**
- 19: Plants hairy; outer involucre bracts lanceolate to linear, with a hyaline margin hardly developed 13. **Crepis**

10. ACTITES Lander

Telopea 1: 130 (1976).

(From the Greek *aktites*, coast dweller, a reference to the habitat of the species.)

Perennial herbs, rhizomatous, branching; hairs simple, glandular and eglandular; leaves all cauline after first season; marginal teeth spinulose, hardly prickly. **Inflorescences** cymose; capitula pedunculate; involucre bracts multiseriate, soft and reflexed at maturity; florets: ligule narrow-oblong, yellow, sometimes purplish towards base. **Achenes** homomorphic, strongly compressed, unbeaked; pappus of bristles, partially persistent; bristles nearly smooth or scabridulous, of two types within a pappus.

A monotypic genus occurring in coastal regions of southern Australia, similar to species of *Sonchus* in Australia but with different fruit and with a rhizomatous habit.

1. **Actites megalocarpus** (Hook.f.) Lander, *Telopea* 1: 129 (1976), as *megalocarpa*. — *Sonchus asper* var. *megalocarpus* Hook.f., *Fl. Tasman.* 1: 227 (1856); *S. megalocarpus* (Hook.f.) J.M.Black, *Fl. S. Australia* 4: 661 (1929); *Embergeria megalocarpa* (Hook.f.) Boulos in Hj.Eichler, *Suppl. Black's Fl. S. Austral.* 333 (1965). *S. asper* var. *littoralis* J.M.Black, *Naturalised Fl. S. Australia* 104 (1909), *nom. illeg. non* Kirk (1895).

Perennials to c. 0.6 m high; leaves often crowded, to 26 cm long, with l:w ratio 3–7, undivided or lobate, somewhat coriaceous; base above mid-stem cordate or sagittate; margin entire, denticulate or dentate; lobate leaves with 3–6 spreading to slightly retrorse lobes per side. **Capitula** few to several; involucre 12–20 mm long, c. 6–12 mm diam.; outer and intermediate bracts narrow-ovate to lanceolate, with hyaline margin very slender, often bearing spine-like hairs along midrib; inner bracts with distinct hyaline margin; receptacle glabrous or pit margin fimbriate; florets: ligule 6–10 mm long, slightly shorter than tube; style pubescence often dark. **Achenes** 4.0–8.0 mm long, compressed, pale to dark brown, smooth, except for 3 longitudinal ribs, with these ribs often inflated; margin smooth, rounded; pappus 7–13 mm long, white. **Dune thistle. Pl. 5A–G.**

S.A.: EP, YP, SL, KI, SE; W.A.; Qld; N.S.W.; Vic.; Tas. Flowers: most of year.

Very similar to *Sonchus asper* and *S. hydrophilus*. Apart from features given in the key, *Actites megalocarpus* tends to have leaf-bases less stem-clasping, hairs when developed on the peduncle and outer and intermediate bracts always spine-like and more robust, and the margin of the achenes rounded and smooth rather than with a sharp edge and scabridulous. The longitudinal ribs of the achenes often become inflated in this species and this feature Lander used to distinguish his new genus from *Sonchus*. This inflation of ribs also sometimes occurs in *S. hydrophilus*, although to a lesser extent. The pappus of dimorphic bristles corresponds to the morphology seen in *Sonchus*. The distinctive glandular hairs seen in species of *Sonchus*, particularly on the peduncle, have not been seen in *A. megalocarpus*. This species has also been confused with *Reichardia tingitana*, a taxon with similar-sized capitula and which also occupies coastal dunes in S.A. Among a number of differences, the outer bracts of *A. megalocarpus* are entirely herbaceous whereas those of *R. tingitana* have a broad hyaline margin.

11. CHONDRILLA L.

Sp. Pl. 2: 796 (1753).

(From the Greek *chondros*, gristle, alluding to the tough wiry stems.)

Annual or perennial herbs, branching; hairs simple, eglandular; leaves basal and cauline. **Inflorescences** paniculate; capitula ± sessile; involucre bracts biseriate; not hardened, reflexed at maturity; florets yellow. **Achenes** homomorphic, not or hardly compressed, beaked; pappus of bristles, persistent; bristles scabridulous, uniform within a pappus.

1. ***Chondrilla juncea** L., *Sp. Pl.* 2: 796 (1753).

Perennials to c. 1.3 m high, becoming much-branched, with spreading to retrorse bristles 2–3 mm long and a close fine wool basally on stems; basal leaves with l:w ratio c. 5–8, runcinately divided; margin dentate or denticulate; cauline leaves much smaller than basal leaves, narrow-linear, entire, not stem-clasping. **Capitula** many, with lateral capitula sub-sessile, single or in groups of 2 or 3; involucre 7–13 mm long, c. 2 mm diam.; bracts somewhat appressed woolly; outer bracts c. 6, ovate, c. 1 mm long; inner bracts c. 7–9, with hyaline margin slender and vestigial; florets 9–12; ligule 7–10 mm long; style pubescence pale. **Achenes** 8–10 mm long; body c. oblong-ellipsoid, with ribs prominent, scaly distally, terminating in a ring of 5 scales surrounding base of beak, cream to brown; beak capillary, c. 50% longer than body, generally caducous with pappus; pappus 6–7 mm long, white; bristles minutely scabridulous. **Skeleton weed. Pl. 5H–J.**

S.A.: *EA, *EP, *NL, *MU, *SL, *SE; *W.A.; *Qld; *N.S.W.; *Vic. Native to western Asia, Europe and northern Africa. The occurrence in the EA region needs confirmation. Flowers: late spring–autumn.

A declared noxious weed in W.A., S.A., N.S.W., Vic. and Tas.

12. CICHORIUM L.

Sp. Pl. 2: 813 (1753).

(From the Greek *cichorion*, the classical name for *Cichorium intybus*, chicory.)

Annual, biennial or perennial herbs, branching; hairs simple, glandular and eglandular; leaves basal and cauline. **Inflorescences** paniculate; capitula pedunculate or sub-sessile; involucre bracts biseriata; basal portion of inner bracts hardened and erect at maturity; florets: ligule violet-blue or blue, rarely white or pink. **Achenes** homomorphic, not compressed, beakless; pappus of scales, persistent; scales uniform within a pappus.

1. ***Cichorium intybus** L., *Sp. Pl.* 2: 813 (1753).

Perennials to c. 2 m tall, becoming much-branched, with short spreading eglandular hairs on stems and leaves, glabrescent; basal leaves with l:w ratio (1–) 3–8, divided or not; margin entire, denticulate or dentate; divided leaves with up to 6 retrorse segments per side; cauline leaves several, mostly undivided; base becoming slightly stem-clasping. **Capitula** numerous, with single capitula on a stout peduncle, or groups of 2 or 3 ± sessile capitula; involucre 9–12 mm long, 2–4 mm diam.; bracts glabrous, or with a few gland-tipped hairs or setae; outer bracts c. 6, ovate–narrow-ovate, 4–6 mm long, with a pale oval region proximally; inner bracts erect and firm at maturity; receptacle c. 3–4 mm diam.; florets: ligule c. 15–25 mm long, blue or rarely white; style pubescence pale. **Achenes** angular-obconical, 2–3 mm long, with ribs undeveloped, brown, sometimes mottled; pappus 0.2–0.3 mm long, white. **Chicory. Pl. 5K–L, 6A–F.**

S.A.: *FR, *NL, *MU, *SL, *KI, *SE; *W.A.; *Qld; *N.S.W.; *Vic.; *Tas. Native to Europe, northern Africa and Asia. Flowers: spring–summer.

13. CREPIS L.

Sp. Pl. 2: 805 (1753).

(From the Greek *krepis*, foundation or boot, originally used for the related *Helminthotheca echioides* and probably alluding to the tuberculate bases of the hairs.)

Annual or biennial herbs, branching, or stemless in *C. pusilla*; hairs simple, glandular and eglandular; leaves predominantly basal. **Inflorescences** cymose or paniculate; capitula pedunculate, sessile in *C. pusilla*; involucre bracts biseriata; inner bracts mostly hardened, strongly convex and erect at maturity; florets: ligule yellow. **Achenes** homomorphic or slightly dimorphic; sometimes slightly compressed, beaked or not; pappus of bristles, persistent or not; bristles minutely scabridulous, uniform within a pappus. **Hawksbeards.**

A genus of c. 200 species from the northern hemisphere, tropics and South Africa; 5 species naturalised in Australia.

The inner series of involucre bracts of most species of this genus become firm and strongly convex as fruits develop. Often achenes adjacent to these bracts are shorter and with a more curved body than more central achenes and tend to be housed within the convexity of the bract at maturity. Achenes have c. 10 prominent ribs.

Crepis dioscoridis L. has been recorded once in Australia, from Meadows in the Southern Lofty Ranges in 1972, but there is no indication that it is naturalised. It is vegetatively similar to *C. capillaris* but with a larger more densely tomentose capitulum and longer achenes.

- 1. Plants stemless; capitula sessile at base of plant 3. **C. pusilla**
- 1: Plants developing aerial stems; capitula pedunculate
 - 2. Stem leaves moderately hairy, entire to lobate; involucre bracts lacking black hairs; capitular buds nodding; central achenes 12–17 mm long, exceeding bracts at maturity..... 2. **C. foetida** subsp. **foetida**
 - 2: Stem leaves glabrous or nearly so, or if moderately hairy then usually mostly pinnatisect; involucre bracts often with black midline hairs; capitular buds erect; central achenes 1.5–9 mm long, shorter than bracts at maturity
 - 3. Outer bracts lanceolate, 1.0–1.3 mm wide; achenes 6–9 mm long, beaked; pappus clearly overtopping bracts..... 4. **C. vesicaria** subsp. **taraxacifolia**
 - 3: Outer bracts narrow-lanceolate to linear, 0.3–0.6 mm wide; achenes 1.5–2.5 mm long, not or hardly beaked; pappus not or hardly overtopping bracts
 - 4. Involucre not densely white-woolly, achenes 1.5–2.5 mm long..... 1. **C. capillaris**
 - 4: Involucre densely white-woolly, achenes 4–6 mm long **C. dioscoridis**

- 1. ***Crepis capillaris** (L.) Wallr., *Erst. Beitr. Fl. Hercyn.* 287 (1840). — *Lapsana capillaris* L., *Sp. Pl.* 2: 812 (1753). *C. virens* L., *Sp. Pl.* ed. 2, 1134 (1763), *nom. illeg.*

Plants to c. 1.2 m high, glabrous except for spreading weak hairs on lower stem and leaf midrib; basal leaves undivided, lobed or lyrate-pinnatisect, with l:w ratio c. 5–8, with segments c. spreading; margin entire or nearly so; stem leaves few, undivided or lobate above mid-stem; base becoming sagittate, stem-clasping upwards. **Capitula** few to several; involucre 5–8 mm long, c. 1.5–3 mm diam.; outer bracts 8–10, 2–4 × 0.3–0.6 mm, hairy or nearly glabrous; inner bracts usually cobwebby, with emergent usually blackish and broad-based gland-tipped hairs, hardened and convex at maturity or not; receptacle 1.5–4 mm diam; florets: ligule 5–9 mm long; style pubescence sometimes slightly darkened. **Achenes** fusiform, 1.5–2.5 mm long, unbeaked, with ribs well-spaced, without ornamentation; pappus caducous, 3–4 mm long, white. **Smooth hawksbeard. Pl. 6G–H.**

S.A.: *MU, *SL, *SE; *W.A.; *N.S.W.; *Vic.; *Tas. Flowers: spring–autumn.

Prior to fruit development, the less divided leaves, smaller capitula and narrower outer bracts distinguishes *C. capillaris* from the otherwise similar *C. vesicaria* subsp. *taraxacifolia*. The inner involucre bracts of *C. capillaris* are glabrous adaxially, unlike those of *C. foetida* and *C. vesicaria*.

- 2. ***Crepis foetida** L. subsp. **foetida**, *Sp. Pl.* 2: 807 (1753).

Plants to c. 0.8 m high, with spreading hairs on lower stem and leaves; basal leaves divided or not, with l:w ratio c. 5–8; margin entire dentate or denticulate; cauline leaves few or several, entire or lobate above mid-stem; base becoming sagittate, stem-clasping upwards. **Capitula** few to several; involucre 9–12 mm long, c. 3–4 mm diam.; outer bracts 12–14, 4–6 × 0.4–1.0 mm, hairy; inner bracts cobwebby, with numerous emergent pale slender-based gland-tipped hairs, hardened and convex at maturity; receptacle c. 2–4 mm diam; florets: ligule 5–9 mm long; style pubescence mostly pale. **Achenes** 7–17 mm long, beaked, dimorphic; central achenes 12–17 mm long; body narrow fusiform, c. 4 mm long, with ribs crowded, scabridulous; marginal achenes 7–10 mm long; pappus persistent, 5–8 mm long, white. **Stinking hawksbeard.**

S.A.: *FR, *NL, *YP, *SL, *KI; *W.A.; *N.S.W.; *Vic. Native of Europe and south-western Asia. Flowers: most of year.

Readily identified in fruit by the extremely long beaks of the central achenes. These exceed the involucre bracts at maturity. The somewhat shorter marginal achenes are housed within the convexity of the involucre bract at maturity. At flowering, the nodding capitular buds and paler indumentum of the involucre distinguishes it from *C. capillaris* and *C. vesicaria* subsp. *taraxacifolia*. Specimens in Australia mostly conform to subsp. *foetida* as defined by Sell (1976), but some specimens have outer involucre bracts broader than 0.75 mm.

3. ***Crepis pusilla** (Sommier) Merxm., *Mitt. Bot. Staatssamml. München* 7: 275 (1968). — *Melitella pusilla* Sommier, *Nuov. Giorn. Bot. Ital.* 14: 497 (1907).

Plants to 2 cm high, acaulescent, nearly glabrous; leaves divided or not, with l:w ratio c. 5–12; margin entire or denticulate. **Capitula** few to several, sessile; involucre 2.5–4 mm long, c. 1 mm diam.; outer bracts 2–4, c. 1 × 0.5 mm, glabrous; inner bracts glabrous, but hairs at base of involucre, morphology not known at maturity; receptacle c. 2 mm diam; florets: ligule c. 1 mm long; style pubescence black. **Achenes** ellipsoid, c. 2 mm long, not or hardly beaked, with ribs crowded, ?smooth; pappus persistent, 1–1.5 mm long, white. **Dandelion crepis**.

S.A.: *EP, *SL, *KI. Native to Portugal, Malta, Greece and Crete. Flowers: spring.

4. ***Crepis vesicaria** subsp. **taraxacifolia** (Thuill.) Thell. in Schinz & R.Keller, *Fl. Schweiz* ed. 3, 1: 594 (1909). — *C. taraxacifolia* Thuill., *Fl. Env. Paris* 409 (1799). *Barkhausia haenseleri* Boiss. ex DC., *Prodr.* 7: 153 (1838), as *Haenseleri*; *C. vesicaria* var. *taraxifolia* (Thuill.) B.Bovin, *Naturaliste Canad.* 94: 523 (1967); *C. vesicaria* subsp. *haenseleri* (Boiss. ex DC.) Sell, *Bot. J. Linn. Soc.* 71: 254 (1975).

Plants to c. 1.2 m high, with spreading hairs on stem and leaves, sometimes rather sparse; basal leaves lyrate 1- or 2-pinnatisect, with l:w ratio c. 5–8, with segments c. spreading; margin entire or with scattered teeth or denticulations; cauline leaves few, usually pinnatisect above mid-stem; base becoming dilated and stem-clasping upwards. **Capitula** few to many; involucre 8–12 mm long, c. 3–5 mm diam.; outer bracts 8–12, 3–5 mm × 1.0–1.3 mm, nearly glabrous; inner bracts cobwebby, with emergent usually blackish and broad-based gland-tipped hairs, ?not hardened, slightly convex at maturity; receptacle 3–6 mm diam; florets: ligule 5–9 mm long; style pubescence dark. **Achenes** 6–9 mm long, beaked; body c. fusiform, 3–4.5 mm long, with ribs well-spaced, scabridulous; pappus persistent, c. 5 mm long, white. **Dandelion hawkbeard**.

S.A.: *SE; *Vic. Native to Europe. Flowers: spring–early summer.

A common weed of roadsides between Warrnambool and Portland in SW Vic., with some extension into S.A.. It has a similar indumentum to *C. capillaris*, but its leaves are more divided, inflorescences more congested and with larger capitula, the outer involucre bracts are broader, and achenes much longer and beaked.

14. HELMINTHOTHECA Zinn

Cat. Pl. Hort. Gott. 430 (1757), cf. Spargue in *Kew Bull.* 1934: 218 (1934).

(From the Greek *helmins*, worm, and *theca*, case, in reference to the form of the achene, perhaps also in belief of its use as a vermifuge.)

Prepared by S. (Avi) Holzapfel

Helminthia Juss., *Gen. Pl.* 170, 468 (1789).

Annual to perennial herbs, prostrate to erect, branched, stems and leaves hispid; indumentum with 2–6-hooked anchor hairs; leaves simple, alternate, basal leaves in a rosette. **Capitula** terminal, in irregular cymose panicles; involucre of at least 2 distinct rows; outer involucre bracts in single row, cordate to broad-ovate; inner bracts in 1 or 2 rows, linear to lanceolate, with a threadlike, sometimes feathery appendix at their tip; receptacle naked, smooth (not in Australia) or shallowly alveolate. **Achenes** homomorphic (not in Australia) or heteromorphic, rostrate; pappus rays pure white, in single row, attached to disk-like apical plate of the rostrum, rays of central achenes plumose, rays of marginal achenes plumose (not in Australia) or scabrous.

A small genus of c. 5 species from the Mediterranean region; 1 species naturalised in Australia and New Zealand, also Europe, North- and South America and southern Africa.

This genus has often been included with *Picris* L. in Australian and other floras. Differences in the achene morphology, involucre and indumentum support a separation as argued by Lack (1974).

Reference: Lack (1974, 1975), Meusel & Jaeger (1992), Holzapfel (1994).

1. ***Helminthotheca echioides** (L.) Holub, *Folia Geobot. Phytotax.* 8: 176 (1973). — *Picris echioides* L., *Sp. Pl.* 2: 792 (1753); *Helminthia echioides* (L.) Gaertn., *Fruct. Sem. Pl.* 2: 368 (1791). — **Illustr.:** J.M.Black, *Fl. S. Austral.* ed. 2, 4: 941, fig. 1255 (1957); S.Ross-Craig, *Drawings Brit. Pl.* 17, XVII, pl. 29 (1962); T.Low, *Bush tucker* 156 (1989), photo on left side; all as *P. echioides*.

Annual to perennial, 25–200 cm high; indumentum of stiff hairs, sparse to dense; anchor hairs mainly 2- and 4-hooked, sometimes with raised base. **Capitula** few to numerous, 8–19 mm long, 9–13 mm in diam.; outer involucre bracts 5, upright to spreading, 8–21 × 4–11 mm; innermost bracts 8–12, upright, 5–12 mm × 1–3 mm, appendix 2–9 mm long. **Achenes** heteromorphic; marginal achenes curved, white, pilose, body 2.9–3.8 mm long, 0.6–1.4 mm in diam., central achenes brown, glabrous, ribbed, body 2.4–3.9 mm long, 0.8–1.1 mm in diam., rostrum slightly shorter, to 1.5 times longer than body; pappus pure white, on marginal achenes shorter compared to central achenes. **Ox-tongue, prickly ox-tongue. Pl. 6I, 7A–C.**

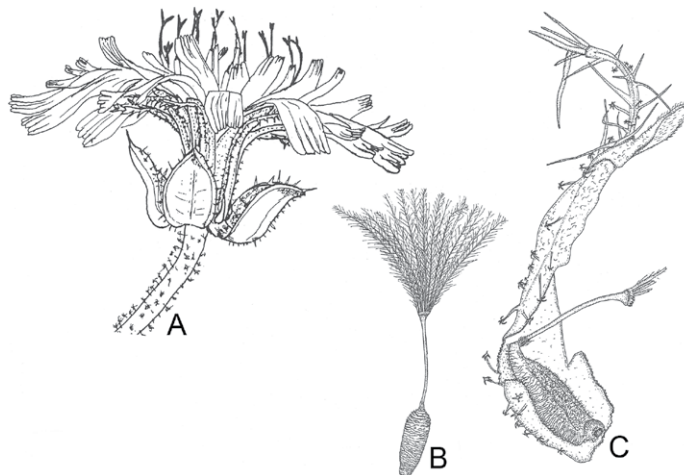


Fig. 1. *Helminthotheca echioides*: A, flowering capitulum; B, central achene and pappus; C, marginal achene partially enclosed in inner involucre bract (pappus rays broken in preparation). Illustrations by S. Holzapfel, A from Willdenowia 24: 110, fig. 2 (1994).

S.A.: *EP, *NL, *MU, *YP, *SL, *SE; *W.A.; *Qld.; *N.S.W.; *Vic.; *Tas. A native of Europe, south-

western Asia and north Africa, naturalised in North- and South America and New Zealand. Locally abundant on roadsides, in open areas and gardens in metropolitan and agricultural areas; amongst and alongside pastures and crops, along fencelines, irrigation channels and creeks; less frequently in remnants of native vegetation (eucalypt woodland); also on recently burned ground. In various soils; mainly at altitudes under 200 m (few specimens between 200 m and 1000 m). Flowers: all year, peak Nov.–June.

The innermost involucre bracts often become strongly sclerotic in fruiting capitula and enclose the marginal achenes, which are then not released by wind, but fall off with the withering capitulum. The oldest collection seen from Australia is a specimen from Mt. Emu Creek (probably Vic.), dated Febr. 1874 (MEL 67719), annotated by F. von Mueller and most probably also collected by him. All other early collections come from around Melbourne and Adelaide, confirming these two ports as the likely gateways for the initial introduction of the species to Australia.

A traditional potherb in Europe, listed also as edible in Australia (Low 1989).

15. HYPOCHAERIS L.

Sp. Pl. 2: 810 (1753).

(A name used by Theophrastus for this or another plant; from the Greek *hypo*, under, and *choiros*, pig, possibly alluding to the underground parts being eaten by pigs.)

Annuals, biennial or perennial herbs, usually branching; hairs simple, eglandular; leaves all or mostly basal. **Inflorescences** solitary or cymose; capitula pedunculate; involucre bracts multiseriate, soft and reflexed at maturity; receptacular paleae linear, membranous, with apex filamentous, not enclosing or falling with achene; florets: ligule yellow or white. **Achenes** homomorphic or dimorphic, not compressed, beaked or not; pappus of bristles, persistent (in Australia), homomorphic or slightly dimorphic; bristles plumose or scabridulous; sometimes of two types within a pappus. **Sow-thistles.**

A genus of c. 60 species mostly from temperate South America and the Mediterranean region, also other parts of Europe and Asia. Three species naturalised in Australia, two from Europe and Asia, one from South America.

The involucre bracts of species occurring in Australia have a slender hyaline margin becoming broader in inner series. The longest intermediate bracts are more than half the length of the inner bracts. Achenes are brown with ribs ornamented with transverse sometimes scale-like ridges and taper into a scabridulous beak.

1. Marginal florets not exceeding involucre or only by up to 2 mm; inner involucre bracts elongating by 60–100% post anthesis, c. equal to or longer than receptacular paleae in fruit; mostly a few to several marginal achenes not beaked 1. ***H. glabra***
- 1: Marginal florets usually exceeding involucre by more than 5 mm; inner involucre bracts elongating by < 50% post anthesis, markedly shorter than receptacular paleae in fruit; all achenes beaked 2. ***H. radicata***

1. ***Hypochoeris glabra** L., *Sp. Pl.* 2: 811 (1753), as *Hypochoeris*. — *S. asper* subsp. *glaucescens* auct. non (Jord.) Ball (1878): D.A.Cooke in Jessop & Toelken, *Fl. S. Austral.* 3: 1654 (1986), partly.

Annuals to c. 0.4 m high, with spreading hairs often on leaves and occasionally on stems; basal leaves with l:w ratio (1–) 2–6, undivided or with spreading lobes; cauline leaves absent. **Capitula** solitary or few to several, not cobwebby; involucre 7–10 mm long at anthesis, subsequently lengthening by 60–100%, c. 1–3 mm diam.; bracts mostly smooth, occasionally with a few spine-like hairs, with those of outer series narrow-ovate, 2–3 mm long; receptacular paleae to 17 mm long, shorter than mature inner bracts; florets: ligule c. 2–5 mm long, not or shortly exceeding involucre, yellow; style pubescence pale. **Achenes** dimorphic, 3–12 mm long; body 3–5 mm long, with numerous ribs; marginal achenes mostly few to several, rarely lacking, with body narrow-obconical or occasionally fusiform, dark red-brown, unbeaked or less often with beak to 2 mm long; central achenes with body narrow-fusiform, red-brown, with glaucous grooves with beak longer than body; pappus biseriate, 6–10 mm long, cream; bristles of inner series plumose, with those on marginal achenes more densely plumose proximally; bristles of outer series much shorter, scabridulous. **Smooth cats-ear. Pl. 7D–G.**

S.A.: *LE, *GT, *FR, *EA, *EP, *NL, *MU, *YP, *SL, *KI, *SE; *W.A.; *N.T.; *Qld; *N.S.W.; *Vic.; *Tas. Native to Europe and western Asia. Flowers: mostly winter to summer.

Occasional specimens, e.g. from the Wimmera in north-western Vic. and the Deniliquin area in south-central N.S.W., are unusual in having setose stems and peduncles. When in flower the narrower capitula with fewer bracts and shorter ligules which barely exceed the bracts readily distinguish *H. glabra* from *H. radicata*. Post-anthesis, the involucre of *H. glabra* elongates markedly and the longer inner bracts typically exceed the receptacular paleae. In contrast, the involucre of *H. radicata* elongates less markedly post-anthesis and its inner bracts are much exceeded by the often pigment-tipped receptacular paleae. The unbeaked marginal achenes of *H. glabra* also usually distinguish it from *H. radicata*, although in occasional specimens the marginal achenes are short-beaked or absent. Beaked achenes differ from short-beaked achenes of *H. radicata* in the absence of bristles on the beak. Depauperate specimens are fairly common and these have very narrow capitula.

2. ***Hypochoeris radicata** L., *Sp. Pl.* 2: 811 (1753), as *Hypochoeris*.

Perennials to c. 1 m high. Spreading hairs usually present on leaves; basal leaves with l:w ratio 3–6, undivided or with spreading to retrorse lobes; cauline leaves absent or occasionally solitary, with small bracts subtending branches. **Capitula** usually few to several, not cobwebby; involucre at anthesis 10–15 mm long subsequently lengthening by c. 20%, c. 3–7 mm diam.; bracts with midrib setose distally or throughout, occasionally ± smooth, with those of outer series narrow-ovate to lanceolate, 2–3 mm long; receptacular paleae to 26 mm long, exceeding mature inner bracts; florets: ligule c. 8–16 mm long, usually exceeding involucre by c. 5–10 mm, yellow; style pubescence pale. **Achenes** homomorphic or dimorphic, 7–14 mm long; body fusiform, 4–5 mm long, with numerous ribs; marginal achenes several or absent, red-brown, with beak shorter than body; central achenes red-brown, with glaucous grooves, with beak longer than body; pappus biseriate, 9–15 mm long, cream; bristles of inner series plumose, with those on marginal achenes not or hardly more densely plumose proximally; bristles of outer series much shorter, scabridulous. **Cats-ear, flat-weed. Pl. 7H–I.**

S.A.: *FR, *EP, *NL, *MU, *YP, *SL, *KI, *SE; *W.A.; *Qld; *N.S.W.; *Vic.; *Tas. Native to Europe. Flowers: mostly spring–autumn.

Extremely common and widespread weed in areas with moderate to high rainfall or in watered sites. Peduncles and inflorescence branches are often long and can arise from below mid-stem. Readily distinguishable in flower from the other two species of *Hypochoeris* in Australia. After flowering it can be distinguished in most cases by the marginal achenes and otherwise by the receptacular paleae which greatly exceed the involucre and are more commonly pigmented than in *H. glabra*.

16. LACTUCA L.

Sp. Pl. 2: 795 (1753).

(From the Latin *lac*, milk, alluding to the milky latex contained in these plants and other members of the Cichorieae.)

Annual, biennial or perennial herbs or (not in Australia) subshrubs or climbers, branching; hairs simple, eglandular; leaves predominantly cauline. **Inflorescences** paniculate; capitula ± sessile, sometimes clustered; involucre bracts multiserial, soft and erect or reflexed at maturity; florets yellow (in Australia), drying whitish or bluish. **Achenes**

homomorphic, strongly compressed, beaked; pappus of bristles, persistent (in Australia); bristles minutely scabridulous, uniform within a pappus. **Lettuces.**

About 100 species from Europe, Asia, Africa and North America; 2 species naturalised in Australia.

The 2 Australian species have complex panicles with a proportion of capitula sessile or short-pedunculate, slender capitula with relatively few florets, achenes that taper abruptly from the body to a long capillary beak, and often silvery stems.

1. Margin of at least larger stem leaves crowded-spinulose; involucre bracts typically \pm reflexed at maturity; body of achene bearing minute whitish cilia distally; beak $< 30\%$ longer than body (plants commonly > 1 m high)..... 2. **L. serriola**
1. Margin of all leaves without spinules; involucre bracts typically erect at maturity; body of achene lacking cilia; beak $> 30\%$ longer than body (plants mostly < 1 m high) 1. **L. saligna**

1. ***Lactuca saligna** L., *Sp. Pl.* 2: 796 (1753).

Annuals or biennials to c. 1 m high, glabrous except for sparse bristles on abaxial midrib of leaves, not glaucous; stem leaves to c. 20 cm long, with l:w ratio c. 3–30; divided or not, undivided leaves linear to narrow-linear; divided leaves with 1–3 narrow retrorsely arching segments per side; base above mid-stem stem-clasping, narrowly sagittate; margin entire or remotely toothed. **Capitula** many; involucre 6–10 mm long, elongating to c. 15 mm long at maturity, c. 1–1.5 mm diam., with bracts \pm erect at maturity; outer bracts 2 or 3, ovate, c. 2 mm long; longer intermediate bracts subequal to inner bracts at anthesis; inner bracts 4 or 5; florets: ligule 7–10 mm long; style pubescence pale. **Achenes** 7–10 mm long; body 3–4 mm long; faces elliptic, dark-brown, commonly mottled blackish, scabridulous distally, tapering somewhat abruptly to a capillary beak; beak c. 40–90% longer than body; pappus persistent, 4–5 mm long, white; bristles extremely fine, \pm smooth. **Willow-leaf lettuce.**

S.A.: *LE, *MU, *YP, *SL, *KI, *SE; *W.A.; *Qld; *N.S.W.; *Vic.; *Tas. A native of Europe and western Asia. Flowers: spring–autumn.

2. ***Lactuca serriola** L., *Cent. Pl.* 2: 29 (1756). — *L. scariola* L., *Amoen. Acad.* 4: 489 (1759).

Annuals or biennials to c. 2.0 m high, with lower stems and abaxial midrib of leaves prickly-setose, or less often stem glabrous, sometimes glaucous; stem leaves to c. 20 cm long, with l:w ratio c. 4–8, divided or not; margin spinulose-denticulate, often becoming \pm smooth nearer summit; undivided leaves narrow-oblong; divided leaves with 1–3 broad retrorsely arching lobes or segments per side; base above mid-stem sagittate, stem-clasping. **Capitula** many to c. 100; involucre 6–10 mm long elongating to c. 15 mm long at maturity, c. 2 mm diam., with bracts reflexed at maturity; outer bracts 3–6, ovate, 1–2 mm long, with hyaline margin absent; longer intermediate bracts subequal to inner bracts at anthesis; inner bracts 4 or 5, with hyaline margin distinct; florets: ligule 7–10 mm long; style pubescence pale. **Achenes** 6–8 mm long; body c. 3 mm long; faces narrow-obovate, mid-brown, with minute whitish cilia distally; beak as long as or up to c. 30% longer than body; pappus persistent, c. 6 mm long, white; bristles extremely fine, minutely scabridulous. **Prickly lettuce.**

A native of Europe and western Asia. Flowers:

Recorded by Everist (1981) as possibly poisonous to stock, but nothing is known about the nature of the poisonous principle. *Lactuca sativa* L., from which edible lettuce varieties was derived, has more or less identical fruits to *L. serriola*, but has involucre bracts that are finally erect. There is no clear evidence that it is naturalised in Australia. Another species sometimes confused with *L. serriola* is *L. virosa* L.; however, it has larger, darker achenes and leaves always undivided. The panicles are typically pyramidal with capitula of primary branches tending not to diverge greatly from the branch. Leaves are typically twisted at the base so that the lamina is in a vertical plane and alternate leaves point in opposite directions.

1. At least the mid-stem leaves lobate to subpinnatisect (dissection $> 30\%$ toward midrib) 2b. **Lactuca serriola** forma **serriola**
1. Leaves all entire or at the most with a few shallow broad teeth (dissection $< 30\%$ toward midrib) 2a. **Lactuca serriola** forma **integrifolia**

- 2a. ***Lactuca serriola**. forma **integrifolia** (Gray) S.D.Prince & R.N.Carter, *Watsonia* 11: 337 (1977). — *Lactuca virosa* var. *integrifolia* Gray, *Nat. Arr. Brit. Pl.* 2: 417 (1821).

Mid-stem leaves entire or sometimes some with a few broad teeth; upper-stem leaves and leaves of branch entire.

S.A.: ?*EP, ?*MU, ?*SL; *N.T.; *N.S.W.; *Vic. Flowers: spring–autumn.

The plant is questionably established in S.A.

- 2b. ***Lactuca serriola** L. forma **serriola**

Mid-stem leaves lobate to subpinnatisect, with 1–3 spreading or retrorsely arched lobes/segments per side, or sometimes a proportion entire; upper-stem leaves and leaves of branches lobate or entire. **Pl.** 7J–M, 8A–C.

S.A.: *LE, *NU, *GT, *FR, *EA, *EP, *NL, *MU, *SL, *KI, *SE; *W.A.; *N.T.; *Qld; *N.S.W.; *Vic.; *Tas. Flowers: spring–autumn.

17. LAPSANA L.

Sp. Pl. 2: 811 (1753).

(From the Greek *lapsane* the classical name for an edible weed, probably *Sinapis arvensis* L., charlock.)

Annual, biennial or perennial herbs, branching; hairs simple, glandular and eglandular; leaves predominantly cauline. **Inflorescences** paniculate; capitula pedunculate; involucre bracts biseriata; inner bracts somewhat firm and erect at maturity; florets: ligule yellow. **Achenes** homomorphic, mildly compressed, beakless; pappus absent.

1. ***Lapsana communis** L. subsp. **communis**, *Sp. Pl.* 2: 811 (1753).

Annuals or biennials to c. 1.2 m high, with gland-tipped hairs on lower stem and sometimes upper stem, and short eglandular hairs on or near leaf margins; basal leaves variably persistent; cauline leaves to 16 cm long, with l:w ratio 1–4, undivided or lyrate divided, petiole-like basally, with 1 or 2 spreading or slightly retrorse lobes per side; margin denticulate or dentate; blade or terminal segment ovate, with base truncate or cordate; upper-stem leaves tending to be undivided, narrow-elliptic, with base narrow-cuneate. **Capitula** few to many; involucre 5–8 mm long, c. 2–2.5 mm diam., with margin of bracts glabrous or inconspicuously ciliate; outer bracts 4–6, ovate, c. 1 mm long, with hyaline margin vestigial; inner bracts 6–10, keeled basally, slightly incurved, with hyaline margin vestigial; florets: ligule 5–10 mm long; style pubescence black. **Achenes** narrow-ellipsoid to obconical, 3–5 mm long, slightly compressed, briefly tapering distally, with ribs crowded, not prominent, glabrous, pale brown or greenish. **Nipplewort**.

S.A.: *SL; *Qld; *N.S.W.; *Vic.; *Tas. Native of Europe. Flowers: mainly summer.

Predominantly a weed of sites around human habitation. The glandular portion of the stem hairs is often lost early and hairs will appear eglandular.

18. LEONTODON L.

Sp. Pl. 2: 798 (1753).

(from the Greek *leontos*, lion, and *odontos*, tooth, probably alluding to the deeply toothed leaves.)

Hedynois Mill., *Gard. Dict. Abr.* ed. 4 (1754).

Annual or perennial herbs, branching or not; hairs furcate or simple, with prongs usually straight; leaves predominantly basal. **Inflorescences** solitary or cymose; capitula pedunculate; involucre bracts biseriata or multiseriata; inner bracts ± hardened, strongly convex and erect to reflexed at maturity; florets: ligule yellow. **Achenes** homomorphic or dimorphic; not compressed, beaked or unbeaked; pappus of bristles and scales, somewhat persistent, dimorphic; bristles and scales plumose or scabridulous, sometimes of two types within a pappus.

The genus *Hedynois* was combined with *Leontodon* following the analysis of Enke *et al.* (2012).

A genus of c. 50 species from Europe, northern Africa and south-western Asia, mainly in the Mediterranean region; two species naturalised in Australia.

1. Perennial; florets with ligules c. 7–10 mm long; central florets with pappus 6–9 mm long, with longest bristles plumose; achenes dimorphic, 3–5 mm long, central achenes shortly beaked..... 2. **L. saxatilis**
1. Annual; florets with ligules c. 3–6 mm long; central florets with pappus to 6 mm long, with bristles scabridulous; achenes ± homomorphic, 4.5–9 mm long, not beaked..... 1. **L. rhagadioloides**

1. ***Leontodon rhagadioloides** (L.) Enke & Zidorn, *Org. Divers. Evol.* 12: 14 (2012). — *Hyoseris rhagadioloides* L., *Sp. Pl.* 2: 809 (1753); *Hedypnois rhagadioloides* (L.) F.W.Schmidt, *Samml. Phys.-ökon. Aufsätze* 1: 279 (1795). *Hedypnois polymorpha* DC., *Prodr.* 7(1): 81 (1838).

Annuals to c. 0.4 m high, often < 0.2 m high; scattered hairs on leaves, distal peduncle and involucre bracts, non-glandular, those of leaves and stems minutely bifurcate; basal leaves variably persistent, to c. 20 cm long, with l:w ratio 3–12, entire, lobate or pinnatisect, with segments somewhat antrorse; margin entire or dentate; cauline leaves (0–) 1–4, undivided, with base becoming broad-cuneate, hardly stem-clasping. **Capitula** solitary or few; involucre c. 3 mm diam.; outer bracts 6–10, linear-lanceolate or lanceolate, 2–3 mm long; inner bracts 10–12, 5–9 mm long, variously bristly, or glabrous, hardened and incurved or erect at maturity; hyaline margin narrow or broad in alternate bracts; florets: ligule c. 3–6 mm long; style pubescence pale. **Achenes** narrow-obloid, curved, 4.5–9 mm long, with ribs inconspicuous, minutely scaly in lines; marginal achenes housed within concavity of bract at maturity; pappus of marginal achenes a corona of largely-fused scales, 0.5–1 mm long; pappus of central achenes: bristles usually 5, 3–6 mm long, dilated at base; intervening scales to 0.5 mm long. **Cretan weed. Pl. 8D–L.**

S.A.: *LE, *NU, *GT, *FR, *EP, *NL, *MU, *YP, *SL, *KI, *SE; W.A.; N.T.; Qld; N.S.W.; Vic.; Tas. Native to the Mediterranean region.

Some authors recognised two subspecies in *Hedypnois rhagadioloides* (Thompson 2007): subsp. *rhagadioloides* and subsp. *cretica* (L.) Hayek in Fedde, *Rep. Sp. Nov. Beihefte* 2: 807 (1931). However, when transferred to *Leontodon*, no valid name exists under that genus for subsp. *cretica*. Hence no infraspecific taxa are recognised in this treatment. The subspecies often grow sympatrically, but there is little evidence of hybridisation between the two forms. The involucre bracts of subsp. *cretica* have robust hairs confined to the midline, in one or two rows, or are glabrous. The distal peduncle may be transiently cobwebby prior to anthesis. Although less reliable for discriminating subspecies, the ligules, achenes and pappus bristles are generally longer in subsp. *cretica* and the peduncle generally does not dilate distally to the same extent. Nordenstam (1977) indicates that subsp. *rhagadioloides* is characterised by a chromosome number of $2n = 16$, whereas subsp. *cretica* has a number of $2n = 13$. Plants are variable in habit from erect to prostrate, and often become multi-stemmed from the base. The peduncle dilates to a variable extent distally, and the achenes become firmly attached to the receptacle at maturity and are somewhat enclosed by hardened incurved bracts.

2. ***Leontodon saxatilis** Lam., *Fl. Franç.* 2: 115. 1779, as *saxatile*. — *Hyoseris taraxacoides* Vill., *Prosp. Hist. Pl. Dauphiné* 33 (1779); *L. taraxacoides* (Vill.) Willd. ex Mérat, *Ann. Sci. Nat. (Paris)* 22: 108 (1831), *nom. illeg.*; *L. nudicaulis* subsp. *taraxacoides* (Vill.) Schinz & Thell., *Bull. Herb. Boissier sér.* 2, 7: 389 (1907), *nom. inval.* *L. hirtus* auct. non L.: J.M.Black, *Fl. S. Austral.* 4: 659 (1929); *L. leysleri* auct. non (Wallr.) Beck: J.M.Black, *Fl. S. Austral.* 4: 940 (1957).

Scapose perennials to c. 0.4 m high; hairs bifurcate, c. 1 mm long sparse to scattered on leaves and lower stems and sometimes on involucre; leaves to c. 30 cm long, with l:w ratio 4–15, undivided or lobate to subpinnatisect; margin entire or remotely sinuate dentate; divided leaves with 3–6 ± spreading lobes or segments per side. **Capitula** solitary, nodding in bud; involucre 6–11 mm long, c. 3–5 mm diam.; bracts glabrous or occasionally moderately hairy; bracts of outer series c. 6–8, narrow-lanceolate, 1–2 mm long; intermediate bracts not reaching to half way; inner bracts with a grey hyaline margin; florets: ligule c. 7–10 mm long; style pubescence pale. **Achenes** 3–5 mm long, dimorphic; marginal achenes curved-fusiform, tapering into a short neck, ± smooth, housed within adjacent inner bract at maturity; central achenes short-beaked; body narrow-fusiform, transversely ridged or scaly, with beak 0.5–1 mm long; pappus cream; pappus of marginal achenes of fused scales 0.5–1 mm long; pappus of central achenes 6–9 mm long, biseriate; inner series c. 10, sparsely plumose, much wider at base; outer series 0.5–3 mm long, scabridulous. **Hairy hawkbit.**

S.A.: *MU, *SL, *KI, *SE; *W.A.; *Qld; *N.S.W.; *Vic.; *Tas. Native to Europe. Flowers: mainly late winter–spring, also other times.

A common weed of disturbed areas and of lawns in southern Australia. The involucre is either glabrous or

moderately hairy with little evidence of intermediate forms. However, no correlation has been identified between this and other characters in Australian collections. Although the involucre is multiseriate, the outer and intermediate bracts are relatively small, and the intermediate bracts generally do not reach halfway along the involucre. This is one of several characters distinguishing *L. saxatilis* from the superficially similar and often co-occurring *Hypochoeris radicata*. Other characters distinguishing it from *H. radicata* include: stems unbranched; hairs on leaves minutely bifurcate, paleae absent, involucre bracts all smooth, and inner involucre bracts with a grey hyaline margin. Subspecies are recognised in Europe, however this is not maintained in Australia.

19. MICROSERIS D. Don

Philos. Mag. Ann. Chem. 11: 388 (1832).

(Greek *mikros*, small; *seris*, chicory; referring to the tuberous roots, resembling small *Cichorium* roots.)

Prepared by David A. Cooke

Phyllopappus Walp., *Linnaea* 14: 507 (1840).

Perennial herb with fleshy tuberous roots; leaves all basal, erect, thin, flat. **Capitula** solitary on erect naked scapes, homogamous; involucre cylindric, 4- or 5-seriate; bracts imbricate, unequal, herbaceous with membranous margins; receptacle flat, naked, pitted; florets all bisexual, fertile, ligulate; ligules linear, yellow; corolla tube narrowly cylindric, pubescent above; anthers sagittate at the base, with small rounded apical appendages; style branches short, subterete, linear-oblong, obtuse, papillose. **Achenes** all similar, terete, ribbed; pappus uniseriate, of free scarious scales with acuminate apices produced into barbellate bristles.

13 species in western North America, 1 species each in South America (Chile & Peru), Australia and New Zealand.

1. **Microseris lanceolata** (Walp.) Sch.Bip., *Jahresber. Pollichia* 22–24: 310 (1866). — *Phyllopappus lanceolatus* Walp., *Linnaea* 14: 507 (1840); *M. scapigera* auct. non (Sol. ex Cunn.) Sch.Bip.: J.M.Black, *Fl. S. Austral.* ed. 2, 4: 938 (1957); *M. forsteri* Hook.f., *Bot. Antarct. Voy. II. (Fl. Nov.-Zel.)* 1: 151 (1852). — **Illustr.:** *Pl. W. N.S.W.* 713 (1982).

Herb 10–40 cm high, summer-deciduous; tubers several, tapering, 1–4 cm long; leaves in a basal cluster, linear-lanceolate to narrowly oblanceolate, narrowed at the base, acute, 4–30 cm long, 2–15 mm wide, entire to remotely toothed, glabrous, dark-green, with a prominent mid-vein. **Scapes** 10–40 cm long, unbranched, smooth, glabrous; capitula nodding until mature; involucre 16–24 mm long, glabrous; outer bracts 2- or 3-seriate, broadly lanceolate, appressed, 3–7 mm long; inner bracts in 2 equal series, more narrowly lanceolate, 16–24 mm long; ligules 1.5–2.5 cm long, patent or the outer ones deflexed, bright- to pale-yellow, often purplish on the reverse. **Achenes** narrowly cylindric to obconic, straight, 6–9 mm long, 10-ribbed, glabrous to minutely puberulent, brown; pappus scales 10–12, equal, 1.2–1.9 cm long, straw-coloured. **Yam daisy, native yam, murrnong. Pl. 8M, 9A–G.**

S.A.: GT, FR, EA, EP, NL, MU, YP, SL, KI, SE; W.A.; Qld; N.S.W.; Vic.; Tas. In mallee, swamps, woodland, coastal shrubland and other open vegetation. Flowers: Jul.–Oct.

Microseris can vary widely in abundance from one season to the next, possibly due to selective grazing by stock and the digging of tubers by rabbits. Australian and New Zealand populations of *Microseris lanceolata* and *M. scapigera* (Sol. ex Cunn.) Sch.Bip. were subject to several studies (e.g. Vijverberg *et al.* 1999, 2002). Despite this, a detailed taxonomic revision of the genus in Australasia is still needed. There are several entities present in south-eastern Australia, but these are at the moment not recognised by the *Australian Plant Census*. Only in Vic., three entities are accepted, and in W.A. the name *M. scapigera* is used for this taxon.

The tubers are very palatable and were an important food for indigenous people in south-eastern Australia.

20. PICRIS L.

Sp. Pl. 2: 792 (1753).

(From the Greek *picros*, bitter, in reference to the bitter taste of at least some members of this genus.)

Prepared by S. (Avi) Holzapfel

Annual to perennial, taprooted herbs, branched or rarely unbranched, stems and leaves hispid; indumentum with mainly 2-hooked or mainly 2-, 3- and 4-hooked anchor hairs; leaves simple, alternate, basal leaves in a rosette. **Capitula** terminal, in panicle or rarely only 1; involucre of 1–4 irregular outer and 2 inner rows, outer involucre

bracts more than 5, imbricate, upright to squarrose; receptacle naked, shallowly alveolate or smooth (not in Australia). **Achenes** homomorphic or heteromorphic (not in Australia), fusiform, cuspidate, usually of 5 segments, transversely ribbed, ribs scaly; pappus rays of central achenes plumose, creamy white, in 2 rows, joined to a ring at base or free (not in Australia), pappus rays of marginal achenes plumose or scabrous (not in Australia), or reduced (not in Australia).

A genus of 45–50 species from the Mediterranean region, Africa, central Europe, Asia, Australia and New Zealand; several species naturalised in Europe, North America and possibly elsewhere; 10 native species in Australia (3 in S.A.) of which 9 are endemic (2 of these occur in S.A.). Two further species known from 2 collections each but apparently not naturalised.

One species frequently cited as naturalised in Australia, *P. echioides* L., has been transferred to *Helminthotheca* Zinn (Lack 1974).

A specimen of *Picris* (now as *P. angustifolia* subsp. *carolorum-benricorum*) was among plants collected by J. Banks and D. Solander during their first landfall at Botany Bay in 1770. Despite this fact, the genus has often been treated as introduced to Australia.

P. hieracioides L. (hawkweed) and *P. altissima* Delile, the only non-native species of *Picris* in Australia, are each known from only 2 early collections and appear to have not successfully naturalised here. Most previous collections of native species of *Picris* in Australia (including Norfolk Island) and New Zealand have been incorrectly identified as *P. hieracioides*.

P. altissima has been collected in S.A. (between Flinders Range and Lake Torrens, Mrs. T.P. Richards, MEL). Apart from the characters of indumentum and pappus, *P. altissima* is distinguished from Australian species of *Picris* by its branches spreading at a wider angle (often 60° or more) and its marginal achenes being enfolded by the inner involucre bracts. A native of the Mediterranean Region, introduced in North America.

Reference: Lack (1974), Murray & Brown (1992), Holzapfel (1994).

1. Transition from upper peduncle bracts to outer involucre bracts abrupt, involucre bracts clearly separated and distinct from peduncle bracts, sometimes peduncle bracts absent, outer involucre bracts straight, appressed or slightly squarrose
2. Involucre of 2–3 irregular outer and 2 inner rows, outer bracts not as wide as inner bracts, longest outer bracts clearly shorter than inner bracts 1. **P. angustifolia** subsp. **angustifolia**
2. Involucre of 2–3 irregular outer and 2 inner rows, at least some outer bracts wider than inner bracts, longest outer bracts almost as long as inner bracts 2. **P. drummondii**
1. Transition from upper peduncle bracts to outer involucre bracts gradual, outer involucre bracts appear to descend onto peduncle, outer involucre bracts over entire length or at least at tip recurved, distinctively squarrose 3. **P. squarrosa**

1. **Picris angustifolia** DC. subsp. **angustifolia**, *Prodr.* 7: 130 (1838). — *P. asperrima* Lindl., *Edwards's Bot. Reg.* 24 (*Misc.*): 58 (1838). *P. hieracioides* auct. non L.: D.A.Cooke in Jessop & Toelken, *Fl. S. Austral.* 3: 1649 (1986); *P. hieracioides* L. var. *hieracioides* auct. non Benth.: Jessop, *List Vasc. Pl. S. Austral.* 21 (1983). — **Illustr.:** W.E.Blackall & J.B.Grieve, *How to know W. Austral. Wildfl.* 4: 858, no. 74 (1975); D.A.Cooke in Jessop & Toelken, *Fl. S. Austral.* 3: 1650, fig. 755B (1986); both as *P. hieracioides*; S.Holzapfel, *Willdenowia* 24: 135, fig. 6 (1994).

Herb, 7–140 cm high, branched or rarely unbranched; anchor hairs mainly 2-hooked; peduncles 1–20 cm long, peduncle bracts absent or present, clearly separate from involucre bracts. **Capitula** few to rarely > 30, sometimes 1, (9–) 11–15 (–16) mm long, (3–) 4–8 mm in diam., fruiting (11–) 13–18 mm long, (5–) 7–10 mm in diam.; involucre of (18–) 20–36 bracts in 2–3 outer and 2 inner rows, longest outer bracts clearly to slightly shorter than inner; outer bracts straight, appressed or slightly squarrose, narrowly lanceolate, narrowly oblanceolate, narrowly obovate or linear, (1.7–) 2.3–12 × 0.4–1.1 (–1.8) mm, not wider than inner bracts, hairless or with 1–3 lines of straight hairs 0.7–2.2 (–3.4) mm long along midrib. **Achenes** including cuspid (5–) 6.2–10.7 (–12.5) mm long; cuspid (1.2–) 2–6.8 (–7.4) mm, c. (1/5–) 1/3–1/2 of total achene length. **Pl. 9H–I, 10A–F.**

S.A.: GT, FR, EA, EP, YP, SL, KI, SE; N.S.W.; W.A.; Vic.; Tas. Also native in New Zealand. Coastal sand dunes, coastal and inland forest at lower altitudes (rarely above 500 m), on undisturbed and disturbed ground. Flowers: Oct.–Apr., some flowering outside this period in favorable conditions possible.

Variation in *P. angustifolia* between specimens from extreme ends of its distribution is considerable, in particular in

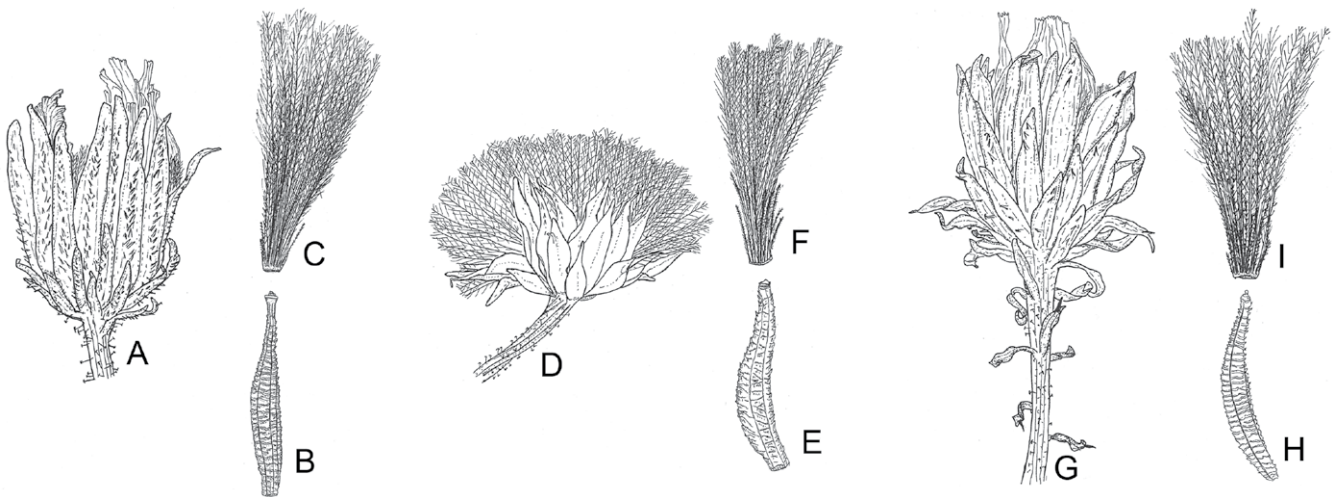


Fig. 2. A–C, *Picris angustifolia* subsp. *angustifolia*: A, flowering capitulum; B, achene; C, pappus. D–F, *Picris drummondii*: D, immature fruiting capitulum; E, achene; F, immature pappus. G–I, *Picris squarrosa*: G, flowering capitulum; H, achene; I, pappus. Illustrations by S. Holzapel, D–F from *Willdenowia* 24: 177, fig. 22A, D, E (1994).

the length of the achene and cuspid. Intermediate specimens indicate a cline rather than separate species. Three subspecies (*angustifolia*, *carolorum-benricorum* (Lack) S.Holzapel and *merxmulleri* Lack & S.Holzapel), of which only subsp. *angustifolia* occurs in S.A. Specimens from Yorke and Eyre Peninsula and Kangaroo Island are characterised by long-cuspidate achenes and overall rough indumentum; single-stemmed dwarf plants also occur in this region and in the bays of southern and south-western Tas., the latter breed true in cultivation in regards to their habit.

2. ***Picris drummondii*** S.Holzapel in Lack & S.Holzapel, *Willdenowia* 23: 187 (1993). — **Illustr.:** S.Holzapel, *Willdenowia* 24: 177, fig. 22 (1994).

Herb, 17–120 cm high, branched, rarely unbranched; anchor hairs mainly 2-hooked; peduncles 1–7 cm long, peduncle bracts 0–2, clearly separate from involucre bracts. **Capitula** 1 to > 30, flowering 8–14 mm long, 6–10 mm in diameter, fruiting 9–16 mm long, 6–15 mm in diam.; involucre of c. 22–42 bracts in 2–3 outer and 2 inner rows, at least some outer bracts wider than inner, longest outer bracts only slightly shorter than inner bracts; outer bracts straight, appressed, 4.0–15.0 × 1.5–3.0 mm, broadly lanceolate, lanceolate to broadly obovate-acute, hairless or midrib with single line of 0.5–0.8 mm long hairs. **Achenes** including cuspid 7.0–7.8 mm long, cuspid 1.1–2.6 mm, 1/3–1/5 of total achene length.

S.A.: LE, GT; W.A. On moist, loamy soil (W.A.) and rocky soil on creek beds, banks and hills, in brown silty-clay or skeletal soil (S.A.); habitat incompletely known. Flowers: c. Nov.–May (W.A.), Sep.–Oct. (S.A.), incompletely known.

Previously assumed restricted to W.A. and extinct, but more recent collections from Wimbrinna and Lake Torrens areas have been identified as *P. drummondii* during work for the current *Flora of South Australia*, indicating a wider distribution of the species with extant, and possibly under-collected, populations. Despite the disjunct distribution, specimens from S.A. are remarkably similar to those from W.A. in regards to involucre and achenes.

3. ***Picris squarrosa*** Steetz in Lehm., *Pl. Preiss.* 1: 488 (1844). — *P. hieracioides* var. *squarrosa* (Steetz) Benth., *Fl. Austral.* 3: 678 (1867). — **Illustr.:** Cunningham *et al.*, *Pl. W. N.S.W.* 717 (1981), as *P. hieracioides* var. *hieracioides*; S.Holzapel, *Willdenowia* 24: 191, 199, figs. 29, 31 (1994).

Herb, 20–120 cm, sparingly to densely branched; anchor hairs 2-hooked; peduncles 1–15 (–20) cm long, peduncle bracts few to many, transitioning gradually into outer involucre bracts. **Capitula** few to > 70, flowering 9–18 mm long, 5–9 mm in diam., fruiting (9–) 12–19 mm long, 6–10 mm in diameter; involucre of 35–50 bracts in 3–4 outer and 2 inner rows, longest outer bracts slightly, rarely clearly (1/2–1/4) shorter than inner bracts; outer bracts distinctively squarrose, recurved, linear to ovate or obovate, acute, (4.2–) 5–17.5 × 1.3–2.1 mm, not wider than inner bracts, margin hairless, rarely with few simple hairs, midrib hairless or with a single line of straight, 0.2–0.8 (–1.3) mm long hairs. **Achenes** including cuspid 5–8 mm long, cuspid 0.7–2.6 mm, c. 1/3–1/5 (–1/7) of total achene length. **Pl. 10G–K.**

S.A.: EP^{u50}, SL, MU, SE^{u50}; N.S.W.; W.A.; Vic. Coastal sand dunes, inland on riverbanks and alluvial river

flats, often in *Eucalyptus* woodland (*E. camaldulensis*, *E. largiflorens*). Naturally disturbed areas and tracksides, yet vulnerable to urbanisation. Mainly low altitudes (0–200m). Formerly also known from EP and SE, but no recent collections from there are known. Flowers: mainly Oct.–Mar., some flowering outside this period (Aug.–May) in favourable conditions.

Specimens from coastal S.A., W.A. and Vic. are usually strong, with a leafy stem, large capitula and wide involucre bracts, whereas those from the river banks and floodplains of interior S.A., N.S.W. and Vic. are more slender, with fewer stem leaves, smaller capitula and narrow involucre bracts. Intermediate forms occur at both habitat types.

21. REICHARDIA Roth

Bot. Abb. Beobacht. 35 (1787).

(named after J.J.Reichard, 1743–82, German physicist and botanist.)

Annual or perennial herbs, branching; hairs \pm lacking; leaves basal and cauline. **Inflorescences** solitary or cymose; capitula pedunculate; involucre bracts multiseriate, soft, not convex, infolded at maturity; florets: ligule predominantly yellow. **Achenes** homomorphic or inner ones abortive, not compressed, unbeaked; pappus of bristles, not persistent; bristles \pm smooth, uniform within a pappus.

A genus of 8 species from the Mediterranean region. Two species naturalised in Australia. These two species have outer and intermediate involucre bracts that are relatively broad, cordate-based, and with conspicuous hyaline margins.

1. ***Reichardia tingitana** (L.) Roth, *Bot. Abb. Beobacht.* 35 (1787) — *Scorzonera tingitana* L., *Sp. Pl.* 2: 791 (1753); *Picridium tingitanum* (L.) Desf., *Fl. Atlant.* 2: 220 (1799). *Reichardia picroides auct. non* (L.) Roth: J.M.Black, *Fl. S. Australia* ed. 2, 4: 944 (1957)

Annuals or biennials to c. 0.7 m high, branching, glabrous, often glaucous; leaves forming a rosette, to 17 cm long, with l:w ratio 3–5, divided or not; margin crowded-denticulate often minutely, also commonly remotely dentate, sometimes weakly spinulose; divided leaves with 2–5 slightly antrorse segments per side; cauline leaves few to several, becoming lanceolate upwards; base becoming cordate-auriculate upwards, somewhat stem-clasping. **Capitula** solitary or few; peduncle dilating distally; involucre 10–14 mm long, c. 7–10 mm diam.; outer bracts c. 8, broad-ovate, 5–7 mm long, with hyaline margin 1–2 mm wide, with a short black sub-apical spur; longer intermediate bracts extending over half way; inner bracts with hyaline margin distinct, but narrower than in outer bracts; florets: ligule 16–20 mm long, purple-red at base; style pubescence pale or slightly darkened. **Achenes** broad-obloid, 1.5–4 mm long, not tapering apically, sometimes squarish in transverse section, deeply verrucose or transversely ridged; inner ones pale, outer ones light or dark brown, glabrous; pappus c. 7–9 mm long, white, detaching as a unit; bristles fine, smooth. **False sow-thistle, reichardia. Pl. 11A–M.**

S.A.: *NU, *GT, *FR, *EA, *EP, *NL, *MU, *YP, *SL, *SE; *W.A.; *N.S.W.; *Vic. Native to the Mediterranean. Flowers: mostly late winter–early summer, also other times.

Readily recognised by its large capitula, long ligules, and overlapping, broad-margined outer bracts. A very common weed in south-eastern S.A.

22. SCORZONERA L.

Sp. Pl. 2: 790 (1753).

(possibly from the French *scorzon*, viper, alluding to its supposed value against snakebite, or from the Italian *scorza*, bark, skin, and *nera*, black, alluding to the black epidermis of the root of *S. hispanica*.)

Podospermum DC., *Fl. Franç.* ed. 3, 4: 61 (1805).

Annual, biennial or perennial herbs, branching or not; hairs simple, eglandular; leaves mostly basal. **Inflorescences** solitary, cymose or (not in Australia) paniculate; capitula pedunculate; involucre bracts multiseriate, soft and reflexed at maturity; florets: ligule yellow (in Australia), violet, or purple. **Achenes** homomorphic, hardly compressed, unbeaked; pappus of bristles, persistent, bristles plumose, uniform within a pappus.

A genus of c. 175 species from Europe, Asia and northern Africa; one species naturalised in Australia.

1. ***Scorzonera laciniata** L., *Sp. Pl.* 2: 791 (1753). — *Podospermum laciniatum* (L.) DC., *Fl. Franç.* ed. 3, 4: 62 (1805).

Biennials to c. 0.4 m high; indumentum appressed-woolly, glabrescent or nearly glabrous; basal leaves many, ± persistent, to c. 18 cm long, with l:w ratio 4–40 undivided or more commonly deeply pinnatisect; base weakly sheathing; margin entire; divided leaves with 1–several segments per side, with shape various; cauline leaves 1–several, similar to basal leaves but smaller, with base not clasping stem. **Capitula** solitary or few, 8–15 mm long, subsequently elongating to 12–35 mm long, c. 2–7 mm diam.; bracts glabrous or variably appressed woolly; outer bracts 4–8, 3–8 mm long, with or without subapical spur; intermediate bracts extending over halfway at anthesis; inner bracts alternately long with broad margin, short with narrow margin; florets: ligule 8–12 mm long; style pubescence pale. **Achenes** 8–15 mm long, glabrous, comprising two distinct portions; basal portion elliptic, c. 3–5 mm long, with pale prominent ribs, darker between ribs; apical portion narrower than basal portion, narrow obloid, c. 6–10 mm long, not tapered apically, pale purplish; pappus 8–20 mm long, cream. **Scorzonera**.

This species is included in Sect. *Podospermum* (DC.) Boiss. of *Scorzonera* based on its pinnatisect leaves and its achenes with a relatively large basal enlargement. A feature of this species is the massive taproot.

1. Segments of leaves or distal 4 cm of undivided leaves with l:w ratio mostly > 10; involucre 8–12 mm long at onset of anthesis, elongating to up to 27 mm long at maturity; outer bracts usually unspurred..... 1b. **Scorzonera laciniata** var. **laciniata**

1. Segments of leaves or distal 4 cm of undivided leaves with l:w ratio mostly < 10; involucre 10–15 mm long at onset of anthesis, elongating to up to 35 mm long at maturity; outer bracts with a subapical spur 1a. **Scorzonera laciniata** var. **calcitrapifolia**

- 1a. ***Scorzonera laciniata** var. **calcitrapifolia** (Vahl) Bisch. ex Boiss., *Fl. Orient.* 3: 757 (1875). — *S. calcitrapifolia* Vahl, *Symb. Bot.* 2: 87 (1791). *S. resedifolia* L., *Sp. Pl.* 2: 1198 (1753); *Podospermum resedifolium* (L.) DC., *Fl. Franç.* ed. 3, 4: 61 (1805).

Rachis of leaves commonly at least twice as broad in distal quarter as it is midleaf, 2–15 mm wide; lateral segments with a l:w ratio < 10. **Involucre** 10–15 mm long at onset of anthesis, elongating to up to 35 mm long at maturity; bracts glabrous or sparsely to densely appressed-woolly at anthesis, with outer and usually intermediate involucre bracts bearing a subapical spur to c. 2 mm long. **Achenes** 10–15 mm long; pappus c. 12–20 mm long.

S.A.: *SE; *N.S.W.; *Vic. Native to Europe and Asia. Flowers: spring–summer.

Distinguished from the typical variety by its broader leaf segments, longer capitula and fruit, and the presence of a subapical spur on its involucre bracts.

- 1b. ***Scorzonera laciniata** L. var. **laciniata**

Rachis of leaf less than twice as broad in distal quarter as it is midleaf, 1–4 mm wide; lateral segments with l:w ratio mostly > 10. **Involucre** 8–12 mm long at onset of anthesis, elongating to up to 27 mm long at maturity; bracts glabrous or sparsely appressed-woolly at anthesis, unspurred or spur to 0.8 mm long. **Achenes** 8–12 mm long; pappus c. 8–14 mm long.

S.A.: *FR, *NL, *MU, *YP, *SL, *SE; *Vic.; *Tas. Native to Europe and western Asia. Flowers: spring–summer.

23. SONCHUS L.

Sp. Pl. 2: 793 (1753).

(From the Greek *sonchos*, a classical name for *S. asper* and *S. oleraceus*.)

Annual, biennial or perennial herbs, branching, sometimes glaucous; hairs simple, glandular and eglandular; leaves basal and cauline. **Inflorescences** cymose; capitula pedunculate; involucre bracts multiseriate, not hardening, reflexed at maturity; florets: ligules yellow (in Australia). **Achenes** homomorphic, moderately to strongly compressed, unbeaked; pappus of bristles, partially persistent; bristles nearly smooth or scabridulous, of two types within a pappus. **Sow-thistles**.

A genus of c. 55 species mainly from Africa, but virtually cosmopolitan; one native and two introduced species in Australia.

Actites megalocarpus is very similar to species of *Sonchus* in Australia, but it is rhizomatous and its achenes are substantially larger and more attenuate distally.

Species in Australia have succulent hollow stems and are nearly glabrous or they develop distinctive spreading gland-tipped hairs on upper stems, branches, peduncles and the involucre. A fine caducous wool is sometimes also present on the receptacle. Denticulations and teeth on leaf margins are spine-tipped and sometimes prickly. The multiseriate involucre comprises 25–45 bracts in several gradational series with the longer intermediate bracts almost as long as the inner bracts. Before and at the onset of anthesis the involucre is cylindrical, but it soon becomes markedly conical as the receptacle expands and achenes enlarge proximally and the involucre closes on the withered corollas distally. Pappus bristles in Australian species are white and of two types within a pappus, comprising an inner series of several caducous scabridulous bristles and an outer series of numerous persistent downy hair-like bristles.

1. Leaf-margin with few to numerous denticulations or teeth with spiny tips to c. 1 mm long, or margin entire, generally not prickly; auricles commonly sagittate, sometimes downcurved but not arched back towards apex; achenes \pm oblanceolate, 0.5–1 mm wide, with l:w ratio $>$ 3, weakly to strongly transversely wrinkled..... 3. **S. oleraceus**
- 1: Leaf-margin with numerous denticulations or teeth with spiny tips to c. 5 mm long, prickly or not; auricles rounded, downcurved and arched back toward apex; achenes elliptic or slightly obovate, 0.8–2.0 mm wide, with l:w ratio $<$ 3, without transverse wrinkles
 2. Mid-stem leaves with l:w ratio 1.5–5 (–8); achenes \pm elliptic 2.0–3.2 mm long, central ones orange-brown and marginal ones pale yellow 1. **S. asper** subsp. **asper**
 - 2: Mid-stem leaves with l:w ratio 3–10; achenes oblong-elliptic, 2.8–4.2 mm long, usually all mid to dark chocolate-brown..... 2. **S. hydrophilus**

1. ***Sonchus asper** (L.) Hill subsp. **asper**, *Brit. Herb.* 1: 47 (1769). — *S. oleraceus* var. *asper* L., *Sp. Pl.* 2: 794 (1753). *S. asper* subsp. *glaucescens* auct. non (Jord.) Ball: D.A.Cooke in Jessop & Toelken, *Fl. S. Australia* 3: 1654, partly.

Annuals to c. 1.2 (–2) m high, with rosette variously developed; leaves to c. 30 cm long, with l:w ratio 1–5 (–8), divided or not, thin to coriaceous, sometimes semi-rigid at margin; base above mid-stem strongly stem-clasping, with auricles rounded basally, strongly downturned and arching back toward apex; margin with frequent denticulations or teeth, with spiny tips 0.5–5 mm long, somewhat prickly or not; divided leaves lobate to subpinnatisect, with up to 8 usually spreading or slightly retrorse lobes or segments per side; terminal segment usually not or hardly larger than lateral segments; uppermost leaves mostly ovate–narrow-ovate. **Capitula** few to many; involucre 8–13 mm long, 3–8 mm diam.; outer and intermediate bracts ovate–lanceolate; florets: ligule 4–5 mm long, shorter than tube; style pubescence dark. **Achenes** elliptic or slightly obovate, 2.0–3.2 \times 0.8–1.8 mm, strongly compressed, distinctly winged, without transverse wrinkles; central achenes orange-brown and marginal ones pale yellow; margin usually minutely scabridulous; pappus 7–9 mm long. **Prickly sow-thistle. Pl. 12A.**

S.A.: *FR, *EA, *EP, *NL, *MU, *YP, *SL, *KI, *SE; *W.A.; *Qld; *N.S.W.; *Vic.; *Tas. Native to Africa, Europe and Asia. Widely naturalised. Flowers: spring–autumn.

Sonchus asper subsp. *asper* is highly variable in leaf dissection, prickliness and degree of rosette development, with almost a continuum of variation evident in these characters. For convenience, three forms could be recognised: a robust form with a well-developed rosette, stout stems, and particularly prickly, coriaceous leaves; a form with little or no rosette development and thin, undivided or shallowly divided, non-prickly leaves; and an intermediate form.

2. **Sonchus hydrophilus** Boulos in Hj.Eichler, *Suppl. Black's Fl. S. Austral.* 331 (1965). — *S. asper* var. *gracilis* auct. non Albert: Cleland, *S. Austral. Naturalist* 23: 13 (1946).

Annuals or possibly biennials to c. 1.8 m high, with rosette well-developed; leaves to c. 40 cm long; stem leaves with l:w ratio c. 3–10, undivided or lobate to deeply lobate, thin to mildly coriaceous; base above mid-stem strongly stem-clasping, with auricles rounded basally, strongly downturned and arching back toward apex; margin usually with frequent denticulations with spiny tips 1–3 mm long, not or slightly prickly; lobate leaves with up to 6 spreading to retrorse lobes per side; uppermost leaves \pm lanceolate. **Capitula** several to many; involucre 8–12 mm long, c. 4–9 mm diam.; outer and intermediate bracts narrow-ovate or more often lanceolate; florets: ligule c. 5–7 mm long, shorter than tube; style pubescence dark. **Achenes** elliptic or oblong-elliptic, 2.8–4.2 \times 1.3–2.0 mm, strongly compressed, distinctly winged, without transverse wrinkles, generally all mid to dark chocolate-brown; margin smooth or minutely scabridulous; pappus 7–9 mm long. **Native sow-thistle.**

S.A.: NW, LE, FR, EP, NL, MU, YP, SL, KI, SE; W.A.; Qld; N.S.W.; Vic.; Tas. Also native to New Zealand and New Guinea. Flowers: spring–autumn.

Similar to *Sonchus asper* in leaf and achene morphology. It can be usually distinguished from this taxon by the leaves which generally have a higher length to width ratio, and by the achenes which are larger, usually all chocolate brown, with broader wings and shorter asperities on ribs and margins. *Sonchus hydrophilus* is also similar to the coastal species *Actites megalocarpus* in leaf and achene morphology, but the latter is rhizomatous, its capitula and achenes are longer, and the achenes usually paler and more tapered distally.

3. ***Sonchus oleraceus** L., *Sp. Pl.* 2: 794 (1753). — *S. tenerrimus* auct. non L.: D.A.Cooke in Jessop & Toelken (eds), *Fl. S. Austral.* 3: 1653 (1986), partly.

Annuals or biennials to c. 1.8 m high, with rosette variously developed; leaves to c. 25 cm long, with l:w ratio commonly c. 2–10, divided or not, thin or slightly coriaceous, always ± pliant along margin; base above mid-stem strongly stem-clasping with auricles usually sagittate, sometimes slightly to strongly downturned, but not arching back toward apex; margin variably denticulate, with spiny tips 0.5–1 mm long, generally not prickly, or margin entire; divided leaves pinnatisect, occasionally almost bipinnatisect, with up to 5 spreading to retrorse primary lateral segments per side; terminal segment often much larger than lateral segments; uppermost leaves variously shaped. **Capitula** mostly several; involucre 8–13 mm long, 3–6 mm diam.; outer and intermediate bracts ovate–lanceolate; florets: ligule 5–8 mm long, ± equal to tube; style pubescence dark. **Achenes** oblanceolate, 2.2–3.2 × 0.5–1 mm, moderately compressed, not obviously winged, transversely wrinkled; central achenes reddish-brown and marginal ones pale yellow; margin minutely scabridulous; pappus 5–8 mm long. **Common sow thistle. Pl. 12B.**

S.A.: *NW, *LE, *NU, *GT, *FR, *EA, *EP, *NL, *MU, *YP, *SL, *KI, *SE; *W.A.; *N.T.; *Qld; *N.S.W.; *Vic.; *Tas. Native to Europe, northern Africa, and Asia. Widely naturalised. Flowers: spring–autumn.

This species is extremely variable in leaf shape and its shape may resemble that of *S. asper*. However, unlike in *S. asper*, the auricles are not arched back towards the apex of the leaf and are commonly sagittate rather than rounded, and the uppermost leaves sometimes have an entire or nearly entire margin. Some forms of *Sonchus asper* have prickly leaves, whereas *S. oleraceus* is generally not prickly. Forms with lateral leaf-segments somewhat constricted proximally, or with linear segments, have in recent state floras been erroneously identified as *S. tenerrimus* L. Compared to *S. oleraceus*, *S. tenerrimus* is a more delicate plant. Its leaves become abruptly petiole-like distal to the amplexicaul base and the lateral segments of the leaves are more numerous and more strongly constricted proximally. The ligules of *S. tenerrimus* are markedly longer than the corolla-tube, and the receptacle has a more persistent wool. *Sonchus oleraceus* commonly occurs with *S. asper* and is likely to hybridise with it.

24. TARAXACUM F.H.Wigg.

Prim. Fl. Holsat.: 56 (1780), *nom. cons.*

(from the latinized form of the Persian *tarkhabshqun* for plants of the genus.)

Prepared by Neville Scarlett

Leontodon L., *Sp. Pl.* 2: 798 (1753), partly; *Dioszegia* Heuff. *Z. Natur.-Heilk. Ungarn* 5: 177 (1854).

Taprooted perennial herbs; leaves basal, rosetted, usually lobed, glabrous, bristly or arachnoid hairy. **Capitula** homogamous, ligulate, solitary or rarely a few on scapes; involucre oblong–campanulate; involucre bracts in several series, outer series recurved, spreading or appressed to the longer, erect inner series, sometimes with a terminal or subterminal callus; receptacle naked; florets yellow, rarely white; ligules often with coloured stripes externally. **Cypselas** oblong, terete to subterete, ribbed, variously coloured, usually spinulose or muricate above, narrowed into a conical or cylindrical cone that subtends a slender beak (rarely the beak is absent); pappus bristles in several series, finely scabrous, persistent. **Dandelion.**

A genus of c. 2500 species in c. 52 sections, predominantly Eurasian, but also native in North Africa, the Americas and Australasia, solely an introduced genus in South Africa. Present in all Australian States and Territories, including the southern N.T. (Alice Springs).

World-wide, the majority of described species are polyploid (mainly triploid: $3n = 24$), with an obligately agamosperous, diplosporous parthenogenetic breeding system; the remaining c. 10% are sexual diploids ($2n = 16$), including the species of the Australasian native sect. *Australasica* (see Hughes & Richards 1989). All recorded chromosome counts of introduced species in Australia up to the present time are triploid (P. Ellis *in sched.*, AD collections).

Four sections are certainly present in South Australia, including the native sect. *Australasica*, which also occurs in New Zealand. The closely related sect. *Antarctica* is confined to southern South America (Uhlemann *et al.* 2004).

The introduced species in S.A. belong to 3 Eurasian sections and two informal species groups of uncertain sectional affinities. Following Bentham (1866), Australian authors, including J.M Black in the *Flora of South Australia* (1929), assigned all *Taraxacum* species to *T. officinale* and its synonyms (see Kirschner & Štěpánek 1987) until the recognition by Willis (1973) of the native *T. aristum* Markl. Cooke (1986) recognised both *T. officinale* and *T. erythrosperma* in S.A., the latter name being used in a broad sense to refer to sect. *Erythrosperma*. In the present treatment only sections *Antarctica* and *Erythrosperma*, and *Taraxacum* species group B are resolved to the species level, as the species of the other sections and *Taraxacum* species group A are poorly known as yet. Thus in South Australia and more generally for Australia as whole, the sections must be used as “one of the basic categories in the taxonomic hierarchy” as was recommended for *Taraxacum* in China by Ge *et al.* (2011).

Taraxacum bracteatum Dahlst. of sect. *Celtica* A.J.Richards is represented by two old specimens in AD. As no recent collections for S.A. are known, this species has been omitted from the present treatment.

Poorly dried, blackened *Taraxacum* collections are rarely identifiable. Capitula in bud and flower, mature cypselas and a representative sample of well-pressed leaves are all essential. Notes on colour and bract posture from living material and capitula preserved in alcohol are extremely useful. Richards (1972) gives further detail.

The following points should be borne in mind when using the key and descriptions:

Cypselas. Cypselas measurements and descriptions are based on mature fruit (almost-ripe capitula can be ripened indoors with the scape-base in water). Cypselas lengths include the ‘cone’, the distal part that tapers to a very slender beak. The cone shape traditionally termed ‘cylindrical’ is actually elongate-conical, with some degree of tapering. All *Taraxacum* cypselas are longitudinally ribbed; where a part of the cypselas surface is described as ‘smooth’ this refers to the absence of spines or warts on these ribs, it does not mean that the ribs are absent.

Capitula. Diameter measurements include the marginal ligules.

Leaves. Leaf descriptions refer only to the mature leaves of flowering material, leaves collected at other times are often different in shape and degree of dissection also vary between lateral lobes, terminal lobes and interlobes.

Involucral bracts. Care must be taken to distinguish the outermost and shortest 1–2 series from the slightly longer intermediate series and the longest innermost series. Bract borders are rarely uniform in width; measurements refer to the border at the widest part of the bract. The calli may be obscured in withered dry bracts and these should be soaked out in water. The posture of bracts is best observed in live or preserved flowering capitula. Bracts of seeding capitula often have a different posture.

Phenotypic plasticity. Populations in extremely dry, extremely fertile or very shaded sites may have dimensions outside those noted for species or sections. Leaf morphology may also be aberrant. It is worthy of note that as a general rule the leaves of late winter to mid spring flowering plants are more simply dissected than those of later flowering plants (‘summer forms’). When this contrast is extreme, it is noted in the descriptions below.

The genus is of minor economic importance; various species are cultivated as a source of food, substitute coffee and herbal medicine as ‘*Taraxacum officinale*’. *Taraxacum kok-saghyz* L.E.Rodin, a source of latex for rubber production, was grown experimentally in W.A. and Tas. during the 1940s.

Reference: Galán (2011), Ge *et al.* (2011), Scarlett (1999), Uhlemann *et al.* (2005).

1. Outermost involucral bracts completely appressed to the next series, always with a clear white border, c. 0.3–0.5 mm wide; ligules scarcely exceeding the involucre I. **Taraxacum sect. Australasica**
- 1: Outermost involucral bracts not completely appressed to the next series, at least the upper part patent to reflexed, variously bordered; ligules mainly far exceeding the involucre
 2. Cypselas pale red to dark brown, cone cylindrical > 0.5 mm long II. **Taraxacum sect. Erythrosperma**
 - 2: Cypselas olive-green, grey or pale brown, cone various
 3. Outermost involucral bracts unbordered or with a narrow white border < 0.5 mm wide, lanceolate, erect to reflexed, with or without a callus
 4. Petioles and midribs clearly striate on the upper surface (i.e. with interwoven purple and green strands visible with a ×5 lens); involucral bracts without a callus III. **Taraxacum sect. Hamata**
 - 4: Petioles and midribs green or uniformly purple on the upper surface, not striate; involucral bracts with or without a callus

- 5. Cypsela cone < 0.7 mm long
 - 6. Cypsela cone tapering abruptly to the beak (conical to subconical); outer involucre bracts without a callus VI. **Taraxacum sect. Taraxacum**
 - 6. Cypsela cone tapering gradually to the beak (cylindrical); outer involucre bracts with a callus
 - 5: Cypsela cone > 0.7 mm long IV. **Taraxacum species group 1**
- 3: Outermost involucre bracts with a white border > 0.5 mm wide, cordate to ovate-lanceolate, patent to recurved, usually with a callus V. **Taraxacum species group 2**

I. **TARAXACUM sect. Australasica** Kirschner, Scarlett & Štěpánek

in Uhlemann, Kirschner & Štěpánek, *Folia Geobot.* 39: 204 (2004).

T. sect. Antarctica Hand.-Mazz., *Monogr. Taraxacum* XI (1907), partly.

Rosetted herb; leaves oblong to linear-lanceolate, c. 4–16 (–26) cm long, glabrescent; lobes short, deltoid to falcate, distal margins denticulate to lobulate; petioles and midribs green or uniformly purple on the upper surface. **Capitula** on scapes; outermost involucre bracts ovate to lanceolate, completely appressed to the next series, borders white, > 0.5 mm wide, variously coloured but not glaucous, the tips thickened but without a callus; marginal ligules scarcely exceeding the involucre, pollen present, stigmas yellow. **Cypselas** straw-coloured, red or purplish black, cone cylindrical, beak equal to or up to 3 times the length of the rest of the cypsela, pappus yellowish white

A section of 3 described species native to New Zealand and southern Australia. 2 species occur in Australia.

1. **Taraxacum cygnorum** Hand.-Mazz., *Monogr. Taraxacum* 55 (1907). — *T. dens-leonis auct. non* (Desv.) Poir.: Benth., *Fl. Austral.* 3: 680 (1867), partly, as to *Drummond 367* and *Anon. s.n.*, ‘in the plains of the Avon’ (MEL); *T. officinale auct. non* F.H.Wigg. *s.str.*: D.A.Cooke in Jessop & Toelken, *Fl. S. Austral.* 3: 1656 (1986), partly. — **Illustr.:** Hand.-Mazz., *Monogr. Taraxacum* t. 2 (1907); *Fl. Victoria* 4: 692, fig. 132a (1999).

Rosetted herb; leaves oblong to linear-lanceolate, c. 4–12 cm × 0.8–2 mm, green, glabrescent; often more or less entire, in dissected leaves the lateral lobes in 4–7 pairs, short, obtusely to acutely deltoid to hamate-attenuate, sometimes pointing forward, distal margins of the upper 2 or 3 lobes denticulate to lobulate, proximal margins entire; terminal lobe relatively short, entire to trilobulate, sometimes with marginal teeth; petiole usually pale green, very narrowly winged; midrib pale green to purple. **Capitula** 15–20 mm long, on scapes 3–5 cm long at flowering, 6–10 cm long at maturity, white-woolly in bud, glabrous at flowering except under the capitulum, green; outer involucre bracts ovate to ovate-lanceolate, 3–6 × 1–2.5 mm, appressed to the next series, white-bordered, c. 0.3–0.5 mm wide, the margins fimbriate, tip apiculate with a small, dark, smooth thickening; innermost bracts linear, 11–16 (–19) × c. 1.5 mm, tips not thickened; outer ligules pale lemon-yellow, involute, subequal to the involucre; anthers with pollen; stigmas yellow. **Cypselas** dark red to blackish-purple, narrow-fusiform, (4–) 4.5–6 mm × c. 1 mm, the apex with ± flat, straight scale-like spines, 0.2 mm long, the lower part verrucate to the base; cone cylindrical, 1.2–2 mm long; beak (3–) 4–6 (–7) mm long, subequal to the rest of the cypsela; pappus 5–6 mm long. **Coast dandelion. Fig. 3A–D, Pl. 12C–G.**

S.A.: EP, SE; W.A.; N.S.W.; Vic.; Tas. The species grows in woodland and scrub on coastal limestone in the only currently known localities in Vic. and S.A. Known only from 19th century collections in W.A. (including the type), N.S.W. and Tas. The historic N.S.W. collections, except for that from the Jenolan Caves, are rather fragmentary and their assignment to *T. cygnorum* is thus rather uncertain. Modern collections are needed for verification. Flowers: Sep.–Mar.

Distinguished from *T. aristum* by the cypsela shape and sculpturing and the proportionately short beak. The type description gives a cypsela length of 7 mm, but no material I have seen has cypselas of this length, including the surviving type material in K & W.

(Recognised as Vulnerable in Australia under the *Environment Protection and Biodiversity Conservation Act* 1999.)

II. **TARAXACUM** sect. **Erythrosperma** (H.Lindb.) Dahlst.

Acta Fl. Sueciae 1: 36 (1921).

T. subsect. *Erythrosperma* (Dahlst.) Schischk., *Fl. S.S.S.R.* 29: 497–498 (1964), partly. *T. officinale* auct. non F.H.Wigg. s.str.: J.M.Black, *Fl. S. Austral.* 4: 660 (1929) partly; *T. erythrospermum* auct. non Andr. ex Besser s.str.: D.A.Cooke in Jessop & Toelken, *Fl. S. Austral.* 3: 1656 (1986).

Rosetted herb; leaves lanceolate to oblanceolate, glabrous to sparsely arachnoid hairy; lobation diverse and sometimes complex with the lobes further divided; petioles and midribs green or uniformly purple on the upper surface. **Capitula** c. 2.5–4 cm diam.; outermost involucre bracts ovate to lanceolate, erect, patent to recurved, never completely appressed to the next series (in Australia), white-bordered, < 0.5 mm wide, green or glaucous-green, the tips normally with calli; marginal ligules usually far exceeding the involucre; pollen present (rarely absent). **Cypselas** 2.5–5 mm long, pale red to red-brown, greyish-red or deep brown, rarely pale ochre, spinulose above, verrucate to smooth below, cone cylindrical, 0.5–c. 2 mm long, beak (5–) 7–12 mm long, pappus white to yellowish white.

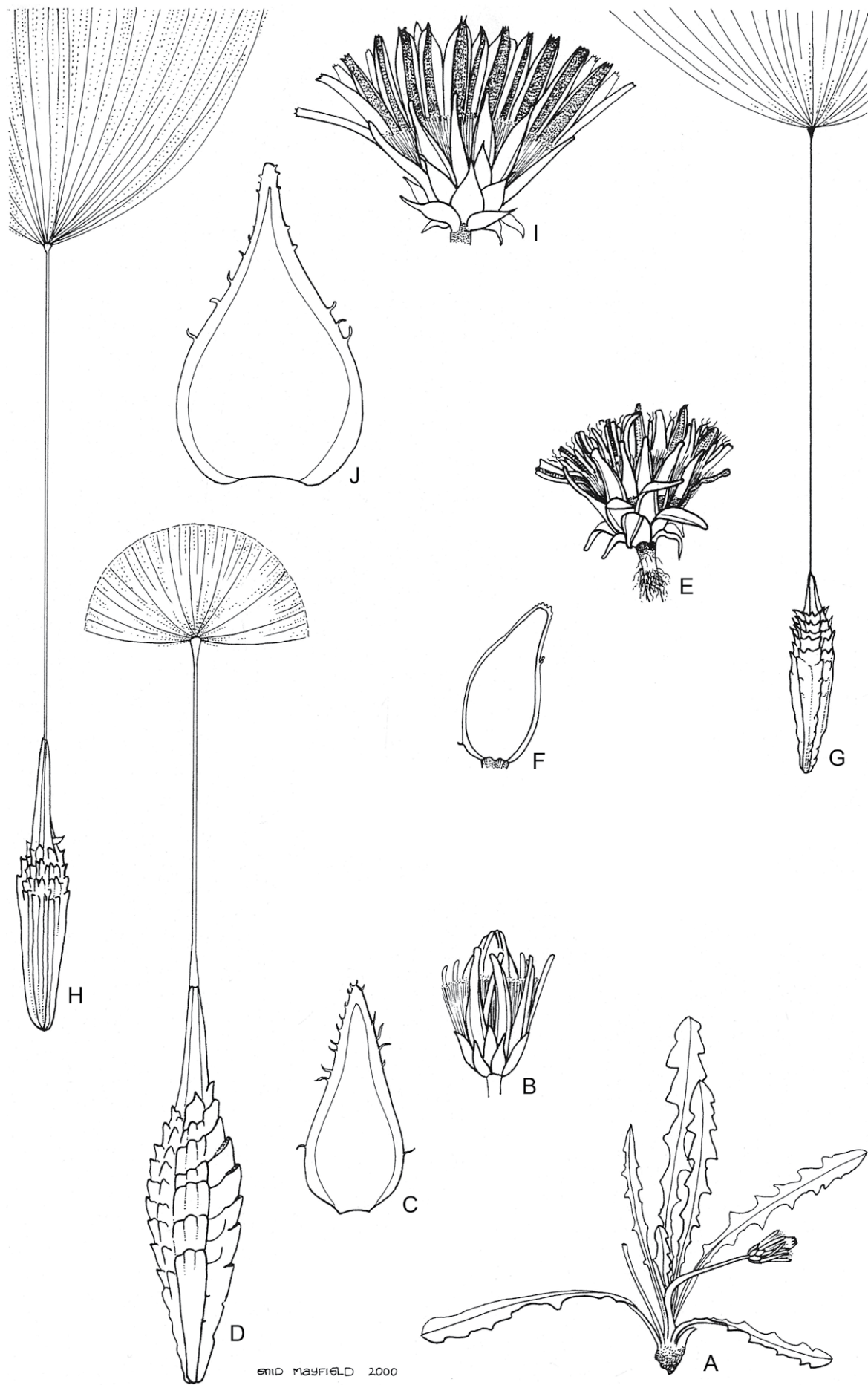
A section of c. 100 species native to Eurasia and North Africa, naturalised in the Americas, South Africa, Australia and N.Z. Species of the section occur from southern Qld to S.A. and Tas. The most widespread species in sect. *Erythrosperma*, *T. hepaticolor*, *T. gracilens* and *T. multidentatum*, tend to grow on alkaline loams in both natural communities and weedy urban areas.

T. retzii Soest, formally placed in sect. *Erythrosperma* has some of the characters of sect. *Scariosa* Hand.-Mazz. and is thus treated separately here. *T.* sect. *Erythrocarpa* Hand.-Mazz. intergrades with *T.* sect. *Erythrosperma*; *T. multidentatum*, included in the latter section by van Soest, may be better classed in *T.* sect. *Erythrocarpa*, as is discussed below.

1. Leaves dissected to at least half of the distance from margin to midrib
2. Cypselas dark red-brown with relatively long (± 0.4 mm) spreading (± 45 degrees) to recurved spines at the apex 2. **Taraxacum gracilens**
- 2: Cypselas salmon-pink to red-brown with relatively short (< 0.4 mm) upright (< 45 degrees) spines at the apex
3. Cypselas broadly fusiform, the body tapering abruptly into the cone..... 3. **Taraxacum hepaticolor**
- 3: Cypselas narrowly fusiform, the body tapering gradually into the cone
4. Cypselas red-brown, cone 0.8–1 mm long, apical spines 0.2–0.3 mm long, lower 2/3 verrucate, rarely smooth. Upper lateral leaf-lobes triangular to falcate, acute but never caudate, the distal margins entire to denticulate, sometimes with 1–2 larger teeth..... 3. **Taraxacum hepaticolor**
- 4: Cypselas salmon-pink to red-brown, cone 1.2–1.5 mm long, apical spines < 0.2 mm long, lower 2/3 usually smooth, sometimes verruculate. Upper lateral leaf-lobes deltoid to deltoid-caudate, the tails often with expanded ends, distal margins usually dentate to lacinate 4. **Taraxacum multidentatum**
- 1: Leaves entire or dissected to less than half of the distance from the margin to the midrib; juvenile flowering plants 3. **Taraxacum hepaticolor**

2. ***Taraxacum gracilens** Dahlst, *Acta Horti Berg.* 9: 30 (1926). — **Illustr.:** H.Dahlstedt, *Acta Horti Berg.* 31, fig. 14; t. 1, 47–49 (1926).

Rosetted herb; leaves lanceolate, 10–15 cm \times 25–50 mm, grey-green to yellowish green, sparsely arachnoid; lateral lobes in 3–4 pairs, deltoid often with \pm linear attenuate tips, distal margins of the upper 2–3 usually lacinate often with 1–2 longer, \pm parallel lobules, proximal margins entire; terminal lobe hastate, sometimes dentate to lacinate; petioles rose-purple, wings absent; midrib similarly coloured, at least at the base. **Capitula** c. 4.5 cm diam., on scapes 4–7 cm long at flowering, 11–20 cm long at maturity, white woolly in bud, becoming glabrous at maturity except under the capitulum, wine-red, usually \pm entirely; outer bracts ovate-lanceolate to lanceolate, 7–9 mm \times 2–3 mm, patent to reflexed, white borders wide (0.25–0.5 mm), the margins sparsely ciliolate, tips callose; innermost bracts linear, c. 15 \times 1–1.5 mm, tips callose; outer ligules flat, exceeding the involucre by c. 10 mm; anthers with pollen; stigmas dull green. **Cypselas** dark red-brown, narrow fusiform, 3.8–4.25 \times 0.5–0.7 mm, the apex with slender spines, ± 0.4 mm long, spreading (± 45 degrees) and tending to be reflexed, the lower 2/3 muricate to the base; cone cylindrical, 1–1.3 mm long; beak 8–10 mm long; pappus 5–7 mm long. **Fig. 3E–G.**



ENID MAYFIELD 2000

Fig. 3. A–D, *Taraxacum* sect. *Australasica* (*T. cygnorum*): A, habit; B, capitulum; C, bract; D, cypsela. E–G, *T. sect. Erythrosperma* (*T. gracilens*): E, capitulum; F, bract; G, cypsela. H, *T. species group 1* (*T. khatoonae*), cypsela. I–J, *T. species group 2* (*T. squamulosum*, not in S.A.): I, capitulum; J, bract. Illustration by Enid Mayfield for Flora of Australia, reproduced with permission from ABRIS.

S.A.: *MU, *SE; *N.S.W.; *Vic. A species native to southern Europe. In Australia it is found mainly in the Mildura-Loxton area of Vic. and S.A., with an apparently isolated occurrence in the Scone district of N.S.W. Grows in disturbed grassy open forest, riverine woodland, farmland and urban areas, usually on clay soils. Flowers: Aug.–Nov.

T. gracilens can resemble *T. multidentatum* vegetatively, but the different colour and sculpturing of the cypselas separates the two species.

3. ***Taraxacum hepaticolor** Soest, *Proc. Kon. Ned. Akad. Wetensch. C* 69: 380 (1966). — *T. disseminatum* auct. non G.E.Haglund: D.A.Cooke in Jessop & Toelken, *Fl S. Austral.* 3: 1656 (1986), partly.

Rosetted herb; leaves lanceolate to oblanceolate, (4–) 6–12 (–18) × 1–4 cm, greyish to yellowish green, glabrescent; upper lateral lobes in 5–6 pairs, triangular to falcate, distal margins entire or with 1–2 patent teeth, the proximal margins and adjacent interlobes entire or rarely with one small tooth; terminal lobe relatively short, triangular to trilobulate; petiole rose-purple, wings very narrow to absent; midrib usually rose-purple over c. 3/4 of the leaf. **Capitula** 25–35 mm diam., on scapes (1–) 6–12 (–18) cm long at flowering, 8–25 cm long at maturity, white-woolly in bud, glabrescent at flowering except under the flower, usually entirely rose-purple, outer bracts broad-lanceolate to lanceolate, 7–9 × 2–3 mm, recurved, white borders very narrow, c. 0.1 mm wide, margins not ciliolate, tips variably callose; innermost bracts linear, c. 15 × c. 2 mm, tips rarely with a callus; outer ligules often involute, exceeding the involucre by 2–4 (–6) mm; anthers with pollen; stigmas greenish yellow. **Cypselas** red-brown, fusiform, 4–5 × 0.8–1.0 mm, the apex with short, flat spines, 0.2–0.3 mm long, straight, rarely recurved, the lower 2/3 verrucate, rarely smooth; cone cylindrical, 0.8–1 mm long; beak 8–9 mm long; pappus 6–7 mm long.

S.A.: *SL, *MU, *SE; *N.T.; *N.S.W.; *Vic. Iran; ?Turkey; ?Greece (see *T. buttleri*, below). A species described from Iran. It occurs in southern N.T., eastern S.A., south-western N.S.W. and Vic., growing in a wide range of semi-natural vegetation and also in urban habitats in relatively dry areas. Flowers: mainly Sep.–Mar.

T. buttleri Soest, described from Turkey and also widespread in Greece is very likely to prove to be synonymous with *T. hepaticolor*. *Taraxacum hepaticolor* in “summer form” can be confused with *T. multidentatum*, as is discussed under the latter species.

4. ***Taraxacum multidentatum** Soest, *Proc. Kon. Ned. Akad. Wetensch. C* 69: 444 (1996). — **Illustr.:** Soest, *Proc. Kon. Ned. Akad. Wetensch. C* 69: 445, fig. 7 (1996).

Rosetted herb; leaves lanceolate, 9–30 cm × 20–90 mm, green, hairy to glabrous; lateral lobes in 5–8 pairs, markedly dimorphic, in early flowering plants broadly deltoid with finely denticulate distal margins and entire proximal margins, in later flowering plants deltoid-caudate, the tail often long and expanded at the tip; distal margins of the upper 2–3 lobes ± lacinate with 1–2 longer ± parallel lobules, proximal margins entire or with one acute lobule; terminal lobe acute, hastate to trilobulate; petiole relatively short, rose-purple, wing narrow to absent; midrib rose-purple, at least at the base. **Capitula** 3–3.5 mm diam., on scapes 6–10 cm long at flowering, 15–25 (–30) cm long at maturity, white-woolly in bud, becoming glabrous at maturity except under the capitulum, completely wine-red, outer bracts broad-lanceolate to lanceolate, 8–10 × 2–4 mm, patent to recurved, white borders c. 0.25 mm wide, tips with a large callus c. 1.5 mm high; innermost bracts linear, 16–17 × 1–3 mm, tips usually with a large callus to 1 mm high. Outer ligules flat, exceeding the involucre by 3–5 mm; anthers usually with pollen; stigmas greenish yellow. **Cypselas** of very variable colour, from very pale brown (ochraceous) through salmon-pink to dark red-brown, narrow fusiform, 4–5 × 0.75–1.25 mm, the apex with flattened, straight spines, < 0.2 mm long, the lower 2/3 verrucate to smooth; cone cylindrical, 1.2–1.5 mm long; beak 8–10 mm long; pappus 5–7 mm long.

S.A.: *SL, *SE; *N.S.W.; *Vic. Europe. Described from France, the species also occurs in Italy (Petit 1988) and Spain (Galán 2011). In Australia it occurs mainly in weedy urban areas from West Wyalong (N.S.W.) south to eastern S.A. Flowers: mainly Sep.–Apr.

This species, although placed in sect. *Erythrosperma* by van Soest, has the robust growth habit and large cypselas with long cones of sect. *Erythrocarpa* spp. and seems more closely related to these than to most sect. *Erythrosperma* spp. Early flowering plants producing dark red-brown cypselas are very close to *T. calocephalum* Hand.-Mazz., and the two species may eventually prove to be conspecific. South Australian specimens that I have determined as this species are best included with *T. multidentatum* pending further investigation.

Summer forms of *T. multidentatum* and *T. hepaticolor* can be difficult to separate. The most convenient and useful character to identify the former species is the constant presence of calli on the inner involucre bracts, these are virtually absent from these bracts in *T. hepaticolor*.

III. **TARAXACUM** sect. **Hamata** H.Øllg.

Pl. Syst. Evol 141: 201 (1983).

T. officinale auct. non F.H.Wigg. s.str.: J.M.Black, *Fl. S. Austral.* 4: 660 (1929), partly.

Rosetted herb; leaves lanceolate to oblanceolate, c. 5–40 cm long, glabrescent, hamately lobed; petioles and leaf midribs striate, i.e. with interwoven purple and green strands on the upper surface (stomata present only on the green strands). **Capitula** c. 4.5 cm diam.; outermost involucre bracts erect, patent or recurved, usually to different degrees within a single capitulum, ovate to ovate lanceolate, c. 8–12 mm long, bordered to unbordered, tips without a callus, upper surfaces glaucous, inner involucre bracts dark green; marginal ligules far exceeding the involucre; pollen present. **Cypselas** turbinate, pale to dark brown, spinulose above, smooth below; cone conical, 0.3–0.7 mm long; beak > 3.5 mm long, always longer than the cypselas body; pappus white.

S.A.: *NL, *SL; *N.S.W.; *Vic.; *Tas. Europe; S America. A section of c. 30 species native to Europe, introduced in Australia and also South America (Uhlemann 2002). All are triploid apomicts. The species of the section grow in urban gardens, farmland and disturbed native grassy woodland, mainly in the Adelaide area.

Two species of the section have been identified in S.A. *T. subericinum* Hagend., Soest. & Zevenb. and *T. kernianum* Hagend., Soest & Zevenb. Øllgaard (1983) gives a key to most of the species of the section.

IV. **TARAXACUM** species group 1 (A.C.Beaglehole 67529) Scarlett

in N.G.Walsh & Entwisle, *Fl. Victoria* 4: 693 (1999).

T. officinale auct. non F.H.Wigg. s.str.: D.A.Cooke in Jessop & Toelken, *Fl. S. Austral.* 3: 1655 (1986), partly; *T. pseudocephalum* auct. non Soest: Scarlett in N.G.Walsh & Entwisle, *Fl. Victoria* 4: 694 (1999), partly (non S.A. publications).

Rosetted herb; leaves lanceolate to lyrate, often over 30 cm long and relatively broad, initially arachnoid hairy becoming glabrous; blade shallowly to deeply lobed, proximal lobe margins often lobulate to lacinate; petioles and midribs green or uniformly purple. **Capitula** c. 3.5–4 cm diam.; outermost involucre bracts lanceolate to linear-lanceolate, erecto-patent to abruptly reflexed, uniformly or variously oriented in a single capitulum, variously coloured, white borders present, ≤ 0.25 mm wide, tips with a callus; marginal ligules exceeding the involucre, sometimes scarcely so; pollen present or absent. **Cypselas** dark olive-brown to straw-coloured, markedly spinulose above, verrucate to smooth below; cone cylindrical, (0.5–) 1–1.5 mm long; beak longer than the rest of the cypselas; pappus white or yellowish white.

S.A.: EP, FR, NL, SL, MU; W.A.; Qld; N.S.W.; Vic. Eurasia. The species grow in weedy urban habitats, farmland and native vegetation from sea-level to subalpine grassy woodland. Only 1 species has been identified in South Australia: *T. khatoonae* Abedin. Further collections and comparative studies are needed to determine the other species present in the State.

The species grouped here have affinities with a number of sections: sect. *Taraxacum*, sect. *Disimilia* Dahlst., sect. *Erythrocarpa* and sect. *Macrocornuta* Soest. They extend from W.A. to S.A. and Vic. and are the predominant *Taraxacum* species of southern Qld. and northern N.S.W. *Taraxacum koksaghyz* L.E.Rodin (sect. *Ceratoidea* Kirschner & Štěpánek) which was grown experimentally for rubber production during the World War II (W.A.; S.A.; Tas.) would key to *T.* species Group A. However, it has not become naturalised.

1. Cypselas cone 1–1.5 mm long..... 5. **Taraxacum khatoonae**

1: Cypselas cone < 1 mm long..... Other taxa in **species group 1**

5. **Taraxacum khatoonae** Abedinin S.Abedin & Z.Tajuddin, *Pakistan J. Bot.* 41(2): 587 (2009). — *T. labolense* Abedin, *Pakistan J. Bot.* 39(5): 1422 (2007). *T. pseudocalocephalum* auct. non Soest: W.R.Barker *et al.*, *J. Adelaide Bot. Gard. Suppl.* 1: 154 (2005), partly (S.A. publications only). — **Illustr.:** Abedin, *Pakistan J. Bot.* 39(5): 1419, fig. 1a-a1 (2007).

Rosetted herb; leaves oblanceolate to lanceolate, c. 15–22 × 3–8 cm, green to grey-green, initially woolly but becoming glabrous, lateral lobes in (3–) 4–6 pairs, acutely triangular, distal margins entire, toothed or shortly

lacinate, proximal margins with 1–2 acute lobes close to the midrib, terminal lobe broadly helmet-shaped to triangular and ± trilobate, petiole light red-brown, unstriated, midrib green distally. **Capitula** c. 2–4 cm diam., on scapes 5–8 cm long at flowering, (30–) 50–60 cm long at maturity, green, very densely woolly initially but finally glabrate; outer involucral bracts lanceolate to linear-lanceolate, 7–15 × 2–3 mm, erect to recurved with narrow (c. 0.2 mm) white or purple borders, ciliolate basally, tips callosed, inner involucral bracts linear, 15 × 1–1.5 mm, tips callosed; outer ligules flat, exceeding the involucre by 3–5 mm; anthers with pollen; stigmas lime-green. **Cypselas** straw coloured, narrow fusiform, (3–) 4–5.5 × 0.8 mm, markedly spinulose above, verrucate to smooth below, cone cylindrical, (0.8–) 1–1.5 mm long; pappus brownish white, 7–8 mm long. **Fig. 3H.**

S.A.: EP, NL, SL, MU; W.A.; N.S.W. India (Himalaya region). Growing on alkaline loams in urban weedy habitats and disturbed native vegetation, most commonly in riparian areas. Flowers: June–Nov.

Abedin assigns *T. kbatoonae* to sect. *Macrocornuta* Soest., species of which are widespread in Central Asia (Kirschner & Štěpánek 2008), however the weakly developed corniculation of the involucral bracts and the brownish white pappus of *T. kbatoonae* are not diagnostic of this section, thus its sectional placement is uncertain.

T. breviscapum A.J.Richards, as delimited and illustrated in Hilliard (1977) from South African collections, is very close to *T. kbatoonae*, though differing somewhat from Richards' type description. It is likely that the two species are conspecific. The fact that *T. breviscapum* was described from Afghanistan strengthens this possibility.

V. **TARAXACUM** species group 2 (N.H.Scarlett 83-199) Scarlett

in Kellermann, *Fl. S. Austral. Asteraceae (version 1)* 38 & 35, Fig. 3I–J (2014) [flora.sa.gov.au/ed5].

Rosetted herb; leaves oblanceolate to lanceolate; lateral lobes deltoid to falcate often with narrow apices; petioles green to rose-purple, the wing narrow or absent. **Capitula** 3–4.5 cm diam.; outermost bracts cordate to broad lanceolate, erect to abruptly reflexed, borders white to pale pink, 0.3–0.5 mm wide, hair-fringed, variably callosed; outer ligules flat to naviculate, exceeding the involucre by 5–11 mm; anthers with pollen, sometimes sparsely so; stigmas greenish yellow. **Cypselas** pale ochre, cinnamon or grey, cone mostly cylindrical rarely conical, 0.5–1.0 mm long; beak 5–10 mm long; pappus 5–7 mm long, white.

Growing in disturbed urban habitats and native grassy woodlands on alkaline loams.

As noted above, *T. retzii* Soest and the related *T. squamulosum* Soest (Fig. 3I–J) are both formally placed in sect. *Erythrosperma*, but they have obvious affinities to the species in sect. *Scariosa* Hand.-Mazz. in having very broadly bordered outer involucral bracts and cypselas with relatively short beaks; for this reason they are treated separately here.

6. **Taraxacum retzii** Soest, *Acta Bot. Neerl.* 10: 290 (1962). — **Illustr.:** Soest., *Acta Bot. Neerl.* 10: 306, fig. 16 (1962).

Rosetted herb, leaves oblanceolate, c. 8–18 × 2–4.5 cm, greyish green, glabrate, lateral lobes in (3) 4 pairs, deltoid and falcate often with distally directed apices which are acute and often caudate, distal margins of the upper 2 or 3 lobes entire or with 1 (2) acute lobes, proximal margins entire or with one acute lobe close to the midrib, terminal lobe sagittate, apex acute, petiole green suffused with purple. **Capitula** c. 3 cm diam., on scapes c. 7 cm long at flowering, c. 25 cm at maturity, green suffused with pink, woolly in bud glabrous at flowering except just below the involucre; outer involucral bracts ovate to broad lanceolate, appressed basally with the upper half patent to reflexed sometimes unevenly with white to pale pink borders, 0.3–0.5 mm wide, hair-fringed apically, tips variably callosed, inner involucral bracts linear, 12–14 × 1–3 mm, tips corniculate; outer ligules apically naviculate exceeding the involucre by 7–11 mm; anthers with pollen; stigmas greenish yellow. **Cypselas** pale cinnamon to ochre, turbinate, 2.5–3 × c. 1 mm, the apex with incurved flat spines, c. 0.2 mm long, smooth to verrucate in the lower half, cone broadly cylindrical, 0.5–0.8 mm long, beak 5–10 mm long, pappus white c. 6 mm long.

S.A.: NL; N.S.W.; Vic. Britain; France; Spain. Growing on alkaline loams in urban weedy habitats and native grassy woodland. Flowers: June–Nov.

T. maroccanum H.Lindb. and *T. wallonicum* Soest are closely related to *T. retzii* and may prove to be conspecific. *T. squamulosum* Soest (Vic.; Tas.) superficially resembles *T. retzii*, but has erecto-patent outer involucral bracts and pinkish brown to grey cypselas.

VI. TARAXACUM F.H.Wigg. sect. *Taraxacum*

T. sect. Ruderalia. Kirschner, H.Øllg. & Štěpánek, *Taxon* 36: 615 (1987). *T. officinale auct. non* F.H.Wigg. *s.str.*: J.M.Black, *Fl. S. Austral.* 4: 660 (1929), partly; D.A.Cooke in Jessop & Toelken, *Fl. S. Austral* 3: 1655, partly.

Rosetted herb; leaves lanceolate to oblanceolate, c. 8–30 cm long, arachnoid hairy to glabrescent; deeply lobed, usually with complex further dissection; petioles and midribs green or uniformly purple. **Capitula** c. 4.5 cm or more in diam.; outermost involucre bracts lanceolate to linear-lanceolate, erecto-patent to abruptly reflexed, uniformly or variously oriented in a single capitulum, variously coloured; white borders absent or very narrow, < 0.2 mm wide, tips without a callus; marginal ligules far exceeding the involucre; pollen usually present. **Cypselas** brown to straw-coloured, spinulose above smooth below; cone conical 0.2–0.5 (–0.7) mm long; beak longer than the rest of the cypselas; pappus white **Garden dandelion**.

S.A.: *EP, *NL, *SL, *MU, *SE, *Qld; *N.S.W.; *Vic.; *Tas. Eurasia; Africa; N & S America; SE Asia; N.Z. A section of c. 1000 very narrowly delimited agamosperous species, native from western Asia to western Europe and North Africa. Introduced in the Americas, India, Indonesia, Australia and New Zealand. The species are confined to humid areas from southern Qld to S.A., growing in urban habitats and damp native vegetation, including alpine grasslands. Only one species has so far been reliably identified in S.A.: *T. oblongatum* Dahlst.

The binomial '*Taraxacum officinale*' is currently used by many botanical authors to represent the 'common or garden dandelion', disregarding A.J.Richards' lectotypification (1985), which restricted its use to a species of the then sect. *Crocea* M.P.Christ. of northern and alpine Europe. A new lectotypification proposal, which would return the name to its most common usage has recently been published (Kirschner & Štěpánek 2011). This proposal is accepted here and thus *T. sect. Taraxacum* replaces *T. sect. Ruderalia*. As diagnosed above, *T. sect. Taraxacum* excludes those species with relatively long cylindrical cones and callosed involucre bracts, that are included in the section by most authors. These are placed in *T. species Group A* in this treatment.

25. TOLPIS Adans.

Fam. Pl. 2: 112 (1763).

(derivation unknown.)

Annual or perennial herbs, branching; hairs simple, eglandular; leaves mostly basal. **Inflorescences** cymose or paniculate; capitula pedunculate; involucre bracts ± biseriate; inner bracts hardened, strongly convex and erect at maturity; florets: ligule yellow or purplish-brown. **Achenes** dimorphic, not compressed, unbeaked; pappus of bristles and scales, persistent, dimorphic; bristles and scales scabridulous, sometimes of two types within a pappus

A genus of c. 20 species from the Mediterranean region, South Africa and America. Two species naturalised in Australia. Apart from characters given in the key to genera, these two species are characterised by being much taller than broad, and with inflorescences where the overtopping of the primary or medial capitulum by the lateral capitula is very marked.

1. ***Tolpis barbata** (L.) Gaertn., *Fruct. Sem. Pl.* 2: 372 (1791). — *Crepis barbata* L., *Sp. Pl.* 2: 805 (1753). *Tolpis umbellata* Bertol., *Mem. Soc. Med. Emul. Genova* 2: 133 (1803).

Annuals to c. 0.6 m high, with appressed-cobwebby or woolly indumentum on stems and capitula, glabrescent, with sparse to dense septate hairs on leaves, or leaves ± glabrous; basal leaves often persistent at anthesis, to c. 11 cm long, with l:w ratio c. 4, undivided or lobate with lobes antrorse; base attenuate; margin entire, denticulate or dentate; cauline leaves 1–4, becoming somewhat narrower upwards, with base attenuate. **Capitula** 2–7; peduncle of primary capitulum to c. 3 cm long, c. 1 mm diam.; peduncle of lateral capitula to 12 cm long, mostly c. 0.3–0.6 mm diam.; involucre 8–10 mm long, c. 2–4 mm diam.; outer bracts 15–25, linear, 8–10 mm long, setaceous; inner bracts c. 16–22, c. 5 mm long, with midrib often developing tubercles, with hyaline margin distinct and vestigial in alternate bracts; florets: ligule c. 2–5 mm long, yellow with a purple band or central-most florets entirely purple; style pubescence pale. **Achenes** ± obloid, 1.3–1.7 mm long, not tapering distally; marginal achenes housed within concavity of hardened inner bract at maturity, densely brown-hairy; central achenes with numerous close-spaced ribs, glabrous; pappus white; bristles scabridulous; pappus of marginal achenes c. 0.4 mm long, of scales of varying length; pappus of central achenes 3–5 mm long; bristles 2–4, wider at base; intervening shorter scales more numerous, c. 0.3 mm long. **Yellow hawkweed. Pl. 12H–J.**

S.A.: *MU, *SL; *W.A.; *Qld; *N.S.W.; *Vic.; *Tas. A native of southern Europe. Flowers: mid-spring–summer.

26. TRAGOPOGON L.

Sp. Pl. 2: 789 (1753).

(From the Greek *tragos*, billy-goat, and *pogon*, beard, alluding to the appearance of the pappus.)

Annual, biennial or perennial herbs, branching or not; hairs simple, eglandular or lacking; leaves basal and cauline. **Inflorescences** solitary; capitula pedunculate; involucre bracts uniseriate, soft and reflexed at maturity; florets: ligule yellow or purple. **Achenes** homomorphic or slightly dimorphic in terms of ornamentation of the body, not compressed, beaked; pappus of bristles, persistent, homomorphic, or in *T. hybridus* dimorphic, bristles plumose or rarely scabridulous, sometimes slightly dimorphic within a pappus.

A genus of c. 50 species from temperate Europe, Asia and Africa; three species naturalised in Australia.

Distinctive features of this genus include the linear, entire, sheathing leaves with parallel venation and the solitary capitula lacking outer and intermediate involucre bracts borne on long distally dilated peduncles. The pappus is biseriate and the inner series typically comprises longer bristles that are distally non-plumose.

Tragopogon brevirostris subsp. *longifolius* (Heldr. & Sart. ex Boiss.) I. Richardson has been collected once in Australia, from a roadside on the road to Ironbark near Adelaide. There is currently no indication that it has become naturalised. As well as having differently coloured ligules, the capitula and achenes of this taxon are considerably smaller than in the two naturalised taxa.

1. Capitula or base of capitula woolly, sometimes somewhat transiently; ligules yellow.....
..... **T. brevirostris** subsp. **longifolius**
- 1: Capitula glabrous; ligules pinkish or purplish
 2. Biennials to 1.3 m high, not or sparingly branched; ligules as long as bracts or nearly so; pappus of all achenes with numerous plumose bristles..... 2. **T. porrifolius**
 - 2: Annuals to 0.5 m high, typically branching; ligules much shorter than bracts; pappus of marginal achenes comprising 5 unequal rigid non-plumose bristles; pappus of central achenes with more numerous plumose bristles..... 1. **T. hybridus**

1. ***Tragopogon hybridus** L., *Sp. Pl.* 2: 789 (1753).

Annuals to c. 0.8 m high, glabrous, not glaucous. **Capitula:** involucre c. 30 mm long, increasing to c. 50 mm long at maturity, 3–5 mm diam.; bracts 5–8, with hyaline margin vestigial or very slender, not becoming hardened, finally reflexed; florets: ligule less than half the length of the bracts, pinkish-lilac; style pubescence pale. **Achenes** slightly dimorphic; marginal achenes 35–50 mm long; body narrow-cylindrical, 25–40 mm long, light brown, smooth except for minutely scabridulous ribs, with transition into beak very gradual; beak shorter than body, not dilated sub-terminally; central achenes with body slightly shorter; pappus 10–20 mm long, cream, dimorphic; pappus of marginal achenes comprising 5 rigid scabrid bristles of unequal length; pappus of central achenes comprising numerous plumose bristles.

S.A.: ?*NL. Native to southern Europe. Flowers: spring–summer.

Has been recorded from two different localities in the Northern Lofty Ranges and has probably become naturalised. It is readily distinguished after florets have fallen by the pappus of its marginal achenes. It is typically more branched than *T. porrifolius*.

2. ***Tragopogon porrifolius** L., *Sp. Pl.* 2: 789 (1753).

Biennials to c. 1.3 m high, glabrous, sometimes glaucous. **Capitula:** involucre 25–35 mm long, increasing to up to 60 mm long at maturity, c. 5–12 mm diam.; bracts 5–8, with hyaline margin vestigial or distinct proximally in alternate bracts, finally reflexed; florets: ligule as long as or slightly shorter than bracts, lilac to deep violet; style pubescence pale. **Achenes** 20–40 mm long, homomorphic except for rib ornamentation; body fusiform, 10–15 mm long, light to mid brown, with crowded scale-like tubercles on ribs, with tubercle size reducing to nearly smooth inwards, with transition into beak fairly abrupt; beak slightly longer than body, with a sub-terminal dilation 1–2 mm long; pappus 15–25 mm long, cream to golden-brown, homomorphic. **Salsify, oyster plant. Pl. 12K–M, 13A–C.**

S.A.: *FR, ?*EP, *NL, *MU, *SL, *SE; *W.A.; *Qld; *N.S.W.; *Vic.; *Tas. Native to northern Africa, southern

Europe, Turkey, and Macaronesia. Widely naturalised in temperate regions. Flowers: spring–summer.

The non-plumose tips of the longer pappus bristles are usually purplish unlike in the other species in Australia. The beak of the achenes is dilated in the distal few millimetres then abruptly constricted below a hairy pappus ring. This beak morphology is also present in *T. dubius* Scop. except that the dilated portion is shorter. Flowers of these two species apparently open only in the morning. Other subspecies of *T. porrifolius* from Europe differ in being lanate or puberulent, having relatively shorter ligules, and achenes more gradually tapering to form the beak. The receptacular pits of *T. porrifolius* and *T. dubius* are thickened and raised. Several subspecies are recognised in Europe and Africa. The taxon that is introduced in Australia belongs to subsp. *porrifolius*.

27. UROSPERMUM Scop.

Intr. Hist. Nat. 122 (1777).

(From the Greek *oura*, tail, and *sperma*, seed, alluding to the long beak on the achene.)

Annual or perennial herbs, branching; hairs simple, eglandular; leaves basal and cauline. **Inflorescences** solitary or cymose; capitula pedunculate; involucre bracts uniseriate, soft and reflexed at maturity; florets: ligule yellow. **Achenes** homomorphic, not compressed, beaked; pappus of bristles, not persistent; bristles plumose, uniform within a pappus.

A genus of two species from the Mediterranean region, both naturalised in Australia.

Capitula are moderately large and are borne on a long peduncle that gradually dilates distally. Spreading hairs numerous and variable in size; on or near the margin of leaves they are minute and very densely packed, whereas on lower stems and leaf-midribs they are often larger. A distinctive feature of the mature receptacle is the ciliate pit margins.

1. ***Urospermum picroides** (L.) Scop. ex F.W.Schmidt, *Samml. Phys.-ökon. Aufsätze* 1: 275 (1795). — *Tragopogon picroides* L., *Sp. Pl.* 2: 790 (1753); *Arnopogon picroides* (L.) Willd., *Sp. Pl.* 3: 1496 (1803).

Annuals to c. 0.5 m high, with spreading to retrorse setose hairs scattered on all parts, with minute hairs on margin of leaves; basal leaves few to several, variably persistent; cauline leaves few to several, to c. 25 cm long, with l:w ratio 3–6; undivided, or lobate to pinnatisect; base becoming truncate, cordate or sagittate, somewhat stem-clasping upwards; margin dentate or denticulate. **Capitula** solitary or 2; involucre 12–22 mm long, c. 5–8 mm diam.; bracts 7–10, with long setose hairs, with hyaline margin slender and usually grey or broad and pale on alternate bracts, finally reflexed; florets: ligule c. 15 mm long; style pubescence pale. **Achenes** 10–15 mm long, somewhat sigmoidal overall, brown, comprising two distinct portions: basal portion flattened-obloid, 3–5 mm long with numerous long tubercles on faces; apical portion c. 7–10 mm long, comprising a dilated part 3.5–5 mm long bearing transverse wrinkles, tapering gradually into beak; beak c. as long as dilated part of apical portion; pappus 8–12 mm long, detaching as a unit, white. **False hawkbit. Pl. 13D–J.**

S.A.: *GT, *FR, *EP, *NL, *MU, *YP, *SL, *KI, *SE; *W.A.; *Qld; *N.S.W.; *Vic. Native to southern Europe, northern Africa, western Asia and Macaronesia. Flowers: late winter to spring.

A distinctive species with its bristly involucre lacking outer bracts and peculiar achene morphology.

HELENIEAE LINDL.

A.R. Bean

Annual or perennial herbs; leaves alternate, rarely opposite, blades entire to pinnatifid, linear to lanceolate. **Capitula** radiate or discoid, solitary or in panicleiform or corymbiform cymes. Involucres cylindrical, campanulate or hemispheric, involucre bracts in 2–several series; receptacles flat to convex or globosa, usually epaleate; ray florets fertile or neuter, often conspicuously 3–5-lobed; disc florets bisexual, rarely functionally male; anthers shortly caudate to ecaudate. **Ray** and disc achenes very similar, clavate to subterete, pale; pappus of several scales with aristate, acuminate or obtuse apices, or of multiple bristles.

13 genera and about 120 species all indigenous to the New World, with most species in southwestern USA and Mexico. One taxon naturalised in South Australia.

Reference: Panero (2007a).

28. GAILLARDIA Foug.

Observ. Phys. 29: 55 (1786).

(Named in honour of Gaillard de Charentonneau, a French amateur botanist of the time.)

Annual or perennial herbs; stems unbranched to strongly branched, tomentose; leaves simple, alternate, entire, toothed or pinnatifid. **Inflorescences** solitary on long peduncles, tomentose; capitula heterogamous; involucre bracts multiseriate, apex acute to acuminate, reflexed in fruit; receptacle bearing numerous stiff setae; ray florets often sterile; ligules showy, yellow, red or purple or combinations of these; disc florets bisexual, yellow to red or purple; anthers not caudate at base; style branches long, tapered, glabrous or hairy. **Achenes** obconical, with dense antrorse hairs near base or throughout; pappus persistent, of 5–10 scales, often aristate.

A genus of about 25 species, mostly indigenous to North America, but with 2 species in temperate South America. Two taxa are naturalised in Australia, one occurring in S.A.

Reference: Biddulph (1944), Turner & Whalen (1975), Webb (1988).

1. ***Gaillardia** ×**grandiflora** Van Houtte, *Fl. Serres* 12: t. 1183 (1857). — *G. aristata* auct. non Pursh.: D.A.Cooke in Jessop & Toelken, *Fl. S. Austral.* 4: 1436 (1986).

Perennial herb to 70 cm high; stems with antrorse, eglandular hairs; leaves lanceolate to elliptic, 3–10 × 0.6–2.7 cm, entire to coarsely serrate, with eglandular hairs and sessile glands, apex acute; lower leaves petiolate; upper leaves sessile or nearly so. **Capitula** solitary or few; involucre 17–25 mm diameter at anthesis, 30–60 flowered; involucre bracts lanceolate, 8–11 mm long, apex acuminate; ligules red and yellow; disc corolla purple; tube 5–6 mm long; lobes subulate, 1.5–2 mm long, densely tomentose; anthers c. 4 mm long. **Achenes** obconical, 2.5–3 mm long, white, with long antrorse hairs on lower half; receptacle setae c. 1.5 times length of achene; pappus of 6–8 scales, 4–8 mm long, apex awn-like. **Indian blanket, blanket flower.**

S.A.: ?*NL *SE; *N.S.W. Sporadically naturalised in south-western N.S.W. and adjoining areas of S.A., forming roadside colonies. Flowers: Nov.–Apr.

A garden ornamental of hybrid origin (= *G. aristata* Pursh × *G. pulchella* Foug.).

TAGETEAE CASS.

A.R. Bean

Annual or perennial shrubs; leaves alternate or opposite, simple, pinnate or bipinnate, often with marginal and scattered pellucid glands. **Capitula** radiate, rarely discoid, in open cymes, sometimes solitary and scapose, peduncles sometimes fistulose; involucre sometimes with a calyculus, involucre bracts in 1–5 series, free or variously fused; receptacles flat to conical, mostly epaleate; ray florets female; disc florets hermaphrodite, rarely functionally male, corolla actinomorphic, pentamerous. **Achenes** cylindrical to narrowly fusiform or oblanceolate, brown to black, striate. Pappus of few to multiple scales or bristles, rarely absent.

32 genera and about 270 species, all indigenous to the New World, and mainly in south-western USA and Mexico. 2 genera and 3 species naturalised in South Australia.

Reference: Panero (2007b).

1. Leaves entire or serrate; involucre bracts free 29. **Flaveria**
- 1: Leaves pinnatisect to compound-pinnate; involucre bracts fused for most of their length 30. **Tagetes**

29. FLAVERIA Juss.

Gen. Pl. 186 (1789).

(From the Latin *flavus* meaning yellow, in reference to the corolla colour.)

Annual or perennial herbs or shrubs; stems erect or lax, strongly branched, glabrous or shortly pubescent (not in Australia); leaves simple, opposite throughout, entire or serrate. **Inflorescences** terminal and corymbose (not in Australia), or axillary and glomerule-like; capitula pedunculate or sessile, heterogamous, comprising several 1–2-floret (or more in non-Australian species) heads clustered together; involucre bracts uniseriate; receptacle setose or naked

(not in Australia); ray florets (when present) female; disc florets hermaphrodite; corolla yellow; anthers ecalcarate; style branches flattened, recurved. **Achenes** brown to black, 10-ribbed, glabrous, narrowly oblanceolate or linear-oblong; pappus absent, or rarely present.

A genus of 21 species, all indigenous to tropical and subtropical parts of North and South America, two of them naturalised in Africa and Asia. One species naturalised in Australia, and occurring in S.A.

Reference: Bentham (1867b), Bean (2009), Powell (1978).

1. ***Flaveria trinervia** (Spreng.) C.Mohr, *Contr. U.S. Natl. Herb.* 6: 810 (1901). — *Oedera trinervia* Spreng., *Bot. Gart. Halle* 63 (1800). *F. australasica* Hook. in T.Mitch., *J. Exped. Trop. Australia* 118 (1848). — **Illustr.:** *Pl. W. N.S.W.* 667 (1981); J.Milson, *Pasture Pl. N.W. Queensl.* 17 (2000).

Annual herb to 1.5 m high; leaves sessile, linear to narrow-lanceolate, 2–11 × 0.15–0.9 cm, glabrous, with 3 longitudinal veins, entire to shortly serrate, apex acute. **Capitulescence** axillary, comprising several capitula, each containing 1–2 florets; receptacle convex, with a few slender acuminate setae; involucre bracts 2, concave or cymbiform, 4.2–5.5 mm long, glabrous, apex obtuse or lacerate; corolla tube 1.5–2.3 mm long, with minute hairs on outer surface; lobes deltate; ligules of ray florets 0.5–0.8 mm long; anthers enclosed in corolla tube, 0.9–1.2 mm long. **Achenes** oblanceolate, 2.6–3.3 mm long; pappus absent. **Speedy weed. Pl. 14A–B.**

S.A.: *?NW, *LE, ?*GT, *FR, *EA; *W.A.; *N.T.; *Qld; *N.S.W. A native of Mexico; naturalised in southern U.S.A., Central America, northern South America, central Africa, Middle East and India. Naturalised across much of drier and monsoonal mainland Australia, usually on heavy clay soils. It can also occur in saline littoral areas. Flowers: throughout the year.

30. TAGETES L.

Sp. Pl. 2: 887 (1753).

(Named for Tages, an Etruscan god.)

Aromatic annual or perennial herbs; stems erect, unbranched to strongly branched, conspicuously gland-dotted and aromatic; leaves simple (not in Australia) or pinnately dissected, opposite on lower parts of plant, usually alternate above. **Inflorescences** terminal or solitary or in leafy corymbose cymes; capitula cylindrical to campanulate, pedunculate, heterogamous; involucre bracts uniseriate, connate, glandular; outer florets female, ligulate; disk florets bisexual; corolla yellow to orange, rarely white; style branches truncate and penicillate, or with a short apical appendage; anthers auriculate at base. **Achenes** strigose, linear-clavate, longitudinally striate, black; pappus persistent, comprising 3–10 unequal basally connate scales or bristles.

A genus of 55 species distributed from south-western U.S.A. (Arizona) to Argentina. Two species naturalised in Australia and S.A.

Reference: Bentham (1867a), McVaugh (1984), Soule (1996).

1. Capitula numerous, in dense corymbose cymes; ray limb pale yellow to cream; disc florets 4–7..... 2. **T. minuta**
- 1: Capitula solitary; ray limb yellow to orange or reddish brown, rarely white (in cultivars); disc florets (10–) 50–120 1. **T. erecta**

1. ***Tagetes erecta** L., *Sp. Pl.* 2: 887 (1753). — *T. patula* L., *Sp. Pl.* 2: 887 (1753).

Annual herb 0.1–1.2 m high; stems glabrous; leaves glabrous, pinnately divided with 9–19 segments, opposite to alternate; leaf segments lanceolate to linear-lanceolate, 15–25 (–45) × 3–8 (–12) mm, margins serrate, apex acute. **Capitula** solitary; peduncles 30–100 (–150) mm long; involucre cylindrical to campanulate, (3–) 5–12 mm diam. at anthesis; involucre bracts 5–8, connate except near apex; ray florets (3–) 5–8 (–100 in “double” cultivars); lamina yellow to orange, red-brown or white (some cultivars), (2–) 12–18 (–25) mm long; disc florets (10–) 50–120 mm long, corolla 7–12 mm long. **Achenes** 6–11 mm, dark brown to black; pappus of 2–6 subulate scales, the longest 6–12 mm long, apex aristate. **Marigold.**

S.A.: ?*NW, ?*GT, ?*EP, ?*NL; *W.A.; *Qld; *Vic. Native to Mexico and Central America. Occasionally naturalised in South Australia, often from garden waste. Flowers: throughout the year.

Cultivars of *Tagetes erecta* are widely grown in gardens and, commercially, for cut flowers. They often persist after abandoned plantings. Tetraploid plants ($2n = 48$) with smaller involucre and wholly or partially red-brown corollas included here in *T. erecta* have been called *T. patula* by some botanists.

2. ***Tagetes minuta** L., *Sp. Pl.* 2: 887 (1753). — *T. glandulifera* Schrank, *Pl. Rar. Hort. Monac.* 2: t. 54 (1820). — **Illustr.:** *Pl. W. N.S.W.* 668 (1981).

Slender annual herb to 2 m high; stems glabrous, striate; leaves glabrous, pinnately divided with 5–11 segments, opposite on lower parts of plant, alternate on upper parts; leaf segments narrowly lanceolate, 12–60 × 2–8 mm, with 10–30 submarginal elliptical oil glands, margins serrate, apex acute. **Capitula** numerous; involucre cylindrical, 1.7–3.5 mm diameter at anthesis, 4–6 flowered; involucral bracts 3 (4), connate except near apex, 8–12 mm long, apex obtuse; corolla pale yellow; tube 2–4 mm long, with antrorse eglandular hairs; lobes deltate, 0.6–1 mm long; anthers 1.1–1.3 mm long. **Achenes** linear, 6–8.5 mm long, black, faintly striate; pappus of 5–6 translucent scales, the longest 2.8–3.5 mm long, apex acute. **Stinking Roger. Pl. 14C–D.**

S.A.: *EP, *NL, *MU, *SL; *Qld; *N.S.W.; *Vic. A native of South America, from Peru to Argentina and Chile. Naturalised in subtropical eastern Australia, in eucalypt woodland, often near creeks. Sparsely naturalised in South Australia. Flowers: Apr.–Aug.

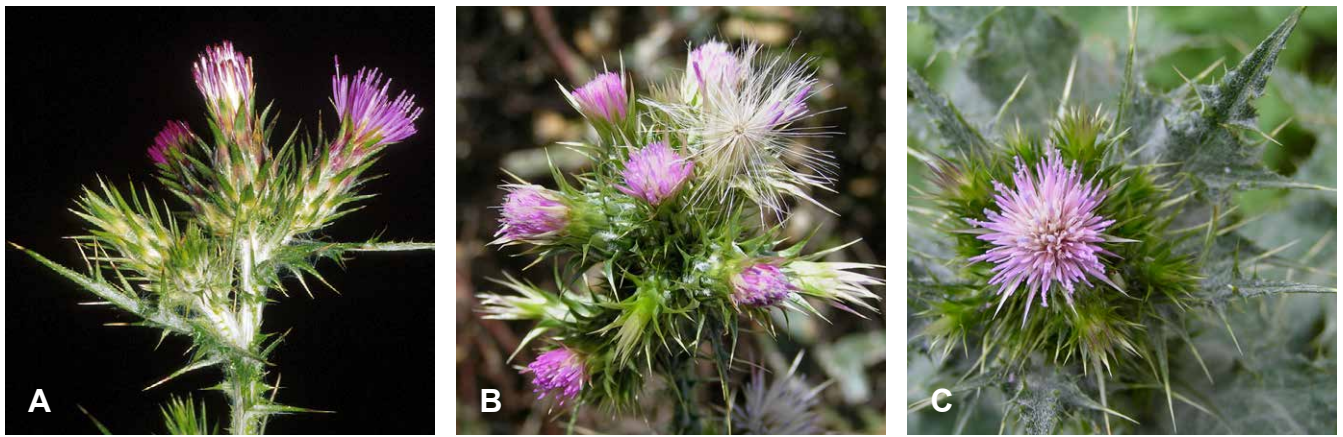
Known to cause contact dermatitis in some people.

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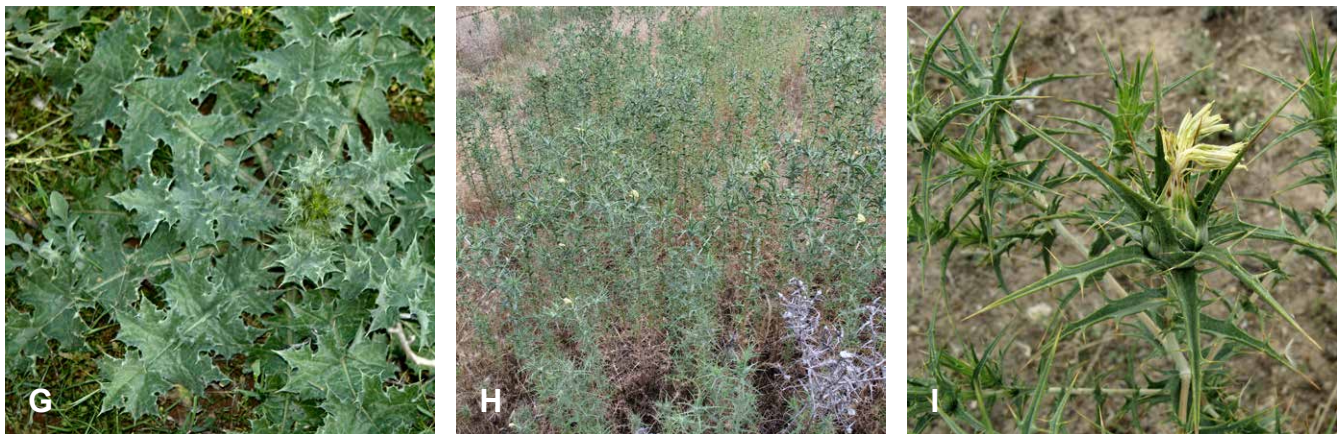
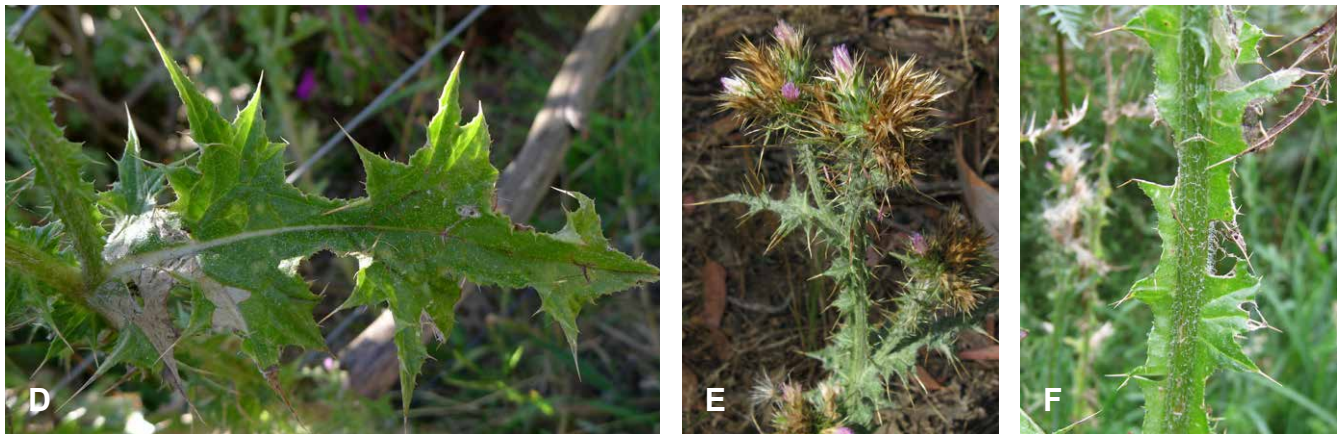
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Carduus pycnocephalus

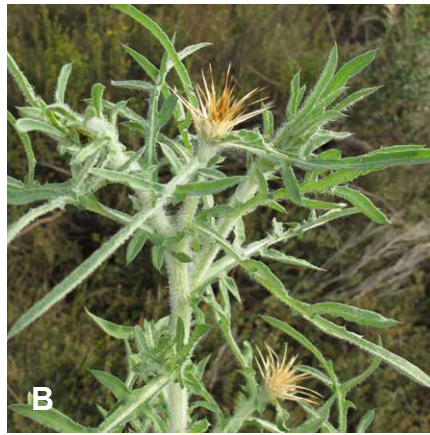
C. tenuiflorus (B, C, D, E, F & G)



Carthamus lanatus (H, I, J, K & L)



Pl. 1. **A**, near Lenswood, SL. **B**, near Browns Beach, Innes N.P., YP. **C**, ibid, INP-570. **D**, Stanley, Tas. **E**, Scorpion Springs C.P., MU. **F**, stem wings, Dargo, Vic. **G**, Box Flat, Ngarkat C.P., SE. **H–J**, **K**, head with bristle-bearing achenes, **L**, head showing receptacle setae; Scorpion Springs C.P., MU. Photos: A, P.J. Lang; B, C, T.M. Jaques; D, F, J. Tann; E, G, I–K, A.L. Carle; H & L, G.N. Carle.



Centaurea calcitrapa (A, B & C)

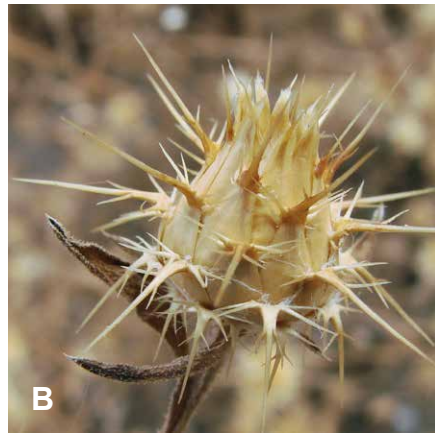


C. cineraria (D, E, F, G, H & I)



C. melitensis (J, K & L)

Pl. 2. A, Mudgee, N.S.W. B & C, near Keith, SE. D–I, near Inneson, Innes N.P., YP. (D & G: INP-587). J, YP. K, Box Flat, Ngarkat C.P., SE, LJ 1317. L, YP. Photos: A, J. Tann; B, G.N. Carle; C, A.L. Carle; D–I, J & L, T.M. Jaques; K, L. Jansen.



A
Centaurea melitensis (A & B)

C
C. solstitialis



D
Cirsium vulgare (D, E & F)

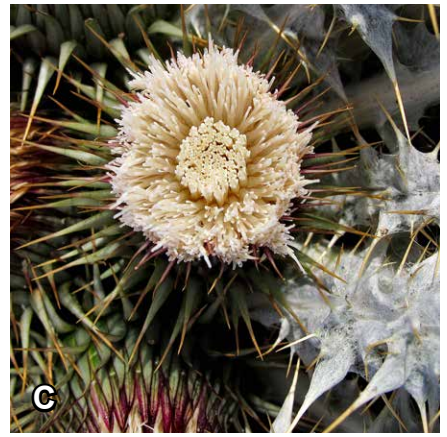
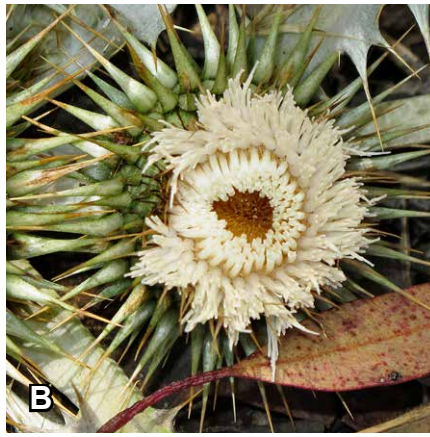


G
Cynara cardunculus subsp. *flavescens* (G, H & I)

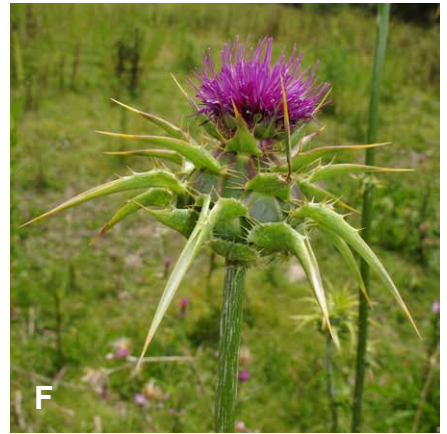
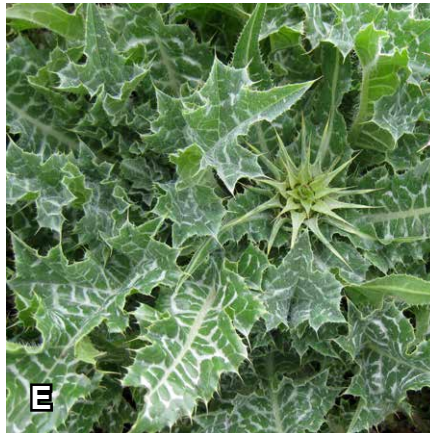


J
Onopordum acaulon (J, K & L)

Pl. 3. **A**, FR. **B**, near Pandalowie, Innes N.P., YP. **C**, Mudgee, N.S.W. **D** & **E**, Murrayville - Nhill Rd, Vic. **F**, Mudgee, N.S.W. **G**, Port Prime, SL. **H**, Second Beach, YP. **I**, Vic. **J**, S of Bakara C.P., MU. **K** & **L**, Scorpion Springs C.P., MU. Photos: A, A.C. Robinson, DEWNR; B, T.M. Jaques; C, F, J. Tann; D, E, K & L, G.N. Carle; G & H, R.K. Sandercock, DEWNR; I, A.L. Carle; J, L. Jansen.



Onopordum acaulon (A, B & C)

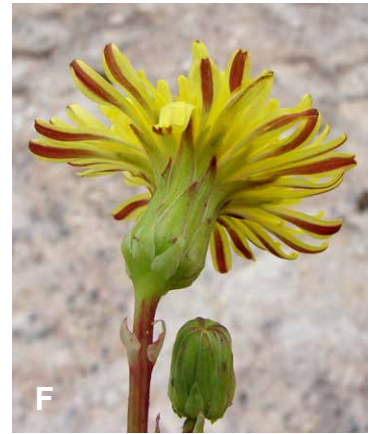


Silybum marianum (D, E & F)

Pl. 4. **A**, S of Bakara C.P., MU. **B & C**, Scorpion Springs C.P., MU. **D & E**, Vic. **F**, Meehan Range, Tas. Photos: A, L. Jansen; B, C & F, G.N. Carle; D & E, A. Grubb.



Actites megalocarpus (A, B, C, D, E, F & G)



Chondrilla juncea (H, I & J)

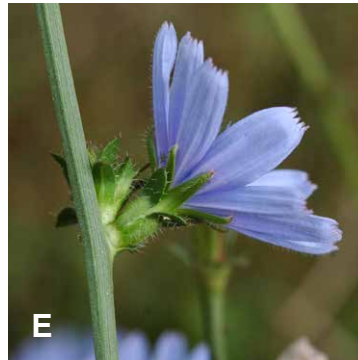


Cichorium intybus (K & L)

Pl. 5. **A**, Baby Lizards Beach, YP. **B**, Point AVOID, Coffin Bay N.P., EP. **C**, Pandalowie, Innes N.P., YP, INP-893. **D**, near Ethel Wreck, Innes N.P., YP, INP-892. **E**, Pandalowie, Innes N.P., YP, INP-893. **F** & **G**, near Ethel Wreck, Innes N.P., YP, INP-892. **H**, Scorpion Springs C.P., MU. **I**, Qld. **J**, Scorpion Springs C.P., MU. **K** & **L**, Vic. Photos: A & B, R.K. Sandercock, DEWNR; C–G, T.M. Jaques; H, A.L. Carle; I, H. Rose; J, G.N. Carle; K & L, A. Grubb.



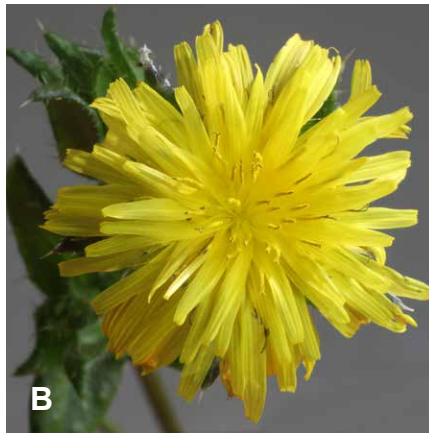
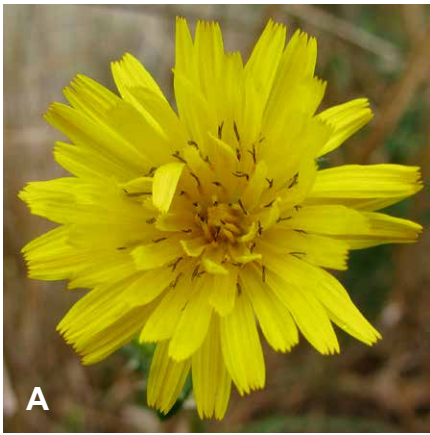
Cichorium intybus (A, B, C, D, E & F)



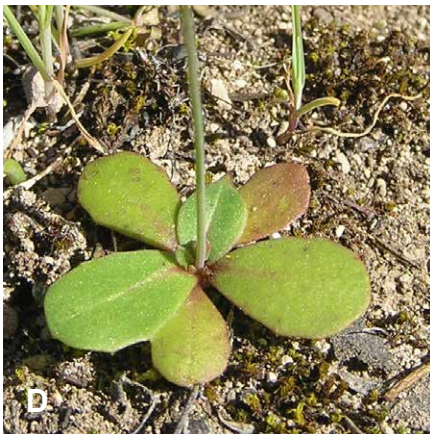
Crepis capillaris (G & H)

Helminthotheca echioides

Pl. 6. A, Qld. B & C, Mt Barker, SL. D, Qld. E & F, Mt Barker, SL. G, Waite Conservation Res., SL. H, Upper Sturt, SL. I, Oakbank, SL. Photos: A & D, H. Rose; B, C, E & F, L. Jansen; G & I, P.J. Lang; H, A.C. Robinson.



Helminthotheca echioides (A, B & C)



Hypochaeris glabra (D, E, F & G)



Hypochaeris radicata (H & I)

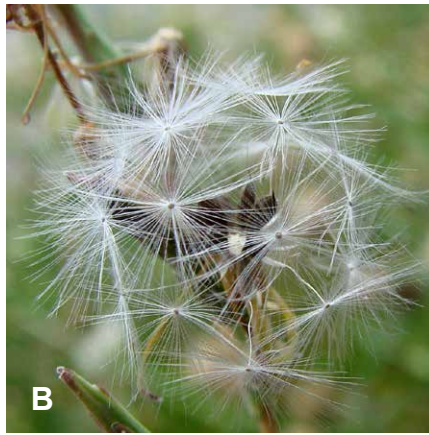


Lactuca serriola forma *serriola* (J, K, L & M)

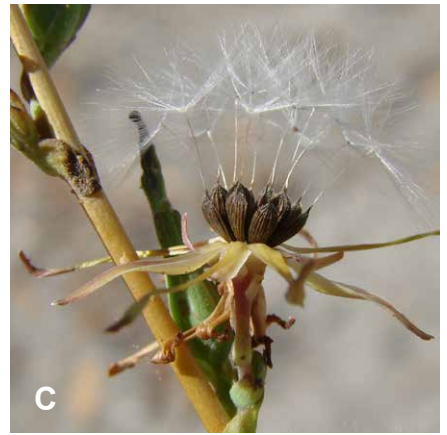
Pl. 7. **A**, near Mylor, SL. **B**, Oakbank, SL. **C**, Meadows, SL. **D**, Stenhouse Bay, Innes N.P., YP. **E**, Box Flat, Ngarkat C.P., SE. **F**, near Pandalowie, Innes N.P., YP, INP-600. **G**, Stenhouse Bay, Innes N.P., YP. **H**, Vic. **I**, Dargo, Vic. **J**, **K** & **L**, Stenhouse Bay, Innes N.P., YP, INP-823. **M**, Upper Sturt, SL. Photos: A, C & E, L. Jansen; B, P.J. Lang; D, F, G, J, K & L, T.M. Jaques; H, A. Grubb; I, J. Tann; M, A.C. Robinson.



A

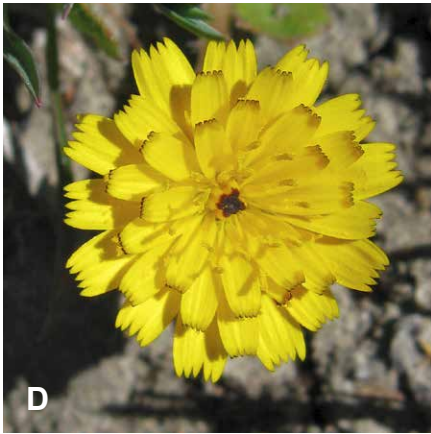


B

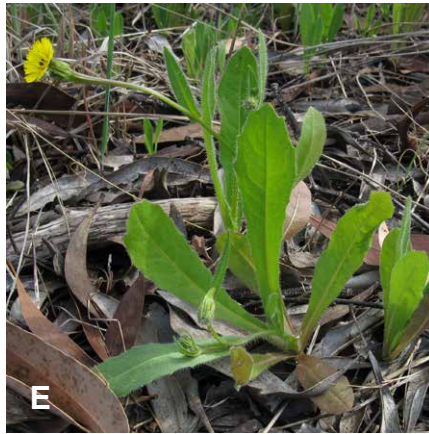


C

Lactuca serriola forma *serriola* (A, B & C)



D



E



F



G

Leontodon rhagadioloides (D, E, F, G, H, I, J, K & L)



H



I



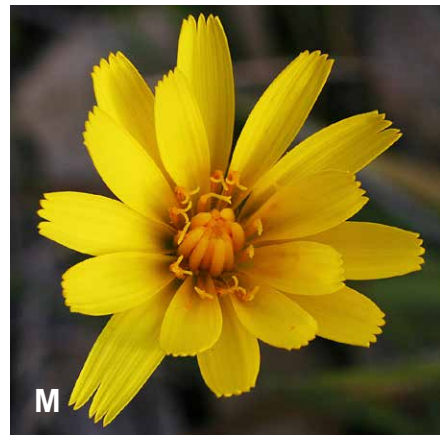
J



K



L



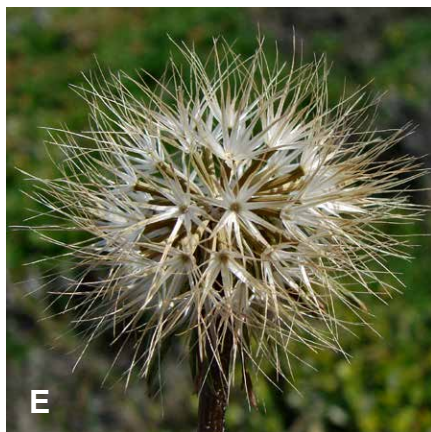
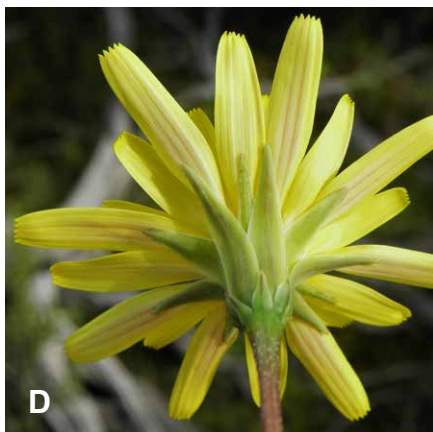
M

Microseris lanceolata

Pl. **A, B & C**, Stenhouse Bay, Innes N.P., YP. **D**, Box Flat, Ngarkat C.P., SE. **E, F & G**, Harding Springs C.R., SE. **H & I**, near West Cape, Innes N.P., YP. **J**, Cable Bay, Innes N.P., YP. **K & L**, near West Cape, Innes N.P., YP, INP-754. **M**, Waite Conservation Res., SL. Photos: A–C & H–L, T.M. Jaques; D–G, A.L. Carle; M, P.J. Lang.

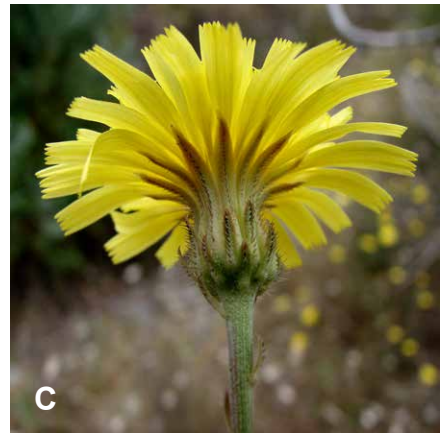
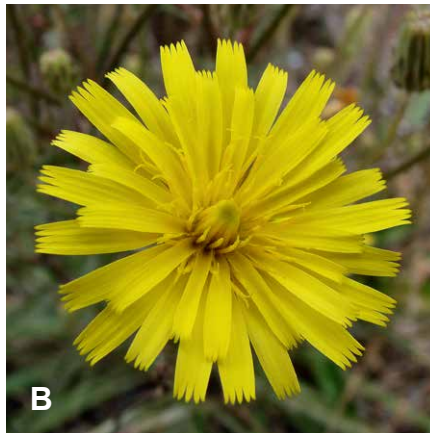


Microseris lanceolata (A, B, C, D, E, F & G)

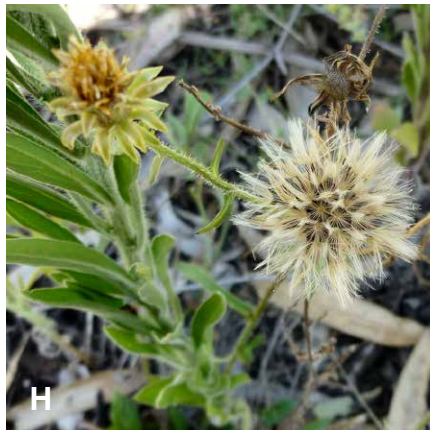
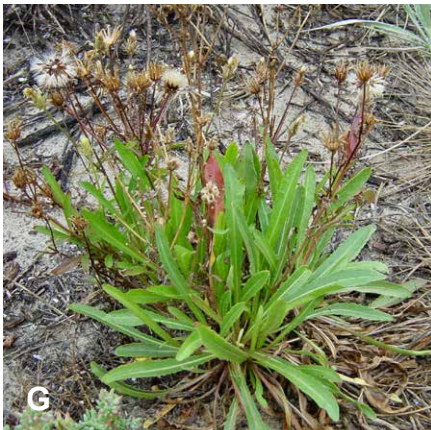


Picris angustifolia subsp. **angustifolia** (H & I)

Pl. 9. **A**, Waite Conservation Res., SL. **B**, Pondalowie, Innes N.P., YP. **C** & **D**, Innes N.P., YP. **E**, Cable Bay, Innes N.P., YP. **F**, Innes N.P., YP. **G**, Ngarkat C.P., SE. **H** & **I**, Foul Bay, YP, FBCG-11. Photos: A, P.J. Lang; B–F, H & I, T.M. Jaques; G, A.L. Carle.



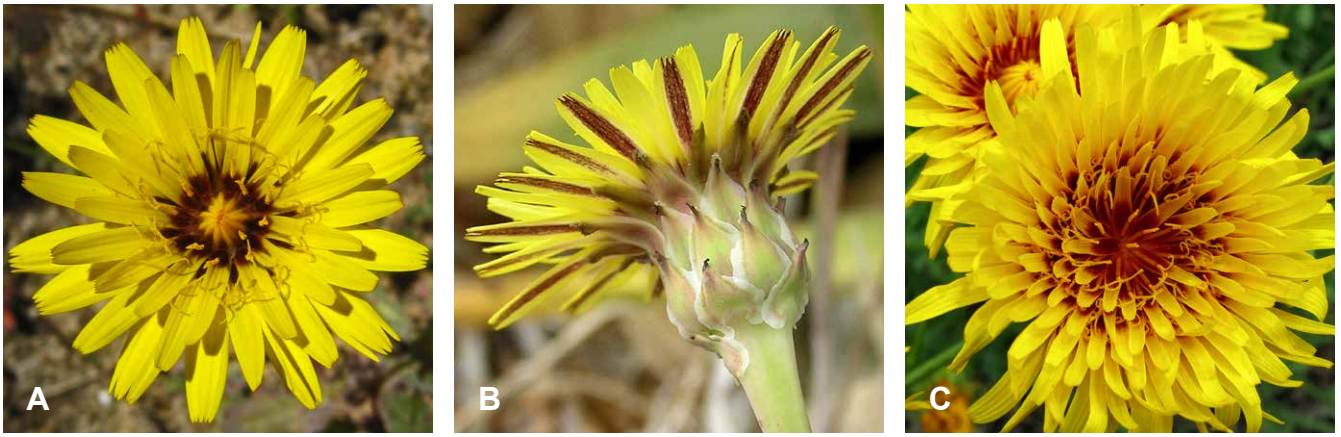
Picris angustifolia subsp. *angustifolia* (A, B, C, D, E & F)



P. squarrosa (G, H, I, J & K)



PI. 10. A-F, Foul Bay, YP, FBCG-11. G, Tennyson, SL. H, Murray River, MU. I & J, Port Noarlunga, SL. K, Tennyson, SL. Photos: A-F, T.M. Jaques; G & I-K, R.K. Sandercock, DEWNR; H, S.A. Seed Conservation Centre, DEWNR.



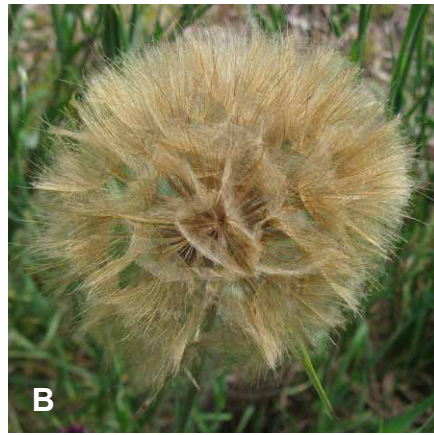
Reichardia tingitana (A, B, C, D, E, F, G, H, I, J, K, L & M)



Pl. 11. **A**, Coomandook, SE. **B**, Stenhouse Bay, Innes N.P., YP. **C**, SW of Lamerero, MU. **D**, Stenhouse Bay, Innes N.P., YP, INP-659. **E**, Baan Hill Track, Ngarkat C.P., SE. **F**, Hattah - Robinvale Rd, Vic. **G-I**, Innes N.P., YP. **J-L**, Jolly's Beach, Innes N.P., YP. **M**, Innes N.P., YP. Photos: A, J.G. Conran; B, D & G-M, T.M. Jaques; C, A.L. Carle; E & F, G.N. Carle.



Pl. 12. **A**, S of Lameroo, MU. **B**, young plant, Vic. **C**, Lower Glenelg N.P., Vic. **D–F**, Bascombe Well C.P., EP, D.J. Duval 2384 **G**, Lower Glenelg N.P., Vic. **H**, Gundaroo, N.S.W. **I**, Inverleigh, Vic. **J**, Gundaroo, N.S.W. **K**, Vic. **L**, near Meadows, SL. **M**, Vic. Photos: **A** & **L**, G.N. Carle; **B**, A. Grubb; **C** & **G**, J. Eichler; **D–F**, S.A. Seed Conservation Centre, DEWNR; **H** & **J**, J. Tann; **I**, L. Phelan; **K** & **M**, A. Grubb.



Tragopogon porrifolius (A, B & C)



Urospermum picroides (D, E, F, G, H, I & J)



Pl. 13. A, Vic. B & C, near Meadows, SL. D & E, Perth, W.A. F-H, Mt Monster, SE. I, Perth, W.A. J, Mt Monster, SE. Photos: A, A. Grubb; B & C, G.N. Carle; D, E, & I, R. Cumming; F-H & J, A.L. Carle.



Flaveria trinervia (A & B)



Tagetes minuta (C & D)

Pl. 14. A & B, Fishhole Ck, LE, BS69-31942. C & D, Goulburn River N.P., N.S.W. Photos: A & B, P.D. Canty, DEWNR; C & D, Tony Rodd.