

## Four new species of *Acacia* (Fabaceae: Mimosoideae) with fasciculate phyllodes from south-west Western Australia

Bruce R. Maslin

Western Australian Herbarium, Department of Parks and Wildlife,  
Locked Bag 104, Bentley Delivery Centre, Western Australia 6983  
Email: Bruce.Maslin@dpaw.wa.gov.au

### Abstract

Maslin, B.R. Four new species of *Acacia* (Fabaceae: Mimosoideae) with fasciculate phyllodes from south-west Western Australia. *Nuytsia* 24: 161–175 (2014). Four new species of *Acacia* Mill. sect. *Acacia* are described, namely, *A. dilloniorum* Maslin, *A. keigheryi* Maslin, *A. kulinensis* Maslin and *A. parkerae* Maslin. *Acacia keigheryi*, *A. parkerae* and *A. kulinensis* occur in the wheatbelt region of the South West Botanical Province; the first two were previously treated as informal variants of *A. lullfitziorum* Maslin to which they are related, with the latter more distantly related to these species. *Acacia dilloniorum* occurs in the adjacent Eremaean Botanical Province, in the south-west extremity of the arid zone; it is most closely related to *A. kochii* W.Fitzg. ex Ewart & Jean White and is not especially close to the other three new species described here. All four new species are classified as Priority taxa under Department of Parks and Wildlife Conservation Codes for Western Australian Flora. Notes are provided (under *A. parkerae*) on *A. scabra* Benth., a poorly known entity of uncertain taxonomic status that is known only from its type.

### Introduction

The four new species described here belong to *Acacia* Mill. sect. *Acacia* (formerly *Acacia* sect. *Phyllodineae* DC.). The phyllodes on three of these species (*A. keigheryi* Maslin, *A. kulinensis* Maslin and *A. parkerae* Maslin) are all or mostly grouped at the mature nodes to form distinct, fasciculate, nodose clusters arranged on short shoots (which are often called brachyblasts). While nodose clusters occur in the fourth species (*A. dilloniorum* Maslin) its phyllodes are more commonly sub-fasciculate. Species with fasciculate phyllodes are not especially common among the Australian acacias with 53 species (representing *c.* 5% of the genus) recorded as possessing them (Maslin 2014). These species occur in sect. *Acacia* (29 species, representing 7% of the section), sect. *Juliflorae* (Benth.) Maiden & Betche (19 species, representing 7% of the section) and sect. *Plurinerves* (Benth.) Maiden & Betche (5 species, representing 3% of the section). Fasciculate phyllodes are not known to occur in sect. *Lycopodiifoliae* Pedley (phyllodes verticillate) or in either of the two bipinnate-leaved groups, sect. *Botrycephalae* (Benth.) Taub. and sect. *Pulchellae* (Benth.) Taub.

There has been no systematic study of fasciculate phyllodes within the Australian *Acacia* flora. Nevertheless, it is clear from the above that this phyllode arrangement occurs in a number of disparate groups within the genus. Also, as evidenced by the following examples, the mode of expression of the fasciculate condition varies among the species. Although brachyblasts are not uncommon, they do

not occur in all species that possess fasciculate phyllodes. In some species, such as *A. tetragonophylla* F.Muell. (*vide* Maslin 2001: 394), brachyblasts are common and well-developed. However, there are many examples where phyllodes simply arise from a common point on the main branches without any short-shoot development (e.g. *A. conjunctifolia* F.Muell., *vide* NSW 2001, and *A. aptaneura* Maslin & Reid, *vide* Maslin & Reid 2012: 172). There is also variation among species with respect to the frequency of fascicles. In some species fascicles occur at most mature nodes (e.g. *A. keigheryi*, *A. kulinensis* and *A. parkerae*), whereas in other species the fascicles are fewer and are interspersed (at varying frequencies) with single-phyllode nodes (e.g. *A. lullfitziorum* Maslin which is discussed below under *A. keigheryi* and *A. hilliana* Maiden, *vide* NSW 2001a). Sometimes fascicles are confined to the juvenile growth phase of individuals, with the subsequent adults possessing single-phyllode nodes. This occurs, for example, in *A. estrophiolata* F.Muell. (*vide* Cowan & Maslin 2001) and in certain members of the Mulga (*A. aneura* F.Muell. ex Benth.) group (*vide* Maslin & Reid 2001: 159).

Brachyblastic species proliferate their branch system through the development of a new shoot that arises from within the cluster. When first initiated the phyllodes on these new shoots occur singularly at the nodes, but with time secondary phyllodes are often initiated within the axils of these phyllodes and new brachyblasts are formed. Within the brachyblast it is not uncommon to observe phyllodes of different sizes (reflecting their varying ages) and for this reason only presumed mature phyllodes are described in the descriptions below. Macroscopically at least these brachyblastic clusters with their phyllodes of varying sizes appear to be homologous to the primary and secondary leaves described by Ross (1979: 12) for the bipinnate-leaved African species of *Vachellia* Wight & Arn. (syn. former *Acacia* subgen. *Acacia*).

There is variation among the species regarding the length of time it takes for phyllode clusters to develop on the new shoots. In some species (e.g. *A. keigheryi* and *A. kulinensis*) secondary phyllode development occurs very quickly at all or most nodes as the new shoot expands so that single-phyllode nodes are infrequent. In other species (e.g. *A. tetragonophylla*) there is a time-lag before the secondary phyllodes are produced and in these cases single-phyllode nodes occur on new shoots while nodes possessing fascicles occur on mature branchlets. This dimorphism for phyllode disposition can sometimes be misleading, especially when viewing herbarium material. For example, Bentham (1864: 330) described *A. genistoides* Cunn. ex Benth. as having single-phyllode nodes, based on material collected by Alan Cunningham and others, presumably unaware that the material used in this description was simply the new growth of the brachyblastic species *A. tetragonophylla* that had been described by Mueller (1863: 3) the year previously (*vide* Maslin 1980: 319).

Of the four new species described below, three (*A. keigheryi*, *A. kulinensis* and *A. parkerae*) occur in the South West Botanical Province, while the fourth (*A. dilloniorum*) occurs in the adjacent Eremaean Botanical Province. These four new species are included in the online identification key to Australian acacias (Maslin 2014).

## Taxonomy

***Acacia dilloniorum*** Maslin, *sp. nov.*

*Type:* Weld Range, Western Australia [precise locality withheld for conservation reasons], 23 August 2011, D. Coultas, N. Henshaw & J. Grantham WR-05 (*holo:* PERTH 08294348; *iso:* CANB, K, MEL, NSW).

*Acacia* sp. Wilgie Mia (D. Coultas & G. Woodman AW 03-Opp 1), Western Australian Herbarium, in *FloraBase*, <http://florabase.dpaw.wa.gov.au> [accessed June 2014].

Diffuse, intricately branched *shrub* (0.3–)0.5–1.8 m tall. *Bark* light grey. *Branches* terete, ribs not visible, glabrous, reddish brown aging grey, dividing into numerous, short, straight, rigid, divaricate, coarsely pungent lateral branchlets that are often devoid of phyllodes towards their apices. *Stipules* fused over their entire length, early caducous and falling as a single unit, present only on very young new shoots, *c.* 1 mm long. *Phyllodes* occasionally fasciculate in nodose clusters but normally single and crowded on short shoots, often appearing sub-fasciculate, elliptic, oblong-elliptic, obovate or oblanceolate, (5–)7–12(–15) mm long, (2–)3–5(–7) mm wide, l:w = 2–3(–4), straight, wide-spreading, green, glabrous except for a few appressed hairs when very young; *midrib* ±prominent, yellow; *lateral nerves* yellow and variably anastomosing distally near margin of phyllodes; *marginal nerve* not thickened, yellow; *apices* asymmetrically narrowed to a rigid, slender, straight, pungent, brown cusp 0.7–1.5 mm long; *pulvinus* distinct, 0.5–1 mm long, terete, sub-smooth, yellow to light brown. *Gland* situated on upper margin of phyllode 0–0.5 mm above the pulvinus, circular to oblong, very small, 0.1–0.2 mm diam./long, not raised. *Inflorescences* simple, single within axil of phyllodes; *peduncles* 8–20 mm long, glabrous, ebracteate; *heads* globular to obloid, 35–40-flowered, 5–6 mm diam./long when dry, yellow; *receptacle* glabrous. *Bracteoles* peltate, 1–1.5 mm long; *claws* narrowly oblong to linear, colourless, glabrous; *laminae* circular to oblate, *c.* 0.8 mm diam., brown or yellowish, glabrous or sparsely minutely ciliolate. *Flowers* 5-merous; *calyx* gamosepalous, 1/2 or slightly exceeding 1/2 length of petals, dissected for 1/4–1/3 its length into oblong or broadly triangular, slightly inflexed, glabrous or sparsely and minutely ciliolate lobes, calyx tube sparsely short-puberulous especially at its base; *petals* 2–2.5 mm long, glabrous, nerveless; *ovary* glabrous. *Pods* narrowly oblong, 25–55 mm long, 4.5–5.5 mm wide, flat but slightly raised over the seeds and not constricted between them, coriaceous, slightly undulate, moderately to strongly curved (sometimes into an open circle), slightly shiny, reddish brown, faintly pruinose when young, glabrous, very obscurely openly reticulately nerved, marginal nerve not thickened. *Seeds* longitudinal to oblique in pods, obloid but noticeably constricted at the hilar end, 3.5–4 mm long, 3–3.3 mm wide, black, with a satin lustre, minutely and obscurely pitted except at centre; *pleurogram* obscure; *areole* ‘u’-shaped, with a wide opening at end facing the aril, 0.5 mm long, 0.4–0.5 mm wide; *funicle* gradually expanded into a once- or twice-folded, lateral, cream (?white when fresh) *aril* that extends for 1/3–1/2 down one side of the seed. (Figure 1)

*Characteristic features.* Intricately branched *shrub* with numerous, short, straight, rigid, divaricate, coarsely pungent lateral branchlets. *Phyllodes* crowded (often appearing sub-fasciculate) on short shoots, normally single at nodes, (5–)7–12(–15) mm long, (2–)3–5(–7) mm wide, midrib ±prominent, lateral nerves anastomosing near phyllode margins; *apices* asymmetrically narrowed to a slender, pungent cusp; *pulvinus* distinct, 0.5–1 mm long. *Inflorescences* simple; *peduncles* 8–20 mm long, glabrous; *heads* globular to obloid. *Flowers* 5-merous; *calyx* gamosepalous, *c.* 1/2 length of petals, shortly dissected into oblong or broadly triangular lobes. *Pods* 25–55 mm long, 4.5–5.5 mm wide, narrowly oblong, curved (sometimes into an open circle), reddish brown, very obscurely reticulately nerved. *Seeds* longitudinal, obloid but noticeably constricted at the hilar end, 3.5–4 mm long, 3–3.3 mm wide, black, with a satin lustre; *aril* extending 1/3–1/2 down one side of the seed.

*Other specimens examined.* WESTERN AUSTRALIA: [localities withheld for conservation reasons] 23 Aug. 2011, *D. Coultas, N. Henshaw & J. Grantham* WR-03 (PERTH); 25 Aug. 2011, *D. Coultas, N. Henshaw & J. Grantham* WR-10 (PERTH) & WR-12 (PERTH); 26 Aug. 2008, *D. Coultas & G. Woodman* AW 03-Opp1 (MEL, PERTH); 15 Oct. 2008, *S. Hitchcock s.n.* (PERTH 08033587); 23 Oct. 2008, *S. Hitchcock s.n.* (PERTH 07982917).

*Distribution.* Occurs in the mid-west region of the south-west arid zone in Western Australia where it is known from only the Weld Range, about 60 km north-west of Cue. *Acacia dilloniorum* occurs over a 20 km linear stretch of the range in a series of relatively small, scattered populations, and

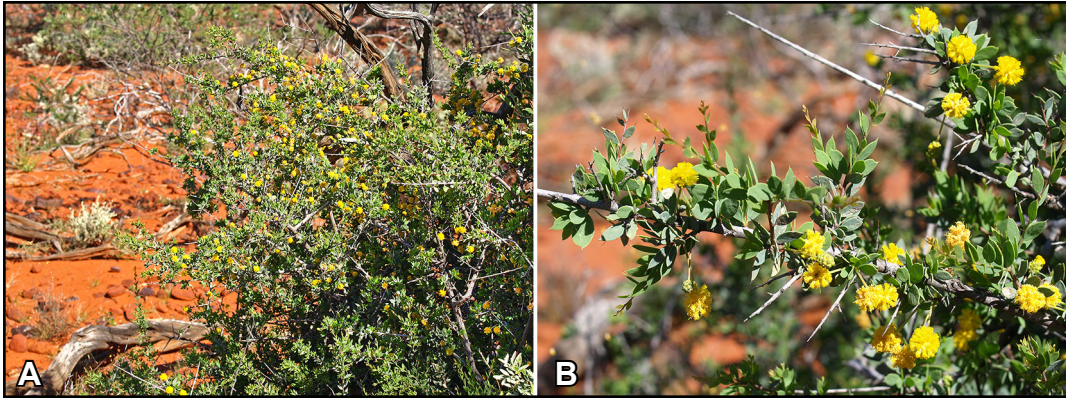


Figure 1. *Acacia dilloniorum*. A – habit showing intricate branching system; B – portion of branch showing pungent phyllodes on short, rigid, coarsely pungent branchlets, and globular heads. Photographs by David Coultas.

is generally quite common in the places where it occurs. As of 2012, nine populations have been recorded, with four of these containing in excess of 2,500 individual plants. It seems likely that future survey will reveal additional populations because the range contains hitherto unsurveyed habitats that are similar to those from where the species is currently known. It is probably unlikely, however, that *A. dilloniorum* would occur outside the Weld Range. All known populations of *A. dilloniorum* occur on mineral exploration and mining tenements (at least two are on active mining tenements and several on exploration tenements). The above information regarding population details was provided by David Coultas (pers. comm., December 2013).

*Habitat.* Grows in red clay-loam or red-brown silty clay-loam on the middle and upper slopes and crests of low ranges mostly associated with outcropping basalt, but some plants in one of the populations occurred on Banded Iron Formation (BIF) (D. Coultas pers. comm.). It occurs in tall, open shrubland of *Acacia* sp. Weld Range (A. Markey & S. Dillon 2009) and sometimes *A. speckii* or members of the Mulga group (*A. aneura* and its allies) over low shrubland that includes *Dodonaea amplisemina*, *Eremophila mackinlayi* subsp. *spathulata*, *Grevillea inconspicua*, *Heliotropium ovalifolium*, *Ptilotus obovatus* and various species of *Senna*.

*Phenology.* The few existing collections show *A. dilloniorum* as flowering in August and possessing pods with mature seed in late October.

*Conservation status.* *Acacia dilloniorum* is listed by Smith (2013) as Priority One under Department of Parks and Wildlife Conservation Codes for Western Australian Flora, under the name *Acacia* sp. Wilgie Mia (D. Coultas & G. Woodman AW 03-Opp1).

*Etymology.* This species is named for Department of Parks and Wildlife employees Steven (Steve) Dillon and his wife Adrienne Markey, in recognition of their excellent work during 2005 and 2008 in connection with surveys of greenstone belts and the BIF ranges in southern Western Australia. The comprehensive Markey and Dillon collections from these surveys, including many species of *Acacia*, are deposited at the Western Australian Herbarium (PERTH).

*Common name.* Wilgie Mia Wattle.

*Notes.* *Acacia dilloniorum* differs from the other three species described in this work with respect to

its phyllode arrangement. Although the phyllodes occasionally are grouped in nodose clusters they normally occur singly at the nodes and because they are crowded on short shoots they often assume the appearance of being sub-fasciculate.

*Affinities.* This species is most closely allied to *A. kochii* W.Fitzg. ex Ewart & Jean White and is not closely related to the other three new species that are described below. *Acacia dilloniorum* and *A. kochii* resemble one another in being intricately branched shrubs with short, divaricate, spinescent lateral branchlets and possessing fasciculate or sub-fasciculate, 1-nerved, distinctly pulvinate phyllodes with similar dimensions, having commonly obloid heads on long peduncles and similar flower morphologies. *Acacia kochii* differs most obviously from *A. dilloniorum* by its innocuous phyllodes, moniliform to sub-moniliform pods that are larger (to 90 mm long, (4–)5–7 mm wide), prominently raised over the seeds and longitudinally nerved, and larger (5–6 × 3.2–4.5 mm), elliptic seeds that are not noticeably constricted at the hilar end and which possess a terminal, conical aril. Although both species often have obloid heads, in *A. kochii* they vary to shortly cylindrical (to 15 mm long), a condition which does not occur in *A. dilloniorum*, and are never globular as is sometimes the case in the new species. *Acacia kochii* occurs in the Mount Gibson–Morawa area, about 250 km to the south of where *A. dilloniorum* grows.

***Acacia keigheryi* Maslin, sp. nov.**

*Type:* south of Ongerup, Western Australia [precise locality withheld for conservation reasons], 5 December 2013, B.R. Maslin 10277 (*holo:* PERTH 08520429; *iso:* CANB, K, MEL, NSW).

Diffuse or low-domed, intricately branched, straggly *shrub* normally 0.3–0.5 m tall and 0.5–1.7 m across, occasionally prostrate to *c.* 5 cm tall. *Bark* smooth, grey. *Branches* terete, ribs not visible or very obscure, normally with a light grey epidermis that becomes longitudinally fissured with age and ultimately exfoliates to reveal a reddish brown under-surface, puberulous especially towards apices, the hairs short, straight and patent to shallowly curved and retrorsely ±appressed, sometimes dividing into short, wide-spreading, straight, rigid, innocuous or ±coarsely pungent lateral branchlets. *Stipules* at base of phyllode clusters persistent or sub-persistent, narrowly triangular to linear-triangular, 0.8–2 mm long, erect, straight to shallowly recurved, thickened and sub-indurate on lower half, brittle in upper half, innocuous to slightly pungent, brown, hirsutellous in lower half or glabrous. *Phyllodes* fasciculate in nodose clusters of 2–5(–8) at mature nodes, single on new shoots that arise from some clusters, oblong to narrowly oblong, oblong-elliptic or oblong-lanceolate, occasionally slightly obovate, symmetric or asymmetric (with upper margin straight to shallowly concave and lower margin shallowly convex), 3–7(–9) mm long, 1–2 mm wide, l:w = 1.5–4, straight to shallowly incurved, ±patent to somewhat reflexed, green, glabrous or with short, normally curved and ±appressed (or sometimes straight and/or patent) hairs mostly on margins and midrib, occasionally very sparsely punctulate by scattered, minute, circular, sessile, dull brown, resinous trichomes; *midrib* central or sub-central, not prominent; *lateral nerves* not visible or few and indistinct; *apices* obtuse to sub-acute, innocuous, mucro microscopic (*c.* 0.1 mm long) or absent; *pulvinus* *c.* 0.5 mm long, terete, smooth or obscurely and finely transversely wrinkled when dry. *Gland* situated on upper margin of phyllode 1–2 mm above the pulvinus, sometimes absent, circular to oblong-elliptic, microscopic, 0.1–0.3 mm diam./long, easily overlooked (even at magnification), sessile, not raised. *Inflorescences* simple, 1–2(–3) per phyllode cluster at terminal nodes; *peduncles* (4–)5–9 mm long, slender, strongly recurved when in pod, sub-glabrous or with hairs similar to branches (except shorter), rarely with a single bract *c.* 1 mm long near or above the middle; *heads* globular, (17–)20–28-flowered, 3–4 mm diam. at anthesis when dry. *Bracteoles* spatulate, 1 mm long; *claws* narrowly oblong, 0.3–0.5 mm long; *laminae* ovate-lanceolate, 0.3–0.5 mm wide, shallowly concave, shallowly inflexed, brown, sparsely

hairy, acute to short-acuminate. *Flowers* 5-merous; *sepals* free, *c.* 2/3 length of petals, membranous, glabrous or sub-glabrous, claws narrowly oblong, normally slightly expanded (to *c.* 0.2 mm wide) at their non-thickened, acute apices; *petals* 1.2–1.5 mm long, glabrous, nerveless. *Pods* 10–25 mm long, 3–4 mm wide, narrowly oblong to sub-moniliform, flattened but domed over the seeds with umbo extending to edge of valve, shallowly to moderately constricted between the seeds, slightly undulate, thinly coriaceous, straight to shallowly or strongly curved, pure brown, glabrous or sometimes with very scattered, minute, appressed hairs, nerveless or obscurely reticulate by very fine nerves that are not longitudinally aligned, inner surface of valve marked by a pale-coloured, broad, thin band of tissue that extends the length of the pod; *marginal nerve* not thickened or slightly thickened, yellow. *Seeds* longitudinal within the pods, ellipsoid to globose, 2.5–3 mm long, 2–2.2 mm wide, turgid (*c.* 2 mm thick), dull, dark brown to blackish except dull lighter brown at centre (sometimes only bordering the pleurogram), clearly mottled dull yellow; *pleurogram* fine; *areole* broadly ‘u’-shaped with a wide opening at end facing the aril, 0.3–0.5 mm long, 0.5–0.7 mm wide; *funicle* expanded into a thickened *aril* below the seed, the aril dull cream when dry (?white when fresh). (Figure 2)

*Characteristic features.* Diffuse or low-domed *shrub* 0.3–0.5 m tall, rarely prostrate. *Branches* puberulous, the hairs patent to retrorsely ±appressed, sometimes dividing into short, wide-spreading, straight, rigid, innocuous or ±coarsely pungent branchlets. *Stipules* 0.8–2 mm long, innocuous to slightly pungent. *Phyllodes* fasciculate in nodose clusters at mature nodes, single on new shoots, mostly oblong to narrowly oblong, oblong-elliptic or oblong-lanceolate, 3–7(–9) mm long, 1–2 mm wide, innocuous, midrib not prominent. *Inflorescences* simple; *peduncles* (4–)5–9 mm long, slender, strongly recurved in pod, rarely bracteate; *heads* globular, small (3–4 mm diam. at anthesis when dry), (17–)20–28-flowered. *Bracteoles* 1 mm long, the laminae ovate-lanceolate and *c.* 0.3 mm wide. *Flowers* 5-merous; *sepals* free. *Pods* small (10–25 × 3–4 mm), narrowly oblong to sub-moniliform, straight to curved, pure brown, normally glabrous, nerveless or obscurely reticulate. *Seeds* dark brown to blackish and clearly mottled dull yellow.

*Other specimens examined.* WESTERN AUSTRALIA: [localities withheld for conservation reasons] 29 July 2005, *S. Barrett* 1369 (PERTH); 12 Oct. 2005, *S. Barrett* 1412 (PERTH); 2 Nov. 1986, *G.J. Keighery* 8893 (PERTH); 5 Dec. 2013, *B.R. Maslin* 10277 (PERTH); 24 Oct. 1996, *J.W. Mercer* 137 (PERTH); 8 Sep. 1963, *K. Newbey* 930 (PERTH, MEL); 15 Nov. 1964, *K. Newbey* 1508 (PERTH); 24 Sep. 1965, *K. Newbey* 1794 (PERTH); 29 Aug. 1974, *K. Newbey* 4319 (PERTH); 8 Dec. 2013, *S. Osborne* 1 & 2 (both PERTH); 20 Sep. 2004, *S. Osborne* 16 (PERTH); 16 Sep. 1999, *M.B. Stockwell* 19 (PERTH).

*Distribution.* Occurs in south-west Western Australia in a relatively restricted area to the west and north-west of the Stirling Range. Most collections are from between Ongerup and the vicinity of Boxwood Hill and north of Cape Riche (a north–south distance of about 70 km). As best can be judged from the current collections *A. keigheryi* is scattered and not especially uncommon within this area that has been extensively cleared for agriculture. It has been recorded from one nature reserve (no. 13240) within this area (i.e. *J.W. Mercer* 137) and from land adjacent to the Greaves Hill Nature Reserve (i.e. *S. Barrett* 1412), but it is not known if it occurs within the latter reserve.

*Habitat.* Grows on gentle slopes in often stony, gritty sand, sandy loam, sandy clay or clay over granite or gneiss, in very open Mallee woodland over heath scrub.

*Phenology.* Flowers from mid-August to mid-October. Immature pods have been collected in the first half of November and pods with mature seeds collected from early to mid-December.





Figure 2. *Acacia keigheryi*. A – habitat; B – habit showing low-domed growth form; C – branches showing phyllodes fasciculate at mature nodes and single at young nodes near ends of branchlets; D – node showing fasciculate phyllodes in nodose cluster; E – pod. Photographs by Bill and Jane Thompson (A, B) and Bruce Maslin (C–E).

**Conservation status.** *Acacia keigheryi* is to be listed as Priority Three under Department of Parks and Wildlife Conservation Codes for Western Australian Flora (A. Jones pers. comm.).

**Etymology.** This species is named for Gregory (Greg) J. Keighery, Senior Principal Research Scientist with the Department of Parks and Wildlife, in recognition of his significant contributions to the botany of Western Australia.

**Common name.** Keighery's Wattle.

**Affinities.** *Acacia keigheryi* was noted, as variant number three, in the protologue of *A. lullfitziorum* Maslin (Maslin 1999: 369–370), but was not included within the circumscription of this species. The two species are closely related as evidenced especially by their fasciculate, 1-nerved, innocuous phyllodes, simple inflorescences, globose heads and free sepals. While carpological characters readily distinguish the species, care is needed with non-fruiting specimens that they not be confused. The pods of *A. lullfitziorum* differ from those of *A. keigheryi* in being terete, narrower (2–3 mm wide) and clearly longitudinally reticulate with elongated nerve-islands, and its seeds are not mottled. Non-fruiting specimens of *A. lullfitziorum* can be distinguished in the following ways: plants seemingly more often truly prostrate, forming ground-hugging, flat-topped or low-domed mats (further field knowledge of *A. keigheryi* is needed to confirm that plants of this species are only occasionally similarly prostrate); branches normally glabrous but if hairs are present they are curved and antrorsely ±appressed or

rarely straight and patent (never retrorsely  $\pm$  appressed as often occurs in *A. keigheryi*), and normally dividing into more numerous, short, rigid lateral branchlets that are more obviously spinose (i.e. sharply pungent or sub-pungent); phyllodes wider (2–6 mm); peduncles commonly with a single bract located at some point along their length (this bract is absent or rare in *A. keigheryi*). Although both species possess fasciculate phyllodes that occur in nodose, brachyblastic clusters that grow out, in *A. keigheryi* the clusters very quickly develop within the axils of single phyllodes at all nodes as the new shoots elongate, whereas in *A. lullfitziorum* not all nodes develop clusters and therefore it is not uncommon to find in this species a mixture of single phyllodes and phyllode-clusters. *Acacia lullfitziorum* has a wider geographic range than that of *A. keigheryi*, extending from Badgingarra south to the Stirling Range. This distribution is generally to the west and north of where the new species grows. However, the two species are parapatric in the vicinity of Ongerup (they are not known to be sympatric) with the specimen *K. Newbey s.n.* (PERTH 00174718), from 12 miles [19.3 km] west of Ongerup, representing the closest known record of *A. lullfitziorum* to that of *A. keigheryi*. The specimen *G.J. Keighery* 8385 of *A. lullfitziorum* from the western extremity of the Stirling Range also occurs relatively close to south-western occurrences of *A. keigheryi*.

***Acacia kulinensis*** Maslin, *sp. nov.*

*Type:* near Kulin, Western Australia [precise locality withheld for conservation reasons], 2 December 2013, *B.R. Maslin* 10269 (*holo:* PERTH 08517363; *iso:* AD, BRI, CANB, G, K, MEL, NSW, NY).

*Acacia* sp. Kulin (S. Murray 504), Western Australian Herbarium, in *FloraBase*, <http://florabase.dpaw.wa.gov.au> [accessed June 2014].

Spreading, intricately branched *shrub* 0.5–1.5 m tall and 1–2 m wide, the terminal branches sparingly divided. *Bark* dark grey to mid-grey. *Branches* terete, ribs not visible or occasionally very obscure, with a light grey, longitudinally fissured epidermis (revealing reddish brown under-surface), puberulous to  $\pm$ hirsute, the hairs patent to sub-appressed and sub-straight. *Stipules* at base of phyllode clusters persistent, evident, fused at base, 2–3 mm long, wide-spreading, shallowly recurved, slender but rigid, subulate, pungent, normally brittle in upper half (commonly only the lower portion persisting at mature nodes), reddish brown. *Phyllodes* fasciculate in often short-nodose clusters of 4–10(–12) at mature nodes, single at apex of new shoots but clusters soon developed, oblong to elliptic or obovate, (1.5–)2–3 mm long, 0.6–1 mm wide, 1:w = 2–3, straight, slightly thickened, smooth when fresh but sparingly and shallowly longitudinally rugose when dry, green, glabrous; *nerves* not visible or midrib very obscure; *apices* obtuse, mucronulate or mucro wanting; *base* contracted (sometimes abruptly so) into a distinct, short (0.3–0.5 mm long), yellow pulvinus. *Gland* absent. *Inflorescences* simple, 1 or 2 per phyllode cluster; *peduncles* 4–10 mm long, slender, straight or shallowly curved, glabrous to sparsely hairy, the fine hairs patent to sub-appressed, short and curved to sub-crisped, a single,  $\pm$ caducous bract situated on upper half of flowering peduncles but absent from fruiting peduncles, the bract narrowly oblong to narrowly lanceolate, *c.* 1 mm long, curved and short-acuminate; *heads* globular, 17–20-flowered, *c.* 4 mm diam. at anthesis when dry, bright yellow. *Bracteoles* spatulate, *c.* 1 mm long; *claws* narrowly oblong to linear, glabrous; *laminae* narrowly oblong-lanceolate, 0.7–0.8 mm long, *c.* 0.4 mm wide, shallowly curved, shallowly concave, light brown, sub-glabrous, short-acuminate. *Flowers* 5-merous; *sepals* free, 2/3 length of petals, linear-spatulate, the laminae *c.* 0.2 mm wide, sub-glabrous and obtuse or acute; *petals* 1.3–1.5 mm long, glabrous, nerveless. *Pods* sub-moniliform, clearly raised over seed with umbo extending to edge of valves, shallowly but discernibly constricted between the seeds, 20–50 mm long, 3–3.5 mm wide, thinly coriaceous, shallowly or more commonly strongly curved (sometimes into an open circle), curved/twisted or coiled (sometimes  $\pm$ irregularly so) upon dehiscence, light brown, sparsely appressed-hairy, margins



not thickened, gradually narrowed at base. *Seed* longitudinal in pods, obloid to ellipsoid, 2.5–3.5 mm long, 2–2.5 mm wide, turgid (1.5–2 mm thick), shiny except dull at centre, very dark brown to black; *pleurogram* obscure; *areole* widely ‘u’-shaped and open at end facing the aril, 0.2–0.3 mm long, c. 0.4 mm wide; *funicle* expanded into a fleshy, thickened, normally once-folded, cream (when fresh) *aril* that partially sheaths the base of the seed. (Figure 3)

*Characteristic features.* Intricately branched, prickly *shrub* 0.5–1.5 m tall. *Stipules* evident below phyllode clusters, 2–3 mm long, slender but rigid and pungent, shallowly recurved. *Phyllodes* fasciculate in often short-nodose clusters, oblong to elliptic or obovate, (1.5–)2–3 mm long, 0.6–1 mm wide, glabrous; *nerves* not visible or midrib very obscure; *apices* obtuse; *pulvinus* short (0.3–0.5 mm long) but distinct. *Gland* absent. *Inflorescences* simple; *peduncles* 4–10 mm long, glabrous to sparsely hairy; *heads* globular, 17–20-flowered, small (c. 4 mm diam. at anthesis when dry), bright yellow. *Flowers* 5-merous; *sepals* free, linear-spathulate. *Pods* sub-moniliform, clearly raised over seeds and shallowly constricted between them, 3–3.5 mm wide, thinly coriaceous, mostly strongly curved, light brown. *Seed* small (2.5–3.5 × 2–2.5 mm), very dark brown to black; *aril* partially sheathing base of seed.

*Other specimens examined.* WESTERN AUSTRALIA: [localities withheld for conservation reasons] 6 Dec. 2007, T. Erickson & T. Clifton TEE 251 (PERTH); 21 Sep. 2002, J.P. Francis 90 (K, MEL, PERTH); 12 Aug. 2004, K. Kershaw & S. Murray KK 2446 (PERTH); 23 Sep. 2001, S. Murray 504 (PERTH).

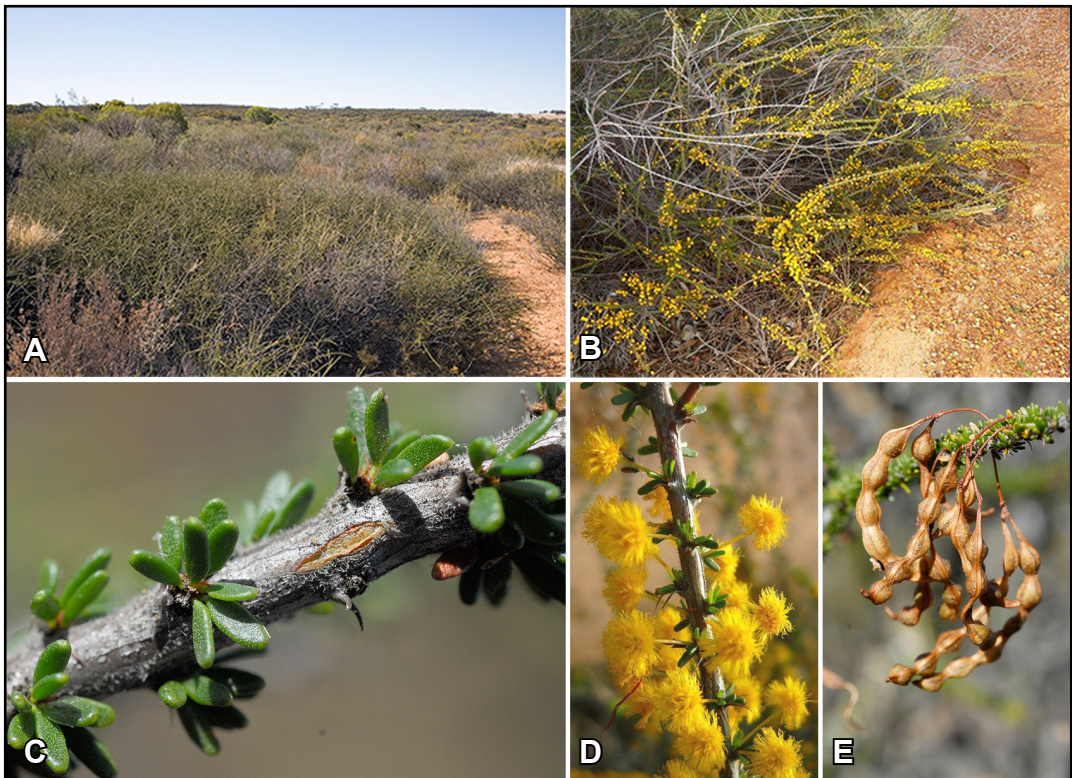


Figure 3. *Acacia kulinensis*. A – habit (foreground plant) and habitat; B – habit showing sparsely divided terminal branches; C – portion of branchlet showing fasciculate, small phyllodes and recurved, spiny stipules; D – flowering branch showing bright golden heads; E – pods. Photographs by Todd Erickson (A), Debbie Scrivener, (B, D) and Bruce Maslin (C, E).

*Distribution.* Occurs in the south-central wheatbelt region of south-west Western Australia where it is known from only a very restricted area in the vicinity of Kulin. Existing collections are from disturbed areas within a water catchment reserve and from the adjacent, degraded road verge. A single plant is also known from a disturbed site about 3 km from the reserve but this may not represent a natural occurrence (S. Murray pers. comm.). It is not known if *A. kulinensis* occurs in the relatively large, undisturbed stand of natural vegetation that is contained within the water reserve. The general region in which the species occurs has been extensively cleared for agriculture with most of the remaining natural vegetation existing as remnants, either along (often highly disturbed) road verges or in small nature reserves. Somewhat surprisingly the first collection of this species occurred only a decade ago, by Sandra Murray.

*Habitat.* The reserve where most collections are from is a disturbed site that was graded and shallowly contoured some years ago for water conservation purposes. Most collections are from the graded area that has now regenerated with a dense, low shrubland dominated by *Baeckea crispiflora*, *Cryptandra* sp., *Gastrolobium spinosum*, *Hypocalymma angustifolium*, *Grevillea hookeriana* and *Leptospermum erubescens*. *Acacia kulinensis* is common in this shrubland. The soil comprises brown or yellow-brown, often gravelly sand or sandy loam over clay. Along the degraded road verge adjacent to the water reserve *A. kulinensis* is scattered on gravelly brown sand with *Leptospermum erubescens*, *Dryandra* sp. and the introduced Capeweed (*Arctotheca calendula*).

*Phenology.* Determining a comprehensive phenology for this species is not possible because of the paucity of collections. However, plants at full anthesis have been collected in late September and pods with mature seed in early December.

*Conservation status.* *Acacia kulinensis* is listed by Smith (2013) as Priority One under Department of Parks and Wildlife Conservation Codes for Western Australian Flora, under the name *Acacia* sp. Kulin (S. Murray 504).

*Etymology.* The species is named for the township, Kulin, from near where the species is found.

*Common name.* Kulin Wattle.

*Affinities.* This is a very distinctive species on account of its spiny stipules and more particularly its fasciculate phyllodes that are very small, obtuse and shortly but distinctly pulvinate. It probably has affinities with *A. nodiflora* Benth., which also possesses spiny stipules and fasciculate phyllodes, in addition to globular heads and free sepals that are found in the new species; however, this relationship is not especially close. *Acacia nodiflora* is readily distinguished from *A. kulinensis* by its linear phyllodes that are 7–13 mm long, longer peduncles (10–20 mm), larger heads with 25–50 flowers, narrowly oblong pods 7–8 mm wide and larger seeds (c. 5 × 3.5 mm). *Acacia nodiflora* is an uncommon, geographically restricted species that occurs in the northern wheatbelt about 400 km to the north-west of where *A. kulinensis* grows.

***Acacia parkerae* Maslin, sp. nov.**

*Type:* west-south-west of Kojonup, Western Australia [precise locality withheld for conservation reasons], 3 December 2013, B.R. Maslin 10274 (*holo:* PERTH 08520348; *iso:* AD, CANB, K, MEL, NSW, NY, PERTH 08520356).

Prostrate, intricately branched, often sprawling *shrub* to *c.* 1 m across, branches sometimes erect and reaching *c.* 0.2 m high. *Bark* grey. *Branches* terete, ribs not visible or obscure, often developing a light grey epidermis that becomes longitudinally fissured with age and ultimately exfoliates to reveal a reddish brown under-surface, puberulous by normally antrorsely appressed, short, straight or antrorsely shallowly curved hairs, the hairs rarely patent or retrorsely  $\pm$ appressed, rarely dividing into a few short, straight, wide-spreading, rigid,  $\pm$ coarsely pungent lateral branchlets. *Stipules* at base of phyllode clusters persistent except on oldest clusters where they are absent or only basal portion remaining, narrowly triangular to linear-triangular or (especially when young) lanceolate, 2–3(–4) mm long, slender, erect, straight or sometimes very shallowly recurved, thickened and sub-indurate on lower half, brittle on upper half which commonly breaks off,  $\pm$ scarious when young, innocuous to slightly pungent when mature, dark red-brown or (when young) light brown, ciliolate on lower half or glabrous. *Phyllodes* fasciculate in nodose clusters of 2–5(–9) at mature nodes, single on new shoots that arise from within some clusters, shape and size variable, commonly narrowly oblong-oblancheolate or obovate but ranging to narrowly oblong-elliptic, oblong or narrowly oblong, asymmetric with upper margin straight to shallowly concave and lower margin shallowly to moderately convex, (8–)10–25 mm long, (2–)3–5(–6) mm wide, l:w = 3–5(–6), normally shallowly incurved (curving uniformly over entire length or on upper 1/3 only), sometimes straight,  $\pm$ patent to ascending, rarely reflexed on new shoots, thinly coriaceous, dark green, with short, fine, appressed hairs on margins and sometimes midrib, otherwise glabrous, punctulate by scattered (often very sparse), small, circular, sessile, dull brown resinous trichomes; *midrib* central or sub-central, often yellow when dry; *lateral nerves* indistinct; *marginal nerve* thin and not prominent; *apices* obtuse, innocuous, mucro centric or sub-centric, straight or hooked and 0.1–0.3 mm long; *pulvinus* 0.5–1 mm long,  $\pm$ smooth. *Gland* situated on upper margin of phyllode 0.5–3(–8) mm above the pulvinus, sometimes absent from a few phyllodes, oblong-elliptic, 0.4–0.5 mm long, sessile, flat (not raised), central pore shallow. *Inflorescences* simple, 1–3 per phyllode cluster; *peduncles* (7–)10–30(–40) mm long, slender, often shallowly curved or wavy when dry, some recurved when in pod, red on surface facing sun when fresh and yellowish green on opposite surface, sparsely to moderately (rarely densely) hairy, the hairs straight or shallowly curved and  $\pm$ appressed or sometimes patent, rarely with a single, lanceolate, brown bract *c.* 1.5 mm long near or above the middle, a single flower or a pedunculate head sometimes arising within axil of this bract; *heads* globular, 22–25-flowered, 4–6 mm diam. at anthesis when dry, yellow. *Bracteoles* spatulate, 1.5–2 mm long, often slightly exerted in mature buds, glabrous or sub-glabrous; *claws* narrowly oblong, 0.5–0.6 mm long; *laminae* triangular-lanceolate, 1–1.5 mm long, 0.4–0.6 mm wide, flat or shallowly concave, dark brown, sparsely hairy, acuminate. *Flowers* 5-merous; *sepals* free or very shortly united at base, 3/5–2/3 the length of petals, claws narrowly oblong and expanded at apex into small, acute laminae *c.* 0.3 mm wide, glabrous or sub-glabrous; *petals* 2 mm long, glabrous or sub-glabrous, nerveless. *Pods* tightly and sometimes irregularly spirally coiled, 5–15 mm long (unexpanded length), 3–4(–5) mm wide, thinly coriaceous, domed over the seeds with umbo extending to edge of valve, brown, sub-glabrous to sparsely appressed-puberulous with very short, shallowly curved hairs, nerves not visible or obscurely openly reticulate by fine nerves; *marginal nerve* thickened, often pale. *Seeds* longitudinal within the pods, obloid, occasionally ovoid, 3–4 mm long, 2.5–2.7 mm wide, turgid (*c.* 2 mm thick), dull to sub-shiny, dark brown to blackish except dull yellow or light brown at centre, sometimes very obscurely mottled dull yellow; *pleurogram* fine; *areole* ‘u’-shaped with a wide opening at end facing the aril, 0.4–0.5 mm long, 0.5–0.7 mm wide; *funicle* filiform and *c.* 1 mm long, expanded into a sub-straight or shallowly curved, white *aril* that is once-folded at the attachment to the seed, attachment sub-lateral. (Figure 4)

*Characteristic features.* Prostrate *shrub*. *Branches* puberulous, the hairs normally antrorsely appressed, rarely dividing into a few short, straight, wide-spreading, rigid,  $\pm$ coarsely pungent lateral branchlets. *Stipules* 2–3(–4) mm long, innocuous to slightly pungent. *Phyllodes* fasciculate in nodose clusters at mature nodes, single on new shoots, shape and size variable, commonly asymmetrically narrowly



oblong-oblongate or obovate, (8–)10–25 mm long, (2–)3–5(–6) mm wide, l:w = 3–5(–6), normally shallowly incurved, 1-nerved, innocuous. *Inflorescences* simple, *peduncles* (7–)10–30(–40) mm long, slender, rarely bracteate; *heads* globular, 22–25-flowered. *Bracteoles* 1.5–2 mm long, often slightly exerted in mature buds, the laminae triangular-lanceolate and acuminate. *Flowers* 5-merous; *sepals* ±free. *Pods* tightly and sometimes irregularly spirally coiled, 3–4(–5) mm wide, ±nerveless. *Seeds* not mottled or sometimes very obscurely mottled.



Figure 4. *Acacia parkerae*. A – prostrate growth form (with Thu Maslin); B – fruiting branch; C – distinctively tightly coiled pods; D – nodes showing fasciculate phyllodes. Photographs by Bruce Maslin.

*Other specimens examined.* WESTERN AUSTRALIA: [localities withheld for conservation reasons] 30 Sep. 1971, *A.S. George* 11063 (CANB, MEL, PERTH); 3 Oct. 1978, *A.S. George* 15255 (PERTH); 16 Oct. 1996, *C.M. Lewis* 119 (PERTH); 10 Oct. 1998, *C.M. Lewis* 427 (PERTH); 11 Nov. 2000, *C.M. Lewis* 508 (PERTH); 20 Sep. 1988, *P. Luscombe* 121 (AD, K, NSW, PERTH); 3 Dec. 2013, *B.R. Maslin* 10274 (PERTH); 4 Dec. 2013, *B.R. Maslin* 10275 (PERTH) & 10275A (MEL, PERTH); 28 Feb. 1989, *G.S. McCutcheon* 1991 (PERTH).

*Distribution.* Occurs in south-west Western Australia in a somewhat restricted area near Kojonup, straddling the boundary of the wheatbelt and forest regions. Most gatherings of this rather poorly collected species are from scattered populations in the forest region to the west and south of Kojonup. A majority of these collections are roadside gatherings and it is possible that further sampling of suitable habitats within the region will show the species to be more common than currently known. The wheatbelt specimen of *A. parkerae* that was collected in 1971 (i.e. *A.S. George* 11063) represents the first gathering of the species. A recent (December 2013) investigation of this site by the author showed that no plants survive in this population which was located on a narrow road verge in a landscape extensively cleared for agriculture.

*Habitat.* Grows in brown loam, clay or clay loam (normally not lateritic), typically in association with *Eucalyptus wandoo*.

*Phenology.* Flowers in September and October. Pods with mature seed occur in early December.

*Conservation status.* *Acacia parkerae* is to be listed as Priority Three under Department of Parks and Wildlife Conservation Codes for Western Australian Flora (A. Jones pers. comm.).

*Etymology.* This species is named for Cheryl Parker, Technical Officer at the Western Australian Herbarium. The competent technical assistance that Cheryl has so graciously provided to Herbarium staff, including myself, over the past 35 years has been greatly appreciated and it is therefore a pleasure to commemorate her in this plant name.

*Common name.* Parker's Wattle.

*Affinities.* The two collections, *A.S. George* 11063 and 15255, that were noted in the protologue of *A. lullfitziorum* (Maslin 1999: 369–370), but not included within the circumscription of that species, are *A. parkerae*. These two species are related, as evidenced especially by their fasciculate, 1-nerved, innocuous phyllodes, simple inflorescences, globose heads and free sepals. Also, plants of *A. lullfitziorum* are often completely prostrate, forming ground-hugging mats like those of *A. parkerae*. *Acacia lullfitziorum* is very easily distinguished from the new species by its pods that are terete, straight to shallow curved and clearly longitudinally reticulately nerved. The distinctive spirally coiled pods of *A. parkerae* were unknown at the time *A. lullfitziorum* was described. Other characters that enable *A. lullfitziorum* to be distinguished from *A. parkerae* include its possession of numerous, short, wide-spreading, straight, rigid, pungent or sub-pungent lateral branchlets, more consistently fasciculate phyllodes that are commonly shorter (normally 5–13 mm long), normally shorter peduncles (mostly 5–10 mm long) that often possess a single bract at some point along their length (this bract is rarely present in *A. parkeri*) and shorter bracteoles (c. 1 mm long) with smaller, acute or obtuse laminae. Although the geographic range of *A. parkerae* partially intersects that of the more widespread *A. lullfitziorum* (which extends from Badgingarra south to the Stirling Range), the two species are not known to be sympatric.

*Acacia parkerae* sometimes superficially resembles the more distantly related *A. cuneifolia* Maslin which is readily distinguished by its short, gamosepalous calyx, small, acute to sub-acute bracteoles, curved to loosely and openly coiled pods and normally dimidiately cuneate phyllodes with a ± pungent mucro and which are not often fasciculately arranged. *Acacia cuneifolia* is an erect shrub 1.5–3 m tall that occurs on granite rocks to the north of where *A. parkerae* grows (*vide* Maslin 1999: 340).

It is appropriate here to comment briefly on *A. scabra* Benth., a poorly known entity that was provisionally treated as conspecific with *A. nodiflora* by Maslin (2001a: 553), but which is now included by Maslin (2014) in the WATTLE key to Australian *Acacia* species as a separate entity. *Acacia scabra* is known only from its type, namely, *J. Drummond* (?collection 2) no. 162, which comprises specimens in young pod and a few detached heads. While *A. scabra* is probably most closely related to *A. nodiflora* (as noted by Maslin *loc. cit.*) its type does resemble *A. parkerae* in a number of ways, namely: main branches lack short, rigid, spinescent lateral branchlets; phyllodes 10–20 mm long, 2–3 mm wide (which is at the lower end of the width range for *A. parkerae*), 1-nerved, innocuous, and with at least some arranged in fascicles; peduncles 13–20 mm long; sepals free. Despite these similarities the two species are not conspecific because there is no evidence at all that the pods on the type of *A. scabra* are coiled, which is one of the diagnostic features of *A. parkerae*. Furthermore, the phyllodes of *A. scabra* are different from those of *A. parkerae* in being symmetrically narrowly oblong to oblong-elliptic, straight to shallowly sigmoid, sparsely to moderately hispidulous (hairs patent) and excentrically mucronulate. While some of these attributes are occasionally found on specimens of *A. parkerae* they are not combined as in the type of *A. scabra*.

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David Coultas (Woodman Environmental Consulting Pty Ltd) is gratefully acknowledged for providing distribution and habitat information for *A. dilloniorum*. Ongerup residents Sue Osborne and Bill and Jane Thompson are thanked for assistance in acquiring specimens and photographs of *A. keigheryi*, and Sarah Barrett (Department of Parks and Wildlife, Albany) for providing personal observations on the field occurrence of the species. Sandra Murray from Kulin is thanked for field assistance, specimen acquisition and local knowledge relating to *A. kulinensis*. Joan Francis (Brookton) and her sister, Debbie Scrivener, are thanked for providing photographs of *A. kulinensis*. My wife, Thu, is thanked for assistance provided in the field in December 2013 when pods were collected of all species described here, except *A. dilloniorum*. Alex George is thanked for checking the formulation of the new names contained in this work.

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