



Alyogyne leptochlamys comb. et stat. nov. (Malvaceae): clarification and species rank for an often overlooked taxon from western South Australia and Western Australia

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Abstract: A taxon formerly recognised at variety level by the names *Hibiscus huegelii* var. *leptochlamys* Benth. and *Alyogyne pinoniana* var. *microandra* Fryxell has been the subject of much confusion, partly because the former name was never transferred to the genus *Alyogyne* and the latter was very narrowly circumscribed. This uncommon but often collected shrub, currently known by the phrase name *Alyogyne* sp. Great Victoria Desert (*D.J. Edinger 6212*) WA Herbarium, is here described at species level as *Alyogyne leptochlamys* (Benth.) P.J.Lang, with details of its distinguishing features, distribution and ecology. An update to the *Flora of South Australia* key for *Alyogyne* is provided.

Keywords: biodiversity, new species, taxonomy, Australia, *Alyogyne*

Introduction

In reviewing the numerous collections from Eyre Peninsula determined as *Alyogyne huegelii* (Endl.) Fryxell in the State Herbarium of South Australia (AD), it became apparent to P.J.L. that many were misidentifications of another taxon. It was clear that this second entity included the type of *A. pinoniana* var. *microandra* Fryxell (Fig. 1), but varied beyond the circumscription traditionally applied to that variety. Further investigation revealed that its variation extended to encompass the type of *Hibiscus huegelii* var. *leptochlamys* Benth. (Fig. 2). The taxon differs distinctly in many characters from the typical variety of *A. pinoniana*, as well as all other *Alyogyne* species and is herein described and formally recognised at species level as *A. leptochlamys* (Benth.) P.J.Lang.

The taxonomy of *Alyogyne huegelii* s.lat. is a subject of ongoing work by J.G.C. and T.D.M. and is not addressed here, except to note that we regard *A. huegelii* s.str. as an endemic Western Australian (W.A.) taxon, and its only wild occurrences in South Australia (S.A.) are presumed introductions where it has self-established to a limited extent from plantings. Aside from the new species, we consider that all native S.A. material treated as *A. huegelii* in the published census of Barker *et al.* (2005) and current online version (State Herbarium of

South Australia 2023), together with matching W.A. material, is also distinct at species level from *A. huegelii* s.str. That taxon will be referred to here by an existing phrase name, *Alyogyne* sp. Hutt River (*B.J. Lepschi & T.R. Lally 2310*) WA Herbarium. It has a similar disjunct distribution across the Great Australian Bight to the new species (AVH 2023).

Material currently known as *Alyogyne* sp. Great Victoria Desert (*D.J. Edinger 6212*) WA Herbarium in both the Western Australian (FloraBase) and South Australian censuses is the subject of this paper. Most of it was segregated from *Alyogyne huegelii* in the course of this study. The taxon has previously been referred to both *Hibiscus huegelii* var. *leptochlamys* and *Alyogyne pinoniana* var. *microandra*.

Previous treatments

Hibiscus huegelii was described by Endlicher (1837) based on a collection by Hugel from Swan River, W.A. In his *Flora Australiensis*, Bentham (1863: 217) considered it a variable species with a wide distribution in S.A. and W.A. and provided a brief diagnosis for five of “the most conspicuous forms”. These included var. *leptochlamys* from “Murchison river”, for which he noted the “bracteoles” [= epicalyx] as relatively long and free to the base. This is the basionym for the new species we describe in this paper.



Fig. 1. Holotype of *Alyogyne pinoniana* var. *microandra* Fryxell. **A** Holotype sheet: R. Pearce s.n. (AD98595718); **B** closer view of flower (inset rotated). Scale bar: B = 10 mm.

In the first edition *Flora of South Australia*, Black (1926) partly included the new species under *H. huegelii* var. *leptochlamys* and gave its distribution as “Fowler’s Bay and near Ooldea.—West Australia”, the former two S.A. localities corresponding to two J.M. Black specimens at the State Herbarium of South Australia (AD). Significantly, he separated var. *leptochlamys* from typical *H. huegelii* in his key based on the “free linear bracteoles” (Black 1926: 380) and provided some additional diagnostic characters including petals with blotching at the base and “the stigmas of *H. Pinonianus*” (Black 1926: 382). However, in the same work Black misidentified two other S.A. collections of the new species, referring them to *Hibiscus pinonianus* var. *drummondii*, which he published therein as a new combination, reducing *Hibiscus drummondii* Turcz., a taxon otherwise endemic to W.A., to variety level. In the second edition of *Flora of South Australia* (Black 1952) the treatment of *H. huegelii* var. *leptochlamys* was unchanged, but Black reinstated *H. drummondii* as a species, separating it from *H. pinonianus* on its leaf shape. In both *Flora* editions Black gave the S.A. distribution for *H. drummondii* as “Minnipa, Eyre Peninsula; north of Murat Bay” (Black 1926: 380, as var. *drummondii*, 1952: 566), again corresponding to

AD sheets of the new species *Alyogyne leptochlamys*, bearing descriptive annotations by him.

Fryxell (1968) transferred *Hibiscus huegelii*, along with *H. pinonianus*, to *Alyogyne*. His account of *A. huegelii* made no reference to any of Bentham’s other varieties, and not even *H. huegelii* var. *leptochlamys*, which Black (1952) had recognised, was cited in synonymy. Under the new combination *Alyogyne pinoniana* (as ‘*pinonianus*’) Fryxell erected a new variety, var. *microandra* (as ‘*microandrus*’), apparently overlooking to amend the epithet endings to match the feminine generic name *Alyogyne*. He gave only a brief diagnosis, distinguishing it from the nominate variety by “its smaller stature, its smaller petals (to 3 cm.) which lack a basal spot, its shorter filaments (to ½ mm) that are one-fourth the length of those of the typical variety, and its smaller stigma of only 1 mm. diameter”. The epithet *microandrus*, from the Latin for “small male”, is presumably a reference to the shorter filaments. Fryxell noted that “in spite of the reduced flower parts, the fruits and seeds are of similar size” (Fryxell 1968: 265). He designated as type the specimen R. Pearce s.n., from near Midgee Rocks (34 km NE of Cowell) on eastern Eyre Peninsula (AD98595718, formerly ADW29591).



Fig. 2. Syntype of *Hibiscus huegelii* var. *leptochlamys* Benth. (two specimens on right): J. Drummond s.n. (K000659927).

We regard this specimen as being conspecific with the type of *Hibiscus huegelii* var. *leptochlamys*.

Fryxell's taxonomic concept of *Alyogyne pinoniana* var. *microandra* proved to be problematic, and apart from the holotype and isotype sheets, few, if any, specimens were ever determined with that name. In the *Flora of Central Australia*, Mitchell (1981) noted that 'var. *microandrus*' was distinguished by its smaller stature and petals and that only one specimen was available. In the 4th edition of the *Flora of South Australia*, Overton (1986: 826) commented that its taxonomy "has not been investigated" and (provisionally) sank the variety, listing it as a synonym under *A. pinoniana*, while nevertheless presenting an outline of Fryxell's diagnosis.

After Fryxell's publication, most specimens of the new species were assigned to *Alyogyne huegelii* s.lat., sometimes with annotations referencing Bentham's *Hibiscus huegelii* var. *leptochlamys* to draw attention to the linear free epicalyx lobes. Although clearly belonging in *Alyogyne* rather than *Hibiscus* on account of the undivided style, the combination '*A. huegelii* var. *leptochlamys*' was only proposed, but never formally published. In studies for the *Flora of Central Australia* in the late 1970s, A.S. Mitchell segregated some AD collections using the manuscript designation *A. huegelii* var. *leptochlamys*, but most were determined simply as *A. huegelii* and incorporated amongst other material now known as *Alyogyne* sp. Hutt River. However, his published treatment (Mitchell 1981) had only one *Alyogyne* species, *A. pinoniana*, with a brief mention of 'var. *microandrus*'. Overton's (1986) flora treatment followed Fryxell in not recognising varieties under *A. huegelii* and included the new species under a broad concept of that name.

Transfer of *Hibiscus huegelii* var. *leptochlamys* to *Alyogyne pinoniana* was proposed more recently by JGC. The manuscript combination *A. pinoniana* var. *leptochlamys*

(Benth.) Conran ms was referenced in 2011 on Florabase v. 2.6 (APNI 2023), prior to that website adopting the phrase name *Alyogyne* sp. Shark Bay (*D.J. Edinger 6212*) WA Herbarium in Nov. 2013 to align with CHAH phrase name protocols, as recorded by Parker & Biggs (2014). The locality reference was amended at the suggestion of PJJ to conform to the cited collection, and the updated phrase name as *Alyogyne* sp. Great Victoria Desert (*D.J. Edinger 6212*) WA Herbarium was projected on the SA Census online in July 2015 and formally documented for WA the following year (Parker & Percy-Bower 2016). A few specimens of the new species were identified with the (JGC) manuscript name '*Alyogyne pyrrhophila*', subsequently designated by the phrase name *Alyogyne* sp. Hyden (*G.S. Durell GD127*) WA Herbarium (Parker & Biggs 2014).

Variation in flowers of *Alyogyne leptochlamys*

Examination by PJJ of 81 available specimens and/or sheet images assigned to the new species showed both basal pigmentation of petals and flower size to be highly variable (Fig. 6B–D & F). Areas of darker pigmentation towards the base of petals were completely lacking on some specimens, but more often they were just reduced with most flowers exhibiting some degree of red or purple blotching or streaking near their base, but rarely as heavy as the deep red-purple to blackish-violet basal patches of *A. pinoniana* s.str.

Petal length (from apex down to basal junction with the staminal tube) was measured for the 57 sheets (or sheet images with scale) that had suitably pressed flowers and plotted against leaf length (measured from the base of the lamina to the tip of the median segment). The scatterplot (Fig. 3) shows that variation in petal length extends across the W.A. and S.A. collections, is reasonably continuous, and is not strongly correlated to leaf size.

The specimen with the smallest flowers (petals 28 mm long), and the only one fitting Fryxell's diagnosis of *A. pinoniana* var. *microandra* on a strict measurement of petal length, was *P.J. Lang 2847*. It was collected from 7.5 km NNE of Midgee Rocks (38 km NNE Cowell), which is very near to the type locality. Petals on the holotype (Fig. 1) and isotype sheets measured 33–35 mm long, so Fryxell's limit of 3 cm presumably referred to the length of exposed petal from the base of the calyx lobe sinuses. Even adjusting for this, only a handful of individuals had flowers small enough to fit Fryxell's diagnosis.

The geographical distribution of petal size classes (Fig. 4) indicates a node of variation with smaller flowers tending to be more common in the Cowell district on upper eastern Eyre Peninsula, but this is not a consistent trait there, and both smaller and larger flowers are scattered throughout the taxon's range. As well as genetic variation, seasonal conditions and growth stage also appear to influence flower size, with

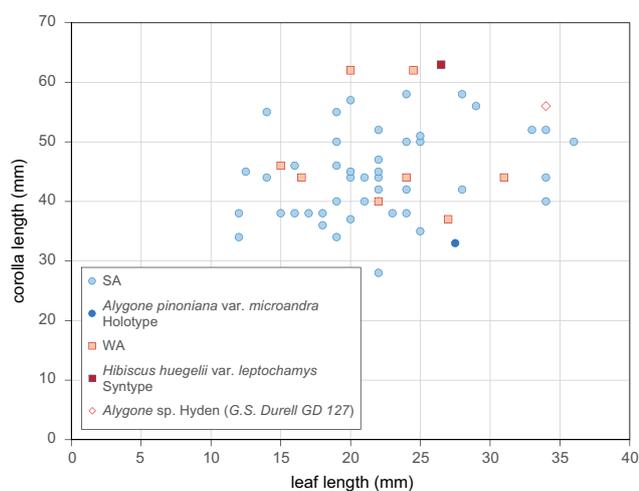


Fig. 3. Scatterplot of petal length (from apex to junction with staminal tube) vs. leaf length (= length of the median leaf lobe) for 57 sheets of the new species *Alyogyne leptochlamys* with measurable flowers.

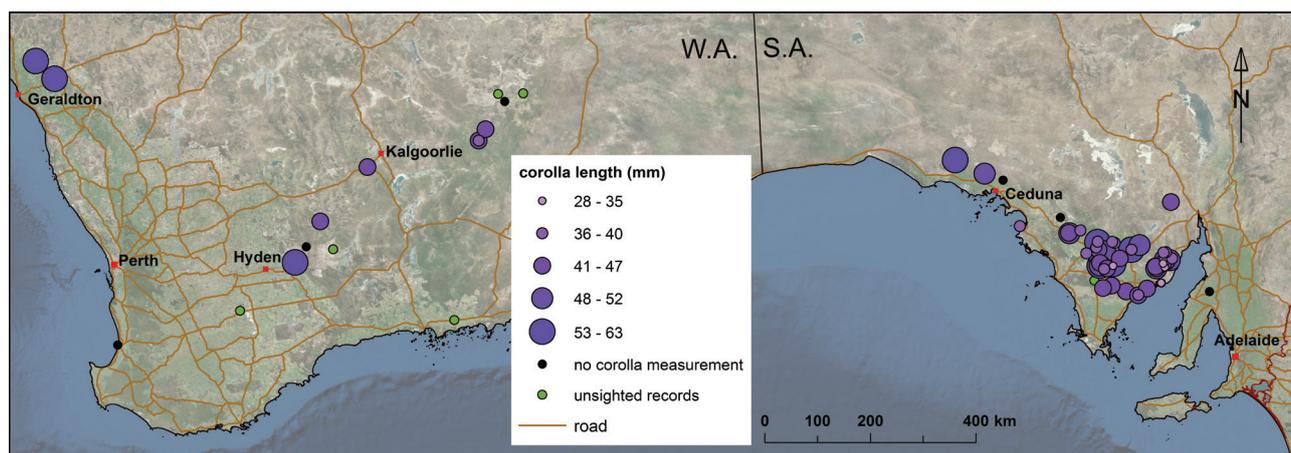


Fig. 4. Distribution of *Alyogyne leptochlamys*, showing geographical spread of corolla length classes for the 57 sheets with measurable flowers.

smaller flowers being found by JGC on older and smaller plants at PJJ collection sites in the following season.

At the other extreme, the longest petal measurement (63 mm) was taken from an image of specimens in Kew (K000659927) collected by J. Drummond in 1853 from “Between Moore & Murchison Rivers, Western Australia” (Fig. 2). This is a syntype of *Hibiscus huegelii* var. *leptochlamys* Benth., labelled with that name in Bentham’s red script. Based on this and similar material, together with Bentham’s (1863) brief diagnosis highlighting the “bracteoles [= epicalyx segments] longer, free to the base” (Bentham 1863: 217), the new species is taken to be synonymous with *H. huegelii* var. *leptochlamys*. This collection is from near the western limit of the new species’ range, although just how far west is unknown, as the Moore & Murchison Rivers run towards the western coast from a considerable distance inland. It also resembles two other westerly collections with similarly large flowers and coarse dense indumentum: one on the same K sheet as the Drummond specimen by A.F. Oldfield from near Bunbury (K000659926), also labelled as *H. huegelii* var. *leptochlamys* by Bentham; plus a 1958 C.A. Gardner collection from near Yuna (which falls between the Moore & Murchison Rivers). While these three have the largest flowers, several S.A. specimens approach them in size, e.g., *A.F. Richards s.n.* (Fig. 5A). So too does a W.A. specimen from c. 53 km E of Hyden (*B.J. Lepschi 2137*) that was previously identified as ‘*Alyogyne pyrrophila*’ [= *Alyogyne* sp. Hyden (*G.S. Durrell GD127*)]. Separate taxonomic status for this phrase name is now considered to be unwarranted, as it fits within the range of variation of the new species, but is indicative of the lush growth that can be produced post-fire under favourable conditions.

The investigation of petal size found no geographic pattern that would support segregating a smaller flowered taxon based on var. *microandra* from the new species, at either species or subspecies level.

Discussion

For many years the species we describe below as *Alyogyne leptochlamys* has been largely overlooked and without a widely accepted name. Its recognition has also been hampered by it sometimes being confused with two very different, but often similar-looking species: *Alyogyne* sp. Hutt River and *Hibiscus drummondii*. Although *A. leptochlamys* is synonymous with both *H. huegelii* var. *leptochlamys* and *A. pinoniana* var. *microandra*, neither of these names have been widely applied to it. The first was most likely avoided because, as Fryxell recognised, it clearly belongs in *Alyogyne* rather than *Hibiscus* on account of the undivided style. The similarity of its seed to that of *A. pinoniana* rather than *A. huegelii* is another possible factor. On the other hand, application of the name *A. pinoniana* var. *microandra* was probably constrained by the narrow circumscription conveyed in Fryxell’s treatment, particularly in regard to the specified flower size and lack of basal pigmentation of petals. The protologue appears to be based solely on the holotype in AD, with the isotype in CANB recorded as not seen, and no other collections or occurrences being cited. As such it provides an inadequate representation of flower size and other attributes of the taxon. Over the years the criterion of “smaller petals (to 3 cm.)” in Fryxell’s (1968: 265) diagnosis led to most specimens of the new species being assigned to *A. huegelii* s.lat., sometimes annotated with a reference to Bentham’s var. *leptochlamys* to draw attention to the linear free epicalyx lobes.

In assigning it as a variety under *Alyogyne pinoniana*, Fryxell rightly recognised the type material of his new variety as being more closely related to *A. pinoniana* than to the forms of *A. huegelii* s.lat. also found on Eyre Peninsula and which are now known as *Alyogyne* sp. Hutt River. This is supported by the seeds (Fig. 5B), which match those of typical *A. pinoniana* in being covered in long, fine, light-brownish hairs, in stark contrast to the darker short-haired blackish-brown seeds of *Alyogyne* sp. Hutt River. It is unfortunate that Fryxell only commented on their size being the same as in the

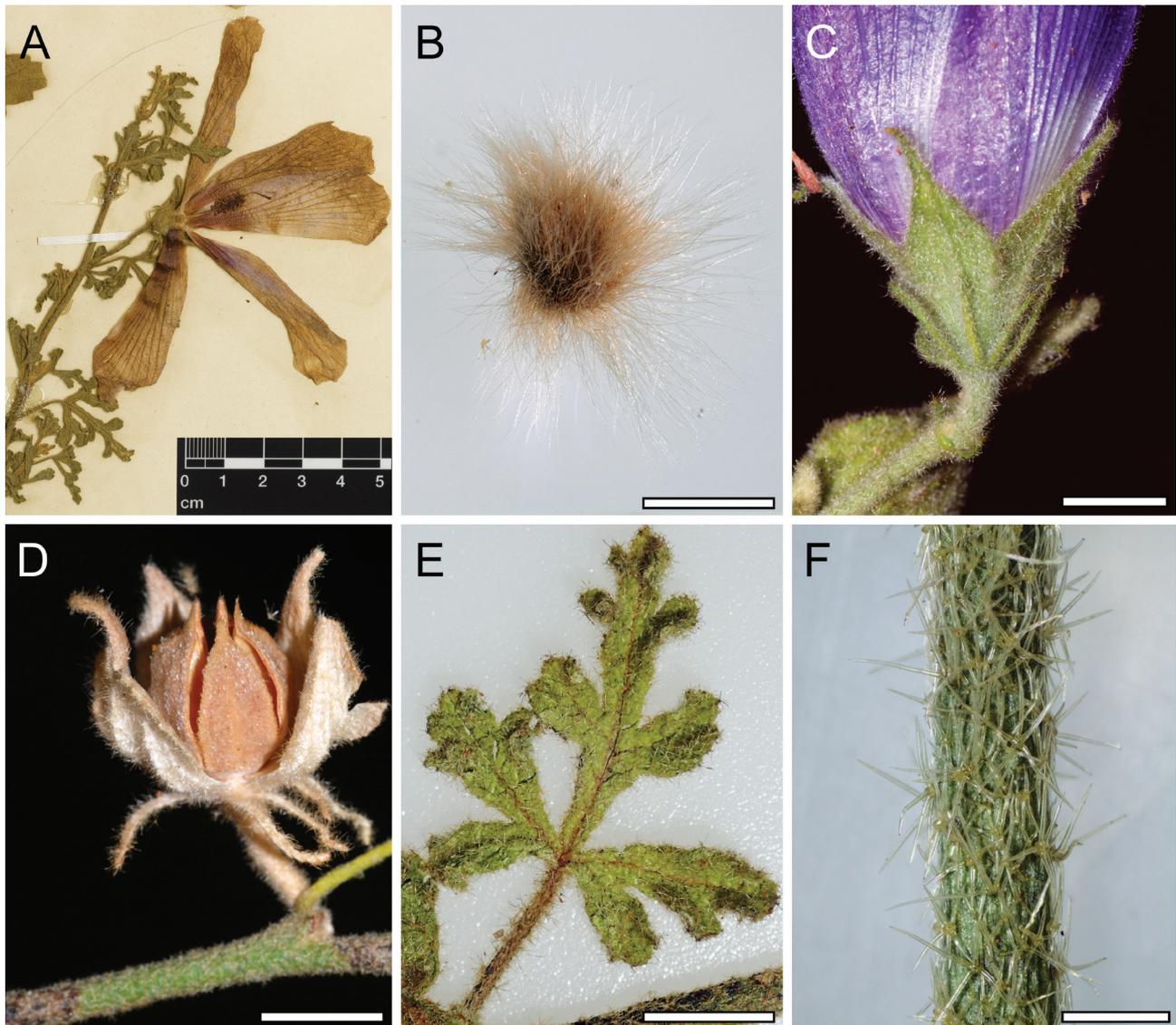


Fig. 5. *Alyogyne leptochlamys*. **A** Large-flowered form from western Eyre Peninsula; **B** seed; **C** base of flower showing calyx and epicalyx; **D** fruit: dehiscent capsule with calyx remains and epicalyx reflexed at base; **E** leaf; **F** young stem, showing stellate indumentum and underlying green colouration. Scale bars: B, F = 2 mm, C, D = 5 mm, E = 10 mm — A A.F. Richards s.n. (AD97611533Y), B–D, F J.G. Conran 3763 (AD), E N. Kalfas NK011 (AD).

typical variety and did not mention the similarity of vestiture. Intriguingly, in distinguishing var. *microandra* from the nominate variety of *A. pinoniana*, Fryxell made no reference to the obvious differences in leaf form and indumentum. In its general appearance, deeply incised leaves and moderately sparse indumentum, var. *microandra* has a closer resemblance to *Alyogyne* sp. Hutt River than to *A. pinoniana*.

Fryxell's publication of *Alyogyne pinoniana* var. *microandra* did not resolve the confusion between specimens of *A. leptochlamys* and those of *Alyogyne* sp. Hutt River. Indeed, his account of *A. huegelii* (s.lat.) in the same paper cites a specimen that is *A. leptochlamys* (and thus equivalent to his just described new variety), alongside four specimens which correspond to *Alyogyne* sp. Hutt River from S.A. The misidentified collection, W.S. Reid s.n. (ADW27924, now AD98595947), even has corollas comparable in size to the type of *A. pinoniana* var.

microandra (30 mm exposed, c. 35 mm in total). The confusion most likely came from its unusually wide leaf lobes which confer a greater than usual resemblance to leaves of *Alyogyne* sp. Hutt River. However, the median leaf lobe is still significantly longer than the others, a feature characteristic of the type of *A. pinoniana* var. *microandra* and of *A. leptochlamys* in general.

Overton's (1986) flora treatment maintained the confusion by including material of *Alyogyne leptochlamys* under two species: firstly, reinforcing Fryxell's very constrained description of var. *microandra* and provisionally placing it in synonymy under *A. pinoniana*, and secondly, listing *Hibiscus huegelii* var. *leptochlamys* in synonymy under *A. huegelii* (as implied but not specifically stated by Fryxell). Despite the latter, there was no clear accommodation of character traits of var. *leptochlamys* in the description. However, the illustrations provided for *A. huegelii* (Overton 1986:

827, Fig. 434B) display leaves, a flower and a fruit matching *Alyogyne* sp. Hutt River alongside a long-haired seed matching *A. leptochlamys*, despite the fact that the description has the seeds as “subglabrous”.

Black’s (1926) misapplication of *Hibiscus drummondii* to two of the four collections of *Alyogyne leptochlamys* that he mentioned is presumably what led him to temporally relegate *H. drummondii* to a variety of *H. pinoniana*. Conversely, three more recent collections of *H. drummondii* (S.D. Hopper 1403, V. Jones 97 and K. Newbey 7437), were found by P.J.L. to have been misidentified as var. *leptochlamys*. These match *A. leptochlamys* in plant height and have a stellate indumentum of similar density and remarkably similar ternate foliage.

Taxonomy

Alyogyne leptochlamys (Benth.) P.J.Lang, *comb. et stat. nov.*

Hibiscus huegelii Endl. var. *leptochlamys* Benth., *Fl. Austral.* 1: 217 (1863). — **Type citation:** “Murchison river”. **Lectotype (here designated):** Western Australia, between Moore & Murchison Rivers, 1853, J. Drummond 103 (K000659927). **Residual syntype:** Western Australia, near Bunbury, *s.dat.*, [A.F.] Oldf. [iield] *s.n.* (K000659926).

Alyogyne pinoniana var. *microandra* Fryxell, *Proc. Linn. Soc. New South Wales* 92(3): 265 (1968), as ‘*A. pinonianus* var. *microandrus*’. — **Holotype:** Roadside near Midgee Rocks, on road to Mitchelville NE of Cowell, Eyre Peninsula, Feb. 1965, R. Pearce *s.n.* (AD98595718!). **Isotype:** CANB209735!

Alyogyne pinoniana var. *leptochlamys* Paczk. & A.R.Chapm., *W. Austral. Fl. Descr. Cat.* 288 (2000), *nom. inval.*

Alyogyne pinoniana var. *leptochlamys* (Benth.) Conran ms, *FloraBase W. Austral. Fl. vers.* 2.6. [<http://florabase.dec.wa.gov.au>] (2011); CHAH, *Austral. Pl. Cens.* [<https://biodiversity.org.au/nsl/services/search/taxonomy>] (2012); C.M.Parker & L.J.Biggs, *Nuytsia* 24: 52 (2014).

Alyogyne pyrrhophila Conran ms, *FloraBase W. Austral. Fl. vers.* 2.6. [<http://florabase.dec.wa.gov.au>] (2011). — *Alyogyne* sp. Hyden (G.S. Durell GD127) WA Herbarium, *FloraBase W. Austral. Fl. vers.* 2.6. [<http://florabase.dec.wa.gov.au>] (2011); C.M.Parker & L.J.Biggs, *Nuytsia* 24: 52 (2014).

Alyogyne sp. Shark Bay (D.J. Edinger 6212) WA Herbarium, *FloraBase W. Austral. Fl. vers.* 2.6. [<http://florabase.dec.wa.gov.au>] (2011); CHAH, *Austral. Pl. Cens.* [<https://biodiversity.org.au/nsl/services/search/taxonomy>] (2012). — *Alyogyne* sp. Great Victoria Desert (D.J. Edinger 6212) WA Herbarium: C.M.Parker & J.M.Percy-Bower, *Nuytsia* 27: 7 (2016); CHAH, *Austral. Pl. Cens.* [<https://biodiversity.org.au/nsl/services/search/taxonomy>] (2018). (amended phrase name locality to match cited specimen).

Hibiscus pinonianus var. *drummondii* auct. non (Turcz.) J.M.Black: J.M.Black, *Fl. S. Austral.* 3: 381 (1926).

Hibiscus drummondii auct. non Turcz.: J.M.Black, *Fl. S. Austral.* ed. 2, 3: 566 (1952).

Alyogyne huegelii auct. non (Endl.) Fryxell: Fryxell, *Proc. Linn. Soc. New South Wales* 92(3): 265 (1968), partly (only as to W.S. Reid specimen, ADW27924); J.Overton, *Fl. S. Austral.* ed. 4, 2: 826–8 (1986), partly (as to inclusion of var. *leptochlamys* in synonymy and seed of fig. 434C); J. Adelaide Bot. Gard Suppl. 1: 92 (2005), partly.

Alyogyne pinoniana auct. non (Gaudich.) Fryxell: J. Overton in Jessop & Toelken, *Fl. S. Austral.*, 2: 828 (1986), partly & questionably (only as to inclusion of var. *microandra* Fryxell in synonymy and contraindicated by description and distribution).

Short-lived perennial *shrub* 15–75 (–120) cm high with a tap root, erect (to partially decumbent) stems and indumentum of pale straw-coloured to golden stellate hairs. *Leaves* discolorous, slightly darker green below, seedling and juvenile phases trilobed to tripartite, adult leaves trisect with segments crenate to lobed, median segment much longer than the two lateral ones, the latter on their lower margin each with a major lobe that is very much shorter than the segment itself, overall outline triangular to trullate, (8–) 14–33 (–41) mm long, (7–) 14–30 (–44) mm wide, lamina surface and margins undulate, veins impressed above, strongly raised below with a prominent midrib on each segment, stellate hairs mid-dense above but sparser around major veins, denser below especially on veins; stipules caducous, narrowly-lanceolate to very narrowly elliptic, 1.5–4.5 mm long, 0.4–1.0 mm wide; petioles 6–22 (–35) mm long. *Pedicels* mostly simple, 4–18 mm long (rarely to 42 mm long and conspicuously articulate and/or bearing a bracteole, 2–3.5 mm long by 0.4–1.5 mm wide), densely covered in stellate hairs. *Epicalyx* (7–) 8–11 (–12)-lobed; segments free at base, slightly spreading, incurved, sometimes violet-tipped, loriate, 5–13 (–18) mm long, 0.3–0.75 mm wide, with mid-dense stellate hairs. *Calyx* fused for lower 30–40%; lobes valvate in early to mid-stage bud with their adjacent recurved margins strongly adpressed to form five longitudinal crimped ridges or wings (but subulate lobe apices often parted), spreading in late bud and at anthesis except near their bases, ovate and strongly acuminate, 9–19 mm long, 4.5–9 mm wide; abaxial surface with a dense stellate indumentum and 3 (–5) parallel veins marked by ribs and larger hairs; adaxial surface with veins impressed, sericeous in distal half with dense antrorsely inclined, whitish, irregularly undulate, narrowly ‘V-shaped’ hairs, grading to glabrous away from margins in proximal half; apices subulate; margins gently recurved, lightly crispate, the edges sometimes stained dark violet. *Petals* lilac to violet, grading to pale lilac or white in lower 20–50% on outside, changing more abruptly inside near the base to mostly white with medial red to purple (drying purple-violet) colouration as a discrete patch or as weak blotching or streaking or sometimes absent, (narrowly-) obovate to spatulate-cuneate, (28–) 35–58 (–63) mm long from extreme base, 15–35 (–44) mm wide, adnate at base to staminal column, 1-toothed on upper outer edge, outside with mid-dense stellate hairs on outer 20–35% where exposed

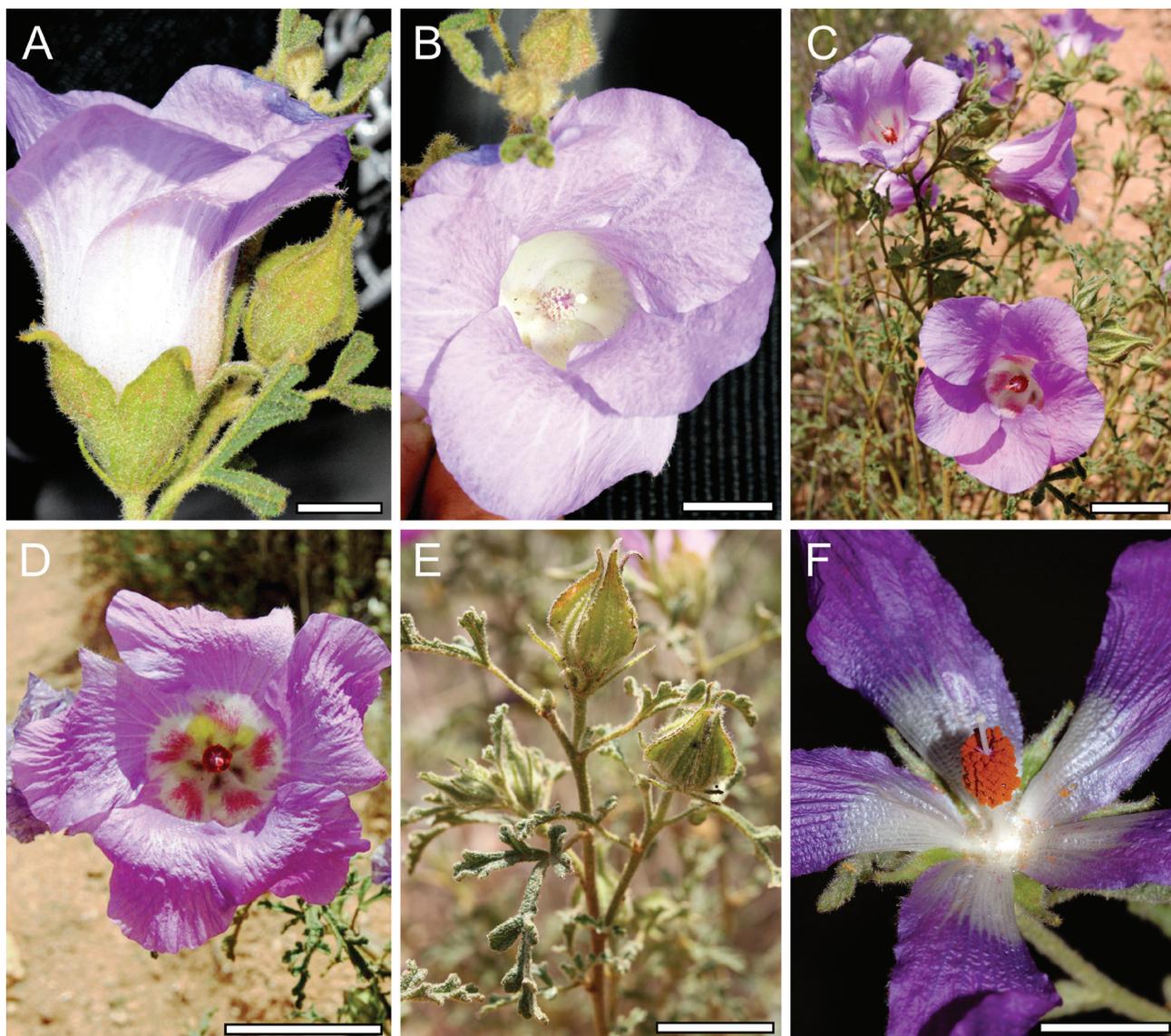


Fig. 6. *Alyogyne leptochlamys*. **A, B** Flowers with petal bases white externally and internally; **C, D** flowers with petal bases prominently blotched internally; **E** buds and foliage; **F** flower spread to show staminal column with densely clustered anthers. Scale bars: A, B = 5 mm, C, D = 20 mm, E, F = 10 mm. — A, B T.D. Macfarlane & C.J. French TDM6396 (AD), C–E P.J. Lang 2800 (AD), F J.G. Conran 3763 (AD).

in late bud, glabrous inside apart from tufts of soft fine biramous hairs at the base and sparsely scattered below the tooth in a strip adjoining the outer margin. *Stamens* forming a staminal column, 9.5–16 mm long; filaments 0.5–1.5 (–2) mm long, emanating singly, in pairs and in irregular whorls along distal 3–7 mm of column; anthers crowded, orange-brown, 0.6–1.2 mm long, 0.4–0.7 mm wide; pollen yellow, pink or purple. *Ovary* ovoid, densely hirsute, 8–12 ovules per locule; style exerted 3–7.5 (–11) mm beyond apex of staminal column; stigma red to (dark) violet, capitate, 0.5–1 (–1.8) mm wide, weakly 5-lobed. *Capsule* 5-valved, broadly obovoid, apiculate, 10–15 (–17) mm long, densely covered by inclined, stiff, multiramous hairs with fascicled antrorse arms (compressed stellate hairs). *Seeds* brown, angular-ovoid, 1.7–3 mm long, 1.2–1.8 mm wide, densely villous with straw-coloured to brown hairs, 1.5–3.2 mm long. **Figs 1–7.**

Affinities and distinctive features. Superficially, *Alyogyne leptochlamys* resembles a small form of *Alyogyne* sp. Hutt River (until recently treated as *A. huegelii* s.lat. in S.A.) and has most often been confused with that taxon. Nevertheless, it is easily separated by its densely villous seeds covered in fluffy light brown hairs (Fig. 5B) (in contrast to dark blackish-brown seeds with an uneven covering of short stiff hairs and (sub-) glabrous patches) and by its completely divided epicalyx with lobes free to the base (rather than fused basally) (Fig. 5C & D). Flowers of *Alyogyne* sp. Hutt River are larger on average than those of the new species, but their size varies substantially in both species with much overlap between them. Although vegetatively similar, *A. leptochlamys* can be distinguished consistently on its foliage alone, having leaf laminae triangular to trullate in outline that are composed of three major lobes with the two lateral lobes much shorter than the median one

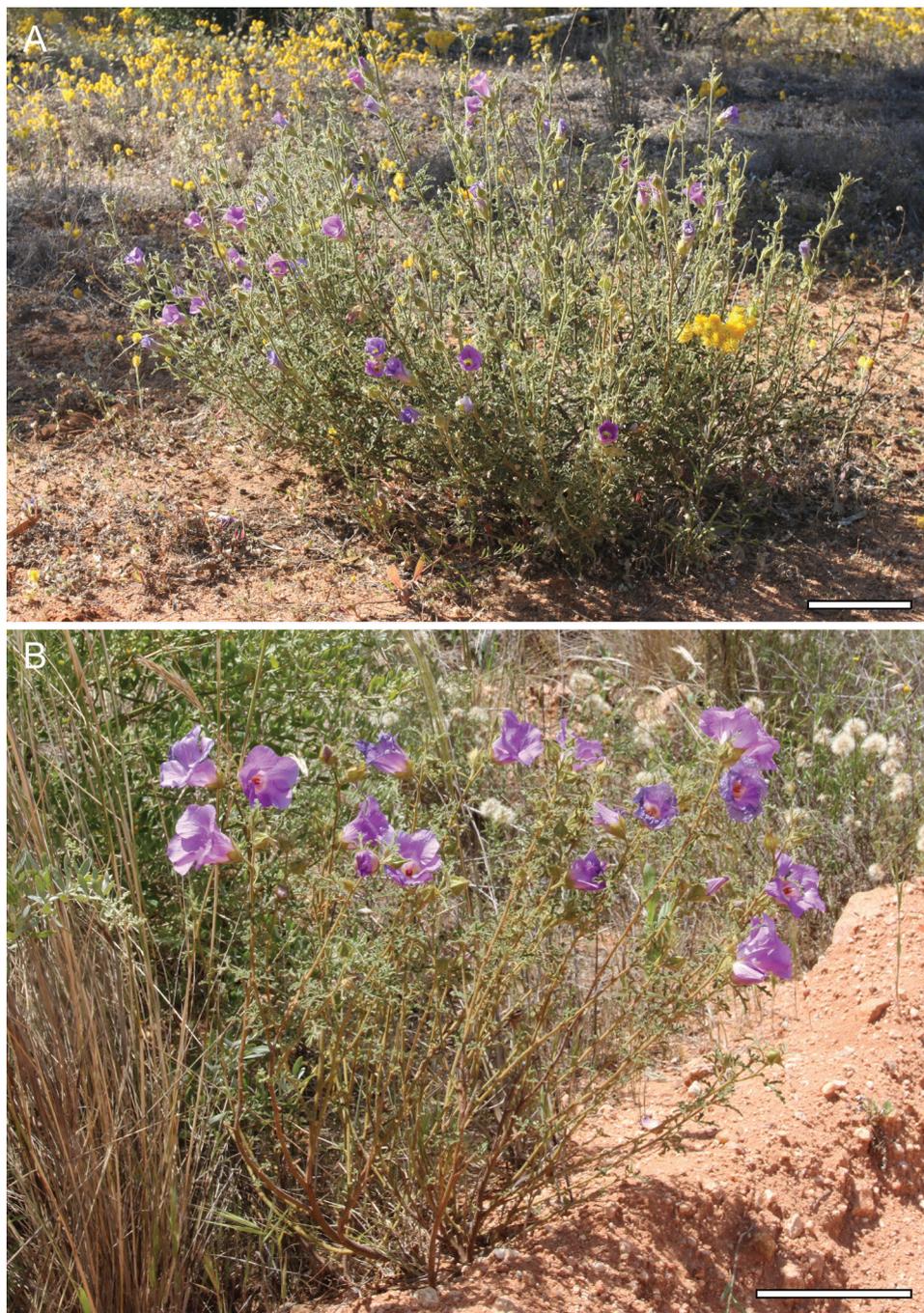


Fig. 7. *Alyogyne leptochlamys*. Habit. Scale bars = 20 cm. — A P.J. Lang 2844 (AD), B P.J. Lang 2801 (AD).

(Fig. 5E). In *Alyogyne* sp. Hutt River, the laminae are more orbicular in outline and approach the palmate condition (palmatifid to palmatifid) in having five major lobes, with the two lateral lobes closer in length to the median one and each bearing a substantial/subequal secondary lobe near the base on their outer margin. *Alyogyne leptochlamys* has a small weakly lobed capitate stigma and variable blotching at the base of the petals, compared to a much larger prominently five-armed star-shaped stigma and petal blotching absent in *Alyogyne* sp. Hutt River.

Setting aside the similar seeds and epicalyx, *Alyogyne leptochlamys* differs more obviously from *A. pinoniana*

than from *Alyogyne* sp. Hutt River by having narrower and strongly dissected leaves, in contrast to the shallowly lobed and ovate laminae of *A. pinoniana*. It also has a much sparser indumentum (Fig. 5F) on the stems and leaves which are both green in colour, whereas *A. pinoniana* has a dense matted cover of smaller stellate hairs below the larger ones, giving its stems and leaves a grey appearance. In *A. leptochlamys*, the lower part of the petals have the blotching mostly reduced or absent above a paler base (Fig. 6A–E), compared to a consistent dark blotch continuing to the base in *A. pinoniana*. It also has much shorter projecting staminal filaments that are pale rather than dark violet, and a smaller stigma.

Alyogyne leptochlamys differs from both *A. pinoniana* and *Alyogyne* sp. Hutt River in the following distinctive features: a smaller habit, narrower more strongly acuminate calyx lobes which form ridges at their margins in bud (Fig. 6E), and densely clustered orange-brown anthers on very short filaments arising from a short section of the staminal column (Fig. 6F). In both other species, the section of column from which the stamens project is longer and begins closer to the base of the flower, and the stamens are more widely spaced on longer filaments. The anthers in *A. pinoniana* are grey-purple and in *Alyogyne* sp. Hutt River golden-yellow. Compared to its congeners, *A. leptochlamys* has a low growth habit (Fig. 7), with a maximum recorded height of 1.2 m. A mean height of 45 cm was obtained for a sample of 37 sheets using either heights given in collector notes or measured from the sheet for specimens with a root-stem junction.

Apart from the divided style of *Hibiscus*, *H. drummondii* can be recognised by its generally smaller flowers, often on longer peduncles which are obviously articulated, calyx lobes spreading in bud, epicalyx flatter with the segments narrow-oblongate and strongly decurved apically, larger hairs particularly on the calyx and capsule, and more persistent stipules.

Typification. Under the species description of *Hibiscus huegelii*, Benth (1863: 217) follows his usual practice of listing localities and collectors' names under the relevant states, for example "Murchison river, Drummond, Oldfield, etc.". However, for the several varieties of *H. huegelii* he mentions locations only, with no indication of collectors. The two varieties indicated as occurring at Murchison River are var. *angulatus* and var. *leptochlamys*. An Oldfield specimen from Murchison River is known, matching var. *angulatus*, namely the syntype MEL1620523 (image!). There are two collections labelled as var. *leptochlamys* at Kew, mounted on a single sheet and both are marked as having been examined by Benth for *Flora Australiensis* with determinations in his own red script, as was his practice. The first, "near Bunbury, W. Austr.", *Oldfield s.n.* (left specimen: K000659926, image!), is from a location not mentioned in the protologue, but in view of Benth's determinavit we regard it as a probable syntype. The leaves, excepting the uppermost one, are rather broad and may indicate a juvenile growth phase. The second collection, "Between Moore & Murchison Rivers, W. Australia, 1853", *J. Drummond 103*, comprises two pieces (the middle specimen labelled "103", and the lower right specimen: K000659927, image!). The two pieces are morphologically concordant and appear to be from a single gathering (Fig. 2); they are here chosen as the lectotype, leaving the Oldfield specimen on the same sheet as a probable residual syntype. These Kew specimens are the only material known to us, but Drummond's collections were usually represented by multiple duplicates which were sold as sets and so it is possible that there are collections of this material

in other herbaria which might be isolectotypes (R.M. Barker, pers. comm., 2023).

Distribution. *Alyogyne leptochlamys* has a wide range spanning c. 2200 km, from an isolated occurrence on northern Yorke Peninsula, through most of central and northern Eyre Peninsula where it has been well collected, around peripheral parts of the Great Victoria Desert, to near the western coast of W.A.

Ecology. *Alyogyne leptochlamys* is mostly associated with mallee communities on sandy soils but can occur on loamy soils and calcareous substrates. Of the 48 collections with habitat notes recorded, 12 specifically refer to disturbance, either generally (4), by land clearance (2) or recent burning (6); and a further 15 describe it as being found on or beside a track or road. It is a relatively short-lived perennial shrub and is often found as isolated occurrences, usually in small numbers or as single plants. The evidence indicates a fire-adapted species that is dependent on disturbance for recruitment.

Conservation status. Although uncommon and sparsely occurring, it is frequently collected and known from numerous sites. It is unlikely to qualify for EPBC or State listing, because its wide range encompasses extensive areas of suitable habitat in uncleared areas and includes many conservation reserves, with no obvious threats to its survival. The apparent rarity follows from its relatively short lifespan and episodic establishment from seed linked to disturbance events. In settled areas, small, scattered occurrences are as expected for a species with this ecology, but observations are needed from intact habitats in remote areas to establish whether it does regenerate in large extensive populations following disturbance, since this has not been documented.

Etymology. The species epithet is from the Greek *lepto*, slender, and *chlamys*, cloak, and refers to the narrow epicalyx segments (Fig. 5C & D).

Selected specimens examined

***Alyogyne leptochlamys* (81 examined).** — SOUTH AUSTRALIA. **Northern Lofty:** 3.2 miles N of Bute on Wokurna Rd, 22 Oct. 1966, *B. Copley 808* (AD). **Eyre Peninsula:** Hundred (Hd) of Goode (N of Murat Bay), Dec. 1917, *Anon., Herb. J.M. Black* (AD); Minnipa, on W side of railway station, 11 Nov. 1915, *Anon., Herb. J.M. Black* (AD); 5.5 km N of Barna Tank, c. 19 km NE of Kimba, 26 Aug. 1983, *J.D. Briggs 1057* (AD; CANB, *n.v.*); several km from Lucky Bay Rd, 7 Feb. 2011, *C.J. Brodie 2482 & D.E. Symon* (AD); 500 m E along Plane Rd, off Lincoln Hwy, 3 Jan. 2016, *J.G. Conran JGC3763* (AD); c. 27 km N of Cowell Causeway, 23 Nov. 1989, *F.E. Davies 1408 & B. Hadlow* (AD; CANB, MEL, *n.v.*); c. 63 km W of Kimba, 9 Nov. 1957, *R. Hill 638* (AD; K, G, IA, *n.v.*); near Waddikee Rock [= Koongawa], 2 Sep. 1935, *E.H. Ising s.n.* (AD); Roadside of Mitchellville Rd, past stock gate, 12 Oct. 2016, *N. Kalfas NK011* (AD); 14.7 km direct WSW Caralue, Hambidge Conservation Park (C.P.), 1 Nov. 2001, *S.D. Kenny BS131-746* (AD); between Cowell and Arno

Key to species of *Alyogyne* in South Australia

Amended from Overton (1986: 826); State Herbarium of South Australia regions given in brackets, as defined in Barker *et al.* (2005); * indicates non-native occurrence in S.A.

1. Leaves glabrous or glabrescent
 2. Leaves or leaf lobes linear or subterete (NU, FR, EP) *A. hakeifolia*
 - 2: Leaves ovate or orbicular in outline, palmatisect with flat, oblong, angular lobes (EP, SL) **Alyogyne huegelii* (s.str.)
- 1: Leaves sparsely to densely hairy, at least on abaxial side
 3. Epicalyx lobes emanating from fused basal cup; stigma stellate with 5 conspicuous radiating lobes; seed dark with short uneven hairs (FR, EP, NL, YP) *Alyogyne* sp. Hutt River (*B.J. Lepschi & T.R. Lally 2310*)
 - 3: Epicalyx segments free to base; stigmas shortly lobed, capitate; seed light brown with long fluffy hairs
 4. Leaves broadly lobed to coarsely crenate, stems & leaves grey, with dense matted indumentum; petals with dark basal blotch continuous to base (NW, LE, NU) *A. pinoniana*
 - 4: Leaves deeply dissected with narrow segments, stems and leaves green with sparse to mid-dense indumentum; lower part of petals with pale base and blotching reduced or absent (EP, NL) *A. leptochlamys*

Bay, 27 Nov. 1961, *D.N. Kraehenbuehl 530* (AD; NBG, *n.v.*); Glynn Rd, N side, 925 m by rd E of junction of Whitegate Rd, 3.5 km NE of Mt Geharty summit, 26 Oct. 2011, *P.J. Lang 2801 & 2802* (AD, CANB); Corrobinnie Hill track, c. 0.5 km NE of Peela Rocks, 7 Oct. 2013, *P.J. Lang 2844* (AD, CANB, PERTH); Plane Rd, Munyaroo C.P. [W block], 10.6 km NW of Midgee, 27 Oct. 2013, *P.J. Lang 2847* (AD); Hambidge C.P., 5 Nov. 2016, *P.J. Lang 3086* (AD); Carrierloo Station, 16 Sep. 1992, *D.J. Michael 389* (AD); 8.6 km direct NNE of Curtinye Hill (Katinga Hill), 13 Oct. 1998, *D.E. Murfet BS103-145* (AD); Hd of Moonabie, (Mr Moulds) part of Cooyerdoo Stn, S of the Whyalla-Kimba Rd, 2 Feb. 1962, *W.S. Reid s.n.* (AD); Euroo [Eurua Well/Rockhole, c. 60 km NE Fowlers Bay], Jun. 1880, *A.F. Richards* [as *Anon.*] (AD); on Natuma Rd, 18.65 km from Todd Highway N of Lock, 25 Aug. 2014, *R. Taylor 1786* (AD).

WESTERN AUSTRALIA. Cundeelee, 1967, *P. Boswell R7 & R17* (PERTH); Lake Barker Reserve (Res.), Nov. 1971, *W.H. Butler s.n.* (PERTH); 8 miles S of Queen Victoria Spring, 15 Sep. 1975, *J. Carrick 3981* (AD); PCN Baseline Track S of Tropicana Camp, outside Plumridge Lakes Nat. Res. in Great Victoria Desert, 4 May 2007, *D.J. Edinger 6212* (PERTH); Prope [near] Yuna, 24 Oct. 1958, *C.A. Gardner 12011* (PERTH); W of Cundeelee Mission (N of Zanthus), 9 Nov. 1963, *A.S. George 5991* (PERTH); Coolgardie District, 1902, *E. Kelso s.n.* (PERTH); c. 53 km E of Hyden on rd to Forrestania crossroads, 16 Oct. 1995, *B.J. Lepschi 2137* (PERTH); 76.2 km W of Disappointment Rock, Hyden-Norseman Rd, 22 Oct. 2015, *T.D. Macfarlane & C.J. French TDM 6396* (AD, PERTH); Mount Holland, Dec. 1929, *H. Steedman s.n.* (PERTH).

Hibiscus drummondii. — WESTERN AUSTRALIA. Cooloomia Nat. Res., 15 km NW Cooloomia Homestead, 19 Sep. 1979, *S.D. Hopper 1403* (PERTH); *s.loc.*, 1 Aug. 1985, *V. Jones 97* (PERTH); Afghan Rock, c. 180 km E of Norseman, 19 Sep. 1980, *K. Newbey 7437* (PERTH).

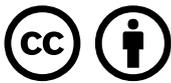
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