# A taxonomic revision of *Lagenophora* Cass. (Asteraceae) in Australia

**Jian Wang & A.R. Bean**


## Summary

Wang, J. & Bean, A.R. (2019). A taxonomic revision of *Lagenophora* Cass. (Asteraceae) in Australia. ***Austrobaileya* 10(3): 405–442.** The genus *Lagenophora* Cass. is taxonomically revised for Australia with 12 species recognised from Western Australia, South Australia, Queensland, New South Wales, Australian Capital Territory, Victoria and Tasmania. Nine species are endemic to Australia and three also occur elsewhere. *Lagenophora adenosa* Jian Wang ter & A.R.Bean and *L. platysperma* Jian Wang ter & A.R.Bean are newly described; *L. gunniana* Steetz and *L. latifolia* Hook.f. are reinstated; *L. montana* Hook.f. is newly recognised for South Australia; *L. sublyrata* (Cass.) A.R.Bean & Jian Wang ter is a new combination (based on *Ixauchenus sublyratus* Cass.); and *L. gracilis* Steetz is reinstated in its original (geographically restricted) sense. All of the 12 species are fully described and seven species are illustrated. Notes are provided on the Australian distribution of all species (including maps), habitat and proposed conservation status. Identification keys are provided for Australia and for each state.


Key Words: Asteraceae; *Lagenifera*; *Lagenophora adenosa*; *Lagenophora brachyglossa*; *Lagenophora fimbriata; Lagenophora gracilis*; *Lagenophora gunniana*; *Lagenophora huegelii*; *Lagenophora latifolia*; *Lagenophora montana*; *Lagenophora platysperma*; *Lagenophora queenslandica*; *Lagenophora stipitata*; *Lagenophora sublyrata*; Australia flora; new species; identification keys; distribution maps; conservation status

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## Introduction

The genus *Lagenifera* Cass. was established in 1816 by the prolific synantherologist Henri Cassini (Cassini 1816). Two years later, he used the spelling *Lagenophora* for the same genus (Cassini 1818), and the correct spelling of the genus name was for many years controversial. A proposal by Nicolson (1996) to conserve *Lagenophora* against *Lagenifera* was ultimately successful and has brought stability.

In the original publication, Cassini mentioned two species belonging to his genus (*Calendula magellanica* Willd. and *Bellis stipitata* Labill.), but he did not transfer them to *Lagenophora*. The former is now *Lagenophora nudicaulis* (Lam.) T.R.Dudley, from southern South America, and the latter is now *L. stipitata* (Labill.) Druce from southern Australia and New Zealand.

Cassini (1822) coined the name *Lagenophora billardierei* Cass., based on *Bellis stipitata*. According to the custom at that time, he combined his new genus name with a species epithet honouring the author of the name being replaced. A few years later, he (Cassini 1828) described the genus *Ixauchenus* Cass. with a single species *I. sublyratus* Cass., which he differentiated from *Lagenophora* by its many disc florets, "perhaps hermaphrodite", the many ligulate florets arranged in two rows, the bracts of the involucre uniform throughout, and the achenes with a thick and glutinous neck. The original material for *Ixauchenus sublyratus* was for many years unknown, but recently the name has been typified (Bean & Wang 2017). The type matches a widespread Australasian species formerly included in *L. gracilis* Steetz.

De Candolle (1836) recorded four species for the genus, two from southern South America, one from New Zealand and one from

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Australia. He also recognised *Ixauchenus* as a distinct genus, and was the last botanist to do so.

Cabrera (1966) provided the most recent account of the genus as a whole; he enumerated 15 species, including three species that are now included in the allied genus *Myriactis* Less. For an excellent summary of the genera allied to *Lagenophora*, *i.e.* subtribe *Lagenophorinae* Nesom, see Hind (2004).

**Phylogeny**

*Lagenophora* is one of 9 genera belonging to the "Lagenophora group" within subtribe *Lagenophorinae* G.L.Nesom (Nesom 1998; Hind 2004), namely *Keysseria* Lauterb., *Pappochroma* Raf., *Lagenocypsela* Swenson & K.Bremer, *Lagenophora* Cass., *Myriactis* Less., *Novaguinea* D.J.Hind, *Piora* J.Kost., *Pytinicarpa* G.L.Nesom and *Solenogyne* Cass. Hind (2004) overlooked the fact that Nesom (1998) had reduced his genera *Lagenithrix* G.L.Nesom and *Lagenopappus* G.L.Nesom to synonymy with *Pappochroma* Raf.

There have been limited molecular studies dealing with the phylogeny of *Lagenophora* and its relatives. Nakamura *et al*. (2012) showed that *Solenogyne mikadoi* Koidz. from southern Japan clustered strongly with the Australian representatives of *Solenogyne*. It would be interesting to add the two species of *Lagenocypsela* from New Guinea to that analysis, as from a morphological standpoint, they would seem to be synonymous with *Solenogyne*. Nakamura *et al*. (2012) also discovered that *Lagenophora huegelii* formed part of the same clade with the species of *Solenogyne*. The study of Nakamura *et al.* (2012) suggested that *L. lanata* and *L. gracilis* are synonymous, but one of the vouchers is from Queensland, Australia, and the other from Amamioshima Island, Japan, and both could easily be *L. sublyrata*.

The latter finding was corroborated and expanded by Sancho *et al*. (2015), who identified two major clades involving *Lagenophora* and *Solenogyne*, with the Australian/New Zealand species *L. huegelii*, *L. lanata* and *L. gracilis* aligning with *Solenogyne*. The remaining "core" *Lagenophora* clade includes most of the New Zealand species, the species from southern South America, and the Australasian species *L. montana* and *L. stipitata*.

**History of the Australian *Lagenophora* species**

Bentham (1867) recognised four species (*Lagenophora billardierei* Cass., *L. huegelii* Benth., *L. solenogyne* F.Muell. and *L. emphysopus* Hook.f.) for Australia, but the latter two are now classified in the genus *Solenogyne* Cass. Bentham's taxonomy was followed by Davis (1950), in her revision of Australian species, resulting in the recognition of only *L. stipitata* (Labill.) Druce (syn. *L. billardierei*) and *L. huegelii* Benth. Cabrera (1966) recognised three species for Australia, *L. stipitata*, *L. huegelii* and *L. gracilis* Steetz, and established *L. gracilis* as a very widespread species, citing specimens of it from much of southern Australia, and in Malesia, south-east Asia, New Caledonia and Sri Lanka. Koster (1966) considered *L. gracilis* and *L. lanata* A.Cunn. to be synonymous, and hence she used the earlier name *L. lanata* in her study of New Guinea Asteraceae. Almost all Australian state and regional floras (Curtis 1963; Cooke 1986; Stanley & Ross 1986; Porteners & Brown 1992; Wheeler *et al.* 2002) have used only these three species names in their treatments. The exception was Clarke (1999), who reinstated *L. montana* Hook.f. for Australia, a taxon that was treated at varietal rank by Cabrera (1966). Three new species were described by Wang & Bean (2016), in their revision of the Queensland members of the genus.

In the current paper, a total of 12 species based on morphological characters are recognised for Australia. Two species (*Lagenophora adenosa* Jian Wang ter & A.R.Bean and *L. platysperma* Jian Wang ter & A.R.Bean) are newly described; *L. gunniana* Steetz and *L. latifolia* Hook.f. are reinstated; *L. montana* is newly recognised for South Australia; *L. sublyrata* (Cass.) A.R.Bean & Jian Wang ter is a new combination (based on *Ixauchenus sublyratus*); and *L. gracilis* is reinstated in its original (geographically restricted) sense. *L. montana*, *L. stipitata* and

*L. sublyrata* extend outside Australia, the first two to New Zealand, the last widely to mainland Asia, south-east Asia, Malesia and New Guinea.

Our morphological studies have identified two major groups within Australian *Lagenophora*. The first group (including *L. brachyglossa*, *L. fimbriata*, *L. gracilis*, *L. gunniana*, *L. huegelii*, *L. platysperma*, *L. queenslandica*, *L. sublyrata*) has bunched, rather fleshy roots and very short rhizomes, usually numerous scapes (up to 20), stems never elongating (and therefore, leaves in basal rosette). The second group (including *L. adenosa*, *L. latifolia*, *L. montana*, *L. stipitata*) has slender wiry roots, long fibrous rhizomes, often only one scape, and often with elongated stems.

Scanning electron microscopy (SEM) images of achenes have proved to be taxonomically useful in other Asteraceae groups (e.g. Zhang *et al*. 2013; Bona 2015). It transpired that it was not possible to discern unique patterns for individual Australian *Lagenophora* spp., as the within-species variation was great. However, two rather distinct patterns were noted:

Type 1 consisted of elongated cells with striate unidirectional (longitudinal) surface wax ornamentation. The species showing this pattern were *L. brachyglossa* (**Fig. 1A**), *L. gunniana, L. huegelii* (**Fig. 1B**), *L. platysperma* and *L. sublyrata*.

Type 2 consisted of oval or elliptical cells with multidirectional surface wax ornamentation. The species showing this pattern were *L. adenosa, L. fimbriata, L. gracilis* (**Fig. 1D**), *L. latifolia, L. montana, L. queenslandica* and *L. stipitata* (**Fig. 1C**).

The groupings based on SEM micrographs are not the same as those based on macro-morphology, but there is quite good correlation. For example, all the members of morphological group 2 are present in SEM Type 2. A more detailed SEM study utilising other plant parts may find further patterns or characters with taxonomic utility.

## Materials and methods

This revision is based on morphological examination of *Lagenophora* material at BRI, and specimens received on loan from A, AD, AK, CANB, GH, HO, L, NSW, MEL and PERTH. Images of type specimens held at FI, G, HAL, K, M, NY, P and W have also been examined. Most measurements are based on dried material, but the dimensions of florets are based on material reconstituted with boiling water.

In this study, we took scanning electron microscope (SEM) images of the achene surface for all Australian species of *Lagenophora*, to determine whether there were patterns that would distinguish individual species. The scanning electron microscope (SEM) images were performed under the Phenom™, a high resolution desktop imaging tool with an optical camera. Achenes from between two and four vouchered specimens were used for each species.

Common abbreviations in the specimen citations are Mt (Mountain), NP (National Park), NR (Nature Reserve) and SF (State Forest). Measurements abbreviated as e.g. 1.3–2 mm infer that the feature measured varied between 1.3 and 2.0 mm.

## Taxonomy

**Lagenophora** Cass., *Bull. Sci. Soc. Philom. Paris* 1816: 199 (Dec 1816) (*'Lagenifera'*) (*orth. cons.*). **Lectotype:** *Lagenophora billardierei* (= *L. stipitata*), *fide* A. Cunningham, *Ann. Nat. Hist*. 2(8): 126 (1839).

Small perennial herbs with stoloniferous rhizomes. Stems, leaves and scapes usually covered with eglandular hairs. The stem rudimentary or occasionally elongated (usually in the species *L. adenosa*, *L. latifolia*, *L. montana*, *L. stipitata*). Leaves rosulate or occasionally alternate on an elongated stem, obovate or oblanceolate, green, penninerved, sinuate, dentate to lobed. Scapes unbranched, usually ribbed when dry, with small or leafy bracts scattered throughout. Capitula solitary, radiate, campanulate, hemispherical to cupular, with 2–4(–6) rows of involucral bracts; the bracts herbaceous, linear-lanceolate

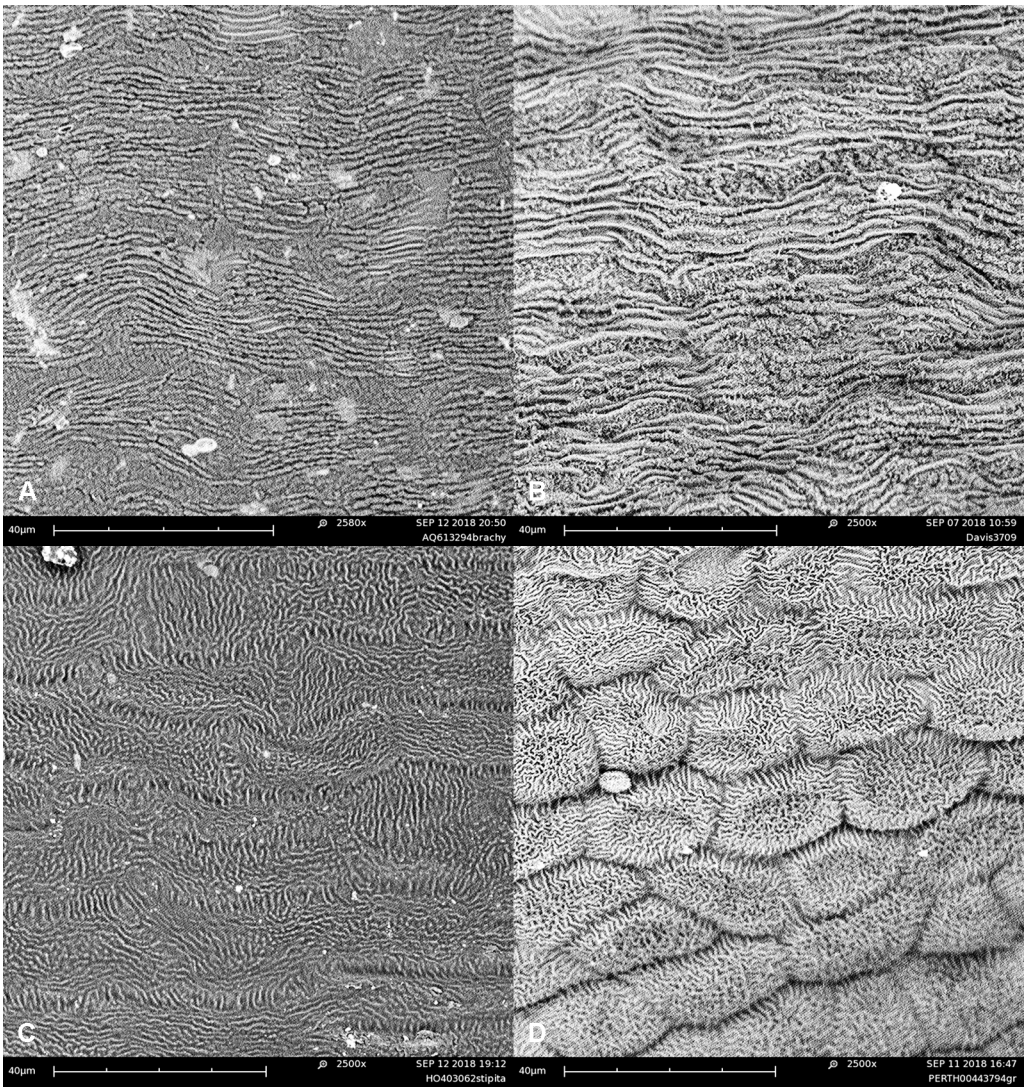


**Fig. 1.** SEM micrographs of ***Lagenophora*** achene surface. A. ***L. brachyglossa*** (*Butler & Fairfax s.n*., BRI [AQ613294]); B. ***L. huegelii*** (*Davis 3709*, PERTH); C. ***L. stipitata*** (*Moscal 12504*, HO); D. ***L. gracilis*** (*Royce 2917*, PERTH).

to oblanceolate, acute to obtuse, with narrow, scarious or fimbriate margins. Receptacle glabrous, epaleate. Ray florets in two to five rows, pistillate, ligulate, white, creamy to purple coloured; style 2-branched. Disk florets bisexual but functionally male, with a tubular corolla that is 4 or 5(–6) dentate and papillose on the outer surface. Stamens (4–)5, anthers connected, obtuse at base, filaments free. Style 2-branched; pappus absent, or (in *L. sublyrata*) 1–2 pappus scales or an annulus present on disc florets. Receptacle flat to convex, glabrous. Achenes glandular, laterally flattened, obliquely obovate to oblanceolate or lunate, usually with thickened margins, and with a short to long beak; carpopodium annular, white. Achene pappus absent.

About 25 species (Australia, New Zealand, South America, New Caledonia, China, India, Sri Lanka, Malesia, south-east Asia). 12 species in Australia.

## Key to the Australian species of *Lagenophora*

**1** Ligules of marginal florets up to 1 mm (0.4–1 mm) long. . . . . **2**
**1.** Ligules of marginal florets > 1 mm, (1–)1.4–6 mm long . . . . . **4**

**2** Achenes oblanceolate, 3.2–3.7 mm long excluding beak, 0.7–1.1 mm wide, light or yellowish brown, both sides tapering to the beak (**Fig. 2B**); leaves and scapes firmly attached to stem and/or rootstock . . . . . **L. brachyglossa**
**2.** Achenes obliquely obovate, 2.8–3.4 mm long excluding beak, 1.3–1.8 mm wide, dark or reddish brown, both sides abruptly contracted into the beak (**Fig. 2E&F**); leaves and scapes usually readily detached from rootstock . . . . . **3**

**3** Achenes smooth on both faces and edges, scattered hairs on both faces; disc florets usually 20–30 . . . . . **L. huegelii**
**3.** Achenes transversely wrinkled on both surfaces and edges; glabrous or with a few hairs on both faces; disc florets usually 10–15 . . . . . **L. gunniana**

**4** Roots fibrous and wiry, not bunched, rhizomes spreading; stem short or often elongated (leaves alternate along stem), glands on the dorsal edge of achene densely and continuously distributed from beak to carpopodium . . . . . **5**
**4.** Roots tuberous and fleshy, bunched; rhizomes short; stem absent or very short (leaves in basal rosette); glands on dorsal edge of achene scattered or absent . . . . . **8**

**5** Scape glabrous or with a few appressed to antrorse hairs; the apex of involucral bracts obtuse . . . . . **L. montana**
**5.** Scape hairs retrorse to patent; involucral bracts more or less subulate and finely pointed . . . . . **6**

**6** Leaf margins usually obtusely serrate; scape with eglandular hairs only; achene glands usually confined to dorsal edge from beak to carpopodium (**Fig. 2K**) . . . . . **L. stipitata**
**6.** Leaf margins sinuate to undulate; scape with eglandular hairs and shorter glandular hairs; achene glands extending along ventral and dorsal edges from beak to carpopodium and often on the basal and distal portions of both faces (**Fig. 2A&G**) . . . . . **7**

**7** Leaves 4–5 times longer than wide, 7–15 cm long, 1–3 cm wide; achenes 3.3–4.3 mm long, 1.0–1.3 mm wide . . . . . **L. adenosa**
**7.** Leaves 2.5–2.9 times longer than wide, 1–3.5 cm long, 0.4–1.2 cm wide; achenes 2.7–3.5 mm long, 0.7–0.9 mm wide . . . . . **L. latifolia**

**8** Achenes obliquely obovate, both sides abruptly contracted into the beak (**Fig. 2F&I**); achene surfaces often with scattered hairs; leaves and scapes usually readily detaching from rootstock . . . . . **9**
**8.** Achenes oblanceolate, one or both sides tapering to the beak (**Fig. 2C, D, J&L**); achene sufaces glabrous; leaves and scapes firmly attached to stem and/or rootstock . . . . . **10**

**9** Ligules (3–)4.5–6 mm long; achenes 3.7–4.5 mm long excluding beak, 2.1–3 mm wide, achene edges not thickened . . . . . **L. platysperma**
**9.** Ligules 0.9–1.5 mm long; achenes 2.8–3.3 mm long excluding beak, 1.3–1.7 mm wide; achene edges thickened . . . . . **L. huegelii**

**10** Achene glands confined to the dorsal side of beak and adjacent upper dorsal edge; achenes usually with 1–5 hairs at base . . . . . **L. sublyrata**
**10.** Achene glands surrounding the beak, and extending sparsely along ventral and/or dorsal edges; achenes never with basal hairs . . . . . **11**

**11** Ligules 3–4.7 mm long; leaves glabrous except for fimbriate margins . . . . . **L. fimbriata**
**11.** Ligules 1.4–1.8 mm long; leaf surfaces and margins more or less equally hairy . . . . . **12**

**12** Leaves 2.1–3.3 times longer than wide, sessile or with a winged petiole-like base to 1 cm long; achene beak usually 0.2–0.3 mm long, without a thickened white annular collar at its apex . . . . . **L. queenslandica**
**12.** Leaves 4–5 times longer than wide, with a winged petiole-like base 1–3 cm long; achene beak usually 0.5–0.7 mm long, with a thickened white annular collar at its apex . . . . . **L. gracilis**

### Key to the Western Australia species of *Lagenophora*

**1** Roots fibrous and wiry, not bunched, rhizomes spreading; stem short or often elongated (leaves alternate along stem); scape hairs retrorse to patent; glands on the dorsal edge of achene densely and continuously distributed from beak to carpopodium . . . . . **L. stipitata**
**1.** Roots tuberous and fleshy, bunched; rhizomes short; stem absent or very short (leaves in basal rosette); scape hairs appressed to antrorse; glands scattered on the dorsal edge of achene . . . . . **2**

**2** Stem 0.5–1(–3) cm long; leaves and scapes firmly attached to stem; achenes oblanceolate, both sides tapering to the beak (**Fig. 2D**), achene faces glabrous . . . . . **L. gracilis**
**2.** Stem less than 0.5 cm long; leaves and scapes usually readily detached from rootstock; achenes obovate, both sides abruptly contracted into the beak (**Fig. 2F&I**); achene faces usually with scattered hairs . . . . . **3**

**3** Ligules of marginal florets (3–)4.5–6 mm long; achenes 3.7–4.5 mm long excluding beak, 2.1–3 mm wide, achene edges not thickened . . . . . **L. platysperma**
**3.** Ligules of marginal florets 0.9–1.5 mm long; achenes 2.8–3.3 mm long excluding beak, 1.3–1.7 mm wide; achene edges thickened . . . . . **L. huegelii**

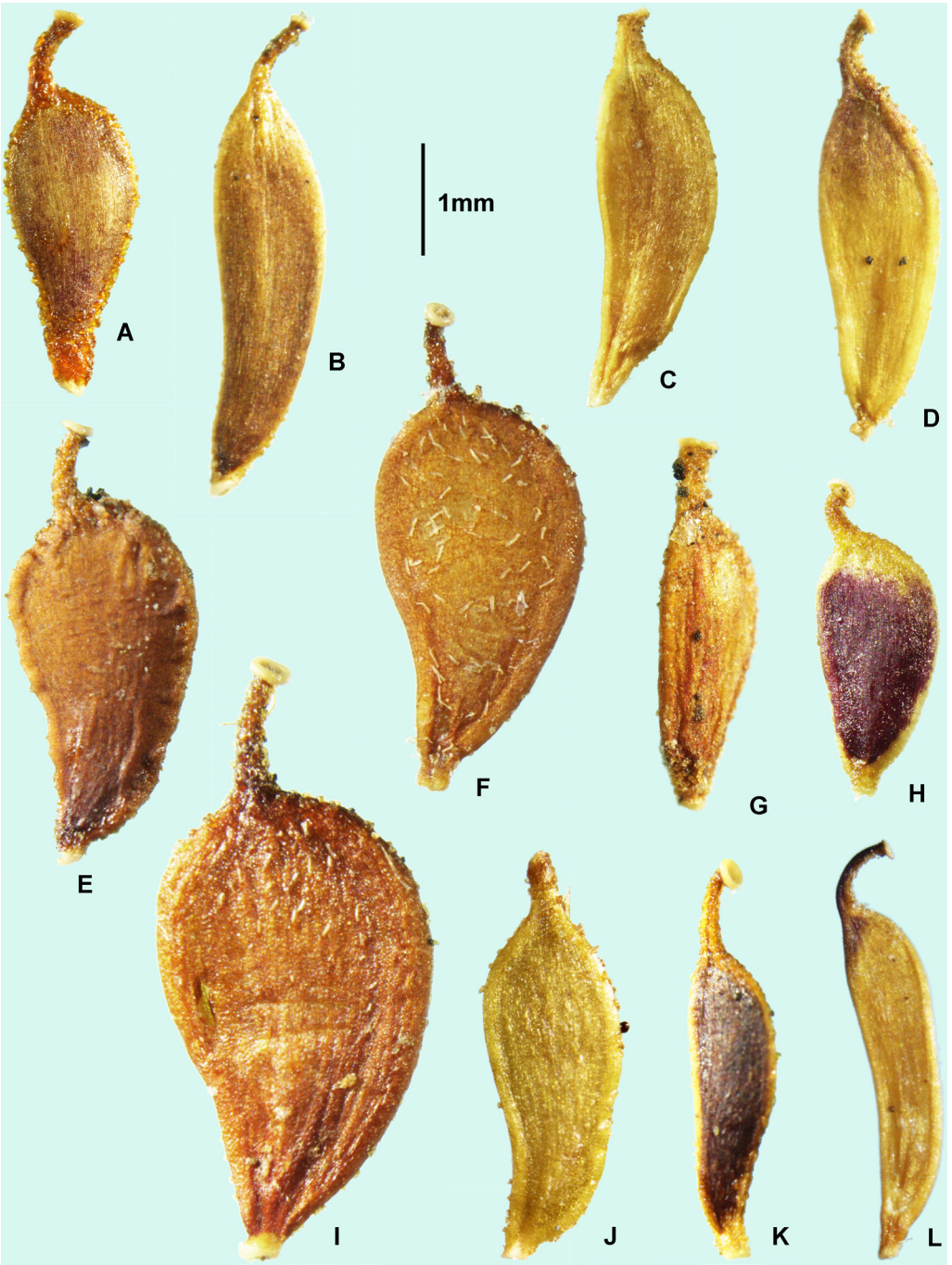


**Fig. 2.** Achenes of the 12 Australian ***Lagenophora*** species. A. ***L. adenosa*** (*Stajsic 812*, MEL). B. ***L. brachyglossa*** (*Butler & Fairfax s.n.*, BRI [AQ613294]). C. ***L. fimbriata*** (*Johnson 725*, BRI). D. ***L. gracilis*** (*Royce 2917*, PERTH [neotype]). E. ***L. gunniana*** (*Duncan 1035*, HO). F. ***L. huegelii*** (*Hislop 1199*, PERTH). G. ***L. latifolia*** (*Curtis s.n.*, HO 52184). H. ***L. montana*** (*Brown 185*, HO). I. ***L. platysperma*** (*Keighery 2108*, PERTH). J. ***L. queenslandica*** (*Thompson SLT2563*, BRI). K. ***L. stipitata*** (*Taylor 229*, NSW). L. ***L. sublyrata*** (*Blakely s.n.*, NSW 10275). Scale bar = 1 mm.

### Key to the South Australia species of *Lagenophora*

**1** Ligules of marginal florets 0.4–1 mm long; achenes transversely wrinkled on both faces and edges . . . . . **L. gunniana**

**1.** Ligules of marginal florets 1.8–3.8 mm long; achenes smooth on both faces and edges . . . . . **2**

**2** Roots tuberous and fleshy, bunched; rhizomes short; stem very short (leaves in basal rosette); achene glands confined to the dorsal side of beak and adjacent upper dorsal edge; achenes usually with 1–5 hairs at base. . . . . **L. sublyrata**

**2.** Roots fibrous and wiry, not bunched, rhizomes spreading; stem short or often elongated (leaves alternate along stem), achene glands on the dorsal edge densely and continuously distributed from beak to carpopodium; achenes without basal hairs . . . . . **3**

**3** Scape glabrous or with a few appressed to antrorse hairs; the apex of involucral bracts obtuse. . . . . **L. montana**

**3.** Scape hirsute, hairs retrorse to patent; involucral bracts ± subulate and finely pointed . . . . . **L. stipitata**

### Key to the Queensland species of *Lagenophora*

**1** Roots fibrous and wiry, not bunched, rhizomes spreading; stem short or often elongated (leaves alternate along stem), scape hirsute, hairs retrorse to patent; achenes dark reddish brown, glands on the dorsal edge densely and continuously distributed from beak to carpopodium . . . . **L. stipitata**

**1.** Roots tuberous and fleshy, bunched; rhizomes short; stem absent or very short (leaves in basal rosette); scape hairs appressed to antrorse; achenes light brown or yellowish brown, glands scattered along or absent from the dorsal edge. . . . . **2**

**2** Leaves glabrous except for fimbriate margins; involucre 1.1–1.4 cm diameter with 52–62 disc florets; ligules 3–4.7 mm long . . . . . **L. fimbriata**

**2.** Leaf surfaces and margins more or less equally hairy; involucre up to 1 cm diameter with 10–30 disc florets; ligules < 3 mm long. . . . . **3**

**3** Ligules of marginal florets 0.4–0.7 mm long; achenes 3.2–3.7 mm long excluding beak . . . . . **L. brachyglossa**

**3.** Ligules of marginal florets 1.4–2.5 mm long; achenes 2–3 mm long excluding beak . . . . . **4**

**4** Achene glands confined to the dorsal side of beak and adjacent upper dorsal edge; achenes usually with 1–5 hairs at base; achene usually with one to few hairs at base; achene beak 0.4–0.6 mm long, with a thickened white annular collar at its apex . . . . . **L. sublyrata**

**4.** Achene glands surrounding the beak, and extending sporadically along ventral and dorsal edges; achenes without basal hairs; achene beak usually 0.2–0.3 mm long, without a thickened white annular collar at its apex. . . . . **L. queenslandica**

## Key to the New South Wales and Australian Capital Territory species of *Lagenophora*

**1** Roots tuberous and fleshy, bunched; rhizomes short; stem very short (leaves in basal rosette); achene glands confined to the beak and/or near carpopodium on both dorsal and ventral edges . . . . . **2**

**1.** Roots fibrous and wiry, not bunched, rhizomes spreading; stem short or often elongated (leaves alternate along stem), achene glands on the dorsal and/or ventral edges densely and continuously distributed from beak to carpopodium . . . . . **3**

**2** Ligules of marginal florets 0.4–0.7 mm long; achene glands confined to the beak and near carpopodium on both dorsal and ventral edges; achene without basal hairs . . . . . **L. brachyglossa**

**2.** Ligules of marginal florets 1.5–2.5 mm long; achene glands confined to the dorsal side of beak and/or adjacent margin of body; achene usually with 1–5 basal hairs . . . . . **L. sublyrata**

**3** Scape glabrous or with a few appressed to antrorse hairs; the apex of involucral bracts obtuse . . . . . **L. montana**

**3.** Scape hairs retrorse to patent; involucral bracts more or less subulate and finely pointed . . . . . **4**

**4** Leaf margins usually obtusely serrate; scape with eglandular hairs only; achene glands usually confined to dorsal edge from beak to carpopodium (**Fig. 2K**) . . . . . **L. stipitata**

**4.** Leaf margins sinuate to undulate; scape with eglandular hairs and shorter glandular hairs; achene glands extending all along ventral and dorsal edges from beak to carpopodium and often on the basal and distal portions of both faces (**Fig. 2A**) . . . . . **L. adenosa**

## Key to the Victoria species of *Lagenophora*

**1** Ligules of marginal florets up to 1 mm (0.4–1 mm) long . . . . . **2**

**1.** Ligules of marginal florets more than 1 mm (1.8–3.8 mm) long . . . . . **3**

**2** Achenes oblanceolate, smooth on both faces and edges, light or yellowish brown; achene glands confined to the beak and near carpopodium on both dorsal and ventral edges; leaves and scapes firmly attached to stem and/or rootstock . . . . . **L. brachyglossa**

**2.** Achenes obliquely obovate, transversely wrinkled on both faces and edges, dark reddish brown; achene glands on the dorsal edge densely and continuously distributed from beak to carpopodium; leaves and scapes usually readily detached from rootstock . . . . . **L. gunniana**

**3** Roots tuberous and fleshy, bunched; rhizomes short; stem absent or very short (leaves in basal rosette); achene glands confined to the beak and adjacent upper dorsal edge; achenes usually with 1–5 hairs at base . . . . . **L. sublyrata**

**3.** Roots fibrous and wiry, not bunched, rhizomes spreading; stem short or often elongated (leaves alternate along stem), achene glands on the dorsal edge densely and continuously distributed from beak to carpopodium; achenes without basal hairs . . . . . **4**

**4** Scape glabrous or with a few appressed to antrorse hairs; the apex of involucral bracts obtuse . . . . . **L. montana**
**4.** Scape hairs retrorse to patent; involucral bracts more or less subulate and finely pointed . . . . . **5**

**5** Leaf margins usually obtusely serrate; scape with eglandular hairs only; achene glands usually confined to dorsal edge from beak to carpopodium (**Fig. 2K**) . . . . . **L. stipitata**
**5.** Leaf margins sinuate to undulate; scape with eglandular hairs and shorter glandular hairs; achene glands extend all along ventral and dorsal edges from beak to carpopodium and often on the basal and distal portions of both faces (**Fig. 2A**) . . . . . **L. adenosa**

**Key to the Tasmania species of *Lagenophora***

**1** Ligule of marginal florets up to 1 mm (0.5–1 mm) long; achene faces usually transversely wrinkled . . . . . **L. gunniana**
**1.** Ligule of marginal florets more than 1 mm (1.8–3.8 mm) long; achene faces smooth . . . . . **2**

**2** Roots tuberous and fleshy, bunched; rhizomes short; stem absent or very short (leaves in basal rosette); achene glands confined to the beak and adjacent upper dorsal edge; achene usually with 1–5 basal hairs . . . . . **L. sublyrata**
**2.** Roots fibrous and wiry, not bunched, rhizomes spreading; stem short or often elongated (leaves alternate along stem), achene glands on the dorsal edge densely and continuously distributed from beak to carpopodium; achene without basal hairs . . . . . **3**

**3** Scape glabrous or with a few appressed to antrorse hairs; the apex of involucral bracts obtuse . . . . . **L. montana**
**3.** Scape hairs retrorse to patent; involucral bracts more or less subulate and finely pointed . . . . . **4**

**4** Leaf margins usually obtusely serrate; scape with eglandular hairs only; achene glands usually confined to dorsal edge from beak to carpopodium (**Fig. 2K**) . . . . . **L. stipitata**
**4.** Leaf margins sinuate to undulate; scape with eglandular hairs and shorter glandular hairs; achene glands extend all along ventral and dorsal edges from beak to carpopodium and often on the basal and distal portions of both faces (**Fig. 2G**) . . . . . **L. latifolia**

**1. Lagenophora adenosa** Jian Wang ter & A.R.Bean, **sp. nov.** with affinity to *L. stipitata*, but differing by the larger leaf size, the crenate or waved leaf margins, two types of scape indumentum and different distributional pattern of glands on the achenes. **Typus:** Victoria. Snowfields District: Lake Mountain, Woollybutt Track, February 1993, *V. Stajsic 812* (holo: MEL 2020538; iso: MEL 2160257).

Perennial rhizomatous herb; roots and rhizomes fibrous; stem short (leaves in basal rosette) or often elongated (leaves alternate along stem); leaves and scapes firmly attached to stem and/or rootstock. Leaves 5–16(–20), obovate to spathulate, (4–)7–15 cm long, 1–3 cm wide (4–5× longer than wide), sessile with a winged petiole-like base to 4 cm long; leaf apex obtuse; leaf margins sinuate to undulate, usually with 11–15 shallow lobes, each lobe 1–3 mm long; upper leaf surface

green; lower leaf surface pale green; both surfaces with eglandular hairs 0.3–1 mm long, 4–12 per mm$^2$, and sessile glands; leaf margins with 8–15 eglandular hairs per mm$^2$, each 0.4–0.8 mm long; lateral veins obvious on dried material on both surfaces. Scapes channelled, 1–3(–5) per tuft, each 10–23 cm long at anthesis, 15–26 cm long at fruiting stage, *c*. 1 mm diameter but expanding to *c*. 2.5 mm at apex; indumentum including broad-based eglandular hairs 0.4–0.6 mm long, patent or retrorse, 3–6 hairs per mm² at midpoint of scape, 6–8 hairs per mm$^2$ towards apex, narrow eglandular hairs 0.1–0.3 mm long, appressed, patent or retrorse and shorter glandular hairs to *c*. 0.01 mm long, all hair types with similar densities; bracts 1–4, upper ones *c*. 5 × 0.5 mm, lower ones *c*. 20 × 1 mm or occasionally even larger. Capitula (5–)6–7 mm long, (11–)12–15(–17) mm diameter; involucral bracts 47–60 in 5–6 rows, linear, narrow-lanceolate, glabrous except for hairs along midrib on outer surface, apex acute to acuminate, with fringed margins on distal half; outer bracts *c*. 3 × 0.4 mm, inner bracts 3–4 × 0.4–0.7 mm. Receptacle convex, 3–5.2 mm diameter and 1.5–2.6 mm high. Ray florets *c*. 88, in 4–6 rows; tube 0.6–1 mm long, 0.2–0.3 mm wide, glandular hairy; style branches 0.3–0.5 mm long; ligules 3–3.4 × 0.4–0.6 mm with 3–4 longitudinal veins, mauve to blue, apex obtuse and usually 2-lobed. Disc florets *c*. 18; corolla tubular, 2–2.5 mm, mauve, outer surface with short glandular hairs, lobes (4–)5, deltate, 0.6–0.7 × 0.4–0.5 mm; stamens 5, *c*. 0.6 mm long; style branches *c*. 0.4 mm long; sterile ovary 1.8–2 mm long, with a thickened white annular collar at its apex, collar 0.25–0.4 mm diameter. Achenes oblanceolate, straight or slightly curved, 2.8–3.3 mm long excluding beak, 1–1.3 mm wide, mostly uniformly brown at maturity; edges not thickened; glands extending all along ventral and dorsal edges from beak to carpopodium, and on the basal and distal portions of both faces, otherwise glabrous; beak 0.5–1 mm long, densely surrounded by glands, and with a white annular collar at its apex, 0.2–0.25 mm diameter. **Fig. 3.**

***Additional selected specimens examined*: New South Wales.** Southern Tablelands District: Bimberi Peak, Queanbeyan, Jan 1912, *Cambage 3422* (NSW); The Peaks, Yarrangobilly, Jan 1933, *de Beuzeville s.n.* (NSW 10304); Near summit of Mt Lowden, Tallaganda SF, Dec 1973, *Hoogland 12445* (NSW). **Australian Capital Territory.** Mt Bimberi, Dec 1930, *Burges s.n.* (NSW 15850); Bendora to Mt Franklin, Jan 1958, *Burbidge MG4456* (CANB). **Victoria.** Far SW of Mt Buffalo Plateau, between The Horn & Wilfred's Hill, Feb 1963, *Willis s.n.* (MEL 2161250); *c*. 2 miles [3.3 km] SW of Mt Wellington on the Tali Karng track, Gippsland, Jan 1964, *Muir 3105* (MEL); Baw Baw Ski Village, Beech Trail, Dec 2005, *Stajsic 3757* (MEL); Lake Hill, SW of Nunniong Plains, Jan 1971, *Beauglehole 36332 & Finck* (MEL); Nunniong Plateau, Dripping Hut Track, N of Reedy Track, Feb 1973, *Beauglehole 41432* (MEL); Nunniong Plateau, no Name Flat area, Feb 1973, *Beauglehole 41442* (MEL); Nunniong Plateau, Jam Tin Flat, Feb 1973, *Beauglehole 41473* (MEL); 1.6 km E of Mt Phipps, 17.7 km SW of Omeo. Extreme upper reaches of Livingstone Creek, Mar 1975, *Beauglehole 41702* (MEL); Mt Donna Buang, Mar 1979, *Morton s.n.* (MEL 1513241); Mt Stirling, eastern slopes near The Monument, Jan 1982, *Corrick 7987* (MEL); Mt Buffalo NP, *c*. 250 m N of retaining wall of Reservoir, Jan 1982, *Short 1397* (MEL); Cambarville, Mar 1985, *Earl s.n.* (MEL 672053); Wabonga Plateau State Park, E of Buckland Spur Track, Jan 1988, *Beauglehole 93124* (MEL); Eskdale Spur, Mt Bogong, Feb 1992, *Craven 2175 & Craven* (MEL); *c*. 8.5 km S by E of Buxton, Blue Range Road at crossing of Storm Creek, Feb 1993, *Clarke 2263* (MEL); On Black Range Track, *c*. 3 km W of Stephens Spur Track, Mar 1994, *Kemp s.n.* (MEL 2025758); S of Harrietville, on track to Mt Sugarloaf, 1 km from the Alpine Road, Apr 1994, *Gutter s.n.* (MEL 2025755).

***Distribution and habitat*:** *Lagenophora adenosa* is endemic to Victoria and the southern area of New South Wales where it is restricted to high altitudes above 1,000 m (**Map 1**). It usually grows in montane damp forest, wet sclerophyll forest, tall eucalypt forest, alpine meadow and low heathland and open woodland. There is also a record from *Leptospermum grandifolium* Sm. thicket.

***Phenology*:** Flowers mostly from November to March and fruits from January to April.

***Affinities*:** *Lagenophora adenosa* is of similar appearance to the parapatric *L. stipitata*, but differs by the larger leaf size usually 7–15 cm long (1.5–7.7 cm long for *L. stipitata*), the crenate or waved leaf margins (obtusely serrate for *L. stipitata*), the two types of scape indumentum (usually one type only for *L. stipitata*) and different gland distributional pattern on the achenes.

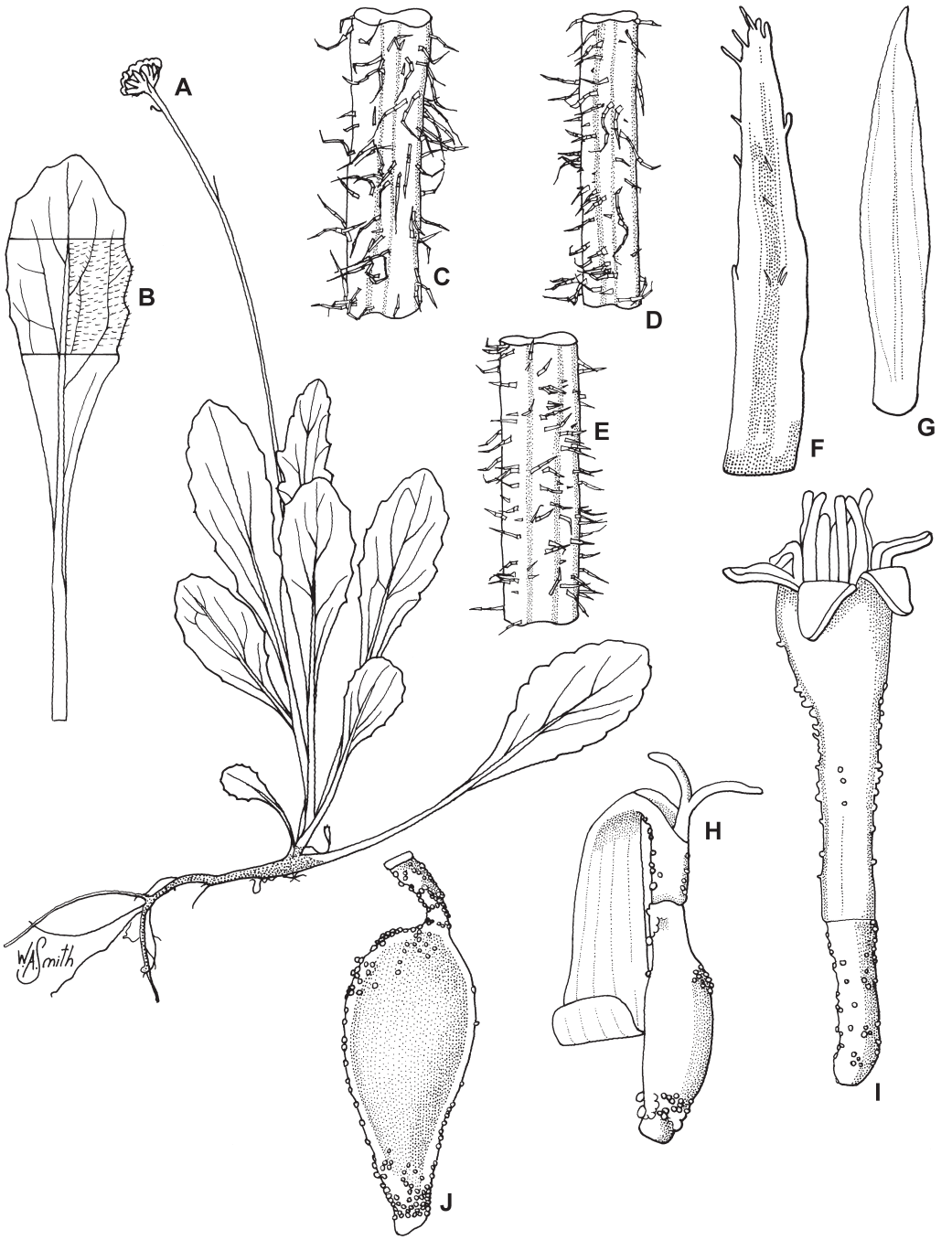


**Fig. 3.** ***Lagenophora adenosa.*** A. habit of whole plant with flowering inflorescences ×0.6. B. leaf with a section showing indumentum detail ×1. C–E. lower, mid and upper-sections of scape ×8. F. outer involucral bract ×16. G. inner involucral bract ×16. H. marginal floret ×16. I. disc floret ×16. J. achene ×16. A–I from *Stajsic 3757* (MEL); J from *Stajsic 812* (MEL [holotype]). Del. W. Smith.

***Conservation status*:** *Lagenophora adenosa* is a common species where it was recorded in Victoria, it is unlikely to be rare in southern NSW and is not considered to be threatened. A **Least Concern** conservation status is recommended using the IUCN (2012) criteria.

***Etymology*:** From the Latin *adenosus*, meaning 'glandular'. This refers to the dense glands or glandular hairs on the scapes and leaf surfaces of this species.

**2. Lagenophora brachyglossa** Jian Wang ter & A.R.Bean, *Austrobaileya* 9: 475 (2016). **Type:** Queensland. Moreton District: 3.2 km along Duck Creek Road, near Lamington National Park, 29 February 2016, *A.R. Bean 32729 & J. Wang* (holo: BRI; iso: NSW).

***Illustrations*:** Wang & Bean (2016: 476, 477).

Perennial rhizomatous herb; roots fleshy, bunched, 0.6–1.6 mm diameter; no stem or stem extremely short to 5 mm long; leaves and scapes firmly attached to stem and/or rootstock. Leaves 6–9, oblanceolate to obovate, 3–10 cm long, 0.9–2.5 cm wide (3.3–4× longer than wide), sessile or with a winged petiole-like base to 2 cm long; leaf apex obtuse; leaf margins crenate to sinuate, with 13–21 teeth, each tooth 0.5–1.5 mm long; upper leaf surface grey-green, lower leaf surface pale green; both surfaces with eglandular hairs 0.2–0.3 mm long and 3–7 per mm$^2$; leaf margins with 10–15 eglandular hairs per mm$^2$, each 0.2–0.3 mm long; lateral veins obscure on dried material. Scapes slightly channelled, 2–6 per tuft, each 10–16 cm long at anthesis, 9–30 cm long at fruiting stage, *c*. 0.6 mm diameter; indumentum eglandular, 0.1–0.3 mm long, antrorse, more or less appressed, 4–8 hairs per mm$^2$ at midpoint of scape, rather more dense towards apex; bracts 3–5, upper ones *c*. 2 × 0.1 mm, lower ones *c*. 18 × 3 mm. Capitula 4–6 mm long, 6–10 mm diameter; involucral bracts 20–40 in 3–4 rows, oblanceolate, glabrous, apex obtuse, margin with short hairs on distal part; outer bracts 1–1.8 × 0.5–0.7 mm, inner bracts 2.2–3 × 0.5–0.7 mm. Receptacle slightly convex, *c*. 2.3 mm diameter and *c*. 0.9 mm high. Ray florets 35–45 in 2–4 rows; tube 0.2–0.3 mm long, *c*. 0.2 mm diameter, minutely hairy; style branches 0.2–0.4 mm long; ligule 0.4–0.7 mm long, *c*. 0.2 mm wide, bright pink to purple, apex obtuse. Disc florets 15–20, corolla tubular, *c*. 1.6 mm long, light yellow, outer surface with a few minute hairs, lobes 5, deltate, *c*. 0.3 mm long; sterile ovary 0.9–1 mm long. Achenes obliquely oblanceolate, straight or slightly curved, 3.2–3.7 mm long excluding beak, 0.7–1.1 mm wide, light brown to brown at maturity; edges not thickened; glands sparsely distributed at the base on both ventral and dorsal edges, otherwise glabrous; beak 0.6–0.8 mm long, densely surrounded by glands, and with a white annular collar at its apex, *c*. 0.2 mm diameter.

***Additional selected specimens examined*: Queensland.** Burnett District: Fig Tree Gully, Bunya Mountains, Jun 2003, *Butler & Fairfax s.n.* (BRI [AQ613294]). Darling Downs District: 7 km WNW of Clifton, Feb 1995, *Fensham 1997* (BRI); 23 km SSE of Toowoomba, Feb 1995, *Fensham 2073* (BRI); Allora Mt, Allora, Nov 2005, *Flesser s.n.* (BRI [AQ724458]); 16 km NNE of Stanthorpe, Mar 2010, *Thompson 252B & Brennan* (BRI). Maranoa District: Saddler Springs, at spring 5.3 km NNW of homestead, Carnarvon Range, Jan 2010, *Eddie 1791 & Hancock* (BRI). Moreton District: 3.6 km along Duck Creek road, near O'Reillys guest house, Mar 2001, *Bean 17391B* (BRI). **New South Wales.** Central Coast District: Kentlyn Road, Campbelltown, Mar 1962, *McBarron 6947* (NSW); Sportsground, Appin, Feb 1967, *McBarron 13928* (NSW). Central Western Slopes District: Hoffman Property, near Muswellbrook, May 2003, *James & Corkish s.n.* (NSW 721138). North West Slopes District: Oxley Park, Tamworth, Nov 1985, *Hosking s.n.* (NSW 563235); *ibid*, Nov 1985, *Hosking s.n.* (NSW 563552). South Western Slopes District: Tarcutta Hills (Bush Heritage's site), Aug 2004, *Burrows s.n.* (NSW 723815). **Victoria.** Devils Backbone, W of Snowy River, Mar 1971, *Beauglehole 37267* (MEL).

***Distribution and habitat*:** *Lagenophora brachyglossa* is endemic to eastern Australia and is a relatively widespread species occurring in Victoria, New South Wales and Queensland. In Queensland, it extends from near Stanthorpe and the Lamington Plateau, north-west to Carnarvon Range, mainly in the higher altitude and higher rainfall areas (**Map 2**). It usually grows on basaltic clay soils in open forests and woodland dominated by *Eucalyptus crebra* F.Muell., *E. biturbinata* L.A.S.Johnson & K.D.Hill, *E. caliginosa* Blakely & McKie, *E. eugenioides* Sieber ex Spreng., *E. laevopinea* R.T.Baker, *E. microcorys* F.Muell., *E. moluccana* Roxb., *E. orgadophila* Maiden & Blakely, *E.*

*tereticornis* Sm. and *Angophora floribunda* (Sm.) Sweet with grassy understorey.

***Phenology*:** Flowers are recorded from November to March and fruits from January to June.

***Affinities*:** *Lagenophora brachyglossa* is of similar appearance to the parapatric *L. sublyrata*, but differs by the very short ligules 0.4–0.7 mm long (1.8–3 mm long for *L. sublyrata*), the longer achene 3.2–3.7 mm long excluding beak (versus 2.4–2.8(–3.3) mm long excluding beak for *L. sublyrata*), the glands surrounding the beak and on achene base of both ventral and dorsal edges (the glands confined to dorsal side of beak and adjacent area of achene for *L. sublyrata*). *L. brachyglossa* also lacks hairs at the base of the achene (usually 1–5 hairs at base for *L. sublyrata*).

***Conservation status*:** *Lagenophora brachyglossa* has a large distributional range from Victoria to southern Queensland. Although it is usually not a common species where it was recorded, it does occur in national parks. Therefore, a **Least Concern** conservation status is recommended using the IUCN (2012) criteria.

**3. Lagenophora fimbriata** Jian Wang ter & A.R.Bean, *Austrobaileya* 9 : 472 (2016). **Type:** Queensland. Moreton District: Purga Nature Reserve, 14 km SSW of Ipswich, 1 December 2015, *A.R. Bean 32442 & J. Wang* (holo: BRI; iso: BM, CANB, CHR, MEL, NSW, P, US).

***Illustrations and photo*:** Wang & Bean (2016: 473, 474).

Perennial rhizomatous herb; roots fleshy, bunched, 1–2 mm diameter; no stem or short stem to *c*. 5 mm long; leaves and scapes firmly attached to stem and/or rootstock. Leaves 5–16, oblanceolate, 4–15 cm long, 0.8–2.7 cm wide (5–5.6× longer than wide), sessile or with a winged petiole-like base to 4 cm long; leaf apex obtuse; leaf margins finely toothed, with 9–23 teeth, each tooth 0.2–1 mm long; upper leaf surface dark green, lower leaf surface pale green; both surfaces usually glabrous; leaf margins with 3–4 eglandular hairs per mm$^2$, each *c*. 0.3 mm long; lateral veins often obscure on dried material on both surfaces. Scapes channelled, (1–)3–7 per tuft, each 10–20 cm long at anthesis, 14–38 cm long at fruiting stage, 0.6–1.2 mm diameter; indumentum 0.05–0.1 mm long, antrorse, more or less appressed, 2–5 hairs per mm$^2$, very sparse at midpoint of scape, rather denser towards apex; bracts 3–7, 10–18 mm long and 0.5–2 mm wide. Capitula 6–10 mm long, 11–14 mm diameter; involucral bracts 24–28 in 2–3 rows, oblong to obovate, glabrous, apex obtuse, with fringed margin on distal part, outer bracts 1.6–2.1 × 0.6–0.7 mm, inner bracts 2.5–3.5 × 0.7–1 mm. Receptacle convex, *c*. 2 mm diameter and *c*. 1 mm high. Ray florets 40–50, in 2 rows; tube *c*. 1 mm long and 0.3 mm diameter with minute hairs; style branches *c*. 0.5 mm long; ligule 3–4.7 × 0.5–1.1 mm, white to mauve, apex obtuse. Disc florets (46–)52–62; corolla tubular, 2.7–3.2 mm long, light yellow, outer surface with minute hairs; corolla lobes 5, deltate, 0.4–0.5 × 0.3–0.4 mm; stamens 5, *c*. 2.5 mm long (anthers *c*. 1.2 mm long, filaments *c*. 1.3 mm long); style branches 0.6–1 mm long; sterile ovary 1–1.5 mm long; pappus scales absent. Disc florets (46–)52–62; corolla tubular, 2–2.8 mm long, light yellow, outer surface with minute hairs, lobes 5, deltate, 0.3–0.4 mm long; sterile ovary 1–1.5 mm long. Achenes obliquely oblanceolate, 2.8–3.2 mm long excluding beak, 0.8–1 mm wide, light brown to brown at maturity; edges slightly thickened; glands mostly confined to dorsal edge, the density gradually reducing from apex to base, otherwise glabrous; beak (0.2–)0.4–0.5(–0.7) mm long, densely glandular on dorsal side, sparsely glandular elsewhere, with a white annular collar at its apex, 0.2–0.3 mm diameter.

***Additional selected specimens examined*: Queensland**. Burnett District: Auburn Ranges, *c*. 6.2 km N of Dawson Vale East, along road to Rockybar, Mar 1997, *Pollock 450 & Baumgartner* (BRI); Borania SF, S of the Eidsvold – Theodore Road, Apr 2015, *Forster PIF42379 & Thomas* (BRI). Darling Downs District: Inglewood, Mar 1911, *Boorman s.n.* (NSW 10281); *c*. 10 miles [16.6 km] S of The Gums, Mar 1959, *Johnson 725* (BRI); Calala, *c*. 10 miles [16 km] E of Meandarra, Jun 1960, *Johnson 1612* (BRI); Burraburri Creek, 16 km W of Durong, May 1992, *Forster PIF9858* (BRI, DNA, MEL). Moreton District: Jimboomba, May 1921,

*Cheel s.n.* (NSW 10280); Near Willowbank raceway, SW of Ipswich, Apr 1990, *Bean 1526* (BRI); Champion Way, 1 km N of Cunningham Highway, *c.* 12 km SW of Ipswich, Apr 1991, *Sharp 5039 & Bird* (BRI); 1.4 km along Champion's Way from Cunningham Highway, Willowbank, *c.* 12 km SW of Ipswich, Jan 1993, *Jobson 1872 & Albrecht* (MEL).

***Distribution and habitat*:** *Lagenophora fimbriata* is endemic to south-east Queensland, extending from near Cracow to Inglewood, and east to Jimboomba (**Map 1**). It inhabits heavy clay soils in flat or gently undulating terrain, in communities dominated by *Acacia harpophylla* F.Muell. ex Benth. (brigalow) and *Casuarina cristata* Miq. (belah), or *Eucalyptus moluccana* and/or *Melaleuca irbyana* R.T.Baker.

***Phenology*:** Flowers mostly from November to April and fruits mainly from March to May. Mass flowering event also recorded in July 2016.

***Affinities*:** *Lagenophora fimbriata* is of similar appearance to the parapatric *L. sublyrata*, but differs by the glabrous leaf surfaces, the fimbriate hairs on leaf margin, the larger capitula 11–14 mm diameter (usually to 2.5–11 cm long for *L. sublyrata*), the larger ligules 3–4.7 × 0.5–1.1 mm (1.8–3 × 0.15–0.35 mm for *L. sublyrata*), disc florets 46–62 (10–30 in *L. sublyrata*), and the glands on the achene distributed along dorsal edge from beak to near base (versus confined to dorsal side of beak and adjacent area of achene for *L. sublyrata*).

***Conservation status*:** Although *Lagenophora fimbriata* has a restricted distributional range in south-east Queensland, it can be locally abundant where it occurs. A species survey by us found that on a 4-hectare property at Jimboomba, the population size varied from 120 to 190 plants per 100 square metres, with a total of 5,000–6,000 plants estimated. To date, there are only 5 locations where the species was recorded in the last 30 years (**Map 2**). There is evidence that due to urban development and habitat destruction, the species' occupancy area has declined in the past decade. Therefore, a **Vulnerable** conservation status is recommended based on the IUCN (2012) criteria.

**4. Lagenophora gracilis** Steetz, *Pl. Preiss. [J.G.C.Lehmann]* 1(3): 431 (1845). **Type citation:** Western Australia, *L. Preiss s.n.*; King George Sound, *J.S. Roe s.n.* **Type:** Western Australia. Darradup, 16 miles [26 km] W of Nannup, 21 October 1948, *R.D. Royce 2917* (neo: PERTH 00443794 [here designated]; isoneo: PERTH 00444014).

Perennial rhizomatous herb; roots fleshy, bunched, 1–4 mm diameter; stem 0.5–1(–3) cm long; leaves and scapes firmly attached to stem. Leaves (5–)10–16, obovate, oblanceolate, spathulate, 4–10(–13) cm long, 1–2(–3) cm wide (4–5× longer than wide), with a winged petiole-like base 1–3 cm long; leaf apex obtuse, rounded; leaf margins sinuate to repand, usually with 7–13 teeth, each 0.5–2.5 mm long; upper leaf surface slightly dark green, glabrous or with 1 eglandular hairs per $mm^2$, each 0.3–0.6 mm long; lower leaf surface pale green, glabrous or with 1–2 hairs per $mm^2$, each 0.4–0.7(–1.0) mm; leaf margins with 5–20 hairs per $mm^2$, each 0.2–0.6 mm long; lateral veins often obscure on dried material on both surfaces. Scapes channelled, 2–14 per tuft, each 2–11 cm long at anthesis, 8–21 cm long at fruiting stage, 0.4–1 mm diameter from lowest section to upmost section; indumentum 0.1–0.6 mm long, antrorse, more or less appressed, scattered throughout, glabrous or very sparse at midpoint of scape (2–5 hairs per $mm^2$), gradually denser towards apex; bracts 3–7, upper ones *c.* 2 × 0.5 mm, lower ones *c.* 10 × 1.5 mm or occasionally even larger. Capitula 3–4.5 mm long, 7–9 mm diameter; involucral bracts 30–40 in 3–5 rows, lanceolate, glabrous or minute hairs on lower mid part of outer surface, apex acuminate to obtuse, fringed and purple coloured, outer bracts *c.* 2 × 0.5 mm, inner bracts *c.* 3 × 0.7 mm. Receptacle convex, 1.2–1.7 mm diameter and 0.6–1 mm high. Ray florets *c.* 60, in 2 rows; tube *c.* 0.5 mm long, 0.1–0.15 mm wide, glandular hairy; style branches *c.* 0.3 mm long; ligule 1.4–1.6 × 0.3–0.4 mm with 2–3(–4) longitudinal veins, mauve, apex obtuse. Disc florets *c.* 25; corolla tubular, *c.* 1.8 mm, light green, outer surface with short glandular hairs, lobes 5, deltate, *c.* 0.3 × 0.15 mm long and with purple tips; stamens 5, *c.* 0.7 mm long; style branches

*c*. 0.5 mm long; sterile ovary *c*. 1 mm long; no pappus scales between corolla and sterile ovary. Achenes oblanceolate, usually straight, 2.7–3 mm long excluding beak, 0.7–0.8 mm wide, purplish brown at maturity; edges slightly thickened; glands scattered along dorsal edge from top to base and beak (not dense at all), otherwise glabrous; beak (0.3–) 0.5–0.7 mm long, surrounded by glands, and with a white annular collar at its apex, *c*. 0.2 mm diameter. **Fig. 4.**

***Additional specimens examined*: Western Australia.** Lowden, Aug 1909, *Koch 1924* (PERTH); Pemberton, Nov 1921, *Koch 2584* (PERTH); West Cape Howe, W of Albany, Mar 1956, *Royce 5393* (PERTH); King Creek, West of Mt Manypeaks, May 1964, *George 6285* (PERTH); Poronguruup, corner Porongurup and Surrey Downs Road, 1990, *Burchell 34* (PERTH); Walpole – Nornalup NP, the Gap track, SW from Peaceful Bay, Sep 1992, *Wheeler 3186B* (PERTH); Crampton NR, 23 km N of Bunbury, Nov 1994, *Keighery 13547* (PERTH); 30 m N of bridge over Rosa Brook, 3000 m E of Sues Road on Denny Road, Jan 1997, *Casson B12.5 & Evans* (PERTH); 40 m E of road, Bevan Road, 5.7 km E of Watershed Road, Feb 1997, *Godden W113.7 & Casson* (PERTH); 5 km along Wagelup Road from intersection with Carter Road, Feb 1997, *Day MJ14.3 & Annels* (PERTH); Hartwood Road, Oct 1998, *Davis 8085B* (PERTH); Ten Mile Brook, Bramley NP, S of Margaret River, Nov 2007, *Keighery 1116 & Keighery* (PERTH).

***Distribution and habitat*:** *Lagenophora gracilis* is endemic to south-western Western Australia, extending from Gin Gin (just north of Perth) to Manypeaks, near Albany (**Map 3**). It grows mostly in eucalypt and/or melaleuca open woodlands. It also recorded in tall shrubland on floodplain and heathland on peaty sand and/or loam.

***Phenology*:** Flowering has been recorded from January, February, March, May, August, September, and November. Fruiting mainly in October and November, also in March, May and September.

***Typification*:** Type material was sought from C, DBN, E, G, H, HBG, K, L, LD, LE, OXF, MEL, P, M and MEL, but no relevant specimens could be located. This has necessitated the designation of a neotype for the name.

***Affinities*:** *Lagenophora gracilis* is of similar appearance to *L. huegelii* and *L. sublyrata*. It differs from *L. huegelii* by the more or less glabrous leaf surface (hairy for *L. huegelii*), the sinuate to repand leaf margins (lacerate or incised for *L. huegelii*), the glabrous achenes (few to many hairs for *L. huegelii*). It differs from *L. sublyrata* by the absence of pappus scales on the disc florets, the glands scattered along dorsal edge from top to base and on beak (versus dorsal side of the beak and adjacent margin only for *L. sublyrata*), and the absence of basal hairs of the achenes (usually 1–5 hairs present for *L. sublyrata*).

***Conservation status*:** Although *Lagenophora gracilis* has a restricted distributional range in south Western Australia, it can be locally abundant where it occurs. The species is not considered to be threatened and a **Least Concern** conservation status is recommended using the IUCN (2012) criteria.

**5. Lagenophora gunniana** Steetz, *Pl. Preiss. [J.G.C.Lehmann]* 1(3): 431 (1845). **Type:** Tasmania. in 1844, *R. Gunn 510* (lecto: K 000890132, *fide* Cabrera 1966: 295).

Perennial rhizomatous herb; roots fleshy, bunched, 1–5 mm diameter; stem usually absent; leaves and scapes usually readily detached from rootstock. Leaves (3–)5–9 (–17), ovate, obovate to spathulate, 1–6(–10.5) cm long, 0.5–1.5(2.5) cm wide (2.1–4.1× longer than wide); leaf base slightly winged petiolate-like 0.5–2(–4) cm long; leaf apex obtuse or rounded, leaf margins dentate, crenate, pinnatilobate, with 11–21 teeth, each tooth 1–3 mm long; upper leaf surface slightly dark green, with 3–10 eglandular hairs per $mm^2$, each 0.5–1 mm long; lower leaf surface pale green, with 3–15 eglandular hairs per $mm^2$, each 0.4–1 mm; leaf margins with 8–20 eglandular hairs per $mm^2$, each 0.4–1 mm long; lateral veins obscure on dried material on both surfaces. Scapes more or less channelled, 1–5 per tuft, each 3–16 cm long at anthesis, 6–30 cm long at fruiting stage, 0.4–1.2 mm diameter from lowest section to upmost section; indumentum 0.3–0.7 mm long, upright, antrorse, retrorse and appressed, 3–6 hairs per $mm^2$ at midpoint of scape, gradually denser towards apex; bracts 3–6, upper ones 2–4 × 0.5–1 mm, lower ones 4–20 × 1–4 mm or occasionally even larger. Capitula 4–7 mm long, 7–12

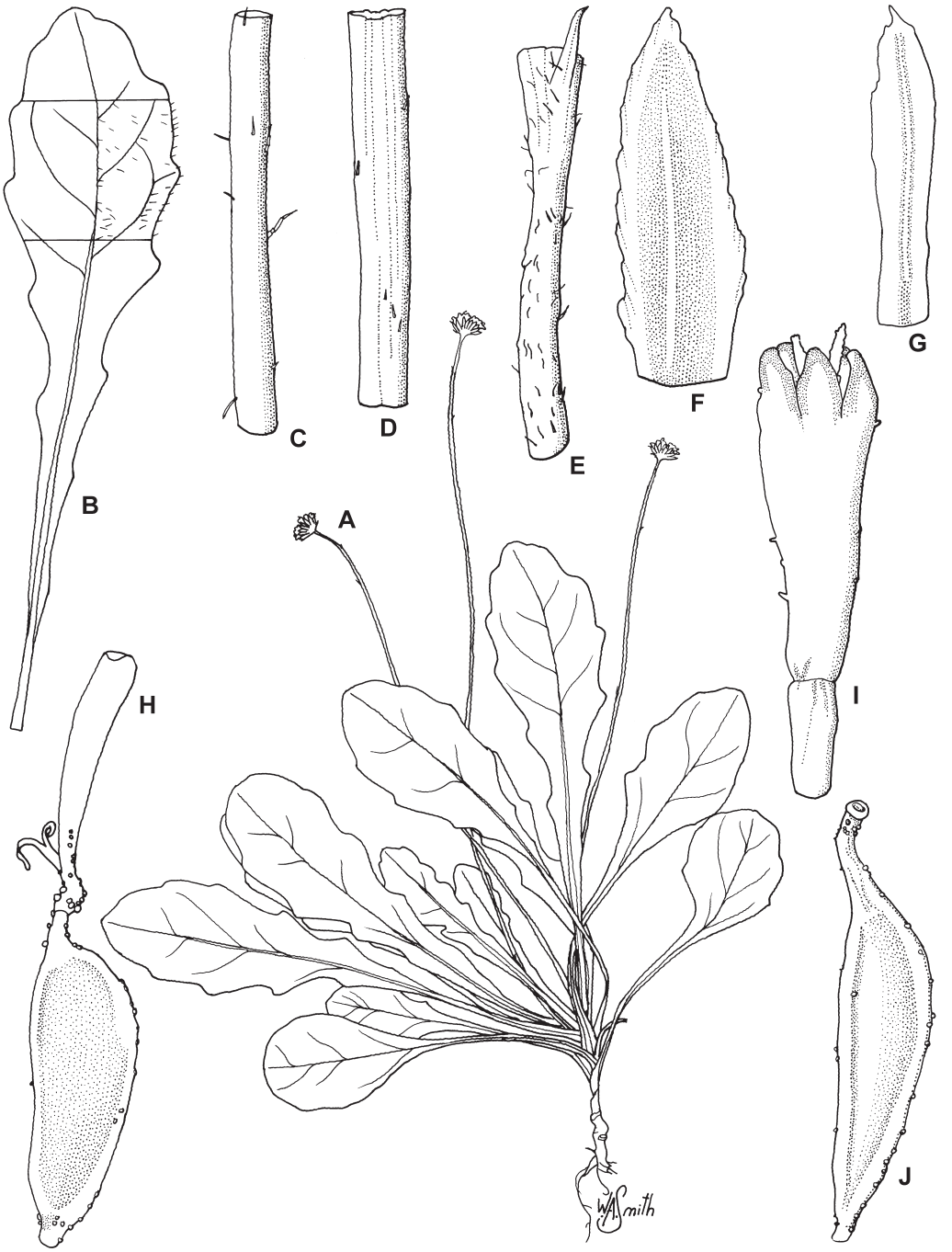


**Fig. 4.** ***Lagenophora gracilis***. A. habit of whole plant with flowering and fruiting inflorescences ×1. B. leaf with a section showing indumentum detail ×1.5. C–E. lower, mid and upper-sections of scape ×12. F. outer involucral bract ×24. G. inner involucral bract ×24. H. marginal floret ×24. I. disc floret ×24. J. achene ×16. A–E from *Keighery 13547* (PERTH); F–I from *Keighery & Keighery 1116* (PERTH); J from *Royce 2917* (PERTH [neotype]). Del. W. Smith.

mm diameter; involucral bracts 24(–30) in 2–4 rows, lanceolate to narrow lanceolate, glabrous or minute hairs on mid part of outer surface, apex acute, margin mainly on the top half fringed and purple coloured; outer bracts *c*. 2.2 × 0.4 mm; inner bracts *c*. 3 × 1 mm. Receptacle near convex, 1.8–3 mm diameter and 0.7–1.7 mm high. Ray florets 41(–50), in 4–6 rows; tube *c*. 0.4 mm long and 0.2 mm wide, glandular hairy; style branches 0.3–0.5 mm long; ligules 0.5–1 × 0.2–0.4 mm with 2–4 longitudinal obscure veins, mauve, light yellow, creamy, apex obtuse. Disc florets 10(–15); corolla tubular, 1.4–1.8 mm, mauve, outer surface with scattered glandular hairs, lobes 4 or 5, deltate, *c*. 0.5 × 0.5 mm long, and with purple tips; stamens 5, *c*. 1.1 mm long (anthers *c*. 0.6 mm long, filaments c. 0.5 mm long); style branches *c*. 0.5 mm long; sterile ovary *c*. 1 mm long; pappus scales present as a rim between corolla tube and sterile ovary. Achenes obliquely obovate with lower part unequal, 2.9–3.4 × 1.4–1.8 mm excluding beak, dark purplish brown at maturity; edges thickened; surfaces usually transversely wrinkled, glabrous or with a few hairs *c*. 0.1 mm long; glands evenly scattered along dorsal edge and densely covered ventral edges; beak 0.6–1 mm long, densely surrounded by glands, and with a white annular collar at its apex, *c*. 0.2 mm diameter. **Fig. 5.**

***Additional selected specimens examined*: South Australia.** South East District: 25 miles [40 km[ E of Meningie, *c*. 110 km SE of Adelaide, on Lake Albert, Oct 1960, *Sharrad 923* (AD); Big Heath Reserve, near Keith, Nov 1965, *Hunt 2587* (AD). Northern Lofty District: Webb Gap, 8 km E of Waterloo, Oct 1981, *McAlister 204* (AD). Southern Lofty District: Sturt Gorge Recreation Park, Hundred of Noarlunga, Section 1665, Oct 2001, *Blaylock 3069* (AD). Kangaroo Island District: American River Cannery walking trail, Sep 2012, *Overton & Overton 3119* (AD). York Peninsula District: Stansbury on a N/S track, *c*. 1 mile [1.6 km] S of the Minlaton – Stansbury Road, Oct 1970, *Barber 835* (AD). Eyre Peninsula District: 3.4 km direct ESE of the Fountain, Sep 2004, *Lang & Canty BS128–3380* (AD). Flinders Ranges District: 6.2 km direct WNW of Melrose, Hd. Wongyarra, Oct 1992, *Canty & Heard BS49–767* (AD). Murray District: Kaiser Stuhl Conservation Park, off Tanunda Creek Road, Sep 1990, *Taplin 405* (AD). **Victoria**. Yarra [River], Oct 1852, *Mueller s.n.* (MEL 2160540); Moyston, Oct 1872, *Sullivan 45* (MEL 2160551); Shire of Dimboola, Oct 1897, *Reader s.n.* (MEL 2160554); Strathbogie Ranges, in the Euroa district. On the Strathbogie road 3.5 miles [5.8 km] from Merton, Oct 1960, *Muir 1439* (MEL); Little Desert, 5 km E of Broughtons Waterhole, 25 km SE of Kaniva Post Office, Nov 1979, *Beauglehole 66337* (MEL); Meredith at Garema, at the end of Pioneer Ridge Road in the hill near the cliff, Sep 1985, *Lebreton 48* (MEL); Drumanure, beside Nine Mile Creek on S side and *c*. 100 m W of Gordon's Road. 8 km SE of Numurkah, Nov 1991, *Thompson 72* (MEL). **Tasmania.** Sandy Bay, Nov 1894, *Rodway 351* (HO); Queens Domain, Hobart, Oct 1949, *Curtis s.n.* (HO 13457); Sandy Bay, old rifle range, now site of University, Sep 1951, *Curtis s.n.* (HO 13458); Tinderbox, S of Hobart, Oct 1975, *Ratkowsky s.n.* (HO 14996); Meehan Range, near Tunnel Hill, May 1985, *Duncan 1035* (HO); SE ridge of Knopwood Hill, Nov 1984, *Buchanan 3894* (HO); Wimmera River, 3km S of Dimboola, Sep 1990, *Collier 4789* (HO); Diprose Lagoon, Cleveland, Oct 1998, *Duncan s.n.* (HO 443339).

***Distribution and habitat*:** *Lagenophora gunniana* is endemic to Tasmania, including Bass Strait islands, and south-eastern mainland Australia where it is distributed in Victoria and South Australia (**Map 2**). It grows mostly in eucalypt woodlands and open forests on a variety of soil conditions such as heavy grey clay, sandy loam. It is distributed from near sea level to above 1,000 m.

***Phenology*:** Flowers mostly recorded in September-October and fruits mainly from September to November. There are collections showing both flowering and fruiting in May.

***Typification*:** Gunn collected this species from several locations on various dates, but consistently used the number "510" for all of these. Cabrera (1966) specified a collection made in 1844, and there is only one specimen at K with this year on the label.

***Affinities*:** *Lagenophora gunniana* is of similar appearance to *L. huegelii* and *L. platysperma*, but differs by the disc florets 10(–15) (20–50 florets for both *L. huegelii* and *L. platysperma*), and the transversely wrinkled achenes on both faces and edges (smooth achenes for both *L. huegelii* and *L. platysperma*).

***Conservation status*:** Although *Lagenophora gunniana* is occasional and rare at a number of sites where it has been recorded, it can also be abundant and common from some sites. The species is not considered to be threatened and a **Least Concern** conservation status is recommended using the IUCN (2012) criteria.

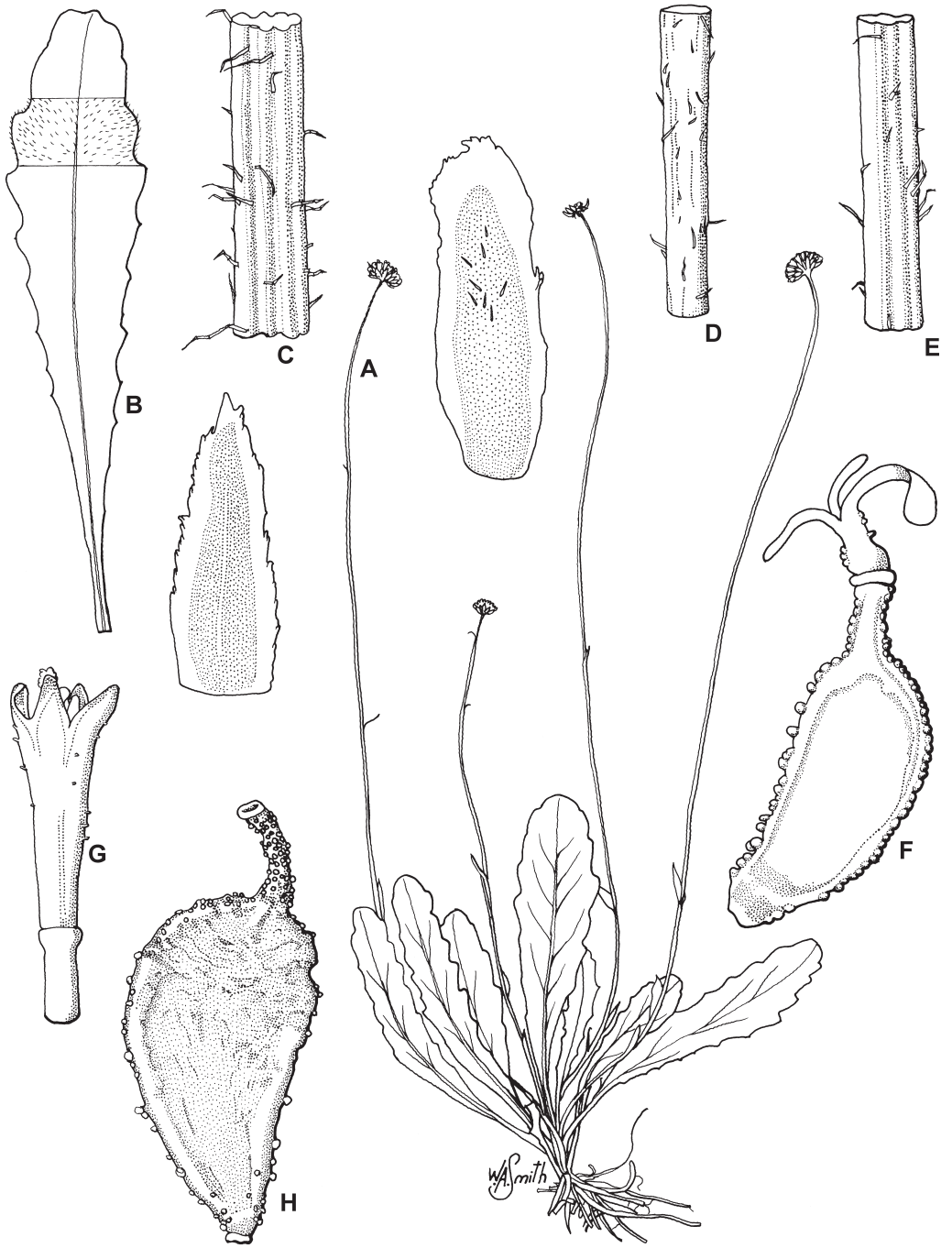


**Fig. 5.** ***Lagenophora gunniana.*** A. habit of whole plant with flowering and fruiting inflorescences ×0.5. B. leaf with a section showing indumentum detail ×1. C–E. lower, mid and upper-sections of scape ×8. F. inner involucral bract ×16. G. outer involucral bract ×16. H. marginal floret ×24. I. disc floret ×16. J. achene ×16. All from *Buchanan 3894* (HO). Del. W. Smith.

**6. Lagenophora huegelii** Benth., *Enum. Pl. [Endlicher]* 59 (1837). **Type:** Western Australia. King George's Sound, *s.dat*., *C.A.A. Hügel s.n.* (lecto: W 0047214 [here designated]).

Perennial rhizomatous herb; roots fleshy, bunched, 0.7–4(–7) mm diameter; stem absent; leaves and scapes usually readily detached from rootstock. Leaves 4–10(–15), ovate, obovate to spathulate, 3.5–11 cm long, 1.6–3 cm wide (2.2–3.7× longer than wide), sessile with a slightly winged petiolate-like base to 6 cm long; leaf apex obtuse or rounded; leaf margins crenate or sinuate, usually with 13–23 shallow lobes, each lobe (0.5–)1–3(–4) mm long; upper leaf surface slightly dark green, with (2–)4–7 eglandular hairs per mm$^2$, each (0.3–)0.5–0.9 mm long; lower leaf surface pale green, with 4–8 eglandular hairs per mm$^2$, each 0.3–0.9 mm; leaf margins with 8–15 eglandular hairs per mm$^2$, and each 0.4–1.2 mm long; lateral veins obscure on dried material on both surfaces. Scapes more or less channelled, 1–6 per tuft, each 7–16 cm long at anthesis, 13–35 cm long at fruiting stage, 0.4–0.8 mm diameter from lowest section to upmost section; indumentum 0.2–0.7 mm long, upright and retrorse, 3–6 hairs per mm$^2$ at midpoint of scape, gradually more dense towards apex, much denser on the top and near the involucre; bracts 3–8, upper ones *c*. 4 × 1 mm, lower ones *c*. 20 × 4 mm or occasionally even larger. Capitula 4–6 mm long, 8–11 mm diameter; involucral bracts 24–46 in 2–6 rows, lanceolate to narrow lanceolate, usually more or less hairy especially on mid part of outer surface, apex acute, margin mainly on the top half fringed and purple coloured; outer bracts 2–3 × 0.4–1 mm, inner bracts 3–3.5 × 0.9–1.1 mm. Receptacle convex, 3–4 mm diameter and 1–2 mm high. Ray florets 40–60, in 4–6 rows, tube 0.3–0.5 mm long, *c*. 0.3 mm wide, glandular hairy; style branches 0.4–0.5 mm long; ligules 0.9–1.5 × 0.2–0.4 mm with 2–4 longitudinal obscure veins, mauve, light yellow, creamy; apex obtuse. Disc florets 20–30, corolla tubular, *c*. 3 mm long, mauve, outer surface with scattered gland, lobes 4(–5), deltate, *c*. 0.5 × 0.5 mm, and with purple tips; stamens 4(–5), *c*. 1.3 mm long (anthers *c*. 0.8 mm long, filament *c*. 0.5 mm long); style branches 0.4–0.6 mm long; sterile ovary 0.5–1 mm long; no or rarely 1 appendage 0.4–0.5 mm long between corolla and sterile ovary. Achenes obliquely obovate or obovate with lower part unequal, 2.8–3.3 × 1.3–1.7 mm excluding beak, dark purplish brown at maturity; surfaces with scattered hairs 0.1–0.2 mm long; edges thickened; glands sparsely distributed along both dorsal (densely) and ventral (sparsely) edges; beak 0.5–0.8 mm long, densely surrounded by glands, and with a white annular collar at its apex, *c*. 0.2 mm diameter. **Fig. 6.**

***Additional selected specimens examined*: Western Australia.** Acton Park, Busselton district, Sep 1951, *Royce 3812* (PERTH); Near Mt Gordon, S of Bremer Bay, Oct 1965, *George 6940* (PERTH); 1 km W of Great Northern Highway along Hay Flat Road, 26 km N of South Bindoon, Sep 1983, *Cranfield 4215* (PERTH); Misery Beach, Torndirrup NP, 20 km S of Albany, Nov 1986, *Keighery 8523* (PERTH); 'Sandy Bay', Nornalup Inlet, Nov 1986, *Wilson 12415* (PERTH); 13 km S of Witchcliffe, Sep 1992, *Annels 2506* (PERTH); Kennys Tank Reserve, Frankland Road, off Highway 1, S of Frankland, Oct 1993, *Croxford 7124* (PERTH); Valley Bush, 28 km WSW of Kojonup, Oct 1997, *Lewis 285* (PERTH); Capercup North Road, opposite Capercup NR, Oct 1998, *Davis 8663* (PERTH); 7.5 km SW of Mt Dale, Jul 1997, *Davis 3709* (Perth); Tom Road just N of Donnelly River Crossing, close to Tom Road campsite, SW of Wheatley; Nov 1998, *Hislop 1199* (PERTH); Wickepin Shire Reserve on the corner of 86 Gate Road and Rich Road, 30 km ENE of the town of Wickepin, Oct 1999, *Gunness et al. 23273342* (PERTH); W side of Benaring Road, *c*. 10 km ENE of Calingiri, Sep 2000, *Davis WW 6–9* (PERTH); Loaring Lane, 5 km W of Margaret River, Oct 2000, *Scott 231* (PERTH); North Boundary Road, 1 km N of Kingston Road, Winnejup Forest Block, Oct 2001, *Cranfield & Ward s.n.* (PERTH 06027571); NE of eastern end of Oakover Road, S of York, Sep 2004, *Hislop et al. WW 144–39* (PERTH); S of Milton Road, opposite Quarbabing Hill, E of Pingelly, Sep 2006, *Hislop et al. WW 183–16* (PERTH); Foxes Lair, Walk track entry off Felspar Street, Oct 2007, *Sawkins & Rose 454* (PERTH); off W end of Pike Road, W of Brookton, Sep 2008, *Hislop & Griffiths WW 233–32* (PERTH); S of Pike Road and E of Strange Road, W of Brookton, Sep 2008 *Hislop & Griffiths WW 234–10* (PERTH); W of Moorumbine Road opposite the intersection with Gillett Road, NE of Pingelly, Oct 2008, *Hislop & Griffiths WW 238–8* (PERTH).

***Distribution and habitat*:** *Lagenophora huegelii* is endemic to south-west Western Australia where it is distributed as far north as Geraldton and east to Cape Arid (**Map 4**). It grows in low and tall eucalypt open forests and woodlands including Jarrah/Marri

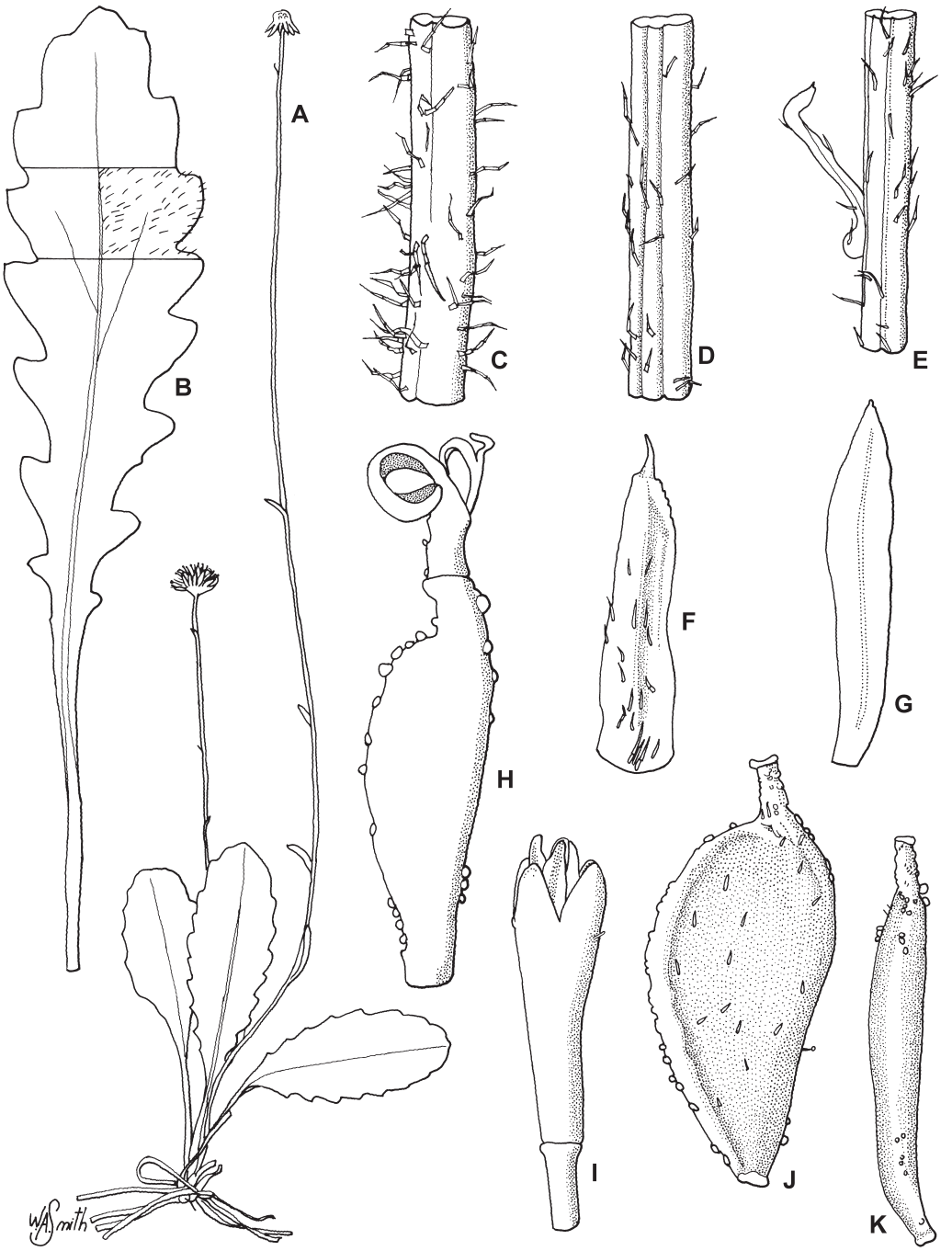


**Fig. 6.** ***Lagenophora huegelii.*** A. habit of whole plant with fruiting inflorescences ×0.8. B. leaf with a section showing indumentum detail ×1.5. C–E. lower, mid and upper-sections of scape ×8. F. outer involucral bract ×16. G. inner involucral bract ×16. H. marginal floret ×24. I. disc floret ×16. J. achene ×16. K. side view of an achene × 16. A, C–E from *Davis 8663* (PERTH); B & F–K from *Hislop et al. WW144-39* (PERTH). Del. W. Smith.

forest and Jarrah woodland. It also grows in heathland and very open shrubland with sedges and other herb species in the ground layer. The soils usually are grey sandy clay, brown clayey sand, brown dark loam and loamy sand.

***Phenology*:** Flowers recorded from as early as July and August, but mostly from September to October, rarely in December. Fruits usually from September to December.

***Typification*:** We consider that one of the two specimens cited in the protologue, from Swan River (W 0047213), represents *L. gracilis*. The protologue of *L. huegelii* describes the achenes, and only W 0047214 possesses achenes. Hence this specimen is the better choice for the lectotype, and it preserves the current usage of the name.

***Affinities*:** *Lagenophora huegelii* is of similar appearance to *L. gunniana* and *L. platysperma*. It differs from *L. gunniana* by the 20–30 disc florets (10(–15) disc florets for *L. gunniana*) and smooth achenes (achenes transversely wrinkled on both surfaces and on edges for *L. gunniana*). It differs from *L. platysperma* by the shorter and narrower ligules, usually 0.9–1.2(–3) mm long and 0.2–0.4 mm wide (versus 4.5–6 mm long, 0.8–1.2 mm wide for *L. platysperma*), and the achenes 3.3–4.5 × 1.3–1.7 mm (4.8–5.1 × 2.1–3 mm for *L. platysperma*).

***Conservation status*:** *Lagenophora huegelii* has relatively wide spread distributional range in south-west Western Australia. It is usually a frequent species and can be locally abundant where it occurs. The species is not considered to be threatened and a **Least Concern** conservation status is recommended using the IUCN (2012) criteria.

**7. Lagenophora latifolia** Hook.f., *London J. Bot.* 6: 113 (1847); *L. stipitata* var. *latifolia* (Hook.f.) Domin, *Biblioth. Bot.* 89: 653 (1930). **Type:** Tasmania. Mt Wellington, 1 March 1839, *R. Gunn s.n.* (lecto: K 000890125 [here chosen]; isolecto: NSW 10305).

Perennial rhizomatous herb; roots and rhizomes fibrous; stem very short (leaves in basal rosette) or sometimes elongated (leaves alternate along stem); leaves and scapes firmly attached to stem and/or rootstock. Leaves 5–9, ovate, obovate or spathulate, (0.5–)1–3.5 cm long, 0.4–1.2 cm wide (2.5–2.9× longer than wide), sessile with a winged petiole-like base to 1 cm long; leaf apex obtuse; leaf margins sinuate or waved, usually with 7–11 shallow lobes, each lobe 1–2 mm long; upper leaf surface dark green, with 4–8 eglandular hairs per mm$^2$, each 0.4–1 mm long; lower leaf surface pale green, with 4–10 eglandular hairs per mm$^2$, each 0.3–1 mm long; leaf margins with 8–12 eglandular hairs per mm$^2$, each 0.3–0.6 mm long; lateral veins obvious on dried material on both surfaces. Scapes channelled, 1–3(–5) per tuft, each 2–9 cm long at anthesis, 3–12 cm long at fruiting stage, 0.5–1(–1.5) mm diameter from lowest section to upmost section; indumentum including broad-based eglandular hairs 0.4–0.6 mm long, patent or retrorse, 10–15 hairs per mm$^2$ at midpoint of scape, 12–20 hairs per mm$^2$ towards apex, narrow eglandular hairs 0.1–0.3 mm long, appressed, patent or retrorse and shorter glandular hairs to *c*. 0.01 mm long, all hair types with similar densities; bracts 1–3, upper ones *c*. 2.5 × 0.5 mm, lower ones *c*. 12 × 1 mm or occasionally even larger. Capitula 4–5 mm long, 7–11 mm diameter; involucral bracts *c*. 46 in 4–5 rows, linear, narrow lanceolate, glabrous except for hairs along midrib on outer surface, apex acute to acuminate, with fringed margins usually on top half distal part; outer bracts *c*. 2.3 × 0.4 mm, inner bracts *c*. 3.5 × 0.5 mm. Receptacle convex, *c*. 2.4 mm diameter and 1.3 mm long. Ray florets *c*. 70, in 3 rows, tube 0.4–0.5 mm long, *c*. 0.2 mm wide, glandular hairy; style branches 0.4–0.5 mm long; ligules 1.5–2 × 0.2–0.4 mm with 2–3 longitudinal veins, mauve, apex obtuse or 2-splited. Disc florets *c*. 17; corolla tubular, 1.7–2.5 mm, mauve, outer surface covered with short glandular hairs, lobes 5 or 6, deltate, *c*. 0.5 × 0.4 mm in size; stamens 5, 0.8–1 mm long; style branches, *c*. 0.25 mm long; sterile ovary *c*. 2 mm long, with a thickened creamy annular collar at its apex. Achenes lanceolate, usually straight, 2.3–2.7 × 0.7–0.9 mm excluding beak, dark brown to purplish at maturity; edges slightly thickened; glands along both dorsal edge (densely) and

ventral edge (sparsely) from top to base, near base and neck areas on both faces, otherwise glabrous; beak 0.4–0.8 mm long, 0.2–0.3 mm wide, densely surrounded by glands, and with a white annular collar at its apex, 0.25–0.35 mm diameter. **Fig. 7.**

***Additional selected specimens examined*: Tasmania.** Ben Lomond District: Ben Lomond NP, disturbed area at roadside, near Ranger Headquarters, Nov 1978, *Noble 28044* (HO); Ben Lomond NP, Mar 1979, *Noble 28455* (HO); Mt Victoria, Apr 1985, *Moscal 10628* (HO). Central Highlands District: Cradle Mt Reserve at Waldheim, Mar 1949, *Curtis s.n.* (HO 52184); Hill between Granite Tor and High Tor, Jan 1985, *Moscal 9432* (HO); Quamby Bluff, summit, Mar 1986, *Moscal 12599* (HO); Below Eldon Bluff, Feb 1987, *Buchanan 9979* (HO); Lees Track, Jan 1988, *Moscal 15385* (HO); Mt Inglis, Jan 1989, *Collier 3965* (HO); Skullbone Plains South, end of Kenneth Lagoon Road, Mar 2012, *Schmidt-Lebuhn 1328* (HO). Derwent Valley District: Near Lake Dobson, Mt Field, Jan 1978, *Smith 260* (HO). South West District: Moores Bridge, Moonlight Ridge, Jan 1984, *Adams 49* (HO); Abbotts Lookout, Mar 1985, *Moscal 10349* (HO). West Coast District: S ridge of Mt Dundas, Jan 1987, *Collier 2127* (HO).

***Distribution and habitat*:** *Lagenophora latifolia* is endemic to Tasmania where it is widespread, but restricted to high altitudes from 800 m to 1,160 m (**Map 1**). It usually grows in eucalyptus open forests, open grassy woodland, subalpine woodland and rainforest edges along rivulet. It has been recorded in logged disturbed areas and along 4WD tracks.

***Phenology*:** Flowers mostly from November to February and fruits from January to March.

***Typification*:** A second sheet of this species collected by Gunn (K 00089128) is present at K, and has been designated an 'isotype' by Cabrera. However, this specimen was evidently collected at a later date, and cannot convincingly be linked to the lectotype.

***Affinities*:** *Lagenophora latifolia* is of similar appearance to *L. stipitata*, but differs by the leaves 0.5–3.5 cm long and 2.5–2.9× longer than wide (versus 1.5–7.7 cm long and 3.8–4.3× longer than wide for *L. stipitata*), the sinuate to undulate leaf margins (obtusely serrate for *L. stipitata*), glandular and eglandular hairs present on the scape (only broad-based eglandular for *L. stipitata*), and the achene beak 0.4–0.8 mm by 0.2–0.3 mm (0.6–1 mm by 0.15–0.25 mm for *L. stipitata*).

***Conservation status*:** At a few locations where *Lagenophora latifolia* is recorded, it is noted to be an occasional or infrequent species. However, as it seems to be able to tolerate certain disturbance, *i.e.* logging, a **Least Concern** conservation status is recommended using the IUCN (2012) criteria.

**8. Lagenophora montana** Hook.f., *London J. Bot*. 6: 113 (1847); *L. montana* var. *montana*, Hook.f., *loc. cit.*; *L. billardierei* var. *montana* (Hook.f.) Rodway, *Tasman. Fl. 77* (1907); *L. stipitata* var. *montana* (Hook.f.) Domin, *Biblioth. Bot*. 89: 653 (1930). **Type:** Tasmania. Circular Head, 11 January 1837, *R. Gunn 832* (lecto: K 000890122; *fide* Cabrera 1966: 303).

*Lagenophora montana* var. *major* Hook.f., *London J. Bot*. 6: 113 (1847). **Type:** Tasmania. Marlborough, 4 January 1841, *R. Gunn 833* (syn: K 000890119); Woolnorth, 30 March 1837, *R. Gunn 833* (syn: K 000890120).

*Lagenophora montana* var. *minor* Hook.f., *London J. Bot*. 6: 113 (1847). **Type:** Insula Van Diemen [Tasmania], *s.dat*., *R. Gunn 832* (syn: K 000890124; *fide* Cabrera 1966: 303).

Perennial rhizomatous herb; roots and rhizomes fibrous, wiry, not bunched; 0.1–1(–1.5) mm diameter; stems often elongated to 12 cm long; leaves and scapes firmly attached to stem and/or rootstock. Leaves 2–5 (–12), oblong, ovate, lanceolate, spathulate, 1.1–5 cm long, 0.3–1.2 cm wide (3.7–4.2× longer than wide), alternate along stem, sessile with a winged petiole-like base to 2 cm long; leaf apex obtuse or rounded; leaf margins denticulate, occasionally entire, often with 5–9 teeth, each tooth 0.01–1 mm long; upper leaf surface slightly dark green, glabrous or with 1–5 eglandular hairs per $mm^2$, each 0.1–0.4 mm long; lower leaf surface pale green, glabrous or with 1–2 eglandular hairs per $mm^2$, each 0.1–0.4 mm long; leaf margins with 5–10 eglandular hairs per $mm^2$, each 0.1–0.4 mm long; lateral veins obvious on dried material on both surfaces. Scapes more or less rounded or 4-squared, 1 only per tuft, 2–8(–14) cm long at anthesis, 5–8 (–14) cm long at fruiting stage, 0.4–1 mm diameter from lowest section to upmost section; indumentum *c*. 0.1 mm long, upright, antrorse

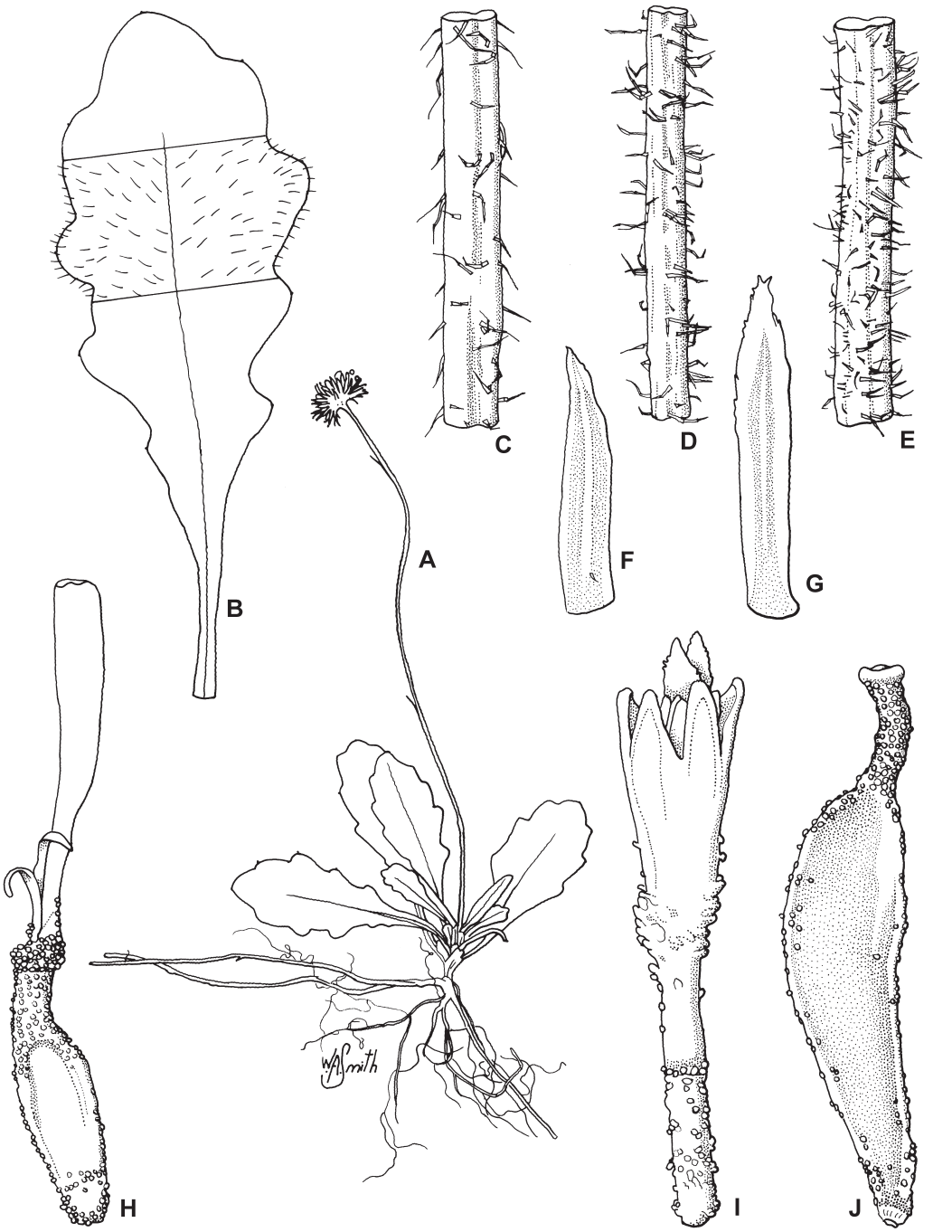


**Fig. 7.** ***Lagenophora latifolia*****.** A. habit of whole plant with flowering inflorescence ×1. B. leaf with a section showing indumentum detail ×3. C–E. lower, mid and upper-sections of scape ×12. F. outer involucral bract ×16. G. inner involucral bract ×16. H. marginal floret ×24. I. disc floret ×24. J. achene ×24. All from *Moscal 12599* (HO). Del. W. Smith.

and more or less appressed, glabrous or 1–3 hairs per mm$^2$ at midpoint of scape, denser to the apex and near the involucre; bracts 2–5, upper ones *c*. 2 × 0.5 mm, lower ones *c*. 10 × 1 mm or smaller in size. Capitula 3–4 mm long, 5–9 mm diameter; involucral bracts (20)–47 in 3–4 rows, lanceolate to narrow lanceolate, glabrous on both surfaces, apex obtuse, margin mainly on the top half fringed and purple coloured; outer bracts *c*. 2.3 × 0.6 mm, inner bracts 3–3.5 × 0.7–1.3 mm. Receptacle flattened and disc-like, *c*. 2 mm diameter and 0.2 mm high. Ray florets *c*. 68, in 3–4 rows; tube 0.5–1 × 0.2–0.3 mm, glandular hairy; style branches 0.6–0.8 mm long; ligules 2.8–3.8 × 0.4–0.6 mm with 3 longitudinal obscure veins, mauve, light yellow, creamy, apex obtuse. Disc florets *c*. 20, corolla tubular, *c*. 1.6 mm long, light brown, outer surface with scattered short glandular hairs, lobes, 4(–5), deltate, 0.4–0.5 × 0.2–0.5 mm, and with purple tips; stamens 5, *c*. 0.8 mm long (anthers *c*. 0.5 mm long, filament *c*. 0.3 mm long); style branches *c*. 0.3 mm long; sterile ovary 0.8–1.6 mm long; pappus scales present as a thickened rim between corolla and sterile ovary. Achenes obovate or ovate, 1.8–2.2 × 0.8–1 mm excluding beak, dark purplish brown at maturity, with a creamy to light yellow coloured edge, glabrous throughout; edges slightly thickened; glands densely scattered along both dorsal (more) and ventral (less) edges, as well as on the top and bottom areas of both surfaces, otherwise glabrous; beak 0.2–0.4 mm long, densely surrounded by glands, with a white annular collar at its apex, *c*. 0.2 mm diameter. **Fig. 8.**

***Additional selected specimens examined*: South Australia.** Southern Lofty District: Knott Hill, Creek Line, Mar 1991, *Murfet 1027* (AD). **New South Wales.** Northern Tablelands District: 3 km N from entrance, Cathedral Rock NP, Feb 1996, *Ito 96018 et al.* (MEL, NSW). Southern Tablelands District: Mt Kosciusko NP, *c*. 5.5 km SE of Sawyers Hill along road to Adaminaby, Feb 1993, *Short 3984* (MEL, NSW). **Australian Capital Territory.** Moonlight Hollow Road, *c*. 15 km SW of Cotter Reserve, Jan 1972, *Adams 2677 & Barker* (CANB, K, NSW); *c*. 0.5 km W of Little Bimberi, Bimberi Range, Namadgi NP, Mar 1987, *Gilmour 6194* (CANB, NSW). **Victoria**. Wombargo, Jan 1949, *Wakefield 4164* (MEL); Forlorn Hope Track, S of Benambra – Wulgulmerang Road, Jan 1971, *Beauglehole 36200 & Finck* (MEL); Pheasant Creek Flora Reserve, Jan 1988, *Beauglehole 93216 & Strudwick* (MEL); *c*. 3.5 km NE of Lake Mountain, headwaters of Royston River, Feb 1993, *Clarke 2266* (MEL); *c*. 8.5 km S by E of Buxton, Blue Range Road at crossing of Storm Creek, Feb 1998, *Clarke 2261* (MEL). **Tasmania.** Ben Lomond District: Weldborough (Thomas Plain), Feb 1877, *Simson 515* (HO). Central Highlands District: Junction of boat ramp road and Poatina Highway, E side of Great Lake, Jan 1981, *Brown 185* (HO); Lees Paddocks, Upper Mersey River, Jan 1988, *Moscal 15341* (HO); Big Den, Lake River, 35 km W of Campbell Town, Dec 1990, *Collier 5029* (HO); N end, Bronte Lagoon, Feb 2013, *Wood 335 & Johnson* (HO). East Coast District: Mt Dromedary, Feb 1894, *Rodway s.n.* (HO 131636). Midlands District: Meander River Flats, S of Deloraine, Jan 1959, *Somerville s.n.* (HO 10048). South West District: Marsh near Mt Styx, Mar 1910, *Rodway s.n.* (HO 13431). West Coast District: Waratah, Jan 1893, *Simson 2726* (HO).

***Distribution and habitat*:** *Lagenophora montana* is known from Tasmania and south-eastern mainland Australia where it is distributed in Victoria, New South Wales, Australia Capital Territory and South Australia (**Map 5**). The species is also present in New Zealand where it is scarce (Drury 1974; de Lange *et al.* 2010). In Australia, it grows in subalpine heathland, scrubby grassland, savannah woodland and riparian scrub community near swamps. The soils can be sandy loam, loam and basalt. It has been recorded from 250 m to 1,500 m above sea level. One record from Tasmania is from 25 m altitude.

***Phenology*:** Flowers mostly from January to February and fruits mainly from February to March, also recorded through May.

***Affinities*:** *Lagenophora montana* is of similar appearance to the parapatric *L. stipitata* and *L. latifolia*. It differs from these two species by more or less glabrous leaves (leaves obviously hairy for *L. stipitata* and *L. latifolia*); scape hairs antrorse or appressed, *c*. 0.1 mm long (vs. retrorse, *c*. 0.2 mm); involucral bracts glabrous with obtuse apex (versus involucral bracts with some hairs, and apex acute to acuminate for both *L. stipitata* and *L. latifolia*).

***Conservation status*:** Although in most cases *Lagenophora montana* is an occasional or uncommon species where it was recorded, it is a relatively widespread in Tasmania, Victoria, South Australia, New South Wales

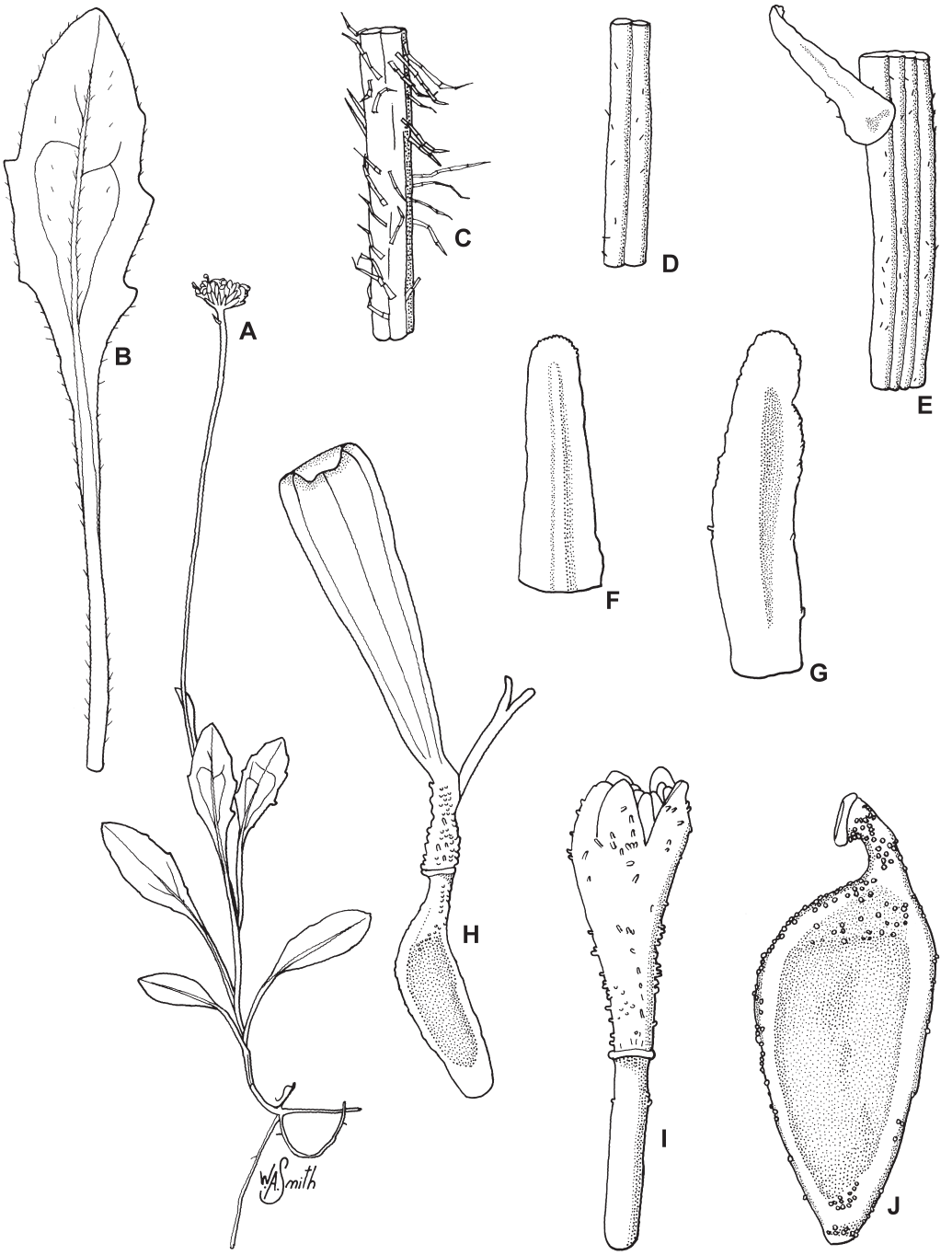


**Fig. 8.** ***Lagenophora montana.*** A. habit of whole plant with flowering inflorescence ×1. B. leaf ×3. C–E. lower, mid and upper-sections of scape ×12. F. outer involucral bract ×16. G. inner involucral bract ×16. H. marginal floret ×16. I. disc floret ×16. J. achene ×24. A–I from *Collier 5029* (HO); J from *Brown 185* (HO). Del. W. Smith.

and Australia Capital Territory. Therefore, a **Least Concern** conservation status is recommended using the IUCN (2012) criteria.

In New Zealand, *Lagenophora montana* is seriously threatened (de Lange *et al.* 2017).

**9. Lagenophora platysperma** Jian Wang ter & A.R.Bean **sp. nov.** with affinity to *L. huegelii* but differing by the much larger ligules, longer corolla tubes of disc floret, the larger achenes and the longer scapes at anthesis. **Typus:** Western Australia. Lowlands, private property at W end of Lowlands Road, Shire of Serpentine, Jarrahdale, 10 October 1994, *B.J. Keighery 2108* (holo: PERTH 06514421).

Perennial rhizomatous herb; roots fleshy, bunched, 0.5–3.2 mm diameter; stem usually absent; leaves and scapes usually readily detached from rootstock. Leaves 4–10, ovate, obovate or spathulate, (1–)5.4–11.5(–18) cm long, 2.1–3.3 cm (2.6–3.5× longer than wide), sessile with a winged petiole-like base to 7 cm long; leaf apex obtuse; leaf margins crenate or sinuate, usually with 15–23 teeth, each tooth 1–6 mm long; upper leaf surface slightly darker green than lower, with 1–4 hairs per mm$^2$, each 0.2–0.6 mm long; lower leaf surface with 4–8 hairs per mm$^2$, each 0.3–0.7 mm long; leaf margins with 8–12 hairs per mm$^2$, and each 0.4–0.8 mm long; lateral veins usually obscure on dried material on both surfaces. Scapes channelled, 1–4(–6) per plant, each 15–34 cm long at anthesis, 26–38 cm long at fruiting stage, *c*. 0.7 mm diameter but expanding to *c*. 1.8 mm at apex; indumentum 0.2–0.6 mm long, patent or retrorse, 5–10 hairs per mm$^2$ at midpoint of scape, dense to very dense at the distal end near the involucre; bracts 2–7, upper ones *c*. 10 × 1.5 mm, lower ones *c*. 30 × 6 mm or occasionally even larger. Capitula 5–7 mm long, 10–13 mm diameter; involucral bracts 36–42 in 4–6 rows, lanceolate to narrow lanceolate, glabrous or sparsely scattered hairy on the outer surface, apex acute and usually purple coloured, margin fimbriate especially on the distal half; outer bracts 2.5–4 × 0.5–1 mm, inner bracts 4–5.5 × 0.8–1.2 mm. Receptacle flat to slightly dome-shaped, 3.2–5.2 mm diameter and 1.4–1.6 mm high. Ray florets *c*. 50, in 2–4 rows; tube 0.6–0.8 mm long, *c*. 0.2 mm wide, glandular hairy; style branches *c*. 0.6 mm long; ligules (3.2–)4.5–6 × 0.8–1.2 mm, with 4–5 longitudinal obscure veins, creamy or purplish, apex obtuse. Disc florets 30–50; corolla tubular, *c*. 3.5 mm long, mauve, usually with minute glandular hairy on the outside of lower part, lobes 5, narrow deltate, *c*. 0.6 × 0.3 mm, and with purple tips; stamens 5, *c*. 2 mm long (anthers *c*. 1.2 mm long, filament *c*. 0.8 mm long); style branches *c*. 0.8 mm long; sterile ovary 1.5–2.2 mm long, no pappus scales between corolla and sterile ovary. Achenes obovate with lower part unequal, 3.7–4.5 mm long excluding beak, 2.1–3 mm wide, dark brown at maturity, with scattered hairs *c*. 0.2 mm long mainly on the top half section, becoming glabrous; edges not thickened; glands scattered along both dorsal (more) and ventral (less) edges; beak 0.5–1.1 mm long, densely surrounded by glands, and with a white annular collar at its apex, *c*. 0.35 mm diameter. **Fig. 9.**

***Additional specimens examined*: Western Australia**. Capel, Sep 1951, *Royce 3793* (PERTH); Lake Mealup, 20 km W of Pinjarra, Aug 2003, *Creed 74* (PERTH); Yanchep NP between Loch and Main road at N end of park, Aug 1964, *James 264* (PERTH); Medina, Sep 1965, *Turner 5475* (PERTH); 5 miles N of Lake Clifton Roadhouse, Sep 1971, *Paust 78* (PERTH); Uganda Road, Wanneroo, Aug 1978, *Cranfield s.n.* (PERTH 00443891); Vacant block opposite Department of Agriculture, Jarrah Road, South Perth, Aug 1980, *Cranfield R344* (PERTH); *ibid*, Aug 1981, *Cranfield R378* (PERTH); Forestdale Lake NR, Aug 1985, *Alford 28* (PERTH); Yanchep NP, Aug 1991, *Greig 4* (PERTH); William Bay NP, track N from Madfish Bay Road to 'petrified forest', Oct 1993, *Hammersley 1016* (PERTH); S of Saunders Street (W end), Henley Brook, Aug 1996, *Edgecombe 8* (PERTH); Koondoola Regional Bushland, Koondoola, Sep 1996, *Friends of Koondoola KRB63O* (PERTH); Caversham Air Base, Oct 1997, *Edgecombe 137* (PERTH); N of Gnangara Road, N side of Lot 46 Maralla Road, Ellenbrook, Aug 1999, *Trudgen & Trudgen MET 20586* (PERTH); Ellis Brook Valley Reserve, Sep 1999, *Bowler 246* (PERTH); Bodhinyana Monastery, 216 Kingsbury Drive, Serpentine, Jul 2002, *Nyanatusita 76* (PERTH); *c.* 12 km NE of Two Rocks, W of Wanneroo Road along Smokebush Road, Aug 2003, *Richardson KCR204* (PERTH); Roman Road Bushland, Mundijong, Aug 2009, *Wildflower Soc of WA/DEC BAUD02/22* (PERTH 08215901); Reserve No. 18644, southern end of Reserve adjacent Jackson Street, East Augusta, Sep 2009, *Matei TB35* (PERTH); Reserve No. 18644, 20 m N of Jackson Street, East Augusta, Sep 2011, *Bradshaw TB157C* (PERTH).

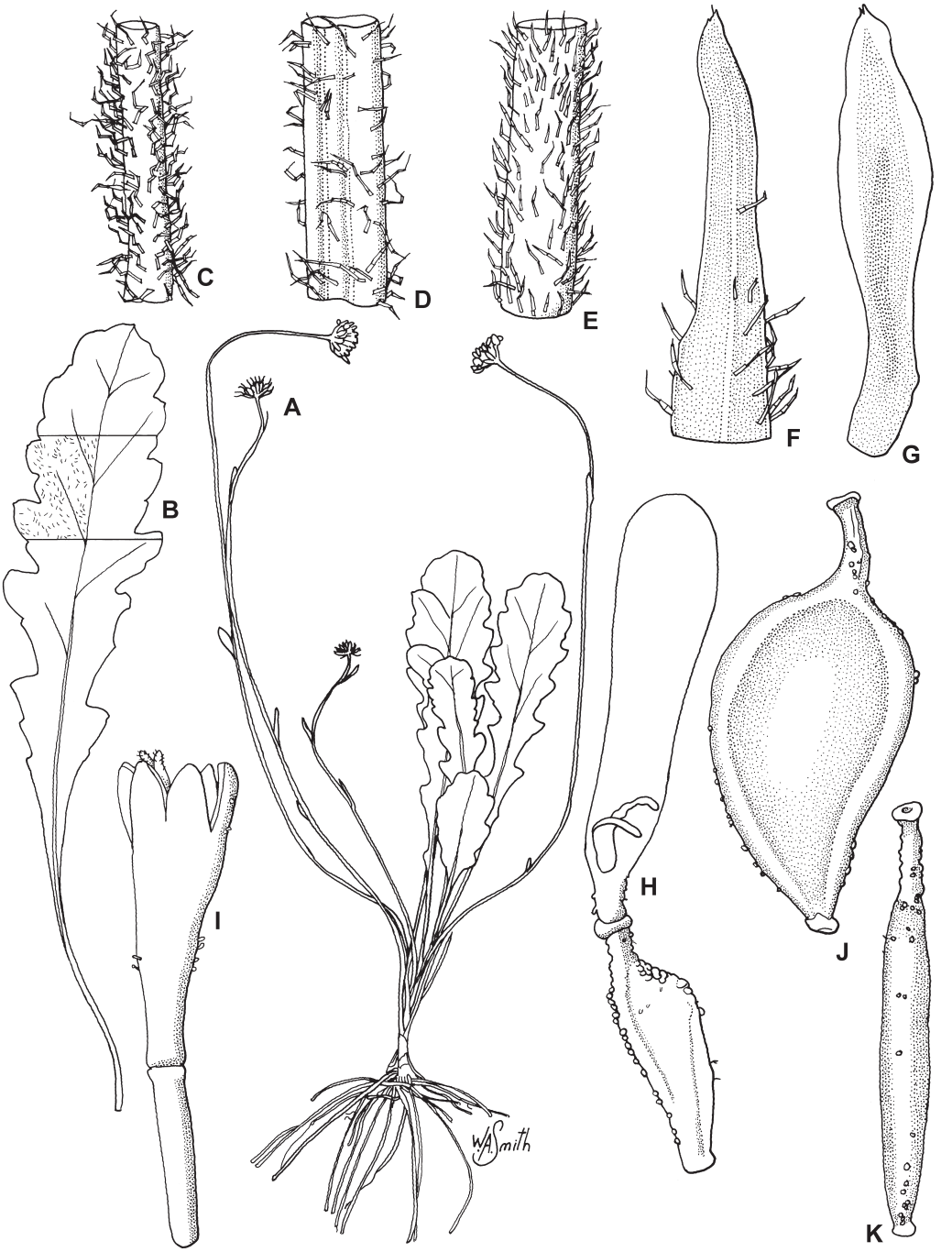


**Fig. 9.** ***Lagenophora platysperma*.** A. habit of whole plant with flowering and fruiting inflorescences ×0.4. B. leaf with a section showing indumentum detail ×0.8. C–E. lower, mid and upper-sections of scape ×18. F. outer involucral bract ×12. G. inner involucral bract ×12. H. marginal floret ×12. I. disc floret ×12. J. achene ×12. K. side view of achene ×12. A & J from *Wildflower Soc of WA/DEC, BAUD 02/22* (PERTH); B–E & K from *Keighery 2108* (PERTH [holotype]); F–I from *Turner 5475* (MEL). Del. W. Smith.

***Distribution and habitat*:** Endemic to Western Australia, *Lagenophora platysperma* is mainly distributed along the west and south west coastal areas from Jurien to Albany (**Map 6**). It grows in variety of habitats, dense low heath and woodland of coast dunes, Jarrah open woodland, Jarrah-banksia woodland, eucalypt/allocasuarina woodland, eucalypt/melaleuca woodland, Jarrah/Marri forest, tall shrubland/sedgeland, wetland etc. on various sandy soils and/or loamy soils.

***Phenology*:** Flowers mostly from July to October and fruits mainly from August to November.

***Affinities*:** *Lagenophora platysperma* is of similar appearance to the parapatric *L. huegelii*, but differs by the larger ligules 4.5–6 × 0.8–1.2 mm (ligules 0.9–1.2(–3) × 0.2–0.4 mm in *L. huegelii*), longer corolla tubes of disc floret 0.6–0.8 mm long (versus *c*. 0.5 mm in *L. huegelii*), larger achenes 4.8–5.1 × 2.1–3 mm (versus 3.3–4.5 × 1.3–1.7 mm in *L. huegelii*), and the scapes at anthesis 15–34 cm long (versus 7–16 cm long in *L. huegelii*).

***Conservation status*:** Although *Lagenophora platysperma* has a restricted coastal distribution in south-west Western Australia, it is often a frequent species that can be locally common where it occurs. The species is not considered to be threatened and a **Least Concern** conservation status is recommended using the IUCN (2012) criteria.

***Etymology*:** From the Greek *platy* and *spermus*, meaning 'broad-seed'. This species has the widest achenes of all *Lagenophora* species in Australia.

**10. Lagenophora queenslandica** Jian Wang ter & A.R.Bean, *Austrobaileya* 9: 469 (2016). **Type:** Queensland. Cook District: 3 km from Mt Molloy on Mareeba road, 12 April 1975, *L.A. Craven 3243* (holo: BRI; iso: CANB *n.v.*; L 1815328).

***Illustrations*:** Wang & Bean (2016: 470, 471).

Perennial rhizomatous herb; roots fleshy, bunched, 0.8–2 mm diameter; no stem or short stem 1–5 mm long; leaves and scapes firmly attached to stem and/or rootstock. Leaves 4–14, oblong, obovate or elliptical, 2.5–8 cm long, 1.2–2.4 cm wide (2.1–3.3× longer than wide), sessile or with a winged petiole-like base to 1 cm long; leaf apex obtuse; leaf margins crenate to sinuate, with 9–17 teeth, each tooth 0.5–1.5(–2) mm long; upper leaf surface green, with 0–2 eglandular hairs per mm$^2$, each 0.3–0.5 mm long; lower leaf surface pale green, with 0–3 eglandular hairs per mm$^2$, each 0.3–0.6 mm long; up to 7 eglandular hairs per mm$^2$ along the mid vein on both leaf surfaces; leaf margins with 5–7 eglandular hairs per mm$^2$, each 0.1–0.4 mm long; hairs to 1 mm or more at leaf base; lateral veins usually obscure on dried material on both surfaces. Scapes slightly channelled, (1–)3–8 per plant, each 9–17 cm long at anthesis, 11–25 cm long at fruiting stage, 0.6–1.2 mm diameter; indumentum *c*. 0.05 mm long, antrorse, more or less appressed, 4–7 hairs per mm at midpoint, rather denser towards apex; bracts 2–6, each up to 8 × 1.4 mm. Capitula 4–5 mm long, 6–9 mm diameter; involucral bracts 20–40 in 2–4 rows, oblong to obovate, glabrous, apex obtuse, with fringed margin on distal part, outer bracts 1–1.6 × 0.4–0.6 mm, inner bracts *c*. 2.1 × 0.5–0.7 mm. Receptacle convex, *c*. 2.7 mm diameter and 1 mm high. Ray florets 30–40, in 2–5 rows; tube *c*. 0.5 mm long and 0.2 mm diameter, with minute eglandular hairs; style branches 0.3–0.5 mm long; ligules 1.4–1.8 mm long, 0.3–0.4 mm wide, white to mauve, apex obtuse. Disc florets 18–30, corolla tubular, 1.7–1.8 mm long, light yellow, outer surface with minute glandular hairs, lobes 5, deltate, 0.1–0.3 mm long; sterile ovary 0.6–0.9 mm long. Achenes obliquely oblanceolate, 2–3 × 0.6–1.2 mm excluding beak, light brown to brown at maturity; edges more or less thickened; glands distributed from distal end to base, especially along dorsal edge, otherwise glabrous; beak 0.2–0.3 (–0.4) mm long and 0.2–0.3 mm wide, densely glandular throughout, lacking a thickened white annular collar at its apex.

***Additional selected specimens examined*: Queensland.** Cook District: Portland Roads, Jun 1948, *Brass 18995* (BRI); Byerstown Range, Feb 2016, *McDonald 17663* (BRI); Brooklyn Homestead near Rifle Creek/Lustre Creek junction, Jan 1996, *Godwin MGC4202 & Russell* (BRI); 500 m W of MBA [Mareeba] –Mt Molloy Road opposite Hodzic Road, Mar 2002, *Thompson 2563 & Newton* (BRI); 19 km E of Kennedy Highway along Tinaroo Creek road, 0.9 km W of road junction, Apr

2003, *Neldner 4206* (BRI); E of Cobra Creek between Tinaroo Falls & Malone Road turnoff on Cairns Road, Feb 1962, *Webb 5875 et al.* (BRI); 9.1 km from Forsayth pub along Einasleigh Road, near Mt Talbot turnoff, Feb 2011, *McDonald 10591* (BRI). North Kennedy District: Forty Mile Scrub NP, Mar 1993, *Fensham 1113* (BRI); 37.4 km by road to Princess Hills, from junction with Kennedy Highway near Mt Garnet, Jan 2005, *McDonald 3589* (BRI); White Mountain NP near Warang, Apr 2000, *Wannan 1747* (BRI, MEL, NSW). Leichhardt District: Homevale Station, 3.5 km W of station [homestead], Mar 1994, *Champion 1033 et al.* (BRI). Mitchell District: Warang, WNW of Torrens Creek, Apr 1990, *Cumming 9662* (BRI). Port Curtis District: Eden Bann road, W of Canoona, Mar 1994, *Bean 7541* (BRI); Neerkool Creek, *s.dat*., *Bowman s.n.* (MEL 2161644); 1.5 km SW along E-W road from junction with Elanora track, Razorback Sector, Shoalwater Bay Training area, Feb 2014, *Halford QM939* (BRI). Burnett District: SF 43, 16.6 km along Hawkwood Road, SW of Mundubbera, Apr 1997, *Bean 11955* (BRI); Near regrowth experiment, Narayen, Nov 1969, *s. coll*. (BRI [AQ583268]).

***Distribution and habitat*:** *Lagenophora queenslandica* is endemic to central and north Queensland. Most records are from coastal and near coastal areas from Mareeba to Rockhampton, but there are several occurrences further inland e.g. White Mountains near Pentland, near Mundubbera, and Springsure. There is also a record from Portland Roads on Cape York Peninsula (**Map 7**). The species usually inhabits *Eucalyptus* open forests and *Melaleuca* woodlands on ridges or alluvial plains. There is also a record from dry rainforest on basalt soil.

***Phenology*:** Flowers and fruits are mostly from January to April. However, there are also records of flower or fruits in October, November, May and June.

***Affinities*:** *Lagenophora queenslandica* is of similar appearance to the parapatric *L. sublyrata*, but differs by the leaves more consistently obovate (leaf length/width ratio 2.1–3.3 versus 2.5–4.1 for *L. sublyrata*); the shorter and broader involucral bracts; the lack of hairs at the base of the achene; the glands surrounding the achene beak (confined to the dorsal side in *L. sublyrata*), and the achene beak only 0.2–0.3(–0.4) mm long (0.4–0.8 mm long for *L. sublyrata*), and without the obvious thickened white annular collar at its apex.

***Conservation status*:** *Lagenophora queenslandica* can be relatively common where it was recorded. It is wide-spread from the central coastal Queensland to the Cape York Peninsula. Therefore, a **Least Concern** conservation status is recommended using the IUCN (2012) criteria.

**11. Lagenophora stipitata** (Labill.) Druce, *Rep. Bot. Soc. Exch. Club Brit. Isles* 4: 630 (1917); *Bellis stipitata* Labill., *Nov. Holl. Pl. Sp.* 2: 55, t. 205 (1806); *Lagenophora billardierei* Cass., *Dict. Sci. Nat., ed. 2. [F. Cuvier]* 25: 111 (1822), *nom. illeg.*; *L. stipitata* var. *stipitata*, Domin, *Biblioth. Bot.* 89: 653 (1930). **Type:** Tasmania. "Habitat in capite Van-Diemen", 1792 or 1793, *J.H.H. de Labillardière s.n.* (lecto: FI 006144; isolecto: M 0029701, P 00742956; *fide* Wang & Bean 2016: 465).

*Lagenophora billardierei* var. *pusilla* DC., *Prodr. [A. P. de Candolle]* 5: 307 (1836). **Type:** Australia. *s.loc*., *s.dat*., *J.[H.H.] de Labillardière s.n.* (holo: G 00454018).

Perennial rhizomatous herb; roots and rhizomes fibrous, wiry, not bunched, 0.1–1 mm diameter; stem very short (leaves in basal rosette) or often elongated (leaves alternate along stem); leaves and scapes firmly attached to stem and/or rootstock. Leaves 5–20, narrowly obovate to spathulate, 1.5–7.7 cm long, 0.4–1.8 cm wide (3.8–4.3× longer than wide), sessile or with a winged petiole-like base to 2 cm long; leaf apex obtuse; leaf margins usually obtusely serrate with 5–15 serrations, each serration 1–3 mm long; upper leaf surface green, lower leaf surface pale green; both surfaces with eglandular hairs 0.2–0.35 mm long, 7–9 per mm$^2$; leaf margins with 10–15 eglandular hairs per mm$^2$, each 0.2–0.3 mm long; leaf veins obscure on dried material on both surfaces. Scapes channelled, 1–5 per tuft, each 4–15 cm long at anthesis, 5–19 cm long at fruiting stage, 0.5–1.2 mm diameter; indumentum 0.2–0.4 mm long, spreading or retrorse to patent, 2–10 hairs per mm at midpoint of scape, equally dense throughout or denser towards apex; bracts 1–3 (–5) up to *c.* 8 mm long and 1 mm wide. Capitula *c.* 6 mm long, 8–12 mm diameter; involucral bracts 50–60 in 5–6 rows, linear

to narrow lanceolate, entire, apex acute to occasionally acuminate, with fringed margins on distal half; outer bracts *c*. 2.1 × 0.3 mm, inner bracts *c*. 3.5 × 0.4 mm, all with hairs along the midrib. Receptacle convex, 2–3.2 mm diameter, 1.2–1.5 mm high. Ray florets 40–70, in 2–4 rows; tube 0.7–0.9 mm long, *c*. 0.3 mm diameter, minute hairy; style branches *c*. 0.5 mm long; ligules 2.3–3.3 mm long, 0.3–0.5(–0.8) mm wide with 3 longitudinal veins, blue, purple or light yellow, apex acute to acuminate. Disc florets *c*. 15, corolla, tubular, 2–2.5 mm long, yellow-green, outer surface glandular hairy on bottom part and short hairy on top part; lobes 5, deltate, 0.2–0.3 mm long, purplish brown, minute hairy. Achenes obliquely oblanceolate, 2.2–3 × 0.7–0.9 mm excluding beak, light dark brown to purplish brown at maturity; edges slightly thickened and light-coloured in contrast with the faces; glands extending from distal end to base, especially along dorsal edge, but mainly basal and near apex, otherwise glabrous; beak 0.6–1 mm long, 0.15–0.25 mm wide, densely glandular throughout, with a thickened white annular collar at its apex, 0.25–0.3 mm diameter.

***Additional selected specimens examined*: Western Australia.** Lease Road, Donnelly River Valley, Dec 1999, *Tunsell et al. 24* (PERTH). **South Australia.** Southern Lofty District: Colonial Road, Upper Morialta, Dec 1991, *Bates 26628* (AD). Kangaroo Island District: Flinders Chase, in the Koala area at Rocky River, Dec 1965, *Eichler 18524* (AD, NE, NY). South-Eastern District: State Forest, National Trust Lease, adjacent to western side of Lower Glenelg NP, Oct 1982, *Weber 7787* (AD). **Queensland.** Darling Downs District: Head of Racecourse Creek, Girraween NP, Mar 2009, *Holmes 245 & Holmes* (BRI); 250 m south of "L" junction, Girraween NP, Jan 2016, *Bean 32691 & Wang* (BRI, MEL); between "K" junction and "L" junction, Girraween NP, Jan 2016, *Bean 32695 & Wang* (BRI, NSW); "Z" junction, Girraween NP, just west of Bald Rock, Jan 2016, *Bean 32719 & Wang* (BRI). **New South Wales.** Northern Tablelands District: Upper slopes of Bald Rock, Bald Rock NP, N of Tenterfield, Dec 2015, *Bean 32542* (BRI); Warra SF, E of Llangothlin at Crown Mountain FR entrance, Feb 1995, *Hunter 2715 et al.* (BRI). Central Coast District: Macquarie Pass NP, SW of Wollongong, Dec 2000, *Bean 17159* (BRI). **Australian Capital Territory.** Namadgi NP, 9.7km N of Mt Aggie gate along Mt Franklin Road, Mar 1996, *Donaldson 1053, Edwards & Conway* (CANB). **Victoria.** 17 km S from Whitfield in Wabonga Plateau State Park, Dec 1986, *Piesse 664* (MEL); Lucyvale, on Cravensville Road, 900m NW of Mangans Road, Feb 1994, *Molnar & Sutter s.n.* (MEL 2025764; The Lakes NP, Rotamah Island, Oct 1986, *Crawford 529* (MEL); *c*. 3.5 km NE of Lake Mountain, headwaters of Royston River, Feb 1993, *Clarke 2265* (MEL). **Tasmania.** Central Highlands District: Lake Myrtle Track, N of Lake Bill, Mar 1987, *Collier 2267* (HO). East Coast District: St Peters Pass, Jan 1931, *Rodway 21* (HO). Midlands District: Meander River, Feb 1986, *Moscal 12504* (HO). North West District: Mermaid Hut track, Three Hummock Island, Oct 1995, *Harris & Balmer s.n.* (HO 444872). South West District: Nye Bay, Jan 1986, *Buchanan 7712* (HO).

***Distribution and habitat*:** *Lagenophora stipitata* is widespread in Australia, occurring in Western Australia, South Australia, Queensland, New South Wales, Australian Capital Territory, Victoria and Tasmania (**Map 8**). It has also been reported from Mangonui County, North Auckland in New Zealand (Drury 1974); and it has been found along much of western Northland to the western Waikato, and also along the eastern side of the Coromandel Peninsula (P. de Lange pers. comm.). In Australia, it has been recorded from near sea level (especially in Tasmania) to about 1,300 m altitude in various habitat, *i.e*. *Nothofagus* and *Leptospermum* forest, tall wet sclerophyll forest, mixed tall closed forest, open eucalypt forest, eucalypt woodland, dry and wet heathlands, scrub forest, dune swale etc.

***Phenology*:** In Queensland, flowers are recorded in January and March; fruits in January and March. In New South Wales, Victoria, South Australia and Tasmania, flowers from September to March and fruits from November to April.

***Conservation status*:** *Lagenophora stipitata* is widespread in the southern states of Australia. It is recorded from a number of national parks and not considered to be threatened. A **Least Concern** conservation status is recommended based on the IUCN (2012) criteria.

**12. Lagenophora sublyrata** (Cass.) A.R.Bean & Jian Wang ter, **comb. nov.**; *Ixauchenus sublyratus* Cass., *Dict. Sci. Nat., ed. 2. [F. Cuvier]* 56: 176 (1828). **Type:** New South Wales. Port Jackson, November–December 1819, *C. Gaudichaud* (lecto: P 00742955†, image only extant; *fide* Bean & Wang 2017: 168). **Epitype:** New South Wales. Hornsby,

April 1914, *W.F. Blakely s.n.* (NSW 10275; *fide* Bean & Wang 2017: 168).

*Ixauchenus lyratus* Less., *Syn. Gen. Compos.* 193 (1832), *nomen nudum*.

*Lagenophora billardierei* var. *media* DC., *Prodr. [A. P. de Candolle]* 5: 307 (1836). **Type:** Nova Hollandia, [in 1823], *F.W. Sieber 505* (syn: G 00454010, HAL, NY 00180436).

*Lagenophora billardierei* var. *glabrata* DC., *Prodr. [A. P. de Candolle]* 5: 307 (1836). **Type:** Nouvelle Holland, in 1816, from Lambert's herbarium (syn: G 00454009).

*Lagenophora lanata* A.Cunn., *Ann. Nat. Hist.* 2: 126 (1839). **Type:** New Zealand. Between the Waitangy and Keri-Keri Rivers, in 1834, *R. Cunningham* (syn: K 000890104).

Perennial rhizomatous herb; roots fleshy, bunched, 0.5–1.5 mm diameter; no stem or short stem to *c.* 1 cm long; leaves and scapes firmly attached to stem and/or rootstock. Leaves (4–) 7–17, obovate, oblanceolate, elliptical, spathulate, (1–)2–3(–9) cm long, (0.4–)0.6–1.4(–2.2) cm wide (2.5–3.3(–4.1) × longer than wide), sessile or with a winged petiole-like base to 3 cm long; leaf apex obtuse or rounded; leaf margins toothed, crenate to sinuate, with (5–)7–9(–19) teeth, each tooth (0.2–)0.5–1(–2) mm long; upper leaf surface green, glabrous or with 1–2(–7) hairs per mm², each 0.1–0.2 mm long; lower leaf surface pale green, glabrous or with 2–4(–8) hairs per mm², each 0.1–0.3 mm long; leaf margins with 6–12 hairs per mm², each 0.1–0.2 mm long; leaf veins usually obscure on dried material on both surfaces. Scapes channelled, 1–7 per tuft, each (4–)7–19 cm long at anthesis, (4–)6–23(–31) cm long at fruiting stage, (0.3–)0.5–0.6(–0.8) mm diameter, 0.3–0.8 mm thick from lowest to upmost section; indumentum *c.* 0.1 mm long, antrorse, more or less appressed; 2–10 hairs per mm² at midpoint of scape, slightly denser towards apex; bracts 2–5, upper ones 1.3–1.7 × 0.2 mm, lower ones 3–5.5 × 0.5–0.8 mm or occasionally even larger. Capitula (2.5–)4–5(–6) mm long, (2.5–)4–5.4(–11) mm diameter; involucral bracts (20–)36 in 4–5 rows, lanceolate, oblong to obovate, glabrous, apex obtuse, acute, ciliate or with fringed margin on distal part, outer bracts 1.2–1.9 × 0.3–0.6 mm, inner bracts 2.1–2.6 × 0.5–0.7 mm. Receptacle convex, 1.5–2(–2.7) mm diameter, 0.8–1.2 mm high. Ray florets 20–37(–72) in 2–5 rows; tube 0.4–0.5 mm long, 0.1–0.2 mm wide, glandular hairy; style branches 0.3–0.4 mm long; ligules (1.8–)2.1–2.2(–3) mm long, 0.15–0.4 mm wide, with longitudinal veins obscure, creamy to mauve, apex obtuse. Disc florets (10–)30, corolla tubular, 1.5–1.9 mm long, light yellow, outer surface with sparse glandular hairs; corolla lobes 4 or 5, deltate, 0.1–0.3 mm long × 0.3–0.4 mm wide; stamens 4 or 5, 0.6 mm long; style branches *c.* 0.3 mm long; sterile ovary 0.7–0.8 mm long; pappus scales 1 or 2, 0.1–0.2 mm long. Achenes lanceolate, obliquely oblanceolate, 2.4–2.8(–3.3) × 0.6–0.8 mm excluding beak, light brown to dark brown at maturity; edges more or less thickened; glands confined to dorsal side of beak and adjacent area of achene, 1–5 eglandular hairs usually present at base of achene, otherwise glabrous; beak 0.4–0.6 mm long, with a thickened white annular collar at its apex, 0.15–0.25 mm diameter.

***Additional selected specimens examined*: Queensland.** Cook District: Daintree NP, Adeline Creek headwaters, ridge to Hill 929, May 1999, *Forster 24527 & Booth* (BRI, MEL). North Kennedy District: Taravale near Hell Hole Creek, 0.5–1 km E of homestead, Mar 1987, *Jackes 8703* (BRI). South Kennedy District: Snake Road, SF 62, at locked gate, NE of Eungella Township, Feb 2003, *Bean 20045* (BRI). Leichhardt District: Carnarvon Gorge, Carnarvon NP, NW of Injune, Apr 1994, *Morley s.n.* (BRI [AQ 471673]). Port Curtis District: 10 km SE of Forestry Camp, Kroombit Tops, Dawes Range, 64 km SW of Calliope, Dec 1983, *Sharpe 3421* (BRI). Burnett District: Gorge Oaky LA, Coominglah SF, NW of Monto, Jun 1996, *Bean 10416* (BRI). Wide Bay District: Compartment 56A, just S of Benarige Creek track junction, SF 57, Parish of St Mary, Mar 1995, *Grimshaw 2041 & Turpin* (BRI). Darling Downs District: Mt Colliery area off Gambubal Road, 'Paddy's Gully' adjacent to Main Range NP, Apr 2015, *Forster PIF42568 et al.* (BRI). Moreton District: Kobble Creek, *c.* 3.5 km from Hawkins Road, Samsonvale, Apr 2003, *Phillips 1088 & Phillips* (BRI). **New South Wales.** Central Coast District: Liverpool, Oct 1965, *Coveny s.n.* (NSW 98345); Woolwash, Campbell Town, Dec 1966, *McBarron 13738* (NSW); Wollemi NP, SE section, W end of Culoul Range, Mar 1981, *Haegi 2045* (NSW). South Coast District: Flat Rock Creek, Nowra, Jan 1933, *Rodway 4892–4* (NSW); Nowra Road, 5 miles [8.3 km] E of Nerriga, *Adams 1473*, Oct 1965 (NSW). North Coast District: Grafton – Armidale Road, Glenfernie FR, Dec 1893, *Maiden s.n.* (NSW 457126). **Victoria.** Mt Elizabeth, Feb 1971, *Beauglehole 37109* (MEL);

Yalmy Forest Management Block, East Gippsland, Nov 1983, *Chesterfield 10* (MEL); Croajingolong NP near Mallacoota, track to Sandy Point from Mallacoota – Genoa Road, Nov 2016, *Karunajeewa 1490* (MEL). **South Australia.** Southern Lofty District: Cox Scrub, Damp gully in S corner of the park, Feb 2007, *Duval 320 & Erickson* (AD). South Eastern District: Honans Scrub, Nov 1991, *Bates 26488* (AD). Mt Lofty Range District: Near Mt Lofty Railway Range, Adelaide Hills, Nov 1948, *Cleland s.n.* (AD 97220069). **Tasmania.** East Coast District: Near Freestone Hill (20 km N of Swansea), Dec 1984, *Buchanan 4807* (HO). North East District: Low Head, road to aerodrome, Dec 1965, *Curtis s.n.* (HO 13462). North West District: Somerset, Feb 1948, *Curtis s.n.* (HO 13464).

***Distribution and habitat*:** *Lagenophora sublyrata* is the most widespread species in the genus. It has been recorded (as *L. gracilis* or *L. lanata*) in south Asia (e.g. China, India, Sri Lanka), south-east Asia (e.g. Thailand), Malesia (e.g. Java, New Guinea), Australia and New Zealand. In Australia, it occurs in South Australia, Queensland, New South Wales, Australia Capital Territory, Victoria and Tasmania (**Map 9**) where it mainly inhabits eucalypt or *Melaleuca* dominated open forest or woodland on a wide range of soils from near sea level up to 1,500 m altitude.

***Phenology*:** Flowers and fruits have been recorded mainly from spring, summer and autumn.

***Note*:** *Lagenophora sublyrata* is a widespread species with variable leaf shape, indumentum and plant size. New Zealand specimens received on loan from AK are quite hairy and small in stature, but features of the achene, scape and involucral bracts are consistent with typical plants from eastern New South Wales, Victoria and Tasmania. The distribution of this species in the northern hemisphere requires examination. Occurrences outside Australia and New Zealand require confirmation with regards to their taxonomy and nomenclature.

***Conservation status*:** As the most widely distributed species in the genus, *Lagenophora sublyrata* occurs in numerous national parks. Therefore, it is not considered to be threatened in Australia and a **Least Concern** conservation status is recommended based on the IUCN (2012) criteria.

## Excluded names

*Lagenophora emphysopus* Hook.f., *Fl. Tasm*. 1: 189 (1855). (= **Solenogyne bellioides**).

*Lagenophora solenogyne* F.Muell., *Fragm*. 5(34): 62 (1865). (= **Solenogyne bellioides**).

*Lagenophora bellioides* (Cass.) Druce, *Rep. Bot. Soc. Exch. Club Brit. Isles* 4(Suppl. 2): 630 (1917). (= **Solenogyne bellioides** Cass.).

*Lagenophora gunnii* (Hook.f.) J.M.Black, *Trans. & Proc. Roy. Soc. S. Austral*. 51: 58 (1927). (= **Solenogyne gunnii** Hook.f.).

*Lagenophora gunnii* var. *glabra* Domin, *Biblioth. Bot*. 89: 653 (1930). (= **Solenogyne dominii** L.Adams).

## Dubious names

*Lagenophora billardierei* var. *microcephala* Benth., *Fl. Austral*. 3: 507 (1866); *L. stipitata* var. *microcephala* (Benth.) Domin, *Biblioth. Bot*. 89: 653 (1930). Identity unknown; no type cited.

*Lagenophora billardierei* var. *normalis* Benth., *Fl. Austral*. 3: 507 (1866), *nom. inval.*; this is presumably the type variety.

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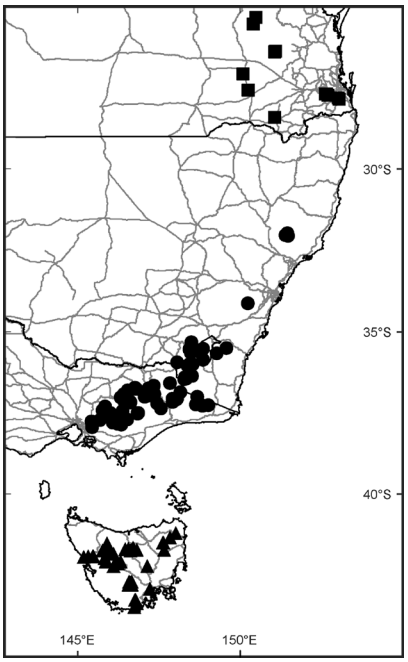
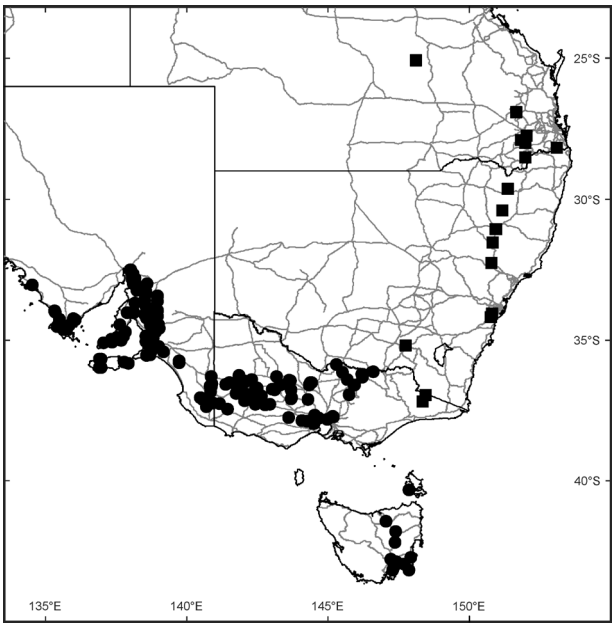
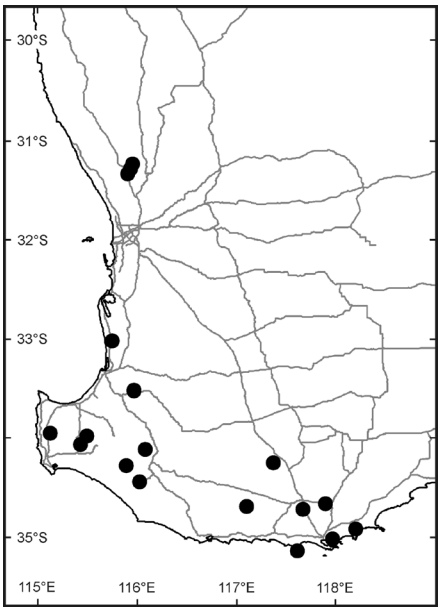


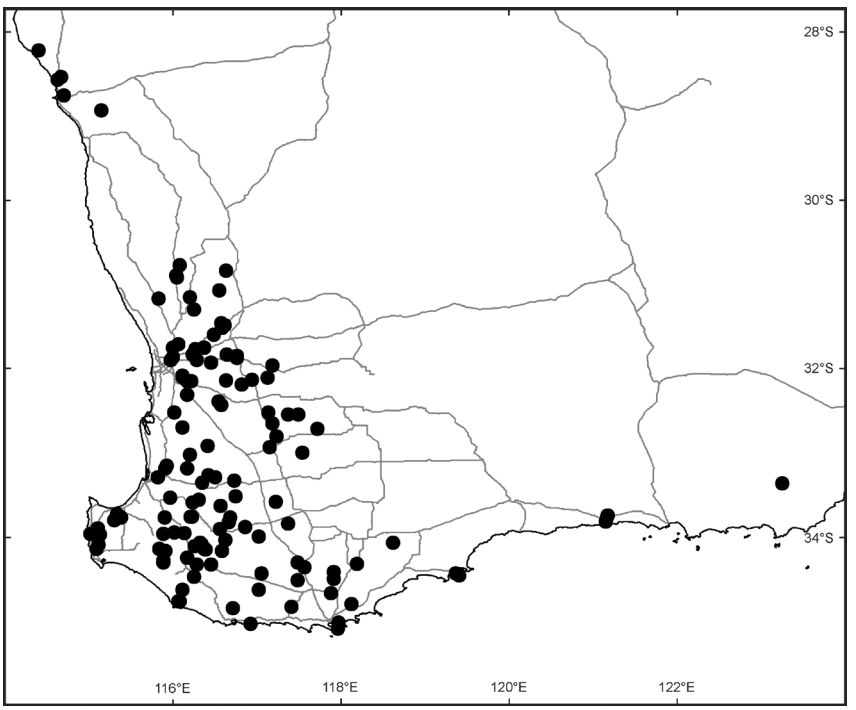

**Map 1.** Distribution of ***Lagenophora adenosa*** ●, ***L. fimbriata*** ■, ***L. latifolia*** ▲.



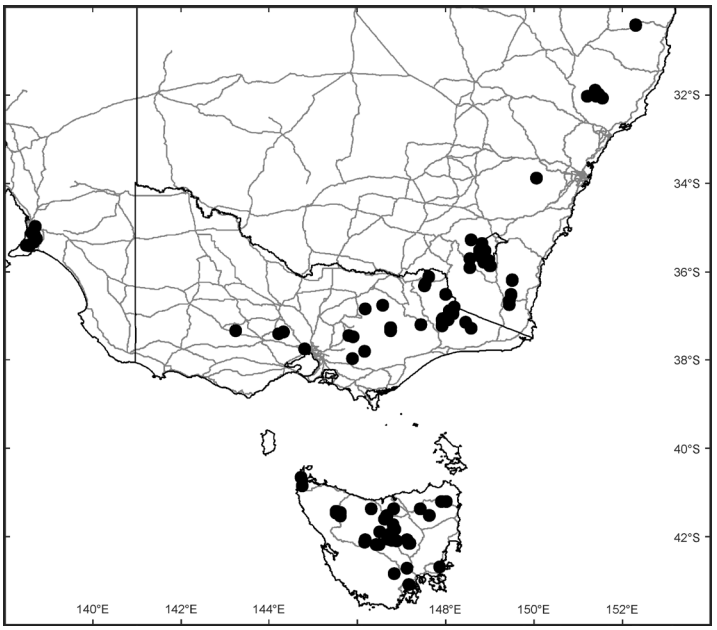

**Map 2.** Distribution of ***Lagenophora brachyglossa*** ■, ***L. gunniana*** ●.



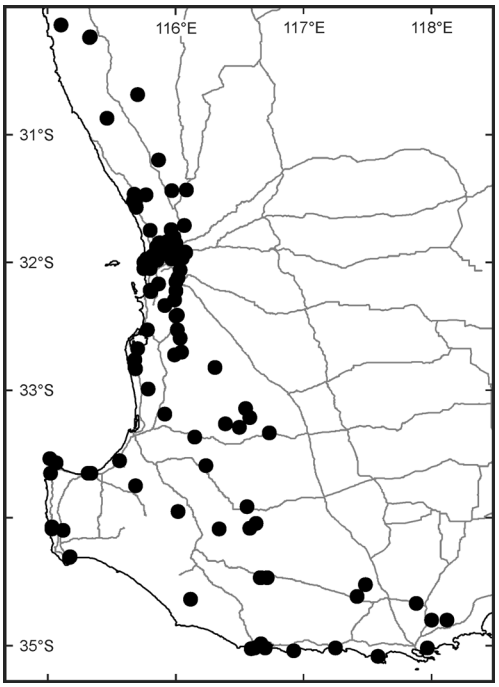

**Map 3.** Distribution of ***Lagenophora gracilis***.



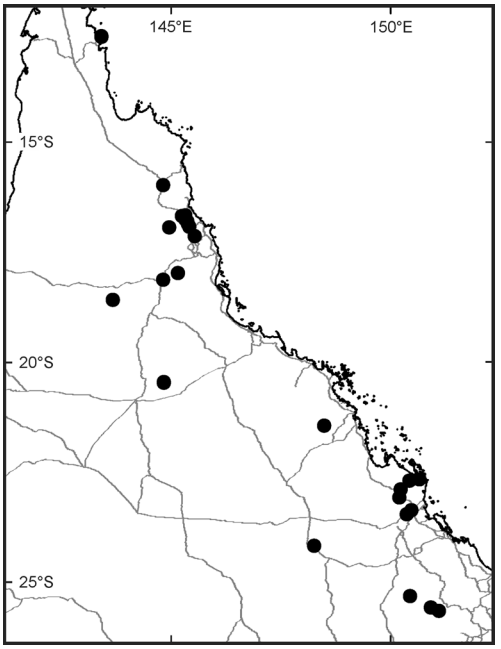

**Map 4.** Distribution of ***Lagenophora huegelii***.



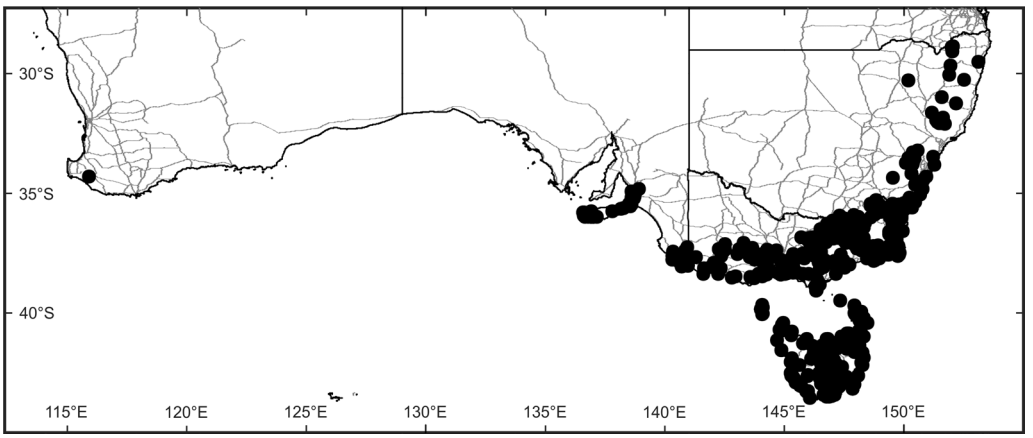

**Map 5.** Distribution of ***Lagenophora montana*** in Australia.



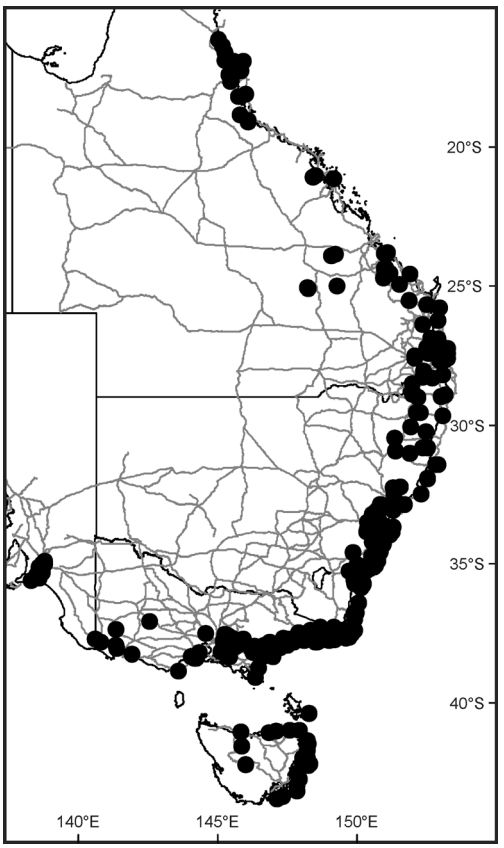

**Map 6.** Distribution of ***Lagenophora platysperma***.




**Map 7.** Distribution of ***Lagenophora queenslandica***.




**Map 8.** Distribution of ***Lagenophora stipitata*** in Australia.




**Map 9.** Distribution of ***Lagenophora sublyrata*** in Australia.