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An update to the taxonomy of some Western Australian genera of Myrtaceae tribe Chamelaucieae: 5. *Hysterobaeckea*

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Abstract

Rye, B.L. An update to the taxonomy of some Western Australian genera of Myrtaceae tribe Chamelaucieae: 5. *Hysterobaeckea*. *Nuytsia* 29: 75–107 (2018). Eight new species belonging to *Hysterobaeckea* (Nied.) Rye are described: *H. cornuta* Rye, *H. glandulosa* Rye, *H. graniticola* Rye, *H. longipes* Rye, *H. occlusa* Rye, *H. petraea* Rye, *H. pterocera* Rye and *H. setifera* Rye. *Hysterobaeckea ochropetala* (F.Muell.) Rye is broadly delimited and two new subspecies are described as subsp. *cometes* Rye and subsp. *reliqua* Rye. The new subspecies *H. setifera* subsp. *meridionalis* Rye is also described. Six of the new taxa have conservation priority. A key is given for the named members of the genus.

Introduction

Hysterobaeckea (Nied.) Rye has only recently been established as a genus (Rye 2015a) rather than a subgenus (Niedenzu 1893). It belongs to the tribe Chamelaucieae DC. of Myrtaceae and occurs in southern mainland Australia. Recombinations were made in Rye (2015a) for three named species of *Hysterobaeckea* but most of the Western Australian taxa remained undescribed. Eleven new Western Australian members of the genus are described here, using the same methodology as in previous papers of this series (see Rye 2013b).

A shared character for the three previously named species of *Hysterobaeckea* and a majority of the new taxa is the presence of a line-like groove on the adaxial surface of their leaves. These taxa are referred to here as the core group since they include the type species *H. behrii* (Schltdl.) Rye. Several species that lack this leaf character, but are otherwise similar in morphology to the core group, have also previously been considered to be closely related to *H. behrii*. One such species, which is associated with granite in the Northern Territory, was included by Bean (1997) in his concept of *H. behrii* [as *Babingtonia behrii* (Schltdl.) A.R.Bean]. This new species has recently been given the phrase name *H.* sp. Mt Zeil (D.E. Albrecht 8650) and is apparently closely related to two south-western Australian taxa from granite and lateritic outcrops that have also been placed in *H. behrii s. lat.* Molecular evidence (see below) indicates that the core group is closely related to one of the south-western species on rock outcrops, and also to a western arid-zone species from ironstone outcrops, *Baeckea* sp. Melita Station (H. Pringle 2738). The three Western Australian taxa from rocky outcrops are therefore included here as part of the genus *Hysterobaeckea*; they are described as *H. graniticola* Rye, *H. petraea Rye* and *H. occlusa* Rye.

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The generic limits of *Hysterobaeckea* need to be examined further using a combination of morphological and molecular evidence. This could result in additional species being included in the genus.

Published and manuscript names (1876–1996)

Prior to the 1990s, Western Australian species now placed in *Hysterobaeckea* were mostly included under the south-eastern Australian species *Baeckea behrii.* The only other validly published name in use was *B. ochropetala* F.Muell. (Mueller 1876), now known as *H. ochropetala* (F.Muell.) Rye.

Two invalidly published names for Western Australian species are listed in Table 1. One of these, *B. behrii* var. *brevifolia* F.Muell. *nom. nud.* (Mueller 1877), was replaced by the manuscript name *B. benthamii* Trudgen in 1994. A second western species was called *B. recurva* Trudgen ms in 1996. Both of the manuscript species names were included in the descriptive catalogue of Western Australian plant species by Paczkowska and Chapman (2000), but were replaced by phrase names in 2010.

Phrase names (1994–2015)

Numerous phrase names were applied to the *Hysterobaeckea* species under study here between 1994 and 2015 (see Table 1). Malcolm Trudgen established most of these, but *Baeckea* sp. Fitzgerald Peaks (P.J. Poli 53) and *B.* sp. Lake Brown (E. Merrall s.n. 1889) were established as part of the current study, as was the phrase name for the new species from the Northern Territory, *H.* sp. Mt Zeil (D.E. Albrecht 8650).

Molecular evidence

Lam *et al.* (2002) sampled *H. petraea*, a south-western Australian species of *Hysterobaeckea* from rock outcrops [as *H. behrii* W] and a Victorian sample of the type species [as *H. behrii* E]. These two taxa formed a strongly supported clade, but with 'considerable genetic distance between them' (Lam *et al.* (2002: 542), indicating that it is highly unlikely that they belong to the same species.

Later sampling placed *H. petraea* sister to a clade comprising *H. occlusa*, *H. ochropetala s. lat.*, the South Australian species *H. tuberculata* (Trudgen) Rye and *H. behrii* (Peter Wilson pers. comm.). *Hysterobaeckea occlusa* differs from other members of the genus in having an indehiscent fruit. Indehiscent fruits have arisen many times in the tribe Chamelaucieae, for example within the genera *Astartea* DC. (Rye 2013a) and *Babingtonia* Lindl. (Rye 2015b), so this character does not appear to be of any concern regarding the decision made here to include *H. occlusa* in *Hysterobaeckea*.

Current outcomes and future studies

All but one of the 26 Western Australian phrase names are placed under one of the 12 species or subspecies recognised here (see Table 1). The residual phrase name is transferred to the genus *Hysterobaeckea* to become *H.* sp. Exclamation Lake (M.E. Trudgen 1524). This taxon is known from two collections, which were made close together and may be from the same population; these have fruits but very few flowers attached. *Hysterobaeckea* sp. Exclamation Lake belongs to the *H. ochropetala* species complex, and does not appear to be particularly distinctive in its morphology although it is geographically distinct. It tends to have longer, narrower leaves than the rest of the complex, with a point up to 0.2 mm long, and probably occurs in a damper habitat, suggesting that it might warrant description as a subspecies. As it is very poorly known, a decision as to its status is deferred.

Table 1. Manuscript names, phrase names and invalidly published names for *Hysterobaeckea* species, with the year established.

Current name	Synonyms
Hysterobaeckea cornuta Rye	*Baeckea* sp. Bungalbin Hill (B.J. Lepschi & L.A. Craven 4586); 2004 *Baeckea* sp. Die Hardy Range (E. Mattiske J91); 2004 *Baeckea* sp. Mt Jackson (G.J. Keighery 4362); 2004
Hysterobaeckea glandulosa Rye	*Baeckea* sp. Kalgarin Hill Road (A.M. Lyne, L. Craven & F. Zich AML 1018); 2004
Hysterobaeckea graniticola Rye	*Baeckea* sp. Fitzgerald Peaks (P.J. Poli 53); 2015
Hysterobaeckea longipes Rye	*Baeckea* sp. Wubin (M.E. Trudgen 5404); 1996
Hysterobaeckea occlusa Rye	*Baeckea* sp. Melita Station (H. Pringle 2738); 1994 *Baeckea* sp. Mt Clifford (B. Severne 74002); 2004 *Thryptomene* sp. Leinster (G. Cockerton 1534); 1996
Hysterobaeckea ochropetala subsp. *cometes* Rye	*Baeckea* sp. Comet Vale (A.S. George 8078); 2004
Hysterobaeckea ochropetala (F.Muell.) Rye subsp. *ochropetala*	*Baeckea grandiflora* var. *ochropetala* W.E.Blackall *nom. inval.;* 1954 *Baeckea* sp. Lake Brown (E. Merrall s.n. 1899); 2004
Hysterobaeckea ochropetala subsp. *reliqua* Rye	*Baeckea* sp. Boorabbin (J.H. Willis s.n. 4/10/1961); 2004 *Baeckea* sp. Bulla Bulling (D.J.E. Whibley 4648); 2004 *Baeckea* sp. Coolgardie (A. Strid 21320); 2004 *Baeckea* sp. Gnarlbine Rocks (G. Barrett GRH469); 2004 *Baeckea* sp. Mt Clara (R.J. Cranfield 11693); 2004 *Baeckea* sp. Queen Victoria Rock (K.R. Newbey 6103); 2004 *Baeckea* sp. Roundtop Hill (P. Armstrong 05/843); 2010 *Baeckea* sp. Ubini (R. Pullen 9610); 2004
Hysterobaeckea petraea Rye	*Baeckea recurva* Trudgen ms; 1996 *Baeckea* sp. Barbalin (B.L. Rye & M.E. Trudgen BLR 241022); 2010 *Baeckea* sp. Pigeon Rocks (D. Grace DJP 281); 2004
Hysterobaeckea pterocera Rye	*Baeckea* sp. Flying Fox Mine (A. O'Connor & V. Longman FF532); 2004
Hysterobaeckea setifera subsp. *meridionalis* Rye	*Baeckea behrii* var. *brevifolia* F.Muell. *nom. nud.;* 1877 *Baeckea benthamii* Trudgen ms; 1994 *Baeckea* sp. Bencubbin-Koorda (M.E. Trudgen 5421); 2004 *Baeckea* sp. Lake Campion (A. Coates AC 2285); 2010
Hysterobaeckea setifera Rye subsp. *setifera*	*Baeckea* sp. Wanarra (M.E. Trudgen 5376); 2010
Hysterobaeckea sp. Exclamation Lake (M.E. Trudgen 1524)	*Baeckea* sp. Exclamation Lake (M.E. Trudgen 1524); 2004

Generic description

Hysterobaeckea (Nied.) Rye, *Nuytsia* 25: 213 (2015). *Baeckea* subg. *Hysterobaeckea* Nied., *Nat. Pflanzenf.* 3(7): 99 (1893). *Type*: *Baeckea behrii* Schltdl. = *Hysterobaeckea behrii* (Schltdl.) Rye, lectotype, *fide* B.L. Rye, *Nuytsia* 25: 213 (2015).

Small to very tall *shrubs*, erect, often broome-like, glabrous, usually single-stemmed at the base and commonly multi-branched low down, sometimes ± at ground level, but with a lignotuber recorded for the Northern Territory species. *Young stems* with a whitish epidermis that is shed in strips, smooth in most species (sometimes with darker oil glands visible but not very prominent), tuberculate in *H. tuberculata*. *Leaves* opposite, often appressed or nearly so. *Petioles* well differentiated from the blade. *Leaf blades* entire, moderately to very thick; abaxial surface deeply convex; adaxial surface with a line-like groove along the middle in most species. *Peduncles* 1–3-flowered. *Bracteoles* with sides incurved, usually acuminate or acute. *Pedicels* usually much shorter than the peduncles. *Hypanthium* cup-shaped, adnate to ovary for most of its length; adnate part dotted with oil glands (sometimes obscurely), somewhat to obviously rugose in fruit; free part becoming smooth in fruit. *Sepals* 5, entire, persistent after the petals are shed, in some species with the outer surface ridged or horned. *Petals* 5, widely spreading, much longer than sepals. *Stamens* 9–28 but commonly *c.* 20, fairly equally distributed in a circle or with gaps opposite the centre of the petals, geniculate at the top of the free filament such that the large connective gland and terminal thecae extend directly inwards towards the centre of the flower; filament often with a fairly broad base but slender above; anther with small, closely connate thecae, dehiscent by basally divergent short slits. *Ovary* inferior, 2- or 3-locular; placentas large, shortly stalked or ± sessile; ovules radial, 6–21 per loculus. *Style* deeply inset; stigma peltate in most species. *Fruits* dehiscent by 2 or 3 terminal valves or (in *H. occlusa*) indehiscent. *Seeds* usually crustaceous and distinctly facetted, but only thinly crustaceous and unfacetted in *H. occlusa*, 0.7–2 mm long.

Size and distribution. As currently circumscribed, *Hysterobaeckea* extends from inland parts of the South West Botanical Province of Western Australia east to near Bendigo in Victoria and inland to the MacDonnell Ranges of the Northern Territory (Figure 1). Of the 12 species recognised here, nine are endemic to Western Australia and three occur further east.

Co-occurring species. Most members of this genus are geographically or ecologically separated from all others. Rock outcrop and sandplain species are separated by their habitat differences but may sometimes occur fairly close together. At one locality visited in 2004, *H. petraea* (*B.L. Rye* 241047 *& M.E. Trudgen*) grew in shallow soil at the edge of some sheet granite while *H. setifera* Rye occurred about 20 m downslope from the granite (*B.L. Rye* 241049 *& M.E. Trudgen*).

Among the sandplain taxa of south-western Australia, there is little or no overlap in their known distributions. The ranges of *H. longipes* Rye and *H. setifera* show the greatest overlap, although still largely distinct. No cases of co-occurrence are known.

Notes. The diameter of the base of the shrubs has not been measured for most species but is commonly 70–80 mm in *H. setifera* and has been recorded as up to 200 mm in *H. petraea*. Those two species can reach heights of over 3 m, with a maximum height of 4 m recorded for *H. petraea*.

Flower buds are often purplish or reddish on the hypanthium and sepals, with the exposed parts of the petals commonly deep pink. After the flowers open the petals are usually white inside (sometimes yellow-flowered in *H. ochropetala*), but with a splash of pink retained on the outside of the outer petals.

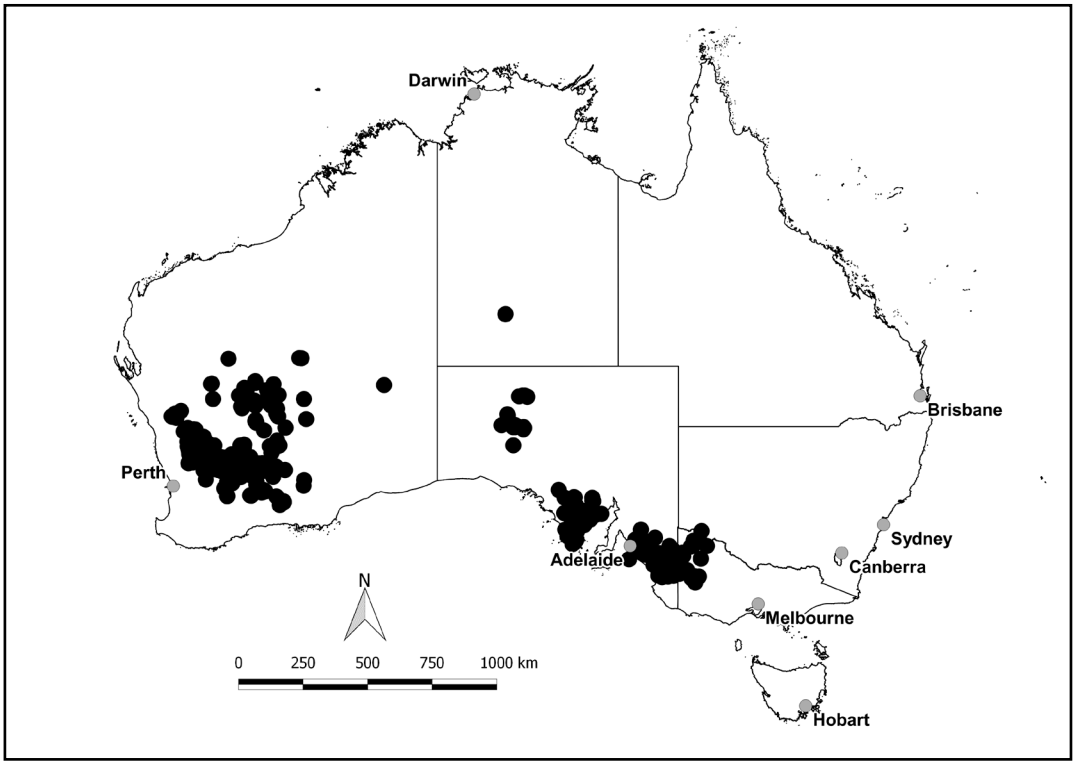

Figure 1. Distribution of *Hysterobaeckea*.

In mature fruits, the placentas are very broadly ovate to almost circular and usually 0.8–1.4 × 0.7–1.2 mm, with the abaxial surface highly raised except for a narrow rim, and with discrete circular attachment points of seeds around the lower part of the raised area. In most species the seeds have colliculate lateral surfaces and a small hilum. Chaff pieces (abortive seeds or unfertilised ovules) are usually similar to the seeds but somewhat smaller, and often darker.

Key to named species and subspecies of *Hysterobaeckea*

Note for use of key. When measuring the blade length and apical point of leaves, choose large leaves with the full point present, as the point tends to be partially lost as leaves age.

1. Ovary 2-locular in all or most flowers; ovules 6–9 per loculus

2. Leaves prominently tuberculate; apical point absent or less than 0.2 mm long. Bracteoles 1.5–1.8 mm long. Sepals *c.* 1 mm long, tuberculate towards the base. Fruits dehiscent by 2 valves (near Tallaringa Well–'Spanners Hwy', SA)..... **H. tuberculata**

2: Leaves not tuberculate; apical point 0.3–0.5 mm long. Bracteoles 0.6–0.8 mm long. Sepals 0.3–0.4 mm long, not tuberculate. Fruits indehiscent (Robinson Ra. area–Weld Ra.–near Leonora–S of Warburton, WA)..... **H. occlusa**

1: Ovary 3-locular in all or most flowers; ovules usually 9–21 per loculus

3. Leaves with an apical point 0.3–2.5 mm long

4. Leaves with an abaxial groove but no adaxial groove

5. Peduncles 1.5–3 mm long. Pedicels 0–1(–1.7) mm long. Petals 2.5–4 mm long (Mt Churchman–near Norseman, WA) ..... **H. petraea**

5: Peduncles 4–7 mm long. Pedicels 2–4.5 mm long. Petals 4–5 mm long (Fitzgerald Peaks area, WA) ..... **H. graniticola**

4: Leaves with an adaxial groove

6. Stamens 9–12. Mature style 0.8–1.5 mm long. Occurring in south-eastern Australia (Eyre Peninsula, SA–near Bendigo, Vic.)..... **H. behrii**

6: Stamens usually 13–26 but down to 10 in *H. longipes*. Mature style 2.3–3.7 mm long. Occurring in south-western Australia

7. Sepals prominently horned. Leaves 2.5–3.5 mm long, with an apical point 0.3–1(–1.5) mm long (Die Hardy Ra.–Woongaring Hills–Bungalbin Hill, WA)..... **H. cornuta**

7: Sepals sometimes prominently ridged but not horned. Leaves up to 15 mm long, rarely as short as previous choice, with an apical point 0.7–2.5 mm long

8. Leaves 9–15 mm long; adaxial furrow usually open although still narrow. Sepals rather petaline, without obvious glands, not ridged; apex very obtuse (Buntine–near Wyalkatchem, WA)..... **H. longipes**

8: Leaves (2–)3–9 mm long; adaxial furrow usually closed and line-like. Sepals reduced and mostly herbaceous or larger and with obvious oil glands, usually ridged; apex obtuse or acute, sometimes with a point

9. Sepals 0.5–1.3 mm long. Leaves (2–)3–6 mm long; apical point 1.5–2.5 mm long (Remlap Stn–Narembeen, WA) ..... **H. setifera** subsp. **meridionalis**

9: Sepals 0.3–0.6 mm long (excluding apical point if one is present). Leaves 3.5–9 mm long; apical point 0.7–1.7 mm long (Pindar–Pithara–Mt Gibson Sanctuary, WA)..... **H. setifera** subsp. **setifera**

3: Leaves without any point or with a mucro up to 0.1 mm long

10. Leaves with adaxial furrow partially developed or absent, when present only in basal half of blade. Sepals with a compressed, laterally projecting, dorsal ridge, which is about as deep as long. Ovules 9–13 per loculus (E of Hyden, WA)..... **H. pterocera**

10: Leaves with adaxial furrow extending for most of length of blade. Sepals with little or no ridge in many cases, the ridge (when present) either thick or protruding apically as a horn, always longer than deep. Ovules usually 14–21 per loculus but down to 11 in *H. glandulosa*

11. Oil glands obvious on peduncles, pedicels and outside of flowers (hypanthium and sepals) as well as on leaves. Mature style 1.9–2.2 mm long. Ovules 11–15 per loculus (Karlgarin Hill area, WA) ..... **H. glandulosa**

11: Oil glands usually not obvious on all of the plant parts listed above. Mature style 2.5–4.5 mm long. Ovules 14–21 per loculus

12. Leaf blades 1.2–1.6 mm long; apex ± truncate. Flowers (where known) pale yellow (Diemals Stn area–Mt Moore–Jaurdi Stn, WA) ..... **H. ochropetala** subsp. **ochropetala**

12: Leaf blades 1.7–3.5 mm long in most specimens, sometimes 1.2–1.7 mm long in subsp. *reliqua*; apex obtuse on long-leaved specimens and usually also on short-leaved ones. Flowers white

13. Outer sepals moderately to markedly horned; horn 0.5–1.5 mm long. Petals 4–5.5 mm long. Stamens 19–28 (Comet Vale area, WA) ..... **H. ochropetala** subsp. **cometes**

13: Outer sepals unhorned or moderately horned; horn 0–0.6 mm long. Petals 3.3–4.5 mm long. Stamens 16–23 (E of Southern Cross–SW of Coolgardie–Taylor Rock, WA) ..... **H. ochropetala** subsp. **reliqua**

Western Australian species

Hysterobaeakea cornuta Rye, *sp. nov.*

Typus: south of Helena and Aurora Range, Western Australia [precise locality withheld for conservation reasons], 7 November 2000, *B.J. Lepschi & L.A. Craven* 4586 (*holo*: PERTH 06466613; *iso*: CANB 638980 *n.v.*).

Baeckea sp. Bungalbin Hill (B.J. Lepschi & L.A. Craven 4586), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Die Hardy Range (E. Mattiske J91), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Mt Jackson (G.J. Keighery 4362), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Shrub 0.7–1.8 m high, 0.9–3 m wide; flowering branchlets usually with 1 or 2 pairs of flowers, the leaves appressed or antrorse. *Petioles* 0.4–0.6 mm long. *Leaf blades* narrowly obovate in outline, 2.5–3.5 mm long, 0.9–1.1 mm wide, 0.7–1 mm thick, thick and recurved towards the apex, distinctly mucronate or pointed; abaxial surface with 2 or 3 main rows of very prominent oil glands on each side of midvein; adaxial surface with a line-like furrow extending at least half its length; mucrone or point somewhat to very recurved, 0.3–1(–1.5) mm long, whitish. *Peduncles* 4–10 mm long, 1(2)-flowered; secondary axes (when present) commonly 3.5–5 mm long. *Bracteoles* usually caducous or deciduous, 2–4 mm long, *c.* 0.3 mm wide, somewhat scarious. *Pedicels* 0.5–3(–5) mm long. *Flowers* 11–14 mm diam. *Hypanthium c.* 3.5 mm long, 4–5 mm wide; free portion *c.* 1 mm long. *Sepals* depressed-ovate, 0.8–1.5 mm long excluding horn and up to 2.7 mm long including it, *c.* 2 mm wide, with scarcely any pale-translucent margin, entire; horn projecting distally and incurved, bilaterally compressed, 1.2–2.5 mm long. *Petals* 4–4.5 mm long, white. *Stamens* 16–23, in a circle. *Longest filaments c.* 1.5 mm long, *c.* 0.2 mm wide at base. *Anthers* 0.3–0.4 mm wide from front view; connective gland *c.* 0.5 mm long; thecae *c.* 0.2 mm long. *Ovary* 3-locular; ovules 12–17 per loculus. *Style* 2.5–3.7 mm long; stigma up to 0.5 mm diam. *Fruits* more than half inferior, 4–5 mm long, 5.5–6 mm wide excluding the prominent calyx horns; hypanthium smooth in distal 0.8–1 mm. *Seeds* 1.2–1.3 mm long, 0.6–1 mm wide, 0.8–0.9 mm thick, pale brown to orange-brown; outer surface smooth to slightly colliculate.

Diagnostic characters. Among the species that have leaves with both an adaxial groove and an obvious apical point, *H. cornuta* is distinguished by having prominently horned sepals.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 14 Nov. 2003, *G. Cockerton* LCS8759 (PERTH); 24 Nov. 1981, *G.J. Keighery* 4362 (PERTH); 6 Dec. 2004, *Landcare Services* LCH 12159 (PERTH); 6 Nov. 2000, *E. Mattiske* J91 (PERTH); 20 Nov. 2007, *G. McLean & F. Faria* LCS 15987 (PERTH); 24 Sep. 1981, *K.R. Newbey* 8997 (PERTH); 7 Dec. 2010, *S. Reiffer* SRE 511 (PERTH); 21 Nov. 2010, *K.R. Thiele* 4089 (PERTH); 14 Nov. 2006, *W.A. Thompson* WAT 75 (PERTH).

Distribution and habitat. Recorded from sandplain areas, extending from near Die Hardy Range south-west to Woongaring Hills and south-east to Bungalbin Hill (Figure 2), commonly in yellow sand, often with lateritic gravel.

Phenology. Flowers mainly from October to December. Mature fruits recorded in November and December.

Conservation status. Variably listed under three phrase names by Smith and Jones (2018) as Priority Three (*B.* sp Bungalbin Hill) and Priority One (*B.* sp. Die Hardy Range and *B.* sp. Mt Jackson). The species will be maintained under Conservation Codes for Western Australian Flora as Priority Three.

Etymology. From the Latin *cornutus* (horned), referring to the markedly horned sepals.

Affinities. This is one of the core-group species. It may be closest to the *H. ochropetala* complex but is like *H. setifera* in having an obvious apical point on its leaves.

Variation. Most specimens have been housed under the name *B.* sp. Bungalbin Hill. One of them, *S. Reiffer* SRE 203, has leaves with an unusually long apical point, up to about 1.5 mm long. Otherwise the degree of variation within the material placed here is relatively small.

Baeckea sp. Die Hardy Range and *B.* sp. Mt Jackson were applied respectively to *E. Mattiske* J91 and *G.J. Keighery* 4362, neither of which shows any obvious distinguishing features in comparison to specimens housed as *B.* sp. Bungalbin Hill.

Notes. Plant width in the above description is based on two specimen records. Flower buds are prominently 5-horned at the summit in *H. cornuta*, and the sepal horns are also obvious in fruit.

Hysterobaeckea glandulosa Rye, *sp. nov.*

Typus: N of Kondinin-Hyden Road, Western Australia [precise locality withheld for conservation reasons], 4 November 2004, *B.L. Rye* 241159 *& M.E. Trudgen* (*holo*: PERTH 07218451; *iso:* CANB, K, MEL, NSW).

Baeckea sp. Kalgarin Hill Road (A.M. Lyne, L.A. Craven & F. Zich AML 1018), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Shrub 0.5–2 m high, 0.35–3 m wide, with prominent glands on young stems, peduncles and pedicels; flowering branchlets with 1 or occasionally 2 pairs of flowers, the leaves appressed or antrorse. *Petioles* 0.3–0.5 mm long. *Leaf blades* oblong-elliptic or broadly so in outline, 2.2–3 mm long, 1.1–1.4 mm wide, 0.7–1.1 mm thick, obtuse, not or scarcely mucronate; abaxial surface with 2 or 3 main rows

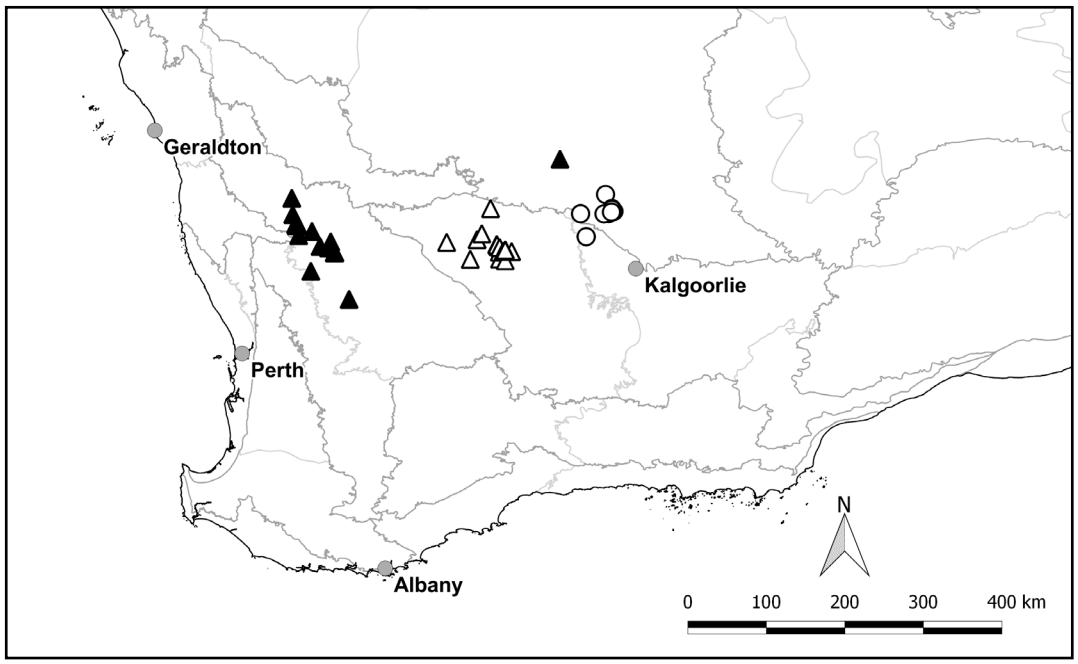

Figure 2. Distribution of *Hysterobaeckea cornuta* (△), *H. longipes* (▲) and *H. ochropetala* subsp. *cometes* (○).

of oil glands on each side of midvein; adaxial surface with a line-like furrow for most of its length. *Peduncles* 4–8 mm long, 1-flowered. *Bracteoles* deciduous, 1–1.5 mm long, 0.2–0.3 mm wide, largely scarious. *Pedicels* 2–5.5 mm long. *Flowers* 9–13 mm diam. *Hypanthium* 1.5–2 mm long, 2.5–2.8 mm wide, with prominent scattered oil glands but otherwise smooth in bud and remaining so or becoming more rugose in flower; free portion 0.6–0.9 mm long. *Sepals* depressed-ovate to triangular, 1–1.3 mm long, 1.1–1.6 mm wide, scarious, with a whitish margin *c.* 0.2 mm wide, slightly ridged but not horned, often with a dense grouping of prominent oil glands at the centre. *Petals* 3.3–4.5 mm long, white. *Stamens* 17–20, in a circle. *Longest filaments* 0.8–1.5 mm long, *c.* 0.2 mm wide at base. *Anthers* 0.3–0.35 mm wide from front view; connective gland 0.5–0.8 mm long; thecae 0.2–0.25 mm long. *Ovary* 3-locular; ovules 11–15 per loculus. *Style* 1.9–2.2 mm long; stigma 0.2–0.3 mm diam. *Fruits* largely inferior or *c.* half-inferior, *c.* 3 mm long, 4–4.5 mm wide; hypanthium smooth in distal 0.8–1.1 mm. *Seeds* apparently 0.9–1.2 mm long, at least 0.4 mm wide, *c.* 0.7 mm thick, pale to golden brown; outer surface smooth. (Figure 3A)

Diagnostic characters. Distinguished by the following combination of characters: leaves not or scarcely pointed, with an adaxial groove; hypanthium (also pedicel and peduncle) with prominent glands; sepals scarcely ridged but with prominent glands; ovules 11–15 per loculus; style about 2 mm long.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 4 Nov. 1992, *A.M. Lyne, L.A. Craven & F. Zich* AML 1018 (CBG *n.v.*, PERTH); 4 Nov. 2004, *B.L. Rye* 241162 *& M.E. Trudgen* (AD, BRI, PERTH); 4 Nov. 2004, *B.L. Rye* 241163 *& M.E. Trudgen* (PERTH).

Distribution and habitat. Known from the Karlgarin Hill area, between Kondinin and Hyden (Figure 4). Recorded from a gently undulating site with sandy soil and low open woodland.

Phenology. Flowers and fruits recorded in early November.

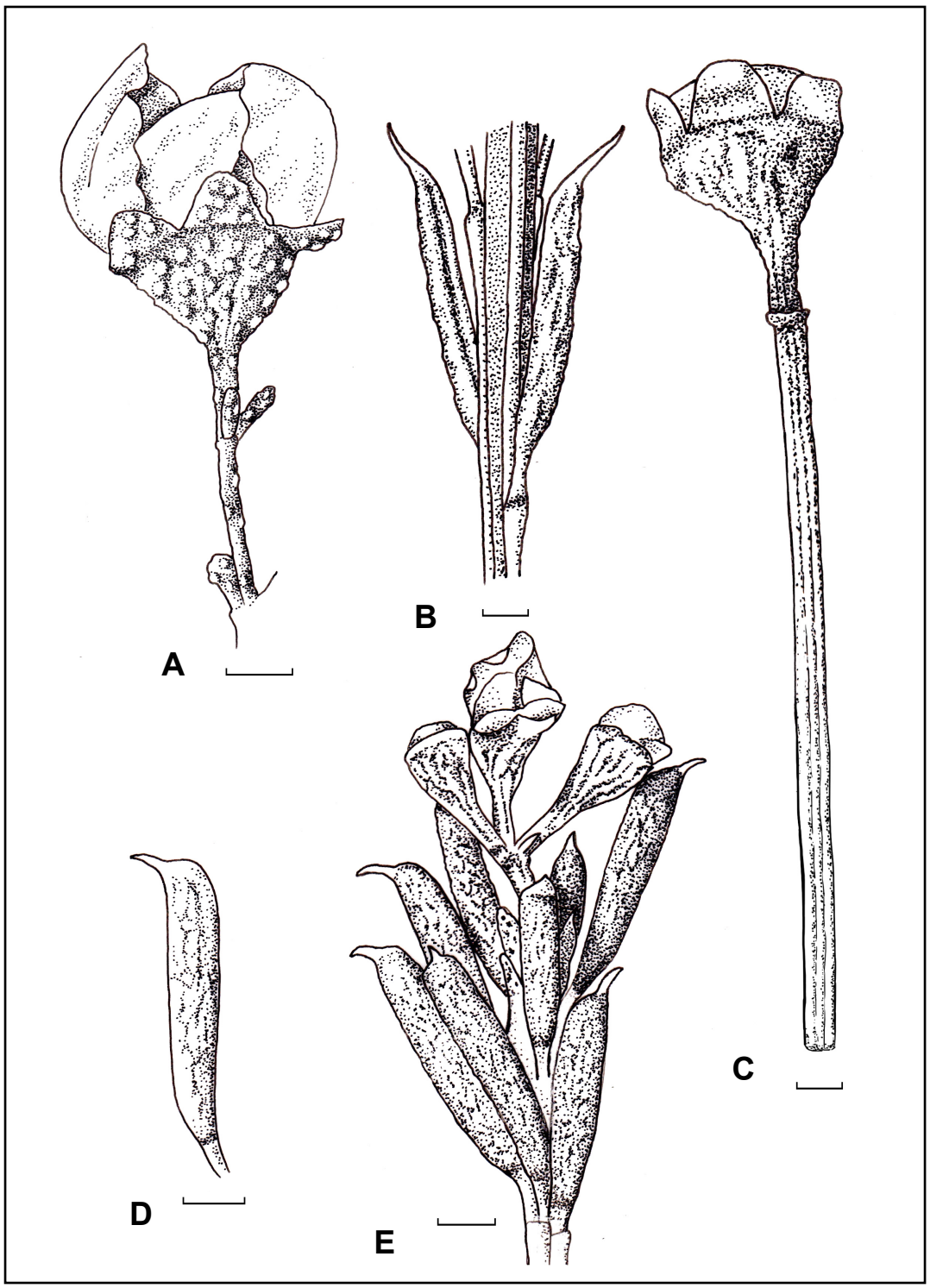

Figure 3. *Hysterobaeckea glandulosa*. A – late flower bud with pedicel, bracteoles and peduncle. *Hysterobaeckea longipes*. B – pair of leaves; C – flower bud, pedicel and long peduncle (bracteoles shed). *Hysterobaeckea occlusa*. D – leaf; E – flowering stem with three flower buds on a common peduncle. Scale bars = 1 mm. Drawn by Skye Coffey from *B.L. Rye* 241159 & *M.E. Trudgen* (A), *M.E. Trudgen* 5398 (B,C) and *B. Eckermann, H. Barwick, J. Warden & S. Burgess* LCS 18599 (D,E).

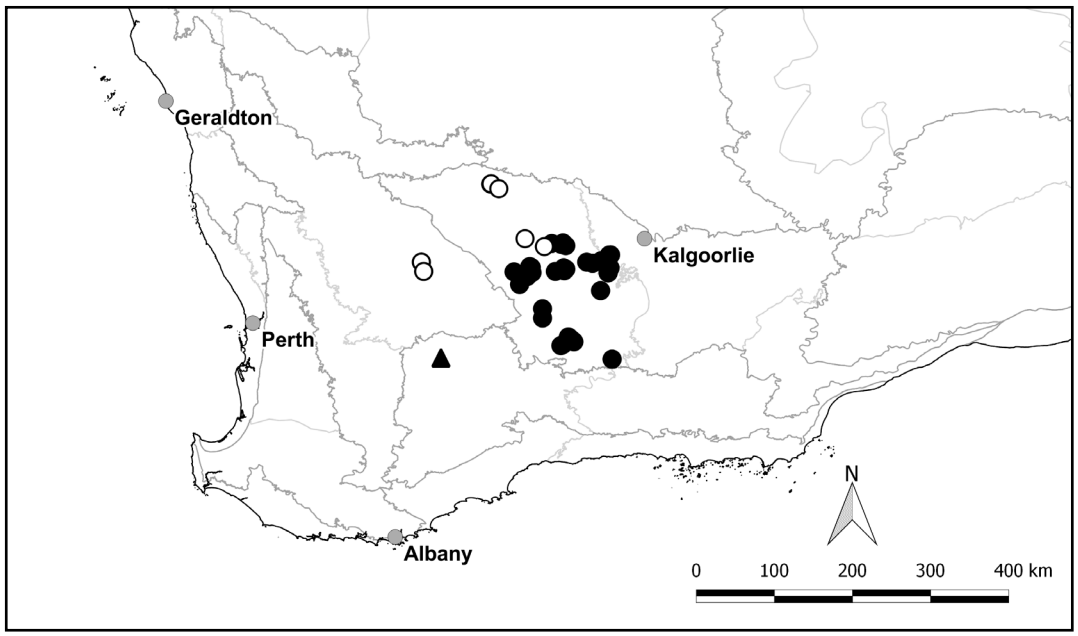

Figure 4. Distribution of *Hysterobaeckea glandulosa* (▲), *H. ochropetala* subsp. *ochropetala* (○) and *H. ochropetala* subsp. *reliqua* (●).

Conservation status. Recently listed as Priority One under Conservation Codes for Western Australian Flora under the phrase name *Baeckea* sp. Kalgarin Hill Road (A.M. Lyne 1018, L.A. Craven & F. Zich). The only known area of occurrence is less than 1 km long.

Etymology. The epithet, derived from the Latin *glandulae* (glands) and *–osus* (abounding in), refers to the presence of prominent glands on leaves, young stems, peduncles, pedicels and flowers (on the hypanthium and sepals). In other species that have prominent glands, the glands are usually less widely distributed.

Affinities. This species belongs to the *H. ochropetala* complex, which is treated here as comprising three named species, with *H. ochropetala* divided into three subspecies. *Hysterobaeckea glandulosa* is geographically isolated, occurring at the south-western extreme of the range of the complex in the least arid part of the range. It differs from other members of the complex in tending to have more obviously glandular peduncles and longer pedicels in relation to the length of the peduncles. It is closest to *H. pterocera* Rye in its style length and ovule numbers, but is readily distinguished, for example by its unhorned sepals (see notes under *H. pterocera*).

Notes. When the phrase name was established, Karlgarin was misspelt as Kalgarin because the original collection of this taxon, *A.M. Lyne* 1018, *L.A. Craven & F. Zich*, had the locality given with that spelling. A correction has now been made to the specimen.

As the above description is based on only four specimens, some of the quantitative characters may show a much greater range of variation within *H. glandulosa* than has been recorded so far. Two chaff pieces that probably were of roughly seed size were used to estimate the seed measurements given in the description.

Hysterobaeckea graniticola Rye, *sp. nov.*

Typus: Peak Charles, Western Australia, [precise locality withheld for conservation reasons], 28 September 1977, *R.J. Chinnock* 4183 (*holo*: PERTH 03411966; *iso*: AD *n.v.*, K).

Baeckea sp. Fitzgerald Peaks (P.J. Poli 53), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Shrub 1–2.5 m high, sometimes spreading up to 2.5 m wide, usually more erect; flowering branchlets usually with 1–4 pairs of flowers, the leaves appressed to moderately spreading. *Petioles* 0.8–1.1 mm long. *Leaf blades* narrowly oblong in outline, 6–9.5 mm long, 0.9–1 mm wide, 0.5–0.6 mm thick, with a recurved apical point; abaxial surface with 1 or 2 main rows of oil glands on each side of midvein, with a line-like furrow for most of its length; adaxial surface not furrowed; apical point 1–1.5 mm long. *Peduncles* 4–7 mm long, 1-flowered. *Bracteoles* caducous or deciduous, 2–2.3 mm long, 0.3–0.7 mm wide, largely scarious. *Pedicels* 2–4.5 mm long. *Flowers* 10–11 mm diam. *Hypanthium* 1.5–2.3 mm long, 2.5–3.5 mm diam.; free portion up to *c.* 0.5 mm long. *Sepals* depressed-elliptic, 1.5–1.8 mm long, 1.5–2.5 mm wide, deep pink with a narrow white margin, smooth or outermost one ridged. *Petals* 4–5 mm long, white. *Stamens* 14–16, in antisepalous groups of 2–4. *Longest filaments* 1.3–1.5 mm long, *c.* 0.3 mm wide at base. *Anthers* 0.35–0.5 mm wide from front view; connective gland 0.5–0.6 mm long; thecae 0.3–0.35 mm long. *Ovary* 3-locular; ovules 15–17 per loculus. *Style* 2–2.3 mm long; stigma 0.4–0.6 mm diam. *Fruits c.* 2/3 inferior, 2.5–3 mm long, 3–3.5 mm diam.; hypanthium smooth in distal 0.4–0.8 mm. *Seeds* 1–1.3 mm long, 0.5–0.6 mm wide, 0.7–0.75 mm thick, pale brown to orange-brown; outer surface smooth.

Diagnostic characters. Distinguished from all but two species in having leaves with an abaxial rather than an adaxial groove, and distinguished from those two species by the following combination of characters: leaf blades 6–9.5 mm long, peduncles 4–7 mm long, pedicels 2–4.5 mm long, petals 4–5 mm long and 15–17 ovules per loculus.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 24 Oct. 1964, *J.S. Beard* 3816 (PERTH); 21 Sep. 1985, *M.G. Corrick* 9471 (MEL, PERTH); 10 Nov. 1979, *K. Newbey* 6440 (NSW, PERTH); 18 Sep. 1985, *P.J. Poli* 53 (CANB, PERTH); 2 Nov. 1990, *R.W. Purdie* 3952 (CBG, PERTH).

Distribution and habitat. Occurs in the Fitzgerald Peaks region (Figure 5), on granite outcrops.

Phenology. Flowers recorded from September to November.

Conservation status. Listed by Smith and Jones (2018) as Priority Two under the name *B.* sp. Fitzgerald Peaks (P.J. Poli 53). This species is geographically restricted, being known from a single nature reserve.

Etymology. The epithet refers to the granitic habitat favoured by this species.

Affinities. This is a member of the *H. petraea* complex. It differs from *H. petraea* in having larger peduncles and pedicels, the latter sometimes being absent in *H. petraea*. It also tends to have longer (but less thickened) leaves and larger flowers.

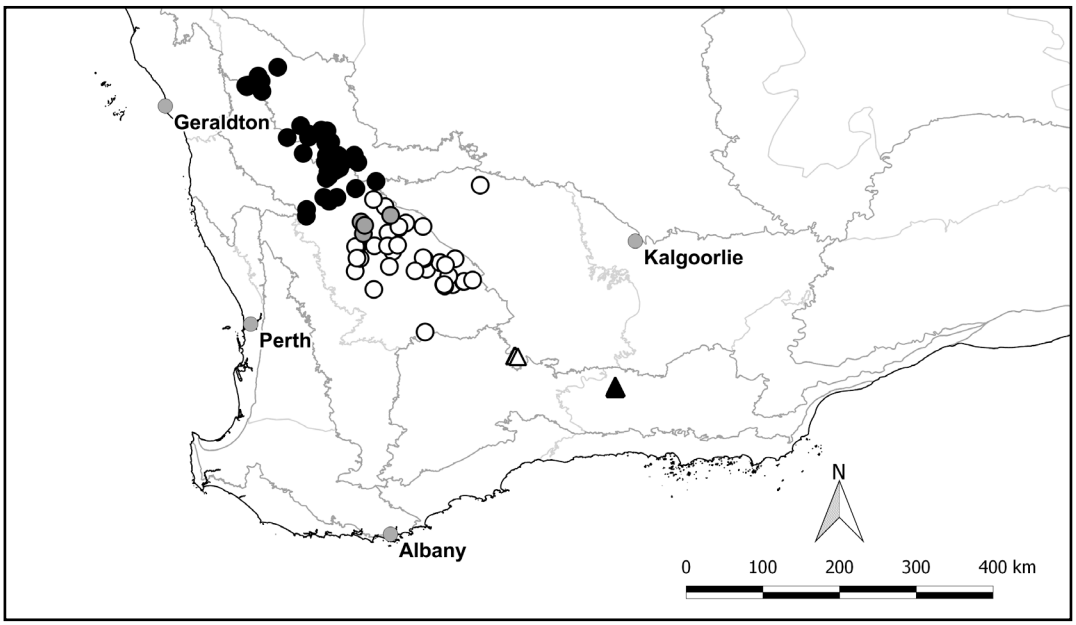

Figure 5. Distribution of *Hysterobaeckea graniticola* (▲), *H. pterocera* (△), *H. setifera* subsp. *meridionalis* (○), *H. setifera* subsp. *setifera* (●) and intermediates between the subspecies (◉).

Notes. This taxon could be treated as a subspecies of *H. petraea* as it is very similar to that taxon. However the morphological differences between the two taxa are clear-cut and there is an additional difference in leaf size in the southern area where both are found. The southernmost collection of *H. petraea* (*R.J. Cranfield* 10232) is close to the nature reserve where *H. graniticola* occurs. *Hysterobaeckea graniticola* has leaves 6–9.5 mm long whereas south-eastern specimens of *H. petraea* have leaves 3–5 mm long. Other specimens of *H. petraea* have leaves 3–6(–8) mm long.

Hysterobaeckea longipes Rye, *sp. nov.*

Typus: 7 miles [11 km] north-east of Wubin, Western Australia, 12 November 1986, *M.E. Trudgen* 5398 (*holo*: PERTH 06218849; *iso*: CANB, K, MEL, NSW).

Baeckea sp. Wubin (M.E. Trudgen 5404), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 348 (2000); Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Shrub 0.9–3 m high, 0.6–2.5 m wide; flowering branchlets with 1–3 pairs or groups of flowers, the leaves appressed or antrorse. *Petioles* 1–1.6 mm long. *Leaf blades* linear in outline, 9–15 mm long, 0.5–0.8 mm wide, 0.5–1 mm thick, with a recurved apical point; abaxial surface with *c.* 3 main rows of oil glands on each side of midvein (although the glands and midvein often scarcely visible as the surface is wrinkled in dried leaves); adaxial surface with the furrow narrow but open and extending for its full length; point 1.5–2.3 mm long. *Peduncles* (6–)12–26 mm long, 1–3-flowered; secondary axes (when present) 5–10 mm long. *Bracteoles* caducous, 2–3.3 mm long, 0.2–0.4 mm wide, largely scarious. *Pedicels* 1.6–5.5 mm long. *Flowers* 10–13.5 mm diam. *Hypanthium* 2.3–3.5 mm long, 3–4 mm wide; free portion 0.7–1.1 mm long. *Sepals* depressed-ovate to very depressed-elliptic, 0.5–1.4 mm long, 1.8–2.5 mm wide, rather petaline, pink-tinged. *Petals* 3.5–5.25 mm long, white. *Stamens* 10–21,

usually in a circle. *Longest filaments* 1.5–2.3 mm long, 0.2–0.3 mm wide at base. *Anthers c.* 0.5 mm wide from front view; connective gland *c.* 0.6–0.7 mm long; thecae *c.* 0.3 mm long. *Ovary* 3-locular; ovules 8–11 per loculus. *Style* 3–3.5 mm long; stigma 0.2–0.3 mm diam. *Fruits c.* 2/3-inferior, 3–3.5 mm long, 4–5 mm diam. excluding calyx and up to 6 mm diam. including calyx; hypanthium smooth in distal 0.6–1 mm. *Seeds or chaff pieces* 1.3–1.4 mm long, 0.6–0.8 mm wide, 0.8–1.1 mm thick, dark red-brown; outer surface minutely reticulate-pitted. (Figure 3B, C)

Diagnostic characters. Among the species that have leaves with an obvious apical point (1.5–2.3 mm long in this case), *H. longipes* is distinguished by the following combination of characters: appressed to spreading leaves with an adaxial groove, obtuse sepals, and dark seeds with the outer surface reticulate-pitted.

Selected specimens examined. WESTERN AUSTRALIA: Burakin, 3 Nov. 1987, *H. Demarz* 11929 (KPBG, PERTH); Petrudor Rock Reserve, SE of Dalwallinu off main N–S track *c.* 500 m S of picnic area, 7 Nov. 1999, *M. Hislop* 1852 (PERTH); S side of Nugadong East Rd, *c.* 25 km NE of Dalwalinu, 11 May 1996, *M. Hislop* 296 *& J.P. Orsini* (PERTH); Wubin east, 22 Dec. 1962, *F. Lullfitz* L 2030 (PERTH); S of Wyalkatchem, 14 Nov. 1963, *S.B. Rosier* 409 (PERTH); Taylor Rd, 0.2 km W of Old Well Rd, E of Latham, 13 Oct. 2003, *B.L. Rye & M.E. Trudgen* BLR 231026 (DNA, PERTH); 2.4 km S of Wubin, 13 Oct. 1983, *C.I. Stacey* 739 (PERTH); Dalwallinu, 9 Nov. 1961*, Mrs Strickland s.n.* (PERTH); Dalwallinu–Kalannie Rd, 300 m W of Birdwood Rd and 13 miles [21 km] from Dalwallinu, 13 Nov. 1986, *M.E. Trudgen* 5407 (AD, BRI, PERTH).

Distribution and habitat. Extends from Buntine Nature Reserve south-east to near Burakin, with an inexplicable outlier at Mt Ida (Figure 2). Occurs in sandy soils, sometimes with gravel, the sand often yellow. Associated species often include *Allocasuarina*, *Acacia*, *Eucalyptus*, *Melaleuca* and *Grevillea*.

Phenology. Flowers recorded from late October to December.

Conservation status. Not currently considered to be at risk.

Etymology. From the Latin *longus* (long) and *pes* (foot), referring to the long peduncles (see Figure 3C). The peduncles are up to 26 mm long, although they have been observed to be as little as 3 mm long in a few fruits on a specimen that had mostly much longer peduncles. Among the other members of the large *Hysterobaeckea* group of genera, the greatest peduncle length known is 23 mm, recorded in *Scholtzia spatulata* (Turcz.) Benth.

Affinities. This species could be confused with *H. setifera*. It occurs mainly west of the distribution of *H. setifera* but there is some overlap. It differs from *H. setifera* in its usually longer leaves, with the adaxial groove not closed, and the oil glands tending to be less prominent. Differences in its sepal morphology are as indicated in the key.

Good fruiting material is still needed for *H. longipes*; the best available specimen (*F. Lullfitz* L 2030) has a good number of apparently full-sized, but empty seeds, which are either immature or actually chaff pieces. The immature seeds or chaff pieces observed so far are darker than those in related taxa and also distinctive in their patterning, which is minutely reticulate-pitted over the three main surfaces. *Hysterobaeckea longipes* has maroon ovules, which may be related to this distinct seed colour.

Notes. The leaves of *H. longipes* are the longest in the genus and the longest in all Western Australian species of the *Hysterobaeckea* group of genera. Outside Western Australia, the longest leaves for this group are found in *Sannantha pluriflora* (F.Muell.) Peter G.Wilson.

Stamen numbers are particularly variable in this species, with up to 21 stamens per flower but occasionally as few as ten.

Hysterobaeckea occlusa Rye, *sp. nov.*

Typus: east side of Mt Richardson, Western Australia, 10 December 2008, *B. Eckermann, H. Barwick, J. Warden & S. Burgess* LCS 18599 (*holo*: PERTH 08470316; *iso*: CANB, K, MEL).

Baeckea sp. Melita Station (H. Pringle 2738), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 348 (2000); Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Mt Clifford (B. Severne 74002), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Thryptomene sp. Leinster (G. Cockerton 1534), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 404 (2000); Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Shrub 0.7–3 m high, up to 2.5 m across; flowering branchlets with 1–3 pairs of peduncles, the leaves mostly antrorse or moderately spreading. *Petioles* 0.4–0.6 mm long. *Leaf blades* narrowly obovate in outline, 2.5–5 mm long, 0.5–1 mm wide, 0.8–1.1 mm thick, with a recurved apical point; abaxial surface with numerous oil glands (not or scarcely in rows) on each side of midvein; adaxial surface not furrowed; apical point 0.3–0.5 mm long, white. *Peduncles* 1–3.5 mm long, 1–3-flowered, commonly 3-flowered; secondary axes 0–0.6 mm long. *Bracts and bracteoles* caducous or deciduous, 0.6–0.8 mm long, 0.2–0.4 mm wide, scarious. *Pedicels* 0.6–1.1 mm long. *Flowers* 4.5–6 mm diam. *Hypanthium* 1.4–1.5 mm long, 2–3 mm wide, densely glandular; free portion 0.4–0.7 mm long. *Sepals* 0.3–0.4 mm long, 1–1.5 mm wide, with a whitish border *c.* 0.2 mm wide, not ridged or horned. *Petals* 1.5–1.8 mm long, white. *Stamens* 15–20, in antisepalous groups of 2–5. *Longest filaments* 0.5–0.6 mm long, 0.15–0.25 mm wide at base. *Anthers* 0.3–0.4 mm wide from front view; connective gland *c.* 0.3 mm long; thecae 0.2–0.25 mm long. *Ovary* 2-locular; ovules 6–9 per loculus. *Style* 0.8–1 mm long; stigma *c.* 0.2 mm diam. *Fruits* indehiscent, inferior, 1.5–2 mm long, 2–2.5 mm diam.; hypanthium sometimes smoother in the distal 0.4 mm but often without any smooth part visible. *Seeds* irregularly rounded (e.g. ± very broadly elliptic) in outline, not facetted, 0.9–1.2 mm long, 0.8–0.9 mm wide, *c.* 0.5 mm thick, whitish; outer surface with some slight folds but otherwise smooth. (Figure 3D, E)

Diagnostic characters. Distinguished from other species of *Hysterobaeckea* in having an indehiscent fruit and the connective gland scarcely longer than the anther thecae. It is the only species apart from *H. tuberculata* that has a 2-locular ovary.

Selected specimens examined. WESTERN AUSTRALIA: 144 km E of Mount Magnet [near Sandstone], S side of road just E of parking area, 31 Jan. 2005, *D. Brinsden* 3 (PERTH); just W of central Yandal Stn, 9 km NNW from the geological Mt McClure, 17 Dec. 1998, *D. Hirschberg s.n.* (PERTH); *c.* 90 km S of Warburton, 20 Sep. 2010, *J. Jackson* 187 (PERTH); SW corner of proposed Ida Valley

Conservation Park, 3 Apr. 2007*, B. Jeanes s.n.* (PERTH); Booylgoo Spring Stn, *c.* 5.2 km NE of Mt St Michel and 5.8 km NW of Garden Well, Booylgoo Range, 7 Sep. 2006, *A. Markey & S. Dillon* 4686 (PERTH); Robinson Range, 17 Aug. 2006, *R. Meissner & B. Bayliss* 793 (NSW, PERTH); Melita Stn, 5 Dec. 1989, *H. Pringle* 2738 (PERTH); Weld Range, 10 Mar. 2009, *G. Turner* 806702 (PERTH).

Distribution and habitat. A wide distribution in the arid zone, extending from the Robinson Range area (north of Meekatharra) south to Melita Station (near Leonora) and from Weld Range east to south of Warburton (Figure 6), mostly associated with ironstone hills, often with *Acacia* and *Eremophila*. This distribution is well inland of, and much larger than, the ranges of all of the other Western Australian species.

Phenology. Flowers probably at any time of the year, whenever conditions in this arid region are suitable.

Conservation status. Not considered to be at risk, its known range extending for about 1,000 km from west to east.

Etymology. From the Latin *occlusus* (closed, shut), referring to the indehiscent fruits.

Affinities. This highly distinctive species differs from the other three rock-occupying species, *H. graniticola*, *H. petraea* and *H.* sp. Mt Zeil, in lacking an abaxial groove on the leaves, and differs

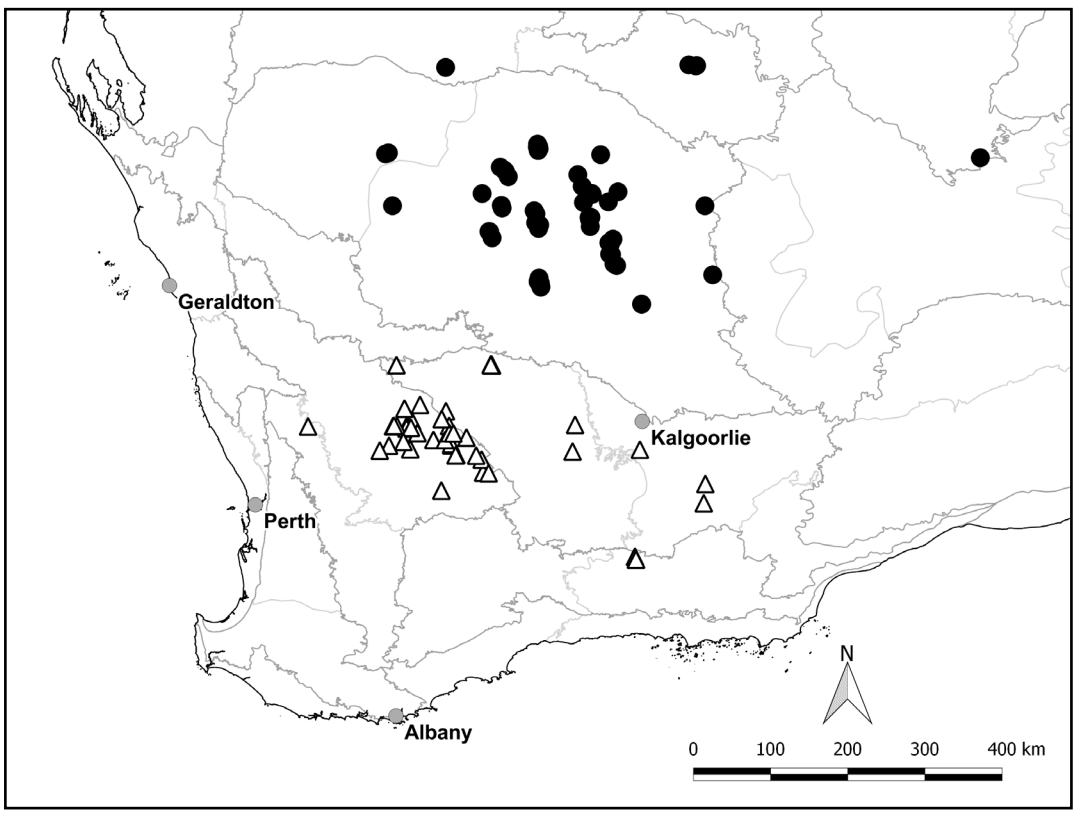

Figure 6. Distribution of *Hysterobaeckea occlusa* (●) and *H. petraea* (△).

from the core group species of *Hysterobaeckea* in lacking an adaxial groove on the leaves. It also differs from all species in having an indehiscent fruit, and from all except *H. tuberculata* in having a 2-locular ovary.

Variation. The single specimen, *B. Severne* 74002, that has been named *Baeckea* sp. Mt Clifford has mature fruits but no flowers. Its leaves are more shrunken than usual so may be drought-stressed. Otherwise *H. occlusa* is not particularly variable considering how wide its distribution is.

Notes. Most of the collections of *H. occlusa* are sterile, and those with flowers are not very well pressed, so there may be inadequacies in the description of flowers given above. Mature seeds were also examined on only a few specimens. Nearly all of the specimens have galls, the most common kind being a more or less ovoid, verrucose gall that appears to have been formed by the fusion of two pairs of abnormally broad leaves at the apex of a shoot. No galls of this kind have been observed on the other species described here, although other kinds of galls are common.

At maturity the indehiscent fruits tend to have the two loculi protruding somewhat at the top, resulting in two parallel swellings on either side of the style. Sometimes the fruits contain an insect larva, probably of a wasp, in a somewhat enlarged seed and loculus, as on *A. Markey & S. Dillon* 4686. Commonly one seed is produced in each loculus and the usually dark red-brown chaff pieces are very compressed; however, if a single seed does not develop the chaff pieces may enlarge, becoming pale, facetted, seed-like and *c.* 1.75 mm long.

Hysterobaeckea ochropetala (F.Muell.) Rye, *Nuytsia* 25: 215 (2015). *Baeckea ochropetala* F.Muell., *Fragm.* 10: 29 (1867). *Type*: between Ularring Rock and Mt Jackson, Western Australia, 17–20 October 1875, *J. Young s.n.* (*lecto*: MEL 72891, *fide* B.L. Rye, *Nuytsia* 25: 215 (2015); *isolecto*: K 00082139).

Illustration. W.E. Blackall & B.J. Grieve, *How Know W. Austral. Wildfl.* 3A: 79 (1980) [as *Baeckea ochropetala*], apparently showing the typical subspecies and at least one of the other subspecies.

Shrub 0.3–2 m high, 0.35–3 m wide; flowering branchlets with 1 or occasionally 2 pairs of flowers, the leaves appressed or antrorse. *Petioles* 0.2–0.8 mm long. *Leaf blades* narrowly oblong to almost circular in outline, 1.2–3.5 mm long, 0.8–1.5 mm wide, 0.6–1.3 mm thick, sometimes with an erect to recurved mucro up to 0.1 mm long; abaxial surface with 1–3 main rows of oil glands on each side of midvein, although there are often very few glands; adaxial furrow usually line-like for most of its length. *Peduncles* (1–)2–14 mm long, 1-flowered. *Bracteoles* caducous to persistent, 0.8–3 mm long, 0.2–1 mm wide, usually largely scarious. *Pedicels* 0–4.5 mm long. *Flowers* 9–15 mm diam. *Hypanthium* 2.3–4 mm long, 3–6 mm wide; free portion 0.7–1.2(–1.5) mm long. *Sepals* depressed-triangular to almost semicircular, usually ± depressed-ovate, usually 0.7–1.3 mm long but up to 2 mm long when horned, 1.5–2.5(–3) mm wide, with a somewhat scarious margin 0.2–0.3 mm wide, the outer sepals somewhat ridged to prominently horned; horn (when present) projecting distally and incurved, bilaterally compressed, up to 1.5 mm long. *Petals* 3–5.5 mm long, white or pale yellow. *Stamens* 16–28, in a circle. *Longest filaments* 0.7–1.6 mm long, mostly 0.25–0.4 mm wide at base. *Anthers* 0.3–0.6 mm wide from front view; connective gland 0.5–0.8 mm long; thecae 0.2–0.4 mm long. *Ovary* 3-locular; ovules 14–21 per loculus. *Style* 2.5–4.5 mm long; stigma 0.3–0.5 mm diam. *Fruits* largely inferior or *c.* half-inferior, 3–4.5 mm long, 3.5–5.5 mm wide excluding the sometimes widely spreading calyx; hypanthium smooth in distal 0.7–1.6 mm. *Seeds* 0.8–1.4 mm long, 0.5–0.8 mm wide, 0.5–0.9 mm thick, pale to golden brown; outer surface smooth.

Diagnostic characters. Distinguished from all other species of *Hysterobaeckea* in the following combination of characters: leaves with a long, line-like abaxial groove but with no apical point or just a mucro up to 0.1 mm long; sepals with horn absent or up to 1.5 mm long; style 2.5–4.5 mm long; ovules 14–21 per loculus.

Distribution. Extends from the Diemals Station area east to the Comet Vale area, south-west to Mt Moore and south-east to Taylor Rock.

Notes. This species was incorrectly treated as a variety of *Babingtonia grandiflora* (Benth.) Rye in Blackall and Grieve (1954: 289) under the invalid name *Baeckea grandiflora* var. *ochropetala* W.E.Blackall, although it was included as *B. ochropetala* in a later edition (Blackall & Grieve 1980: 79).

Hysterobaeckea ochropetala is an extremely variable taxon, belonging to a larger complex that encompasses *H. glandulosa*, *H. pterocera* Rye and the poorly known *H.* sp. Exclamation Lake. Three subspecies are tentatively recognised in order to reflect some of this variation, although a few specimens appear to be intermediate between the extremely variable subsp. *reliqua* Rye and the other two, less variable subspecies. Future collecting in the central wheatbelt to goldfields area could clarify this picture, by establishing the full extent of the yellow-flowered variant and other variants, and by determining whether intermediates reflect clinal variation or whether hybridisation is responsible for some of the blurring of boundaries in this complex.

The brief description of *H. ochropetala* given by Rye (2015a) applies only to typical specimens, treated here as subsp. *ochropetala*.

Hysterobaeckea ochropetala subsp. **cometes** Rye, *subsp. nov.*

Typus: Comet Vale, Western Australia [precise locality withheld for conservation reasons], 27 September 1966, *A.S. George* 8078 (*holo*: PERTH 03415805; *iso*: MEL).

Baeckea sp. Comet Vale (A.S. George 8078), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Illustration. Drawings on *C.A. Gardner* 2082.

Petioles 0.5–0.7 mm long. *Leaf blades* oblong to broadly obovate in outline, 2.2–3.5 mm long, 0.8–1.3 mm wide, 0.6–0.9 mm thick, obtuse. *Peduncles* 3–14 mm long. *Bracteoles* 1.5–3 mm long. *Pedicels* 1–3.5 mm long. *Flowers* 12–15 mm diam. *Hypanthium* tending to have large prominent oil glands. *Sepals* 0.7–1.1 mm long excluding horn and up to 2 mm long including it; horn 0.8–1.5 mm long. *Petals* 4–5.5 mm long, white. *Stamens* 19–28. *Longest filaments* 1.2–1.6 mm long. *Ovules* 15–21 per loculus. *Style* 3.5–4.2 mm long. *Seeds* 1.3–1.4 mm long. (Figure 7A–D)

Diagnostic characters. Subspecies *cometes* is distinguished from the other two subspecies by its larger flowers, with white petals 4–5.5 mm long and prominently horned sepals.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] Sep. 1927, *W.E. Blackall s.n.* (PERTH); 5 July 1995, *R.J. Cranfield* 9850 (PERTH); 13 June 2008, *D.J. Edinger* 6752 (PERTH); 9 Sep. 1927, *C.A. Gardner* 2802 (PERTH); 7 Sep. 2011, *N. Gibson & M.A. Langley* 5295 (PERTH); 1980, *A.V. Milewski* AVM 20A (AD, PERTH); 13 Sep. 1966, *K.R. Newbey* 2585 (PERTH); 25 Sep. 1991, *Peter G. Wilson* 1250 *& R. Rowe* (PERTH).

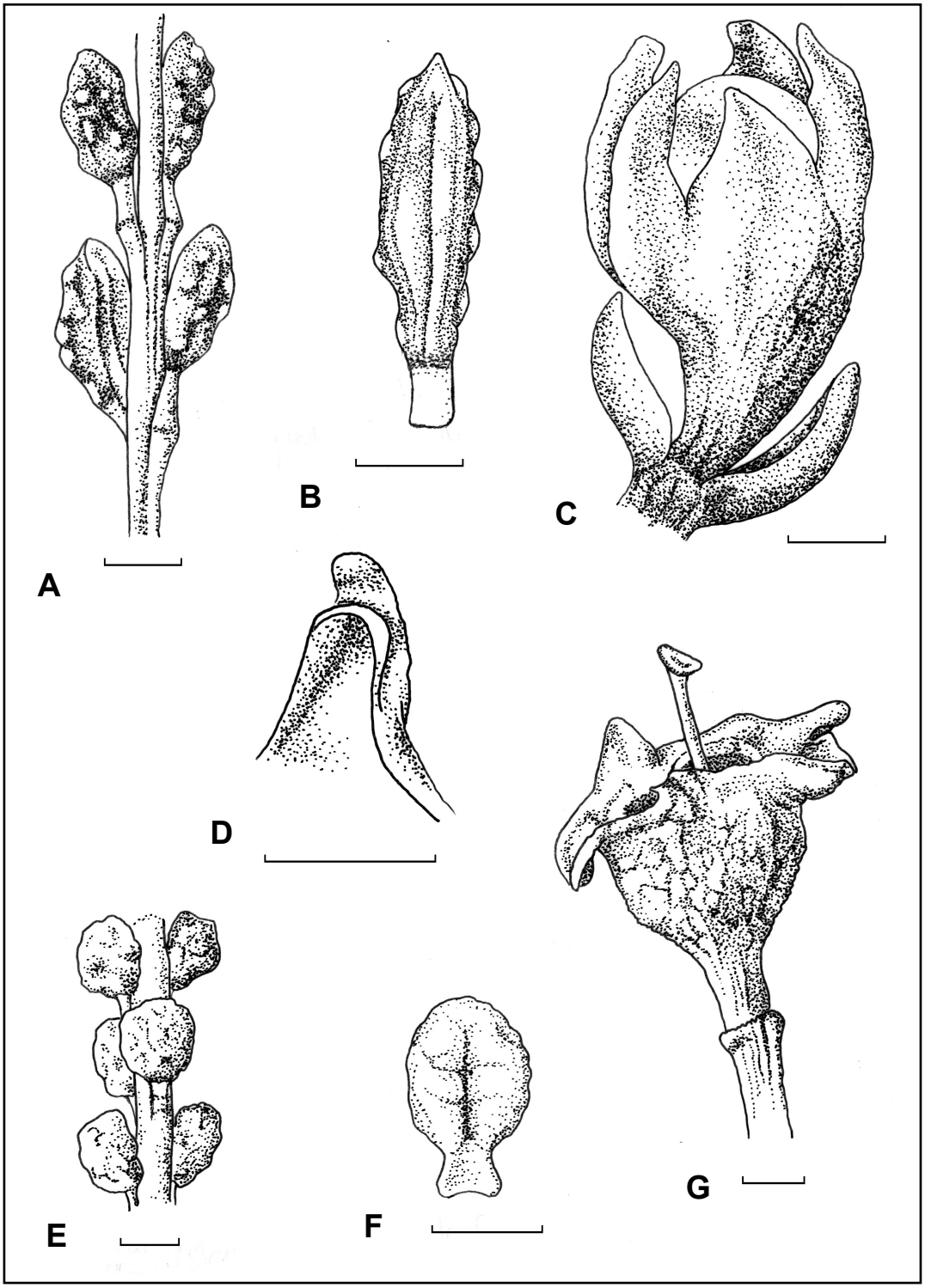

Figure 7. *Hysterobaeckea ochropetala* subsp. *cometes*. A – opposite leaves, with pedicels up to half as long as the blades; B – adaxial surface of leaf; C – horned flower bud with bracteoles (soaked), D – horned sepal (soaked). *Hysterobaeckea ochropetala* subsp. *ochropetala*. E – opposite leaves; F – adaxial surface of leaf; G – young fruit with pedicel and peduncle. Scale bars = 1 mm. Drawn by Skye Coffey from *A.S. George* 8078 (A, B), *P.G. Wilson* 1250 (C, D) and *B.L. Rye* 241066 & *M.E. Trudgen* (E–G).

Distribution and habitat. Occurs in the Comet Vale area (Figure 2) in sandy soils, often red or yellow, the dominant vegetation often of mallees over *Acacia* species, with an understory of spinifex.

Conservation status. Recently listed by Smith and Jones (2018) as Priority Three under Conservation Codes for Western Australian Flora, under the name *Baeckea* sp. Comet Vale (A.S. George 8078). The taxon is geographically restricted and possibly not recorded from any conservation reserves. The distribution is *c.* 60 km long, or *c.* 70 km long if the record (*W.E. Blackall s.n.*) from Menzies is reliable.

Phenology. Flowers recorded from July to September and mature fruits in early July.

Etymology. From the Latin for comet (*cometes*), a noun in apposition, as this species is restricted to the Comet Vale area.

Notes. Subspecies *cometes* occurs in the north-eastern part of the range of *H. ochropetala*. It has, on average, the largest flowers and the most numerous stamens in the genus. The prominent horns on its sepals cause the flower buds and young fruits to be 5-horned.

Hysterobaeckea ochropetala (F.Muell.) Rye subsp. **ochropetala**

Baeckea sp. Lake Brown (E. Merrall s.n. 1889), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Petioles 0.2–0.5 mm long. *Leaf blades* broadly oblong-elliptic to almost circular in outline, 1.2–1.6 mm long, 1–1.5 mm wide, 1–1.3 mm thick, ± truncate. *Peduncles* 2–5 mm long. *Bracteoles* 1.3–2.2 mm long. *Pedicels* 0.4–1.3(–3) mm long. *Flowers c.* 10 mm diam. *Hypanthium* rugose in late bud, the oil glands often sunken and not particularly obvious. *Sepals* 0.8–1.5 mm long, the outer ones somewhat ridged. *Petals c.* 3.5 mm long, usually pale yellow. *Stamens* 16–25. *Longest filaments c.* 1.5 mm long. *Ovules* 14–17 per loculus. *Style* 2.5–3.8 mm long. *Seeds c.* 1.1 mm long. (Figure 7E–G)

Diagnostic characters. Distinguished from the other subspecies of *H. ochropetala* by its uniformly short, more or less truncate leaves. Unlike the other subspecies, this taxon often has yellow flowers.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 19 Oct. 2011, *J. Jackson* 240 (PERTH); 16 Nov. 2010, *M. Maier & B. Eckermann* MM 1048 a (AD, PERTH); 1889, *E. Merrall s.n.* (MEL 76410); 1889, *E. Merrall s.n.* (MEL 73147); 25 Sep. 2013, *W.P. Muir* WPM 3346 (K, PERTH).

Distribution and habitat. Extends from the Diemals Station area south-west to Mt Moore and south-east to Jaurdi Station (Figure 4). Occurs in yellow sand or other sandy habitats, some records being of sand over laterite.

Phenology. Flowers and fruits August to November.

Conservation status. Listed as Priority Two by Smith and Jones (2018) under the names *H. ochropetala* and *B.* sp. Lake Brown (E. Merrall s.n. 1889). Occurs in several reserves including the wildlife sanctuary that includes Boordarding Rock and Split Rocks.

Variation. The name *B.* sp. Lake Brown was applied to two MEL specimens in the far west of the distribution, separated by more than 100 km from the closest populations in the remainder of the range of *H. ochropetala*. In addition to their geographical isolation these specimens have the shortest petioles recorded in the *H. ochropetala* complex, down to 0.2 mm long. However, both specimens of *B.* sp. Lake Brown comprise small pieces of stem so may not represent this western variant well, and both are in early bud. Recent searches in the Lake Brown area, have failed to locate any populations. Consequently, the petal colour and quantitative floral characters of the *B.* sp. Lake Brown variant remain unknown.

Notes. Subspecies *ochropetala* differs from all other members of the genus *Hysterobaeckea* in having yellow petals on the type (Mueller 1876). It occurs in the north-western part of the distribution of *H. ochropetala*, well separated from subsp. *reliqua* except in the vicinity of Jaurdi Station (see Figure 4). Its very short, thick leaves have a more or less truncate apex, which may be somewhat pinched in at the middle, in contrast to the obtuse apex found in the two other subspecies.

Flower buds are scarcely lobed or obtusely 5-lobed at the summit in subsp. *ochropetala*. Previously the style length was recorded as *c.* 1.5 mm (Rye 2015a) but that was based on a single measurement obtained from a specimen that did not have any fully mature styles. Mature styles 2.5–3.8 mm long have now been measured. However, the floral measurements recorded here for subsp. *ochropetala* are still based on very little material, while seeds have been found on only one specimen.

Hysterobaeckea ochropetala subsp. **reliqua** Rye, *subsp. nov.*

Typus: Goldfields Woodlands Conservation Park, *c.* 40 km south of Coolgardie on the Victoria Rock road, Western Australia, 20 December 2012, *J. Jackson* 260 (*holo*: PERTH 08670005; *iso*: K, MEL).

Baeckea sp. Boorabbin (J.H. Willis s.n. 4/10/1961), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Bulla Bulling (D.J.E. Whibley 4648), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Coolgardie (A. Strid 21320), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Gnarlbine Rocks (G. Barrett GRH 469), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Mt Clara (R.J. Cranfield 11693), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Queen Victoria Rock (K.R. Newbey 6103), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Roundtop Hill (P. Armstrong 05/843), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Ubini (R. Pullen 9610), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Petioles 0.35–0.8 mm long. *Leaf blades* oblong-elliptic to almost circular in outline, 1.2–2.5(–3.5) mm long, 0.8–1.3 mm wide, 0.7–1.3 mm thick, usually obtuse, sometimes truncate. *Peduncles* (1–)3–12 mm long. *Bracteoles* 0.8–2.2(–2.5) mm long. *Pedicels* (0–)1–3(–4) mm long. *Flowers* 9–13 mm diam. *Hypanthium* rugose throughout, usually even in young bud, the oil glands often sunken and not particularly obvious. *Sepals* 0.8–1.6 mm long, somewhat to markedly ridged or with a horn up to 0.6 mm long. *Petals* 3–4.5 mm long, white. *Stamens* 16–23. *Longest filaments* 0.7–1.4 mm long. *Ovules* 14–19 per loculus. *Style* 2.6–4.5 mm long. *Seeds* commonly 1.15–1.35 mm long.

Diagnostic characters. Distinguished from the other two subspecies by the combination of its mostly obtuse leaves, white petals 3–4.5 mm long, and ridged to moderately horned sepals.

Specimens examined of western, small-leaved variant. WESTERN AUSTRALIA: 25 km E of Southern Cross in gravel pit, 14 Oct. 1985, *J.M. Brown* 311 (PERTH); Yilgarn Breakaway, *c.* 150 km by road E of Hyden on Hyden–Norseman Track, 24 Apr. 2000, *G. Cockerton s.n.* (PERTH); 7 km NNE of Mt Clara, 2 Dec. 1997, *R.J. Cranfield* 11703 (PERTH); along State Vermin Fence No 7, between 45 and 65 km S of Great Eastern Hwy, 15 Oct. 1987, *J. Dodd* 420 (PERTH); Southern Cross, 23 Nov. 1962, *W. Middleton s.n.* (MEL); 11.9 km E of Yellowdine on Great Eastern Hwy, 15 Oct. 2004, *B.L. Rye* 241066 *& M.E. Trudgen* (CANB, K, MEL, NSW, PERTH); 3 km S of trans-Australian Railway line on Health Department Rd, N of Boorabbin, 12 Oct. 1999, *L.W. Sage & F. Hort* 2312 (PERTH); 18 km ENE of Marvel Loch, on the track to Mt Palmer Cemetery, 100 m from the north end, ESE of Southern Cross, 3 Dec. 2008, *M.E. Trudgen* 23355 B (AD, BRI, NSW, PERTH); half mile [0.8 km] W of Karalee [Rock, E of Southern Cross] on Great Eastern Hwy, 19 Sep. 1963, *J.H. Willis s.n.* (MEL); 11.9 km E of Yellowdine, 15 Oct. 1997, *P.G. Wilson* 1380 *& N. Lam* (PERTH).

Specimens examined with ridged or scarcely horned sepals. WESTERN AUSTRALIA: 20.2 miles [32 km] from Coolgardie towards Southern Cross, 8 Sep. 1968, *E.M. Canning s.n.* (PERTH); N of Great Eastern Hwy near Coolgardie, 16 July 2014, *L. Dadour* BCLD 18 (PERTH); 65 miles [105 km] W of Coolgardie, Mar. 1957, *P.R. Jefferies, D.E. White & J.W. Green* 573076 (PERTH); 24 km SSW of Queen Victoria Rocks, 25 Sep. 1979, *K.R. Newbey* 6103 (PERTH); Great Eastern Hwy, 21 km from Coolgardie towards Southern Cross, 10 Nov. 1982, *A. Strid* 21320 (PERTH).

Specimens examined with distinctly horned sepals. WESTERN AUSTRALIA: 7.7 km S of Gnarlbine Rocks, 28 Sep. 1992, *G. Barrett* GRH 469 (PERTH); *c.* 1.9 km N of Great Eastern Hwy, 16 km NE of Woolgangie, 13 Oct. 2011, *J. Nelson & R. Daniel* MW 11016–05 (PERTH); *c.* 18 km W of Coolgardie, 24 Nov. 1974, *R. Pullen* 9610 (PERTH); 10.6 km E of Boorabbin on Great Eastern Hwy, 15 Oct. 2004*, B.L. Rye* 241078 *& M.E. Trudgen* (NSW, PERTH); 10 km SW of Gnarlbine Rock, 15 Oct. 2004, *B.L. Rye* 241081 *& M.E. Trudgen* (AD, BRI, MEL, PERTH); 60 km WSW of Kalgoorlie [*c.* 20 km WSW of Coolgardie on Great Eastern Hwy], 30 Oct. 1974, *D.J.E. Whibley* 4648 (AD, PERTH).

Distribution and habitat. Extends from east of Southern Cross south-east to Roundtop Hill and Taylor Rock and east to near Queen Victoria Rocks (Figure 4). Occurs in yellow or brown sandy soils, sometimes in sand over laterite.

Phenology. Flowers from September to December, especially in October and November.

Conservation status. Not considered at risk. Several of the phrase names given above were previously listed as Priority One, while others were unlisted (Smith & Jones 2018). Currently the subspecies is known from many collections, including several from the vicinity of Boorabbin National Park and Lake Barker Wildlife Sanctuary, suggesting that it is relatively well protected, and its known range is more than 250 km long.

Etymology. From the Latin *reliquus* (leftover, remainder) as this taxon covers the remaining variants following the removal of the other two subspecies. In most respects the subspecies is intermediate between the other subspecies.

Variation. This particularly variable subspecies was previously split into eight phrase-named entities. Southern specimens tend to have a longer style (*c.* 4 mm) than the northern ones, while eastern ones have more variable leaves, which are longer on average than in the western specimens. The small-leaved variant that is common in the west of the range was given the phrase name *B.* sp. Mt Clara (R.J. Cranfield 11693) and shows the greatest approach to subsp. *ochropetala*, with which it may slightly overlap in range. A possibly intermediate specimen is *L.W. Sage & F. Hort* 2053 from Jaurdi Station, as this has short, more or less truncate leaves combined with white flowers.

Baeckea sp. Boorabbin (J.H. Willis s.n. 4/10/1961) is based on a sheet with three pieces attached. The piece on the right side of the sheet is a good match for the *B.* sp. Mt Clara variant, including a specimen (*T. Houston* 408-33) from near Boorabbin, except that all branches on the latter have tiny leaves whereas the former has a mixture of branches with tiny leaves and branches with somewhat longer leaves. Most leaves on the other two pieces of *J.H. Willis s.n.* are of the longer kind, although a few tiny leaves are present, and the sepals are somewhat horned (certainly more so than on the right branch and the *T. Houston* 408-33 specimen). Other relatively long-leaved collections from the Boorabbin area have more obviously horned sepals, such as *B.L. Rye & M.E. Trudgen* BLR 241077–241079, although specimens collected less than 1 km further along the road, *B.L. Rye & M.E. Trudgen* BLR 241073 & 241074, have sepals scarcely horned as in the left pieces of the *J.H. Willis s.n.* collection. Apart from the slight difference in the degree of horning, these two groups of Rye and Trudgen specimens appear very similar. The lack of clear morphological differences among Boorabbin specimens makes formal recognition of more than one taxon impracticable. Instead, subsp. *reliqua* is regarded as being variable both in its leaf length and sepal morphology in the eastern part of its range.

Also with relatively long leaves, but this time with more consistently longer leaves, is the Newbey specimen that was used as the basis for the name *B.* sp. Queen Victoria Rock (K.R. Newbey 6103). That specimen has particularly short (or more or less absent) pedicels 0–0.8 mm long, and peduncles 3–3.5 mm long. Similarly *B.* sp. Coolgardie (A. Strid 21320) is based on a specimen with consistently long leaves, but in this case it shows no obvious morphological distinctiveness in any characters from the remaining variants.

Three other names relevant to the eastern material are *B.* sp. Bulla Bulling (D.J.E. Whibley 4648), *B.* sp. Gnarlbine Rocks (G. Barrett GRH 469) and *B.* sp. Ubini (R. Pullen 9610), all with definite horns on the sepals, similar to sepals on some specimens of subsp. *cometes*. These specimens could be regarded as being intermediate between subspp. *reliqua* and *cometes* but are retained here within subsp. *reliqua* because they intergrade with specimens of the latter that occur nearby.

In the south of the range of the *H. ochropetala* complex, there are three groups of specimens, one group previously housed as *B.* sp. Roundtop Hill (P. Armstrong 05/843), a second group from further south at Taylor Rock with no phrase name attached, and the last group from furthest south now housed

under the phrase name *H.* sp. Exclamation Lake (M.E. Trudgen 1524). Exclamation Lake specimens have longer leaves than most other specimens and are being retained as a separate taxon at present, but the Roundtop Hill specimens are not so distinctive.

Notes. The petioles in subsp. *reliqua* are often very long in comparison with the length of the blade. Peduncles are usually ± smooth but prominently glandular ones are found in a few specimens e.g. *P. Armstrong* 05/840. Subspecies *cometes* tends to have a more prominently glandular hypanthium than subsp. *reliqua*.

Hysterobaeckea petraea Rye, *sp. nov.*

Typus: *c.* 1.5 km north of Koorda–Southern Cross Rd on Barbalin–Koonkoobing Rd, east of Bencubbin, Western Australia, 13 October 2004, *B.L. Rye* 241019 *& M.E. Trudgen* (*holo*: PERTH 07273835; *iso*: CANB, K, MEL, NSW).

Baeckea recurva Trudgen ms, in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 348 (2000); Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Barbalin (B.L. Rye & M.E. Trudgen BLR 241022), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Pigeon Rocks (D. Grace DJP 281), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Illustrations. W.E. Blackall & B.J. Grieve, *How Know W. Austral. Wildfl.* 3A: 78 (1980) [as *Baeckea behrii*]; drawings by R.J. Cranfield on *R.J. Cranfield & P.J. Spencer* 7696 and by C.A. Gardner on *W.E. Blackall* 3426.

Shrub 1–4 m high, up to 4 m across; flowering branchlets usually with 1–3 pairs of flowers, the leaves appressed to moderately spreading. *Petioles* 0.5–0.8 mm long. *Leaf blades* narrowly oblong in outline, 3–6(–8) mm long, 0.6–1 mm wide, 0.5–0.8 mm thick, with a recurved apical point; abaxial surface with 1 or 2 main rows of oil glands on each side of midvein, with a line-like or open groove; adaxial surface not grooved; apical point 0.8–2 mm long. *Peduncles* 1.5–3 mm long, normally 1-flowered. *Bracteoles* deciduous, 1.1–2.3 mm long, 0.4–0.8 mm wide. *Pedicels* 0–1(–1.7) mm long. *Flowers* 7–10 mm diam. *Hypanthium* 1.7–2 mm long, 2.7–3 mm wide; free portion up to *c.* 0.5 mm long. *Sepals* oblong-ovoid to depressed-elliptic or depressed-ovoid, 0.7–1.8 mm long, 2–2.5 mm wide, whitish, smooth or outermost one slightly ridged. *Petals* 2.5–4 mm long, white (possibly rarely pale pink). *Stamens* 12–18, in antisepalous groups of 2–4. *Longest filaments* 1–1.5 mm long. *Anthers* 0.4–0.5 mm wide from front view; connective gland *c.* 0.5 mm long; thecae 0.25–0.3 mm long. *Ovary* 3-locular; ovules 12–18 per loculus. *Style* 1.8–2.5 mm long; stigma 0.3–0.5 mm diam. *Fruits c.* 2/3 inferior, 2.5–3 mm long, 3–3.5 mm diam.; hypanthium smooth in distal 0.4–0.7 mm. *Seeds* 0.8–1.35 mm long, 0.45–0.6 mm wide, 0.6–0.7 mm thick, pale to medium brown; outer surface smooth. (Figure 8A)

Diagnostic characters. Distinguished from all but two species in having leaves with an abaxial rather than an adaxial groove, and distinguished from those two species by the following combination of characters: leaf blades usually 3–6 mm long, peduncles 1.5–3 mm long, pedicels absent or up to 1.7 mm long and petals 2.5–4 mm long.

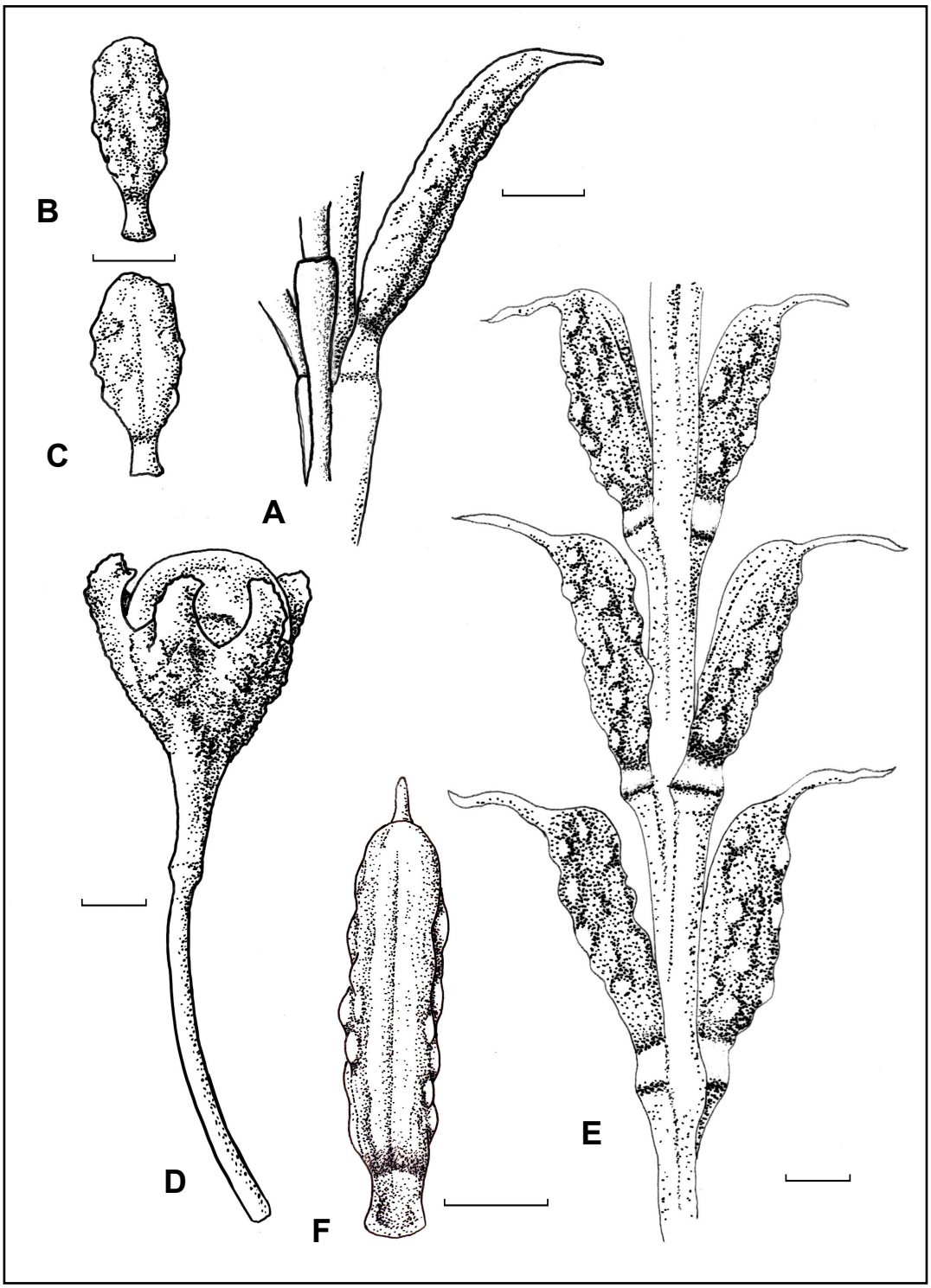

Figure 8. *Hysterobaeckea petraea*. A – leaf with abaxial groove. *Hysterobaeckea pterocera*. B – abaxial surface of leaf; C – adaxial surface of leaf, D – flower bud, pedicel and peduncle (bracteoles shed). *Hysterobaeckea setifera* subsp. *meridionalis*. E – opposite leaves; F – adaxial surface of leaf. Scale bars = 1 mm. Drawn by Skye Coffey from *B.L. Rye* 241019 & *M.E. Trudgen* (A), *M.E. Trudgen* 23414 A (B–D) and *B.L. Rye* 241049 & *M.E. Trudgen* (E, F).

Selected specimens examined. WESTERN AUSTRALIA: Mt Churchman, near summit, 19 Sep. 1985, *B.J. Conn* 2284 (PERTH); 58 km SW of Norseman, 20 Aug. 1995, *R.J. Cranfield* 10232 (PERTH); Sandford Rocks, near Westonia, 29 Sep. 2005, *M.D. Crisp* 10093 *& L.G. Cook* (PERTH); S of Coolgardie, 11 Oct. 1955, *E. Gauba s.n.* (CBG 024784); Yanneymooning Hill Nature Reserve, NE of Muckinbudin, 8 June 2008, *M. Hislop* 3775 (PERTH); Bonnie Rock–Wialki, 11 Sep. 1957, *A.R. Main s.n.* (PERTH); Pigeon Rocks, Diemals Stn, *c.* 10 km N of Windarling, 16 Mar. 2010, *S. Reiffer* SRE 022 (CANB, MEL, NSW, PERTH); 3.6 km S of Luckman Rd, 4.7 km N of Koorda–Southern Cross Rd on Barbalin–Koonkoobing Rd, E of Bencubbin, 13 Oct. 2004, *B.L. Rye* 241022 *& M.E. Trudgen* (BRI, PERTH); Chiddarcooping Hill Nature Reserve, *c.* 70 km NE of Merredin, 3 Nov. 1984, *A.S. Weston* 14451 (PERTH).

Distribution and habitat. Occurs from Mt Churchman and Bencubbin south-east to the Norseman area (Figure 6). One of the specimens was labelled with the doubtful locality of Wongan Hills (*P. Roberts* 237), but this record has been removed from the distribution data as it was probably collected at Karroun Hill or Giles Rock, where Roberts made a number of collections (e.g. *P. Roberts* 234) in September 1983. Through most of its range *H. petraea* appears to be restricted to granite outcrops, but at the south-eastern end of the range most of the specimens are from laterite rather than granite. *Baeckea* sp. Walyahmoning (M.E. Trudgen 5412), a species of uncertain generic placement, co-occurs with *H. petraea* on one granite outcrop but not in the same soil pockets. When specimens of both species were collected there on 14 October 2004, *H. petraea* (*B.L. Rye* 241043 & 241044 *& M.E. Trudgen*) was recorded from a large soil pocket near the base of the outcrop while *B.* sp. Walyamoning (*B.L. Rye* 241042 *& M.E. Trudgen*) was in a somewhat higher, small soil pocket.

Phenology. Flowers mainly from August to October.

Conservation status. This widespread taxon is not considered to be at risk. The phrase name *B.* sp. Pigeon Rocks (D. Grace DJP 281) is listed by Smith and Jones (2018) as Priority One, with no priority given to the other phrase name.

Chromosome number. *2n* = *c.* 22 (Rye 1979: 571) [as *Baeckea grandiflora*]; voucher *B.L. Rye* 74003.

Etymology. From the Greek *petraios* (belonging to rocks) as this species is restricted to granite and lateritic outcrops.

Affinities. Two other species are currently recognised in the *H. petraea* group, *H. graniticola* (which is very similar; see notes under that species) and *H.* sp. Mt Zeil. *Hysterobaeckea petraea* tends to have shorter leaves and peduncles than both of those taxa, with *H. graniticola* having larger flowers (with petals 4–5 mm long) and *H.* sp. Mt Zeil having fewer ovules (5–9 per loculus).

Variation. *Hysterobaeckea petraea* comprises isolated populations occurring on rock outcrops scattered over a large area. Short-leaved specimens are widespread but with the shortest, thickest leaves tending to be in the Coolgardie–Norseman area where specimens also tend to have relatively long pedicels. Specimens with thinner, medium-length leaves occur in the Sinclair Soak area, east of Norseman.

The variant previously known as *Baeckea* sp. Pigeon Rocks occurs on the inland, north-eastern edge of the geographical range but is not particularly distinctive. One specimen (*V. Clarke* 573) from Pigeon Rocks has unusually long, narrow leaves, with a blade up to 8 mm long rather than 3–6 mm long as in all other specimens from that locality; these atypical leaves were apparently derived from a flush

of new growth. Another abnormality is a two-flowered peduncle observed on a specimen (*S. Reiffer* SRE 022) from this locality.

Notes. *Hysterobaeckea petraea* was sampled for a molecular study (Lam *et al.* 2002) using the voucher specimen *P.G. Wilson & N. Lam* PGW 1388. It appears on average to be the largest member of the genus, with a maximum height of 4 m and girth of 200 mm recorded.

Hysterobaeckea pterocera Rye, *sp. nov*.

Typus: south-east of North Ironcap, Western Australia [precise locality withheld for conservation reasons], 12 December 2008, *M.E. Trudgen* 23414A (*holo*: PERTH 08228310; *iso*: CANB, K, MEL).

Baeckea sp. Flying Fox Mine (A. O'Connor & V. Longman FF532), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Shrub commonly 0.4–0.8 m high, width not recorded; flowering branchlets with usually 1 or 2 pairs of flowers, the leaves appressed to moderately spreading. *Petioles* 0.5–0.6 mm long. *Leaf blades* oblong-elliptic or broadly so in outline, 1.5–2.2 mm long, 0.8–1.3 mm wide, 0.7–1 mm thick, not or scarcely mucronate; abaxial surface with prominent oil glands in 2 or 3 main rows on each side of midvein; adaxial surface lacking a furrow or with one poorly developed in the basal half of blade. *Peduncles* 5–12 mm long, 1-flowered. *Bracteoles* deciduous, 0.6–1.5 mm long, *c.* 0.3 mm wide, scarious. *Pedicels* 0.5–3.5 mm long. *Flowers* 9–11 mm diam. *Hypanthium* 2.7–3 mm long, 3.5–4 mm wide; free portion 0.5–1 mm long. *Sepals* ± depressed-ovate-triangular, 0.9–1.5 mm long, 1.5–2.2 mm wide at base (but much narrower above); horn projecting dorsally more than distally, bilaterally compressed and somewhat wing-like, 0.7–1.3 mm long. *Petals* 3–3.5 mm long, white. *Stamens* 19–23, in a circle. *Longest filaments* 0.9–1.5 mm long, *c.* 0.3 mm wide at base. *Anthers* 0.4–0.6 mm wide from front view; connective gland *c.* 0.5 mm long; thecae *c.* 0.3 mm long. *Ovary* 3-locular; ovules 9–13 per loculus. *Style* 1.6–2.8 mm long; stigma 0.4–0.5 mm diam. *Fruits c.* half-inferior, *c.* 4 mm long, *c.* 4 mm wide excluding calyx and 6–7 mm wide including calyx; hypanthium smooth in distal *c.* 0.6 mm. *Seeds* 0.8–1.3 mm long, 0.5–0.6 mm wide, 0.6–0.7 mm thick, yellowish brown; outer surface smooth. (Figures 8B–D, 9)

Diagnostic characters. This species is distinctive in having sepals with a laterally projecting, wing-like horn; other members of the genus either lack a horn or have it poorly developed to distally projecting. Other important characters: leaves 1.5–2.2 mm long, not or scarcely pointed, with adaxial groove absent or only partially developed; ovules 9–13 per loculus.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 27 July 2005, *P.G. Armstrong* PA 05/258 (PERTH); 21 June 2005, *G.F. Craig* 6534 (AD, NSW, PERTH); 22 Mar. 2004, *A. O'Connor & V. Longman* FF 532 (BRI, DNA, PERTH).

Distribution and habitat. Known from the Forrestania area, east of Hyden (Figure 5). Recorded on a low stony ridge and in sandplain sites with brown sand with some gravel. *Hysterobaeckea pterocera* has been recorded growing with *Baeckea muricata* C.A.Gardner and *B.* sp. North Ironcap (R.J. Cranfield 10580).

Phenology. Flowers recorded in June and December and mature fruits in March.

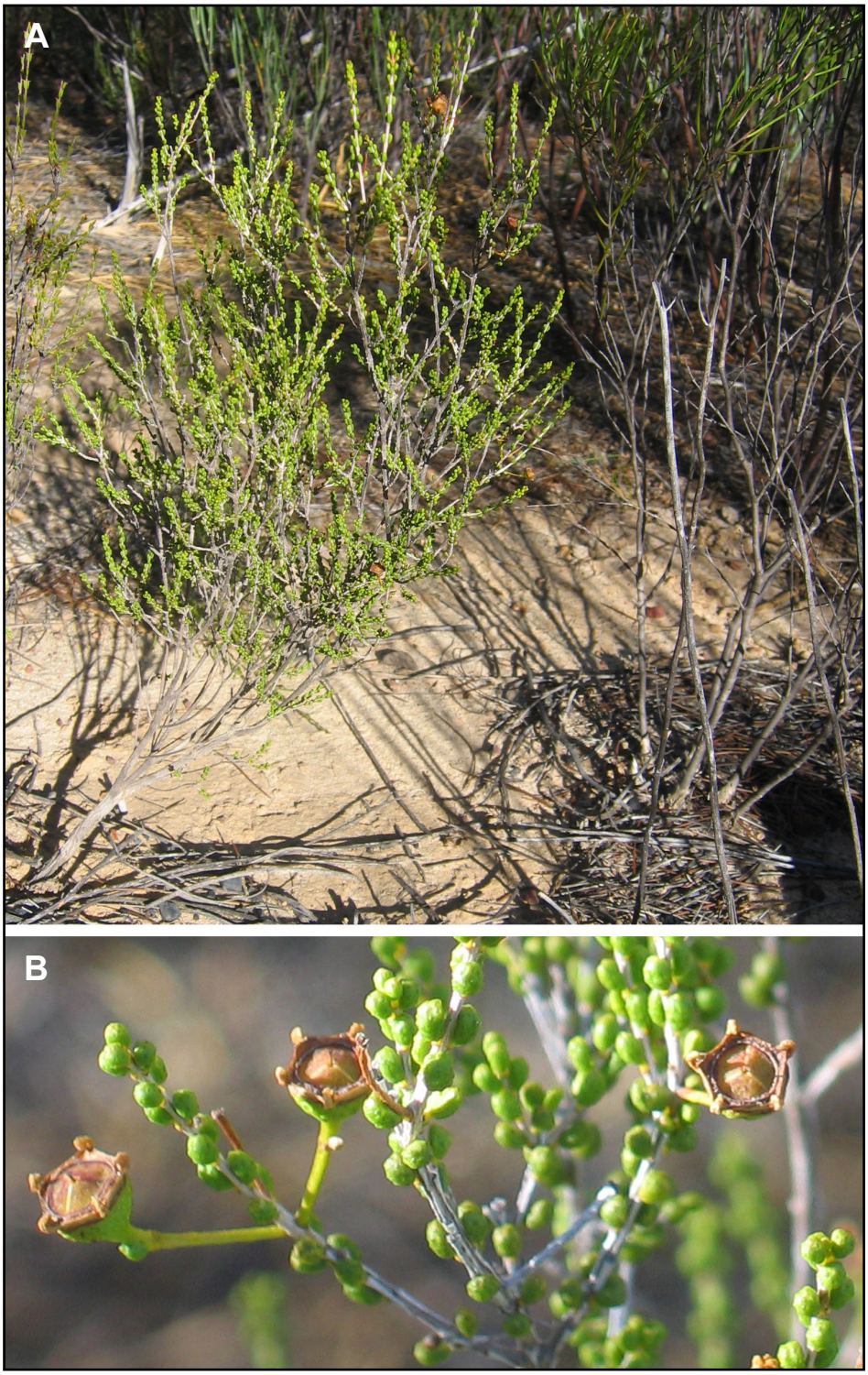

Figure 9. *Hysterobaeckea pterocera*. A – single-stemmed, erect plant; B – fruiting branchlets. Images taken by Alice O'Connor at the population where the *A. O'Connor & V. Longman* FF 532 specimen was collected.

Conservation status. Recently listed as Priority One under Conservation Codes for Western Australian Flora under the phrase name *Baeckea* sp. Flying Fox Mine (A. O'Connor & V. Longman FF532). This geographically restricted species is currently known from three collection sites, which extend for a distance of *c.* 6 km.

Etymology. From the Greek *ptero-* (winged) and *-ceras* (-horn, horn-like projection) referring to the wing-like flattened shape of the very prominent dorsal ridge on each sepal.

Affinities. Similar to *H. ochropetala*, but that species has the adaxial furrow better developed on the leaf and more numerous ovules. The peduncles in *H. pterocera* are often prominently glandular as in *H. glandulosa*.

Notes. Flower buds and fruits are crowned by five, wing-like horns formed by the calyx (Figure 8B). After the flowers open, each wing is lateral to the sepal body rather than projecting distally above it as in *H. cornuta* and *H. ochropetala* subsp. *cometes* (see Figure 7D).

Hysterobaeckea setifera Rye, *sp. nov.*

Typus: 4.9 km north of Wanarra Rd, on Rabbit Proof Fence Rd, east of Perenjori, Western Australia, 13 October 2003, *B.L. Rye* 231020 *& M.E. Trudgen* (*holo*: PERTH 06588441; *iso*: CANB, K, MEL, NSW).

Illustration. Drawings on *C.A. Gardner s.n.* Sep. 1939 (PERTH 03351777).

Shrub 0.9–3.2 m high, 0.5–3 m wide; flowering stems usually with 1–3 pairs or clusters of flowers, the leaves appressed or almost so. *Petioles* 0.2–1 mm long. *Leaf blades* oblong to linear in outline, (2–)3–9 mm long, 0.8–1.3 mm wide, 0.7–1 mm thick, apex obtuse with a recurved point; abaxial surface with 2 or 3 main rows of prominent or very prominent oil glands on each side of midvein; adaxial surface with a line-like furrow extending its full length; apical point 0.7–2.4 mm long, usually bent ± at right angles to the midvein. *Peduncles* (3–)5–15 mm long, 1(–3)-flowered; secondary axes (when present) 2–4 mm long. *Bracteoles* deciduous or persistent in young fruit, 1.5–3.3 mm long, 0.2–1 mm wide. *Pedicels* usually 0.8–3(–4) mm long, rarely indistinct or apparently absent. *Flowers* 9–14 mm diam. *Hypanthium* 1.8–3 mm long, 3–5 mm wide; free portion 0.6–1 mm long. *Sepals* very reduced (low and rounded) to almost triangular, 0.3–1.3 mm long, 1.5–2.5 mm wide, erect, often reddish, scarious margin ± absent to almost the whole lobe, the herbaceous part glandular, sometimes ridged on outer sepals. *Petals* 3–5 mm long, white. *Stamens* 17–26, in a circle. *Longest filament*s 0.8–1.3 mm long, 0.1–0.35 mm wide at base. *Anthers* 0.4–0.5 mm wide from front view; connective gland 0.4–0.7 mm long; thecae 0.3–0.4 mm long. *Ovary* 3-locular; ovules 10–18 per loculus. *Style* 2.3–3 mm long; stigma 0.4–0.5 mm diam. *Fruits* 3.5–5 mm long, 4–6 mm wide excluding calyx and the same or up to 7 mm wide including calyx; hypanthium smooth in distal 0.5–1.1 mm. *Seeds* 1–1.5 mm long, 0.4–0.9 mm wide, 0.7–1 mm thick, whitish to orange-brown or pale speckled brown; outer surface smooth.

Diagnostic characters. Among the species that have leaves with an obvious apical point (0.7–2.4 mm long in this case), *H. setifera* is distinguished by the following combination of characters: appressed leaves with a line-like adaxial groove, sepals very reduced to ± triangular and seeds with outer surface smooth.

Distribution and habitat. Extends almost 500 km from Pindar south-east to near Narembeen (Figure 5), occurring in varied habitats with sandy soils, for example in yellow sand and yellow brown sandy loam, at least sometimes associated with laterite.

Conservation status. Not considered to be at risk.

Phenology. Flowers recorded mainly from September to November, with mature fruits recorded from October onwards.

Etymology. The epithet, based on the Latin word *setifer* (bristle-bearing), refers to the stems. Since each of the appressed leaves terminates in a long, bristle-like point (see Figure 8E), the stems appear bristly.

Affinities. While its closest affinities are uncertain, *H. setifera* is most likely to be confused with *H. longipes*; see notes under that species.

Notes. Two main variants, treated here as subspecies, have been recognised previously by having separate phrase names, with *B.* sp. Bencubbin-Koorda (M.E. Trudgen 5421) having moderate-sized sepals and *B.* sp. Wanarra (M.E. Trudgen 5376) having reduced sepals. The former (subsp. *meridionalis* Rye) occupies the southern or south-eastern half of their combined range and the latter (subsp. *setifera*) occurs in the remainder of the range, while a few specimens from near the centre of the combined range (see Figure 6) are somewhat intermediate in sepal morphology.

The first published name of this new species, *Baeckea behrii* var. *brevifolia nom. nud.*, distinguished the southern subspecies of *H. setifera* from the eastern Australian *H. behrii s. str.* by its shorter leaves. However, there are several Western Australian members of the genus with even shorter leaves, such as *H. cornuta*.

Most specimens of *H. setifera* have all peduncles 1-flowered. Even on specimens with up to three flowers per peduncle, most of the peduncles are 1-flowered.

Hysterobaeckea setifera subsp. **meridionalis** Rye, *subsp. nov.*

Typus: south of Warrachuppin on Warrachuppin Rd, *c.* 5.7 km north of George Rd and *c.* 4 km south of Daddow Rd, Western Australia, 14 October 2004, *B.L. Rye* 241049 *& M.E. Trudgen* (*holo*: PERTH 07264410; *iso*: CANB, K, MEL, NSW).

Baeckea behrii var. *brevifolia* F.Muell. *nom. nud.*, *J. Bot.* 15: 280 (1877). *Type*: near Mt Churchman, Western Australia, 1875, *J. Young s.n.* (MEL 72515).

Baeckea benthamii Trudgen ms, in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat* p. 346 (2000); Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Bencubbin–Koorda (M.E. Trudgen 5421), in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 348 (2000), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Baeckea sp. Lake Campion (A. Coates AC 2285), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Leaf blades oblong to linear in outline, (2–)3–6 mm long; apical point 0.7–1.7 mm long. *Sepals* reduced and rounded to almost triangular, 0.5–1.3 mm long, scarious margin broad, sometimes almost the whole lobe scarious, broadly obtuse to acute. (Figure 8E, F)

Diagnostic characters. Differs from subsp. *setifera* mainly in having larger sepals. It usually also has a shorter apical point on its leaves.

Selected specimens examined. WESTERN AUSTRALIA: 13 miles [21 km] N of Bencubbin, 6 Oct. 1937, *W.E. Blackall* 3307 (PERTH); between Koorda and Mollerin, Sep. 1939, *C.A. Gardner s.n.* (PERTH); Wyalcatchem, Oct. 1959, *B.J. Grieve s.n.* (PERTH); 5.8 km W of Koorda along dirt road to Manmanning, 8 Oct. 1991, *R.W. Greuter* 22630 (PERTH); Cowcowing, Aug.–Sep. 1904, *M. Koch* 1230 (MEL, NSW, PERTH); no. 5 Pumping Station, Yerbillon, 26 Oct. 1923, *M. Koch* 2909 (MEL); 5 miles [8 km] E of Trayning, 22 Oct. 1964, *K.R. Newbey* 1686 (PERTH); W of Mt Jackson/Diemal Stn, 16 Nov. 1993, *H. Pringle* 30110 (PERTH); turnoff to Remlap Stn homestead from Mouroubra Rd, 16 Sep. 2012, *K.R. Thiele & S.M. Prober* KRT 4669 (PERTH); *c.* 1 mile [1.6 km] W of Bonnie Rock Siding near N end of Dotanning Rd, 14 Oct. 1986, *M.E. Trudgen* 5421 (PERTH); 2 miles [3 km] S of Carrabin, 19 Nov. 1986, *M.E. Trudgen* 5441 (CANB, K, MEL, NSW, PERTH); near Mt Churchman, 1875, *J. Young s.n.* (MEL).

Distribution and habitat. Extends from Remlap Station south-east to near Narembeen, with an outlying collection inland at Diemals Station (Figure 5). The southernmost record of 'near Narembeen' (*W.E. Blackall s.n.* Sep. 1929, PERTH 04138848), mapped as Narembeen on the figure, is also somewhat isolated so may have been collected to the north of Narembeen.

Conservation status. Not considered to be at risk, this subspecies has a distribution more than 200 km long, and is known from several reserves.

Etymology. From the Latin *meridionalis* (southern), alluding to the southern distribution of this subspecies.

Variation. A single short-leaved, non-flowering specimen, with leaves *c.* 2 mm long, has been known as *B.* sp. Lake Campion (A. Coates AC 2285). Some other specimens, e.g. *B.L. Rye & M.E. Trudgen* BLR 241038, have some dormant branchlets with similarly small leaves, although their growing branchlets have much longer leaves. As *A. Coates* AC 2285 was collected in April, its branchlets all appear to be dormant, which could explain its consistently short leaves. More collections are needed to determine the leaf size on flowering specimens from this locality. The specimen may also be affected by its occurrence in an atypically saline habitat, as it was collected from a large lunette dune near a salt lake.

Some specimens from the Mollerin–Beacon area, such as *C.A. Gardner s.n.* Sep. 1939 (PERTH 03351777), appear to be intermediate between the two subspecies and are mapped with a distinct symbol in Figure 5.

Notes. Subspecies *setifera* tends to have longer leaves than subsp. *meridionalis*, although there is considerable overlap in leaf size between them. The leaf apical point length shows less overlap, as

does sepal length.

Hysterobaeckea setifera Rye subsp. **setifera**

Baeckea sp. Wanarra (M.E. Trudgen 5376), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 10 May 2016].

Leaf blades narrowly oblong or linear in outline, 3.5–9 mm long; apical point 1.5–2.4 mm long. *Sepals* reduced or very reduced, usually rounded, 0.3–0.6 mm long, scarious margin ± absent or narrow throughout or with a protruding central area, rarely with an apical point up to 1 mm long.

Diagnostic characters. Differs from subsp. *meridionalis* mainly in having more reduced sepals. It usually also has a longer apical point on its leaves.

Selected specimens examined. WESTERN AUSTRALIA: *c.* 160 km E of Geraldton on the Yalgoo road, 1 Sep. 1968, *A.M. Ashby* 2582 (AD, PERTH); 7.5 km SSE of Rothsay Mine, 22 Nov. 1992, *R.J. Cranfield* 8594 (PERTH); Pindar, 200 m along Tardun road, 13 Oct. 1981, *L.A. Craven* 7111 (PERTH); *c.* 50 km directly NE of Perenjori at Old Karara Stn, 25 Oct. 1992, *A.M. Lyne* 883, *L.A. Craven & F. Zich* (PERTH); White Well Stn, *c.* 150 m N of homestead along track to Wanarra Rd, 7 Oct. 2003, *S.J. Patrick* 4858 (PERTH); 14 miles [23 km] E of Mt Gibbs Homestead turnoff from Paynes Find–Wubin Rd, 1 Sep. 1974, *B.L. Powell* 74078 (PERTH); 2.55 km S of NE corner of CALM reserve on Lochada Rd, E of Koolanooka, 10 Sep. 2003, *B.L. Rye* 239080 *& M.E. Trudgen* (PERTH); Glamoff Rd, 1.9 miles [3.1 km] W of Struggle Rd, SE of Wubin, 12 Nov. 1986, *M.E. Trudgen* 5402 (AD, BRI, PERTH).

Distribution. Extends from Pindar south to Pithara and south-east to Mt Gibson Sanctuary (Figure 5).

Conservation status. This subspecies is not considered to be at risk. It has a distribution more than 200 km long, and is known from several reserves including Charles Darwin Nature Reserve.

Chromosome number. n = 11 (Rye 1979: 570) [as *Baeckea* sp. *aff. behrii*], voucher specimen: *B.L. Powell* 74078.

Variation. The hyaline margin of the sepals ranges from more or less absent or very narrow and fairly uniform in most specimens to one that is distinctly larger at the centre and acute in a few specimens (e.g. *A.M. Ashby* 2582) or produced into a short to leaf-like apical point (e.g. *E. Wittwer* 1241).

Notes. This subspecies is notable for the long apical point on its leaves, similar in measurement to that of *H. longipes* but longer in proportion to the length of the leaf blade. Indeed it has the longest apical point, up to almost 2.5 mm, recorded for the tribe Chamelaucieae.

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