

An update to the taxonomy of some Western Australian genera of Myrtaceae tribe Chamelaucieae. 2. *Cyathostemon*

Malcolm E. Trudgen and Barbara L. Rye¹

Western Australian Herbarium, Department of Parks and Wildlife,
Locked Bag 104, Bentley Delivery Centre, Western Australia 6983

¹Corresponding author, email: Barbara.Rye@dpaw.wa.gov.au

Abstract

M.E. Trudgen & B.L. Rye. An update to the taxonomy of some Western Australian genera of Myrtaceae tribe Chamelaucieae. 2. *Cyathostemon*. *Nuytsia* 24: 7–16 (2014). Three new species of *Cyathostemon* Turcz. are described, illustrated and mapped, and a key is given to the seven named species in the genus. The new species are *C. divaricatus* Trudgen & Rye, *C. gracilis* Trudgen & Rye and *C. verrucosus* Trudgen & Rye. This has reduced the number of taxa known by informal names to seven, most of which belong to a difficult species complex that needs a great deal more work to resolve.

Introduction

This paper dealing with *Cyathostemon* Turcz. is the second in a series updating the taxonomy of myrtaceous genera belonging to the tribe Chamelaucieae. *Cyathostemon* is endemic to the south-west of Western Australia, extending from Canna south to the Stirling Range area and south-east to Israelite Bay, with an outlying occurrence at Eyre (see Rye 2013a: Figure 1B). Three new species are described here and taxa needing further study are noted.

Background

Cyathostemon was described by Turczaninow (1852) based on a single Drummond collection (*J. Drummond* 5th Collection, n. 123) of the type species *C. tenuifolius* Turcz. Mueller (1874) reduced *Cyathostemon* to a section of *Baeckea* L. when he named a closely related species *B. ambigua* F.Muell. However, *Cyathostemon* was not recognised at either the generic or sectional level by Niedenzu (1893), and Domin (1923) transferred its type species to *Baeckea*.

Rye and Trudgen (2008, 2012) reinstated *Cyathostemon* as a distinct genus and made new combinations for three of its species that were originally placed either in *Astartea* DC. or *Baeckea*. This brought the number of named species included in the genus to four. Two recent revisions (Rye & Trudgen 2008; Rye 2013a) presented evidence that *Cyathostemon* is closely related to *Astartea*, *Hypocalymma* (Endl.) Endl. and *Seorsus* Rye & Trudgen, and outlined the distinguishing characteristics of the four genera.

Need for further work

Six informal names originally placed under *Astartea* apply to *Cyathostemon* (Table 1). Three of these

are given scientific names here while the other three have recently been transferred to *Cyathostemon*, bringing the number of informal names listed for *Cyathostemon* to seven (Western Australian Herbarium 1998–). Five of the *Cyathostemon* taxa with phrase names, *C. sp.* Dowak (J.M. Fox 86/271), *C. sp.* Esperance (A. Fairall 2431), *C. sp.* Jyndabinbin Rocks (K.R. Newbey 7689), *C. sp.* Lake King (M.E. & M.E. Trudgen 1462) and *C. sp.* Salmon Gums (B. Archer 769), belong to a complex that extends from north-west of the Stirling Range eastwards to the Great Australian Bight. Two named species, *C. ambiguus* (F.Muell.) Rye & Trudgen and *C. tenuifolius*, are also members of the complex. There appears to be extensive hybridisation in this group, which is proving to be particularly difficult to resolve, and further investigation is needed to ensure that any hybrids are recognised as such rather than being treated as distinct species or subspecies.

Cyathostemon sp. Red Roo Rock (G.F. Craig 6896) is a very distinctive new species which cannot be addressed here because it is known from only a single collection. It differs from all of the other known members of the genus in having long peduncles that are only slightly shorter than the pedicels, and in having the stamens clustered into antipetalous groups.

Cyathostemon sp. Mt Dimer (C. McChesney TRL4/72) is also only known from one collection. It needs further investigation to determine how well differentiated it is from *C. verrucosus* Trudgen & Rye.

Table 1. Informal names previously included under *Astartea* that apply to *Cyathostemon*, indicating the year the phrase name was established.

Informal name	Year	New name
<i>A. sp.</i> Bungalbin Hill (K.R. Newbey 8989)	1996	<i>C. verrucosus</i> Trudgen & Rye
<i>A. sp.</i> Esperance (A. Fairall 2431)	1996	<i>C. sp.</i> Esperance (A. Fairall 2431)
<i>A. sp.</i> Fitzgerald (K.R. Newbey 10844)	1994	<i>C. gracilis</i> Trudgen & Rye
<i>A. sp.</i> Jyndabinbin Rocks (K.R. Newbey 7689)	1996	<i>C. sp.</i> Jyndabinbin Rocks (K.R. Newbey 7689)
<i>A. sp.</i> Mt Dimer (C. McChesney TRL4/72)	1996	<i>C. sp.</i> Mt Dimer (C. McChesney TRL4/72)
<i>A. sp.</i> Red Hill (K.R. Newbey 8462)	1996	<i>C. divaricatus</i> Trudgen & Rye

Methods

Methods used to record measurements and plot distribution maps are as described in the first paper in this series (Rye 2013b). Images of leaves and flower buds were taken with a Nikon Digital Camera Head (DS-5M) controlled by a DS Camera Control Unit (DS-L1). A line drawing of a fruit was augmented by digital shading.

Descriptions and key

All *Cyathostemon* species are glabrous shrubs and have opposite, decussate leaves with a short petiole. Their distinctly stalked, solitary, axillary flowers have five smooth or slightly ridged sepals, five widely spreading, more or less circular petals, 8–30 stamens, 0–12 staminodes and a largely inferior, 2- or 3-locular ovary with 1–9 ovules per loculus.

The broad, petaline-textured filaments are united, often for most of their length, into a persistent tube. Like the petals they are white or rarely pale pink. The tube may be more or less level around the summit or may be cut more deeply at some points around its circumference than at others, and is narrower

at the summit than at the base. Above the summit of the tube, the free filaments are usually arranged in an alternating sequence of longer and shorter ones, but with those opposite the petals longer on average than those opposite the sepals. Anthers are more or less basifixed, with a dorsal-subterminal to terminal connective gland, and dehisce by parallel, longitudinal slits.

The style base is deeply inserted into a cylindrical depression that reaches to the level of the placentas. Ovules (when more than two per placenta) are usually arranged in an arch. They are distinctly 2-toned, divided into a dark brown inner-basal portion and a larger, brown-translucent, outer-distal portion. The fruits are dehiscent and usually largely superior. The seeds are 1.3–2 mm long and irregularly obovoid to reniform, with the body somewhat to much narrower at the base than at the summit, and with a protrusion extending along the inner surface from near the base for 1/2 to 4/5 of the length of the seed. The testa is crustaceous and either colliculate or smooth.

Characters that are constant for the genus are not repeated in the species descriptions given below.

Key to the named species of *Cyathostemon*

- 1: Peduncles 4–6 mm long, longer than the pedicels. Ovary 2-locular, with 1 ovule in each locus (Fitzgerald River NP)..... **C. gracilis**
- 1: Peduncles 0.1–2.5 mm long, much shorter than the pedicels. Ovary 3-locular, with 2–9 ovules in each locus
 - 2: Stamens 8–15. Ovules 2 per locus. Fruit valves rounded and not forming a crest
 - 3: Fruits more than half-inferior. Occurring in the northern and central wheatbelt, almost entirely restricted to the South-West Botanical Province (Canna–Mt Madden)..... **C. heterantherus**
 - 3: Fruits largely superior. Occurring inland of the distribution of *C. heterantherus* in the Coolgardie IBRA region of the Eremaean Botanical Province
 - 4: Stems divaricately branched. Leaves with a petiole 0.6–1 mm long and with prominent oil glands scattered on the abaxial surface of the blade. Sepals 0.9–1.3 mm long (Kambalda area)..... **C. divaricatus**
 - 4: Stems branched at acute angles. Leaves with a petiole 0.3–0.5 mm long and with prominent oil glands densely covering the abaxial surface of the blade. Sepals 0.5–0.8 mm long (Bungalbin Hill area–Queen Victoria Rocks area)..... **C. verrucosus**
 - 2: Stamens 11–30. Ovules (2–)3–9 per locus, never uniformly 2 per locus. Fruit valves tending to be crested and forming a triangular ridge around the central depression that encloses the style base
 - 5: Leaves obovate to circular, much wider than thick, 2–5 mm wide. Ovules 5–9 per locus (Ongerup and Pallinup River to Israelite Bay)..... **C. blackettii**
 - 5: Leaves linear to narrowly obovate in outline, usually about as thick as wide, 0.7–1.8 mm wide. Ovules 2–5 per locus
 - 6: Leaves 1.2–1.8 mm wide (Stirling Range area–Israelite Bay)..... **C. ambiguus**
 - 6: Leaves 0.7–1(–1.2) mm wide (Stirling Range area–Israelite Bay)..... **C. tenuifolius**

Cyathostemon divaricatus Trudgen & Rye, *sp. nov.*

Typus: east of Kambalda West, Western Australia [precise locality withheld for conservation reasons], 9 August 1981, K.R. Newbey 8462 (*holo*: PERTH 04365623; *iso*: CANB, K, MEL, NSW).

Astartea sp. Red Hill (K.R. Newbey 8462), Western Australian Herbarium, in *FloraBase*, <http://florabase.dpaw.wa.gov.au> [accessed 21 July 2013]; G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* 346 (2000).

Shrub often low and spreading and then 0.3–0.5 m high, 0.5–0.75 m wide, but reportedly up to 1 m high, divaricately branched; young branchlets somewhat tuberculate at first, with very marked below-leaf flanges and densely arranged, mostly widely spreading leaves. *Petioles* 0.6–1 mm long. *Leaf blades* linear in outline, terete or slightly flattened adaxially, 2–4.5 mm long, 0.5–0.7 mm wide, 0.5–0.7 mm thick, obtuse; abaxial surface with scattered, large, raised oil glands resulting in a tuberculate surface; adaxial surface without tubercles. *Inflorescence* of 1–4 pairs of flowers on each branchlet. *Peduncles* 0.2–0.5 mm long. *Bracteoles* persistent, 0.6–0.8 mm long, 0.3–0.4 mm wide from side view, acute, scarious, brown and gland-dotted along midrib and paler on margin. *Pedicels* 2.5–4 mm long. *Flowers* 5–8 mm diam. *Hypanthium* 0.8–1.4 mm long, 2.2–3.5 mm wide; free portion *c.* 0.2 mm long. *Sepals* 0.9–1.3 mm long, 1.2–1.9 mm wide, with a herbaceous thickened centre and scarious margin. *Petals* 1.7–3 mm long, white tinged with pink. *Androecium* of 10–15 stamens and often several staminodes, in a circle with long and short ones tending to alternate; filaments connate for most of their length, 0.7–1.2 mm long. *Anthers* 0.3–0.5 mm long, 0.4–0.6 mm wide, with gland very prominent on back of anther. *Ovary* 3-locular; ovules 2 per loculus, collateral, \pm diagonally divided into two colour zones. *Style* cylindrical, 1–1.2 mm long; stigma *c.* 0.15 mm diam. *Fruits* largely superior, *c.* 2 mm long, *c.* 2.5 mm wide, 1–3-seeded, as far as known producing a maximum of 1 seed in each loculus; hypanthium 3-lobed; summit smoothly rounded (not crested), with some large, slightly raised oil glands. *Seeds* irregularly obovoid-reniform, *c.* 1.6 mm long, *c.* 0.7 mm deep; testa medium brown, colliculate; inner protrusion extending more than 2/3 of distance to top of seed. (Figure 1A)

Diagnostic features. *Stems* divaricately branched. *Petioles* 0.6–1 mm long. *Leaf blades* 2–4.5 mm long, 0.5–0.7 mm diam., with scattered prominent oil glands. *Peduncles* 0.2–0.5 mm long. *Pedicels* 2.5–4 mm long. *Sepals* 0.9–1.3 mm long. *Petals* 1.7–3 mm long. *Stamens* 10–15. *Ovary* 3-locular, with 2 ovules in each loculus. *Style* 1–1.2 mm long. *Seeds* *c.* 1.6 mm long, irregularly obovoid-reniform; testa medium brown, colliculate.

Other specimens examined. WESTERN AUSTRALIA [localities withheld for conservation reasons]: 21 Apr. 1996, R. Davis RD 591 (PERTH); 30 Apr. 1993, V. English VE 1119 (AD, PERTH); 7 Sep. 1952, D. Kemsley *s.n.* (MEL, PERTH); 10 June 2013, A. Sleep AS 79-01 (PERTH).

Distribution and habitat. Occurs on rocky hill slopes near Kambalda in the South-western Interzone (Figure 2), with one record from a low mixed shrubland of *Eremophila clarkei*, *Thryptomene australis* etc. over annual Asteraceae and grass species, and another record from ‘*Acacia resinomarginea* scrub’.

Phenology. Flowers recorded from April to May and from August to September. Mature fruits and seeds recorded in late April.

Conservations status. Listed by Smith (2013) as Priority One under Department of Parks and Wildlife Conservation Codes for Western Australian Flora, as *Astartea* sp. Red Hill (K.R. Newbey 8462). The known range of this taxon is *c.* 12 km long.

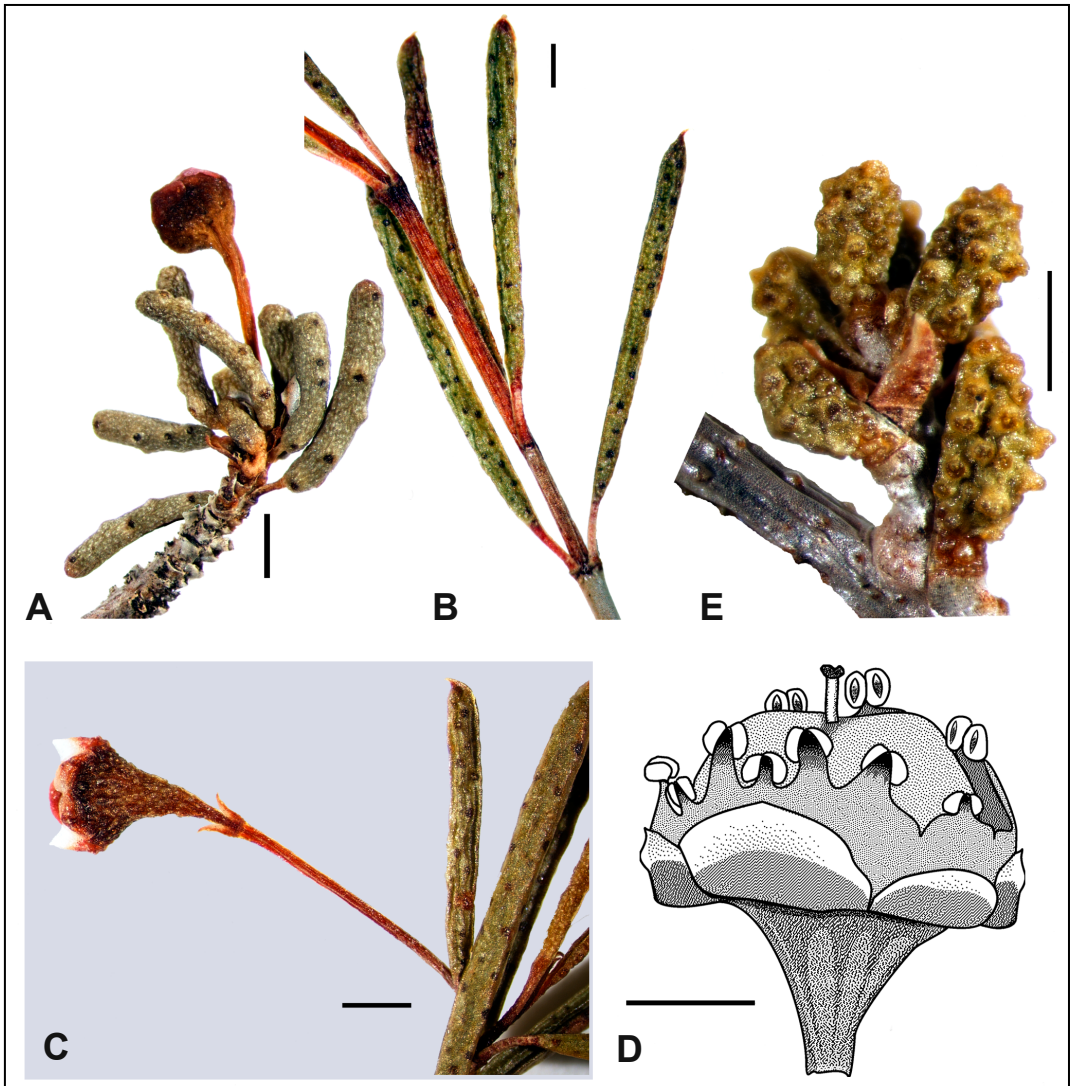


Figure 1. *Cyathostemon* images. A – leaves and flower bud of *C. divaricatus*; B,C – leaves and flower bud of *C. gracilis*, D – compressed fruit of *C. gracilis* viewed from an angle showing its full width; E – leaves of *C. sp.* Mt Dimer (C. McChesney TRL4/72). Prepared by Alex Williams from *K.R. Newbey* 8462 (A), *N. McQuoid* 321 (B–D) and *C. McChesney* TRL 4/72 (E). Scale bar = 1 mm.

Etymology. From the Latin *divaricatus* (spread apart, widely spreading, forked), referring to the plant's divaricate branching pattern.

Affinities. This species appears to be closely related to *C. verrucosus* but occurs south-east of the range of that species and has more terete leaves with more scattered oil glands. It also tends to have more numerous stamens.

Notes. *Cyathostemon divaricatus* occurs on the margin of the known distribution of the genus. The few available specimens give no indication as to whether or not the species has a lignotuber, but it appears to be unique in having a divaricate branching pattern, rather than branches at acute angles as in other members of the genus.

Cyathostemon gracilis Trudgen & Rye, *sp. nov.*

Typus: Fitzgerald River Reserve, Western Australia [precise locality withheld for conservation reasons], 26 April 1969, *A.S. George* 9293 (*holo*: PERTH 04270223; *iso*: CANB, K, MEL, NSW).

Astartea sp. Fitzgerald (K.R. Newbey 10844), Western Australian Herbarium, in *FloraBase*, <http://florabase.dpaw.wa.gov.au> [accessed 21 July 2013]; G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* 346 (2000).

Shrub usually 0.25–0.5 m but up to 0.7 m high, slender or up to 0.6 m wide, single-stemmed at base; young branchlets very slender, with below-leaf flanges only slight, with a usually dense arrangement of antrorse to widely spreading leaves. *Petioles* 0.8–1.3 mm long. *Leaf blades* linear in outline, 8–13 mm long, 0.5–1 mm wide, 0.4–0.7 mm thick, with very narrow translucent margins and a recurved apical point, smooth, dotted with small, dark oil glands; abaxial surface deeply convex; adaxial surface somewhat channelled; apical point up to 0.4 mm long, whitish. *Inflorescence* of 1 or 2 pairs of flowers most often at base of each branchlet, the subtending leaves sometimes reduced to small bracts similar to the bracteoles but more persistent and tending to be somewhat larger. *Peduncles* 4–6 mm long. *Bracteoles* deciduous or persistent, 0.4–0.7 mm long, 0.15–0.3 mm wide, scarious or herbaceous, acute. *Pedicels* 1.2–2.8 mm long. *Flowers* 4–5.5 mm diam. *Hypanthium* 0.7–1.3 mm long, 2.5–3 mm wide, smoothly 5-ridged; free portion *c.* 0.2 mm long. *Sepals* 0.6–0.9 mm long, 1.3–1.6 mm wide, with an herbaceous base and broad scarious margin, tinged with deep pink or red. *Petals* 1.7–2.3 mm long, white. *Androecium* of 11–14 stamens and occasionally a few staminodes; filaments connate for almost their full length in ring, longest ones most often antisepalous, 0.7–1 mm long. *Anthers* very unequal, 0.2–0.3 mm long, 0.4–0.6 mm wide. *Ovary* 2-locular; ovules 1 per loculus, almost transversely divided into the two colour zones. *Style* cylindrical, 0.5–0.6 mm long; stigma less than 0.1 mm diam. *Fruits* largely superior, somewhat compressed, *c.* 2 mm long, *c.* 2.6 mm wide, *c.* 1.6 mm thick, usually with only 1 fully developed seed, rarely 2-seeded; summit somewhat rugose, distinctly crested right across the 2 valves except for a dip at the centre between them, with scattered large glands forming shallow pits. *Seeds* very irregularly obovoid, broad at summit and very narrow at base with a large concavity, 1.6–1.8 mm long, 0.8–1 mm wide, 0.7–1 mm deep; testa yellowish, smooth, with an extremely fine reticulate pattern; inner protrusion 1/2 or more than 1/2 as long as seed. (Figure 1B–D)

Diagnostic features. *Young stems* very slender. *Petioles* 0.8–1.3 mm long. *Leaf blades* 8–13 mm long, 0.5–1 mm wide, 0.4–0.7 mm thick, fairly smooth. *Peduncles* 4–6 mm long. *Pedicels* 1.2–2.8 mm long. *Sepals* 0.6–0.9 mm long. *Petals* 1.7–2.3 mm long. *Stamens* 11–14. *Ovary* 2-locular, with 1 ovule in each loculus. *Style* 0.5–0.6 mm long. *Seeds* 1.6–1.8 mm long, broad at summit and very narrow at base with a large concavity; testa yellowish, smooth.

Other specimens examined. WESTERN AUSTRALIA [localities withheld for conservation reasons]: 16 Oct. 1995, *A.R. Bean* 9071 (PERTH); 16 Nov. 2008, *M. Bennett* 1212 (PERTH); 13 Oct. 1991, *S. Gourley* 91/290 (PERTH); 21 Oct. 1992, *N. McQuoid* 321 (PERTH); 23 Sep. 1984, *K.R. Newbey* 10844 (AD, BRI, PERTH); 11 Sep. 1986, *K.R. Newbey* 11136 (DNA, PERTH); 18 Oct. 1997, *Peter G. Wilson* 1404 & *N. Lam* (PERTH); 10 Aug. 2003, *Peter G. Wilson* 1644 & *G.M. Towler* (PERTH); 27 Aug. 1965, *E. Wittwer* 402 (PERTH).

Distribution and habitat. Endemic to the South-West Botanical Province, known from a small area in Fitzgerald River National Park (Figure 2). Recorded from sandy soils on fairly flat ground, for example on a sandy plateau above a river, often occurring in *Eucalyptus tetragona* mallee shrublands.

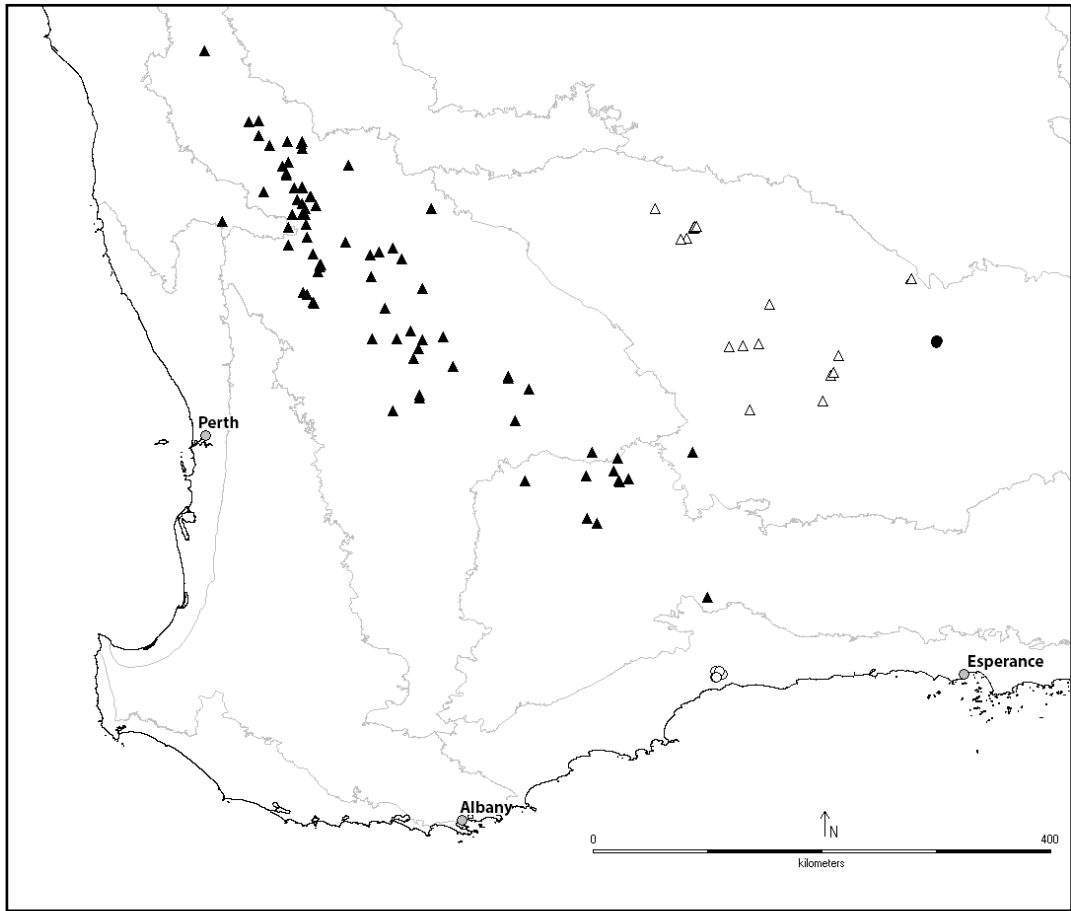


Figure 2. Distribution map. *Cyathostemon divaricatus* (●), *C. gracilis* (○), *C. heterantherus* (▲) and *C. verrucosus* (△).

Phenology. Flowering is recorded in April and from August to October. Mature fruits and seeds recorded in late September and in October.

Conservation status. Listed by Smith (2013) as Priority Two under Department of Parks and Wildlife Conservation Codes for Western Australian Flora, as *Astartea* sp. Fitzgerald (K.R. Newbey 10844). Being non-lignotuberous, this species is presumably readily killed by fires. It is geographically restricted but is protected within a large national park.

Etymology. From the Latin *gracilis* (slender), referring to the very slender growth form, stems and leaves.

Affinities. This very distinctive species has no obvious very close relatives. It has very slender stems with scarcely protruding prominences below the petioles, small petals and a particularly short style. It is unique in the genus in having long peduncles that far exceed the length of the pedicel, and a 2-locular ovary with only one ovule in each loculus. The seed of *C. gracilis* is also distinctive, with its very large basal concavity and smooth yellow testa. It is derived from an ovule that has the division into the dark and pale zones closer to transverse (i.e. less oblique) in comparison with other species, a factor perhaps related to the seed's very narrow base.

Cyathostemon verrucosus Trudgen & Rye, *sp. nov.*

Typus: north-east of Bungalbin Hill, Western Australia [precise locality withheld for conservation reasons], 23 September 1981, *K.R. Newbey* 8989 (*holo*: PERTH 04367316; *iso*: CANB, K, MEL, NSW).

Astartea sp. Bungalbin Hill (K.R. Newbey 8989), Western Australian Herbarium, in *FloraBase*, <http://florabase.dpaw.wa.gov.au> [accessed 21 July 2013]; G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* 345 (2000).

Low spreading *shrub*, 0.2–0.4 m tall, 0.3–0.65 m wide, often many-branched at ground level but with no lignotuber; young branchlets with very marked below-leaf flanges, sparsely tuberculate to smooth, with densely arranged, appressed to moderately spreading leaves. *Petioles* 0.3–0.5 mm long. *Leaf blades* narrowly oblong to very narrowly obovate in outline, 2–4.5 mm long, 0.5–0.7 mm wide 0.5–0.8 mm thick, obtuse and usually with a very small mucro, with large glands producing a warty or sometimes prominently tuberculate surface, often glaucous; abaxial surface deeply convex; adaxial surface fairly flat. *Inflorescence* with 1–4 pairs of flowers on each branchlet. *Peduncles* 0.1–0.3 mm long. *Bracteoles* persistent, 0.4–1.4 mm long, 0.25–0.4 mm wide, largely scarious, apex hooded. *Pedicels* 1.5–4 mm long. *Flowers* 5.5–7.5 mm diam. *Hypanthium* 1–1.3 mm long, 2–2.5 mm wide; adnate portion rugose with scattered oil glands and sometimes also irregular longitudinal ribs; free portion *c.* 0.2 mm long. *Sepals* 0.5–0.8 mm long, 1.1–1.5 mm wide, scarious, often pink-tinged. *Petals* 2.3–3.3 mm long, white. *Androecium* of 8–12 stamens and sometimes 1 or 2 staminodes in an irregular ring, tending to have alternating long and short stamens, sometimes with some stamens in close pairs and others more widely separated around the circle; filaments connate for most of their length, 0.9–1.4 mm long. *Anthers* 0.25–0.3 mm long, *c.* 0.4 mm wide. *Ovary* 3-locular but sometimes only one loculus developing in fruit; ovules 2 per loculus or rarely reduced to 1 in one of the three loculi, collateral, ± diagonally divided into two colour zones. *Style* cylindrical, 1–1.3 mm long; stigma up to 0.1 mm diam. *Fruits* largely superior, 2–2.3 mm long, 1.7–2.5 mm wide, usually 3-lobed but somewhat lop-sided if not all loculi produce a seed, 1–3-seeded, with a maximum of 1 seed observed in each loculus; summit often with a pronounced reticulate pattern of large, shallow pits, not crested. *Seeds* irregularly obovoid, 1.6–2 mm long, *c.* 0.8 mm thick; testa golden brown, colliculate; inner protrusion extending *c.* 2/3 of distance to top of seed.

Diagnostic features. *Young stems* sometimes sparsely tuberculate. *Petioles* 0.3–0.5 mm long. *Leaf blades* 2–4.5 mm long, 0.5–0.7 mm wide, 0.5–0.8 mm thick, with large glands producing a warty or sometimes prominently tuberculate surface. *Peduncles* 0.1–0.3 mm long. *Pedicels* 1.5–4 mm long. *Sepals* 0.5–0.8 mm long. *Petals* 2.3–3.3 mm long. *Stamens* 8–12. *Ovary* 3-locular, with 2 ovules in at least two of the loculi. *Style* 1–1.3 mm long. *Seeds* 1.6–2 mm long, irregularly obovoid; testa golden brown, colliculate.

Selected specimens examined. WESTERNAUSTRALIA [localities withheld for conservation reasons]: 8 Aug. 1964, *A.M. Ashby* 932 (AD); 4 July 1965, *A.M. Ashby* 1465 (AD, PERTH); 9 Mar. 1970, *E.M. Bennett* 3271 (PERTH); 2 Oct. 1991, *R.J. Cranfield* 8139 (PERTH); 8 Sep. 1989, *R.J. Cranfield* & *P.J. Spencer* 7782 (PERTH); 17 Sep. 1966, *A.S. George* 8049 (PERTH); 26 Apr. 2003, *M. Hislop* 2950 (PERTH); 15 Oct. 1997, *N. Lam* & *Peter G. Wilson* *s.n.* (PERTH 07085257); 23 Sep. 1979, *K.R. Newbey* 6081 (PERTH); 25 Sep. 1979, *K.R. Newbey* 6097 (PERTH); 9 Sep. 1968, *M.E. Phillips* *s.n.* (PERTH 04367367); 6 Nov. 2004, *B.L. Rye* 241194 & *M.E. Trudgen* (PERTH); 9 Mar. 1970, *M.D. Tindale* 51 & *E.M. Bennett* (PERTH); 4 Oct. 1961, *J.H. Willis* *s.n.* (MEL).

Distribution and habitat. Occurs in the South-western Interzone (Coolgardie IBRA region), extending from the Bungalbin Hill area in the north to Kalgoorlie in the east and to south of Southern Cross (Figure 2). Found on yellow sand plains, recorded in shrublands, sometimes dominated by mallees or *Banksia*.

Phenology. Flowers mainly from late September to early December, also recorded in early March. Mature fruits and seeds recorded from October to December.

Conservation status. Listed by Smith (2013) as Priority Three under Department of Parks and Wildlife Conservation Codes for Western Australian Flora, as *Astartea* sp. Bungalbin Hill (K.R. Newbey 8989). This species is known from more than ten localities over an area extending c. 180 km.

Etymology. From the Latin word *verrucosus* (covered with warts), in reference to the warty appearance of the leaves on dried material.

Affinities. *Cyathostemon verrucosus* appears to have the shortest peduncles in the genus. It was previously confused with *C. heterantherus* (C.A.Gardner) Rye & Trudgen, but is distinguished by many characters including its more rugose leaves, its smaller flowers with the stamens in a more continuous ring (rather than concentrated into five antisepalous groups) and its largely superior fruit with usually fewer seeds. The two taxa are geographically separated (Figure 2), with *C. verrucosus* occurring inland of the range of *C. heterantherus*.

Notes. This species overlaps in range with several other species of *Cyathostemon* but, as far as is known, it never occurs with any of those species. Its leaves are densely covered by warts, which sometimes protrude to form tubercles similar to, but not as prominent as, the tubercles (Figure 1D) on the single specimen currently housed as *C. sp.* Mt Dimer (C. McChesney TRL4/72).

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References

- Domin, K. (1923). New additions to the flora of Western Australia. *Věstník Královské České Společnosti Nauk, Třída Matematiko-Přírodovědecké* 1921/22, 2: 1–125.
- Mueller, F.J.H. von (1864). Myrtaceae. In: *Fragmenta phytographiae Australiae*. Vol. 4. pp. 51–77. (Government Printers: Melbourne.)
- Niedenzu, F.J. (1893). Myrtaceae. In: Engler, A. & Prantl, K. (eds). *Die natürlichen pflanzenfamilien*. Vol. 3. pp. 57–105. (Englelmann: Leipzig.)
- Rye, B.L. (2013a). A revision of the south-western Australian genus *Astartea* (Myrtaceae: Chamelaucieae). *Nuytsia* 23: 189–269.
- Rye, B.L. (2013b). An update to the taxonomy of some Western Australian genera of Myrtaceae tribe Chamelaucieae. 1. *Calytrix*. *Nuytsia* 23: 483–501.
- Rye, B.L. & Trudgen, M.E. (2008). *Seorsus*, new Gondwanan genus of Myrtaceae with a disjunct distribution in Borneo and Australia. *Nuytsia* 18: 235–257.
- Rye, B.L. & Trudgen, M.E. (2012). Seven new combinations for Western Australian members of Myrtaceae tribe Chamelaucieae. *Nuytsia* 22: 393–398.
- Smith, M.G. (2013). *Threatened and Priority Flora list for Western Australia*. (Department of Parks and Wildlife: Kensington, Western Australia.)

- Turczaninow, N. (1852). Myrtaceae xerocarpicae, in Nova Hollandia. *Bulletin de la Classe Physico-Mathématique de l'Académie Impériale des Sciences de Saint-Petersbourg* 10: 394–428.
- Western Australian Herbarium (1998–). *FloraBase—the Western Australian Flora*. Department of Parks and Wildlife. <http://www.dpaw.wa.gov.au/> [accessed 26 February 2014].