

New combinations and lectotypifications for the south-western Australian genus *Astartea* (Myrtaceae)

Barbara Rye

Western Australian Herbarium, Department of Environment and Conservation,
Locked Bag 104, Bentley Delivery Centre, Western Australia 6983

Abstract

Rye, B.L. New combinations and lectotypifications for the south-western Australian genus *Astartea* (Myrtaceae). *Nuytsia* 16(1): 149–156 (2006). Three new combinations, *Astartea affinis* (Endl.) Rye, *A. arbuscula* (Benth.) Rye and *A. astarteoides* (Benth.) Rye, are made for species that were initially described in the genus *Baeckea* L. Lectotypes are selected for two of the base names, *Baeckea affinis* Endl. (including its synonym *Astartea endlicheriana* Schauer *nom. illeg.*) and *B. astarteoides* Benth., and also for *Astartea laricifolia* Schauer.

Introduction

Astartea DC. is a south-western Australian genus of the Myrtaceae that was named by De Candolle (1828) based on the single species *A. fascicularis* (Labill.) DC. De Candolle distinguished the genus from *Baeckea* L. by its stamens being in bundles opposite the sepals. A second species with antisepalous stamen bundles was named *Baeckea affinis* by Endlicher (Endlicher *et al.* 1837), a third as *Astartea laricifolia* by Schauer (1843) and five others, including *A. corniculata* Schauer and *A. scoparia* Schauer, shortly afterwards (Schauer 1844).

In his treatment of the Myrtaceae for “Flora Australiensis”, Bentham (1867) named two more species that are now considered to belong in *Astartea*, but placed both of them in *Baeckea* because their stamens were so reduced in number that there were no obvious stamen bundles opposite the sepals. He did, however, recognise the morphological similarity of one of these species to *Astartea* by naming it *Baeckea astarteoides* and he stated that *Astartea* only differed “from the section *Schidiomyrtus* of *Baeckea* in the stamens more or less united at the base opposite the calyx-lobes”^{*}.

In fact, *Astartea s. str.* can be readily distinguished from *Baeckea s. str.* by differences in its stamens and seeds. Any difficulties in separating *Astartea* and *Baeckea* in the past have resulted from the inclusion in both genera of species that did not belong. Most of the anomalous species that have been placed in *Astartea* belong to the genus *Cyathostemon* Turcz., which needs to be reinstated; the others, including one from the Northern Territory, belong to a new genus. Two papers (Rye & Trudgen in prep., Trudgen & Rye in prep.) are now being prepared to remove these species from *Astartea* and reduce its circumscription to that used in early publications up to and including Turczaninow (1852).

^{*}*Baeckea* sect. *Schidiomyrtus* (Schauer) F. Muell. is no longer recognised. Bean (1998) listed it, together with its base name *Schidiomyrtus* Schauer, in synonymy under *Baeckea s. str.*

The only recent taxonomic treatments of *Astartea* have been in two regional floras for Western Australia, "Flora of the Perth Region" (Rye 1987) and "Flora of the South West" (Wheeler *et al.* 2002). In the former treatment, all material of *Astartea* from the Perth region was included under the name *Astartea fascicularis*, but the need for additional species to be recognised in the genus was noted. *Baeckea astarteoides* (listed as a synonym of *A. fascicularis* s. lat.) was regarded as part of the genus *Astartea* on the advice of M.E. Trudgen. The other treatment, Wheeler *et al.* (2002), covered the region with the highest density of *Astartea* species. In that flora eight informal names were used based on a preliminary sorting of the specimens into taxa by M.E. Trudgen (pers. comm.) and a ninth species, *Baeckea arbuscula*, was included with the note that this taxon was expected to be transferred to the genus *Astartea*.

Molecular data (Lam *et al.* 2002, Peter Wilson pers. comm.) support the morphological evidence in placing the two species described by Bentham (1867), i.e. *Baeckea arbuscula* and *B. astarteoides*, in the genus *Astartea*.

Astartea is now considered to include over 20 species and is endemic to Western Australia, with its maximum development in the highest rainfall zones of the south-west. Most species occur in or around winter-wet depressions, along watercourses, or in seasonally damp sites associated with granite outcrops or other rocky habitats. They range from dwarf shrubs in low swamp heath (e.g. *A. arbuscula*) to 5 m trees on the banks of seasonally fast-flowing rivers (*A. leptophylla* Schauer). Despite showing a great variation in plant size, the genus is remarkably constant in some aspects of the morphology of its leaves, flowers and seeds. *Astartea* appears to be a natural but taxonomically difficult genus, with many similar species resulting from a relatively recent radiation.

In the current study of *Astartea*, commenced in the latter part of 2002, type material was examined to ascertain the correct application of the available names, most of which had been reduced to synonymy by Bentham (1867). This paper presents the new combinations and lectotypifications that were found to be needed for *Astartea*. This will bring the available names into use prior to the completion of a taxonomic revision of this difficult genus, which must await further field work.

Formal taxonomy

The species listed below are all known from many locations, including some with large populations, and are not currently considered to be threatened.

Astartea affinis (Endl.) Rye, *comb. nov.*

Baeckea affinis Endl. in S.L. Endlicher, E. Fenzl & G. Bentham, *Enum. Pl.* 51 (1837). – *Astartea endlicheriana* Schauer *nom. illeg.*, *Linnaea* 17: 242 (1843). Type: "King George Sound" [actually probably collected near Perth, Western Australia, November–December 1833], C.A. von Hügel (*lecto*: W n.v., photograph seen, left specimen of sheet here selected); central and right specimens on the sheet bearing the lectotype (*lectopara*: W n.v., photograph seen).

?*Leptospermum dubium* Spreng. *nom. dubium*, *Syst. Veg.* 2, 492 (1825). Type citation: Nov. Holl. (n.v.).

Selected specimens examined. WESTERN AUSTRALIA: "ex horto bot. Petropolitano", Anon. (K); Yallingup, Dec. 1930, W.E. Blackall s.n. (PERTH); Twin Swamp Wildlife Sanctuary, Reserve 27621 in the

Ellensbrook to Bullsbrook area, 13 Jan. 1972, *N.T. Burbidge* 7949 (PERTH); Bowelling–Duranillan road, between Trigwell Bridge Rd and Wunnenberg Rd, SW of Bowelling, 27 Nov. 1994, *V. Crowley* DKN 426 (PERTH); Picton Junction, Nov. 1900, *L. Diels & E. Pritzel* s.n. (PERTH); Brixton Rd, Beckenham, Perth, 19 Nov. 1982, *G.J. Keighery* 5389 (PERTH); Chester Forest Block, between Augusta and Nannup, 34°11' S, 115°20' E, 31 Dec. 1990, *G.J. Keighery* 13463 (PERTH); Bartram Rd swamps, Jandakot, 21 Feb. 1992, *G.J. Keighery* 12756 (PERTH); lower Canning River, 2 Jan. 1899, *R. Helms* s.n. (PERTH); Pinjarra, Nov.–Dec. 1877, *F. Mueller* (MEL 75995); Preston River, 8 Dec. 1877, *F. Mueller* (MEL 76007); Wellington district, Dec. 1900, *E. Pritzel* 87 (AD); Mooliabeenee, E of Gingin, 15 Dec. 1953, *R.D. Royce* 4745 (PERTH); South Western Hwy, 0.3 km N of Wealand Rd, N of Waroona, 1 Dec. 2002, *B.L. Rye* 221202 (PERTH); Waterloo, 33°20' S, 115°45' E, 20 Dec. 1984, *Paul G. Wilson* 12148 (PERTH).

Distribution. Occurs in winter-wet depressions on the Swan Coastal Plain from near Gingin south to Yallingup, extending inland to near Bowelling.

Phenology. Flowering is mainly in spring and early summer, from late October to early January, but with spasmodic records through to mid April.

Lectotypification. Schauer (1844) based his illegitimate name *Astartea endlicheriana* on two previously published names, *Leptospermum dubium* Spreng. and *Baeckea affinis* Endl., and hence a lectotype needs to be selected for Schauer's name. As Schauer named the species after Endlicher and saw the specimen Endlicher had based his species on, but did not see any material of *L. dubium*, the type of *B. affinis* is clearly the appropriate one to select as the lectotype of *A. endlicheriana*.

Photographs were examined of three W specimens of *Astartea* collected from the Swan River Colony by Hügel between November 1833 and January 1834. All were labelled as coming from King George Sound and were therefore considered to be possible type material of *Baeckea affinis*. Only one of these three sheets bore material that appeared to match the protologue of *Baeckea affinis*; this sheet was also the only one to match the description of *Astartea endlicheriana* *nom. illeg.* This sheet bears three pieces of *Astartea*, one of which has larger leaves than the other two and appears to have been collected from a different plant individual, but all appear to be of the same species. The label identifies the material as "*Astartea endlicheriana* Schauer" and directly below this as "*Baeckea affinis* n. sp.". No PERTH specimens of *Astartea* from King George Sound could be found that matched this material, but there are similar specimens from near Perth, where Hügel made collections between 17 November and 19 December 1833 before sailing to King George Sound and making further collections in early January 1834 (Endlicher *et al.* 1837). Evidently the locality given on the type sheet is incorrect.

Specimens on the other two W sheets of *Astartea* did appear to match material from King George Sound. One of them, a sheet bearing a single piece with dense clusters of leaves apparently separated by broadly winged stems, was identified as probably *Astartea laricifolia*. The other sheet, bearing three pieces with short leaves mostly in clusters, could not be identified with any certainty from the photograph as the flowers were not sufficiently clear.

As noted above, three pieces of *Astartea* are attached to the W sheet believed to have been collected from the Perth area. The left piece, which has long linear leaves, is selected as the lectotype because it is the best fit for the protologue, which described the species as having a general appearance similar to that of *Baeckea linifolia* Rudge. The other two pieces, with somewhat shorter leaves, are here treated as lectoparatypes although they may well have been collected from the same population. One recent collection of the species, *G.J. Keighery* 12756, has a similar combination of pieces attached, one kind

with long leaves similar to the lectotype and the other kind similar to the lectoparatype. The long-leaved piece also has much longer horns on the sepals.

Notes. Schauer (1843) based his illegitimate name *Astartea endlicheriana* on a previously published name, *Baeckea affinis* Endl., and on the misapplied name *Baeckea frutescens* Otto & Dietr. non L., and he later (Schauer 1844) listed an even earlier name, *Leptospermum dubium* Spreng., as a synonym of his illegitimate name. Although he did not see the type specimen, Schauer (1844: 115) considered *Leptospermum dubium* to be synonymous with *Astartea endlicheriana* [= *A. affinis*], because specimens of *A. affinis* were housed under the name *L. dubium* in several herbaria. If the earlier name *Leptospermum dubium* could be confirmed as applying to the same taxon as *Baeckea affinis*, the correct epithet for this *Astartea* species would be *dubia* rather than *affinis*. However, no type material of *Leptospermum dubium* was located in this study. Much of Kurt Sprengel's herbarium, apparently including the Myrtaceae, was acquired by Berlin (B) in 1890 and is no longer extant (Stafleu & Cowan 1985: 806). Since the protologue of *Leptospermum dubium* is too brief and lacking in detail to positively identify the species and the type apparently no longer exists, this name is regarded here as a *nomen dubium*.

A much more recent name for *Astartea affinis*, used for example in Wheeler *et al.* (2002), is '*Astartea* sp. Brixton Rd (G.J. Keighery 5389)'. Although once described as a *Baeckea*, this species has the antisepalous stamen bundles that characterise *Astartea*. It is a lignotuberous shrub up to 2 m tall, with white or pink flowers that are usually 6–9 mm in diameter. The flowers have slightly to prominently horned sepals, with the horn of the outer sepals 0.3–0.5(0.9) mm long, up to about 40 stamens, which are all or mostly in distinct bundles of 2–7(10), and a 3-locular ovary with 7–12 ovules per loculus. The fruit is a 3-valvate capsule with usually several seeds 0.7–0.9(1.1) mm long in each loculus.

Astartea arbuscula (R. Br. ex Benth.) Rye, *comb. nov.*

Baeckea arbuscula R. Br. ex Benth., Fl. Austral. 3, 79 (1867). *Type:* King George Sound, heaths between Oyster and Princess Royal Harbours, December 1801, R. Brown (*holo:* BM 00758991; *iso:* K, NSW 497662).

Selected specimens examined. WESTERN AUSTRALIA: Albany, Dec. 1902, C.R.P. Andrews *s.n.* (NSW); near Kalgan River, 5 Jan. 1902, C.R.P. Andrews 1276 (PERTH); Caldyanup Rd, between Frankland River and Collis Rd, Frankland National Park, 9 Feb. 1995, A.R. Annels 5299 & R.W. Hearn (PERTH); Pingerup Rd, 1.8 km from South West Coastal Hwy, 13 Feb. 1995, A.R. Annels 5309 (PERTH); King George Sound, Feb. 1899, B.T. Goadby (K, PERTH); 400 m along a track running NE through the Rudgyard Nature Reserve, Wilson Inlet, 28 Mar. 2000, B.G. Hammersley 2432 (PERTH); Thompson Rd, 5 Aug. 1994, R.W. Hearn 4385 (PERTH); 1 km W of Elleker, G.J. Keighery 8361 (PERTH); Boronia Rd, 0.2 km NW of Collis St, 4 Dec. 2002, B.L. Rye 221245 & R.W. Hearn (PERTH).

Distribution. Extends along the south coast from the Pingerup Plains area east to Kalgan River, occurring in the seasonally inundated parts of winter-wet flats, with any associated species of *Astartea* occurring more towards the margins of such areas.

Phenology. Flowering occurs mainly from late December to mid-March.

Conservation status. Perhaps mainly because of its small plant size and its very inconspicuous flowers, *Astartea arbuscula* was poorly collected until it was included [as *Baeckea arbuscula*] on the Western Australia's Declared Rare Flora list in 1982. Recent surveys have shown it to be much more common than

previously believed and it is now assigned a Conservation Code for Western Australian Flora of Priority Four (Atkins 2005), meaning that it has been adequately surveyed and is not currently threatened.

Notes. *Astartea arbuscula* is a dwarf shrub, 0.1–0.3(0.4) m tall, without a lignotuber, and has pale to deep pink flowers. The flowers are exceptionally small, only 1.5–2 mm diam., smaller than any other member of its own or related genera, and perhaps the smallest known in the Australian Myrtaceae. Associated with this extreme reduction in flower size is a very reduced stamen number of 4 or 5, with all stamens solitary opposite the sepals, and a 2-locular ovary with the adaxial loculus abortive and a solitary ovule in the abaxial loculus. The fruit is indehiscent, somewhat compressed and lop-sided, and has a solitary seed that is 0.6–0.7 mm long.

Astartea astarteoides* (Benth.) Rye, *comb. nov.

Baeckea astarteoides Benth., Fl. Austral. 3, 80 (1867). *Type:* inland from Cape Le Grand, [Western Australia], *G. Maxwell* (*lecto:* K, here designated; *isolecto:* MEL 72507). *Other material:* along the coast from Bremer Bay to Esperance, [Western Australia], *G. Maxwell* (*lectopara:* MEL 72508). *Excluded syntypes:* King George Sound, [Western Australia], December 1801–January 1802, *R. Brown* (BM 000758990); Lucky Bay, [Western Australia], January 1802, *R. Brown* (BM 000758988, K); damp rocky shores of King George Sound, [Western Australia], December 1821, *A. Cunningham* (K).

Selected specimens examined. WESTERN AUSTRALIA: just N of Thistle Cove, 21 Jan. 1966, *A.S. George* 7531 (PERTH); 12.5 km NNE of Mt Arid, Cape Arid National Park, 30 Oct. 1990, *G.J. Keighery* 11792 (PERTH); adjacent to Helm Arboretum, 17 km N of Esperance on the Norseman road, 24 Oct. 1979, *N.S. Lander* 1066 (PERTH); Cape Le Grand Rd, 4.3 km S of Merivale Rd, 11 Dec. 2003, *B.L. Rye* 231243 & *C.D. Turley* (PERTH); 45 km E of Esperance, *D.J.E. Whibley* 5450 (PERTH); Lake Rd, Esperance, 33°48'15" S, 121°53'09" E, 19 Oct. 1997, *Peter G. Wilson* 1407 & *N. Lam* (NSW, PERTH); Nares Island Beach, near parking area at the end of Nares Island Rd, 33°56'13" S, 121°35'14" E, 21 Oct. 1997, *Peter G. Wilson* 1414 & *N. Lam* (NSW, PERTH).

Distribution. Grows in sandy soils, mainly associated with winter-wet depressions, extending in near-coastal areas from Esperance east to Cape Arid National Park.

Phenology. The flowering time is mainly from late October to January.

Lectotypification. The five collections Bentham (1867) cited for this species belong to two very similar but geographically distinct species, with two King George Sound collections representing the western taxon and three collections (including the lectotype) from the Esperance area and Lucky Bay representing the eastern taxon. Material collected since the 1860s has extended the known range of the western taxon eastwards to east of Mt Manypeaks, but there remains a large disjunction of over 200 km between it and the eastern taxon.

Bentham (1867) noted that the Lucky Bay specimen collected by R. Brown had a much smaller style and stigma than the other specimens, and since this collection was singled out from the others it was not considered for selection as the lectotype. This specimen seems to be from a plant with effectively male flowers as the gynoecium appears to be abortive. The remaining four collections matched the protologue well. Of these four, the collection selected for lectotypification appeared to be the most suitable as it was of good quality and it was the only one that was known to be represented at more than one herbarium.

Selected specimens of the eastern taxon, for which the name *Astartea astarteoides* is now established, are cited above. The western taxon differs from *A. astarteoides* in having red markings on its seeds, and it forms part of a very variable complex that includes the type material of *Astartea glomerulosa* Schauer. Most members of this complex can be readily distinguished from *A. astarteoides* by their longer pedicels and peduncles and more numerous stamens, but the specimens cited by Bentham (1867) have lower stamen numbers than usual, falling within the range of stamen numbers observed in *A. astarteoides*. The western complex needs further study to determine the status of its variants.

Notes. *Astartea astarteoides* is a spindly non-lignotuberous shrub 0.4–1.5 m high, with small pink flowers 4.5–6 mm in diameter. It is tallest when growing in very dense shrubland with just a few slender flowering stems protruding from the dense foliage of other shrubs. Its flowers have 5–11 stamens, with a maximum of 3 opposite a sepal, and a 3-locular ovary with 6–8 ovules per loculus. The fruit is a 3-valvate capsule with usually several seeds 0.6–0.9(1.1) mm long in each loculus.

In flowers with as few as 5 stamens, at least one sepal has no stamen opposite it. Where 2 or 3 stamens occur opposite a sepal, they are usually not or only partially united into bundles. The occasional occurrence of antisepalous bundles is evidence that the general lack of such bundles in the taxon is purely a result of its marked reduction of stamen number in comparison with most members of the genus.

Astartea laricifolia Schauer in W.G. Walpers, *Repert. Bot. Syst.* 2, 922 (1843). – *Leptospermum laricifolium* A. Cunn. ex Schauer *nom. inval.* in W.G. Walpers, *Repert. Bot. Syst.* 2, 922 (1843). *Type:* "In paludosis ad Sinum Regis Georgii III" [King George Sound, Western Australia], 31 January 1818, A. Cunningham 81 (*lecto:* BM000758993, here designated; possible *isolecto:* BM000758994, 000758995).

Selected specimens examined. WESTERN AUSTRALIA: 18.5 km E of Walpole, track off Peaceful Bay Rd, Walpole Nornalup National Park, 19 Jan. 1989, A.R. Annels 664 (PERTH); King George Sound, 1828–1829, W. Baxter (BM000603454); 2.2 km S of NE corner of Yelverton Forest Block, 3 Dec. 1996, N. Casson & T. Annels SC 29.20 (PERTH); Brockman Hwy 9 km E of Sues Rd intersection, 10 Jan. 2001, R.J. Cranfield 16206, 16213 (PERTH); on Meerup River, 50 m N of old track, 34°39'14"S, 115°56'17"E, 27 Feb. 1997, C. Day & P. Ellery P 74.1A (PERTH); no locality, J. Drummond, [coll. 2?] n. 3 (MEL 76294); Mt Melville, Albany, 18 Dec. 1999, P. Foreman 160 (PERTH); Chester Pass, Stirling Range, 16 Jan. 1936, C.A. Gardner (PERTH); King George Sound, Jan. 1834, C.A. von Hügel (W); 23 km from Denmark on Walpole road, 28 Feb. 1986, G.J. Keighery 7964 (PERTH); Bow River, Dec. 1912, S.W. Jackson (NSW, PERTH); 1.3 km W of Angrove Rd/Centre Rd intersection, 34°55'S, 116°39'E, 13 Feb. 1997, C. McChesney & C. Day W 35.1 (PERTH); Broke Inlet Rd, 4.6 km E of Chesapeake Rd, 23 Jan. 2003, B.L. Rye 230176 & R.W. Hearn (PERTH); Thompson Rd 2.8 km N of Weld Rd, 23 Jan. 2003, B.L. Rye 230182 & R.W. Hearn (PERTH); Break Rd, 3.8 km W of Harewood Rd and 6.2 km E of Fernley Rd, 34°51'18"S, 117°09'49"E, 22 Jan. 2003, B.L. Rye 230145, R.W. Hearn & B.G. Hammersley (PERTH); W across inlet from Walpole township, 34°59'S, 116°43'E, 13 Feb. 1994, M.E. Trudgen 12044 (PERTH).

Distribution. Occurs in the extreme south-west corner of Western Australia, extending from Preston River south to Scott River and east to Albany.

Phenology. Flowering is recorded from early December to early March.

Lectotypification. The specimen chosen here as the lectotype has an erect much-branched stem on the left side of a sheet with mixed collections. Of the pieces labelled as being collected by Cunningham, the lectotype is the largest piece and the one with the most pronounced wings on its stems. The number

81 has been cut out and pasted upside down on its label so as to appear to read 18, but it is clear from the handwriting that it should be the other way up. The remainder of its label reads "*Desmia alata* nov. King George's Sound in King's 1st voyage Cunningham", with the date 1818 added in pencil.

The specimens cited above as possible isolectotypes have a total of six pieces of plant, all similar to one another but apparently taken from more weeping branches than the lectotype. They are presumably from a different individual in the same population as the lectotype. One further specimen (BM 00758992), mounted on the same sheet as the lectotype, is an earlier collection made in December 1801 and appears to be of a different species.

Notes. This species was identified by the unpublished name '*Desmia alata*' on labels on the isotype sheets, and it has been housed at PERTH under the phrase name '*Astartea* sp. wing tips (*M.E. Trudgen* 12044)', both names alluding to the very prominently winged young stems which distinguish *Astartea laricifolia* from other members of the genus. The species was briefly described and illustrated in Wheeler *et al.* (2002) under its phrase name.

Other notable characteristics of the species are its habitat, height and aromatic oils. *Astartea laricifolia* is restricted to very damp localities with tall vegetation and is often a very tall shrub, reaching a maximum height of about 5 metres. While volatile oils are characteristic of the genus as a whole and many other members of the Myrtaceae, *A. laricifolia* produces an exceptionally strong odour of aromatic oils when its leaves are crushed. The flowers are white, 5.5–8 mm in diameter, and have a 3-locular ovary with 13–16 ovules per loculus. The numerous stamens are in antisepalous bundles of 5–11, occasionally also with a solitary stamen opposite some of the petals. The fruit has usually several seeds 0.6–0.7 mm long in each loculus.

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