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Life on the rocks: *Darwinia sphaerica* (Myrtaceae: Chamelaucieae), a new species currently known from one granite outcrop

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SHORT COMMUNICATION

Western Australian members of the myrtaceous genus *Darwinia* Rudge *s. lat.* belong to sect. *Genetyllis* (DC.) Benth. & Hook.f. and number more than 60 species and subspecies (Western Australian Herbarium 1998–). They range from tiny-flowered, insect-pollinated species to spectacular bird-pollinated ones, with many species highly prized in cultivation. The best-known species are arguably the stunning mountain bells of the Stirling Range (see Keighery 1985), which have large, colourful bracts closely surrounding elongated flowers, but even species with small flowers tend to be very attractive when the flowers are massed into head-like clusters.

Geographically restricted or poorly known species are common in sect. *Genetyllis*: 43 are conservation-listed, including 16 as Threatened (Western Australian Herbarium 1998–; Smith & Jones 2018). The new species described below, which is only known from a single, highly localised population, may also merit listing as Threatened. It was relatively recently discovered, having been collected for the first time in 1998, with a phrase name allocated by one of us (RD) in 2007.

Darwinia sphaerica R.W.Davis & Rye, *sp. nov.*

Type: Canna, Western Australia [precise locality withheld for conservation reasons], 2 October 2018, *R. Davis & T. Hammer* RD 12923 (*holo*: PERTH 08171041; *iso*: K, MEL, NSW).

Darwinia sp. Canna (R. Davis 11241), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 24 October 2018].

Shrubs 0.35–0.5 m high, commonly 0.4–1.2 m wide, often multi-branched at base. *Young stems* glabrous, whitish and irregularly ribbed below each leaf base at first, becoming pale grey and rugose with protruding leaf bases after leaves shed, eventually with a dark outer bark that splits and is shed in strips. *Leaves* alternate, antrorse to patent when densely clustered on short lateral branchlets but becoming more spaced and ± appressed on older stems. *Petioles* 0.3–0.5 mm long, ± well-defined. *Leaf blades* ± narrowly obovate in outline, 3–4 mm long, 0.7–1.3 mm wide, 0.5–0.8 mm thick, concolorous, bright green, with a denticulate scarious rim usually 0.05–0.2 mm wide along margins and distal part of keel, obtuse, lacking an apical point. *Inflorescences* head-like, erect, ± spherical, 8–11 mm diam.,

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c. 30–50-flowered; inner involucral bracts leaf-like distally and bract-like at base, broadly or very broadly ovate, 2.5–3.5 mm long, green with broad clear-translucent to yellowish or whitish margins on the base, toothed; axis globular or broadly ovoid to depressed-ovoid. *Peduncles* 0–0.3 mm long. *Bracteoles* 2.5–3.5 mm long, persistent, with a winged keel. *Flowers* 2.5–3.5 mm diam., with a strong sweet scent. *Hypanthium c.* 2.5 mm long; adnate part *c.* 1.5 mm long, with 4–7 transverse rows of long-toothed, pale green flaps; free part 0.8–1 mm long, fairly dark green to dark purplish, minutely tuberculate, with groups of 3 radiating ribs directed towards centre and margins of each sepal. *Sepals* 5, inserted 0.4–0.5 mm below the petals and stamens, erect, depressed-ovate or -oblong to almost semicircular, 0.4–0.5 mm long, white, toothed. *Petals* 5, erect or slightly spreading, ovate or broadly ovate, 1–1.3 mm long, entire, white. *Stamens* 10, united in the basal 0.2–0.3 mm to the staminodes. *Antipetalous filaments* 0.4–0.5 mm long. *Anthers* 0.15–0.2 mm long, green to brown (not becoming very dark), releasing a greenish brown pollen mass. *Staminodes* 10, *c.* 0.7 mm long, simple, linear. *Ovary* 2-ovulate. *Style* 4–5 mm long, straight or gently curved (not uncinate), white to pale green; stigma capitate, small; substigmatic hairs 0.15–0.25 mm long, in a cylindrical belt 0.3–0.5 mm long. *Fruits* not seen at maturity. (Figure 1A, B)

Diagnostic features. Distinguished from other members of the genus by the following combination of characters: alternate leaves; erect, many-flowered, spherical inflorescences; 4–7 transverse rows of projections on the lower part of the hypanthium; white petals; green to brown anthers; and a white style 4–5 mm long, with substigmatic hairs 0.15–0.25 mm long.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 16 Oct. 2003, *G. Byrne* 577 (PERTH); 25 Sep. 2008, *M. Crowhurst* 307 (PERTH); 14 Sep. 2007, *R. Davis* 11241 (PERTH); 26 Oct. 1998, *G.J. Keighery & N. Gibson* 7128 (PERTH); 25 Aug. 2014, *K.R. Thiele* 5104 (PERTH).

Distribution and habitat. Apparently restricted to the Canna area in Western Australia's Avon Wheatbelt (Western Australian Herbarium 1998–), where it is recorded from a granite outcrop. Associated species include *Borya sphaerocephala*, *Melaleuca fulgens* and *Malleostemon tuberculatus*.

Phenology. Flowers recorded from late August to late October and immature fruits in October.

Conservation status. Listed by Smith and Jones (2018) as Priority Two under Conservation Codes for Western Australian Flora, under the name *D.* sp. Canna (R. Davis 11241). At its only known locality, *D. sphaerica* occurs in a conservation reserve and the population appears to be healthy.

Etymology. From the Latin *sphaericus* (globose, spherical), referring to the inflorescences being closer to a sphere than is usual for the genus.

Vernacular name. Canna Darwinia.

Affinities. *Darwinia sphaerica* shows many morphological similarities to *D.* sp. Morawa (C.A. Gardner 2662), which appears to be its closest relative. *Darwinia* sp. Morawa has more silvery leaves than *D. sphaerica* and also differs in the colour of its bracts and floral parts, including its red petals and style and dark purplish brown to black anthers (Figure 1C). In *D. sphaerica*, the style and petals are white and the anthers are of much paler green to brown tones (Figure 1B). *Darwinia* sp. Morawa has mostly shorter substigmatic hairs (0.1–0.15 mm long *cf.* 0.15–0.25 mm in *D. sphaerica*) and petals that are more cupped than those of *D. sphaerica*, with its sepals and petals inserted at about the

Figure 1. A – habitat of *Darwinia sphaerica* on granite, showing the species' low, widely spreading habit; B – top view of an inflorescence of *D. sphaerica* showing buds at the centre and the most mature flowers around the margin with white petals and a white style. Note that the involucral bracts are obscured in this view; C – top view of inflorescence of *D.* sp. Morawa (C.A. Gardner 2662), showing the protruding involucral bracts, and flowers with red petals and a red style. Images by R. Davis from *R. Davis & T. Hammer* RD 12923 (A, B) and *R. Davis & T. Hammer* RD 12925 (C).

same level rather than being distinctly separated. It also has an ovoid to broadly ovoid inflorescence in which the involucral bracts clearly protrude when viewed from above (Figure 1C) whereas the bracts in *D. sphaerica* are obscured because of the spherical shape of the inflorescence (Figure 1B). *Darwinia* sp. Morawa also tends to have larger bracts, bracteoles, sepals and stamens, but somewhat

shorter leaves. When the type collection of *D. sphaerica* was made, the plants were observed to be smaller and denser than those of *D.* sp. Morawa (at *R. Davis & T. Hammer* RD 12925) suggesting that there may also be a difference in habit between the two taxa. *Darwinia sphaerica* occurs within the geographic range of *D.* sp. Morawa but the two species do not co-occur.

Darwinia sphaerica and *D.* sp. Morawa belong to the same molecular clade as *D. purpurea* (Endl.) Benth. and several other species from the northern part of the South West Botanical Province (M. Barrett pers. comm.). Species in this group have numerous, densely clustered flowers that are borne above ground level, surrounded (but not hidden) by numerous involucral bracts less than 20 mm long, and have a prominently patterned hypanthium with 4–9 transverse rows of projections. The key given below is just for the members of this clade.

1. Inflorescences erect, spherical to broadly ovoid, 8–13 mm diam. including bracts (but not styles), with peduncles on a globular to depressed-ovoid inflorescence axis which is revealed when the fruits and bracts are shed

2. Inflorescences ± spherical, with outermost peduncles up to 0.3 mm long. Petals white. Style white; substigmatic hairs 0.15–0.25 mm long (Canna area) ..... **D. sphaerica**

2: Inflorescences ovoid to very broadly ovoid, with outermost peduncles 0.6–1.2 mm long. Petals red. Style red; substigmatic hairs 0.1–0.15 mm long (Morawa–Yalgoo) ..... **D.** sp. **Morawa**

1: Inflorescences usually pendulous at maturity, ± hemispherical, 13–40 mm diam. including bracts, with peduncles on a peltate inflorescence axis which is revealed when the fruits and bracts are shed

3. Mature style 14–17 mm long; substigmatic hairs in a belt 1.7–2.3 mm long. Petals 2.5–3 mm long. (Yalgoo area) ..... **D. masonii**

3: Mature style 4–11.5 mm long; substigmatic hairs in a belt 0.25–0.7 mm long. Petals 1.6–2 mm long.

4. Petals 1–2 mm long. Mature style 7.5–11.5 mm long

5. Leaf blades narrowly ovate in outline, 3.5–4 mm long. Mature style 10.5–11.5 mm long; substigmatic hairs in a belt 0.8–1 mm long. Occurring on laterite (Kirkalocka area) ..... **D.** sp. **Kirkalocka**

5: Leaf blades linear in outline, 5–12 mm long. Mature style 7.5–10 mm long; substigmatic hairs in a belt 0.6–0.7 mm long. Occurring mainly on granite (Westonia–Corrigin area) ..... **D.** sp. **Chiddarcooping**

4: Petals 1–1.3 mm long. Mature style 4–6 mm long

6. Longest leaf blades 2–6(–8) mm long; apical point absent or up to 0.3 mm long. Inner involucral bracts broadly ovate, usually longer than the outer involucral bracts. Occurring often on sandy or clayey soils, rarely on granite (Yalgoo area–central wheatbelt) ..... **D. purpurea**

6: Longest leaf blades 7–13 mm long; apical point always present, up to 0.5 mm long. Inner involucral bracts ± ovate, exceeded by the more leaf-like outer involucral bracts. Occurring on granite outcrops

7. Longest leaf blades 7–11 mm long; apical point 0.3–0.5 mm long. Style 4–5 mm long (Moora–Chittering area) ..... **D. acerosa**

7: Longest leaf blades 10–13 mm long; apical point 0.2–0.3 mm long. Style apparently *c.* 6 mm long (Corrigin area) ..... **D.** sp. **Corrigin**

Notes. When the flowers begin to open, the inflorescences have an attractive combination of bright green or lime-coloured bracts and white buds and flowers (Figure 1B). Greg Keighery (*G.J. Keighery & N. Gibson* 7128) recorded that the flowers had a sweet foetid smell and were visited by flies, while Kevin Thiele (*K.R. Thiele* 5104) recorded them to be very strongly honey-scented.

The relatively pale anther colour in *D. sphaerica* is notable in view of the occurrence of much darker anthers in a number of species with similarly sized white flowers but from other species groups, such as *D. capitellata* Rye, *D. diosmoides* (DC.) Benth. and *D. vestita* (Endl.) Benth.

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