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A new species that's worth its salt: *Verticordia elizabethiae* (Myrtaceae: Chamelaucieae), a salt-tolerant rarity from semi-arid Western Australia

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SHORT COMMUNICATION

When Alex George named *Verticordia halophila* A.S.George, a Featherflower associated with saline environments in the Coorow area, he noted that it was unusual for species of *Verticordia* DC. *s. lat.* to occur in this type of habitat (George 1991: 328). The new species described below also grows near salt lakes but occurs more than 200 km further inland than *V. halophila*. It was first collected in 1926 from a salt lake near Southern Cross by Charles Gardner, who identified it as *V. pennigera* Endl. Gardner's specimen remained the only collection until 1990, when three further collections were made. Elizabeth George treated the new taxon as a disjunct 'eastern' or 'inland' variant of *V. halophila*, noting that it differed from the western variant in being 'more rigid but lower, spreading to 40–45 cm wide' and in flowering more prolifically (George & Pieroni 2002: 318).

Two samples of each variant of *V. halophila sensu* George and Pieroni (2002) were sequenced for the External Transcribed Spacer (ETS) as part of a preliminary phylogenetic study of *Verticordia* and allies by one of us (MB). The samples consistently differed by a single substitution in *V. halophila s. str.*, resulting in an ETS haplotype shared with *V. blepharophylla* A.S.George, a species occurring closer to the west coast. While a single substitution by itself carries little weight, the fact that *V. blepharophylla* and *V. halophila s. str.* seemed to be more closely related than the disjunct, eastern variant of *V. halophila*, prompted a morphological review of *V. halophila*. Although genetic data instigated this study, the conclusions drawn here are based on consistent morphological differences that support the recognition of a new species, which we name after Elizabeth George.

Verticordia elizabethiae Rye & M.D.Barrett, *sp. nov.*

Type: Baladjie [precise locality withheld for conservation reasons], Western Australia, 23 November 2018, *J.A. Wege & R. Davis* JAW 2089 (*holo*: PERTH 09077928; *iso*: CANB, K, MEL, NSW).

Verticordia sp. Koolyanobbing (B.H. Smith 1457), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 1 May 2018].

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Low-growing *shrubs* 0.3–0.6 m high, 0.4–1.2 m wide, apparently without a lignotuber; flowering stems with floral leaves similar to stem leaves, the flowers usually borne at 1–4 crowded, consecutive nodes. *Petioles* ± absent. *Leaf blades* mostly ± obovate in outline (dorsiventrally compressed but quite thickly so), 1.5–2.25 mm long, 1–1.5 mm wide, 0.4–0.5 mm thick, usually grey-green, sometimes with pink margins, toothed around the distal margin, sometimes with a few scattered teeth lower down or with teeth extending almost to the base, with usually 2 rows of dark oil glands on each side of midvein, with 4–6 glands along the main (innermost) rows; terminal or subterminal (dorsal) point ± patent, 0.1–0.3 mm long. *Peduncles* 0.4–0.6 mm long. *Bracteoles* 1.8–3 mm long, caducous; subterminal (dorsal) point 0.35–0.5 mm long. *Flowers* 8–10 mm diam., 5-merous. *Hypanthium* 1.5–2 mm long, deep maroon, glabrous, with 5 prominent, rounded ribs; reflexed appendages 5, rounded, 0.5–0.6 mm long, bright green. *Sepals* 4–5 mm long, with base and main lobes deep maroon and the minor lobes or fringe pale pink, minutely scabrid on the outer surface of main lobes and on the margins of minor lobes; main lobes 4–6, usually 5; auricles fairly large, covering each rib of the free distal part of hypanthium but leaving most of the adnate part exposed, deeply fimbriate, white; fimbriae irregularly curved and tangled, up to *c.* 1 mm long. *Petals* inserted 0.3–0.5 mm above the insertion of the sepals, 2.5–3.5 mm long, bright pink or somewhat purplish pink, minutely scabrid on outer surface, lacking longitudinal veins or with very narrow, inconspicuous ones, toothed across a broad apex, without auricles; largest teeth 0.35–0.6 mm long. *Stamens* 10, all similar, alternating with staminodes. *Filaments* narrowly triangular, 1.2–1.6 mm long, pale pink. *Anthers* 0.35–0.4 mm long, elliptic in outline, deep maroon, dehiscing by slits running most of their length. *Staminodes* 10, united to stamens at base for 0.2–0.4 mm; free part 1–1.5 mm long, pale pink, with prominent oil glands on the triangular basal 1/2–2/3 below an attenuate distal point. *Ovules* 6, ± radially arranged in a horizontal plane on a basal placenta. *Style* gently to strongly curved, 3–4.5 mm long, glabrous except for substigmatic hairs in a cylindrical belt 0.6–0.8 mm long; lowest hairs 0.3–0.4 mm long, distally forked or multi-branched; uppermost hairs 0.1–0.2 mm long. *Fruits c.* 1.5 mm long, *c.* 1.6 mm diam., indehiscent; seed 5-angled from top view, *c.* 1.2 mm long, *c.* 1.3 mm across. (Figure 1)

Diagnostic features. Leaves grey-green, 1.5–2.25 mm long; peduncles 0.4–0.6 mm long; bracteoles 1.8–3 mm long, caducous; petals 2.5–3.5 mm long, dentate, with largest teeth 0.35–0.6 mm long; style 3–4.5 mm long; ovules 6.

Selected specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 30 Oct. 2006, *G. Byrne* 2469 (PERTH); 31 Mar. 1991, *K. Coate s.n.* (PERTH); 1 Dec. 1997, *R.J. Cranfield* 11648 (PERTH); 13 Dec. 1926, *C.A. Gardner s.n.* (PERTH); 18 May 2004, *M. Hislop & F. Hort* MH 3181 (PERTH); 15 Nov. 1990, *F.H. & M.P. Mollemans* 3804 (PERTH); 4 Dec. 1990, *B.H. Smith* 1449 (PERTH); 5 Dec. 1990, *B.H. Smith* 1457 (PERTH); 5 Nov. 1998, *B.H. Smith* 1935 (PERTH); 14 Nov. 2003, *L.S.J. Sweedman* 6242 (PERTH).

Distribution and habitat. *Verticordia elizabethiae* occurs in the Coolgardie bioregion where it is restricted to the Bullfinch–Yellowdine area (Western Australian Herbarium 1998–), growing on flats surrounding salt lakes, with halophytic heath (e.g. *Maireana*, *Gunniopsis* and *Frankenia*) and fringing *Callitris*. Its inland distribution in relation to *V. halophila s. str.* is shown in George and Pieroni (2002: 318).

Phenology. Flowers mainly from October to December. Mature fruits have been recorded on a single specimen in late March.

Conservation status. Listed by Smith and Jones (2018) as Priority One under Conservation Codes for Western Australian Flora, under the name *V.* sp. Koolyanobbing (B.H. Smith 1457). This species is

Figure 1. *Verticordia elizabethiae* at the type location. A – habitat; B – leaves and flowers; note particularly the short, grey-green leaves. Images taken by Rob Davis.

geographically restricted and has not been recorded from within lands managed by the Department of Biodiversity, Conservation and Attractions. Further survey is required.

Etymology. Named in honour of Elizabeth Anne (Berndt) George, née Sykes (1935–2012). Elizabeth spent several decades intensively collecting and passionately studying *Verticordia*, which at the time was in considerable taxonomic disarray. Establishing an army of contacts throughout south-

western Australia, Elizabeth created a reference collection for the genus, now housed at the Western Australian Herbarium. She was instrumental in mapping out species distributions, the rediscovery of several extremely rare species, and the collection and recognition of numerous new taxa, including four species and one variety that she published as first author. Her efforts culminated in 2002 with the release of *Verticordia: The Turner of Hearts*, a detailed compendium of *Verticordia* species, including morphological descriptions and notes on their cultivation, complete with exquisite paintings by Margaret Pieroni (George & Pieroni 2002).

Vernacular name. Elizabeth's Featherflower.

Affinities. *Verticordia elizabethiae* is currently placed in sect. *Verticordella* Meisn., which is the typical section of *V.* subg. *Eperephes* A.S.George (see George 1991). This subgenus is diagnosed by the combination of the presence of five, reflexed, green, antisepalous appendages between five, prominent, antipetalous ribs, and dorsiventrally flattened leaf blades; other pertinent characteristics are the ± oblong or elliptic (in outline) anthers dehiscing by slits, glabrous hypanthia, 5–10 ovules, and a base chromosome number of 11. This definition excludes sections *Integripetala* A.S.George, *Jamiesoniana* A.S.George and *Tropica* A.S.George, which phylogenetically lie outside the core subg. *Eperephes*. Section *Verticordella* is diagnosed by a combination of caducous bracteoles, terete to triangular stamen filaments (not clavate), usually erose, toothed or ciliate leaf margins, and non-peltate sepal auricles.

Verticordia elizabethiae has previously been included within *V. halophila* but differs in leaf, bracteole and petal characteristics and its very different area of occurrence (see key below). These two species show greatest morphological similarity to *V. pennigera*, which they resemble in having relatively thick leaves and petals that are prominently dentate distally, but differ in peduncle, stamen and staminode lengths, petal venation and ovule number (see key below). *Verticordia blepharophylla*, although possibly the closest relative as discussed above, differs by having prominently fimbriate petals, and flat leaves with prominent cilia. *Verticordia lindleyi* Schauer also shows similarities but has flat leaves and entire to shortly dentate petals (not as prominently dentate as in *V. pennigera*, *V. halophila* and *V. elizabethae*). A key to all these species is provided below.

1. Petals fimbriate, with fine segments 1.5–2 mm long (Mt Adams–Badgingarra area) ..... **V. blepharophylla**

1: Petals entire to prominently dentate

2. Leaves narrowly obovate to elliptic, scarcely thickened but slightly concave. Petals entire or shortly dentate

3. Petals pale pink, somewhat narrowed towards the apex, entire or shortly dentate. Staminodes ± as long as or shorter than antipetalous filaments (Gillingarra–Murray River)..... **V. lindleyi** subsp. **lindleyi**

3: Petals purple or deep pink, fairly broad at apex, coarsely dentate. Staminodes longer than antipetalous filaments (Brookton area–Collie–Cranbrook)..... **V. lindleyi** subsp. **purpurea**

2: Leaves oblong or obovate in outline, up to 0.6 mm thick. Petals prominently dentate

4. Peduncles 1.5–3 mm long. Petals with obvious dark longitudinal veins. Stamens and staminodes 1.6–2 mm long. Ovules 8–10 (Kalbarri NP–Capel area–Fitzgerald River NP)..... **V. pennigera**

4: Peduncles 0.3–1 mm long. Petals not or only inconspicuously veined. Stamens and staminodes 1–1.7 mm long. Ovules 6

5. Leaves grey-green, 1.5–2.25 mm long. Bracteoles 1.8–3 mm long; dorsal point 0.35–0.5 mm long. Petals 2.5–3.5 mm long (Bullfinch–Yellowdine area) ..... **V. elizabethiae**

5: Leaves medium to bright green, sometimes with a red tinge, 2–3.5 mm long. Bracteoles 3–4 mm long; dorsal point 0.7–1.3 mm long. Petals 3.5–4 mm long (Coorow area) .....**V. halophila**

Notes. Species with more than four ovules in other genera of Chamelaucieae (e.g. *Chamelaucium* Desf.) frequently have a range of ovule numbers, such as 5–7 per flower. In contrast, several species within *V*. subg. *Eperephes*, including *V. halophila* and *V. elizabethiae*, appear to have a constant or almost constant ovule number of six.

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References

George, A.S. (1991). New taxa, combinations and typifications in *Verticordia* (Myrtaceae: Chamelaucieae). *Nuytsia* 7(3): 231–394.

George, E.A. & Pieroni, M. (2002). *Verticordia: the turner of hearts.* (University of Western Australia Press.)

Smith, M.G. & Jones, A. (2018). *Threatened and Priority Flora list 5 December 2018*. Department of Biodiversity, Conservation and Attractions. https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants [accessed 10 January 2020].

Western Australian Herbarium (1998–). *FloraBase—the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions. https://florabase.dpaw.wa.gov.au/ [accessed 5 February 2018].