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Synonymisation of *Verticordia spicata* subsp. *squamosa* under *V. spicata* (Myrtaceae) based on molecular and morphological evidence

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SHORT COMMUNICATION

Verticordia spicata subsp. *squamosa* A.S.George was described by George (1991) to distinguish a rare, geographically disjunct entity with smaller floral and leaf features from the more widespread *V. spicata* F.Muell. subsp. *spicata*. Subsequently, subsp. *squamosa* was declared as Rare Flora in 1995 and it remains listed as Critically Endangered under the current Western Australian *Biodiversity Conservation Act 2016* due to the very small area of occurrence, very low number of individuals and ongoing decline (Stack *et al*. 2004; State of Western Australia 2024). However, a recent assessment of the since expanded collections of these taxa has demonstrated that the geographic separation between the two subspecies has been considerably overestimated, that the few diagnostic characters between the two subspecies are not discrete but continuous and overlapping, and that there is similar or greater morphological and molecular variation within subsp. *spicata* than there is between the two subspecies (Bradbury *et al*. 2025). As such, there is no taxonomic basis for continuing to recognise *V. spicata* subsp. *squamosa* as a separate taxon and, consequently, also no basis for its conservation listing. Here we synonymise subsp. *squamosa* under *V. spicata* to form a single species that is common in the coastal Midwest region of Western Australia.

Verticordia spicata F.Muell., *Fragm.* 1(10): 226 (1859); *Verticordia spicata* A.S.George subsp. *spicata*, *Nuytsia* 7(3): 368 (1991). *Type*: 'Ad flumen Murchison in locis apricis. A. Oldfield' [Murchison River, Western Australia 1856–1859, *A.F. Oldfield s.n.*] (*lecto*: K 000843393 image!, designated by A.S. George, *Nuytsia* 7(3): 368 (1991); *isolecto*: BM *n.v.*).

Verticordia spicata subsp. *squamosa* A.S.George, *Nuytsia* 7(3): 368–369 (1991). *Type*: '7.2 km E of Three Springs–Morawa road along Simpson Road, Western Australia, c. 29° 24' S, 115° 50' E,', 30 December 1981, *C. Chapman* 42 (*holo*: PERTH 01887831!; *iso*: CANB 425689 image!, K 000843392 image!).

Illustrations. E. Pritzel, *Bot. Jahrb. Syst.* 35: 406, Figure 48A–C (1904); W.E. Blackall & B.J. Grieve, *How to Know W. Austral. Wildfl.* 3A: 27 (1980); E.A. George & A.S. George, *Nuytsia* 9(3): 338, Figure 2D, G, J (1994); E.A. George & M. Pieroni, *Verticordia: the turner of hearts* 355 & 357, Plate 83A, B (2002).

Shrub 0.3–2 m high, 0.2–1.5 m wide, without a lignotuber. *Petioles* ± absent. *Leaf blades* ovate-elliptic to very broadly ovate, 2–3.5 mm long, 1.2–2.5 mm wide, ciliolate; apical point ± absent. *Peduncles* mostly borne at 6–27 consecutive nodes, 0–0.2 mm long, the spike-like inflorescence up to 55(–70) mm long. *Bracteoles* persistent in flower and sometimes in fruit, 3.5–4.5 mm long, with a dorsal point 0.4–1.3 mm long. *Flowers* 8–13 mm diam. *Hypanthium* with 5 antipetalous ribs separated by 5 large appendages, the overall shape (including appendages) pentagonal in cross-section, 1.7–2.3 mm long, glabrous, honeycombed (i.e. reticulate-pitted); appendages antisepalous, reflexed onto hypanthium and concealing most of it, narrowly obtriangular or obtriangular, 1.6–2 mm long, green. *Sepals* 3–5.5 mm long, pink;

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lobes 6 or 7; auricles very narrow and with long narrow divisions, *c.* as long as the hypanthium and largely concealing the antipetalous ribs. *Petals* inserted 0.4–0.5 mm above the sepals, 2.5–4.5 mm long, pink, conspicuously fringed, without auricles; fringe 1–2 mm long. *Stamens* 10, united to staminodes at base and of a similar length to them. *Anthers* ± oblong from front view, 0.45–0.6 mm long, dehiscent by longitudinal slits, deep pink; connective gland large. *Staminodes* 10, triangular to subulate, 1.5–1.7 mm long, glandular-verrucose. *Ovules* usually 6, rarely 7. *Style* exserted, usually sigmoid distally and gently curved below, 4–9 mm long; substigmatic hairs 0.3–0.4 mm long, in a cylindrical zone 1–1.5 mm long, with some of the hairs branched; stigma capitate, *c.* 0.1 mm diam. *Fruits* 1.5–1.8 mm high, 2–2.6 mm across; seed star-shaped (5-pointed) from top view, 1–1.2 mm high, 1.2–1.35 mm across.

Selected specimens examined. WESTERN AUSTRALIA: N of Kalbarri National Park, W of Eurardy Station, 28 Oct. 2024, *B. Anderson & K.J. Sadgrove* BMA 343 (PERTH); Colgate Rd, 6 Nov. 2019, *A. Chant* AC 3058 (PERTH); 4 km NE along Three Springs–Morawa road from Verral Road, 3 Dec. 1995, *E. Holland & F. Bunny* EH 616 (PERTH); Indarra Springs Nature Reserve, 13 Nov. 2019, *J. Jackson & K. Dodd* 411 (PERTH); Coolcalalaya Station, 29 Oct. 1991, *G.J. Keighery* 14743 (PERTH).

Distribution and habitat. Extends for *c.* 300 km, from near Zuytdorp Nature Reserve south-east to near Three Springs, usually in yellow sand, in species-rich shrublands that are often dominated by scattered tall shrubs or trees in the genera *Allocasuarina*, *Banksia*, *Callitris*, *Eucalyptus* or *Grevillea*.

Conservation status. Not currently considered to be at risk in Western Australia (Western Australian Herbarium 1998–).

Phenology. Flowers from October to January, with fruits recorded from November and January.

Vernacular name. Spiked Featherflower.

Chromosome number. *n* = 11 (Tyagi *et al.* 1991).

Affinities. George (1991) placed *V. spicata* in section *Verticordella* Meisn. of *Verticordia* subgenus *Eperephes* A.S.George but the species is atypical of this section in its persistent bracteoles, long sepal auricles and northern distribution. Molecular data (Matt Barrett pers. comm.) indicate that *V. spicata* should be transferred to sect. *Pennuligera* Meisn., which it matches in having persistent bracteoles. However, it is also somewhat atypical of sect. *Pennuligera* in the different shape of its reflexed auricles, which are very narrow and only cover the antipetalous ribs rather than the whole hypanthium.

Further evidence that *Verticordia spicata* should be transferred is that it is reported to hybridise with *V. comosa* A.S.George, *V. dichroma* A.S.George and *V. fragrans* A.S.George of sect. *Pennuligera* but not with any members of sect. *Verticordella* (George 1991; George & George 1994; George & Pieroni 2002). *Verticordia spicata* and one further species of sect. *Pennuligera*, *V. chrysostachys* Meisn., are also recorded as parents for a single putative hybrid specimen (*J. Docherty* 494) at PERTH.

The most recent key to sect. *Pennuligera* (George & Pieroni 2002: 97–98) is updated below to incorporate the additional species, *V. spicata*, and various new information for other taxa.

Key to members of *Verticordia* sect. *Pennuligera*

1. Mature style 10–25 mm long. Sepals bright red or silver and purple

2. Petals digitately lobed, purple. Sepals purple with silver lobes. Substigmatic zone including some branched hairs (Kalbarri NP–Wandana NR) ..... **V. oculata**

2: Petals dentate or fimbriate, creamish red to bright red. Sepals bright red. Substigmatic hairs all simple

3. Leaves 8–15 mm long. Petals dentate. Mature style 20–25 mm long (S of Eneabba–Badgingarra area) ..... **V. grandis**

3: Leaves 2–6.5 mm long. Petals fimbriate. Mature style 10–20 mm long

4. Leaf blades (3.5–)4–6.5 mm long. Peduncles 6–10 mm long. Sepals (7.5–)8–10 mm long. Mature style usually 16–20 mm long (Meadow Stn–Kalbarri NP) ..... **V. etheliana** var. **etheliana**

4: Leaf blades 2–3(–4.5) mm long. Peduncles 3–6(–8) mm long. Sepals 7–8(–9) mm long. Mature style usually 12–16 mm long (Kalbarri NP area–near Mullewa) ..... **V. etheliana** var. **formosa**

1: Mature style 4–9 mm long. Sepals pink to maroon, white or yellow.

5. Sepals with long slender auricles that only cover part of the hypanthium. Petals lacking auricles (near Zuytdorp NR–Three Springs area) ..... **V. spicata**

5: Sepals with broad peltate auricles that cover the whole hypanthium. Petals with small auricles

6. Staminodes channelled, ± narrowly oblong, dentate or 3-lobed, not particularly glandular (glands few, widely spaced and/or not very prominent)

7. Substigmatic hairs in a lateral tuft. Petals with a fringe 0.6–1.1 mm long (Three Springs–Morawa) ..... **V. comosa**

7: Substigmatic hairs in a cylindrical zone. Petals entire or with a fringe up to 0.8 mm long

8. Sepal lobes broad throughout, plumose (S of Eneabba) ..... **V. fragrans**

8: Sepal lobes narrow and tapering distally, fimbriate

9. Petals maroon, fringed distally with hairs 0.4–0.8 mm long (S of Wicherina) ..... **V. muelleriana** subsp. **minor**

9: Petals cream to mid yellow or pinkish, entire or shortly fringed distally with hairs less than 0.4 mm long

10. Sepals 3.5–4.5 mm long, divided for *c.* 2/3 their length into long-ciliate lobes. Petals dentate or erose at least on lateral margins (Kalbarri–Mullewa area) ..... **V. lepidophylla** var. **lepidophylla**

10: Sepals 2–2.5 mm long, divided for less than 1/2 their length into ciliate lobes or simple with a dentate margin. Petals entire distally, denticulate towards the base (Zuytdorp–Nerren Nerren area) ..... **V. lepidophylla** var. **quantula**

6: Staminodes linear-subulate, entire, usually with prominent glands that are densely grouped distally or in some other position

11. Sepals 8–9 mm long. Mature style *c.* 8 mm long (Cape Range NP) ..... **V. serotina**

11: Sepals 4–6 mm long. Mature style 4.5–7 mm long

12. Style with a cylindrical zone of substigmatic hairs or with hairs concentrated on the inner surface of a sigmoid curve

13. Substigmatic hairs 0.15–0.4 mm long

14. Leaves 5–9 mm long, 7–10 mm wide (S of Eneabba) ..... **V. argentea**

14: Leaves 3–4 mm long, 2.5–3 mm wide (Perenjori–Wongan Hills–Bencubbin) ..... **V. venusta**

13: Substigmatic hairs 0.5–1.2 mm long

15. Leaves 6–9 mm wide. Sepals dark pink to maroon (Coorow–Watheroo) ..... **V. muelleriana** subsp. **muelleriana**

15: Leaves 1.5–4.5 mm wide. Sepals white or pale pink (SW of Three Springs) ..... **V. albida**

12: Style with substigmatic area strongly curved and with hairs concentrated on the outer surface, forming a lateral tuft

16. Flowers pink to maroon throughout

17. Leaves entire or with teeth that are just marginal to a broad, thin border around blade. Petals deep magenta to maroon. Occurring south of Shark Bay (Eurardy Stn)..... **V. × eurardyensis**

17: Leaves usually with teeth that ± reach the thickened part of blade. Petals pale to deep pink. Occurring north of Shark Bay (Onslow–Carnarvon–Wooramel River area)..... **V. forrestii**

16: Flowers yellow throughout or partially yellow

18. Flowers pale to deep yellow throughout

19. Peduncles 2.5–4 mm long. Petals golden yellow, 6–7 mm long, including a fringe of obtuse segments 2–3.5 mm long. Substigmatic hairs 0.2–0.3 mm long (Kalbarri NP area–near Mullewa) ..... **V. chrysostachys** var. **chrysostachys**

19: Peduncles 1.3–3 mm long. Petals pale yellow, 4.5–6 mm long, including a fringe of acute segments (0.5–)1–2(–2.5) mm long. Substigmatic hairs 0.3–0.6 mm long (Kalbarri NP area–S of Morawa)..... **V. chrysostachys** var. **pallida**

18: Flowers 2-toned with both yellow and maroon to bronze

20. Substigmatic hairs 0.15–0.25 mm long. Peduncles 2.5–5.5 mm long (NE of Yuna).....**V. aereiflora**

20: Substigmatic hairs 0.7–0.9 mm long. Peduncles 1.5–2(–3) mm long

21. Leaves commonly strongly reclinate or recurved; blade usually 3–4 × 2.5–4 mm. Flowers often 12 or more per cluster. Petals 5–7 mm long; fringe 2–3.5 mm long (Kalbarri NP area) ..... **V. dichroma** var. **dichroma**

21: Leaves rarely strongly reclinate or recurved; blade usually 2–3 × 1.7–3 mm. Flowers often fewer than 10 per cluster. Petals 4–6 mm long; fringe 1.5–2 mm long (W of Billabong–Kalbarri NP) ..... **V. dichroma** var. **syntoma**

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References

Bradbury, D., Binks, R.M., Chant, A., Monks, L., Rye, B.L. & Byrne, M. (2025). Genomic and morphological evidence do not support taxonomic recognition of the critically endangered scaly-leaved featherflower, *Verticordia spicata* subsp. *squamosa* (Myrtaceae): implications for conservation in a biodiversity hotspot. *Conservation Genetics* 26: 449–462. https://doi.org/10.1007/s10592-025-01680-8

George, A.S. (1991). New taxa, combinations and typifications in *Verticordia* (Myrtaceae: Chamelaucieae). *Nuytsia* 7(3): 231–394. https://doi.org/10.58828/nuy00167

George, E.A. & George, A.S. (1994). New taxa of *Verticordia* (Myrtaceae: Chamelaucieae) from Western Australia. *Nuytsia* 9(3): 333–341. https://doi.org/10.58828/nuy00209

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

Stack, G., Chant, A., Broun, G. & English, V. (2004). *Scaly-leaved featherflower (*Verticordia spicata *subsp.* squamosa*) Interim Recovery Plan 2004-2009 (No. 185).* Department of Conservation and Land Management,

Western Australia. https://www.dcceew.gov.au/environment/biodiversity/threatened/recovery-plans/scaly-leaved-featherflower-verticordia-spicata-subsp-squamosa-interim-recovery-plan-2004 [accessed 26 March 2025].

State of Western Australia (2024). Biodiversity Conservation (Listing of Native Species) (Flora) Order 2024. Western Australian Government Gazette 2024(49): 1133–1150. www.legislation.wa.gov.au/legislation/statutes.nsf/gazettes2024.html [accessed 9 September 2025].

Tyagi, A.P., McComb, J. & Considine, J. (1991). Cytogenetic and pollination studies in the genus *Verticordia* DC. *Australian Journal of Botany* 39(3): 261–272. https://doi.org/10.1071/BT9910261