

Living on the edge: *Hemigenia diadela* (Lamiaceae), a new species from remnant vegetation in Western Australia's northern Avon Wheatbelt

Juliet A. Wege¹ and Greg R. Guerin²

¹Western Australian Herbarium, Biodiversity and Conservation Science,
Department of Biodiversity, Conservation and Attractions,

Locked Bag 104, Bentley Delivery Centre, Western Australia 6983

²School of Biological Sciences, The University of Adelaide, South Australia 5005

²Corresponding author, email: greg.guerin@adelaide.edu.au

SHORT COMMUNICATION

Hemigenia diadela G.R.Guerin & Wege, a new species known only from a single site in the northern Avon Wheatbelt, is described below. First collected by Sue Patrick in 2001 during rare flora surveys by the then Department of Conservation and Land Management, it belongs to *H.* sect. *Homalochilus* Benth., members of which are characterised by strongly zygomorphic (two-lipped) calyces with reduced and/or fused lobes (Guerin 2008a).

Phylogenetic and morphological studies on Lamiaceae subfam. Prostantheroideae Luer. have resulted in a number of changes to generic circumscriptions (Olmstead *et al.* 1999; Rye 2005; Conn *et al.* 2009; Conn *et al.* 2011; Wilson *et al.* 2012a; Wilson *et al.* 2012b). Further taxonomic changes are inevitable, most notably within the tribe Westringieae Bartl., with both *Hemigenia* R.Br. and *Microcorys* R.Br. having been shown to be polyphyletic (Guerin 2008a). Additional data are required to resolve the limits of these genera and of the allied *Westringia* Sm. and *Hemiandra* R.Br.; however, the absence of a robust generic framework should not preclude the formal description of new species of Westringieae—nomenclatural stability is outweighed by the need for published descriptive information and associated data to assist on-ground conservation efforts. Although 15 Western Australian species have recently been described in *Hemigenia* (Guerin 2008b, 2015; Thiele & Guerin 2016) and four in *Westringia* (Guerin 2009; Davis & Jobson 2013), a further 20 remain informally recognised under *Hemiandra*, *Hemigenia* or *Microcorys*, of which 13 are rare or poorly known (Western Australian Herbarium 1998–). We are hopeful that our description of *H. diadela* will lead to the discovery of additional populations.

Hemigenia diadela G.R.Guerin & Wege, *sp. nov.*

Type: west of Three Springs, Western Australia [precise locality withheld for conservation reasons], 30 October 2017, J.A. Wege 2048 (*holo:* PERTH 08970025; *iso:* AD, CANB).

Hemigenia sp. Three Springs (S. Patrick 4043 A), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 18 January 2018].

Spreading, openly branched *shrubs* 10–30 × 25–80 cm; *branchlets* ascending to prostrate, rounded in T.S., with a dense, white indumentum of unicellular hairs 0.15–0.2(–0.5) mm long, and more sparsely distributed multicellular hairs *c.* 1–2.5 mm long. *Leaves* in whorls of 3, with an inconspicuous petiole to 0.5 mm long, patent to suberect, straight or slightly incurved, lanceolate to narrowly lanceolate or oblong, 8–22 mm long, 2.5–5.2 mm wide, acute or acuminate; margin entire, usually with sparse long hairs (especially towards the base); base attenuate, with short hairs on the adaxial side of the petiole. *Inflorescence* a raceme-like thyrses with single flowers subtended by leaf-like bracts; *pedicels* shorter than the calyx, 3.5–5.5 mm long, with a similar indumentum to that on the stems and often also with scattered sessile glands concentrated toward the distal end; *bracteoles* inserted 0.3–1.2 mm below the calyx, erect to suberect, linear, 6–8 mm long at anthesis, with multicellular hairs on the margin and lower midrib. *Calyx* 2-lipped, 9–12 mm long, with multicellular hairs at the sinuses of the two lips and on the ribs of the tube, otherwise glabrous; tube narrowly funnel-shaped, ribbed; adaxial lip 6–8 mm long, broadly ovate, acute or acuminate, entire or with small lateral lobes; abaxial lip 6–7 mm long, with acute, triangular lobes. *Corolla* *c.* 14–15 mm long including a *c.* 6–7 mm tube, magenta, white in the throat where there are scattered, brownish red blotches, with glandular hairs on the outer and inner tube and the inner adaxial lobe, and short, white hairs near the sinuses, on the margin of the adaxial lobe, and scattered on the inside of the lobes with a dense cluster towards the base of the tube; adaxial median lobe pair hooded, shorter than the abaxial lobes, *c.* 4.5–5.5 mm long; abaxial median lobe flabellate to obdeltate, *c.* 5–5.5 mm long and apically sinuate (occasionally also bilobed), lateral lobes elliptic to ovate, *c.* 4 mm long and slightly emarginate. *Stamens* included in the throat, the abaxial pair *c.* 7 mm long, the adaxial pair *c.* 6 mm long; filaments with a few short hairs near the base; abaxial anthers with 2 unequal thecae, adaxial anthers with a single theca and the lower end bearded. *Style* *c.* 8.5 mm long, glabrous. *Fruiting calyx* papery, not accrescent. *Mericarps* pale brown, obconic to obovoid, rounded on the outer face, angled between the inner faces, 1.6–1.8 mm long, shallowly pitted, attachment scar slightly more than half the length of the mericarp, apex with sparse glandular hairs. (Figure 1)

Diagnostic features. *Hemigenia diadela* can be readily differentiated from other species in the genus by the following combination of features: leaves that are arranged in whorls, lanceolate to narrowly lanceolate or oblong, and 8–22 mm long; a strongly zygomorphic calyx; and stems and pedicels with a dense indumentum of short hairs combined with longer, more sparsely distributed hairs.

Other specimen examined. WESTERN AUSTRALIA: [locality withheld for conservation reasons] 5 Oct. 2001, S. Patrick 4043 A (PERTH).

Phenology. Flowering in October and November. While a few fruit were collected in late October, peak fruiting time would be later the year.

Distribution and habitat. *Hemigenia diadela* is known from a single location to the west of Three Springs in Western Australia's northern Avon Wheatbelt, where it grows on a south-facing lateritic hillslope in open mallee woodland of Powderbark Wandoo (*Eucalyptus accedens*) with *Allocasuarina campestris* and assorted shrubby Proteaceae.

Conservation status. Listed by Smith and Jones (2018) as Priority Two under Conservation Codes for Western Australian Flora, under the name *H. sp.* Three Springs (S. Patrick 4043 A). The type population has a very small area of occupancy, consisting of just 17 plants growing at the edge of a reserve and adjacent to farmland. Further survey should be prioritised to ascertain whether this species warrants listing as Threatened.



Figure 1. *Hemigenia diadela*. A – habitat on a lateritic hillslope in open mallee woodland of *Eucalyptus accedens*; B – low, spreading habit; C – branchlet showing the relatively large, whorled leaves and magenta flowers with a white throat; D – branchlet showing lateral lobing on the upper calyx lip; E – lateral view of a flower showing a short pedicel and entire upper calyx lip. Note the indumentum of both short and long hairs. Photographs © Juliet Wege from J.A. Wege 2048.

Etymology. From the Greek, *diadelos*, meaning distinguishable or distinctive.

Vernacular name. Mid West Capote.

Affinities. *Hemigenia diadela* can be readily distinguished from other members of sect. *Homalochilus* by its stem and pedicel indumentum, which consists of dense, short hairs and longer, more sparsely distributed hairs. While highly distinctive, it is perhaps most similar to *H. sp.* Newdegate (E. Bishop 75), an undescribed species from the Mallee and Coolgardie bioregions that also has zygomorphic calyces, whorled leaves and dense short hairs on the stems and pedicels. *Hemigenia sp.* Newdegate, however, lacks the long, multicellular hairs found in *H. diadela*, has smaller leaves ($4\text{--}11 \times 0.8\text{--}2$ mm *cf.* $8\text{--}22 \times 2.5\text{--}5.2$ mm in *H. diadela*), and has a shorter calyx (3.5–4 mm long *cf.* 9–12 mm in *H. diadela*) with a distinctly 3-lobed adaxial lip (*cf.* entire or with small lateral lobes).

Identification. We have updated the interim key to species of *H. sect. Homalochilus* (see Guerin 2013) to accommodate data that we have obtained from recent collections, and update the species nomenclature. *Hemigenia macrantha* F.Muell., a species that is densely stellate-hairy on the branches, leaves and calyces, has not been included since molecular analyses (Guerin 2008a) do not appear to support its retention in this section.

1. Leaves opposite
 2. Pedicels 9–20 mm long; bracteoles lanceolate or ovate, 5–9 mm long; calyx 7.5–10 mm long, adaxial lip not becoming recurved nor significantly inflated in fruit **H. rigida**
 - 2: Pedicels 4.5–6 mm long; bracteoles narrowly linear-subulate, 2–4 mm long; calyx 4–6 mm long, adaxial lip becoming inflated and recurved in fruit **H. pritzelii**
- 1: Leaves in whorls of 3
 3. Young stems densely hairy or with distinct lines of hairs in the grooves
 4. Young stems with distinct lines of short white hairs in the grooves; pedicels glabrous **H. ramosissima**
 - 4: Young stems hairy throughout; pedicels hairy
 5. Branchlets with both short and long hairs; leaves 8–22 mm long, 2.5–5.2 mm wide; calyx 9–12 mm long, adaxial lip entire or with small lateral lobes **H. diadela**
 - 5: Branchlets with short hairs; leaves 4–11 mm long, 0.8–2 mm wide; calyx 3–6 mm long, adaxial lip distinctly 3-lobed..... **H. sp. Newdegate**
 - 3: Young stems glabrous, or glabrous except for hairs in and around the leaf axils
 6. Leaves ovate, elliptic or lanceolate (often narrowly so), margins not inrolled or conduplicate **H. microphylla**
 - 6: Leaves linear, conduplicate or the margins tightly inrolled and joined to form an adaxial groove
 7. Pedicels 6–10 mm long; calyx glabrous outside or with minute hairs concentrated towards the base, scarcely zygomorphic; leaves with tightly inrolled margins..... **H. tichbonii**
 - 7: Pedicels 1–4 mm long; calyx with conspicuous multicellular hairs to 2 mm long concentrated towards the base, clearly zygomorphic; leaves conduplicate
 8. Corolla *c.* 20–25 mm long, tube exerted from the calyx; abaxial calyx lip less than half the length of the adaxial lip at anthesis **H. macphersonii**
 - 8: Corolla 10–13 mm long, tube not exerted from the calyx; abaxial calyx lip more than half the length of the adaxial lip at anthesis..... **H. yalgensis**

Acknowledgements

We thank the Collections staff and volunteers at the Western Australian Herbarium and the State Herbarium of South Australia for specimen-related assistance, and the *Nuytsia* editorial team for facilitating the publication of this research, in particular Barbara Rye and Kelly Shepherd for their respective comments on the manuscript. This research was supported by a Science Project Support Grant from Biodiversity and Conservation Science (DBCA).

References

- Conn, B.J., Streiber, N., Brown, E.A., Henwood, M.J. & Olmstead, R.G. (2009). Infrageneric phylogeny of Chloanthae (Lamiaceae) based on chloroplast *ndhF* and nuclear ITS sequence data. *Australian Systematic Botany* 22: 243–256.
- Conn, B.J., Henwood, M.J. & Streiber, N. (2011). Synopsis of the tribe Chloanthae and new nomenclatural combinations in *Pityrodia* s. lat. (Lamiaceae). *Australian Systematic Botany* 24: 1–9.
- Davis, R.W. & Jobson, P. (2013). Two new species of *Westringia* sect. *Cephalowestringia* (Lamiaceae: Westringieae) from the south-west of Western Australia. *Nuytsia* 23: 271–276.
- Guerin, G.R. (2008a). Evidence for polyphyly in *Hemigenia* and *Microcorys* (Lamiaceae: Westringieae). *Australian Systematic Botany* 21: 313–325.
- Guerin, G.R. (2008b). A taxonomic revision of *Hemigenia* section *Malleantha* sect. nov. (Lamiaceae: Westringieae). *Australian Systematic Botany* 21: 326–374.
- Guerin, G.R. (2009). A revision of *Westringia* section *Cephalowestringia* (Lamiaceae: Westringieae). *Australian Systematic Botany* 22: 121–136.
- Guerin, G.R. (2013). Distinguishing characters of *Hemigenia rigida*, a conservation significant species confused with *H. pritzelii* (Lamiaceae: Westringieae). *Nuytsia* 23: 467–474.
- Guerin, G.R. (2015). *Hemigenia yalgensis*, a new species from the Mid-west region of Western Australia (Lamiaceae: Westringieae). *Journal of the Adelaide Botanic Gardens* 29: 7–10.
- Olmstead, R.G., Reeves, P.A. & Lepschi, B.J. (1999). Confirmation of a monophyletic Chloanthoideae (Lamiaceae) comprising tribes Chloanthae and Prostanthereae. *Lamiales Newsletter* 6: 7–10.
- Rye, B.L. (2005). A taxonomic review of *Dicrastylis* sect. *Corymbosae* (Lamiaceae: Chloanthae), incorporating *Mallophora* as a new synonym. *Nuytsia* 15(3): 445–455.
- 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 18 September 2019].
- Thiele, K.R. & Guerin, G.R. (2016). *Hemigenia tichbonii* (Lamiaceae), a new, rare species from Western Australia. *Nuytsia* 27: 129–132.
- Western Australian Herbarium (1998–). *FloraBase—the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions. <https://florabase.dpaw.wa.gov.au/> [accessed 4 July 2018].
- Wilson, T.C., Conn, B.J. & Henwood, M.J. (2012a). Molecular phylogeny and systematics of *Prostanthera* (Lamiaceae). *Australian Systematic Botany* 25: 341–352.
- Wilson, T.C., Henwood, M.J. & Conn, B.J. (2012b). Status of the genus *Wrixonia* F.Muell. (Lamiaceae). *Telopea* 14: 1–3.

