

## A new species of *Homoranthus* (Myrtaceae: Chamelaucieae) in the New England Tableland Bioregion of Eastern Australia

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### Abstract

The genus *Homoranthus* A.Cunn. ex Schauer currently includes 31 endemic species in eastern and southern Australia. In a c. 400,000-hectare section of the New England Tableland bioregion, there are seven rare described species of *Homoranthus* endemic to granite outcrops, six of which are each found only in a single small, isolated distribution. The exception, *Homoranthus lunatus* Craven & S.R.Jones, has populations 70 km apart and broadly spans the range of the other species. Genetic analysis of the seven *Homoranthus* species in the region revealed a phylogenetically distinct lineage indicative of an eighth, undescribed taxon. Morphological assessment of *H. lunatus* has led to the formal recognition and conservation assessment of *H. wissmannii* Pemberton & McMaster (Myrtaceae), with a revised assessment for *H. lunatus*.

### Introduction

*Homoranthus* A.Cunn. ex Schauer is a genus of shrubs endemic to eastern and southern Australia. Many of the 31 species of *Homoranthus* occur in sandy soils, and all except two currently accepted species are described as having restricted and/or disjunct distributions (Craven & Jones 1991; Copeland *et al.* 2011). There are seven described rare granite outcrop species of *Homoranthus* in the northern area of the New England Tableland (NET) bioregion spanning the New South Wales and Queensland border (Figure 1), and all these species except *H. lunatus* Craven & S.R.Jones are allopatric. *Homoranthus lunatus* was first collected from Torrington State Conservation Area in 1996 during a vegetation survey, and it was noted as a “significant disjunction” from the known *H. lunatus* populations c. 70 km away in Boonoo Boonoo National Park and Basket Swamp National Park (Hunter 1997).

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Population genomic analysis of the seven species indicated an unrecognised taxon from Torrington, previously treated as *H. lunatus*, but forming a clearly distinct genetic cluster. Samples from the Torrington population rendered *H. lunatus* non-monophyletic. They were shown to be more closely related to *H. binghiensis* J.T.Hunter than to the type population of *H. lunatus* at Boonoo Boonoo National Park (McMaster et al. 2025).

Here, we aimed to explore whether the genetic differentiation between the population of *H. lunatus* from the Torrington State Conservation Area and the populations from Boonoo Boonoo National Park and Basket Swamp National Park was corroborated by morphological differences.

## Materials and methods

For simplicity, the new proposed name *Homoranthus wissmannii* Pemberton & McMaster will be used hereafter, despite its formal taxonomic treatment appearing later in the paper (cf. Saldivia and Nicol 2025).

To assess morphological differentiation between *H. lunatus* and *H. wissmannii*, fresh flowering material was collected from 22 individuals: seven from Boonoo Boonoo National Park (the type locality), five from Basket Swamp National Park, and five from each of the two Torrington State Conservation Area populations. *Homoranthus lunatus* flowers in September and October, however, the Torrington populations flowered in November, requiring two separate field trips to collect flowering material, followed by a third visit in January for post-flowering observations. The existing *H. lunatus* specimens from Boonoo Boonoo National Park, Basket Swamp National Park, and Torrington State Conservation Area housed in the N.C.W. Beadle Herbarium (NE) were examined for morphological differences prior to the field trips.

For each plant, a voucher specimen was pressed, dried, and incorporated into the NE collection (replicate specimens will later be distributed to other herbaria). Additional samples of leaf tissue were preserved in silica gel, flowers were stored in 70% ethanol, and cuttings were taken for propagation.

The vouchers were examined using a Leica MZ75 microscope equipped with an eyepiece reticle. Torrington State Conservation Area samples were compared with a high-resolution image of the holotype of *H. lunatus* (Boonoo Boonoo National Park, N.S.W., -28°52', 152°08', 28 Sep 1990, S.R. Jones 19 (CANB); <https://plants.jstor.org/stable/pdf/10.5555/al.ap.specimen.canb401320>; accessed 26 Jan 2025).

The 22 vouchers examined were analysed using 48 morphological characters, including five key traits in *Homoranthus*: growth habit, leaf shape (side view), inflorescence type, hypanthium trichomes, and sepal apex (Copeland et al. 2007, Copeland et al. 2011). Several species of *Homoranthus* possess pseudopeduncles, which are modified internodes on flowering branchlets that resemble peduncles (Craven and Jones 1991), and the pseudopeduncle characteristic is used in the key to species of *Homoranthus* of Copeland et al. (2011).

Leaves of many species of *Homoranthus* are laterally compressed, and the side-view leaf shape serves as a defining species characteristic (Copeland et al. 2011). Leaf shape used

throughout this paper therefore refers to the shape in side view. Leaf measurements of *H. wissmannii* were taken from branchlets with mature leaves 15–20 cm below the primary apex, as new growth and flowering branchlets had leaves that differed in shape and size. We considered whether the floral leaves were bracts, as apical leaves are significantly reduced in size. However, we chose to use the term 'floral leaf', as the lower floral branchlet leaves are longer and not substantially shorter than leaves on the leaf branchlets. By the time of the last field trip, the fruits had already abscised, so they were not available for observation. To search for diagnostic features and to develop taxonomic descriptions, we used a Leica Wild MZ8 microscope to compare *H. wissmannii* with two other nearby species that have pseudopeduncles: *H. binghiensis* and *H. biflorus* Craven & S.R.Jones (Craven and Jones 1991, Hunter and Copeland 2001).

The distribution map of *Homoranthus* was created based on occurrence data from the Atlas of Living Australia (ALA) via the galah R package v2.0.2 (Westgate et al. 2025) (Atlas of Living Australia (5 March 2025), occurrence download <https://doi.org/10.26197/ala.7e7c00e9-d496-4bed-9d3c-f1bd67500385>). Records were filtered to include only those from 2000 onwards. A closer view of the study area was generated with Bing satellite imagery (Microsoft 2025).

To quantify Area of Occupancy (AOO) and Extent of Occurrence (EOO) in target species, ALA records were combined with the locations of samples collected for this study. Spatially suspect records were excluded from the analysis. AOO and EOO calculations followed the guidelines outlined by the IUCN utilizing the red R package v1.6.1 (Cardoso 2017) for spatial analysis and range size calculations.

## Results and Discussion

In the Boonoo Boonoo National Park and Basket Swamp National Park populations of *H. lunatus*, all morphological characters agreed with its taxonomic description (Craven and Jones 1991), apart from the number of flowers per branchlet. The description lists 1–6 flowers, whereas we observed up to 10 flowers per flowering branchlet. In contrast, specimens of *H. wissmannii* exhibited differences from *H. lunatus* in mature leaf shape, presence of branched and modified flowering branchlets (pseudopeduncles), and hypanthium form (Table 1), although 44 of the 48 characteristics examined aligned with the morphological description of *H. lunatus*.

The leaves of *H. lunatus* in side view are lunate to scimitar-shaped (Craven and Jones 1991), with the abaxial edge tapering up to the leaf stem, whereas those of *H. wissmannii* are hemi-elliptical in the side view, with the abaxial edge of the mature leaves meeting the petiole at an angle of 90–135°. The difference in leaf shape is evident in mature leaf branchlet leaves, the leaves on flowering branchlets or post-flowering new growth of *H. wissmannii* and *H. lunatus* are less-obviously differentiated.

The flowering branchlets of *H. lunatus* are unmodified and have single flowers in the axils of opposite leaves along the branchlet, with non-apical anthesis flowers on pedicels of similar length (Figure 2A, C). In contrast, the modified flowering branchlets on *H. wissmannii* include pseudopeduncles (Figure 2B), where the internodes are of similar colour and texture to the pedicels.

The flowers are singular, upright, and arranged in opposite pairs. Lower flower pairs have longer pedicels than those immediately above, with the lengths reducing for each pair closer to the branchlet apex, resulting in all flower pairs on a branchlet being at a similar height to the apical flower pair. The pseudopeduncles may have multiple branches, and several branches of single flowers may appear to be a multi-flowered inflorescence, creating a quasi-corymb of comparable-height flower heads (Figure 2D).

As is the case for the internodes and pedicels, the floral leaves in *H. wissmannii* are also variable in length, with the lower floral leaves longer than the pair of floral leaves above them (Figure 2B, D). However, the floral leaves are shorter than the combined length of the accompanying pedicel and hypanthium, and the floral leaf apex rarely reaches above the upright flowers. By comparison, the floral leaves of *H. lunatus* are mainly similar to leaf branchlet leaves and generally exceed the flower and pedicel combined length (Figure 2A, C). Not all the flowers in *H. lunatus* are as displayed on the flowering branchlet, especially the lower pairs. The hypanthium of *H. lunatus* is frequently flared, being narrower at the base. In contrast, the hypanthium of *H. wissmannii* has sides that are parallel for most of their length, or the sides are slightly arcuate, and it also has a more pronounced distal restriction than that of *H. lunatus*.

Among the five key traits of *Homoranthus*, namely, growth habit, leaf shape, inflorescence type, hypanthium trichomes, and sepal apex (Copeland *et al.* 2007, 2011), the absence of hypanthium trichomes was the only trait shared by *H. lunatus*, *H. binghiensis*, *H. biflorus* and *H. wissmannii*. Otherwise, the four species have different combinations of the morphological characteristics listed in Table 1, corroborating the results of our molecular analyses (McMaster *et al.* 2025). In concert with clear genomic differentiation, morphological differences provide a sound basis for formal recognition of *H. wissmannii*.

The similarities between *H. lunatus* and *H. wissmannii* had allowed the latter to be collected but unrecognised as a new species. Three of the four differences identified are flower-related and are only apparent when *H. wissmannii* is in flower. This includes the modified flowering branchlets, which are not persistent. The fourth difference is subtle, that of the side leaf shape, and is only apparent in mature foliage, which may not be present in the outer 15 cm of new growth in leaf branches. The initial indication of a new species resulted from a population genomic analysis, highlighting the importance of integrating field and herbarium observations together with morphological and molecular assessments in plant systematics research. Understanding that there are two species rather than one will aid conservation by enabling a more targeted conservation assessment and management plan for each species.

## Taxonomic treatment

***Homoranthus wissmannii*** Pemberton & McMaster, *sp. nov.*

Type: AUSTRALIA: New South Wales: Northern Tablelands: Torrington State Conservation Area, 3 km S from Butlers Rd, along Butlermine Trail, 150 m W of trail, 10 Nov. 2024, *P.J. Pemberton 73* (holo: NSW; iso: BRI, CANB, CNS, K, MEL, MO, NE, P).

*Homoranthus* sp. Torrington *sensu* McMaster *et al.* (2025).

*Shrub* to 70 cm tall, ascending; branches spreading. *Leaves* opposite, decussate, punctate; petiolate; lamina in side view hemi-elliptical, 6–10 mm long, 1.2–2.0 mm thick, upper edge  $\pm$ straight. Floral and new growth laminae lunate or oblanceolate. Flowering branchlets differentiated, pale green, resembling the pedicel, often branched. Floral leaves variable in length, lower longer than upper, and not exceeding floral apices. *Inflorescence* an axillary monad, typically clustered in a corymb-like conflorescence consisting of up to 16 or more flowers. Bracteoles caducous, 3–5 mm long. *Pedicels* 1–2 mm long; lower pedicels longer than upper. *Hypanthium* cylindrical, with sides parallel most of the length or slightly arcuate, 3–5 mm long; 1.2–1.5 mm wide at ovary, glabrous, 5-costate. *Sepals* triangular, 1.5–2.9 mm long, apex long acuminate, margin entire. *Petals* broadly ovate, cupped, 0.9–1.1 mm long, margin entire. *Ovary* unilocular; placenta sessile; ovules 6–8 in two columns. *Style* terete, 6–8 mm long. Fruit not seen.

**Distribution:** *Homoranthus wissmannii* is restricted to two known populations 5 km apart in the south-east of Torrington State Conservation Area on the Northern Tablelands of New South Wales, 50 km south-west of Tenterfield.

**Habitat:** Generally located on south-eastern slopes at altitudes of approximately 1,000 m and with an estimated annual rainfall of 900 mm, *H. wissmannii* grows on exposed granite outcrops, in sheet crevices and shallow skeletal soil on the outcrop aprons. *Homoranthus wissmannii* grows in *Leptospermum novae-angliae* shrubland to *Eucalyptus prava*, *Callitris endlicheri* low woodland with *Acacia venulosa*, *A. granitica*, *Olix stricta*, *Boronia granitica*, *Zieria laevigata*, *Mirbelia pungens* and *Entolasia stricta* (Community 4b Torrington Shrublands; Hunter and Clarke 1998).

**Phenology:** Flowering in November. Time of fruiting is unknown; absent in January.

**IUCN Conservation assessment:** We assess *Homoranthus wissmannii* against IUCN Red List criteria applicable to Australian federal and state listings. To be listed as threatened, a species must meet at least one criterion, with the highest eligible category assigned. *Homoranthus wissmannii* is restricted to Torrington State Conservation Area, NSW, occurring in two subpopulations about 5 km apart. Its extent of occurrence (EOO) is 0.842 km<sup>2</sup> and area of occupancy (AOO) is 12 km<sup>2</sup>, based on ALA records and this study. Although protected from development, threats include browsing (especially by feral goats), fire, future mining opportunities, and potential susceptibility to myrtle rust, as three *Homoranthus* species have been recorded to be moderately susceptible (Pegg *et al.* 2014).

The total population is estimated at ~780 individuals, with fewer than 250 mature plants. The north-western subpopulation consists of 500 healthy adult and juvenile plants in an area of approximately 200 × 75 m, but the majority were juveniles (Saunders *et al.* 2024). The initial count at the south-eastern subpopulation was 20 plants (Hunter 1997), and only one mature individual survived the 2019–2020 Gulf Road wildfire (JTH, pers. obs.). However, post-fire recruitment was observed by PJP, RLA, and JJB in 2024–2025, and most individuals have been enclosed in an approximately 30 × 15 m fenced area created after the fires to prevent damage from feral animals. Currently, there are 280 plants in the enclosure, primarily juvenile individuals. Population

numbers may decline in the future due to natural attrition of juveniles in both populations (Hunter 1997, Saunders *et al.* 2024).

Under Criterion B (Geographic Range), AOO < 500 km<sup>2</sup> satisfies the range criteria for Endangered. It also meets sub-criterion B(a) for severe fragmentation (two subpopulations) and B(c) for extreme fluctuations in the number of individuals. Under Criterion C (Population Size), the species qualifies as Endangered, with total population below 2,500 and each subpopulation having fewer than 250 mature individuals (C2(a)(i)). Under Criterion D (Very Small or Restricted Population), it qualifies as Endangered due to the low number of mature individuals (<250 mature individuals).

Based on the area of occupancy and number of individuals under Criteria B, C, and D, we recommend the listing of *H. wissmannii* as Endangered under the Biodiversity Conservation NSW (BC) and Environment Protection and Biodiversity Conservation (Cth) (EPBC) Acts. Its narrow range, small population, and ongoing threats place it at high extinction risk, warranting conservation prioritisation as Endangered.

With the recognition of *H. wissmannii*, *H. lunatus* is now known from populations at Boonoo Boonoo National Park and Basket Swamp National Park, and its current listing as Vulnerable under the BC and EPBC Acts may require revision and upgrading to Endangered (see below).

**Specimens examined:** New South Wales: Northern Tablelands: Torrington State Conservation Area, SW of Bismuth Dam, above Highland Home Creek, 10 Nov. 2024, *P.J. Pemberton 72 & R.L. Andrew* (AD, BRI, CANB, CNS, K, L, MEL, MO, NE, NSW, P, US).

#### Specimens examined for comparison species:

*H. lunatus*: New South Wales: Northern Tablelands, Boonoo Boonoo National Park, Cyprus Camping area, 18 Oct 2000, *L.M. Copeland 2710* (CANB, K, MO, NSW, NE), Basket Swamp National Park, 08 Nov 2002, *L.M. Copeland, J.J. Bruhl & I.R. Telford 3547* (CANB, NSW, NE): North Western Slopes, Torrington, Bootha Rd, 04 May 1996, *J.T. Hunter 3930* (NSW, NE), Torrington, Butler Rd, 13 Nov 2000, *L.M. Copeland 2733 & P.J. Clarke* (BRI, CANB, K, MEL, NSW, NE).

*H. biflorus*: New South Wales, North Western Slopes, Kings Plains National Park, 4 Dec 2000, *L.M. Copeland 2785* (BRI, CANB, K, MEL, MO, NSW, NE Stud).

*H. binghiensis*: New South Wales: North Western Slopes, Torrington State Recreation Area, 14 Nov 2000, *L.M. Copeland 2735 & P.J. Clarke* (BRI, CANB, CFSHB, K, MEL, MO, NSW, NE Stud).

**Notes:** *Homoranthus wissmannii* differs from *H. lunatus* by the distinct modified internodes (pseudopeduncles) on flowering branchlets, and in the subtle shape difference of the mature leaves in side view. *Homoranthus wissmannii* is characterised by its ascending form, branched pseudopeduncles, leaf shape and glabrous hypanthium.

**Etymology:** This species is named in honour of Hans Wissmann, a former Botany Technical Officer at the University of New England and then long-time volunteer for the N.C.W. Beadle Herbarium, where he contributed 2,014 plant collections. This project was partly funded by the “Hans Wissmann Scientific Research Fund for Systematic Botany” student grant, which supported the collecting and DNA sequencing of plant samples.

#### Conservation assessment of *Homoranthus lunatus*

Following the reclassification of the Torrington populations as *Homoranthus wissmannii*, *H. lunatus* is now confined to three locations within Boonoo Boonoo and Basket Swamp National Parks in northern New South Wales. We assess the updated definition of *H. lunatus* against IUCN Red List criteria applicable to Australian federal and state listings. To be listed as threatened, a species must meet at least one criterion, with the highest eligible category assigned.

According to records from the Atlas of Living Australia (ALA) after 2000, the extent of occurrence (EOO) for *H. lunatus* is 7.42 km<sup>2</sup>, with an area of occupancy (AOO) of 12 km<sup>2</sup>. In 1999, J. Hunter reported that the Basket Swamp site supported approximately 300 individuals, while the Boonoo Boonoo River population was estimated at fewer than 1,000 individuals (Hunter 1999). Substantial fluctuations in population size have been documented, including a 60% decline during the 1997–1998 drought (Hunter 1999). More recently, in 2024, P. Pemberton observed approximately 200 individuals each at both Boonoo Boonoo River and Basket Swamp (approximately 400 total). In addition to these two populations, a third population occurs within Boonoo Boonoo National Park at Mount Prentice, with a population estimate of 50 individuals in 1994. The Wallangara wildfire impacted all three populations in February 2019 and is likely the cause in the observed population reductions at both Boonoo Boonoo River and Basket Swamp National Parks. Despite occurring within protected areas, the species remains vulnerable to threats such as grazing, altered fire regimes, climate extremes, and the inherent risks associated with small population sizes.

Under IUCN Criterion A, which assesses population reduction over the past ten years or three generations, *H. lunatus* qualifies as Endangered, based on an observed population decline exceeding 50%. It also meets the threshold for Endangered under Criterion B, due to its small area of occupancy (AOO) of 12 km<sup>2</sup> (well below the 500 km<sup>2</sup> threshold), occurrence at five or fewer locations, and documented extreme fluctuations in population size.

Under Criterion C, the species may qualify as Vulnerable, given that the total number of mature individuals is likely fewer than 10,000, with fewer than 1,000 individuals in each subpopulation. It also meets the threshold for Vulnerable under Criterion D due to its highly restricted range (AOO less than 20 km<sup>2</sup>) and limited number of locations.

In summary, *Homoranthus lunatus* qualifies as Endangered under Criterion A and B, and is Vulnerable under Criteria C and D. Further survey work is needed to update population estimates.

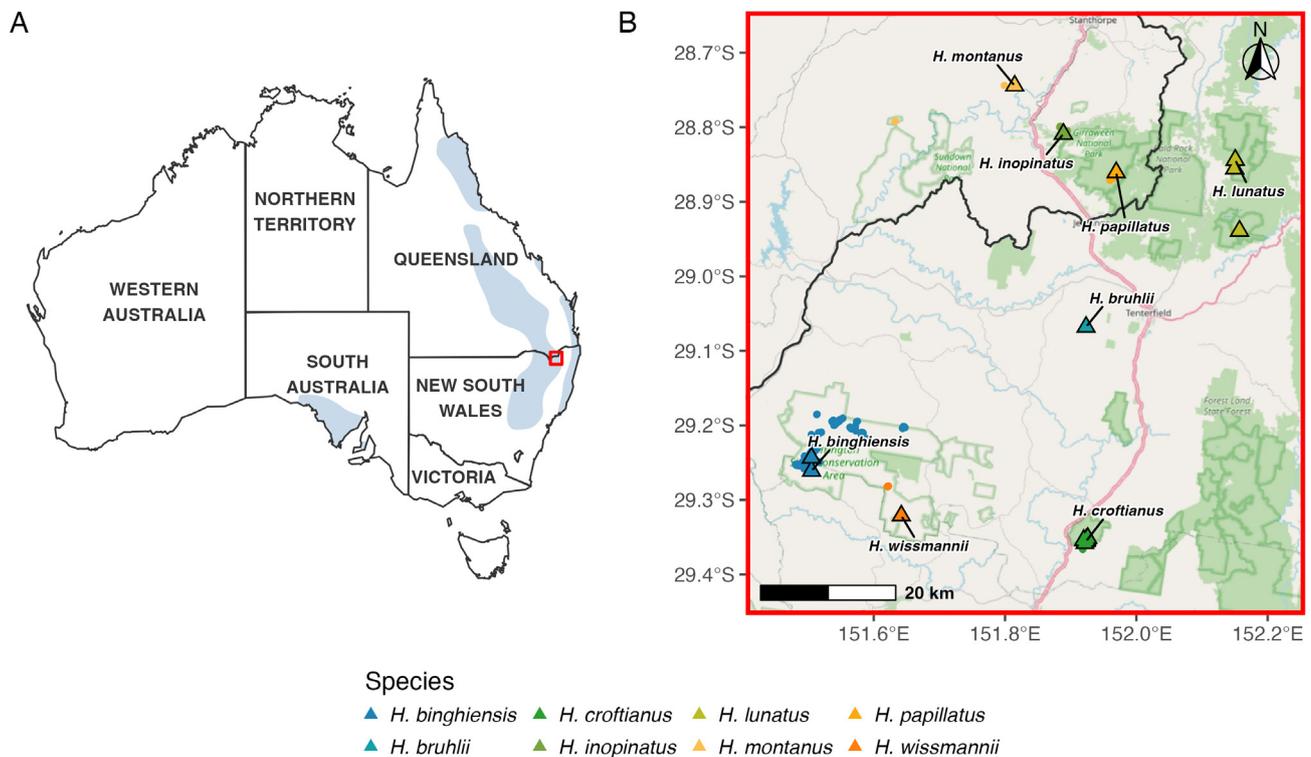
## Key to *Homoranthus* species

The key to species presented by Copeland *et al.* (2011) is amended as follows (**changes in bold**):

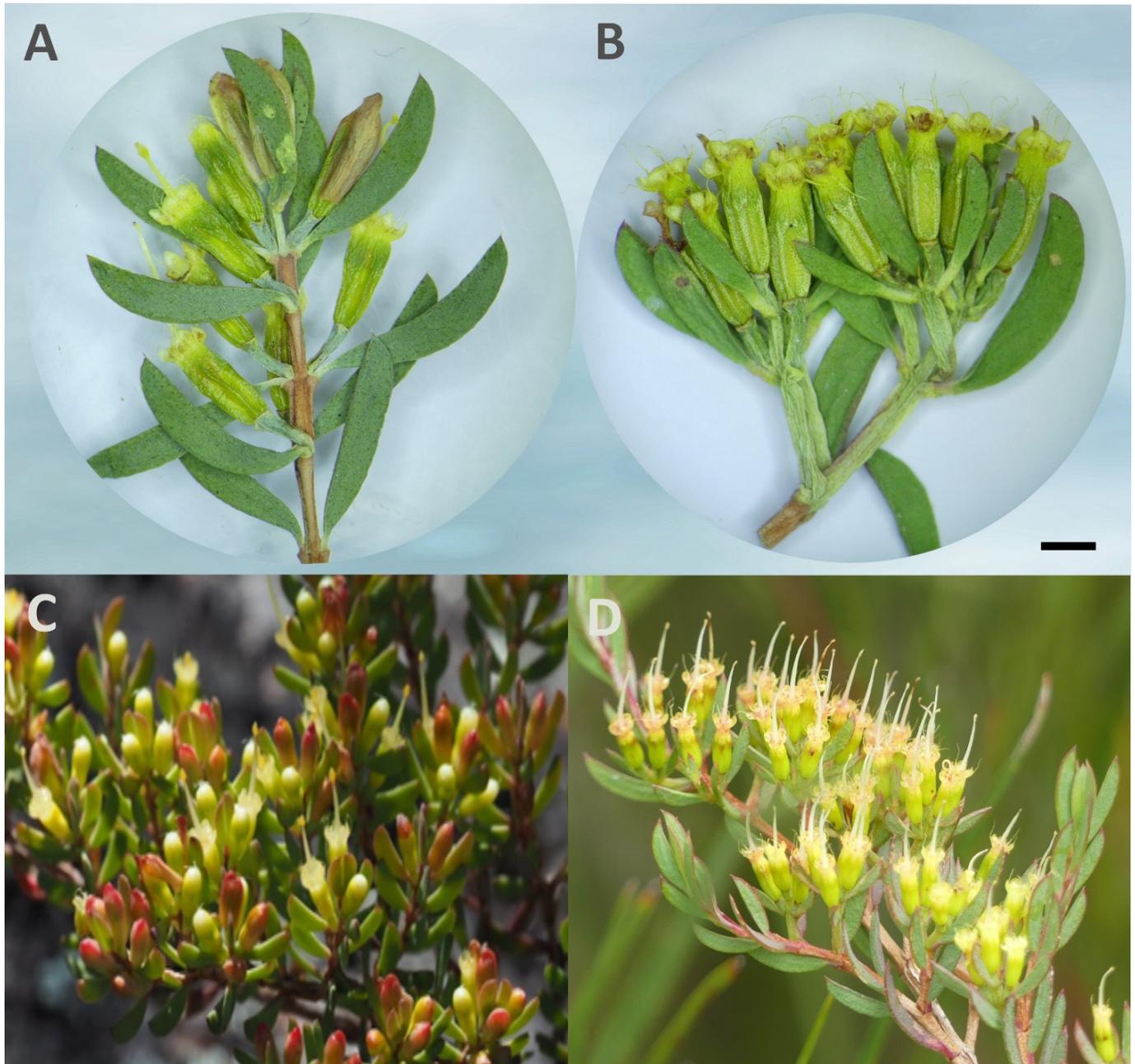
1. Leaf blade axe head-shaped in side view, >2.6 mm thick..... 2
- 1: Leaf blade incurved linear, incurved oblanceolate or lunate in side view, <2.5 mm thick..... 3
2. Sepals 3–4 mm long, white or pink; style 15–20 mm long, white or pink..... *H. thomasii*
- 2: Sepals 5–6.5 mm long, red; style 22–30 mm long, black..... *H. zeteticorum*
3. Leaves distinctly papillose..... *H. papillatus*
- 3: Leaves glabrous, smooth..... 4
4. Flowers clustered in terminal, corymbose heads of 5 or more flowers..... 5
- 4: Flowers not clustered in terminal, corymbose heads..... 6
5. Leaf blade linear in side view; stylar hairs mostly. Branched..... *H. wilhelmii*
- 5: Leaf blade incurved oblanceolate in side view; stylar hairs all simple, non-branched..... *H. tropicus*
6. Flowers held erect..... 7
- 6: Flowers pendulous..... 28
7. Hypanthium strongly constricted above the ovary; flowers turning purple with age..... *H. decasetus*
- 7: Hypanthium not constricted above the ovary; flowers variously coloured but never purple..... 8
8. Bracteoles strongly keeled on outer surface, apex acute; anthers red..... *H. homoranthoides*
- 8: Bracteoles rounded on outer surface, apex obtuse or retuse; anthers yellow to pale brown..... 9
9. Sepal apex obtuse to acute..... 10
- 9: Sepal apex long-acuminate or laciniate..... 11
10. Plants decumbent, rooting at the nodes; style 2–3 times as long as the hypanthium..... *H. decumbens*
- 10: Plants ascending, not rooting at the nodes; style <1.5 times as long as the hypanthium..... *H. brevistylis*
11. Sepal apex long-acuminate (or rarely with 2 or 3 short, slender processes in *H. vagans* and *H. inopinatus*)..... 12
- 11: Sepal apex always lacinate, divided into 2–12 long, slender processes..... 23
12. Peduncles 6–15 mm long..... *H. floydii*
- 12: Peduncles <4 mm long..... 13
13. Hypanthium densely hairy between the ribs with thin, unicellular trichomes..... *H. croftianus*
- 13: Hypanthium tuberculate or smooth between the ribs but without any thin, unicellular trichomes..... 14
14. Hypanthium tuberculate between the ribs with broad, rounded, multicellular trichomes..... 15
- 14: Hypanthium smooth between the ribs, multicellular trichomes absent..... 18
15. Plants erect, >1 m tall; petals, sepals and style creamy white..... *H. virgatus*
- 15: Plants decumbent to weakly erect, <0.8 m tall; petals, sepals and style yellow..... 16
16. Plants ascending to weakly erect, 0.15–1.2 m tall..... 17
- 16: Plants decumbent, 0.05–0.2 m tall..... *H. vagans*
17. Hypanthium 3.4–4.7 mm long; leaves slightly glaucous..... *H. flavescens*
- 17: Hypanthium 2.0–3.2 mm long; leaves strongly glaucous..... *H. prolixus*
18. Leaf blade lunate to narrow-oblanceolate, or hemi-elliptical, in side view, >1.1 mm thick at the deepest point..... 19
- 18: Leaf blade linear in side view, <1 mm thick..... 21
- 19. Flowers opposite, borne on modified branchlets, i.e. monads clustered on peduncle-like internodes (pseudopeduncle present)..... *H. wissmannii***
- 19: Flowers in pairs or threes borne on unmodified branchlets (pseudopeduncle absent)..... 20**
20. Plants ascending, usually <0.7 m tall; leaves <9 mm long..... *H. lunatus*
- 20: Plants erect, usually >0.8 m tall; leaves >11 mm long..... *H. inopinatus*
21. Plants erect, >1 m tall; hypanthium >4.2 mm long..... *H. montanus*
- 21: Plants decumbent to ascending, <0.6 m tall; hypanthium <3.8 mm long..... 22
22. Plants ascending, >0.25 m tall; leaves dull, slightly glaucous..... *H. melanostictus*
- 22: Plants decumbent, <0.2 m tall; leaves shiny, never glaucous..... *H. bebo*
23. Flowers clustered in pairs; clusters on a peduncle-like internode (**i.e., pseudopeduncle present**)..... 24
- 23: Flowers clustered in groups of 3 or more; flowering branchlets unmodified..... 25
24. Leaf blade linear in side view, <1 mm thick..... *H. biflorus*
- 24: Leaf blade incurved oblanceolate in side view, >1.3 mm thick..... *H. binghiensis*
25. Hypanthium densely hairy between the ribs with thin, unicellular trichomes..... *H. croftianus*
- 25: Hypanthium tuberculate or smooth between the ribs but without any thin, unicellular trichomes..... 26
26. Hypanthium tuberculate between the ribs; sepal apex with 3–6 laciniae..... *H. elusus*
- 26: Hypanthium smooth between the ribs; sepal apex with 2 or 3 laciniae..... 27
27. Mature plants <0.8 m tall; leaves 0.8–1.4 mm thick..... *H. bruhlii*
- 27: Mature plants >1.2 m tall; leaves <0.8 mm thick..... *H. montanus*
28. Leaves terete; plants restricted to New South Wales..... 29
- 28: Leaves conspicuously flattened; plants restricted to Queensland..... 30
29. Leaves 2.5–4.5 mm long; bracteoles persistent after anthesis..... *H. darwinioides*
- 29: Leaves 5–11 mm long; bracteoles caducous..... *H. cernuus*
30. Leaf blade <1.0 mm thick at deepest point; leaf margins strongly recurved when dry..... *H. tricolor*
- 30: Leaf blade >1.0 mm thick at deepest point; leaf margins never recurved..... 31
31. Flowers in clusters of 3–5, rarely 2; sepal laciniae with a conspicuous midvein..... *H. coracinus*
- 31: Flowers arranged in pairs; sepal laciniae without a conspicuous midvein..... 32
32. Style 7–11 mm long; sepal laciniae 0.3–0.6 mm long, barely exceeding the petals..... *H. cummingii*
- 32: Style >11 mm long; sepal laciniae >1.0 mm long, extending well beyond the petals..... 33
33. Leaves dull, slightly glaucous; bracteoles yellow aging red; style 16–19 mm long..... *H. porteri*
- 33: Leaves shiny, never glaucous; bracteoles creamy white; style 12–16 mm long..... *H. clarksonii*

**Table 1.** Comparison of selected morphological characters of the study group in *Homoranthus*.

| Character   | <i>H. biflorus</i>            | <i>H. binghiensis</i>               | <i>H. lunatus</i>         | <i>H. wissmannii</i>                      |
|---|-------------------------------|-------------------------------------|---------------------------|---|
| Mature leaf blade shape in side view                | incurved linear               | incurved to falcate                 | lunate to scimitar-shaped | hemi-elliptical                           |
| Leaf thickness (depth)                              | 0.3–0.5 mm                    | 1.3–2.6 mm                          | 1.0–1.8 mm                | 1.2–2.0 mm                                |
| Inflorescence pseudopeduncles                       | present                       | present                             | absent                    | present                                   |
| Pseudopeduncles branched                            | no                            | no                                  | not applicable            | yes                                       |
| Number of flowers in pseudoflorescence              | 2                             | 2                                   | not applicable            | 2–16 or more                              |
| Flower-heads above the apex of the flowering leaves | yes                           | no                                  | no                        | yes                                       |
| Hypanthium shape                                    | narrowly flared from the base | flared from the base                | flared from the base      | sides mostly parallel or slightly arcuate |
| Pedicels are uniform in length                      | yes                           | yes                                 | yes (at anthesis)         | no  |
| Sepal apex  | 3–5 laciniae                  | variously divided into 2–6 laciniae | long acuminate, entire    | long acuminate, entire                    |
| Plant height  | 1.2 m                         | 3.0 m                               | 1.0 m                     | 0.7 m                                     |
| Plant growth habit                                  | erect                         | erect                               | ascending                 | ascending                                 |



**Figure 1.** Geographic distribution of the populations of the eight species of *Homoranthus* for which samples were collected for the genomic analysis. (A) Blue-shaded areas show the known distribution of *Homoranthus* species, with the study region highlighted by a red box. (B) Detailed view of the study area, showing collection sites for each of the eight outcrop endemic species as triangles (including *H. wissmannii*), and additional dots indicate further records from the Australasian Virtual Herbarium (AVH since 2000. <https://avh.chah.org.au/>, accessed 05 March 2025 ). The New South Wales–Queensland border is marked in grey.



**Figure 2.** Modified flowering branchlets, inflorescence and hypanthium of *H. lunatus* and *H. wissmannii*. (A) *H. lunatus* (from Pemberton 65d) and (B) *H. wissmannii* (from Pemberton 72); scale bar of A and B = 2 mm. In B, two flowering branchlet leaves were removed from the lower pseudopeduncle closest to the lens for a clearer view of the modified branchlet. *Homoranthus lunatus* (C) consists of solitary flowers with lower flowers amongst floral leaves that are similar in length to those of leaf branchlets. In contrast, the *H. wissmannii* (D) solitary flowers are borne on branched pseudopeduncles and pedicels of varying length, and appear as an exposed cluster, with all flower heads on the same plane, prominent, and above the apices of flowering branchlet leaves. Note: In (C), *H. lunatus* is pictured at the commencement of flowering, and many bracteoles (floral prophylls) are still present. The term bracteole is used in this paper to be consistent with the key to *Homoranthus*. Images: A, B and D: P.J. Pemberton; C: J.J. Bruhl.

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