Nuytsia
The journal of the Western Australian Herbarium

Volume 36: 123–139
Published: 25 September 2025
https://doi.org/10.58828/nuy01095

Three new species separated from the eastern Australian *Haemodorum planifolium* (Haemodoraceae)

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Abstract

Macfarlane, T.D. & Barrett, R.L. Three new species separated from the eastern Australian *Haemodorum planifolium* (Haemodoraceae). *Nuytsia* 36: 123–139 (2025). The taxonomy of the eastern Australian species *Haemodorum planifolium* R.Br. is reviewed and it is divided into four species, three of them new. *Haemodorum brevistylum* T.Macfarlane & R.L.Barrett occurs mainly in the South Coast and Southern Tablelands regions, north to the Central Coast and Central Tablelands of New South Wales. *Haemodorum collevatum* T.Macfarlane & R.L.Barrett has a limited distribution in the Northern and Central Coast regions from Sydney to Newcastle. *Haemodorum celsum* R.L.Barrett & T.Macfarlane is a species of the Northern Tablelands region of New South Wales and the Granite Belt in the southern Darling Downs District of Queensland. *Haemodorum planifolium* R.Br. is re-described and lectotypified. In the revised sense, *H. planifolium* occurs in the Central Coast and Central Tablelands regions of New South Wales (i.e. Wollongong to Gosford, inland to Newnes). All species are illustrated and mapped and a key to the *Haemodorum* species of New South Wales is provided.

Introduction

Haemodorum Sm. (Haemodoraceae) is a genus currently of 30 species (Council of Heads of Australasian Herbaria 2006–), all occurring in Australia with one species extending to New Guinea. The most recent additions to the genus were by Barrett *et al*. (2015), who added seven species from north-western Australia. A checklist with new taxa is being published simultaneously with this paper (Hopper *et al.* 2025). In a Flora account, Macfarlane (1987, 2020) reported that *H. planifolium* R.Br., occurring in New South Wales and southern Queensland, is variable in inflorescence form and relative dimensions of some floral parts and that it required further study. We have made a more detailed study of *H. planifolium*, concluding that the current concept of that species encompasses four species, three of them newly described here. The treatment by Harden (1993) simply followed Macfarlane (1987), without mention of any morphological variants. Full descriptions and photographs of the four species are provided here.

Methods

All relevant specimens at AD, BM, BRI, L, K, MEL, NSW, PERTH and SYD were examined, along with selected specimens on loan from CANB. A digital image of a specimen at CGE was also seen (S.A. James *pers. comm.*). Type specimens have been examined at BM, MEL, NSW and online through *Global Plants* (https://plants.jstor.org/). All specimens cited have been examined unless indicated with *n.v*. *Haemodorum brevistylum* T.Macfarlane & R.L.Barrett, *H. collevatum* T.Macfarlane & R.L.Barrett

ISSN 2200-2790 (Online)
https://florabase.dbca.wa.gov.au/nuytsia/

and *H. planifolium* R.Br. have been examined in the field by RLB. We also assessed all records of *Haemodorum* from New South Wales and adjacent south-east Queensland on the citizen science platform iNaturalist (https://www.inaturalist.org/; accessed 14 February 2025). The maps are based on cited and selected other specimens and the cited iNaturalist observations.

Character notes

Most characters are depicted in the Figures and referenced in the captions.

Basal leaves are attached below ground and form a tuft at the base of the inflorescence scape. There are a varying number of leaves attached above ground (*leaves on scape*) that resemble the basal leaves in length, transitioning upwards into shorter *bracts*, the lower of which may be green and the colour may change to blackish in upper ones.

Pedicels are measured from the flower base (base of the receptacle) to the branch point below and bear two separated bracteoles, the lower and upper. Flowers terminating a main axis often have an atypical arrangement, e.g. an unusually long 'pedicel' and deviate from having two bracteoles, so they have been ignored for pedicel measuring.

Flower groupings in the inflorescence have been usually termed *aggregations* for the large, dense collection of flowers in all species other than *H. collevatum*, rather than terms such as clusters or cymes that imply a lower level of grouping.

Major branches are primary branches that bear an aggregation of flowers like (but often smaller than) the main terminal aggregation. Occasionally there is ambiguity between a terminal cluster and a major branch because of close spacing of the structures.

Terminal aggregations of flowers are those borne on the morphological terminus of the main axis, which can be identified by tracing the main axis past each branch point, the branch identifiable by its subtending bract.

A comparison of characters for the four species described here is provided in Table 1.

Table 1. Comparison of characters for species in the *Haemodorum planifolium* complex.

Character	***H. brevistylum***	***H. celsum***	***H. collevatum***	***H. planifolium***
Basal leaf number (per scape)	3–5	3–7	4–6	4–8
Leaf width	2.8–4.5(–5.5) mm	1.6–3.7(–5.7) mm	1.5–6(–7) mm	3.5–4.4 mm
Leaves and bracts on scape	Scape leaves 1 or 2, green, transitioning to blackish bracts, lowest bract to 210 mm long	Scape leaves (3)4(5), green, transitioning to blackish bracts, lowest bract to 250 mm long	Scape leaves 3 or 4, green, transitioning to glaucous-green bracts, lowest bract to 210 mm long	Scape leaves reduced, sometimes 1–3 leaf-like and green, transitioning to brownish or blackish bracts, lowest bract to 180 mm long
Scape colour	glaucous-green	brownish	glaucous-green	glaucous-green to blackish

Character	*H. brevistylum*	*H. celsum*	*H. collevatum*	*H. planifolium*
Inflorescence major branch number	0–3	1–4	4–6	1–4
Inflorescence major branch length	40–114 mm	60–90 mm	70–450 mm	20–160 mm
Inflorescence major branch angle from main axis	15–45°	10–40°	45–90°	30–55°
Inflorescence secondary branching of major branches (excl. within flower aggregations)	0–1 branched	0–1 branched	Repeatedly branched	0–1 branched
Flower grouping pattern	A dense flower aggregation terminating main axis and major branches	A dense flower aggregation terminating main axis and major branches	Small flower clusters terminating branches	A dense flower aggregation terminating main axis and major branches
Terminal flower aggregation position relative to other aggregations	Shorter	Shorter	Slightly longer, equal or slightly shorter	Shorter
Number of flowers in terminal aggregation	10–22	13–21	*c.* 6	9–30
Number of flowers in other aggregations	5–11	7–14	2–4	5–19
Pedicel length	4–10 mm	4–10 mm	6–12 mm	4–11 mm
Bracteole length	4–10 mm	10–14 mm	3.5–8 mm (lower); 4.5–7 (upper)	6.5–8.5 mm
Upper bracteole distance below flower	2–3 mm	4–8 mm	1.9–3.5 mm	1–2 mm
Flower length	9.5–11(–12.5) mm	(13–)15–19 mm	(10–)11–14 mm	(8–)9–16 mm
Anther length	2–3.2 mm	3.8–5.1 mm	3.2–3.7 mm	3.4–4.0 mm
Style length	5.8–7.5 mm	14–16 mm	(8.5–)10–12 mm	(9.5–)11.2–14.0 mm
Stigma (style apex) form	shortly trifid	entire	entire	entire
Style apex position relative to petal tips	Shorter by 2–3.4 mm	Longer by (0–) 0.5–1 mm	Longer by 0.3–1.8 mm	Longer by 0–1.2 mm
Fruit colour	bright to dark reddish brown to dark brown	greenish to brownish black	mid-brown, sometimes with a reddish tint	dark brown to blackish
Fruit diameter	7.5–8.5 mm	8–11 mm	9–14 mm	10–13 mm

Taxonomy

Haemodorum brevistylum T.Macfarlane & R.L.Barrett, *sp. nov.*

Type: SE-most walking track entrance to Tura Flora Reserve, inside High Crescent, Tura Beach, *c.* 3 km direct N of Merimbula, South Coast, New South Wales, Australia, 25 November 2024, *J. Miles* 25-17 (*holo*: NSW 1326955; *iso*: PERTH).

Plant 53–75 cm tall. *Bulb* 4–13 cm below the soil surface, red. *Basal leaves* 3–5 (up to 8 when two inflorescences present); lamina linear, flat, up to (180–)250–470 mm long, 2.8–4.5(–5.5) mm wide. *Leaves on scape* 1 or 2, green, transitioning to blackish bracts, lowest bract to 210 mm long. *Inflorescence* usually one (occasionally 2) per plant, paniculate; scape 350–690 mm long, glaucous-green; flowering portion 80–235 mm long from lowest major branch, with 0–3 major branches 40–114 mm long, the branches narrowly spreading at 15–45° from the main axis, secondary branches (excluding within flower aggregations) 0–1; flowers arranged in dense cymose aggregations, terminal on the main axis and each major and secondary branch (when present), flowers 10–22 in terminal aggregation, 5–11 in branch aggregations; terminal aggregation exceeded by those on the branches. *Pedicels* 4–10 mm long. *Bracteoles* 2, similar, 4–10 mm long, ovate to narrowly ovate, acute to acuminate, opaque, the texture fairly thick, without a differentiated broad membranous margin, veins several, obscure; upper bracteole attached 2–3 mm below the flower base, apex at *c.* 1/4 of the flower length. *Flowers* 9.5–11(–12.5) mm long; sepals similar to petals but shorter to almost equal, oblong or ovate-oblong, becoming narrowly linear when dried except for the broader unexpanded base, dark brown to black; petals 9–10(–11.5 mm long, orange-brown in lower part, dark brown to blackish in upper part. *Stamens* equal, enclosed in perianth; filaments 5.5–6.5 mm long, at least sometimes pink; anthers versatile, 2–3.2 mm long, yellow, the tip 1–3 mm below petal apex. *Style* 5.8–7.5 mm long, red to orange in upper part, yellow in lower 1/3 at anthesis, shorter than the petals by 2–3.4 mm; stigma shortly trifid, minutely papillose, positioned from the middle or to the tip of the anthers. *Fruits* bright to dark reddish brown to dark brown, glossy, 7.5–8.5 mm diameter. *Seeds* not seen. (Figure 1)

Diagnostic features. *Haemodorum brevistylum* may be distinguished from all other members of the genus by the following combination of characters: leaves flat; inflorescence paniculate, with major branches spreading at relatively narrow angles (15–45°), flowers in dense aggregations of 5–22; bracteoles at least partly dark brownish to black, without a differentiated broad membranous margin, upper bracteoles attached relatively distant from the flower base by 4–8 mm; sepals dark brown to blackish; anthers 2–3.2 mm long, held within the flower and shorter than the petal tips by 1–3 mm; style short (5.8–7.5 mm long), not exceeding anther tips and shorter than petal apices by 1–3 mm; stigma shortly trifid.

Other specimens examined. NEW SOUTH WALES: Clyde District, Nov. 1884, *W. Baeuerlen* 178 (MEL 609496); Braidwood District, Feb. 1885, *W. Baeuerlen* 437 (MEL 609539); near Hume Hwy, 1 mile N of Paddy's River Bridge, 22 Jan. 1968, *I. Beeton s.n.* (CANB CBG 022273); Agnes Banks, near Richmond, 40 m, 11 Sep. 1975, *D.H. Benson* 1320 (NSW 408425); Currockbilly Mountain near Braidwood, Mar. 1909, *J.L. Boorman s.n.* (NSW 149755); South Coast Study Area, 35°30'S, 150°10'E, 31 Mar. 1974, *L.A. Craven* 2644 (CANB); Lapstone Hill, within railway fence, 27 Oct. 1927, *O.D. Evans* 2389 (CANB 2257; SYD); St Marys, Dec. 1925, *O.D. Evans s.n.* (SYD); Spence Road between Government Road and Judd Street, Shane Park, Crown Land, 30 m, 16 Jan. 1991, *P.D. Hind 6312* (NSW 237172); near Carrington Falls, Moss Vale – Robertson area, 29 Dec. 1974, *K.H.L. Key s.n.* (CANB 249364); Lower Boro, c. 28 km N of Braidwood, 19 Jan. 1989, *P.G. Kodela & D.A. Foster s.n.* (NSW 436949); Charleyong – Tarago Rd, 15 Oct. 1952, *C.W.E. Moore* 1906 (CANB 51037); close to entrance at Rickards Road, Agnes Banks Nature Reserve, 26 m, 12 Jan. 2004, *L. von Richter 358 & W. Robertson* (NSW 615730); Yalwal, Nov. 1923, *F.A. Rodway s.n.* (NSW 149741); back of Post Office, Royal Naval College, Jervis Bay, Jan. 1924, *F.A. Rodway s.n.* (NSW 149740); Burrier Road, *c.* 8 mi [12.9 km] from Nowra, 21 Dec. 1930, *F.A. Rodway s.n.* (K *n.v.*; NSW 149739); between Stony Creek and Steamer Beach, S of Jervis Bay, 8 Feb. 1942, *F.A. Rodway s.n.* (NSW 254952); S of Jervis Bay, 8 Feb. 1942, *F.A. Rodway s.n.* (NSW 149738); Candelo [?region], Feb. 1885, *T. White s.n.* (MEL 609540).

Figure 1. *Haemodorum brevistylum*. A – base of plant showing the flat leaves and glaucous inflorescence axis [scape]; B – fruiting inflorescence showing the panicle structure, with a dense terminal aggregation of flowers and major branches with relatively narrow branch angle and a dense flower aggregation on each, exceeding the terminal one in height; C – an aggregation of post-anthesis flowers showing perianth exterior colours; D – two aggregations of late post-anthesis flowers showing developing fruits and the positions of petal tips, anthers and style tips; E – a flower aggregation from above showing flowers at anthesis (top left) with petals closed, as usual in *Haemodorum*, shorter sepals and older flowers showing red well-developed immature fruits and perianth internal colours; F – a flower aggregation with dark brown to black mature fruits. Photographs (A, C) by Max Campbell, Tura Beach, iNaturalist: 252568540 (CC-BY); (B, D, F) by Russell Barrett, Carrington Falls; (E) by Robyn Russell, Morton National Park, iNaturalist: 147053480 (CC-BY-NC).

Selected iNaturalist observations [13 of 40] (https://www.inaturalist.org/observations/). NEW SOUTH WALES: 68476885; 143628071; 146265236; 146755376; 187762828; 249839236; 250998376; 252258072; 253342237; 254364466; 254453074; 257214207; 257895959.

Phenology. Flowering from November to December (occasionally to January). Fruiting December to February.

Distribution and habitat. South Coast and Southern Tablelands regions with outlying occurrences near Sydney, Central Coast region, and Blue Mountains, Central Tablelands, New South Wales, Australia (Figure 2). The known range is from Eden north to Carrington Falls near Mossvale with outlying collections from Lapstone Hill and Agnes Banks in north-western Sydney and iNaturalist observations from the Blue Mountains. Previously it was known only as far south as the Batemans Bay area but in recent years the range has been extended 150 km southward through images posted on iNaturalist Australia (under *H. planifolium*), now supported by specimen evidence via assistance from iNaturalist contributors (e.g. *J. Miles* 25-17). The species grows in infertile soils, usually sand over sandstone, occasionally noted as sand over clay soil, in forest dominated by *Angophora bakeri*, *Corymbia* spp. (e.g. *C. gummifera*), *Eucalyptus* spp. (e.g. *E. sclerophylla, E. sieberi, E. globoidea*) and *Themeda triandra*, and also in low heathland at higher altitudes. It ranges from near sea level to higher altitudes inland. There is some evidence of it flowering following fire or other disturbance.

Conservation status. While poorly known, and with relatively few recent collections, the distribution of the species, combined with recent citizen science records, suggest that this species is not currently of conservation concern.

Etymology. The epithet is from *brevi-* (short, in Latin compounds) and *stylus* (style), in reference to the comparatively short style of this species.

Haemodorum celsum R.L.Barrett & T.Macfarlane, *sp. nov.*

Type: Basket Swamp National Park, NNE of Tenterfield, New South Wales, 9 December 2003, *A.R. Bean* 21326 (*holo*: NSW 843744; *iso*: BRI AQ764379, *n.v.*).

Illustration. G. Holmes *et al*., *Flora of the granite belt* 117, pl. (2018) (as *H. planifolium*).

Plant 90–120 cm tall. *Bulb* 5–15 cm below the soil surface, red. *Basal leaves* 3–7 (up to 18 when more than one inflorescence present); lamina linear, flat, (120–)180–390 mm long, 1.6–3.7(–5.7) mm wide. *Leaves on scape* (3)4(5), green, lowest bract to 250 mm long, reducing in size above and transitioning to blackish bracts within the flowering portion. *Inflorescence* 1–3 per plant, paniculate; scape 890–1180 mm long, brownish; flowering portion 90–180 mm long from lowest major branch, with 1–4 major branches 60–90 mm long, the branches narrowly spreading at 10–40° from main axis; secondary branches (excluding within flower aggregations) 0–1, with flowers arranged in dense cymose aggregations, terminal on the main axis and each major and secondary branch (when present), flowers 13–21 in terminal aggregation, 7–14 in branch aggregations; terminal aggregation exceeded by those on the branches. *Pedicels* 4–10 mm long. *Bracteoles* 2, similar, 10–14 mm long, narrowly lanceolate to linear, acute to acuminate, opaque, the texture fairly thick, without a differentiated broad membranous margin, veins usually 5, obscure to slightly raised; upper bracteole attached 4–8 mm below the flower base, apex at *c.* 1/2 of the flower length. *Flowers* (13–)15–19 mm long; sepals similar to petals, subequal or 0.5–2 mm shorter, lanceolate, becoming narrowly linear when dried except for the broader unexpanded base which is 1.6–2.1 mm wide, mostly dark brownish but green at least on the expanded, somewhat saccate base; petals 12–17 mm long, orange-brown in lower part, dark brown to blackish in upper part. *Stamens* equal, enclosed in perianth; filaments 5.2–8.0 mm long; dull pink to orange-brown; anthers versatile, 3.8–5.1 mm long, yellow, the tip 3.6–5.0 mm below petal apex. *Style* 14–16 mm long, pink or red to orange or yellow in upper part, yellow to green in lower 1/2 at anthesis, usually longer than the petals by (0–)0.5–1 mm; stigma entire, slightly

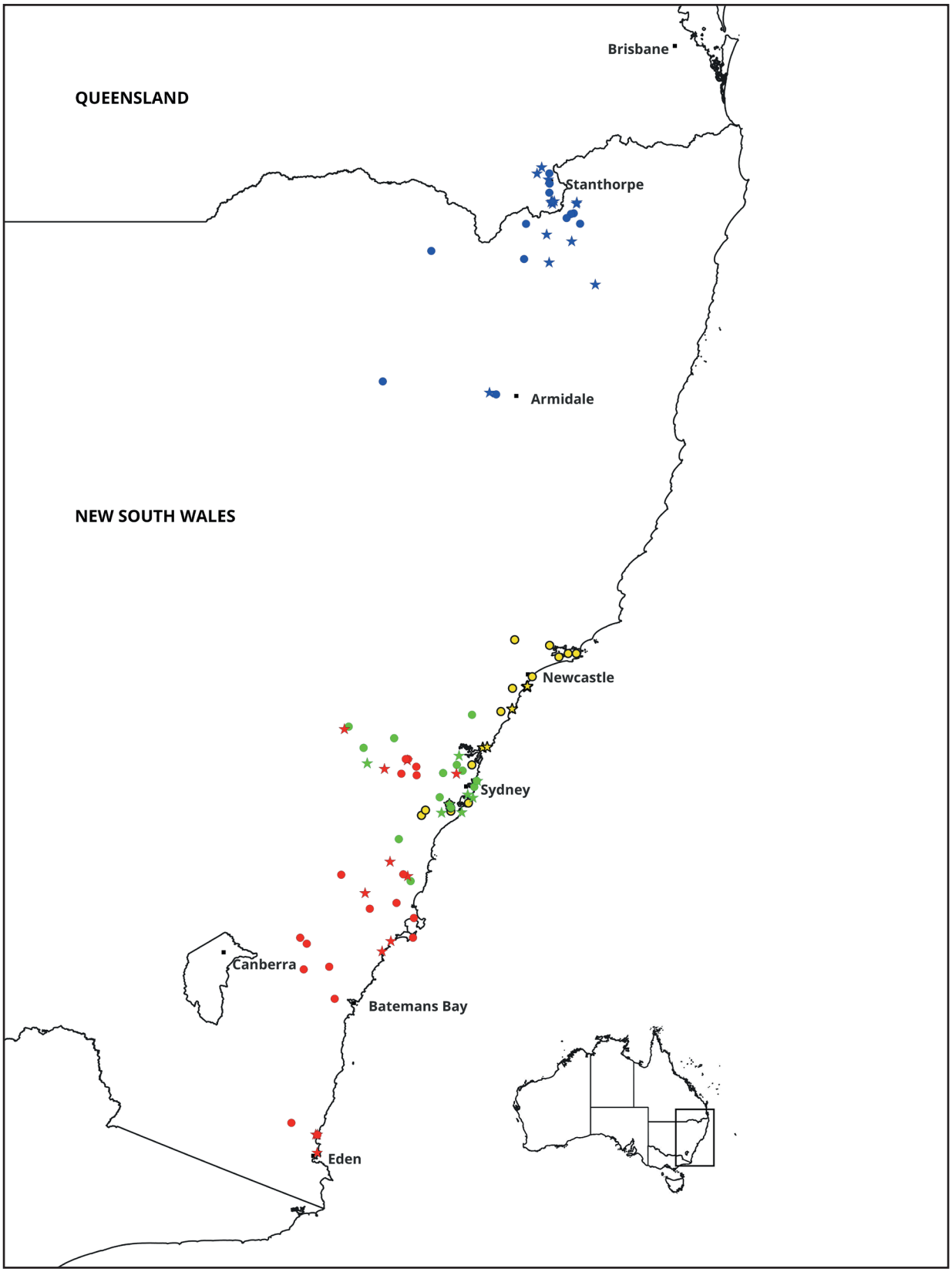

Figure 2. Distribution map for *Haemodorum* species. Symbols indicate specimen records (circles) and iNaturalist observations (stars). Species colour representations: red *H. brevistylum*, blue *H. celsum*, yellow *H. collevatum*, green *H. planifolium*.

capitate, minutely papillose, positioned 3–5 mm above the tip of the anthers. *Fruits* greenish to brownish black, glossy, 8–11 mm diameter. *Seeds* not seen. (Figure 3)

Diagnostic features. *Haemodorum celsum* can be distinguished from the other species in the genus by the combination of flat leaves; inflorescence paniculate, with major branches spreading at relatively narrow angles (10–40°), flowers in dense aggregations of 7–21; bracteoles without a differentiated broad membranous margin; flowers at least partly dark brown to blackish; sepals green, at least towards the base on the abaxial surface; anthers 3.8–5.1 mm long, held within the flower and shorter than the petal tips by 3.6–5 mm; style long (14–16 mm long), equalling or exceeding the petal tips by (0–)0.5–1 mm; stigma entire.

Selected specimens examined. QUEENSLAND: Stanthorpe, *s.dat., F.M. Bailey s.n.* (BRI AQ136742); Wyberba, 19 Jan. 1933, *S.T. Blake* 4558 (BRI AQ136740); near Ballandean, Nov. 1944, *M.S. Clemens s.n.* (BRI AQ0136741); Stanthorpe, 29 Mar. 1960, *W.T. Jones* 1427 (CANB 129706); Stanthorpe, 11 Aug. 1966, *W.T. Jones* 3227 (CANB 189736); eastern Darling Downs, *s.dat., H. Lau s.n.* (MEL 532830); Stanthorpe, Dec. 1883, *B. Scortechini s.n.* (NSW 149776). NEW SOUTH WALES: Wallangra, Nov. 1912, *J.L. Boorman s.n.* (NSW 149756); 'Dunbarra', W of Invergowrie, SE of The Pinnacle, *c.* 100 m NW of Teatree Creek, 25 Dec. 2024, *J.J. Bruhl & J.T. Hunter* JJB 3875 (NE 116203, NSW, PERTH); Torrington, 29 July 1907, *R.H.C. [Camfield?] s.n.* (SYD); Boonoo Boonoo National Park rangers house, off Mount Lindesay Road, Tenterfield, 9 Nov. 1998, *S.D. Hopper* 8403 (PERTH 09277234); Great Dividing Range, 8 miles N of Tenterfield on Mt Lindesay Highway, 24 Nov. 1973, *A.N. Rodd* 2494 (NSW 811725); granite ranges E of Barraba, Nov. 1913, [H.M.R.] *Rupp s.n.* (MEL 103494); Clifton, *s.dat., C. Stuart s.n.* (MEL 609487); New England, *s.dat., C. Stuart s.n.* (MEL 609497); Timbarra, Dec., *C. Stuart* 141 (MEL 609486, MEL 609482); Torrington, *c*. 3750 ft, 22 Feb. 1961, *J.W. Vickery s.n.* (NSW 149748).

Selected iNaturalist observations [17 of 46] (https://www.inaturalist.org/observations/). QUEENSLAND: 58581260; 107100980; 222830143; 147849742; 178341590; 248416403; 248563392; 252680099; 252773548; 254464256. NEW SOUTH WALES: 129130898; 144199020; 243740580; 246717320; 253392218; 259823125; 259824277.

Phenology. Flowering from November to December (January). Fruiting from December to February.

Distribution and habitat. *Haemodorum celsum* grows on the Northern Tablelands of New South Wales and adjacent south-east Queensland, between Stanthorpe and Walcha (Figure 2). Grows in open woodland with *Eucalyptus cameronii*, *E. campanulata*, *E. radiata*, and shrubby understorey over porphyry geology in coarse sands.

Conservation status. While relatively localised in distribution, the species is represented in a sufficient number of conservation reserves that it is not currently considered to be of conservation concern.

Etymology. The epithet is from the Latin *celsus* (prominent, elevated), in reference to the location of this species on the New England Tableland, at higher elevations than its relatives *H. brevistylum* and *H. planifolium*. It also refers to the long style, with the apex commonly exposed above the tepals at anthesis.

Notes. A mixed collection of *H. collevatum* and *H. celsum* by the early collector, scientist and explorer Ludwig Leichhardt in about 1842, 'going to Mr Hurry's, New England' (MEL 609494) suggests that he distinguished the two species during his journey although the combining of the material indicates that this distinction was not appreciated until now. Mr Hurry appears to be Edward Hurry who had established the pastoral property Bolivia in 1840 or 1841 and sold it in 1842 (Irby 1939), now the locality Bolivia in Shire of Tenterfield, Northern Tablelands region, New South Wales.

Figure 3. *Haemodorum celsum*. A – a plant with two inflorescences showing major branches with relatively narrow branch angles and flowers in dense aggregations on terminus and major branches; B – flower (centre) at anthesis with closed perianth with brown sepals and petals green at the base, stigma just showing above petal tips and bracteoles distinctly separated from the flower base; C – the same flower with a petal and a sepal removed, showing a stamen well-enclosed within the flower (style not shown); D – a flower (right) with a dull reddish full size immature fruit and style as long as the persistent perianth. Photographs by Jeremy Bruhl, W of Invergowrie (Voucher: *J.J. Bruhl & J.T. Hunter* JJB 3875, NE).

Haemodorum collevatum T.Macfarlane & R.L.Barrett, *sp. nov.*

Type: Nelson Bay [Port Stephens, New South Wales], 2 December 1964, *G.M. Lithgow s.n.* (*holo*: NSW 149742).

Plant 65–135 cm tall. *Bulb* to 25 mm diameter, 6–21 cm below the soil surface, dark orange. *Basal leaves* 4–6; lamina linear, flat, 350–1060 mm long, 1.5–6(–7) mm wide. *Leaves on scape* 3 or 4(5), green, transitioning to glaucous-green bracts, lowest bract to 210 mm long. *Inflorescence* one (rarely 2) per plant, paniculate; scape 620–1310 mm long, glaucous-green; flowering portion from lowest major branch 150–450 mm long, with 4–6 primary branches 70–450 mm long, the branches widely spreading at 45–90° from main axis, secondary branching well developed, sometimes repeatedly; flowers in small dense cymose aggregations terminal on the main axis and major and secondary branches, 4–6(–8) in terminal aggregation, 2–4 in branch aggregations; terminal aggregation slightly exceeding, equalling or slightly shorter than those on the branches. *Pedicels* 6–12 mm long. *Bracteoles* 2, similar or the lower broader, the texture fairly thick, opaque, without a differentiated broad membranous margin, veins several, obscure; lower bracteole 3.5–8 mm long, narrowly ovate, ovate or obovate, acute; upper bracteole 4.5–7 mm long, ovate to narrowly oblong, acute to obtuse, attached 1.9–3.5 mm below the flower base, the apex at base or to *c.* 1/4(–1/2) of the flower length. *Flowers* (10–)11–14 mm long; sepals similar to petals but 1–1.5 mm shorter, narrowly oblong to almost lanceolate, dark brownish, to dark greenish brown towards base; petals 10–13 mm long, dark brownish, sometimes with a purple tint. *Stamens* equal, enclosed in perianth; filaments 6–7 mm long, yellowish; anthers versatile, 3.2–3.7 mm long, yellow, the tip 2.3–4.1 mm below petal apex. *Style* (8.5–)10–12 mm long, orange-red at apex, pale green in lower 1/3, longer than the petals by 0.3–1.8 mm; stigma entire, slightly capitate, positioned 3–4.1 mm above the anther tips, exceeding petal tips by 0.3–1.8 mm. *Fruits* mid-brown, sometimes with a reddish tint, glossy, 9–14 mm diameter. *Seeds* black, winged-discoid, 6–7 mm long, 4–5 mm wide. (Figures 4, 5)

Diagnostic features. *Haemodorum collevatum* is distinguished from all other species in the genus by the leaves flat; inflorescence an open panicle with major branches spreading at wide angles (45–90°), usually repeatedly branched with flowers in small clusters of 2–4 (*c.* 6 in terminal cluster); flowers at least partly dark brownish; bracteoles without a differentiated broad membranous margin; anthers 3.2–3.7 mm long, held within the flower and shorter than the petal tips by 2.3–4.1 mm; style exceeding petal tips by 0.3–1.8 mm; stigma entire.

Other specimens examined. NEW SOUTH WALES: 50 m N of Coolgardie Crescent, Burnum Burnum Nature Reserve, Sutherland, 20 Feb. 2025, *R.L. Barrett* RLB 9676 (CANB, MEL, NSW, PERTH); Charmhaven, NE of Wyong, 15 Nov. 1969, *B.G. Briggs* 2988 (NSW 254895); Kings town, Newcastle, Nov. 1804, *R. Brown s.n.* [Iter Austral. 5619] (BM (BM000552334)); Hunters River, *R. Brown s.n.* (E (E00682543) image!); Kingstown, Hunters River, *s.dat.*, *R. Brown s.n.* (K (K000846224; K000846230); Newcastle, *s.dat.*, *R. Brown s.n.* [Iter Austral. 5619] (K (K000846222)); Port Stephens, *s. dat*., *Burnett* (CGE 00063182, image!); Newcastle, 19 Nov. 1901, *R.H. Cambage* 604 (NSW 254961); [Royal] National Park, Dec. 1895, *J.H. Camfield s.n.* (NSW 149732); Toronto, Oct. 1924, *E. Cheel s.n.* (NSW 149746); Salamander Bay, Port Stephens, 20 ft, *s. dat*., *S. Clarke s.n.* (NSW 149747); Temptation Creek, Royal National Park, 30 Apr. 1984, *R. Coveny* 11839 *& W. Bishop* (NSW 630463, PERTH 01735152); Bahai Temple, Ingleside, 24 Nov. 1981, *R. Coveny* 11070 & *P. Hind* (NSW 628971; K, L, MO, RSA all *n.v.*); Botany Bay National Park, Kurnell, Polo Road, 15 m, 23 Apr. 2007, *D.M. Crayn*, *R.G. Coveny & M.R. Whitehead* 1084 (NSW 759563); 2 mi. [3.2 km] W of Karuah, 12 Oct. 1953, *L.A.S. Johnson s.n.* (NSW 149743); 600 m W of Georges River crossing on Wedderburn Road, Georges River Nature Reserve, 260 m, 3 Apr. 1992, *M. Kennedy* 322 *& P. Hind* (NSW 253303); Georges River, Kentlyn, 19 Nov. 1966, *E.J. McBarron* 13594 (NSW 254968); Georges River, Kentlyn, 21 Dec. 1966, *E.J. McBarron* 13725 (NSW 2192294); Paterson, Nov. 1924, *J.D. Tucker s.n.* ex *H.M.R. Rupp* (MEL 103497); *c.* 2 km due S of Tanilba, 5 Nov. 1979, *H. Van Rees* 177 (MEL 578243).

Figure 4. *Haemodorum collevatum*. A – an inflorescence at anthesis showing the wide branching angle, small flower aggregations and glaucous inflorescence axis [scape]; B – two inflorescences with flowers at anthesis and developing fruit showing repeated branching, wide branch angles panicle structure and small flower aggregations; C – base of plant with flat leaves and two inflorescence axes; D – part of an inflorescence axis showing glaucous surface, a green leaf-like bract and flat leaf blades; E – a flower cluster showing two flowers at anthesis with perianth closed, green and partly black sepals and reddish brown petals, the long style with stigma shortly exposed above tips of petals and green and blackish bracteoles; F – full size immature dull reddish fruits. Photographs A–C, E, F, from Awabakal Nature Reserve; D from Newcastle. (A) by Tom Fletcher, iNaturalist: 251106974 (CC-BY-NC); (B, C) by Gary Williams, iNaturalist: 143981253 (CC-BY-SA); (D) by Ron O'Reilly, iNaturalist: 141947754 (CC-BY-NC-ND); (E, F) by Karen Nicoll, iNaturalist: 249565576, 143231040 (CC-BY-NC).

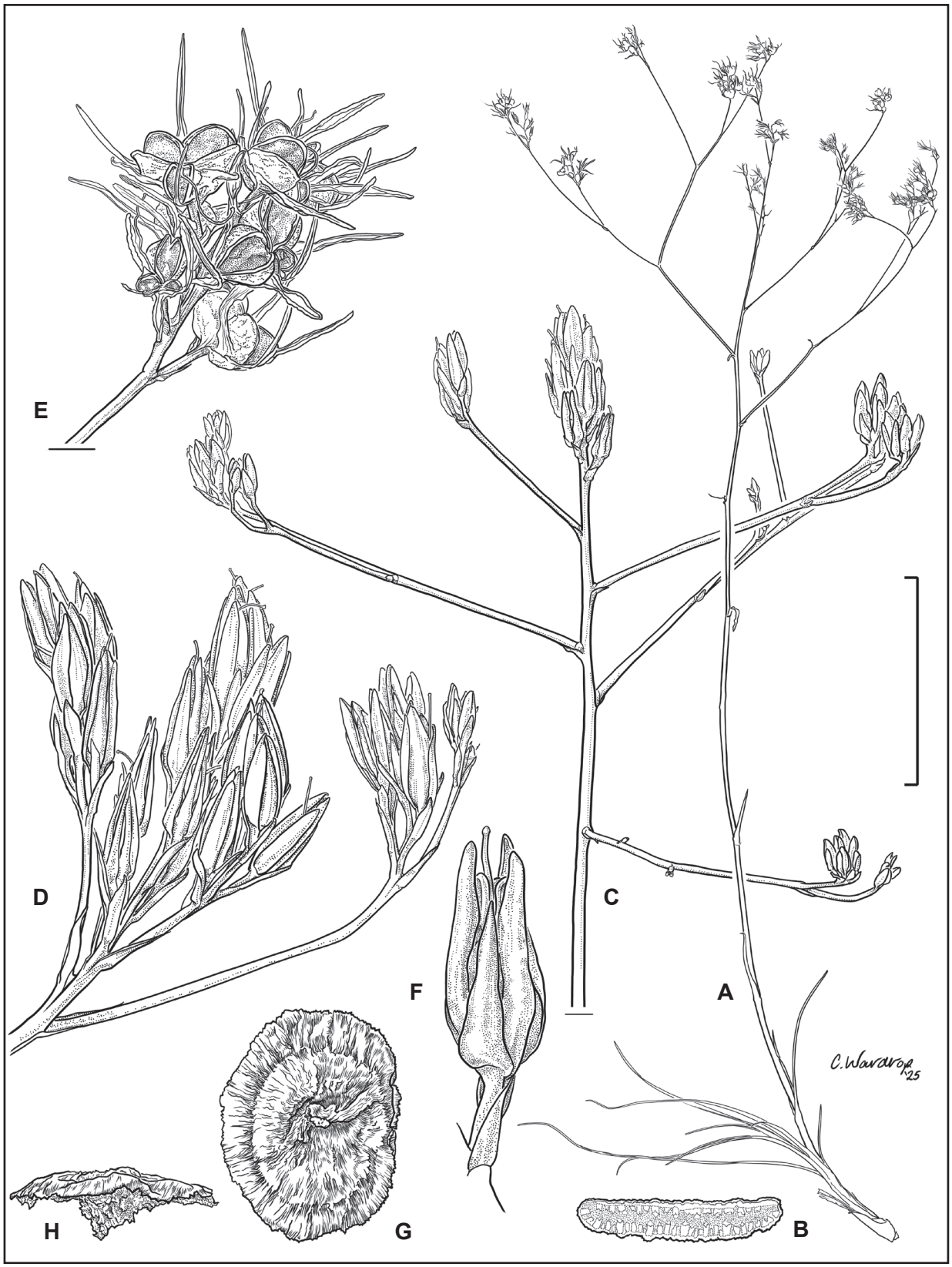

Figure 5. Illustration of *Haemodorum collevatum*. A – habit; B – leaf cross-section; C – branching habit; D – inflorescence; E – infructescence; F – spent flower, showing protruding stigma and anther position; G – seed, dorsal view; H – seed, lateral view, showing stalk. A, B, E, G, H from *R.L. Barrett* RLB 9676 (NSW); C: Drawn from a photograph by Tom Fletcher, iNaturalist: 251106974; D: Drawn from a photograph by fw_bouddi, iNaturalist: 250235806; F: Drawn from a photograph by sitsci, iNaturalist: 141947754. Scale bar: A = 26.7 cm; B = 4 mm; C = 50 mm; D, E = 25 mm; F = 13.3 mm; G, H = 5 mm. Illustration by Catherine Wardrop.

Selected iNaturalist observations [13 of 21] (https://www.inaturalist.org/observations/). NEW SOUTH WALES: 141947754; 143231040; 143929822; 143981253; 184482225; 240482672; 240484989; 249565576; 251106974; 251266985; 252789727; 258798661; 262307743.

Phenology. Flowering from November to December. Fruiting from December to January.

Distribution and habitat. Most collections of *H. collevatum* are from the Central Coast region around Newcastle, between Charmhaven and Port Stephens, with additional records from as far south as the Georges River and Royal National Park, New South Wales, Australia (Figure 2). Growing in deep coastal sand or dry sclerophyll forest, usually near the coast or tidal rivers. Recorded in association with the dominants *Angophora costata*, *A. floribunda*, *Calytrix tetragona*, *Eucalyptus pilularis*, *E. robusta*, *Leptospermum arachnoides*, *L. flavescens*, *Melaleuca nodosa* and *M. thymifolia*.

Conservation status. While relatively restricted in the northern part of its range between Charmhaven and Port Stephens, its presence in the greater Sydney region suggests that current records underestimate its distribution. Further surveys for this species are encouraged, but it is probably not currently threatened as a species, though it does face development pressures across much of its range and it should be monitored.

Etymology. The epithet is derived from a combination and contraction of the Latin *collis* (hills), and *elevatio* (to lift up, hoist), a reference to the widely spreading, sparse inflorescence that is tallest in the centre, resembling the iconic Australian 'Hills Hoist' clothesline.

Notes. *Haemodorum collevatum* differs from *H. planifolium* and *H. celsum* by the distinctive shape of the inflorescence, with widely spreading (*vs* ± erect, compact) branches bearing few-flowered (2–5(–7)-*vs* 5–11-flowered) cymose clusters. The style in this species varies from occasionally slightly shorter to usually slightly longer than the perianth, individual specimens being consistent for one or the other. These three species are also each consistent in having styles longer than the perianth and distinctly longer than the anthers, distinguishing them from *H. brevistylum*, which has styles not exceeding the apex of the anthers.

Robert Brown's collections (excluded syntypes of *H. planifolium*) were the earliest made of this species, whose status has remained unrecognised for at least 215 years, partly because it has seldom been collected over this time-span.

Some confusion has arisen between *H. collevatum* and *H. austroqueenslandicum* Domin, as some individuals with small inflorescences are difficult to interpret. An example is the specimen Hastings River, *s. dat.*, *Dr Beckler s.n.* (MEL 609491) that has an inflorescence like *H. collevatum* except that the terminal flower cluster is of three flowers (4–6(–8) recorded for *H. collevatum*), the main axis is flexuose, and the style is shorter, the stigma appearing shortly trifid and positioned 3 mm below the petal tips, like *H. austroqueenslandicum* (*vs* entire and 3–4.1 mm beyond the petals in *H. collevatum*). These unplaced specimens may represent an undescribed species and require further collecting and research. The illustration by Beadle (1987 p. 963, Fig. 421) is based on one of these unplaced plants.

Haemodorum planifolium R.Br., *Prodr. Fl. Nov. Holland* 300 (1810).

Type citation: (J.) v.v. *Type specimens*: Australia, New South Wales, between Sydney and South Head, October 1803, *R. Brown s.n.* [Iter Austral. 5619] (*lecto*: BM (BM000588667)), designated here; *possible isolecto*: Port Jackson [Sydney], *s.dat.*, *R. Brown s.n.* (BM (BM000552332), NSW 276999). *Residual syntypes* (see below under *Typification note*): heaths near Kings town, Newcastle, Nov^{r} 1804, *R. Brown s.n.* [Iter Austral. 5619] (BM (BM000552334)); Hunters River, *s.dat.*, *R. Brown s.n.* (E (E00682543 image!)); Kingstown, Hunters River, *s.dat.*, *R. Brown s.n.* (K (K000846224, K000846230)); Newcastle [no original label], *s.dat.*, *R. Brown s.n.* [Iter Austral. 5619] (K (K000846222)).

Illustrations. A. Fairley & P. Moore, *Native Pl. Sydney Distr*. 373, Plate 1367 (2002); D.J. Mabberley & D.T. Moore, *Bull. Nat. Hist. Mus., London, Bot.* 29: 190, Bauer watercolour drawing 208 (1999).

Plant 65–85 cm tall. *Bulb* 8–20 cm below the soil surface, red. *Basal leaves* 4–8; lamina linear, flat, (210–)250–440 mm long, 3.5–4.4 mm wide. *Leaves on scape* usually reduced, sometimes 1–3 leaf-like and green, transitioning to brownish or blackish bracts, lowest bract to 180 mm long. *Inflorescences* 1(–3) per plant, paniculate; scape 640–840 mm long, glaucous-green to blackish; flowering portion 100–150 mm long from lowest major branch, with 1–4 major branches 20–160 mm long, the branches narrowly spreading at 30–55° from main axis; secondary branches (excluding within flower aggregations) 0–1; flowers arranged in dense cymose aggregations, terminal on the main axis and each major and secondary branch (when present), flowers 9–30 in terminal aggregation, 5–19 in branch aggregations; terminal aggregation exceeded by those on the branches. *Pedicels* 4–11 mm long. *Bracteoles* 2, similar, 6.5–8.5 mm long, narrowly lanceolate, acute, opaque, the texture fairly thick, without a differentiated broad membranous margin, veins 5, prominent and raised when dry; upper bracteole attached 1–2 mm below the flower base, apex at 1/4–1/2 of the flower length. *Flowers* (8–)9–16 mm long; sepals similar to petals, subequal or up to 1 mm shorter than petals, lanceolate, becoming narrowly linear when dried except for the broader unexpanded base which is 1.6–2.5 mm wide, mostly dark brownish but sometimes with a purplish or greenish tint, somewhat saccate base when dried; petals (6.6–)8.7–15 mm long, dark brown but sometimes with a purplish or greenish tint. *Stamens* equal, enclosed in perianth; filaments yellowish, 4.1–7.0 mm long; anthers versatile, 3.4–4.0 mm long, yellow, the tip 2.2–4.7 mm below petal apex. *Style* (9.5–)11.2–14.0 mm long, orange in upper part, yellowish or greenish in lower 1/3 at anthesis, equal to or up to 1.2 mm longer than the petals; stigma entire but slightly capitate, minutely papillose, positioned 2.8–4.2 mm above the tip of the anthers. *Fruits* dark brown to blackish, glossy, 10–13 mm diameter. *Seeds* not seen. (Figure 6)

Diagnostic features. *Haemodorum planifolium* may be distinguished from all other species in the genus by the flat leaves; inflorescence paniculate, major branches spreading at relatively narrow angles (30–55°), flowers in dense aggregations of 5–30; bracteoles without a differentiated broad membranous margin, upper bracteole attached close to the flower base, 1–2 mm below; flowers at least partly dark brownish; anthers 3.4–4 mm long, held within the flower, 2.8–4.2 mm shorter than the petal tips; style long (10–15.7 mm), the tip approximately equalling the petal tips or exceeding them by up to 1.2 mm; stigma entire.

Selected specimens examined. NEW SOUTH WALES: Voyager Point Wetland Reserve, *c.* 100 m N of Sirius Drive on N side of oval, 20 Feb. 2025, *R.L. Barrett* RLB 9678 (NSW); Barren Grounds Faunal Reserve, 1972, *E. Conabere* 381 (NSW 254944); Nepean Dam, Bargo, 1600 ft, 1 Dec. 1953, *E.F. Constable s.n.* (NSW 26451); 5.4 km SE of Bell, 28 Mar. 1984, *R. Coveny* 11836 *& C. Miller* (K, L, MO *n.v.*, NSW 630283, PERTH 01735160); on road from Mountain Lagoon to Bilpin, 19 Apr. 1977, *P. Hind* 943 (NSW 233657); Williams Park, North Bondi, 6 May 1951, *L.A.S. Johnson s.n.* (NSW 149734); *c.* 1 mile S of Castle Hill, 5 Mar. 1966, *D.J. McGillivray* 1674 (NSW 630457); St Ives - Tumbledown Dick, 4 Dec. 1952, *C.W.E. Moore* 2157 (CANB 51038); 1.2 km NE of Asquith Railway Station, 19 Aug. 1986, *A.N. Rodd* 4665 (NSW 2192296); North Head Reserve, Port Jackson, 13 Dec. 1934, *F.A. Rodway s.n.* (K image!, NSW 149730); Manly Point, Sydney, 15 Dec. [18]86, *A. Toepffer* 191 (MEL 609537); Sunnyside Road, 2.4 km from Birds Rock Trail, Newnes State Forest, 26 Mar. 1993, *A.J. Whalen* 41*, P.D. Hind & J. Cornford* (NSW 268502); Kulnura near Gosford, 5 Dec. 1935, *C.T. White* 10244 (BRI AQ0136743).

Selected iNaturalist observations [9 of 197] (https://www.inaturalist.org/observations/). NEW SOUTH WALES: 98165561; 102457525; 105545182; 139716015; 187990759; 188452756; 250235806; 252787766; 252971538.

Phenology. Flowering from November to December. Fruiting from December to February.

Distribution and habitat. *Haemodorum planifolium* occurs from Gosford south to Wollongong, extending inland to Barren Grounds and the Newnes Plateau (Greater Blue Mountains) in New South Wales

Figure 6. *Haemodorum planifolium*. A – plant base with several leaves; B – basal leaves with flat blades and an inflorescence axis; C – an inflorescence showing its structure with a large terminal flower aggregation and two smaller aggregations on major branches (flowers mostly at anthesis); D – upper part of an inflorescence showing the terminal flower aggregation (flowers mostly post-anthesis with red developing fruits) and a major branch with a smaller flower aggregation (flowers younger, at anthesis with protruding style tips showing entire stigmas); E – a flower aggregation showing greenish brown sepals without green at base, reddish brown petals and bracteoles positioned close to flower bases (flowers either at anthesis with protruding style tips or pre-anthesis); F – old dehisced fruits. Photographs by Russell Barrett, (A, E) Royal National Park, iNaturalist: 188452756 (CC-BY-NC); (B–D, F) near Leura, Blue Mountains.

(Figure 2). Growing almost exclusively on sandstone substrates, though sometimes in coastal situations that are also limestone-rich, often in run-on zones that are seasonally wet, usually in low heath or open woodland in association with a range of *Angophora*, *Banksia*, *Corymbia* and *Eucalyptus* species.

Conservation status. Relatively common within its range and not currently considered to be of conservation concern.

Etymology. The epithet is from the Latin *planus* (flat, level), and *folia* (leaf), presumably a reference to the compressed to flat leaves in this species.

Typification note. Brown's known specimens, cited by Mabberley and Moore (2022), indicate that he collected this species from at least two areas, Newcastle and Sydney/Port Jackson and collections from those areas are regarded here as representing two collections. The lectotype is chosen in order to fix the application of the name and comes from among the sheets labelled either Sydney or Port Jackson. The lectotype sheet comprises complete plants with well-preserved flowers at anthesis and a reasonably precise locality statement. A possible duplicate is labelled Port Jackson but does not have an original label and the flowers are more mature than on the lectotype, so there is doubt about whether it is part of the same gathering. On an annotation slip in 1983, during preparation of the *Flora of Australia* account (Macfarlane 1987), TDM indicated as lectotype a specimen from Newcastle (BM000552334), although this lectotypification was not published. Mabberley and Moore (2022, p. 193) indicated that this specimen (but with barcode apparently accidentally omitted) was, in their terminology, a Good Candidate For Lectotypification. We now consider that the Newcastle collections by Brown are the taxon we are here naming *H. collevatum*, so the designated lectotype fixes the name *H. planifolium* to plants occurring around Sydney and represents the most commonly collected species in this group.

Key to *Haemodorum* species in New South Wales, Australia

1. Leaves terete to compressed, 1–2 mm wide (sometimes broader at base)

2. Flowers 12–15 mm long; flowers in several–many-flowered clusters ..... **H. corymbosum**

2: Flowers 4–5 mm long; flowers solitary or in few-flowered clusters..... **H. tenuifolium**

1: Leaves flat, usually more than 2 mm wide

3. Style distinctly shorter than the tips of the petals; stigma shortly trifid or lobed

4. Flowers solitary; inflorescence a narrow panicle; branches raceme-like ..... **H. austroqueenslandicum**

4: Flowers in clusters or large aggregations of 5–22; major branches with cymose branching ..... **H. brevistylum**

3: Style equal to or longer than the tips of the petals; stigma entire

5. Inflorescence an open, widely spreading panicle, major branches widely spreading at angles to the main axis of 45–90°, scape glaucous-green; flowers in several to numerous small aggregations of 2–4 (*c.* 6 in terminal aggregation) ..... **H. collevatum**

5: Inflorescence a dense panicle, often branched with separate dense flower aggregations, major branches at narrow angles to the main axis of 10–55°, scape glaucous-green to blackish; flowers in large aggregations of 5–11

6. Bracteoles 10–14 mm long; upper bracteole attached 4–8 mm below the flower; style 14.0–16.0 mm long ..... **H. celsum**

6: Bracteoles 6.5–8.5 mm long; upper bracteole attached 1–2 mm below the flower; style (9.5–)11.2–14.0 mm long..... **H. planifolium**

Acknowledgements

Herbaria for access to specimens through loans, visits or images: AD, BM, BRI, L, K, MEL, NSW,

PERTH, SYD. Steve Hopper for discussion and sharing information. Jackie Miles for her contributions to iNaturalist Australia, for enthusing other local naturalists to search for plants and for collecting the type specimen of *H. brevistylum* at our request, including detailed habitat information. Jeremy Bruhl and John Hunter kindly sought out new collections of *H. celsum* near Armidale on Christmas day, 2024. Thomas Mesaglio, iNaturalist expert, for advice and help on iNaturalist matters. Shelley James for a CGE specimen image resulting from her Churchill Fellowship project. Max Campbell, Tom Fletcher, Karen Nicoll, Ron O'Reilly, Robyn Russell and Gary Williams are thanked for permission to reproduce their images posted on iNaturalist. Catherine Wardrop is thanked for her fine illustration of *H. collevatum*.

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