



Open-access, online, rapid taxonomy

https://doi.org/10.54102/ajt

# Four new species of *Hydrocotyle* (Araliaceae) from Queensland and New South Wales, Australia

# A.R. Bean

Queensland Herbarium, Mt Coot-tha Road, Toowong 4066, Queensland. Corresponding author: tony.bean@des.qld.gov.au

Tony Bean 💿 https://orcid.org/0000-0002-4116-2810

# $\odot$

© Copyright of this paper is retained by its authors, who, unless otherwise indicated, license its content under a CC BY 4.0 license

# Abstract

Four species of *Hydrocotyle* L. occurring in Queensland and northern New South Wales are newly described, i.e. *H. demissa sp. nov., H. fontana sp. nov., H. inops sp. nov.,* and *H. maculosa sp. nov.* They are illustrated, diagnosed against related species, and their distributions mapped.

Cite this paper as: Bean AR (2023). Four new species of *Hydrocotyle* (Araliaceae) from Queensland and New South Wales, Australia. *Australian Journal of Taxonomy* 26: 1–8. doi: https://doi.org/10.54102/ajt.beccv

## Introduction

*Hydrocotyle* L. comprises more than 130 species worldwide (Eichler 1986), with an estimated 55 species in Australia (Henwood 2014), although this estimate needs to be revised upwards to account for the recently documented high species diversity in south-western Western Australia (Perkins 2018a, 2018b, 2018c, 2019, 2020).

The taxonomy of *Hydrocotyle* in Queensland had received very little attention until the paper by Bean & Henwood (2003), where six new species were described and a key to the Queensland species produced. Subsequent to this, additional new taxa have been discovered, and more complete material of known unnamed taxa has been collected. Four species, *H. demissa, H. fontana, H. inops*, and *H. maculosa* are newly described and diagnosed against similar species. Images from dried herbarium material and a distribution map (Fig. 1) are also provided.

## Methods

This study was based on examination of dried herbarium specimens at BRI, images of herbarium specimens from NSW, and field observations by the author. All measurements and morphological observations are based on dried specimens. The reddish foliar glands that are conspicuous in dried material of *H. maculosa* and *H. fontana* are only faintly visible in fresh specimens.

#### Taxonomy

#### Hydrocotyle demissa A.R.Bean sp. nov.

**Type:** Queensland. Warrego district: Tank near headwaters of Paroo River, "Varna", 7 November 2016, *J.L. Silcock JLS2190 & R.J. Fairfax* (holo: BRI).

*Hydrocotyle* sp. (Lake Broadwater K.A.Williams AQ230829) in Bean (2021).

*Hydrocotyle* sp. Lake Broadwater (K.A.Williams AQ230829) Qld Herbarium, Australian Plant Census

*Hydrocotyle* sp. 1 (Byrock), Australian Plant Census, https://id.biodiversity.org.au/instance/apni/764793

This paper was submitted on 7 March 2023 and published on 22 June 2023 (2023-06-21T22:40:36.100Z). It was reviewed by Andrew Ford and an anonymous reviewer, and edited by Kevin Thiele. Australian Journal of Taxonomy. ISSN: 2653-4649 (Online).



**Figure 1**. Distributions of *Hydrocotyle demissa* (black circles); *H. fontana* (black squares); *H. inops* (grey triangles); *H. maculosa* (grey circles) in southern Queensland and northern New South Wales. Major roads indicated by grey lines.

Briggs, J.D. & Leigh, J.H. (1988), Rare or Threatened Australian Plants: 19, 195.

*Hydrocotyle* sp. 1 (Byrock; Hj.Eichler 22868), Australian Plant Census, https://id.biodiversity.org.au/name/apni/242793 Briggs, J.D. & Leigh, J.H. (1996), Rare or Threatened Australian Plants: 21, 213.

Prostrate stoloniferous herb; stems filiform, glabrous. Stipules orbicular or deltate, 0.5–0.6 x 0.5–0.8 mm, white; margin entire or minutely erose. Petioles of fully developed leaves terete, 4-25 mm long, inserted at base of lamina; petioles glabrous. Lamina reniform to orbicular-cordate, radius 1.5-4.0 mm, with 5 major palmate veins; margin with 3-5 deep lobes, each lobe entire to 3-toothed; radius at major sinuses 45-60% of lamina radius; upper surface glabrous, without reddish punctate glands; lower surface glabrous. Inflorescence umbellate, 3-8-flowered; all flowers bisexual; peduncles absent or up to 1 mm long, much shorter than the adjacent petiole, glabrous. Involucral bracts 3-6, linear, c. 0.2 mm long; pedicels c. 0.1 mm long; petals white, c. 0.15 mm long, anthers c. 0.1 mm long. Schizocarps symmetrical, compressed; mericarps 2, ± lenticular, 0.6-0.7 mm long, 0.5-0.55 mm wide, green, glabrous; dorsal ribs narrowly winged; mericarps with a central white or green mound surrounded by an annulus of raised tissue and bisected by the lateral rib. Fruiting styles c. 0.1 mm long, style base rudimentary. Fig. 2.

Specimens examined: **Queensland.** Warrego district: Twin Sisters spring, Idalia National Park, 15 Jul 2015, *R.J. Fensham RJF6517* (BRI); Harlot spring, Idalia National Park, 6 Jul 2009, *R.J. Fensham 5957* (BRI). Mitchell district: Milo station, Powell Ck, NNW of Adavale, 4 Aug 2009, *P.I. Forster PIF35400 & M.B. Thomas* (BRI); Hell Hole Gorge National Park, NW of Adavale, above Hell Hole waterhole on Powell Ck, 7 Aug 2009, *P.I. Forster PIF35663 & M.B. Thomas* (BRI). Maranoa district: Toulby section, Culgoa Floodplain National Park, 16 Dec 2008, *R. Moore 934* (BRI). Darling Downs district: "Lakeview", Lake Broadwater, via Dalby, 1 Oct 1988, *K.A. Williams s.n.* (BRI, AQ230829). **New South Wales.** North western plains: Mulgowan Station, at end of track 12 km SSW of homestead, c. 65 km SSW of Bourke, 27 Sep 1981, *H. Eichler 22840* (BRI, CANB, NSW).

*Distribution & habitat.* Sporadically distributed from near Blackall in Queensland to near Bourke in New South Wales, and eastwards to Dalby (Fig. 1). It grows on the edges of lagoons and dams, along creeks, and in wetlands associated with springs.

*Etymology.* From the Latin *demissus*, meaning low, weak, dwarf. This is in reference to the small size and prostrate habit of the species.

*Notes. Hydrocotyle demissa* is completely glabrous with very small leaves (radius 1.5–4 mm), very short fruiting styles (c. 0.1 mm long), and the mericarp morphology is distinctive. It is perhaps close to *H. dipleura* A.R.Bean, but *H. demissa* differs by the peduncles 0–1 mm long (3–17 mm long for *H. dipleura*); the stipules entire or



Figure 2. Hydrocotyle demissa. a. leaf, upper surface b. fruits. (a from Moore 934; b from Silcock JLS2190 & Fairfax).

minutely erose (with laciniate margins for *H. dipleura*); mericarp with one lateral rib (2 lateral ribs for *H. dipleura*); and the petals c. 0.15 mm long (c. 0.4 mm long for *H. dipleura*).

# Hydrocotyle fontana A.R.Bean sp. nov.

**Type:** Queensland. Leichhardt district: Banniabie Spring, State Forest 50, c. 11 km NW of 'Reedy Creek', NW of Taroom, 21 January 2003, *A.R. Bean 19897* (holo: BRI; iso: MEL).

Prostrate stoloniferous herb; stems filiform, glabrous or with scattered hairs. Stipules orbicular or broader than long, 1.2–1.3 x 1.3–2.1 mm, white with reddishbrown mottling; margin entire or dentate. Petioles of fully developed leaves terete, 30-140 mm long, inserted at base of lamina; petiole hairs very dense at distal end, becoming less dense proximally, 0.2-0.6 mm long, retrorse to spreading, white or brown. Lamina orbicularcordate, radius 9-17 mm, with 6-8 major palmate veins; margin with 4-7 shallow lobes, each lobe crenate to crenulate, obtuse; radius at major sinuses 75-85% of lamina radius; upper surface glabrous, with many tiny reddish punctate glands < 0.1 mm apart; lower surface sparsely to moderately hairy; hairs white, spreading, 0.2-0.7 mm long. Inflorescence umbellate, 15-22-flowered; all flowers bisexual; peduncles 10-21 mm long, much shorter than the adjacent petiole, glabrous or with sparse hairs 0.2-0.3 mm long. Involucral bracts 10–20, narrowly-elliptic, 0.9–1.1 mm long; pedicels 0.4–0.7 mm long; petals white, c. 0.6 mm long, anthers c. 0.2 mm long. Schizocarps symmetrical, strongly compressed; mericarps 2, 0.6–0.7 mm long, 0.35–0.65 mm wide, brown, glabrous; dorsal ribs not winged; lateral ribs prominent. Fruiting styles 0.4-0.5 mm long; style base swollen. Fig. 3.

Specimens examined: **Queensland.** Leichhardt district: Spring near homestead at 'Pony Hills' station, E of Injune, 7 Nov 2000, *R.J. Fensham 4119* (BRI); Glenhaughton, NW of Taroom, 13 Apr 2002, *R.J. Fensham 4738* (BRI); Banniabie Spring, 'Reedy Creek' NW of Taroom, 14 Mar 2002, *R.J. Fensham 4752* (BRI). Warrego district: 'Dooloogarah' NW of Injune, 20 Apr 1999, *R.J. Fensham 3749* (BRI). Maranoa district: Spring Ridge, N of Roma, 27 Jan 1999, *R.J. Fensham 3513* (BRI).

*Distribution & habitat.* Endemic to Queensland. Extending from north-west of Injune to near Taroom and south almost to Roma (Fig. 1). It has been found only in or adjacent to springs.

*Etymology.* From the Latin *fontanus*, meaning 'of fountains or springs'. This species is apparently confined to or associated with springs.

*Notes. Hydrocotyle fontana* is similar to *H. maculosa* (see notes under that species). It is also similar to *H. laxiflora*, but *H. fontana* differs by its bisexual flowers (unisexual in *H. laxiflora*), the fruiting styles 0.4–0.5 mm long (0.6–1.0 mm long for *H. laxiflora*), and obtuse lamina lobes (usually acute for *H. laxiflora*) and the petioles 30–140 mm long (mostly 15–50 mm long for *H. laxiflora*).

*Hydrocotyle fontana* shares a similar habitat to *H. dipleura*, but the latter can immediately be distinguished by its glabrous stems and leaves, with the lamina radius only 2–7 mm.

### Hydrocotyle inops A.R.Bean sp. nov.

**Type:** Queensland. Moreton district: 100 metres SW of Apple Tree Park, Springbrook, 30 January 2023, *A.R. Bean 35184* (holo: BRI; iso: CANB, MEL, NSW).

Prostrate stoloniferous herb; stems filiform, sparsely to densely hairy. Stipules orbicular to ovate, 0.9-1.0 x 0.8–1.0 mm, white; margin dentate. Petioles of fully developed leaves terete, 3-42 mm long, inserted at base of lamina; petiole hairs very dense at distal end, becoming less dense proximally, 0.6–1.1 mm long, retrorse to spreading, white or brown. Lamina orbicular-cordate, radius 5–10 mm, with 5–8 major palmate veins; margin with 5-7 shallow lobes, each lobe crenate to crenulate, or without distinct lobes; radius at major sinuses 80–90% of lamina radius; upper surface moderately hairy, hairs ± appressed, 0.3-0.8 mm long, reddish punctate glands absent; lower surface moderately to densely hairy; hairs white, spreading, 0.3–0.8 mm long. Inflorescence umbellate, 4-8-flowered; all flowers bisexual; peduncles 5-17 mm long, longer than the adjacent petiole, with dense hairs 0.2-0.4 mm long. Involucral bracts 3–6, narrowly elliptic, 0.5–0.8 mm long; pedicels 0-0.2 mm long; petals white, c. 0.25 mm long, anthers c. 0.15 mm long. Schizocarps symmetrical, strongly compressed; mericarps 2, 1.0-1.3 mm long, 0.7-0.75 mm wide, brown, with abundant slender spreading hairs 0.1–0.2 mm long; dorsal ribs not winged; lateral ribs not prominent. Fruiting styles 0.2-0.4 mm long; style base swollen. Fig. 4.

Specimens examined: **Queensland.** Moreton district: c. 2 km SW of Hinze Dam eastern boat ramp, 2 Jul 2019, *J.L. White 6 & D. Jinks* (BRI); Gold Coast Hinterland great walk, adjacent to Apple Tree Park, 19 Dec 2018, *P.I. Forster PIF45910 & G. Leiper* (BRI); Gold Coast Hinterland great walk, adjacent to Apple Tree Park, 13 Mar 2019, *P.I. Forster PIF46090 & G. Leiper* (BRI).

*Distribution & habitat.* Known only from near Springbrook and Hinze Dam in Queensland (Fig. 1). It grows in tall eucalyptus forest (*E. microcorys* F.Muell., *E. campanulata* R.T.Baker & H.G.Sm., *E. saligna* Sm.) with some rainforest species in the understorey, and a ground layer dominated by ferns.

*Etymology.* From the Latin *inops*, meaning 'poor, weak, helpless'. This is in reference to the small size and prostrate habit of the species.

*Notes. H. inops* is distinctive by virtue of its small orbicular leaves with very shallow lobes, dense brown to white hairs on both surfaces of the lamina and on the petioles and stems, and by the abundant hairs 0.1–0.2 mm long on the fruit surface. Its closest relative is unknown; *H. inops* is somewhat similar in appearance to *H. algida* N.A.Wakef., but differs by the 3–8-flowered umbels (10–15-flowered for *H. algida*), the peduncles 5–17 mm long (10–70 mm for *H.algida*) and the hairy mericarps



**Figure 3**. *Hydrocotyle fontana*. **a**. leaf, upper surface **b**. leaf, lower surface **c**. fruits **d**. glands on upper leaf surface (a,b,d from *Fensham 3513*; c from *Fensham 3749*).

(glabrous for *H. algida*). *H. algida* measurements from Duretto (1999).

#### Hydrocotyle maculosa A.R.Bean sp. nov.

**Type:** New South Wales. Northern Tablelands: Mt Lindesay Highway, 2 km S of Boonoo Boonoo, 2 February 2023, *A.R. Bean 35252* (holo: BRI; iso: CANB, MEL, NSW).

Stoloniferous herb (to 50 cm high when supported by adjacent vegetation); stems filiform, glabrous. Stipules orbicular or broader than long, 1.3–1.5 x 1.2–1.5 mm, white with reddish-brown mottling; margin entire. Petioles of fully developed leaves terete, 45–90 mm long, inserted at base of lamina; petiole hairs few at distal end, 0.4–1.0 mm long, retrorse, brown. Lamina orbicular-cordate, radius 7–14 mm, with 6–8 major palmate veins; margin with 5–7 shallow lobes, each lobe crenate to crenulate; radius at major sinuses 67–85% of lamina radius; upper surface glabrous, punctate with many minute reddish glands < 0.1 mm apart; lower surface glabrous. Inflorescence umbellate, 7–13-flowered; all flowers bisexual; peduncles 4–10 mm long, much shorter than the adjacent petiole, glabrous. Involucral bracts

10–20, spathulate, 0.6–0.9 mm long; pedicels 0.2–0.4 mm long; petals purple or white, c. 0.9 mm long, anthers c. 0.25 mm long. Schizocarps symmetrical, strongly compressed; mericarps 2, 0.8–0.9 mm long, 0.55–0.7 mm wide, brown, glabrous, sometimes glandular; dorsal ribs not winged; lateral ribs prominent. Fruiting styles 0.4–0.5 mm long; style base swollen. Fig. 5.

Specimens examined: **Queensland.** Darling Downs district: Watson's Swamp, 6 km N of Amiens, 27 Mar 1993, *A.R. Bean 5854 & P.I. Forster* (BRI, CANB); near Racecourse Creek, Mt Norman road, Girraween National Park, 2 Feb 2023, *A.R. Bean 35261* (BRI, P). **New South Wales**. Northern Tablelands: 7.3 km by road SW of Tenterfield, 8 Dec 2003, *A.R. Bean 21264* (BRI); 2 km S of Boonoo Boonoo, 16 Dec 1990, *A.R. Bean 2806* (BRI, CANB); Silent Grove-Torrington road, 19.1 km N of Torrington, 27 Jan 1995, *A.R. Bean 8228* (BRI, NSW).

*Distribution & habitat.* Only known from the Stanthorpe area of Queensland, and adjacent areas on the Northern Tablelands of New South Wales (Fig. 1). It is apparently confined to poorly drained swampy areas



Figure 4. Hydrocotyle inops. a. leaf, upper surface b. leaf, lower surface c. fruits (all from Forster PIF46090 & Leiper).

dominated by sedges (Cyperaceae) and restiads (Restionaceae).

*Etymology.* From the Latin *maculosus*, meaning 'spotted'. This is in reference to the many small spots on the upper surface of the leaf lamina in dried specimens of this species (Fig. 5c).

*Notes. Hydrocotyle maculosa* is clearly allied to *H. fontana* but differs by the petiole hairs being confined to the apex (petioles hairy throughout for *H. fontana*), the lower leaf surface glabrous (hairy throughout for *H. fontana*), the 7–13 flowers per inflorescence (15–22 flowers for *H. fontana*), the peduncles 4–10 mm long (10–21 mm long for *H. fontana*), and the mature fruits 0.8–0.9 mm long (0.6–0.7 mm long for *H. fontana*).

*Hydrocotyle maculosa* differs from *H. dipleura* by the leaf laminae with radius 7–14 mm (2–7 mm radius for *H. dipleura*), petioles 45–90 mm long (6–20 mm, rarely to 50

mm long for *H. dipleura*), stipules entire (stipules deeply laciniate for *H. dipleura*) and mericarps with a single lateral rib (two lateral ribs for *H. dipleura*). Their habitats are also quite different, as *H. dipleura* is confined to the dried-out margins of artesian springs.

The reddish glands on the upper surface of the lamina are conspicuous in dried herbarium material, but only faintly visible in fresh material.

#### Disclosures

No conflict of interest.

#### Acknowledgments

I am grateful to Melody Fabillo (BRI), who greatly assisted me in the production of the illustrations, and to the two referees for their helpful suggestions.



**Figure 5**. *Hydrocotyle maculosa*. **a**. leaf, upper surface **b**. leaf, lower surface **c**. glands on upper leaf surface **d**. fruits (a,b,c from *Bean 5854*; d from *Bean 8228*).

#### References

Bean, A.R. & Henwood, M.J. (2003). Six new species of *Hydrocotyle* L. (Apiaceae) from Queensland. Austrobaileya 6(3): 537-548.

Bean, A.R. (2021). Araliaceae. In: G.K. Brown (ed.), *Census of the Queensland Flora 2021*. Queensland Department of Environment and Science, Queensland Government. www.data.qld.gov.au/dataset/census-of-the-queens-land-flora-2021, accessed 20 January 2023.

Duretto, M.F. (1999). Apiaceae. In: Walsh, N.G.; Entwisle, T.J., *Flora of Victoria Vol. 4, Cornaceae to Asteraceae*, pp. 256–258. Inkata Press, Melbourne.

Eichler, H. (1986). *Hydrocotyle*. In: J.P. Jessop & H.R. Toelken (eds), *Flora of South Australia, Part II*, pp. 992-999. South Australian Government Printing Division: Adelaide.

Henwood, M.J. (2014). *Hydrocotyle rivularis*, a new trifoliolate species from south-eastern Australia. *Telopea* 17: 217-221.

Perkins, A.J. (2018a). *Hydrocotyle spinulifera* and *H. dimorphocarpa* (Araliaceae), two new Western Australian species with dimorphic mericarps. *Nuytsia* 29: 57-65.

Perkins, A.J. (2018b). *Hydrocotyle asterocarpa, H. decorata* and *H. perforata* (Araliaceae), three new Western Australian species with spicate inflorescences. *Nuytsia* 29: 205–216.

Perkins, A.J. (2018c). *Hydrocotyle eichleri, H. papilionella* and *H. tuberculata* (Araliaceae), three new annual species from Western Australia. *Nuytsia* 29: 233–243.

Perkins, A.J. (2019). Nomenclatural updates and a new species of annual *Hydrocotyle* (Araliaceae) from Western Australia. *Nuytsia* 30: 253–277.

Perkins, A.J. (2020). *Hydrocotyle simulans* (Araliaceae), a new perennial species from south-eastern Australia. *Phytotaxa* 437: 66-72.



This paper was typeset using Prince

www.princexml.com