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Hydrocotyle rivularis: a new trifoliolate species from south-eastern Australia[1]

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Abstract

A new species of perennial, trifoliolate *Hydrocotyle* (*H. rivularis* H.Eichler ex Henwood) from south eastern Australia is described and compared to other trifoliolate species from Australia and New Zealand. A distribution map and illustrations of the new species are provided.

Introduction

Hydrocotyle (Araliaceae) is a cosmopolitan genus comprising an estimated 130 species (Pimenov and Leonov 1993). The global distribution of the genus is currently characterized by two regions of relatively high species diversity: South America (c. 60 species; Mathias 1936; Mathias and Constance 1952; Reiche 1902), and Australia (c. 55 species; Duretto 1999). *Hydrocotyle* occurs in all States and Territories of Australia where it occupies a range of habitats, displays a variety of life histories, and is morphologically very variable. The taxonomy of Australian *Hydrocotyle* is relatively poorly understood, but has received some attention in recent years (Bean and Henwood, 2003). However, there remain a number of species complexes and related taxonomic issues to be resolved. Part of the ongoing difficulty for *Hydrocotyle* systematics in general is the traditional reliance on leaf morphology for taxonomic decision-making (Constance and Dillon 1990). This, combined with an often restricted knowledge of morphological variation within a taxon, has sometimes led to the regionally inconsistent application of names to geographically widespread taxa or the inappropriate recognition of segregates (Humbert 1957).

An assemblage of perennial *Hydrocotyle* species with compound leaves can be recognized from South America (*H. apolobambensis* M.Mend. & A.Fuentes – Bolivia, *H. minutifolia* Rose – Colombia, *H. nixoides* Mathias & Constance and *H. palmata* Mathias – Peru and Ecuador), New Zealand (*H. sulcata* C.J.Webb & P.N.Johnson and *H. hydrophila* Petrie) and Australia (*H. geraniifolia* F.Muell., *H. muscosa* A.Rich., *H. paludosa* A.R. Bean, *H. digitata* A.R. Bean & Henwood and *H. tripartita* R.Br. & A.Rich.). There are no species with compound leaves shared between South America, New Zealand and Australia. However, a localised population of *H. tripartita* in New Zealand is considered to be recently introduced to that country from Australia (Webb and Johnson 1982).

[1]This paper is dedicated to my former colleague Elizabeth Anne Brown (1956–2013) in recognition of her dedication to her research and to postgraduate student supervision.

Of the Australian species with compound leaves, *H geraniifolia* is the most morphologically distinctive having ornamented, winged mericarps similar to those of some endemic annual species. The three to five finely toothed, lanceolate leaflets of *H. geraniifolia* also easily distinguish it from other Australian species with compound leaves. *Hydrocotyle muscosa* bears a strong morphological similarity to *H. tripartitia*, but is separable from the latter by its often 5-foliolate leaves and characters of its schizocarps. *Hydrocotyle tripartita* and *H. muscosa* are each separable from *H. hydrophila* and *H. sulcata* by the former's sparsely dentate leaflets with abaxial trichomes, a skirt of trichomes at the apex of the petiole and schizocarps with more prominent ribs (Webb and Johnson 1981). In these characters, the New Zealand species are more similar to *H. paludosa*, a species that is endemic to Australia.

Hydrocotyle tripartita occurs naturally from north Queensland to Tasmania. As with some other geographically widespread perennial Australian *Hydrocotyle*, *H. tripartita* has been considered to comprise a number of different morphotypes (Jacobs and Pickard 1981, Burbidge and Gray 1970). Bean and Henwood (2006) refined the concept of *H. tripartita* by segregating two distinctive species: *H. paludosa* and *H. digitata*. As part of ongoing research into the systematics and evolution of *Hydrocotyle*, another ecologically and morphologically distinct species, *H. rivularis* H.Eichler ex Henwood, is here described.

Taxonomy

Hydrocotyle rivularis H.Eichler ex Henwood ***sp. nov.***

Diagnosis: *Hydrocotyle rivularis* H.Eichler ex Henwood differs from *H. tripartita, H. paludosa* A.R.Bean and *H. digitata* A.R.Bean & Henwood in having orbiculate median leaflets, round to obtuse median lobules, and glabrous abaxial leaflet surfaces and petioles. *Hydrocotyle rivularis* differs further from *H. paludosa* by its smooth mericarp surface (not irregularly papillate as in *H. paludosa*).

Type: New South Wales: Southern Tablelands: Gudgenby Nature Reserve, Grassy Creek crossing, *H. Eichler 22881*, 21 Dec 1981 (holo CANB452632.1; iso: CHR, CONC, L, LAE, MEL713559A, MO, NSW277956).

Informal names: *Hydrocotyle* aff. *tripratita* sensu N.T. Burbidge & M. Gray, *Flora of the Australian Capital Territory* 282 (1970).

Hydrocotyle sp. Happy Jacks Plain sensu J. Thompson & M. Gray, *Telopea* 2: 330 (1981).

Hydrocotyle sp. A (aff. *tripartita*) sensu S.W.L. Jacobs & J. Pickard, *Plants of New South Wales* 66 (1981).

Illustrations: *Hydrocotyle rivularis*, EBOT Plant Sciences Collection, The University of Sydney http://ebot.library.usyd.edu.au/view?docId=ebot/records/1215.xml

Plants perennial. Stems prostrate, robust, glabrous, rooting at nodes, roots abundant and fibrous. Stipules 1.6–1.7 mm long, 2–2.2 mm wide, broadly elliptic, entire, white (translucent). Petioles (10–)50–160 mm long, glabrous. Leaves compound, 3-foliolate, lighter green below, glabrous on both surfaces. Median leaflet orbiculate, (3–)6–11 mm long, (3–)7–13 mm wide, apex comprising 3 lobules, the 2 lateral lobules shorter than the median lobule; median lobule apex obtuse or round, with three teeth of equal length; median leaflet base acuminate. Lateral leaflets 10–11 mm long, 13–15.5 mm wide, incised into two symmetrical or asymmetrical lobes, sinuses c. 30% of lateral leaflet length. Inflorescence a simple umbel, 7–9-flowered; flowers all hermaphrodite, or with a few apparently male flowers. Peduncles much shorter than subtending petioles, (5–)30–50 mm long, glabrous. Bracts 0.3–0.5 mm long, 0.2 mm wide, ovate, entire, green. Flowers pedicellate; flowering pedicels 1–1.8 mm long. Corolla white (occasionally with margin of petals purple); petals 5, ovate, 0.65–0.75 mm long, 0.4–0.5 mm wide. Filaments white, 0.4 mm long; anthers purple, 0.25 mm long. Schizocarps ellipsoid, slightly laterally compressed; bases truncate; fruiting pedicels 0.8–2 mm long. Mericarps 0.7–0.8 mm wide, 0.9–1 mm long, dorsal and lateral ribs acute, median ribs not raised; surface between lateral and dorsal ribs convex or flat, smooth, surface between median and lateral ribs convex, smooth. Fruiting styles 0.5 mm long. Fig. 1.

Representative specimens listed by botanical region: New South Wales (Jacobs and Pickard 1981). **Northern Tablelands:** 3.4 km along Majors Point road, North East of Ebor, *A.R. Bean 17355*, 11 Feb 2001 (NSW); c. 20 miles N of Nowendoc on Walcha Road, *N.C. Ford s.n.*, 8 Jan 1958 (NSW78248); Bullock Creek, c. 10.5 km south-southwest of Ebor. *T.A. James 1380 & S.F. McCune*, 25 Nov 1992 (NSW); Alongside Little Murray Creek at edge of Barrington Trail, Barrington Tops National Park, *J.R. Hosking 3591 & R.W. Medd*, 24 Feb 2012 (CANB, NE, NSW). **Southern Tablelands:** Source of Billy Billy Creek, near Corin Dam road (Kangaroo Creek), SW of Canberra, *N.T. Burbidge 75791*, 9 Jan 1966 (CANB); Australian Alps, Kosciusko State Park, Happy Jacks Plains (north of Happy Jacks Road, west of Tolbar Road; ca 20 km west-south-west of Adaminaby), *H. Eichler 18976*, 31 Jan 1967 (CANB); Between Wee Jasper and Tumut, *H. Eichler* 22870, 17 Dec 1981 (CANB); Gudgenby Nature Reserve, Nursery Swamp, *H. Eichler 23174*, 8 Jan 1983 (CANB, MEL, NSW); Kiandra,

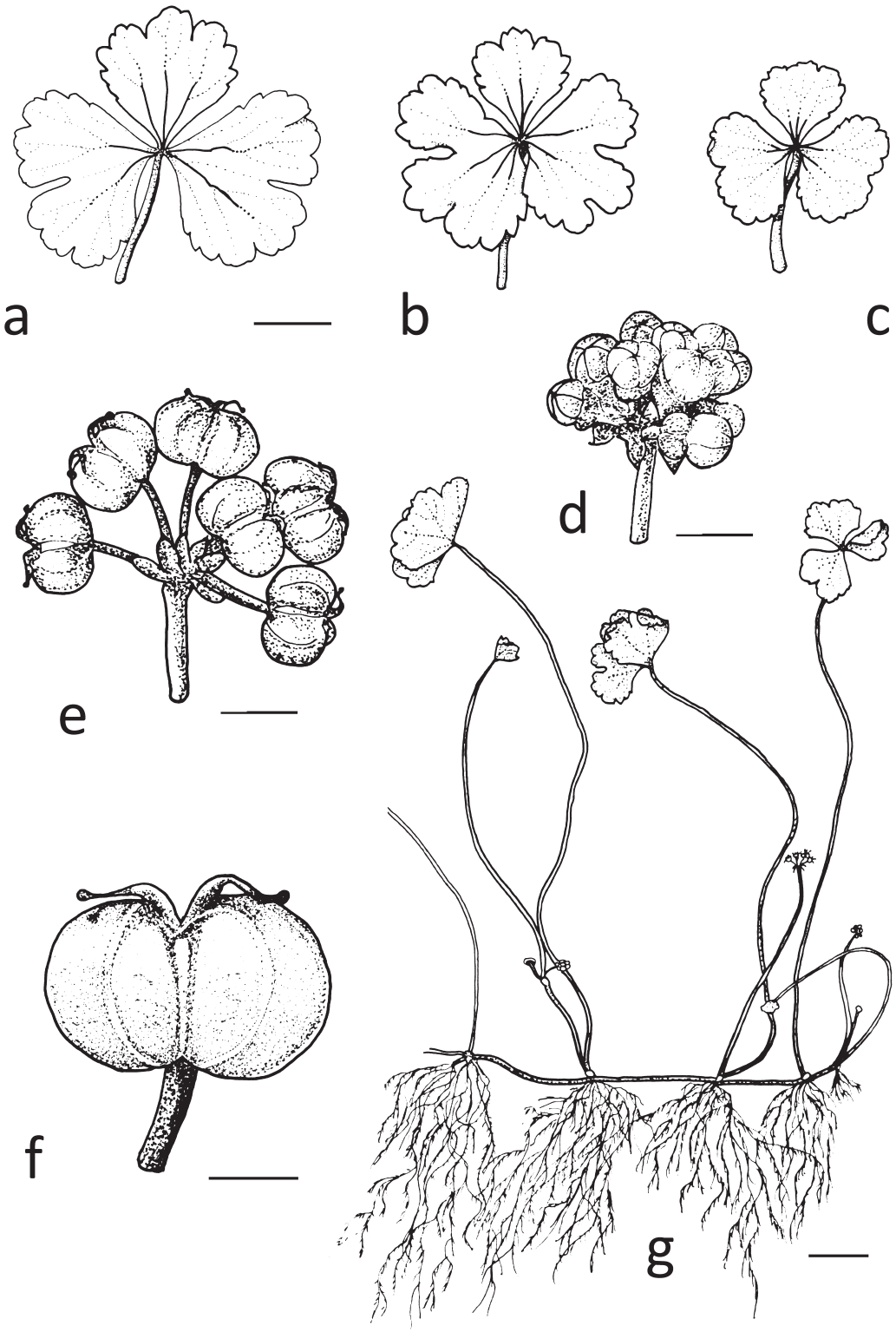

Fig. 1. Illustration of *Hydrocotyle rivularis*: **a–c,** Adult leaf; **d,** flower buds; **e,** fruiting umbel; **f,** schizocarp; **g,** habit. Scale bar: **a–c** = 5 mm; **d, e** = 1 mm; **f** = 0.5 mm; **g** = 10 mm. **a** from *Willlis & Rogers s.n.* (CANB459386). **b** from *Schodde 1303*; **c, f** from *Eichler 24071*; **d, e, g** from *Eichler 18976*. Illustration: M.J.Henwood

H. Eichler 24017, 16 Feb 1989 (CANB, NSW); Smokers Gap area, *H.Eichler s.n.*, 7 May 1980 (CANB459390); Namadgi National Park, where track first crosses Nursery Ck. c. 2 km SW of Orroral Road, *M.J. Henwood 809*, 21 Apr 2007 (SYD); Eucumbene River, East of Kiandra, *A.J. Perkins s.n.*, 25 Apr 2006 (NSW728305, SYD); Coolamon [=Cooleman] Flat, Roule's [=Rules] Point, *C.W.E. Moore 2930*, 24 Mar 1954 (MEL); Micalong Swamp, Tumut - Brindabella Road, *A.N. Rodd 5409, S.R.Corbett & D.I. Wilson*, 12 Apr 1986 (NSW); Near Badja Mill, S of The Bald Mountain [c. NE of Cooma], *A. Rodd s.n.* 4 Oct 1964 (NSW78229); Cotter River District, head of Murrays Gap, Bimberi Range, *R. Schodde 1303*, 15 Feb 1961 (NSW). **Victoria** (Conn 1993). **East Gippsland:** Snowy River area. Near Junction of Stony Creek, *A.C. Beauglehole 35128,* 3 Dec 1970 (MEL). **Snowfields**: Border of Grids V52-1/V53-1. Rocky Plain, *A.C. Beauglehole 35836*, 6 Jan 1971 (MEL); Morass Creek Flora & Fauna Reserve, *A.C. Beauglehole 68654*, 17 Jan 1981 (MEL); Bentleys [=Bentley] Plains, *A.C. Beauglehole 36984*, 23 Feb 1971 (MEL). Forlorn Hope Plain Creek, N of Reedy River and Nunniong Plateau, *J.H. Willis & K.C. Rogers s.n.* 23 Feb 1974 (CANB459386, MEL2114397).

Etymology: The specific epithet refers to its preference for growing in (relatively high altitude) streams. The name was used by the late Hansjörg Eichler on a number of specimens circulated to Australian herbaria.

Distribution and habitat: Endemic to south eastern Australia above c. 600 m altitude. Found in flowing montane streams, on their margins, or associated with swampland that is regularly inundated. With *Montia*, various Cyperaceae, *Eucalyptus dalrympleana*, *E. stellulata* and *E. pauciflora*. Petioles and stolons are often submerged, with leaf laminas and umbels floating on the water surface, sometimes forming large masses of foliage. Fig. 2.

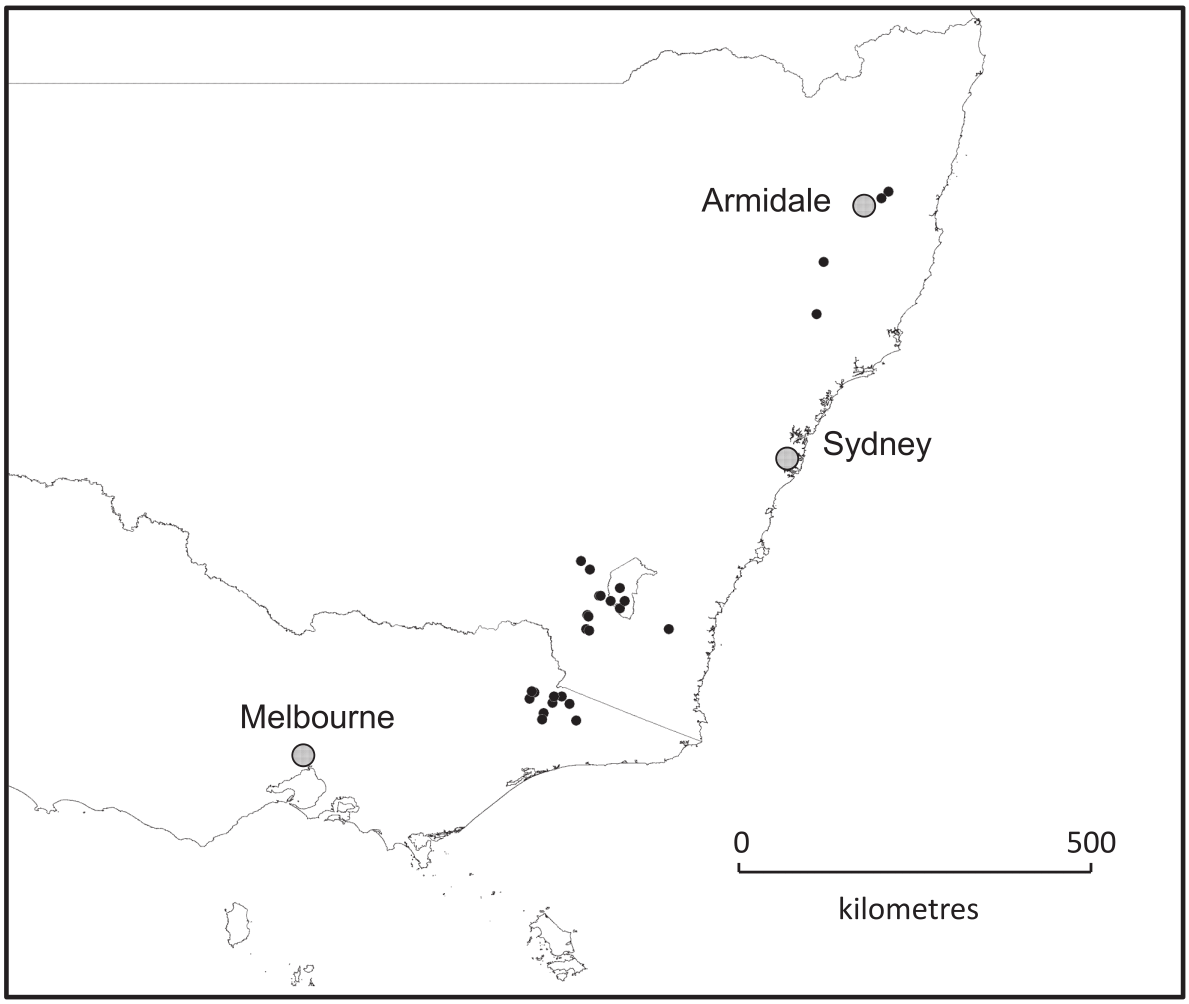

Fig. 2. Distribution of *Hydrocotyle rivularis* in eastern New South Wales, the Australian Capital Territory and eastern Victoria (Australia).

Flowering: December to February.

Conservation status: *Hydrocotyle rivularis* is widely distributed but localised to suitable habitats. It occurs in a number of conservation reserves throughout its geographic range and so is here regarded as not vulnerable or endangered.

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