

SHORT COMMUNICATION

***Hydrocotyle asterocarpa*, *H. decorata* and *H. perforata* (Araliaceae), three new Western Australian species with spicate inflorescences**

Three new species of *Hydrocotyle* L. from the south-west of Western Australia are described and illustrated herein. All three species differ from most members of the genus in being annuals with spicate inflorescences (rather than umbellate) and highly ornate fruits with prominently lobed or raised dorsal and lateral ribs. Their close relationship with the widespread Australian species *H. medicaginoides* Turcz. is discussed and a key is provided. All three species have conservation priority.

Key to annual species of *Hydrocotyle* with spicate inflorescences

1. Schizocarps with 6 wing-like lobes developing from the dorsal and lateral ribs
 2. Wings spreading, orbicular, margins rugulose.....**H. medicaginoides**
 - 2: Wings ascending above fruiting styles, shape and margins not as above
 3. Wings becoming inflated at maturity, margins entire or shallowly lobed**H. asterocarpa**
 - 3: Wings flattened at maturity, marginal lobing undulate to finger-like**H. decorata**
- 1: Schizocarps with 2 slender wings along the dorsal ribs, lateral ribs raised**H. perforata**

Hydrocotyle asterocarpa* A.J.Perkins, *sp. nov.

Type: saline lake east of Scaddan, Western Australia [precise locality withheld for conservation reasons], 20 October 2017, *A.J. Perkins* AJP-WA 140 (*holo:* PERTH 08935068; *iso:* AD, CANB, MEL, NSW).

Hydrocotyle sp. Truslove (M.A. Burgman 4419), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 13 October 2017].

Annual herbs with a basal rosette of leaves and branched stems bearing leaves and dense spicate inflorescences, 2–6 cm high, 2–15 cm wide. *Stems* erect (in smaller plants) to decumbent (in larger plants), light green to reddish green, terete, villous. *Stipules* white, ovate to linear lanceolate, 1.5–4.0 mm long, 0.5–2.5 mm wide, membranous, translucent, fimbriate along margins. *Petioles* 5–45(–50) mm long, light green, villous. *Leaf blades* simple, dorsiventral, carnose, rhombic to trilobed in juvenile leaves, trilobed to pedately lobed in mature leaves, 4–12 mm long, 4–18 mm wide; adaxial surface glabrous to subglabrous to puberulous, light green to yellowish green; abaxial surface slightly lighter in colour than adaxial, subglabrous to puberulous. *Leaf margins* toothed; teeth rounded to obtuse, glabrous to occasionally tipped with acute hairs. *Median leaf lobes* elliptic to obovate, 4–11 mm long, 3–8 mm wide, with 1–3 marginal teeth. *Lateral leaf lobes* 4–11 mm long, 3–10 mm wide, with 2–9 marginal teeth, incised into 2 asymmetrical lobules in pedate leaves; leaf sinuses 10–90% of lateral lobe length. *Inflorescences* spicate, leaf-opposed, 8–24-flowered. *Peduncles* terete, longer than subtending leaf, 5–25 mm long, villous. *Involucral bracts* absent. *Rachis* 4–16 mm long. *Pedicels* light

green, 0.1–0.2 mm. *Flowers* all hermaphrodite, protandrous, densely arranged along the rachis. *Sepals* absent. *Petals* 5, cream to light creamy yellow, ovate, 0.8–1.0 mm long, 0.5–0.6 mm wide. *Filaments* light cream, 0.5–0.6 mm long. *Anthers* creamy yellow to crimson, elliptic, 0.3 mm long. *Ovaries* light green at anthesis, orbicular to obovate, dorsal and lateral ribs lobed towards their apices. *Schizocarps* bilaterally flattened, symmetrical, broadly obovate, 6 prominent wings developing on the apical lobing of the dorsal and lateral ribs, light green during early development turning creamy brown at maturity and often remaining persistent on the carpophore beyond the senescence of the plants; commissure 85–95% the length of mericarps (excluding the wings). *Mericarps* minutely colliculate, 1.0–1.5 mm long, 1.0–1.3 mm wide; dorsal and lateral ribs raised along the basal half with prominent wings at their apices; wings 0.4–0.9 mm long, ascending well above the fruiting styles, ovate to oblong, margins entire or with shallow lobing, apices often falcate with obtuse to acute tips, wings often enlarging, becoming inflated at maturity; mericarp surface between dorsal and lateral ribs appearing pitted due to raised reticulate ridges; surface between lateral ribs and median ribs similarly covered by raised reticulate ridges; mature mericarps remaining persistent to the carpophore beyond the senescence of the plants. *Carpophores* persistent, acerose. *Fruiting styles* swollen at the base, 0.6 mm long, reflexed. *Cotyledons* oblong in the seedlings. (Figure 1)

Diagnostic features. *Hydrocotyle asterocarpa* can be distinguished from all other taxa in *Hydrocotyle* by possessing the following combination of characters: annual herbs with dense spicate inflorescences; schizocarps star-like due to 6 prominent wings that ascend well above the fruiting styles and are formed from apical lobing of the dorsal and lateral ribs; mericarp wings often enlarging and becoming inflated at maturity; mericarp surfaces appearing pitted due to raised reticulate ridges between the dorsal, lateral and median ribs; mature mericarps remaining persistent to the carpophore (and the infructescences remaining intact) beyond the senescence of the plants; carpophores acerose and persistent (Figure 1A–C).

Selected specimens. WESTERN AUSTRALIA: [localities withheld for conservation reasons] Oct. 1984, *M.A. Burgman* 4419 (PERTH); 5 Sep. 1984, *M.A. Burgman & C. Layman* MAB 3461 (PERTH); 29 Nov. 2007, *J.A. Cochrane & B. Davis* JAC 6924 (K, PERTH); 22 Sep. 1992, *G.F. Craig* 2166 (PERTH); 11 Oct. 2000, *G.J. Keighery & N. Gibson* 5362 (PERTH); 13 Oct. 2007, *A.J. Perkins s.n.* (NSW, PERTH 08048576, SYD); 20 Oct. 2017, *A.J. Perkins* AJP-WA 141 (PERTH); 23 Oct. 2005, *C.D. Turley* 134/1005 (PERTH); 16 Sep. 2011, *C.D. Turley & R.M. Hoggart* 1/911 (PERTH).

Phenology. This species is a winter annual, with flowering and fruiting occurring from September to early November.

Distribution and habitat. *Hydrocotyle asterocarpa* is currently known from areas north of Esperance, around Scaddan and eastward towards Mt Ney, all within the Mallee bioregion (Western Australian Herbarium 1998–) (Figure 2). Plants grow in sandy loam soils surrounding the margins of inland salt lakes, in low open shrubland, often in sheltered positions around mature plants of *Tecticornia* and *Frankenia* spp. (Figure 1D).

Conservation status. *Hydrocotyle asterocarpa* is listed by Smith and Jones (2018) as Priority Two under Conservation Codes for Western Australian Flora, under the name *H. sp.* Truslove (*M.A. Burgman* 4419). This species is known from several general localities around Scaddan, scattered eastward for about 55 km (Figure 2).

Etymology. The epithet *asterocarpa* is derived from the Greek *astero-*, ‘starry’, and *-carpus*, ‘fruit or seed’, in reference to the star-shaped schizocarps of this species (Figure 1B, C). The common name ‘Starry Pennywort’ is here suggested.

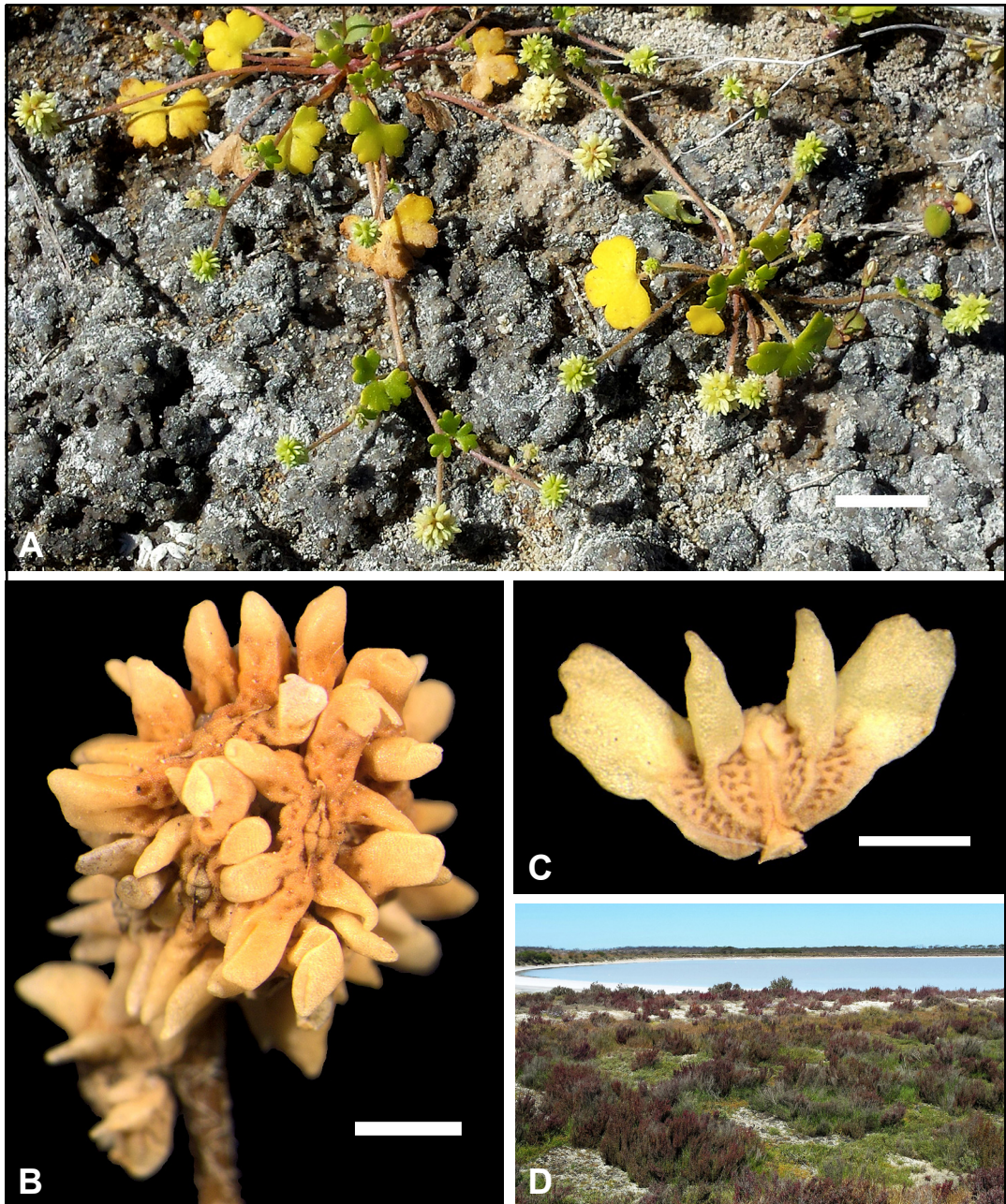


Figure 1. *Hydrocotyle asterocarpa*. A – flowering plants *in situ*; B – infructescence with developing schizocarps bearing winged lobes; C – lateral view of a mature schizocarp showing winged lobes and pitted mericarp surface; D – typical habitat. Scale bars = 1 cm (A); 1 mm (B, C). Vouchers: *A.J. Perkins* AJP-WA 140 (A, D); *J.A. Cochrane & B. Davis* JAC 6924 (B, C). Photographs by A. Perkins.

Affinities. *Hydrocotyle asterocarpa* is morphologically similar to the widespread Australian winter annual, *H. medicaginoides* (Figure 3), and the two rare Western Australian annuals, *H. decorata* A.J.Perkins and *H. perforata* A.J.Perkins, due to all four species possessing dense spicate inflorescences, subsessile flowers, schizocarps with prominent dorsal and lateral ribs that are often lobed or winged

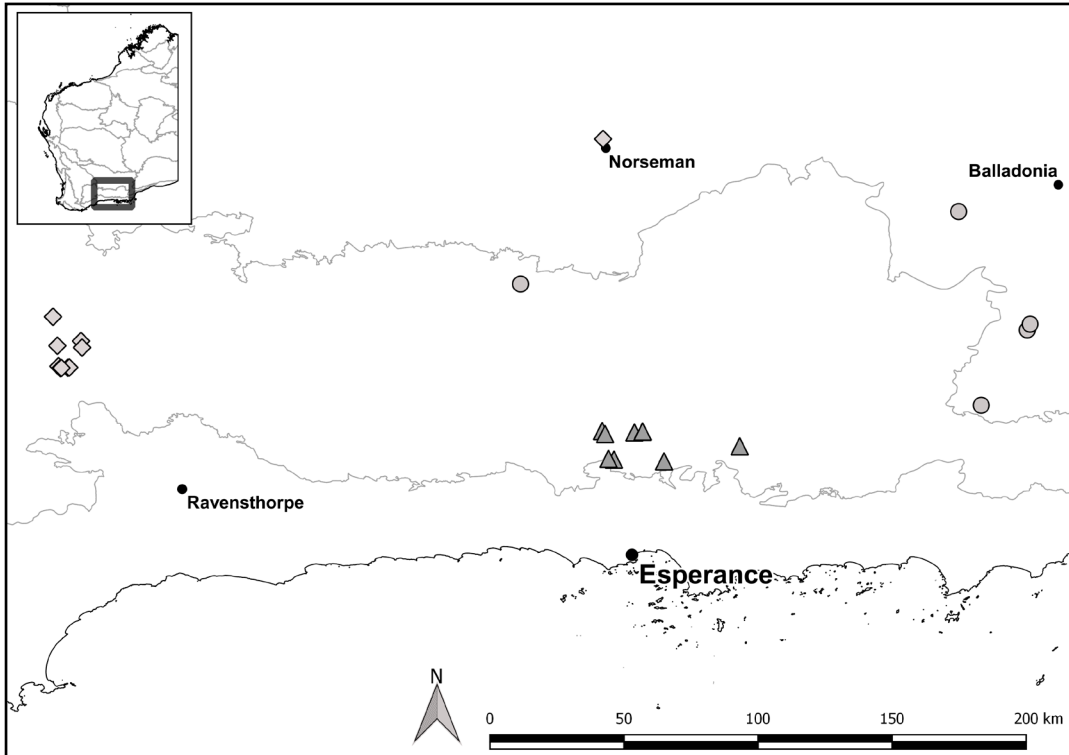


Figure 2. Distribution of *Hydrocotyle asterocarpa* (▲), *H. decorata* (◆) and *H. perforata* (●) based on selected specimens held at CANB, MEL and PERTH. Map with *Interim Biogeographic Regionalisation for Australia* version 7 bioregions (Department of the Environment 2013) shown in grey. Overview map for Western Australia shown in the top left corner.

at maturity, mericarp surfaces ornamented with reticulate ridges and pits (Figures 3–5), and persistent carpophores. The mature mericarps in all four species also remain attached to their carpophores beyond the senescence of the plants in late spring to early summer.

The inflorescence of *H. medicaginoidea* has been previously interpreted as being umbellate (Duretto 1999), but with the disarticulation of the mericarps (or removal of the mericarps from the infructescence) it is revealed to be predominantly spicate in structure. Small plants of *H. medicaginoidea* may produce umbellate inflorescences (of 3–5 flowers) due to low flower numbers, but most plants typically produce dense spicate inflorescences of 6–12 flowers, like those in *H. asterocarpa*, *H. decorata* and *H. perforata* (Figures 1, 3–5).

Both *H. asterocarpa* and *H. medicaginoidea* are known to occur in similar habitats, preferring sites around saline lakes or saline coastal swamps, often associated with low chenopod shrublands (Figures 1D, 3D) and have been found growing sympatrically around Scaddan in Western Australia (Western Australian Herbarium 1998–; AVH 2017). *Hydrocotyle asterocarpa* can be readily distinguished from *H. medicaginoidea* based on differences in the schizocarp morphology. Primarily, the schizocarp wings in *H. asterocarpa* ascend well above the fruiting styles, with the margins entire or occasionally with shallow lobing and the apices often falcate with obtuse to acute tips (Figure 1B, C). In *H. medicaginoidea*, the wing-like lobes are spreading (not ascending), rugulose along the margins and orbicular in shape (Figure 3B, C). Overall, the ascending wings in *H. asterocarpa* give the dense spicate infructescences in this species a spiky or ‘prickly’ appearance (Figure 1A–C), whereas the infructescences in *H. medicaginoidea* are more spherical to elliptical in profile (Figure 3A, B).

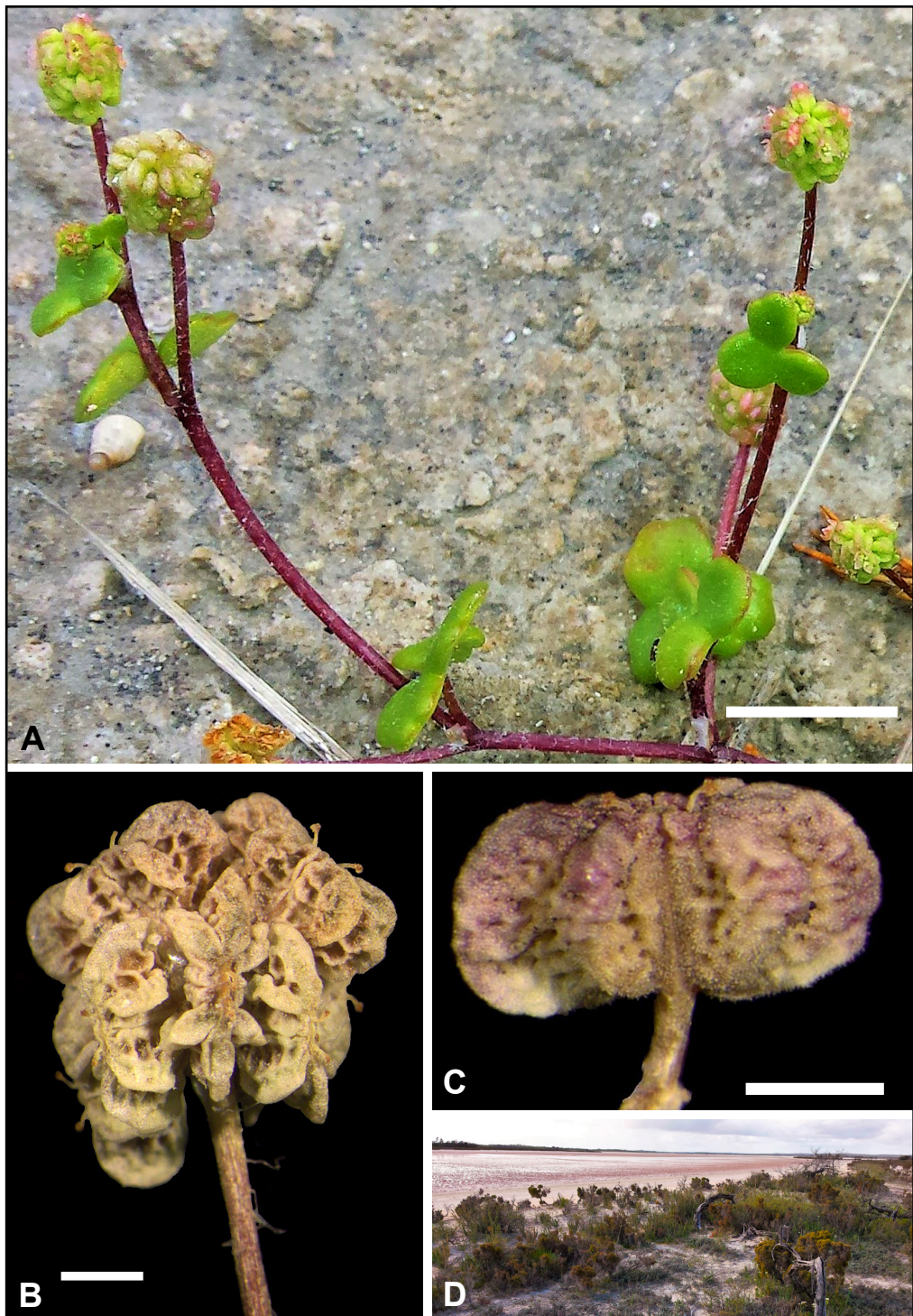


Figure 3. *Hydrocotyle medicaginoides*. A – portion of flowering plant *in situ* showing dense spicate inflorescences and infructescences; B – spicate infructescence with mature schizocarps; C – lateral view of a mature schizocarp showing wing-like lobes with rugulose margins and pitted mericarp surfaces; D – typical habitat. Scale bars = 5 mm (A); 1 mm (B, C). Voucher: *A.J. Perkins* AJP-WA 125 (A, B, C). Photographs by A. Perkins.

Hydrocotyle decorata A.J.Perkins, *sp. nov.*

Type: Lake King, Western Australia [precise locality withheld for conservation reasons], 22 October 2017, A.J. Perkins AJP-WA 144 (*holo:* PERTH 08935033; *iso:* AD, CANB, MEL, NSW).

Hydrocotyle hexaptera H.Eichler ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 13 October 2017].

Hydrocotyle sp. *Hexaptera* (T. Erickson TEE 173), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 13 October 2017].

Annual herbs with a basal rosette of leaves and branched stems bearing leaves and spicate inflorescences, 1–4 cm high, 2–30 cm wide. *Stems* decumbent, straight to sinuous, light green to crimson, terete, villous. *Stipules* white, lanceolate to linear lanceolate, 1.0–4.0 mm long, 0.5–2.2 mm wide, membranous, translucent, finely fimbriate along margins. *Petioles* 5–40(–50) mm long, light greenish yellow to reddish green, villous. *Leaf blades* predominantly simple or occasionally compound, dorsiventral, carnose, rhombic to trilobed in juvenile leaves, trilobed to pedately lobed in mature leaves or sometimes trifoliolate, 4–20 mm long, 6–30 mm wide; adaxial lamina surface glabrous or subglabrous to puberulous, light green to yellowish green; abaxial lamina surface slightly lighter in colour than adaxial, subglabrous to puberulous. *Leaf margins* toothed; teeth rounded to obtuse, glabrous to occasionally tipped with short acute hairs. *Median leaf lobes* elliptic to obovate, 4–18 mm long, 3–12 mm wide, with 1–6 marginal teeth. *Lateral leaf lobes* 3–18 mm long, 3–15 mm wide, 3–9 marginal teeth, incised into 2 asymmetrical lobules in pedate leaves; leaf sinuses in simple leaves 10–95% of lateral lobe length. *Inflorescences* leaf-opposed, spicate, 6–26-flowered. *Peduncles* terete, longer than subtending leaves, 4–45 mm long, villous. *Involucral* bracts absent. *Rachis* 3–10 mm long. *Pedicels* light green, 0.1–0.2 mm long. *Flowers* all hermaphrodite, protandrous, densely arranged along the rachis. *Sepals* absent. *Petals* 5, predominantly cream to light creamy yellow with light crimson on the abaxial surface towards the apex, ovate, 0.8–1.0 mm long, 0.5–0.6 mm wide. *Filaments* light cream, 0.6 mm long. *Anthers* predominantly crimson to occasionally creamy yellow, elliptic, 0.3 mm long. *Ovaries* light green at anthesis, orbicular, dorsal and lateral ribs lobed towards their apices. *Schizocarps* bilaterally flattened, symmetrical, broadly obovate, 6 prominent wings developing on the apical lobing of the dorsal and lateral ribs, light green during early development turning creamy brown at maturity; commissure 90–95% the length of mericarps (excluding the wings). *Mericarps* minutely colliculate, 1.2–1.5 mm long, 0.9–1.2 mm wide; dorsal and lateral ribs raised with prominent wings along the entire length of the ribs; wings 0.3–1.0 mm long, ascending with undulate to obtusely lobed margins appearing finger-like with lobes variable in length and number along margin, wings remaining flattened at maturity; mericarp surface between dorsal and lateral ribs with 2 rows of pits either side of a raised undulate ridge running in parallel with the lateral rib; surface between lateral ribs and median ribs similarly with 2 rows of pits either side of a raised undulate ridge running alongside the lateral rib. *Carpophores* persistent, acerose. *Fruiting styles* swollen at the base, 0.5 mm long, reflexed. *Cotyledons* lanceolate in the seedlings. (Figure 4)

Diagnostic features. *Hydrocotyle decorata* can be distinguished from all other taxa in *Hydrocotyle* by possessing the following combination of characters: decumbent annual herbs with dense spicate inflorescences; schizocarps with 6 prominent wings formed from apical lobing of the dorsal and lateral ribs; mericarp wings ascending, flattened (and remaining so at maturity), margins with distinct undulate to finger-like lobing; mericarp surface between the dorsal and lateral ribs with 2 rows of pits separated by a raised undulate ridge (running parallel with the lateral ribs), similarly

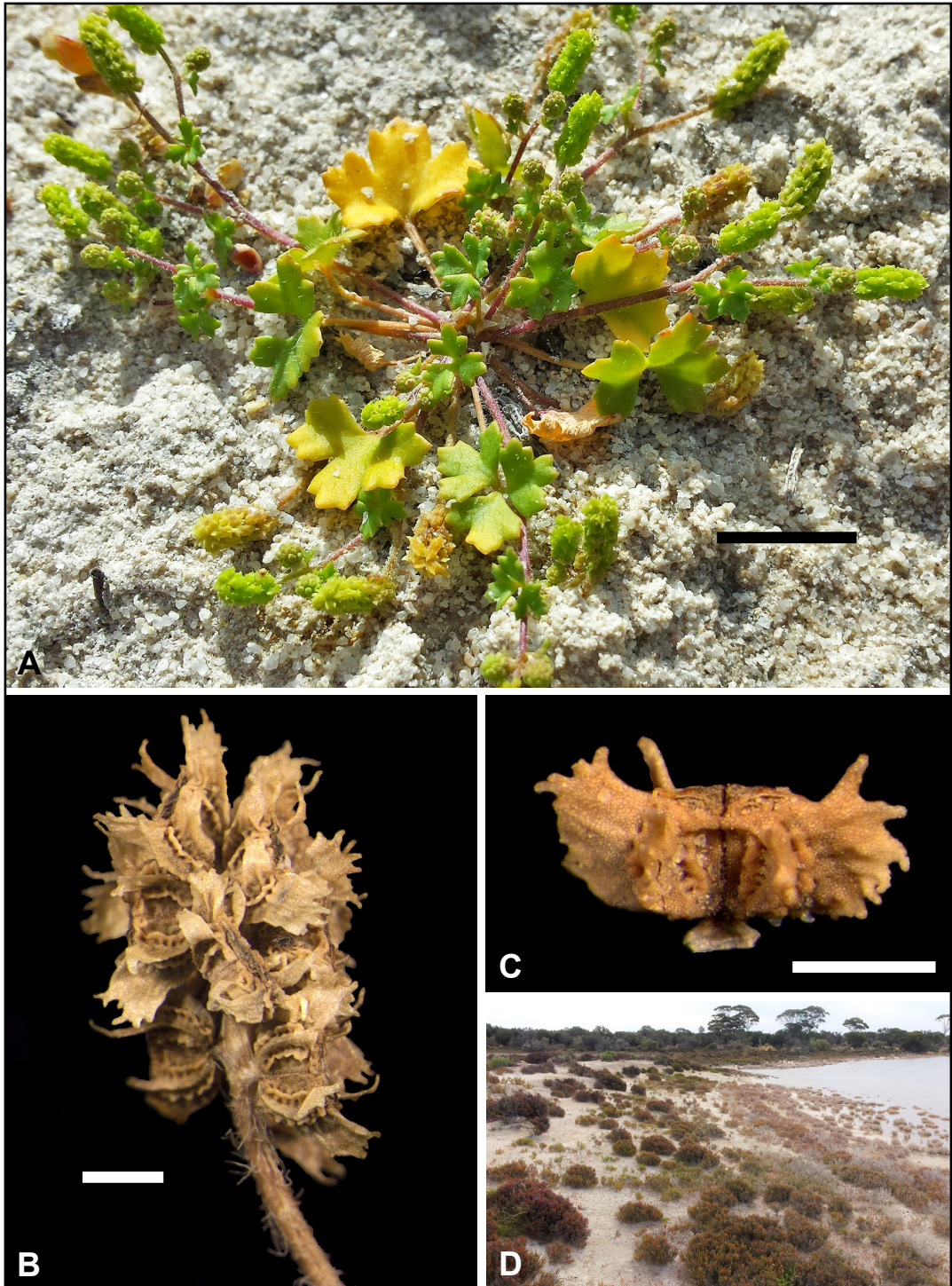


Figure 4. *Hydrocotyle decorata*. A – flowering plant *in situ* showing the habit and spicate inflorescences; B – infructescence with developing schizocarps bearing winged lobes; C – lateral view of a mature schizocarp showing winged lobes and pitted mericarp surface; D – typical habitat. Scale bars = 2 cm (A); 1 mm (B, C). Vouchers: *A.J. Perkins* AJP-WA 142 (A); *M. Graham* G 215-19 (B, C). Photographs by A. Perkins.

the mericarp surface between the lateral and median ribs with 2 rows of pits separated by a raised undulate ridge; carpophores acerose and persistent (Figure 4A–C).

Selected specimens. WESTERNAUSTRALIA: [localities withheld for conservation reasons] 31 Oct. 2005, *P. Armstrong* PA 05/772 (PERTH); 13 Sep. 1971, *Hj. Eichler* 21248 (CANB); 8 Sep. 1982, *Hj. Eichler* 22967 (CANB); 30 Sep. 1982, *Hj. Eichler* 23114 (CANB, PERTH); 30 Sep. 1982, *Hj. Eichler* 23115 (CANB); 5 Oct. 1982, *Hj. Eichler* 23149 (CANB); 19 Nov. 2007, *T. Erickson* TE 173 (K, PERTH); 3 Nov. 1965, *A.S. George* 7292 (CANB, PERTH); 27 Nov. 1994, *M. Graham* G 215-19 (PERTH); 17 Sep. 1998, *M.N. Lyons & S.D. Lyons* 4418 (PERTH); 27 Sep. 2005, *A.J. Perkins s.n.* (NSW, PERTH 08029628, SYD); 21 Oct. 2017, *A.J. Perkins* AJP-WA 142 (PERTH); 22 Oct. 2017, *A.J. Perkins* AJP-WA 143 (PERTH).

Phenology. This species is a winter annual, with flowering and fruiting occurring from September to November.

Distribution and habitat. *Hydrocotyle decorata* is known to occur near Lake King in the Mallee bioregion and Lake Cowan (near Norseman) in the Coolgardie bioregion (Western Australian Herbarium 1998–; AVH 2017) (Figure 2). Plants grow in sandy loam soils surrounding the margins of inland salt lakes, in low open shrubland, often in sheltered positions around mature plants of *Tecticornia* and *Frankenia* spp. (Figure 4D).

Conservation status. *Hydrocotyle decorata* is listed by Smith and Jones (2018) as Priority Two under Conservation Codes for Western Australian Flora, under the name *H. sp. Hexaptera* (T. Erickson TEE 173). The two areas of occurrence for this species are over 220 km apart (Figure 2).

Etymology. The epithet is derived from the Latin *decoratus*, ‘decorative’, in reference to the elaborate ornamentation of the fruit in this species (Figure 4B, C). The common name ‘Decorative Pennywort’ is here suggested.

Affinities. *Hydrocotyle decorata* differs from *H. asterocarpa* by having schizocarp wings that remain flattened at maturity (becoming inflated in *H. asterocarpa*), wings with undulate to finger-like lobing of the margins (mostly entire margins or occasionally shallowly lobed in *H. asterocarpa*) (Figures 1B, 4B). In contrast, the prominent lobing of the dorsal and lateral ribs in *H. medicaginoides* is spreading (not ascending) (Figure 3B, C) and only the dorsal ribs are narrowly winged in *H. perforata* (Figures 1B, C, 5B, C). Additionally, pitting on the mericarp surfaces in *H. decorata* are in two distinct rows separated by raised undulate ridges running in parallel with the lateral ribs (Figures 2B, 3B), whereas pitting on the mericarp surfaces in *H. asterocarpa* and *H. medicaginoides* are irregular in arrangement, being interspersed amongst the reticulate ridges (Figure 1C).

Hydrocotyle perforata A.J.Perkins, *sp. nov.*

Type: south of Balladonia Motel, Eyre Highway, Western Australia [precise locality withheld for conservation reasons], 16 September 1980, *K.R. Newbey* 7477 (*holo:* PERTH 03539873; *iso:* CANB 352120).

Hydrocotyle coraginaensis H.Eichler ms, Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 13 October 2017].

Hydrocotyle sp. *Coraginaensis* (K.R. Newbey 7477), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 13 October 2017].

Annual herbs with a basal rosette of leaves and branched stems bearing leaves and spicate inflorescences, 2–7 cm high, 1–5 cm wide. *Stems* ascending, straight to sinuous, light green to crimson in colour, terete, villous. *Stipules* white, lanceolate to linear-lanceolate, 1.0–3.0 mm long, 0.5–1.5 mm wide, membranous, translucent, lacinate to fimbriate along margins. *Petioles* 4–15 mm long, light green, villous. *Leaf blades* simple, dorsiventral, carnose, rhombic to shallowly trilobed in juvenile leaves, shallow to deeply trilobed in mature leaves, 3–6 mm long, 3–12 mm wide; adaxial lamina surface light green, subglabrous to puberulous; abaxial lamina surface slightly lighter in colour than adaxial, subglabrous to puberulous. *Leaf margins* toothed; teeth rounded to obtuse or occasionally acute. *Median leaflobes* ovate to oblanceolate, 3–6 mm long, 2–4 mm wide, with 1–3 marginal teeth. *Lateral leaflobes* 2–6 mm long, 2–4 mm wide, with 1–4 marginal teeth; leaf sinuses 20–80% of lateral lobe length. *Inflorescences* leaf-opposed, spicate, 6–20-flowered. *Peduncles* terete, longer than subtending leaf when in fruit, 3–20 mm long, villous. *Involucral bracts* absent. *Rachis* 3–6 mm long, glabrous to sparsely villous. *Pedicels* light green, 0.2–0.5 mm long. *Flowers* all hermaphrodite, protandrous, densely arranged along the rachis. *Sepals* absent. *Petals* 5, cream with light crimson on the abaxial surface towards the apex, ovate, 0.5–0.8 mm long, 0.4–0.5 mm wide. *Filaments* light cream, 0.4–0.5 mm long. *Anthers* crimson or occasionally creamy yellow, elliptic, 0.2–0.3 mm long. *Ovaries* light green at anthesis, orbicular, dorsal and lateral ribs distinctly raised in profile. *Schizocarps* bilaterally flattened, symmetrical, broadly elliptic to broadly obovate, light green during early development turning reddish brown to dark brown at maturity, dorsal and lateral ribs prominently raised; commissure 90–95% the length of mericarps. *Mericarps* minutely verrucate to colliculate, 0.4–0.8 mm long, 0.6–0.8 mm wide; dorsal ribs conspicuous, bearing a slender wing at maturity; wing margins repand; lateral ribs prominently raised; mericarp surface between dorsal and lateral ribs with 2 longitudinal rows of pits bordered by raised undulate ridges; surface between lateral ribs and median ribs similarly with 2 (rarely 3) longitudinal rows of pits bordered by raised undulate ridges; ridges surrounding pits becoming thickened and more prominent leading up to fruit maturation. *Carpophores* persistent, acerose. *Fruiting styles* swollen at the base, 0.4–0.5 mm long, reflexed. *Cotyledons* oblong to oblanceolate in the seedlings. (Figure 5)

Diagnostic features. *Hydrocotyle perforata* can be distinguished from all other taxa in *Hydrocotyle* by possessing the following combination of characters: ascending annual herbs with dense spicate inflorescences; broadly elliptic to broadly obovate schizocarps with slender wings along the dorsal ribs; lateral ribs raised (but not lobed); mericarp surfaces distinctly pitted with 2 longitudinal rows of pits bordered by raised undulate ridges between the dorsal and lateral ribs, similarly with 2 rows of pits between lateral ribs and median ribs; carpophores acerose and persistent (Figure 5A–C).

Selected specimens. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 29 Sep. 1990, *W.R. Archer* 2909903 (MEL); 7 Nov. 2007, *G. Cockerton & N. McQuoid* LCH 15782 (PERTH); 7 Sep. 1982, *Hj. Eichler* 22953 (CANB); 11 Sep. 1980, *K.R. Newbey* 7266 (PERTH).

Phenology. This species is a winter annual, with flowering and fruiting occurring from September to November.

Distribution and habitat. *Hydrocotyle perforata* is currently known from a locality near Salmon Gums in the Mallee bioregion and four localities south-west of Balladonia in the Coolgardie bioregion (Western Australian Herbarium 1998–; AVH 2017) (Figure 2). This species grows in sandy loam soils

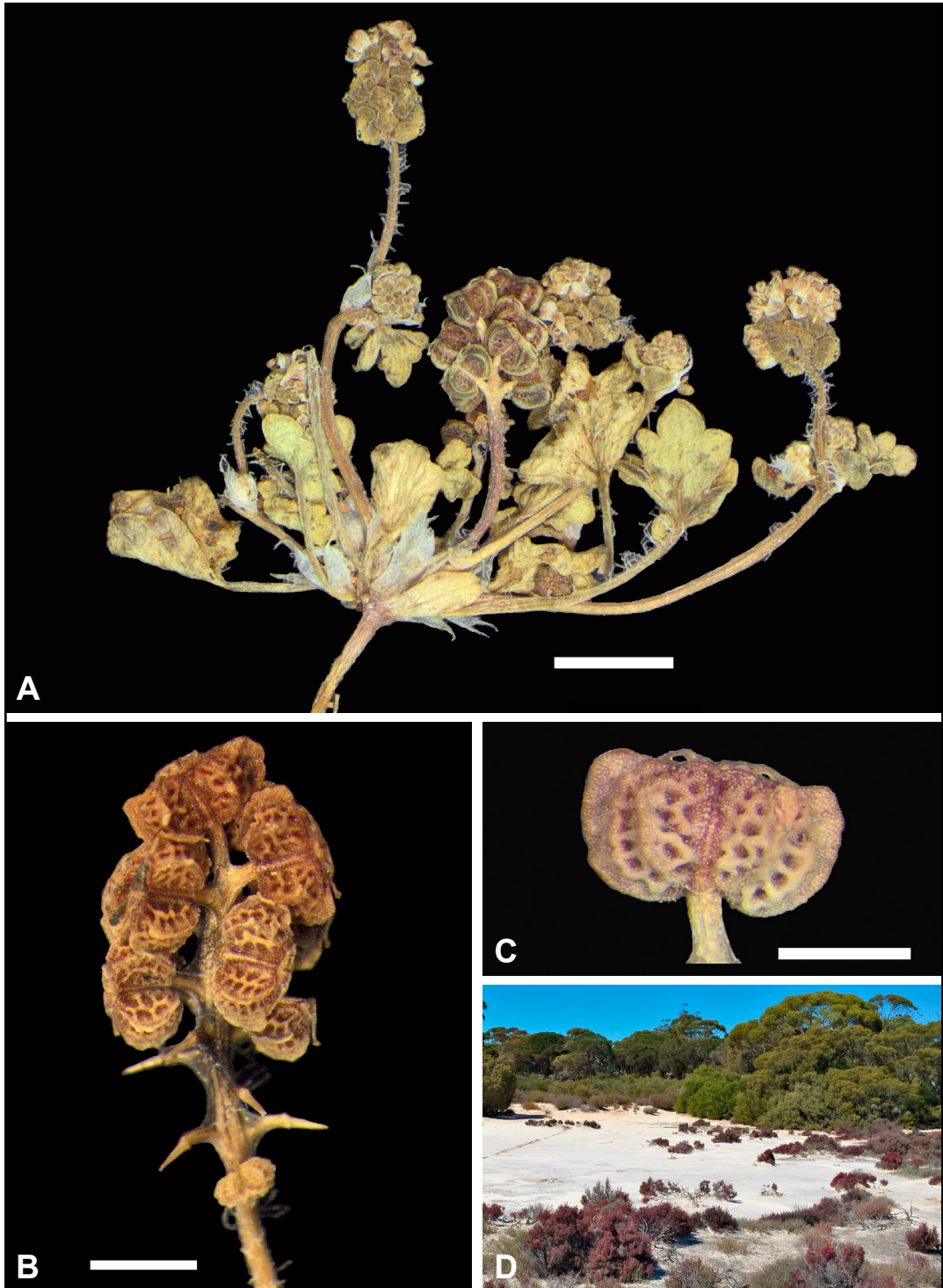


Figure 5. *Hydrocotyle perforata*. A – herbarium voucher showing a fertile plant with flowers and developing fruit borne on spicate inflorescences; B – infructescence showing mature schizocarps with pits in longitudinal rows; C – lateral view of a mature schizocarp showing slender wings along the dorsal ribs, raised lateral ribs and pitted mericarp surface; D – typical habitat in the Salmon Gums area. Scale bars = 5 mm (A), 1 mm (B, C). Vouchers: *K.R. Newbey* 7266 (A); *G. Cockerton & N. McQuoid* LCH 15782 (B, C). Photographs by A. Perkins.

surrounding the margins of inland salt lakes and in granitic sandy loams surrounding exposed granite outcropping or shallow granite sheeting of variable drainage.

Conservation status. *Hydrocotyle perforata* is listed by Smith and Jones (2018) as Priority Two under Conservation Codes for Western Australian Flora, under the name *H. sp. Coraginaensis* (K.R. Newbey 7477).

Etymology. The epithet is derived from the Latin *perforatus*, ‘perforated’, in reference to the perforated or pitted ornamentation of the fruit in this species (Figure 5A–C). The common name ‘Pitted Pennywort’ is here suggested.

Affinities. The schizocarps of *Hydrocotyle perforata* differ from *H. medicaginoides*, *H. asterocarpa* and *H. decorata* by having slender flattened wings along the dorsal ribs only (Figure 5B, C) and the lateral ribs being raised (lateral ribs with prominent lobing in *H. medicaginoides*, *H. asterocarpa* and *H. decorata*). Also, the undulate ridges that border the pits on the mericarp surfaces become thickened as the fruit reaches maturity, giving this species their distinctively pitted schizocarps (Figure 5A–C).

Acknowledgements

The author thanks Julia Percy-Bower, Karina Knight and Skye Coffey (Western Australian Herbarium) for curatorial assistance, Barbara Rye and Robert Davis (Western Australian Herbarium) for constructive discussions regarding the taxonomic descriptions, and Mike Lyons (Department of Biodiversity, Conservation and Attractions) for providing additional vouchers from the Salinity Action Plan Flora Survey to the Western Australian Herbarium and for sharing his valuable field knowledge. Carolyn Connelly (National Herbarium of New South Wales) and Karen Muscat are thanked for assistance in the field. The curators of CANB (Australian National Herbarium) and MEL (National Herbarium of Victoria) are thanked for providing access to their holdings. Thanks also to Murray Henwood for access to additional CANB vouchers on loan to SYD (John Ray Herbarium) and the late Hansjörg Eichler for his contribution to the systematics of *Hydrocotyle*.

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