

Apocissus Jackes & Trias-Blasi, a new genus in the Vitaceae

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Summary

Jackes, B.R. & Trias-Blasi, A. (2023). *Apocissus* Jackes & Trias-Blasi, a new genus in the Vitaceae. *Austrobaileya* 13: 94–104. Molecular phylogenetic studies have shown that *Cissus* L. is polyphyletic. A small, Neotropical – Australian clade has been recognised as distinct. A new genus *Apocissus* Jackes & Trias-Blasi, based on phylogenetic and morphological studies, is described to accommodate the species included in this clade. *Apocissus* can be recognised by the following combination of characters: the presence of domatia and/or large stipules. Species occur on the island of New Guinea, in Australia and central South America. The following new combinations are made: *Apocissus acrantha* (Lauterb.) Jackes & Trias-Blasi, *A. antarctica* (Vent.) Jackes & Trias-Blasi, *A. behrmannii* (Lauterb.) Jackes & Trias-Blasi, *A. hypoglauca* (A.Gray) Jackes & Trias-Blasi, *A. oblonga* (Benth.) Jackes & Trias-Blasi, *A. sterculiifolia* (F.Muell. ex Benth.) Jackes & Trias-Blasi and *A. trianae* (Planch.) Jackes & Trias-Blasi. Lectotypes for *Cissus behrmannii* Lauterb., *C. hypoglauca* A.Gray and *C. oblonga* Benth. are designated, as well as a neotype for *C. acrantha* Lauterb. All species are concisely described for the purposes of comparison, with notes provided on distribution, habitat and phenology. A key to the species of *Apocissus* is provided.

Key Words: Vitaceae; *Apocissus*; *Apocissus acrantha*; *Apocissus antarctica*; *Apocissus behrmannii*; *Apocissus hypoglauca*; *Apocissus oblonga*; *Apocissus sterculiifolia*; *Apocissus trianae*; *Cissus*; *Cissus* II; Neotropical – Australian clade; flora of Australia; flora of New Guinea; flora of Central America; flora of South America; taxonomy; new combinations; lectotypes; key to species

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Introduction

The largest genus in the Vitaceae is *Cissus* L., currently over 350 species are recognised (POWO 2022). Molecular phylogenetic data has shown that *Cissus* is polyphyletic (Rossetto *et al.* 2007; Liu *et al.* 2013; Lu *et al.* 2018; Wen *et al.* 2018). Liu *et al.* (2013) recognised that most species of *Cissus* were in a core group originating in Africa, diverging in the late Cretaceous with rapid migration elsewhere; however, there was a small clade referred to by Lu *et al.* (2018) as *Cissus* II which had a Neotropical – Australian origin. *Cissus* II was considered to have diverged from the core *Cissus* clade in the late Eocene when Australia and South America were still connected via Antarctica. This could have provided a route for species in this clade to be present in both areas, followed by rapid diversification in the Oligocene (Rodrigues *et al.* 2014), or it could possibly be long distance dispersal (Liu *et al.* 2013; Lu *et al.* 2018).

Jackes (1988) recognised a small Australian group, now in *Cissus* II, as being distinct on morphological grounds. This group included *Cissus antarctica* Vent., *C. hypoglauca* A.Gray, *C. oblonga* (Benth.) Planch., and *C. sterculiifolia* (F.Muell. ex Benth.) Planch., but excluded *C. penninervis* (F.Muell.) Planch., which agrees with the analysis by Rossetto *et al.* (2002, 2007), Ren *et al.* (2011) and Rodrigues *et al.* (2014). In 2001, Latiff transferred *C. hypoglauca* and *C. sterculiifolia*, together with *C. penninervis* (F.Muell.) Planch., and two species from New Guinea, *C. acrantha* Lauterb., and *C. behrmannii* Lauterb., to *Nothocissus* (Miq.) Latiff. The type species of this genus is *N. spicifera* Griff., from the Malay Peninsula. Subsequent studies do not support their inclusion within the genus *Nothocissus* (Rossetto *et al.* 2007; Rodrigues *et al.* 2014;

Liu *et al.* 2016; Lu *et al.* 2018). Lui *et al.* (2013) and Lu *et al.* (2018) placed *Nothocissus* in the *Ampelocissus/Pterisanthes/Vitis* clade and distinct from Core *Cissus* and *Cissus* II clades. An analysis by Ma *et al.* (2021) confirmed the close relationship between *C. antarctica*, a species with simple leaves endemic to Australia, and *C. acrantha*, a species with compound leaves endemic to the island of New Guinea, and that they formed a sister clade to the core *Cissus* clade.

The species included in the *Cissus trianae* clade (Rodrigues *et al.* 2014) and included in the group referred to as *Cissus* II by Lu *et al.* (2018) are united by a combination of morphological characters. These are the presence of domatia on the abaxial leaf surface and/or prominent pouch forming stipules. Stipule development in *C. oblonga* and *C. hypoglauca* was shown to be similar by Lacroix & Posluszny (1989), although one was a species with simple leaves with domatia and the other had compound leaves with no domatia. In the Australian species in *Cissus* II, each pair of cotyledons are similar in appearance in contrast to other Australian species of *Cissus* where they are dissimilar (Jackes 1988). A study by Chen & Manchester (2011) found that a common feature of the seeds was the presence of linear chalazas, usually long ventral infolds and a rugose surface.

Although Chen & Manchester (2011) included *Cissus granulosa* Ruiz. & Pav., and *C. penninervis* in the informal “Austrocissus” on the basis of seed anatomy and structure they also found considerable variation within this informal group. However, these two species are excluded from this treatment as the phylogenetic analyses by Rossetto *et al.* (2007) and Rodrigues *et al.* (2014) place *C. penninervis* in the Core *Cissus* of Lu *et al.* (2018). Neither species possess the defining domatia or pouch-like stipules. The only apparent characters linking these species to the *C. trianae* clade are the appearance of the seeds. *Cissus granulosa* has since been transferred to *Clematicissus* (Lombardi 2015).

The pollen morphology of only a limited number of *Cissus* species have been studied (Cartaxo-Pinto *et al.* 2017). However, multivariate analysis based on characters of the apocolpium and mesocolpium, placed *C. hypoglauca*, *C. oblonga* and *C. sterculiifolia* in a separate cluster to *C. penninervis* (Cartaxo-Pinto *et al.* 2022).

On the basis of both these morphological and phylogenetic studies, the following seven species of *Cissus* are transferred to a newly described genus *Apocissus* Jackes & Trias-Blasi: *C. acrantha*, *C. antarctica*, *C. behrmannii*, *C. hypoglauca*, *C. oblonga*, *C. sterculiifolia* and *C. trianae*. Short descriptions of all species are provided for purposes of comparison.

Materials and methods

Herbarium acronyms follow those of Thiers (continuously updated). Specimens from the following herbaria have all been seen by the senior author, A, BRI, CANB, L, K, PR. Specimens only viewed online at JSTOR Global Plants (JSTOR 2022) are indicated by an asterisk (*). Specimens seen at L and which are also available via the website of the Naturalis Biodiversity Centre, (biportal.naturalis.nl), are indicated by the Leiden number in brackets. Duplicate specimens listed as occurring in herbaria others than those indicated above have been taken from labels and have not been seen by the senior author. Where measurements are given, these are based on dried material. Examination of material was made using a binocular microscope.

The following descriptions include features specific to the species. Illustrations of the Australian species of *Apocissus* are available on the ‘Atlas of Living Australia’ website and in Jackes (1988); specimen images for all species, except *A. acrantha*, are available on JSTOR Global Plants; *A. acrantha* is available on the National Herbarium of the Netherlands site as *Nothocissus acrantha*, likewise *A. behrmannii* is also on this site under *Nothocissus*.

Specimens examined are only given for localities in New Guinea. Refer to Jackes (1988) for specimens in Australia and Lombardi (2007) for those in South America.

Taxonomy

Apocissus Jackes & Trias-Blasi, **gen. nov.**

Distinguished by the presence of domatia and/or ‘pouch-like stipules. The domatia vary from pit to inflated and pouch-like, size can vary with position on the leaf abaxial surface.

Type species: *Apocissus antartica* (Vent.) Jackes & Trias-Blasi

Vines, often robust, climbing or occasionally scrambling. Stems rounded or striate, lenticels often prominent. **Tendrils** leaf-opposed, unbranched or branched, each branch or aborted branch subtended by a bract, frequently pubescent, hairs 2-armed. **Stipules** 2, caducous, prominent, usually ‘pouch forming’. **Leaves** alternate, simple or palmately 3–5-foliolate, margins entire, weakly or prominently serrate; with two exceptions (*A. hypoglauca* & *A. trianae*), domatia are present on abaxial surface. **Hairs** present on all leaves at least when young, density varies with age, chiefly 2-armed, usually rusty-coloured, some simple hairs may occur. **Inflorescence** leaf-opposed, pedunculate, multiflowered, ultimate clusters umbellate, congested/compact or loose.

Flowers bisexual, tetramerous; calyx cup-shaped, entire or shallowly lobed, corolla lobes adhering in bud, free at maturity, reflexed after anthesis, soon caducous. **Stamens** inserted on the receptacle at the base of the disc, opposite the petals, filaments erect, anthers introrse, dorsifixed opening by longitudinal slits. Pollen grains tricolporate. Disc adnate to, and entirely surrounding the ovary. **Ovary** 2-locular with 2 anatropous basally attached ovules per locule; style often conical, stigma minute, entire, expanding after anthesis. **Berry** fleshy, with 1–4 seeds, usually 2 or 3, shape of seeds in transverse section depends on the number of seeds maturing in the fruit; chalaza linear, usually long ventral infolds and surface is rugose. Endotesta irregularly lignified, endosperm ruminant, appearance in median transverse section is constant for each species. **Cotyledons** where known (4 species) are lanceolate, similar with entire margins.

Distribution: Species of *Apocissus* occur in eastern Australia from eastern Victoria to the Torres Strait in Queensland, then north to Papua New Guinea and Indonesia in Papua. There is one species endemic to Central and South America.

Etymology: A combination formed from the Greek *apo*, meaning away, from, or diverging from; chosen as these species are now being transferred from the genus *Cissus* L.

Key to the Species of *Apocissus*

- 1 Simple leaves with both domatia and prominent stipules 2
- 1. Compound leaves 3–5-foliolate with either prominent stipules and/or domatia 3
- 2 Lower surface of leaflets rarely glabrous, hairs 2-armed and distinctly stalked, margins with some serrations. Flowers in compact umbels. 2. **A. antarctica**
- 2. Lower surface of leaflets usually glabrous except when young, hairs 2-armed and closely adpressed to surface, margins usually entire. Flowers in loose umbels 5. **A. oblonga**
- 3 Leaves lack domatia but have prominent stipules 4
- 3. Leaves with domatia 5
- 4 Leaves 3–5-foliolate, abaxial surface usually glaucous, margins entire or slightly serrate (Australia) 4. **A. hypoglauca**
- 4. Leaves 3-foliolate, abaxial surface not glaucous, upper margins crenate (Central/South America) 7. **A. trianae**

- 5 Flowers in loose umbels; leaflet margins entire or weakly serrate **6. A. sterculiifolia**
- 5. Flowers in compact umbels; leaflet margins irregularly serrate **6**
- 6 Stems rounded, nodal sections of stems forming a zig-zag, lenticels prominent, leaves 3-foliolate **1. A. acrantha**
- 6. Stems striate, nodal sections do not form a zig-zag or if so then only slightly, lenticels small, leaves chiefly 5-foliolate **3. A. behrmannii**

1. Apocissus acrantha (Lauterb.) Jackes & Trias-Blasi, **comb. nov.**

Cissus acrantha Lauterb., *Bot. Jahrb. Syst.* 59: 522 (1925); *Nothocissus acrantha* (Lauterb.) Latiff, *Folia Malaysiana* 2(3): 184 (2001). **Type citation:** Papua New Guinea. “Sepik area, Schradsenberg Range 2070 m in montane forest, mossy with many epiphytes, Pandanus, Bamboo and climbing ferns, soil loamy, 27 May 1913, *C.L. Ledermann* 11650” (holo: WRSL? *n.v.* or †). **Type:** Papua New Guinea. SANDUAN (WEST SEPIK) PROVINCE: Telefomin subdistrict, on mountainside between Busilmin and Funmuk, 22 April 1975, *W.R. Barker & A. Vinas LAE67583* (neo [here designated]: L [L. 238730]); isoneo: (A 02326827, BRI [AQ0374644], E, K).

Robust vine, stems thick, section between the nodes of the terminal branches change direction resulting in a zig-zag appearance; lenticels prominent, hairs 2-armed markedly asymmetrical, rusty-coloured; tendrils branched. **Stipules** ovate, covering axillary buds *c.* 0.5 cm long, pubescent. **Leaves** 3-foliolate, leathery; **petiole** 0.5–2 cm long, petiolules similar in length 0.5–1.5 cm long, rusty 2-armed hairs present; central leaflet ovate-lanceolate to elliptic, 6–12 cm long, 2.5–7 cm wide, lateral leaflets similar but asymmetrical at base, margins irregularly serrate; adaxial surface light green when fresh, drying dark, veins yellowish, sparsely pubescent, abaxial surface with pale to rusty-brown 2-armed hairs appressed to surface, stalk short; midrib prominently raised on lower surface. Pit to pocket **domatia** in axils of mid-rib and often in basal pair of secondary and tertiary veins. **Inflorescence** of terminal umbels, congested, pubescent. **Corolla** *c.* 1 mm long, varies from white to green to

yellowish-green, outer surface pubescent. **Staminal filaments** flattened in the middle. **Berry** ovoid to elongate-falcate, to 17 × 10 mm, dark red to dark brown at maturity; seeds 1–4 per fruit, ovoid.

Additional selected specimens examined:
Indonesia. PAPUA: Baliem Valley, May 1991, *Burley & Ismael 4606* (L [L. 2338726, L. 2338727]). **Papua New Guinea.** SANDAUN (WEST SEPIK) PROVINCE: Telefomin Subdistrict., bush camp on ridge below Tamanagabip on track to Busilmin, May 1975, *Vinas & Wiakabu LAE59551* (A, BRI, CANB, K, L [L. 2338724]). WESTERN HIGHLANDS PROVINCE: Sirunki, near Nanguris - Sirunki Village, Sep 1962, *Walker ANU901* (A, K, L [L. 2338733]); Mt Hagen – Eastern side, Aug 1967, *Wheeler ANU6328* (CANB). SOUTHERN HIGHLANDS PROVINCE: Vicinity of Habona Rest House, west of Mt Ne, Aug 1966, *Frodin NGF28487* (BRI, CANB, K, L [L. 2338729]); SE foot of Mt Ambua, Aug 1966, *Kalkman 5196* (A, K, L [L. 2338722]); Western slopes of Mt Giluwe, above Klareg, Sep 1961, *Schodde 2098* (CANB, L [L. 2338723]). MOROBE PROVINCE: Sattelberg, Dec 1937, *Clemens 7858* (A); Wau, Mt Kiandi trail to old Edie Creek Road, Jul 1977, *Fallen et al. 504* (A, BISH, L [L. 2338734], MO); Pad 27, adjacent to Summit camp, Salamaua Road, Feb 1967, *Millar NGF22794* (A, BRI, CANB, E, K, L [L. 2338732], NSW).

Distribution and habitat: *Apocissus acrantha* is endemic to the island of New Guinea. Specimens have been collected in Indonesian Papua, as well as in Papua New Guinea, where it extends from the Sandaun Province (West Sepik) area to as far east as the Morobe Province. It occurs in forested areas between 2000 and 3000 m altitude.

Phenology: Flowering and fruiting occurs throughout the year; however, the peak period appears to be May to October.

Diagnostic features: *Apocissus acrantha* is readily distinguished by the leathery 3-foliolate leaves with rusty to dark-coloured, markedly asymmetrical 2-armed hairs and leaflets with serrate margins. The staminal filaments being flattened in the middle, are unique in *Apocissus*.

Typification: Despite previous attempts by both authors, no original material has been found for *Cissus acrantha*. It is probable that all material was lost as the result of World War 2, certainly any duplicates in Berlin would have been lost and material in WRSL has not been located. Therefore, in the absence of known type material (*Ledermann 11650*) a flowering specimen (*W.R. Barker & A. Vinas LAE67583*) from the general area has been chosen as the neotype. This specimen (L. 238730) and its duplicates agree with Lauterbach's description (1925: 522).

Note: It is reported that the sap is useful to put on sores. Fruits are eaten although they are sour.

2. *Apocissus antarctica* (Vent.) Jackes & Trias-Blasi, **comb. nov.**

Cissus antarctica Vent., *Choix Pl.* 4: 21, t. 21 (1804); *Vitis antarctica* (Vent.) Benth., *Fl. Austral.* 1: 447 (1863). **Type citation:** "Arbrisseau sarmenteux, originaire de la Nouvelle Hollande, cultivé depuis plusieurs années chez M. Cels. Il passe l'hiver dans l'orangerie, et fleurit pendant l'été". **Type:** Jardin de Cels, *s.dat.*, [*E.P.*] *Ventenat s.n.* (holo: G 00341435*, *fide* Callmander *et al.* 2017: 127).

Cissus glandulosa Poir., *Encycl. [J. Lamarck & al.] Suppl.* 1: 105 (1810), *nom illeg.*

Vitis kanguruh DC., *Prodr.* 1: 629 (1824), *nom inval.*, *pro. syn.*

Vitis lucida Fisch. ex Steud., *Nomencl. Bot. [Steudel]*, ed. 2, 2: 778 (1841), *nom inval.*, *pro. syn.*

Vitis baudiniana F.Muell., *Fragm.* 4: 136 (1864), *nom. illeg.*; *Cissus baudiniana* (F.Muell.) Planch., *Monogr. Phan. [A.DC. & C.DC.]* 5(2): 517 (1887), *nom. illeg.*

Cissus antarctica var. *integerrima* Domin, *Biblioth. Bot.* 22(89): 920 (1927). **Type:** Australia. Queensland. MORETON DISTRICT: Tamborine Mountains, March 1910, *K. Domin 6359* (holo: PR 528951).

Cissus antarctica var. *pubescens* Domin, *Biblioth. Bot.* 22(89): 920 (1927). **Type:** Australia. Queensland. COOK DISTRICT: Yungaburra, February 1910, *K. Domin 6360* (holo: PR 528952).

Robust vine, tendrils unbranched or bifid. **Stipules** triangular, 5–10 mm × 3–5 mm. **Leaves** simple, fleshy-leathery; **petiole** to 4 cm long; lamina ovate to oblong, to 14 cm long and 9 cm wide, apex acuminate to obtuse, base cordate to truncate, margins serrate, sometimes minutely; adaxial surface glabrous at maturity, abaxial surface pubescent, hairs 2-armed, distinctly stalked, rusty-coloured occasionally greyish. **Domatia** occur in axils of midrib and lower secondary veins, sometimes in other axils, varying from being relatively flat to being inflated. **Inflorescence** paniculate, with terminal umbels congested, pubescent. **Corolla** 1.5–2 mm long, pale yellow, pubescent. **Staminal filaments** not flattened in middle. **Berry** globular, 8–12 mm diameter, black at maturity; seeds usually 2 or 3 per fruit, ovoid. Tetraploid 2n=40, Chu *et al.* (2018).

Distribution and habitat: *Apocissus antarctica* is endemic to Australia along the east coast from 15°S in Queensland to the Victorian border area about 37°S. It is found chiefly in rainforest, on rainforest margins and in wetter open forest.

Phenology: Flowering spring to summer. Fruits have been collected throughout the year.

Diagnostic features: *Apocissus antarctica* is distinguished from *A. oblonga* by the hairs which are distinctly stalked, serrate margins on the leaf, although these are not always well developed, and the relatively flatter domatia.

Typification: An original collection by Ventenat was listed as the holotype for *Cissus antarctica* by Callmander *et al.* (2017: 127).

Note: Commonly referred to as ‘kangaroo vine’.

3. *Apocissus behrmannii* (Lauterb.) Jackes & Trias-Blasi, **comb. nov.**

Cissus behrmannii Lauterb., *Bot. Jahrb. Syst.* 59: 523 (1925); *Nothocissus behrmannii* (Lauterb.) Latiff, *Folia Malaysiana* 2(3): 184 (2001). **Type citation:** “Nordöstl. Neu-Guinea: Sepik-Gebiet, Lordberg, 1000 m, in lichtigem etwa 20 m hohem montanem Wald mit viel Windbruch; große Moospolster in den Kronen, viel Rotang und Zwergpalmen (LEDERMANN n. 10016! in Knospe 3. Dez. 1912; Original der Art); Etappenberg, 850 m, in dichtem, bis 25 m hohem, ziemlich bemoostem Höhenwald mit kletternden Freycinetien und Araceen; viele Agathis, Pandanus, im Unterholz Zwergfächer-palmen (LEDERMANN n. 9540!, in Knospe 28. Okt. 1912).” **Type:** Papua New Guinea. EAST SEPIK PROVINCE: Etappenberg, 28 October 1912, *C.L. Ledermann 9540* (lecto [here designated]: L [L. 0013696*]).

Robust vine, stems striate, nodal sections on young branches virtually straight; lenticels present but not prominent; tendrils appear branched. **Stipules** orbicular, to 7 mm long, not ‘pouch-like’. **Leaves** 3–5-foliolate, probably leathery (Lauterbach 1925: 523); **petiole** to 5 cm long, central petiolule appears to be slightly longer than laterals so leaf often appears digitate; leaflets lanceolate to ovate-lanceolate, central leaflet to 10 cm long and 4 cm wide, apex acute, base cuneate; hairs 2-armed, sparse on adaxial surface, scattered on abaxial surface, midrib and laterals raised on abaxial surface, margins entire or shallowly serrate, revolute towards base. Pit **domatia** present in axils of midrib and secondary veins on abaxial surface. **Inflorescence** paniculate, terminal umbels congested, pubescent,

peduncle 2.5–3 cm long. **Corolla** whitish, glabrous. **Staminal filaments** not flattened in middle. **Berry** and seeds unknown.

Distribution and habitat: *Apocissus behrmannii* is endemic to the island of New Guinea in the East Sepik province of Papua New Guinea, where it was collected by Ledermann on Lordberg at 1000 m in December, and on Etappenberg at 850 m in October. Ledermann described the area where he collected it on Lordberg, as in a windblown montane forest to 20 m high, with rattans and dwarf palms and lots of moss in the crowns. His description of the Etappenberg area was of a dense montane forest to 25 m high dominated by *Freycinetia*, Araceae, *Pandanus*, rattans and dwarf palms with lots of moss and epiphytes. These historical collection localities have been localised by Veldkamp *et al.* (1988).

Phenology: Notes on the Ledermann specimens indicate that flowering occurs in late spring and summer.

Typification: Although two specimens are listed by Lauterbach (1925: 523), *Ledermann 10016* which is listed as “Original der Art”, has not been found and hence the duplicate at L of *Ledermann 9540* has been selected as the lectotype.

Notes: The description of *Apocissus behrmannii* is based on notes from an examination of *Ledermann 9450* at L, and Lauterbach’s description (1925). Confirmation of identification of specimens of this species depends on reproductive material. Lauterbach (1925) notes that it is distinguished from *A. acrantha* by the thinner leaves with a different shape and smooth margins. He notes that it has dense terminal buds, a character which distinguishes it from *A. sterculiifolia* where the terminal umbels are not congested.

4. *Apocissus hypoglauca* (A.Gray) Jackes & Trias-Blasi, **comb. nov.**

Cissus hypoglauca A.Gray, *U.S. Expl. Exped., Phan.* 15(1): 272 (1854); *Vitis hypoglauca* (A.Gray) F.Muell., *Pl. Vict.* 1: 94, t. 10 (1862); *Nothocissus hypoglauca* (A.Gray) Latiff, *Folia Malaysiana* 2 (3): 185 (2001). **Type:** Australia.

New South Wales. [near Sydney], 1838–1842, *U.S. South Pacific Exploring Expedition* [A. Gray] s.n. (lecto [here designated]: GH 0051605); isolecto: Sydney, 1838–1842, *U.S. Exploring Expedition* [A. Gray] s.n. (isolecto: US 00094595*).

Cissus australasica F.Muell., *Trans. Philos. Soc. Victoria* 1: 8 (1855). **Type citation:** “On the wooded banks of the Broadribb River”. **Type:** Australia. Victoria. Brodribb River, January 1855, *F. Mueller* s.n. (lecto [here designated]: MEL 540172; isolecto: K 000736425).

Robust vine, stems striate, pubescent, hairs chiefly 2-armed rusty-coloured, some unicellular hairs may be present; tendrils bifid, pubescent. **Stipules** forming a pocket around developing leaf, 8–14 mm × 3–6 mm, pubescent. **Leaves** compound, 3–5-foliolate; **petiole** 3.5–4 cm long, petiolules usually pubescent, central petiolule 1–3 cm long; upper lateral leaflets to 2.1 cm long, lower lateral leaflets to 1.7 cm long, central leaflet broadly lanceolate to obovate, to 11 × 5.2 cm, apex acuminate, base rounded laterals smaller and slightly oblique at base, margins entire or slightly serrate; adaxial surface usually glabrous at maturity, abaxial surface varies from densely tomentose to glabrous or glaucous, hairs chiefly 2-armed, abaxial surface varies from pale green to glaucous, main veins and petioles may be carmine in colour. **Domatia** absent. **Inflorescence** paniculate, terminal umbels loose. **Corolla** yellow, 1.5–2.5 mm long. **Staminal filaments** not flattened in middle. **Berry** globular, 10–12 mm diameter, purplish-black to black at maturity; seeds 2–4 per fruit, ovoid.

Additional selected specimens examined from New Guinea only. **Indonesia.** PAPUA: Vogelkop Peninsula; Nettoti Range, S slope of Mt Nettoti, path Andjai – Wekari River, Nov 1961, *Van Royen & Sleumer* 7906 (A, BRI, CANB, K, L [L. 2345338], MO). **Papua New Guinea.** SANDUAN (WEST SEPIK) PROVINCE: Telefomin, Oksapmin Oct 1968, *Henty et al.* NGF41771 (A, BRI, CANB, K, L [L.2333939]). MOROBE PROVINCE: Ogeramnang, Jan 1937, *Clemens* 4970 (A); Kuper Range, Mt Kolorong Wildlife Conservation Area, Jun 1992, *Hoft* 2286 (L [L. 4253884]); Kamiali Wildlife Management Area ridge to Blue Mountain, Apr 2005, *Takeuchi et al.* 21186 (BRI, LAE). CENTRAL PROVINCE: Port Moresby; Forest WSW Efogi, Sep 1970, *Stevens* LAE50429 (A, BRI, CANB, K, L [L. 2338737]) Near

Boridi Village, Oct 1973, *Foreman & Vinas* LAE60287 (BRI, CANB, K, L [L. 2333938]). MILNE BAY PROVINCE: 1 km downstream from Mayu 2, Mt Suckling, Goropu Mountains, Jul 1972, *Stevens & Veldkamp* LAE55775 (A, BRI, K, L [L. 2333937], MO).

Distribution and habitat: *Apocissus hypoglauca* is endemic to Australia and the island of New Guinea. In Australia it has been collected from the Windsor Tableland area 16°S, to Mt Buck in Victoria about 37°S (Jackes 1988). However, it has also been collected in Indonesian Papua and in Papua New Guinea; it is probably quite widespread in New Guinea, but under collected. The species is found in rainforest and wet sclerophyll forest, also occasionally in drier eucalypt forest.

Phenology: Flowering occurs throughout the year with a peak period from September to January. Fruits collected throughout the year.

Diagnostic features: *Apocissus hypoglauca* is distinguished by the distinct petiolules of the leaf that are arranged rather like the spokes of a wheel attached to the central column; the glaucousness of the abaxial surface of the leaves and the variable amount of anthocyanin present.

Typification: The specimen at the Gray Herbarium (GH 00051605*) has been selected as the lectotype of *Cissus hypoglauca*, rather than the specimen at the United States National Herbarium (US 00094595*), as the former shows the inflorescence as well as both sides of the leaves. There is also a note attached to the GH specimen that it was verified by A. Gray in 1854. The US specimen is scrappy by comparison. It is currently listed as the holotype by US.

Gray (1854) gives no details as to where he collected it, other than near Sydney; however, he comments “It is singular that so conspicuous a plant should have escaped notice in the neighbourhood of Sydney; but I do not find the species described, nor does it occur in the Hookerian herbarium”.

Note: A common name for *Apocissus hypoglauca* is ‘water vine’ as water can be extracted from the cut stems.

5. *Apocissus oblonga* (Benth.) Jackes & Trias-Blasi, **comb. nov.**

Vitis oblonga Benth., *Fl. Austral.* 1: 447 (1863); *Cissus oblonga* (Benth.) Planch., *Monogr. Phan. [A.DC. & C.DC.]* 5: 517 (1887). **Type citation:** “Queensland. E. coast, *R. Brown*; Curtis Island, *Henne*”. **Type:** Australia. Queensland. [PORT CURTIS DISTRICT]: Broad Sound, 12 September 1802, *R. Brown [Bennett no. 5236]* (lecto [here designated]: BM 000838229; isolecto: CANB 2786341, E, K 000736433, K 000736434).

Vine often scrambling, deciduous, hairs 2-armed, grey; tendrils rarely branched, pubescent. **Stipules** triangular, 3–12 × 2.5–3 mm, pubescent. **Leaves** simple; petiole to 2.7 cm long; lamina oblong to oblong-ovate, to 11 cm long and 3 cm, apex usually obtuse, base truncate or shallowly cordate, margins entire or shallowly serrated; adaxial surface typically glabrous, abaxial glabrous or some unicellular and 2-armed hairs may be present. **Domatia** inflated, pouch-like in axils of midrib and basal pair secondary veins, sometimes in other axils. **Inflorescence** umbellate but not congested. **Corolla** 1–1.5 mm long, greenish, pubescent. **Staminal filaments** not flattened in middle. **Berry** globular, black to purplish-black, 10–12 mm diameter; seeds 1–4 per fruit, usually 3, ovoid.

Distribution and habitat: *Apocissus oblonga* is endemic to Australia where it is found only in eastern Queensland extending from about 15°S to 25°S. It is usually found in deciduous and semi-evergreen vine thickets where it scrambles over rocks and associated vegetation; it is occasionally found in eucalypt woodland.

Phenology: Flowering in spring and summer, fruits collected throughout the year.

Diagnostic features: *Apocissus oblonga* is distinguished from *A. antarctica* by the prominent pouch-like domatia, hairs closely appressed to the surface, leaf margins usually entire and the terminal umbels not congested in bud.

Typification: The BM specimen of the Brown collection from Broad Sound, has been chosen from the syntypes as the lectotype (BM 000838229) for *Cissus oblonga* as the collection is fertile and well represented in herbaria.

6. *Apocissus sterculiifolia* (F.Muell. ex Benth.) Jackes & Trias-Blasi, **comb. nov.**

Vitis sterculiifolia F.Muell. ex Benth., *Fl. Austral.* 1: 450 (1863); *Cissus sterculiifolia* Planch., *Monogr. Phan. [A.DC. & C.DC.]* 5: 519 (1887); *Nothocissus sterculiifolia* (F.Muell. ex Benth.) Latiff, *Folia Malaysiana* 2(3): 185 (2001); *Ampelocissus sterculiifolia* (F.Muell. ex Benth.) Latiff, *Malayan Nat. J.* 66: 331 (2014). **Type citation:** “Hastings river, *Beckler*”. **Type:** Australia. New South Wales. Hastings River, *s.dat.*, [*H.J. Beckler s.n.*] (lecto [designated here]: K 000736429; isolecto: BM, K 000736428 [with “Dr. B.”], MEL 539833).

Cissus sterculifolia Planch., *Monogr. Phan. [A.DC. & C.DC.]* 5: 519 (1887), *orth. var.*

Vitis brachypoda F.Muell., *Fragm.* 9: 125 (1875); *Cissus brachypoda* (F.Muell.) Planch., *Monogr. Phan. [A.DC. & C.DC.]* 5: 520 (1887). **Type citation:** “In silvis densis udis prope Rockingham’s Bay; Dallachy.” **Type:** Australia. Queensland. Rockingham’s Bay, *s.dat.*, [*J.J. Dallachy s.n.*] (lecto [here designated]: MEL 540135; isolecto: BRI [AQ024420], K 00736427 [lacking collector, but with “Com. 10/1884. F.v.Mueller”]).

Robust vine, stems rounded or striate, lenticels often prominent, unicellular and 2-armed hairs present, the latter closely adpressed, arms deciduous leaving a black-coloured base; tendrils unbranched, pubescent. **Stipules** triangular, 3–3.5 × 1–2.5 mm glabrous or pubescent. **Leaves** 3–5-foliolate, leathery; **petiole** 0.5–8 cm long, central petiolule 0.8–2 cm long, laterals shorter; central leaflet broadly lanceolate to oblong, apex acuminate, base attenuate to angustate and up to 16.5 × 9 cm, lateral leaflets smaller but asymmetrical at base, margins entire or with some small serrations towards the apex; adaxial surface glabrous or with scattered pale to rusty-coloured hairs, abaxial surface

pubescent 2-armed hairs tend to concentrate near veins. Pit **domatia** in axils of midrib and main laterals. **Inflorescence** umbellate, not congested. **Corolla** 1–5 mm long, papillose, white to pale green. **Staminal filaments** not flattened in middle. **Berry** ovoid to elongate-falcate, 1–2 cm long, purplish black at maturity; seeds 1–3 per fruit, ovoid to falcate.

Additional selected specimens examined from New Guinea: Papua New Guinea. WESTERN PROVINCE: Near Ingambit Village, Jun 1967, *Henty et al. NGF31818* (A, BRI, CANB, K, L [L. 2338739]). MOROBE PROVINCE: Bulung River, Jan 1937, *Clemens 5269* (A); Adjacent to summer camp, Salamaua Road, Feb 1967, *Millar NGF22794* (BRI, CANB, K, L).

Distribution and habitat: *Apocissus sterculiifolia* is endemic to Australia and New Guinea (Papua New Guinea only). In Australia it occurs from the Atherton Tableland area 16°S in Queensland to south of Sydney 34°S in New South Wales (Jackes 1988). It is found in rainforest where it frequently grows up into the canopy.

Phenology: In Australia flowering occurs in spring and summer, with fruit chiefly collected in winter. It has been inadequately collected in New Guinea to ascertain the regional reproductive phenology.

Diagnostic features: *Apocissus sterculiifolia* is distinguished by the leathery compound leaves with pit domatia and pale or rusty-coloured appressed hairs on the abaxial surface, the midrib when fresh is yellowish. When dry the point of attachment of the hairs is black, a character that has not been observed in the other species. The open inflorescence is distinctive, as is the elongated fruit although similar to the fruit of *A. acrantha*.

Typification: Four specimens collected by Dr H. Beckler from the type locality for *Vitis sterculiifolia* have been located. A fertile specimen at K [K 000736429] is here selected as the lectotype as it was examined by Bentham. The remaining specimens are probable isolectotypes. The K specimens, K 000736428 and K 000736429, are mounted on the same sheet but with different data. Both were incorporated into the Herbarium Hookerianum in 1867, thus postdating

publication of the name. The MEL specimen is labelled as a holotype; however, there is no evidence that it was seen by Bentham.

The type material of *Cissus brachypoda* was collected at Rockingham Bay by John Dallachy. With the dispersal of duplicates by Mueller from MEL, some specimens from this location (that Mueller never visited) have been attributed to Mueller instead of Dallachy (Bean & Forster 2021). This appears to be the case with the apparent syntype at K where it has been attributed to Mueller.

7. *Apocissus trianae* (Planch.) Jackes & Trias-Blasi, **comb. nov.**

Cissus trianae Planch., *Monogr. Phan. [A.DC. & C.DC.]* 5: 555 (1887). **Type:** Columbia. Près de Chinchá, El Arracachal, Andes de Bogotá, 1851–1857 [November 1856], *J.J. Triana s.n.* (holo: G 00488517* [lacking precise date]; iso: BM 000603437*, K 000543708*; *vide* Lombardi 1995: 203 in part).

Cissus martiniana Woodson & Siebert., *Ann. Missouri Bot. Gard.* 24: 191 (1937); *C. trianae* var. *martiniana* (Woodson & Siebert) Steyerf., *Fieldiana, Bot.* 28: 356 (1952). **Type:** Panama. Valley of the Upper Chiriqui Viejo, vicinity of Monte Lino, June–July 1935, *R.J. Siebert 241* (holo: MO 111530*; iso: MO 160785).

Vine scrambling or climbing, stems striate; axillary buds conspicuously developed; hairs 2-armed, ferruginous, sometimes mixed with unbranched non-glandular hairs; tendrils dichotomously branched once or several times, adhesive discs present on the tips. **Stipules** orbicular, to 3 mm diameter, sparsely pubescent. **Leaves** compound, 3-foliolate, leathery; **petiole** to 2.9 cm long, central petiolule to 2.9 mm long, lateral petiolules to 1.5 mm long; leaflets obovate to elliptical, apex usually obtuse, base cuneate, margins recurved with some crenations towards the apex, central leaflet to 6.8 cm long and 3.3 cm wide, laterals slightly smaller, asymmetrical at base; midrib and laterals prominent on abaxial side, on adaxial raised in a groove; hairs 2-armed scattered, sparse on adaxial surface, density on abaxial surface varies,

sometimes restricted to the veins. **Domatia** absent. **Inflorescence** paniculate, to 4.5 cm long and 3.1 cm wide, peduncles to 23 mm long, pedicel 3–4 mm long, peduncle and pedicels pubescent, a bract subtends each branch, terminal umbels loose. **Corolla** yellowish-green to 3 mm long, pubescent. **Staminal filaments** not flattened in middle. **Berry** ovoid, to 7 mm long and 6 mm wide; seeds 1–3, linguiform, to 6 mm long and 4 mm wide. (Description based on Steyermark 1952; Lombardi 2000, 2007; specimens on JSTOR Global Plants 2022).

Additional specimen examined: Colombia. WESTERN CORDILLERA: Paraguas Highland about an hour by jeep from El Cairo, Dec 1986, *Silverstone-Sopkin et al.* 2790 (CANB).

Distribution and habitat: *Apocissus trianae* is widespread in central and northern South America. Collections have been made in the following countries: Mexico, Guatemala, Venezuela, Ecuador, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, Colombia, Brasil, Bolivia and Peru. For details, please refer to Lombardi (2000). The species commonly occurs on the edges of relatively undisturbed forests as well as regrowth forest at altitudes between 1100 and 3333 m above sea level.

Typification: This species was typified by Lombardi (1995: 203) with the citation “Holotype: Colombia, pres de Chinchá, El Arracachal, Andes de Bogotá, Triana (G [F Neg. No. 25296!]; isotype: BM!)”. According to JSTOR Global Plants the barcode for the holotype is G 00488517*. Another isotype has been located at K (K 000543708*).

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