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A new Wedding Bush from the eastern goldfields of Western Australia (*Ricinocarpos digynus*: Euphorbiaceae)

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SHORT COMMUNICATION

Ricinocarpos digynus Hislop & Wege is the first addition to *Ricinocarpos* Desf. (Euphorbiaceae: Ricinocarpeae: Ricinocarpinae) since Halford and Henderson's (2007) taxonomic revision in which 28 species were recognised, all of them endemic to Australia. As part of this study, Halford determined a single specimen of *R. digynus* (*J. Bale* 313), collected from the Kambalda area in 1966, as *R. stylosus* Diels *s. lat.* with a notation that the specimen was atypical in its 'longer leaves and spreading rather than appressed petioles'. That it was not confirmed to represent a new taxon at this time is unsurprising since the material not only lacks fruit but the female flowers are in early bud. The recent discovery of a second population on a mining lease north of Kalgoorlie by Andrea Williams of Botanica Consulting, and her repeated site visits to obtain fruiting material, has assisted its taxonomic resolution. We describe this new and distinctive species below, bringing the number of Western Australian *Ricinocarpos* species to 19 (Western Australian Herbarium 1998–) of which seven are conservation-listed (Smith & Jones 2018).

Ricinocarpos digynus Hislop & Wege, *sp. nov.*

Type: north of Kalgoorlie, Western Australia [precise locality withheld for conservation reasons], 2 September 2015, *A. Williams s.n.* (*holo*: PERTH 08695849; *iso*: BRI, CANB, K, MEL).

Ricinocarpos sp. Eastern Goldfields (A. Williams 3), Western Australian Herbarium, in *FloraBase*, https://florabase.dpaw.wa.gov.au/ [accessed 29 March 2018].

Monoecious, spreading *shrubs* to *c.* 2 m high and 2 m wide. Young *branchlets* bluntly angular, becoming terete with age, glabrous, heavily resinous, assuming a white, scurfy texture with age. *Leaves* petiolate, spirally arranged, resinous; petiole 1.0–1.8 mm long, variably antrorse but rarely appressed, glabrous; blade linear, 8–22 mm long, 1.3–1.8 mm wide, obtuse or acute, sometimes bluntly mucronate, base attenuate to cuneate, margins revolute and obscuring all but the midrib abaxially, secondary venation obscure on both surfaces, adaxial surface glabrous, abaxial surface moderately hairy with stellate hairs 0.2–0.4 mm across; marginal glands absent. *Inflorescences* terminal, with 2–5 male flowers in a raceme *c.* 5–7 mm long subtended by 1 or 2 female flowers at the base of the rachis or on a separate lower branch (the male flowers apparently reaching anthesis well before the female flowers), sometimes

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unisexual (with either male or female flowers present); bracteoles narrowly ovate, 1.2–1.5 mm long, 0.3–0.4 mm wide, glabrous, usually shed in bud. *Flowers* apetalous, calyx 4- or 5-lobed, abaxial surface with sessile glands beneath a white and scurfy excrescence and with a few irregular stellate hairs towards the apex and margins, adaxial surface glabrous or sparsely stellate-hairy distally and becoming densely stellate-hairy towards base. *Male flowers* with a thick, slightly compressed pedicel 1–2 mm long; calyx lobes ovate, 1.2–2.0(–2.5) mm long, 1.3–1.8 mm wide, obtuse to subacute; disc an undulate, yellow ring, 0.4–0.5 mm long, glabrous apart from a few stellate hairs towards the base of the adaxial surface; central column 1.6–2.2(–2.5) mm long, stellate-hairy, at least towards the base; stamens 15–28; free portion of filament 0.3–0.5 mm long, glabrous, erect to spreading at anthesis; anthers 0.4–0.5 mm long. *Female flowers* with a thick pedicel; calyx lobes ovate, obtuse to acute, enlarging as fruit develops to 2.0 mm long and 1.5 mm wide (observation based on flowers in late bud and fruit, refer to notes below); disc as for male flowers; ovary ± globose, stellate-hairy and with sessile glands; style very short, up to 0.3 mm long; stigmatic limbs 2, deeply 2- or occasionally 3-lobed, with the lobes 0.8–1.0 mm long, widely spreading and ± recurved, dorsiventrally compressed and grooved abaxially with sparse stellate hairs and a white, scurfy excrescence in the lower half, glabrous adaxially. *Fruit* compressed-ellipsoid to compressed-obloid, with deep, medial longitudinal grooves delineating the two cocci, 5.0–8.0 mm long, 4.5–5.0 wide, 2-seeded, thickly resinous and deeply rugose while immature, becoming smoother towards maturity with a crustaceous texture, sparsely stellate-hairy; calyx *c.* 1/5–1/3 the length of mature fruit. *Seed* compressed-obovoid, *c.* 3.4–3.6 mm long (including caruncle), *c.* 2.0 mm wide, *c.* 1.5 mm deep (but refer notes below), testa mid-brown. (Figure 1)

Diagnostic characters. Readily distinguished from all other species of *Ricinocarpos* by the combination of spreading leaf petioles, apetalous flowers, female flowers with 2 stigmatic limbs that are mostly 2-lobed, and 2-locular fruit.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 8 Nov. 1966, *J. Bale* 313 (PERTH); 7 Sep. 2011, *M. Cheng & C. Symonds* MC 076 (NSW, PERTH); 25 Feb. 2015, *A. Williams* 1 (PERTH); 25 Feb. 2015, *A. Williams* 2 (BRI, PERTH); 23 Mar. 2015, *A. Williams* 3 (PERTH); 23 Mar. 2015, *A. Williams* 4 (PERTH).

Distribution and habitat. Currently known from three localities in Western Australia that are situated to the north, north-west and south of Kalgoorlie, in the Eastern Murchison and Eastern Goldfield sub-bioregions. At the type locality (north of Kalgoorlie), *R. digynus* grows in sandy loam on rocky hillsides in association with *Casuarina pauper*, *Acacia kalgoorliensis*, *Ptilotus obovatus* and *Triodia scariosa*. No site information was recorded for the other two collections.

Phenology. It seems likely that this species has an extended flowering period, at least through the hotter months of the year between November and March, and possibly significantly longer. Fruit, at various stages of maturity, is likely to be present for much of the year.

Etymology. From the Greek *di-* (two-) and *gyne* (a female). This is the only known species of *Ricinocarpos* to have a consistently two-carpellate gynoecium.

Vernacular name. Andrea's Wedding Bush.

Conservation status. Currently listed as Priority One under Conservation Codes for Western Australian Flora (Smith & Jones 2018), under the name *R.* sp. Eastern Goldfields (A. Williams 3). The type locality is situated on a mining tenement and the western-most population occurs within Credo Conservation

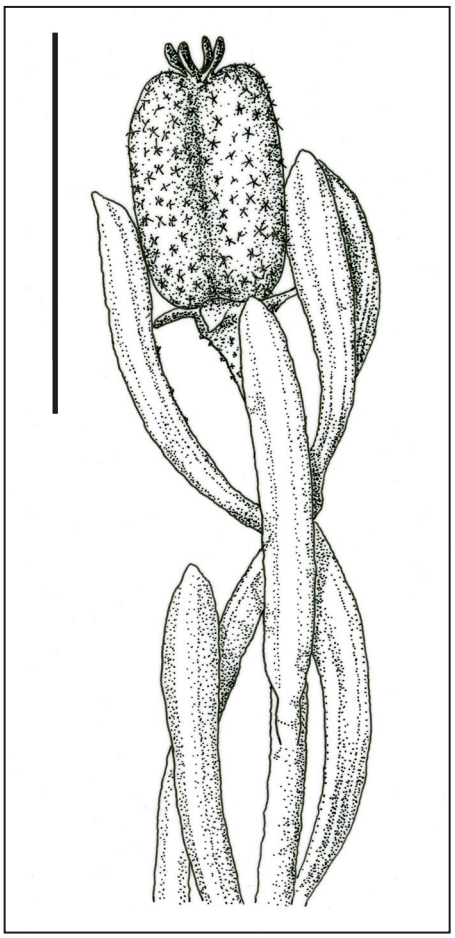

Figure 1. Fruiting branchlet of *Ricinocarpos digynus*, showing the medial longitudinal grooves that delineate the two cocci. Scale bar = 10 mm. Drawn by Skye Coffey from the holotype.

Park, a former pastoral lease with active mining leases. The southern population, if extant, may prove difficult to relocate given the absence of precise locality and habitat information. Further survey is required to establish whether this species' conservation ranking should be upgraded to Threatened.

Affinities. There are only three other apetalous species in *Ricinocarpos*: *R. muricatus* Müll.Arg. and *R. verrucosus* Halford & R.J.F.Hend. from sect. *Apetalidion* Müll.Arg., and *R. stylosus* from the monotypic sect. *Scissostylus* Grüning. Unlike these three species, *R. digynus* has female flowers with usually two stigmatic limbs rather than three, and 2-locular and 2-seeded fruit (*cf.* 3-locular and usually 3-seeded). The fruit of *R. digynus* also differs in shape (compressed-ellipsoid to compressed-obloid with two longitudinal grooves that delimit the cocci *cf.* globose to subglobose or broadly ovoid with 3 longitudinal grooves), and surface texture (smooth to faintly verrucose *cf.* strongly tuberculate to verrucose).

Ricinocarpos digynus can be further separated from *R. muricatus* by the absence of marginal glands at the base of the leaves, its shorter racemes (*c.* 5–7 mm *cf.* 15–30 mm) bearing fewer male flowers (2–5 *cf.* 6–12) and the following differences in male flower morphology: a stellate-hairy (*cf.* glabrous)

central column that is usually shorter (1.6–2.2(–2.5) mm *cf.* 2.0–4.0 mm), densely arranged stamens with the axis often obscured at anthesis (*cf.* loosely arranged stamens, with the axis visible at anthesis), and shorter anthers (0.4–0.5 mm *cf.* 0.7–0.8 mm). *Ricinocarpos muricatus* has a widespread distribution in south-western Australia, extending from west of Denham to north of Esperance and while it occurs in the Eastern Goldfields sub-bioregion near Dundas, it is not known to overlap in distribution with *R. digynus*.

Ricinocarpos digynus has shorter and narrower leaf blades than *R. verrucosus* (8–22 × 1.3–1.8 mm *cf.* 45–100 × 2–4 mm), a species endemic to north-eastern Queensland. It also has shorter racemes (*c.* 5–7 mm *cf.* 20–50 mm) with fewer male flowers (2–5 *cf.* 8–20), and male flowers with fewer stamens (15–28 *cf. c.* 40) and shorter anthers (0.4–0.5 mm *cf.* 0.6–0.8 mm).

In addition to the female flower and fruit differences noted above, *R. digynus* can be readily distinguished from *R. stylosus* by it mostly longer leaves (8–22 mm *cf.* 6–10(–12) mm) with petioles that are usually spreading (*cf.* always appressed), and its racemose (*cf.* umbelliform) inflorescences. Both species have 2–5 male flowers per inflorescence, but there is a tendency for the central column to be shorter in *R. digynus* (1.6–2.2(–2.5) mm *cf.* 2.0–2.5 mm) and for the anthers to be shorter (0.4–0.5 mm *cf.* 0.5–0.7 mm). *Ricinocarpos stylosus* is widespread in the Eastern Goldfields sub-bioregion and its distribution comes close to that of *R. digynus* in the Kambalda area.

According to the infrageneric classification presented by Halford and Henderson (2007), *R. digynus* should be placed with *R. muricatus* and *R. verrucosus* in sect. *Apetalidion* on account of its racemose inflorescence and antrorse petioles. However, the absence of leaf marginal glands along with similarities in male flower number and morphology suggest that it may be more closely allied to *R. stylosus* in sect. *Scissostylus*. Phylogenetic data is required to better understand species relationships within *Ricinocarpos* and to test whether the apetalous species are indeed monophyletic.

Notes. While fruit at various stages of maturity is present in several of the specimens examined above, no female flowers have been seen at anthesis, and hence the description above is incomplete in that regard. Because of the small sample size the dimensions of fruit and seed given here cannot be regarded as definitive.

It is noteworthy that the male flowers on the Kambalda specimen (*J. Bale* 313) are larger than those from the type locality: sepals to 2.5 mm long (*cf.* to 2.0 mm) and central staminal column to 2.5 mm long (*cf.* to 2.2 mm).

Identification. A key to the apetalous species of *Ricinocarpos* is provided below.

1. Gynoecium 2-carpellate, with 2 stigmatic limbs, each 2- or rarely 3-lobed;
fruit compressed-ellipsoid to compressed-obloid, with 2 medial longitudinal grooves.....**R. digynus**

1: Gynoecium 3-carpellate, with 3 stigmatic limbs, each 2–5-lobed;
fruit globose to subglobose or broadly ovoid, with 3 longitudinal grooves

2. Leaves 6–10(–12) mm long, marginal glands absent, petiole usually appressed;
male inflorescence umbelliform.....**R. stylosus**

2: Leaves 15–100 mm long, marginal glands often present, petiole not or rarely appressed;
male inflorescence racemose

3. Leaves linear, 1–2 mm wide; adaxial surface of calyx lobes glabrous;
male flowers with a glabrous central column; ovary and fruit glabrous [WA] .....**R. muricatus**

3: Leaves narrow-elliptic or narrow-lanceolate, 2–4 mm wide; adaxial surface of calyx lobes pubescent; male flowers with a stellate-hairy central column; ovary and fruit stellate-hairy [Qld]..... **R. verrucosus**

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References

Halford, D.A. & Henderson, R.J.F. (2007). A taxonomic revision of *Ricinocarpos* Desf. (Euphorbiaceae: *Ricinocarpeae*, *Ricinocarpinae*). *Austrobaileya* 7(3): 387−449.

Smith, M.G. & Jones, A. (2018). *Threatened and Priority Flora list 5 December 2018*. Department of Biodiversity, Conservation and Attractions. https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants [accessed 18 September 2019].

Western Australian Herbarium (1998–). *FloraBase—the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions. https://florabase.dpaw.wa.gov.au [accessed 29 March 2018].