

***Beyeria lateralis* (Euphorbiaceae), a previously overlooked new species
from Western Australia's Mallee region**

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SHORT COMMUNICATION

Members of the genus *Beyeria* Miq. (Euphorbiaceae: Ricinocarpeae: Ricinocarpaceae) are shrubs with mostly small, greenish and inconspicuous, unisexual flowers. In many species all parts of the plants, including the flowers, are thickly coated in resin. The combination of being easily overlooked in the field and having flowers that are difficult to interpret in the dried condition may partly explain why almost half of the currently recognised Western Australian taxa were only described in a recent revision of the genus (Halford & Henderson 2008). Other contributory factors are likely to be an apparently high level of short-range endemism in the genus and the fact that Western Australia has never had a local taxonomist specialising in Euphorbiaceae. The only additions to the western *Beyeria* in the twentieth century were made by the distinguished English botanist, Herbert Airy Shaw (1971).

One area of particular taxonomic complexity in the genus centres on the recently described *B. sulcata* Halford & R.J.F.Hend. This species had previously been recognised under the name *B. brevifolia* var. *robustior* Airy Shaw, which was one of three varieties of *B. brevifolia* (Müll.Arg.) Benth. described by Airy Shaw (1971), the other two being *B. brevifolia* var. *brevipes* Airy Shaw and *B. brevifolia* var. *truncata* Airy Shaw. Halford and Henderson (2008) treated *B. brevifolia* as a stand-alone species, and transferred Airy Shaw's remaining varieties to *B. sulcata*, at the same rank. In addition they added a third, new variety, *B. sulcata* var. *gracilis* Halford & R.J.F.Hend.

Of the four segregates of *B. sulcata*, the least well known by far is *B. sulcata* var. *truncata* (Airy Shaw) Halford & R.J.F.Hend. When originally described by Airy Shaw (1971) it was based on just three collections, all apparently made within a short distance of each other east of Lake King. Halford and Henderson (2008) referred another specimen from an area south of Lake King to this taxon (*J.R. Knox* 65 x 34 m); however, there are significant taxonomic differences between material from this second locality and the typical form of *B. sulcata* var. *truncata*. These differences support the recognition of a new species, described below.

Beyeria lateralis* Hislop, *sp. nov.

Type: south of Lake King, Western Australia [precise locality withheld for conservation reasons], 18 May 2016, *M. Hislop* 4598 (*holo*: PERTH 08902607 [female, sheet 1 of 2], PERTH 08902615 [male, sheet 2 of 2]; *iso*: BRI, CANB, MEL).

Beyeria sp. Lake King (P.R. Jefferies 680514), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 24 April 2018].

Apparently dioecious, spreading *shrubs*, to *c.* 80 cm high and 100 cm wide. Young *branchlets* bluntly angular, glabrous, longitudinally grooved, resinous. *Leaves* petiolate, spirally arranged, resinous; petiole rather inconspicuous, 0.4–0.8 mm long, glabrous; blade linear, ± compressed-quadrangular in T.S., 6–15 mm long, 0.6–0.9 mm wide, straight or more frequently incurved along the longitudinal axis, obtuse and ± apiculate through extension of the midrib, base attenuate, adaxial and abaxial surfaces glabrous, lateral surfaces each with a closed, pale groove running along their length, densely stellate-hairy within the grooves; glands absent. *Inflorescence* axillary, male flowers 1–3 together in an umbellate arrangement, female flowers solitary; pedicels glabrous, resinous, stouter and longer on female flowers; bracts ovate or narrowly ovate, 0.3–0.5 mm long, *c.* 0.2 mm wide, glabrous, persistent. *Flowers* 5-merous, petals usually present, calyx lobes glabrous, resinous; disc absent. *Male flowers* with pedicels 1.0–2.0 mm long; calyx lobes 0.6–0.9 mm long, 0.5–0.7 mm wide, the outer 3 ovate, obtuse to subacute, the inner 2 ± orbicular; petals broadly elliptic to ± orbicular, 0.6–0.8 mm long, 0.5–0.7 mm wide, glabrous abaxially, sparsely hairy towards the base adaxially; receptacle 0.6–0.7 mm across, glabrous; stamens 7–10; filaments 0.2–0.3 mm long, glabrous or with a few, irregular stellate hairs on the adaxial surfaces, erect at anthesis; anthers 0.2–0.3 mm long. *Female flowers* with pedicels 1.0–4.0 mm long; calyx lobes narrowly ovate to oblong, 1.0–1.4 mm long, 0.5–0.6 mm wide, obtuse; petals narrowly ovate to ovate, 0.2–0.5 mm long, *c.* 0.2 mm wide, sometimes absent; ovary thickly resinous, compressed-ovoid, 0.7–1.0 mm long, 0.6–0.8 mm wide, glabrous, 2-locular; style stout, 0.3–0.5 mm long at anthesis, with the stigma held *c.* level with the calyx lobe tips, but quickly elongating after fertilisation; stigma calyptriform, *c.* 0.3 mm wide. *Fruit* compressed, ovoid or narrowly ovoid, 5.5–7.0 mm long (inclusive of a style at least 1.2 mm long), 2.3–3.6 mm wide, acute, tapering from the widest point (*c.* 1/2 way along the fruit length) to the stigma, usually 1- or occasionally 2-seeded, glabrous, smooth, thinly resinous, calyx 1/5–1/4 the length of the mature fruit. *Seeds* compressed-ellipsoid, 4.0–4.5 mm long (including caruncle), 1.9–2.1 mm wide, 1.7–1.9 mm deep, testa shiny, dark brown; caruncle 1.2–1.3 mm long, cream-coloured. (Figure 1A, B)

Diagnostic characters. Readily distinguished from all other species of *Beyeria* by the combination of laterally positioned leaf grooves, acute fruit apices and an apparently dioecious habit.

Other specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons] 18 May 2016, *M. Hislop* 4599A & B (BRI, PERTH); Oct. 1965, *J.R. Knox* 65 xo 34 m (PERTH); May 1968, *P.R. Jefferies* 680514 (PERTH).

Distribution and habitat. Occurs in open mallee woodland on low, sandy flats close to a salt lake. Associated species include *Eucalyptus leptocalyx*, *Adenanthos glabrescens*, *Melaleuca hamata* and *Grevillea oligantha*.

Phenology. In common with many species of *Beyeria*, *B. lateralis* appears to have an extended flowering period with flowers or fruit, or both likely to be present for much of the year.

Etymology. From the Latin *lateralis* (lateral), a reference to the laterally positioned leaf grooves.

Vernacular name. Jefferies' *Beyeria* is the suggested common name for the new species. Phillip R. Jefferies was a former professor of organic chemistry at the University of Western Australia and published widely on the biochemistry of Euphorbiaceae. Annotations on a collection he made in 1968,



Figure 1. A – *Beyeria lateralis* habitat and growth habit (plant in foreground); B – fruiting branch of *B. lateralis* showing the acute fruit apices and pale, laterally positioned, longitudinal grooves on the leaves (e.g. white arrow); C – fruiting branch of *B. sulcata* var. *gracilis* showing the obtuse fruit apices. Photographs by Juliet Wege (A) and Rob Davis (B, C) from the type locality (A, B) and J.A. Wege & K.A. Shepherd JAW 2052 (C).

which was until recently housed at the University's herbarium, indicated that he was aware that it was likely to be an unrecognised species.

Conservation status. Listed as Priority Two under Conservation Codes for Western Australian Flora (Smith & Jones 2018), as *B. sp.* Lake King (P.R. Jefferies 680514). It is currently known from one population in a nature reserve, where it is locally common.

Affinities. The presence of petals indicates that *B. lateralis* is a member of sect. *Beyeriopsis* (Müll. Arg.) Benth. under the current classification; however, its closest affinities are currently uncertain. The distinctive fruiting gynoecium with its acute apex readily distinguishes this species not only from *B. sulcata* but almost all other members of the section. Fruit of the four varieties of *B. sulcata* appear to be indistinguishable from each other and for purposes of comparison an image of the fruit of *B. sulcata* var. *gracilis* (Figure 1C) is shown alongside that of *B. lateralis* (Figure 1B).

Two other western species, *B. cinerea* (Müll. Arg.) Benth. and *B. villosa* Halford & R.J.F. Hend., have similarly shaped fruit to those of *B. lateralis*. In most other respects however, those species are very different from *B. lateralis* and there seems little reason otherwise to believe that they are close relatives. For example, both have hairy rather than glabrous branchlets and are not or only slightly resinous.

The laterally positioned leaf grooves of this species are unique within the genus. Consistent dioecy is also highly unusual although some species, such as *B. cinerea*, may be mostly dioecious. While it may be premature to claim a consistently dioecious status for *B. lateralis*, the collections that have been made to date and my field observations show no indication of monoecy.

Notes. The collection (*J.R. Knox* 65 x 34 m) that was referred to *B. sulcata* var. *truncata* by Halford and Henderson (2008) consists of a databased sheet (PERTH 08025495) and two undistributed duplicates. The databased sheet and one of the duplicates are from a male plant while the other duplicate is from a female. It seems likely that this new species was overlooked by these authors because they did not examine the female duplicate. In the absence of female flowers or fruit, *B. lateralis* could certainly be confused with *B. sulcata* var. *truncata*, especially in the size, shape and orientation of the leaves. However, even sterile material of *B. lateralis* can be distinguished from that taxon by its laterally positioned, rather than abaxially positioned, leaf grooves.

Identification. In order to accommodate the new species, Halford and Henderson's key to species of *B. sect. Beyeriopsis* (2008: 596) requires modification as follows:

- 9a.** Leaves with lateral grooves; fruit ovoid, apex acute; plants apparently dioecious..... **B. lateralis**
9b: Leaves with abaxial grooves; fruit variously shaped, rarely ± ovoid, apex rounded;
 plants monoecious **10**

Additional notes on the current taxonomy of B. sulcata. The transfer by Halford and Henderson (2008) of Airy Shaw's three varieties from *B. brevifolia* to a new species, *B. sulcata* (based on *B. brevifolia* var. *robustior*), represented a significant step forward in clarifying the taxonomy of the group; however, problems remain around the circumscription of the four varieties of *B. sulcata*. Three of these (the typical variety, *B. sulcata* var. *brevipes* and *B. sulcata* var. *gracilis*) have extensive, and in significant part, overlapping distributions. It could be argued therefore, assuming the character differences are maintained, that they are better recognised as distinct species. The same can be said of the apparently restricted *B. sulcata* var. *truncata* (currently listed as Priority Three under Conservation Codes for Western Australian Flora; Smith & Jones 2018), which occurs within the distributions of the other three.

However, morphological distinctions between the segregate taxa, as given by Halford and Henderson (2008), are subtle and while they appear to hold up in the main there is a degree of overlap. Two of the three segregates with longitudinally grooved branchlets, *B. sulcata* var. *sulcata* and *B. sulcata* var. *brevipes*, are distinguished mainly by leaf width. Morphologically these two are very close and there are at least a few specimens that could as well be assigned to one taxon as the other.

The only character used to distinguish *B. sulcata* var. *truncata*, the third segregate with grooved branchlets, from *B. sulcata* var. *brevipes* is leaf apex morphology: a ‘truncate apiculum’ in the former versus an ‘acute apiculum’ in the latter. While the very few available collections of this taxon do mostly have a truncate or even a bilobed apiculum, the duplicate of one collection (Knox & Jefferies 670520) has an obtuse apiculum, much like that seen in *B. sulcata* var. *brevipes*. This appears to undermine the distinctive status of *B. sulcata* var. *truncata*, but in order to properly gauge its significance it would be necessary to make detailed field observations of the character across the population as a whole.

The new variety recognised by Halford and Henderson (2008), *B. sulcata* var. *gracilis*, has broadly and shallowly grooved branchlets that are distinct from the narrowly grooved branchlets of the other three varieties. *Beyeria sulcata* var. *gracilis* also tends to have longer pedicels and more acute leaf apices than the other segregates, although these are not consistent differences. My field observations in the Hyden and Lake Grace areas indicate that *B. sulcata* var. *gracilis* and the typical variant may grow in close proximity to one another while maintaining their distinctions. There is also a mixed collection of *B. sulcata* var. *gracilis* and *B. sulcata* var. *sulcata* from north of Ravensthorpe (D. Halford & G. Cockerton Q 9141; PERTH 08369372 and 08988064), apparently indicating that the two are sympatric at that site; however, a collections mix-up cannot be discounted since *B. sulcata* var. *sulcata* was also sampled by these collectors on the same day at a nearby site (D. Halford & G. Cockerton Q 9142). Field observations are required to confirm if the two taxa co-occur since this would lend support to the recognition of *B. sulcata* var. *gracilis* as a separate species.

Ideally *B. sulcata* should be the subject of a dedicated research project in which the morphology is revisited in the light of an accompanying molecular study. The project would also need to include extensive fieldwork to better understand character consistency and variation within populations, and patterns of distributions in those areas where more than one segregate occurs.

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