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# *Berberis myriovula* (Berberidaceae), a remarkable new species with the highest recorded ovule counts

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ABSTRACT: *Berberis myriovula* sp. nov., a remarkable new deciduous species is described here. The ovary of this new species contains 15–17 ovules, the highest count recorded so far in the genus *Berberis*. A detailed taxonomic description, diagnosis, colour photoplate and distribution map are provided.

KEY WORDS: Arunachal Pradesh, *Berberis setifolia*, Berberidaceae, new taxon, deciduous, ovule.

## INTRODUCTION

*Berberis* L., the largest genus of Berberidaceae, likely contains between 400 and 500 species, although the total number is currently unknown. The majority are in Asia, with 22 species reported from Nepal (Adhikari *et al*., 2012, 2022) and at least 285 in China (Harber, 2020; Li *et al*., 2022).

In a previous article we published the combination *Berberis setifolia* (Ahrendt) Bharali, Hajong & Harber based on *Berberis macrosepala* var. *setifolia* Ahrendt. It is found in NE Bhutan and Tawang and West Kameng in W Arunachal Pradesh, India. We noted that "One of the areas of Asia where there is still much to be learnt about *Berberis* stretches from west Bhutan, across Arunachal Pradesh in India, to the border with Myanmar" (Hajong *et al*., 2024). Our on-going research suggests that Tawang and West Kameng is a *Berberis* hot spot, hosting *inter alia* a number of unrecognised deciduous species. Here we report on one of these for which we propose the name *B. myriovula*.

Harber (2020) stated "the ovary [in *Berberis*] contains one to 15 ovules. Ovaries with large numbers of ovules are confined to single-flowered or few flowered fascicled species mainly from Tibet". This was in line with Ahrendt (1961. 18-19). In publishing *Berberis extensiflora*, an umbellate species from Nepal with up to 13 ovules, Adhikari *et al*. (2022) noted that "Only five additional Asian species of *Berberis* are recorded as having 10 or more ovules: *B. calliantha* Mulligan, *B. capillaris* Cox ex Ahrendt, *B. chrysophaera* Mulligan, *B. daiana* T.S. Ying and *B. tsangpoensis* Ahrendt, which all have solitary flowers". This list was incomplete in that it omitted the 1-4 fascicled *B. macrosepala* (Hook. F. & Thoms.) from Sikkim whose number of ovules is currently unrecorded but the number of seeds is given as 10. Our *B. setifolia* another single flowered species with up to 13 ovules added an eighth species to this list.

Of the 6 species with 10 or more ovules listed above, the two with the highest number of ovules, are *B. calliantha* and *B. tsangpoensis* (both up to 15). Our new species *B. myriovula* which has up to 17 ovules would therefore appear to be unique.

It is perhaps worth noting here that *Berberis* species with large number of ovules appear to be limited almost exclusively to the Old World. The only New World species recorded with 10 or more ovules being *Berberis comberi* Sprague & Sandwith from Argentina and *B. microphylla* G. Forst from Argentina and Chile (Landrum, 1999).

## MATERIALS AND METHODS

Various *Berberis* expeditions have been undertaken by Bipankar Hajong in the Tawang and West Kameng districts of Arunachal Pradesh from 2021 to the present. Several apparently unrecognised deciduous *Berberis* species have been collected and among them a one-flowered species from Tawang with up to 17 ovules - higher than that recorded for any published species. Key morphological observations and measurements of the plants were taken in the field. Micromorphological characters were recorded subsequently with a stereomicroscope (Model No: Leica S9i). From these observations and measurements and by comparing them to those of the most similar species–*B. setifolia* (Suppl. Fig. S1), it was concluded this should be proposed as a new species which we name *Berberis myriovula.*

## TAXONOMIC TREATMENT

***Berberis myriovula*** Hajong & Bharali, ***sp. nov.***
**Figs. 1 & 2**

***Type:*** INDIA, Arunachal Pradesh, Tawang District, Near Bangajaan, 27°29′53.63″ N, 92°00′39.32″ E, 3925

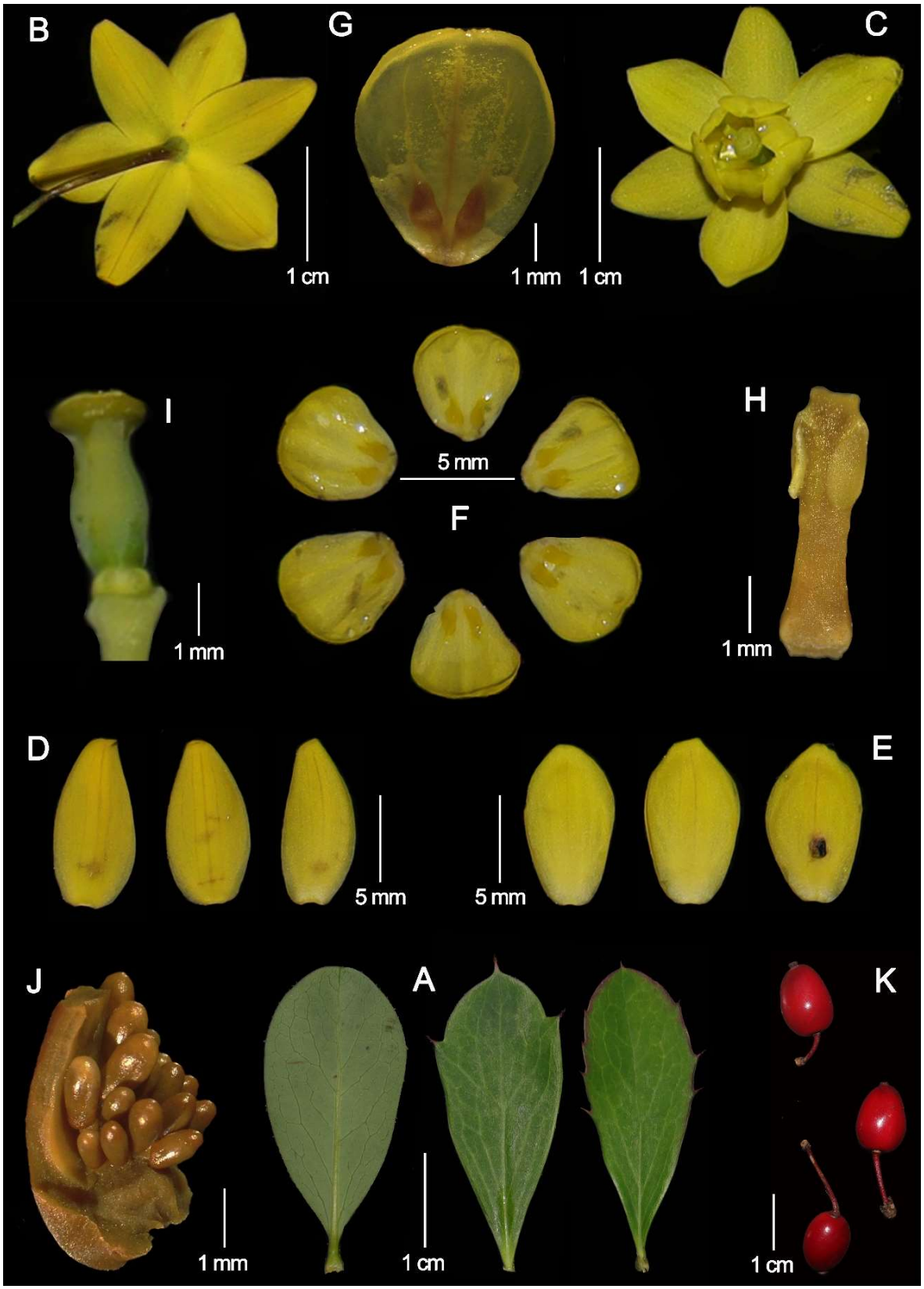


**Fig. 1.** ***Berberis myriovula*** Hajong & Bharali, sp. nov. **A.** Abaxial and adaxial surface of leaf; **B.** Back view of flower; **C.** Front view of flower; **D.** Outer sepals; **E.** Inner sepals; **F.** Adaxial view of petal; **G.** Venation and nectary glands of petal; **H.** Stamen; **I.** Pistil; **J.** Ovary with ovules; **K.** Berry.

**Fig. 2.** ***Berberis myriovula*** Hajong & Bharali, sp. nov., Habit (left: flowering; right: fruiting). Photos by B. Hajong.

**Table 1.** Morphological comparison between ***B. myriovula*** and ***B. setifolia***

| Character | *B. myriovula* | *B. setifolia* |
|---|---|---|
| **Height** | to 1 m | to 2 m |
| **Mature stems** | dark brown | reddish brown |
| **Leaf colour** | adaxially dullish mid green | adaxially mid green, slightly shiny |
| **Leaf shape & size** | elliptic-oblanceolate or oblanceolate, 1.7–3.5 × 1–1.5 cm | elliptic-ovate, elliptic obovate or obovate, 1–2.5 × 0.5–1.3 cm, |
| **Leaf margin** | entire, sometimes spinose with 1–4 teeth on each side | spinulose with 3 – 15 teeth on each side, sometimes entire |
| **Leaf apex** | obtuse or subacute, sometimes minutely mucronate | acuminate, sometimes minutely mucronate |
| **Pedicel** | 8–15 (–20) mm | 10–27 mm |
| **Flowers** | bright yellow, ca. 25 mm in diameter | bright yellow, ca. 20 mm in diameter, sepals sometimes with reddish stripe or mark near apex |
| **Outer sepals** | ovate-lanceolate, 9–10 × 4–5 mm, apex acute | narrowly ovate or elliptic 12–13 × 5–6 mm, apex sometimes minutely pointed, |
| **Inner sepals** | obovate- elliptic, 9–10 × 5–6 mm, apex acute or obtuse | obovate or obovate-elliptic, 12–13 × 7–8 mm, apex subacute |
| **Petals** | obovate 4.5–6 × 4–5 mm, base rounded or slightly obtuse, apex praemorse or slightly emarginate | obovate or oblong-obovate, 5–7 × 4–5 mm, base cuneate. apex slightly emarginate |
| **Anther connective** | slightly extended, truncate | slightly extended, rounded |
| **Ovules** | (14–) 15–17 | (8–) 10–13 |
| **Berry** | elliptic-ovate, 1.3–1.5 × 0.9–1 cm, style slightly persistent. | oblong or ellipsoid 12–13 ×7 –10 mm; style slightly persistent |

m, 13 July 2023, *B. Hajong*, *BH028* (holotype CAL, isotype ASSAM).

***Diagnosis:*** *Berberis myriovula* Hajong & Bharali is allied to *Berberis setifolia*, but differs inter alia from the latter species in its by its leaf surface and shape and its flower structure including the number of ovules (14–) 15–17 (vs (8–) 10–13). For more details see Table 1 below.

***Description****: Shrubs,* deciduous, to 1 m tall; *mature stems* dark brown; *Spine* 3-fid, abaxially sulcate, red, 10–23 mm long. *Leaves* subsessile or petiolate up to 3 mm long, pale green; blade abaxially pale green, adaxially green, elliptic-oblanceolate or oblanceolate, 1.7–3.5 × 1–

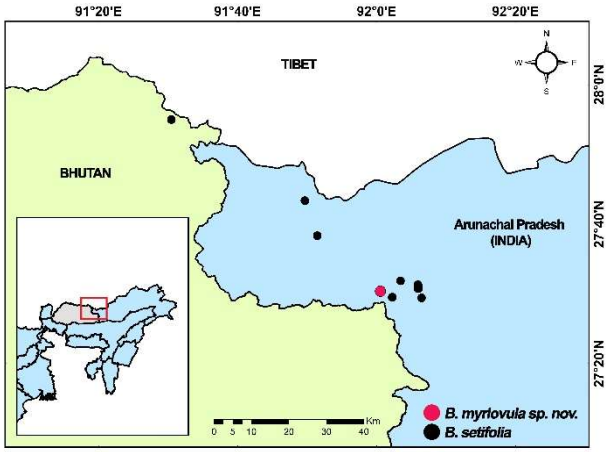


**Fig. 3.** Map showing the type location of ***B. myriovula*** Hajong & Bharali, sp. nov. and distribution of closely related species ***B. setifolia*** in Bhutan and Arunachal Pradesh, India.

1.5 cm, papery, midvein raised abaxially, impressed adaxially, lateral veining and reticulation conspicuous both abaxially and adaxially, base attenuate, margin entire or sometimes spinose with 1–4 teeth on each side, apex mucronate or rounded. *Inflorescence* 1-flowered; pedicel 0.8–1.5 (–2) cm, pale green or red tinged; *Flowers* bright yellow ca. 25 mm in diameter; *sepals* in 2 whorls, outer sepals ovate-lanceolate, 9–10 × 4–5 mm, apex acute, inner sepals obovate-elliptic, 9–10 × 5–6 mm, apex acute or obtuse, base rounded; *petals* obovate, 4.5–6 × 4–5 mm, base rounded or slightly obtuse, glands separate, apex praemorse or slightly emarginate, venation distinct with 2 to 3 pairs of lateral veins, branched, central vein continued to the apex, Stamens 4–5 mm long, anther connective slightly extended, truncate, Pistil ca. 5 mm long; *ovules* (14–) 15–17. *Berries* red, elliptic-ovate, 1.3–1.5 × 0.9–1 cm, style slightly persistent, ca. 1 mm.

***Distribution:*** So far, the *B. myriovula* is only known from Bangajaan area, Tawang, Arunachal Pradesh, India (Fig. 3).

***Flowering and fruiting:*** *B. myriovula* has been observed in flower from June to mid-July and in fruit from mid-July to October.

***Habitat and ecology:*** Currently *B. myriovula* is known only from the type locality near Bangajaan, Tawang, Arunachal Pradesh close to the border with Bhutan. A colony of four plants was found at ca. 3925 m, adjacent a very disturbed road (Fig. 3) in a sub-alpine area populated by *Rhododendron* sp., *Meconopsis* sp., and *Rosa* sp., at ca. 3925 m asl.

***Additional specimen:*** INDIA, Arunachal Pradesh, Tawang District, Near Bangajaan, 27°29′53.63″ N, 92°00′39.32″ E, 3925 m, 10 October 2024, *B. Hajong, BH111* (CAL).

***Proposed IUCN Conservation category:*** *B. myriovula* is preliminarily assigned as Data Deficient according to IUCN (2022) guidelines. The road expansion is going on the type locality so unless there are other colonies elsewhere the species would appear to be highly vulnerable

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**Supplementary materials are available from Journal Website**