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Cover: A male Scarlet Skimmer perching on vegetation by the banks of a waterbody. Ink and watercolour illustration by Anandita Pascal.

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SHORT COMMUNICATION

Bonnaya gracilis a novel find for the flora of Uttarakhand, India

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Abstract: *Bonnaya gracilis* was transferred from the genus *Torenia* to the genus *Bonnaya* in 2021. The species resembles *B. antipoda* but can be distinguished by the presence of dense yellow hairy staminodes and long vertical fruiting pedicels. This species only occurs in Nepal, Myanmar, Bangladesh, and India. In India distribution of this species is not very clear hence this paper reports *Bonnaya gracilis* from Uttarakhand along with their description, images and location map.

Keywords: Doon valley, forest ecosystems, Linderniaceae, new record, semi-aquatic, shallow water, staminodes, swamps, torenia.

The word valley refers to low-laying area between two mountain ranges formed by the movement of tectonic plates. Valleys harbour high biological diversity and act as drainage systems for all water sources originated in hills. Doon valley, Uttarakhand is a longitudinal expansion of 75 km in length (east to west) and 22–25 km wide (north to south). Geographically Doon Valley lies at 30.362° N, 77.991° E and covers an area of more than 2000 km^2. Valley harbours two main perennial rivers of India, i.e., Yamuna in the west & Ganga in the east (including their tributaries and subtributaries) forming a watershed, creating moist habitat all along the valley. Wetlands of Doon Valley are extensively studied since 1901, recognizing their unique ecosystems, species structure, composition, lifeform diversity, and fragile nature (Kanjilal 1901; Dakshini (1960a,b); Deva & Aswal 1974; Sharma & Joshi 2008; Mir et al. 2018).

The taxonomic complexities within family Linderniaceae Borsch, Kai Müll. & Eb. Fisch. had garnered global attention. However, recent advancements have solidified its taxonomy, defining diagnostic features for every genus. One such complexity has recently been solved where Pal et al. (2021) had transferred *Torenia gracilis* Benth. to the genus *Bonnaya* Link & Otto as *Bonnaya gracilis* as a new species. *B. gracilis* shows prominent characteristic features of genus *Bonnaya*, i.e., deeply-lobed calyx, two clavate staminodes, linear cylindrical capsules twice as long as calyx, hence, this transfer was very justified. Genus *Bonnaya* Link & Otto is among the four largest genera within the family, which was previously suggested to be circumscribed under the genus *Lindernia* sensu lato, currently consisting of 17 species globally and in India represented by nine species (POWO 2024; Garg et al. 2020). The genus is divided into two sections, i.e., section *Bonnaya* noted by Lax racemes and section *Aculeata* noted by capitate inflorescences (Liang & Wang 2014).

In India, three similar looking species—Bonnaya antipoda (L.) Druce, *Bonnaya gracilis* A.Pal, Sardesai &

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M.Chowdhury, and *Bonnaya sanpabloensis* Y.S.Liang & J.C.Wang are found. All these three species can be identified on field by observing staminodes which are either subglabrous or densely hairy with yellow/red/purple hairs or with densely white pilose hairs respectively. *B. antipoda* has wide distribution in country (present in most of the states), *B. gracilis* is reported from parts of southern, central, northern, and northeastern India and *B. sanpabloensis* is so far only reported from the Western Ghats of Maharashtra by Sardesai et al. (2019).

Materials & Methods

During a local field around the fringe areas of Ashkrodi Range Forest Dehradun, Uttarakhand authors spotted an interesting plant belonging to family Linderniaceae, growing in shallow water pools formed during monsoon season. For further identification some specimens were collected, and after consultation of literature (Hooker 1884; Gaur 1999; Pennell 1943; Liang & Wang 2014; Pal et al. 2021) the specimen was identified as *Bonnaya gracilis*, a species described in 2021. This paper marks the first distributional record of this species from northern India (Uttarakhand). A few specimens were dried following the standard methods of herbarium preparations (Rao & Sharma 1990) and been deposited in the Herbarium of Wildlife Institute of India (WII) Dehradun.

Taxonomic Description

Bonnaya gracilis A.Pal, Sardesai & M.Chowdhury in Nordic Journal of Botany 39(8) 1–7. 2021.
(Image I)

Erect annual herbs, 25–30 cm long. Stem four angled, with lax branches, ascending or diffused, glabrous occasionally, rooting at lower nodes. Leaves simple, opposite decussate, sessile, oblong obovate to elliptical, acute, glabrous on both surfaces, margins serrate with 6–15 pairs of teeth, pinnately veined; secondary veins 9–12 pairs. Inflorescence terminal or axillary lax racemes. Flower about 8–10 in racemes**,** each with a subtending linear bract about 3–5mm long, pedicels ascending in flowers 5–14 mm and almost vertical in fruits 12–22 mm. Calyx is five-lobed, persistent,5–8 mm long with apex acuminate-acute. Corolla, bilipped, 10–12mm long, ventral lip of the corolla has three rounded lobes (3–3.8 x 3.1–3.9 mm) while the dorsal lip has an obtuse apex or is bilobed (4.1–5.1 x 2–3 mm); pale blue to pale purple coloured, white specks at the base of the central lobe. Stamens 2, epipetalous, pale blue to pale purple,

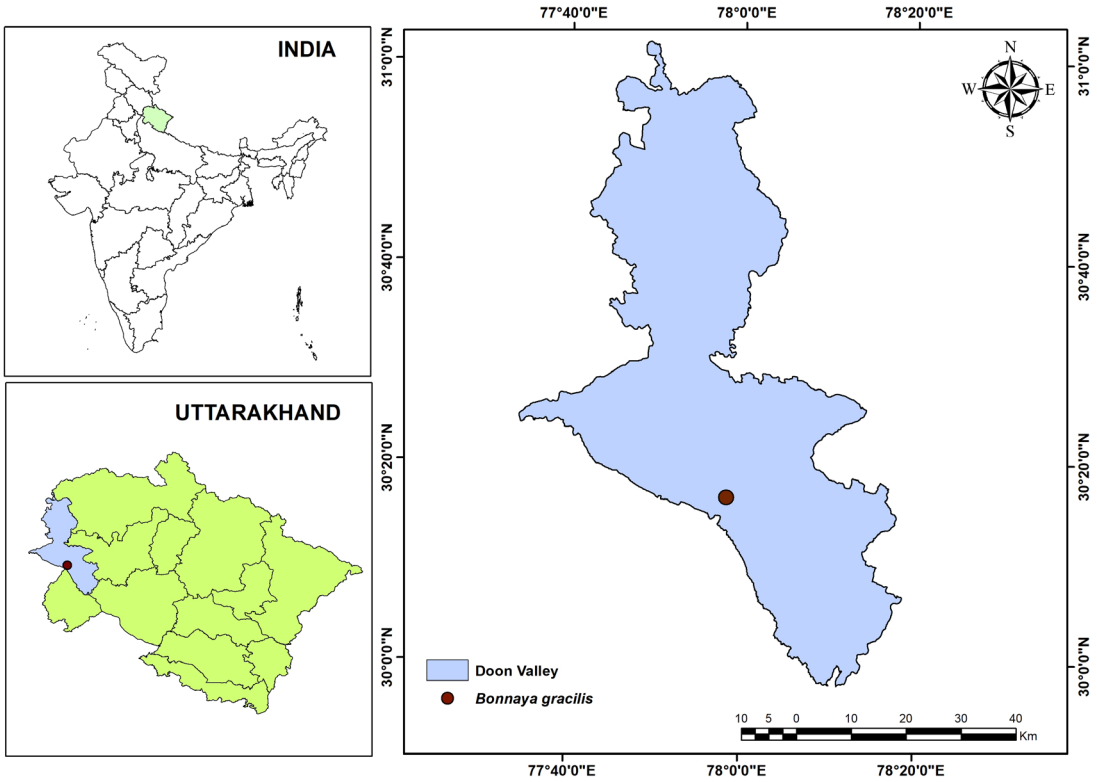

Figure 1. *Bonnaya gracilis* A.Pal, Sardesai & M.Chowdhury in Uttarakhand.

Table 1. A comparative analysis of *Bonnaya gracilis* A.Pal, Sardesai & M.Chowdhury with other closely related species *Bonnaya antipoda* (L.) Druce.

Diagnostic characters	*Bonnaya gracilis*	*Bonnaya antipoda*
Leaves	Margin serrate with 6–15 pairs of teeth.	Margin serrate with 5–12 pairs of teeth
Inflorescence	Always axillary or terminal lax racemes with 4–12 flowers.	Solitary axillary and terminal racemes with 5–10 flowers
Staminodes	Staminodes covered with dense yellow, red hairs	Staminodes, glabrous
Pedicel	12–20 mm in fruiting, almost vertical.	5–12 mm almost half the size of *B. gracilis* in fruiting, ascending.
Distribution	Found in Nepal, Bangladesh, Myanmar and India only.	Found across Asia and Africa to the New World including Venezuela, Hawaii, Louisiana, Mauritius.

1.3–2.1 mm long, anthers 1.3–1.7 mm long; Staminodes 2, filaments 1.5–2 mm long light blue to pale purple, anther 1.1–1.7 mm long, Staminodes 2 about 6 mm long clavate with upper half brightly yellow coloured, lower half white coloured covered with dense pilose hairs. Ovary cylindrical about 2.3 X 0.5, with 5.1–5.5 mm long style. Yellow disc is adherent to ovary on ventral side. Fruit capsule about 2 mm long slightly shorter than pedicels and 2–3 times longer than the calyx. Seeds numerous tiny angular, brownish scrobiculate, with stellate projections and scattered mesh about 0.2–0.5 X 0.2–0.3 mm.

Flowering and Fruiting: June to December.

Habitat and Ecology: Semi-aquatic plant in shallow water pools formed during the monsoon season found with *Acorus calamus* L., *Bonnaya ciliata* (Colsm.) Spreng., *Bonnaya antipoda* (L.) Druce, *Lobelia alsinoides* Lam., *Paspalum scrobiculatum* L., *Torenia anagallis* (Burm.f.) Wannan, W.R.Barker & Y.S.Liang, *Torenia crustacea* (L.) Cham. & Schltdl.

Distribution: Nepal, Bangladesh, Myanmar and India (Kerala, Karnataka, Maharashtra, Puducherry, West Bengal; Pal et al. 2021, and Assam; Roy et al. 2024) now from Uttarakhand.

Specimens examined: India: Uttarakhand, Dehradun, Elevation 610m, 13.vii.2024, 30.275° N & 77.972° E, Revan Yogesh Chaudhari 14967. India: Uttarakhand, Dehradun, Elevation 610m, 13.vii.2024, 30.275° N & 77.972° E, Monal Rajendra Jadhav.

Discussion

Uttarakhand has been extensively explored for its botanical diversity. During our field visits in the Doon Valley, we frequently observed *B. antipoda* and *B. gracilis* growing together. This close association may explain why earlier researchers found it difficult to distinguish between the two species in the field. Without careful and detailed observation, it is challenging to recognize them, indicating a sympatric relationship between the two. Swampy habitats of valley are also home to this species, but these landscapes are under continuous threat of habitat degradation and encroachment posing potential threat to this species. Family Linderniaceae Borsch, Kai Müll. & Eb.Fisch in the state is represented by six genera and 17 species [*Bonnaya* Link & Otto (03 spp.), *Craterostigma* Hochst. (02 spp.), *Lindernia* All. (03 spp.), *Torenia* L. (07 spp.), *Vandellia* L. (01 spp.), and *Yamazakia* W.R.Barker, Y.S.Liang & Wannan (01 sp.)] (Uniyal et al. 2007), with an addition of one species to the list.

References

Dakshini, K.M.M. (1960a). The vegetation of Mothronwala swamp forest: A preliminary survey. *Bulletin of the Botanical Survey of India* 2(1): 57–59.

Dakshini, K.M.M. (1960b). The vegetation of Mothronwala swamp forest (Plant communities of swamp zone). *Indian Forester* 86: 728–733.

Deva, S. & B.S. Aswal (1974). Taxonomy and ecology of Mothronwala swamp: A reassessment. *Indian Forester* 100(1): 12–19.

Gaur, R.D. (1999). Flora of the District Garhwal, North West Himalaya (with ethnobotanical notes). Trans Media, Srinagar (Garhwal), U.P., India,

Hooker, J.D. (1884). *The Flora of British India* (Vol. 4, pp. 246–319). State for India in Council.

Kanjilal, U.N. (1901). Swamp forests in Dehradun, N.W. Province. *Indian Forester* 27: 228–230.

Liang, Y.S., & J.C. Wang (2014). A systematic study of *Bonnaya* section *Bonnaya* (Linderniaceae). *Australian Systematic Botany* 27: 180–198. https://doi.org/10.1071/SB14002

Mir, T.A., S. Dhyani & M. Jan (2018). Taxonomic evaluation of monocot flora in Karwapani swamp forest, Dehradun, Uttarakhand. *Indian Forester* 144(3): 260–263. https://doi.org/10.36808/if/2018/v144i3/122754

Pal, A., M.M. Sardesai & M. Chowdhury (2021). Transfer of *Torenia gracilis* Benth. to *Bonnaya* as *Bonnaya gracilis* sp. nov. (Linderniaceae). *Nordic Journal of Botany* 39(8): 1–7. https://doi.org/10.1111/njb.03292

Pennell, F.W. (1943). *Scrophulariaceae of the Western Himalayas*. The Academy of Natural Sciences, 163 pp.

POWO. (2024). *Plants of the World Online*. Facilitated by the Royal Botanic Gardens, Kew. http://www.plantsoftheworldonline.org/. Accessed on 15.vii.2024.

Rao, R.R. & B.D. Sharma (1990). *A Manual for Herbarium Collections*. Botanical Survey of India, 25 pp.

Roy, S., B. Das & N. Nath (2024). *Bonnaya gracilis* (Linderniaceae): a new distributional record for northeast India. *Journal of Economic &*

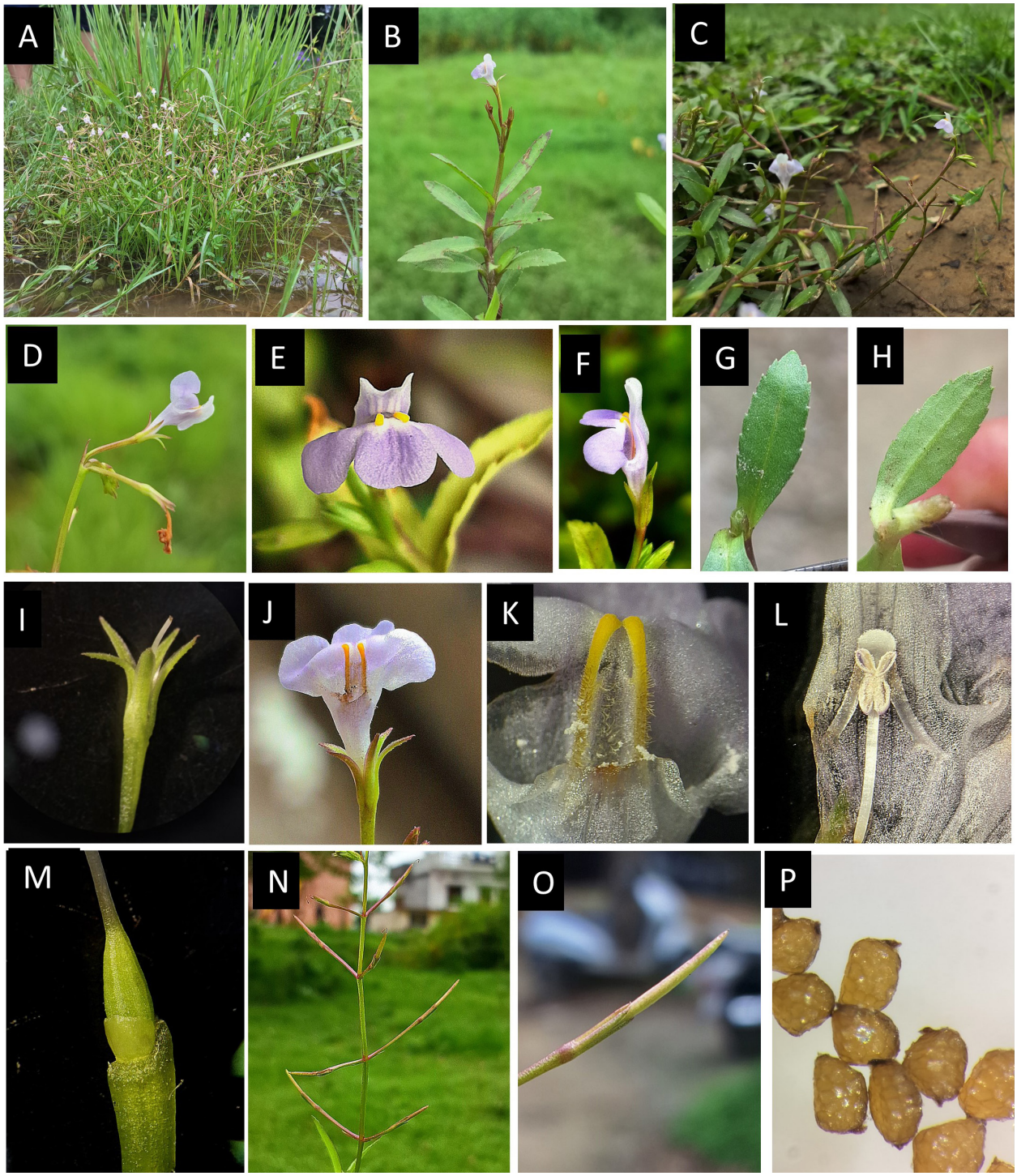

Image 1. *Bonnaya gracilis* A.Pal, Sardesai & M.Chowdhury: A—Habit | B&C—Flowering twig | D–F—Flower | G&H—Leaf | I—Clayx | J&K—Staminodes with pilose hairs | L—Fertile stamens | M—Ovary with disk | N—Vertical fruiting pedicels | O—Capsule closeup | P—Seeds. © Revan Chaudhari.

Taxonomic Botany 48(3): 119–123. https://doi.org/10.61080/JETB/V48/i3/2024/119-123

Sardesai, V.A., S.S. Sathe & V.B. Shimpale (2019). *Bonnaya sanpabloensis* (Linderniaceae): an addition to the flora of India. *Rheedea* 29(2): 178–180. https://doi.org/10.22244/rheedea.2019.29.2.03

Sharma, N. & S.P. Joshi (2008). Comparative study of a freshwater swamp of Doon Valley. *Journal of American Science* 4(1): 7–10.

Uniyal, B.P., J.R. Sharma, U. Choudhery & D.K. Singh (2007). Flowering Plants of Uttarakhand (A Checklist). Bishen Singh Mahindra Pal Singh, Dehradun, 404 pp.

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