A new species of *Lobelia* L. (Campanulaceae: Lobelioideae) from the Arunachal Pradesh part of the Eastern Himalaya in India

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Abstract

A new species, *Lobelia arunachalensis* D.Borah, S. Tangjang & AP. Das has been recognized and named from the Lower Subansiri district of Arunachal Pradesh, which is situated on the easternmost part of the Indian Himalaya. The species is morphologically quite close to *Lobelia nicotianifolia* Roth ex Roem. & Schult. Detailed description, photographs of different plant parts and reference to Type specimen has been provided.

Key words: *Lobelia arunachalensis*, New species, Arunachal Pradesh, Eastern Himalaya

INTRODUCTION

Lobelia L. is the second largest genus of Campanulaceae Juss. Among the 84 genera in the family, 29 are placed under the subfamily Lobelioideae Burnett. The members of the group show great diversity in their size, habit, morphology, reproductive strategies, and chromosome numbers (Lammers 2011).

Linnaeus established the genus *Lobelia* in his *Species Plantarum* (1753) and presented 25 species under it. C.B. Clarke (1881) divided the genus *Lobelia* into three sections as Holopogon, Isolobus and Rhyncopetalum. Later on, Lammers (2011) recognized eighteen sections in the genus rendering it easier to study (Biju *et al.* 2016). The genus is widespread throughout the world consisting of over 400 species (Lammers 2011). Singh and Diwakar (2010) recorded the occurrence of six species of *Lobelia* in India. Biju *et al.* in 2016 identified and named one new species from the state of Kerala that makes the total of seven species of the genus for the flora of this country. In addition, some introduced ornamental species of *Lobelia* are also available in Indian gardens (Singh & Diwakar 2010). These seven species can be easily recognized based on their morphology and growth form.

The richness of the flora of Arunachal Pradesh is well known that is covering the easternmost part of the Eastern Himalaya (Hajra *et al.* 1996). The area of this state of NE India was earlier an integrated part of the state of Assam and was recognised as a separate state on 20th February 1987 (https://en.wikipedia.org/wiki/Arunachal_Pradesh#Early_history). In their *Assam Flora*, Kanjilal *et al.* (1939) did not record any species of *Lobelia*. However, Giri *et al.* (2008) recorded three species from Arunachal Pradesh, namely *Lobelia doniana* Skottsb., *L. pyramidalis* Wall. and *L. rosea* Wall.

While inventorying the flowering dicots of Lower Subansiri district of Arunachal Pradesh [approximately between 92°40' and 94°21' East Longitude and 26°55' and 28°21' North Latitudes], India, the authors came across the population of an interesting species of *Lobelia* in its reproductive stage along the hill slopes on the roadside [± 962 m amsl]. After detailed study of the specimen and persuasion of different literature [C.B. Clarke (1881); Singh & Diwakar (2010); Lammers (2011); Biju *et al.* (2016)], the plant is now recognised as a new species of *Lobelia* belonging to the sect. Rhyncopetalum. The new species is quite similar to *Lobelia nicotianifolia* Roth ex Roem. & Schult. with some variation in stable and important characters.

Figure 1. Districts of Arunachal Pradesh [Source: <http://www.mdoner.gov.in/content/arunachal-pradesh-1>]

Taxonomy

Lobelia arunachalensis D.Borah, S.Tangjang & AP Das, Sp. nov. [PLATE – I]

Diagnosis

Lobelia arunachalensis is very similar to *Lobelia nicotianifolia* in its habit and flower structure. However, the new species differs from *N. nicotianifolia* in its life-span, height, leaf structure, size of the flower and shape of the fruit. Flowering period of these two species are abruptly different even in the same area. The differences between these two species has been presented in Table 1.

Types: INDIA. Arunachal Pradesh: Lower Subansiri District, Potin, 27°33'28.62" N 93°79'27.743 E, 16 September 2017, D. Borah, S. Tangjang & AP. Das 034
(**Holotype:** CAL; **Isotypes:** ASSAM, ARUN)

Herbs, annual, erect, 0.3 – 1.4 m tall. **Stems** 0.2 – 0.5 cm in diameter, terete, producing only flowering branches above; branches densely but minutely villous. **Leaves** alternate, at least lower ones petiolate; petiole 0.2 – 1 cm; lamina broadly lanceolate, 1 – 8.5 × 0.2 – 1.5 cm,

PLATE - I: *Lobelia arunachalensis*: **A.** Entire plant; **B.** Part of inflorescence; **C.** Calyx lobe; **D.** Corolla from outside; **E.** Inside of corolla; **F.** Staminal column along with gynoecium; **G.** Synangium with strigose barbs; **H.** United filaments and anthers; **I.** Gynoecium. **Insets:** Leaf - (i) upper & (ii) lower surfaces

double dentato-serrate, acuminate, base slightly unequal, gradually narrowing into the petiole; lateral veins 8, arching upward densely villous above, sparsely villous below. **Racemes** lax, terminal on branches and main shoot, leafy, secund, many flowered. **Bracts** linear to leaf-like, gradually smaller upwards, upper ones shorter but lower ones longer than flowers. **Pedicels** 4 – 6 mm, slender, terete. **Flowers** epigynous, zygomorphic, 1.8 – 2 cm long. **Calyx** lobes long subulate-lanceolate, $4 - 8 \times 0.5 - 1$ mm, mid-vein prominent, both surfaces sparsely villous, green, herbaceous, glandular serrate, persistent; serrations 4 – 6, long and subulate. **Corolla** split to the base on the anterior side and spreading on the posterior side, 5 lobed one sided (unilabiate but not rayed), 2 lateral lobes slender more deeply dissected, curved, spreading outward the lips, 17 mm long; middle three lobes nearly equal, not dissected up to the tube but each lobe acuminate and with a median longitudinal depression, white to purplish-white; corolla tube open above, 0.6 – 0.8 mm long, exterior surface glabrous, strigose inside base towards the anterior surface. **Filaments** connate from little above the base; filament tube glabrous or sparsely shortly strigose below, 7 – 10 mm long; anthers connate, 2.5 – 3 mm long, upper 3 anthers sparsely strigose, lower 2 anthers barbed at the tip. **Gynoecium**: style 1, 10 – 15 mm long, slightly curved above, stigma 2-lobed, peeping out from tip of synangium. **Capsules** conical oblong, $8 - 10 \times 3 - 5$ mm. **Seeds** ovoid, striate, lenticular, ± 0.5 mm long.

Flowering and fruiting: August to December

Etymology: The species is named after the biodiversity-rich state Arunachal Pradesh of India where from the new species has been recognised.

Distribution: So far, the species is known to grow only in the Lower Subansiri districts of Arunachal Pradesh, India.

Table 1. Comparison of *Lobelia nicotianifolia* and *Lobelia arunachalensis*.

Character	<i>Lobelia nicotianifolia</i>	<i>Lobelia arunachalensis</i> sp. nov
Habit	Up to 6 m tall	Plants up to 1.4 m tall
Life-span	Biennial	Annual
Leaf	Basal leaves numerous, up to 31 cm long	Basal leaves few, only up to 8.5 cm long
Stem	Glabrous or pilose or pubescent, stout	Densely but minutely villous, slender
Pedicel	Pedicels 0.5 – 3.5 cm long	Pedicel 0.4 – 0.6 cm long
Flowering time	August – April	August – December
Flowers	Over 3 cm long	Up to 2 cm long
Calyx lobes	Linear to linear-lanceolate, up to 20 mm long, denticulate or entire, glabrous or pubescent; lobes in terminal flowers extend beyond the corolla	Subulate-lanceolate, up to 8 mm long, glandular-serrate, both sides villous; lobes in terminal flowers cover half of the corolla
Corolla	Tube up to 3 cm long	Tube up to 0.8 cm
Stamens	Filaments 7 – 18 mm, lower one-third part free; anthers glabrous or pubescent or pilose,	Filaments 7 – 10 mm, lower one-fifth part free; anthers sparsely pubescent above
Style	Up to 21 mm long	Up to 15 mm long
Capsule	Sub-globose or globose or ovoid	Oblong with conical base

Affinities: *Lobelia arunachalensis* is allied to *Lobelia nicotianifolia*. The shape of lamina and corolla are identical in both the allies. A comparison of characters is provided in Table 1 for their easy distinction.

Conservation status: The presently known area of its distribution is a private land and its occurrence in any nearby reserved vegetation is yet to be confirmed.

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