

Record of *Primula waltonii* Watt ex I.B. Balfour (Primulaceae) from Arunachal Himalaya with taxonomic notes

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Abstract

Primula waltonii Watt ex I.B. Balfour (Primulaceae) a little known species from Indian Eastern Himalayan region is now reported and described from the Tawang district of Arunachal Pradesh. The species is poorly represented in literature and herbarium collections. Detailed morphological description and other relevant information are provided to facilitate easy identification of the species.

Key words: *Primula waltonii*, Distribution, Arunachal Pradesh.

INTRODUCTION

The genus *Primula* Linnaeus belongs to Primulaceae is one of the largest genera in the herbaceous angiosperms represented by about 38 section and 425 species (Richard 2003). The genus is widely distributed throughout Asia and Europe in the temperate and cold regions and in the tropical mountains of the northern hemisphere (Richard 2003). About 113 taxa are reported from India (Ghosh 1978) which is concentrated to Himalayan region only. The Indian Eastern Himalaya with Bhutan and Tibet is one of the major centers of *Primula* diversity in the world. The Arunachal Himalaya harbors a large number of species and records of 40 species are found from this state (Giri *et al* 2008; Basak *et al* 2000). To understand the taxonomic diversity and distributional features, a study on *Primula* Linnaeus has been undertaken by the authors. During exploration, the authors came across an interesting specimen of *Primula* collected at Pangatengtso area in Tawang district. After critical studies and consultation of herbarium specimen (Holotype) at CAL, the species have been identified as *P. waltonii* Watt ex I.B. Balfour – a native to the Tibet Himalaya. Besides Tibet, it is also recorded from Bhutan (Grierson *et al* 1999; Richards 2003) and China (Hu *et al* 1996). The species falls under the section *Sikkimensis* of the genus *Primula* L. and very close to *P. sikkimensis* Hooker var. *sikkimensis* and *P. ioessa* W.W. Smith var. *hopeana* (I.B. Balfour & R.E. Cooper) A.J. Richards. An investigation of relevant literature and scrutiny of herbarium specimens at major Indian herbaria including ARUN, ASSAM, BSHC, CAL, BSD, and DD revealed that *Primula waltonii* is a very rare species. No collections were found in the Indian Herbaria except the type. After its

first publication from Tibet (Balfour 1915), the record of the species from Indian region is only found in the publication of Smith *et al* (1943), Richards (2003) and Grierson *et al* (1999) indicating the distribution from Sikkim and Arunachal Pradesh besides Tibet and Bhutan without referring any collection number. No evidence of the distributional record in any Indian floristic work has been found except the publication of (Ghosh 1978) where the species is listed without any characterization based on herbarium evidences. Hence the present collection of the species with its detail characterization assumes special significance. The present collection of the species possibly is the first representation of a herbarium specimen from the Indian territory. A detailed description, other relevant notes and comparison with *P. sikkimensis* Hooker var. *sikkimensis* and *P. ioessa* W.W. Smith var. *hopeana* (I.B. Balfour & R.E. Cooper) A.J. Richards, which are treated very close to the species, are appended here.

Taxonomic treatment:

Primula waltonii Watt ex I.B. Balfour, Notes Roy. Bot. Gard. Edinburgh. 9: 57. 1915; Smith *et al.*, Trans. Bot. Soc. Edinburgh. 33(4): 431 – 458. 1943; Ghosh, An. Aula Dei 15(3 – 4): 219 – 218. 1978; Hu *et al.*, Fl. Ch.15: 99 – 189. 1996; Grierson *et al.*, Fl. Bhu.2 (2): 540. 1999; Rich. A., Pri. 237. 2003. *Primula prionotes* I.B. Balfour & Watt, Notes Roy. Bot. Gard. Edinburgh 9: 35. 1915. *P. waltonii* subsp. *prionotes* (I.B. Balfour & Watt) W.W. Smith & Forrest, Notes Roy. Bot. Gard. Edinburgh 16: 39. 1928.

Types: Tibet, Lhasa, Walton? August 1904 (CAL, 273359, Holotype.)

Herbs, perennial. Leaves in rosette; petioles up to 12 cm long; lamina elliptic-oblong to oblanceolate, 11 – 20 × 2 – 5 cm, crenate, rounded or sub-acute, base attenuate, margin sparsely minute glandular; secondary veins alternate, 8 – 10 pairs. Scapes up to 70 cm, circular (3.9 – 5.5 mm) and cylindrical, yellow farinose at the apex; umbels with 2 – 22 flowers; involucre bracts often purple, linear-lanceolate, 1 – 1.5 cm. Pedicels 7 – 9 cm, creamy yellow farinose. Flowers heterostylous. Calyx purple, campanulate, 6 – 8 mm, sparsely farinose outside, abundantly inside, prominently 5-veined; lobes lanceolate, acute. Corolla pink to deep wine purple; campanulate, creamy light yellow farinose with an dark purple eye spot, tube 0.8 – 1 cm; limb 2.5 – 3.5 cm wide; lobes sub-orbicular to obovate-oblong, 4 – 5 mm, margin entire or slightly emarginate. Pin flowers: stamens ca. 2.5 mm above base of corolla tube; style up to 1 cm as long as corolla tube. Thrum flowers: stamens toward apex of corolla tube up to 2.5 – 3 mm; styles 3 – 4 mm. Anthers attachment are basifixed. Capsule cylindrical, ca. as long as calyx.

Flowering: June – August; **Fruiting:** August – September

Ecology: Growing in humid and marshy areas and stream sides at the elevation of 3500 – 3800 m. Abundant populations have been found in some isolated pockets but limited to two localities in Tawang district in Western Arunachal Pradesh. The population density was recorded as 17.84 individual/m². *Primula sikkimensis* Hooker, *Senecio diversifolius* Harvey, *Rumex nepalensis* Sprengel, *Fragaria vesca* Linnaeus etc. are found as common associated species.

Distribution: India (Arunachal Pradesh & Sikkim), Tibet, China, Bhutan and Nepal.

Specimen Examined: India, Arunachal Pradesh, Tawang District, Pangatengtso area, 3800-3900m, A. Bawri, 20, dated 25.08.2011 (NERIST).

Additional specimen examined: Tibet, Lhasa, H. J. Walton? August 1904; Holotype. (CAL 273359).



PLATE I. *Primula waltonii* Watt ex I.B. Balfour, (a, d, g, h, l, o-r): a. Habit; d. Flowering twig showing morphological characters; g-h. Leaves; l. Gynoecium of Pin morph; o. Dissected flower showing Pin morph; p. Dissected flower showing Thrum morph; q. Dissected Anther; r. Dissected Calyx.; *Primula sikkimensis* Hooker var. *sikkimensis*, (b, e, i, j, m): b. Habit; e. Flowering twig showing morphological characters; i-j. Leaves; m. Gynoecium of Pin morph; *Primula ioessa* var. *hopeana* (I.B. Balfour & R.E. Cooper) A.J. Richards, (c, f, k, n): c. Habit; f. Flowering twig showing morphological characters; k. Leaves; n. Gynoecium of Pin morph

Note: This species is treated as close relative to *P. sikkimensis* var. *sikkimensis*, and *P. ioessa* var. *hopeana* (Grierson *et al* 1999; Richards 2003) which are distinguished from each other mostly based on corolla colour. As per our observations on all the three species in the field conditions some specific differences have been recorded in Table 1, which confirms the distinct identity of the species.

Table 1. Diagnostic morphological characters of *Primula waltonii* *P. sikkimensis* var. *sikkimensis* and *P. ioessa* var. *hopeana*

Characters	<i>Primula waltonii</i>	<i>Primula sikkimensis</i>	<i>P. ioessa</i> var. <i>hopeana</i>
Lamina apex	Obtuse or Sub- acute	Obtuse or round	Obtuse or round
Petiole length	3 – 12 cm long	12 – 14 cm long distinct petiole	9 – 13 cm long
Corolla colour	Dark purple	Yellow	White or creamy white
Scapes	65 – 70 cm long with light yellow farinose at the apex portion.	60 – 65 cm long with light yellow farinose at the apex	35-38 cm long with light yellow farinose at the apex
Gynoecium	Ovary and style purple; stigma yellowish	Ovary green; style and stigma yellowish green	Ovary green; style and stigma yellowish green

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