

***Moneses uniflora* (Ericaceae): A new record to Bhutan**Gyeltshen Dorji¹ and Jigme Tshelthrim Wangyal^{1,2,*}**Abstract**

Moneses uniflora (L.) A. Gray, commonly called Single Delight, a single member of the genus *Moneses* was observed twice by the authors in June 2015 and July 2018 on the ridges of Chelela, Paro, Bhutan at an altitude of 3430 m asl. The species could be identified by its short petiole, slender rhizome and five spreading slightly rumpled white petals. A new record for Bhutan, this paper describes the locality of the species along with other field observations.

Keywords: Bhutan, conservation, distribution, ecology, *Moneses uniflora*

Introduction

Moneses uniflora (earlier Pyrolaceae) is a perennial herb in Ericaceae family. Known by several common names in different localities (one-flowered wintergreen in British Isles; single delight, wax-flower, shy maiden, star of Bethlehem in Aleutian Islands; St. Olaf's candlestick in Norway, wood nymph, or frog's reading lamp), the plant was earlier largely considered as a new world element (Wright and Lusby, 1999; Preston and Hill, 1997). Thus, the plants for a future web page (<https://pfaf.org/>) included its presence in most of America and Europe while it just mentioned northern Asia in the old world. However, the flora of china web page (<http://www.efloras.org>) reports its presence in

China, North Korea, Mongolia and Russia expanding the distribution of the species down south. The hermaphrodite plant known for its use in medicines is also known to be home grown in some European countries and the United States (Nelson, 1995) but was never reported from Bhutan. Thus, in this report we provide a novel information on occurrence of *Moneses uniflora* (L.) A. Gray, from the Himalayan Kingdom of Bhutan, a country known to be home to many flowering plants. We also provide basic measurements such as the stem length, floral diameter and length of root of the species observed direct from the field.

Material and Method

Moneses uniflora was observed and collected from the conifer (silver fir and spruce) forest in Chelela and internet resources (see reference list) were used to identify the plant. Being stationed at Haa not far from the species locality, the authors travel back and forth around the habitat multiple times for various purposes. And in one of the floristic explorations, the first author

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collected specimens for herbarium on 25th June 2015 which later somehow deteriorated. To make up the loss, second specimen from the same locality was collected on 1st July 2018 and since has been deposited with the Bhutan's National Herbarium maintained by the National Biodiversity Centre of Bhutan with the accession number Gy.D-001(THIMP). The plant was identified using key characters mentioned in <https://gobotany.nativeplanttrust.org/species/moneses/uniflora/> and www.eflora.bc.ca) since there were no examples of such plants in flora of Bhutan. To compare our specimen, we referred the type specimen maintained as ISO_3166:BE, Belgium the details of which are digitally available (Verloove et al., 2020).

Photographs of the habit and morphological characters of the plant was taken using Nikon D90 camera and measurements of different parts of the plants were taken in the field using fresh specimens and common scales to the nearest millimeters.

Results and Discussion

Taxonomy

Linnaeus in 1753 named it as *Pyrola uniflora* from the specimens collected from Europe. Later in 1843 Thomas Nuttall renamed it as *Moneses reticulata* as mentioned by Richard Salisbury on creating a new genus of *Moneses* in 1700s. The earlier synonyms were *Pyrola uniflora* L. *Moneses uniflora* ssp. *reticulata* (Nutt.) Calder and Roy L. Taylor, *Moneses uniflora* var. *reticulata* (Nutt.) S.F. Blake; *Moneses grandiflora* Salisb. ex Gray; *Moneses reticulata* Nutt. The current nomenclature *Moneses uniflora*, Asa Gray (1848) (<https://www.swcoloradowildflowers.com>) is considered valid for now.

The taxonomical order of the species is thus; Eukaryota, Plantae, Spermatophyta, Angiospermae, Dicotyledonae, Ericales, Ericaceae, *Moneses*, *Moneses uniflora* commonly called as single delight. Literature revealed that it is the sole member of genus *Moneses*.

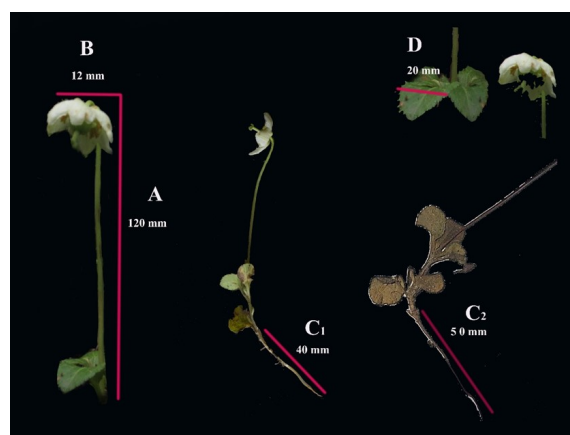


Figure 1: *Moneses uniflora*, A. Height of plant. B. Floral width. C1. Root of specimen 1. C2. Root of specimen 2. D. Width of leaf.



Figure 2: *Moneses uniflora*, a copy of herbarium image Gy. D-001 (THIM) maintained by NBC, Thimphu and a duplicate by first author.

Description (as observed in the field)

Perennial herb 12 cm tall arising from slender creeping rhizome like root (underground stems) and scapose or leafless stem (Figure 1A). It is a single white nodding flower herb with 3 or more whorled simple deep green leaf, alternate at base and tooth/serrated at the edge of the leaf blade (Figure 1D). **Stem** glabrous erect and not branched. **Roots** are long, slender rhizome and branched (Figures C1 and C2).

Flowers symmetrical with 5 petals that are white to cream colour and 5 sepals which are fringed, oval, separate and white-greenish (Figure 1B). **Inflorescence**; flower 1; peduncle minutely papillate above; bracts 1--2, ovate. **Flowers**; solitary at end of stem, radial, nodding, parts in 5s, free, 14mm across, white or creamy petals, widely spreading, 12mm long (Figure 1B). **Leaf** is small, +- basal, 2.3cm, ovate to obovate, leathery, finely crenate or sharp-toothed, has petiole, evergreen, and crowded at the base of stem, 20mm in diameter, with small teeth (Figure 1D) and the petiole is shorter than the leaf diameter.

Habitat

In this study, *Moneses uniflora* plant (Figure 2, an image from herbarium copy), was observed in the moist conifer forest (mostly spruce and silver fir) with lots of mosses and other herbaceous plant species such as *Frageria nubicola*, *Orechis foliosa*, *Iris* sp. and *Rhododendron*

shrubs. They grow well on decaying mosses laden needles of conifers on the open slopes. Other distant associates of the species include host of *Primula* species and alpine grasses inside the conventional fir and spruce forests.

We also observed this species in slightly disturbed areas along the road sides on moist soils. The flowering time as observed in the field in case of this particular location (Figure 3) is from late June through to July. More flower could be seen in the east or southeast facing slopes (aspect). The soil type is sandy loam mostly fed by fir and spruce leaves.

Uses

The flower of the plant is said to be used as medicinal remedy by native American tribes for the treatment of skin rashes, cold, throat pain and analgesic (Flora of North America; http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=200016134). The plant is also used for the treatment of bunions and

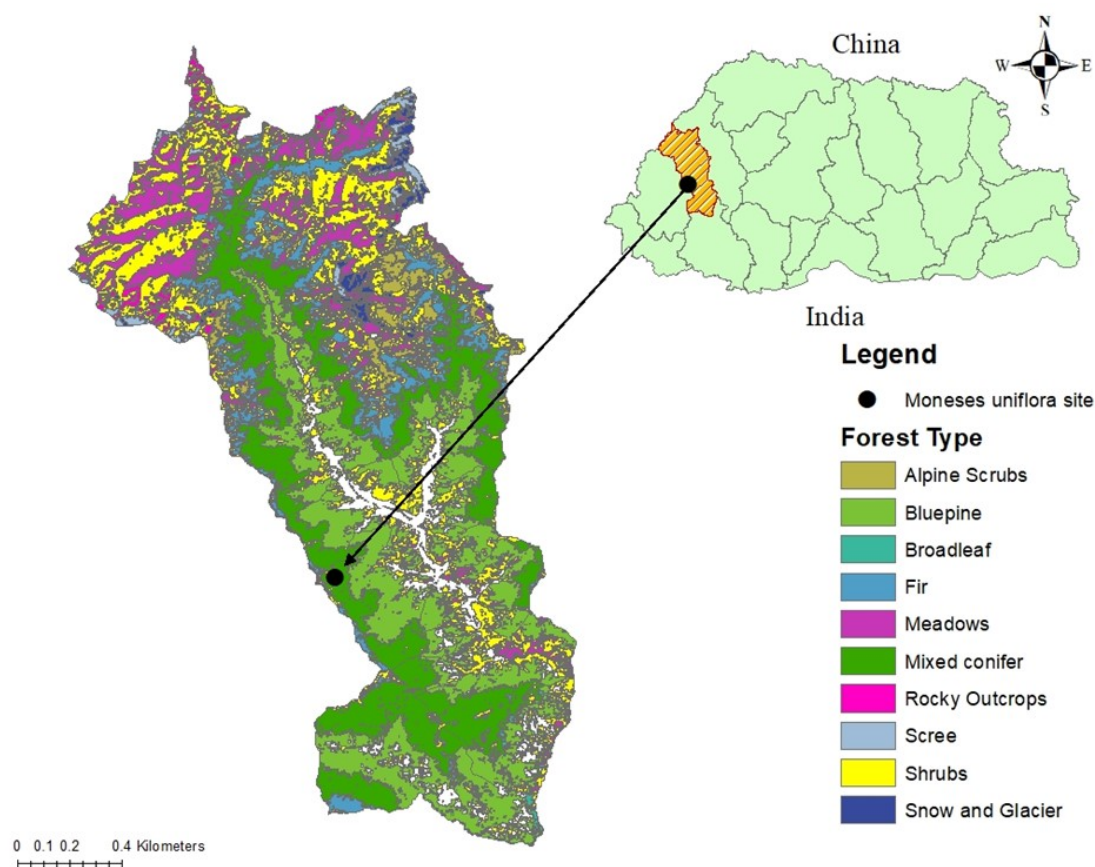


Figure 3: Map of the location from where the specimens were collected and the specie observed.

corns in humans simply by bandaging the flowers on the affected areas (<http://www.borealforest.org/herbs/herb25.htm>). Extensive use has been observed in coastal First Nations cultures for traditional treatment by tribes of the Pacific North West and could be good against tuberculosis (www.centralcoastbiodiversity.org/). However, no local uses have been known from the reported locality in Bhutan.

Distribution

The species in this report is from Chelela (27° 23' 19.00" N 89° 20' 52.04" E), Paro District, Bhutan (Figure 3). Elevation 3430masl. Observed in summers of 2015 and 2018. According to Bhutan Biodiversity portal observation (<https://biodiversity.bt/observation/show/60080>), a team of plant explorers viz. Rinchen Wangchuk, Ugyen Tenzin and Tshethup Tshering from Ugyen Wangchuck Institute for Conservation and Research also observed the flower at Ura (27° 28' 19.6896"N, 90° 54' 31.896"E), Bumthang District in summer of 2018. This species discovery is significant in that the species' range extends from China to Bhutan, although not a surprise since the countries share large geographical similarities.

Outside Bhutan, the ericale, commonly known by many names such as the one-flowered wintergreen (British Isles), single delight, wax-flower, shy maiden, star of Bethlehem (Aleutians), St. Olaf's candlestick (Norway), wood nymph, or frog's reading lamp was once considered indigenous to moist coniferous forests in temperate regions of the Northern Hemisphere from Spain to Japan and across North America (Wright and Lusby 1999). However, the species was later reported adequately from the Chinese provinces of Gan-

su, Heilongjiang, Jilin, Shanxi, N Sichuan, Taiwan, Xinjiang, Xizang and NW Yunnan (www.eflora.bc.ca). The plant is also found in Pakistan (Pakistan occupied Kashmir), Japan, N Korea, Mongolia and Russia.

Conservation

Different countries in Europe and America have different status for *Moneses uniflora*. For example, the species is totally protected in Switzerland while the International Union for Conservation of Nature considers it Least Concerned. Bhutan might consider further explorations before assigning conservation status.

Conclusion

Moneses uniflora, a novel record for Bhutan was found a couple of times but was not reported early since the tradition of reporting in Bhutan is considered less important. The plant which can be seen within the ecotone of conifer and the dwarf *Rhododendron* zone adds further value to the already rich flora of Bhutan. The authors look forward to have the plant monitored as and when we cross the habitat. Further study may be conducted to know the status of the plant in Bhutan for appropriate conservation actions.

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