Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

Note

Anemone trullifolia and *Berberis angulosa* as new records to the flora of the western Himalaya, India

Ishwari Datt Rai, Gajendra Singh & Gopal Singh Rawat

26 April 2018 | Vol. 10 | No. 5 | Pages: 11679–11682
10.11609/jott.3961.10.5.11679–11682

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 April 2018 | 10(5): 11679–11682

ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

OPEN ACCESS

Anemone trullifolia and *Berberis angulosa* as new records to the flora of the western Himalaya, India

Ishwari Datt Rai [1], Gajendra Singh [2] & Gopal Singh Rawat [3]

[1,3] Wildlife Institute of India, Post Box # 18, Chandrabani, Dehradun, Uttarakhand 248002, India
[2] Uttarakhand Space Application Centre, 93/II, Vasant Vihar, Dehradun, Uttarakhand 248006, India
[1] ishwari.rai@gmail.com (corresponding author), [2] gajendrawat@yahoo.com, [3] rawatg@wii.gov.in

The Himalaya, one of the global biodiversity hotspots, represents ~10,000 plant species, of which 71 genera and ~3,160 species are endemic to this region. The elevation gradient of mountains in the Himalaya is the highest on earth, resulting in a great diversity of ecosystems that range from the warm subtropical climate to the perpetual snow peaks. The Indian Himalayan Region (IHR) represents about 61% of endemic species and 49% of endemic genera of flowering plants (Nayar 1996). Several authors recognized the western Himalaya as an important floristic region of India (Hooker 1907; Chatterjee 1939). Floristically, compared to the eastern Himalaya, the western Himalaya is more explored; however, several pockets in the interior valleys still require intensive botanical surveys. Interestingly, reports of several noteworthy species are still being brought out from this region and many new species have been described in the recent past (Tiwari & Adhikari 2011; Rai et al. 2014, 2015, 2017; Rai & Rawat 2015) indicating a further need of intensive floristic explorations in this region.

Materials and Methods

Extensive floristic surveys were conducted in the high altitudes of the western Himalaya during the last two decades. The surveys were made in the entire western Himalaya covering Uttarakhand, Himachal Pradesh and Jammu and Kashmir. Random sampling method is used covering various vegetation types and landform units viz., moist and dry alpine meadows, marsh meadows, alpine steppes, scree slopes, moraines etc. Samples of the interesting species were collected, dried and herbarium specimens were prepared and housed at herbarium of Wildlife Institute of India (WII). During these floristic surveys, we recorded *A. trullifolia* (Ranunculaceae) and *Berberis angulosa* (Berberidaceae), which are hitherto undescribed from the western Himalaya (Fig. 1). After a detailed scrutiny of the literature and regional flora (Hooker & Thomson 1855; Hooker 1975–97; Press et al. 2000; Uniyal et al. 2007; Adhikari 2010), taxonomic notes and searches in various herbaria (BSD, DD and WII), these species were identified as additions to the flora of the western Himalaya. In this article, we present a brief description of each recorded species along with a photo-plate for easy identification, their distribution, ecology and phytogeography in the Himalayan region.

Anemone trullifolia Hook.f. and Thomson, Flora Indica. 22. 1855 (Image 1)

Anemone chumulangmaensis W.T. Wang, 1974: 171.
Anemone obtusiloba subsp. *trullifolia* (Hook.f. and

DOI: http://doi.org/10.11609/jott.3961.10.5.11679-11682

Editor: Anonymity requested. **Date of publication:** 26 April 2018 (online & print)

Manuscript details: Ms # 3961 | Received 18 December 2017 | Final received 12 March 2018 | Finally accepted 24 March 2018

Citation: Rai, I.D., G. Singh & G.S. Rawat (2018). *Anemone trullifolia* and *Berberis angulosa* as new records to the flora of the western Himalaya, India. *Journal of Threatened Taxa* 10(5): 11679–11682; http://doi.org/10.11609/jott.3961.10.5.11679-11682

Funding: Wildlife Institute of India.

Competing interests: The authors declare no competing interests.

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

Uttarakhand Space Application Centre
Department of Science & Technology
Government of Uttarakhand

Acknowledgements: The authors are grateful to the Director and Dean, Wildlife Institute of India for institutional support.

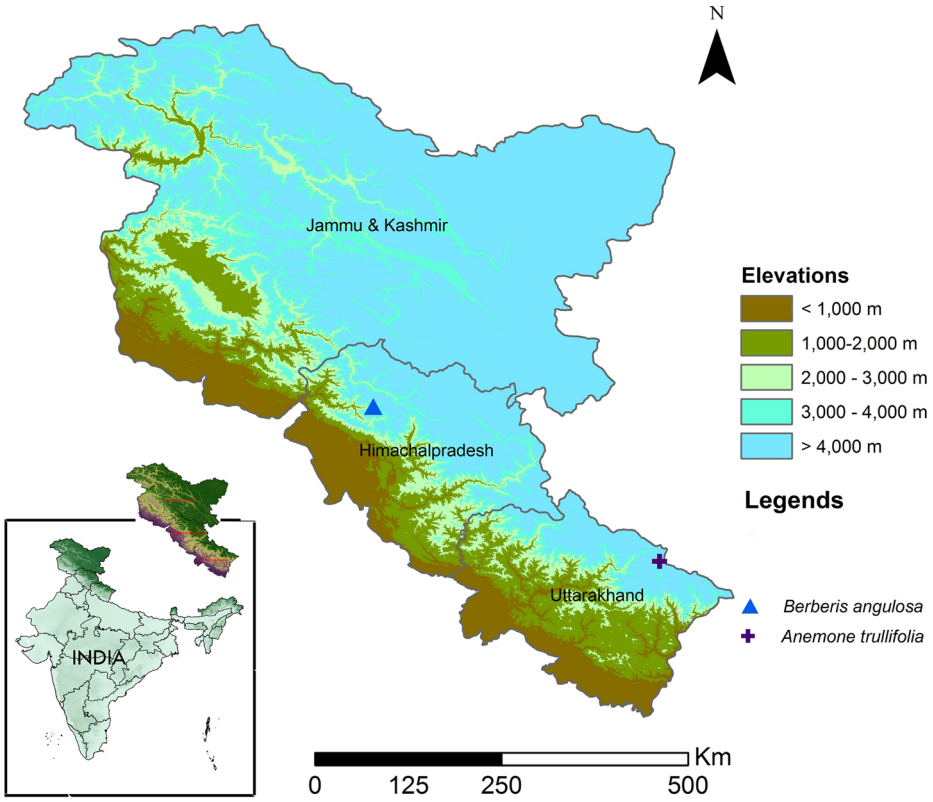

Figure 1. Distribution map and locations of *Anemone trullifolia* and *Berberis angulosa,* in the western Himalaya, India.

Thomson) Brühl, 1896:77.

Perennial, densely hairy herbs with stout rootstocks bearing fibrous remains of old leaves; Leaves simple, 4–10; petiole flat, 1–3 cm× 3–5 mm, villous or densely pubescent; leaf blade 3-lobed, spathulate, rhombic, ovate-rhombic, or obovate, 2–7×1–5 cm, densely pubescent, base attenuate, sometimes cuneate, margin distally dentate, apex rounded. Scapes 2–7, 3–15 cm long, villous or densely pubescent; cyme 1–2-flowered. Involucral bract, 3-dentate or entire, narrowly obovate or lanceolate, 1–2.5 cm, hirsute. Bracteoles sometimes present, paired, small. Flowers solitary or 2–3, Pedicel 1–5 cm, pubescent or puberulent. Sepals 5 or 6, yellow to purplish, elliptic-obovate, 5–12×4–8 mm, pubescent. Stamens light brown, 1.8–3.4 mm; filament narrowly ovoid, 0.5–0.7 mm wide; anther globose, small. Pistils light brown, cylindric-ovoid, 2–4 mm; ovary villous or pubescent. Achene body ellipsoid-ovoid or fusiform, slightly compressed, 3–4×1–2 mm, hairy, beak hooked, ca. 2mm long.

Flowering and fruiting: May–August.

Distribution: India (Uttarakhand, Sikkim, Arunachal Pradesh); Bhutan; Nepal; China.

Material examined: 339 (WII), 20.v.2004, India, Uttarakhand, Pithoragarh, Topidhunga, 30.637615^{0}N & 80.133509^{0}E, 4,400m, coll. G.S. Rawat (Image 3).

Image 1. *Anemone trullifolia* Hook. f. and Thomson

Ecology and phytogeography: The species grows alongside streams and moist alpine meadows between 3,500–4,700 m elevation. It was recorded on dry and stable, undulating slopes having fine murram. Higher slopes have large hemispheric cushions of *Thylacospermum caespitosum*. These slopes harbour about 25–30 % herbaceous and 15–20 % graminoids with a dominance of *Arenaria* spp. The only shrub in the area was *Potentilla rigida.* The herbaceous species found in association with *Potentilla bifurca, Waldheimia*

tomentosa, *Leontopodium alpinum, Oxytropis lapponica, Arenaria bryophylla, Chesneya nubigena* and *Rheum moorcroftianum*. Overall vegetation cover in the region ranges between 25–70 %. The area has scattered colonies of Himalayan Marmot *Marmota himalayana*. The earlier known distribution range of this plant species is Nepal, Bhutan and SW Gansu, S Qinghai, S Sichuan, S Xizang and NW Yunnan regions of China (www.efloras.org).

***Berberis angulosa* Wall. ex Hook.f. and Thomson, Flora Indica. 227. 1855 (Image 2)**

Deciduous shrubs, upto 2m tall. Stems and branches terete to sulcate, glabrous, reddish-brown when young. Internodes 1–2.5 cm. Spines 3 or 5-fid, strong, usually terete. Leaves slightly coriaceous. Petiole indistinct or short, 2–5 mm. Lamina obovate to oblanceolate, 1.5–4.5×0.5–1.5 cm, base cuneate to shortly attenuate, apex obtuse, mucronate, margin usually entire, sometimes with 1–3 spinulose teeth on each side, dark green above, paler beneath, venation slightly prominent below. Flowers solitary or in fascicles of 2–6 flowers. Bracts indistinct. Flower solitary, yellow, 1.5–2 cm in diameter. Pedicel 0.5–2 cm, glabrous to puberulous. Sepals in two whorls, outer sepals ovate or spathulate, 6–10×3.5–4.5 mm; inner sepals obovate, 7–10×5–7 mm. Petals obovate, 5.5–8.5×3.5–5.5 mm, base cuneate, apex undulate or rounded, margin entire, venation distinct with one central and 2 or 3 pairs of lateral veins; glands obovoid, ca. 1mm long. Stamens 4–5 mm long, connectives slightly produced, tip conical. Pistil 3–4 mm long; ovules 4–6. Berries bright red, sub-globose, 8–10 mm long.

Flowering and fruiting: May–August.

Distribution: India (Himachal Pradesh, West Bengal, Sikkim); Nepal; China.

Material examined: 11494 (WII), 19.VI.2009, India, Himachal Pradesh, Kugti, 32.453372^{0}N & 76.739902^{0}E, 3,420m, coll. G. Singh & G.S. Rawat (Image 4).

Ecology and phytogeography: The species grows in dry open slopes, open canopy forests and meadows between an elevation of 3,000–4,500 m. The earlier recorded western most distribution of the species was in the Myagdi area of Nepal (Adhikari 2010) which is about four degree below in latitude from the current location. In China it is reported from Qinghai, Xizang regions (www.efloras.org).

Image 2. *Berberis angulosa* Wall. ex Hook.f. and Thomson

Discussion

The western Himalaya have received attention of a large number of botanists yet they remain rather under explored. The wide variation in altitude and climate makes it ideal for sustaining a rich diversity of plant and animal species. Previously in the Indian Himalayan region *Anemone trullifolia* and *Berberis angulosa* were known to occur only in the eastern and central Himalaya. Current reports from the western Himalaya make them bio-geographically noteworthy by means of their distribution in the Himalaya. These species in this region could be attributed to their extended range of distribution or restrained botanical excursions in these interior valleys. Further, the current report on the presence of a few individuals indicates their rarity in the region.

References

Adhikari, B. (2010). Systematics and Phylogeographic studies of *Berberis* L. (Berberidaceae) in the Nepal Himalaya. PhD Thesis. The University of Edinburgh, Royal Botanic Garden, Edinburgh.

Brühl, P. & G. King (1896). A century of new and rare Indian plants. *Annals of the Royal Botanic Garden. Calcutta* 5(2): 71–200.

Chatterjee, D. (1939). Studies on the endemic flora of India and Burma. *Journal of the Royal Asiatic Society of Bengal* 5(1): 19–67.

Hooker, J.D. (1875–1897). *The Flora of British India*. Vol. 1–7. Reeve & Co. Ltd. The Oast House. Brook, Nr. Ashford, Kent.

Hooker, J.D. (1907). Sketch of the Flora of British India. *Imperial Gazetteer of India, Oxford* 1(4): 157–212.

Hooker, J.D. & T. Thomson (1855). *Flora Indica*, Vol. 1. W. Pamplin, London, 285pp.

Nayar, M.P. (1996). *Hot Spots of Endemic Plants of India, Nepal and Bhutan. Thiruvananthapuram*. Tropical Botanic Garden and Research Institute, Palode, 252pp.

Press, J.R., K.K. Shrestha & D.A. Sutton (2000). *Annotated Checklist of the Flowering Plants of Nepal*. Natural History Museum, London, i–x+430pp.

Rai, I.D. & G.S. Rawat (2015). *Oxygraphis kumaonensis* sp. nov. (Ranunculaceae) from western Himalaya, India. *Phytotaxa* 230(1): 092–096; http://doi.org/10.11646/phytotaxa.230.1.10

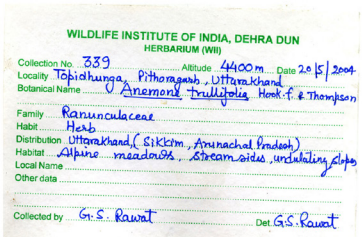

Image 3. Herbarium image of *Anemone trullifolia* (339 (WII)

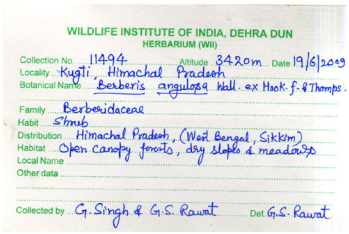

Image 4. Herbarium image of *Berberis angulosa* (11494 (WII)

Rai, I.D., A. Kumar, G. Singh, B.S. Adhikari & G.S. Rawat (2017). Three noteworthy additions to the flora of the western Himalaya, India. *Journal of Threatened Taxa* 9(7): 10421–10425; http://doi.org/10.11609/jott.3371.9.10421-10425

Rai, I.D., J.S. Jalal, G. Singh & G.S. Rawat (2014). *Platanthera pachycaulon* (Orchidaceae) an addition to the orchid flora of western Himalaya, India. *Richardiana* XIV (9): 266–273.

Rai, I.D., J.S. Jalal, G. Singh & G.S. Rawat (2015). Extended distribution of *Platanthera cumminsiana* (King and Pantl.) J. Renz (Orchidaceae) in western Himalaya, India. *Indian Journal of Forestry* 38(1): 95–98.

Tiwari, U.L. & B.S. Adhikari (2011). *Berberis rawatii* sp. *nov*. (Berberidaceae) from India. *Nordic Journal of Botany* 29: 184–188; http://doi.org/10.1111/j.1756-1051.2011.00940.x

Wang, W.T. (1974). Notulae de Ranunculaceis Sinensibus III. *Acta Phytotaxonomica Sinica* 12(2): 155–190.

Journal of Threatened Taxa

www.threatenedtaxa.org

ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

April 2018 | Vol. 10 | No. 5 | Pages: 11551–11702
Date of Publication: 26 April 2018 (Online & Print)
DOI: 10.11609/jott.2018.10.5.11551-11702

Article

Butterfly diversity in human-modified ecosystems of southern Sikkim, the eastern Himalaya, India
-- Prem Kumar Chettri, Kishor Sharma, Sailendra Dewan & Bhoj Kumar Acharya, 11551–11565

Communications

Contrasting human perceptions of and attitudes towards two threatened small carnivores, *Lycalopex fulvipes* and *Leopardus guigna*, in rural communities adjacent to protected areas in Chile
-- I. Sacristán, A. Cevidanes, F. Acuña, E. Aguilar, S. García, M.J. López, J. Millán & C. Napolitano, Pp. 11566–11573

Sighting trend of the Indian Skimmer (Charidiformes: Laridae: *Rynchops albicollis* Swainson, 1838) in National Chambal Gharial Sanctuary (1984–2016) reflecting on the feasibility of long-term ecological monitoring
-- L.A.K. Singh & R.K. Sharma, Pp. 11574–11582

Comparative cross-sectional survey on gastrointestinal parasites of captive, semi-captive, and wild Elephants of Sri Lanka
-- Nirupama Abeysekara, R.P.V. Jayanthe Rajapkse & R.S. Rajakaruna, Pp. 11583–11594

Short Communications

The extinction of Faure's Broom *Adenocarpus faurei* Maire (Leguminosae) in Algeria
-- Mohamed Djamel Miara, Mohammed Ait Hammou & Jah Skipper, Pp. 11595–11598

Conservation assessment of two rare gingers (Zingiberaceae) from Dampa Tiger Reserve, Mizoram, India
-- Pankaj Kumar & Priya Singh, Pp. 11599–11605

New records of bats (Mammalia: Chiroptera) from Assam, northeastern India with a distribution list of bat fauna of the state
-- Ananda Ram Boro, Prasanta Kumar Saikia & Uttam Saikia, Pp. 11606–11612

On the birds of Marivan County, western Iran: an update
-- Fatah Zarei, Seyed Naseh Hosseini, Jalal Pezeshk, Loghman Maleki & Hamid Reza Esmaeili, Pp. 11613–11617

Nesting pattern of birds in Jahangirnagar University Campus, Bangladesh
-- Israt Jahan, Sajeda Begum, Mohammad Mostafa Feeroz, Delip Kumar Das & Ashis Kumar Datta, Pp. 11618–11635

An annotated checklist of the birds of the upper Siang region, Arunachal Pradesh, India
-- Anirban Datta-Roy, Vivek Ramachandran & Karthik Teegalapalli, Pp. 11636–11651

Report of the early winter migrants and resident birds in an inland wetland near Tundi Camp, Bajana, Gujarat
-- Abhishek Chatterjee, Sudeshna Ghoshal, Soumyajit Chowdhury & Pinakiranjan Chakrabarti, Pp. 11652–11658

The first report of two thread-legged assassin bugs (Hemiptera: Reduviidae: Emesinae) from India
-- Balasaheb V. Sarode, Swapnil S. Boyane & Hemant V. Ghate, Pp. 11659–11664

Water striders, the genus *Cylindrostethus* Mayr (Insecta: Heteroptera: Gerridae) from India with a new record
-- E. Eyarin Jehamalar, Kailash Chandra & G. Srinivasan, Pp. 11665–11671

The invasive aphid *Pterochloroides persicae* (Cholodkovsky, 1899) (Hemiptera: Aphidoidea: Lachninae) recorded on important fruit trees in Kashmir Valley, India
-- Govindasamy Mahendiran, Shahid Ali Akbar & Mudasir Ahmad Dar, Pp. 11672–11678

Notes

***Anemone trullifolia* and *Berberis angulosa* as new records to the flora of the western Himalaya, India**
-- Ishwari Datt Rai, Gajendra Singh & Gopal Singh Rawat, Pp. 11679–11682

Notes on fairy orchids (Magnoliopsida: Asparagales: Orchidaceae: *Oberonia*) of Sri Lanka: revision in regional distribution and documentation on vegetative propagation
-- Menaka Ariyarathne & Deepthi Yakandawala, Pp. 11683–11685

Additional reports of solitary potter wasps (Hymenoptera: Vespidae: Eumeninae) in Bhutan
-- Tshering Nidup, Wim Klein, P. Girish Kumar & Phurpa Dorji, Pp. 11686–11696

On the occurrence of the rare Long-nosed Stargazer *Ichthyscopus lebeck* (Bloch & Schneider, 1801) (Uranoscopidae) in the coastal waters off Visakhapatnam, India
-- Govinda Rao Velamala & Muddula Krishna Naranji, Pp. 11697–11700

Correction

Corrigendum - Butterfly host plant Monograph, P. 11701

Miscellaneous

National Biodiversity Authority

Member

Publisher & Host

Threatened Taxa

Partners

The Mohamed bin Zayed Species Conservation Fund