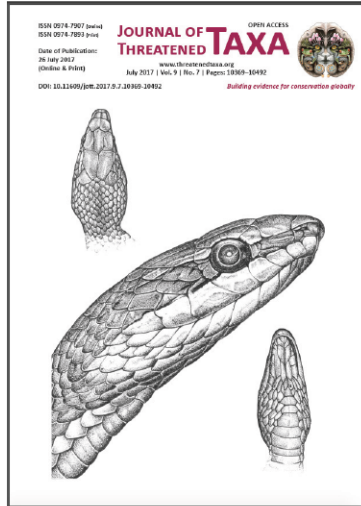


OPEN ACCESS



The Journal of Threatened Taxa is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction, and distribution by providing adequate credit to the authors and the source of publication.



Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

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

SHORT COMMUNICATION

THREE NOTEWORTHY ADDITIONS TO THE FLORA OF THE WESTERN HIMALAYA, INDIA

Ishwari Datt Rai, Amit Kumar, Gajendra Singh, Bhupendra Singh Adhikari & Gopal Singh Rawat

26 July 2017 | Vol. 9 | No. 7 | Pp. 10421–10425

10.11609/jott.3371.9.7.10421–10425



For Focus, Scope, Aims, Policies and Guidelines visit http://threatenedtaxa.org/About_JoTT

For Article Submission Guidelines visit http://threatenedtaxa.org/Submission_Guidelines

For Policies against Scientific Misconduct visit http://threatenedtaxa.org/JoTT_Policy_against_Scientific_Misconduct

For reprints contact info@threatenedtaxa.org

Partner



Publisher/Host





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

THREE NOTEWORTHY ADDITIONS TO THE FLORA OF THE WESTERN HIMALAYA, INDIA

Ishwari Datt Rai¹, Amit Kumar², Gajendra Singh³, Bhupendra Singh Adhikari⁴ & Gopal Singh Rawat⁵

^{1,2,4,5} Wildlife Institute of India, Post Box # 18, Chandrabani, Dehradun, Uttarakhand 248001, India

³ Uttarakhand Space Application Centre, 93/II Vasant Vihar, Dehradun, Uttarakhand 248006, India

¹ ishwari.ra@gmail.com (corresponding author), ² amit_ndbr@wii.gov.in, ³ gajendrawat@yahoo.com,

⁴ adhikaribs@wii.gov.in, ⁵ rawatg@wii.gov.in

OPEN ACCESS



Abstract: During recent botanical explorations in the western Himalaya, three interesting species were recorded from the subalpine-alpine areas, which were hitherto unknown from this region. Their occurrence in this region is phytogeographically significant and noteworthy. In this paper a brief description of these species along with phenology, distribution, ecology, photographs and phytogeographical notes are provided.

Keywords: *Anemone demissa*, *Anthoxanthum flexuosum*, *Scrophularia pauciflora*.

The Himalaya represent a distinct biogeographic eco-region with high biodiversity and endemism due to large variation in topography and climate (Olson et al. 2001). It harbours a rich array of the floral diversity across diverse habitats in mountain systems expanding as a parallel chain from the Shivaliks to the Trans-Himalaya. The mountains rise abruptly, resulting in a diversity of ecosystems that range from subtropical climate to perpetual snow beyond the alpine areas. It represents about 61% of endemic species and 49% of the endemic genera of flowering plants in India (Nayar 1996). The Himalayan Biodiversity Hotspot is divided into eastern and western Himalaya, of which the eastern

region is considered as one of the centres of evolution. At present the eastern Himalaya have 466 endemic taxa of angiosperms and the western Himalaya have 297 endemic taxa (Singh et al. 2015).

Several authors such as Hooker (1907), Chatterjee (1939) and Khullar (2000) recognized the western Himalaya i.e., Kashmir to Kumaon, as an important floristic region of India. The region supports a great diversity of flora and fauna including two sites designated by UNESCO, i.e., Nanda Devi & Valley of Flowers National Parks; and Great Himalayan National Park as World Natural Heritage sites. The diversity in habitats and elevational gradients supports various ecosystems and transition zones of biogeographical units such as Shivaliks, Lesser Himalaya, Greater Himalaya and Trans-Himalaya. The vegetation of the eastern Himalaya shows affinities with Chinese and Malaysian elements, whereas, the floristic elements of the western Himalaya exhibit affinities with the Mediterranean, Siberian, Tibetan and Indo-Malayan regions (Chawla et al. 2012). In the eastern Himalaya, a number of vascular plants including species of ferns, legumes, orchids, *Primula*, *Impatiens*, *Rhododendron* and *Quercus* are much higher

DOI: <http://doi.org/10.11609/jott.3371.9.7.10421-10425>

Editor: P. Lakshminarasimhan, Botanical Survey of India, Pune, India.

Date of publication: 26 July 2017 (online & print)

Manuscript details: Ms # 3371 | Received 24 February 2017 | Final received 25 May 2017 | Finally accepted 03 July 2017

Citation: 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.3371.9.7.10421-10425>

Copyright: © Rai et al. 2017. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use of this article in any medium, reproduction and distribution by providing adequate credit to the authors and the source of publication.

Funding: Science and Engineering Research Board (SERB), Govt. of India, University Grant Commission, New Delhi and Wildlife Institute of India, Dehradun

Competing interests: The authors declare no competing interests.

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



भारतीय वन्यजीव संस्थान
Wildlife Institute of India



than in the western Himalaya. Compared to the eastern Himalaya, this region is floristically more explored; however, several pockets in the interior valleys still need intensive botanical surveys. The state of Uttarakhand in the western Himalaya alone contains more than 4,700 species of flowering plants (Uniyal et al. 2007), which is about 27% of the flowering plants of India. Interestingly, reports of several noteworthy species are still coming out from this region (Jalal et al. 2010; Kumar et al. 2016; Rai et al. 2016) indicating the need for intensive floristic explorations.

MATERIALS AND METHODS

During recent floristic surveys, we recorded *Anemone demissa* (Ranunculaceae), *Scrophularia pauciflora* (Scrophulariaceae) and *Anthoxanthum flexuosum* (Poaceae) which were hitherto unknown from the western Himalaya (Fig. 1). Upon detailed scrutiny of the literature and regional flora (Hooker 1982–87; Hooker & Thomson 1855; Karthikeyan et al. 1989; Press et al. 2000; Uniyal et al. 2007), taxonomic notes and herbaria (Botanical Survey of India, Dehradun (BSD), Forest Research Institute, Dehradun (DD) and Wildlife Institute of India, Dehradun (WII) and Virtual Herbaria's (Royal Botanic Garden, Kew (K) and National Museum

of Natural History, Paris (MNH), the identities of these species were confirmed. Since they are new records to the western Himalaya, a brief description of the species, distribution and ecology along with images have been provided for easy identification in the field.

Anemone demissa

Hook.f. & Thomson Fl. Ind. 1: 23. 1855 (Ranunculaceae)

(Image 1)

Perennial herbs with monopodial woody rootstock, surrounded by fibrous leaf remains. Stem erect, ascending or decumbent. Radical leaves broadly ovate, 3-partite or twice ternately divided; petiole 5–30 cm long, sparsely or densely villous. Leaf blade 3-sect, ovate, rhombic-pentagonal or reniform-pentagonal, 5–8×4–6 cm, villous or subglabrous, base cordate or subtruncate, margin ciliate; central segment petiolulate, 3-parted, broadly rhombic or rhombic-ovate, margin incised lobulate, ultimate lobules ovate or triangular; lateral segments sessile, unequally 2 or 3-parted, smaller than central one, sometimes much more so. Scapes 1–3, 5–30 cm long, densely white hairy, 3–6-flowered in simple umbels, involucre bracts 3 or 4; bract blade 3-lobed, broadly rhombic or narrowly obovate-oblong,

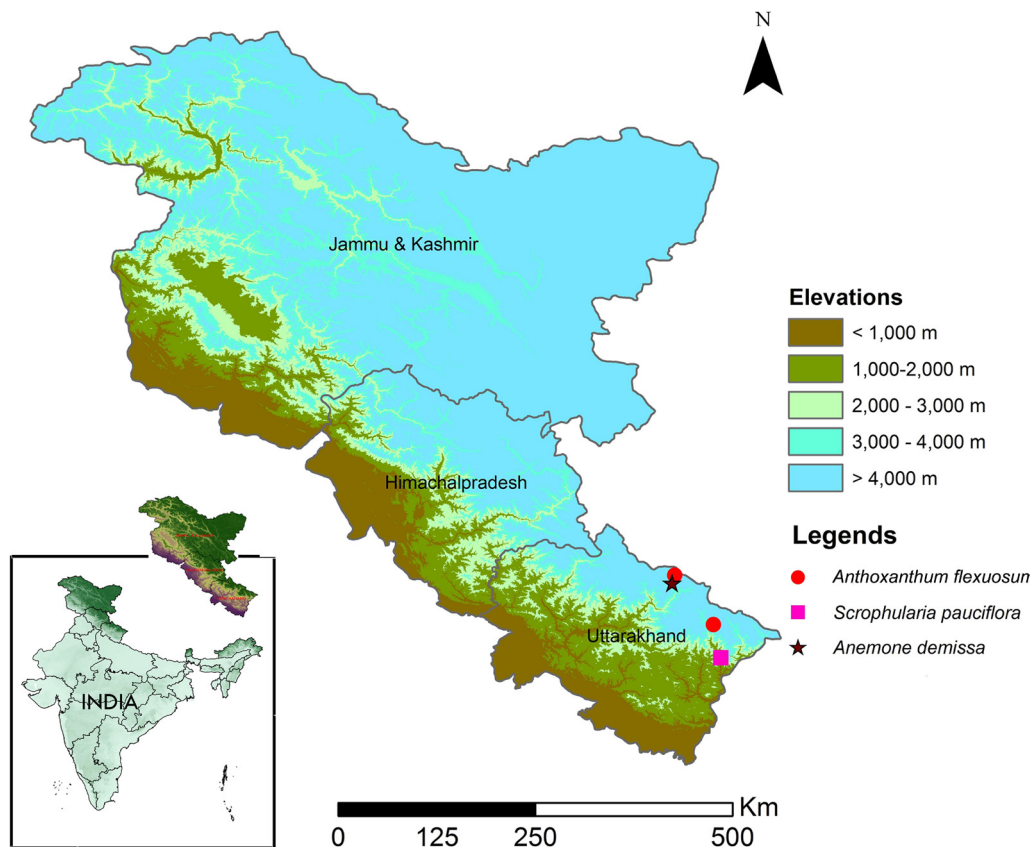


Figure 1. Distribution map and locations of *Anemone demissa*, *Scrophularia pauciflora* and *Anthoxanthum flexuosum* in the western Himalaya, India

pubescent. Pedicel 2–6 cm long, pubescent. Sepals 5–7, blue, purple or red, obovate or elliptic, 8–18×4–12 mm, sometimes dimorphic (inner ones smaller and of different shape), sparsely puberulent. Stamens 3–5 mm long; filament slightly dilated; anther cylindrical, 1–2 mm, apex rounded. Staminodes sometimes present. Ovary glabrous or scarcely pubescent, sometimes sterile. Achene broadly ellipsoid or obovoid, 6–7×4–6 mm, glabrous or scarcely pubescent; wings 0.8–1.2 mm wide; style curved, 1.8–2 mm long.

Specimen examined: 14607 (WII), 24.vii.2004, India, Uttarakhand, Chamoli, Niti Valley, Lang Payar, 30.7825 N & 79.8163 E, 3,600m, coll. G.S. Rawat & G. Singh.

Flowering and fruiting: May–July.

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

Ecology and phytogeography: The species was recorded in open habitats especially on dry grassy slopes sparsely distributed in association with one or more species of *Carex*, *Festuca*, *Kobresia*, *Thymus*, *Bistorta*, *Anaphalis*, *Anemone*, *Potentilla*, *Cassiope*,

and scrub vegetation comprising *Lonicera myrtillus*, *Juniperus communis*, and *Rhododendron anthopogon*. Situated in the cold arid region of Nanda Devi Biosphere Reserve in Uttarakhand, the area is locally known as 'Lang Payar' which is protected for wild plants as well as animals by the local community throughout the year for the past 20–25 years. Overall, 85–95 % of the area is vegetated. The species was recorded in north-east facing gentle slope (10–20°) between 3,500–3,900 m elevation. Earlier records of its habitat and distribution are from open grassy and rocky slopes and moraines at 3,300–5,000 m elevation zones in the Nepal, central Himalaya eastwards to Bhutan, Myanmar and southern Gansu, southern Qinghai, western Sichuan, eastern and southern Xizang, northwestern Yunnan regions of southwestern China (www.efloras.org).

Scrophularia pauciflora

Benth. Scroph. Ind. : 17. 1835. (Scrophulariaceae)

(Images 2,3)

Perennial herbs, erect, up to 60cm tall, branched. Stem quadrangular, white glandular hairy. Leaves simple, opposite, decussate; Petiole ca. 5cm long, decurrent on stem and becoming wing like ribs, densely white glandular hairy; blade ovate-cordate, up to 9cm long, short hairy on veins when young, margin coarsely double serrate. Inflorescence thyrses, terminal, narrowly spicate, up to 22cm long; cymes opposite, densely to widely spaced, usually 4-flowered; peduncle glandular



Image 1. *Anemone demissa* Hook.f. & Thomson



Image 2. *Scrophularia pauciflora* Benth.



Image 3. Herbarium of *Scrophularia pauciflora* Benth.

hairy. Flowers crowded; pedicel short, glandular hairy. Calyx 3–4 mm long; lobes ovate-lanceolate, glandular hairy, apex acute. Corolla 5–6 mm long, glabrous; lower lip middle lobe smaller than lateral lobes; upper lip slightly longer than lower lip. Stamens slightly shorter than lower lip; staminode absent. Ovary ovoid, ca. 1.5 mm. Style as long as ovary. Capsule ovoid, 6–8 mm long.

Specimen examined: 11465 (WII), 03.vi.2015, India, Uttarakhand, Pithoragarh, Ro-Ro Dhar (Daphiyadhura), 29.9428 N & 80.3622 E, 3,030m, coll. I.D. Rai & G.S. Rawat.

Flowering and fruiting: May–June.

Distribution: India (Uttarakhand, West Bengal, Sikkim), China, Bhutan, Nepal.

Ecology and phytogeography: The species grows in the south-west facing rocky slopes dominated by *Quercus semecarpifolia* and *Rhododendron arboreum*. The individuals were found mostly on shady ravines especially under the shelter of rocks and boulders between 2,500–3,300 m elevation and 40–60 degree slope. Unlike most species of *Scrophularia* in this region, this species was selectively browsed by wild herbivores. The dominant plant species observed in association

with it were *Impatiens sulcata*, *Rubrivena polystachya*, *Primula edgeworthii*, *Ajuga brachystemon*, *Trachydium roylei* and one or more species of fern. The soil is sandy with deposits of gravel. This species is hitherto reported from Khaptad National Park in western Nepal where forests are dominated by *Rhododendron* spp. and Oaks. Khaptad is located in the south-east of present location along a parallel chain of mountains with similar vegetation types, dissected by deep valleys with sub-tropical climate which may lead to interrupted distribution of the species. Patchy distribution and habitat specificity of this species might also be a cause of limited reports of its occurrence in the past and the species might have a broader distribution in the Himalayan region.

Anthoxanthum flexuosum

(Hook.f.) Veldkamp Blumea 30: 347. 1985.

Hierochloe flexuosa Hook.f., Fl. Brit. India 7: 222. 1896.

(Poaceae) (Image 4)

Perennial tufted grass, 30–60 cm high. Ligule an eciliate membrane. Leaf-blades 5–12×0.2–0.4 cm; apex abruptly acute. Inflorescence a very loose panicle,



Image 4. *Anthoxanthum flexuosum* (Hook.f.) Veldkamp

ovate, 5–8 cm long. Panicle branches capillary; flexuous. Spikelets solitary, cuneate, laterally compressed, ca. 5mm long. Basal sterile florets 2; fertile florets 1. Glumes persistent; reaching apex of florets; shiny. Lower and upper glume ovate, ca. 5mm long, membranous, purple, 1-keeled, 3-veined, apex acute. Lemma of lower sterile floret oblong, ca. 5mm long, 1-keeled, 5-veined, pubescent, dentate, 2-fid, obtuse, awned. Awn of lower sterile floret ca. 1.5mm long. Lemma of upper sterile floret oblong, ca. 5mm long, pubescent, lobed, 2-fid, awned. Awn exerted, nearly as long as the spikelet, Awn of upper sterile floret dorsal, 5–6 mm long. Lower lemma hairy, fertile lemma ovate, ca.3.5mm long, without keel. Lemma surface pubescent, hairy above. Lemma margins convolute, covering most of palea. Lemma apex acute. Palea elliptic, 1-veined, without keels. Anthers 2 (bisexual) or 3 (male); 1.5mm long. Ovary glabrous. Fruit caryopsis with adherent pericarp.

Specimen examined: 21967 (WII), 18.x.2014, India, Uttarakhand, Chamoli, Niti Valley, 30.9117 N & 79.8547 E, 4,055m, coll. Amit Kumar; 14275 (WII), Uttarakhand, Pithoragarh, Ralam, 30.3219 N & 80.3205 E, 4,010m, coll. G.S. Rawat & G. Singh.

Flowering and fruiting: July–September.

Distribution: India (Uttarakhand, Sikkim), Nepal.

Ecology and phytogeography: *Anthoxanthum flexuosum* grows in alpine dry scrub and dry alpine pastures above 4,000m. In Ganesh Ganga watershed, it inhabits dry rocky stable slopes. It grows in association with one or more species of *Elymus*, *Festuca*, *Trisetum*, *Oxytropis*, *Astragalus*, *Caragana*, *Eurotia*, *Lonicera*, *Lappula*, *Potentilla* and *Thymus*. The species is endemic to the Himalayan region. The species was earlier reported from central Himalaya (Nepal; e-monocot.org, Karthikeyan et al. 1989) and eastern Himalaya (Sikkim).

DISCUSSION

In the Indian Himalayan region, the three species discussed above are previously known to occur in eastern and central Himalaya; however, the current reports from western Himalaya make them biogeographically noteworthy by means of their distribution in the Himalaya Biodiversity Hotspot. The present record of these species in this region could be attributed to their extended range of distribution not recorded earlier

due to an artefact of 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

- Bentham, G. (1835). *Scrophularineae Indicae*. J. Ridgway, London, 57pp.
- Chatterjee, D. (1939). Studies on the endemic flora of India and Burma. *Journal of the Royal Asiatic Society of Bengal* 5(1): 19–67.
- Chawla, A., O. Parkash, V. Sharma, S. Rajkumar, B. Lal, Gopichand, R.D. Singh & A.K. Thukral (2012). Vascular plants, Kinnaur, Himachal Pradesh, India. *Check List* 8(3): 321–348.
- Hooker, J.D. & T. Thomson (1855). *Flora Indica - Vol. 1*. W. Pamplin, London, 285pp.
- Hooker, J.D. (1872–1897). *The Flora of British India. Vol. 1–7*. Bishen Singh Mahendra Pal Singh, Dehradun.
- Hooker, J.D. (1907). *Sketch of the Flora of British India*. Imperial Gazetteer of India. Oxford 1(4): 157–212. <http://e-monocot.org> (as accessed on 01/02/2017). <http://www.efloras.org> (as accessed on 01/02/2017)
- Jalal, J.S., I.D. Rai, P. Kumar, G.S. Rawat & Y.P.S. Pangtey (2010). *Platanthera leptocaulon* (Hooker f.) Soo: An addition to the orchid flora of western Himalaya, India. *Richardiana* 10(2): 85–93.
- Karthikeyan, S., S.K. Jain, M.P. Nayar & M. Sanjappa (1989). *Flora Indicae Enumeratio: Monocotyledonae*. Botanical Survey of India, Calcutta, 435pp.
- Khullar, S.P. (2000). *An illustrated fern flora of the west Himalaya, Vol. II*. International Book Distributors, Dehradun, India.
- Kumar, A., B.S. Adhikari & G.S. Rawat (2016). New phytogeographically noteworthy plant records from Uttarakhand, Western Himalaya, India. *Journal of Threatened Taxa* 8(6): 8943–8947; <http://dx.doi.org/10.11609/jott.2416.8.6.8943-8947>
- Nayar, M.P. (1996). *Hot Spots of Endemic Plants of India, Nepal and Bhutan*. Thiruvananthapuram: Tropical Botanic Garden and Research Institute, Palode, 252pp.
- Olson, D.M., E. Dinerstein, E.D. Wikramanayake, N.D. Burgess, G.V.N. Powell, E.C. Underwood, J.A. D'Amico, I. Itoua, H.E. Strand, J.C. Morrison, C.J. Loucks, T.F. Allnutt, T.H. Ricketts, Y. Kura, J.F. Lamoreux, W.W. Wettengel & K.R. Kassem (2001). Terrestrial ecoregions of the World: a new map of life on Earth. *BioScience* 51(11): 933–938.
- 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. Singh & G.S. Rawat (2016). Noteworthy additions to the flora of Uttarakhand, western Himalaya, India. *Journal of Threatened Taxa* 8(7): 9004–9008; <http://doi.org/10.11609/jott.2607.8.7.9004-9008>
- Schouten, Y. & J.F. Veldkamp (1985). A revision of *Anthoxanthum* including *Hierochloe* (Gramineae) in Malesia and Thailand. *Blumea* 30: 319–351.
- Singh, P., K. Karthikeyan, P. Lakshminarasimhan & S.S. Dash (2015). *Endemic Vascular Plants of India*. Botanical Survey of India, 339pp.
- Uniyal, B.P., J.R. Sharma, U. Choudhery & D.K. Singh (2007). *Flowering plants of Uttarakhand - A Checklist*. Bishen Singh Mahendra Pal Singh, Dehradun, 404pp.





OPEN ACCESS



The Journal of Threatened Taxa is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction, and distribution by providing adequate credit to the authors and the source of publication.

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

July 2017 | Vol. 9 | No. 7 | Pages: 10369–10492

Date of Publication: 26 July 2017 (Online & Print)

DOI: 10.11609/jott.2017.9.7.10369-10492

www.threatenedtaxa.org

Communications

The status of Arabian Gazelles *Gazella arabica* (Mammalia: Cetartiodactyla: Bovidae) in Al Wusta Wildlife Reserve and Ras Ash Shajar Nature Reserve, Oman

-- Mansoor H. Al Jahdhami, Sultan Al Bulushi, Haitham Al Rawahi, Waheed Al Fazari, Ahmed Al Amri, AbdulRahman Al Owaisi, Salim Al Rubaiey, Zahran Al Abdulasalam, Metab Al Ghafri, Shaeilendra Yadav, Sami Al Rahbi & Steven Ross, Pp. 10369–10373

On the occurrence of the Black Spine-cheek Gudgeon *Eleotris melanosoma* Bleeker in Sri Lankan waters, with comments on the Green-backed Guavina *Bunaka gyrinoides* (Bleeker) (Teleostei: Eleotridae)

-- Sudesh Batuwita, Sampath Udugampala & Udeni Edirisinghe, 10374–10379

Captive breeding for conservation of Dussumier's Catfish (Actinopterygii: Siluriformes: Clariidae: *Clarias dussumieri*) a Near Threatened endemic catfish of peninsular India

-- K.G. Padmakumar, L. Bindu, P.S. Sreerekha, Nitta Joseph, Anuradha Krishnan, P.S. Manu & V.S. Basheer, Pp. 10380–10385

Influence of seasonal and edaphic factors on the diversity of scolopendromorph centipedes (Chilopoda: Scolopendromorpha) and general observations on their ecology from Kerala, India

-- Dhanya Balan & P.M. Sureshan, 10386–10395

Butterflies of eastern Assam, India

-- Arun P. Singh, 10396–10420

Short Communications

Three noteworthy additions to the flora of the western Himalaya, India

-- Ishwari Datt Rai, Amit Kumar, Gajendra Singh, Bhupendra Singh Adhikari & Gopal Singh Rawat, 10421–10425

New distribution records of three *Sarcophyton* species (Alcyonacea: Alcyoniidae) in Indian waters from Andaman Islands

-- Seepana Rajendra, C. Raghunathan & Tamal Mondal, 10426–10432

Additions to the Indian dragonfly fauna, and new records of two enigmatic damselflies (Insecta: Odonata) from northeastern India

-- Shantanu Joshi, Joyce Veino, Dahru Veino, Lightson Veino, Rakoveine Veino & Krushnamegh Kunte, Pp. 10433–10444

Dragonflies and Damselflies (Odonata: Insecta) of Keoladeo National Park, Rajasthan, India

-- Dheerendra Singh, Brijendra Singh & Jan T. Hermans, Pp. 10445–10452

Records of the Indian Sand Snake *Psammophis condanarus* (Merrem, 1820) (Reptilia: Lamprophiidae) in southern India

-- S.R. Ganesh, Vivek Sharma & M. Bubesh Guptha, Pp. 10453–10458

An ecological note on the new record of *Cuora amboinensis* (Riche in Daudin, 1801) (Reptilia: Testudines: Geoemydidae) in northeastern India

-- Kulendra Chandra Das & Abhik Gupta, Pp. 10459–10462

A new distribution record of the European Free-tailed Bat *Tadarida teniotis* (Chiroptera: Molossidae) from the western Himalaya, India

-- Rohit Chakravarty, Pp. 10463–10467

Measuring Indian Blackbuck *Antelope cervicapra* (Mammalia: Cetartiodactyla: Bovidae) abundance at Basur Amruth Mahal Kaval Conservation Reserve, Chikkamagaluru, southern India

-- H.S. Sathya Chandra Sagar & P.U. Antoney, Pp. 10468–10472

Notes

A new species of *Sarcinella* (Ascomycetes) from Eturnagaram Wildlife Sanctuary, Warangal District, Telangana, India

-- Khaja Moinuddin Mohammad, Bagyanarayana Gaddam & Rana Kausar, Pp. 10473–10475

Re-collection of the Black Catchfly *Silene nigrescens* (Caryophyllales: Caryophyllaceae) after 130 years from Indian western Himalaya

-- Satish Chandra, D.S. Rawat & P.K. Pusalkar, Pp. 10476–10479

Eight new records of the family Erebiidae (Lepidoptera: Noctuoidea) from India

-- Jagbir Singh Kirti, Navneet Singh & Harkanwal Singh, Pp. 10480–10486

New records of hover wasps (Hymenoptera: Vespidae: Stenogastrinae) from Bhutan

-- Tshering Nidup, Wim Klein & Phurpa Dorji, Pp. 10487–10489

Addition of four species to the butterfly checklist of Kaleshwar National Park, Haryana, India

-- Sachin P. Ranade, Pp. 10490–10492