

## 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](http://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](http://www.threatenedtaxa.org)

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

## NOTE

### NEW PTERIDOPHYTIC RECORDS FROM MIZORAM, NORTHEASTERN INDIA

Sachin Sharma, Amit Kumar, Bhupendra Singh Kholia & Surendra Singh Bargali

26 May 2018 | Vol. 10 | No. 6 | Pages: 11822-11826

10.11609/jott.3691.10.6.11822-11826



For Focus, Scope, Aims, Policies and Guidelines visit <http://threatenedtaxa.org/index.php/JoTT/about/editorialPolicies#custom-0>

For Article Submission Guidelines visit <http://threatenedtaxa.org/index.php/JoTT/about/submissions#onlineSubmissions>

For Policies against Scientific Misconduct visit <http://threatenedtaxa.org/index.php/JoTT/about/editorialPolicies#custom-2>

For reprints contact [info@threatenedtaxa.org](mailto:info@threatenedtaxa.org)

## Partners



صندوق محمد بن زايد  
للمحافظة على  
الكائنات الحية  
The Mohamed bin Zayed  
SPECIES CONSERVATION FUND



Member



Publisher & Host





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

OPEN ACCESS



The northeastern region of India, well known for its rich biological diversity, constitutes a transitional zone between the Indian, Indo–Malayan and Sino–Himalayan biogeographical zones (Rao 1994). The region supports a wide vegetation range and has been extensively explored in terms of pteridophytic flora since the British rule. Several publications such as Deb (1981), Baishya & Rao (1982), Jamir & Rao (1988), Kachroo et al. (1989), Vasudeva et al. (1990), Bir et al. (1989, 1990, 1991), Borthakur et al. (2000), Singh & Panigrahi (2005), and Kholia (2010, 2011, 2014) deal with ferns and fern-allies of this region.

Mizoram, one of the northeastern Indian states falls under northeast Hills (9B; Rodgers et al. 2000) and the Indo–Burma Biodiversity Hotspot (Conservation International, 2011). The total geographical area of this hilly state is ca. 21,081km<sup>2</sup>, which shares international boundaries with Myanmar and Bangladesh. Due to biogeographic, physiognomic and climatic perspectives, the region has ideal habitats for the growth of tropical vegetation. Unlike higher plants, pteridophytic flora had received less attention and there were sporadic reports in the past, viz.: Gage (1901), Fischer (1938), Deb & Dutta (1987), Chandra & Chandra (1983). The studies on this group, however, has accelerated recently due to explorations on different protected areas of Mizoram (Barbhuiya & Singh 2013; Benniamin 2011, 2012; Sharma et al. 2013, 2017; Vanlalpeka & Laha 2014; Verma et al. 2014).

NEW PTERIDOPHYTIC RECORDS FROM MIZORAM, NORTHEASTERN INDIA

Sachin Sharma<sup>1</sup>, Amit Kumar<sup>2</sup>, Bhupendra Singh Kholia<sup>3</sup> & Surendra Singh Bargali<sup>4</sup>

<sup>1,3</sup> Botanical Survey of India, Northern Regional Centre, Dehradun, Uttarakhand 248195, India  
<sup>2</sup> Wildlife Institute of India, Chandrabani, Dehradun, Uttarakhand 248002, India  
<sup>4</sup> DSB Campus, Kumaun University, Nainital - Kaldungi Road, Nainital, Uttarakhand 263001, India  
<sup>1</sup>sachinbsi2012@yahoo.co.in (corresponding author),  
<sup>2</sup>amit\_ndbr@wii.gov.in, <sup>3</sup>bskholia\_bsi@yahoo.co.in,  
<sup>4</sup>surendrakiran@rediffmail.com

During field explorations conducted by one of the authors (SS), four interesting species of pteridophytes were collected in Murlen National Park, Mizoram (2012–2015). Upon detailed study of different morphological characters, scrutiny of literature and comparison of species with previously housed herbarium specimens at ASSAM and CAL revealed that these species were hitherto unknown from Mizoram. Therefore, the present communication reports these species as new records to the flora of Mizoram State. The plant specimens were processed and prepared following standard herbarium methods (Jain & Rao 1977) and deposited in the herbarium of the Botanical Survey of India, Eastern Regional Centre, Shillong (ASSAM).

Taxonomic treatment and description

1. *Lycopodium casuarinoides*

Spring Mono. Lycop. I: 94, 1842; Clarke, Trans. Linn.

DOI: <http://doi.org/10.11609/jott.3691.10.6.11822-11826>

Editor: Anonymity requested.

Date of publication: 26 May 2018 (online & print)

Manuscript details: Ms # 3691 | Received 24 July 2017 | Final received 07 December 2017 | Finally accepted 20 April 2018

Citation: Sharma, S., A. Kumar, B.S. Kholia & S.S. Bargali (2018). New pteridophytic records from Mizoram, northeastern India. *Journal of Threatened Taxa* 10(6): 11822–11826; <http://doi.org/10.11609/jott.3691.10.6.11822-11826>

Copyright: © Sharma et al. 2018. 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: No funding has been received as the present work is a part of Ph.D research of the first author.

Competing interests: The authors declare no competing interests.

Acknowledgements: The authors are thankful to Dr. Ramesh Kumar, Scientist-C, Botanical Survey of India and forest officials of Murlen National Park, Mizoram for necessary support.



भारतीय वन्यजीव संस्थान  
Wildlife Institute of India





Image 1. *Lycopodium casuarinoides*



Image 2. Herbarium sheet of *Lycopodium casuarinoides*

Soc. II. Bot. 1. 593, 1880; Bak. Handb. Fern Allies 24, 1887; Nessel, Barlappgewachse 371, 1939.

*Lepidotis casuarinoides* (Spring) Rothmaler, Feddes Repert. Sp. Nov. 54: 67, 1944.

Lithophyte, erect when young, hanging on maturity, aerial stem light green when young become stramineous on age, densely covered by microphylls or leaves; sterile branches ca. 3mm wide, fertile branches ca. 1mm wide, ultimate sterile branchlets spreading, 5–15 cm long, ultimate fertile branchlets 2.5–15 cm long; vegetative leaves dimorphic on sterile branches, adnate, free apex of the sterile leaves hyaline, 2–3 mm long, free apex of fertile leaves 1mm long or less. Strobili 8–18 mm long, Sporophylls broadly ovate, acuminate or caudate.

Specimen examined: BSI, ERC 133494 (ASSAM), 20.ix.2014, Tualpui core, Murlen National Park, Mizoram, India, 1,350m, coll. Sachin Sharma (Image 1 & 2).

Fertile period: August–December

Threat status: Not evaluated in IUCN Red List. Chandra et al. (2008) mention this species as 'rare'.

Habitat: Scandent on rocky slopes, edges and boulders between 1200–1500 m elevation.

Distribution: India (Arunachal Pradesh, Assam, Meghalaya and Mizoram (present record)), Bhutan, China, Japan, Malay Islands, Malay Peninsula, Myanmar, Philippines, and Taiwan.

## 2. *Pichisermolodes crenatopinnata*

(C.B. Clarke) Fraser-Jenk. Indian Fern J. 26(1 & 2): 122, 2010.

*Selliguea crenatopinnata* (C.B. Clarke) S.G.Lu, Hovenkamp & M.G.Gilbert, Fl. China 2–3: 782, 2013.

*Polypodium crenatopinnatum* C.B. Clarke, J. Linn. Soc., Bot. 25(165–169): 99, pl. 42. 1888. *Pichisermollia crenatopinnata* (C.B. Clarke) Fraser-Jenk., Taxon. Revis. Indian Subcontinental Pteridophytes 52, 2008.

Terrestrial, rhizome thin, creeping, densely clothed with small, lanceolate, scales; stipes 5–12 cm long, slender, glabrous; fronds elongate–deltoid, 8–25 cm long, pinnatifid close to the rachis, glabrous, lobes 4–5 pairs, 1.5– 5 cm long, 0.5–1.5 cm wide, apex acute, margin undulate–crenate, costa distinct, costule inconspicuous; sori one row in between the main veins and in one row on either side of midrib, small, brown.

Specimen examined: BSI, ERC 131483 (ASSAM), 17.ix.2014, Ngur forest, Murlen National Park, Mizoram, India, 1,485m, coll. Sachin Sharma (Image 3 & 4).

Fertile period: August–November

Threat status: Not evaluated in IUCN Red List. Chandra et al. (2008) mention this species as 'rare'.

Habitat: Grows on calcareous sandy slopes between



Image 3. *Pichisermoloides crenatopinnata*



Image 4. Herbarium sheet of *Pichisermoloides crenatopinnata*

1400–1600 m elevation.

Distribution: India (Manipur, Meghalaya, Mizoram (present record) and Nagaland), China.

### 3. *Belvisia henryi*

(Hieron. ex C.Ch.) Raymond, Mém. Jard. Bot. Montréal 55: 32, 1962. *Hymenolepis henryi* Hieron. ex C.Ch., Dansk Bot. Arkiv 6(3): 67, f. 1d, 1929.

*Macrolethrus henryi* (Hieron. ex C.Ch.) Tagawa, Act. Phytotax. Geobot. 11(3): 234, 1942.

Rhizome short-creeping, scaly at apex, scales ovate-oblong-lanceolate, 0.22–0.44 × 0.06–0.12 linear, 4–15 × 0.1–0.3 cm. sori linear, in two rows along the rachis, but in well developed forms seems completely covering the spike, margins curved; spores hyaline, brown. Stipes 0.5–2 cm long; lamina 7–27 × 1.5–5 cm, tufted, lanceolate or elongate, simple, subcoriaceous and brattle, base gradually narrowed or sometimes irregularly truncate, margins entire to undulate, apex acuminate-caudate forming a narrow fertile spike.

Specimen examined: BSI, ERC 128498 (ASSAM), 13.ix.2014, Vapar forest, Murlen National Park, Mizoram, India, 1,260m, coll. Sachin Sharma (Image 5 & 6).

Fertile period: September–April

Threat status: Not evaluated in IUCN Red List. Chandra et al. (2008) mention this species as 'near threatened'.

Habitat: Epiphyte on broad-leaved trees like *Elaeocarpus* sp. and *Engelhardtia spicata* in dense and moist forests.

Distribution: India (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram (present record), Sikkim and West Bengal), Bhutan, China (Yunnan), and Nepal.

### 4. *Acystopteris tenuisecta*

(Blume) Tagawa, Act. Phytotax. Geobot. 7(2): 73, 1938.

*Aspidium tenuisectum* Blume, Enum. Pl. Javae 2: 170, 1828.

*Athyrium tenuisectum* (Blume) T.Moore, Index Fil. (Moore) 188, 1860.

*Cystopteris tenuisecta* (Blume) Mett., Ann. Mus. Bot. Lugd.-Bat. 1(8): 241, 1864. *Acystopteris tenuisecta* (Blume) Ching, Bull. Fan Mem. Inst. Biol. 11(2): 52, 1941. *Cornopteris tenuisecta* (Blume) Tardieu, Amer. Fern J. 48(1): 32, 1958.

Rhizome creeping, densely scaly scales light-brown, 0.2–0.6 cm long, 0.17–0.5 cm broad, ovate-lanceolate, entire; stipes 16–45 cm long, stramineous, scaly, scales as on rhizome, rachis stramineous, scaly; lamina tripinnate, 18–55 × 12–32 cm, deltate, herbaceous,





Image 5. *Belvisia henryi*



Image 7. *Acystopteris tenuisecta*



Image 6. Herbarium sheet of *Belvisia henryi*



Image 8. Herbarium sheet of *Acystopteris tenuisecta*

sparingly hairy; pinnae 10–20 pairs, 12–25 × 2–9 cm, triangular lanceolate; pinnules 9–20 pairs, 2–4 × 0.8–2 cm, lanceolate, asymmetrical, alternate, sub sessile or sessile; costae and costules stramineous, scaly and hairy, Sori indusiate.

Specimen examined: BSI, ERC 128164 (ASSAM), 15.i.2013, Near Bear lodge, Murlen National Park, Mizoram, India, 1,427m, coll. Sachin Sharma (Image 7 & 8).

Fertile period: November–April.

Threat status: Not evaluated in IUCN Red List.

Habitat: Grows along streams.

Distribution: India (Arunachal Pradesh, Darjeeling (West Bengal), Meghalaya, Mizoram (present record), Sikkim and Uttarakhand), Bhutan, China, Indonesia,

Japan, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Taiwan, Thailand, Tibet, and Vietnam.

## References

- Baishya, A.K. & R.R. Rao (1982). *Ferns and fern allies of Meghalaya State, India*. Scientific Publishers, Jodhpur, India, 161pp.
- Barbhuiya, H.A. & S.K. Singh (2013). New and noteworthy additions to the fern flora of Mizoram, India. *NeBIO* 4(1): 26–30.
- Benniamin, A. (2011). Studies on the genus *Dryopteris* Adans (Pteridophyta-Aspidiaceae Sensu. Lato) from Mizoram, north-east India. *Indian Journal of Forestry* 34: 345–352.
- Benniamin, A. (2012). The diversity of ferns and fern-allies of Murlen National Park, Mizoram, north east India. *Indian Fern Journal* 29: 1–12.
- Bir, S.S., S.M. Vasudeva & P. Kachroo (1989). Pteridophytic flora of North-Eastern India - I (Families: Huperziaceae-Sinopteridaceae). *Indian Fern Journal* 6: 30–55.
- Bir, S.S., S.M. Vasudeva & P. Kachroo (1990). Pteridophytic flora of North-Eastern India - IV (Families: Davalliaceae-Salviniaceae). *Indian Fern Journal* 7: 219–226.
- Bir, S.S., S.M. Vasudeva, P. Kachroo & Y. Singh (1991). Pteridophytic flora of North-Eastern India - V ecological, distributional and phytogeographic account. *Indian Fern Journal* 8: 98–139.
- Borthakur, S.K., P. Deka & K.K. Nath (2000). *Illustrated Manual of Ferns of Assam*. Bishen Singh Mahendra Pal Singh, Dehradun, 468pp.
- Chandra, P. & S. Chandra (1983). Contribution to the ferns of Mizoram. *Journal of the Bombay Natural History Society* 80: 461–465.
- Chandra, S., C.R. Fraser-Jenkins, A. Kumari & A. Srivastava (2008). A summary of the status of threatened pteridophytes of India. *Taiwania* 53(2): 170–209.
- Conservation International (2011). Hotspots. Arlington, VA: Conservation International, [http://www.conservation.org/where/priority\\_areas/hotspots/Pages/hotspots\\_main.aspx](http://www.conservation.org/where/priority_areas/hotspots/Pages/hotspots_main.aspx), accessed 8 June 2016.
- Deb, D.B. (1981). *The Flora of Tripura State* - Vol. 1. Today & Tomorrow's Printers and Publishers, New Delhi, 509pp.
- Deb, D.B. & R.M. Dutta (1987). A contribution to the flora of Mizoram. *Journal of Economic and Taxonomic Botany* 10: 21–61.
- Fischer, C.E.C. (1938). The flora of Lushai hills. *Records of the Botanical Survey of India* 12: 75–161.
- Gage, A.T. (1901). A botanical tour in the south Lushai Hills. *Records of the Botanical Survey of India* 1: 331–369.
- Jain, S.K. & R.R. Rao (1977). *A Handbook of Field and Herbarium Methods*. Today & Tomorrow's Printers & Publishers, New Delhi, India, 150pp.
- Jamir, N.S. & R.R. Rao (1988). *The Ferns of Nagaland*. Bishen Singh Mahendra Pal Singh Dehradun, 426pp.
- Kachroo, P., S.S. Bir & S.M. Vasudeva (1989). Pteridophytic flora of North-Eastern India - II (Families: Cryptogrammeaceae-Thelypteridaceae). *Indian Fern Journal* 6: 78–99.
- Kholia, B.S. (2010). *Ferns and Fern-allies of Sikkim, A Pictorial Handbook 1*. Department of Forest, Environment and Wildlife Management, Government of Sikkim, Gangtok and Botanical Survey of India, 207pp.
- Kholia, B.S. (2011). Pteridophytic wealth of Sikkim Himalaya, pp. 35–68. In: Arrawatia, M.L., & S. Tambe (eds.). *Biodiversity of Sikkim Ferns*. Sikkim Biodiversity Board, Gangtok.
- Kholia, B.S. (2014). *Ferns and Fern-allies of Sikkim, A Pictorial Handbook 2*. Department of Forest, Environment and Wildlife Management, Government of Sikkim, Gangtok and Botanical Survey of India, 291pp.
- Rao, R.R. (1994). *Biodiversity in India: Floristic Aspects*. Bishen Singh Mahendra Pal Singh, Dehradun, India, 371pp.
- Sharma, S., R. Kumar, S.K. Singh & H.A. Barbhuiya (2013). Four new additions to the pteridophytic flora of Mizoram. *NeBIO* 4(1): 10–13.
- Sharma, S., B. S. Kholia, R. Kumar & A. Kumar (2017). Pteridophytic diversity in human-inhabited buffer zone of Murlen National Park, Mizoram, India. *Check List* 13(2): 1–8; <http://doi.org/10.15560/13.2.2081>
- Singh, S. & G. Panigrahi (2005). *Ferns and fern allies of Arunachal Pradesh, Vol. 1 & II*. Bishen Singh Mahendra Pal Singh, Dehradun, India, 881pp.
- Vanlalpeka, R. & R. Laha (2014). Ferns of Aizawl District, Mizoram, India. *The Indian Forester* 140(11): 1114–1117.
- Vasudeva, S.M., S.S. Bir & P. Kachroo (1990). Pteridophytic flora of North-Eastern India - III (Families: Aspleniaceae-Oleandraceae). *Indian Fern Journal* 7: 66–85.
- Verma, D., S.K. Singh, B.S. Kholia, B.K. Sinha & S. Pandey (2014). Pteridophytes of Khawnglung Wildlife Sanctuary, Mizoram, India. *Indian Journal of Forestry* 37(2): 219–234.







## 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](http://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)

May 2018 | Vol. 10 | No. 6 | Pages: 11703–11830

Date of Publication: 26 May 2018 (Online & Print)

DOI: 10.11609/jott.2018.10.6.11703-11830

[www.threatenedtaxa.org](http://www.threatenedtaxa.org)

### Communications

#### Home range and spatial organization by the Hoary Fox *Lycalopex vetulus* (Mammalia: Carnivora: Canidae): response to social disruption of two neighboring pairs

-- Julio C. Dalponte, Herson S. Lima, Stuart Klorfine & Nelton C. da Luz, Pp. 11703–11709

#### People's attitude towards wild elephants, forest conservation and Human-Elephant conflict in Nilambur, southern Western Ghats of Kerala, India

-- C.K. Rohini, T. Aravindan, K.S. Anoop Das & P.A. Vinayan, Pp. 11710–11716

#### Analysis of regurgitated pellets of Spotted Owlet *Athene brama* (Temminck, 1821) (Aves: Strigiformes: Strigidae) from Punjab, India

-- Renuka Malhotra & Neena Singla, Pp. 11717–11724

#### Species diversity and abundance of birds on Bharathiar University Campus, Tamil Nadu, India

-- L. Arul Pragasam & M. Madesh, Pp. 11725–11731

#### On the taxonomy of the first record of rare deep-water rough shark species of Oxynotidae (Chondrichthyes: Squaliformes) in the western Indian Ocean

-- Sarah Viana & Mark W. Lisher, Pp. 11732–11742

#### Forest evergreenness and tree endemism in the central Western Ghats, southern India

-- Divakar K. Mesta & Ganesh R. Hegde, Pp. 11743–11752

#### Distribution of *Rhododendron falconeri* Hook. F. (Ericales: Ericaceae) in Yuksam-Dzongri trekking corridor of Khangchendzonga National Park, Sikkim, India

-- Aseesh Pandey & Hemant K. Badola, Pp. 11753–11759

### Peer Commentary

#### The characteristics, representativeness, function and conservation importance of tropical dry evergreen forest on India's Coromandel Coast

-- Mark Everard, Pp. 11760–11769

### Short Communications

#### Mugger Crocodile *Crocodylus palustris* Lesson, 1831 (Reptilia: Crocodylia: Crocodylidae) in river Saberi of Godavari system in southern Odisha, India: conservation implications

-- Subrat Debata, Swetashree Purohit, Anirban Mahata, Sudheer Kumar Jena & Sharat Kumar Palita, Pp. 11770–11774

#### A new record of the lesser-known butterfly Small Woodbrown *Lethe nicetella* de Nicéville, 1887 (Lepidoptera: Nymphalidae: Satyrinae) from Khangchendzonga National Park, Sikkim, India

-- Sailendra Dewan, Bhoj Kumar Acharya & Sudeep Ghatani, Pp. 11775–11779

### Partners



Member



Publisher & Host



### Early stages and larval host plants of some northeastern Indian butterflies

-- Tarun Karmakar, R. Nitin, Vivek Sarkar, Sarika Baidya, Subhajit Mazumder, V.K. Chandrasekharan, Rudraprasad Das, G.S. Girish Kumar, Swapnil Lokhande, Joyce Veino, Lightson Veino, Rakoveine Veino, Zeeshan Mirza, Rajesh V. Sanap, Bimal Sarkar & Krushnamegh Kunte, Pp. 11780–11799

### Inventory of teloganodid mayflies (Ephemeroptera: Teloganodidae) from southern India with records of endemic taxa

-- C. Selvakumar, K.G. Sivaramkrishnan, T. Kubendran & Kailash Chandra, Pp. 11800–11805

### Notes

#### Durga Das's Leaf-nosed Bat *Hipposideros durgadasi* Khajuria, 1970 (Mammalia: Chiroptera: Hipposideridae): a new distribution record in northern India hidden in the National Zoological Collections

-- M. Kamalakannan, Tauseef Hamid Dar & C. Venkatraman, Pp. 11806–11811

#### A new range record of noctuid moth *Owadaglaea elongata* (Lepidoptera: Noctuidae: Xyleninae) from India

-- P.R. Shashank & Balázs Benedek, Pp. 11812–11814

#### Natural history of Large Cabbage White *Pieris brassicae nepalensis* Gray, 1846 (Lepidoptera: Pieridae) on Nasturtium, *Tropaeolum majus* (Tropaeolaceae) in Uttarakhand, India

-- Bhawana Kapkoti Negi & Ravindra K. Joshi, Pp. 11815–11817

#### An account of the occurrence of Wedge Sea Hare *Dolabella auricularia* (Lightfoot, 1786) (Gastropoda: Aplysiidae) from Andaman Islands, India

-- Vikas Pandey, Ganesh Thiruchitrambalam, M. Savurirajan, Raj Kiran Lakra, Jawed Equbal, Kunal Satyam, P. Shanmukha Sainath & Rokkarukala Samson, Pp. 11818–11821

#### New pteridophytic records from Mizoram, northeastern India

-- Sachin Sharma, Amit Kumar, Bhupendra Singh Kholia & Surendra Singh Bargali, Pp. 11822–11826

#### Clarke's Morning Glory *Ipomoea clarkei* Hook.f. (Convolvulaceae): addition to the flora of Eastern Ghats

-- L. Rasingam, J. Swamy & M. Sankara Rao, Pp. 11827–11829

### Miscellaneous

National Biodiversity Authority