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Cover: Himalayan Gray Langur *Semnopithecus ajax* (adult female) © Rupali Thakur.



An overview of genus *Pteris* L. in northeastern India and new report of *Pteris amoena* Blume from Arunachal Pradesh, India

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Abstract: The present paper highlights a taxonomic account of genus *Pteris* L. (Pteridaceae E.D.M. Kirchn.) with newly reported species *Pteris amoena* Blume, which was collected from the Pange range of Tale Wildlife Sanctuary and Hapoli Primary Forest, Hapoli, Lower Subansiri District of Arunachal Pradesh. The present communication is based on plant exploration and in-depth surveys done by the first two authors and through scrutiny of herbaria and literature. All the species are enumerated in this list along with worldwide distribution (outside India), local distribution in Arunachal Pradesh, northeastern India as NEI included with other Indian states. Reported species shows some morphological closeness with *P. terminalis* Wall. ex. J. Agardh but differ in having bright pink axes and more rounded and crenately toothed segment-apices. All these characters differentiate to this species to its closely related species and testifying that *P. amoena* Blume as a new report to the Arunachal Pradesh. Detailed description, distributional range, ecology and specimen examined of newly reported taxa are provided in this paper.

Keywords: Brake fern, distributional range, ferns, local distribution, Lower Subansiri district, plant, taxonomy.

Editor: Anonymity requested.

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Author details: DR. V.K. RAWAT has working on Pteridophyte taxonomy for the last 20 years. During the period, he has been explored central India, Western Ghats and northeastern India. He has been discovered two new species and several new records for the country. At Present he is working as scientist 'E' at Botanical Survey of India, Arunachal Pradesh Regional Centre, Itanagar. DR. A. BENNIAMIN has working on Pteridophyte taxonomy for the last 19 years. During the period, he has been visited Western Ghats, northeastern India. He has been discovered six new species and several new records for the country. At Present he is working as Scientist 'E' at Botanical Survey of India, Western Regional Centre, Pune. SH. ABHINAV KUMAR is an Indian Forest Service officer of the Agmut cadre. He has worked in Arunachal Pradesh for over six years at the grassroots level in seven districts with various local tribal communities in furthering their cause. He has a keen interest in issues of climate change, biodiversity conservation and wildlife preservation and has publications in these fields. He is presently posted as additional secretary, Department of Environment at Government of NCT of Delhi. MR. ASHISH K. SONI pursuing his PhD under the able guidance of Dr. V. K. Rawat, from BSI, APRC, Itanagar. He has working on Pteridophyte taxonomy for the last four years. During the period, he has been explored western Arunachal Pradesh. He has been discovered five new records for the country and several new additions to the northeastern India. He is the life member of the Indian Fern Society. He has also worked in BSI- Central National Herbarium for one year in the NDF project- 2018 as junior project fellow. At Present he is working as senior research fellow at Botanical Survey of India, Arunachal Pradesh Regional Centre, Itanagar.

Author contributions: VKR, AB and AKS conducted field survey for the detailed study of this project and identified the specimens. AKS, AK and VKR have finalized and approved the manuscript.

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INTRODUCTION

Pteris L. is a large, pantropical genus represented in all continents except Antarctica, but only a few species occur in warm temperate regions of the world. This genus is commonly called “Brake” ferns. Molecular and paleontological analyses revealed that the genus *Pteris* L. originated and diversified in the Late Cretaceous with other pteridoid ferns about 100 million years ago (Schneider *et al.* 2004) but Walker (1956) considered *Pteris* L. as a young genus. It grows in shaded places, from sea level to high mountains, less often in open places, road sides, earth cuttings, and on calcareous & other rock crevices (Tryon *et al.* 1990). Usually, different species of genus *Pteris* L. are used as ornamental plant e.g., *P. vittata* L., *P. ensiformis* Burm.f., and *P. cretica* L. in homes and gardens, while some of the species are widely used as heavy metal accumulators. Of these, *P. vittata* L. is considered as an excellent model organism in experimental plant biology. The majority of the species are grouped into a number of complexes of various sizes and these complexes show very different biological behaviors, according to whether they are predominantly apogamous or a mixture of apogamous and sexual species (Walker 1962). The members of this family are usually characterized by the absence of true indusia, the protective covering layer of sporangia, though some genera frequently develop recurved leaf margins to serve the same function. These structural modifications in the leaves are referred to as ‘false-indusia’ or ‘pseudo-indusia’. The other identifying characters of the family are free leaf veins, linear, sub-marginal sori and usually trilete to rarely monolete spore (Soni *et al.* 2020). It is estimated to contain 200–280 species (Copeland 1947), 300 species (Walker 1956), 250 species (Holttum 1968; Tryon *et al.* 1990), 200 species (Tryon & Tryon 1982), in the world. Of these, 57 species are present in India (Fraser-Jenkins *et al.* 2016) though Dixit (1984) had reported 48 species. Most of the *Pteris* L. species are present in the Western Ghats and Indian Himalayan Region (IHR) of India. But according to the Fraser-Jenkins *et al.* (2016) there are 50 taxa followed by 12 ssp. including one hybrid species (*P. vittata* notho ssp. × *nayariana* Fraser-Jenk., S.C.Verma & Khullar) and one cultivated species (*P. parkeri* hort. ex J.J.Parker) of genus *Pteris* L. in northeastern India. Of these 42 species of genus *Pteris* L. are from Arunachal Pradesh except the newly reported species *P. amoena* Blume. So, as per this datum Arunachal Pradesh also has the most number of species of the depicted genus and is the dominant zone for pterido-diversity and richness of India.

The pterido-geographical region of India deals with Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura, the seven states located in the northeastern part of the country and command special importance in India, not only because of their location but also their cultural and historical uniqueness. All these states of northeastern India have rich natural resources of flora. Therefore, if the region is called a paradise for botanists, there is no doubt.

The present paper deals with all species of genus *Pteris* L. of northeastern India with newly reported taxa to Arunachal Pradesh and are presented here, based on personal collection (field surveys) of the first two authors, herbarium consultation, literature scrutiny such as Fraser-Jenkins *et al.* (2008, 2016) and provides an enumerative checklist of the most puzzled genus of Pteridaceae for northeastern India in Table No. 01.

MATERIAL & METHODS

Field survey and collection

In the case of the newly reported species *P. amoena* Blume, while studying taxonomy of Pteridophytes of Lower Subansiri District of Arunachal Pradesh, the first authors came across a new specimen, which was collected from the Pange range of the Tale Wildlife Sanctuary and Hapoli primary forest of Arunachal Pradesh. The newly reported taxa was recognized by its smooth, reddish stipe and lower rachis, black costae and upper rachis; pinnule-apices crenately toothed, acute, not aristate; on critical evaluation and perusal of literatures, the authors identified and confirmed it as *P. amoena* Blume. So far this species was previously reported from the neighboring states of NEI (northeastern India; Assam, Manipur, and Meghalaya) but there was no report from this state till date, so this communication testifies a new Pteridophytic record of *P. amoena* Blume from Arunachal Pradesh. All the specimens collected from the research site are deposited in the herbarium and provisional identification was made with the help of available literature and later determined in various Herbaria (ARUN, ASSAM, CAL, and BSA). The depicted list provided for species of genus *Pteris* L. in northeastern India are based on voucher specimens, which are deposited in the Herbarium ARUN, Botanical Survey of India, Arunachal Pradesh Regional Centre, Itanagar, Arunachal Pradesh. Description and mentioned photo plates with relevant notes of newly reported taxa are provided here for easy identification and future collection.

SYSTEMATIC TREATMENT

Pteris amoena Blume, Enum. PL Javae 2: 210. 1828. (Image 1)

Type: from Indonesia, Java, boven Tjibodas, C.L. von Blume, L.

Pteris purpureorachis Cope L, Philipp. J. Sci., C, 12: 48. 1917., *Pteris maclurei* Ching, Bull. Dept. Biol. Sun Yatsen Univ. 6: 28. 1933., *Pteris tokioi* Masam., Trans. Nat. Hist. Soc. Taiwan 25: 13. 1935., *Pteris porphyrophlebia* C.Chr. & Ching, in Ching, Lingnan Sci. J. 15(3): 393. 1936., *Pteris nakasimae* Tagawa, Act. Phytotax. Geobot. 7: 84. 1938., *Pteris yakusimensis* Tagawa, Act. Phytotax. Geobot. 5: 107. 1936., *Pteris tokioivar. Yakusimensis* (Tagawa) Sa.Kurata, Hokuriku J. Bot. 6: 10. 1957.

Adults terrestrial, about 70–90 cm tall; Rhizome stout, erect, ca. 1–2 cm in diam., tufted, bearing fronds close together, Rhizome scale basifixed, dark brown, ca. 03–04 mm, sparsely scaly, scales hair like, 2–3 cells widest base, above uni-seriate. Fronds ca. up to 90 × 20 cm, ovate in shape; Stipes ca. 40–50 cm long, 2–3 mm thick, laterally grooved, not adaxially and abaxially, dark blackish at base to shiny brown upwards, glossy; Rachis similar but too much thin compared to stipes; Lamina ca. 35–40 cm; ovate-oblong, bipinnatifid, texture chartaceous; Pinnae up to 4–6 pairs, opposite, sometimes 2-pinnatifid, lateral pinnae shortly stalked, upper pinnae sessile, lanceolate, base rounded-cuneate, apex acute, caudate (ca. 05–07) cm, ca. 20 × 05 cm; terminal pinna similar to lateral pinnae but wider with long stalked (ca. 02 cm), ca. 22 × 07 cm; basal pair of pinnae well developed often with a basisopic pinnule near base, similar in shape to main part of pinna but smaller, ca. 15 × 04 cm; Pinnules ca. 20 pairs in each pinnae, alternate, ca. 02 × 04 mm apart, sinuses wide and U shaped, margins serrulate, apex obtuse or mucronate, basal pinnules of pinnae slightly shorter and more widely spaced, basally decrescent to costules; Costae and Costules adaxially straw-colored, grooved, with spines along groove and bases of midribs; abaxially sorrel-red, shiny, glabrous, prominent abaxially; Veins conspicuous, oblique, apical pairs of veins simple, remainder bi-forked, basal basisopic arising from costae and reached just below the sinus but not connected, others arising from veinlets, areoles present between the costae; Venation free; Sori indusiate, cup shaped, dark brown, confined to the terminals on 1 or 2 venation, solitary at the apex of each segment; Indusia indusium membranaceous, entire from base of segments upward to about one-third from the serrate apex. Spores monolete, exine smooth (Image 1).

Distribution: China, India (Assam State, Manipur, Meghalaya (Mawryngkaeng, X Rup Chand, MICH) Indonesia, Japan, Malaysia, Myanmar, Taiwan, Thailand, Tibet, Vietnam; Australasia: New Guinea. (Fraser-Jenkins et al. 2016).

Distribution in Arunachal Pradesh: New report from Tale Wildlife Sanctuary and Hapoli Primary Forest, Lower Subansiri district, Arunachal Pradesh (Figure 1).

Phenology: Vegetative phase: June–September; Reproductive phase: October–December

Ecology: Terrestrial collected from wild floor of Hapoli Primary Forest, Hapoli and Tale Wildlife Sanctuary, Lower Subansiri District of Arunachal Pradesh 1,625–1,959 m.

Specimens examined: 42833, Acc no., 31689 (ARUN), 11.i.2020, Hapoli Primary Forest, at the back of Arunachal Guest House, Lower Subansiri District, Arunachal Pradesh, India, 27.536 N. 93.809 E, 1,625 m, Soni A.K. (Image 1, Figure 1); 43969, Acc. No., 31690, 31691 & 31692 (ARUN), 16.ii.2021, Pange Range, Tale Wildlife Sanctuary, Lower Subansiri District, Arunachal Pradesh, India, 27.587 N. 93.985 E, 1,959 m, 16.ii.2021, Soni A.K. (Image 1, Figure 1).

IUCN Status: CR.

RSEULT AND DISCUSSION

The Pteridaceae E.D.M.Kirchn. is a large and diverse family of nearly worldwide distribution with around 50 genera and more than 1,000 species, and roughly 10% of the extant lepto-sporangiate fern diversity (Schuettpelez et al. 2007). In northeastern India, it is represented by 14 genera with a total of 93 species and 14 subspecies from this region. Of these, the most dominant, critical and puzzled genus *Pteris* L. (Pteridaceae) has 50 taxa followed by 12 ssp. including one hybrid and one cultivated species also (Soni et al. 2020). The bar chart (Figure 3) and distributional map of northeastern India (Figure 2) showing the state-wise status, including species, subspecies, hybrid and cultivated taxa of genus *Pteris* L. of northeastern India and depicted table also prove that Arunachal Pradesh has the most diverse status of the mentioned genus in northeastern India including 42 taxa (11 subspecies); Assam follows with 19 species, seven subspecies and one cultivar taxa; Manipur is in third position in this list, which has 27 (seven subspecies) taxa. Meghalaya follows with 32 taxa of this genus (nine subspecies and one hybrid species); Mizoram (15 taxa including four subspecies) and Nagaland has 18 taxa with seven subspecies. Following the above listing, we can say that the state Tripura with



Image 1. *Pteris amoena* Blume A—Whole plant | B—Habitat with basal pinnae | C—Abaxial surface of lamina showing sori | D—Pinnae showing venation | E—Rhizome | F—Pinnules showing margin | G—Apex of Pinnae | H—Mounted desiccated specimens. © Ashish K. Soni.

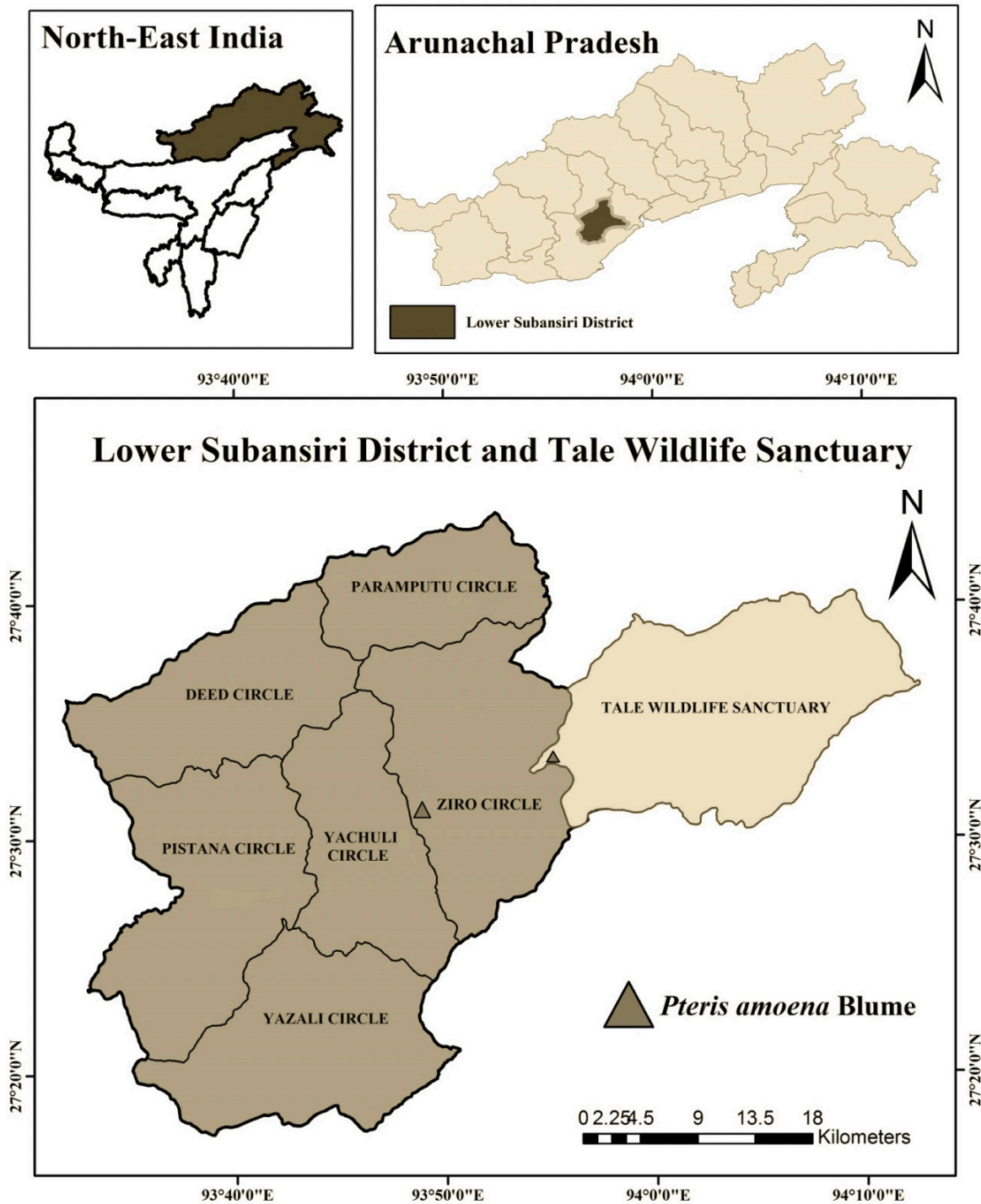


Figure 1. Representative map showing northeastern India including with localities in Lower Subansiri District of Arunachal Pradesh where *Pterisa moena* Blume were reported.

four sub species has the lowest number, 11 taxa, for the genus *Pteris* L. in northeastern India. The detailed listing of all species of genus *Pteris* L. of northeastern India on worldwide distribution pattern with localities in Arunachal Pradesh presented here are totally based on the personal collection of the first two authors

and another collector, Mr. Chhandam Chanda (Senior researcher at BSI, APRC, Itanagar), followed by the actual specimens of herbariums consultation personally, ARUN, ASSAM, CAL and BSA also. The collected plants were preserved following Bridson & Forman, (1998) and subsequently identified with the help of standard Indian

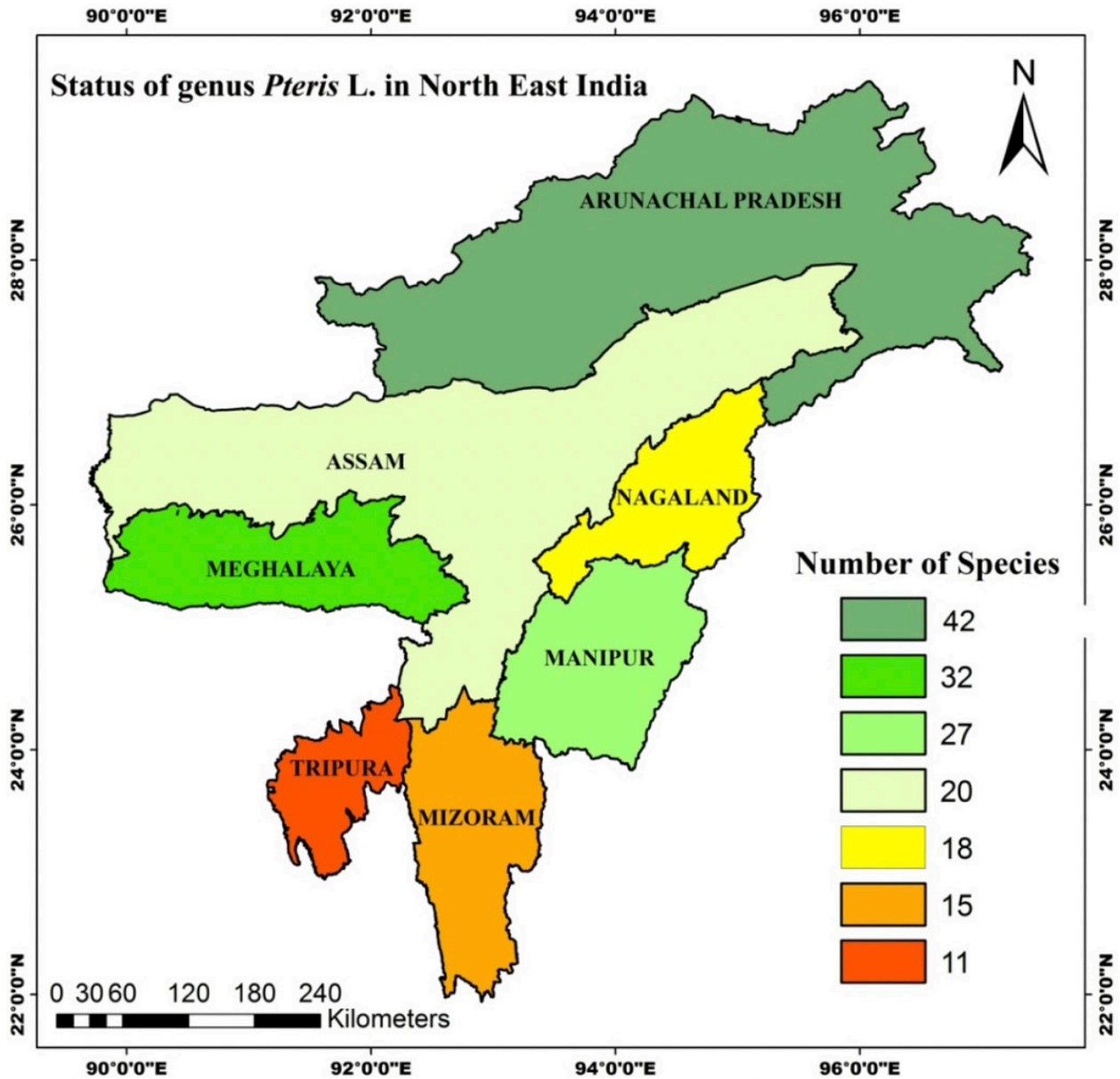


Figure 3. Representative map showing state-wise status of genus *Pteris* L. in northeastern India.

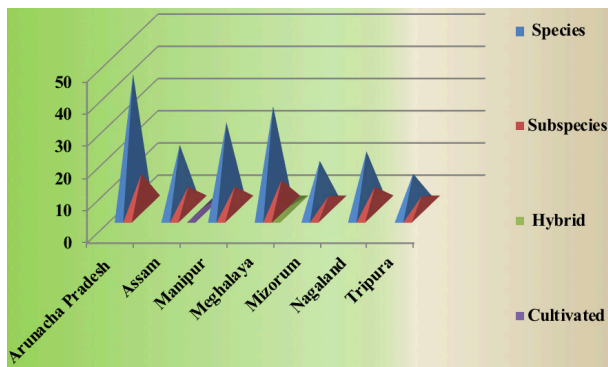


Figure 2. Statewise status of genus *Pteris* L. in northeastern India.

and foreign literature (Beddome 1866; Lyell 1870; Jamir & Rao 1988; Borthakur et al. 2001; Ghosh et al. 2004; Singh & Panigrahi 2005; Gangmin et al. 2013; Fraser-Jenkins et al. 2016) (Table 1).

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Table 1. List of species of *Pteris* L. from northeastern India with worldwide distribution and localities in Arunachal Pradesh, India.

	Taxa of genus <i>Pteris</i> L. in northeastern India	Distribution of genus <i>Pteris</i> L. in NEI with locality in Arunachal Pradesh	Worldwide distribution of genus <i>Pteris</i> L.
1	<i>Pteris actinopteroides</i> Christ	Arunachal Pradesh (Lower and Upper Dibang) and Meghalaya.	Asia: China.
2	<i>Pteris alata</i> L.	Arunachal Pradesh (Changlang, Kameng, Lohit, Papum Pare, Siang, Lower Subansiri District and Tirap), Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura.	Asia: Bangladesh, Bhutan, China, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Sri Lanka, Taiwan, Thailand and Vietnam.
3	<i>Pteris amoena</i> Blume	Arunachal Pradesh (First time reported from Tale Wildlife Sanctuary and Hapoli Primary Forest of Lower Subansiri District), Assam, Manipur and Meghalaya.	Asia: China, Myanmar, Taiwan, Tibet and Vietnam.
4	<i>Pteris arisanensis</i> Tagawa	Arunachal Pradesh (Changlang, Debang Valley, Kameng, Lohit, Papum Pare, Siang, Lower Subansiri District and Tirap), Manipur, Meghalaya and Nagaland.	Elsewhere in India and Asia.
5	<i>Pteris aspericaulis</i> Wall. ex J.Agardh	Arunachal Pradesh (Debang Valley, Kameng, Lohit, Lower Subansiri District, Siang and Tawang), Manipur and Meghalaya.	Elsewhere in Western Himalaya and Asia.
6	<i>Pteris assamica</i> Fraser-Jenk. & T.G.Walker	Arunachal Pradesh (Kameng, Lower Subansiri District and Papum Pare), Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura.	Elsewhere in Asia.
7	<i>Pteris barbigera</i> Ching	Arunachal Pradesh	Asia: Vietnam.
8	<i>Pteris biaurita</i> L. ssp. <i>fornicata</i> Fraser-Jenk.	Arunachal Pradesh (Changlang, Kameng, Lohit, Lower Subansiri and Papum Pare), Assam, Manipur, Meghalaya, Mizoram Nagaland and Tripura.	Elsewhere in India; Asia and Africa.
9	<i>Pteris biaurita</i> L. ssp. <i>walkeriana</i> Fraser-Jenk. & Dom. Rajkumar	Arunachal Pradesh (Changlang, Debang Valley, Itanagar, Kameng, Lohit, Namdapha, Papum Pare, Siang, Lower Subansiri District, Tirap, Upper Siang, and West Kameng), Assam, Manipur, Meghalaya, Mizoram and Nagaland.	Elsewhere in India; Asia and Africa.
10	<i>Pteris blumeana</i> J.Agardh	Arunachal Pradesh (Papum Pare and Siang), Assam, Manipur, Meghalaya and Tripura.	Elsewhere in India and Asia.
11	<i>Pteris cadieri</i> Christ ssp. <i>dimorpha</i> (Copel.) Fraser-Jenk.	Arunachal Pradesh (Changlang)	Asia: Bangladesh, China, Taiwan and Vietnam.
12	<i>Pteris cadieri</i> Christ ssp. <i>walker</i> Fraser-Jenk.	Assam, Manipur and Meghalaya.	China
13	<i>Pteris cretica</i> L. ssp. <i>cretica</i> .	Arunachal Pradesh (Kameng, Lohit, Siang and Lower Subansiri District), Meghalaya, Nagaland and Tripura.	Asia: Bhutan, China, Myanmar, Nepal, Pakistan, Sri Lanka, Taiwan, Thailand and Tibet.
14	<i>Pteris cretica</i> L. ssp. <i>laeta</i> (Wall. ex Ettingsh.) Fraser-Jenkins	Arunachal Pradesh (Changlang, Debang Valley, Kameng, Siang, Lower Subansiri District and Tirap), Assam, Manipur, Meghalaya, Nagaland and Tripura.	Elsewhere in India; Asia and Africa.
15	<i>Pteris dactylina</i> Hook.	Arunachal Pradesh (Debang Valley, Kameng and Siang).	Asia: Bhutan, China, Myanmar, Nepal, Taiwan and Tibet.
16	<i>Pteris dixitii</i> Fraser-Jenk. & Pariyar	Arunachal Pradesh (Debang Valley, Lohit, Lower Subansiri District, Papum Pare and Siang), Manipur, Meghalaya, Mizoram, Nagaland and Tripura.	China and Myanmar.
17	<i>Pteris ensiformis</i> Burm.f.	Arunachal Pradesh (Changlang, Kameng, Papum Pare, Lower Subansiri District and Tirap), Assam, Manipur, Mizoram, Meghalaya, Nagaland and Tripura.	Elsewhere in India and Asia, Australasia, Pacific Islands, North America.
18	<i>Pteris grevilleana</i> Wall. ex J.Agardh ssp. <i>grevilleana</i>	Arunachal Pradesh (Changlang), Assam and Meghalaya.	Asia: Bangladesh, China, Myanmar, Singapore, Taiwan, Thailand and Vietnam.
19	<i>Pteris griffithii</i> Hook.	Arunachal Pradesh (Kameng, Siang and Lower Subansiri District).	Asia: Bhutan and Myanmar
20	<i>Pteris hirtula</i> (C.Chr.) C.V.Morton	Arunachal Pradesh (Changlang, Papum Pare, Siang and Upper Subansiri District) and Manipur.	Asia: Bhutan, China, Myanmar, Tibet and Vietnam
21	<i>Pteris inaequalis</i> Baker	Arunachal Pradesh (Kameng, Lower Subansiri District) and Manipur.	Asia: China, Japan and Nepal.
22	<i>Pteris kathmanduensis</i> Fraser-Jenk. & T.G.Walker	Arunachal Pradesh (Papum Pare and Lower Subansiri District) and Meghalaya.	Asia: China and Nepal.
23	<i>Pteris khasiana</i> (C.B.Clarke) Hieron. ssp. <i>khasiana</i>	Arunachal Pradesh (Kameng, Papum Pare, Siang and Tirap), Assam, Manipur, Meghalaya and Nagaland.	Asia: Bangladesh, Bhutan, China, Myanmar and Nepal.

	Taxa of genus <i>Pteris</i> L. in northeastern India	Distribution of genus <i>Pteris</i> L. in NEI with locality in Arunachal Pradesh	Worldwide distribution of genus <i>Pteris</i> L.
24	<i>Pteris longipinnula</i> Wall. ex J. Agardh	Arunachal Pradesh (Changlang, Papum Pare and Tirap), Assam, Manipur, Meghalaya, Mizoram and Nagaland.	Asia: Bangladesh, China, Myanmar and Nepal
25	<i>Pteris mawmaiensis</i> Fraser-Jenk. & Benniamin	Arunachal Pradesh (Siang) and Meghalaya.	Asia: Myanmar.
26	<i>Pteris medogensis</i> Ching & S.K.Wu	Arunachal Pradesh (Lower Subansiri District) and Meghalaya.	Asia: Bhutan, China, Nepal and Tibet.
27	<i>Pteris normalis</i> D. Don	Arunachal Pradesh (Kameng, Lohit, Siang, Lower Subansiri District and Tirap), Manipur, Meghalaya, Mizoram and Nagaland.	Asia: Bhutan, China, Myanmar, Nepal, Taiwan, Thailand and Tibet.
28	* <i>Pteris parkeri</i> hort. ex J.J. Parker	Assam	Asia: Nepal. Commonly worldwide cultivated taxa.
29	<i>Pteris pellucens</i> J. Agardh	Arunachal Pradesh (Debang Valley, Kameng, Lohit, Siang and Upper Subansiri District), Assam, Manipur, Meghalaya and Nagaland.	Asia: Bhutan, China, Indonesia, Nepal, Philippines, Sri Lanka, Taiwan, Thailand and Vietnam.
30	<i>Pteris pseudopellucida</i> Ching	Arunachal Pradesh (Changlang, Papum Pare, Siang and Tirap), Manipur, Meghalaya and Mizoram.	Asia: Bangladesh, China, Laos, Myanmar, Thailand and Vietnam.
31	<i>Pteris puberula</i> Ching	Arunachal Pradesh (Kameng and Siang), Manipur, Meghalaya and Mizoram.	Asia: Bhutan, China, Myanmar, Nepal, Thailand and Tibet.
32	<i>Pteris roseoilacina</i> Hieron.	Meghalaya and Mizoram.	Asia: China, Myanmar and Nepal.
33	<i>Pteris scabripes</i> Wall. ex J. Agardh.	Assam and Meghalaya.	Asia: Indonesia, Malaysia, Myanmar and Thailand.
34	<i>Pteris scabrigrans</i> Fraser-Jenk., S.C. Verma & T.G. Walker	Arunachal Pradesh (Debang Valley, Kameng and Siang), Meghalaya, Manipur and Nagaland.	Asia: Bhutan, Nepal and Tibet.
35	<i>Pteris spinescens</i> C. Presl	Arunachal Pradesh (Debang Valley, Kameng and Lower Subansiri District), Manipur, Meghalaya and Nagaland.	Asia: Bhutan, China, Japan, Myanmar, Nepal and Tibet.
36	<i>Pteris subindivisa</i> C.B. Clarke	Arunachal Pradesh (Debang Valley, Kameng, Lower Subansiri District, Papum Pare, Siang and Subansiri), Assam and Mizoram.	Asia: Bhutan, China, Myanmar and Nepal.
37	<i>Pteris subquinata</i> Wall. Ex J. Agardh	Arunachal Pradesh (Kameng).	Asia: Bhutan, China, Myanmar, Nepal and Thailand.
38	<i>Pteris taiwanensis</i> Ching	Arunachal Pradesh (Kurung-kumey and Lower Subansiri District).	Asia: Bhutan, China, Nepal and Taiwan.
39	<i>Pteris terminalis</i> Wall. ex J. Agardh	Arunachal Pradesh (Kameng, Lower Subansiri District and Siang) and Manipur.	Asia: Bhutan, China, Indonesia, Myanmar, Nepal, Pakistan, Philippines, Taiwan, Tibet and Vietnam.
40	<i>Pteris tricolor</i> Linden	Manipur and Mizoram.	Asia: China and Myanmar.
41	<i>Pteris tripartita</i> Sw.	Arunachal Pradesh (Siang).	Asia: China, Indonesia, Malaysia, Philippines, Sri Lanka, Taiwan, Thailand and Vietnam.
42	<i>Pteris venulosa</i> Blume	Manipur, Mizoram and Tripura.	Asia: Indonesia and Malaysia.
43	<i>Pteris venusta</i> Kunze, ssp. <i>matsudae</i> (Masam.)	Arunachal Pradesh (Changlang and Siang), Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura.	Asia: Bangladesh, Bhutan, Cambodia, China, Laos, Myanmar, Nepal, Taiwan, Thailand, and Vietnam.
44	<i>Pteris vittata</i> L. ssp. <i>vittata</i>	Arunachal Pradesh (Changlang, Debang Valley, Kameng, Papum Pare, Siang and Lower Subansiri District), Assam Manipur, Meghalaya, Mizoram, Nagaland and Tripura.	Asia: Bangladesh, Bhutan, China, Nepal, Pakistan, Sri Lanka, Taiwan, Thailand and Vietnam.
45	<i>Pteris vittata</i> ssp. <i>emodi</i> Fraser-Jenk.	Arunachal Pradesh (Changlang, Lohit, Siang and Subansiri) and Meghalaya.	Asia: Bhutan, China, Myanmar, Nepal, Pakistan and Tibet.
46	<i>Pteris vittata</i> L. ssp. <i>vermae</i> Fraser-Jenk.	Arunachal Pradesh (Kameng, Papum Pare, Subansiri and Siang).	Asia: Bhutan, China, Nepal and Tibet.
47	<i>Pteris wallichiana</i> J. Agardh	Arunachal Pradesh (Debang Valley, Kameng, Tirap, Siang, Lower Subansiri District and Papum Pare), Assam, Manipur and Nagaland.	Asia: Bhutan, China, Indonesia, Myanmar, Nepal, Philippines, Taiwan, Thailand, Tibet and Vietnam.
48	* <i>P. vittata</i> nothosubsp. \times <i>nayariana</i> Fraser-Jenk., S.C. Verma & Khullar	Meghalaya	Asia: only reported from India.

*—cultivated taxon | #—hybrid taxon.

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