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Notes on diversity and distribution of genera *Pteris* Linn. and *Pteridium* Gleditsch ex Scopoli in Odisha

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ABSTRACT

Three species of *Pteris* and one species of *Pteridium* Gleditsch ex Scopoli are reported as new distributional records for Odisha state from Similpal Biosphere Reserve. Correct botanical name, diagnostic features, phenology and ecology of each species has been provided.

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The taxonomic study of pteridophytes of Odisha has not been given due attention and no comprehensive account is yet available. However, Haines (1924), Mooney (1950), Datta *et al.* (1985), Saxena and Brahmam (1994-96) and Panigrahi (1998) have reported occurrence of some ferns and fern allies of different parts of the state. A comprehensive account of the ferns of Koraput district was provided by Das *et al.* (1989). Biswal *et al.* (2011) and Sahu *et al.* (2013) reported the occurrence of two additional species from within the geographical boundary of Odisha.

The authors conducted intensive field work for about five years in the Similpal Biosphere Reserve and reported the occurrence of as many as 99 taxa belonging to 31 fern families. Out of which, three species of *Pteris* (Pteridaceae) and one taxon namely *Pteridium revolutum* (Bl.) Nakai (Dennstaedtiaceae) turned out to be new distributional records for the state of Odisha.

Genus *Pteris* is a large and complex genus containing many apomictic and allopolyploidy taxon, but the

identification has never been a problem as the diagnostic characters are constant and not too difficult to recognize. The usual features like stipe-base scale-characters are not very diagnostic in this case. Though many infra-generic categories have been described under the genus, Fraser-Jenkins (2015) considered such separations are meaningless based on the latest findings. The genus *Pteris* is represented by about 250 species, mainly distributed in tropical and sub-tropical regions of the world. In Odisha, Saxena and Brahmam (1994-96) reported seven species of Pteridaceae from the state, while, Panigrahi (1998) mentioned about the occurrence of eight species of *Pteris* from the state. During the present study, eight species of *Pteris* have been collected from Similpal alone. Three taxa namely *Pteris arisanensis* Tagawa, *P. ensiformis* Burm. f. and *P. longipes* D. Don turned out to be new distributional records for Odisha.

Since these taxa are new to the state flora, correct botanical name with author citation, brief descriptions etc. are provided below. A taxonomic account of genus *Pteris* as reported by various workers from Odisha is given in Table 1.

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1. *Pteris arisanensis* Tagawa, Acta Phytotax. Geobot. 5: 102. 1936.

Plants 1-1.5 m tall. Rhizome erect, short, 1.5-2 cm in diam., apex with black-brown scales. Fronds clustered (6-8 per plant); stipe basally brown, upper part straw-colored, slightly lustrous, as long as fronds, 3-4 mm in diam., glabrous; lamina 2- or 3-pinnatipartite, oblong-ovate in outline, 50-70 × 20-30 cm; lateral pinnae 5-15 pairs, opposite, slightly decumbent, sessile or basal pairs shortly stalked, lanceolate, 15-25 (-33) × 3-4 (-5.5) cm, base rounded-cuneate and slightly oblique, deeply pectinately divided to winged costa, apex long caudate; basal pair of pinnae often each with basispic pinnule similar to main part of pinnae but smaller; segments 25-35 pairs, alternate, subspreading or oblique, falcate-oblong, 20-30 × 5-8 mm, base slightly enlarged, margins entire, apex obtuse or mucronate; terminal pinna similar to lateral pinnae; costae with 6-10 mm wide wings, prominent abaxially, straw-colored, glabrous, grooved adaxially, with spines; veins conspicuous and convex on both sides, decumbent, 2-forked at base, basispic vein of segment base arising from rachis, and acrosopic vein from base of costa, 2 opposite veins of pinna base arriving at margin of incision and forming a fork or triangle, or sometimes interlinked into a continuous triangular mesh, and other veins outward from mesh separate and extending to base of incision; lamina green, yellowish green, or brown-green, sub-leathery when dried, glabrous.

Specimens examined: RRLB-12641, NCR & AKB, 30.04.2011. Bhanjabasa, Similipal

Ecology: In dense forests, among rock boulders in accumulated humus rich soil near streams; 100-1800 m.

Fertile: March- October.

Note: This species is very close to diploid apomictic species of *P. confusa* described from South India and Sri Lanka (misreported from Arunachal Pradesh by Singh & Panigrahi, 2005), but the range of variations of *P. confusa* includes large deltate fronds with long pinna-lobes, which do not occur in large plants of *P. arisanensis*, hence both the taxa are not conspecific.

2. *Pteris ensiformis* Burm.f., Fl. Ind. 230. 1768.

Plants 30-50 cm tall. Rhizome ascending or prostrate, slender, 4-5 mm in diam., apex with black-brown scales. Fronds dense, dimorphic; sterile fronds 1.5-2(-3) cm apart, shorter than fertile fronds; stipe and rachis straw-colored, slightly lustrous, stipe 10-30 cm (stipes of sterile fronds shorter), 1.5-2 mm in diam., glabrescent; lamina oblong-ovate, 10-25 × 5-15 cm, pinnate to bipinnate; pinnae 2-6

pairs, opposite, slightly decumbent, upper ones sessile, lower pairs shortly stalked; sterile fronds often pinnate, triangular in outline, 2.5-3.5(-8) × 1.5-2.5(-8) cm, acuminate; pinnules (1 or)2 or 3 pairs, opposite, contiguous, sessile, decumbent, oblong-oblancoolate to broadly lanceolate, basally decurrent and entire, upward and apices with acute teeth, apex obtuse; pinnae of fertile fronds distant (basal pairs 5-7 cm apart), 1-3-forked, middle fork longest, apical pinnae not decurrent at base, basal two pairs sometimes pinnate; pinnules 2 or 3(or 4) pairs, decumbent, narrowly linear, basally decurrent, margins entire except at apices, sterile parts with dense teeth, apically acuminate; midvein straw-colored, adaxially prominent; veins dense, often forked; lamina gray-green to brown-green, sometimes with nearly white bands along each side of mid-vein, herbaceous when dried, glabrous.

Specimens examined: NOU-475, AKB, 16.06.2007, Upper Barakamda; RRLB-12618. NCR & AKB.

Ecology: Wet acidic soils beneath forests, stream sides; 100-1000 m.

Fertile: May –Feb.

Note: The varieties described under the species show range of variation and subsequently nested in one species i.e. *P. ensiformis*. A white variegated species found in the wild are cultivated in many countries and should not create any taxonomic confusion.

3. *Pteris longipes* D. Don, Prodr. Fl. Nepal. 15. 1825.

Plants 1.2-1.5 m tall. Rhizome erect, short, 1.5-2 cm in diam., woody, apex with dark brown scales. Fronds clustered; stipe dark straw-colored to light brown, slightly lustrous, 70-80 cm, 6-8 mm in diam., firm, glabrous; lamina 3-pinnatipartite, triangular-ovate in outline, 60-70 × 35-45 cm; lateral pinnae 12-20 pairs, subopposite or alternate, oblique, sessile, lanceolate, 10-12 × 1.5-2 cm, base truncate, pectinately divided nearly to costae, apex caudate (2-3 cm), with linear lobes; segments 25-28 pairs, alternate, interlinked and slightly decumbent, oblong, ca. 10 × 3-4 mm, base slightly enlarged, apex obtuse and crenate; apical pinnule same as middle lateral ones, stalked (ca. 1 cm); costae prominent abaxially, straw-colored, glabrous, slightly grooved adaxially, with needle like spines on both sides; veins conspicuous on both surfaces, oblique, 2-forked at base, and opposite two veins oblique up to margin of incision; lamina pale green to green-brown, herbaceous when dried, glabrous.

Specimens examined: RRLB- 12666, NCR& AKB, 30.04.2011. Upper Barakamda.

Table 1
Reports on occurrence of *Pteris* species in Odisha by various workers

Odisha (Saxena & Brahmam,1996)	Odisha (Panigrahi,1998)	Similipal (Present study)
<i>Pteris biaurita</i>	<i>P. biaurita</i>	<i>P. arisanensis</i> *
<i>P. cretica</i>	<i>P. cretica</i>	<i>P. biaurita</i>
<i>P. heteromorpha</i>	<i>P. heteromorpha</i>	<i>P. cretica</i>
<i>P. nemoralis</i>	<i>P. linearis</i>	<i>P. ensiformis</i> *
<i>P. pellucida</i>	<i>P. nemoralis</i>	<i>P. longipes</i> *
<i>P. quadriaurita</i>	<i>P. quadriaurita</i>	<i>P. pellucida</i>
<i>P. vittata</i>	<i>P. venusta</i>	<i>P. quadriaurita</i>
	<i>P. vittata</i>	<i>P. vittata</i>

* New records for Odisha

Ecology: Occasional in moist-deciduous forests as undergrowth.

Fertile: March-October.

Genus *Pteridium* has long been treated as a dubious one. All taxa reported earlier were placed under single species prior to the study by Tryon (1941), who attempted to solve the taxonomy of the genus. Subsequently, the taxonomy of the genus as occurring in South Asia and Europe was worked out by Fraser-Jenkins (1992, 1997 and 2008). By and large, the genus requires a great deal of taxonomic research. *P.aquilinum* was the sole representative of the genus in the state till date but the present work adds one more species namely, *P. revolutum* to it.

Pteridium revolutum (Bl.) Nakai, Bot. Mag.(Tokyo) 39: 109.1925; Chandra, Ferns of India (Enumeration, Synonyms & Distribution). 1-459. 2008. *Pteris revoluta* Bl. Enum. Pl. Java 214. 1828.

Plants up to 1 m tall. Rhizome long creeping. Fronds subleathery when dried, margins often revolute; stipe straw-colored or brown, 35-50 cm, 5-8 mm in diam. at base, adaxially grooved, densely clothed with pallid hairs when young, glabrous when old; lamina 3-pinnate-pinnatifid, broadly triangular or ovate-triangular in outline, 30-80 × 30-50 cm, apex acuminate; pinnae 4-6 pairs, opposite, decumbent, oblong, base subtruncate, stalked (2-3 cm), apex acuminate; basal pinnae 2-pinnate-pinnatifid, slightly triangular, 20-30 × 10-15 cm, stalked (2-3 cm); pinnules to 12-18 pairs per pinna, opposite or alternate, spreading, sessile, lanceolate, 6-8 × 1-1.5 cm, base truncate, not adnate to costule, deeply pinnate, apex shortly caudate-acuminate; ultimate pinnules ca. 20 pairs per pinna, opposite or alternate, slightly obliquely spreading, lanceolate-falcate, ca. 8 × 3 mm, base connate to costule, often entire, apex obtuse or acute; apical pinnae 2-pinnate-pinnatifid, lanceolate;

segments approximate, with pallid or light brown hairs abaxially; veins prominent abaxially, grooved adaxially; rachises, costae, and costules approximate, with pallid or light brown hairs or verrucose, glabrescent.

Specimens examined: RRL-B-12686, NCR& AKB, 31.05.11, Jenabil, Similipal

Ecology: Sunny slopes, open grassland on forest fringe.

Fertile: May –Sept.

Note: *P. aquilinum* as reported from various parts of India, so also from Similipal is considered to be an European species (Fraser Jenkins, 2015), but further study is necessary to conclude its taxonomic and ecological stance. Both *P. revolutum* and *P. aquilinum* are highly toxic and carcinogenic due to the presence of cyanide Thiaminase and the carcinogen Ptaquiloside, which is often passed in to the milk by cattle eating this bracken fern. It may be fatal to livestock grazing on them and the human beings as well.

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