



## ***Thelypteris indusiata* (Thelypteridaceae), a new fern species from Amazonian Brazil**

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### **Abstract**

*Thelypteris indusiata* is described as a new species from Amazonian Brazil. This species with 1-pinnate laminae and terminal pinnae that resemble lateral ones belongs to *Thelypteris* subgenus *Goniopteris* and resembles several other species, mainly *T. poiteana*, *T. ghiesbreghtii*, *T. vivipara* and *T. platypes*, but differs from these species mainly by the venation pattern and the indusiate sori.

**Key words:** Ferns, *Goniopteris*, Pará state, Brazil, Carajás Range

### **Introduction**

During a pteridophyte floristic survey at Carajás National Forest in Pará State, northern Brazil, five new species were discovered. Three of them have been described elsewhere (Dittrich *et al.* 2012, Salino *et al.* 2011), one species of *Isoetes* will be further described, and one species of *Thelypteris* is described here. This species belongs to subg. *Goniopteris* (Presl 1836: 181) Duek (1971:720), which has long been recognized as a natural group (Christensen 1913, Mickel & Smith 2004, Smith 1983, 1990, 1992, 1993, 1995 a, b, Tryon & Tryon 1982). Recent molecular phylogenetic analyses supported *Goniopteris* as a monophyletic group (Smith & Cranfill 2002, Schuettelpelz & Pryer 2007, Alvarez-Fuentes 2010, He & Zhang 2012). However, sampling of *Goniopteris* to date has been sparse, and infrageneric treatments of *Thelypteris sensu lato* are in flux (Smith *et al.* 2006). The presence of furcate or stellate hairs is a useful diagnostic for *Goniopteris* (Salino 2002); however, some species lack these hairs (Smith 1992). *Goniopteris* is a Neotropical group of about 115–120 species, of which 36 occur in Brazil (A. Salino, unpublished data). In addition to the new species described here, nine other species of subg. *Goniopteris* occur in Amazonian Brazil: *Thelypteris abrupta* (Desvaux 1827: 239) Proctor (1959 [1960]: 306), *T. amazonica* Salino & Fernandes (2011: 611), *T. biformata* (Rosenstock 1909: 300) Tryon (1967: 5), *T. biolleyi* (Christ 1901: 31) Proctor (1953: 58), *T. juruensis* (Christensen 1913: 256) Tryon & Conant (1975: 33), *T. pennata* (Poiret 1804: 535) Morton (1967: 64), *T. poiteana* (Bory 1826: 233) Proctor (1953: 63), *T. tetragona* (Swartz 1788: 132) Small (1938: 256) and *T. tristis* (Kunze 1834: 47) Tryon (1967: 8).

### **Materials & Methods**

Specimens of all mentioned species of *Thelypteris* subg. *Goniopteris* including the type specimens and additional material from the following herbaria were studied: B, BM, COAH, COL, F, FI, GH, HB, HUA, IAN, JAUM, K, MEDEL, MG, MO, NY, P, PI, PMA, Q, QCA, QCNE, QPLS, RB, S, STRI, UC, and US. The morphological terminology used in the description follows Lellinger (2002). For SEM images, samples of spores and leaves were transferred from herbarium specimens to aluminum SEM stubs coated with double-sided carbon tape. The stubs were then coated with gold in a sputter-coater, and were imaged digitally using a FEI Quanta 200 SEM at an accelerating voltage of 30 kV.

## Key to species of *Thelypteris* subg. *Goniopteris* from Amazonian Brazil

1. Costules and veins on abaxial side with sessile stellate hairs ..... 2
- Costules and veins on abaxial side glabrous or with acicular hairs ..... 3
2. Lamina gradually reduced into a pinnatifid apex; proximal pair of veins from adjacent segments uniting below the sinus to an excurrent vein and the next pair running at or above the sinus ..... *T. biolleyi*
- Lamina with terminal pinna that resembles a lateral one (conform apex); proximal pair of veins from adjacent segments uniting below the sinus to an excurrent vein, with the next 1–2 pairs either joining the excurrent vein below the sinus or running directly to sinus ..... *T. pennata*
3. Veins anastomosing, forming 3–9 series of areoles between costa and margin or sinus; pinnae crenate or very shallowly lobed less than 1/5 the distance to costae; sori exindusiate ..... *T. poiteana*
- Veins free or rarely anastomosing, forming 1–2 areoles series between costa and margin or sinus; pinnae shallowly to deeply lobed, 1/3 or more (if rarely shallowly lobed less than 1/5 then sori indusiate); sori indusiate or exindusiate ..... 4
4. Proximal pairs of veins from adjacent segments uniting below the sinus to an excurrent vein to sinus; sori exindusiate; sporangia with simple acicular hairs on the capsules and stalks ..... *T. tetragona*
- Proximal pairs of veins from adjacent segments uniting at the sinus or ending blindly below the sinus, without excurrent vein; sori indusiate, rarely exindusiate; sporangia glabrous or with hairs only on sporangial stalks (in *T. abrupta*) ..... 5
5. Lamina gradually narrowed distally into a pinnatifid apex ..... *T. abrupta*
- Lamina with terminal pinna resembling a lateral one (conform apex), rarely subconform apex ..... 6
6. Veins glabrous on both surfaces; distal vein of proximal pair arising from costa; indusia absent or minute ..... *T. juruensis*
- Veins with hairs on both surfaces, rarely glabrous; distal vein of proximal pair arising from costule; indusia conspicuous ..... 7
7. Pinnae 2–4(–5) pairs; pinnae usually entire with crenate margins, rarely incised to 1/3 their width; buds or plantlets absent ..... *T. indusiata*
- Pinnae 7–18 pairs; pinnae incised 1/3–3/4 of their width; buds or plantlets usually present in axils of distal pinnae ..... 8
8. Proximal pinnae with short- to long-cuneate bases; abaxial surface of costae glabrous or with sparsely acicular hairs, and a few furcate hairs ..... *T. tristis*
- Proximal pinnae with truncate or oblique bases; abaxial surface of costae moderately to densely pilose with a mixture of acicular, furcate and stellate hairs ..... 9
9. Segments with 6–9 vein pairs, proximal 1–2 pairs from adjacent segments ending well below the sinus; veins usually with clavate apices ..... *T. amazonica*
- Segments with 10–20 vein pairs, proximal 1–2 pairs from adjacent segments connivent to sinus; veins without clavate apices ..... *T. biformata*

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