First record of the exotic fern Pteristripartita Sw. (Pteridaceae) for the Maranhão state, northeastern Brazil

Abstract

This study is the first record of the exotic fern species of Pteristripartita Sw. (Pteridaceae) for the Maranhão state, northeastern Brazil. Here we present a description of the species and comments about its geographical distribution in the world and states in Brazil in which it has a collection report. Our data increases knowledge on the number of pteridophyta species recorded for the state, and help to delimit the geographical distribution pattern of this naturalized species in the country, determining its invasive potential and possible impacts that it can cause to the native vegetation.

Keywords: amazon forest, botany, invasive species, sáo luís island

Introduction

Exotic species are considered one of the greatest threats to regional and local biodiversity, being an important agent of structural change of the landscape. There are many cases of fern species introduced in Brazil, mainly due to activities related to gardening and ornamentation. Approximately 13,600 species of ferns and lycophytes are estimated to occur worldwide, 3,500 of them in South America. The latest study on the distribution of ferns and lycophytes in Brazil has reported a total 1,111 ferns and 142 lycophytes.

The Family Pteridaceae encompasses 53 genera and 1,211 species of ferns, having a remarkable presence on tropical and subtropical regions. In Brazil, for instance, 23 genera and 196 species of Pteridaceae have been reported. Species of this family possess several lifeforms, such as: terrestrial, epiphytic, rupicolous, or even aquatic. The genus Pteris L. was erected by Linnaeus in 1753; currently including about 250 species, widely distributed in the tropical regions of the world. It is characterized by the sori formed on the margin of the lamina, with paraphyses and indusium formed by the revolute margins of the lamina. Pteris species may have ornamental and culinary uses and occur from sunny environments to less sunlight (in forests) in acidic or basic soils. This versatility of life forms and adaptation to environments contributes for its wide geographic distribution. In Brazil, Pteris has about 24 species (six of them endemic) distributed throughout most of the country. All species occurring in Brazil have lamina at least once pinnate. These species are distributed in the following biomes: Brazilian Cerrado, Atlantic and Amazon Forest.

The Maranhão state, northeastern Brazil, includes a transition zone between the Amazônia and the Brazilian Cerrado biomes, which determines a great variety in the vegetation that is represented in fragments of Amazon Forest, babassu-palm forests and mangroves, on depressions and plains. In the Maranhão state officially just two species of Pteris occur, with specimens deposited on herbarium: Pterisvittata L. and Pterisvittata Sw. The collection of Pteristripartita Sw., mentioned in this paper, increases the number of species of the genus in this stateto three. It is important to emphasize that a fourth species of the genus, Pterisvittata L., is also found in Maranhão, but always associated with urban areas, never occurring on natural areas and environment (Fernandes Pers. Obs.). For this reason, P. vittata was not considered in this study. The present study reports the first record of Pteristripartita Sw. for Maranhão state, northeastern Brazil.

Materials and methods

Specimens were collected during studies on the Maranhão flora. Species locality was accurately recorded by using GPS (Figure 1) and photographed using a digital camera. Fertile material was collected, pressed and oven-dried according to Silva. Voucher specimens were then deposited in the MAR Herbarium, at Federal University of Maranhão. Herbarium acronyms followed THIERS. The taxonomic treatment and description of the geographical distribution of Pteristripartita Sw. were made based on existing literature, on the Brazilian Flora online database, and on the analysis of specimens from the Reflora Virtual Herbarium, while the species geographical distribution was consulted on the Brazilian Flora online database. The taxonomic classification system followed was that proposed in the PPGI. The map of the study area was prepared with software QGis® 2.18.16 Essen, using the coordinate system UTM zone 23S, GCS South American Datum 1969. The conservation status of the species was consulted in the IUCN Red List criteria.
Brazil. Paraná: Antonina, Reserva 19
2,16
22
2,16
21
16

Brazil. acute apex, denticulate margin, costulaeadaxially visible; venation
terminal pinnule, 6–10×1–3cm; frond segments falcate to oblong,
middle pinnules, 15–22×1–3cm; distal pinnules, 4–8×1–2.5cm;
short-petiolulate; proximal pinnules slightly shorter, 5–7×1–3cm;
pinnules pinnatipartite 20–30 pairs, alternate, lanceolate, sessile, or
pinnatipartite, 20–40×10–15cm, glabrous adaxial and abaxial surfaces,
bisulcate adaxially; papery leaf blade, deltate, tripartite, pinnate-
to 1.2m×30–100cm, erect, monomorphic; petiole dark brown at the
2 cm in diam., apex brown, lanceolate, 0.2–1.3cm. Fronds 52 cm
distribution on the leaf.

Figure 2

Results and discussion

Pteristripartita Sw., J. Bot. 1800 (2): 67. 1801. Figure 2.

Type: INDONESIA. JAVA: undated, Thunberg s.n. (holotype: UPS-T).

Figure 2 Pteristripartita Sw. (MAR 9285). (A) Habit. (B) Detail of sori
distribution on the leaf. (C) Detail of the three frond divisions in an exsiccate.

Terricolous herb, up to 2m high. Rhizome ascending, short, ca.
2 cm in diam., apex brown, lanceolate, 0.2–1.3cm. Fronds 52 cm
to 1.2m×30–100cm, erect, monomorphic; petiole dark brown at the
base and light brown at its distal portion, 60–80×0.5–1cm, glabrous,
bisulcate adaxially; papery leaf blade, deltate, tripartite, pinnate-
pinnatipartite, 20–40×10–15cm, glabrous adaxial and abaxial surfaces,
pinnules pinnatipartite 20–30 pairs, alternate, lanceolate, sessile, or
short-petiolulate; proximal pinnules slightly shorter, 5–7×1–3cm;
middle pinnules, 15–22×1–3cm; distal pinnules, 4–8×1–2.5cm;
terminal pinnule, 6–10×1–3cm; frond segments falcate to oblong,
acute apex, denticulate margin, costulaeadauxially visible; venation
partially areolate, veinlets anastomosing to form a series of narrow
areoles along costae. Sori interrupted in the sinuses and absent at the
apex of frond segments; pseudindusium; trilete spores.

Examined specimen: Brazil. Maranhão: São José de Ribamar, mata
de galeria, Rio Paciência [gallery forest, Paciência River], 02°32’55.6″
S, 044°11’47.3″ W, 11-I-2017, W.R.Silva Junior and A.W.C. Ferreira
004 (MAR 9285).

Additional examined specimen: Brazil. Paraná: Antonina, Reserva
Natural Rio Cachoeira (SPVS). Trilha dos Formos. Floresta Ombrofíla
Densa [Rio Cachoeira Natural Reserve (SPVS). Oven’s Track. Dense
Ombrophilous Forest], 25°15’00″ S, 048°41’00″ W, 2-III-2005, F.B.
Matos and U. Ferreira 474 (UPCB 56964). BRAZIL. ACRE: Rio
Branco. APA PZ, 09°57’14″ S, 067°72’17″ W, 23-V-2007, C.S. Pessoa
et al. (RB 515212).

Comments: The species was collected at São José de Ribamar
municipality, in a gallery forest fragment by the Paciência River
(Figure 1). The specific epithet tripartita refers to the division of the
leaf into three large parts (Figure 2). Pteristripartita is not included in
the IUCN Red List,15 but according to the IUCN Red List criteria
and to its geographic distribution in Brazil,16 the species has an EOO
(Extension of Occurrence) greater than 20,000 km², and thus may not
be considered endangered.

Pteristripartita is found in tropical regions of the world, occurring
in the following countries and continents: Africa (Ghana, Madagascar
and Zaire) Australia, Central America (Costa Rica, Cuba, Dominican
Republic, Haiti, Jamaica, Leeward Islands, Panama, Puerto Rico,
Virgin Islands and Windward Islands), South America (Bolivia,
Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname
and Venezuela), North America (Mexico, United States) and Asia
(China, India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand
and Vietnam).20 This species is not native to the Americas. It was
introduced by humans on this region and is considered an invasive
plant.15,16,20 Pteristripartita is scarcely distributed in Brazil due to
few botanical collections, with records confirmed only in the states
of Acre, Amazonas, Paraíba, Pernambuco, Alagoas, Espírito Santo,
São Paulo and Paraná.2,16 in this paper being registered for the first
time for the Maranhão state, more accurately in the Amazon region
of the state.

Conclusion

The presence of the collected species indicates a certain degree of
conservation of the site where they were found, since ferns depend
on humid and well-preserved environments to grow and live.21
No studies have been done in Brazil on the invasive potential of P.
tripartita. The few collections recorded in Brazilian territory point to
the high dispersion capacity of this species. These collections were in
areas of the Amazon Forest (northern Brazil) and the Atlantic Forest
(Northeast, South and Southeast regions of Brazil). These regions
come to have distances of about 6,000km.22 This broad dispersion
capacity may contribute to P. tripartita becoming an invasive fern.

The occurrence of a naturalized species such as Pteristripartita
Sw. brings a question about the invasive ferns and their impacts on
the natural vegetation. Among the impacts that can be caused by naturalized
ferns, are the placement of native species, formation of hybrids with
local representatives, and invasion of native forests, as recorded in
the islands of Hawaii.23 In Brazil, some species of Pteridophytes
are highlighted by the invasive potential, such as Deparia petersenii.
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Conflict of interest

There is no conflict of interest to declare regarding the publication of this paper.

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