



Ceratopteris thalictroides (L.) Brongn. (Pteridaceae): Confirmation of its presence in the pteridoflora of Peru

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ABSTRACT

We report the presence of *Ceratopteris thalictroides* based on a recent collection from northeastern Peru. This aquatic fern is widely distributed in the tropics, however, its presence in Peru remained uncertain and without a voucher until now. This finding increases to four the number of species of the subfamily Parkerioideae, Pteridaceae within Peru.

Keywords: *Ceratopteris*, Pteridaceae, Peru, new record, pteridoflora.

Ceratopteris is a monophyletic genus of the subfamily Parkerioideae (PPG I, 2016) that together with its sister genus *Acrostichum* include the only aquatic and semiaquatic members of the Pteridaceae (Schuettpelz *et al.*, 2007). Both homosporous genera are present in Peru (Tryon & Stolze, 1989), although the number of *Ceratopteris* species has remained inconclusive. Indeed, only New World *C. pteridoides* (Hook.) Hieron. is definitely known with vouchers from lowland Amazonian Peru (Tryon & Stolze, 1989; León, 1993); while *C. thalictroides* (L.) Brongn. has only been mentioned as expected (Tryon & Stolze, 1989) or ambiguously included (León *et al.*, 2012). *Ceratopteris thalictroides* is a tetraploid ($2n=77$), widely distributed pantropical species known in tropical South America from neighboring Brazil (Hirai & Prado, 2020) and Colombia (Murillo *et al.*, 2016) growing in aquatic environments below 500 m elevation. The available taxonomic revision of the genus (Lloyd, 1974) indicated a wide variability in sterile frond morphology for *C. thalictroides*, while later Masuyama *et al.* (2002) examined this morphological polymorphism among Japanese populations using molecular

data that revealed three potential cryptic species, and with probable independent origins (Adjie *et al.*, 2007). Indeed, *C. thalictroides* represents an interesting species complex for further research in understanding reticulation and speciation as shown by Kinoshita *et al.* (2020a, b), particularly among neotropical populations. Therefore, this new record for Peru and for the western Amazon basin opens new opportunities for research in this probably allotetraploid species. Populations of *C. thalictroides* in Peru were found rooted in inundated soils of irrigation canals of “palmito” fields (*Bactris gasipaes* Kunth var. *gasipaes*) together with *Limnocharis flava* (L.) Buchenau, *Heteranthera reniformis* Ruiz & Pav. and *Sagittaria* sp. (Fig. 1A) at 180 m elevation, in Caynarachi, 6°11'8.80"S, 76°20'10.64"W, San Martín (F. Peláez 901 HUT, USM). Fronds are mostly erect (Fig. 1B), 1–3 pinnate, with 4–6 pairs of pinnae; sterile leaves 31–70 cm long, petiole 12–38 cm long; fertile leaves 33–77 cm long, petiole 21–40 cm (Fig. 1C, D); abaxial sporangia with inrolled segment margins (Fig. 1E, F, G) with more than 30 indurated annulus cells (Fig. 1H), and trilete spores (Fig. 1I).

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Figure 1. *Ceratopteris thalictroides*. A. Habitat along an irrigation canal, San Martín, Peru. B. Habit showing rooted plants in inundated soils. C. Fertile leaf on the left, sterile leaf on the right. D. Detail of narrow fertile segments. E. Abaxial location of sori. F. Hand-cut transverse section of fertile segment. G- Detail of transverse section showing inrolled segment and a sorus. H. Sporangia. I. Trilete spore. (Photos by F. Peláez and N. Alarcón)

Key to *Ceratopteris* in Peru

Plants mostly floating; sterile fronds with inflated petioles; laminae deltoid, pinnatifid with broad segments *Ceratopteris pteridoides*

Plants rooted aquatics; sterile fronds without inflated petioles; laminae lanceolate, 1–3 pinnate *Ceratopteris thalictroides*

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Author's Contributions

BL: Manuscript drafting, Elaboration taxonomic key; FP: Field collection and photography; NA: Histology and Microphotography.

Conflict of interests

We authors declare that no conflict of interest exists.

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