

**NEW FERN RECORDS FOR THE STATE OF MORELOS, MEXICO:
HEMIONITIS PINNATIFIDA AND *MYRIOPTERIS LONGIPILA* SUBSP.
BREVIPILO (PTERIDACEAE)**

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ABSTRACT

We report two new records of rare fern species for the state of Morelos, Mexico: *Hemionitis pinnatifida* and *Myriopteris longipila* subsp. *brevipila*. For both species, we describe their main characteristics, cite studied material and present photographs and distribution maps, followed by comments on their habitat characteristics, historical record, rarity, and differential characteristics to closely related species or varieties.

INTRODUCTION

Ferns represent 4.4% of the vascular flora of Mexico (Tejero-Díez et al., 2014) and 5.6% of Morelos (188 taxa) (Riba et al., 1996; Hernández-Cárdenas et al., 2014), a Mexican state located in the southern, central highlands covering an area of nearly 5000 km². Several authors have studied the fern diversity of Morelos (Vázquez-Sánchez, 1974; Riba et al., 1996; Bonilla-Barbosa & Villaseñor-Ríos, 2003; Mickel & Smith, 2004; Bonilla-Barbosa et al., 2010; Sánchez-Popoca, 2016), yet most collection efforts have focused on angiosperms (Riba, 1998). Here, we report on two new records of rare fern species for the state of Morelos that were documented during a botanical survey of the Sierra de Huautla Biosphere Reserve (SHBR), where ferns currently represent 6% (57 species) of the recorded vascular plants (Sánchez-Popoca, 2016).

METHODS

Between 2014 and 2017, three botanical surveys were carried out in the Huautla Biosphere Reserve, located in southern Morelos. This reserve comprises an area of 59.030 ha, representing nearly 12% of the state of Morelos, and extends across an altitudinal range from 670 to 2200 m. The dominant vegetation is classified as tropical dry forest (Dorado et al., 2005). First, we reviewed the literature records of all fern species of the state of Morelos (Vázquez-Sánchez, 1974; Riba et al., 1996; Bonilla-Barbosa & Villaseñor-Ríos, 2003; Mickel & Smith, 2004; Bonilla-Barbosa et al., 2010). Then, we identified the collected specimens and corroborated their identity

with material from the National Herbarium of the National Autonomous University of Mexico (MEXU), the Metropolitan Autonomous University (UAMIZ), as well as with specimens in online databases such as TROPICOS (2019) and Boyle et al. (2013), and help of other specialists (Aniceto Mendoza Ruíz). The classification used in the present study was that of PPG I (2016). Based on the collected information, we elaborated distribution maps for each species. Finally, the collected specimens were deposited in the herbarium of the Center for Biodiversity and Conservation Research of the Autonomous University of the State of Morelos (HUMO).

RESULTS AND DISCUSSION

Hemionitis pinnatifida Baker in Hooker & Baker, Syn. Fil. 399. 1868. Type: Costa Rica: Wendland 438 [holotype: K].

Species description. Plant herbaceous, terrestrial; Rhizomes ascending to erect, with linear scales, bicolorous with dark brown central portion and light brown margins, 4–5 x 0.8 mm. Fronds clustered, dimorphic, 5–20 cm long; Stipes 1–2 mm diameter, terete, castaneous, with narrow scales at bases, hirsute, the hairs glandular, 0.1 mm long; Blades pinnatifid palmately lobed, 4–10 cm long, margins crenulate, adaxial and abaxial surfaces with dense, articulated, acicular hairs of 1–1.5 mm long; Veins netted; Sori along all veins; Indusia absent; Spores light yellow-orange.

Studied material. MEXICO. Chiapas, to 38 km north east to Motozintla, Cuauhtémoc City, glen in holm oak forest, 750 m.a.s.l., 22/10/1985, *Breedlove 38432* (MEXU), *Lionnet 2663* (MEXU), *Matuda 2128* (MEXU). Ciudad de México, *Montoya 19* (MO). Guerrero, *González 344* (FCME), along the Barranca Choloa highway, municipality of Chilpancingo, riparian vegetation in rocky soil, 29/09/1988, *Verduzco-Martínez 401* (ENCB). Jalisco, Huehuenton highway to 20–25 km east to Chamela, municipality of Huerta, on slopes and in tropical subdeciduous forest, very few individuals, 400 m.a.s.l., 27/08/1976, *Rzedowski & McVaugh 1361* (ENCB). Morelos, along the Huautla-Santiopa highway, Tlaquiltenango, 1018 m.a.s.l., 18°26'43.4"N, 98°59'18.7"W, terrestrial, in tropical dry forest, 9/05/2014, *A.D. Sánchez-Popoca 223* (HUMO) (Figure 1A, B; Figure 2). Oaxaca, *Campos 4659*, *Lyons 103*, *141* (MEXU), *Sánchez 221* (MEXU).

Comments: *Hemionitis pinnatifida* is terrestrial and grows from 50 to 2700 m elevation in Mexico (ENCB, HUMO, MEXU, UAMIZ): Chiapas, Oaxaca, Guerrero and Jalisco, and also occurs in Guatemala, El Salvador, Honduras, Nicaragua and Costa Rica (Tropicos, 2019). In 2016, the population in the study area was composed of six fertile individuals, of which we collected two individuals. No gametophytes and young sporophytes were found within a range of 50 m distance. The area was covered by Leptosol soil (INEGI, 2017). The population of the collected specimens was exposed to direct sunlight, but was surrounded by trees of *Conzattia multiflora* (Robinson) Standl. (Fabaceae) and *Guazuma ulmifolia* Lam. (Malvaceae), which were both dominant. The only other herbaceous vegetation consisted of *Selaginella pallescens* (C. Presl) Spring and *Cheilanthes brachypus* Kunze. Visits performed later in 2017 confirmed that the population had been extirpated as a result of the expansion of the federal highway. For this reason, the collected individuals and photographs are important given that they present the only recent historic record of *H. pinnatifida* in the state of Morelos.

Hemionitis pinnatifida can be confused with *H. palmata* L., a species with a much

wider distribution throughout the Neotropics. However, the first species has a denser indumentum of hairs, and bicolorous rhizome scales (vs. concolorous in *H. palmata*).

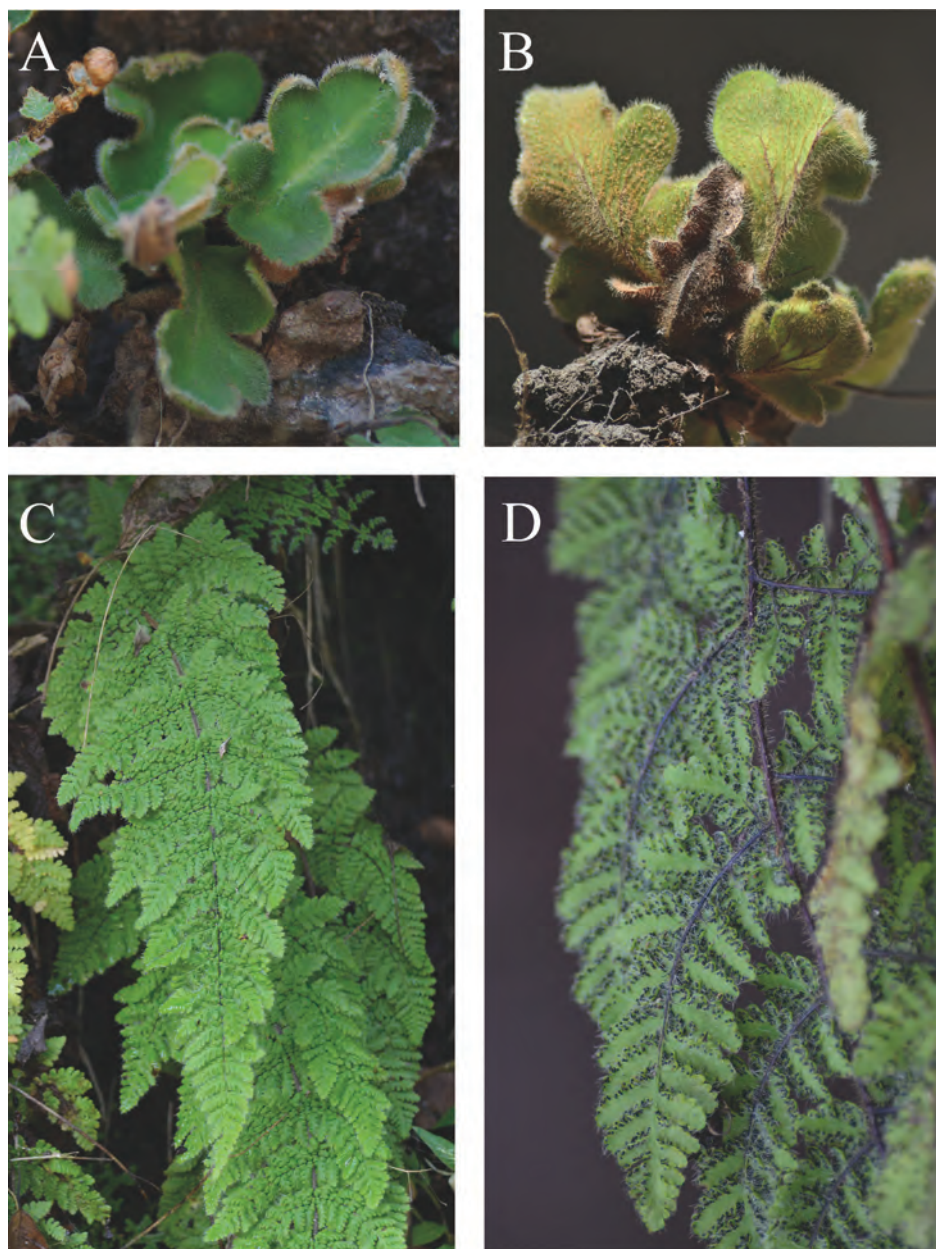


Figure 1. A, B. *Hemionitis pinnatifida* Baker. C, D. *Myriopteris longipila* subsp. *brevipila* (Mickel) Grusz & Windham. A, C. Species habit. B, D. Abaxial surface of fertile frond



Figure 2. Geographic distribution of *Hemionitis pinnatifida* Baker based on herbarium records.

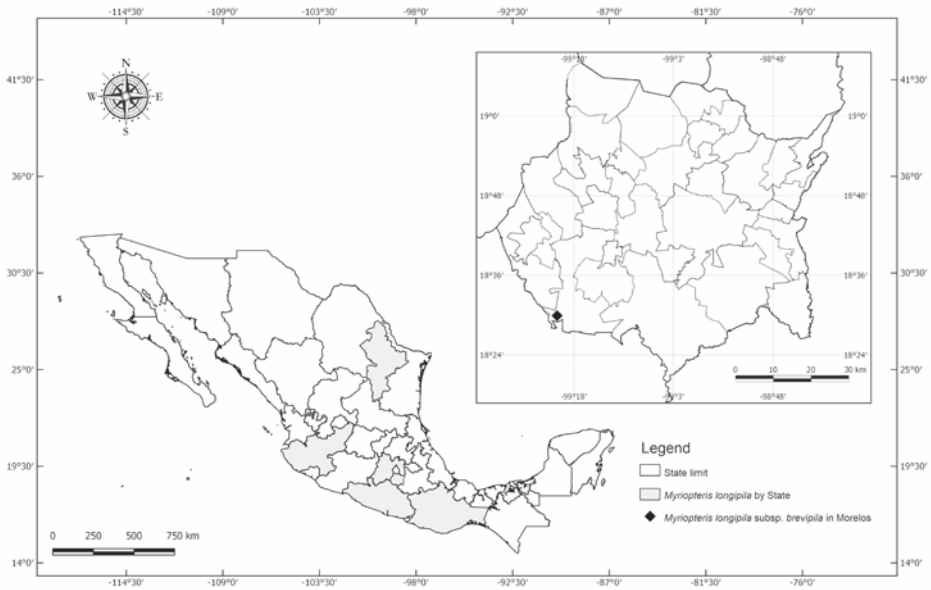


Figure 3. Geographic distribution of *Myriopteris longipila* subsp. *brevipila* (Mickel) Grusz & Windham based on herbarium records.

Myriopteris longipila subsp. *brevipila* (Mickel) Grusz & Windham, Bot. (Oxford) 5: 211. 1891. Type: Mexico. San Luis Potosí, 22°N Lat., 6000–8000 ft., Parry & Palmer 989 [holotype: K; isotype: US (fragment)]. Basionym: *Cheilanthes longipila* subsp. *brevipila* Mickel

Species description. Plant herbaceous, terrestrial; Rhizomes erect covered with adnate scales, irregular, concolorous, golden to castaneous, margins irregular. Fronds clustered, laxly arching; Stipes terete or grooved, brown, lustrous, 10 cm long, 1.5 mm diam, covered with dense, flexuous, septate, glandular hairs, 1.5–2 mm long, scales at bases concolorous, golden, patent, lanceolate, clathrate, but marginal cells light brown, scale margins entire, 2–5 mm x 1–2 mm; Rachises terete, lustrous, castaneous, covered with dense, septate, patent, glandular hairs, 1–2 mm long; Blades lanceolate, 3- or 4-pinnate at bases but less divided at the apices, up to 22 cm long, pinnae 2–10 x 1–5 cm, pinnules 1–2 x 6–8 mm; adaxial surface with dense, septate, hyaline, patent hairs, abaxial surface with dense, simple to septate, entangled, hyaline, hairs; Veins obscure. Sori exindusiate, marginal on the veins; Spores varying from dark to light brown

Studied material. MEXICO. Guerrero, to 2km south east of Amatlán, 1600 m.a.s.l., 13/08/1994, Antonio 339 (FCME, NY), Calzada 16172 (NY). Morelos, along the El Zapote-Los Tanques highway, Puente de Ixtla, 1300 m.a.s.l., 18°29'24.2"N, 99°20'32.3"W, terrestrial, 19/10/2014, A.D. Sánchez-Popoca 318 (HUMO) (Figure 1C and D; Figure 3).

Comments: This subspecies is endemic to Mexico where it occurs from 600 to 2200 m elevation (ENCB, HUMO, MEXU, UAMIZ). Mickel & Smith (2004) described its habitat as rocky slopes in oak forest or tropical dry forest on volcanic soil. The population in the study area consisted of only five fertile plants within a 50 m radius. The underlying soil was Phaeozem (INEGI, 2017).

The present record of the subspecies is only the third collection for Mexico. Mickel & Smith (2004) referred to *Myriopteris longipila* as *Cheilanthes longipila* Baker and distinguished two varieties: *C. longipila* var. *longipila* and var. *brevipila*. The former is distinguished from the latter by hairs 1–3 mm long (vs. 0.5–1 mm) in length on the adaxial surface and 1 mm (vs. 0.5 mm) on the abaxial surface, flexuose, stipe with trichomes 0.5–2 mm (vs. 0.2–0.5 mm, occasionally 1 mm). The characteristics of the latter variety match those of our collected specimen.

CONCLUSION

According to Arreguín-Sánchez *et al.* (2009), species that have not been collected for more than 25 years are rare and those that have not been collected for more than 50 years may be locally extirpated. Based on our study, both studied species must be considered as rare, because *H. pinnatifida* has been recorded 12 times since 1972 (in the last 45 years), and *Myriopteris longipila* with two subspecies has been recorded 10 times since 1939 (in the last 78 years). In the future, the conservation status of both taxa should be evaluated at the national level given their limited distribution and endemic status of *M. longipila* subsp. *brevipila*.

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