



Palinotaxonomy of *Passiflora* section *Xerogona* (Passifloraceae)

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Abstract

Passiflora sect. *Xerogona* is a tropical and subtropical group comprising 14 species that occur in tropical and Atlantic forest domains throughout Latin America. The section is characterized by herbaceous vines bearing leaves without petiole glands or bracts, leaf blades without ocelli, and capsular fruits. The pollen grains of 13 species of this section were acetolysed and subsequently measured, described, and photographed. The taxa have large or medium sized pollen grains that are isopolar, prolate spheroidal, prolate, oblate spheroidal, spherical or subprolate, 12-colpate, 12-colporate or 6-colporate, 3 or 6 mesocolpium, with the presence or absence of an operculum, pseudoperculum, and secondary operculum, and with exineheteroreticulate. A key to the species based on pollinic data is presented, demonstrating that pollinic characteristics are important in the taxonomy of *Passiflora*.

Key words: Palynology, *Passiflora*, *Decaloba*, *Xerogona*

Introduction

Passiflora Linnaeus (1753: 955–960) subgenus *Decaloba* (de Candolle 1822: 435) Reichenbach (1828: 132) supersection *Decaloba* (de Candolle 1822: 435) MacDougal & Feuillet (2004: 37) section *Xerogona* (Rafinesque 1838: 103) Killip (1938: 26) (Passifloraceae) is a tropical and subtropical section comprising 14 species (Feuillet and MacDougal 2003 [2004]) that occur throughout Latin America, although principally in Central America, and in tropical and Atlantic forest domains. This section is characterized by the absence of ocelli on the leaf blades, the absence of bracts, and capsular fruits. They are herbaceous vines with linear-subulate stipules, small flowers (< 4 cm diameter) with one or two series of corolla filaments, a folded operculum, and transversally sulcate seeds.

Presting (1965) initiated palynological studies of Passifloraceae and proposed a phylogeny for the family based on pollen characteristics and the classification of Killip (1938). Milward-de-Azevedo *et al.* (2004, 2010) presented a palynotaxonomic study of the species of *Passiflora* subgenus *Decaloba* that contributed to (1) their characterization and circumscription and (2) delimiting the genus *Passiflora* in conformity with the classification of MacDougal and Feuillet (2004). Pollinic characters were found to be informative for the phylogeny of the group in both works.

The present study characterized the pollen of the taxa of *Passiflora* subg. *Decaloba* supersect. *Decaloba* sect. *Xerogona* and help clarify the taxonomy of this group and evaluate the circumscription of this section.

Discussion

The results of the palynological analyses corroborated the studies by Presting (1965) and Huynh (1972) in terms of the number of colpi, by Barrios (2005) in terms of having also encountered in the present study 12-colpate pollen grains, as well as those by Milward-de-Azevedo *et al.* (2004, 2010) and Evaldt *et al.* (2011). Milward-de-Azevedo *et al.* (2004) noted that the species *P. cervii* had not yet been described and was previously treated as *P. capsularis*, which justifies the differences in their aperture types.

Dettke & Santos (2009) analyzed the pollen grain apertures of 11 species subordinated to the subgenera *Astrophea*, *Decaloba* and *Passiflora*. The terminology adopted in the present study for the primary and secondary operculum, the pseudoperculum, and mesocolpium correspond to the pontoperculum, operculum, pseudoperculum, and mesocolpium, respectively, as used by Dettke & Santos (2009). These authors described the pollen grains of *P. capsularis* as 12 colpate, differing from the present study, although this may have been due to the different terminologies used in that work, as described above.

A number of diverse pollinic characters have been found to be of specific diagnostic value in the taxonomy of the section *Xerogona*, such as the number of colpi, mesocolpia, pseudopercula and secondary opercula, the presence or absence of an endoaperture, reticula with sinuous or straight muri, the diameters of the lumens of the reticula, the presence or absence of bacula, and the length of the colpi. These characters differentiate the taxa at the species level, as can be seen in the identification key presented here.

It can be seen in the pollinic key that the pollen grains of the species *P. brevipes* and *P. cobanensis* are morphologically very similar and do not demonstrate any diagnostic characteristics that can easily separate one from the other. The vegetative and floral morphological characteristics observed in base species are likewise not distinct and they do not appear to constitute autonomous taxa—indicating that it will be necessary to revise and synonymize these species.

Very few specimens of *P. escobariana* and *P. pusilla* were encountered in the international herbaria we visited, and most of the specimens examined did not have floral buds—so only one individual of each species could be analyzed. The acetolysis of the single individual of *P. escobariana* was not successful, and we were therefore not able to collect pollinic data concerning this species.

Acknowledgements

The authors thank CNPq for the study grants to the authors; FAPESP and FAPERJ for auxiliary support; UNICAMP, CCA-UFES, MN/UFRJ, ITR/UFRRJ and the Missouri Botanical Garden for their institutional support; the biologist Raquel Maria Batista Souza de Souza for her assistance with the acetolysis and measurements of the pollinic material; the scanning electron microscopy technician MSc. Noêmia Rodrigues Gonçalves of the Instituto de Biofísica da Universidade Federal do Rio de Janeiro for producing the electron micrographs of the pollen specimens; Roy Funch for translating the text; and the BHCB, ESA, HUEFS, IAC, K, LP, MEXU, PEUFR and VIC herbaria for lending botanical material to the UEC.

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