



First record of *Opuntia rioplatense* (Cactaceae) for the Brazilian Flora

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The genus *Opuntia* Miller (1754) (Cactaceae Juss., Opuntioideae K.Schum., Opuntieae DC.) is native to the Americas, where is distributed from southern Argentina to Canada (Anderson 2001), and represents one of the largest genus of Cactaceae with ca. 150 species (see e.g., Stuppy 2002). Members of *Opuntia* shares a combination of peculiar morphological traits, including shrubs or trees with flattened photosynthetic stem shoots (cladodes), areoles with large smooth or retrorsely barbed spines and glochids, reduced and small caducous leaves, rotaceous diurnal flowers with inferior ovaries inner the pericarpels and stigma plurilobed, stamens with thigmonasty, reticulate semitectate pollen, and seeds covered by a sclerified funicular aril (Buxbaum 1953, Anderson 2001, Stuppy 2002, Hunt 2006, Majure & Puente 2014, Majure *et al.* 2017).

Species delimitation within *Opuntia* is not a simple issue especially concerning the high morphological plasticity (often related to environmental factors), a common hybridization, the poor conservation of collected specimens, the few data about biological information (morphology, chromosome counts, etc.) and phylogeny (see e.g., Majure & Puente 2014). These issues are especially relevant for the species occurring in southern parts of South America (sSA), that have been historically less studied. However, recently studies for the sSA species have brought advances in the understanding of their distribution and circumscription (Leuenberger 2002, Font 2014, Las Peñas *et al.* 2017).

As part of the taxonomic and floristic studies of *Opuntia* in sSA, we found a new record for the Brazilian flora [*Opuntia rioplatense* Font (2014: 85)] based on fieldworks carried out in the west of the state of Rio Grande do Sul. The collected material was deposited at the Federal University of Rio Grande do Sul herbarium, “Instituto de Ciências Naturais” (ICN) (acronym according to Thiers 2018).

Opuntia rioplatense Font (2014: 85) (Fig. 1) *nom. nov. pro* *Opuntia elata* Salm-Dyck (1834: 361) var. *obovata* Walther (1930: 204) non *O. obovata* Griffiths (1919: 202).

Lectotype (designated by Crook & Mottram 1996: 140):—[Icon] Figure 1 in Walther (1930: 203).

Epitype (designated by Las Peñas *et al.* 2017: 113):—ARGENTINA. Santa Fe, Rosario, Zavalla, 33°01'27.89"S, 60°54'07.69"W, 10 November 2012, Galetti *s.n.* (UNR).

Distribution and habitat:—*Opuntia rioplatense* occurs in central and eastern Argentina (Buenos Aires, Córdoba, Corrientes, Entre Ríos, La Pampa and Santa Fe Provinces), central-western Uruguay (Paysandú, Soriano, Montevideo, Maldonado) and extreme southwestern Brazil (west of Rio Grande do Sul State, our new record). In Brazil, the species is apparently restricted to the Pampa biome, specifically in a steppic-savanna environment known as Espinilho Park. The Espinilho Park is characterized by the occurrence of *Prosopis affinis* Sprengel (1825: 326), *P. nigra* (Grisebach 1879: 118) Hieronymus (1881: 283) and *Vachellia caven* (Molina 1782: 174) Seigler & Ebinger (2005: 148), exhibiting similarities to the Chaco vegetation in Argentina, the largest South American seasonally dry forest, which is a mosaic of xerophytic forests, woodlands, shrubs, savannas and grasslands (Roesch *et al.* 2009).

Notes on taxonomy, karyology and phylogeny:—*Opuntia rioplatense* is a taxon recently resurrected within Elata group species based on *Opuntia elata* var. *obovata* Walther (Font 2014), non *O. obovata* Griffiths (1919: 202). *O. rioplatense* differs from *O. elata* because of its acute flower bud apex (Fig. 1D), obovate-elliptic cladodes (Fig. 1C) and the obovate fruits (Fig. 1F), in contrast to the obtuse-rounded bud apex, elongated-oblong cladodes and the shortly obpyriform fruits. *O. rioplatense* was already known by the end of the 19th century by the first Argentine cactologists, but it was always erroneously cited as *O. vulgaris* Miller (1768) or *O. paraguayensis* Schuman (1899: 149).

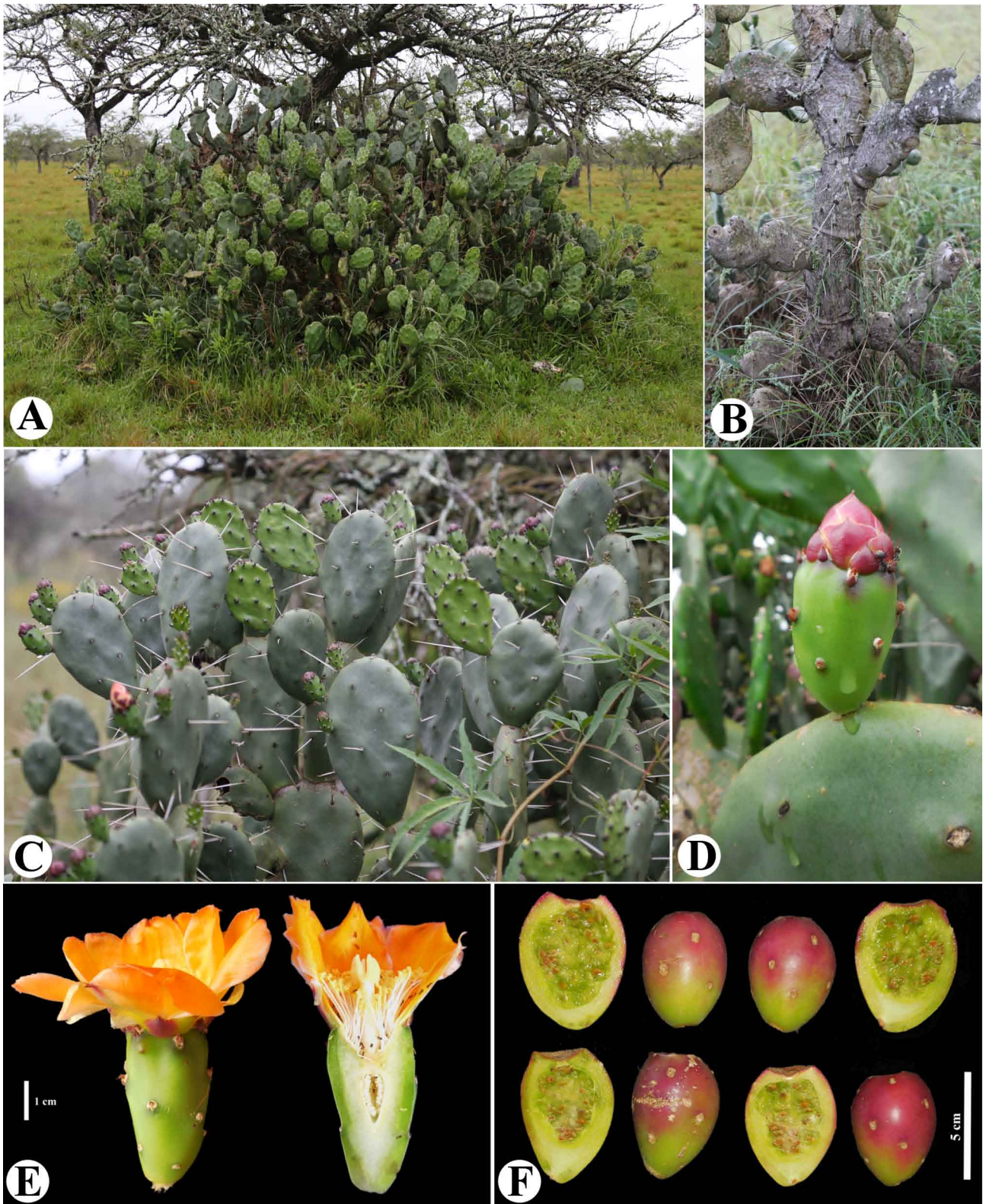


FIGURE 1. *Opuntia rioplatense* **A.** Habit (M. Köhler *et al.* 218) **B.** Trunk with spines (M. Köhler *et al.* 217) **C.** Details of cladodes (M. Köhler *et al.* 221) **D.** Floral bud with acute apex (M. Köhler *et al.* 221) **E.** Flowers in longitudinal section (M. Köhler *et al.* 220) **F.** Fruits with longitudinal section (M. Köhler *et al.* 221).

Opuntia rioplatense is reported as a tetraploid species ($2n = 4x = 44$) (Realini *et al.* 2014a; Las Peñas *et al.* 2017), and our counts have reinforced that ploidy level (Köhler unpublished data). The phylogenetic position of *O. rioplatense* is still uncertain, as the only phylogeny of the sSA species cannot be considered as conclusive (see Realini *et al.* 2014b), although there is a clear distinct haplotype between *O. elata*, and *O. rioplatense*. The species is probably nested in the *Elatae* clade

(see Majure *et al.* 2012), and further molecular data should provide for more robust phylogenetic hypothesis regarding the species of this clade (Köhler unpubl. data).

Notes on conservation status:—Although the species is widely distributed in Argentina and Uruguay, we emphasize its restricted occurrence in Brazil in a small area of the State of Rio Grande do Sul. Considering that to date, the species has not been cited or considered for the Brazilian flora (Flora do Brasil 2018), we highlight the importance of investigating the state of conservation of the species in Brazilian territory to ensure its maintenance.

Diagnostic key to the southern Brazilian *Opuntia* species with orange flowers:

1. Stigma-lobes green to greenish; ripe fruits with purple to reddish inner pericarpel tissue *O. megapotamica*
- Stigma-lobes creamy white or yellowish; ripe fruits with green inner pericarpel tissue 2
2. Flower buds with rounded or depressed apex; cladodes elongated to oblong *O. elata*
- Flower buds with acute or conical apex; cladodes obovate to elliptic *O. rioplatense*

Specimens examined:—BRAZIL. Rio Grande do Sul: **Barra do Quaraí**, Parque Estadual do Espinilho, 56 m, 30°11'16.10"S 57° 29'51.54"W, 12 October 2017, *M. Köhler et al.* 217 (ICN); 57 m, 30°11'7.60"S 57°29'44.78"W, 12 October 2017, *M. Köhler et al.* 218 (ICN); 42 m, 30°11'30.00"S 57°31'37.47"W, 12 October 2017, *M. Köhler et al.* 220 (ICN); 44 m, 30°11'26.78"S 57°31'33.91"W, 12 October 2017, *M. Köhler* 221 (ICN). URUGUAY. Paysandú: **Lorenzo Geyres**, Camping Queguay, 36 m, 32°7'26.45"S 57°55'51.33"W, 3 December 2017, *M. Köhler et al.* 288 (ICN). Soriano: **Mercedes**, Ruta 14, 29 m, 33°14'22.98"S 57°58'17.52"W, 3 December 2017, *M. Köhler et al.* 291 (ICN). Montevideo: **Montevideo**, Camino a Punta Espinillo, 37 m, 34°49'55.95"S 56°21'44.10"W, 4 December 2017, *M. Köhler et al.* 312 (ICN).

Acknowledgements

The first author (MK) is grateful to the American Society of Plant Taxonomists (ASPT) and to the Cactus and Succulent Society of America (CSSA) for support part of the fieldwork with their respective grants for research, and also thanks the Brazilian National Council for Scientific and Technological Development (Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq) for his scholarship. TTSC is also grateful to CNPq by the PQ1C grant. We are grateful to the SEMA/RS for providing collection permits at “Parque Estadual do Espinilho” (PEE), to park-ranger Mauricio de Freitas Scherer for helping during the fieldwork at PEE, and Ethiéne Guerra for a proofread of an early version of this correspondence.

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