



Overlooked diversity in Brazilian *Cypella* (Iridaceae, Iridoideae): four new taxa from the Río de la Plata grasslands

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Abstract

Three new species and one subspecies of *Cypella* are described for Rio Grande do Sul (RS), Brazil: *Cypella altouruguaya* from northern RS, *C. amplimaculata* widely distributed across the state and *C. rivularis* restricted to southern RS, in grassland streams of the Pampa biome. *Cypella hauthalii* subsp. *minuticristata* is found in a central area of Rio Grande do Sul. The different taxa are described, illustrated and compared with related species. The resulting taxonomic framework shows that most of the species described for *Cypella* occur in the Río de la Plata grasslands, with various infrageneric taxa characterised by a high level of endemism, especially in the Subtropical Grasslands of Southern Brazil.

Key words: Campos eco-region, endemism, Rio Grande do Sul, Subtropical Grasslands, taxonomy

Introduction

Iridaceae is divided into seven subfamilies and comprise about 2030 species distributed among 65 to 75 genera (Goldblatt *et al.* 2008). The Iridoideae, with more than 900 species, represent one of the two major evolutionary branches of the family and make up about 44% of the species richness of the Iridaceae (Goldblatt & Manning 2008). Among the five tribes of this subfamily, the New World tribe of Tigridieae forms a monophyletic lineage of about 15 genera and 160 species (Goldblatt & Manning 2008, Chauveau *et al.* 2012). *Cypella* Herbert (1826: t. 2637), with 30 species and four subspecies accepted by the World Checklist of Iridaceae (WCI), is one of two largest genera of the tribe in South America (Goldblatt & Manning 2008, Barker 2014). The taxonomic delimitation of this genus phylogenetically closely related to *Calydorea* and *Herbertia* remains controversial (Chauveau *et al.* 2012, Deble *et al.* 2012). Indeed, among the species accepted by the WCI in *Cypella*, three species present the distinctive morphological features of *Phalocallis* Herbert (1839: t. 3710): *C. boliviana* Huaylla (2012: 297), *C. geniculata* (Klatt 1871: 517) Ravenna (1964: 53) and *C. oreophila* Spegazzini (1917: 44). The former species is considered morphologically strictly related to the type species of *Phalocallis*, *P. coelestis* (Lehmann 1826: 17) Ravenna (1977: 9) and is only distinguished by small variations of floral traits (Huaylla & Wood 2012). *Cypella geniculata* and *C. oreophila* were included by Ravenna (2009) in *Phalocallis* based on the same distinctive floral traits than the type species of the genus. Furthermore, the latest comprehensive phylogeny of Tigridieae confirmed that *Phalocallis* should be regarded as a separate genus from *Cypella* (Chauveau *et al.* 2012). The resulting circumscription of *Cypella* shows that 80% of the species and subspecies are found in the Río de la Plata grasslands (RPG), one of the most extensive biogeographic units of the grassland biome in the world (Medan *et al.* 2011). Indeed, this is the largest complex of subtropical and temperate grassland ecosystems in South America (Soriano *et al.* 1992, Miñarro & Bilenca 2008). These grasslands include the eco-regions of Pampas in North Eastern Argentina, and the Campos eco-regions in Uruguay, Northern Argentina, South East Paraguay and Southern Brazil, where most of the *Cypella* species are distributed (Di Giacomo & Krapovickas 2005, Overbeck *et al.* 2007, Paruelo *et al.* 2007). In Southern Brazil, the grassland vegetation is included in two separate biomes according to the current official classification (IBGE 2004): the Pampa and the Atlantic Forest (Overbeck *et al.* 2007). The RPG is perhaps one of the regions in the world with highest rates of land use and land cover changes related to human activities

more than 85% of the taxa currently described for the genus occur in the Río de la Plata grasslands, 80% are endemic to this biogeographic unit and 65% are only found in the Campos eco-region, mainly in the state of Rio Grande do Sul (Southern Brazil) where 14 species and two subspecies are presently registered. These observations suggest that the centre of diversity of *Cypella* is located in the Río de la Plata grasslands, mostly in the subtropical Campos grasslands, and that local endemism is not uncommon at the infrageneric level.

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