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First record of *Plantago commersoniana* (Plantaginaceae), a rare and threatened species, in the Central-West region of Brazil

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**Abstract:** *Plantago commersoniana* is a rare and threatened species, with a highly disjunct distribution, mainly in southern Brazil. This study expands its distribution to Mato Grosso do Sul state, in the Central-West region of Brazil, due to the discovery of a collection of this species from rocky grasslands in Ponta Porã. This new record is ca. 285 km distant from the nearest known population, in Yhú, Caaguazú department, eastern Paraguay. This is also the first record of a native *Plantago* species in Mato Grosso do Sul. Its conservation status according to the IUCN criteria is Endangered (EN).

**Key words:** distribution extension; Neotropics; new record; rare species; South America

*Plantago* L. (Plantaginaceae) is a cosmopolitan genus with over 250 species, concentrated in temperate and high-elevation tropical regions (Pilger 1937; Rahn 1996; Rønsted et al. 2002). Together with its closest genera, *Littorella* P.J.Bergius (Hoggard et al. 2003) and *Aravoa* Kunth (Bello et al. 2002), *Plantago* is part of tribe Plantagineae (Olmstead et al. 2001). *Plantago* species are anemophilous herbs or rarely subshrubs, perennial or annual (Pilger 1937; Meudt 2012). Some *Plantago* species have wide geographic distributions, a few being cosmopolitan ruderals, like *P. major* L. (von Linné 1753: 112–113) and *P. lanceolata* L. (von Linné 1753: 113–114). However, most *Plantago* species have more restricted geographic distributions, some of these being extremely narrow endemics (Rahn 1996; Segarra and Wood 2011; Hassemer and Baumann 2014; Hassemer et al. 2014), including several species endemic to small oceanic islands (Dunbar-Co et al. 2008; Tay et al. 2010; Meudt 2012). Many *Plantago* species are well-known for their traditional medicinal uses and also for other interesting properties (Samuelsen 2000; Weryszko-Chmielewska et al. 2012).

*Plantago commersoniana* Decne. ex Barnéoud (Barnéoud 1845: 37) is a rare and threatened species, with a highly disjunct distribution (Figure 1), endemic to rock outcrops on grasslands (“lajeados”, in Portuguese) from sea level up to 2,700 m a.s.l. (Rahn 1966, 1974). Because of these environmental requirements, this species can be considered an edaphic endemic species (Ferreira and Boldrini 2011). A few populations of *P. commersoniana* occur in the South region of Brazil, in addition to a single population in Serra do Caparaó (Souza and Hassemer 2015), another in eastern Paraguay, and a probably extinct population in southern Uruguay (Rahn 1966, 1974; Souza and Hassemer 2015). Hefler et al. (2011) affirm that this species occurs in Argentina, but no collection of *P. commersoniana* is known from that country.

During the revision of the entire *Plantago* collections at C, EFC, FLOR, FURB, HBR, ICN, MBM and UPCB herbaria, in addition to high-resolution images from ESA, G and IRAI, we found a collection of this species (G.G. Hatschbach et al. 76667, MBM) (Figure 2) from Ponta Porã, southern Mato Grosso do Sul state, Central-West region of Brazil. This is the first record of *P. commersoniana* in the Central-West region of Brazil, and is ca. 285 km distant from the nearest known population, in Yhú, Caaguazú department, eastern Paraguay. This is also the first record of a native *Plantago* species in Mato Grosso do Sul (Souza and Hassemer 2015), as only *P. major*, a non-native species in South America, was hitherto referred to this Brazilian state.

*Plantago commersoniana* are perennial herbs, with a taproot. Caudex growing vertically. Leaves linear to lanceolate, with variously-oriented trichomes, the abaxial surface usually with densely distributed, long, silky trichomes, the adaxial surface with sparsely distributed, shorter trichomes. Trichomes on leaves and scape usually long (2–5 mm) and always very thin, without conspicuous cellular articulations. Ovary with 1–3 ovules. Pyxidium 1–2-seeded. Synonyms of *P. commersoniana* include *P. bradei* Pilg. (Pilger 1949: 568)
First record of *Plantago commersoniana* in the Central-West region of Brazil

Hassemer et al. | Volume 11 | Number 4 | Article 1667

*Plantago commersoniana* is absent from the recent floristic survey of the hilly grasslands of Porto Alegre (Setúbal et al. 2011), which is one of the recorded locations for this species (see Figure 1).

Recent (January 2015) field work conducted by GH in southern Brazil — Guaíba and Santana do Livramento municipalities in Rio Grande do Sul state, and Palmeira municipality in Paraná state — did not find any specimens of *P. commersoniana*. His observations during this field work give us reason to believe that some populations of this species are already extinguished, or could become so in a near future, due to the advance of agriculture and of invasive *Pinus* L. (Pinaceae) species, to the detriment of its rare and restricted habitats (Figure 3).

Because of this, we stress that this species needs urgent conservation attention and efforts. Its conservation status according to the IUCN criteria (IUCN 2012, 2014) is Endangered (EN – B2a,b[i,ii,iii,iv,v]). It is necessary to

and *P. selloi* J.A.Schmidt (Schmidt 1878: 171); the name *P. yhuensis* has been applied to the Paraguayan collection of this species (*Hassler 9471, G*), but it is a *nomen nudum*.

The discovery of a population of *Plantago commersoniana* in Mato Grosso do Sul does not improve the conservation situation of this species. *Plantago commersoniana* is a rare species, with a sparse and discontinuous distribution, and its few recorded populations are small and isolated (Rahn 1966, 1974). These populations are likely in decline due to the ongoing destruction of its habitats, which could be verified during recent field work conducted in some localities where this species has been collected in the past. It is probable that this species is already extinct in Uruguay, a hypothesis already pointed by Rahn (1966, 1974), who did not find other collections of this species from that country apart from the type, collected in 1767 around Montevideo, southern Uruguay. Additionally, *P. commersoniana* is absent from the recent floristic survey of the hilly grasslands of Porto Alegre (Setúbal et al. 2011), which is one of the recorded locations for this species (see Figure 1).

Recent (January 2015) field work conducted by GH in southern Brazil — Guaíba and Santana do Livramento municipalities in Rio Grande do Sul state, and Palmeira municipality in Paraná state — did not find any specimens of *P. commersoniana*. His observations during this field work give us reason to believe that some populations of this species are already extinguished, or could become so in a near future, due to the advance of agriculture and of invasive *Pinus* L. (Pinaceae) species, to the detriment of its rare and restricted habitats (Figure 3).

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Figure 2. Scanned image of the collection of Plantago communisiana (G.G. Hartsch & al. 76667, MBM) from Ponta Porã, Mato Grosso do Sul state, Brazil.
Hassemer et al. | First record of Plantago commersoniana in the Central-West region of Brazil

correct the conservation status of *P. commersoniana* in the "Red List of the Brazilian Centre for the Conservation of the Flora" (Kutschenko and Messina 2012), where its conservation status has been assessed as Least Concern (LC). Additionally, *P. commersoniana* is absent from the "Red Book of the Flora of Brazil" (Martinelli and Moraes 2013).

In addition to serious conservation issues, *P. commersoniana* is also notable for its very complicated and unsatisfactorily resolved taxonomy, like many other *Plantago* species (Meudt 2011; Hassemer et al. 2015b; Shipunov 2015). This species is morphologically very variable between regions, especially regarding leaves and roots, and its distribution is highly disjunct. There is mostly a continuous variation for these characters, though, which makes it difficult their use for classification. In some localities, specimens of *P. guilleminiana* Decne. (Decaisne 1852: 722–723), a fairly frequent species, endemic to high-elevation grasslands in southern Brazil, exhibit some morphological characters similar to *P. commersoniana*. Following the judgement of Rahn (1974), all these doubtful collections are presently identified as *P. guilleminiana*. Therefore, we can consider the *P. commersoniana* complex an important challenge to plant taxonomy and conservation in the Neotropics, one of the world’s most important hotspots of plant diversity (Antonelli and Sannmartin 2011; Hassemer et al. 2015a).

**MATERIAL EXAMINED**


Figure 3. Habitats of *Plantago commersoniana* being invaded by *Pinus* sp., which kills the plants native to these areas by shading. Both areas were photographed by GH in 2015. A: Location of the only collection of *P. commersoniana* from Palmeira municipality, Paraná state, Brazil (collected by OSR in 1997). B: Location of the only collection of *P. commersoniana* from Guaiaba municipality, Rio Grande do Sul state, Brazil (collected by Nelson Ivo Matzenbacher in 1994, who kindly helped GH to find this area).

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Hassemer et al. | First record of Plantago commersoniana in the Central-West region of Brazil


Authors’ contribution statement: GH revised the herbarium collections, wrote the text, authored the photographs, produced the map and prepared the figures. OSR first identified the collection from Ponta Porã, and GH confirmed the identification. NR and OSR revised the text.

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