



Taxonomic novelties in *Plantago* section *Virginica* (Plantaginaceae) and an updated identification key

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Abstract

This study raises two rather poorly understood subspecies to the rank of species, and revalidates two subspecies in *Plantago* (Plantaginaceae) section *Virginica*. *Plantago napiformis*, formerly *P. tomentosa* subsp. *napiformis*, is an uncommon species from grasslands in northeastern Argentina, southern Paraguay and southern Brazil. *Plantago pretoana*, formerly *P. australis* subsp. *pretoana*, is a rare species, endemic to high-elevation bogs in two small areas in southern Brazil: Serra do Itatiaia, and around Lagoa Dourada. *Plantago australis* subsp. *angustifolia* and *P. australis* subsp. *hirtella* have been recently synonymised under *P. australis* subsp. *australis*, but we present evidence here for the revalidation of these two subspecies. We also revise the distribution of *P. australis* subsp. *angustifolia*, greatly reducing it, and expand the distribution of *P. australis* subsp. *australis*. Finally, we provide an updated identification key to all 22 *Plantago* species and subspecies in Brazil, Paraguay, Uruguay and northeastern Argentina.

Key words: Lamiales; neotropics; Plantagineae; South America; taxonomy

Resumo

Este estudo eleva à categoria de espécie duas subespécies relativamente pouco estudadas, e revalida duas subespécies, em *Plantago* (Plantaginaceae) seção *Virginica*. *Plantago napiformis*, anteriormente *P. tomentosa* subsp. *napiformis*, é uma espécie pouco frequente, que ocorre em campos naturais no nordeste da Argentina, sul do Paraguai e sul do Brasil. *Plantago pretoana*, anteriormente *P. australis* subsp. *pretoana*, é uma espécie rara, endêmica de banhados de altitude em duas áreas muito restritas nas regiões Sul e Sudeste do Brasil: a Serra do Itatiaia, e ao redor da Lagoa Dourada (Ponta Grossa, Paraná). *Plantago australis* subsp. *angustifolia* e *P. australis* subsp. *hirtella* foram recentemente sinonimizadas sob *P. australis* subsp. *australis*, mas nós apresentamos aqui evidências justificando a revalidação destas duas subespécies. Nós também revisamos a distribuição de *P. australis* subsp. *angustifolia*, reduzindo-a muito, e expandimos a distribuição de *P. australis* subsp. *australis*. Por fim, nós fornecemos uma chave de identificação atualizada para todas as 22 espécies e subespécies de *Plantago* que ocorrem no Brasil, Paraguai, Uruguai e nordeste da Argentina.

Palavras-chave: América do Sul; Lamiales; neotrópicos; Plantagineae; taxonomia

Introduction

Plantago von Linné (1753: 112) (Plantaginaceae) is a cosmopolitan genus with about 250 species concentrated in temperate regions and at high elevations in the tropics (Pilger 1937; Rahn 1996). The leaves and seeds of some species of *Plantago* are well known for being edible (Weryszko-Chmielewska *et al.* 2012), an exceptional source of dietary fibre (Marlett *et al.* 2000), and having many medicinal properties (Samuelsen 2000). *Plantago* is notable for its reduced, wind-pollinated floral morphology, rather variable and plastic vegetative morphology, and complex taxonomy and evolutionary history (Meudt 2011, 2012; Hassemer *et al.* 2015a). Thus, uncertainties remain regarding species number and circumscription, and the phylogenetic relationships of its sections (Ishikawa *et al.* 2009).

TABLE 1. Species and subspecies in *Plantago* section *Virginica*, and their geographical distributions. Country abbreviations: Arg—Argentina; Bol—Bolivia; Bra—Brazil; Chi—Chile; Col—Colombia; Ecu—Ecuador; Mex—Mexico; Par—Paraguay; Uru—Uruguay; Ven—Venezuela.

Species and subspecies	Distribution
<i>P. alismatifolia</i> Pilg.	C Mex
<i>P. argentina</i> Pilg.	NW Arg
<i>P. australis</i> subsp. <i>angustifolia</i> (Pilg.) Rahn	SE Bra
<i>P. australis</i> subsp. <i>australis</i> Lam.	Arg, Uru, Bol, S Bra
<i>P. australis</i> subsp. <i>cumingiana</i> (Fisch. & C.A.Mey.) Rahn	C Chi, W Arg
<i>P. australis</i> subsp. <i>hirtella</i> (Kunth) Rahn	N Arg to SW USA
<i>P. australis</i> subsp. <i>leioloma</i> Rahn	C Mex
<i>P. australis</i> subsp. <i>oreades</i> (Decne.) Rahn	Col, SW Ven
<i>P. australis</i> subsp. <i>pflanzii</i> (Pilg.) Rahn	Peru, Bol
<i>P. australis</i> subsp. <i>sodiroana</i> (Pilg.) Rahn	Peru, Ecu, Col, Ven
<i>P. berroi</i> Pilg.	E Arg, Uru
<i>P. buchtienii</i> Pilg.	W Bol, NW Arg
<i>P. catharinaea</i> Decne.	S Bra
<i>P. commersoniana</i> Decne. ex Barnéoud	S Bra, S Uru, SE Par
<i>P. corvensis</i> Hassemer	S Bra
<i>P. dielsiana</i> Pilg.	E Arg, S Uru
<i>P. firma</i> Kunze ex Walp.	C Chi
<i>P. floccosa</i> Decne.	NE Mex
<i>P. galapagensis</i> Rahn	Galápagos Islands
<i>P. guilleminiana</i> Decne.	S Bra
<i>P. jujuyensis</i> Rahn	NW Arg
<i>P. myosuroides</i> subsp. <i>humilior</i> (Pilg.) Rahn	SW Bol, SE Peru
<i>P. myosuroides</i> subsp. <i>myosuroides</i> Lam.	Arg, Uru, Par, S Bra
<i>P. napiformis</i> (Rahn) Hassemer	NE Arg, S Par, S Bra
<i>P. orbignyana</i> subsp. <i>hartwegii</i> (Decne.) Rahn	Ecu
<i>P. orbignyana</i> subsp. <i>niederleinii</i> (Pilg.) Rahn	NW Arg
<i>P. orbignyana</i> subsp. <i>orbignyana</i> Steinh. ex Decne.	S Peru, Bol, NW Arg
<i>P. orbignyana</i> subsp. <i>pseudomollior</i> (Rahn) Rahn	Peru, Bol, NW Arg
<i>P. pachyneura</i> Steud.	Chi
<i>P. penantha</i> Griseb.	NE Arg, Uru, S Bra
<i>P. pretoana</i> (Rahn) Hassemer	SE Bra
<i>P. pyrophila</i> Villarroel & J.R.I. Wood	E Bol
<i>P. rahniiana</i> Hassemer & R.Trevis.	S Bra
<i>P. rhodosperma</i> Decne.	SW USA, NE Mex
<i>P. subnuda</i> Pilg.	W USA
<i>P. tenuipala</i> (Rahn) Rahn	Col
<i>P. tomentosa</i> Lam.	Arg, Bol, Par, Uru, S Bra
<i>P. trinitatis</i> Rahn	Trindade Island
<i>P. truncata</i> Cham. & Schlecht.	C Chi
<i>P. turficola</i> Rahn	S Bra
<i>P. ventanensis</i> Pilg.	E Arg
<i>P. venturii</i> Pilg.	NW Arg
<i>P. virginica</i> L.	E USA to NW Mex
<i>P. weddelliana</i> Decne.	S Bol, NW Arg

Knowledge of *Plantago* species in Central and South America was greatly expanded with the studies in the twentieth century of the late (July 2013) Danish botanist Knud Rahn. Rahn published many treatments on Plantaginaceae sensu stricto in regional floras on the continent, such as Flora Ilustrada Catarinense (Rahn 1966), Flora of Ecuador (Rahn 1975), Flora Ilustrada de Entre Ríos (Rahn 1979), Flora Fanerogámica Argentina (Rahn 1995) and Flora Patagónica (Rahn 1999). The taxonomy of *Plantago* in the Americas has since been altered by the following studies: Hefler *et al.* (2011) proposed the synonymisation of *P. australis* subsp. *angustifolia* (Pilger 1913: 274) Rahn (1974: 75–76) and *P. australis* subsp. *hirtella* (Kunth 1817: 229) Rahn (1964: 50) under *P. australis* subsp. *australis* de Lamarck (1791: 339); Segarra & Wood (2011: 471–473) described *P. pyrophila* Villarroel & J.R.I. Wood from cerrados in eastern Bolivia; Hassemer & Baumann (2014: 181–185) described *P. corvensis* Hassemer from rocky cliffs in southern Brazil; and Hassemer *et al.* (2014: 637–641) described *P. rahniiana* Hassemer & R.Trevis. from high-elevation grasslands also in southern Brazil.

Additional taxonomic questions require clarification within *Plantago*. Recent and ongoing studies by one of us (GH) of the *Plantago* collections at some European and South American herbaria (C, EFC, FLOR, FURB, HBR, ICN, MBM and UPCB), in addition to field work in Brazil and a thorough review of the relevant taxonomic literature, have shed light on additional taxonomic problems, particularly within South American *Plantago* section *Virginica* Barnéoud (1845: 7).

Section *Virginica* is part of subgenus *Plantago* and includes 44 species and subspecies (Table 1), all of them native to the Americas. However, most of these species and subspecies (35) are restricted to South America. All *Plantago* species native to Brazil, Paraguay and Uruguay belong to this section, with the sole exception of *P. brasiliensis* Sims (1826: 2616), which belongs to subgenus *Psyllium* (de Tournefort ex de Jussieu 1789: 90) Harms & Reiche (1895: 373) section *Gnaphaloides* Barnéoud (1845: 42). Although section *Virginica* has been revised by Rahn (1974), who called it “a critical group” owing to its taxonomic challenges, there are still some evidently poorly-resolved species complexes, most notably the *P. australis* and the *P. commersoniana* Decaisne ex Barnéoud (1845: 37) (Hassemer *et al.* 2015b) complexes.

Here, we provide a revised taxonomic treatment of some species of South American *Plantago* section *Virginica*. We provide evidence for recognising at species rank two previously poorly-understood *Plantago* subspecies, which had been previously overlooked probably because of their subspecies status. We also correct a taxonomic misunderstanding concerning the *P. australis* complex by revalidating two subspecies. Finally, this work provides an updated identification key to all 22 *Plantago* species and subspecies in Brazil, Paraguay, Uruguay and northeastern Argentina (Chaco, Corrientes, Entre Ríos, Formosa, Misiones, Santa Fe and Santiago del Estero provinces).

Materials & Methods

GH examined the entire *Plantago* collections at C, EFC, FLOR, FURB, HBR, ICN, MBM and UPCB herbaria, examined loan collections from IAC and RB and high-resolution images of collections from ESA, F, G, IRAI, K, LE, P, R, S, UC and US (see Appendix 1 for a partial list of the material examined), and conducted field work on various trips in southern Brazil between April 2012 and January 2015. Seeds collected during these trips have permitted GH to conduct cultivation experiments of several *Plantago* species in Florianópolis, Brazil and Copenhagen, Denmark, which were important in giving a better understanding of the development, morphology and ecology of these species. We consulted the works of von Linné (1753), de Jussieu (1789), de Lamarck (1791), von Humboldt *et al.* (1817), von Chamisso & von Schlechtendal (1826), Rapin (1827), von Fischer *et al.* (1837), Barnéoud (1845), von Steudel (1849), Decaisne (1852), Schmidt (1878), von Fernsee (1888), Harms & Reiche (1895), Pilger (1912, 1913, 1928, 1937), Rahn (1964, 1966, 1974, 1975, 1978, 1979, 1983, 1992, 1995, 1996, 1999), Luteyn *et al.* (1999), Souza & Souza (2002a, 2002b), Hefler *et al.* (2011), Segarra & Wood (2011), Hassemer & Baumann (2014) and Hassemer *et al.* (2014, 2015a, 2015b). To elaborate the new identification key we built upon previous keys from Rahn (1966, 1995), Hefler *et al.* (2011) and Hassemer *et al.* (2014). We included in the new key only the Argentine provinces where the taxonomic changes presented in this work are most significant. Inclusion of *Plantago* species from the rest of Argentina (particularly from the Andes and Patagonia) would enlarge the key considerably and make it more difficult to use; this will be the subject of future studies.

The subgeneric classification of *Plantago* follows Rahn (1978, 1996), with the updates of Rønsted *et al.* (2002) and Hoggard *et al.* (2003). The assessment of conservation status follows the IUCN criteria (IUCN 2012, 2014). The classification of trichome types follows Rahn (1992); all species and subspecies treated in this study have type G trichomes on the leaves and scape (i.e., long, eglandular trichomes with visible cellular articulations, gradually tapering towards its apex; see for example Figures 1C and 2C). We followed the treatment and typification of the synonyms of the species and subspecies presented here as in Rahn (1974). Varietal synonyms have not been provided, except when we judged it relevant to present them; for a complete list of varietal synonyms see Rahn (1974).

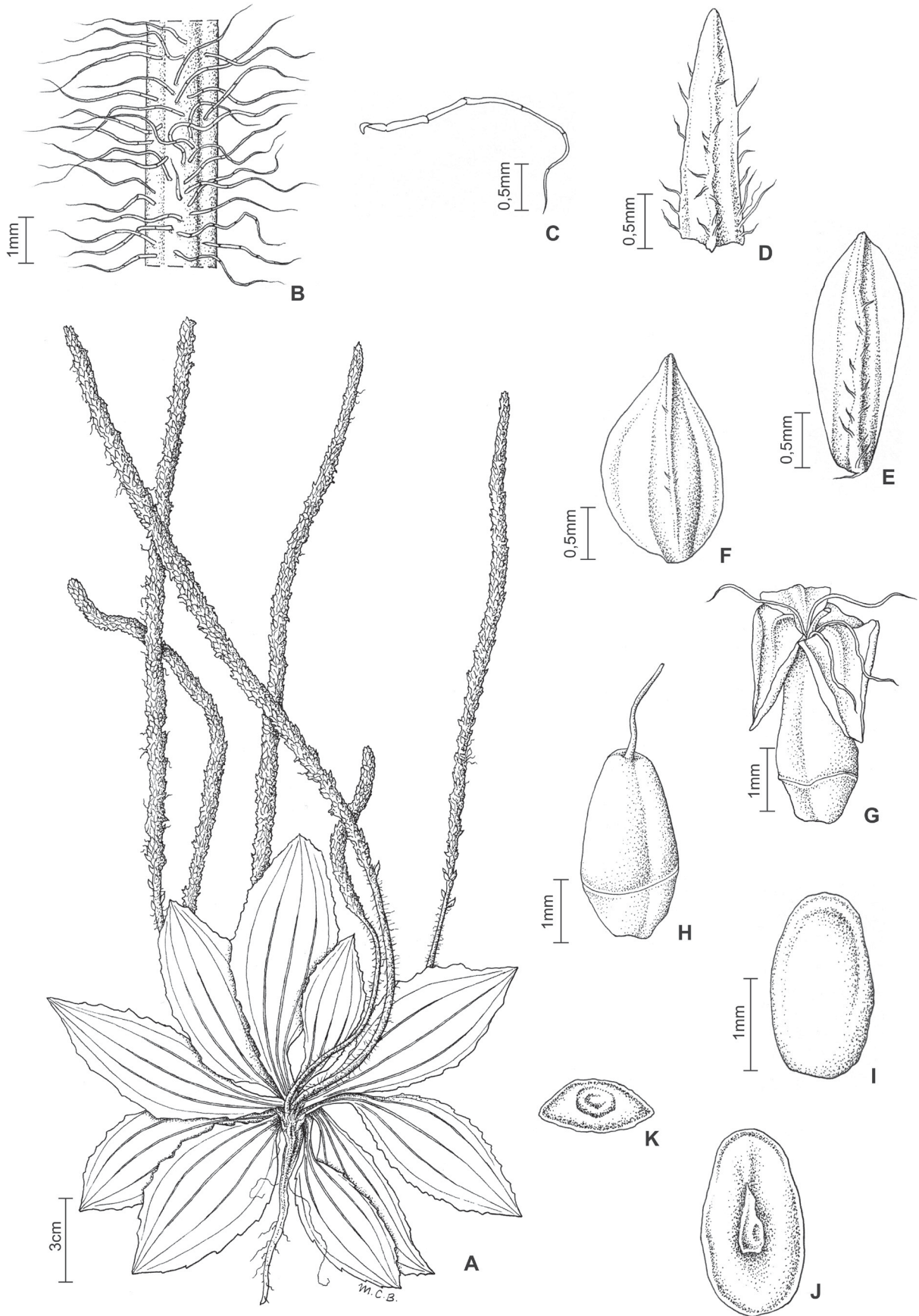


FIGURE 1. *Plantago napiformis*. A. Habit. B. Detail of scape. C. Detail of a trichome from scape. D. Bract, dorsal face. E. Anterior sepal, dorsal face. F. Posterior sepal, dorsal face. G. Flower. H. Fruit. I. Seed, dorsal side. J. Seed, ventral side. K. Seed, transversal section. From *K. Hagehund 5690* (ICN), illustrations by Marina Clasen Baumann.

Taxonomic Treatment

New combinations for two previously poorly-understood subspecies

Plantago napiformis (Rahn 1964: 56–57) Hassemer, *comb. et stat. nov.*

≡ *P. paralias* subsp. *napiformis* Rahn (1964: 56–57); ≡ *P. tomentosa* subsp. *napiformis* (Rahn 1964: 56–57) Rahn (1974: 139–141).

Type:—ARGENTINA. CORRIENTES: Empedrado: Estancia Las Tres Marías, dry grassland on the top of the bank of Río Paraná, soil black earth, 22 November 1962, *T.M. Pedersen 6650* (holotype C!).

Rosette herbs, 5–58 cm tall, perennial, often darkening slightly on drying. Taproot usually thickened and napiform above; caudex 0.3–2.0 × 0.4–1.9 cm, with sparsely-distributed brownish orange hairs. Leaves 4.1–21.0 × 1.0–3.7 cm, 4- to 7-veined, chartaceous; petiole rather distinct; lamina elliptic to obovate, with trichomes 0.7–2.8 mm long, type G, sparsely-distributed and variously-directed, but much more densely pilose along the veins of the abaxial surface; margin weakly to strongly toothed, ciliate; apex acute to obtuse. Inflorescence 6–58 cm long. Scape 3–38 cm long, cylindrical, generally with longitudinal grooves; trichomes 1.5–3.0 mm long, type G, densely-distributed, patent. Spike 3–20 cm long, usually subequal to the length of the scape, cylindrical, multi-flowered, with flowers densely packed above, less densely crowded below. Bracts narrowly triangular, rarely triangular, 1.7–3.0 × 0.7–1.0 mm, dorsal face pilose, margin ciliate. Anterior sepals narrowly elliptic to almost oblanceolate, 2.1–2.6 × 0.7–1.0 mm; keel pilose; margin glabrescent; apex mucronulate. Posterior sepals oval to elliptic, 2.2–2.9 × 0.9–1.6 mm; keel pilose; margin glabrescent; apex acute or mucronulate. Corolla actinomorphic, glabrous; lobes ovate, 2.0–3.1 mm long, shorter than the sepals, patent or erect; apex acuminate. Stamens 4. Ovary with 3 ovules; pyxidium 2.4–3.3 × 1.3–1.6 mm, 3-seeded. Seeds narrowly ellipsoid to ovoid, slightly convex ventrally, convex dorsally, 1.4–2.2 × 0.7–1.2 mm; surface reticulate, light to dark brown.

Illustrations:—Figure 1; also Figure 78 in Rahn (1974).

Phenology:—Flowering August–January, fruiting September–February.

Habitat and distribution:—Occurs in rather dry grasslands in southern Paraguay, northeastern Argentina (Chaco, Corrientes, Formosa, Misiones and Santa Fe) and southern Brazil (Rio Grande do Sul) (Figure 3).

Conservation status:—Near Threatened (NT). This species has a rather restricted distribution, and it is not very frequent. Furthermore, it does not appear to thrive in disturbed habitats, as the known collections of this species are from natural grasslands. Although probably not currently threatened with extinction, the destruction of the natural grasslands in Corrientes, Argentina and in southern Paraguay would certainly endanger the survival of this species. It may already be regionally threatened in Brazil, as it is known from only two localities there (Giruá and Santa Maria), and has not been collected there since 1975. We recommend further studies of the populations of this species to allow for better understanding of its distribution, conservation status and intraspecific variation.

Discussion:—*Plantago napiformis*, previously classified as a subspecies of *P. tomentosa* de Lamarck (1791: 340), is however morphologically more similar to *P. catharinea* Decaisne (1852: 726) than to *P. tomentosa*; *P. napiformis* can be distinguished from these two species by its roots, caudex, leaves and seeds (Table 2), and by ecology. The distribution of *P. napiformis* and *P. catharinea* do not overlap, as the latter is restricted to coastal vegetation (“restingas”) in southern Brazil.

TABLE 2. Main morphological differences among *Plantago catharinea*, *P. napiformis* and *P. tomentosa*.

	<i>P. catharinea</i>	<i>P. napiformis</i>	<i>P. tomentosa</i>
Roots	Unthickened taproot	Thickened taproot, usually swollen above	Thickened taproot
Caudex	Elongated, very conspicuous in older plants	Short and inconspicuous	Generally short and inconspicuous
Trichomes on leaves and scape	Short, wide and stiff; patent; generally whitish	Long, wide and stiff; patent; generally brownish	Long and slender, almost silky; variously directed; generally whitish
Seeds	Reticulate	Reticulate	Rugose

As previously treated (Rahn 1964, 1974, 1995), the circumscription of *P. tomentosa* included plants with both rugose and reticulate seeds, and with both slender and wide trichomes. This situation made it impossible to correctly identify specimens of *P. napiformis* using identification keys such as those in Rahn (1966) and Hefler *et al.* (2011). The rugose seeds and the unusually slender type G trichomes are defining of *P. tomentosa*, as no other species in section

Virginica have either of these characteristics; in contrast, *P. napiformis* has reticulate seeds and stiff and wide type G trichomes, as do many other representatives of section *Virginica*. Based on its morphology, and also on environmental differences, we consider that *P. napiformis* warrants species rank.

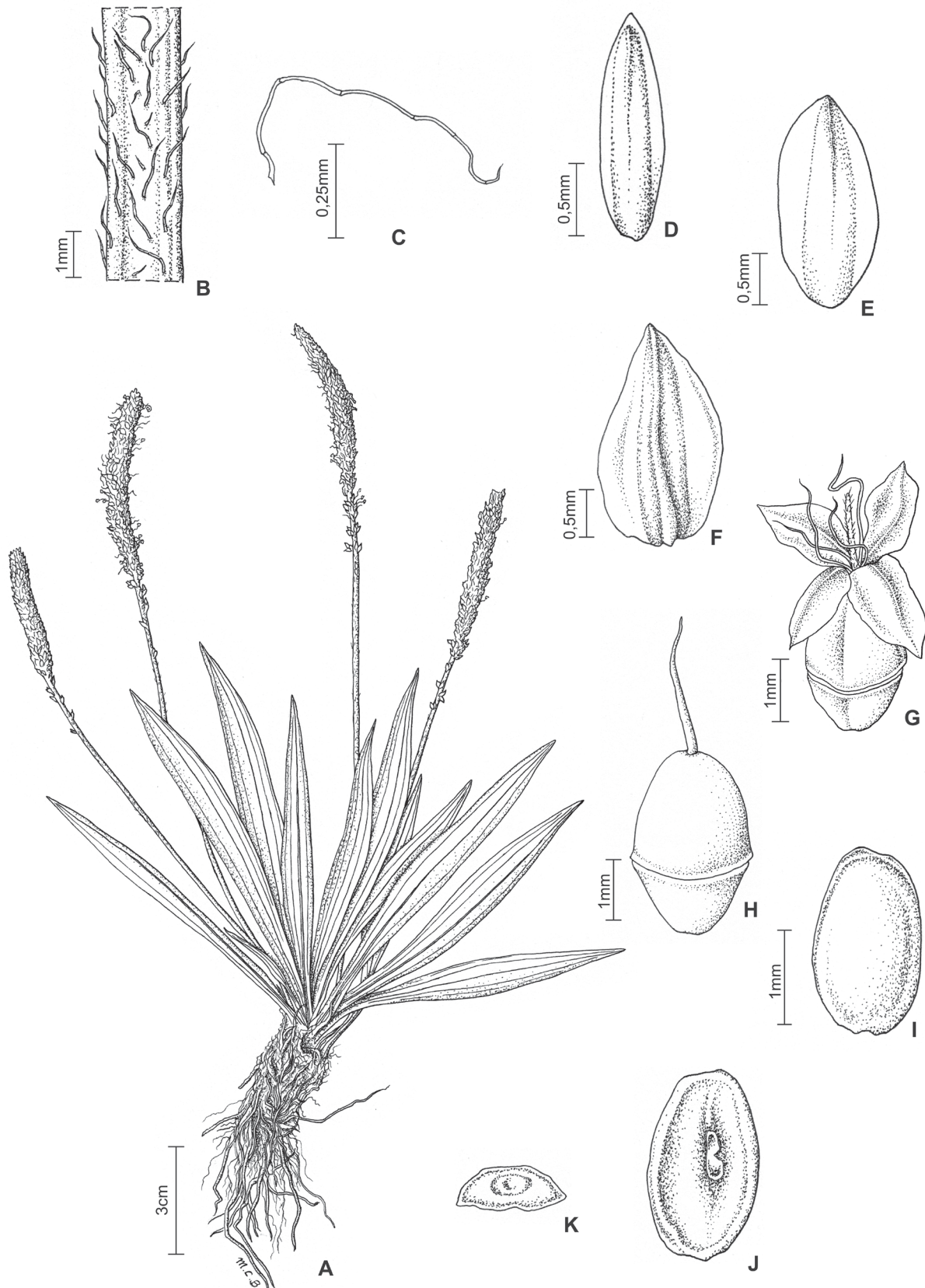


FIGURE 2. *Plantago pretoana*. A. Habit. B. Detail of scape. C. Detail of a trichome from scape. D. Bract, dorsal face. E. Anterior sepal, dorsal face. F. Posterior sepal, dorsal face. G. Flower. H. Fruit. I. Seed, dorsal side. J. Seed, ventral side. K. Seed, transversal section. From *J.M. Silva & J. Cordeiro 7554* (MBM), illustrations by Marina Clasen Baumann.

Plantago pretoana (Rahn 1964: 51–53) Hassemer, *comb. et stat. nov.*

≡ *P. australis* subsp. *pretoana* Rahn (1964: 51–53). Type:—BRAZIL. MINAS GERAIS: Itatiaia, an Tijuca près de la source du Rio Preto, 20 November 1876, *A.F.M. Glazou 8897* (holotype C!, isotypes LE and R, photographs!).

Rosette herbs, 10–58 cm tall, perennial, becoming black, or almost so, on drying. Taproot absent; caudex a rhizome, 1–10 × 0.5–1.8 cm, usually with brownish orange trichomes. Leaves narrowly-elliptic or narrowly-ovate, 7–40 × 0.6–3.0 cm, 3- to 7-veined, membranaceous; petiole scarcely distinct; lamina quite glabrous on both faces or rarely with scattered, patent, type G trichomes, 0.2 mm long; margin with usually inconspicuous teeth, glabrous or rarely with short cilia 0.1 mm long; apex acuminate. Inflorescence 14–58 cm long. Scape 10–44 cm long, cylindrical, generally with longitudinal grooves and trichomes 0.8–1.3 mm long, type G, sparsely-distributed, appressed and antrorse. Spike 4–14 cm long, shorter to subequal to the length of the scape, cylindrical, multi-flowered, with flowers densely packed above, less densely crowded below. Bracts ovate to narrowly ovate, 1.7–2.0 × 0.3–1.8 mm, glabrous to glabrescent. Anterior sepals elliptic, 1.9–3.5 × 0.8–1.4 mm, wholly glabrous; apex acute. Posterior sepals ovate, 2.0–3.0 × 1.1–1.5 mm, wholly glabrous; apex acute. Corolla actinomorphic, glabrous; lobes ovate, 1.9–2.5 × 1.2–1.6 mm, shorter than the sepals, patent, glabrous; apex obtuse to acuminate. Stamens 4. Ovary with 3 ovules, sometimes malformed and with only 1–2 ovules; pyxidium 2.5–3.0 × 1.4–1.7 mm, 3-seeded, sometimes bearing only one malformed seed. Seeds ovoid, flattened to slightly concave ventrally, convex dorsally, 1.5–2.0 × 1.0–1.3 mm; surface reticulate, black.

Illustration:—Figure 2.

Phenology:—Flowering June–March, fruiting December–March.

Habitat and distribution:—Known only from two very restricted, considerably disjunct areas: high-elevation rocky bogs at 2100–2500 m asl in Serra do Itatiaia, southeastern Brazil, and wet grasslands around Lagoa Dourada, 790–840 m asl, in Parque Estadual de Vila Velha, Ponta Grossa, Paraná state, southern Brazil (Figure 3).

Conservation status:—Endangered (EN–B2a,b[iii]). *Plantago pretoana* is a very rare and restricted species, being known from only two markedly disjunct areas. The only two collections of this species from Lagoa Dourada are from 1914 and 1978; recent (January 2015) collection efforts around Lagoa Dourada by GH were unsuccessful. It is possible that the population of *P. pretoana* around Lagoa Dourada may be in decline due to habitat loss, as the grasslands there are gradually being substituted by shrubby vegetation, notably by the advance of *Mimosa pigra* von Linné (1755: 13–14) (Fabaceae), a notoriously problematic invasive plant species (Braithwaite *et al.* 1989). The protection of southern Brazil grasslands is an urgent matter that needs to be discussed widely among scientists and Brazilian politicians, due to the increasing loss of biodiversity in these habitats.

Discussion:—*Plantago pretoana* was described by Rahn (1964) as a subspecies of *P. australis*, together with other species and subspecies in section *Virginica* with wide, antrorse trichomes on the scape. Later, in his treatise on the section *Virginica*, Rahn (1974) adopted a narrower circumscription for *P. australis*, including only plants without a taproot, which resulted in his acceptance of *P. buchtienii* Pilger (1913: 251–252), *P. dielsiana* Pilger (1928: 107–108), *P. orbignyana* Steinheil ex Decaisne (1852: 704) (with 4 subspecies), *P. pachyneura* von Steudel (1849: 406), *P. subnuda* Pilger (1912: 260) and *P. truncata* von Chamisso & von Schlechtendal (1826: 170–171) as distinct species. Therefore, Rahn kept *P. pretoana* as a subspecies of *P. australis*, as it doesn't have a taproot. In his new definition (Rahn 1974), *P. australis* was to have many secondary fibrous roots but not a taproot, and almost always a short and rather inconspicuous caudex, but seldom, although always in *P. australis* subsp. *pretoana*, a long and thickened (to 11 × 3 cm) rhizome.

Although Rahn (1964, 1974) described *P. australis* subsp. *pretoana* as having 1-seeded pyxidia, he admitted that he had probably not seen well-formed seeds. Indeed, in the material we observed, we found that plants of this species are normally 3-seeded, and 1-seeded pyxidia, although not rare, do not seem to contain a well-formed seed. It is important to note that the specimen illustrated in the Figure 36 in Rahn (1974) [*L.B. Smith et al. 7712*, HBR] is not *P. pretoana* (Hassemer *et al.* 2015a); the identity of this specimen is still unknown, it might belong to an undescribed species, but more material is necessary to resolve this question. Contrary to Rahn (1974), we found that *P. pretoana* does not occur in Rio Grande do Sul and Santa Catarina states, as the specimens from there attributed to this species [*B. Rambo 34589*, S and *B. Rambo 51492*, HBR] were shown to be *P. australis* subsp. *australis*, except for *L.B. Smith et al. 7712* [HBR] (see above). Our revision of the material of *P. pretoana* (actually most of these specimens, originating from Serra do Itatiaia, were previously identified as *P. dielsiana*; see Hassemer *et al.* 2015a) confirms that these specimens constitute a distinct species, forming a morphologically, geographically, and ecologically well-defined group.

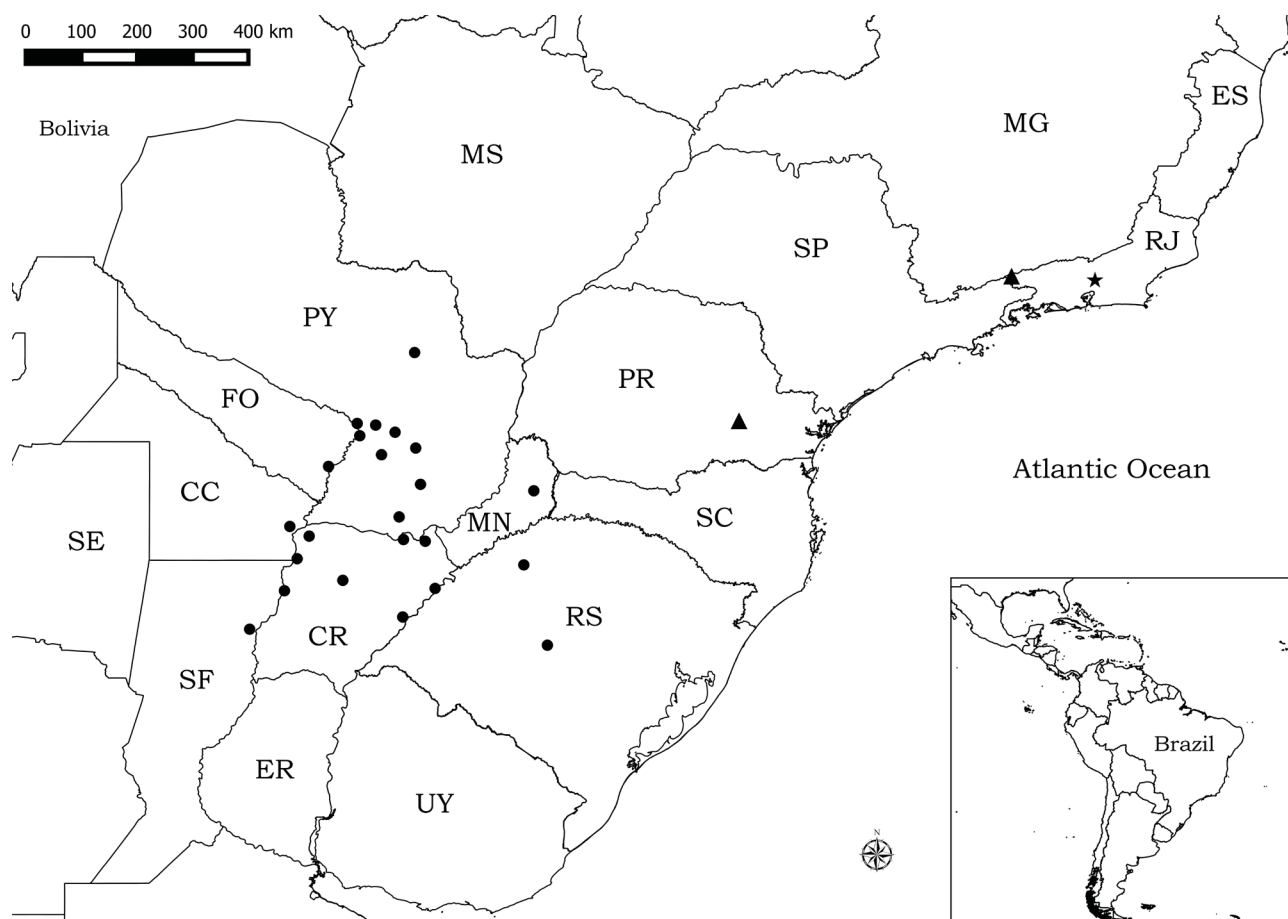


FIGURE 3. Distribution of *Plantago australis* subsp. *angustifolia* (stars), *P. napiformis* (dots) and *P. pretoana* (triangles). Refer to the legend of the identification key for the abbreviations of the territories in the map.

Correcting taxonomic misunderstandings in the *Plantago australis* complex

Plantago australis subsp. *angustifolia* (Pilger 1913: 274) Rahn (1974: 75–76)

≡ *P. bicallosa* var. *angustifolia* Pilger (1913: 274). Type:—BRAZIL. RIO DE JANEIRO: 1885–86, A.F.M. Glaziou 16360 (lectotype C!).

See description in Rahn (1974).

Illustration:—Figure 28 in Rahn (1974).

Phenology:—Poorly known; probably October–January (based on the few known collections).

Habitat and distribution:—Apparently restricted to the high summits of Serra dos Órgãos, 2000–2250 m asl, in Rio de Janeiro state, southeastern Brazil (Figure 3).

Conservation status:—Data Deficient (DD). Distribution data about this subspecies is still deficient, as it has never been included in identification keys to *Plantago* in Brazil. This subspecies appears to be restricted to Serra dos Órgãos, thus warranting a threatened status, but more studies are necessary to clarify the distribution, conservation status and ecology of this poorly-understood subspecies.

Discussion:—Rahn (1974), while making this combination, admitted that “It is with some hesitation that I have included all the material cited above in the same subspecies”, as he greatly expanded the distribution of former *P. bicallosa* var. *angustifolia*, in attributing to it five collections (at HBR herbarium) from Santa Catarina state, southern Brazil. GH examined all these specimens, and concluded that they actually belong to *P. australis* subsp. *hirtella*. That would explain why Hefler *et al.* (2011) proposed the synonymisation of this subspecies under *P. australis* subsp. *australis* (see more details about this misunderstanding under *P. australis* subsp. *hirtella*).

However, the examination of the lectotype (*A.F.M. Glaziou 16360*, C), and of high-resolution images of the isotype at K and of another collection attributed to this subspecies by Rahn (1974) from Serra dos Órgãos (*E.H.G. Ule 136*, R) has convinced us that these specimens are indeed distinct from other *P. australis* subspecies (Table 3). This, in addition to the very controversial synonymisation by Hefler *et al.* (2011), who did not see any collections from Rio de Janeiro, including the type, has led us to propose here the revalidation of this subspecies. This poorly-understood species needs further study to elucidate its morphology, distribution, conservation status, ecology and phylogenetic relationships with other *P. australis* subspecies.

TABLE 3. Main morphological differences between *Plantago australis* subsp. *angustifolia*, *P. australis* subsp. *australis* and *P. australis* subsp. *hirtella*.

	<i>P. australis</i> subsp. <i>angustifolia</i>	<i>P. australis</i> subsp. <i>australis</i>	<i>P. australis</i> subsp. <i>hirtella</i>
Secondary roots	To 1.5 mm wide	To 3 mm wide	To 1.5 mm wide
Caudex	To 3 cm long	To 3 (–5) cm long	To 2 cm long
Leaves	Pilose, especially along the veins on the abaxial face; margin denticulate; apex acuminate	Glabrous to glabrescent, even along the veins; margin generally edentate; apex acute to obtuse	Pilose, especially along the veins on the abaxial face; margin edentate; apex acute to obtuse
Inflorescence	Spike shorter than the scape	Spike equalling or exceeding the length of the scape	Spike equalling or exceeding the length of the scape
Trichomes on scape	Lower half of the scape pilose	Lower half of the scape glabrous to glabrescent	Lower half of the scape pilose

***Plantago australis* subsp. *australis* de Lamarck (1791: 339)**

= *P. accrescens* Pilger (1912: 259); = *P. candollei* Rapin (1827: 453); = *P. denudata* Pilger (1913: 261–262); = *P. durvillei* Delile ex Fisch. & C.A.Mey. in von Fischer *et al.* (1837: 45); = *P. gigantea* Decaisne (1852: 724); = *P. kurtzii* Pilger (1912: 260–261); = *P. macropus* Pilger (1913: 254); = *P. macrostachya* Decaisne (1852: 724) ≡ *P. australis* subsp. *macrostachya* (Decaisne 1852: 724) Rahn (1964: 50); = *P. refracta* Pilger (1912: 261–262); = *P. stuckertii* Pilger (1912: 262–263); = *P. stuckertii* subsp. *catamarcensis* Pilger (1912: 263). Type:—ARGENTINA. “Buenos Ayres”, *Comerson s.n.* (holotype P, photograph!, isotype C!).

See description in Rahn (1974).

Illustration:—Figure 29 in Rahn (1974).

Phenology:—Mainly September–February.

Habitat and distribution:—Uruguay, Argentina (except southern Patagonia), southern Bolivia and southern Brazil. It occurs in open (unforested) areas, on rather moist soils, generally not far from rivers, canals or lakes, from sea-level to 3450 m asl (Rahn 1974). Previously known in Brazil only from Rio Grande do Sul state (Rahn 1974, 1995), this study expands the distribution of this subspecies northwards to Santa Catarina state, as we found collections of this subspecies which originated from five municipalities there: Alfredo Wagner, Bom Jardim da Serra, Grão Pará, Lauro Müller and Urubici.

Conservation status:—Least Concern (LC). This subspecies has a rather large distribution and is very frequent, especially in Argentina.

Discussion:—We noticed that the authors of two synonyms of this subspecies are commonly subject to some confusion in the literature and also online databases. *Plantago candollei* Rapin (Daniel Rapin) is commonly erroneously presented as *P. candollei* Raf. (Constantine Samuel Rafinesque), and *P. durvillei* Delile ex Fisch. & C.A.Mey. (Carl Anton von Meyer) is often erroneously presented as *P. durvillei* Delile ex Fisch. & G.Mey. (Georg Friedrich Wilhelm Meyer) or as *P. durvillei* Delile ex Steud. (Ernst Gottlieb von Steudel).

***Plantago australis* subsp. *hirtella* (Kunth 1817: 229) Rahn (1964: 50)**

≡ *P. hirtella* Kunth in von Humboldt *et al.* (1817: 229); = *P. bicallosa* Decaisne (1852: 725); = *P. cantagallensis* Zahlbr. ex Wawra in von Fernsee (1888: 56); = *P. galeottiana* Decaisne (1852: 726); = *P. leptophylla* Decaisne (1852: 723); = *P. schiedeana* Decaisne (1852: 723); = *P. veratrifolia* Decaisne (1852: 721–722). Type:—“Herb. Mus. Paris. Herbarium Humboldt & Bonpland Amerique equatoriale. *Plantago hirtella*” (holotype P, photograph!).

See description in Rahn (1974).

Illustration:—Figure 31 in Rahn (1974).

Phenology:—In Arizona and Mexico mainly June–August; in Central America, Venezuela, Ecuador and Peru throughout the year; in Bolivia and northwestern Argentina January–March, and in northeastern Argentina, Paraguay and Brazil mainly November–December (Rahn 1974). This subspecies may flower throughout the year throughout its wide range, although flowering seems to be concentrated during spring in southern South America.

Habitat and distribution:—This subspecies occurs from southwestern USA (Arizona) to northern Argentina and Uruguay through Mexico, Central America, the Andes and southern Brazil (Rahn 1974), from sea level to 3000 m asl, but is absent from tropical lowlands. Its original habitat was most probably natural clearings in subtropical forests (Rahn 1974). However, this subspecies has now a very broad ecological range, also occurring in high-altitude grasslands, coastal vegetation, and especially in disturbed habitats as a ruderal plant. This is the most widespread species or subspecies in *Plantago* section *Virginica*, and also the only one that tolerates some shading.

Conservation status:—Least Concern (LC). This subspecies is very frequent, and has a very large distribution and a relatively broad ecological range, including ruderal habitats.

Discussion:—The taxonomic situation of *Plantago australis* subsp. *hirtella* has been the subject of a recent yet quite significant (considering its continental distribution) misunderstanding. In their taxonomic revision of *Plantago* in the South region of Brazil, Hefler *et al.* (2011) affirmed that Luteyn *et al.* (1999) had synonymised *P. australis* subsp. *hirtella* under *P. australis* subsp. *australis*, and they further synonymised *P. australis* subsp. *angustifolia* also under *P. australis* subsp. *australis*. However, a careful reading of Luteyn *et al.* (1999) makes it clear that they did not propose any taxonomic changes, as they merely list the subspecies of *P. australis* that occur in the páramos (Andean high-elevation grasslands). Personal communication (March 2015) with James Luteyn confirmed that Luteyn *et al.* (1999) did not propose any synonymisation in *P. australis*. Despite this, the taxonomic changes proposed by Hefler *et al.* (2011) have been broadly accepted, and were followed, for instance, by important plant catalogues such as the Argentine “Catálogo de las Plantas Vasculares del Cono Sur” (<http://www2.darwin.edu.ar/proyectos/floraargentina/fa.htm>) and the Brazilian “Lista de Espécies da Flora do Brasil” (<http://www.floradobrasil.jbrj.gov.br>).

The careful examination of a great number of collections, in addition to field work and a thorough bibliographic revision have convinced us that *P. australis* subsp. *australis* and *P. australis* subsp. *hirtella* are distinct, and can be separated by their morphology, distribution and ecology; we thus agree with Rahn (1964, 1966, 1974, 1975, 1979, 1995, 1999) in recognising these two subspecies.

It is evident that even though Rahn worked extensively on *P. australis*, it is still poorly resolved at the species level, as Rahn himself admitted (Rahn 1966, 1974). However, the synonymisation of *P. australis* subsp. *hirtella* under *P. australis* subsp. *australis*, in addition to being a misunderstanding as explained above, is a clear regression in the understanding of this species complex. To solve this notoriously confusing species complex it will probably be necessary, in addition to examining material from throughout its vast distribution range (which was not done by Hefler *et al.* 2011), to employ molecular phylogenetic techniques. To date we consider that the available knowledge supports the recognition of both *P. australis* subsp. *australis* and *P. australis* subsp. *hirtella*. In addition to the information presented by Rahn (1974), we found two more morphological characters that can be used to separate these two subspecies: the width of the secondary cord-like roots, and the distribution of the trichomes on the scape (Table 3).

Final considerations

Two species recognised here, *Plantago napiformis* and *P. pretoana*, have historically been overlooked and are missing from recent identification keys because of their former treatment at the rank of subspecies. This taxonomic history has particular repercussions for *P. pretoana*, an endangered and very narrowly distributed species. Similarly, since their synonymisation under *P. australis* subsp. *australis*, *P. australis* subsp. *angustifolia* and *P. australis* subsp. *hirtella* have also disappeared from all identification keys and taxonomic treatments.

We believe that regional taxonomic revisions, especially those providing updated, high-quality identification keys and distribution maps, are important to the advance and proper application of botanical knowledge. However, maximal care should be applied when proposing taxonomic changes, especially to species whose distribution extends beyond the geographical range of these works. We stress the importance of herbarium revision, examination of type specimens, and field work when conducting taxonomic studies.

In his revision of section *Virginica*, which is arguably his most important taxonomic publication, Rahn (1974) admitted that if a “biological species concept” was to be followed then all his subspecies, and probably also many

unnamed entities would have to be granted species rank. Further studies are needed to resolve the *P. australis* complex, but the current study is an important contribution that clears up some taxonomic misunderstandings and moves towards a more “biological” taxonomic understanding of this notorious complex group of plants.

Key to the species of *Plantago* in Brazil, Paraguay, Uruguay and northeastern Argentina

Abbreviations: Argentine provinces: CC—Chaco; CR—Corrientes; ER—Entre Ríos; FO—Formosa; MN—Misiones; SE—Santiago del Estero; SF—Santa Fe. Brazilian states: ES—Espírito Santo; MG—Minas Gerais; MS—Mato Grosso do Sul; PR—Paraná; RJ—Rio de Janeiro; RS—Rio Grande do Sul; SC—Santa Catarina; SP—São Paulo. PY—Paraguay. UY—Uruguay.

Notes: Non-native species are marked with an asterisk. *Plantago lanceolata* and *P. major*, due to their ruderal ecology, can potentially be found in the entire area covered by this key.

1. Subshrubs. Aerial stem woody, to 34 cm long [ES] *P. trinitatis*
- Herbs. Conspicuous woody aerial stem lacking 2
2. Leaves pinnatifid. Corolla tube pubescent or villous [RS; UY] **P. coronopus*
- Leaf margins entire or dentate. Corolla tube glabrous 3
3. Leaves linear. Stamens 2. Seeds 10–25 [CR, ER; PY; UY] **P. heterophylla*
- Leaves linear to ovate or obovate. Stamens 4. Seeds 1–31 4
4. Leaves ovate, with a very evident petiole 5
- Leaves linear to obovate, basally attenuated, with the petiole not clearly distinct from the lamina 6
5. Taproot absent, substituted by many unthickened secondary roots. Trichomes on scape antrorse. Seeds 6–31 [—] **P. major*
- Taproot very long and thicker than 10 mm, or more commonly absent, being substituted by thick secondary roots (to 6 mm). Trichomes on scape patent but becoming retrorse on maturity of the inflorescence. Seeds 1–4 [SC] *P. corvensis*
6. Scape at least 3.5 times longer than spike. Seeds 2, ventral side deeply concave 7
- Scape normally shorter or equal to the length of the spike, rarely to 3 times longer in dwarf plants. Seeds 1–31, ventral side flattened, convex, or moderately concave 8
7. Leaves linear to narrow-lanceolate. Bract with apex obtuse to acuminate. Anterior sepals connate only at base. Corolla zygomorphic, with posterior lobe narrower, and curved at a higher point relative to the other lobes [CR, ER; RS, SC; UY] .. *P. brasiliensis*
- Leaves lanceolate to elliptic-lanceolate. Bract with long-cuspidate apex. Anterior sepals connate for nearly entire length. Corolla actinomorphic [—] **P. lanceolata*
8. Taproot thick, without secondary roots. Trichomes on scape variously directed, silky, relatively slender, not very perceptibly tapering towards the apex. Seeds rugose [CC, CR, ER, FO, MN, SE, SF; MG, PR, RJ, RS, SC, SP; PY; UY] *P. tomentosa*
- Taproot present or absent, with or without secondary roots. Trichomes on scape antrorse or patent, not silky, stiff and wide, very perceptibly tapering towards the apex. Seeds reticulate 9
9. Trichomes on leaves and scape very thin, without conspicuous cellular articulations and not tapering towards the apex 10
- Trichomes on leaves and scape relatively wide, with very conspicuous cellular articulations, gradually tapering towards the apex 12
10. Caudex globose. Leaves elliptic, oblanceolate, or obovate. Seeds 2–3 [MG, PR, RJ, RS, SC, SP] *P. guillemianina*
- Caudex elongated and thickened. Leaves linear to elliptic-lanceolate. Seeds 1–3 11
11. Caudex growing vertically. Leaves linear to narrow-lanceolate, pilose or rarely glabrous, with variously-directed trichomes, sometimes long and silky, but never producing a shiny appearance on both faces [ES, MG, MS, PR, RS, SC; PY; UY] *P. commersoniana*
- Caudex growing horizontally. Leaves elliptic-lanceolate, with densely distributed, short, antrorse trichomes on both faces, which produces a shiny appearance [SC] *P. rahniiana*
12. Trichomes on scape antrorse, generally appressed, but sometimes only very slightly pointing upwards 13
- Trichomes on scape patent 19
13. Taproot present. Cord-like secondary roots absent 14
- Taproot absent. Cord-like secondary roots present 16
14. Taproot unthickened. Leaves narrow-lanceolate. Trichomes on scape very sparsely distributed, rather inconspicuous [CR, ER; RS; UY] *P. penantha*
- Taproot thickened. Leaves elliptic to obovate. Trichomes on scape more or less densely distributed, but always very conspicuous 15
15. Leaves hirsute. Seeds 3 [UY] *P. berroi*
- Leaves glabrous. Seed 1 [UY] *P. dielsiana*
16. Caudex thickened and very conspicuous, to 10 cm long. Leaves glabrous, becoming black, or almost so, on drying; apex acuminate. Bract glabrous [MG, PR, RJ] *P. pretoana*
- Caudex generally inconspicuous, rarely to 5 cm long. Leaves glabrous to pilose, becoming only slightly darker on drying; apex acuminate to obtuse. Bract ciliate 17
17. Leaves narrow-elliptic, pilose; margin denticulate; apex acuminate. Spike shorter than the scape [RJ] *P. australis* subsp. *angustifolia*
- Leaves elliptic to obovate, glabrous to pilose; margin generally edentate; apex acute to obtuse. Spike equalling or exceeding the length of the scape 18

18. Secondary roots to 3 mm wide. Caudex to 3 (–5) cm long. Leaves glabrous to glabrescent. Trichomes on scape concentrated in the upper half of the scape, lower half glabrous to glabrescent [CR, ER, SF; RS, SC; UY] *P. australis* subsp. *australis*
 - Secondary roots to 1.5 mm wide. Caudex to 2 cm long. Leaves pilose. Trichomes on scape more or less evenly distributed along the entire length of the scape [CC, CR, FO, MN; MG, PR, RJ, RS, SC, SP; PY; UY] *P. australis* subsp. *hirtella*
19. Taproot absent. Leaf apex acuminate. Scape usually with sparsely distributed trichomes. Seeds 1–2 [RS, SC] *P. turficola*
 - Taproot present. Leaf apex acuminate to obtuse. Scape usually with densely distributed trichomes. Seeds 3 20
20. Taproot unthickened. Leaves narrow-lanceolate to lanceolate; apex acuminate. Ventral side of seed convex [CC, CR, ER, FO, SE, SF; RS; PY; UY] *P. myosuroides* subsp. *myosuroides*
 - Taproot thickened or unthickened. Leaves elliptic to oblanceolate; apex acute to obtuse. Ventral side of seed flattened to convex 21
21. Taproot thickened, swollen above. Caudex very short, generally inconspicuous. Trichomes on leaves and scape long and stiff, generally brownish. Ventral side of seed generally convex [CC, CR, FO, MN, SF; RS; PY] *P. napiformis*
 - Taproot unthickened. Caudex elongated and unthickened, very conspicuous in older plants. Trichomes on leaves and scape short and stiff, generally whitish. Ventral side of seed generally flattened [PR, RJ, RS, SC, SP] *P. catharinea*

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Appendix 1: Material examined

This is a partial list of the *Plantago* herbarium collections examined by Gustavo Hassemer (actual number of collections examined is much higher, especially of the more common species).

Plantago australis subsp. *angustifolia* (Pilg.) Rahn—BRAZIL. RIO DE JANEIRO: 1885–86, *A.F.M. Glaziou 16360* (C, lectotype, K, isotype, photograph); October 1896, *E.H.G. Ule 136* (R, photograph).

Plantago australis subsp. *australis* Lam.—ARGENTINA. BUENOS AIRES: *P. Commerson s.n.* (C, isotype, P, holotype, photograph). BRAZIL. RIO GRANDE DO SUL: Cambará do Sul: 20 February 1953, *B. Rambo 54071* (S, photograph); São Francisco de Paula: 2 January 1955, *B. Rambo 56441* (HBR 13823); São José dos Ausentes: 8 January 1947, *B. Rambo 34589* (S, photograph); Vacaria: 26 December 1951, *B. Rambo 51492* (HBR 13824). SANTA CATARINA: Alfredo Wagner: 1 December 2009, *A. Korte 1208* (FURB 17366); Bom Jardim da Serra: 6 January 2015, *G. Hassemer 785* (C); Grão Pará: 10 December 2000, *G.G. Hatschbach 71771* (MBM 253849); Lauro Müller: 7 January 2015, *G. Hassemer 790* (C); Urubici: 13 November 2011, *A.L. Gasper 2991* (FURB 36874); 2 December 2012, *G. Hassemer 636* (FLOR 47504); 4 December 2012, *G. Hassemer 623* (FLOR 47492). URUGUAY. MONTEVIDEO: December 1965, *A. Lombardo 5422* (C).

Plantago australis subsp. *hirtella* (Kunth) Rahn—ARGENTINA. TUCUMÁN: Chicligasta: 21 February 1966, *J.G. Hawkes 3556* (C). BOLIVIA. LA PAZ: Nor Yungas: 3 April 1971, *J.G. Hawkes 5045* (C). BRAZIL. MINAS GERAIS: Delfim Moreira: 15 March 2011, *A.L. Gasper 2576* (FURB 36184); Monte Verde: 8 April 1999, *H.M. Longhi-Wagner 6142* (ICN 131671). PARANÁ: Araucária: 12 April 2002, *C. Kozera 1570* (EFC 9895); Campina Grande do Sul: 22 October 1961, *G.G. Hatschbach 8350* (MBM 38674); Curitiba: 12 November 1961, *L.T. Dombrowski s.n.* (MBM 243444); 5 November 1970, *L.T. Dombrowski 3046* (MBM 243445); 19 November 1973, *R. Kummrow 129* (MBM 29125); 26 September 1974, *L.F. Ferreira 58* (MBM 37978); October 1975, *L.T. Dombrowski 6086* (MBM 243447); 8 December 1994, *Y.S. Kuniyoshi 5963* (EFC 6737); 12 January 2006, *A.L. Gasper 395* (FURB 2214); Enéas Marques: 11 October 1974, *G.G. Hatschbach 35147* (MBM 37979); Foz do Iguaçu: 8 October 1979, *Acildo 265* (MBM 67968); Laranjeiras do Sul: 22 September 1968, *G.G. Hatschbach 19795* (MBM 8766); Mangueirinha: 23 October 1991, *F. Bonatto 2* (MBM 201712); Maringá: 8 October 1987, *Y. Terada s.n.* (MBM 132436); Pinhão: 8 November 1991, *A.J. Kostin 14* (MBM 201711); Ponta Grossa: 11 October 1967, *G.G. Hatschbach 17410* (MBM 3766); Quatro Barras: 24 November 2012, *P. Larocca 14* (MBM 385897); Rio Branco do Sul: 12 March 1967, *G.G. Hatschbach 16156* (MBM 3770); 11 October 1996, *A.C. Svolenski 295* (EFC 6963); Roncador: 19 October 1973, *G.G. Hatschbach 32900* (MBM 29129); Tijucas do Sul: 19 October 1974, *R. Kummrow 673* (MBM 37977). RIO GRANDE DO SUL: Bom Jesus: 9 December 2000, *G.G. Hatschbach 71733* (MBM 253848); Caxias do Sul: 29 October 1989, *R. Wasum s.n.* (MBM 148350); 4 November 1993, *L.H. Cappellari 18* (MBM 168788); Cerro Largo: 20 November 1952, *B. Rambo 53072* (HBR 13819); Estrela: 19 October 2000, *H.M. Longhi-Wagner 7236b* (ICN); Flores da Cunha: 19 October 1985, *R. Wasum s.n.* (MBM 107208); Marcelino Ramos: 4 August 1986, *J.A. Jarenkow 418* (FLOR 19420); Osório: 2 October 1950, *B. Rambo 48904* (ICN 16579); Pelotas: 27 November 1957, *J.C. Sacco 717* (HBR 23999); Santa Maria: 27 October 2000, *R. Záchia 5044B* (FLOR 42890); Santa Rosa: 19 December 2000, *R.L.C. Bortoluzzi 841A* (ICN 121521); São Francisco de Paula: 1 April 2012, *J. Bevilacqua s.n.* (FURB 44273); São José dos Ausentes: 3 February 1953, *B. Rambo 53750* (HBR 13814); 3 February 1953, *B. Rambo 53773* (HBR 13813); 13 April 2013, *G. Hassemer 689* (FLOR 48633). SANTA CATARINA: Abelardo Luz: 23 October 1964, *L.B. Smith 12822* (HBR 31536); Água Doce: 4 December 1964, *L.B. Smith 13602* (HBR 55086); Águas Mornas: 5 April 1953, *R.M. Klein 506* (HBR 10337); Alfredo Wagner: 7 December 2000, *G.G. Hatschbach 71578* (MBM 253842); Apiúna: 17 July 2013, *B. Tribess 116* (FURB 42897); 17 July 2013, *B. Tribess 117b* (FURB); Ascurra: 1 October 2007, *L. Meyer s.n.* (FURB 7401); Blumenau: 23 October 1959, *R. Reitz 9216* (HBR 23446); 8 October 2003, *F. Bosio s.n.* (FURB 5139); November 2003, *F. Bosio s.n.* (FURB 1506); 21 March 2004, *A.L. Gasper 86* (FURB 5240); 11 June 2012, *L.A. Funez 600* (FURB 38439); 9 October 2012, *L.A. Funez 1087* (FLOR 51233, FURB 39276); 3 September 2013, *L.A. Funez 2165* (FURB 42109); 22 October 2014, *F. Bittencourt 254* (FURB 45151); Brusque: 4 October 1961, *R.M. Klein 2602* (HBR 28999); Bom Jardim da Serra: 3 January 1949, *R. Reitz 2956* (HBR 3626); 23 October 1958, *R. Reitz 7426* (HBR 26317); 9 December 1958, *R. Reitz 7666* (HBR 31093); 6 January 2015, *G. Hassemer 780* (C); 6 January 2015, *G. Hassemer 781* (C); Bom Retiro: 17 December 1948, *R. Reitz 2507* (HBR 3643); 16 November 1956, *L.B. Smith 7671* (HBR 31105); 12 November 2011, *A.L. Gasper 2915* (FURB 36812); Campo Alegre: 18 October 1957, *R. Reitz 5312* (HBR 31104); Campos Novos: 29 October 1963, *R.M. Klein 4158* (HBR 31098); Catanduvas: 12–13 October 1964, *L.B. Smith 12431* (FLOR 6526, HBR

31535); Cerro Negro: 22 March 2007, *C.R. Grippa 43* (FURB 5017); Concórdia: 27 November 2008, *M. Verdi 2972* (FURB 19312); 21 January 2009, *A.L. Gasper 1980* (FURB 11014); Florianópolis: 18 December 1993, *S. Berber 3* (FLOR 25660); 16 October 1996, *A.B. Andrade 39* (FLOR 33617); 5 November 2008, *G. Hassemer 51* (FLOR 41373); 11 December 2012, *G. Hassemer 113* (FLOR 48678); Guabiruba: 8 October 2004, *F. Bosio s.n.* (FURB 3354); Ibirama: 20 October 1953, *R.M. Klein 615* (HBR 14357); 11 October 1956, *R. Reitz 3823* (HBR 14313, MBM 38672, 243450); Itajaí: 3 November 1965, *R.M. Klein 6317* (HBR 55081); Joaçaba: 19 November 2008, *A. Stival-Santos 163* (FURB 10782); Joinville: 4 October 1957, *R. Reitz 5001* (HBR 55083); 17 November 2009, *S. Dreveck 1272* (FURB 18439); 21 January 2015, *G. Hassemer 768* (C); Lacerdópolis: 30 October 1963, *R.M. Klein 4259* (HBR 31097); Laguna: 15 April 2013, *G. Hassemer 698* (FLOR 48628); Lauro Müller: 7 January 2015, *G. Hassemer 788* (C); 7 January 2015, *G. Hassemer 789* (C); 7 January 2015, *G. Hassemer 792* (C); Lebon Régis: 29 October 1962, *R. Reitz 13860* (FLOR 237, HBR 31100); Massaranduba: 9 September 2013, *L.A. Funez 2167* (FURB 42111); Mondai: 31 December 1963, *R. Reitz 16734* (HBR 31102); Monte Castelo: 25 October 1962, *R. Reitz 13519* (HBR 31101); Palhoça: 22 December 1952, *R. Reitz 5047* (HBR 10338); 22 December 1952, *R. Reitz 5062* (HBR 10336); 24 February 1956, *R. Reitz 2786* (HBR 10334); 6 April 1956, *R. Reitz 2996* (HBR 14312); Pomerode: 20 January 2015, *G. Hassemer 767* (C); Pouso Redondo: 22 September 2008, *M. Verdi 898* (FURB 8307); Rancho Queimado: 24 October 1957, *R. Reitz 5375* (HBR 31103); 14 October 1960, *R. Reitz 10221* (HBR 29003); 29 November 2012, *G. Hassemer 635* (FLOR 47503); São Cristóvão do Sul: 19 March 2008, *A.L. Gasper 1625* (FURB 8489); Timbó: 13 December 2013, *A.L. Gasper 3197* (FURB 43336); Turvo: 20 October 1943, *R. Reitz C65* (HBR 928); Urubici: 28 April 2006, *M.L.R. Souza 1654* (FLOR 34846); 5 December 2006, *M.L.R. Souza 1763* (FLOR 35769); 28 December 2007, *A. Zannin 1490a* (FLOR 36305); 1 December 2012, *G. Hassemer 625* (FLOR 48679); 1 December 2012, *G. Hassemer 639* (FLOR 47507); 2 December 2012, *G. Hassemer 646* (FLOR 47509); 15 January 2013, *L.A. Funez 1392* (FURB 40037). SÃO PAULO: São Paulo: 18 November 1988, *R. Kral 75698* (MBM 217822). COLOMBIA. VALLE DEL CAUCA: Tuluá: 16 February 1990, *T.B. Croat 70633* (C). ECUADOR. PICHINCHA: 4 March 1967, *B. Sparre 14712* (C). GUATEMALA. HUEHUETENANGO: Jacaltenango: 25 September 1976, *J.D. Boeke 181* (C). MEXICO. PUEBLA: Chinantla: May 1841, *F.M. Liebmman 5837* (C); Tehuacán: December 1841, *F.M. Liebmman 5836* (C). NICARAGUA. MADRIZ: Somoto: 28 August 1982, *A. Grijalva 878* (C). PANAMA. CHIRIQUÍ: 10 May 1971, *W.G. D'Arcy 5398* (C); Boquete: 12 May 1971, *W.G. D'Arcy 5441* (C); 4 August 1972, *W.G. D'Arcy 6330* (C). PARAGUAY. CENTRAL: 16 November 1969, *T.M. Pedersen 9808* (C). PERU. *A.J.A. Bonpland s.n.* (P, holotype, photograph). LA LIBERTAD: Santiago de Chuco: 24 March 1994, *S. Leiva G. 1075* (C). VENEZUELA. TRUJILLO: Boconó: 7 February 1987, *G. Aymard 5181* (C).

Plantago berroi Pilg.—ARGENTINA. BUENOS AIRES: Balcarce: 2 April 1966, *J.G. Hawkes 4037b* (C); Coronel Suárez: 18 December 1965, *J.G. Hawkes 3078* (C); Saavedra: 18 December 1965, *J.G. Hawkes 3079* (C); 18 December 1965, *J.G. Hawkes 3080* (C); 21 December 1981, *T.M. Pedersen 13166* (C); Tornquist: 14 November 1962, *O. Boelcke 9485* (C); 17 December 1965, *J.G. Hawkes 3058a* (C); 17 December 1965, *J.G. Hawkes 3074b* (C). URUGUAY. FLORIDA: Casupá: 15 January 1967, *T.M. Pedersen 8018* (C). MALDONADO: Piriápolis: December 1937, *A. Lombardo 2808* (C). MONTEVIDEO: November 1937, *A. Lombardo 3604* (C).

Plantago brasiliensis Sims—ARGENTINA. CÓRDOBA: Punilla: 14 January 1966, *J.G. Hawkes 3233* (C); 23 January 1966, *J.G. Hawkes 3283* (C); 23 January 1966, *J.G. Hawkes 3295* (C); 23 January 1966, *J.G. Hawkes 3296* (C); 24 January 1966, *J.G. Hawkes 3317* (C); 8 January 1968, *A.L. Cabrera 18795* (C); San Alberto: 10 January 1966, *J.G. Hawkes 3209* (C); 10 January 1966, *J.G. Hawkes 3214* (C); 10 January 1966, *J.G. Hawkes 3216* (C). ENTRE RÍOS: Colón: 19 January 1966, *J.G. Hawkes 3266* (C); Concordia: 22 September 1961, *A. Burkart 22753* (C); 21 December 1962, *A. Burkart 24025* (C); Federación: 24 September 1961, *A. Burkart 22756* (C); 20 December 1961, *A. Burkart 23133* (C). RÍO NEGRO: Bariloche: 31 January 1952, *O. Boelcke 6163* (C). SAN LUIS: Libertador General San Martín: 8 January 1966, *J.G. Hawkes 3179a* (C). BRAZIL. MINAS GERAIS: Diamantina: 3 April 1892, *A.F.M. Glaziou 19748* (C, R, photograph). RIO GRANDE DO SUL: Herval: 9 November 2009, *E. Barboza 2469* (MBM 355881); Lavras do Sul: 9 November 1976, *T.M. Pedersen 11418* (MBM 56528); Osório: 4 January 1950, *B. Rambo 45227* (HBR 13821); 3 October 1954, *B. Rambo 55895* (HBR 13822); Pelotas: 16 November 2003, *S.M. Hefler 158* (ICN 135224); Quaraí: 11 November 2009, *E. Barboza 2563* (MBM 355885); Tavares: 5 November 2009, *E. Barboza 2236* (MBM 355882); Viamão: January 1984, *M. Sobral 2920* (MBM 91783). SANTA CATARINA: Bom Jardim da Serra: January 1986, *M. Sobral 4844* (MBM 109425); 28 December 2007, *A. Zannin 1467* (FLOR 36329); Urubici: 25 March 1995, *D.B. Falkenberg 7294* (FLOR 25272); 28 March 1996, *D.B. Falkenberg 7750* (FLOR 47379, FURB 41692); 15 December 2004, *I.I. Boldrini 1378* (ICN 149106); 28 December 2007, *A. Zannin 1467* (FLOR 36329). URUGUAY. MALDONADO: 31 December 1906, *M.B. Berro 3736* (C). RIVERA: 6 December 1907, *M.B. Berro 4780* (C).

Plantago catharinae Decne.—BRAZIL. PARANÁ: Guaraqueçaba: 9 February 1993, *R.X. Lima 103* (EFC 5092; MBM 310955); Guaratuba: 20 December 1968, *G.G. Hatschbach 20641* (MBM 8779); 20 December 1968, *G.G. Hatschbach 20644* (MBM 8780); Matinhos: 31 January 1974, *R. Kummrow 270* (MBM 29130); 28 October 1977, *L.T. Dombrowski 7765* (MBM 243448); Morretes: 14 October 1944, *C. Stellfeld 1014* (MBM 243442); Paranaguá: 23 September 1967, *G.G. Hatschbach 17204* (MBM 3765); 22 October 1968, *G.G. Hatschbach 20100* (MBM 8776); 24 April 1969, *G.G. Hatschbach 21438* (MBM 16364); 8 March 1986, *S.M. Silva 241* (MBM 243451); Pontal do Paraná: 22 March 2001, *S.M. Hefler 47* (MBM 285062). RIO GRANDE DO SUL: Porto Alegre: 1 December 1974, *A.G. Ferreira 759* (ICN 32282); São Leopoldo: 1943, *R. Reitz s.n.* (HBR 769); Taquara: 6 October 1989, *R. Wasum s.n.* (MBM 133418); Torres: 12 November 1954, *B. Rambo 56242* (HBR 13812); 30 October 1966, *J.C. Lindeman 3769* (MBM 9312); November 1989, *R. Wasum s.n.* (MBM 143794). SANTA CATARINA: Araranguá: 14 April 2013, *G. Hassemer 695* (FLOR 48630); 15 April 2013, *G. Hassemer 697* (FLOR 48629); Balneário Barra do Sul: 29 October 1953, *R. Reitz 5808* (HBR 8942); Balneário Rincão: 9 December 2010, *A. Korte 5560* (FLOR 52372, FURB 32955); Barra Velha: 9 January 1953, *R. Reitz 5128* (HBR 10335); Bombinhas: 8 May 2011, *A. Nuernberg 161* (FLOR 41514); Florianópolis: 11 September 1964, *R.M. Klein 5771* (FLOR 239, HBR 31533); 5 October 1964, *R.M. Klein 5840* (FLOR 238, FURB 38745, HBR 31531); 6 October 1964, *R.M. Klein 5874* (FLOR 240, HBR 31532); 22 December 1965, *R.M. Klein 6448* (HBR 55088); 5 October 1984, *M.L.R. Souza 275* (FLOR 26359); 27 November 1992, *M.H. Queiroz NI-74* (FLOR 39479); 12 April 1994, *D.B. Falkenberg 6639* (FLOR 23859, MBM 203161); 12 April 1994, *D.B. Falkenberg 6640* (FLOR 23858); 3 May 1994, *D.B. Falkenberg 6632* (FLOR 23866); 11 August 1994, *A. Zannin 251* (FLOR 29365); 6 February 1996, *R. Moriconi 100* (FLOR 29361); 30 September 2004, *T.B. Guimarães 662* (FLOR 35344); 30 September 2004, *T.B. Guimarães 666* (FLOR 35342); 30 August 2005, *T.B. Guimarães 1100* (FLOR 35343); 20 August 2008, *G. Hassemer 38* (FLOR 41353); 27 April 2010, *M.S. Marques s.n.* (FLOR 38046); 3 December 2010, *J. Cordeiro 4045* (MBM 366781); 3 December 2010, *J. Cordeiro 4048* (MBM 366783); 12 November 2011, *A. Nuernberg 433* (FLOR 50112); 23 January 2013, *G. Hassemer 651* (FLOR 48646); 23 January 2013, *G. Hassemer 666* (FLOR 48645); 19 February 2013, *G. Hassemer 678* (FLOR 48643); 4 March 2013, *G. Hassemer 667* (FLOR 48644); 3 October 2013, *G. Hassemer 701* (FLOR 51192); 3 October 2013, *G. Hassemer 702* (FLOR 51193); 3 October 2013, *G. Hassemer 703* (FLOR 51194); 3 October 2013, *G. Hassemer 704* (FLOR 51195); 3 October 2013, *G. Hassemer 705* (FLOR 51196); 12 September 2013, *G. Hassemer 706* (FLOR 51197); 6 December 2013, *G. Hassemer 731* (FLOR 51221); 6 December 2013, *G. Hassemer 736* (FLOR 51226); 27 September 2014, *L.A. Funez 3442* (FURB 44885); Governador Celso Ramos: 24 September 2014, *L.A. Funez 3097* (FURB 44865); Imbituba: 24 October 2009, *S. Zank 83* (FLOR 38672); Itajaí: 10 October 1946, *R. Reitz C1704* (HBR 2244); 28 May 1953, *R. Reitz 750* (HBR 10339); 26 September 1961, *R.M. Klein 2543* (HBR 29001); 30 September 1961, *R.M. Klein 2564* (HBR 29002); Itapoá: 3 January 1954, *R. Reitz 1448* (HBR 10333); Laguna: 15 April 2013, *G. Hassemer 700* (FLOR 48627); Navegantes: 23 September 1994, *A.C. Araújo 168* (HBR 55087); 29 September 2002, *A.C. Cervi 8327* (MBM 304975); 18 February 2012, *L.A. Funez 359* (FURB 37858); 5 November 2012, *L.A. Funez 1195* (FLOR 51231, FURB 39539); Palhoça: 13 December 1952, *R. Reitz 4819* (HBR 14359); 5 February 1953, *R. Reitz 5513* (HBR 14358, 48775); Penha: 15 December 2010, *A. Korte 5731* (FURB 32991); Palhoça: 5 February 1953, *R. Reitz 5513* (HBR 48775); 24 September 1953, *R. Reitz 972* (HBR 10332); 2 December 2010, *A. Korte 2324* (FURB 32968); Porto Belo: 1 September 2011, *A. Nuernberg 284* (FLOR 54326); São Francisco do Sul: 29 November 2010, *A. Korte 5242* (FLOR 52373, FURB 33005); São José: 8 September 1997, *W. Pagliarini 142* (FLOR 44750).

Plantago commersoniana Decne. ex Barnéoud—BRAZIL. ESPÍRITO SANTO: Iúna: 18 February 2000, *J.P. Souza 3098* (ESA 64290, photograph, MBM 244533). MATO GROSSO DO SUL: Ponta Porã: 23 October 2003, *G.G. Hatschbach 76667* (MBM 290928). MINAS GERAIS: Alto Caparaó: 2 September 1996, *V.C. Souza 12183* (ESA 37391, photograph); 12 February 1998, *J.P. Souza 2131* (ESA 61835, photograph); 9 March 2010, *J.M. Silva 7646* (MBM 359625). PARANÁ: Guarapuava: 21 October 1966, *J.C. Lindeman 2769* (MBM 9311); 21 September 1968, *G.G. Hatschbach 19777* (C, MBM 8773, UP CB 10161); 7 February 1969, *G.G. Hatschbach 21037* (C, MBM 16367); 1 October 1980, *G.G. Hatschbach 43207* (MBM 67967); Palmeira: 5 July 1997, *O.S. Ribas 1875* (MBM 238241); Ponta Grossa: 9 November 1966, *G.G. Hatschbach 15100* (C, HBR 35243, MBM 3630); 27 September 1973, *G.G. Hatschbach 32592* (C, MBM 29123); 1 October 1988, *J.T.W. Motta 1437* (MBM 367566); 1 November 2001, *S.M. Hefler 67* (MBM 285063, UP CB 44868); 29 December 2011, *R. Ristow 2062* (IRAI 5275, photograph). RIO GRANDE DO SUL: Guaíba: 24 September 1994, *N.I. Matzenbacher s.n.* (ICN 103762); Porto Alegre: 2 October 1948, *B. Rambo 37798* (HBR 13825); 3 November 2009, *R. Setúbal 953* (ICN 164347); Santana do Livramento: 25 November 1972, *E. Vianna s.n.* (ICN 21026). SANTA CATARINA: Campo Erê: 20 February 1957, *L.B. Smith 11544* (HBR 31534); Lages: 15 September 1963, *R. Reitz 16317* (HBR 31091); São Joaquim: 2 December 2012, *G. Hassemer 648* (FLOR 47511). PARAGUAY. CAAGUAZÚ: Yhú: September 1905, *E. Hassler 9471* (G, photograph). URUGUAY. MONTEVIDEO: 1767, *P. Commerson s.n.* (C, isotype).

Plantago coronopus L.—BRAZIL. RIO GRANDE DO SUL: Mostardas: 7 December 2002, *V.F. Kinupp 2547* (ICN 128749).

Plantago corvensis Hassemer—BRAZIL. SANTA CATARINA: Grão Pará: 15 November 2008, *J.M. Silva 7188* (MBM 347486, holotype); 15 December 2013, *G. Hassemer 737* (FLOR 51227, paratype).

Plantago dielsiana Pilg.—ARGENTINA. BUENOS AIRES: Balcarce: 27 January 1960, *E.G. Nicora 6918* (C); 3 April 1966, *J.G. Hawkes 4038* (C); March Chiquita: 12 December 1965, *J.G. Hawkes 3030* (C); March del Plata: 15 December 1964, *Okada 2092* (C). URUGUAY. CANELONES: January 1936, *A. Lombardo 4785* (C). MONTEVIDEO: *J.E. Gibert 968* (K, lectotype, photograph).

Plantago guillemianiana Decne.—BRAZIL. MINAS GERAIS: Camanducaia: 19 January 1996, *H.M. Longhi-Wagner 2851* (ICN 127979); 28 February 2000, *R.B. Torres 1088* (IAC 39103); Ouro Preto: 30 January 1971, *H.S. Irwin s.n.* (C). PARANÁ: Balsa Nova: 7 September 1967, *G.G. Hatschbach 17090* (C, MBM 3769); 18 April 1969, *G.G. Hatschbach 21358* (C, MBM 16365); 25 October 1973, *G.G. Hatschbach 32948* (C, MBM 29128); 14 December 1979, *G.G. Hatschbach 42644* (MBM 67966); 7 October 1996, *C.B. Poliquesi 584* (MBM 201713); 28 October 1996, *O.S. Ribas 1537* (MBM 201733); 5 October 2001, *J.M. Silva 3475* (MBM 262613); Campo Largo: 26 February 1946, *R. Maack s.n.* (MBM 4121); 28 February 1951, *G. Tessmann s.n.* (MBM 4122, 75221); 28 August 1960, *G.G. Hatschbach 7164* (MBM 38673); Clevelândia: 21 November 1972, *G.G. Hatschbach 30791* (C, MBM 29126); Colombo: 3 October 1967, *G.G. Hatschbach 17254* (C, MBM 3764); Curitiba: 12 September 1966, *J.C. Lindeman 2443* (MBM 9313); 3 November 1973, *L.T. Dombrowski 4914* (MBM 243455); 13 November 1973, *R. Kummrow 39* (C, MBM 29127); Guarapuava: 16 December 1965, *R. Reitz 17765* (FLOR 15449); 6 December 1968, *G.G. Hatschbach 20512* (C, MBM 8775); Jaguariaíva: 13 October 1968, *G.G. Hatschbach 20062* (C, MBM 8778); Lapa: 3 October 1966, *G.G. Hatschbach 14782* (C, MBM 3768); 25 June 1969, *G.G. Hatschbach 21680* (C, MBM 16366); 13 August 1982, *P.I. Oliveira 606* (MBM 79532); 10 February 2004, *E. Barboza et al. 872* (MBM 294840); 19 May 2006, *J.M. Silva 4769* (MBM 329249); Palmas: 18 January 2013, *S. Campestrini 488* (FLOR 49059); Palmeira: 27 September 1968, *G.G. Hatschbach 19882* (C, MBM 8774); 19 November 2006, *M.G. Caxambu 1311* (MBM 324526); 28 February 2011, *A. Dunaiski 4146* (MBM 371424); Piraquara: 15 August 1949, *G.G. Hatschbach 1450* (HBR 13816, MBM 38671); Ponta Grossa: 27 September 1964, *G.G. Hatschbach 11596* (MBM 38705); 8 September 1967, *G.G. Hatschbach 17124* (C, MBM 3767); 31 May 2001, *S.M. Hefler 56* (MBM 285065); 1 November 2001, *S.M. Hefler 68* (MBM 285067); Quatro Barras: 15 August 1949, *G.G. Hatschbach 1450* (C); São José dos Pinhais: 22 September 1953, *R. Reitz 5724* (C, HBR 8943); 3 October 1968, *G.G. Hatschbach 19885* (C, MBM 8777); Sengés: 8 October 1971, *G.G. Hatschbach 27154* (C, MBM 29124). RIO GRANDE DO SUL: Esmeralda: 13 September 1987, *T. Bordin s.n.* (MBM 118503); São José dos Ausentes: 12 April 2013, *G. Hassemer 686* (FLOR 48636); 13 April 2013, *G. Hassemer 688* (FLOR 48634); 13 April 2013, *G. Hassemer 690* (FLOR 48632). SANTA CATARINA: Alfredo Wagner: 7 December 2000, *G.G. Hatschbach 71578A* (MBM 307205); Bom Jardim da Serra: 3 December 2012, *G. Hassemer 624* (FLOR 47493); 3 December 2012, *G. Hassemer 633* (FLOR 47501); 3 December 2012, *G. Hassemer 641* (FLOR 47508); 6 January 2015, *G. Hassemer 783* (C); 7 January 2015, *G. Hassemer 787* (C); Campo Alegre: 10 March 1957, *L.B. Smith 12012* (HBR 31089); 18 October 1957, *R. Reitz 5291* (HBR 55084); Curitiba: 28 October 1963, *R.M. Klein 4044* (C, HBR 31096); Rio Rufino: 7 May 2009, *A.L. Gasper 2078* (FURB 13326); Santa Cecília: 25 October 1962, *R. Reitz 13470* (C, HBR 31099); Urubici: 7 December 2000, *G.G. Hatschbach 71595* (MBM 253845); 7 December 2000, *G.G. Hatschbach 71607A* (MBM 307206); 8 December 2000, *G.G. Hatschbach 71636* (MBM 253841); 27 April 2006, *M.L.R. Souza 1628* (FLOR 34820); 4 December 2006, *A. Zannin 1143* (FLOR 35542); 30 November 2012, *G. Hassemer 627* (FLOR 47495); 30 November 2012, *G. Hassemer 631* (FLOR 47499); 1 December 2012, *G. Hassemer 626* (FLOR 47494); 1 December 2012, *G. Hassemer 637* (FLOR 47505); 1 December 2012, *G. Hassemer 638* (FLOR 47506); 2 December 2012, *G. Hassemer 647* (FLOR 47510); Urupema: 23 April 2012, *G. Hassemer 540* (FLOR 54158).

Plantago heterophylla Nutt.—ARGENTINA. BUENOS AIRES: 31 October 1927, *A. Burkart 2004* (C); 19 September 1942, *A. Burkart 12932* (C); Escobar: 25 September 1977, *T.M. Pedersen 11890* (C); Pehuajó: 14 October 1950, *A. Burkart 18454* (C); San Vicente: December 1926, *A. Burkart 1680* (C). CORRIENTES: Concepción: 17 September 1986, *T.M. Pedersen 14581* (C, MBM 127341); Mburucuyá: 9 August 1952, *T.M. Pedersen 1789* (C); Monte Caseros: 20 August 1950, *E.G. Nicora 5376* (C). ENTRE RÍOS: Islas del Ibicuy: 24 November 1931, *A.L. Cabrera 1971* (C). USA. NORTH CAROLINA: Nash: 1 May 1956, *H.E. Ahles 11810* (C).

Plantago lanceolata L.—BRAZIL. PARANÁ: Castro: 17 November 1988, *S.M. Silva 1629* (MBM 243457); Curitiba: 12 October 1966, *J.C. Lindeman 2667* (MBM 9310); 3 December 1967, *G.G. Hatschbach 17973* (HBR 35871, MBM 6752); 18 October 1989, *C. Budziak 12* (MBM 132437); 8 December 1994, *Y.S. Kuniyoshi 5964* (EFC 6738); 2 March 2011, *W. Amaral 808* (EFC 10887). RIO GRANDE DO SUL: Caxias do Sul: February 1945, *B. Rambo 31378* (HBR 13820); 4 November 1993, *L.H. Cappellari 23* (MBM 165970); 18 April 2011, *J. Gaio 77* (FURB 37738); 4 October 2012, *M. Grizzon 103* (FURB 44232). SANTA CATARINA: Água Doce: 24 January 2013, *S. Campestrini 426* (FLOR 49060); Florianópolis: 13 October 2010, *G. Hassemer 364* (FLOR 42924); Urubici: 15 January 2013, *L.A. Funez 1360* (FLOR 51229, FURB 40006); 15 January 2013, *L.A. Funez 1450* (FURB 40095). MEXICO. Querétaro: 23 March 1982, *E. Arguelles 1752* (MBM 89128); 23 March 1982, *E. Arguelles 1753* (MBM 89132).

Plantago major L.—AUSTRIA. NIEDERÖSTERREICH: Gänserndorf: 2 October 1986, *W. Till s.n.* (MBM 113818). OBERÖSTERREICH: Attersee: 28 June 1987, *W. Till s.n.* (MBM 122986). BRAZIL. BAHIA: Ilhéus: 14 July 1973, *R.S. Pinheiro 2196* (MBM 94610). PARANÁ: Adrianópolis: 19 February 1981, *G.G. Hatschbach 43620* (MBM 79531); Curitiba: 12 November 1961, *L.T. Dombrowski s.n.* (MBM 243458); 3 December 1967, *G.G. Hatschbach 17974* (MBM 6746). RIO GRANDE DO SUL: Nova Prata: 14 May 2005, *V.F. Kinupp 2976* (ICN 132805). SANTA CATARINA: Apiúna: 27 August 2012, *B. Tribess s.n.* (FURB 40799); 17 July 2013, *B. Tribess 117A* (FURB 42898); Ascurra: 17 March 2008, *L. Meyer s.n.* (FURB 7371); Blumenau: 12 January 2004, *F. Bosio s.n.* (FURB 1782); 9 December 2011, *L.A. Funez 92* (FURB 37197); 20 November 2012, *L.A. Funez 1247* (FURB 39592); Brusque: 29 November 1949, *R. Reitz 3219* (HBR 5154); 4 October 1961, *R.M. Klein 2619* (HBR 28998); 6 December 1961, *R.M. Klein 2777* (HBR 29000); Florianópolis: 20 October 1969, *R.M. Klein 6313* (HBR 55079); 6 October 1994, *R. Moriconi 15* (FLOR 29352); 3 November 1994, *W. Pagliarini 46* (FLOR 29420); 18 September 1997, *W. Pagliarini 157* (FLOR 44770); 4 February 2006, *M. Cavallasi s.n.* (FLOR 40375); 19 November 2008, *G. Hassemer 20* (FLOR 41342); Guabiruba: 18 June 2004, *C.A. Grandó s.n.* (FURB 2653); Indaial: 8 July 2008, *H.F. Uller s.n.* (FURB 7555); Itajaí: 25 October 1965, *R.M. Klein 6316* (HBR 55085); Itapoá: 15 March 2007, *A.H.C. Merétika s.n.* (FLOR 36629); Mafra: 11 December 1965, *R. Reitz 17382* (FLOR 20866, HBR 55080); Navegantes: 15 November 2013, *L.A. Funez 2354* (FURB 42844); Rodeio: 21 July 2012, *L.A. Funez 706* (FURB 38620); São José: 5 September 1997, *W. Pagliarini 127* (MBM 228581); Timbó: 24 July 2014, *L.A. Funez 2879* (FURB 44427); Urubici: 15 January 2013, *L.A. Funez 1413* (FLOR 51228, FURB 40058); 6 January 2015, *G. Hassemer 782* (C). SÃO PAULO: Santos: 15 November 1935, *A. Gehrt s.n.* (MBM 176082). MEXICO. Distrito Federal: 19 November 1976, *B.V.A. 554* (MBM 240872). MÉXICO: Toluca: 27 November 1976, *B.V.A. 596* (MBM 240874). NICARAGUA. JINOTEGA: Cuá-Bocay: 13–18 January 1979, *W.D. Stevens s.n.* (MBM 92978). SPAIN. ARAGÓN: Huesca: 25 July 1975, *J. Montserrat s.n.* (MBM 66061). U.K. Kew: 15 June 1981, *K. Sorvig 132* (MBM 154672). U.S.A. ARIZONA: Maricopa: 10 May 1957, *J. Barnes s.n.* (MBM 138151). VERMONT: Burlington: 5 July 1966, *R.E. Bowman s.n.* (MBM 80842); Waterbury: 27 July 1966, *R.E. Bowman s.n.* (MBM 80843).

Plantago myosuroides subsp. *myosuroides* Lam.—ARGENTINA. BUENOS AIRES: Escobar: 25 September 1977, *T.M. Pedersen 11891* (C). CHACO: Bermejo: 22 September 1967, *T.M. Pedersen 8365* (C); Libertad: 20 February 1970, *T.M. Pedersen 9860* (MBM 30652); Primero de Mayo: 22 September 1967, *A. Krapovickas 13119* (C, MBM 243460); San Fernando: 13 October 1977, *J. Neiff 762* (C). CORRIENTES: Bella Vista: 14 October 1974, *A. Schinini 9944* (C); Capital: 21 September 1970, *A. Krapovickas 16094* (C, MBM 19864); 25 September 1971, *A. Krapovickas 19807* (C); 28 October 1976, *R.M. Crovetto 14018* (C); Curuzú Cuatiá: 29–31 October 1974, *S.G. Tressens 502* (C); Empedrado: 13 August 1954, *T.M. Pedersen 2766* (C); 23 September 1961, *T.M. Pedersen 6072* (C); Itatí: 8 October 1964, *T.M. Pedersen 7071* (C); Lavalle: 9 November 1978, *A. Schinini 15937* (C); 25 November 1979, *A. Schinini 19187* (C); 26 November 1979, *A. Schinini 19270* (C); Mburucuyá: 20 October 1957, *T.M. Pedersen 4654* (C); Mercedes: 11 September 1957, *T.M. Pedersen 4595* (C); 18 October 1961, *T.M. Pedersen 6180* (C); Monte Caseros: 17 October 1949, *E.G. Nicora 4943* (C); 20 October 1949, *E.G. Nicora 4989* (C); 12 September 1979, *A. Schinini 13817* (C); Paso de los Libres: 6 November 1976, *T.M. Pedersen 11379* (C); San Martín: 30 October 1971, *A. Krapovickas 20091* (C); 30–31 October 1971, *A. Krapovickas 20160* (C); 5 November 1973, *A. Schinini 7814* (C); Santo Tomé: 31 October 1970, *A. Krapovickas 16403* (C). ENTRE RÍOS: Concordia: 3 October 1978, *S.A. Renvoize 2869* (C); Federación: 23 September 1961, *A. Burkart 22758* (C); 14 November 1964, *T.M. Pedersen 7133* (C); Gualaguay: 22 October 1949, *A. Burkart 18093* (C); 24 November 1964, *T.M. Pedersen 7290* (C); Islas del Ibicuy: 14 October 1944, *O. Boelcke 1028* (C); Paraná: 31 October 1962, *A. Burkart 23835* (C); Uruguay: 16 October 1949, *A. Burkart 17962* (C); Victoria: 12 December 1937, *A. Burkart 8660* (C). JUJUY: Doctor Manuel Belgrano: 1 February 1956, *J.P. Hjerting 48* (C). BOLIVIA. LA PAZ: Pedro Domingo Murillo: 7 July 1985, *S.G. Beck 11298* (C). TARIJA: Gran Chaco: 23 September 1985, *S.G. Beck 11515* (C). BRAZIL. RIO GRANDE DO SUL: Alegrete: October 1985, *M. Sobral 4494* (FLOR 15545); Alto Alegre: 7 September 2001, *S.M. Heffler 59* (MBM 285060); Barra do Quaraí: 21 September 2003, *V.F. Kinupp*

2719 (ICN 128921); Caçapava do Sul: 25 September 1985, *D.B. Falkenberg 3295* (FLOR 15737); 12 October 1985, *D.B. Falkenberg 2698* (FLOR 9990); Montenegro: 7 October 1949, *B. Rambo 43803* (HBR 13818); Pinheiro Machado: 9 November 2009, *E. Barboza 2503* (MBM 355880); Porto Alegre: 15 October 1955, *B. Rambo 57076* (HBR 11042); Santa Rosa: 14 November 1967, *K. Hagelund 5501* (C, ICN 144524); Santa Vitória do Palmar: 7 November 2009, *E. Barboza 2305* (MBM 355883). ECUADOR. LOJA: 15 May 1967, *B. Sparre 16195* (C). PARAGUAY. CENTRAL: 1 September 1990, *E. Zardini 23084b* (C); Areguá: 11 October 1970, *E. Bordas s.n.* (C). MISIONES: Santiago: 18 October 1967, *T.M. Pedersen 8643* (C). SAN PEDRO: 10 October 1957, *A.L. Woolston 889* (C). PERU. CUZCO: Calca: 11 April 1971, *J.G. Hawkes 5118* (C); 13 April 1971, *J.G. Hawkes 5149* (C). URUGUAY. ARTIGAS: 27 September 1902, *M.B. Berro 2903* (C); 23 October 1902, *M.B. Berro 2901* (C). CANELONES: 29 October 1936, *B. Rosengurt 378* (C); October 1937, *A. Lombardo 2812* (C). FLORIDA: December 1936, *J.P. Gallinal H. 267* (C); 7 December 1936, *J.P. Gallinal H. 6221* (C); 10 December 1936, *J.P. Gallinal H. 401* (C); 20 December 1937, *J.P. Gallinal H. 2422* (C). MALDONADO: 26 December 1906, *M.B. Berro 3735* (C). MONTEVIDEO: 18 November 1904, *M.B. Berro 3249* (C); 10 November 1906, *M.B. Berro 3579* (C); November 1937, *A. Lombardo 2833* (C); November 1937, *A. Lombardo 3605* (C); December 1937, *A. Lombardo 2830* (C); December 1965, *A. Lombardo 5421* (C).

Plantago napiformis (Rahn) Hassemer—ARGENTINA. CORRIENTES: Bella Vista: 13 September 1972, *A. Schinini 5235* (C, MBM 30999); 13 September 1972, *A. Schinini 5369* (C); Concepción: 30 January 1963, *J.C.H. Elano 454* (C); Empedrado: 22 November 1962, *T.M. Pedersen 6650* (C, holotype); Esquina: 1 December 1974, *A. Krapovickas 26947* (MBM 48562); Itatí: 8 October 1964, *T.M. Pedersen 7074* (C); Ituzaingó: 23 October 1967, *T.M. Pedersen 8684* (C); 1 September 1979, *M.N. Arbo 2369* (C); 23–24 October 1974, *S.G. Tressens 463* (C); San Luis del Palmar: 11 May 1966, *T.M. Pedersen 7764* (C); 28 September 1975, *C.L. Cristóbal 1273* (C); San Martín: 15 September 1979, *A. Schinini 18507* (C); Santo Tomé: 9 October 1969, *T.M. Pedersen 9207* (C); 10 October 1969, *T.M. Pedersen 9228b* (C, MBM 249846); 22 September 1974, *A. Krapovickas 26033* (C); 23 September 1974, *A. Krapovickas 26180* (C). FORMOSA: 19 August 1967, *A. Krapovickas 13089* (C). MISIONES: San Pedro: 22 September 1945, *Bertoni 2125* (F, photograph). SANTA FE: 1 February 1936, *M.M. Job 1018* (S, photograph). BRAZIL. RIO GRANDE DO SUL: Giruá: 15 August 1968, *K. Hagelund 5539* (C, ICN 144522); 10 October 1969, *K. Hagelund 5690* (ICN 119149); 11 October 1972, *K. Hagelund 6414* (C); 13 November 1975, *K. Hagelund 9679t* (ICN 144534); Santa Maria: 17 October 1975, *K. Hagelund 9639d* (C, ICN 144535). PARAGUAY. ASUNCIÓN: 20 June 1990, *B. Pérez 245* (C); September 1991, *B. Pérez 1134* (C); September 1991, *B. Pérez 1135* (C). CAAZAPÁ: Tavaí: 28 October 1988, *I. Basualdo 1640* (C). CENTRAL: 1 September 1990, *E. Zardini 23084a* (C); Villeta: 31 August 1990, *E. Zardini 22909* (C); 9 September 1990, *E. Zardini 23450* (C); 9 November 1990, *E. Zardini 23521* (C); 17 November 1990, *E. Zardini 24335* (C); 2 December 1992, *E. Zardini 34073* (C). GUAIRÁ: Villarrica: 14 January 1919, *P. Jørgensen 3899* (C). CORDILLERA: Itacurubí de la Cordillera: 3 October 1967, *T.M. Pedersen 8458* (C); San Bernardino: 24 September 1967, *T.M. Pedersen 8379* (C). MISIONES: Santiago: 21 October 1959, *T.M. Pedersen 5180* (C); 18 October 1967, *T.M. Pedersen 8645* (C). PARAGUARÍ: Acahay: 11 June 1989, *E. Zardini 12779* (C). SAN PEDRO: Lima: 6 October 1967, *T.M. Pedersen 8573* (C).

Plantago penantha Griseb.—ARGENTINA. BUENOS AIRES: San Antonio de Areco: 14 September 1950, *O. Boelcke 4582* (C); 5 November 1961, *O. Boelcke 8781* (C). CORRIENTES: Mercedes: 12 October 1961, *T.M. Pedersen 6101* (C); Monte Caseros: 20 October 1957, *E.G. Nicora 5920* (C). ENTRE RÍOS: Concordia: 29 November 1947, *J.R. Cordini 55* (C); Gualeguay: 21 October 1949, *A. Burkart 18054* (C); 22 October 1949, *A. Burkart 18097* (C); 24 November 1964, *T.M. Pedersen 7289* (C); Uruguay: 19 December 1941, *E.G. Nicora 3341* (C). BRAZIL. RIO GRANDE DO SUL: Alegrete: 10 November 2010, *I.I. Boldrini 1672* (ICN 167254); Barra do Quaraí: 21 September 2003, *V.F. Kinupp 2718* (ICN 128920); Uruguaiana: 16 November 1984, *M. Sobral 3357* (ICN 65363). URUGUAY. CANELONES: 18 October 1936, *B. Rosengurt 13354* (C). FLORIDA: 22 October 1950, *B. Rosengurt 5998* (C). LAVALLEJA: December 1900, *M.B. Berro 1359* (C).

Plantago pretoana (Rahn) Hassemer—BRAZIL. *H. Haas 698* (MBM 10448). MINAS GERAIS: Bocaina de Minas: 20 November 1876, *A.F.M. Glaziou 8897* (C, holotype, LE, isotype, photograph, R, isotype, photograph). PARANÁ: Ponta Grossa: 19 October 1914, *G. Jönsson 1160a* (G, photograph, S, photograph, US, photograph); 17 August 1978, *L.T. Dombrowski 9695* (MBM 243446). RIO DE JANEIRO: Itatiaia: *A.C. Brade s.n.* (RB 62313); 15 June 1902, *P.K.H. Dusen 587* (R, photograph); 3 March 1931, *R.W. Kaempfe 417* (RB 87283); 28 December 1934, *R.K.F. Pilger 72* (RB 25700); 28 December 1934, *R.K.F. Pilger 105* (FLOR 46381, RB 25699); November 1938, *F. Markgraf 3725* (FLOR 46453, RB 39534); 12 October 1945, *A.B. Pereira 107* (FLOR 46214, RB 54739); 1 March 1950, *A.C. Brade 20241* (FLOR 52143, RB 69193); 4 June 1975, *A.M. Camerik 100* (RB 529133); 25 June 1975, *A.M. Camerik 195* (RB 529333); 13 March 2010, *J.M. Silva 7554* (MBM 359624).

Plantago rahniana Hassemer & R. Trevis.—BRAZIL. SANTA CATARINA: Bom Jardim da Serra: 10 December 1958, *R. Reitz 7759* (HBR 31094, paratype, MBM 38670, paratype, UC, photograph); 13 January 1959, *R. Reitz 8154* (FLOR 236, paratype, HBR 31095, paratype); 14 December 1971, *L.B. Smith 15782* (C, FLOR 7101, paratype); January 1986, *M. Sobral 4846* (C); 8 November 1986, *D.B. Falkenberg 3977* (FLOR 16425, paratype); 6 December 1992, *H.M. Longhi-Wagner 2514* (ICN 96655, holotype); 29 March 1996, *D.B. Falkenberg 7844* (FLOR 47378, paratype, FURB 41693); 15 December 2004, *N.I. Matzenbacher s. n.* (ICN 137548, paratype); 12 April 2013, *G. Hassemer 683* (FLOR 48638, paratype); 7 January 2015, *G. Hassemer 786* (C); Urubici: 22 January 2001, *H.M. Longhi-Wagner 7401* (ICN 134161, paratype).

Plantago tomentosa Lam.—ARGENTINA. BUENOS AIRES: La Plata: 15 December 2006, *J.A. Hurrell 6272* (MBM 344453). CÓRDOBA: Colón: 12 February 1997, *L.A. Espinar 3339* (MBM 300015); Punilla: 12 December 1999, *G. Seijo 2040* (MBM 262364). CORRIENTES: Concepción: 7 December 1972, *T.M. Pedersen 10250* (MBM 32384). SALTA: Cachi: 22 January 2002, *V.S. Neffa 862* (MBM 280316). BOLIVIA. COCHABAMBA: Esteban Arze: 6 March 1980, *J.G. Hawkes 6539* (C); José Carrasco: 21 February 1980, *J.G. Hawkes 6425* (C). LA PAZ: Pedro Domingo Murillo: 29 January 1987, *J.C. Solomon 15871* (C). BRAZIL. MINAS GERAIS: Delfim Moreira: 15 March 2011, *A.L. Gasper 2540* (FURB 36202). RIO GRANDE DO SUL: Alto Alegre: 5 November 2000, *S.M. Hefler 27* (MBM 285057); Arroio dos Ratos: 9 November 1974, *K. Hagelund 8102* (ICN 144521); Caçapava do Sul: 12 December 1997, *R. Wasum s.n.* (MBM 225700); Caxias do Sul: 15 October 2001, *F. Soares s.n.* (MBM 266354); 10 November 2001, *A. Kegler 1198* (MBM 285435); Palmares do Sul: 26 November 2011, *E. Valduga 160* (FURB 37693, MBM 388606); Pelotas: 16 October 1972, *Lisakowski 22* (MBM 69802); Porto Alegre: 22 September 1948, *B. Rambo 37708* (HBR 13827); 2 November 1949, *B. Rambo 44227* (HBR 13811); 19 November 1954, *B. Rambo 55977* (HBR 13826); 11 November 2001, *S.M. Hefler 63* (MBM 285058); 11 November 2001, *S.M. Hefler 64* (MBM 285059); Santa Maria: 27 October 2000, *R. Záchia 5044A* (FLOR 48689); Santana do Livramento: 25 November 2000, *R.L.C. Bortoluzzi 707* (ICN 121458); 26 January 2015, *G. Hassemer 794* (C); Santa Rosa: 19 December 2000, *R.L.C. Bortoluzzi 841b* (ICN); Santo Antônio das Missões: 25 January 2015, *G. Hassemer 793* (C); Torres: 18 November 1984, *D.B. Falkenberg 1973* (FLOR 21496); Vacaria: 26 December 1951, *B. Rambo 51502* (HBR 13828). SANTA CATARINA: Florianópolis: 23 January 2004, *T.B. Guimarães 1103* (FLOR 35348); 20 April 2004, *T.B. Guimarães 526* (FLOR 35347); 30 August 2004, *T.B. Guimarães 1101* (FLOR 35345); 6 December 2013, *G. Hassemer 730* (FLOR 51220); 6 December 2013, *G. Hassemer 733* (FLOR 51223); Laguna: 10 November 1951, *R. Reitz 157* (HBR 6535); 12 December 2000, *G.G. Hatschbach 71848* (MBM 253850, 307208); Zortéa: 16 December 2008, *A. Stival-Santos 337* (FURB 10946). PARAGUAY. October 1880, *B. Balansa 3185* (C). ASUNCIÓN: 4 September 1971, *A. Krapovickas 19660* (C); 8 October 1974, *P. Arenas 1036* (C); 21 December 1979, *P. Arenas s.n.* (C); 17 January 1980, *P. Arenas s.n.* (C). CAAGUAZÚ: 28 September 1967, *T.M. Pedersen 8436* (C). CENTRAL: 17 November 1990, *E. Zardini 24177* (C); Villa Elisa: 21 October 1959, *T.M. Pedersen 5258* (C). CORDILLERA: 23 December 1989, *E. Zardini 17362* (C); San Bernardino: 14 October 1973, *C. Quarín 1521* (C). GUAIRÁ: Colonia Independencia: 6 October 1967, *A. Lourteig 1890* (C); 3 April 1972, *T.M. Pedersen 10149* (C). PARAGUARI: 8 September 1988, *E. Zardini 7134* (C). SAN PEDRO: 2 August 1956, *A.L. Woolston 702* (C). PERU. HUANCVELICA: Tayacaja: 25 March 1974, *J.P. Hjerting 5335* (C). URUGUAY. FLORIDA: Casupá: 15 January 1967, *T.M. Pedersen 8023* (C).

Plantago trinitatis Rahn—BRAZIL. ESPÍRITO SANTO: Ilha da Trindade: 13 December 1965, *J. Becker 522* (C, holotype); 3 April 2013, *D. Port s.n.* (FLOR 49242).

Plantago turficola Rahn—BRAZIL. RIO GRANDE DO SUL: Cambará do Sul: 23 March 1999, *H.M. Longhi-Wagner 6017* (ICN 128404); 13 April 2013, *G. Hassemer 691* (FLOR 48631); São José dos Ausentes: 3 February 1953, *B. Rambo 53912* (HBR 13815); 7 February 1996, *D.B. Falkenberg 7650* (FLOR 47382); 12 April 2013, *G. Hassemer 684* (FLOR 48637); 13 April 2013, *G. Hassemer 687* (FLOR 48635). SANTA CATARINA: Bom Jardim da Serra: 18 September 1958, *R. Reitz 7176* (FLOR 235, HBR 31092); 29 March 1996, *D.B. Falkenberg 7865* (FLOR 47384); 12 October 1996, *D.B. Falkenberg 8489* (FLOR 47383); 18 September 2010, *M. Verdi 5690* (FURB 32668); 12 April 2013, *G. Hassemer 680* (FLOR 48641); 12 April 2013, *G. Hassemer 681* (FLOR 48640); 6 January 2015, *G. Hassemer 784* (C); Timbé do Sul: 13 June 2009, *M. Verdi 2296* (FURB 12772); Urubici: 3 January 1965, *L.B. Smith 14232* (HBR 55082); 12 January 1987, *D.B. Falkenberg 4252* (FLOR 17100); 4 January 1995, *D.B. Falkenberg 6823* (FLOR 24853); 9 October 1996, *D.B. Falkenberg 8383* (FLOR 47385, FURB 41695); 8 December 2000, *G.G. Hatschbach 71661* (MBM 253840); 8 December 2000, *G.G. Hatschbach 71664* (MBM 255640); 12 November 2001, *G.G. Hatschbach 72607* (MBM 262608); 18 October 2004, *G.G. Hatschbach 78195* (MBM 304976); 10 February 2007, *G.G. Hatschbach 79976* (MBM 329248); 1 December 2012, *G. Hassemer 621* (FLOR 47491); 11 April 2013, *G. Hassemer 679* (FLOR 48642).