

# First records of *Paspalum notatum* Flüggé and *P. urvillei* Steud. (Poaceae) in Korea

Jeongran Lee, Chang-Seok Kim\*, In-Yong Lee and Young-Woo Han

National Academy of Agricultural Science, Suwon 441-701, Korea

\*Correspondent: e-mail: rdacskim@korea.kr

While collecting Poaceae weeds at Jeju-do, we found two unrecorded species of the *Paspalum*, *P. notatum* Flügge and *P. urvillei* Steud. We provide the descriptions and illustrations of both species. Key to the newly recorded species and related taxa of Korean *Paspalum* is also presented.

Keywords: *Paspalum notatum*, *Paspalum urvillei*, Poaceae, unrecorded species

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## INTRODUCTION

Poaceae Barnhart, the fourth largest plant family after the Asteraceae, Fabaceae, and Orchidaceae, includes approximately 700 genera and 11,000 species in all regions of the world (Chen and Phillips, 2006). Its economic importance is enormous because it provides the main cereal crops such as *Triticum*, *Oryza*, *Zea*, *Hordeum* etc. Poaceae are distributed throughout Korea with about 96 genera and 252 taxa (Korea National Arboretum, 2011).

The genus *Paspalum* L. is composed of approximately 330 species growing in the Americas, in the tropical, subtropical, and warm-temperate areas (Chen and Phillips, 2006). Because of their utilities as turf, forage, and erosion control, many taxa including *P. notatum* are now widely distributed and have become some of the world's most troublesome weeds (Holm *et al.*, 1979).

*Paspalum* species are recognized by their plano-convex abaxial spikelets, often with a ovate, orbicular, elliptic or oblong shape, the upper lemma oriented towards the rachis and the lower glume typically being absent (Renvoize, 1995; Clayton and Renvoize, 1999; Riefner and Denham, 2010). Only four taxa, *P. thunbergii* Kunth ex Steud., *P. dilatatum* Poir., *P. distichum* L. var. *distichum*, and var. *indutum* Shinnery, have been reported in Korea (Ryang, 2004; Lee, 2007; Korea National Arboretum, 2007; 2011). *Paspalum distichum* var. *distichum* and var. *indutum* are found at the wetlands or watercourses of southern provinces, western and southern coast, and Jeju-do, respectively, while *P. thunbergii* has nationwide distribution. *Paspalum dilatatum* is expanding its distribution range after the naturalization at Jeju-do (Kang, 2008).

Recently, we found two unrecorded species of *Paspalum*, *P. notatum* Flügge and *P. urvillei* Steud., at Jeju-do in Korea. Here, both of the newly recorded species are described and illustrated. We also provide a taxonomic key to the species of *Paspalum* in Korea.

## MATERIALS AND METHODS

The two species were collected at Gangjeong-dong and Beophwan-dong of Seogwipo-si, Jeju-do in August and September 2011. Original descriptions of both species were checked (Flügge, 1810; Steudel, 1855) and their habits and spikelets are photographed (Fig. 1) and drawn (Figs. 2 and 3).

Nomenclature of *Paspalum* followed Clayton *et al.* (2012). All the voucher specimens are deposited at the Herbarium Culture Collection at National Academy of Agricultural Science, Suwon, Korea (HCCN).

## DESCRIPTIONS AND DISCUSSION

### 1. *Paspalum notatum* Flügge, Gram. Monogr., *Paspalum* 106. 1810.

*Paspalum taphrophyllum* Steud., Syn. Pl. Glumac. 1: 19 (1853).

*Paspalum distachyon* Willd. ex Döll in C.F.P. von Martius & auct. suc. (eds.), Fl. Bras. 2(2): 73 (1877), pro syn.

*Paspalum saltense* Arechav., Anales Mus. Nac. Montevideo 1: 53 (1894).

*Paspalum uruguayense* Arechav., Anales Mus. Nac. Montevideo 1: 54 (1894).



**Fig. 1.** *Paspalum notatum* (A-D) and *P. urvillei* (E-H). A, E. habits. B, F. inflorescences. C, D, G, H. Portions of the inflorescences. C, G. abaxial side. D, H. adaxial side.

Common name: Bahiagrass, Bahia grass (Allen and Hall, 2007; Osada, 1989).

Korean name: Min-Doong- Cham-sae-pee (민둥참새피)

Perennial with stout, scaly rhizomes. Culms 15-110 cm tall. Leaf sheaths compressed, keeled, glabrous; leaf blades narrowly linear, flat or folded, stiffly spreading, 5-



30 cm long, 2-10 mm wide, glabrous; ligule less than 1.5 mm. Inflorescence a digitate pair of racemes, rarely 3; racemes 10-13 (-16) cm long, recurved-ascending; spikelets single, in 2 row; rachis 1-1.8 mm wide, scabrous. Spikelets green, ovate to obovate, plano-convex, 2.5-4.0 mm long, 1.7-2.5 mm wide, smooth, shining, obtuse; lower glumes absent, upper glume cartilaginous, 3(-5)-veined, glabrous; lower lemma resembling upper glume but slightly shorter; upper lemma pale green to light yellow; palea coriaceous, shiny.

**Habitats.** In inhabited area, at the edges of forests.

**Distribution.** Native to Mexico through the Caribbean and Central America to Brazil, northern Argentina, U.S.A., Australia (USDA, ARS, National Genetic Resources Program, 2012), Japan (Osada, 1989), China (Chen and Phillips, 2006).

**Specimens examined.** Korea. Jeju-do: 897 Gangjeong-dong, Seogwipo-si, N 33° 15' 40.82", E 126° 29' 20.19", 15 Sept. 2011. C. S. Kim & J. Lee. *Kim 201109-01 ~ 05* (HCCN, 5 sheets).

*Paspalum notatum* is notable for its prominent dual, V-shaped inflorescence consisting of two (rarely three) spike-like racemes containing multiple tiny spikelets, each about 2.5-4.0 mm long and 1.7-2.5 mm wide (Fig. 2). The margins of the upper glume and lower lemma are smooth and can be distinguished from *P. distichum* by having an entirely smooth upper glume. This species is native to Central America and introduced to the United States for forage, turf, and erosion control (Allen and Hall, 2007). In Asia, it is also found in Japan, China, and Taiwan. The time of introduction to Jeju-do is not clear. But it was quite predominant with *P. dilatatum* at the inhabited areas of Gangjeong-dong, Seogwipo-si and found at the several orchards in Jeju-do. The Korean name is given as 'Min-Doong-Cham-Sae-Pee' based on the characteristics of glabrous spikelets. Although many species of *Paspalum* are grown as a grain, forages and turf, most of the species are weeds (Häfliger and Scholz, 1982). It is possible that *P. notatum* could be one of major weeds in Jeju-do because of its persistent nature that does not allow native species to survive.

***Paspalum urvillei* Steud., Syn. Pl. Glumac. 1: 24. 1853.**

*Paspalum ovatum* var. *parviflorum* Nees in C.F.P.von Martius, Fl. Bras. Enum. Pl. 2: 43 (1829).

*Paspalum velutinum* Trin. ex Nees in C.F.P.von Martius, Fl. Bras. Enum. Pl. 2: 43 (1829), pro syn.

*Paspalum dilatatum* var. *parviflorum* Döll in C.F.P.von Martius & auct. suc. (eds.), Fl. Bras. 2(2): 64 (1877).

*Paspalum virgatum* var. *parviflorum* Döll in C.F.P.von Martius & auct. suc. (eds.), Fl. Bras. 2(2): 89 (1877).

*Paspalum larranagae* Arechav., Anales Mus. Nac. Montevideo 1: 68 (1894).

*Paspalum vaseyanum* Scribn., Bull. Div. Agrostol. U.S. D.A. 17: 32 (1899).

*Paspalum griseum* Hack. ex Corrêa, Fl. Braz.: 128 (1909), nom. nud. (Clayton *et al.*, 2012).

Common name: Vaseygrass, Vasey grass (Osada, 1989; Allen and Hall, 2007).

Korean name: Tul-Keun-Cham-sae-pee (털큰참새피)

Perennial with a short (less than 1 cm) rhizomes. Culms densely tufted, robust, up to 220 cm tall, glabrous. Lower sheaths pubescent, upper sheaths glabrous; leaf blades linear, 12-60 cm long, 0.2-1.5 cm wide, mostly glabrous, a few long hairs at the base, apex attenuate; ligule membranous, 3-5 mm. Inflorescence axis 10-30 cm; a panicle consisted of 10-30 racemes; racemes 8-15 cm, narrowly ascending or suberect; spikelets paired; rachis ca. 0.5-1.1 mm wide. Spikelets light green or purplish, ovate, 1.8-2.8 mm long, 1.2-1.7 mm wide, sharply acute; upper glume membranous, 3-veined with laterals marginal, appressed pubescent on back, margins densely fringed with long white hairs; lower lemma similar to upper glumes but glabrous on back; upper lemma elliptic, striate, obtuse; palea 1.6-2.1 mm long.

**Habitats.** In moist, open, disturbed areas and roadsides.

**Distribution.** China, Hong Kong, Taiwan (Chen and Phillips, 2006), Japan (Osada, 1989), U.S.A., Bolivia, Argentina, Chile, Paraguay, Uruguay (Allen and Hall, 2007; USDA, ARS, National Genetic Resources Program, 2012).

**Specimens examined.** Korea. Jeju-do: 1289-4 Beophwandong, Seogwipo-si, N 33° 14' 11.28", E 126° 30' 30.64", 30 Aug. 2011. C.S. Kim and J. Lee. *Kim 201108-01 ~ 02* (HCCN, 2 sheets).

*Paspalum urvillei* is native to South America and widespread in tropical to warm-temperate regions of the world as a forage grass and weed (Osada, 1989; Chen and Phillips, 2006). It was first found at Beophwandong, Seogwipo-si. Although the number of individuals of this species in a single area was rarely found they were distributed in a large area along the roadside. *Paspalum urvillei* is similar to *P. dilatatum* because both species have long hairs on their margins of spikelets. They are, however, different in that *P. urvillei* has relatively small flower spikelets (1.8-2.8 mm long) compared to those (2.7-4.1 mm long) of *P. dilatatum*; *P. urvillei* has 10-30 racemes while *P. dilatatum* has 2-7 (Queensland Government, 2012). This species also could be a noxious weed in Jeju-do because it has already been regarded as one of noxious weeds in many countries including Australia and the United States especially in Hawaii (Pacific Islands Ecosystems at Risk, 2008; FloraBase, 2012). The Korean name, 'Tul-Keun-Cham-Sae-Pee' reflects that the plants have many hairs on the leaf sheaths and spikelets and are similar to *P. dilatatum* (Keun-Cham-Sae-Pee).

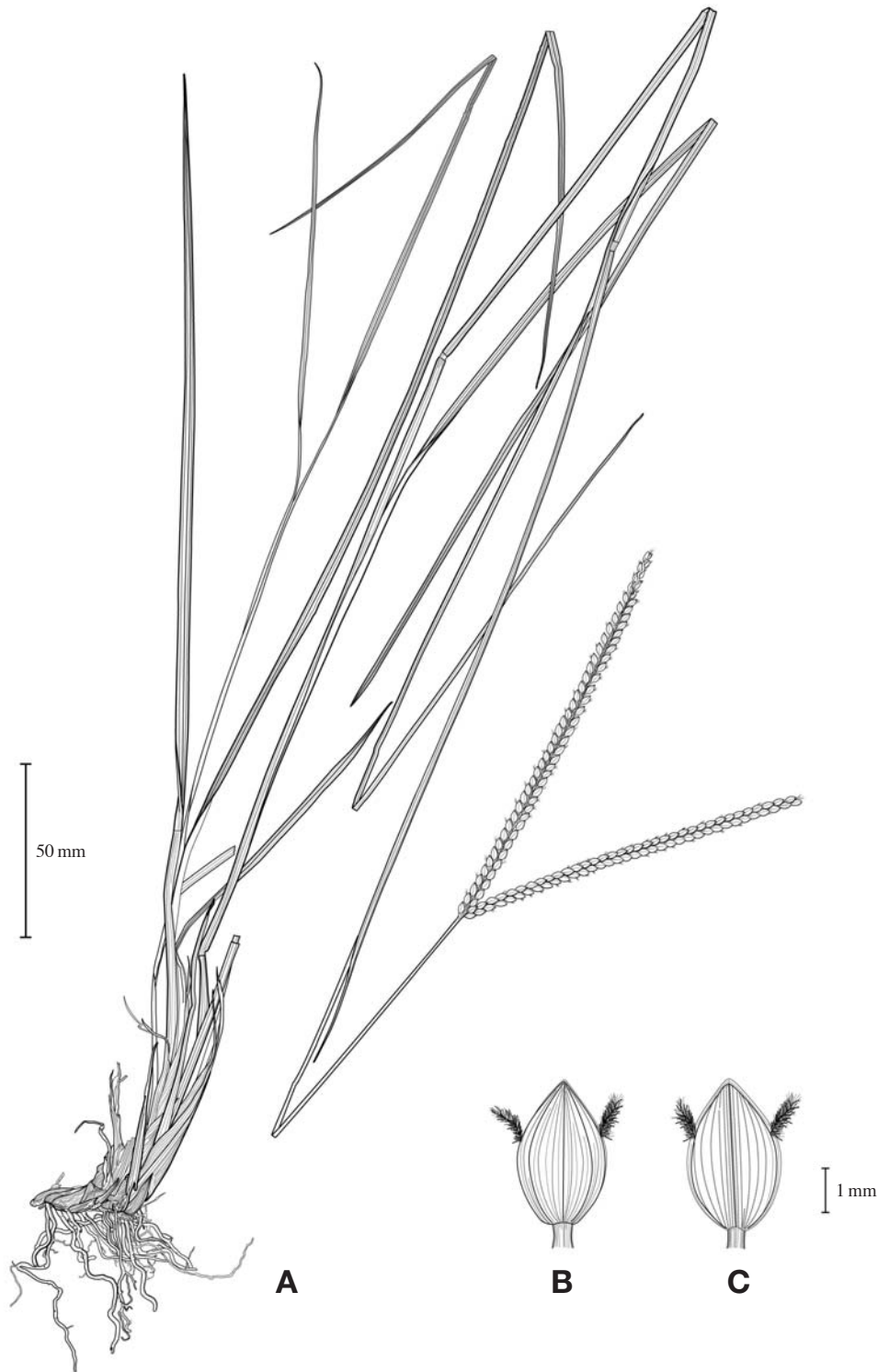
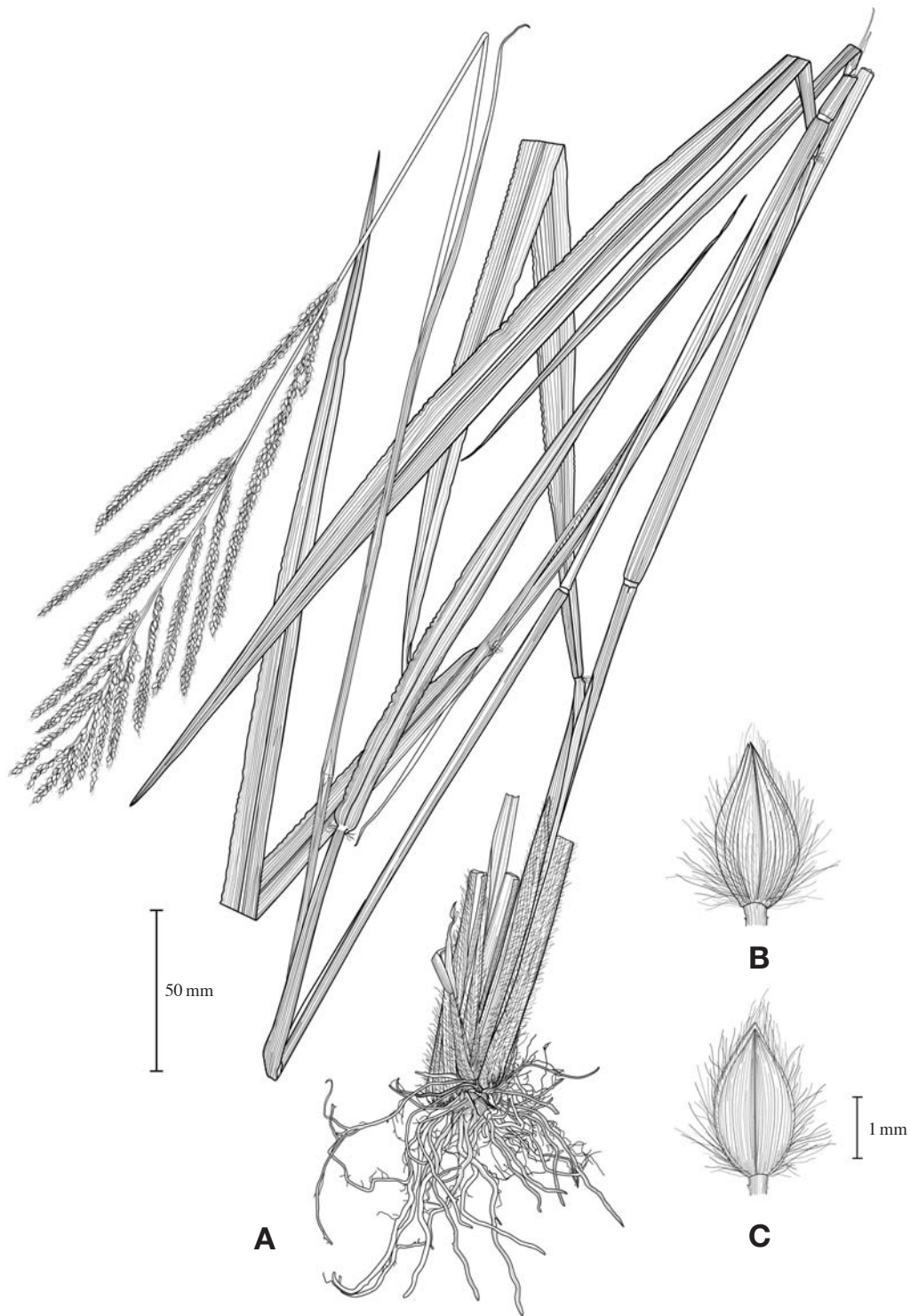


Fig. 2. *Paspalum notatum* Flügge. A. habit; B, C. spikelet. B. abaxial side. C. adaxial side.

**A Key to *Paspalum* in Korea**

- 1. Spikelets with a marginal ciliate fringe of silky hairs; hairs 1-2 mm.
- 2. Racemes 2-7; spikelets 3-4 mm long .....

- ..... *P. dilatatum*
- 2. Racemes 10-30; spikelets 2-3 mm long .....
- ..... *P. urvillei*
- 1. Spikelets glabrous or pubescent, without a marginal



**Fig. 3.** *Paspalum urvillei* Steud. A. habit; B, C. spikelet. B. abaxial side. C. adaxial side.

fringe of silky hairs.

- 3. Plants with long stolons and/or rhizomes; racemes 2 (-3), paired; spikelets born singly.
- 4. Plant with robust rhizomes; upper glume and

- lower lemma cartilaginous and shiny, obtuse  
..... *P. notatum*
- 4. Plant with slender stolons; upper glume and lower lemma papery, acute.

5. Racemes 2; leaf sheath and nodes often glabrous ..... *P. distichum* var. *distichum*  
 5. Raceme 2 or 3; leaf sheath and nodes often pubescent .....  
 ..... *P. distichum* var. *indutum*  
 3. Plants tufted; racemes 3-5 along a common axis, spikelets commonly paired ..... *P. thunbergii*

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