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Miscanthus wangpicheonensis T.I. Heo & J.S. Kim (Poaceae): A new species from Korea

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A new species, *Miscanthus wangpicheonensis* of section *Kariyasua*, is described and illustrated from the morphological characteristics based on a type specimen collected from Gyeongsangbuk-do. This new species is similar to *Miscanthus sacchariflorus* (Maxim.) Hack., and *M. longiberbis* (Hack.) Nakai. The characters which distinguish the above two species are short leaves and racemes, callus hairs 1−1.5-times longer than spikelet, and well-developed awns of spikelet. The specific epithet, "*wangpicheonensis*", is based on the name of the locality where the new species is found. We assume this new species originated from the hybridization of *Miscanthus sacchariflorus* (Maxim.) Hack., and *M. longiberbis* (Hack.) Nakai. *Miscanthus wangpicheonensis* is found in only one locality in Uljin-gun, Gyeongsangbuk-do, Republic of Korea.

Keywords: *Miscanthus*, *Miscanthus wangpicheonensis*, new species, Poaceae

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Introduction

The genus *Miscanthus* Andersson is a small genus belonging to the tribe Andropogoneae of family Poaceae (Lee, 2007; Ibaragi *et al*., 2017; Tang *et al*., 2019), including 14−20 taxa in the world (Lee, 2007; Sun *et al*., 2010) and most species of *Miscanthus* are native to eastern or south-east Asia (Hodkinson *et al*., 2002). The species of *Miscanthus* can be distinguished from those of the genus *Saccharum* by their tough inflorescence rachis and both spikelets of a pair being pedicellate, although the pedicels are of different lengths (Hodkinson *et al*., 2002). Conventional taxonomy (Lee, 1966; Sun *et al*., 2010; Nishiwaki and Nadir, 2014) divides the genus into four sections: sect. *Triarrhena*, sect. *Miscanthus* [=*Eumiscanthus*], sect. *Kariyasua*, and sect. *Diandranthus*.

The Korean taxa of the genus *Miscanthus* were recently revised, and 4 or 5 species representing three sections were recognized (Lee, 2007; Ibaragi *et al*., 2017); *M. sacchariflorus*, *M.*×*ogiformis*, *M. sinensis*, and *M. longiberbis* (=*M. changii*) belong to sections of sect. *Triarrhena*, sect. *Miscanthus*, and sect. *Kariyasua*.

In this study, we describe the morphological characteristics based on the type specimen of a new *Miscanthus* collected from Gyeongsangbuk-do, Republic of Korea. We also provide detailed illustrations, photos, and a taxonomic key to the related species in Korea in order to aid in identification.

Taxonomic Treatment and Description

***Miscanthus wangpicheonensis* T.I. Heo & J.S. Kim**, sp. nov. (Figs. 1−3)

Type. Korea. Gyeongsangbuk-do: Uljin-gun, Geunnam-myeon, Susan-ri, Wangpicheon, 36°58′15.06″N, 129°24′34.76″E, elev. 1 m, 14 Aug 2020, [*heo20101* holotype. KB (NIBRVP0000779340); isotype. KBA].
Korean name. Mul-eok-sae-a-jae-bi (물억새아재비)

Herbs perennial, rhizomatous. Rhizome long-creeping, 2−4 mm diam., hard, covered by scales. Culms erect, 50−80 cm tall, solid, unbranched or branch; nodes hairy (hairs 0.5−1.5 mm long). Leaves cauline; leaf sheaths striate, glabrous or hispid; leaf blades linear, flat, 10−30×1−1.5 cm, glabrous, base tapering, straight or rounded, margins scabrid, apex acuminate; midrib prominent, white; ligule ca. 0.5 mm long, margin ciliate; collar glabrous or pilose. Panicle 7−20(−25) cm long; axis 4−8(−14) cm long, glabrous or pilose at base. Racemes 4−15, 5−20 cm long; rachis internodes glabrous or slightly pilose, nodes pilose;

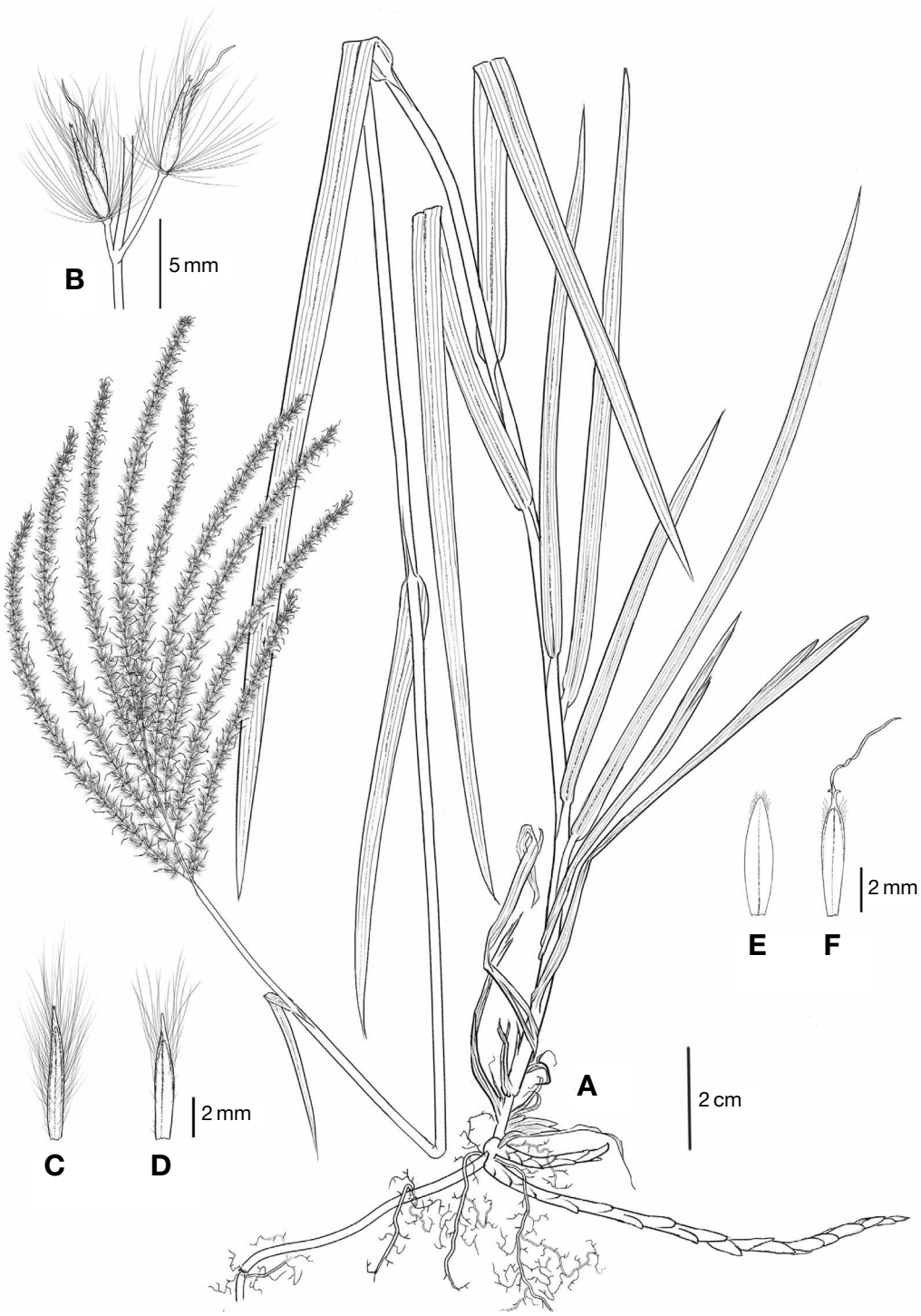

Fig. 1. Illustrations of *Miscanthus wangpicheonensis* T.I. Heo & J.S. Kim. A. Habit. B. Spikelets. C. Lower glume. D. Upper glume. E. Lower lemma. F. Upper lemma.

lower pedicel 1–1.3 mm long, upper pedicel 3–3.6 mm long. Spikelets 5.1–5.3 mm long, pilose, awned; callus hairs (3–)5–7.5 mm long, exceeding the spikelet, white, silky; glumes subequal, 5–5.2 mm long, bright yellow to yellow-orange; lower glume oblong-lanceolate to lanceolate, 5.0–5.2 mm long, apex acuminate, two-toothed, cori-

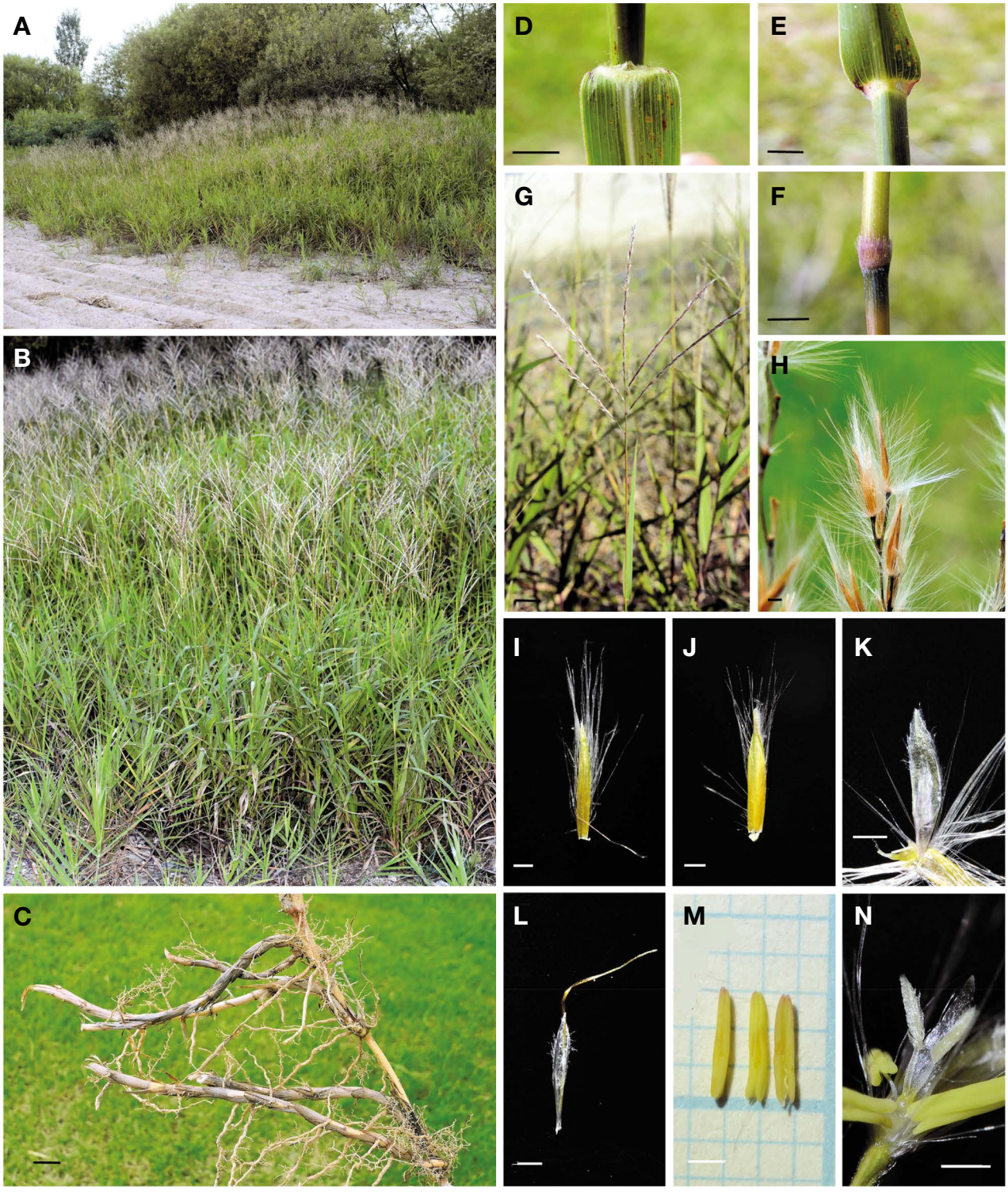

Fig. 2. Photographs of *Miscanthus wangpicheonensis* T.I. Heo & J.S. Kim. A. Habitat of Uljin-gun (25 July 2017). B. Habit. C. Rhizome. D. Ligule. E. Collar. F. Node. G. Panicle. H. Spikelets. I. Lower glume. J. Upper glume. K. Lower lemma. L. Upper lemma. M. Stamens. N. pistil. Scale bars = 1 cm (C, G), 5 mm (D–F), 1 mm (H–N).

aceous, prominent 3–5-veined, pilose with long hairs on abaxial surface, apex and margin densely pilose with 2–5 mm long hairs; upper glume lanceolate, 4.9–5.0 mm long, apex acuminate, coriaceous, 1–3-veined, slightly pilose

Fig. 3. Holotype of *Miscanthus wangpicheonensis* T.I. Heo & J.S. Kim (KB).

with long hairs on abaxial surface, apex and margin pilose with 0.2−3 mm long hairs; lower lemma, narrowly oblong, apex obtuse, membranous, hyaline, ca. 4.2 mm long, inconspicuously (1−)3-veined, pilose with long hairs on margins; upper lemma linear-lanceolate or oblanceolate, 3.5−4 mm long, membranous, inconspicuously 1-veined, pilose with long hairs on margins, apex acuminate, apex and margin densely pilose with long hairs; awn exserted

Table 1. Comparison of diagnostic characters among *Miscanthus wangpicheonensis* and two closely related taxa in Korea.

Characters	Taxa		
	M. sacchariflorus	***M. wangpicheonensis***	*M. longiberbis*
Height (cm)	80–250	50–80	60–100
Length of leaves (cm)	(20–)30–100	10–30	10–30(–40)
Width of leaves (mm)	14–33	10–15	6–14
Hairs of collar	pilose	pilose or glabrous	glabrous
Length of racemes (cm)	4–40	5–20	10–12
Number of racemes	4–30(–70)	4–15	5–7
Length of spikelets (mm)	4.0–6.5	5.1–5.3	5–6
Colour of callus hairs	white	white or purplish white	yellowish white or purplish white
Length of callus hairs (mm)	7–15	(3.0–)5.0–7.5	4.5–8.0
Number veins on the lower glume	2–3	3–5	3–7
Number veins on the upper glume	0–1	1–3	3–5
Awn of the upper lemma	absent	present	present
Length of awn (mm)	–	4.5–5.5	7–8
Length of anthers (mm)	1.5–3.0	3	2.5–3.0

between the teeth of upper lemma, 4.5–5.5 mm long, geniculate, lower part twisted; upper palea ovate-lanceolate, ca. 2.5 mm long, membranous, veinless, apex and margin ciliolate. Stamens 3, anthers ca. 3 mm long. Style ca. 0.6 mm long. Stigmas purple-black, 1.2–1.5 mm long. Ovary orbicular-ovate or suborbicular, 0.2–0.3 mm long (Table 1).

Additional specimens examined. Korea. Gyeongsangbuk-do: Uljin-gun, Geunnam-myeon, Susan-ri, Wangpicheon, 36°58′15.06″N, 129°24′34.76″E, elev. 1 m, 25 July 2017, *kjs17096*, *17097* (KB); 17 Sep 2019, *kjs19040*, *19041*, *19042*, *19043* (KB); 23 Aug 2020, *heo20102*, *20103* (KB).

Flowering. late July to October.

Distribution. Korea (Gyeongsangbuk-do), endemic to Korea.

Habit. Sunny places of riverside.

Etymology. The specific epithet, "*wangpicheonensis*", is based on the name of the locality where the new species is found.

A key to the new *Miscanthus* species and related taxa in Korea

1. Spikelets awnless; callus hairs ca. 1.5–3-times longer than spikelet ····· *M. sacchariflorus* 물억새
1. Spikelets awned; callus hairs shorter or 1–1.5(–2)-times longer than spikelet.
2. Tufted or shortly rhizomatous ····· *M. sinensis* 억새
2. Rhizomatous or rhizome long.
3. Culms 200–230 cm tall; leaf blade 50–70 cm long, 14–19 mm wide; inflorescence 20–30 cm long with 15–30 racemes ····· *M.* × *ogiformis* 순안억새
3. Culms 40–100 cm tall; leaf blade 18–30 cm long, 6–15 mm wide; inflorescence 10–20 cm long with 5–10(–15) racemes.
4. Culms 60–100 cm tall; callus hairs yellowish white or purplish white, shorter or almost same length as spikelet; lower glume apex and margin slightly pilose with long hairs ····· *M. longiberbis* 억새아재비
4. Culms 50–80 cm tall; callus hairs white or purplish white, 1–1.5-times longer than spikelet; lower glume apex and margin densely pilose with long hairs ····· ····· ***M. wangpicheonensis*** 물억새아재비

Discussion

Miscanthus wangpicheonensis is found in only one locality in Uljin-gun, Gyeongsangbuk-do, Republic of Korea. This species occurs in open, sunny places in the estuary area of the Wangpicheon River. At present, fewer than 200 individuals are found in the population areas (ca. 100 m^2) because of clonal reproduction by stoloniferous rhizomes. It grows together with herbaceous plants such as *Ambrosia artemisiifolia* L., *Artemisia capillaris* Thunb., *A. indica* Willd., *Bidens biternata* (Lour.) Merr. & Sherff, *B. frondosa* L., *Calystegia soldanella* (L.) Roem. & Schult., *Metaplexis japonica* (Thunb.) Makino, *Phragmites japonica* Steud., and *Xanthium italicum* Moretti.

This new species is similar to *Miscanthus sacchariflorus* (Maxim.) Hack., and *M. longiberbis* (Hack.) Nakai. It could be distinguished from its congeners by a combination of the following characters: short leaves and racemes, also callus hairs 1–1.5-times longer than spikelet, and

well-developed awns of spikelet (Table 1). We presume this new species originated from the hybridization of *Miscanthus sacchariflorus* (Maxim.) Hack., and *M. longiberbis* (Hack.) Nakai.

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