

Paspalidium Stapf (Poaceae) in Taiwan

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(Manuscript received 25 February 1998; accepted 15 March 1998)

ABSTRACT: In this report we document the recent naturalization of a panicoid grass, *Paspalidium flavidum* (Retz.) A. Camus, in Taiwan. Taxonomic treatment, line drawings and SEM photographs of the upper lemma are provided.

KEY WORDS: *Paspalidium flavidum*, *P. punctatum*, Poaceae, Gramineae, Taxonomy, Taiwan.

INTRODUCTION

Paspalidium is a genus of Poaceae, containing about 40 species, mainly distributed throughout the tropics (Bor, 1960; Lazarides, 1980). The overlapping or distant racemes alternately placed along a main axis, with imbricate spikelets and the rachis tip ending in an inconspicuous point or bristles is the diagnostic criterion of this genus (Clayton and Renvoize, 1986; Gilliland, 1971; Henty, 1969; Lazarides, 1970). In Flora of Taiwan (Hsu, 1978), only one species, *P. punctatum*, was previously recorded. With the acute, awnless upper and lower lemma, and the rugulosed upper lemma, this rare species is easy to distinguish from other Taiwan grasses.

We found a large clump of unidentified grass at forest margin in 1992 when we surveyed the plant resources in Sou-Shan area. On the next field trip to the same locality in the summer of 1993, we found that the population of this grass was gradually spread and growing very well with blooming inflorescence. We were sure that this recent naturalized grass, *P. flavidum*, was a new record to Taiwan flora.

Koyama (1989) pointed out that the name *P. mucronatum* applied by Ohwi to the Taiwanese plant is not suitable and coincided *P. mucronatum* with *P. punctatum* by the transversely rugulose surface features of upper lemma.

In this report, we provide taxonomic treatment and line drawings of *P. flavidum* and *P. punctatum*. The surface features of the floral parts was also illustrated with the scanning electron microscopy since the surface features of the upper lemma are diagnostic characters for the identification of *Paspalidium*.

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MATERIALS AND METHODS

Dried herbarium specimens of *P. punctatum* loaned from the TAI-herbarium and *P. flavidum* deposited at the NCKU-herbarium were studied with published taxonomic literature on *Paspalidium*.

For SEM examination, the spikelets of both species were collected from specimens. The dry materials were immersed with 70% alcohol solution for twenty minutes, then, dehydrated in a graded alcohol series. The materials were dried with Hitachi HCP-2 Critical Point Dryer. All the dried samples were mounted on stubs and coated with palladium and platinum in the Eiko Corp. IBA2 Ion sputter. The materials were observed on the Hitachi S-4200 scanning electron microscope at accelerating voltage of 25 kV and the images photographed on Kodak TMY 120 (ASA 400).

RESULTS

Paspalidium Stapf in Prain, Fl. Trop. Afr. 9, 582. 1920.

Inflorescence composed of spike-like racemes, alternately placed along a main axis, which terminate with a raceme, racemes appressed to main axis, with a flattened axis, abaxial side more or less with a zigzag keel. Spikelets solitary, alternate along the keel, very regularly 2-seriated, close together, elliptic, acute, nearly flat on back, convex on ventral side, 2-florets, articulate with very short pedicels; glumes shorter than spikelet; lower lemma as long as spikelet; upper lemma chartaceous to coriaceous, rugulose or granular, with incurved margins; upper palea chartaceous, embraced by the margins of the upper lemma; lodicules 2; stamens 3; styles 2, free, the stigmas plumose, exerted near apex. Caryopsis is plano-convex.

Key to Species

1. Terrestrial grass with slender culms 1-2 mm thick; basal margin of blade with long hairs; ligule 0.2 mm long, with short cilia nearly the same length of ligule1. *P. flavidum*
1. Aquatic grass with thick culms 4-10 mm across; basal margin of blade not with long hairs; ligule 0.25 mm long, with long cilia nearly 10 times the length of ligule2. *P. punctatum*

1. ***Paspalidium flavidum*** (Retz.) A. Camus in Lecomte, Fl. Gen. de l' Indo-Chine 7: 419. 1922. Figs. 1 & 2

Panicum flavidum Retz., Obs. Bot. 4: 14. 1786.

Panicum floridum Royle, III. Bot. Himal. 420. 1840.

Panicum granulare Lamak., Tab. Encycl. Meth. Bot. 1: 170. 1791.

Terrestrial perennial. Culms erect or ascending, 40-60 cm tall, slender, 1-2 mm thick, the internodes somewhat compressed, glabrous, smooth. Leaves cauline, leaf-blades about 30 cm long, linear, 5-7 mm wide, ligule very short (*ca.* 0.25 mm), densely ciliate with long soft

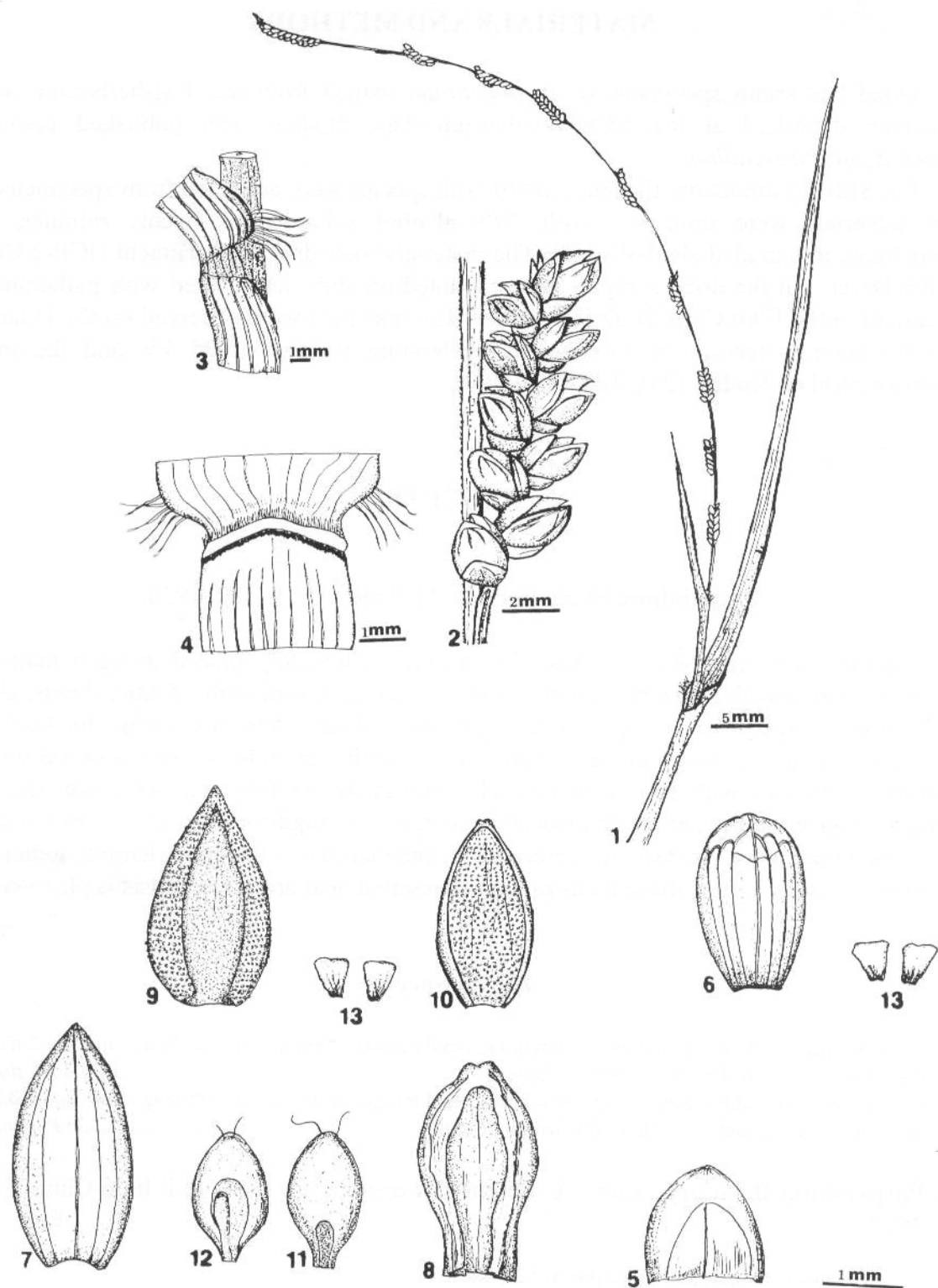


Fig. 1. *Paspalidium flavidum* (Retz.) A. Camus (from Kaohsiung City, C. S. Kuoh, 016970). 1. habit, 2. inflorescence, 3. side view of leaf sheath; 4. adaxial view of leaf sheath, 5. lower glume, 6. upper glume, 7. lower lemma, 8. lower palea, 9. upper lemma, 10. upper palea, 11. caryopsis with hilum, 12. caryopsis with embryo, 13. lodicules of lower floret, 14. lodicules of upper floret.



Fig. 2. Color photograph of inflorescence of *P. flavidum* (Retz.) A. Camus.

hairs 1.5-2.2 mm long. Panicle erect, 8-25 cm long; distantly bearing 6 to 10 racemes; racemes erect 1-1.8 cm long, 2-3 mm wide; rachis flexuous, triquetrous and compressed, winged, abaxial side conspicuously with a zigzag keel, 0.5-0.8mm wide, densely bearing spikelets on one side. Spikelets subsessile, regularly alternately disposed in two rows on one side of the rachis of racemes, ovate-elliptic, dorsio-ventrally flattened, 2.8-3 mm long, 1.5-2 mm wide, glabrous, awnless. First glume 1.5-1.6 mm long, 3-nerved, joint at apex. Second glume 2.2 -2.4 mm long, 7-nerved with tessellate veins at apex, the median vein protrudes to a mucronate. Lower lemma 2.4-2.8 mm long, 5-nerved, lateral vein joint at apex, enclosed the upper floret. Lower palea translucent membranous, margin incurved inside, 2-nerved green, 2-keeled, truncated at apex, very flat; sterile stamens 3, minute, 0.3 mm long. Upper lemma chartaceous to coriaceous, granular on back, 2 mm long, 5-nerved, conspicuously on innersole, margin enclosing the upper palea; upper palea 1.9 mm long, chartaceous to coriaceous, granular and broad shallow on back, boat shaped, mucronate at apex; lodicules 2; stamens 3; styles 2, free, the stigmas plumose, exerted near apex.

Distribution: Tropical Asia.

Kaohsiung City: National Chung-Shan Univ. Kuoh, 016970, in moisture parts of hills, on the margins of the forests growing on coastal coral reefs.

2. ***Paspalidium punctatum*** (Burman f.) A. Camus. in Lecomte, Fl. Gen. de l' Indo-Chine 7: 419. 1922; Hsu in *Taiwania* 9: 51. 1963; *Taiwan Grass*. 573. *pl.* 181. 1975, Fl. Taiwan 5: 579. 1978. Fig. 3

Panicum punctatum sensu Hayata, Icon. Pl. Form. 7: 59. f. 31. 1918.

Panicum punctatum Burm., Fl. Ind. 26. 1768.

Panicum mucronatum Roth in Roem. et Schult., Syst. Veg. 2: 425. 1817.

Paspalidium mucronatum (Roth) Ohwi, Acta Phytotax and Geobot. 11: 33. 1942.

Panicum geminatum sensu Honda in Bot. Mag. Tokyo 37: 23. 1923; Monogr. Poac. Jap. 245. 1930.

Paspalum aquaticum Masam. and Syozi in Trans. Nat. Soc. Taiwan 34: 303. 1944.

Aquatic perennial. Culms erect or geniculate-ascending, 40-80 cm tall, 4-10 mm thick at the midway portion, branched below, the internodes terete, 3-14 cm long, glabrous, smooth. Leaves cauline; basal leaves with a short erect lanceolate blade; upper leaves with elongated leaf-blades, 6-25 cm long, linear, 5-8 wide, ligule very short (0.1- 0.25 mm), densely ciliate with long soft hairs 1.5-2.2 mm long. Panicle erect, 15-35 cm long; distantly bearing 8 to 14 racemes; racemes erect, 1-3 cm long, 3-4 mm wide; rachis flexuous, triquetrous and compressed, winged, abaxial side conspicuously with a zigzag keel, 1-1.2 mm wide, scaberulous-edged, densely bearing spikelets on one side. Spikelets subessile, regularly alternately disposed in two rows on one side of the rachis of racemes, elliptic to ovate-elliptic, dorsi-ventrally flattened, 2.8-3.25 mm long, 1.2-1.4 mm wide, glabrous, awnless. Glumes unequal; lower glume transversely reniform to depressed semi-circular, 1 mm long, rounded to subtruncate at apex, without conspicuous nerve; upper glume obovate to obovate-elliptic 1.1-2 mm long, rounded at apex, 3- or 5-nerved. Lower lemma elliptic to widely elliptic, 5-nerved, subacute at apex, lateral vein joint at apex, the margin embracing the fertile floret; Lower palea wanting. Upper lemma equaling the lower lemma, elliptic, indurate, subacute at apex, 5-nerved, minutely transversely rugulose and minutely dotted, the margins tightly embracing the upper palea except at the recurved apex; upper palea equaling the upper lemma.

Emergent aquatic grass found in wet places such as ponds or margins of streams. Tropical Africa, India, Indo-China, Malesia, and Taiwan.

Distribution: Tropical Asia.

TAINAN: Fantzutien, Mori 674; Hsinhua, Shimada 5980B. It grows in wet places and ponds in southern Taiwan.

Note: The surface features of both glumes and lower lemma are not conspicuously different between *P. flavidum* and *P. punctatum*. Although both species have dome-shaped papillae on the abaxial surfaces of upper lemma and palea. The papilla is coniculate in *P. flavidum* (Fig. 4A) while it is glabrous in *P. punctatum*. (Fig. 4B).

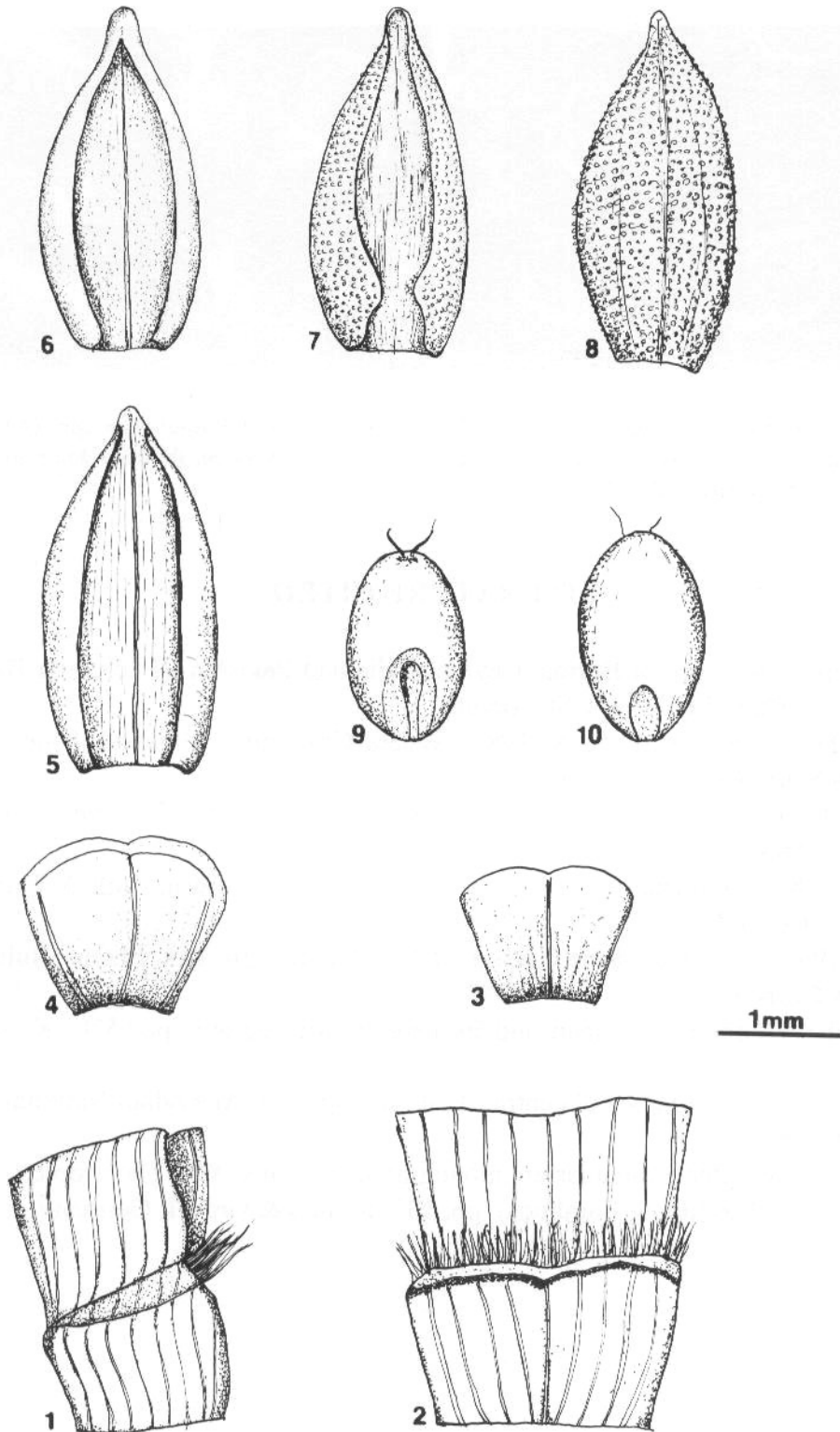


Fig. 3. *P. punctatum* (Burman f.) A. Camus (from Tainan, Mori, 674). 1. side view of leaf sheath, 2. adaxial view of leaf sheath, 3. lower glume, 4. upper glume, 5. lower lemma, 6. upper palea. 7. adaxial side of upper lemma, 8. abaxial side of upper lemma; 9. caryopsis with embryo, 10. caryopsis with hilum.

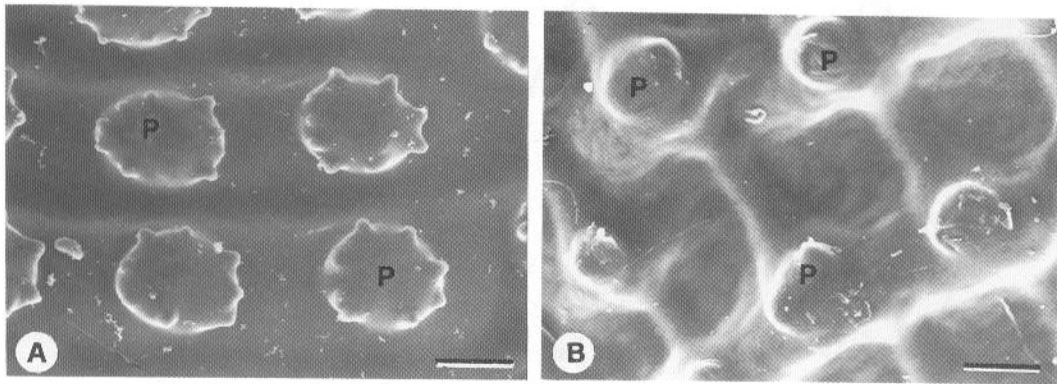


Fig. 4. Scanning electron micrograph of abaxial side of upper lemma of *Paspalidium* spp. (A) *P. flavidum*, showing dome-shaped papillae (P) with corniculate surface. (B) *P. punctatum*, showing dome-shaped papillae (P) with glabrous surface. (bar=20mm)

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臺灣新歸化植物—黃穗類雀稗

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(收稿日期：1998年2月25日；接受日期：1998年3月15日)

摘 要

黃穗類雀稗—*Paspalidium flavidum* (禾本科) 歸化於高雄壽山地區。本文提供本種之分類特徵描述與繪圖，並比較本新紀錄種與類雀稗於植株諸項特徵及內、外稃表面突起的差異。

關鍵詞：黃穗類雀稗、類雀稗、禾本科、分類、台灣。

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