

# GRASS FLORA OF TAIWAN

Bamboos excluded

2 of 3

Subfamily: PANICOIDEAE

Tribe: PANICEAE

*Revised Edition*



Chih-Hui Chen

Che-Yu Lin

Chang-Sheng Kuoh

ENDEMIC SPECIES RESEARCH INSTITUTE

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Chih-Hui Chen (陳志輝)

Endemic Species Research Institute

Che-Yu Lin (林哲宇)

Endemic Species Research Institute

Chang-Sheng Kuoh (郭長生)

Department of Life Science, National Cheng Kung University

Endemic Species Research Institute

Chichi, Taiwan

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## **Grass Flora of Taiwan:**

PANICOIDEAE: PANICEAE

### **Authors**

Chih-Hui Chen, Che-Yu Lin and Chang-Sheng Kuoh

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1, Ming-shen East Road, Chichi Township, Nantou County, Taiwan, 552, R.O.C.

Phone: +886-49-2761331

Fax: +886-49-2763991

e-mail: tesnet@tesri.gov.tw

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# Introduction

The family Poaceae (Gramineae) is one of the largest families of vascular plants with about 700 genera and 11,000 species worldwide (Chen *et al.* 2006). It is also the largest family among Taiwanese vascular plants. According to *Flora of Taiwan* and recent reports, there are eight subfamilies, 21 tribes, 118 genera, about 299 species, and 20 infraspecific taxa of grasses in Taiwan.

We published the first volume of *Grass Flora of Taiwan* in 2011 which included the grasses belonging to seven subfamilies, Pharoideae, Ehrhartoideae, Pooideae, Centothecoideae, Arundinoideae, Aristidoideae, and Chloridoideae of Poaceae in Taiwan. In this volume, we treated 23 genera, 85 species or varieties which belong to tribe Paniceae of the subfamily Panicoideae. The recently naturalized and new record species were also included. We will publish the third volume, the last one, as soon as we can to treat the remaining grasses belonging to tribe Isachneae of subfamily Micrairoideae, and tribes Arundinelleae and Andropogoneae of subfamily Panicoideae.

The descriptions of most genera were from the second edition of *Flora of Taiwan* except some new genera which were reported to occur in Taiwan recently. Their descriptions were from the original reports of their occurrence or from the *Flora of China* (Chen *et al.* 2006). Besides, we spent a lot of time to examine all specimens of grasses at the herbaria HAST, TAI, TAIE, TAIF, TNM, NCKU, and PPI. Based on the specimens, we constructed a dataset about the morphology of most species except some rare species which we could not examine their materials. This dataset is in accordance with the standards and formats of DELTA (DEscriptive Language for TAXonomy) system (Dallwitz, 1974; Dallwitz, 1980; Dallwitz *et al.*, 1999). The descriptions of the species were generated by the program CONFOR automatically (Chen & Kuoh 2000a; Chen & Kuoh 2000b; Coleman *et al.* 2010). We are deeply grateful to Mr. Yoshiyaki Fujimoto (藤本義昭) for his kind offer of some splendid line drawings in this volume although he has passed away. Besides, some photo pictures come by courtesy of Mr. Shih-Sheng Yang (楊師昇), Mr. Chia-Jung Lin (林家榮) and Mr. Hsiu-Yi Yeh (葉修溢). Mr. Hsien-Chun Liao's (廖顯淳) effort on proofreading was also deeply appreciated. The botanical terms we used were adopted from *Flora of China* (Chen *et al.* 2006).

In addition to the published paper copy, all content of this Flora will be available on line, too. Please contact the first author to get the downloading link. The e-mail address is *humblegrass@gmail.com*.

# Taxonomic descriptions

## POACEAE (GRAMINEAE) 禾本科

### KEY TO THE SUBFAMILIES

1. Perennials; culms woody, base of blade articulated with sheath, usually pseudo-petiolate. . . . . Bambusoideae
1. Annuals or perennials; culms herbaceous, base of blade not articulated with sheath.
  2. Spikelets with one to many lemmas, if with two then lower one usually bisexual; glumes and palea of more or less same texture, spikelets terete or laterally compressed, breaking up at maturity above more or less persistent glumes.
    3. Glumes usually wanting or inconspicuous; palea odd-nerved, if 2-nerved, then linear or enclosed in a saclike lemma.
      4. Plants of shaded forest; spikelets unisexual; female spikelets utriculate in fruit . . . . . 1. Pharoideae
      4. Plants of wet land, aquatic or swampy places; spikelets bisexual, never utriculate . . . . . 2. Ehrhartoideae
    3. Glumes distinct; paleas 2-keeled or inconspicuous nerved.
      5. Blade-base a membranaceous collar; lemmas 5 to many-nerved; lodicules acute or acuminate, nerveless; embryo less than 1/4 times as long as caryopsis.
        6. Awn simple or without awn. . . . . 3. Pooideae
        6. Awns trifid. . . . . 6. Aristidoideae
      5. Blade-base composed of a fringe of short to long hairs; lemmas 1 to 3-nerved, or nearly nerveless; lodicules truncate, nerved; embryo more than 1/3 times as long as caryopsis.
        7. Tall reed-like plants or medium sized grasses; spikelets nearly terete, laterally compressed; lemmas distinctly nerved.
          8. Blades broad and tessellately nerved, with cross veins, pseudo-petiolate present; if not as above, spikelets with 2 florets. . . . . 4. Centothecoideae
          8. Blades linear or lanceolate, nerves not tessellate, pseudo-petiolate absent; spikelets with more than 2 florets. . . . . 5. Arundinoideae
        7. Small to medium sized grasses; spikelets compressed; lemmas faintly nerved . . . . . 7. Chloridoideae
    2. Spikelets with two lemmas (only 1, in *Sphaerocaryum*) glumes much more indurate than scarious lemma and palea, lower floret male or neutral, upper bisexual, spikelets usually dorsally compressed, falling off as a unit together with glumes at maturity, embryo more than 1/3 times as long as caryopsis.
      9. Spikelets falling entire at maturity . . . . . 8. **Panicoideae**
      9. Spikelets disarticulating above glumes.
        10. Lemmas both orbicular to broadly elliptic, awnless; leaf blades lanceolate to ovate . . . . . 9. Micrairoideae
        10. Lower lemma often lanceolate, upper lemma terete, often awned; leaf blades linear . . . . . 8. Panicoideae (Arundinelleae)

## Subfamily 8. PANICOIDEAE 黍亞科

### KEY TO THE TRIBES

1. Spikelets articulated above glumes . . . . . 2. Arundinelleae
1. Spikelets articulating below glumes.
  2. Upper lemma and palea coriaceous; thicker than glumes. . . . . 1. **Panicaceae**

2. Upper lemma and palea membranaceous; thinner than glumes . . . . . 3. Andropogoneae

## Tribe 1. PANICEAE 黍族

### KEY TO THE GENERA

1. Spikelets mostly unisexual; plants littoral.
  2. Plants monoecious; spikelets in a simple spike, lower 1 or 2 pistillate (or hermaphroditic), upper 4-6 sessile, staminate; rachis flattened but broadened and partially enclosing spikelets at maturity . . . . . 22. *Thuarea*
  2. Plants dioecious; pistillate spikelets in clustered head-like spikes, with spiny subtending bracts; staminate spikelets on an umbellate-branched rachis . . . . . 21. *Spinifex*
1. Spikelets bisexual.
  3. Spikelets enclosed in a globose spiny bur or subtended by 1 to many free bristles.
    4. Inflorescence in racemose racemes, only the uppermost spikelet of each raceme subtended by a bristle; aquatic . . . . . 18. *Pseudoraphis*
    4. Inflorescence in a panicle, often spikelike, all or many of the spikelets subtended by bristles or a spiny involucre; terrestrial
      5. Bristles persisting on the axis after the spikelets fall . . . . . 20. *Setaria*
      5. Bristles or spines falling as involucre around the spikelets
        6. Involucral bristles slender, free to the base. . . . . 17. *Pennisetum*
        6. Involucral bristles and spines flattened and connate below, or forming a spiny involucre . . . 4. *Cenchrus*
  3. Spikelets not enclosed in a spiny bur, nor subtended by bristles.
    7. Inflorescence in digitate or racemose racemes; spikelets sessile or shortly pedicellate, arranged in one-sided racemes.
      8. Upper glume and upper lemma with their back to floral axis.
        9. Upper lemma with hyaline margins.
          10. Upper lemma awned . . . . . 1. *Alloteropsis*
          10. Upper lemma awnless . . . . . 6. *Digitaria*
        9. Upper lemma with inrolled margins.
          11. Lower glume usually absent, if present, only in some of spikelets . . . . . 16. *Paspalum*
          11. Lower glume present; if absent, then callus well-developed.
            12. Glume and lower lemma acute, awnless.
              13. Upper lemma acute, not mucronate; aquatic . . . . . 15. *Paspalidium*
              13. Upper lemma mucronate or short awned; terrestrial. .... 23. *Urochloa*
            12. Glume and lower lemma acuminate or awned; upper lemma smooth.
              14. Blades linear, narrow; culms erect or suberect. . . . . 7. *Echinochloa*

14. Blades lanceolate to broadly ovate; culms partly creeping . . . . . 12. *Oplismenus*
8. Lower glume and lower lemma with their back to floral axis.
15. Spikelets base thickened into a callus; lower glume absent . . . . . 8. *Eriochloa*
15. Spikelet base not thickened into a callus.
16. Lower glume present; inflorescence racemose . . . . . 3. *Brachiaria*
16. Lower glume absent; inflorescence subdigitate . . . . . 2. *Axonopus*
7. Inflorescence a loose, open or densely contracted spike-like panicle; spikelets usually distinctly pedicellate, not arranged in one sided racemes.
17. Panicle cylindrical, densely set with spikelets.
18. Upper glume lanceolate; upper lemma glabrous, membranaceous; florets sessile . . . . . 9. *Hymenachne*
18. Upper glume inflated-saccate; upper lemma papery-indurate, usually pubescent; florets pedicellate . . . . . 19. *Sacciolepis*
17. Panicle loosely opened, usually sparingly set with spikelets.
19. Upper glume and lower lemma awned or pointed, at least lower lemma awned from sinus. . . . . 11. *Melinis*
19. Upper glume and lower lemma entire at apex.
20. Spikelets gibbose, strongly and laterally compressed . . . . . 5. *Cyrtococcum*
20. Spikelets not gibbose, dorsally compressed.
21. Upper florets with scars at base . . . . . 10. *Ichnanthus*
21. Upper florets without lateral appendages at base.
22. Upper glume as long as spikelet . . . . . 14. *Panicum*
22. Upper glume to 1/2 as long as spikelet. . . . . 13. *Ottochloa*

### 1. *Alloteropsis* Presl., Reliq. Haenk. 1: 343. 1830.

#### 毛穎草屬

Annuals or perennials; culms erect or ascending, tufted. Leaf blade ovate-oblong or linear, glabrous or with tubercle-based hairs; ligule membranaceous, ciliate. Inflorescence composed of racemes, all digitately arranged; racemes secund, sometimes slightly branched. Spikelets falling as a whole, pedicellate, on one side of rachis, sometimes solitary, mostly in pairs, rarely more together, dorsally compressed, ovate-oblong, 2-flowered; glumes herbaceous; lower glume shorter than spikelet, acute, 3-veined; upper glume as long as spikelet, ovate, margins long-ciliate, 5-veined; lower lemma herbaceous, 5-veined; lower palea shorter, deeply 2-fid, broadly inflexed at base, adnate to base of upper lemma, 1-veined; upper lemma chartaceous, glabrous with broadly inflexed, hyaline margins, short-awned, 5-veined; upper palea chartaceous, entire, margins broadly inflexed at base, 2-veined, almost completely embraced by upper lemma; lodicules 2; stamens 3; styles 2, distant, stigmas exerted laterally. Caryopsis ellipsoid, plano-convex, hilum punctiform, basal.

Five species, distributed in tropical regions of Africa and Asia. One species in Taiwan.

1. *Alloteropsis semialata* (R. Br.) Hitchc., Contr. U. S. Herb. 12: 210. 1909; Hsu, *Taiwania* 16: 274. 1971; Hsu, *Fl. Taiwan* 5: 525. *pl. 1420*. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 333. 1987; Liu, *Fl. Taiwan. ed. 2, 5*: 454. *pl. 188*. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 519. 2006. 毛穎草 Photo 1-2

*Panicum semialatum* R. Br., Prodr. 192. 1810.

Perennials, tufted, rhizomatous. Culms erect, slender, 30-70 cm tall, glabrous, culm nodes bearded. Leaf sheaths longer than internodes, surface densely pilose on basal leaf sheaths, outer margins ciliate, joint between sheath and blade pilose. Ligule a ciliolate membrane, 1 mm long. Blades cauline, linear, flat, 10-30 cm long, 3-7 mm wide, margins smooth, apex acuminate, surface sparsely hispid on adaxial side. Inflorescence in digitate racemes, loose, base exerted from uppermost sheath. Racemes 2-4, erect or ascending, straight or arcuate, 4-12 cm long, pubescent at base. Rachis tenacious, angular, midrib thick, not winged or scarcely winged, margins pubescent. Pedicels linear, angular, with truncate tips, margins scaberulous. Spikelets bisexual, paired or grouped, all pedicellate, varying in pedicels length, homomorphic, dorsally compressed, lanceolate, 5-6 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 2.5-3 mm long, 0.5 time of length as the spikelet, chartaceous, 3-veined, not keeled, veins glabrous, surface glabrous, margins ciliate, apex mucronate, awnless, clasping at the base of the spikelet. Upper glume broadly lanceolate, 5-6 mm long, as long as spikelet, chartaceous, 5-veined, not keeled, margins ciliate, apex mucronate, awnless. Lower florets barren. Lower lemma broadly lanceolate, 5-6 mm long, chartaceous, 5-veined, surface glabrous, margins ciliate on the upper part, apex mucronate, awnless. Lower palea well developed, membranous, oblong, 0.35 time of length as lower lemma, 2-keeled. Upper floret pale gray. Upper lemma lanceolate, 4-5 mm long, subcoriaceous, surface smooth, apex acuminate, awned, awn arising from apex, straight, 2-3 mm long. Upper palea lanceolate, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Anthers 3, 2 mm long.

[Distribution] The Himalayas, India, Myanmar, China, Australia and Tropical Africa.

[Habitat] Taiwan, in exposed red soil hillsides.

[Taiwan] HSINCHU: Lienhua Temple, *Yang 6230* (TNM); Shanjiao, *Peng 9462* (HAST). MIAOLI: Hsiaoping, *Hsu 5299* (TAI). TAICHUNG: Tatushan, *Lin 71* (TNM). YUNLIN: Linne, *Chen 1183* (TAIE). TAINAN: Liuchia, *Inoue s. n.* Jan. 30, 1944 (TAI).

## 2. *Axonopus* P. Beauv., Ess. Agrostogr. 12. 1812.

### 地毯草屬

Perennials, rarely annuals; culms tufted, stoloniferous or not. Leaf blade flat or conduplicate,

rather wide; sheaths often strongly keeled-compressed and equitant. Inflorescence composed of 2-numerous sessile, slender spike-like racemes; digitately-racemosely arranged. Spikelets solitary, alternate, dorsally sessile along abaxial keel or rachis, dorsally compressed, oblong, muticuous, 2-flowered, falling off as a whole; lower glume absent; upper glume and lower lemma as long as spikelet, thin, 2 to 7-veined, with or without a faint midvein, with 1-3 marginal veins on either side; lower palea absent; upper lemma and palea coriaceous; upper lemma with narrowly inrolled, opaque margins, usually not acute, embracing upper palea to apex; lodicules 2; stamens 3; style 2, free, stigmas plumose, exerted laterally. Caryopsis free, totally enclosed by indurate upper palea and lemma, elliptic, dorsally compressed, embryos small.

About 110 species distributed in the tropical and subtropical America, now introduced to many warmer countries. Two naturalized species in Taiwan.

### KEY TO THE SPECIES

1. Nodes of culm bearded; spikelets 2–2.7 mm; upper floret shorter than spikelet; leaf blades 6–12 mm wide..... 1. *A. compressus*  
 1. Nodes of culm glabrous; spikelets 1.6–2 mm; upper floret equaling spikelet; leaf blades 3–6 mm wide..... 2. *A. fissifolius*

**1. *Axonopus compressus*** (Sw.) P. Beauv., Ess. Agrostogr. 12. 1812; Hsu, Taiwania 16: 274. 1971; Hsu, Fl. Taiwan 5: 527. *pl. 1421*. 1978; Liu, Fl. Taiwan. ed. 2, 5: 456. *pl. 189*. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 531. 2006.

地毯草 Photo 3-4

*Milium compressum* Sw., Prodr. 24. 1788.

Perennials, stoloniferous. Culms slender, 15-60 cm tall, glabrous, rooting from lower nodes, culm nodes bearded. Leaf sheaths laterally compressed, keeled, surface glabrous, outer margins glabrous or hairy, joint between sheath and blade glabrous. Ligule a ciliolate membrane, 0.3-0.5 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 5-20 cm long, 6-12 mm wide, margins scabrous to spiny-scabrous, apex acute or obtuse, surface sparsely pilose on adaxial side. Inflorescence in digitate racemes or subdigitate racemes, loose, base exerted from uppermost sheath. Racemes 2-5, spreading, straight, 4-10 cm long, pubescent at base. Rachis tenacious, angular, midrib narrow, narrowly winged, 0.5 mm wide, margins smooth. Pedicels short. Spikelets bisexual, solitary, dorsally compressed, oblong-lanceolate, 2-2.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume lanceolate, 2-2.5 mm long, as long as spikelet, membranous, 2 to 4-veined, midvein often suppressed, veins glabrous, surface pilose near the margins, apex acute, awnless. Lower florets barren, epaleate. Lower lemma lanceolate, 2-2.5 mm long, membranous, 2 to 4-veined, midvein absent, veins glabrous, surface glabrous, or sparsely pilose near

the margins, apex acute, awnless. Upper floret pale gray. Upper lemma oblong-elliptic, 1.5 mm long, coriaceous, surface papillose-striate, apex obtuse, ciliolate, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface papillose-striate. Anthers 3, 0.5 mm long.

[Distribution] Native to tropical America.

[Habitat] Taiwan, moist and shady areas.

[Taiwan] TAIPEI: NTU Campus, *Hsu 11254* (TAI); Nankang, *Wang 685* (HAST). NANTOU: Yuchih, *Wang 3915* (TNM). TAINAN: NCKU Campus, *Hsu 13645* (TAI). PINGTUNG: Santimem, *Kuoh 15919* (TNM); Liding Mountain, *Chen 6038* (TAIE). TAITUNG: Liyushan, *Wu 8-026* (TNM).

[Notes] Introduced and naturalized in many warm countries.

**2. *Axonopus fissifolius* (Raddi) Kuhlm., Comm. Lin. Telegr., Bot. 67: 87. 1922;  
Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 531. 2006.**

類地毯草 Photo 5-6

*Paspalum fissifolium* Raddi, Agrostogr. Bras. 26. 1823.

*Axonopus affinis* Chase, J. Wash. Acad. Sci. 28: 180. 1938; Hsu, Fl. Taiwan 5: 527. 1978; Liu, Fl. Taiwan. ed. 2, 5: 456. 2000.

Perennials, stoloniferous. Culms slender, 15-50 cm tall, glabrous, rooting from lower nodes, culm nodes glabrous. Leaf sheaths laterally compressed, keeled, surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule a ciliolate membrane, 0.2-0.5 mm long. Blades cauline, linear, flat, 5-20 cm long, 3-6 mm wide, margins scabrous, apex acute or obtuse, surface glabrous. Inflorescence in digitate racemes or subdigitate racemes, loose, base exerted from uppermost sheath. Racemes 2-4, spreading, straight, 3-8 cm long, pubescent at base. Rachis tenacious, angular, midrib narrow, narrowly winged, 0.5 mm wide, margins smooth. Spikelets bisexual, solitary, dorsally compressed, oblong, 1.5-2 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume ovate, 1.5-2 mm long, as long as spikelet, membranous, 2 to 4-veined, midvein often suppressed, veins glabrous, surface pilose near the apex, apex acute, awnless. Lower florets barren, epaleate. Lower lemma ovate, 1.5-2 mm long, membranous, 2 to 4-veined, midvein absent, veins glabrous, surface sparsely pilose near the apex, apex acute, awnless. Upper floret pale gray. Upper lemma elliptic, 1.5 mm long, coriaceous, surface papillose-striate, apex acute, ciliolate, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface papillose-striate. Caryopsis glabrous, dorso-ventrally compressed, elliptic, 1.5 mm long.

[Distribution] Native to tropical America.

[Habitat] Taiwan, forming wide meadows.

[Taiwan] TAIPEI: Chingtienkan, *Huang 13733* (TAI). NANTOU: Jinyuehtan, *Hsu s. n.* May 19, 1991 (TNM).

3. *Brachiaria* (Trin.) Griseb. in Ledebour, Fl. Ross. 4: 469. 1853.

臂形草屬

Annuals or perennials; culms erect, ascending to creeping, sometimes floating; solid or hollow. Leaves hairy or glabrous; ligule very short, long-ciliate, or a fringe of hairs; blades linear to ovate-lanceolate, broad at base, with acute apex. Inflorescence composed of racemosely arranged spike-like racemes; main axis terminating in a raceme or in apical part with a few spikelets, racemes often secund, lower part sometimes shortly branched. Spikelets falling as a whole, solitary in upper part of raceme, in lower part mostly in unequally pedicellate pairs; sometimes solitary (than in a biseriate raceme), but sometimes lower part in clusters of 3 or more, terete or dorsally compressed, oblong to ovate, 2-flowered; rachilla not produced; glumes and lower lemma herbaceous; lower glume nearly as long as spikelet or much shorter, opaque margins, slightly shorter than spikelet, smooth or finely tuberculate, mucronate or not; upper palea of same texture, embraced all around by margins of upper lemma; stamens 3; ovary glabrous, style 2, free, stigmas plumose, exerted laterally.

About 100 species, distributed mainly in the tropical Old World, 3 species in Taiwan.

KEY TO THE SPECIES

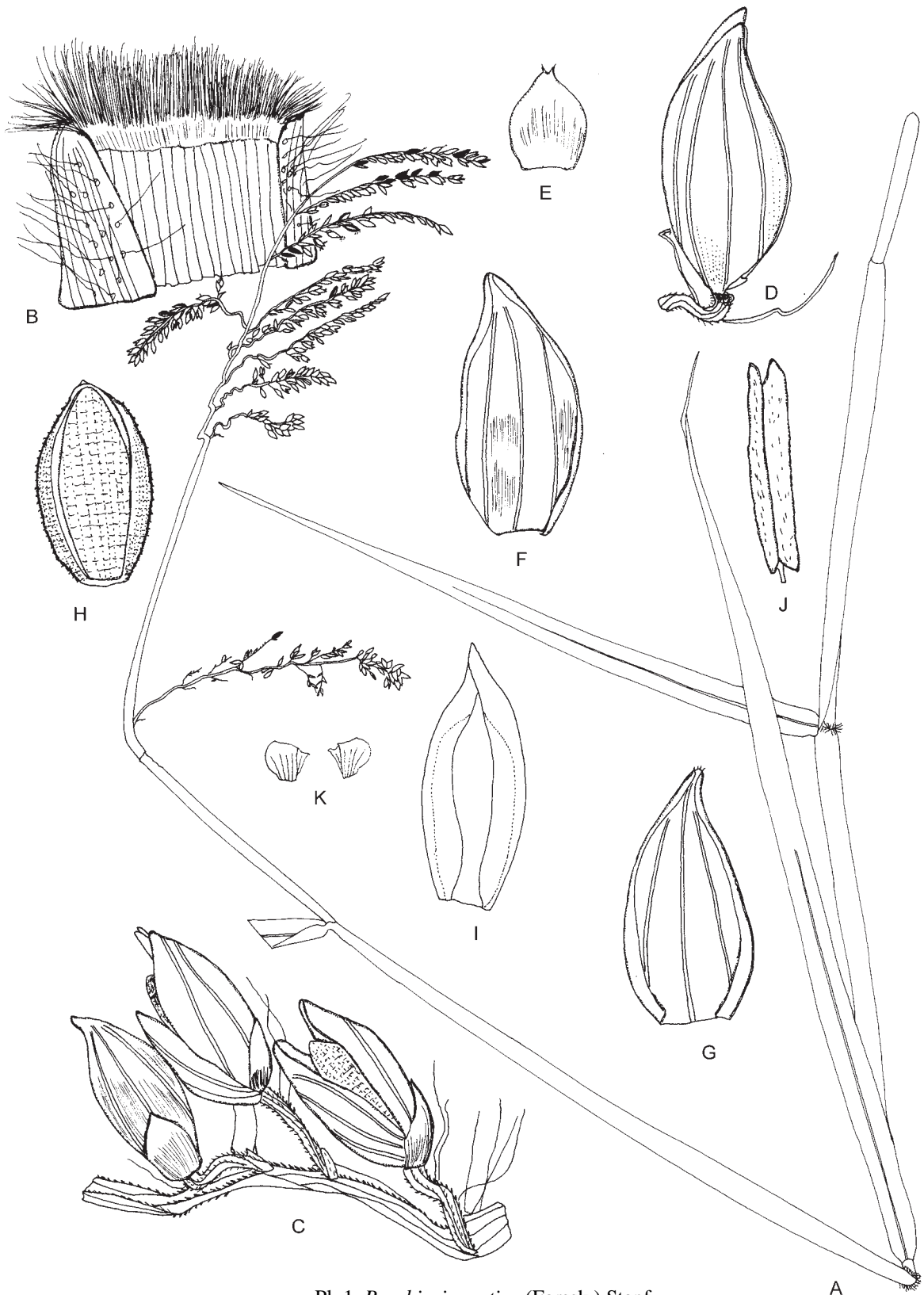
1. Culms stout, 5-8 mm in diam.; racemes more than 10 cm long . . . . . 1. *B. mutica*
1. Culms slender, less than 3 mm in diam.; racemes less than 5 cm long.
  2. Spikelets 3.1-4.3 mm long, narrowly elliptic; leaf blades lanceolate or linear-lanceolate, 4-15 cm long..... 2. *B. subquadripara*
  2. Spikelets 1.6-2.9 mm long, ovate; leaf blades broadly lanceolate, 1-4 cm long . . . . . 3. *B. villosa*

1. *Brachiaria mutica* (Forssk.) Stapf, Fl. Trop. Afr. 9: 526. 1919; Hsu, Taiwania 16: 275. 1971; Hsu, Fl. Taiwan 5: 530. *pl.* 1422. 1978; Koyama, Grass. Jap. Neighb. Reg. 363. 1987; Liu, Fl. Taiwan. ed. 2, 5: 458. *pl.* 190. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 520, 2006. 巴拉草 Pl. 1, Photo 7

*Panicum muticum* Forssk., Fl. Aegypt.-Arab. 20. 1775.

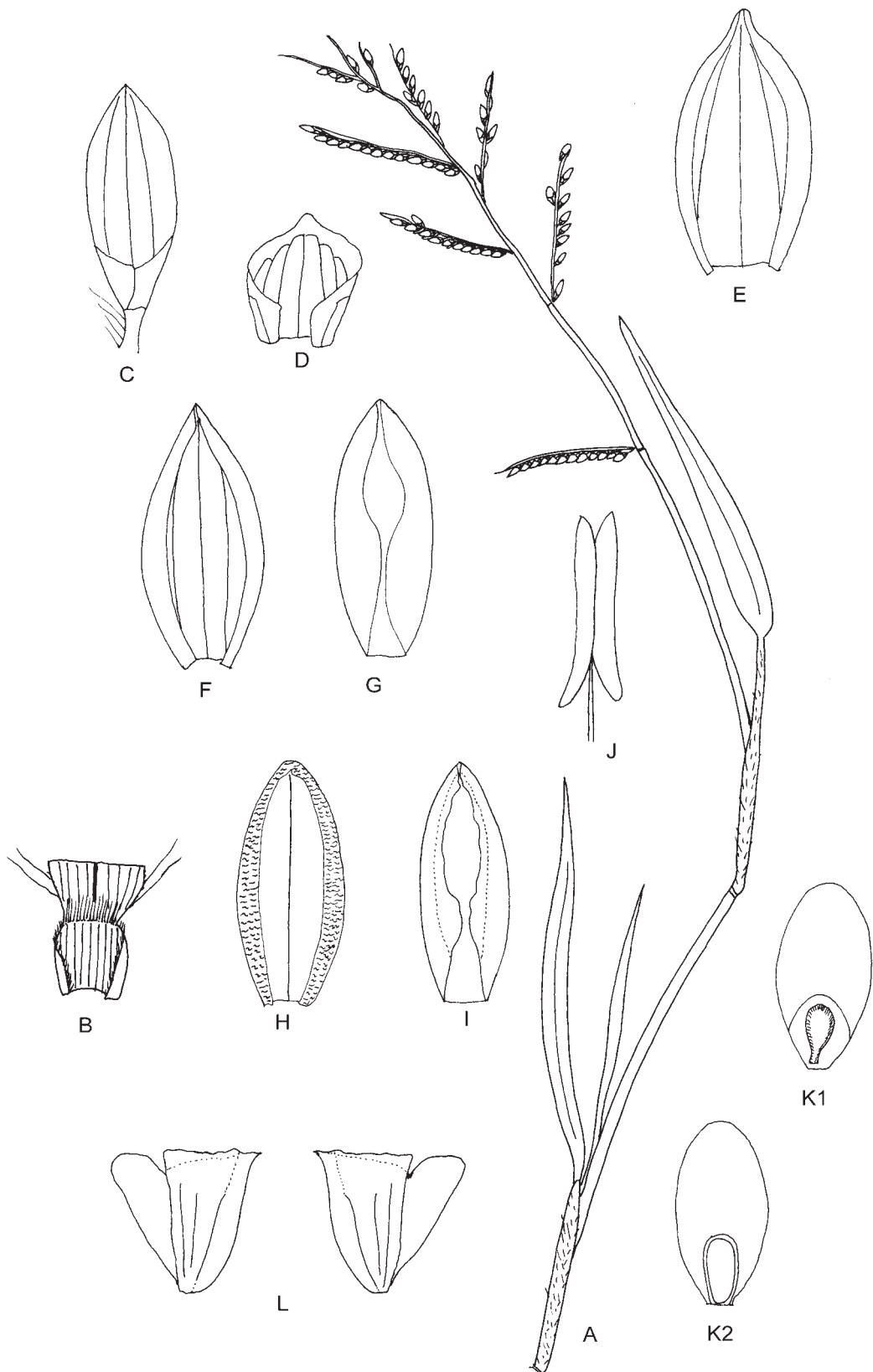
*Urochloa mutica* (Forssk.) T.-Q. Nguyen, Novosti Sist. Vyssh. Rast. 13: 13. 1966; Veldkamp, Blumea 41: 424. 1996.

Perennials. Culms rambling, robust, 100-200 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes densely villous. Leaf sheaths surface glabrous, or sparsely to densely pilose with tubercle-based hairs, joint between sheath and blade pubescent. Ligule a ciliate membrane, 1-1.5 mm long. Blades cauline, linear, flat, 10-30 cm long, 10-20 mm wide, margins scabrous, apex acuminate, surface sparsely to densely pilose on both sides. Inflorescence in racemose racemes, 7-20 cm long, axis scabrous, base exerted from uppermost sheath. Racemes 10-20,



Pl. 1. *Brachiaria mutica* (Forssk.) Stapf

A. habit; B. ligule; C. part of raceme; D. spikelet; E. lower glume; F. upper glume; G. lower lemma; H. upper lemma; I. upper palea; J. anther; K. lodicules.



Pl. 2. *Brachiaria subquadripara* (Trin.) Hitchc.

A. habit; B. ligule; C. spikelet; D. lower glume; E. upper glume; F. lower lemma; G. lower palea; H. upper lemma; I. upper palea; J. anther; K. caryopsis; L. lodicules.

ascending, straight or arcuate, 5-15 cm long, pubescent at base. Rachis tenacious, angular, midrib narrow, clearly winged, 1 mm wide, margins scabrous. Pedicels short, flattened, with discoid tips, margins scaberulous, sometimes bearing long stiff hairs. Spikelets bisexual, paired, homomorphic, dorsally compressed, elliptic, 2.5-3.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume triangular, 0.8-1 mm long, 0.35 time of length as the spikelet, membranous, 0 to 1-veined, surface glabrous, apex acute, ciliolate, awnless. Upper glume broadly lanceolate, 2.5-3.5 mm long, as long as spikelet, chartaceous, 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma broadly lanceolate, 2.5-3.5 mm long, chartaceous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower palea well developed, membranous, lanceolate, as long as lower lemma, 2-veined. Upper floret pale gray. Upper lemma elliptic, 2-2.5 mm long, coriaceous, surface finely rugose, apex obtuse, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface finely rugose.

[Distribution] Originally from Brazil, introduced and naturalized elsewhere.

[Habitat] Taiwan, in open and shady areas, also in swampy places.

[Taiwan] TAIPEI: Tahanhsi, *Yang 7784* (TNM). CHANGHWA: Hsienhsi, *Yang 11584* (TNM).

CHIAYI: Shiuyuandi, *Tang 751* (TAI). TAINAN: Hsinhua, *Kuoh 10965* (TNM).

KAOHSIUNG: Niansung, *Kao 3359* (TAI). PINGTUNG: NPUST Campus, *Chen 2351* (TNM). TAITUNG: *Chang s. n.* Jan. 20 1975 (PPI); Sanjianwu, *Chen 5958* (TAIE).

**2. *Brachiaria subquadripara*** (Trin.) Hitchc., *Lingnan Sci. J.* 7: 214. 1929; Hsu, *Taiwania* 16: 275. 1971; Hsu, *Fl. Taiwan* 5: 533. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 365. 1987; Liu, *Fl. Taiwan. ed. 2*, 5: 460. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 522, 2006. 四生臂形草 Pl. 2, Photo 8-9

*Panicum subquadripara* Trin., *Gram. Panic.* 145. 1826.

*Urochloa subquadripara* (Trin.) R. D. Webster, *Austral. Paniceae* 252. 1987; Veldkamp, *Blumea* 41: 429. 1996.

Annuals or short-lived perennial. Culms rambling, slender, 20-60 cm tall, glabrous or pilose with tubercle-based hairs, much branched above base, rooting from lower nodes, culm nodes pubescent. Leaf sheaths surface glabrous, or sparsely pilose with tubercle-based hairs, outer margins ciliate, joint between sheath and blade glabrous or puberulent. Ligule a ciliate membrane, 1-2 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 5-15 cm long, 4-8 mm wide, margins scabrous, apex acute, surface glabrous, or sparsely pubescent on both sides. Inflorescence in racemose racemes, 3-10 cm long, axis pilose with tubercle-based hairs, base exerted from uppermost sheath. Racemes 3-6, spreading, straight, 2-4 cm long, pubescent at base. Rachis tenacious, flattened, narrowly winged, 0.7-1 mm wide, margins scabrous. Pedicels short, with truncate tips, margins scabrous. Spikelets

bisexual, solitary, dorsally compressed, oblong-lanceolate, 3-4 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 1.5-2 mm long, 0.35-2 time of length as the spikelet, membranous, 5 to 7-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex obtuse to acute, awnless, clasping at the base of the spikelet. Upper glume separated from lower glume by a short internode, broadly lanceolate, 3-4 mm long, as long as spikelet, chartaceous, 5 to 7-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma broadly lanceolate, 3-4 mm long, chartaceous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower palea well developed, membranous, oblong, 0.7 time of length as lower lemma, 2-veined. Upper floret pale yellow. Upper lemma oblong, 2.5-3 mm long, coriaceous, surface finely rugose, apex acute, awnless. Upper palea oblong, as long as upper lemma, coriaceous, 2-veined, surface finely rugose. Caryopsis glabrous, dorso-ventrally compressed, obovate, 2 mm long.

[Distribution] The tropics of the Old World, and introduced elsewhere.

[Habitat] Taiwan, in lowland open waste places, roadsides and moist grassy places.

[Taiwan] TAIPEI: Kuaninshan, *Hsu 1151* (TAI). ILAN: Suao, *Chang 12027* (PPI). TAOYUAN: Tatan, *Chang 4219* (HAST). MIAOLI: Sanyi, *Leong 414* (TNM). TAICHUNG: Tatushan, *Chuang s. n.* Apr. 15, 2000 (TNM). NANTOU: Puli, *Hsu 1372* (TAI). CHANGHWA: Chang-Pin Industrial area, *Yang 4086* (TNM). YUNLIN: Potzuliao, *Lin 14* (PPI). KAOHSIUNG: Meinung elementary school, *Yang* (PPI). PINGTUNG: Maobitou, *Chang 19345* (PPI); Chiupeng, *Chen 6913* (TAIE). TAITUNG: Hsiaoyehliu, *Huang 336* (TNM); Lanyu, *Chang s. n.* Aug. 11, 1975 (PPI).

**3. *Brachiaria villosa*** (Lam.) A. Camus in Lecomte, Fl. Indochine 7: 433. 1922; Hsu, *Taiwania* 16(2): 276. 1971; Hsu, Fl. Taiwan 5: 534. 1978; Koyama, Grass. Jap. Neighb. Reg. 367. 1987; Liu, Fl. Taiwan. ed. 2, 5: 460. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 521. 2006. 毛臂形草 Photo 10-11

*Panicum villosum* Lam., Tabl. Encycl. 1: 173. 1791.

*Urochloa villosa* (Lam.) T.-Q. Nguyen, Novosti Sist. Vyssh. Rast. 3: 14. 1966; Veldkamp, Blumea 41: 431. 1996.

Annuals, loosely tufted. Culms geniculately ascending or decumbent, slender, 10-40 cm tall, pubescent, culm nodes glabrous or pubescent. Leaf sheaths surface densely pubescent near the margins, joint between sheath and blade pubescent. Ligule a ciliate membrane, 0.5-1 mm long. Blades cauline, broadly lanceolate, flat, 1-4 cm long, 3-10 mm wide, margins usually undulate and scabrous, apex acute, surface densely pubescent on both sides. Inflorescence in racemose racemes, 3-7 cm long, axis scabrous, base exerted from uppermost sheath. Racemes 4-8, ascending, straight, 1-6 cm long. Rachis tenacious, angular, narrowly winged, 0.5 mm wide, margins pubescent. Pedicels short, with

discoid tips, margins scaberulous, sometimes bearing long stiff hairs. Spikelets bisexual, solitary, dorsally compressed, elliptic, 2-2.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 0.8-1 mm long, 0.35-0.5 time of length as the spikelet, membranous, 3-veined, not keeled, surface glabrous, or moderately pubescent, margins smooth, apex acute, awnless, clasping at the base of the spikelet. Upper glume separated from lower glume by a short internode, ovate, 1.8 mm long, chartaceous, 5-veined, not keeled, surface pubescent, apex acute, awnless. Lower florets barren. Lower lemma ovate, 2-2.5 mm long, chartaceous, 5-veined, surface pubescent, apex acute, awnless. Lower palea well developed, membranous, ovate, as long as lower lemma, 2-veined. Upper floret pale gray. Upper lemma elliptic, 1.5-2 mm long, coriaceous, surface finely rugose, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface finely rugose. Anthers 3, 1 mm long.

[Distribution] The tropics of southeastern Asia and China.

[Habitat] Taiwan, open waste places and on hill.

[Taiwan] TAIPEI: Kuaninshan, *Hsu 1165-3* (TAI). HSINCHU: Chenhsipao, *Wu 1885* (HAST).

TAICHUNG: Pashienshan, *Hsu 422* (TAI). NANTOU: Hunghsiang, *Leong 2012* (HAST);

Zanai, *Chen 2316* (TAIE). PINGTUNG: *Suzuki s. n.* Aug. 31, 1932 (TAI). HUALIEN:

Tienshang, *Hsu 3738* (TAI). TAITUNG: Lanyu, *Yeh 487* (PPI).

#### 4. *Cenchrus* L., Sp. Pl. 2: 1049. 1753.

##### 蒺藜草屬

Annulas or perennials; culms erect or ascending, rarely stoloniferous. Leaf blade flat, flaccid. Inflorescence a spike-like panicle, composed of spiculate units, arranged on all sides of elongated central axis; units composed of 1 to few spikelets inside an involucre, composed of bristles which are connate at lower part, or fixed to a flat disc at base of spikelets, often arranged in 2 heteromorphous rings; units shortly stipitate, each unit with small knob at base, often articulated, falling entire and acting as a bur; central axis protruding beyond uppermost unit. Spikelets of a unit flowering successively, ovate-oblong, acute, muticous, 2-flowered; glumes and lower lemma thin membranaceous; lower glume smaller than upper glume and lower lemma; lower palea present; upper lemma firmer, with narrowly involute, firm margins embracing from upper palea; lodicules absent; stamens 3, anthers linear, with glabrous or penicillate apex, styles 2, connate at base, exerted apically.

Twenty-three species, distributed in the tropical and warm temperate regions of the world; two species in Taiwan.

#### KEY TO THE SPECIES

1. Involucral bristles only slightly connate at base, not forming a spiny bur ..... 1. *C. ciliaris*
1. Involucral bristles flattened and connate to form a spiny bur ..... 2. *C. echinatus*

1. *Cenchrus ciliaris* L., Mant. Pl. 2: 302. 1771; Chen & Kuoh, *Taiwania* 49: 233. *fig*  
*1*. 2004; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 552. 2006.

水牛草 Pl. 3, Photo 12-13

*Pennisetum ciliare* (L.) Link, Hortus Regius Botanicus Berolinensis 1: 213. 1827.

Perennials, tufted, rhizomatous. Culms erect or geniculately ascending, of moderate texture, 50-100 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, or sparsely pubescent. Ligule a ciliate membrane, 0.5-3 mm long. Blades cauline, linear, flat, 10-50 cm long, 4-8 mm wide, margins scabrous, apex acuminate, surface glabrous, or pilose with tubercle-based hairs on adaxial side of basal leaves. Inflorescence in a panicle, cylindrical, 3-15 cm long, axis scabrous, base exerted from uppermost sheath, without conspicuous branches, branches contracted into spikelets clusters, spikelets subtended by an involucre of bristles. Involucres enclosing 1-4 spikelets, bristles flattened and connate below middle, not forming a spiny burr, margins ciliate, falling with spikelets when mature. Spikelets bisexual, dorsally compressed, narrowly lanceolate, 3-5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate, 1.5-2.5 mm long, 0.35-0.5 time of length as the spikelet, hyaline, 3-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless. Upper glume ovate, 2 mm long, 0.5 time of length as the spikelet, hyaline, 3-veined, not keeled, surface hirtellous, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma broadly lanceolate, 3-5 mm long, chartaceous, 5-veined, surface sparsely hirtellous near the base, apex acute, awnless. Lower palea well developed, membranous, oblong, 0.35 time of length as lower lemma, 2-veined. Upper lemma lanceolate, 3-5 mm long, subcoriaceous, surface ciliolate near the apex, apex acuminate, awnless. Upper palea lanceolate, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Anthers 3, 1.5 mm long.

[Distribution] Native to the Mediterranean region, Africa, Arabia, Canary Islands, Malagasy, Indonesia, northern India, and Pakistan. It was introduced to Australia, United States and Mexico as a pasture grass and had become an invasive weed.

[Taiwan] TAICHUNG: Kaomei, *Yang 5107* (TNM). TAINAN: Hsinhua, *Chang 9509* (PPI).

KAOHSIUNG: Fengshan, *Chang 7951* (PPI). PINGTUNG: Kenting, *Jung 2972* (TAIF); Checheng, *Chen 6167* (TAIE).

[Notes] Cultivated in Taiwan as a pasture grass, escaped and naturalized in southern Taiwan.

2. *Cenchrus echinatus* L., Sp. Pl. 1050. 1753; Hsu, *Taiwania* 16: 276. 1971; Hsu, *Fl. Taiwan* 5: 535. *pl. 1424*. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 382. 1987; Liu, *Fl. Taiwan. ed. 2, 5: 460. pl. 192*. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 553. 2006.

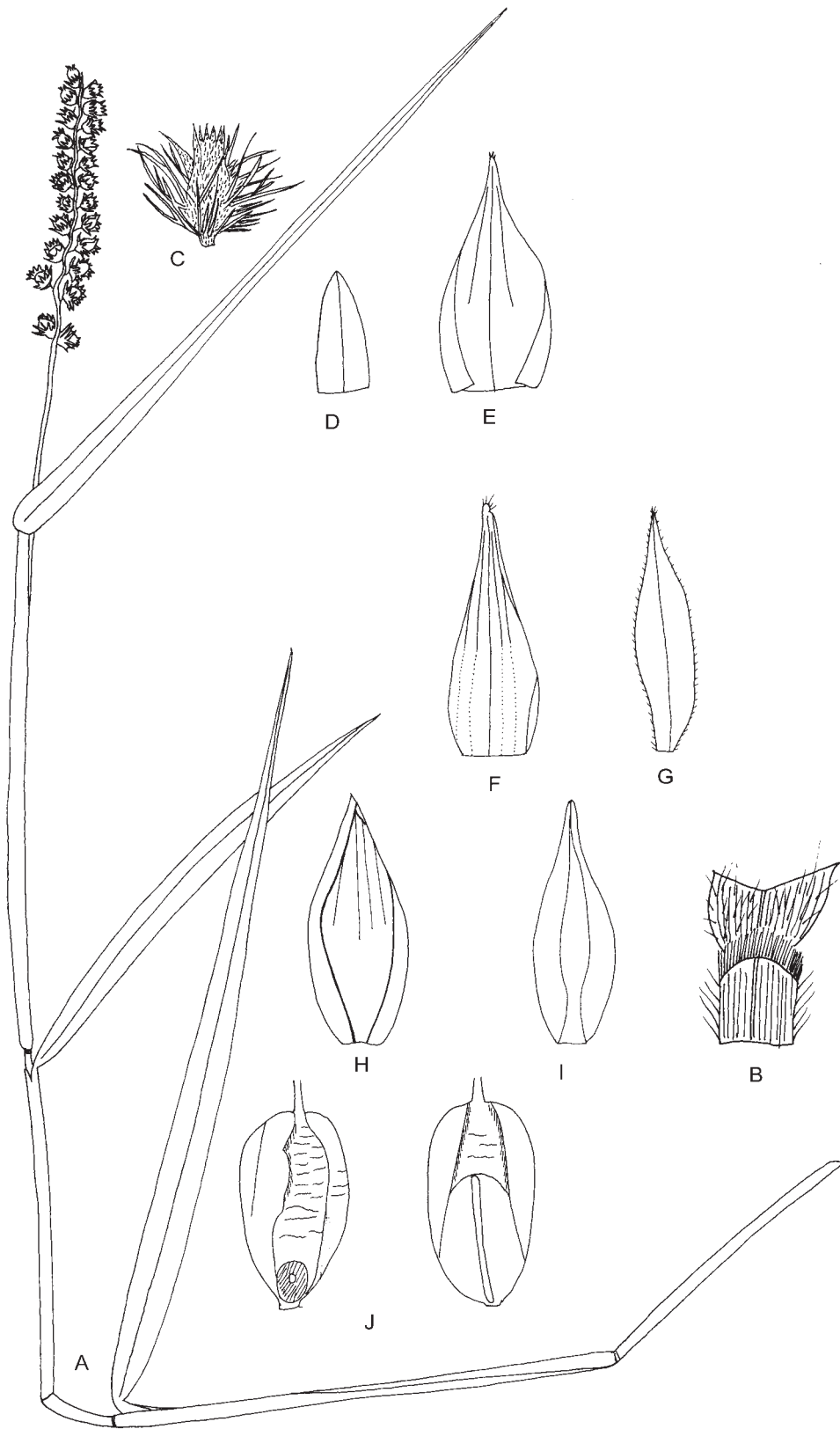
蒺藜草 Pl. 4, Photo 14-15

Annuals, tufted. Culms geniculately ascending, of moderate texture, 15-90 cm tall, glabrous, sometimes rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface glabrous, or sparsely



Pl. 3. *Cenchrus ciliaris* L.

A. habit; B. ligule; C. part of rachis; D. bur; E. part of inner whorl of bristles; F. lower glume; G. upper glume; H. lower lemma; I. lower palea; J. upper lemma; K. upper palea; L. anthers; M. caryopsis.



Pl. 4. *Cenchrus echinatus* L.

A. habit; B. ligule; C. spiny bur; D. lower glume; E. upper glume; F. lower lemma; G. lower palea; H. upper lemma; I. upper palea; J. caryopsis.

pilose, joint between sheath and blade glabrous or pilose. Ligule a ciliate membrane, 1 mm long. Blades cauline, linear-lanceolate or linear, flat, 5-20 cm long, 3-8 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in a panicle, cylindrical, 3-10 cm long, axis scabrous, base exerted from uppermost sheath, without conspicuous branches, branches contracted into spikelets clusters, spikelets subtended by an involucre of bristles. Involucres enclosing 1-4 spikelets, bristles flattened and connate below middle, forming a spiny burr, burr globose, surface pubescent, margins ciliate, falling with spikelets when mature. Spikelets bisexual, dorsally compressed, narrowly lanceolate, 4.5-7 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume oblong, 2-2.5 mm long, 0.5 time of length as the spikelet, membranous, 1-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless. Upper glume lanceolate, 4.5-5.5 mm long, 0.6-0.8 time of length as the spikelet, chartaceous, 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower florets staminate or barren. Lower lemma lanceolate, 4.5-5.5 mm long, chartaceous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower palea well developed, firmly membranous, lanceolate, as long as lower lemma, 2-veined. Upper floret pale gray. Upper lemma lanceolate, 4.5-5.5 mm long, coriaceous, surface smooth, apex acuminate, awnless. Upper palea lanceolate, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3. Caryopsis glabrous, dorso-ventrally compressed, elliptic, 1.5 mm long.

[Distribution] Tropical America, but naturalized in many warmer regions of the world.

[Habitat] Taiwan, in sandy places.

[Taiwan] ILAN: Chinshih police station, *Chen 524* (HAST). MIAOLI: Tingshao, *Hsu 289* (TAI).

TAICHUNG: Kukuan, *Ando 248* (TAI). CHIAYI: Shiu-yuandi, *Tang 744* (TAI); Aoku, *Chen 2565* (TAIE). TAINAN: Anpin, *Wang 20158* (TAI). KAOHSIUNG: Naval Academy, *Hsu s. n.* Jun. 9, 1968 (TAI). PINGTUNG: Kenting, *Huang 706* (TAI); Hsiaoliuchiu, *Chen 6817* (TAIE). PENGHU, *Hus 672* (TAI).

## 5. *Cyrtococcum* Stapf, Fl. Trop. Africa 9: 15. 1917.

### 弓果黍屬

Inflorescence an open or contracted panicle and often branched from all sides. Spikelets pedicellate, falling as a whole, small, strongly laterally compressed, strongly convex on one narrow side, hence oblique and trigonous, unawned, 2-flowered; glumes and lower lemma herbaceous, veins very prominent; upper lemma and palea indurate at maturity; rachilla not produced; lower glume much shorter than spikelet, 3-veined; upper glume larger, strongly convex, 3-veined; lower lemma, as long as spikelet, slightly convex, 5-veined; lower palea small or 0; upper lemma distinctly separated from lower lemma, boat shaped, coriaceous, smooth and glossy, glabrous, with narrowly inrolled, opaque margins; upper palea with margins incurved; lodicules 2; stamens 3; style 2, free, stigmas plumose, exerted laterally. Caryopsis free.

Eleven species, distributed in the tropical regions of the Old World; one species and one variety in Taiwan.

## KEY TO THE SPECIES

1. Panicle up to 17 cm; leaf blades 3–8 × 0.3–1 cm ..... 1a. *C. patens* var. *patens*  
1. Panicle large and diffuse, 16–30 cm; leaf blades 7–15 × 1–2 cm ..... 1b. *C. patens* var. *latifolium*

**1. *Cyrtococcum patens* (L.) A. Camus**, Bull. Mus. Natl. Hist. Nat. 27: 118. 1921;  
Hsu, *Taiwania* 16: 277. 1971; Koyama, Grass. Jap. Neighb. Reg. 313. 1987; Liu,  
Fl. Taiwan. ed. 2, 5: 465. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China  
22: 513. 2006.

### **1a. *Cyrtococcum patens* var. *patens***

弓果黍 Pl. 5, Photo 16-17

*Panicum patens* L., Sp. Pl. 58. 1753.

Annuals. Culms rambling, slender, 15-50 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous or pubescent. Leaf sheaths surface sparsely pilose with tubercle-based hairs, outer margins ciliate. Ligule a glabrous membrane, 1-1.5 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 4-12 cm long, 4-8 mm wide, margins scabrous to spiny-scabrous, apex acute, surface sparsely to densely pubescent on both sides. Inflorescence in a panicle, loose, 5-15 cm long, axis glabrous, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels capillary, terete, with discoid tips, margins smooth. Spikelets bisexual, slightly laterally compressed, obovate, 1.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate, 0.7 mm long, 0.5 time of length as the spikelet, membranous, 3-veined, surface glabrous, or sparsely hispidulous near the apex, margins smooth, apex acute, awnless, clasping at the base of the spikelet. Upper glume boat-shaped, gibbous, 1.2 mm long, 0.8 time of length as the spikelet, chartaceous, 3-veined, not keeled, surface hispidulous above the middle, margins smooth, apex acute, awnless. Lower florets barren, epaleate. Lower lemma elliptic, 1.5 mm long, chartaceous, 5-veined, surface sparsely hispidulous above the middle, margins smooth, apex acute, awnless. Upper floret pale gray. Upper lemma gibbous, 1 mm long, coriaceous, surface smooth, apex obtuse, with a small crest, awnless. Upper palea oblong, as long as upper lemma, coriaceous, 2-veined, surface smooth.

[Distribution] Southeastern Asia.

[Habitat] Taiwan, in open forest and shady places.

[Taiwan] TAIPEI: Kuanghsing, *Huang 117* (TNM); Fengkueitouhushan, *Su 924* (HAST). ILAN:

Hsinfeng Waterfall, *Lin 655* (TNM). TAOYUAN: Neili, *Hsu 1249* (TAI). HSINCHU:

Hsinfeng, *Leong 1153* (TNM). MIAOLI: Senghsing, *Hsu 1364* (TAI). TAICHUNG:

Tiehchenshan, *Yang p9* (TNM). NANTOU: Kuandaochi, *Chang 12259* (PPI); Yuchih, *Chen*

*6744* (TAIE). CHIAYI: Tachichiao, *Yang 14501* (TNM). KAOHSIUNG: Funhsing, *Yang*

*26319* (PPI). PINGTUNG: Wutai, *Huang 90* (TNM). TAITUNG: Chipen, *Hsu 976* (TAI);

Lanyu, *Chang 8062* (PPI).



Pl. 5. *Cyrtococcum patens* (L.) A. Camus

A. habit; B. ligule; C. spikelet; D. lower glume; E. upper glume; F. lower lemma; G. upper floret;  
H. upper lemma; I. upper palea; J. caryopsis.



Pl. 6. *Cyrtococcum patens* var. *latifolium* (Honda) Ohwi

A. habit; B. ligule; C. lower glume; D. upper glume; E. lower lemma; F. upper lemma; G. upper palea; H. lodicules.

**1b. *Cyrtococcum patens* var. *latifolium*** (Honda) Ohwi, Acta Phytotax. Geobot. 11: 47. 1942. Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 514. 2006.

散穗弓果黍 Pl. 6, Photo 18-19

*Panicum patens* L. f. *latifolium* Honda, Bot. Mag. (Tokyo) 37: 25. 1923.

*Panicum accrescens* Trin., Sp. Gram. 1: pl. 88. 1828.

*Cyrtococcum accrescens* (Trin.) Stapf in Hook., Icon. Pl. 31: pl. 3096. 1922; Hsu, Taiwania 16: 277. 1971; Hsu, Fl. Taiwan 5: 537. pl. 1425. 1978; Liu, Fl. Taiwan. ed. 2, 5: 462. pl. 193. 2000.

Annuals. Culms rambling, of moderate texture, 60 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface pilose with tubercle-based hairs, outer margins ciliate. Ligule a glabrous membrane, 1-2 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 7-15 cm long, 10-20 mm wide, margins scabrous to spiny-scabrous, apex acute, surface sparsely to densely pubescent on both sides. Inflorescence in a panicle, loose, 15-30 cm long, axis glabrous, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels capillary, terete, with discoid tips, margins smooth. Spikelets bisexual, slightly laterally compressed, obovate, 1.3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate, 0.7 mm long, 0.5 time of length as the spikelet, membranous, 3-veined, veins glabrous, surface glabrous, margins smooth, apex obtuse, awnless, clasping at the base of the spikelet. Upper glume boat-shaped, gibbous, 1.2 mm long, 0.8 time of length as the spikelet, chartaceous, 3-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, ciliolate, awnless. Lower florets barren, epaleate. Lower lemma elliptic, 1.3 mm long, chartaceous, 3-veined, veins glabrous, surface glabrous, margins smooth, apex acute, ciliolate, awnless. Upper floret pale gray. Upper lemma gibbous, 1 mm long, coriaceous, surface smooth, apex obtuse, with a small crest, awnless. Upper palea oblong, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 0.5 mm long.

[Distribution] The tropics of southeastern Asia and China.

[Habitat] Taiwan, in forest.

[Taiwan] TAIPEI: Nankang, *Wu 1220* (TNM); Shihfenliao, *Hsiao 1299* (HAST). MIAOLI: Nanfu Village, *Wang 5767* (TNM). TAICHUNG: Hsuenshankeng, *Chen 8920* (TNM). NANTOU: Sun-Moon Lake, *Hsu 1339* (TAI). CHIAYI: Chuchi, *Lee 1456* (TNM). TAINAN: Hsienkung Temple, *Lin 75* (TNM). KAOHSIUNG: Tengchih, *Yang 5087* (TAIF); PINGTUNG: Machia, *Ku 610* (PPI); Tahan Forest Road, *Chen 6897* (TAIE). TAITUNG: Feilong, *Liu 908* (TNM).

6. *Digitaria* Haller, Hist. Stirp. Helv. 2: 244. 1768.

馬唐屬

Annuals or perennials; culms hollow or solid; erect, ascending or creeping; shoots intravaginal. Sheaths of leaf often loose from culm; ligule well-developed, membranaceous; blades linear to lanceolate, with broad base and acute tip, flat, soft. Inflorescence branched from all sides, composed

of 2-numerous spike-like racemes. Spikelets crowded, alternately 2-3-together along keel, unequally pedicellate in a group, sometimes subsessile, articulate with widened tip of pedicel, dorsally compressed, linear-lanceolate to obovate, small, 2-flowered, muticous, usually equal in form and size; lower glume absent or very small, hyaline and veinless, rarely faintly 1-veined; upper glume very variable in length, thin, hyaline and veinless, rarely faintly 1-veined; lower lemma as long as spikelet, rarely shorter, 5 to 9-veined; lower palea absent or very small and adnate to base of upper lemma; upper lemma as long as spikelet or slightly shorter, papery with broadly inflexed, hyaline or pale margins, densely striate and very finely tuberculate, often olive-green, brown or dark purple at maturity, glabrous; upper palea as long and of same texture, 2-veined, with inflexed margins, embraced to apex by margins of upper lemma; lodicules very small, cuneate; stamens 3; style 2, free; stigmas plumose, exerted at or near apex. Caryopsis tightly enclosed by only slightly indurate upper palea and lemma, elliptic, dorsally compressed, hilum punctiform, embryo at most 1/2 as long as caryopsis.

A large genus of ca. 250 species distributed in the warm parts of the world; 13 species are found mainly on the plains of Taiwan.

### KEY TO THE SPECIES

1. Spikelets 2.5-4 mm long, acuminate, narrowly lanceolate; pedicels winged, with truncate tips.
  2. Spikelets of a pair heteromorphic, lower spikelet glabrous or almost so, upper spikelet conspicuously hairy.
    3. Rachis flat, midrib of rachis narrow, clearly winged; lower lemma with 7 slender veins.....1. *D. ciliaris*
    3. Rachis triangular, midrib of rachis thick, scarcely winged; lower lemma with 7-11 thick, prominent veins.....4. *D. heterantha*
  2. Spikelets all similar.
    4. Racemes closely contracted; spikelets ca. 2.5 mm long . . . . . 3. *D. henryi*
    4. Racemes partially contracted or spreading.
      5. Lower glume absent; upper glume less than 1/3 length of spikelet. . . . . 12. *D. setigera*
      5. Lower glume small but distinct; upper glume more than 1/3 length of spikelet.
        6. Margins of rachis-wing entire or serrulate. . . . . 9. *D. radicata*
        6. Margins of rachis-wing distinctly serrate.
          7. Plant hairy..... 11. *D. sericera*
          7. Plants glabrous, leaf sheaths glabrous or sparsely papillose-pilose.
            8. Spikelets 3 mm long; intervein spaces of lower lemma evenly distributed; lateral veins of lower lemma smooth. . . . . 1. *D. ciliaris*
            8. Spikelets 3-3.5 mm long; intervein spaces of lower lemma broader at middle; lateral veins of lower lemma scabrous toward apex. . . . . 10. *D. sanguinalis*
  1. Spikelets to 2.2 mm long, acute, elliptic or ovate; pedicels terete, smooth, with discoid tips.
    9. Upper florets pale yellowish brown or gray at maturity.
      10. Culms stoloniferous; sheaths more or less pubescent, at least lower ones; spikelets 1.2-1.5 mm long; racemes 2-6 mm long . . . . . 7. *D. longiflora*

10. Culms erect or decumbent; sheaths villous; spikelets 1.5-2.2 mm long. . . . . 8. *D. mollicoma*
9. Upper florets dark brown to blackish purple at maturity.
11. Upper glume 1/4-1/2 length of spikelet. . . . . 2. *D. fauriei*
11. Upper glume about same length of spikelet.
12. Spikelets 1.2-1.5 mm long, distinctly shorter than pedicel; upper florets light brown. . . . 6. *D. leptalea*
12. Spikelets as long as or longer than pedicel; upper florets brownish.
13. Spikelets ca. 1.8 mm long . . . . . 13. *D. violascens*
13. Spikelets more than 2 mm long . . . . . 5. *D. ischaemum*

**1. *Digitaria ciliaris* (Retz.) Koeler, Descr. Gram. 27. 1802; Veldkamp, Blumea 21: 32. 1973; Hsu, Fl. Taiwan 5: 540. 1978; Liu, Fl. Taiwan. ed. 2, 5: 466. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 543. 2006. 升馬唐 Pl. 7**

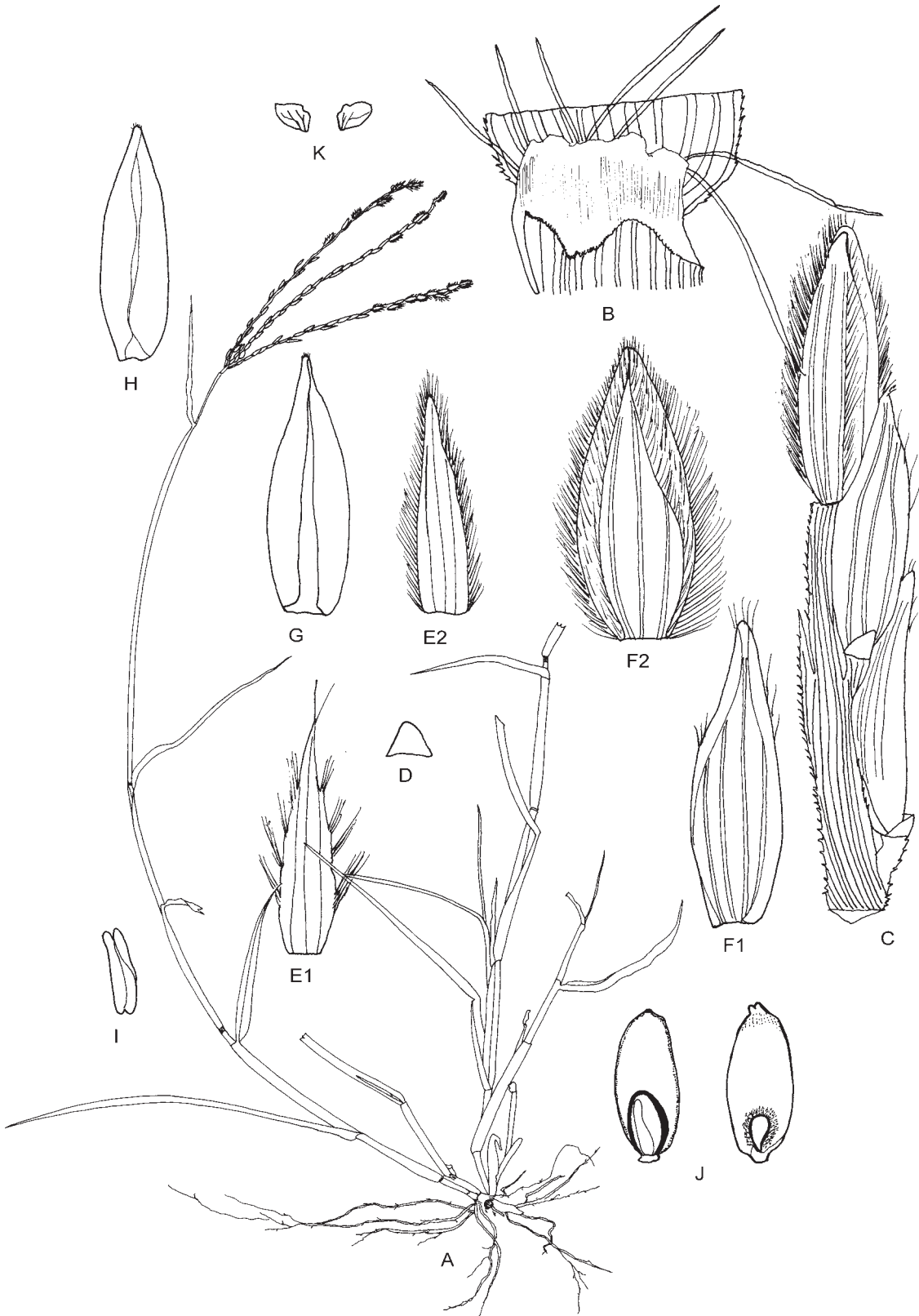
*Panicum ciliare* Retz., Observ. Bot. 4: 16. 1786.

*Panicum adscendens* Kunth in Humboldt *et al.*, Nov. Gen. Sp. (quarto ed.) 1: 97. 1816.

*Digitaria sanguinalis* var. *ciliaris* (Retz.) Parl., Fl. Ital. 1: 126. 1848.

*Digitaria adscendens* (Kunth) Henrard, Blumea 1: 92. 1934; Hsu, Taiwania 16(2): 278. 1971; Koyama, Grass. Jap. Neighb. Reg. 339. 1987.

Annuals. Culms decumbent, slender, 30-100 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous or pubescent. Leaf sheaths surface glabrous, or sparsely to densely pubescent, sparsely with tubercle-based hairs, joint between sheath and blade glabrous. Ligule a glabrous membrane, 1-2 mm long. Blades cauline, linear-lanceolate, flat, 5-20 cm long, 3-10 mm wide, margins scabrous, apex acute or acuminate, surface glabrous, or sparsely to densely pubescent, sparsely with tubercle-based hairs on both sides. Inflorescence in digitate racemes or subdigitate racemes, loose, base exerted from uppermost sheath. Racemes 3-8, ascending, straight or arcuate, 5-15 cm long, pubescent at base. Rachis tenacious, angular, midrib narrow, clearly winged, 0.6-1 mm wide, margins scabrous. Pedicels linear, angular, with truncate tips, margins scabrous. Spikelets bisexual, paired, both pedicellate, upper pedicel longer, lower pedicel shorter, homomorphic or heteromorphic. Lower spikelets glabrous or almost so, dorsally compressed, lanceolate, 2.5-3.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume reduced, minute, triangular. Upper glume lanceolate, 1.5-2 mm long, 0.5-0.8 time of length as the spikelet, membranous, 3-veined, not keeled, surface glabrous, apex acute, awnless. Lower florets barren, epaleate. Lower lemma lanceolate, 2.5-3.5 mm long, chartaceous, 7-veined, interveins evenly spaced or broader at middle, veins glabrous, surface glabrous, or apex acute, awnless. Lower palea absent. Upper floret pale gray. Upper lemma lanceolate, 2-3 mm long, coriaceous, surface papillose-striate, apex acuminate, awnless. Upper palea lanceolate, as long as upper lemma, coriaceous, 2-veined, surface papillose-striate. If spikelets heteromorphic, upper spikelet subequal to lower spikelet but conspicuously hairy. Anthers 3, 0.8-1 mm long.



Pl. 7. *Digitaria ciliaris* (Retz.) Koeler

A. habit; B. ligule; C. part of raceme; D. lower glume; E. upper glume; F. lower lemma; G. upper lemma; H. upper palea; I. anther; J. caryopsis; K. lodicules.

[Distribution] The tropical and warm temperate regions of the world

[Habitat] Taiwan, in roadside and open ground.

[Taiwan] TAIPEI: Fulung, *Huang 110* (TNM), KEELUNG: *Hsu 398* (TAI). ILAN: Meihua Lake, *Lin 343* (TNM). HSINCHU: Hengshan, *Wu 2429* (HAST). MIAOLI: Nafu Village, *Wang 5757* (TNM). TAICHUNG: Salu, *Chang s. n.* May 3, 2000 (TNM). NANTOU: Lienhuachih, *Chang s. n.* Apr. 20, 1991 (TNM). YUNLIN: Potzuliao, *Lin 13* (PPI). CHIAYI: Wantan Village, *Wang 9711* (TNM). TAINAN: Hsinshih: *Chang 15569* (PPI). PINGTUNG: Fengkang, *Hsu 1184* (TAI). HUALIEN: Hualienhsi, *Wang 138* (TNM). TAITUNG: Chipen, *Hsu 989* (TAI); Lanyu, *Chang 8456* (PPI).

**2. *Digitaria fauriei*** Ohwi, Acta Phytotax. Geobot. 11: 31. 1942; Hsu, *Taiwania* 16: 279. 1971; Hsu, *Fl. Taiwan* 5: 541. 1978; Liu, *Fl. Taiwan*. ed. 2, 5: 466. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 547. 2006.

佛歐里馬唐 Photo 20-21

*Digitaria stricta sensu* Koyama, Grass. Jap. Neighb. Reg. 341. 1987. *non* Roth in Roem. & Schult., *Syst. Veg.* 2: 474. 1817.

Annuals, tufted. Culms erect or geniculately ascending, slender, 10-20 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, or sparsely pubescent at basal part, outer margins hairy, joint between sheath and blade glabrous. Ligule a glabrous membrane, 0.5-1 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 2-10 cm long, 2-5 mm wide, margins scabrous, apex acute, surface glabrous, or sparsely pilose with tubercle-based hairs on adaxial side of basal leaves. Inflorescence in digitate racemes, loose, base exerted from uppermost sheath. Racemes 2-4, ascending, straight or arcuate, 3-5 cm long, pubescent at base. Rachis tenacious, flattened, midrib low and rounded, clearly winged, 0.8-1 mm wide, margins scabrous. Pedicels linear, angular, with discoid tips, margins scaberulous. Spikelets bisexual, grouped, with 3 spikelets at each node, all pedicellate, varying in pedicels length, homomorphic, dorsally compressed, elliptic, 1.2-1.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume ovate, 0-0.5 time of length as the spikelet, membranous, 3-veined, not keeled, surface densely pubescent between veins, hair verrucose, some with curled tips, apex obtuse, awnless. Lower florets barren, epaleate. Lower lemma elliptic, 1.2-1.5 mm long, chartaceous, 5-veined, surface densely appressed-pubescent between veins, hairs verrucose, some with curled tips, apex acute, awnless. Lower palea absent. Upper floret purplish brown to blackish. Upper lemma elliptic, 1.2-1.5 mm long, coriaceous, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined. Anthers 3, 0.5 mm long.

[Distribution] Endemic to Taiwan

[Taiwan] MIAOLI: Kuanwu, *Huang 1573* (TAIE). NANTOU: Chingjing Farm, *Chen 6484* (TAIE).

3. *Digitaria henryi* Rendle, J. Linn. Soc. 36: 323. 1904; Hsu, *Taiwania* 16: 279. 1971; Hsu, *Fl. Taiwan* 5: 542. *pl. 1426*. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 339. 1987; Liu, *Fl. Taiwan*. ed. 2, 5: 467. *pl. 194*. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 543. 2006. 亨利馬唐 Photo 22-23

*Syntherisma henryi* (Rendle) Honda, *Bot. Mag. (Tokyo)* 38: 128. 1924. nom. illeg. hom.

*Panicum henryi* (Rendle) Makino & Nemoto, *Fl. Japan* 1472. 1925.

*Syntherisma sasakii* Honda, *Bot. Mag. (Tokyo)* 39: 41. 1925.

*Digitaria sasakii* (Honda) Tuyama, *J. Jap. Bot.* 18: 13. 1942.

Perennials, tufted. Culms prostrate, slender, 20-50 cm tall, glabrous, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface glabrous, or sparsely to densely pubescent, outer margins glabrous, joint between sheath and blade glabrous. Ligule a glabrous membrane, 1-2 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 3-8 cm long, 2-5 mm wide, margins scabrous, apex acute, surface glabrous, or sparsely hispid with tubercle-based hairs on both sides. Inflorescence in subdigitate racemes, contracted, cylindrical, base exerted from uppermost sheath. Racemes 3-9, erect, straight, 4-8 cm long, glabrous at base or pubescent at base. Rachis tenacious, angular, midrib narrow, clearly winged, 0.5-1 mm wide, margins scaberulous. Pedicels linear, angular, with truncate tips, margins scaberulous. Spikelets bisexual, paired, both pedicellate, upper pedicel longer, lower pedicel shorter, homomorphic, dorsally compressed, lanceolate, 2.2-2.8 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume reduced, minute, triangular, 0.2-0.5 mm long, hyaline. Upper glume lanceolate, 1-1.5 mm long, 0.5 time of length as the spikelet, membranous, 3-veined, not keeled, surface densely villous between veins, apex acute, awnless. Lower florets barren, epaleate. Lower lemma lanceolate, 2-2.8 mm long, chartaceous, 7-veined, interveins broader at middle, surface densely appressed-pubescent at lateral interveins, apex acute, awnless. Upper floret pale gray. Upper lemma lanceolate, 2-2.5 mm long, coriaceous, surface smooth, apex acuminate, awnless. Upper palea lanceolate, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 0.6 mm long. Caryopsis glabrous, dorso-ventrally compressed, oblong, 1.5 mm long.

[Distribution] Vietnam, southern China and the Ryukyus.

[Habitat] Taiwan, common in littoral regions.

[Taiwan] TAIPEI: Shyrmendong, *Yang 1996* (TNM); Mienhua Islet, *Huang 3250* (HAST). ILAN:

Suao, *Hsu 859* (TAI); Lanyangshi, *Chen 6774* (TAIE). TAICHUNG: Pashienshan, *Hsu s. n.*

Aug. 5, 1959 (TAI). NANTOU: Puli, *Hsu 1374* (TAI). PINGTUNG: Kenting, *Hsu 1096*

(TAI); Maopitou, *Peng 7175* (HAST). HUALIEN: Shetepin, *Yang 2953* (TAI). TAITUNG:

Hsiaoyehliu, *Huang 340* (TNM); Lanyu, *Chang s. n.* Aug. 13, 1975 (PPI).

**4. *Digitaria heterantha*** (Hook. f.) Merr., Enum. Philipp. Fl. Pl. 1: 54. 1923; Veldkamp, Blumea 21: 46. 1973; Hsu, Fl. Taiwan 5: 541. 1978; Liu, Fl. Taiwan. ed. 2, 5: 467. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 541. 2006. 粗穗馬唐

*Paspalum heteranthum* Hook. f., Fl. Brit. India 7(21): 16. 1896.

*Digitaria dispar* Henrard, Blumea 1: 97. 1934. nom. illeg. superfl.

*Digitaria kanehirae* Ohwi, Bot. Mag. (Tokyo) 55: 543. 1941.

*Digitaria shimadana* Ohwi, Acta Phytobiol. Geobot. 11: 28. 1942.

*Digitaria baliensis* Ohwi, Bull. Tokyo Sci. Mus. 18: 5. 1947.

*Digitaria bantamensis* Ohwi, Bull. Tokyo Sci. Mus. 18: 5. 1947.

*Digitaria bicornis sensu* Hsu, Taiwania 16: 278. 1971. *non* Roem. & Schult., Syst. Veg. 2: 470. 1817.

Perennials, stoloniferous. Culms of moderate texture, 30-100 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface glabrous, or sparsely pilose with tubercle-based hairs, outer margins glabrous, joint between sheath and blade glabrous. Ligule a glabrous membrane, 1.5-3 mm long. Blades cauline, linear-lanceolate or linear, flat, 5-15 cm long, 3-6 mm wide, margins scabrous, apex acute or acuminate, surface glabrous, or sparsely pilose with tubercle-based hairs on both sides. Inflorescence in digitate racemes, base exerted from uppermost sheath. Racemes 2-4, ascending or divaricate, straight or arcuate, 5-15 cm long, pubescent at base. Rachis tenacious, angular, midrib thick, scarcely winged, 0.8 mm wide, margins scaberulous. Pedicels linear, angular, with truncate tips, margins scaberulous. Spikelets bisexual, paired, one sessile and one pedicellate at each node, heteromorphic. Sessile spikelets with a short stalk, narrowly lanceolate, dorsally compressed, 3.5-4.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume reduced, minute, triangular, hyaline. Upper glume narrowly lanceolate, 3-4 mm long, membranous, 3 to 5-veined, veins conspicuous, not keeled, veins glabrous, surface glabrous, apex acute, awnless. Lower florets barren, epaleate. Lower lemma lanceolate, 3.5-4.5 mm long, chartaceous, 9 to 11-veined, veins conspicuous, interveins evenly spaced, surface glabrous, margins villous, apex acute, awnless. Upper floret pale gray. Upper lemma narrowly lanceolate, 3-3.5 mm long, coriaceous, surface papillose-striate, apex acuminate, awnless. Upper palea lanceolate, as long as upper lemma, coriaceous, 2-veined, surface papillose-striate. Pedicellate spikelets subequal to the sessile ones but villous. Anthers 3, 1 mm long. Caryopsis glabrous, dorso-ventrally compressed, elliptic, 1.5 mm long.

[Distribution] Tropical Asia.

[Habitat] Taiwan, littoral of the central and south parts.

[Taiwan] TAIPEI: Chinshan, *Kuoh 1438* (TAI). HSINCHU: Hsinchungtzu, *Hsu 7761* (TAI). MIAOLI: Lungkang, *Huang 3067* (TAI). TAICHUNG: Lungchin, *Yang 5785* (TNM). CHANGHWA: Hsinshi, *Yang 5593* (TNM). YUNLIN: Haikou, *Chao 728* (TNM). TAINAN: *Hsu, 534* (TAI).

PINGTUNG: Hsuhai *Chen* 6922 (TAIE). TAITUNG: Peinan, *Kao* 3529 (TAI). PENGHU:  
*Jung s. n.* Jun. 10, 1984 (PPI).

**5. *Digitaria ischaemum*** (Schreb.) Schreb. ex Muhl., Descr. Gram. 131. 1817; Hsu, *Taiwania* 16(2): 279. 1971; Hsu, *Fl. Taiwan* 5: 544. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 342. 1987; Liu, *Fl. Taiwan. ed. 2, 5*: 467. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 546. 2006. 止血馬唐 Photo 24-25

*Panicum ischaemum* Schreb in Schweigger & Koerte, *Spec. Fl. Erlang.* 16. 1804.

Annuals, loosely tufted. Culms geniculately ascending or decumbent, slender, 10-40 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule a glabrous membrane, 1.5-2 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 3-10 cm long, 4-8 mm wide, margins scabrous, apex acute, surface glabrous, or sparsely pilose with tubercle-based hairs on adaxial side of basal leaves. Inflorescence in digitate racemes or subdigitate racemes, loose, base exerted from uppermost sheath. Racemes 2-4, ascending, straight, 2-9 cm long, pubescent at base. Rachis tenacious, flattened, midrib low and rounded, clearly winged, 0.8-1.1 mm wide, margins scabrous. Pedicels short, semiterete, with discoid tips, margins scaberulous. Spikelets bisexual, paired or grouped, with 3 spikelets at each node, all pedicellate, varying in pedicels length, homomorphic, dorsally compressed, elliptic, 1.8-2.2 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent or reduced, minute. Upper glume elliptic, 1.5-2 mm long, 0.8-1 time of length as the spikelet, membranous, 3 to 5-veined, not keeled, surface densely pubescent between veins, hair verrucose, some with curled tips, apex acute, awnless. Lower florets barren, epaleate. Lower lemma elliptic, 1.8-2.2 mm long, membranous, 5 to 7-veined, surface densely appressed-pubescent between veins, hairs verrucose, some with curled tips, apex acute, awnless. Upper floret purplish brown to blackish. Upper lemma elliptic, 1.5-1.8 mm long, coriaceous, surface smooth, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 0.6 mm long.

[Distribution] The temperate regions of the world.

[Taiwan] ILAN: Yuanyang Lake Nature Reserve, *Huang* 4893 (HAST); HSINCHU: Litungshan, *Leong* 1573 (HAST). NANTOU: Hui-Sun Experimental Forest, *Wang* 4517 (TNM); Shanlinshi, *Chen* 6860 (TAIE). CHIAYI: Alishan Activity Center, *Leong* 2105 (HAST). PINGTUNG: Suitiliao, *Sasaki s. n.* Aug. 6, 1923 (TAI).

**6. *Digitaria leptalea*** Ohwi, *Acta Phytotax. Geobot.* 11: 31. 1942; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 546. 2006. 叢立馬唐

*Digitaria leptalea* var. *reticulmis* Ohwi, *Acta Phytotax. Geobot.* 11: 31. 1942; Hsu, *Taiwania* 16:

279. 1971; Hsu, Fl. Taiwan 5: 546. 1978; Liu, Fl. Taiwan. ed. 2, 5: 467. 2000.

Perennials, tufted. Culms erect or geniculately ascending, slender, 10-40 cm tall, pilose, culm nodes glabrous. Leaf sheaths surface glabrous, or pubescent. Ligule a glabrous membrane, 1-1.5 mm long. Blades cauline, linear-lanceolate, flat, 2-5 cm long, 2-4 mm wide, margins scabrous, apex acute or acuminate, surface pubescent, sparsely with tubercle-based hairs on adaxial side of basal leaves. Inflorescence in digitate racemes, loose, base exerted from uppermost sheath. Racemes 2-3, ascending, straight or arcuate, 2-7 cm long, pubescent at base. Rachis tenacious, flattened, midrib low and rounded, narrowly winged, margins scabrous. Pedicels capillary, terete, with discoid tips, margins smooth. Spikelets bisexual, grouped, with 3 spikelets at each node, all pedicellate, varying in pedicel length, homomorphic, dorsally compressed, elliptic, 1.2-1.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume elliptic, 1.2-1.5 mm long, as long as spikelet, membranous, 5-veined, not keeled, surface densely appressed-pubescent between veins, hair verrucose, apex acute, awnless. Lower florets barren, epaleate. Lower lemma elliptic, 1.2-1.5 mm long, membranous, 7-veined, surface densely appressed-pubescent between veins, hairs verrucose, some with curled tips, apex acute, awnless. Upper floret purplish brown to blackish. Upper lemma elliptic, 1-1.2 mm long, coriaceous, apex acute or acuminate, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined. Caryopsis glabrous, dorso-ventrally compressed, elliptic, 1 mm long.

[Distribution] Japan and the Ryukyus.

[Habitat] Taiwan, along railways or dry hillsides.

[Taiwan] TAIPEI: Chinshan, *Hsu 1287* (TAI). TAOYUAN: Neili, *Hsu 1230* (TAI). TAICHUNG:

Tatushan, *Hsu 10753* (TAI). NANTOU: Lienhuachih, *Yang 8770* (TNM). KAOHSIUNG:

Nanfeng Forest Road, *Chiu 5915* (TNM). TAITUNG: Lanyu, *Hsu 4975* (TAI), *Chang 11811* (PPI).

**7. *Digitaria longiflora*** (Retz.) Pers., Syn. Pl. 85. 1805; Hsu, *Taiwania* 16: 280. 1971; Veldkamp, *Blumea* 21: 66. 1973; Hsu, Fl. Taiwan 5: 545. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 344. 1987; Liu, Fl. Taiwan. ed. 2, 5: 469. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 546. 2006. 長花馬唐

*Paspalum longiflorum* Retz., *Observ. Bot.* 4: 15. 1786.

Annuals or short-lived perennial, stoloniferous. Culms slender, 10-40 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface glabrous, or sparsely to densely pubescent, outer margins glabrous or ciliate, joint between sheath and blade glabrous or pubescent. Ligule a glabrous membrane, 1-1.5 mm long. Blades cauline, linear-lanceolate, flat, 2-5 cm long, 2-4 mm wide, margins scabrous, apex acute or acuminate, surface pilose with tubercle-based hairs on adaxial side of basal leaves. Inflorescence in digitate racemes, loose, base

exserted from uppermost sheath. Racemes 2-3, ascending, straight or arcuate, 2-5 cm long, pubescent at base. Rachis tenacious, flattened, midrib low and rounded, clearly winged, 0.5-1 mm wide, margins scabrous. Pedicels short, terete, with discoid tips, margins smooth. Spikelets bisexual, grouped, with 3 spikelets at each node, all pedicellate, varying in pedicels length, homomorphic, dorsally compressed, elliptic, 1.2-1.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume elliptic, 1.2-1.5 mm long, as long as spikelet, membranous, 5-veined, not keeled, surface densely appressed-pubescent between veins, hair verrucose, apex acute, awnless. Lower florets barren, epaleate. Lower lemma elliptic, 1.2-1.5 mm long, membranous, 7-veined, surface densely appressed-pubescent at lateral interveins, hairs verrucose, apex acute, awnless. Upper floret pale gray or pale yellow. Upper lemma elliptic, 1-1.2 mm long, coriaceous, surface smooth, apex acute or acuminate, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 0.7 mm long. Caryopsis glabrous, dorso-ventrally compressed, elliptic, 1 mm long.

[Distribution] Tropics of the Old World.

[Habitat] Taiwan, along riverbanks and roadsides or on dykes between rice-fields.

[Taiwan] TAIPEI: Fulung, *Hsu 887* (TAI). HSINCHU: Hukou, *Hsu 723* (TAI); Senkyakuseki, *Shimada 4303A* (HAST). MIAOLI: Erpingding, *Jung z012801* (TNM). TAICHUNG: Longjing, *Hsu 605* (TAI). YUNLIN: Huwei, *Hsu 471* (TAI). PINGTUNG: Taputing, *Yang 25834* (PPI); Hsuhai, *Chen 6923* (TAIE).

**8. *Digitaria mollicoma* (Kunth) Henrard, Blumea 1: 97. 1934; Veldkamp, Blumea 21: 69. 1973; Hsu, Fl. Taiwan 5: 542. 1978; Liu, Fl. Taiwan. ed. 2, 5: 469. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 545. 2006. 絨馬唐 Photo 26**

*Paspalum mollicomum* Kunth, Enum. Pl. 1: 47. 1833.

*Syntherisma hayatae* Honda, Bot. Mag. (Tokyo) 38: 128. 1924. nom. invalid.

*Syntherisma hayatae* var. *magnum* Honda, Bot. Mag. (Tokyo) 38: 128. 1924.

*Panicum hayatae* var. *magnum* (Honda) Makino & Nemoto, Fl. Japan 1472. 1925.

*Panicum hayatae* (Honda) Makino & Nemoto, Fl. Jap. 1472. 1925. nom. illeg. hom.

*Digitaria hayatae* Honda, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 291. 1930; Hsu, Taiwania 16: 279. 1971. nom. invalid.

*Syntherisma magna* (Honda) Honda, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot.: 294. 1930.

*Digitaria hayatae* (Honda) Honda ex Ohwi, Acta Phytotax. Geobot. 11: 30. 1942.

*Digitaria elevatovenulosa* Ohwi, Bull. Tokyo Sci. Mus. 18: 6. 1947.

*Digitaria elevatovenulosa* var. *glabra* Ohwi, Bull. Tokyo Sci. Mus. 18: 6. 1947.

*Digitaria magna* (Honda) Tuyama, J. Jap. Bot. 18: 13. 1942; Hsu, Taiwania 16: 280. 1971; Hsu, Fl. Taiwan 5: 545. 1978; Liu, Fl. Taiwan. ed. 2, 5: 469. 2000.

Annuals or short-lived perennial, stoloniferous. Culms slender, 20-50 cm tall, glabrous, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface glabrous, or densely pilose. Ligule a

glabrous membrane, 1-3 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 2-6 cm long, 3-5 mm wide, margins scabrous, apex acute, surface glabrous, or densely pilose, sparsely with tubercle-based hairs on both sides. Inflorescence in digitate racemes, loose, base exerted from uppermost sheath. Racemes 2-3, ascending, straight, 3-9 cm long, pubescent at base. Rachis tenacious, angular, midrib narrow, clearly winged, 1 mm wide, margins scaberulous. Pedicels short, terete, with discoid tips, margins smooth or scaberulous. Spikelets bisexual, grouped, with 3 spikelets at each node, all pedicellate, varying in pedicels length, homomorphic, dorsally compressed, elliptic, 1.7-2.3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume elliptic, 1.7-2.3 mm long, as long as spikelet, membranous, 3 to 5-veined, not keeled, veins glabrous, surface densely villous between veins, apex acute, awnless. Lower florets barren, epaleate. Lower lemma elliptic, 1.7-2.3 mm long, membranous, 7-veined, interveins evenly spaced, surface densely villous between veins, apex acute, awnless. Lower palea reduced and minute or absent. Upper floret pale gray. Upper lemma narrowly elliptic, 1.7-2.3 mm long, coriaceous, surface smooth, apex acute, awnless. Upper palea narrowly elliptic, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 1-1.2 mm long.

[Distribution] Indonesia, Malaysia, the Philippines; Pacific Islands

[Habitat] Taiwan, growing on dry sandy soils near seashore.

[Taiwan] TAIPEI: Fulung, *Huang 102* (TNM). TAOYUAN: Chouwei, *Lee s. n.* May 31, 1953 (TAI).

HSINCHU: Senkyakuseki, *Simada 4307A* (HAST). MIAOLI: Tawu, *Hsu 600* (TAI).

TAINAN: *Hsu 535* (TAI). KAOHSIUNG: Liukuei, *Chen 6880* (TAIE). PINGTUNG:

Sheting, *Chang, Yeh & Chune s. n.* Jul. 20, 1984 (PPI). TAITUNG: Suoann, *Hsu 1069* (TAI).

PENGHU: *Chen s. n. Aug. 24, 1983* (PPI).

**9. *Digitaria radicata*** (J. Presl) Miq., Fl. Ned. Ind. 3: 437. 1857; Veldkamp, Blumea 21: 35. 1973; Hsu, Fl. Taiwan 5: 548. 1978; Liu, Fl. Taiwan. ed. 2, 5: 470. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 542. 2006.

小馬唐 Photo 27-28

*Panicum radicosum* J. Presl, Reliq. Haenk. 1: 297. 1830.

*Panicum timorense* Kunth, Enum. Pl. 1: 83. 1833.

*Digitaria timorensis* (Kunth) Balansa, Journ. Bot. 4: 138. 1890; Hsu, Taiwania 16: 281. 1971.

*Syntherisma formosanum* (Rendle) Honda, Bot. Mag. (Tokyo) 38: 122. 1924.

*Syntherisma formosanum* var. *hirsutum* Honda, Bot. Mag. (Tokyo) 38: 123. 1924.

*Digitaria formosana* Rendle, J. Linn. Soc., Bot. 36: 323-324. 1904.

*Panicum formosanum* (Rendle) Makino & Nemoto, Fl. Japan 1471. 1925.

*Panicum formosanum* var. *hirsuta* (Honda) Makino & Nemoto, Fl. Jap. 1472. 1925.

*Digitaria chinensis* Hornem var. *hirsuta* Ohwi, Acta Phytotax. Geobot. 11: 29. 1942.

*Digitaria formosana* var. *hirsuta* (Honda) Henrard, Monogr. Digitaria 265. 1950.

*Digitaria radicata* var. *hirsuta* (Ohwi) Hsu, Fl. Taiwan 5: 549. 1978; Liu, Fl. Taiwan. ed. 2, 5: 469. 2000.

*Digitaria timorensis* var. *hirsuta* (Ohwi) Henrard, Monogr. Digitaria 838. 1950; Hsu, Taiwania 16: 281. 1971.

Annuals. Culms rambling, slender, 20-50 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous or pubescent. Leaf sheaths surface glabrous, or sparsely to densely pubescent, sparsely with tubercle-based hairs, joint between sheath and blade glabrous or pubescent. Ligule a glabrous membrane, 1-2 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 2-6 cm long, 3-7 mm wide, margins scabrous, apex acute or acuminate, surface glabrous, or sparsely to densely pubescent, sparsely with tubercle-based hairs on both sides. Inflorescence in digitate racemes, loose, base exerted from uppermost sheath. Racemes 2-4, ascending, straight, 3-10 cm long, pubescent at base. Rachis tenacious, angular, midrib narrow, narrowly winged, 0.6 mm wide, margins smooth or scaberulous. Pedicels short, angular, with truncate tips, margins scaberulous. Spikelets bisexual, paired, both pedicellate, upper pedicel longer, lower pedicel shorter, homomorphic, dorsally compressed, narrowly lanceolate, 2.8-3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume reduced, minute, triangular, 0.2-0.3 mm long, hyaline. Upper glume lanceolate, 1.5-2 mm long, 0.5-0.7 time of length as the spikelet, membranous, 3-veined, not keeled, veins glabrous, surface sparsely to densely villous between veins, apex acute, awnless. Lower florets barren, epaleate. Lower lemma narrowly lanceolate, 2.8-3 mm long, membranous, 5 to 7-veined, interveins broader at middle, surface densely villous at lateral interveins, margins smooth, apex acute, awnless. Lower palea absent. Upper floret pale gray. Upper lemma narrowly lanceolate, 2-2.5 mm long, coriaceous, surface smooth, apex acuminate, awnless. Upper palea narrowly lanceolate, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 1 mm long.

[Distribution] Southeastern Asia, China and Polynesia.

[Habitat] Taiwan, in open sandy places.

[Taiwan] TAIPEI: Chinshan, *Chen* 380 (TAI). KEELUNG: *Hsu* 398 (TAI). TAOYUAN: *Kao s. n.* Apr. 23, 1991 (TAI). NANTOU: *Wushe, Hsu s. n.* May 3, 1991 (TNM); *Yuchih, Chen* 6762 (TAIE). PINGTUNG: *Wutai, Huang* 87 (TNM); *Kenting, Peng* 7143 (HAST).

**10. *Digitaria sanguinalis* (L.) Scop.,** *Flor. Carniol.* ed. 2. 1:52. 1772; *Hsu, Taiwania* 16: 280. 1971; *Hsu, Fl. Taiwan* 5: 546. 1978; *Liu, Fl. Taiwan.* ed. 2, 5: 470. 2000; *Chen & Phillips in Chen et al. (eds.), Fl. China* 22: 542. 2006.

馬唐 Photo 29

*Panicum sanguinalis* L., *Sp. Pl.* 57. 1753.

Annuals, tufted. Culms erect or geniculately ascending or decumbent, slender, 10-80 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous or bearded. Leaf sheaths surface glabrous, or sparsely to densely pubescent, sparsely with tubercle-based hairs. Ligule a glabrous membrane, 1-3 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 5-20 cm long, 4-12 mm wide, margins scabrous, apex acute, surface glabrous, or sparsely to densely pubescent, sparsely with tubercle-based hairs on both sides. Inflorescence in digitate racemes or subdigitate

racemes, loose, base exerted from uppermost sheath. Racemes 3-12, erect or ascending, straight or arcuate, 5-15 cm long, pubescent at base. Rachis tenacious, angular, midrib narrow, clearly winged, 0.6-1 mm wide, margins scabrous. Pedicels short, angular, with truncate tips, margins scabrous. Spikelets bisexual, paired, both pedicellate, upper pedicel longer, lower pedicel shorter, homomorphic, dorsally compressed, lanceolate, 3-3.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume reduced, minute, triangular, 0.2 mm long, membranous. Upper glume lanceolate, 1.5-1.7 mm long, 0.5-0.7 time of length as the spikelet, membranous, 3-veined, not keeled, surface sparsely to densely appressed-pubescent between veins, apex acute, awnless. Lower florets barren, epaleate. Lower lemma lanceolate, 3-3.5 mm long, chartaceous, 7-veined, interveins broader at middle, lateral veins setiform-scabrous especially toward the apex, surface densely appressed-pubescent at lateral interveins, apex acute, awnless. Upper floret pale gray. Upper lemma lanceolate, 3 mm long, coriaceous, apex acuminate, awnless. Upper palea lanceolate, as long as upper lemma, coriaceous, 2-veined.

[Distribution] The temperate and warm regions of the world.

[Habitat] Taiwan, naturalized around villages and in waste places.

[Taiwan] TAIPEI: Fulung, *Hsu 891* (TAI). TAOYUAN: Sijhou, *Chen 3996* (TNM). TAICHUNG: Tatushan, *Yang p5* (TNM); Lishan, *Kuoh 80093* (TAI). PINGTUNG: Hsiaoliuchiu, *Chen 6821* (TAIE). TAITUNG: Lanyu, *Chang 17568* (PPI). KINMEN: Taiwushan, *Yang 27387* (PPI).

**11. *Digitaria sericea* (Honda) Honda, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 3: 298. 1930; Hsu, *Taiwania* 16: 277. 1971; Hsu, *Fl. Taiwan* 5: 548. 1978; Liu, *Fl. Taiwan*, ed. 2, 5: 470. 2000.**

絹毛馬唐

*Syntherisma sericea* Honda, *Bot. Mag. (Tokyo)* 38: 127. 1924.

Annuals, tufted. Culms erect or geniculately ascending, slender, 30-50 cm tall, glabrous, culm nodes pubescent. Leaf sheaths surface glabrous, or densely pubescent. Ligule a glabrous membrane, 1-2 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 4-8 cm long, 3-6 mm wide, margins scabrous, apex acute, surface densely pubescent, sparsely with tubercle-based hairs on both sides. Inflorescence in digitate racemes, contracted or loose, base exerted from uppermost sheath. Racemes 2-3, erect or ascending, straight or arcuate, 2.5-5 cm long, pubescent at base. Rachis tenacious, angular, midrib narrow, narrowly winged, 0.6 mm wide, margins scabrous. Pedicels linear, angular, with truncate tips, margins scabrous. Spikelets bisexual, paired, both pedicellate, upper pedicel longer, lower pedicel shorter, homomorphic, dorsally compressed, lanceolate, 3-4 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume reduced, minute, triangular, 0.3-1 mm long, 0.1-0.3 time of length as the spikelet, membranous, surface moderately pubescent near the

margins. Upper glume lanceolate, 1.5-2.5 mm long, 0.5-0.7 time of length as the spikelet, chartaceous, 3-veined, not keeled, surface densely villous between veins, apex acute, awnless. Lower florets barren, epaleate. Lower lemma broadly lanceolate, 3-4 mm long, chartaceous, 7-veined, interveins broader at middle, surface densely villous between veins, apex acute, awnless. Upper floret yellowish brown. Upper lemma narrowly lanceolate, 2.5-3 mm long, coriaceous, apex acuminate, awnless. Upper palea lanceolate, as long as upper lemma, coriaceous, 2-veined, surface smooth. Caryopsis glabrous, dorso-ventrally compressed, oblong, 1.6 mm long.

[Distribution] Endemic to Taiwan.

[Habitat] In sandy littoral areas.

[Taiwan] KEELUNG: *Chen 2680* (TNM). TAICHUNG: Pashienshan, *Hsu 445* (TAI). KAOHSIUNG: Chiihow, *Suzuki s. n.* Oct. 3, 1934 (TAI). PINGTUNG: Lungkeng, *Yang 26482* (PPI). TAITUNG: Hsiaolanyu, *Yeh 42* (PPI).

**12. *Digitaria setigera*** Roth ex Roem. & Schult., *Syst. Veg.* 2: 474. 1817; Veldkamp, *Blumea* 21: 37. 1973; Hsu, *Fl. Taiwan* 5: 546, *pl. 1427*. 1978; Liu, *Fl. Taiwan*. ed. 2, 5: 471. *pl. 195*. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 542. 2006. 短穎馬唐

*Panicum microbachne* J. Presl, *Reliq. Haenk.* 1: 298. 1830.

*Syntherisma microbachne* (J. Presl) Hitchc., *Mem. Bernice Pauahi Bishop Mus.* 8: 177. 1922.

*Syntherisma sanguinalis* var. *evalvula* Honda, *Bot. Mag. (Tokyo)* 38: 122. 1924.

*Digitaria microbachne* (Presl.) Henr, *Med. Rikis Herb. Leiden* 61: 13. 1930; Ohwi, *Bot. Mag. Tokyo* 55: 542. 1941; Ohwi, *Acta. Phytotax. Geobot.* 11: 29. 1942; Hsu, *Taiwania* 9: 42. 1963; Hsu, *Taiwania* 16: 280. 1971; Koyama, *Grass. Jap. Neighb. Reg.* 341. 1987.

*Syntherisma sanguinale* var. *pruriens* (Fisch. ex Trin.) Honda, *J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot.* 3: 299. 1930.

Annuals, tufted. Culms decumbent, robust or of moderate texture, 30-100 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface glabrous, or sparsely to densely pilose with tubercle-based hairs, outer margins glabrous, joint between sheath and blade glabrous. Ligule a glabrous membrane, 1-2 mm long. Blades cauline, linear-lanceolate, flat, 5-20 cm long, 3-10 mm wide, margins scabrous, apex acuminate, surface glabrous, or sparsely to densely pilose, sparsely with tubercle-based hairs on both sides. Inflorescence in digitate racemes or subdigitate racemes, loose, base exerted from uppermost sheath. Racemes 3-12, ascending, straight or arcuate, 5-15 cm long, pubescent at base. Rachis tenacious, angular, midrib narrow, clearly winged, 0.6-0.8 mm wide, margins scabrous. Pedicels linear, angular, with truncate tips, margins scabrous. Spikelets bisexual, paired, both pedicellate, upper pedicel longer, lower pedicel shorter, homomorphic, dorsally compressed, lanceolate, 2-3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume elliptic, 0.8-1 mm long, 0.35

time of length as the spikelet, membranous, 1 to 3-veined, not keeled, surface appressed-pubescent to villous between veins, apex obtuse or acute, awnless. Lower florets barren, epaleate. Lower lemma lanceolate, 2-3 mm long, chartaceous, 5 to 7-veined, interveins broader at middle, surface densely appressed-pubescent at lateral interveins, apex acute, awnless. Upper floret pale gray. Upper lemma linear, 2-3 mm long, coriaceous, surface papillose-striate, apex acute, awnless. Upper palea lanceolate, as long as upper lemma, coriaceous, 2-veined, surface papillose-striate. Anthers 3, 0.5 mm long.

[Distribution] Tropical Asia.

[Habitat] Taiwan, in open waste places throughout the Island.

[Taiwan] TAIPEI: Chingmeishan, *Kao 3405* (TAI). TAOYUAN: Neili, *Hsu 1233* (TAI). MIAOLI: Taian, *Lin 14* (TNM). TAICHUNG: Lungchin, *Yang pl* (TNM). NANTOU: Wushe, *Tsai 23* (TAI); Yuchih, *Chen 6768* (TAIE). CHANGHWA: Shengkang, *Chen 355A* (HAST). CHIAYI: Juili, *Liu s. n.* (TNM). KAOHSIUNG: Neimen, *Yang 14771* (TNM). PINGTUNG: Yichanshan, *Huang 66* (TNM). TAITUNG: Suaan, *Hsu 1061* (TAI); Hsiaolanyu, *Jung 4434* (TAIF).

**13. *Digitaria violascens*** Link, Hort. Berol. 1: 229. 1827; Hsu, *Taiwania* 16(2): 281. 1971; Veldkamp, *Blumea* 21: 63. 1973; Hsu, *Fl. Taiwan* 5: 549, *pl. 1428*. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 342. 1987; Liu, *Fl. Taiwan. ed. 2, 5*: 471. *pl. 196*. 2000; Chen & Phillips in *Chen et al.* (eds.), *Fl. China* 22: 547. 2006.

紫果馬唐 Photo 30-31

*Syntherisma ischaemum* var. *lasiophyllum* Honda, *Bot. Mag. (Tokyo)* 38: 126. 1924.

*Digitaria violascens* var. *villosa* Keng, *Sunyatsenia* 3: 19. 1935.

*Digitaria ischaemum* var. *asiatica* Ohwi, *Acta Phytotax. Geobot.* 11: 32. 1942.

*Digitaria ischaemum* var. *intersita* Ohwi, *Acta Phytotax. Geobot.* 11: 32. 1942.

*Digitaria ischaemum* var. *lasiophylla* (Honda) Ohwi, *Acta Phytotax. Geobot.* 11: 32. 1942.

*Digitaria violascens* var. *lasiophylla* (Honda) Tuyama, *J. Jap. Bot.* 18: 15. 1942.

*Digitaria bogoriensis* Ohwi, *Bull. Tokyo Sci. Mus.* 18: 5. 1947.

*Digitaria pertenuis* var. *glabra* (Boerl.) Ohwi, *Bull. Tokyo Sci. Mus.* 18: 7. 1947.

*Digitaria violascens* var. *intersita* (Ohwi) Ohwi, *Bull. Natl. Sci. Mus.* 33: 67. 1953.

Annuals, loosely tufted. Culms erect or geniculately ascending, slender, 20-60 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule a glabrous membrane, 1-2 mm long. Blades cauline, linear-lanceolate, flat, 5-15 cm long, 2-8 mm wide, margins scabrous, apex acute or acuminate, surface glabrous. Inflorescence in digitate racemes or subdigitate racemes, loose, base exerted from uppermost sheath. Racemes 3-7, ascending, straight, 3-10 cm long, pubescent at base. Rachis tenacious, flattened, midrib low and rounded, clearly winged, 0.5-1 mm wide, margins scabrous. Pedicels short, angular, with discoid tips, margins scabrous. Spikelets bisexual, paired or grouped, with 3 spikelets at each node, all pedicellate, varying in pedicels length, homomorphic, dorsally compressed, elliptic, 1.2-1.5 mm long,

with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume elliptic, 1-1.3 mm long, 0.8 time of length as the spikelet, membranous, 3-veined, not keeled, veins glabrous, surface densely appressed-pubescent between veins, hair verrucose, apex acute, awnless. Lower florets barren, epaleate. Lower lemma ovate, 1.2-1.5 mm long, membranous, 7-veined, veins glabrous, surface densely appressed-pubescent between veins, hairs verrucose, apex acute, awnless. Upper floret purplish brown to blackish. Upper lemma elliptic, 1.2-1.5 mm long, coriaceous, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined. Caryopsis glabrous, dorso-ventrally compressed, elliptic, 1 mm long.

[Distribution] Tropical regions of both hemispheres.

[Habitat] Taiwan, weedy in sunny places.

[Taiwan] TAIPEI: Kankou, *Hsu 636* (TAI). MIAOLI: Mt. Lionhead, *Hsu 655* (TAI). TAICHUNG: Kukuan, *Lu s. n.* Apr. 4, 1986 (PPI). NANTOU: Wushe, *Hsu s. n.* May 3, 1991 (TNM); Shanlinhsi, *Chen 6850* (TAIE). CHANGHWA: Lukang, *Yang 5592* (TNM). TAITUNG: Sanhsiental, *Kao s. n.* May 17, 1991 (TNM); Lanyu, *C. L. Yeh 475* (PPI).

## 7. *Echinochloa* P. Beauv., Ess. Agrostogr. 53. 1812

### 稗屬

Annuals or perennials; culms filled with pith, glabrous; strongly tufted or partly creeping and/or floating; ligule a fringe of hairs or absent. Inflorescence a panicle composed of spike-like racemes, racemously arranged or slightly branched; racemes arranged on all sides of main axis, uppermost short, mostly secund and dense, main axis ending in a few spikelets. Spikelets flat on side of lower glume, other side strongly convex, broadly elliptic, abruptly acuminate, awned or muticous, hairy, sessile or shortly pedicellate, sometimes in pairs, sometimes to 4(-10) together, falling as a whole, 2-flowered; pedicels 0.5-1 mm long, widened at apex; rachilla not produced; glumes and lower lemma herbaceous; lower herbaceous, indurate at maturity; lower glume 1/5-3/5 as long as spikelet, ovate-oblong, acute or shortly awned, distinctly veined; upper glume as long as spikelet, ovate-oblong, acute, 5-veined, muticous or with short straight awn; lower palea slightly shorter, with 2 ciliate veins; stamens present or absent; upper lemma strongly convex, smooth and glossy, embracing upper palea with narrowly incurved opaque margins, acuminate or with short awn; upper palea as long as and of same texture; stamens 3; ovary glabrous, styles 2, free, stigmas plumose, purple, laterally exerted. Caryopsis free, wholly enclosed between upper palea and upper lemma, elliptic, plano-convex, hilum punctiform, basal.

About 35 species distributed in the warmer regions of the world. Three species in Taiwan.

### KEY TO THE SPECIES

1. Grain persisting at maturity; spikelets plumply ovate; cultivated plants..... 3. *E. frumentacea*
1. Grain readily deciduous at maturity; spikelets ovate, ovate-lanceolate or ovate-elliptic; wild plants.

2. Racemes distant, nearly of equal length; spikelets awnless, acute, 2–3 mm.....1. *E. colona*  
 2. Racemes approximate, the upper racemes shorter than lower; spikelets acuminate to shortly awned, 2–4  
 mm.....2. *E. crus-galli*

**1. *Echinochloa colona* (L.) Link, Hort. Berol. 2: 209. 1833; Hsu, Taiwania 16: 282. 1971; Hsu, Fl. Taiwan 5: 552. 1978; Koyama, Grass. Jap. Neighb. Reg. 351. 1987; Liu, Fl. Taiwan. ed. 2, 5: 474. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 517. 2006. 芒稷 Pl. 8, Photo 32-33**

*Panicum colonum* L., Syst. Nat. ed. 10. 2: 870. 1759.

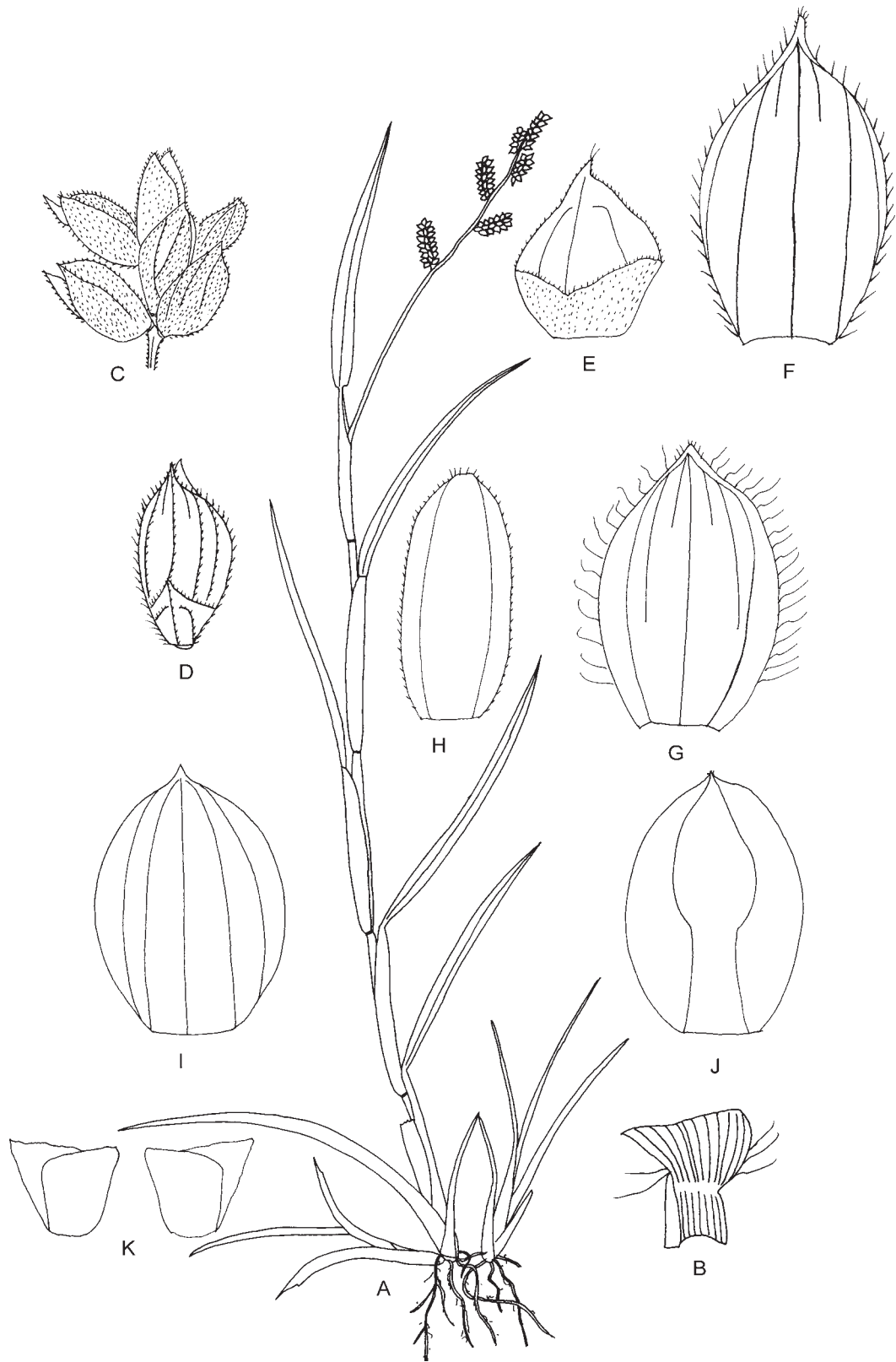
*Echinochloa crus-galli* subsp. *colona* (L.) Honda, Bot. Mag. (Tokyo) 37: 122. 1923.

*Panicum crus-galli* subsp. *colona* (L.) Makino & Nemoto, Fl. Japan 1470. 1925.

Annuals, tufted. Culms erect or geniculately ascending or decumbent, slender, 20-60 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule absent. Blades cauline, linear, flat, 3-20 cm long, 3-7 mm wide, margins smooth or scabrous, apex acute, surface glabrous. Inflorescence in racemose racemes, 5-10 cm long, axis scabrous, base exerted from uppermost sheath. Racemes erect or ascending, straight, 1-2 cm long, distant not overlapping. Rachis tenacious, angular, midrib thick, scarcely winged, 0.6 mm wide, margins scabrous. Pedicels short, with discoid tips, margins scabrous. Spikelets bisexual, paired, both pedicellate, upper pedicel longer, lower pedicel shorter, homomorphic, dorsally compressed, ovate or ovate-elliptic, 2-3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 1-1.5 mm long, 0.5 time of length as the spikelet, membranous, 3-veined, not keeled, veins hispidulous, surface moderately hirtellous, margins hispidulous, apex acute to acuminate, awnless, clasping at the base of the spikelet. Upper glume ovate, 2-3 mm long, as long as spikelet, chartaceous, 5-veined, not keeled, veins hispidulous to hispid, surface hirtellous, apex acute or acuminate, awnless. Lower florets staminate or barren. Lower lemma ovate, 2-3 mm long, chartaceous, 5-veined, veins hispid or hispidulous, surface hirtellous, apex acute or acuminate, awnless. Lower palea well developed, membranous, ovate, as long as lower lemma, 2-veined, veins ciliolate. Upper floret pale gray. Upper lemma elliptic, 1.5-2 mm long, coriaceous, surface smooth, apex acute, ciliolate, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 0.5 mm long.

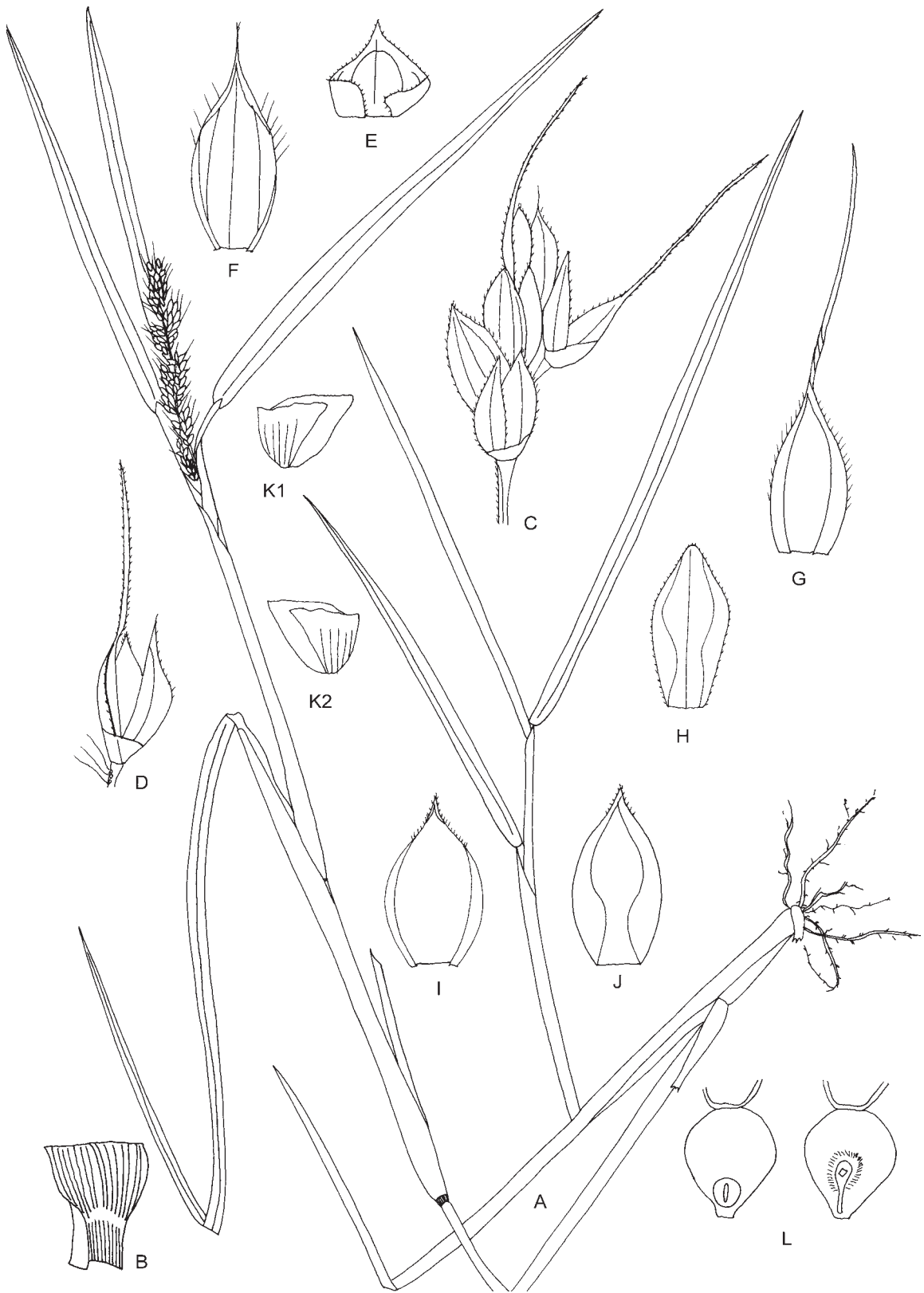
[Distribution] Tropical Asia and Africa.

[Habitat] Taiwan, common in roadside, abandoned fields and orchards.



Pl. 8. *Echinochloa colona* (L.) Link

A. habit; B. ligule; C. part of raceme; D. spikelet; E. lower glume; F. upper glume; G. lower lemma; H. lower palea; I. upper lemma; J. upper palea; K. lodicules.



Pl. 9. *Echinochloa crus-galli* (L.) P. Beauv.

A. habit; B. ligule; C. part of raceme; D. spikelet; E. lower glume; F. upper glume; G. lower lemma; H. lower palea; I. upper lemma; J. upper palea; K. lodicules; L. caryopsis.

[Taiwan] TAIPEI: Shihmen, *Hsu 1250* (TAI). ILAN: Yugong Temple, *Yang 15105* (TNM).  
TAOYUAN: Siouchaiwo, *Chen 3968* (TNM). MIAOLI: Fengshuli, *Peng 5456* (HAST).  
TAICHUNG: Tungnan Village, *Wang 8483* (TNM). NANTOU: Puli, *Hsu 1376* (TAI).  
CHANGHWA: Chang-Pin Industrial area, *Yang 4002* (TNM). YUNLIN: Peikang, *Tsai 322*  
(TNM). KAOHSIUNG: Meinung, *Liu s. n.* Apr. 26, 1991 (TNM). PINGTUNG: Wugo, *Yang*  
*28402* (PPI); Hsiaoliuchiu, *Chen 6820* (TAIE). TAITUNG: Peinan, *Wang 1043* (TNM);  
Lanyu, *Yeh 109*(PPI).

**2. *Echinochloa crus-galli* (L.) P. Beauv.,** Ess. Agrostogr. 53. 1812; Hsu, *Taiwania* 16:  
282. 1971; Hsu, *Fl. Taiwan* 5: 552. *pl. 1429*. 1978; Liu, *Fl. Taiwan*. ed. 2, 5: 474.  
*pl. 197*. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 517. 2006.

稗 Pl. 9, Photo 34-35

*Panicum crus-galli* L., Sp. Pl. 56. 1753.

*Echinochloa oryzoides* (Arduino) Fritsch, Verh. Zool.-Bot. Ges. Wien 41: 742. 1891.

*Echinochloa crus-galli* var. *formosensis* Ohwi, Acta Phytotax. Geobot. 11: 38. 1942; Hsu, *Taiwania* 16:  
282. 1971; Hsu, *Fl. Taiwan* 5: 554. 1978;

*Echinochloa crus-galli* var. *oryzicola* (Vasing) Ohwi, Acta Phytotax. Geobot. 11: 38. 1942; Hsu, *Taiwania*  
16: 282. 1971; Hsu, *Fl. Taiwan* 5: 554. 1978;

*Echinochloa crus-galli* var. *praticola* Ohwi, Acta Phytotax. Geobot. 11: 37. 1942; Hsu, *Taiwania* 16: 282.  
1971; Hsu, *Fl. Taiwan* 5: 554. 1978; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 517. 2006.

*Echinochloa glabrescens* Kossenko, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 11: 40.  
1949.

Annuals, tufted. Culms erect or geniculately ascending, robust or of moderate texture, 50-150 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule absent. Blades cauline, linear, flat, 5-40 cm long, 2-15 mm wide, margins smooth or scabrous, apex acuminate, surface glabrous, or pubescent on both sides. Inflorescence in racemose racemes, 5-20 cm long, axis scabrous, base exerted from uppermost sheath. Racemes erect or ascending, straight or arcuate, 2-10 cm long, approximate and overlapping. Rachis tenacious, angular, midrib thick, scarcely winged, 0.5 mm wide, margins scabrous sparsely with stiff long hair. Pedicels short, with discoid tips. Spikelets bisexual, paired or grouped, with 3 spikelets at each node, all pedicellate, varying in pedicels length, homomorphic, dorsally compressed, ovate or ovate-elliptic, 2.5-4 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 1-1.2 mm long, 0.35 time of length as the spikelet, membranous, 3-veined, not

keeled, veins hispidulous, surface moderately hirtellous, margins hispidulous, apex acuminate to cuspidate, awnless, clasping at the base of the spikelet. Upper glume boat-shaped, gibbous below the middle, 2.5-4 mm long, as long as spikelet, chartaceous, 5-veined, not keeled, veins hispidulous to hispid, surface hirtellous, apex acute or acuminate, awnless. Lower florets barren. Lower lemma ovate, 2.5-4 mm long, chartaceous, 5-veined, veins hispid or hispidulous, surface hirtellous, apex acuminate, awnless or awned, awn 5-15 mm long. Lower palea well developed, membranous, ovate, as long as lower lemma, 2-veined, veins ciliolate. Upper floret pale gray or pale yellow. Upper lemma elliptic, 2-3 mm long, coriaceous, surface smooth, apex acuminate, ciliolate, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface smooth.

[Distribution] Tropical Asia and Africa.

[Taiwan] TAIPEI: Huangtieten, *Yang 2118* (TNM). ILAN: Lanyang Bridge, *Huang 1778* (HAST).

MIAOLI: Erhpensung, *Wang 8267* (TNM). TAICHUNG: Peitun, *Wang 4264* (TNM).

NANTOU: Lienhuachih, *Yang 8769* (TNM). CHANGHWA: Shuiwei Farm, *Yang 7916* (TNM). TAINAN: Hsinhua, *Kao s. n.* May 15, 1991 (TNM). KAOHSIUNG: Hunei, *Wang 11594* (TNM). PINGTUNG: Szukou, *Ku 425* (PPI). HUALIEN: Nanhua, *Yang 11609* (TNM).

**3. *Echinochloa frumentacea*** Link, Hort. Berol. 1: 204. 1827; Hsu, *Taiwania* 16: 282. 1971; Hsu, *Fl. Taiwan* 5: 554. 1978; Liu, *Fl. Taiwan*. ed. 2, 5: 476. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 516. 2006. 稭子

*Echinochloa crus-galli* subsp. *edulis* (Hitc.) Honda, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 3: 266. 1930.

Annuals, tufted. Culms erect, robust, 50-150 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule absent. Blades cauline, linear, flat, 15-40 cm long, 10-24 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in racemose racemes, axis scabrous or bearded in axils. Racemes ascending, straight, 1-3 cm long, approximate and overlapping. Rachis tenacious, angular, not winged, margins scabrous. Pedicels short, with truncate tips, margins scaberulous or scabrous, sometimes bearing long stiff hairs. Spikelets bisexual, paired or grouped, with 3 spikelets at each node, all pedicellate, varying in pedicels length, homomorphic, dorsally compressed, elliptic, 2.5-3.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 0.8-1 mm long, 0.3-0.4 time of length as the spikelet, membranous, 3-veined, not keeled, veins glabrous, surface moderately hirtellous, margins smooth, apex acute, awnless, clasping at the base of the spikelet. Upper

glume ovate, 2.3-3.3 mm long, 0.9 time of length as the spikelet, chartaceous, 5-veined, not keeled, surface hirtellous, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma ovate, 2.5-3.5 mm long, chartaceous, 5-veined, veins hispidulous, surface scaberulous, margins smooth, apex acute, awnless. Lower palea well developed, membranous, ovate, as long as lower lemma, 2-veined. Upper floret pale gray. Upper lemma ovate, 2-3 mm long, coriaceous, surface smooth, apex acute, ciliolate, awnless. Upper palea ovate, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 0.8-1 mm long.

[Distribution] Widely cultivated in the warmer parts of Asia and Africa.

[Taiwan] TAIPEI: NTU Farm, *Shimada 718* (TAI).

## 8. *Eriochloa* Kunth in Hurnboldt *et al.*, Nov. Gen. Sp. 1: 94. 1816.

### 野黍屬

Annuals or perennials, culms erect or creeping at base; ligule a short fringe of hairs. Leaf blade linear with broad base and acute apex, flat or rolled. Inflorescence racemose-paniculate, composed of racemes, arranged on all sides of main axis; lower racemes often pedunculate; rachis of racemes keeled on abaxial side. Spikelets pedicellate, alternately arranged along keel, upper part of raceme solitary, middle part often paired, alternately arranged along keel, lower part of larger racemes often in short biseriate racemes, pedicels of a pair unequal, fused at base; spikelets articulate with widened apex of pedicel, oblong, dorsally compressed, 2-flowered, base of spikelet swollen, knob-like or cupuliform, usually reddish, bearing lower glume; lower glume small and veinless or absent; upper glume as long as spikelet, acute or mucronate or shortly awned, 5-veined; lower lemma as long as upper glume or slightly shorter, acute or mucronate, 5-veined; lower palea present or absent; stamens 3 or absent; upper lemma always shorter than spikelet, adaxial, with rounded apex, mucronate or with short awn, chartaceous with narrowly incurved, opaque margins; upper palea chartaceous, flat, tuberculate, broad, inflexed, smooth; lodicules 2, small, truncate; stamens 3, anthers linear; styles 2, free, stigmas plumose, laterally exserted. Caryopsis free between indurate upper lemma and upper palea, elliptic, dorsally compressed, embryo 1/2 as long as fruit, hilum oblong.

About 30 species distributed in the tropical and subtropical regions of the world. Two species in Taiwan.

### KEY TO THE SPECIES

1. Spikelets 1 mm wide; pedicels bearing several long hairs; plants usually glabrous . . . . . 1. *E. procera*
1. Spikelets 2 mm wide; pedicels villous; plants villous . . . . . 2. *E. villosa*

**1. *Eriochloa procera* (Retz.) C. E. Hubb., Bull. Misc. Inform. Kew 1930: 256. 1930 ;**

Hsu, *Taiwania* 16: 283. 1971; Hsu, *Fl. Taiwan* 5: 555. *pl. 1430*. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 373. 1987; Liu, *Fl. Taiwan*. ed. 2, 5: 476. *pl. 198*. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 525. 2006.

高野黍 Photo 36-37

*Agrostis procera* Retz., *Obs. Bot.* 4: 19. 1786.

*Eriochloa hackelii* Honda, *Bot. Mag. (Tokyo)* 37: 115. 1923.

Annuals or short-lived perennial, tufted. Culms erect or geniculately ascending, of moderate texture, 30-150 cm tall, glabrous, culm nodes pubescent. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade puberulent. Ligule a ciliate membrane, 0.5-1 mm long. Blades cauline, linear, flat, 8-20 cm long, 2-8 mm wide, margins smooth, apex acuminate, surface glabrous. Inflorescence in racemose racemes, loose, 10-20 cm long, axis scaberulous, base exerted from uppermost sheath. Racemes erect or ascending, straight, 3-7 cm long, scabrous at base. Rachis tenacious, angular, midrib narrow, narrowly winged, 0.5 mm wide, margins scabrous. Pedicels linear, angular, with discoid tips, margins scaberulous, sometimes bearing long stiff hairs. Spikelets bisexual, paired or grouped, with 3 spikelets at each node, all pedicellate, varying in pedicels length, homomorphic, dorsally compressed, lanceolate, 3-4 mm long, basal swelling, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent or reduced, minute. Upper glume lanceolate, 3-4 mm long, as long as spikelet, chartaceous, 5-veined, not keeled, surface pilose, margins smooth, apex acuminate, awnless. Lower florets barren, epaleate. Lower lemma lanceolate, 3-4 mm long, chartaceous, 5-veined, surface sparsely pilose, margins smooth, apex acuminate, awnless. Lower palea absent. Upper floret pale gray or pale yellow. Upper lemma oblong, 2 mm long, coriaceous, surface papillose-striate, apex obtuse, awned, 0.3-0.5 mm long. Upper palea oblong, as long as upper lemma, coriaceous, 2-veined, surface papillose-striate. Caryopsis glabrous, dorso-ventrally compressed, oblong, 2 mm long.

[Distribution] India, Sri Lanka, Myanmar, Indochina, Malesia and China. Taiwan, very common and limited to the central and southern parts of the island.

[Habitat] It grows along ditches and the edges of paddy fields.

[Taiwan] MIAOLI: Yangliao, *Wang 8797* (TNM). TAICHUNG: Lungching, *Chiu 5167* (TNM).

NANTOU: Chingjing Farm, *Peng 6101* (HAST). CHANGHWA: Lukang, *Yang 5577* (TNM); Shengkang, *Chen 355B* (HAST). CHIAYI: Tzengwen Reservoir, *Leong 1479* (TNM).

TAINAN: Chiku, *Wang 10445* (TNM). PINGTUNG: Szuchonhsi, *Chang 2119* (TAI); Tahan Forest Road, *Chen 6894* (TAIE). TAITUNG: Penanhsikou, *Wu 5-001* (TNM); Lanyu, *Chang s. n.* Oct. 15, 1986 (PPI).

**2. *Eriochloa villosa* (Thunb.) Kunth, *Revis. Gramin.* 1: 203. 1829 ; Hsu, *Taiwania* 16:**

283. 1971; Hsu, Fl. Taiwan 5: 557. 1978; Koyama, Grass. Jap. Neighb. Reg. 371. 1987; Liu, Fl. Taiwan. ed. 2, 5: 478. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 525. 2006. 野黍 Photo 38-39

*Paspalum villosum* Thunb., Fl. Japon. 45. 1784.

*Eriochloa villosa* var. *stenantha* Ohwi, Repert. Spec. Nov. Regni Veg. 36: 41. 1934.

Annuals, tufted. Culms erect or geniculately ascending, of moderate texture, 30-100 cm tall, puberulent, culm nodes puberulent. Leaf sheaths surface glabrous, or moderately puberulent, outer margins ciliate, joint between sheath and blade glabrous or puberulent. Ligule a ciliate membrane, 1 mm long. Blades cauline, linear, flat, 5-25 cm long, 5-15 mm wide, margins scabrous, apex acute or acuminate, surface densely puberulent on both sides. Inflorescence in racemose racemes, 7-15 cm long, axis puberulent, base exerted from uppermost sheath. Racemes 4-8, ascending or spreading, straight, 1.5-4 cm long. Rachis tenacious, angular, midrib low and rounded, clearly winged, 1-1.5 mm wide, margins villous. Pedicels short, with discoid tips, margins villous with spreading hairs. Spikelets bisexual, solitary, dorsally compressed, ovate-elliptic, 4.5-5 mm long, basal swelling, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent or reduced, minute. Upper glume ovate, 4.5-5 mm long, as long as spikelet, chartaceous, 5 to 7-veined, not keeled, surface puberulent, margins smooth, apex acute, awnless. Lower florets barren, epaleate. Lower lemma ovate, 4.5-5 mm long, chartaceous, 5 to 7-veined, surface puberulous, margins smooth, apex acute, awnless. Upper floret pale yellow. Upper lemma elliptic, 3.5-4 mm long, coriaceous, surface finely rugose, apex obtuse to acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface finely rugose. Anthers 3, 0.5 mm long. Caryopsis glabrous, dorso-ventrally compressed, elliptic, 2.5 mm long.

[Distribution] Vietnam, China and Japan.

[Habitat] Taiwan, in sunny hills.

[Taiwan] TAIPEI: Kuaninshan, *Hsu 407* (TAI). MIAOLI: Dahhu, *Hsu 4002* (TAI). NANTOU: Wushe, *Szuki s. n.* Jul. 14, 1930 (TAI). KAOHSIUNG: Liukuei, *Chen 6881* (TAIE).

### 9. *Hymenachne* P. Beauv., Ess. Agrostogr. 48. 1812.

#### 膜稈草屬

Perennials plants of marshes and water edges; culms filled with white pith; creeping or floating.

Leaf blade linear or linear-lanceolate, amplexicaul at base, with acute apex; ligule membranaceous. Inflorescence a contracted, spike-like panicle, branching from all sides. Spikelets articulate with pedicels, narrowly lanceolate, subterete, acute, 2-flowered; rachilla distinctly elongated between glumes, not produced; glumes and lower lemma herbaceous; lower glume much shorter than spikelet; upper glume slightly shorter than spikelet; lower lemma as long as spikelet, 3 to 5-veined; lower palea absent; upper lemma membranaceous, with thin not inrolled margins embracing upper pale except at apex; upper palea membranaceous; stamens 3; ovary glabrous, styles 2, free, stigma plumose, exerted laterally from upper part of spikelets. Caryopsis free from upper palea and upper lemma.

Five species in the tropical regions. One species in Taiwan.

**1. *Hymenachne amplexicaulis* (Rudge) Nees in Martius, Fl. Bras. Enum. Pl. 2: 276. 1829; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 510. 2006.**

膜稈草 Photo 40

*Panicum amplexicaule* Rudge, Pl. Guian. 21. 1805.

*Hymenachne pseudointerrupta* Müll. Hal., Bot. Zeitung (Berlin) 19: 333. 1861; Hsu, Taiwania 16: 283.

1971; Hsu, Fl. Taiwan 5: 558. *pl. 1431*. 1978; Koyama, Grass. Jap. Neighb. Reg. 315. 1987; Liu, Fl. Taiwan. ed. 2, 5: 478. *pl. 199*. 2000.

*Hymenachne acutigluma* (Steud.) Gilliland, Gard. Bull. Singapore 20: 314. 1964.

Perennials, semi-aquatic, trailing on water edges, tufted. Culms decumbent, stout and succulent, 100-200 cm tall, glabrous, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous or ciliate, joint between sheath and blade glabrous. Ligule a glabrous membrane, 1-2 mm long. Blades cauline, linear, flat, 15-40 cm long, 10-30 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in a panicle, contracted, cylindrical, axis glabrous, base exerted from uppermost sheath, with conspicuous branches, branches often appressed. Pedicels short, with discoid tips, margins scaberulous. Spikelets bisexual, dorsally compressed, narrowly lanceolate, 4.5-6 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate, 1.8 mm long, 0.35-0.5 time of length as the spikelet, hyaline, 3-veined, not keeled, veins scaberulous, surface glabrous, margins smooth, apex mucronate, awnless, clasping at the base of the spikelet. Upper glume separated from lower glume by a short internode, lanceolate, 3-4 mm long, chartaceous, 5-veined, not keeled, veins scabrous, surface glabrous, margins smooth, apex mucronate, awnless. Lower florets barren, epaleate. Lower lemma narrowly lanceolate, 4.5-6 mm long, chartaceous, 5-veined, veins scabrous, surface glabrous, margins smooth, apex mucronate, awnless.

Upper floret pale gray. Upper lemma lanceolate, 3-3.5 mm long, subcoriaceous, surface smooth, apex acute, awnless. Upper palea lanceolate, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Caryopsis glabrous, dorso-ventrally compressed, elliptic, 1.5 mm long.

[Distribution] India, Myanmar, Indochina, Malesia, China and Polynesia.

[Habitat] Taiwan, in swampy places and on margins of ponds or slow-flowing streams.

[Taiwan] TAIPEI: Daian, *Shimada s. n.* 1936 (TAI); Watzewei, *Peng 7506* (HAST). KAOHSIUNG: *Suzuki s. n.* Oct. 31, 1934 (TAI). PINGTUNG: Wuhoushui, *Hsieh 52* (PPI). TAITUNG: Ginlon Lake, *Wu 2840* (TNM).

## 10. *Ichnanthus* P. Beauv., Ess. Agrostogr. 56. 1812.

### 距花黍屬

Annuals or perennials; culms hollow. Leaf sheath often articulate; blades wide, sometimes broad at base, sometimes pseudo-petiolate, sometimes with distinct transverse veins, sometimes slightly falcate. Mostly from shady habitats, often producing long, very slender aerial roots. Spikelets borne on all-sides of branched panicles, tardily deciduous as a whole, oblong and acute before anthesis, afterwards gaping, 2-flowered; rahilla between lower lemma and upper lemma elongated and with a membranaceous appendage on either side, which is free above and adnate to lower lemma below; glumes distinctly spaced, thinly membranaceous, acute, prominently veined; lower glume much shorter than upper glume, embracing base of latter, 3(to 5)-veined; upper glume as long as spikelets, thinly membranaceous, with well-developed lower palea, upper lemma smaller, totally chartaceous, smooth and glossy, faintly veined, margins narrowly inrolled, embracing upper palea all around, mostly with shortly stipitate bases; upper palea chartaceous; lodicules 2, small; stamens 3, anthers linear; styles 2, free, stigmas laterally exerted. Caryopsis free between upper palea and lemma.

Thirty-three species, mainly New World tropics. One species pantropical. One species in Taiwan.

1. *Ichnanthus pallens* (Swartz) Munro ex Bentham var. *major* (Nees) Stieber, Syst. Bot. 12: 207. 1987; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 504. 2006. 距花黍 Pl. 10, Photo 41-42

*Panicum pallens* var. *majus* Nees in Martius, Fl. Bras. Enum. Pl. 2: 137-138. 1829.

*Panicum vicinum* F.M. Bailey, Syn. Queensl. Fl. 3: 82. 1890.

*Ichnanthus vicinus* (F. M. Bailey) Merr., Philip. J. Sci. 20: 367. 1922 ; Hsu, Taiwania 16: 283. 1971; Hsu,

Fl. Taiwan 5: 560. *pl.* 1432. 1978; Koyama, Grass. Jap. Neighb. Reg. 312. 1987; Liu, Fl. Taiwan. ed. 2, 5: 480. *pl.* 200. 2000.

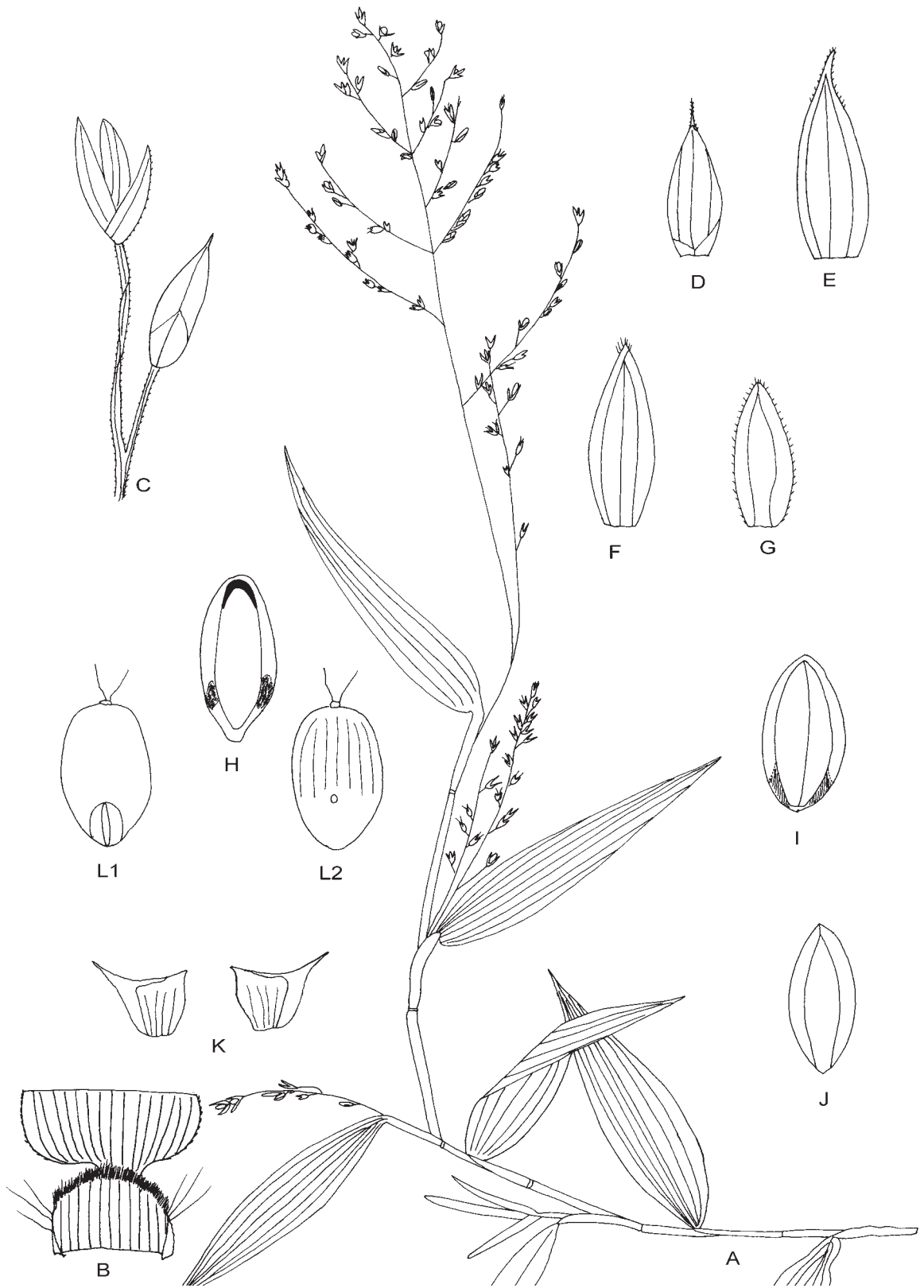
Perennials. Culms rambling, slender, 15-50 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous or pubescent. Leaf sheaths surface glabrous, or sparsely to densely pubescent, outer margins ciliate, joint between sheath and blade glabrous. Ligule a ciliate membrane, 1-2 mm long. Blades cauline, ovate or lanceolate, flat, 3-8 cm long, 10-25 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in a panicle, terminal and axillary from upper nodes, loose, 5-10 cm long, axis pubescent in axils, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels linear, angular, with truncate tips, margins scaberulous. Spikelets bisexual, slightly laterally compressed, oblong-lanceolate, 3.5-5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume lanceolate, 2.5-3.5 mm long, 0.7 time of length as the spikelet, chartaceous, 3-veined, midvein keeled, scabrous, veins glabrous, surface glabrous, margins hyaline and smooth, apex mucronate, awnless, clasping at the base of the spikelet. Upper glume separated from lower glume by a short internode, broadly lanceolate, 3.5-5 mm long, chartaceous, 5-veined, midvein keeled, scabrous, veins glabrous, surface glabrous, margins hyaline and smooth, apex acuminate, awnless. Lower florets staminate or barren. Lower lemma broadly lanceolate, 3.5-5 mm long, chartaceous, 5-veined, veins glabrous, surface glabrous, margins hyaline and smooth, apex obtuse, ciliolate, awnless. Lower palea well developed, membranous, oblong, 0.7 time of length as lower lemma, 2-veined, veins ciliolate. Upper floret yellowish brown, with a oblong callus, this laterally expanded into 2 membranous wings adnate to the lemma base, these often represented in dried material as scars, ca. 1 mm. Upper lemma oblong, 2-2.5 mm long, coriaceous, surface smooth, apex obtuse, awnless. Upper palea oblong, as long as upper lemma, coriaceous, 2-veined, surface smooth.

[Distribution] India, Malesia, Indochina, China and Polynesia.

[Habitat] Taiwan, very common in shady areas, especially in grassland and disturbed places.

[Taiwan] TAIPEI: Kuaninshan, *Wu 909* (TNM). ILAN: Hsinfeng Waterfall, *Lin 649* (TNM).

TAOYUAN: Sancengciding, *Chen 493* (TNM). NANTOU: Puli, *Hsu 11372* (TAI); Yuchih, *Chen 6745* (TAIE). TAINAN: Wushan, *Ku 1705* (HAST). KAOHSIUNG: Sanping, *Kuoh 4013* (TAI). PINGTUNG: Szuchonhsi, *Hsu 13191* (TAI). HUALIEN: Yuli, *Wu 1027* (TNM). TAITUNG: Tajen, *Liu 53* (PPI).



Pl. 10. *Ichnanthus pallens* (Swartz) Munro ex Bentham var. *major* (Nees) Stieber

A. habit; B. ligule; C. part of panicle branch; D. lower glume; E. upper glume; F. lower lemma; G. lower palea; H. upper floret; I. upper lemma; J. upper palea; K. lodicules; L. caryopsis.

11. *Melinis* P. Beauv., Ess. Agrostogr. 54. 1812.

糖蜜草屬

Annuals or perennials, culm creeping, rooting at base, erect above. Leaf blade flat, usually spreading horizontally; ligule a ciliate rim; sheaths often long-hairy and viscid. Inflorescence a repeatedly branched panicle, branches arranged on all sides of central axis, ultimate branchlets slender. Spikelets articulate with pedicel, small, slightly compressed laterally, lower glume minute; upper glume subequal to lower lemma, both thinly membranaceous; upper glume 2-lobed, muticous or with minute awn; lower lemma narrower, with 2 narrow lobes, usually with a slender awn from sinus, 7-veined; lower palea absent; upper lemma shorter, membranaceous, obscurely veined, unawned; upper palea equally long, faintly veined; stamens 3, anthers rather large; styles 2, free, short, stigma plumose, exserted laterally. Caryopsis enclosed between not or scarcely indurate upper palea and lemma, oblong, greenish yellow, faintly variegated with purple or brown; hilum small, basal; embryo nearly 1/2 as long as caryopsis.

22 species, mainly in tropical and S Africa; two species introduced throughout the tropics, including Taiwan.

KEY TO THE SPECIES

1. Leaf blades densely tomentose, sticky; panicle dark purple; spikelets 1.7–2.2 mm, usually glabrous ..... 1. *M. minutiflora*
1. Leaf blades glabrous; panicle silvery-pink; spikelets 2–12 mm, conspicuously villous with fluffy spreading hairs ..... 2. *M. repens*

**1. *Melinis minutiflora* P. Beauv., Ess., Agrost. 54. 1812 ; Hsu, Taiwania 16: 285.**

1971; Hsu, Fl. Taiwan 5: 562. 1978; Liu, Fl. Taiwan. ed. 2, 5: 480. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 539. 2006. 糖蜜草

Perennials, tufted. Culms geniculately ascending, robust, 50-150 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes pubescent. Leaf sheaths surface glabrous, or densely tomentose with glandular hairs, slightly sticky with a strong smell. Ligule a fringe of hairs, 1-2 mm long. Blades cauline, linear, flat, 5-20 cm long, 5-15 mm wide, apex acuminate, surface tomentose with glandular hairs on both sides. Inflorescence in a panicle, loose, 10-20 cm long, axis glabrous, base exserted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels capillary, margins scaberulous. Spikelets bisexual, slightly laterally compressed, oblong, 1.7-2.2 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume reduced, minute, ovate, 0.1-0.4 mm long, membranous, veinless, surface glabrous, apex acute,

awnless. Upper glume oblong, 1.7-2.2 mm long, as long as spikelet, chartaceous, 7-veined, veins conspicuous, not keeled, veins glabrous, surface glabrous, margins smooth, apex mucronate, awnless. Lower florets barren, epaleate. Lower lemma oblong, 1.7-2.2 mm long, chartaceous, 5-veined, veins conspicuous, veins glabrous, surface glabrous, margins smooth, apex emarginate, awned, arising between lobes, awn 5-10 mm long. Upper lemma oblong, 1.5 mm long, subcoriaceous, surface smooth, apex obtuse, ciliolate, awnless. Upper palea oblong, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Anthers 3, 1 mm long.

[Distribution] Originally from Africa, introduced elsewhere.

[Habitat] Taiwan, naturalized in open grassland and disturbed places.

[Taiwan] NANTOU: Sun Moon Lake, *Jung 2463* (TAIF). PINGTUNG: Saichia, *Ku 1529* (PPI); Xueyehgenshan, *Lo 899* (PPI).

**2. *Melinis repens*** (Willdenow) Zizka, *Biblioth. Bot.* 138: 55. 1988; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 539. 2006. 紅毛草 Pl. 11, Photo 43-44

*Saccharum repens* Willd., *Sp. Pl.* ed. 2. 1: 322. 1797.

*Rhynchelytrum repens* (Willd.) C. E. Hubbard, *Bull. Misc. Inform. Kew.* 1934: 110. 1934; Hsu, *Taiwania* 16: 297. 1971; Hsu, *Fl. Taiwan* 5: 596. 1978; Liu, *Fl. Taiwan.* ed. 2, 5: 507, 2000.

Annuals or perennials, loosely tufted. Culms erect or geniculately ascending, of moderate texture, 50-150 cm tall, pilose with tubercle-based hairs, sometimes rooting from lower nodes, culm nodes pubescent. Leaf sheaths surface glabrous, or sparsely pilose with tubercle-based hairs. Ligule a fringe of hairs, 0.5-1 mm long. Blades cauline, linear, flat, 5-20 cm long, 2-5 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in a panicle, loose, 8-20 cm long, axis pubescent or glabrous, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels capillary, with discoid tips, margins scaberulous. Spikelets bisexual, slightly laterally compressed, ovate, 2-5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume reduced, minute, oblong, 0.5-1.5 mm long, chartaceous, 1-veined, not keeled, surface moderately hispidulous, apex obtuse, ciliolate, awnless. Upper glume separated from lower glume by a short internode, boat-shaped, gibbous below the middle, 3 mm long, chartaceous, 5-veined, midvein keeled, surface villous below the middle, margins ciliate, apex emarginate, ciliolate, awned, arising between lobes, awn 1 mm long. Lower florets staminate. Lower lemma gibbous below the middle, 3 mm long, chartaceous, 5-veined, midvein keeled, surface densely villous, margins ciliate, apex emarginate, ciliate, awned, arising between lobes. Lower palea well developed, membranous, oblong, as long as lower lemma, 2-keeled, veins ciliate. Upper lemma oblong, 2 mm long, subcoriaceous, surface smooth, apex acute, awnless. Upper palea oblong, as long as upper lemma, subcoriaceous, 2-veined, surface smooth.

[Distribution] Originally from tropical South Africa, now invaded into most warm countries.



Pl. 11. *Melinis repens* (Willdenow) Zizka

A. habit; B. lower glume; C. upper glume; D. lower lemma; E. lower palea; F. upper lemma; G. upper palea; H. lodicules.

[Habitat] Taiwan, common weed in waste places, roadsides and open fields.

[Taiwan] ILAN: Kuanghsing Bridge, *Lin 726* (TNM). MIAOLI: Toanshikou, *Huang s. n.* Sep. 9, 1992 (TNM). TAICHUNG: KuKuan, *Chen 10118* (TNM). NANTOU: Tucheng, *Wang 5361* (TNM). TAINAN: Hsipuliao, *Chen 8101* (TNM). KAOHSIUNG: Yangnu Lake, *Chen 5769* (TNM). PINGTUNG: Santimen, *Hsu 40119* (TAD); Hsiaoliuchiu, *Chen 6805* (TAIE). TAITUNG: Kuansahn, *Chang 7777* (PPI). PENGHU: *Jung 1091* (PPI).

## 12. *Oplismenus* P. Beauv., Fl. Oware 2: 14. 1810.

### 求米草屬

Annuals or perennials; culms often trailing, creeping near base, forming mats in shady habitats. Inflorescence of racemosely arranged racemes; racemes distant, solitary, secund, spreading or slanting, simple or somewhat compound, sometimes very short, with a few spikelets or only one, in latter case inflorescence resembling a thin spike; axis keeled on abaxial side; branches and pairs of spikelets alternate along keels. Spikelets secund, usually in pairs, one spikelet often poorly developed and small; spikelets articulate with a short pedicel, oblong, 2-flowered; rachilla articulate at base of upper lemma; glumes and lower lemma herbaceous; glumes 5 to 7-veined, awned just below apex, shorter than spikelet, or upper glume as long; lower glume with longest awn, abaxial; upper lemma small, smooth and glossy, glabrous, 5-veined, with opaque inrolled margins embracing upper palea; upper palea as long and of same texture, with broadly incurved margins, 2-veined; lodicules 2, small; stamens 3, anthers linear; ovary oblong, attenuate, with 2 short, distant styles, stigma narrowly plumose, exerted apically. Caryopsis wholly enclosed but free from indurate upper palea and upper lemma.

Nine species, in the tropical and subtropical regions of the world. Two species and two varieties in Taiwan

### KEY TO THE SPECIES

1. Racemes elongate, 2–10 cm long.....1. *O. compositus*
2. Racemes 2-10 cm long, inflorescence axis glabrous or puberulous; spikelets rather apart on rachis; lower glume awn 7-20 mm; upper glume awn 1-2 mm.....1a. var. *compositus*
2. Racemes 1-3 cm long, inflorescence axis densely hairy; spikelets densely crowded; lower glume awn ca. 5 mm; upper glume awn short or awnless.....1b. var. *intermedius*
1. Racemes reduced to dense cuneate fascicles less than 2 cm long.....2. *O. undulatifolius*
3. Inflorescence with short branches.....2a. var. *undulatifolius*
3. Inflorescence with spikelets practically sessile on main axis.....2b. var. *microphyllus*

1. *Oplismenus compositus* (L.) P. Beauv., Ess. Agrostogr. 54. 1812 ; Hsu, Taiwania 16: 286. 1971; Hsu, Fl. Taiwan 5: 563, *pl. 1433*. 1978; Liu, Fl. Taiwan. ed. 2, 5: 482. *pl. 201*. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 503. 2006.

*Panicum compositum* L., Sp. Pl. 57. 1753.

*Oplismenus formosanus* Honda, Repert. Spec. Nov. Regni Veg. 20: 361. 1924.

*Oplismenus compositus* var. *formosanus* (Honda) S. L. Chen & Y. X. Jin, Acta Phytotax. Sin. 22: 470. 1984.

*Oplismenus patens* Honda, Repert. Spec. Nov. Regni Veg. 20: 360. 1924; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 503. 2006.

*Oplismenus compositus* var. *owatarii* (Honda) Ohwi, Acta Phytotax. Geobot. 11: 35. 1942; Hsu, Taiwania 16: 286. 1971; Hsu, Fl. Taiwan 5: 565. 1978; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 503. 2006.

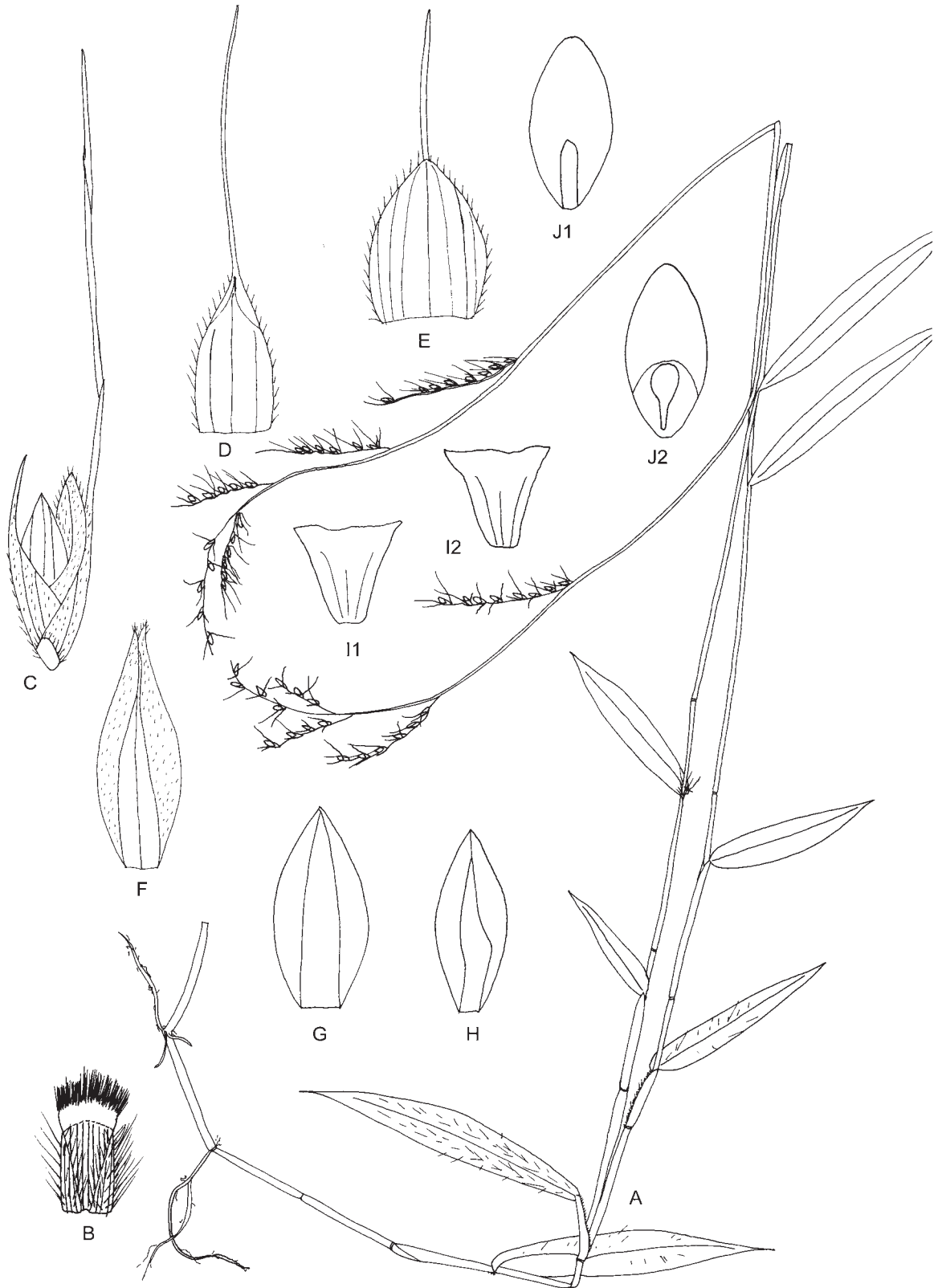
*Oplismenus compositus* var. *patens* (Honda) Ohwi, Fl. Jap. 149. 1953 ; Hsu, Taiwania 16: 286. 1971; Hsu, Fl. Taiwan 5: 565. 1978.

Perennials. Culms rambling, of moderate texture, 30-60 cm tall, glabrous or puberulent, much branched above base, rooting from lower nodes, culm nodes pubescent. Leaf sheaths surface glabrous, or puberulent, outer margins hairy, joint between sheath and blade pubescent. Ligule a ciliate membrane, 1-2 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 3-10 cm long, 8-14 mm wide, margins scabrous, apex acute or acuminate, surface sparsely hispid on both sides. Inflorescence in racemose racemes, 5-15 cm long, axis glabrous or puberulent, base exerted from uppermost sheath, with conspicuous branches. Racemes 3-6, ascending, straight, 2-6 cm long. Rachis tenacious, angular, margins scabrous. Pedicels short, margins scaberulous. Spikelets bisexual, paired, homomorphic, dorsally compressed, lanceolate, 3-3.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume lanceolate, 1.5-2 mm long, chartaceous, 3 to 5-veined, not keeled, surface glabrous, or moderately hispidulous to hispid, apex acuminate, awned, awn 2-5 mm long, clasping at the base of the spikelet. Upper glume broadly lanceolate, 1.5-2 mm long, chartaceous, 5 to 7-veined, not keeled, surface glabrous, or sparsely hispidulous to hispid, apex acute, awned, subapically, awn 1-3 mm long. Lower florets barren, epaleate. Lower lemma broadly lanceolate, 2.5-3.5 mm long, chartaceous, 7 to 9-veined, surface glabrous, or sparsely hispid to hispidulous, apex mucronate, awnless. Upper floret pale gray. Upper lemma lanceolate, 2-2.5 mm long, subcoriaceous, surface smooth, apex acute, with a small crest, awnless. Upper palea lanceolate, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Anthers 3, 1.5 mm long.

[Distribution] Tropics.

[Habitat] Taiwan, very common in shady places.

[Taiwan] TAIPEI: Sanchih, *Chen 419* (TNM). KEELUNG: *Chuang 5552* (TAI). TAOYUAN: Neili, *Hsu 1248* (TAI). MIAOLI: Penglai Village, *Hsu 12634* (TAI). TAICHUNG: Lileng Forest Road, *Yang 1674* (TNM). NANTOU: Pihu, *Chen 538* (TNM). CHANGHWA: Lushan, *Tsai 261* (TNM). CHIAYI: Meishan, *Chen 7944* (TNM), *Chen 2386* (TAIE). TAINAN: Hsinhua, *Yeh s. n.* Jun. 16, 2007 (TNM). KAOHSIUNG: Tienchih, *Yang 7049* (PPI).



Pl. 12. *Oplismenus compositus* (L.) P. Beauv. var. *compositus*

A. habit; B. ligule; C. spikelet; D. lower glume; E. upper glume; F. lower lemma; G. upper lemma; H. upper palea; I. lodicules; J. caryopsis.

PINGTUNG: Shenchihshan, *Huang* 73 (TNM). HUALIEN: Hsiulin, *Ho* 682 (TNM);  
TAITUNG: Tulanshan, *Wu* 16-075 (TNM); Lutao, *Chen* 76 (PPI); Lanyu, *Chang* 12116  
(PPI).

**1b. *Oplismenus compositus* var. *intermedius*** (Honda) Ohwi, *Acta Phytotax. Geobot.* 11: 35. 1942 ; Hsu, *Taiwania* 16: 286. 1971; Hsu, *Fl. Taiwan* 5: 565. 1978; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 503. 2006. 大屯求米草 Photo 46

*Oplismenus burmannii* var. *intermedius* Honda, *Bot. Mag. (Tokyo)* 38: 191. 1924.

*Oplismenus aemulus sensu* Liu, *Fl. Taiwan* ed.2, 5: 482. 2000 *non* Roem. & Schult., *Syst. Veg.* 2: 487.  
1817.

Perennials. Culms rambling, slender, 20-50 cm tall, puberulent, much branched above base, rooting from lower nodes, culm nodes pubescent. Leaf sheaths surface glabrous, or densely pubescent, sparsely with tubercle-based hairs. Ligule a ciliate membrane, 1-2 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 3-8 cm long, 5-15 mm wide, margins scabrous, apex acute or acuminate, surface densely pubescent, sparsely with tubercle-based hairs on both sides. Inflorescence in racemose racemes, 3-8 cm long, axis pubescent or pilose with tubercle-based hairs, base exerted from uppermost sheath, with conspicuous branches. Racemes 3-5, ascending, straight or arcuate, 1-3 cm long. Rachis tenacious, angular, margins pubescent sparsely with stiff long hair. Pedicels short, margins scaberulous. Spikelets bisexual, paired, homomorphic, dorsally compressed, lanceolate, 2-2.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume lanceolate, 1.5 mm long, chartaceous, 3 to 5-veined, not keeled, surface hispidulous to hispid, awned, awn 3 mm long, clasping at the base of the spikelet. Upper glume ovate, 1.5 mm long, chartaceous, 5 to 7-veined, not keeled, surface hispidulous to hispid, apex mucronate, awnless. Lower florets barren, epaleate. Lower lemma broadly lanceolate, 2-2.5 mm long, chartaceous, 7 to 9-veined, surface sparsely hispid to hispidulous, awnless. Upper floret pale gray. Upper lemma elliptic, 2 mm long, subcoriaceous, surface smooth, apex acute, with a small crest, awnless. Upper palea lanceolate, as long as upper lemma, subcoriaceous, 2-veined, surface smooth.

[Distribution] Tropics.

[Habitat] Taiwan, in shady places.

[Taiwan] TAIPEI: Yangmingshan, *Hsu* 924 (TAI). ILAN: Szuyuanyako, *Kuoh* 1751 (TAI). TAITUNG: Lanyu, *Huang* 344 (TNM), *Chang* 1215 7(PPI).

**2. *Oplismenus undulatifolius*** (Ard.) Roem. & Schult., *Syst. Veg.* 2: 482. 1817; Hsu, *Taiwania* 16: 286. 1971; Hsu, *Fl. Taiwan* 5: 565. 1978; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 501. 2006.

*Panicum undulatifolium* Ard., Animad. Sp. Alt. 14. 1764

*Orthopogon imbecillis* R. Br., Prod. Fl. Nov. Holl. 194. 1810.

*Oplismenus hirtellus sensu* Liu, Fl. Taiwan. ed. 2, 5: 483. 2000 *non* P. Beauv., Ess. Agrostogr. 54. 1812.

*Panicum japonicum* Steud., Flora 29: 18. 1846.

*Oplismenus undulatifolius* var. *imbecillis* (R. Br.) Hack., Publ. Bureau Govn. Lab. 35: 82. 1905; Hsu, Taiwania 16: 286. 1971; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 502. 2006.

*Oplismenus undulatifolius* var. *japonicus* (Steud.) Koidz., Bot. Mag. (Tokyo) 39: 302. 1925 ; Hsu, Taiwania 16: 286. 1971.

*Oplismenus hirtellus* subsp. *imbecillis* (R. Br.) U. Scholz, Phan. Monogr. 13: 127. 1981.

*Oplismenus hirtellus* var. *imbecillis* (R. Br.) Fosberg & Sacht, Micronesia 18: 78. 1982; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 502. 2006.

Perennials. Culms rambling, slender, 20-50 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous or pubescent. Leaf sheaths surface sparsely pubescent, outer margins ciliate, joint between sheath and blade pubescent. Ligule a ciliate membrane, 1 mm long. Blades cauline, lanceolate, flat, 3-10 cm long, 3-15 mm wide, margins scabrous, apex acute or acuminate, surface glabrous, or sparsely hispid on both sides. Inflorescence in racemose racemes, 5-15 cm long, axis scaberulous, base exerted from uppermost sheath, without conspicuous branches, branches reduced to dense cuneate fascicles. Pedicels short, with discoid tips, margins scaberulous. Spikelets bisexual, paired, homomorphic, dorsally compressed, lanceolate, 3-3.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume lanceolate, 2-2.5 mm long, chartaceous, 3-veined, not keeled, veins scaberulous, surface glabrous, or moderately hispid, margins ciliate, apex acuminate, awned, awn 5-10 mm long, clasping at the base of the spikelet. Upper glume broadly lanceolate, 2-2.5 mm long, chartaceous, 5-veined, not keeled, veins scaberulous, surface glabrous, or sparsely hispid, margins hyaline and smooth, apex acuminate, awned, subapically, awn 1-3 mm long. Lower florets barren, epaleate. Lower lemma broadly lanceolate, 3-3.5 mm long, chartaceous, 5-veined, veins glabrous, surface sparsely hispid, margins smooth, apex mucronate, awnless. Upper floret pale gray. Upper lemma lanceolate, 2.5-3 mm long, subcoriaceous, surface smooth, apex acute, with a small crest, awnless. Upper palea lanceolate, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Anthers 3, 1.5 mm long.

[Distribution] The warm temperate regions of Asia and Europe.

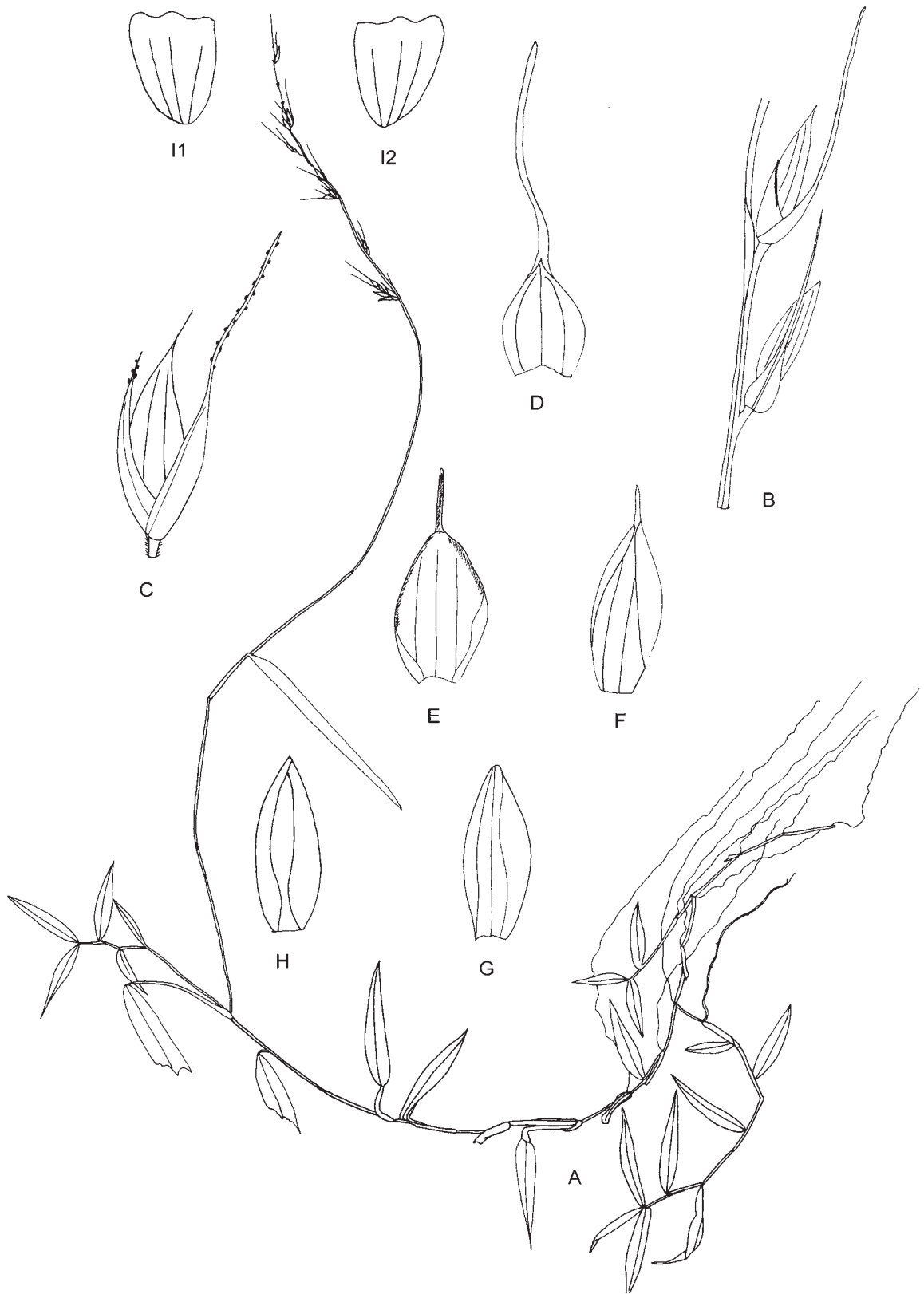
[Habitat] Taiwan, in lowland forest.

[Taiwan] TAIPEI: Fushan, *Lee 2069* (TAIF). ILAN: 100 Forest Road, *Huang 4870* (HAST).

TAOYUAN: Hualing Village, *Chen 531* (TAIF). TAICHUNG: Nankenshi, *Hsu 562* (TAI).

NANTOU: Meifeng Farm, *Lammers 8450* (TAI). CHIAYI: Alishan, *Ku 81* (PPI).

PINGTUNG: Lanjenhsi, *Leong 1703* (HAST). TAITUNG: Tulanshan, *Wu 17-032* (TNM).



Pl. 13. *Oplismenus undulatifolius* (Ard.) Roem. & Schult.

A. habit; B. part of raceme; C. spikelet; D. lower glume; E. upper glume; F. lower lemma; G. upper lemma; H. upper palea; I. lodicules.

**2b. *Oplismenus undulatifolius* var. *microphyllus*** (Honda) Ohwi, Bot. Mag. (Tokyo) 55: 546. 1941; Hsu, *Taiwania* 16: 287. 1971; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 502. 2006. 小葉求米草

*Oplismenus microphyllus* Honda, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 3: 274. 1930.

*Oplismenus hirtellus* subsp. *microphyllus* (Honda) U. Scholz, Phan. Monogr. 13: 137. 1981.

*Oplismenus hirtellus* var. *microphyllus* (Honda) Fosberg & Sachet, *Micronesica* 18: 79. 1982.

Perennials. Culms rambling, slender, 20-50 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous or pubescent. Leaf sheaths surface glabrous, outer margins ciliate, joint between sheath and blade pubescent. Ligule a glabrous membrane, 1 mm long. Blades cauline, narrowly ovate or lanceolate, flat, 1-5 cm long, 3-5 mm wide, margins scabrous, apex acute or acuminate, surface sparsely hispid on both sides. Inflorescence in a raceme, 3-10 cm long, base exerted from uppermost sheath. Rachis tenacious, margins scabrous. Pedicels short, with discoid tips, margins scaberulous or pubescent. Spikelets bisexual, paired, homomorphic, dorsally compressed, lanceolate, 3-3.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume lanceolate, 2-2.5 mm long, chartaceous, 3 to 5-veined, not keeled, veins scaberulous, surface glabrous, or moderately hispid, margins smooth or ciliate, apex acuminate, awned, awn 5-10 mm long, clasping at the base of the spikelet. Upper glume broadly lanceolate, 2-2.5 mm long, chartaceous, 5-veined, not keeled, veins glabrous, surface glabrous, or sparsely hispid, margins smooth, apex obtuse or acute, awned, subapically, awn 1-3 mm long. Lower florets barren, epaleate. Lower lemma broadly lanceolate, 3-3.5 mm long, chartaceous, 5-veined, veins glabrous, surface glabrous, or sparsely hispid, margins smooth, apex mucronate, awnless. Upper floret pale gray. Upper lemma lanceolate, 2-2.5 mm long, subcoriaceous, surface smooth, apex acute, with a small crest, awnless. Upper palea lanceolate, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Anthers 3, 1.2 mm long.

[Distribution] The Philippines.

[Habitat] Moist grassy places in forests.

[Taiwan] ILAN: Nanao, *Hsu 8420* (TAI). TAOYUAN: Hualing, *Chen 531* (TNM). HSINCHU: Kuanwu, *Yang 28553* (PPI). NANTOU: Chitou, *Chuang 3724* (TAI). CHIAYI: Alishan, *Huang 1657* (TAI). KAOHSIUNG: Sanping, *Lammers 8498* (TAI). PINGTUNG: Nanjenshan, *Hsu 7803* (TAI); Chunjih, *Huang 2803* (HAST). TAITUNG: Yenping Forest Road, *Chen 1911* (PPI).

13. *Ottochloa* Dandy, J. Bot. 69: 54. 1931.

奧圖草屬

Perennials; culms slender, lower part ascending and rooting at nodes, usually straggling. Sheath shorter than internode, margins hairy; ligule coriaceous; blade lanceolate, flat. Inflorescence an open panicle. Spikelets dorsally compressed, elliptic, acute, few or several in clusters on slender panicle branches, falling off entirely from pedicel, pedicel very short; glumes nearly of equal length, 3 to 5-veined, but much shorter than spikelet; lower floret sterile, lemma membranaceous, 7 to 9-veined, as long as spikelet; upper floret fertile; upper lemma indurate, glabrous, acute at apex, margins narrowly membranaceous, inrolled margins of same texture as upper palea.

Four species, Old World tropics, one species in Taiwan.

1. *Ottochloa nodosa* (Kunth) Dandy, J. Bot. 69: 55. 1931; Hsu, *Taiwania* 16: 287. 1971; Hsu, *Fl. Taiwan* 5: 566, *pl. 1434*. 1978; Liu, *Fl. Taiwan*. ed. 2, 5: 485. *pl. 202*. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 512. 2006.

新店奧圖草

*Panicum nodosum* Kunth, Enum. Pl. 1: 97. 1833.

Perennials. Culms rambling, slender, 20-60 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins ciliate, joint between sheath and blade pubescent. Ligule a ciliolate membrane, 0.3 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 4-11 cm long, 5-10 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in a panicle, loose, 10-15 cm long, axis pubescent in axils, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels linear, flattened, with discoid tips, margins scaberulous. Spikelets bisexual, grouped in short racemelets, homomorphic, dorsally compressed, elliptic, 2 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume elliptic, 1 mm long, 0.5 time of length as the spikelet, membranous, 3-veined, not keeled, surface glabrous, margins smooth, apex obtuse, awnless. Upper glume ovate, 1-1.2 mm long, 0.5-0.7 time of length as the spikelet, membranous, 5-veined, not keeled, surface glabrous, margins smooth, apex obtuse, awnless. Lower florets barren, epaleate. Lower lemma ovate, 2 mm long, membranous, 7-veined, surface glabrous, margins smooth, apex acute, awnless. Upper floret pale gray. Upper lemma elliptic, 1.5 mm long, subcoriaceous, surface smooth, apex acute, with a small crest, ciliolate, awnless. Upper palea elliptic, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Anthers 3, 0.5 mm long.

[Distribution] India, Sri Lanka, Myanmar, Indochina, Malesia and southern China.

[Habitat] On hillside forest margins in northern Taiwan.

[Taiwan] TAIPEI: Nankang Park, *Jung z012802* (TNM), Hsintein, *Kuoh 120801* (TAI). ILAN: Yuanshan, *Hsu 8368* (TAI).

14. *Panicum* L., Sp. Pl. 1: 55. 1753.

稷屬

Annuals or perennials, in various habits. Inflorescence an open or contracted panicle, branched from all sides, rarely racemose. Spikelets pedicellate, falling entire from pedicel, terete, plano-convex, or dorsally compressed, usually mucous and glabrous, 2-flowered; glumes herbaceous, occasionally equal, usually unequal; lower glume usually not more than 1/2 as long as spikelet, 1 to 5 (to 7)-veined or veinless; upper glume as long as spikelets, rarely shorter, usually 5-11-veined; upper lemma resembling upper glume, as long as spikelet; lower palea thinner, much shorter or absent; upper lemma glossy and smooth, or transversely rugose, rarely tuberculate, glabrous or hairy at apex, indurate at maturity, lodicules 2; stamens 3; ovary glabrous; style 2, free, stigma plumose. Caryopsis free inside upper palea and upper lemma.

A large genus of ca. 500 species distributed in tropical and warmer temperate regions of world; 12 species found in Taiwan.

KEY TO THE SPECIES

1. Upper floret transversely rugose . . . . . 7. *P. maximum*
1. Upper floret papillate or smooth.
2. Glumes or at least the lower, acuminate to cuspidate.
3. Spikelets 1.5–2 mm . . . . . 5. *P. humile*
3. Spikelets 3–5 mm.
4. Lower lemma 7-veined; wild . . . . . 4. *P. elegantissimum*
4. Lower lemma 9 to 13-veined; cultivated . . . . . 8. *P. miliaceum*
2. Glumes obtuse or acute.
5. Lower glume 2/3 length of spikelet or as long as spikelet.
6. Leaves ovate; culms herbaceous . . . . . 2. *P. brevifolium*
6. Leaves lanceolate; culms terete, woody.
7. Lower palea absent . . . . . 9. *P. notatum*
7. Lower palea as long as spikelet . . . . . 11. *P. sarmentosum*
5. Lower glume shorter than 1/2 length of spikelet.
8. Veins of glumes and lower lemma anastomosing . . . . . 6. *P. luzonense*
8. Veins of glumes and lower lemma not anastomosing.
9. Lower glume acute to acuminate, 1/3–1/2 length of spikelet.
10. Spikelets 2–2.5 mm; upper glume and lower lemma equal, 5 veined . . . . . 1. *P. bisulcatum*
10. Spikelets 2.5–3.5 mm; upper glume and lower lemma equal, strongly 9-11 veined . . . . . 12. *P. sumatrense*

9. Lower glume obtuse, 1/5-1/4 length of spikelet.

11. Lower palea present, as long as lower lemma; rhizomatous; culm hard. . . . . 10. *P. repens*

11. Lower palea reduced, much shorter than lower lemma or absent; not rhizomatous; culm spongy. . . . . 3. *P. dichotomiflorum*

**1. *Panicum bisulcatum*** Thunb., Nova Acta Regiae Soc. Sci. Upsal. 7: 141. 1815; Hsu, *Taiwania* 16: 288. 1971; Hsu, *Fl. Taiwan* 5: 569, *pl. 1435*. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 307. 1987; Veldkamp, *Blumea* 41: 188. 1996; Liu, *Fl. Taiwan. ed. 2, 5: 487. pl. 203. photo 54*. 2000; Chen & Renvoize in Chen *et al.* (eds.), *Fl. China* 22: 506. 2006. 糠稷

Annuals. Culms erect or geniculately ascending, of moderate texture, 30-120 cm tall, glabrous, sometimes rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins ciliate, joint between sheath and blade glabrous. Ligule a ciliolate membrane, 0.5-1.5 mm long. Blades cauline, linear, flat, 5-20 cm long, 5-10 mm wide, margins scabrous, apex acuminate, surface glabrous, or hispid on both sides. Inflorescence in a panicle, loose, 10-40 cm long, axis pubescent in axils, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels capillary, terete, with truncate tips, margins smooth. Spikelets bisexual, dorsally compressed, elliptic, 2-2.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate, 1-1.2 mm long, 0.5 time of length as the spikelet, membranous, 1 to 3-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless. Upper glume ovate, 2-2.5 mm long, as long as spikelet, chartaceous, 5-veined, not keeled, surface puberulent, margins smooth, apex acute, awnless. Lower florets barren, epaleate. Lower lemma ovate, 2-2.5 mm long, chartaceous, 5-veined, surface sparsely puberulous, margins smooth, apex acute, awnless. Upper floret pale yellow. Upper lemma elliptic, 1.5-2 mm long, coriaceous, surface smooth, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface smooth. Caryopsis glabrous, dorso-ventrally compressed, elliptic, 1-1.2 mm long.

[Distribution] India, Malesia, Australia, China and Japan.

[Habitat] Taiwan, in lowland forest margin.

[Taiwan] TAIPEI: Delin institute, *Ku 1689* (TNM); Kuaninshan, *Hsu 937* (TAI). TAOYUAN: Erchunghsi, *Wang 10221* (TNM). HSINCHU: Peipu, *Chen 5731* (TAIE). MIAOLI: Cholon, *Wang 12391* (TNM); Nanchung, *Hsu 12504* (TAI). TAICHUNG: Lienkeng Lane, *Wang 12469* (TNM). NANTOU: Jenai, *Chen 6894* (TNM). TAITUNG: Tungho, *Wu 17-039* (TNM).

**2. *Panicum brevifolium*** L., *Sp. Pl.* 59. 1753; Hsu, *Taiwania* 16: 288. 1971; Hsu, *Fl.*

Taiwan 5: 569. 1978; Koyama, Grass. Jap. Neighb. Reg. 310. 1987; Veldkamp, Blumea 41: 189. 1996; Liu, Fl. Taiwan. ed. 2, 5: 487. *pl.* 204. 2000; Chen & Renvoize in Chen *et al.* (eds.), Fl. China 22: 509. 2006. 短葉黍 Photo 48-49

Annuals. Culms rambling, slender, 15-100 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface glabrous, or sparsely pubescent, outer margins ciliate. Ligule a ciliolate membrane, 0.2 mm long. Blades cauline, ovate or narrowly ovate, flat, 5-10 cm long, 10-30 mm wide, base amplexicaul, margins scabrous to spiny-scabrous, apex acute or acuminate, surface glabrous, or pilose on both sides. Inflorescence in a panicle, loose, 5-15 cm long, axis glabrous, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels capillary, terete, with discoid tips, margins scaberulous. Spikelets bisexual, dorsally compressed, elliptic, 1.5-2 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume oblong, 1.5-2 mm long, as long as spikelet, membranous, 3-veined, not keeled, surface glabrous, or moderately puberulous, margins smooth, apex acute, awnless. Upper glume separated from lower glume by a short internode, ovate, 1.5-2 mm long, as long as spikelet, membranous, 5-veined, not keeled, surface puberulent, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma ovate, 1.5-2 mm long, membranous, 5-veined, surface glabrous, margins smooth, apex acute, awnless. Lower palea well developed, membranous, oblong, as long as lower lemma, 2-veined, veins narrowly winged. Upper floret pale gray. Upper lemma elliptic, 1.2-1.5 mm long, subcoriaceous, surface smooth, apex acute, awnless. Upper palea elliptic, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Anthers 3, 1 mm long.

[Distribution] Tropical Africa and Asia.

[Habitat] Taiwan, in thickets, forest margins, trails and rice fields.

[Taiwan] TAIPEI: Menghu, *Lu s. n.* Oct. 31, 1990 (TNM). ILAN: Hsinfeng Waterfall, *Lin 650* (TNM); Shanghsin Garden, *Lin 759* (HAST). HSINCHU: Wuchihshan, *Hsu 15111* (TAI). MIAOLI: Sanchianshan, *Chen 9002* (TNM). NANTOU: Sun-Moon Lake, *Hsu 1333* (TAI); Lienhuachih, *Chen 6115* (TAIE). KAOHSIUNG: Sanping, *Kuoh 4046* (TAI). PINGTUNG: Machia, *Ku 162* (PPI).

**3. *Panicum dichotomiflorum*** Michx., Fl. Bor.-Amer. 1: 48. 1803; Hsu, Fl. Taiwan 5: 572. 1978; Koyama, Grass. Jap. Neighb. Reg. 308. 1987; Liu, Fl. Taiwan. ed. 2, 5: 490. 2000; Chen & Renvoize in Chen *et al.* (eds.), Fl. China 22: 506. 2006.

洋野黍 Pl. 14

*Panicum paludosum* Roxb., Fl. Ind. 1: 310. 1820; Hsu, Taiwania 16: 289. 1971; Hsu, Fl. Taiwan 5: 576. 1978; Liu, Fl. Taiwan. ed. 2, 5: 491. 2000.

Annuals or perennials, tufted, rhizomatous. Culms geniculately ascending, weak or succulent, 30-110 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule a ciliate membrane, 1-3 mm long. Blades cauline, linear, flat, 7-35 cm long, 5-10 mm wide, margins scabrous, apex acute, surface glabrous. Inflorescence in a panicle, loose, 10-20 cm long, axis scabrous, base exerted from uppermost sheath, with conspicuous branches, branches first ones spreading, secondary and tertiary often appressed. Pedicels linear, angular, with truncate tips, margins scabrous. Spikelets bisexual, dorsally compressed, narrowly lanceolate, 3-4 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume cufflike, 0.5-1 mm long, 0.2-0.3 time of length as the spikelet, membranous, 0 to 1-veined, surface glabrous, apex rounded to obtuse, awnless, clasping at the base of the spikelet. Upper glume separated from lower glume by a short internode, lanceolate, 3-4 mm long, as long as spikelet, chartaceous, 7 to 9-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acuminate, awnless. Lower florets barren. Lower lemma lanceolate, 3-4 mm long, chartaceous, 7 to 9-veined, veins glabrous, surface glabrous, margins smooth, apex acuminate, awnless. Lower palea well developed or absent. Upper floret pale gray. Upper lemma oblong-lanceolate, 2-2.5 mm long, coriaceous, surface smooth, apex acute, awnless. Upper palea oblong, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 1.2-1.5 mm long. Caryopsis glabrous, dorso-ventrally compressed, oblong, 1.5 mm long.

[Distribution] India, Malaysia; tropics of the New World

[Habitat] Shallow waters, swampy places.

[Taiwan] TAIPEI: Kankou, *Hsu 730* (TAI). ILAN: Mingchih, *Jung 1708* (TAIF). TAOYUAN: Lungtan, *Peng 7220* (HAST). HSINCHU: Kuanhsi, *Jung 3139* (TAIF). MAIOLI: Tachinfo Temple, *Jung z071005* (TAIF). TAICHUNG: Lishan, *Kuoh 80121* (TAI). NANTOU: Shanlinhsi, *Chen 6854* (TAIE). TAINAN: Hutoupei, *Ku 983* (PPI). KAOHSIUNG: Nanzih, *Yang 28188* (PPI). PINGTUNG: Hengchun, *Hsu 506* (TAI). HUALIEN: Hualienhsi, *Wang 184* (TNM).

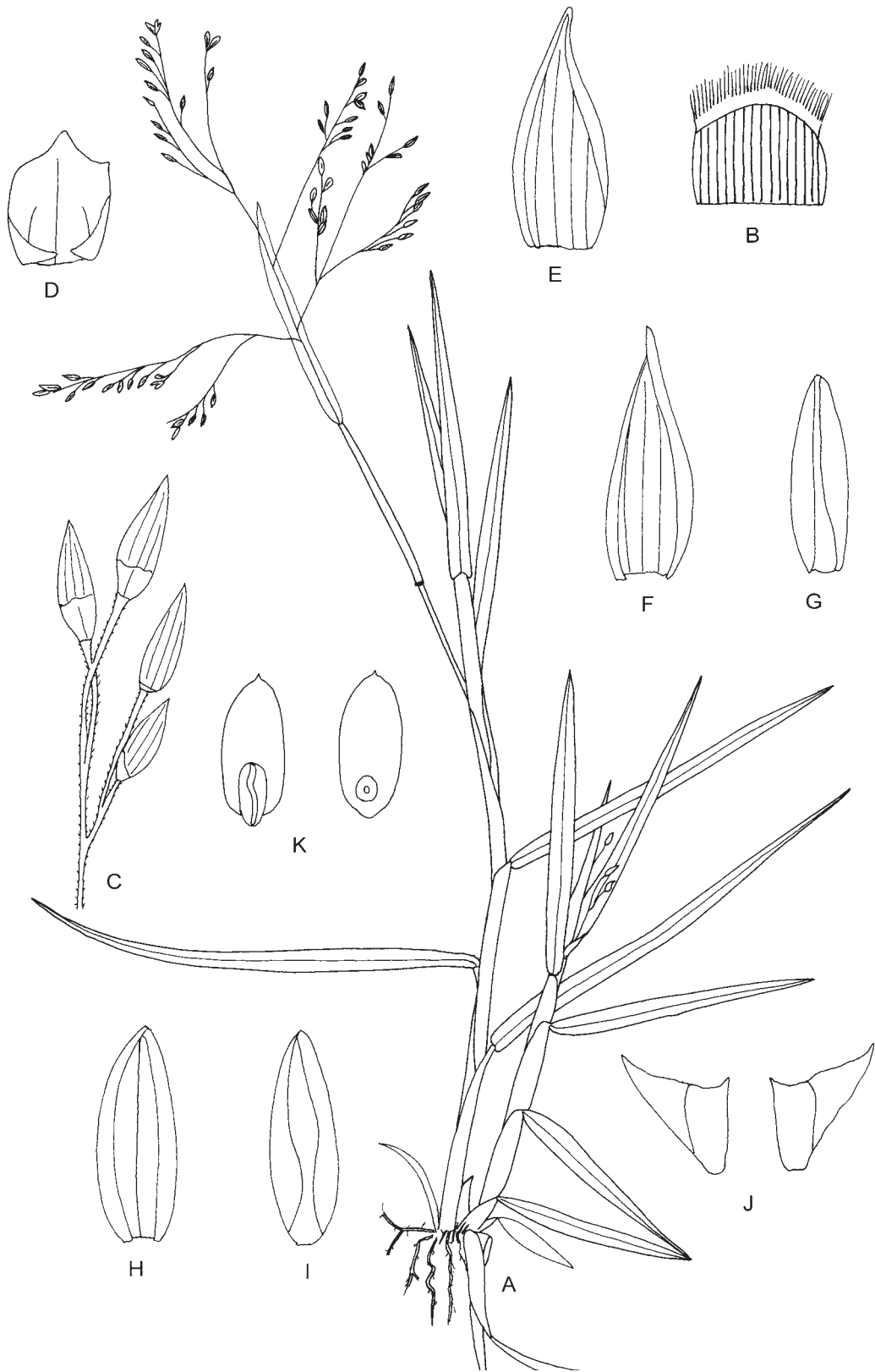
**4. *Panicum elegantissimum* Hook. f., Fl. Brit. India 7: 52. 1896; Chen & Renvoize in Chen *et al.* (eds.), Fl. China 22: 508. 2006.**

水社黍

*Panicum suishaense* Hayata, Icon. Pl. Formosan. 7: 63. 1918.

*Panicum trypheron sensu* Hsu, Fl. Taiwan 5: 578. 1978 *non* Schult., Mant. 2: 244. 1824.

*Panicum curviflorum* Hornem. var. *suishaense* (Hayata) Veldkamp, Blumea 41: 191. 1996; Liu, Fl. Taiwan ed. 2, 5: 487. 2000.



Pl. 14. *Panicum dichotomiflorum* Michx.

A. habit; B. ligule; C. part of panicle branch; D. lower glume; E. upper glume; F. lower lemma; G. lower palea; H. upper lemma; I. upper palea; J. lodicules; K. caryopsis.

Perennials, tufted. Culms erect, of moderate texture, 25-60 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface sparsely hispid. Ligule a ciliate membrane, 1-2 mm long. Blades mainly basal, linear, flat, 10-20 cm long, 3-8 mm wide, apex acuminate, surface densely pilose on both sides. Inflorescence in a panicle, loose, 10-30 cm long, axis scaberulous, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels linear, angular, margins pilose. Spikelets bisexual, dorsally compressed, ovate, 3-4 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 1.5-2 mm long, 0.5-0.7 time of length as the spikelet, membranous, 3 to 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex mucronate, awnless, clasping at the base of the spikelet. Upper glume separated from lower glume by a short internode, ovate, 3-4 mm long, as long as spikelet, chartaceous, 7-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma ovate, 3-4 mm long, chartaceous, 7-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower palea well developed, firmly membranous, lanceolate, 0.6 time of length as lower lemma, 2-veined, veins smooth. Upper floret yellowish brown. Upper lemma oblong, 2-2.5 mm long, coriaceous, surface smooth, apex acute, awnless. Upper palea oblong, as long as upper lemma, coriaceous, 2-veined, surface smooth.

[Distribution] India, Myanmar, Indochina, Malesia and southern China.

[Habitat] Taiwan, in lowland dry fields and roadsides.

[Taiwan] MIAOLI: Tunghsiao, *Jung z070501* (TAIF). TAICHUNG: Shalu, *Chen 7142* (TAIE).

**5. *Panicum humile*** Nees ex Steud., Syn. Pl. Glumac. 1: 84. 1854; Veldkamp, Blumea 41: 194. 1996; Liu, Fl. Taiwan. ed. 2, 5: 490. 2000; Chen & Renvoize in Chen *et al.* (eds.), Fl. China 22: 508. 2006. 南亞黍

*Panicum watense* Mez., Bot. Jahrb. Syst. 34: 146. 1904; Hsu, Taiwania 16: 290. 1971; Hsu, Fl. Taiwan 5: 578. 1978.

*Panicum austroasiaticum* Ohwi, Acta Phytotax. Geobot. 11: 45. 1942.

Annuals, tufted. Culms erect or geniculately ascending, slender, 20-70 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule a ciliolate membrane, 0.5-1 mm long. Blades cauline, linear, flat, 5-10 cm long, 2-6 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in a panicle, loose, 5-15 cm long, axis scabrous, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels capillary, angular, with truncate tips, margins scaberulous. Spikelets bisexual, dorsally compressed, elliptic, 1.5-2 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate, 1 mm long, 0.5-0.7 time of length as the spikelet, membranous, 3-veined, not keeled, surface glabrous, margins smooth, apex cuspidate, awnless, clasping at the base of the spikelet. Upper glume separated from lower glume by a short internode, ovate, 1.5-2 mm long, as long

as spikelet, membranous, 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma ovate, 1.5-2 mm long, membranous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower palea well developed, membranous, ovate, as long as lower lemma, 2-veined. Upper floret pale gray. Upper lemma elliptic, 1 mm long, subcoriaceous, surface smooth, apex obtuse, awnless. Upper palea ovate, as long as upper lemma, subcoriaceous, 2-veined, surface smooth.

[Distribution] Tropical Africa, Madagascar, India, Sri Lanka, Indochina, Malesia and southern China.

[Habitat] Taiwan, at low elevation in tea plantations, dry fields and open waste places.

[Taiwan] HSINCHU: *Suzuki s. n.* Oct. 27, 1934 (TAI). NANTOU: Chingshuikou, *Huang s. n.* Oct. 27, 1959 (TAI). PINGTUNG: Szuchonghsi, *Hsu 1166* (TAI).

**6. *Panicum luzonense*** J. Presl, Reliq. Haenk. 1: 308. 1830; Veldkamp, Blumea 41: 195. 1996; Liu, Fl. Taiwan. ed. 2, 5: 490. 2000; Chen & Renvoize in Chen *et al.* (eds.), Fl. China 22: 507. 2006. 網脈稷

*Panicum cambogiense* Balansa, J. Bot. (Morot) 4: 142. 1890; Hsu, Taiwania 16: 288. 1971; Hsu, Fl. Taiwan 5: 572. 1978.

*Panicum trypheron auct. non* Schultes: Hsu, Taiwania 16: 290. 1971; Hsu, Fl. Taiwan 5: 578. 1978; Koyama, Grass. Jap. Neighb. Reg. 308. 1987.

*Panicum curviflorum* var. *suishaense sensu* Liu, Fl. Taiwan. ed. 2, 5: 488. 2000. *non* Veldkamp, Blumea 34: 81–82. 1989.

Annuals, tufted. Culms erect or geniculately ascending, slender, 30-60 cm tall, hispid, culm nodes bearded. Leaf sheaths surface sparsely hispid. Ligule a ciliate membrane, 1-2 mm long. Blades cauline, linear-lanceolate, flat, 5-10 cm long, 5-10 mm wide, margins scabrous, apex acute, surface densely hispid on abaxial side. Inflorescence in a panicle, 10-15 cm long, axis pubescent in axils, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels linear, angular, with discoid tips, margins scaberulous. Spikelets bisexual, dorsally compressed, elliptic, 2-2.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate or ovate, 0.8-1 mm long, 0.3-0.5 time of length as the spikelet, membranous, 5 to 7-veined, with cross veins, not keeled, surface glabrous, margins smooth, apex acute, awnless, clasping at the base of the spikelet. Upper glume separated from lower glume by a short internode, ovate, 2-2.5 mm long, as long as spikelet, chartaceous, 9 to 11-veined, with cross veins, not keeled, surface glabrous, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma ovate, 2-2.5 mm long, chartaceous, 5 to 7-veined, surface glabrous, margins smooth, apex acute, awnless. Lower palea well developed, membranous. Upper floret pale yellow. Upper lemma elliptic, 1.5-2 mm long, coriaceous, surface smooth, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface smooth.

[Distribution] India, Sri Lanka, Myanmar, Indochina, Malesia and northern Australia.

[Habitat] Taiwan, at low elevation in open areas, roadsides, waste places and grassland, limited to the southern part of the island.

[Taiwan] NANTOU: Chingshuikou, *Huang s. n.* Oct. 28, 1958 (TAI).

**7. *Panicum maximum*** Jacq., *Icon. Pl. Rar.* 1: 2. *pl.* 13. 1781; Hsu, *Taiwania* 16: 289. 1971; Hsu, *Fl. Taiwan* 5: 573, *pl.* 1438. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 305. 1987; Veldkamp, *Blumea* 41: 197. 1996; Liu, *Fl. Taiwan.* ed. 2, 5: 490. *pl.* 205. 2000; Chen & Renvoize in Chen *et al.* (eds.), *Fl. China* 22: 506. 2006.

大黍 Pl. 15, Photo 50

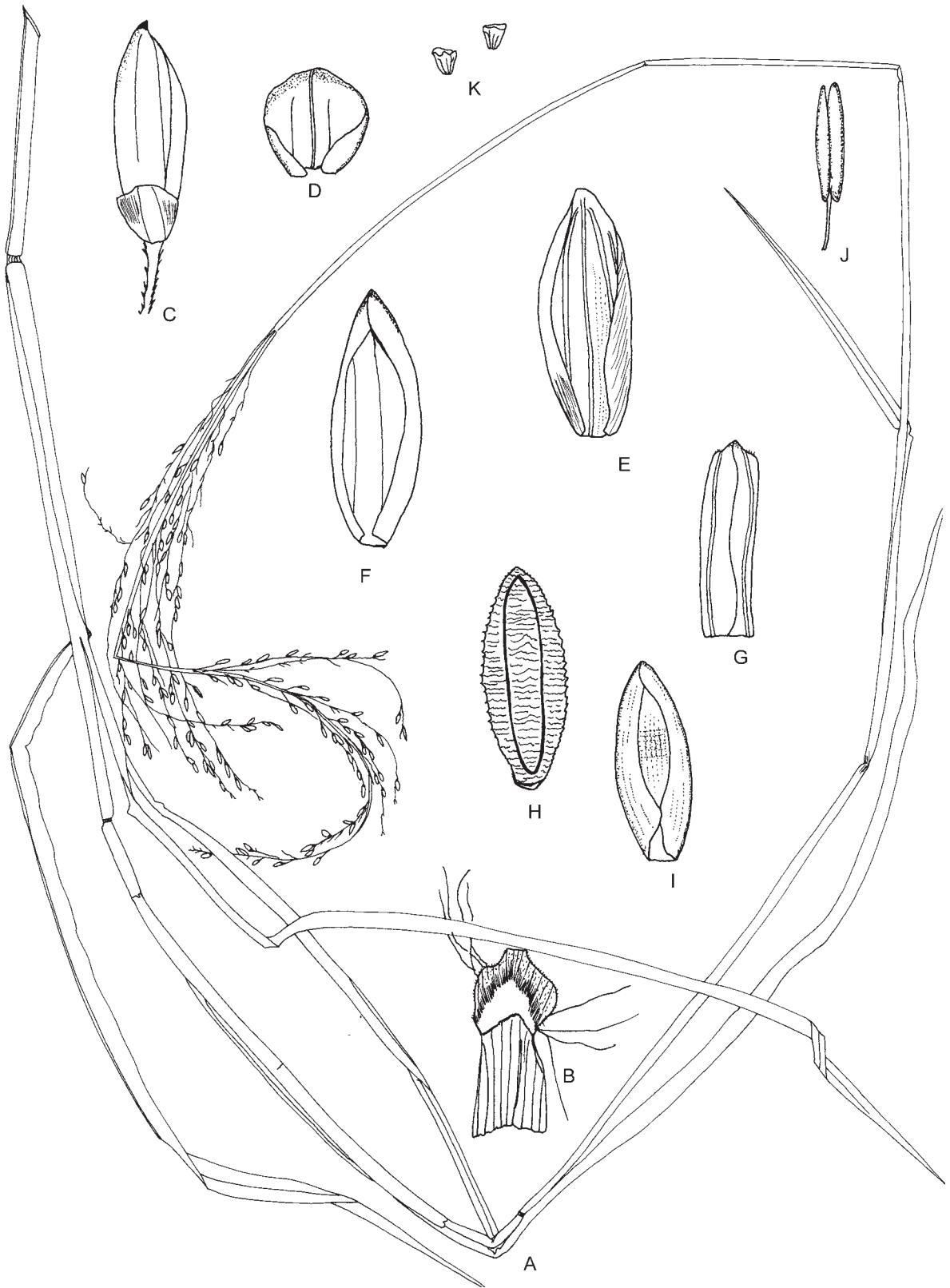
Perennials, tufted, rhizomatous. Culms erect, robust, 100-300 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, or sparsely to densely hispid, outer margins glabrous, joint between sheath and blade puberulent. Ligule a ciliate membrane, 1-3 mm long. Blades cauline, linear, flat, 20-60 cm long, 10-35 mm wide, margins scabrous, apex acuminate, surface densely puberulent on both sides. Inflorescence in a panicle, loose, 10-45 cm long, axis pubescent in axils, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels linear, angular, with truncate tips, margins scaberulous. Spikelets bisexual, dorsally compressed, oblong, 3-3.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 1 mm long, 0.2-0.3 time of length as the spikelet, membranous, 1 to 3-veined, not keeled, surface glabrous, margins smooth, apex obtuse to acute, awnless, clasping at the base of the spikelet. Upper glume broadly lanceolate, 3-3.5 mm long, as long as spikelet, chartaceous, 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower florets staminate or barren. Lower lemma broadly lanceolate, 3-3.5 mm long, chartaceous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower palea well developed, membranous, lanceolate, as long as lower lemma, 2-veined. Upper floret pale gray. Upper lemma oblong, 2-2.5 mm long, coriaceous, surface finely transverse rugulose, apex acute, awnless. Upper palea oblong, as long as upper lemma, coriaceous, 2-veined, surface finely transverse rugulose. Anthers 3, 1.2 mm long.

[Distribution] Originally from tropical Africa, introduced elsewhere.

[Habitat] Africa, introduced elsewhere. Taiwan, in grassland, roadsides, riverbanks, plantations and disturbed places.

[Taiwan] TAIPEI: Chenchou, *Kuo 10053* (TAI). TAOYUAN: Jiba, *Chen 4030* (TNM). MIAOLI: Huoyenshan, *Yang 546* (PPI). TAICHUNG: Taiping, *Wang 4269* (TNM). NANTOU: Wushe, *Tsai 28* (TAI). YUNLIN: Meilin Bridge, *Tsai 311* (TNM). TAINAN: Sitsao Bridge, *Leong 1919* (TNM). KAOHSIUNG: Nanshih Bridge, *Yang 25829* (PPI); Hsiaoliuchiu, *Chen 6812* (TAIE). PINGTUNG: Manchou, *Ku 152* (PPI). TAITUNG: Jijnjhun, *Lee 2968* (TNM). PENGHU: *Jung 440* (PPI).

[Notes] This species belongs to the subgenus *Megathyrsus*. Some authors treated the subgenus as a genus and renamed this species as *Megathyrsus maximus* (Jacq.) B.K. Simon & S.W. Jacobs (Simon and Jacobs 2003).



Pl. 15. *Panicum maximum* Jacq.

A. habit; B. ligule; C. spikelet; D. lower glume; E. upper glume; F. lower lemma; G. lower palea; H. upper lemma; I. upper palea; J. anther; K. lodicules.



Pl. 16. *Panicum miliaceum* L.

A. habit; B. ligule; C. part of panicle branch; D. lower glume; E. upper glume; F. lower lemma; G. lower palea; H. upper lemma; I. upper palea; J. anther; K. lodicules.

**8. *Panicum miliaceum* L.** Sp. Pl. 58. 1753; Hsu, *Taiwania* 16: 289. 1971; Hsu, Fl. Taiwan 5: 576. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 308. 1987; Veldkamp, *Blumea* 41: 198. 1996; Liu, Fl. Taiwan. ed. 2, 5: 491. 2000; Chen & Renvoize in Chen *et al.* (eds.), Fl. China 22: 508. 2006. 稷 Pl. 16

Annuals, tufted. Culms erect, robust, 20-150 cm tall, pilose with tubercle-based hairs, culm nodes pubescent. Leaf sheaths surface glabrous, or densely hispid with tubercle-based hairs. Ligule a ciliate membrane. Blades surface pilose with tubercle-based hairs on both sides. Inflorescence in a panicle, loose, oblong, 15-35 cm long, axis scaberulous, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels linear, angular, with truncate tips, margins scaberulous. Spikelets bisexual, dorsally compressed, ovate or ovate-elliptic, 4-5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate, 2-3 mm long, 0.5-0.7 time of length as the spikelet, membranous, 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex cuspidate, awnless, clasping at the base of the spikelet. Upper glume separated from lower glume by a short internode, broadly lanceolate, 4-5 mm long, as long as spikelet, chartaceous, 9 to 13-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acuminate, awned. Lower florets barren, epaleate. Lower lemma broadly lanceolate, 4-5 mm long, chartaceous, 9 to 13-veined, veins glabrous, surface glabrous, margins smooth, apex acuminate, awnless. Upper lemma elliptic, 3 mm long, coriaceous, surface smooth, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 1 mm long. [Distribution] Originally from Central Asia, cultivated in warm and temperate regions.

[Habitat] Taiwan, cultivated as a green fodder.

[Taiwan] NANTOU: Wushe, *Fukuyama 4787* (TAI); Lushan, *Peng 6154* (HAST).

**9. *Panicum notatum* Retz.,** *Observ. Bot.* 4: 18. 1786; Hsu, *Taiwania* 16: 289. 1971; Hsu, Fl. Taiwan 5: 576. 1978; Veldkamp, *Blumea* 41: 199. 1996; Liu, Fl. Taiwan. ed. 2, 5: 491. 2000; Chen & Renvoize in Chen *et al.* (eds.), Fl. China 22: 509. 2006. 心葉稷, Photo 51

*Panicum cordatum* Büse in Miquel, *Pl. Jungh.* 3: 376. 1854; Koyama, *Grass. Jap. Neighb. Reg.* 300. 1987.

Perennials. Culms rambling, woody, 100-200 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes glabrous or puberulent. Leaf sheaths surface glabrous, or sparsely hispid, outer margins hairy, joint between sheath and blade glabrous or puberulent. Ligule a ciliolate membrane, 0.5 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 5-15 cm long, 10-30 mm wide, base cordate, margins scabrous to spiny-scabrous, apex acuminate, surface glabrous,

or hispid on adaxial side. Inflorescence in a panicle, loose, 10-30 cm long, axis bearded in axils, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels capillary, terete, margins smooth. Spikelets bisexual, dorsally compressed, elliptic, 2-2.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate or oblong, 1.8-2 mm long, 0.75-1 time of length as the spikelet, chartaceous, 3 to 5-veined, not keeled, veins glabrous, surface glabrous, margins hyaline and smooth, apex acute, awnless, clasping at the base of the spikelet. Upper glume separated from lower glume by a short internode, ovate, 2-2.5 mm long, as long as spikelet, chartaceous, 3-5-veined, not keeled, veins glabrous, surface puberulent, margins smooth, apex acute, awnless. Lower florets barren, epaleate. Lower lemma ovate, 2-2.5 mm long, chartaceous, 5-veined, veins glabrous, surface sparsely puberulous, margins smooth, apex acute, awnless. Upper floret pale gray. Upper lemma elliptic, 2 mm long, coriaceous, surface smooth, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 1.2 mm long.

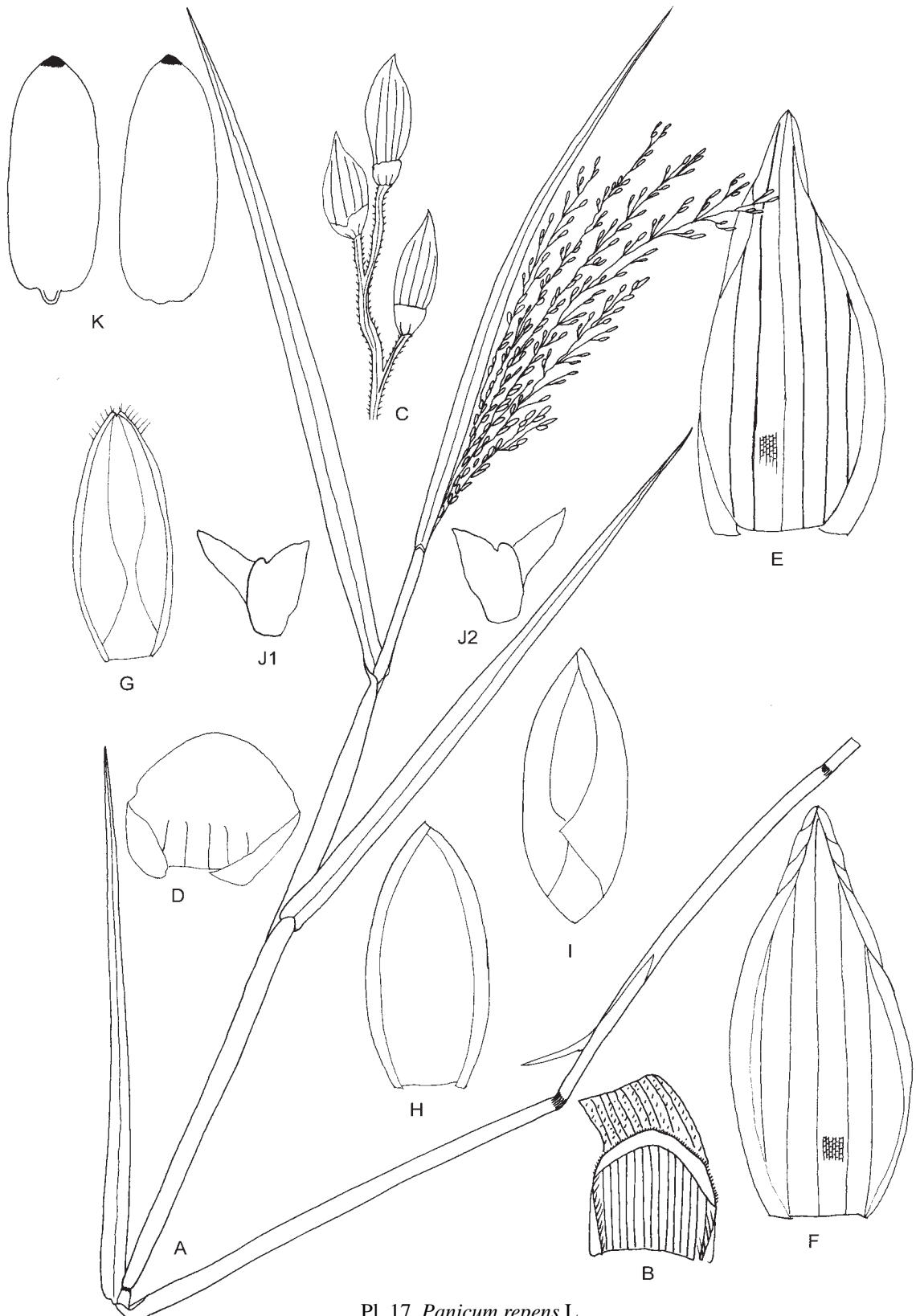
[Distribution] Tropical southeastern Asia.

[Habitat] Taiwan, in plains and hills.

[Taiwan] TAICHUNG: Tatu, *Wang 8428* (TNM), Pashienshan, *Hsu 414* (TAI). NANTOU: Huisun Experimental Forest, *Wang 4491* (TNM); Tungpu, *Chen 6863* (TAIE). KAOHSIUNG: Meilan suspension bridge no. 2, *Yang 26307* (PPI). PINGTUNG: Yichanshan, *Huang 63* (TNM); Tahan Forest Road, *Chen 6896* (TAIE); Kutzuluenshan, *Leong 1462* (HAST). TAITUNG: Feilong, *Liu 907* (TNM).

**10. *Panicum repens* L.**, Sp. Pl. ed. 2. 87. 1762; Hsu, *Taiwania* 16: 290. 1971; Hsu, Fl. Taiwan 5: 577. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 303. 1987; Veldkamp, *Blumea* 41: 202. 1996; Liu, Fl. Taiwan. ed. 2, 5: 491. 2000; Chen & Renvoize in Chen *et al.* (eds.), Fl. China 22: 506. 2006. 鋪地黍 Pl. 17, Photo 52

Perennials, rhizomatous. Culms erect or decumbent, of moderate texture, 30-130 cm tall, glabrous, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface outer margins glabrous or ciliate. Ligule a ciliolate membrane, 0.5-1.5 mm long. Blades cauline, linear-lanceolate or linear, flat, stiff, 7-25 cm long, 3-8 mm wide, margins scabrous, apex acuminate, surface glabrous, or pilose on adaxial side. Inflorescence in a panicle, loose, 5-15 cm long, axis scaberulous, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels linear, angular, with truncate tips, margins scabrous. Spikelets bisexual, dorsally compressed, oblong-lanceolate, 2.5-3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 0.8 mm long, 0.2-0.25 time of length as the spikelet, membranous, 1-veined, not keeled, surface glabrous, margins smooth, apex obtuse to acute, awnless, clasping at the base of the spikelet. Upper glume separated from lower glume by a short internode, broadly lanceolate, 2.5-3 mm long, as long as



Pl. 17. *Panicum repens* L.

A. habit; B. ligule; C. part of panicle branch; D. lower glume; E. upper glume; F. lower lemma; G. lower palea; H. upper lemma; I. upper palea; J. lodicules.



Pl. 18. *Panicum sarmentosum* Roxb.

A. habit; B. ligule; C. part of panicle branch; D. lower glume; E. upper glume; F. lower lemma; G. lower palea; H. upper lemma; I. upper palea; J. lodicules; K. caryopsis.

spikelet, chartaceous, 7 to 9-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower florets staminate. Lower lemma broadly lanceolate, 2.5-3 mm long, chartaceous, 7 to 9-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower palea well developed, membranous, ovate, as long as lower lemma, 2-veined. Upper floret pale gray. Upper lemma oblong, 2 mm long, subcoriaceous, surface smooth, apex acute, awnless. Upper palea oblong, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Anthers 3, 1.2-1.5 mm long.

[Distribution] Pantropic.

[Habitat] Taiwan, common in sunny to slightly shaded, moist places.

[Taiwan] TAIPEI: *Huang 70* (TNM). ILAN: Suao, *Hsu 862* (TAD); Lanyangshi, *Chen 6772* (TAIE). MIAOLI: Feifeng, *Yang 14845A* (TNM). TAICHUNG: Tachiahsi, *Chiu 5505* (TNM). YUNLIN: Taihsi, *Yang 532* (TAD). TAINAN: Chiku, *Wang 10459* (TNM). PINGTUNG: Kenting, *Chang 481* (PPI). HUALIEN: Loshan, *Yang 14326* (TNM). TAITUNG: Lanyu, *Chang 8453* (PPI). PENGHU: Chayangli, *Kuoh 1103* (TAD).

**11. *Panicum sarmentosum* Roxb., Fl. Ind. 1: 311. 1820; Veldkamp, Blumea 41: 203. 1996; Liu, Fl. Taiwan. ed. 2, 5: 493. 2000; Chen & Renvoize in Chen *et al.* (eds.), Fl. China 22: 509. 2006. 藤竹草 Pl. 18, Photo 53-54**

*Panicum submontanum* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30: 402. 1911.

*Isachne fauriei* Ohwi, Bot. Mag. (Tokyo) 45: 386. 1931.

*Panicum incomtum* Trin., Gram. Panic. 200. 1826; Hsu, Taiwania 16: 288. 1971; Hsu, Fl. Taiwan 5: 572.

1978; Koyama, Grass. Jap. Neighb. Reg. 302. 1987; Chen & Renvoize in Chen *et al.* (eds.), Fl. China 22: 509. 2006.

Perennials. Culms rambling, woody, 100-150 cm tall, glabrous or puberulent, much branched above base, rooting from lower nodes, culm nodes puberulent. Leaf sheaths surface glabrous, or puberulent, joint between sheath and blade puberulent. Ligule a ciliolate membrane, 1 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, 10-20 cm long, 8-15 mm wide, margins scabrous, apex acuminate, surface puberulent on both sides. Inflorescence in a panicle, loose, 10-15 cm long, axis puberulent, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels capillary, terete, margins smooth. Spikelets bisexual, dorsally compressed, ovate, 1.5-2 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate, 1-1.5 mm long, 0.6-0.75 time of length as the spikelet, chartaceous, 3 to 5-veined, not keeled, surface moderately puberulous near the apex, margins smooth, apex obtuse to acute, awnless. Upper glume ovate, 1.5-2 mm long, as long as spikelet, chartaceous, 5-veined, not keeled, surface puberulent near the apex, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma ovate, 1.5-2 mm long, chartaceous, 5-veined, surface glabrous, margins smooth, apex obtuse, awnless. Lower palea

well developed, membranous, ovate, as long as lower lemma, 2-veined. Upper floret yellowish brown. Upper lemma elliptic, 1.5 mm long, coriaceous, surface smooth, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 1 mm long.

[Distribution] India, Myanmar, Indochina, Malesia, Australia and southern China.

[Habitat] Taiwan, common at low elevations. It grows on forest margins and forms large areas, straggling over other plants.

[Taiwan] TAIPEI: Tunghua, *Huang 821* (TAI). MIAOLI: Houyenshan, *Yang 3505* (TAI). TAICHUNG: Takeng, *Wang 3763* (TNM). NANTOU: Lienhuachih, *Wang 3696* (TNM); Chiuchiufeng, *Peng 19243* (HAST). CHIAYI: Chentsoliao, *Wang 7990* (TNM). TAINAN: Hsinhua, *Ku1699* (TNM). KAOHSIUNG: Sanping, *Wang 1286* (TNM). PINGTUNG: Peililoushan, *Wang 4048* (TNM); Hsuhai, *Chen 6925* (TAIE). TAITUNG: Kueitien, *Yang 1162* (TNM).

**12. *Panicum sumatrense*** Roth ex Roem. & Schult., Syst. Veg. 2: 434. 1817;

Veldkamp, Blumea 41: 205. 1996; Liu, Fl. Taiwan. ed. 2, 5: 493. 2000; Chen & Renvoize in Chen *et al.* (eds.), Fl. China 22: 507. 2006.

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*Panicum psilopodium* Trin., Gram. Panc. 217. 1826; Hsu, Taiwania 16: 289. 1971; Hsu, Fl. Taiwan 5: 577. 1978; Koyama, Grass. Jap. Neighb. Reg. 307. 1987.

Annuals, tufted. Culms erect or decumbent, of moderate texture, 20-60 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule a ciliolate membrane, 1 mm long. Blades cauline, linear, flat, 8-20 cm long, 4-8 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in a panicle, loose, 5-20 cm long, axis scaberulous, base exerted from uppermost sheath, with conspicuous branches, branches spreading. Pedicels capillary, angular, with truncate tips, margins scaberulous. Spikelets bisexual, dorsally compressed, oblong-lanceolate, 2.5-3.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 0.8-1 mm long, 0.25-0.35 time of length as the spikelet, membranous, 3-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless, clasping at the base of the spikelet. Upper glume broadly lanceolate, 2.5-3.5 mm long, as long as spikelet, chartaceous, 9 to 11-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma broadly lanceolate, 2.5-3.5 mm long, chartaceous, 9-11-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower palea absent or well developed, membranous, lanceolate, as long as lower lemma, 2-veined, veins smooth. Upper floret yellowish brown. Upper lemma oblong, 2-2.5 mm long, coriaceous, surface smooth, apex acute, awnless. Upper palea oblong, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 1.5 mm long.

[Distribution] Eastern Africa, India, Sri Lanka, Malesia and China.

[Habitat] Taiwan, common in sugar-cane plantations, tea plantations and forest edges.

[Taiwan] TAIPEI: Yinhotung, *Hsu 4583* (TAI). MIAOLI: Cholan, *Wang 12239* (TNM). TAICHUNG: Houli Farm, *Hsu 9022* (TAI), Tatushan, *Ku 705* (PPI). NANTOU: Lienhuachih, *Chang 5031* (PPI).

15. *Paspalidium* Stapf, Fl. Trop. Africa 9: 582. 1920.

類雀稗屬

Perennials; culms decumbent and stout. Leaf sheaths glabrous; ligule very short, ciliate; blades linear. Inflorescence composed of spike-like racemes, alternately palced along a rather wider main axis, which merges into a terminal raceme, usually longer than lateral racemes immediately below it; lateral racemes erect and appressed to main axis, with a flattened axis, abaxial side with a zigzag keel. Spikelets solitary, alternate along keel, very regularly 2-seriate, close together, elliptic, acute, nearly flat abaxially, convex on ventral side, unawned, 2-flowered, articulate with very short pedicels; upper spikelet usually poorly developed; glumes shorter than spikelet; lower lemma as long as spikelet, 5 to 7-veined; glumes and lower lemma thin; lower palea with broad, inflexed margins or absent; upper lemma as long as spikelet or slightly shorter, acuminate, in older spikelets chartaceous, distinctly tuberculate or rugose, with incurved margins; upper palea of same texture, embraced by margins of upper lemma; lodicules 2; stamens 3; styles 2, free, stigmas plumose, exserted near apex. Caryopsis plano-convex.

About 40 species throughout tropics. Two species in Taiwan.

KEY TO THE SPECIES

1. Racemes distant; upper glume 2/3–3/4 length of spikelet; upper lemma granulate ..... 1. *P. flavidum*  
1. Racemes overlapping; upper glume 1/4–1/2 length of spikelet; upper lemma finely rugose ..... 2. *P. punctatum*

1. *Paspalidium flavidum* (Retz.) A. Camus in Lecomte, Fl. Indo-Chine 7: 419. 1922;  
Kuoh *et al.*, Taiwania 43: 65. 1998; Liu, Fl. Taiwan. ed. 2, 5: 494. *photo* 55. 2000;  
Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 537. 2006.

黃穗類雀稗 Photo 55-56

*Panicum flavidum* Retz., Observ. Bot. 4: 14. 1786.

*Setaria flavidum* (Retz.) Veldkamp, Blumea 39: 376. 1994.

Perennials, terrestrial. Culms geniculately ascending, of moderate texture, 30-100 cm tall, glabrous, culm nodes glabrous. Leaf sheaths laterally compressed, keeled, surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule a fringe of hairs, 0.5 mm long. Blades cauline, linear, flat, 5-30 cm long, 5-10 mm wide, margins scabrous to setose with tubercle-based hairs, apex acuminate, surface glabrous. Inflorescence in racemose racemes, 5-20 cm long, axis scaberulous. Racemes 6-9, erect, straight, 1.5-2.5 cm long, distant not overlapping, glabrous at base. Rachis tenacious, angular, midrib narrow, narrowly winged, 1 mm wide, margins scabrous.

Pedicels short. Spikelets bisexual, solitary, dorsally compressed, ovate-elliptic, 1.5-2.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 1-1.2 mm long, 0.5 time of length as the spikelet, membranous, 3-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex rounded, awnless. Upper glume broadly ovate, 1-2 mm long, 0.7-0.8 time of length as the spikelet, membranous, 7-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex obtuse or acute, awnless. Lower florets staminate or barren. Lower lemma broadly ovate, 1.5-2.5 mm long, chartaceous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex obtuse or acute, awnless. Lower palea well developed, membranous, ovate, as long as lower lemma, 2-keeled, veins narrowly winged. Upper floret pale gray. Upper lemma ovate, 1.5-2.5 mm long, coriaceous, surface papillose-striate, apex acute, awnless. Upper palea ovate, as long as upper lemma, coriaceous, 2-veined, surface papillose-striate. Anthers 3, 1.2 mm long.

[Distribution] Tropical Asia.

[Habitat] Taiwan, naturalized in roadsides and open places at coastal areas of southern part.

[Taiwan] KAOHSIUNG: Hsiakungshan, *Jung y050102* (TNM), Shoushan, *Kao 10516* (TAI), *Peng 15476* (HAST).

**2. *Paspalidium punctatum*** (Burm. f.) A. Camus in Lecomte, Fl. Indo-China 7: 419. 1922; Hsu, *Taiwania* 16: 290. 1971; Hsu, Fl. Taiwan 5: 579. 1978; Koyama, Grass. Jap. Neighb. Reg. 347. 1987; Kuoh *et al.*, *Taiwania* 43: 68. 1998; Liu, Fl. Taiwan. ed. 2, 5: 494. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 537. 2006.

類雀稗

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

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

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

*Setaria punctatum* (Burm. f.) Veldkamp, Blumea 39: 381. 1994.

Perennials, semi-aquatic, trailing on water edges. Culms erect or geniculately ascending, stout and spongy, 50-100 cm tall, glabrous, rooting from lower nodes, culm nodes glabrous. Leaf sheaths laterally compressed, keeled, surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule a ciliate membrane, 1-2 mm long. Blades cauline, linear, flat, 10-25 cm long, 3-8 mm wide, margins smooth, apex acuminate, surface glabrous. Inflorescence in racemose racemes, 10-30 cm long, axis scaberulous. Racemes 8-15, erect or ascending, straight, 1-5 cm long, approximate and overlapping, glabrous at base. Rachis tenacious, flattened, clearly winged, 1-1.5 mm wide, margins scabrous. Pedicels short. Spikelets bisexual, solitary, imbricate, dorsally compressed, ovate-oblong, 2-3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume cufflike, 0.5-0.7 mm long, 0.25 time of length as the spikelet, membranous, veinless, surface glabrous, margins smooth, apex truncate, awnless. Upper glume suborbicular, 1 mm long, 0.3-0.5 time of length as the

spikelet, membranous, 3-veined, not keeled, surface glabrous, margins smooth, apex rounded or truncate, awnless. Lower florets barren, epaleate. Lower lemma ovate, 2-3 mm long, chartaceous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Upper floret yellowish brown. Upper lemma ovate, 2-3 mm long, coriaceous, surface finely rugose, apex acuminate, awnless. Upper palea ovate, as long as upper lemma, coriaceous, 2-veined, surface finely rugose. Caryopsis glabrous, dorso-ventrally compressed, ovate, 1.5 mm long.

[Distribution] Tropical Asia.

[Habitat] Taiwan, in wet places and ponds at southern part of the island.

[Taiwan] TAINAN: Hsinhua, *Shimada s. n.* Aug. 19, 1940 (TAI). PINGTUNG: Wukou, *Ku 578* (PPI), *Huang 2170* (TAIE).

## 16. *Paspalum* L., Syst. Nat., ed. 10, 2: 855. 1759.

### 雀稗屬

Perennials, culms with fibrous roots or rhizomatous, stoloniferous or not. Leaf blade flat or with involute margins. Inflorescence composed of (1-) 2-numerous spike-like racemes, racemously arranged on all sides of main axis; rachis of racemes keeled on abaxial side. Spikelets alternate along keels, solitary or in unequally pedicellate pairs, usually crowded, articulate with pedicles, suborbicular to oblong, dorsally compressed, flat or concave on abaxial side, convex on adaxial side, 2-flowered, with lower lemma on abaxial side; lower glume usually absent, minute when present; upper glume and lower lemma as long as spikelet or upper glume rarely shorter, herbaceous, with or without a midvein with 1-3 marginal vein on either side; lower palea absent; upper lemma chartaceous-coriaceous with inrolled margins embracing upper palea, with 3-7-faint vein; upper palea as long and of same texture as upper lemma, with a flat 2-veined back and membranaceous inflexed margins; lodicules 2, cuneate; stamens 3, anthers linear; ovary glabrous, styles 2, free, stigmas exerted at or below middle of spikelet. Caryopsis tightly enclosed between indurated upper palea and lemma, dorsally compressed, hilum punctiform, embryo more than 1/2 as long as caryopsis.

A large genus of ca. 250 species distributed in warm lands. In tropical America they form a large proportion of the pasture lands. Many of them are good fodders. Eleven species and two varieties on the plains of Taiwan.

### KEY TO THE SPECIES

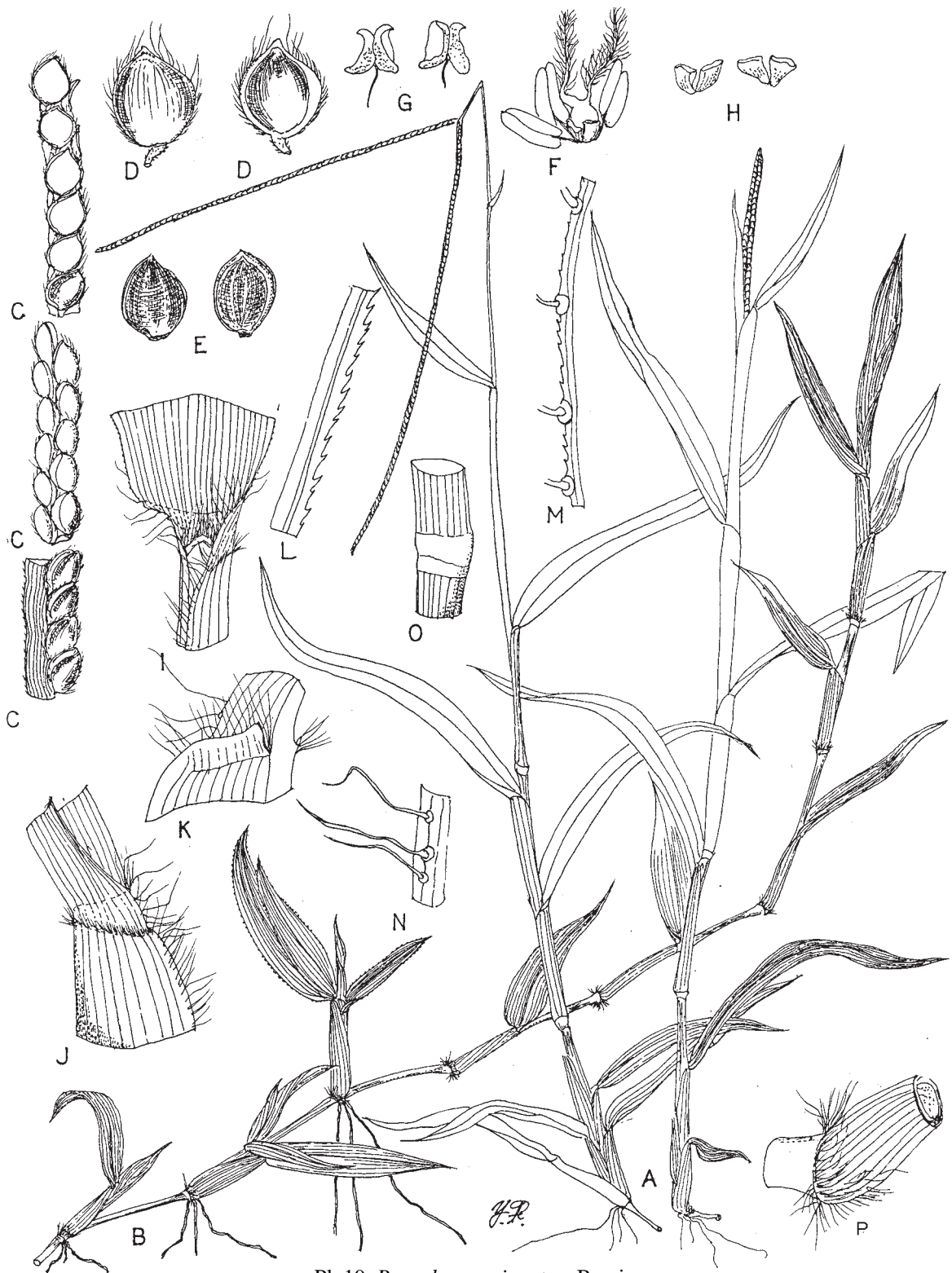
1. Spikelets with a marginal fringe of silky hairs; hairs 1–2 mm.
  2. Racemes 2, paired; stoloniferous perennial.....1. *P. conjugatum*
  2. Racemes usually more than 2, spread along an axis.
    3. Racemes 3-7; spikelets 3–4 mm..... 2. *P. dilatatum*
    3. Racemes usually more than 10; spikelets 2-3 mm.
      4. Spikelets light green or purplish, ovate; upper glume pubescent, fringed along whole length .....9. *P. urvillei*

4. Spikelets brown, obovate; upper glume puberulous, fringed only above middle..... 11. *P. virgatum*
1. Spikelets glabrous or pubescent, without a marginal fringe of silky hairs.
5. Upper glume and lower lemma broadly winged along margins ..... 4. *P. fimbriatum*
5. Upper glume and lower lemma not winged.
6. Plants with long stolons ; racemes 2, opposite or subopposite.
7. Upper glume pubescent; spikelets plano-convex, obovate-oblong..... 3. *P. distichum*
7. Upper glume glabrous; spikelets strongly flattened, lanceolate-oblong..... 10. *P. vaginatum*
6. Plants tufted; racemes 3 or more, alternate.
8. Fertile floret dark glossy brown at maturity; spikelets usually glabrous.....7. *P. scrobiculatum*
9. Leaf blades usually pilose.....7b. var. *bispicatum*
9. Leaf blades usually glabrous.
10. Spikelets ca. 2 mm long, orbicular.....7c. var. *orbiculare*
10. Spikelets 2-3 mm long, broadly elliptic.....7a. var. *scrobiculatum*
8. Fertile floret yellowish green to pale brown at maturity; spikelets pubescent or glabrous.
11. Spikelets 1–1.5 mm .....6. *P. paniculatum*
11. Spikelets 2–3 mm.
12. Sheaths and blades glabrous or nearly so; rachis 2–4 mm wide; spikelets 2–2.5 mm, paired, pubescent ..... 5. *P. longifolium*
12. Sheaths and blades villous or hirsute; rachis 1–1.5 mm wide; spikelets 2.5–3 mm, single or loosely paired..... 8. *P. thunbergii*

**1. *Paspalum conjugatum*** Bergius, Act. Helv. Phys.-Math.7: 129. 1772; Hsu, Taiwania 16: 291. 1971; Hsu, Fl. Taiwan 5: 581, pl. 1439. 1978; Koyama, Grass. Jap. Neighb. Reg. 359. 1987; Liu, Fl. Taiwan. ed. 2, 5: 495. pl. 206. photo 56. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 526. 2006.

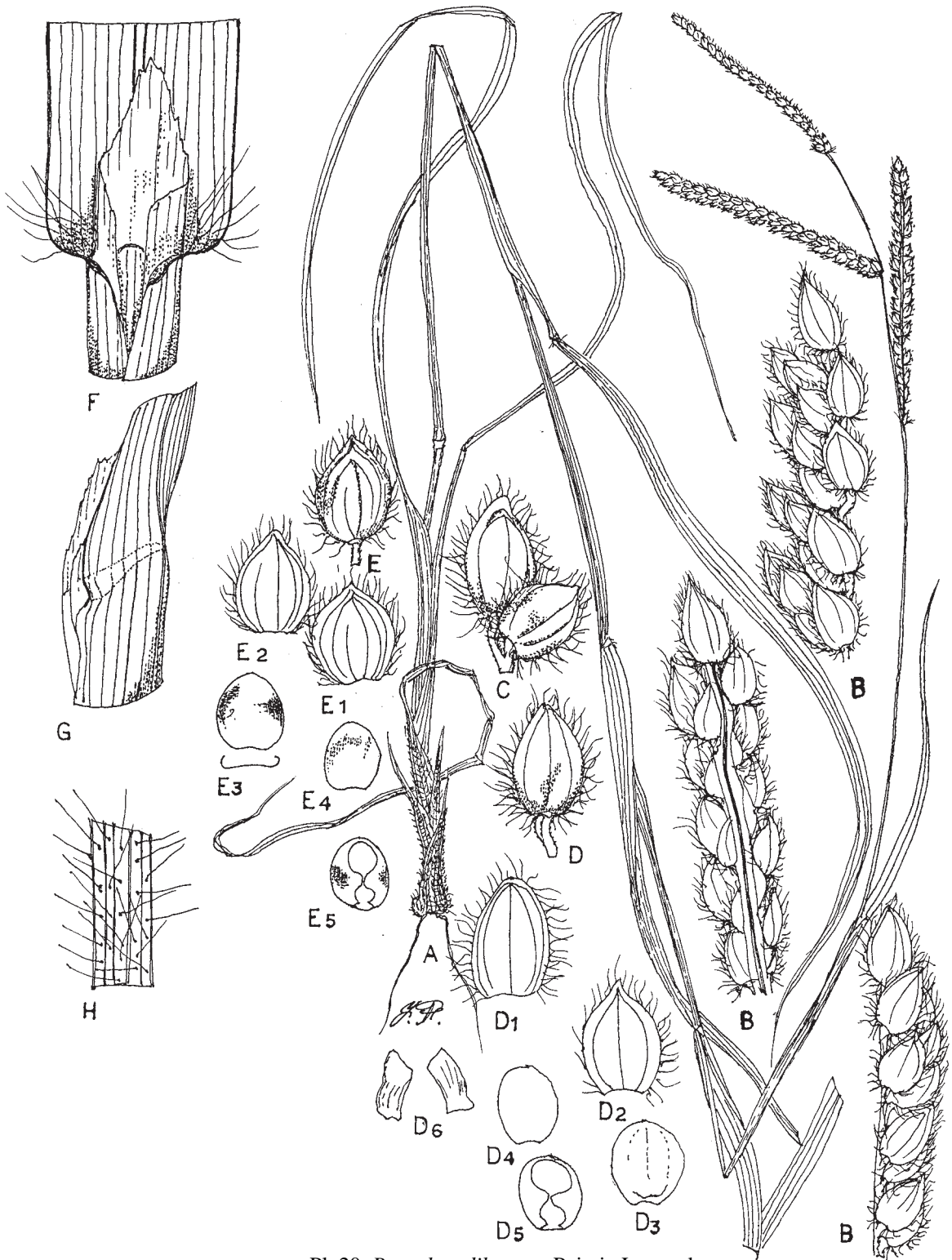
兩耳草 Pl. 19, Photo 57-58

Perennials, stoloniferous. Culms erect or geniculately ascending, of moderate texture or slender, 30-60 cm tall, glabrous, rooting from lower nodes, culm nodes glabrous. Leaf sheaths laterally compressed, keeled, surface glabrous, outer margins glabrous, joint between sheath and blade pilose. Ligule a glabrous membrane, 1 mm long. Blades cauline, linear-lanceolate, flat, 5-15 cm long, 5-10 mm wide, margins scabrous, apex acute, surface glabrous. Inflorescence in digitate racemes, base exerted from uppermost sheath. Racemes 2, divaricate, arcuate, 5-12 cm long, pubescent at base. Rachis tenacious, angular, midrib narrow, clearly winged, 1 mm wide, margins smooth. Pedicels short. Spikelets bisexual, solitary, imbricate, dorsally compressed, ovate, 1.5-1.8 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume ovate, 1.5-1.8 mm long, as long as spikelet, membranous, 2-veined, not keeled, surface glabrous, margins densely fringed with long white hairs, apex acute, awnless. Lower florets barren, epaleate. Lower lemma ovate, 1.5-1.8 mm long, membranous, 2-veined, surface glabrous, margins smooth, apex acute, awnless.



Pl. 19. *Paspalum conjugatum* Bergius

A-B. habit; C. part of raceme; D. spikelets; E. floret; F. anthers and ovary; G. anthers; H. lodicules; I-J. joint of sheath and blade; K. ligule; L. scabrous along rachis margin; M. sheath margin scabrous and pilose with tubercle-based hairs; N. sheath surface pilose with tubercle-based hairs; O. upper node glabrous; P. basal node pubescent.



Pl. 20. *Paspalum dilatatum* Poir. in Lamarck

A. habit; B. part of raceme; C. spikelets in pair; D. lower spikelet: D1. upper glume; D2. lower lemma; D3. lower palea; D4. upper lemma; D5. upper palea; D6. lodicules; E. upper spikelet: E1. upper glume; E2. lower lemma; E3. lower palea; E4. upper lemma; E5. upper palea; F. ligule; G. joint of sheath and blade; H. blade surface pilose.

Upper floret pale gray. Upper lemma ovate, 1 mm long, coriaceous, surface smooth, apex acute, awnless. Upper palea ovate, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 0.8 mm long.

[Distribution] Originally from America, now widely naturalized in warm regions of the world.

[Habitat] Taiwan, very common in slightly shady places.

[Taiwan] TAIPEI: NTU Campus, *Suzuki 12857* (TAI). TAOYUAN: Siouchaiwo, *Chen 3936* (TNM). MIAOLI: Kungkuanchien-shan, *Yu 603* (TAI). TAICHUNG: Lungchin, *Yang 5784* (TNM). NANTOU: Chitou, *Kao s. n.* Feb. 15, 1960 (TAI). CHANGHWA: Puhsin, *Chaw 748* (TNM). CHIAYI: Fenchihu, *Chang 15541* (PPI). KAOHSIUNG: Shoushan, *Kuoh 15981* (TNM). PINGTUNG: Yichangshan, *Huang 65* (TNM); Hsuhai, *Chen 4069* (TAIE). TAITUNG: Dulenshan, *Wu 13-026* (TNM).

**2. *Paspalum dilatatum* Poir.** in Lamarck, *Encycl. Meth. Bot.* 5: 35. 1804; Hsu, *Taiwania* 16: 292. 1971; Hsu, *Fl. Taiwan* 5: 583, *pl. 1440*. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 362. 1987; Liu, *Fl. Taiwan. ed. 2, 5: 497. pl. 207*. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 527. 2006.

毛花雀稗 Pl. 20, Photo 59

Perennials, tufted, rhizomatous. Culms erect or geniculately ascending, of moderate texture, 50-150 cm tall, glabrous, culm nodes glabrous. Leaf sheaths laterally compressed, keeled, surface glabrous, or sparsely pilose at basal part, outer margins glabrous, joint between sheath and blade glabrous. Ligule a glabrous membrane, 2-5 mm long. Blades cauline, linear, flat, 10-45 cm long, 3-12 mm wide, margins smooth, apex acuminate, surface glabrous, or pilose on adaxial side of basal leaves. Inflorescence in racemose racemes, 2-10 cm long, axis bearded in axils. Racemes 2-10, erect or ascending or spreading, straight or arcuate, 5-12 cm long, pubescent at base. Rachis tenacious, flattened, midrib low and rounded, clearly winged, 1-1.5 mm wide, margins scabrous. Pedicels short, margins scabrous. Spikelets bisexual, paired, homomorphic, imbricate, dorsally compressed, broadly ovate, 3-4 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume broadly ovate, 3-4 mm long, as long as spikelet, membranous, 5 to 9-veined, not keeled, veins glabrous, surface glabrous, or pubescent, margins densely fringed with long white hairs, apex acute, awnless. Lower florets barren, epaleate. Lower lemma broadly ovate, 3-4 mm long, membranous, 5 to 9-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Upper floret pale gray. Upper lemma orbicular, 2 mm long, coriaceous, surface papillose-striate, apex obtuse, awnless. Upper palea ovate, as long as upper lemma, coriaceous, 2-veined, surface papillose-striate.

[Distribution] Originally from South America, naturalized elsewhere.

[Habitat] Taiwan, common on waste grounds in northern Taiwan.

[Taiwan] TAIPEI: Chutzuhu, *Wang 4978* (TNM); Nankang, *Wang 658* (HAST). ILAN: Yuanyanghu,

*Huang 166* (TNM); Shuanglainpi, *Chen 6781* (TAIE). HSINCHU: Kuanhsi, *Yang 7935* (TNM). MIAOLI: Taian, *Yu 732* (TAI). TAICHUNG: Kukuan, *Hsu 668* (TAI). NANTOU: Meifeng, *Wang 186* (TNM). KAOHSIUNG: Meilan Forest Road, *Hsieh 842* (PPI). PINGTUNG: Kenting, *Hsu 521* (TAI).

**3. *Paspalum distichum* L.**, Syst. Nat. ed. 10. 2: 855. 1759; Hsu, *Taiwania* 16: 292.

1971; Hsu, *Fl. Taiwan* 5: 583, *pl. 1441*. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 356. 1987; Liu, *Fl. Taiwan. ed. 2, 5*: 497. *pl. 208*. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 528. 2006. 雙穗雀稗 Photo 60-61

*Digitaria paspalodes* Michx., *Fl. Bor.-Amer.* 1: 46. 1803.

*Paspalum paspalodes* (Michx.) Scribn., *Mem. Torrey Bot. Club* 5: 29. 1894.

Perennials, stoloniferous. Culms of moderate texture, 20-50 cm tall, glabrous, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade pilose. Ligule a glabrous membrane, 2 mm long. Blades cauline, linear, flat, 5-15 cm long, 3-7 mm wide, margins smooth, apex acute, surface glabrous. Inflorescence in digitate racemes. Racemes 2-3, divaricate, straight, 3-7 cm long, pubescent at base. Rachis tenacious, angular, midrib narrow, clearly winged, 1.5-2 mm wide, margins smooth. Pedicels short. Spikelets bisexual, solitary, dorsally compressed, obovate-oblong, 2.5-3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent or reduced, minute, triangular, 0.3-1.5 mm long, 0.1-0.5 time of length as the spikelet, membranous. Upper glume ovate, 2.5-3 mm long, as long as spikelet, chartaceous, 3 to 5-veined, not keeled, surface glabrous, or pubescent, margins smooth, apex acute, awnless. Lower florets barren, epaleate. Lower lemma ovate, 2.5-3 mm long, chartaceous, 3 to 5-veined, surface glabrous, margins smooth, apex acute, awnless. Upper floret pale gray. Upper lemma obovate or elliptic, 2 mm long, subcoriaceous, surface punctulate-striate, apex acute, ciliolate, awnless. Upper palea ovate, as long as upper lemma, subcoriaceous, 2-veined, surface punctulate-striate. Anthers 1 mm long.

[Distribution] The tropics and subtropics of the world.

[Habitat] Taiwan, in roadsides, dampy places and along ditches.

[Taiwan] TAIPEI: Kuantu, *Chen 1509* (TNM). KEELUNG: *Hsu 403* (TAI). TAICHUNG: High Speed Rail Taichung Station, *Wang 10249* (TNM). NANTOU: Jenai, *Leong 3548* (HAST). PINGTUNG: Hengchun, *Hsu 503* (TAI). HUALIEN: *Kao 4108* (TAI). TAITUNG: Peinanhsikou, *Wu 4-066* (TNM); Lanyu, *Yang 15186* (HAST)..

**4. *Paspalum fimbriatum* Kunth** in Hurnboldt *et al.*, *Nov. Gen. Sp.* 1: 93. 1816; Hsu, *Taiwania* 16: 292. 1971; Hsu, *Fl. Taiwan* 5: 586. 1978; Liu, *Fl. Taiwan. ed. 2, 5*: 497. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 527. 2006.

裂穎雀稗

Annuals; culms erect, 30-100 cm high. Blade linear, usually 20-30 cm long, 3-15 mm wide, margins ciliate, ciliated also at mouth of sheath; ligule truncate, ca. 2 mm long, membranaceous; sheath sparingly long hairy, shorter than internode. Racemes 3-8, racemosely arranged, 2.5-8 cm long; rachis 8-10 cm long, axils with long stiff hairs. Spikelets ovate, mucronate, ca. 2 mm long, usually paired, arranged along a flat, serrate-margined rachis; basal spikelet often reduced to mere scale; lower glume reduced; upper glume equaling spikelet, margins with stiff, serrulate wings of ca. 1 mm wide, 3 to 5-veined; lower lemma broadly winged. Upper floret smooth and shiny, slightly shorter than spikelet.

[Distribution] Originally from S. America.

[Notes] This species was described as a naturalized grass in the first edition of *Flora of Taiwan* but no specimen was cited for it (Hsu 1978). Liu (2000) didn't cite any specimen for this species in the second edition of *Flora of Taiwan* either. We also couldn't find any its specimen from Taiwan in herbaria. The above description of this species is from second edition of *Flora of Taiwan* (Liu 2000).

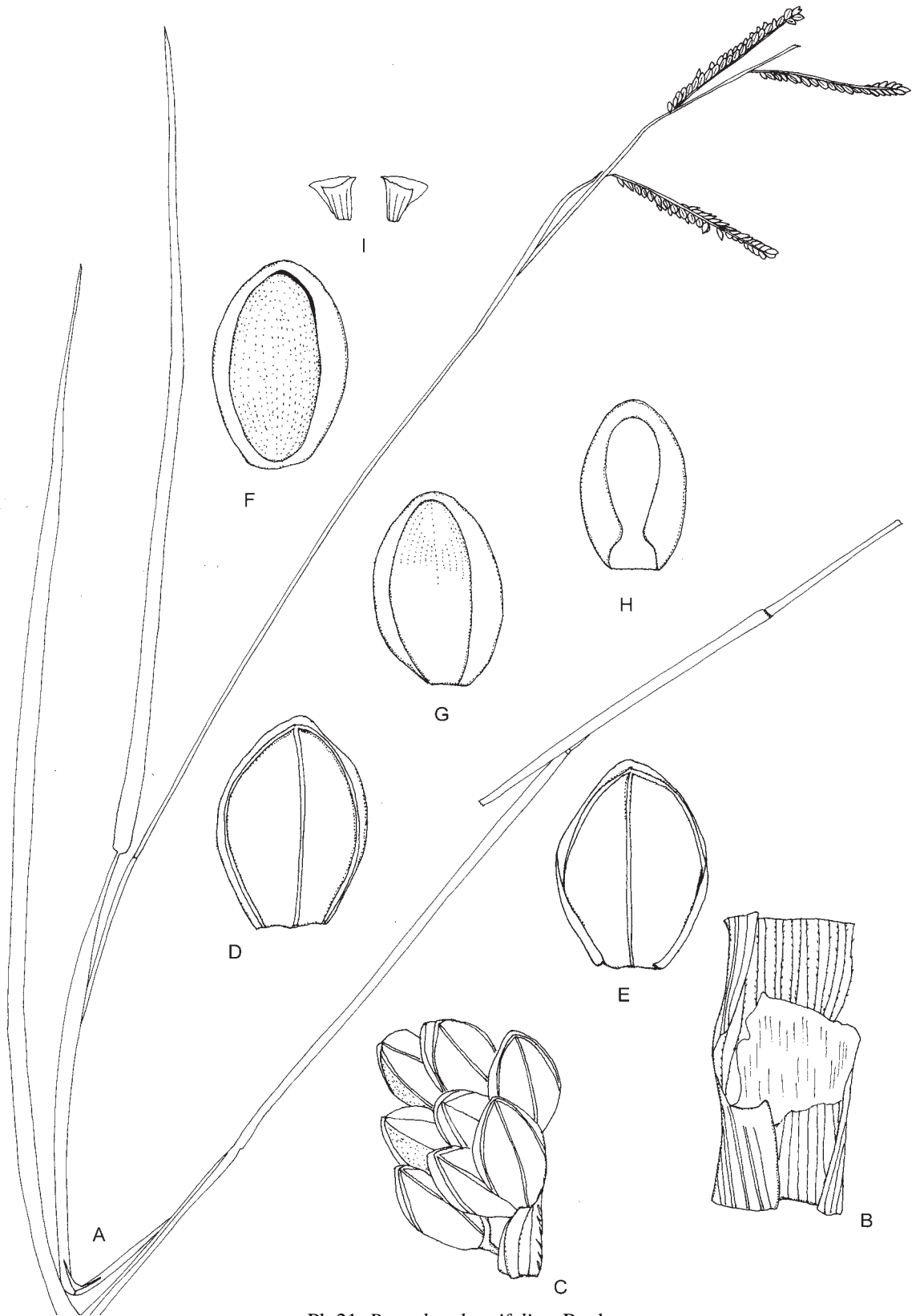
**5. *Paspalum longifolium*** Roxb., Fl. Ind. 1: 283. 1820; Hsu, *Taiwania* 16: 292. 1971; Hsu, Fl. Taiwan 5: 586. 1978; Koyama, Grass. Jap. Neighb. Reg. 361. 1987; Liu, Fl. Taiwan. ed. 2, 5: 497. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 530. 2006. 長葉雀稗 Pl. 21

Perennials, tufted. Culms erect, of moderate texture, 80-130 cm tall, glabrous, culm nodes glabrous. Leaf sheaths laterally compressed, keeled, surface glabrous, or densely pilose with tubercle-based hairs near the margins, joint between sheath and blade pilose. Ligule a glabrous membrane, 1-2 mm long. Blades cauline, linear, flat, 10-30 cm long, 5-10 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in racemose racemes, 4-15 cm long, axis bearded in axils. Racemes 5-20, ascending, straight or flexuous, 4-8 cm long. Rachis tenacious, angular, midrib narrow, clearly winged, 2-4 mm wide, margins scabrous. Pedicels short. Spikelets bisexual, paired, homomorphic, imbricate, dorsally compressed, obovate, 2-2.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume broadly ovate, 2-2.5 mm long, as long as spikelet, membranous, 3-veined, not keeled, veins glabrous, surface puberulent near the margins, apex obtuse or acute, awnless. Lower florets barren, epaleate. Lower lemma ovate, 2-2.5 mm long, membranous, 3-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Upper floret pale gray. Upper lemma obovate, 2-2.5 mm long, coriaceous, surface punctulate-striate, apex acute, awnless. Upper palea ovate, as long as upper lemma, coriaceous, 2-veined, surface punctulate-striate.

[Distribution] India, Nepal, Sri Lanka, Indochina, Malesia, northern Australia and the Ryukyus.

[Habitat] Taiwan, solitary or in groups in moist places.

[Taiwan] TAIPEI: Yangminshan, *Hsu 935* (TAI); Nankang, *Wang 726* (HAST). ILAN: Tali, *Hsu 801* (TAI). PINGTUNG: Nanjenshan, *Chang 7930*(PPI). TAITUNG: Anshu, *Hsu 1064* (TAI).



Pl. 21. *Paspalum longifolium* Roxb.

A. habit; B. ligule; C. part of raceme; D. upper glume; E. lower lemma; F. floret; G. upper lemma; H. upper palea; I. lodicules.

**6. *Paspalum paniculatum*** L. Syst. Nat. ed. 10, 2: 855.1759; Kuoh *et al.*, Taiwania 44: 516. 1999; Liu, Fl. Taiwan. ed. 2, 5: 500. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 529. 2006. 多穗雀稗 Photo 62-63

Perennials, tufted. Culms erect or geniculately ascending, robust, 30-120 cm tall, glabrous, culm nodes pubescent. Leaf sheaths surface densely hispid with tubercle-based hairs near the margins. Ligule a membrane, hispid on back side, 0.2-0.5 mm long. Blades cauline, linear-lanceolate or linear, flat, 5-35 cm long, 6-20 mm wide, margins usually undulate and scabrous, apex acuminate, surface hispid with tubercle-based hairs on both sides. Inflorescence in racemose racemes, 5-20 cm long, axis bearded in axils, base exerted from uppermost sheath. Racemes 7-60, ascending, straight or arcuate, 4-12 cm long. Rachis tenacious, angular, midrib narrow, narrowly winged, 0.5 mm wide, margins smooth. Pedicels short. Spikelets bisexual, paired, homomorphic, imbricate, dorsally compressed, obovate or orbicular-elliptic, 1.2-1.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume obovate or orbicular-elliptic, 1.2-1.5 mm long, as long as spikelet, membranous, 3-veined, not keeled, veins glabrous, surface pubescent, margins smooth, apex rounded, awnless. Lower florets barren, epaleate. Lower lemma ovate, 1.2-1.5 mm long, membranous, 3-veined, surface pubescent near the margins, apex rounded, awnless. Upper floret pale gray. Upper lemma elliptic, 1.2-1.5 mm long, coriaceous, surface punctulate-striate, apex obtuse. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface punctulate-striate.

[Distribution] Tropical South America and western Africa, naturalized elsewhere in tropics.

[Habitat] Taiwan, naturalized at the central part of the island, in moist places along roadsides.

[Taiwan] MIAOLI: Cholan, Wang 12390 (TNM). TAICHUNG: Lienkeng Lane, Wang 12092 (TNM); Shingsay, Kuoh 1516 (TAI). NANTOU: Guohshing, Liao s. n. Oct. 5, 2001 (TNM), Ku 1728 (HAST); Tungpu, Chen 6862 (TAIE).

**7. *Paspalum scrobiculatum*** L., Mant. Pl.1: 29. 1767; Hsu, Taiwania 16: 292. 1971; Hsu, Fl. Taiwan 5: 587. 1978; Koyama, Grass. Jap. Neighb. Reg. 361. 1987; Liu, Fl. Taiwan. ed. 2, 5: 500. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 528. 2006.

**7a. *Paspalum scrobiculatum* var. *scrobiculatum***

鴨草 Photo 64-65

Perennials, tufted. Culms erect or decumbent, of moderate texture, 50-100 cm tall, glabrous, culm nodes glabrous. Leaf sheaths laterally compressed, keeled, surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule a glabrous membrane, 1 mm long. Blades cauline, linear, flat, 15-40 cm long, 5-12 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in racemose racemes, 1-5 cm long, axis scaberulous. Racemes 2-5, ascending,

straight or arcuate, 3-6 cm long, pubescent at base. Rachis tenacious, flattened, midrib low and rounded, clearly winged, 1.5-3 mm wide, margins scabrous. Pedicels short. Spikelets bisexual, solitary, imbricate, dorsally compressed, ovate or ovate-elliptic, 2.5-3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume ovate, 2.5-3 mm long, as long as spikelet, membranous, 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex obtuse, awnless. Lower florets barren, epaleate. Lower lemma ovate, 2.5-3 mm long, membranous, 5 to 7-veined, veins glabrous, surface glabrous, margins smooth, apex obtuse, awnless. Upper floret dark brown. Upper lemma ovate, 2.2-2.5 mm long, coriaceous, surface punctulate-striate, apex obtuse, awnless. Upper palea ovate, as long as upper lemma, coriaceous, 2-veined, surface punctulate-striate.

[Distribution] Tropical Asia and Pacific islands.

[Habitat] Taiwan, common in tea plantation, roadsides, dry fields, grasslands and waste places.

[Taiwan] TAIPEI: Pechatienshan, *Yang 1968* (TNM). KEELUNG: *Suzuki s. n.* Jul. 4, 1936 (TAI).

MIAOLI: Tahu, *Chen 7* (TAI). TAICHUNG: Salu, *Lin s. n.* Apr. 17, 1970 (TAI).

KAOHSIUNG: *Jong 1155* (PPI). TAITUNG: Lanyu, *Yeh 190* (PPI).

**7b. *Paspalum scrobiculatum* var. *bispicatum* Hackel, Allg. Bot. Z. Syst. 20: 146.**

1914; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 529. 2006. 台灣雀稗

*Paspalum commersonii* Lam., *Tabl. Encycl.* 1: 175. 1791; Hsu, *Taiwania* 16: 291. 1971; Hsu, *Fl. Taiwan* 5: 581. 1978; Liu, *Fl. Taiwan*. ed. 2, 5: 495. 2000.

*Paspalum formosanum* Honda, *Bot. Mag. (Tokyo)* 36: 115. 1922.

Perennials, tufted. Culms erect or geniculately ascending, slender, 20-40 cm tall, glabrous, culm nodes glabrous or pubescent. Leaf sheaths laterally compressed, keeled, surface sparsely pilose. Ligule a glabrous membrane, 1 mm long. Blades cauline, linear-lanceolate, flat, 5-15 cm long, 2-6 mm wide, margins smooth, apex acuminate, surface sparsely to densely pilose, sparsely with tubercle-based hairs on both sides. Inflorescence in racemose racemes, 1-3 cm long, axis scaberulous. Racemes 2-4, ascending, straight or arcuate, 2-4 cm long, pubescent at base. Rachis tenacious, flattened, midrib low and rounded, clearly winged, 1.5 mm wide, margins scabrous. Pedicels short, margins scaberulous or pilose. Spikelets bisexual, solitary, imbricate, dorsally compressed, ovate-elliptic, 2-2.3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume suborbicular, 2-2.3 mm long, as long as spikelet, membranous, 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex obtuse, awnless. Lower florets barren, epaleate. Lower lemma broadly ovate, 2-2.3 mm long, membranous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex obtuse, awnless. Upper floret mid-brown. Upper lemma ovate, 2 mm long, coriaceous, surface punctulate-striate, apex acute, awnless. Upper palea ovate, as long as upper lemma, coriaceous, 2-veined, surface punctulate-striate. Anthers 3, 1 mm long.

[Distribution] Tropics and subtropics of the Old World.

[Habitat] Taiwan, at plains in moist place.

[Taiwan] TAIPEI: Hsinhuatien, *Hsu 176* (TAI); Paishawan, *Kuoh 8923* (TAI). PINGTUNG: Checheng, *Chang 514* (PPI). TAITUNG: Lanyu, *Chang 7673* (PPI).

**7c. *Paspalum scrobiculatum* var. *orbiculare*** (G. Forster) Hackel, Bot. Jahrb. Syst. 6: 233. 1885; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 529. 2006.

圓果雀稗 Pl. 22

*Paspalum orbiculare* G. Forst., Fl. Ins. Austr. 7. 1786; Hsu, Taiwania 16: 292. 1971; Hsu, Fl. Taiwan 5: 587. 1978; Koyama, Grass. Jap. Neighb. Reg. 361. 1987; Liu, Fl. Taiwan. ed. 2, 5: 500. 2000.

Perennials, tufted. Culms erect or decumbent, of moderate texture, 40-80 cm tall, glabrous, culm nodes glabrous. Leaf sheaths laterally compressed, keeled, surface glabrous, outer margins glabrous, joint between sheath and blade pilose. Ligule a glabrous membrane, 1-1.5 mm long. Blades cauline, linear, flat, 5-20 cm long, 5-10 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in racemose racemes, 1-5 cm long, axis scaberulous. Racemes 2-5, ascending, straight or arcuate, 3-6 cm long, pubescent at base. Rachis tenacious, flattened, midrib low and rounded, clearly winged, 1.5-3 mm wide, margins scabrous. Pedicels short. Spikelets bisexual, solitary, imbricate, dorsally compressed, obovate or elliptic, 2-2.2 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume suborbicular, 2-2.2 mm long, as long as spikelet, membranous, 3 to 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex obtuse, awnless. Lower florets barren, epaleate. Lower lemma broadly ovate, 2-2.2 mm long, membranous, 3 to 5-veined, veins glabrous, surface glabrous, margins smooth, apex obtuse, awnless. Upper floret yellowish brown or mid-brown. Upper lemma ovate, 2 mm long, coriaceous, surface punctulate-striate, apex obtuse, awnless. Upper palea ovate, as long as upper lemma, coriaceous, 2-veined, surface punctulate-striate.

[Distribution] India, Nepal, Sri Lanka, Indochina, Malesia, northern Australia and Polynesia.

[Habitat] Taiwan, in moist places.

[Taiwan] TAIPEI: Neihu, *Lin 845* (TAI). ILAN: Wuchieh, *Wang 9882* (TNM). TAOYUAN:

Dakuahsiling, *Chen 476* (TNM). HSINCHU: Lienhua Temple, *Yang 4978* (TNM). MIAOLI:

Chuhuangkeng, *Hsu 120* (TAI). TAICHUNG: Wangkaoliao, *Wang 13109* (TNM).

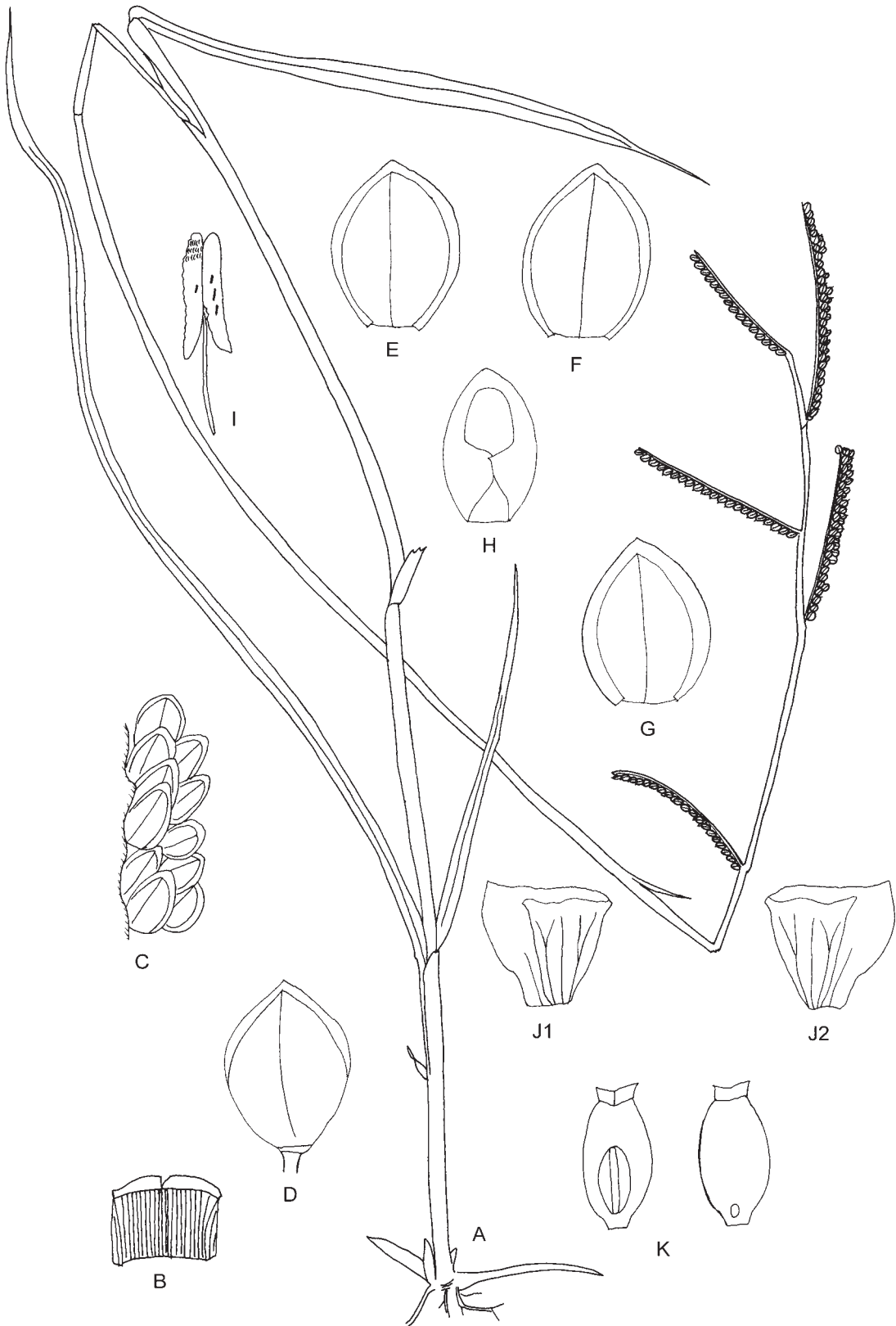
CHANGHWA: Lukang, *Yang 5591* (TNM). CHIAYI: Alishan, *Yang 4041* (PPI). TAINAN:

Hsinhua, *Yang 1134* (PPI). PINGTUNG: Laopei, *Yang 3882* (PPI). TAITUNG: Chaiwuhsi,

*Wu 11-011* (TNM); Lanyu: *Yeh 182* (PPI).

**8. *Paspalum thunbergii*** Kunth ex Steud., Nomencl. Bot. ed. 2, 2: 273. 1841; Hsu, Taiwania 16(2): 294. 1971; Hsu, Fl. Taiwan 5: 588. 1978; Liu, Fl. Taiwan. ed. 2, 5: 500. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 530. 2006.

雀稗



Pl. 22. *Paspalum scrobiculatum* var. *orbiculare* (G. Forster) Hackel

A. habit; B. ligule; C. part of raceme; D. spikelet; E. upper glume; F. lower lemma; G. upper lemma; H. upper palea; I. anther; J. lodicules; K. caryopsis.

*Paspalum dissectum* Thunberg, Fl. Jap. 45. 1784, non L. Sp. Pl. (ed. 2) 1: 81. 1762.

*Paspalum scrobiculatum* L. var. *thunbergii* (Kunth ex Steudel) Makino, Bot. Mag. (Tokyo) 10: 60. 1896.

Perennials, tufted, with knotty rhizomes. Culms erect, slender, 40-100 cm tall, glabrous, culm nodes glabrous or pubescent. Leaf sheaths laterally compressed, keeled, surface glabrous, or densely pilose with tubercle-based hairs. Ligule a glabrous membrane, 1-2 mm long. Blades cauline, linear, flat, 10-20 cm long, 5-10 mm wide, margins scabrous, apex acuminate, surface densely pilose on both sides. Inflorescence in racemose racemes, 3-10 cm long, axis bearded in axils, base exerted from uppermost sheath. Racemes 2-6, ascending, straight, 3-5 cm long. Rachis tenacious, angular, midrib narrow, clearly winged, 10 mm wide, margins scabrous. Pedicels short. Spikelets bisexual, paired, usually one well-developed, another reduced, not developed, imbricate, dorsally compressed, orbicular-elliptic or elliptic, 2.5-2.7 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume orbicular-elliptic to elliptic, 2.5-2.7 mm long, as long as spikelet, membranous, 3-veined, not keeled, veins glabrous, surface puberulent below the middle, apex rounded or obtuse, awnless. Lower florets barren, epaleate. Lower lemma elliptic-ovate or elliptic, 2.5-2.7 mm long, membranous, 3-veined, veins glabrous, surface glabrous, margins smooth, apex rounded or obtuse, awnless. Upper floret yellowish brown or pale gray. Upper lemma orbicular-elliptic or elliptic, 2.5-2.7 mm long, coriaceous, surface punctulate-striate, apex obtuse, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface punctulate-striate. [Distribution] China and Japan.

[Habitat] Taiwan, in mountainous areas.

[Taiwan] TAIPEI: Tatungshan, *Kao 4251* (TAI). PINGTUNG: Oluanpi, *Suzuki 12553* (TAI).

**9. *Paspalum urvillei* Steud., Syn. Pl. Glumac. 1: 24. 1854; Hsu, Taiwania 16: 294.**

1971; Hsu, Fl. Taiwan 5: 588. 1978; Liu, Fl. Taiwan. ed. 2, 5: 501. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 527. 2006. 吳氏雀稗 Photo 66

Perennials, tufted, rhizomatous. Culms erect, robust, 50-200 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, or densely hispid near the margins, joint between sheath and blade pilose. Ligule a glabrous membrane, 3-5 mm long. Blades cauline, linear, flat, 15-50 cm long, 5-15 mm wide, margins usually undulate and scabrous, apex acuminate, surface glabrous, or pilose with tubercle-based hairs on adaxial side of basal leaves. Inflorescence in racemose racemes, 10-30 cm long, axis bearded in axils, base exerted from uppermost sheath. Racemes 10-20, erect to ascending, straight or arcuate, 8-15 cm long. Rachis tenacious, flattened, midrib low and rounded, clearly winged, 1-1.5 mm wide, margins scabrous. Pedicels linear, flattened, with discoid tips, margins scaberulous. Spikelets bisexual, paired, homomorphic, imbricate, dorsally compressed, ovate, 2-3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume ovate, 2-3 mm long, as long as spikelet, membranous, 3-veined, not keeled, veins glabrous,

surface glabrous, or sparsely pubescent, margins densely fringed with long white hairs, apex acute, awnless. Lower florets barren, epaleate. Lower lemma ovate, 2-3 mm long, membranous, 3-veined, surface glabrous, margins densely fringed with long white hairs, apex acute, awnless. Upper floret pale gray. Upper lemma elliptic, 1.6-2 mm long, coriaceous, surface papillose-striate, apex obtuse, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface papillose-striate. Caryopsis glabrous, dorso-ventrally compressed, elliptic, 1.5 mm long.

[Distribution] Originally from Uruguay and Argentina, but now introduced into many warm countries.

[Habitat] Taiwan, along ditches and roadsides, also in waste places.

[Taiwan] TAIPEI: Fulung, *Huang 103* (TNM); Nankang, *Peng 6974* (HAST). KEELUNG: *Yang 19239* (TNM). ILAN: Wuchieh, *Wang 9881* (TNM). TAOYUAN: Tahsi, *Wang 11125* (TNM). HSINCHU: Hsiangshan, *Yang 13869* (TNM). MIAOLI: Sanyi shuiching, *Yu 488* (TAI). NANTOU: Tsaotun, *Wang 8980* (TNM); Tungpu, *Chen 6868* (TAIE). PINGTUNG: Hsiaokueihu Forest Road, *Chen 589* (PPI). HUALIEN: Fushih Village, *Yang 13200* (TNM).

**10. *Paspalum vaginatum* Sw.**, Prodr. 21. 1788; Hsu, *Taiwania* 16: 294. 1971; Hsu, *Fl. Taiwan* 5: 588. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 359. 1987; Liu, *Fl. Taiwan*. ed. 2, 5: 501. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 528. 2006. 海雀稗 Photo 67-68

Perennials, stoloniferous, rhizomatous. Culms of moderate texture, 10-50 cm tall, glabrous, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade pilose. Ligule a glabrous membrane, 1-2 mm long. Blades cauline, linear, flat, 5-15 cm long, 3-8 mm wide, margins smooth, apex acute, surface glabrous. Inflorescence in digitate racemes, 10-30 cm long, base exerted from uppermost sheath. Racemes 2-3, divaricate, straight, 2-5 cm long, glabrous at base. Rachis tenacious, angular, midrib thick, clearly winged, 1-2 mm wide, margins smooth. Pedicels short. Spikelets bisexual, solitary, imbricate, dorsally compressed, oblong-lanceolate, 3.5-4 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume oblong-lanceolate, 3.5-4 mm long, as long as spikelet, chartaceous, 5-veined, midvein absent, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower florets barren, epaleate. Lower lemma oblong-lanceolate, 3.5-4 mm long, chartaceous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Upper floret pale gray. Upper lemma lanceolate, 2.5 mm long, subcoriaceous, surface smooth, apex acute, ciliolate, awnless. Upper palea lanceolate, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Anthers 3, 1.5 mm long.

[Distribution] Tropics and subtropics of the Old World.

[Habitat] Taiwan, halophilous.

[Taiwan] ILAN: Kweishan, *Hsu 876* (TAI). MIAOLI: Tongshiau, *Kao 5699* (TAI). YUNLIN: Mailiao, *Chang 9477* (PPI). CHIAYI: Dungshyr, *Wang 7895* (HAST). TAINAN: Anping, *Suzuki 731* (TAI). KAOHSIUNG: Tungshatao, *Huang 16627* (TAI); Hsiaoliuchiu, *Chen 6808* (TAIE).

PINGTUNG: Liuchiu, *Lo 50* (PPI). TAITUNG: Lutao, *Chen 7174* (TNM); Lanyu, *Sasaki s. n.* Jun. 8, 1926 (TAI).

**11. *Paspalum virgatum* L.**, Syst. Nat. ed. 10. 2: 855. 1759; Hsu, *Taiwania* 18: 71.

1973; Hsu, *Fl. Taiwan* 5: 589. 1978; Liu, *Fl. Taiwan*. ed. 2, 5: 501. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 527. 2006. 粗稗雀稗

Perennials, tufted, rhizomatous. Culms erect, robust, 100-200 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins hairy, joint between sheath and blade pubescent. Ligule a glabrous membrane, 2-3 mm long. Blades cauline, linear, flat, 30-75 cm long, 10-25 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in racemose racemes, 10-30 cm long, axis pilose with tubercle-based hairs. Racemes 20, ascending, straight, 5-15 cm long, pubescent at base. Rachis tenacious, flattened, clearly winged, 1.5 mm wide, margins scabrous sparsely with stiff long hair. Pedicels short. Spikelets bisexual, paired, homomorphic, dorsally compressed, obovate, 2.2-2.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume obovate, 2.2-2.5 mm long, as long as spikelet, membranous, 3 to 5-veined, not keeled, surface puberulent, margins fringed with short silky hairs above middle, apex obtuse, awnless. Lower florets barren, epaleate. Lower lemma obovate, 2.2-2.5 mm long, membranous, 3 to 5-veined, surface puberulous, margins fringed with short silky hairs above middle, apex obtuse, awnless. Upper floret yellowish brown. Upper lemma ovate, 2.2-2.5 mm long, coriaceous, surface punctulate-striate, apex obtuse, awnless. Upper palea ovate, as long as upper lemma, coriaceous, 2-veined, surface punctulate-striate.

[Distribution] Originally from Jamaica, now naturalized elsewhere.

[Habitat] Taiwan, naturalized in the northern part.

[Taiwan] TAIPEI: Nankang, *Hsu 14157* (TAI).

**17. *Pennisetum* Rich. in Pers., Syn. Pl. 1: 72. 1805.**

### 狼尾草屬

Annuals or perennials; culms solid, erect or ascending, sometimes creeping. Ligule short, glabrous or ciliate; blades linear, narrow or wide, flat conduplicate or inrolled, with scabrid margins. Inflorescence a spike-like panicle, composed of spiculate units, arranged on all sides of an elongated central axis, rarely consisting of 2-4-spikelets and remaining partly or totally enclosed in upper-most leaf; units consisting of 1-4-spikelets inside an involucre, consisting of bristles, unites sessile or stipitate, falling off as a whole; bristles free, unequal, scabrid or feathery. Spikelets terete, ovate-lanceolate, 2-flowered; glumes and lemma thin and hyaline, glabrous or hairy; lower glume small, 0 to 3-veined; upper glume larger, 1 to 3-veined; lower lemma slightly shorter than spikelet, or sometimes as long, with broadly incurved margins, 3 to 8-veined; lower palea present or absent; upper lemma reaching apex of spikelet, with broadly incurved margins, 4 to 7-veined; upper palea 2-veined,

thin or less thin; lodicules absent; stamens 3, anthers linear with glabrous or penicillate tip, styles connate, stigma long, exerted apically, straight; flower protogynous. Caryopsis free, enclosed inside indurate or nonindurated upper lemma and upper palea, dorsally compressed, elliptic, pear shaped or obovate; hilum punctiform, embryo large.

About 80 species throughout the tropics. Five species in Taiwan.

The genus *Pennisetum* is closely related to *Cenchrus*. Recently some researchers include the genus *Pennisetum* in the genus *Cenchrus* based on molecular phylogeny (Chemisquy *et al.* 2010). We hesitate to accept such an extreme deduction and still regard *Pennisetum* as a separate genus (Lin and Chen 2014).

### KEY TO THE SPECIES

1. Culms stoloniferous; inflorescence nearly enclosed in upper sheaths when flowering . . . . .2. *P. clandestinum*
1. Culms not stoloniferous; inflorescence exerted.
  2. Lemma dimorphic, inner bristles densely silky-plumose at base
    3. Flowering culms much branched; upper florets easily disarticulating at maturity; upper lemma subcoriaceous, surface smooth and shiny . . . . .3. *P. polystachion*
    3. Flowering culms less branched or solitary; upper florets not disarticulating at maturity; upper lemma chartaceous, surface sparsely hispidulous . . . . .5. *P. setaceum*
  3. Lemma monomorphic; inner bristles not plumose.
    4. Spikelets with 2-3mm long pedicel; anthers without a tuft of hairs at one end . . . . .1. *P. alopecuroides*
    4. Spikelets sessile; anthers with a tuft of hairs at one end . . . . .4. *P. purpureum*

**1. *Pennisetum alopecuroides* (L.) Spreng., Syst. Veg. 1: 303. 1825; Hsu, Taiwania 16: 295. 1971; Hsu, Fl. Taiwan 5: 590, *pl.* 1442. 1978; Liu, Fl. Taiwan. ed. 2, 5: 502. *pl.* 209. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 550. 2006.**

狼尾草 Photo 69-70

*Panicum alopecuroides* L., Sp. Pl. ed. 2. 1: 82. 1762.

*Pennisetum japonicum* Trin. in Sprengel, Neue Entdeck. Pflanzenk. 2: 76. 1821.

*Pennisetum alopecuroides* var. *erythrochaetum* Ohwi, Acta Phytotax. Geobot. 4: 59. 1935.

Perennials, tufted. Culms erect, robust, 30-120 cm tall, glabrous, culm nodes glabrous. Leaf sheaths laterally compressed, keeled, surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule a fringe of hairs, 0.5 mm long. Blades cauline, linear, flat, 10-60 cm long, 5-8 mm wide, margins scabrous, apex acuminate, surface sparsely pilose with tubercle-based hairs on adaxial side of basal leaves. Inflorescence in a panicle, cylindrical, 5-25 cm long, axis hispid, base exerted from uppermost sheath, without conspicuous branches, branches contracted into spikelets clusters, spikelets subtended by an involucre of bristles. Involucres with a basal 2-3 mm stipe,

enclosing 1 spikelet, bristles slender and free to the base, margins not plumose, falling with spikelets when mature. Spikelets bisexual, dorsally compressed, narrowly lanceolate, 5-8 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume reduced, minute, ovate, 0.6 mm long, hyaline, veinless. Upper glume lanceolate, 2.5-3 mm long, 0.3-0.5 time of length as the spikelet, membranous, 3 to 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, ciliolate, awnless. Lower florets barren, epaleate. Lower lemma broadly lanceolate, 5-8 mm long, chartaceous, 7 to 11-veined, veins scaberulous, surface glabrous, margins smooth, apex acute, ciliolate, awnless. Upper floret pale gray. Upper lemma lanceolate, 5-8 mm long, subcoriaceous, surface smooth, apex acute, awnless. Upper palea lanceolate, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Anthers 3, 3 mm long.

[Distribution] Myanmar, Malesia, Australia, Polynesia, China and Japan.

[Habitat] Taiwan, common on sunny hillsides, roadsides and rice fields.

[Taiwan] TAIPEI: Leikungpo, *Kuoh 2046* (TAI); Chihsingshan, *Peng 9880* (HAST); Erziping Recreation Area, *Chen 6431* (TAIE). ILAN: Kueishan, *Kuoh 2481* (TAI). TAOYUAN: Tachi, *K. C. Yang 5012* (TNM). HSINCHU: Litungshan, *Leong 1567* (TNM). NANTOU: Chitou, *Kuoh 3587* (TAI). TAINAN: Kuantzuling, *Wang 20012* (TAI). MATSU: *Lai 1258* (TAI).

**2. *Pennisetum clandestinum*** Hochst. ex Chiov., *Ann. Ist. Bot. Roma* 8: 41. 1903; Hsu, *Taiwania* 16: 295. 1971; Hsu, *Fl. Taiwan* 5: 592, *pl. 1443*. 1978; Liu, *Fl. Taiwan*. ed. 2, 5: 502. *pl. 210*. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 549. 2006. 鋪地狼尾草

Perennials, stoloniferous, rhizomatous. Culms of moderate texture, 20 cm tall, glabrous, rooting from lower nodes, culm nodes glabrous. Leaf sheaths surface pilose. Ligule a ciliate membrane, 1-2 mm long. Blades cauline, linear, flat, 15 cm long, 2-5 mm wide, margins scabrous, apex acute, surface densely pilose on both sides. Inflorescence in a reduced raceme, with 2-4 spikelets, enclosed within the uppermost leaf sheath, only spikelet tips protruding, spikelets subtended by numerous bristles. Spikelets bisexual, dorsally compressed, narrowly lanceolate, 13-20 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume absent or reduced and minute, cufflike, 1-3 mm long. Lower florets barren, epaleate. Lower lemma lanceolate, 13-20 mm long, chartaceous, 10 to 13-veined, surface glabrous, margins smooth, apex acuminate, awnless. Upper lemma lanceolate, 13-20 mm long, chartaceous, apex acuminate, awnless. Upper palea lanceolate, as long as upper lemma, chartaceous, surface glabrous.

[Distribution] Originally from tropical East Africa, but introduced into many other countries.

[Taiwan] TAOYUAN: Yangmei, *Peng 2958* (TAI). TAICHUNG: Lishan, *Hsu 12462* (TAI). NANTOU: Chianchen, *Huang 7* (TAI).

[Note] This species was introduced into Taiwan as a fodder grass. We never found it in wild fields.

**3. *Pennisetum polystachion*** (L.) Schult., *Mant.* 2: 146. 1824; Liu, *Fl. Taiwan*. ed. 2,

5: 505. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 550. 2006.

牧地狼尾草 Photo 71-72

*Panicum polystachion* L., Syst. Nat. ed. 10, 2: 870. 1759.

*Cenchrus setosus* Sw., Prodr. 26. 1788.

*Pennisetum setosum* (Sw.) Rich. in Pers., Syn. Pl. 1: 72. 1805; Hsu, Taiwania 16: 295. 1971; Hsu, Fl. Taiwan 5: 592. 1978.

Annuals or short-lived perennial, tufted. Culms erect, robust, 50-150 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, or sparsely hispid, joint between sheath and blade glabrous. Ligule a ciliate membrane, 1 mm long. Blades cauline, linear, flat, 5-20 cm long, 3-15 mm wide, margins scabrous, apex acuminate, surface hispid on both sides. Inflorescence in a panicle, terminal and axillary from upper nodes, cylindrical, 10-25 cm long, axis angular with sharp decurrent wings, base exerted from uppermost sheath, without conspicuous branches, branches contracted into spikelets clusters, spikelets subtended by an involucre of bristles. Involucres sessile, enclosing 1 spikelet, bristles slender and free to the base, margins densely silky-plumose in lower half, falling with spikelets when mature. Spikelets bisexual, dorsally compressed, narrowly lanceolate, 3-4.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent or reduced, minute, triangular. Upper glume broadly lanceolate, 3-4.5 mm long, as long as spikelet, membranous, 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, ciliolate, awnless. Lower florets barren, epaleate. Lower lemma broadly lanceolate, 2.5-3.5 mm long, membranous, 5-veined, veins glabrous, surface sparsely scaberulous above the middle, margins smooth, apex acute, ciliolate, awnless. Upper floret pale gray. Upper lemma lanceolate, 2 mm long, subcoriaceous, surface smooth, apex acute, ciliolate, awnless. Upper palea lanceolate, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Anthers 3, 1.2 mm long.

[Distribution] Originally from tropical America and Africa, but now introduced to many countries.

[Habitat] Taiwan, hillsides in the central and southern parts.

[Taiwan] MIAOLI: Cholan, *Wang 12368* (TNM). TAICHUNG: Tatushan, *Yang 945* (TAI).

CHANGHWA: Taian Village, *Wang 8500* (TNM). CHIAYI: Wuhuliao, *Wang 11890* (TNM).

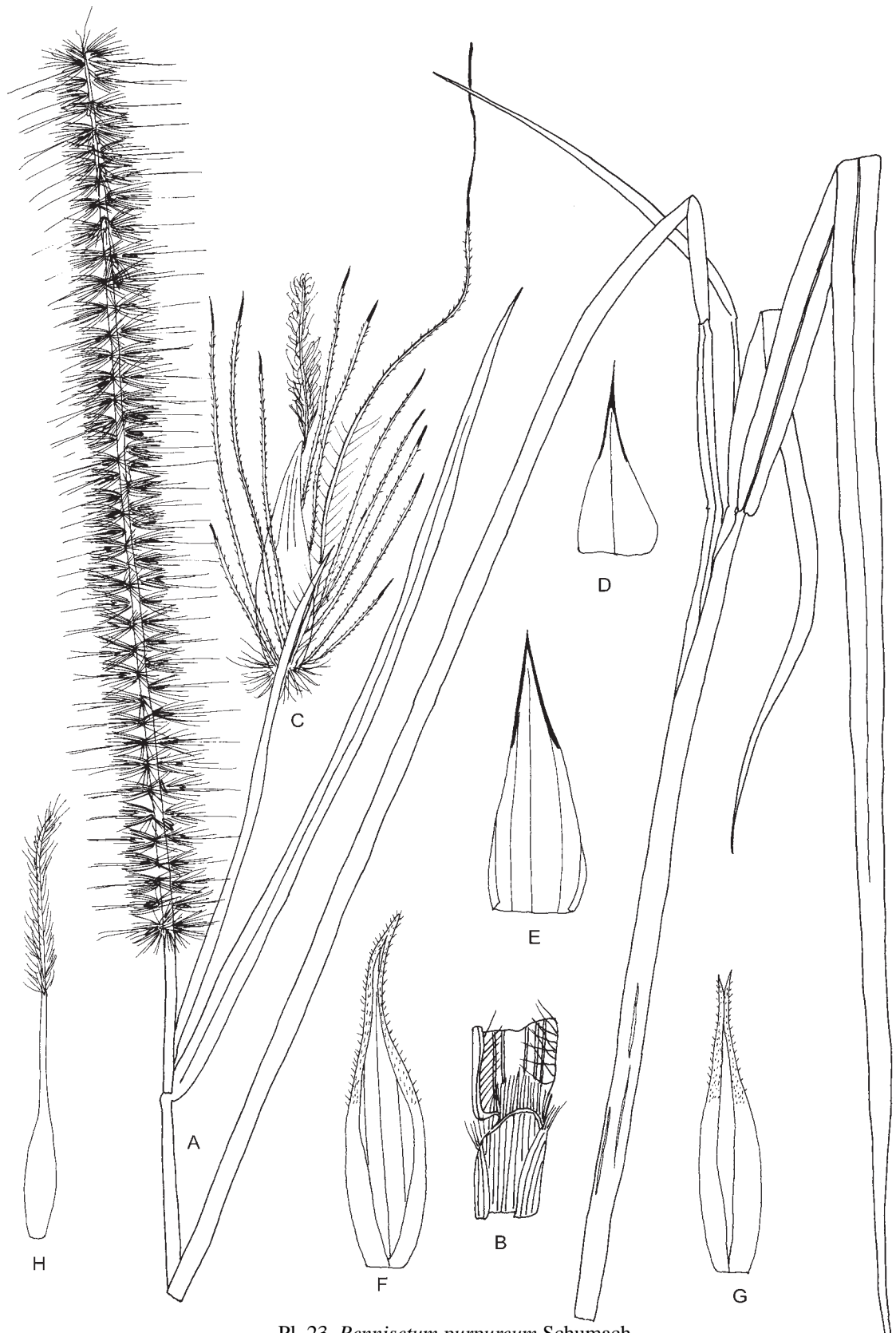
TAINAN: Hsinhua, *Hsu 10446* (TAI). KAOHSIUNG: Tona Forest Road, *Chiu 5927* (TNM);

Paoshan Village, *Ho 929* (HAST). PINGTUNG: Wutai, *Huang 84* (TNM); Hsiaoliuchiu,

*Chen 6814* (TAIE).

**4. *Pennisetum purpureum*** Schumach., Beskr. Guin. Pl. 44. 1827; Hsu, Taiwania 16: 295. 1971; Hsu, Fl. Taiwan 5: 592. 1978; Koyama, Grass. Jap. Neighb. Reg. 376. 1987; Liu, Fl. Taiwan. ed. 2, 5: 505. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 550. 2006. 象草 Pl. 23, Photo 73-74

Perennials, tufted, rhizomatous. Culms erect, reed like, 200-400 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, or sparsely hispid, outer margins glabrous, joint between



Pl. 23. *Pennisetum purpureum* Schumach.

A. habit; B. ligule; C. spikelet; D. upper glume; E. lower lemma; F. upper lemma; G. upper palea; H. ovary.



Pl. 24. *Pennisetum setaceum* (Forsk.) Chiov.

A. habit; B. joint between sheath and blade: B1. ligule, B2. Leaf sheath; C. spikelet with bristles; D. spikelet without bristles; E. upper glume; F. lower lemma; G. lower palea; H. upper lemma; I. upper palea; J. anthers.

sheath and blade glabrous. Ligule a ciliate membrane, 1.5-5 mm long. Blades cauline, linear, flat, 20-120 cm long, 10-50 mm wide, margins scabrous, apex acuminate, surface glabrous, or sparsely to densely hispid, sparsely with tubercle-based hairs on both sides. Inflorescence in a panicle, terminal and axillary from upper nodes, cylindrical, 10-30 cm long, axis pubescent, base exerted from uppermost sheath, without conspicuous branches, branches contracted into spikelets clusters, spikelets subtended by an involucre of bristles. Involucres subsessile, enclosing 1-5 spikelets, bristles slender and free to the base, margins not plumose, falling with spikelets when mature. Spikelets bisexual, dorsally compressed, narrowly lanceolate, 5-7 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume absent. Upper glume lanceolate, 1-3 mm long, 0.25-0.5 time of length as the spikelet, membranous, 1-veined, not keeled, veins scaberulous, surface glabrous, margins smooth, apex acuminate, awnless. Lower florets barren, epaleate. Lower lemma lanceolate, 2.5-5 mm long, chartaceous, 5-veined, veins scaberulous, surface glabrous, margins smooth, apex acuminate, awnless. Upper lemma lanceolate, 5-7 mm long, subcoriaceous, veins scaberulous, surface smooth, surface hispidulous above the middle, apex acuminate, awnless. Upper palea lanceolate, as long as upper lemma, chartaceous, 2-veined, surface hispidulous. Anthers 3, 2.5 mm long.

[Distribution] Originally from tropical Africa, but now introduced into many other tropical countries.

[Habitat] Taiwan, in open areas.

[Taiwan] TAIPEI: Tachienshan, *Yang 1617* (TAI); Mengmengku, *Lu 523* (HAST). TAOYUAN: Yangmei, *Peng 2941* (TAI). MIAOLI: Tapu, *Hsu s. n.* Jun. 30, 1960 (TAI). TAICHUNG: Shalu, *Chen s. n.* Apr. 12, 2000 (TNM). NANTOU: Wukou Temple, *Wang 6440* (TNM). CHIAYI: Tachichiao, *Yang 14494* (TNM). KAOHSIUNG: Liukuei, *Liu s. n.* Apr. 28, 1991 (TNM). PINGTUNG: Kenting, *Hsu s. n.* Sep. 21, 1959 (TAI); Hsiaoliuchiu, *Chen 6813* (TAIE). HUALIEN: Mataian, *Yang 14322* (TNM). TAITUNG: Dolan Forest Farm, *Yang 1432* (TNM); Lutao, *G. P. Hsieh 1865* (PPI).

**5. *Pennisetum setaceum*** (Forssk.) Chiov., *Boll. Soc. Bot. Ital.* 1923: 113. 1923; Clayton and Renvoize, *Fl. Trop. East Afr. Gramineae*: 675. 1982; Webster, *Aus. Paniceae*: 192. 1987; Chaudhary, *Grasses Saud. Ara.*: 385. 1989; Wipff in Barkworth *et. al.* (eds.), *Fl. North America* 25: 527. 2003; Lin and Chen, *TW. J. Biodivers.* 16: 393. 2014. 羽絨狼尾草 Pl. 24, Photo 75

*Phalaris setacea* Forssk., *Fl. Aegypt.-Arab.* 17. 1775.

*Cenchrus setaceus* (Forssk.) Morrone, *Ann. Bot.*, 106: 129. 2010.

Perennials, tufted. Culms erect, of moderate texture, 50-130 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous to densely pilose. Ligule a ciliate membrane, 1-1.5 mm long. Blades cauline, linear, flat, 20-65 cm long, 3-5 mm wide, margins scaberulous, apex acuminate, surface densely, pilose on both sides. Inflorescence a panicle, terminal, cylindrical, 15-20 cm long, axis angular with sharp decurrent wings, base exerted from uppermost sheath, without conspicuous

branches, branches contracted into spikelets clusters, spikelets subtended by an involucre of bristles. Involucres subsessile, enclosing 1 spikelet, bristles slender and free to the base, margins densely silky-plumose in lower half, falling with spikelets when mature. Spikelets bisexual, dorsally compressed, narrowly lanceolate, 4.5-5 mm long, with 2 florets; lower floret reduced, usually sterile, sometimes staminate; upper floret fertile. Lower glume absent or reduced, minute. Upper glume broadly lanceolate, 3.5-4 mm long, membranous, 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower lemma lanceolate, 4.5-5 mm long, chartaceous, 5-7-veined, midvein keeled, veins glabrous, surface sparsely hispidulous, margins smooth, apex acuminate, awnless. Lower palea well developed, membranous, lanceolate, 2-keeled, keel scaberulous. Upper floret pale gray. Upper lemma lanceolate, 3-4.5 mm long, chartaceous to subcoriaceous, but thinner, 5-7-veined, veins glabrous, surface hispidulous, margin smooth, apex mucronate. Upper palea oblong, subcoriaceous, but thinner, 2-veined, surface smooth. Anthers 3, 1.5 mm long.

[Distribution] Native to northern and eastern Africa, south-western Asia. Introduction into Australia, North American, Hawaii and Mexico.

[Habitat] Grassy places on mountain slopes, lawns, wastelands, roadsides.

[Taiwan] MIAOLI: Tapu, *Hsu s.n. June 30, 1960* (TAI). NANTOU: Wandan, *Chen 6193* (TAIE).

CHIAYI: Fanlu, *Kung & Chang 67* (TNM). KAOHSIUNG: Taoyuan, *Chen 7026* (TAIE).

TAITUNG: Tawu, *Liu & Su s.n. June 28, 2003* (TAIF).

[Note] This species was first reported in Taiwan as a cultivated grass (Huang 1979) and was not formally described in any publication. We confirm that it has escaped and been naturalized in Taiwan (Lin and Chen 2014).

## 18. *Pseudoraphis* Griff. ex Pilg., Notizbl. Bot. Gart. Berlin-Dahlem 10: 210. 1928.

### 偽針茅屬

Perennials. Leaf blade linear or lanceolate; ligule membranaceous, short or well-developed; glabrous, hygrophilous. Inflorescence a panicle, composed of slender, spike-like racemes, or consisting of only one raceme; racemes racemously arranged on all sides of central axis, simple, strongly compressed peduncled, ending in setaceous tips. Spikelets solitary, abaxial, alternate, spaced, shortly pedicellate, lanceolate, terete or slightly dorsally compressed, acute, 2-flowered; lower glume small, hyaline, veinless, abaxial; upper glume and lower lemma slightly shorter, flat, with inflexed margins; lower palea present. Rachilla-internode between lemmas stipe-like; upper lemma smaller, acute, thinly membranaceous, hyaline; stamens 3, rudimentary or totally absent; ovary oblong, style 2, shortly fused at base, stigma feathery.

About six species distributed in India, China, Japan and extending to Australia; one species in Taiwan.

### 1. *Pseudoraphis brunoniana* (Wallich & Griffith) Pilger, Notizbl. Bot. Gart.

Berlin-Dahlem 10: 210. 1928; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 548. 2006.

大偽針茅

*Panicum brunonianum* Wallich & Griffith, J. Asiat. Soc. Bengal 5: 574. 1836.

*Pseudoraphis spinescens* auct. non Vickery: Hsu, Taiwania 16: 297. 1971; Hsu, Fl. Taiwan 5: 594, pl.

1444. 1978; Koyama, Grass. Jap. Neighb. Reg. 379. 1987; Liu, Fl. Taiwan. ed. 2, 5: 505. 2000.

Perennials, aquatic, floating on water, with emergent flowering shoots. Culms slender, 20-40 cm tall, glabrous, rooting from lower nodes, culm nodes pubescent. Leaf sheaths longer than internodes, surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule a ciliolate membrane, 1-2 mm long. Blades cauline, linear-lanceolate, flat, 3-9 cm long, 3-6 mm wide, margins hispidulous, apex acute, surface sparsely hispid on adaxial side. Inflorescence in racemose racemes, 5-10 cm long, axis glabrous, base exerted from uppermost sheath, with conspicuous branches, branches ascending, only the uppermost spikelet of each raceme subtended by a single bristle. Bristles slender, persisting on the axis after the spikelets fall. Racemes bearing 2-3 spikelets. Rachis margins scabrous, internodes long and slender. Pedicels short. Spikelets bisexual, solitary, distant, dorsally compressed, narrowly lanceolate, 5-8 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume reduced, minute, 0.5 mm long, hyaline, veinless, surface glabrous, apex rounded, awnless. Upper glume lanceolate, 5-8 mm long, as long as spikelet, chartaceous, 7 to 11-veined, not keeled, surface hispidulous to hispid, apex acuminate, awnless. Lower florets staminate or barren. Lower lemma lanceolate, 4.8-7.8 mm long, chartaceous, 7 to 9-veined, veins glabrous, surface glabrous, margins smooth, apex acuminate, awnless. Lower palea well developed, hyaline, lanceolate, 0.6 time of length as lower lemma, 2-veined, veins smooth. Upper floret shortly stipitate. Upper lemma lanceolate, 2 mm long, subcoriaceous, surface smooth, apex acute, awnless. Upper palea lanceolate, as long as upper lemma, subcoriaceous, 2-veined, surface smooth. Caryopsis glabrous, dorso-ventrally compressed, oblong, 1.8 mm long.

[Distribution] Bangladesh, China, NE India, Myanmar, Philippines, Thailand, Vietnam

[Habitat] Taiwan, growing in shallow water or floating on deep water.

[Taiwan] ILAN: Yuanshan, *Shimada s. n.* Aug. 8, 1942 (TAI). TAOYUAN: Lungtan, *Peng 7222* (HAST). YUNLIN: Huwei, *Suzuki 6446* (TAI). TAINAN: Hsinhua, *Hsu 614* (TAI).

19. *Sacciolepis* Nash in Britton, Man. Fl. N. States 89. 1901.

囊穎草屬

Annuals; culms hollow; ligule membranaceous; leaf blade flat. Inflorescence a spike-like raceme or a contracted panicle, branched from all sides. Spikelets ovate-oblong, gibbous, otherwise terete or slightly laterally compressed, 2-flowered, muticous, articulated with pedicel; rachilla not produced, articulate above lower lemma; upper glume and lower lemma as long as spikelet or upper glume slightly shorter; upper glume inflated at base, 7 to 11-veined; lower lemma not or only little

inflated; lower palea smaller, membranaceous; upper lemma shorter than upper glume, papery, glossy and slightly indurated at maturity, with opaque margins embracing upper palea nearly to apex; upper palea as long or slightly shorter, of same texture; stamens 3; ovary glabrous, style 2, free, stigmas pulvose, exerted below apex. Caryopsis free between upper palea and upper lemma. Together forming a false fruit with knob-like stipe.

About 30 species in tropics, with most species in Africa. One species in Taiwan.

**1. *Sacciolepis indica* (L.) Chase**, Proc. Biol. Soc. Wash. 21: 8. 1908; Hsu, Taiwania 16: 297. 1971; Hsu, Fl. Taiwan 5: 597, *pl.* 1445. 1978; Koyama, Grass. Jap. Neighb. Reg. 317. 1987; Liu, Fl. Taiwan. ed. 2, 5: 507. *pl.* 212. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 511. 2006.

囊穎草 Pl. 25, Photo 76-77

*Aira indica* L., Sp. Pl. 1: 63. 1753.

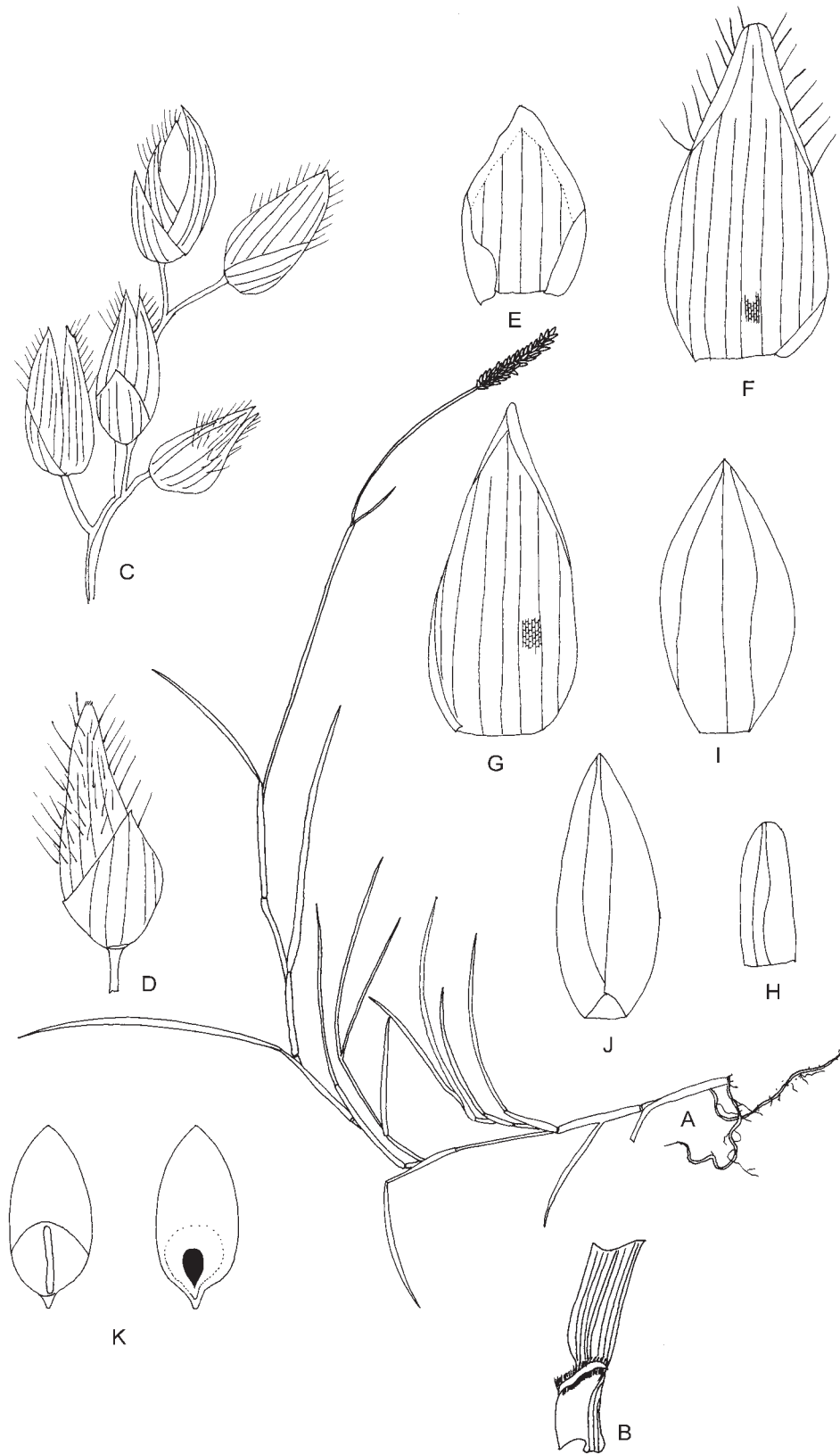
*Panicum indicum* L. var. *oryzeturum* Makino, Bot. Mag. (Tokyo) 27: 28. 1913.

*Sacciolepis indica* var. *oryzeturum* (Makino) Ohwi, Bull. Tokyo Sci. Mus. 18: 3. 1947; Hsu, Taiwania 16: 297. 1971; Hsu, Fl. Taiwan 5: 598. 1978.

Annuals. Culms geniculately ascending or decumbent, slender, 20-100 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade puberulent. Ligule a hairy membrane, 0.2-0.5 mm long. Blades cauline, linear-lanceolate or linear, flat, 5-20 cm long, 0.2-0.5 mm wide, margins scabrous, apex acute, surface glabrous. Inflorescence in a panicle, contracted, cylindrical, 1-6 cm long, axis glabrous, base exerted from uppermost sheath, without conspicuous branches. Pedicels short, terete, with discoid tips, margins smooth. Spikelets bisexual, slightly laterally compressed, lanceolate, 2-2.8 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate, 1-1.5 mm long, 0.35-0.5 time of length as the spikelet, membranous, 3 to 7-veined, not keeled, veins glabrous, surface glabrous, margins hyaline and smooth, apex acute, awnless, clasping at the base of the spikelet. Upper glume lanceolate, 2-2.8 mm long, as long as spikelet, chartaceous, 7 to 11-veined, not keeled, veins glabrous, surface sparsely hispid with tubercle-based hairs, margins hyaline and smooth, apex acute, awnless. Lower florets barren. Lower lemma lanceolate, 2-2.8 mm long, chartaceous, 7 to 11-veined, veins glabrous, surface sparsely hispid with tubercle-based hairs above the middle, margins hyaline and smooth, apex acute, awnless. Lower palea reduced and minute, hyaline. Upper lemma elliptic, 1.5 mm long, coriaceous, surface smooth, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface smooth. Anthers 3, 0.5 mm long.

[Distribution] Tropical Asia and Australia.

[Habitat] Taiwan, in swampy places.



Pl. 25. *Sacciolepis indica* (L.) Chase

A. habit; B. ligule; C. part of panicle branch; D. spikelet; E. lower glume; F. upper glume; G. lower lemma; H. lower palea; I. upper lemma; J. upper palea; K. caryopsis.

[Taiwan] TAIPEI: Shihmen, *Yang 6242* (TNM). KEELUNG: *Yang 19198* (TNM). ILAN: Yugong Temple, *Yang 15118* (TNM). MIAOLI: Lungteng, *Yu 121* (HAST). TAICHUNG: Lileng Forest Road, *Yang 1649* (TNM). NANTOU: Kuangtaohsi, *Chang 2155* (TAI). CHIAYI: Wanton Village, *Wang 9709* (TNM). KAOHSIUNG: Tengchih, *Wang 4392* (TNM). PINGTUNG: Nanjenshan, *Ku 1015* (PPI); Shouka, *Chen 5905* (TAIE). TAITUNG: Tawu, *Hsu 323* (TAI); Lanyu, *Chang 7800* (PPI).

## 20. *Setaria* P. Beauv., Ess. Agrostogr. 51. 1812.

### 狗尾草屬

Annuals or perennials; culms tufted, sometimes stoloniferous. Ligule divided into hair-like slips or ciliate; baldes linear to lanceolate, with a broad or attenuate base and acute tip, usually flat, sometimes conduplicate or inrolled, sometimes longitudinally plicate. Inflorescence an all-side branched, open or contracted panicle or spike-like raceme. Spikelets all or in part subtended by one or more setae at base; bristles scabrid, persistent after spikelets have fallen off; spikelets articulate with short pedicel, ovateelliptic- oblong, flat or faintly convex at one side, strongly convex at other side, totally glabrous, muticuous, 2-flowered; glumes with widely embracing base, herbaceous, often with anastomosing veins; lower glume on flat side of spikelet, short, 1 to 5-veined; upper glume larger, 5 to 9-veined; lower lemma as long as spikelet, 5 to 8-veined, herbaceous; upper lemma equally long, strongly convex, 5-veined, distinctly transversely rugose-tuberculate, coriaceous; stamens 3; ovary glabrous; style 2, free, stigmas plumose. Caryopsis free, enclosed between upper palea and lemma, plano-convex, the embryo 1/2-3/5 as long as caryopsis, hilum punctiform, basal.

About 130 species in tropics and subtropics. Ten species in Taiwan.

### KEY TO THE SPECIES

1. Panicle contracted, cylindrical; blades not plicate.
  2. Upper glume 2/3 as long to equaling spikelet; lower palea distinctly shorter than lower lemma or reduced.
    3. Main axis of panicle serrulate; bristles retrosely barbed. . . . . 9. *S. verticillata*
    3. Main axis of panicle hairy; bristles antrosely barbed.
      4. Upper glume 2/3-3/4 length of spikelet, upper lemma exposed above it. . . . . 2. *S. faberii*
      4. Upper glume subequal to spikelet; almost completely covering upper lemma.
        5. Glumes and lower lemma persistent; cultivated . . . . . 3. *S. italica*
        5. Glumes and lower lemma falling off together with upper floret; wild . . . . . 10. *S. viridis*
  2. Upper glume up to 1/2 as long as spikelet, upper floret clearly exposed; lower palea as long as lower lemma
    6. Lower palea ovate, as wide as upper floret; upper lemma coarsely rugose.
      7. Inflorescence up to 10 cm long; spikelets 3-4 mm long. . . . . 7. *S. pumila*
      7. Inflorescence 10-50 cm long; spikelets 2-2.5 mm long. . . . . 8. *S. sphacelata*

6. Lower floret neuter, its palea lanceolate, much narrower than upper floret; upper lemma finely rugose.....5. *S. parviflora*
1. Panicle loosely open; blades folded, fan-fashion between longitudinal veins.
8. Leaf sheath surface pilose with tubercle-based hairs.....1. *S. barbata*
8. Leaf sheath surface glabrous or sparsely hispid.
9. Blade 3-7 cm wide; lower glume 1/3–1/2 spikelet length, usually acute to obtuse; upper floret ovate, obscurely rugose. .... 4. *S. palmifolia*
9. Blade 1-3 cm wide; lower glume 1/4–1/3 spikelet length, usually broadly obtuse to truncate; upper floret narrowly ovate, transversely rugose . . . . . 6. *S. plicata*

**1. *Setaria barbata* (Lam.) Kunth., Rev. Gram 1: 47, 1829. Jung *et al.*, Taiwania 57: 428. 2012. 柔毛狗尾草**

*Panicum barbatum* Lam., Tabl. Encycl. 1: 171. 1791.

Annuals, tufted. Culms erect or geniculately ascending, robust or of moderate texture, 50-200 cm tall, pilose, culm nodes puberulent. Leaf sheaths surface densely pilose with tubercle-based hairs, margins ciliate. Ligule a ciliate membrane, 1-2 mm long. Blades cauline, lanceolate, flat, 10-20 cm long, 10-25 mm wide, margins scabrous, apex acuminate, surface moderately pilose with tubercle-based hairs on both sides. Inflorescence a panicle, slightly contracted to loose, cylindrical, 5-20 cm long, axis pubescent, base exerted from uppermost sheath, with conspicuous branches, branches spreading, some spikelets subtended by a single bristle. Bristles slender, persisting on the axis after the spikelets fall. Spikelets bisexual, dorsally compressed, oblong, 2.5-3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Pedicels short, angular, margins scaberulous. Lower glume orbicular to ovate, 0.35 time the length of the spikelet, 0.8-1 mm long, membranous, 3-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless. Upper glume separated from lower glume by a short internode, ovate, 0.8 time the length of the spikelet, 2 mm long, membranous, 5 to 7-veined, not keeled, surface glabrous, margins smooth, apex mucronate, awnless. Lower florets barren. Lower lemma broadly lanceolate, 2.5 mm long, membranous, 5 to 7-veined, surface glabrous, margins smooth, apex mucronate, awnless. Lower palea well developed, hyaline, lanceolate, 2-keeled, keel narrowly winged. Upper floret pale gray. Upper lemma lanceolate, 2.5 mm long, coriaceous, surface finely rugose, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, surface finely rugose. Anthers 3, 0.5 mm long.

[Distribution] Native to Africa and India, then introduced to the West Hemisphere.

[Taiwan] TAIPEI: Tungpei Street, Jung 5750 (TAIF); Mt. Jiantan, Hsu 5135 (TAIF). HUALIEN:

National Hualien University of Education, Chen *s. n.* Nov. 28, 2006 (TAIF).

[Note] This species is recorded as a newly naturalized species in Taiwan.

**2. *Setaria faberi*** R. A. W. Herrm., Beitr. Biol. Pflanz. 10: 51. 1910; Hsu, *Taiwania* 16: 299. 1971; Hsu, Fl. Taiwan 5: 600. 1978; Koyama, Grass. Jap. Neighb. Reg. 329. 1987; Liu, Fl. Taiwan. ed. 2, 5: 510. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 535. 2006. 法氏狗尾草

*Setaria autumnalis* Ohwi, Acta. Phytotax. Geobot. 7:129. 1938.

Annuals, tufted. Culms erect or geniculately ascending, robust, 50-120 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins ciliate, joint between sheath and blade glabrous. Ligule a ciliate membrane, 1-2 mm long. Blades cauline, linear-lanceolate, flat, 10-30 cm long, 5-20 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in a panicle, cylindrical, 5-10 cm long, axis pubescent, base exerted from uppermost sheath, without conspicuous branches, branches reduced to short branchlets bearing several spikelets, spikelets subtended by numerous bristles. Bristles slender, antrorsely barbed, persisting on the axis after the spikelets fall. Pedicels short, with discoid tips, margins scaberulous. Spikelets bisexual, dorsally compressed, elliptic, 2.8-3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 1-1.5 mm long, 0.35-0.5 time of length as the spikelet, membranous, 3-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless, clasping at the base of the spikelet. Upper glume ovate, 2 mm long, 0.6-0.75 time of length as the spikelet, membranous, 5-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma ovate, 2.8-3 mm long, membranous, 5-veined, surface glabrous, margins smooth, apex acute, awnless. Lower palea reduced and minute, hyaline, 0.5 time of length as lower lemma. Upper floret pale yellow. Upper lemma elliptic, 2.5 mm long, coriaceous, surface finely rugose, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface finely rugose.

[Distribution] Vietnam, China and Japan.

[Habitat] Taiwan, in open fields.

[Taiwan] TAIPEI: Sanchih, *Chang 20281* (PPI). TAICHUNG: Chuanhsingshan Nursery, *Wang 1090* (TNM), Lishan, *kuoh 80130* (TAI). KINMEN: Tungchu, *Huang 622* (TAI).

**3. *Setaria italica*** (L.) P. Beauv., Ess. Agrostogr. 51. 1812; Hsu, *Taiwania* 16: 301. 1971; Hsu, Fl. Taiwan 5: 602, *pl. 1447*. 1978; Koyama, Grass. Jap. Neighb. Reg. 328. 1987; Liu, Fl. Taiwan. ed. 2, 5: 510. *pl. 214*. 2000; Chen & Phillips in Chen

*Panicum italicum* L. Sp. Pl. 1: 56. 1753.

Annuals, tufted. Culms erect, robust, 50-150 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, or pubescent, outer margins ciliate. Ligule a ciliate membrane, 1-2 mm long. Blades cauline, linear-lanceolate or linear, flat, 15-45 cm long, 6-20 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in a panicle, cylindrical, 6-40 cm long, axis pubescent, base exerted from uppermost sheath, without conspicuous branches, branches reduced to short branchlets bearing several spikelets, spikelets subtended by numerous bristles. Bristles slender, antrorsely barbed, persisting on the axis after the spikelets fall. Pedicels short, terete, margins scaberulous. Spikelets bisexual, dorsally compressed, ovate or elliptic, 2-3 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate, 0.6-1 mm long, 0.3-0.5 time of length as the spikelet, membranous, 3-veined, not keeled, surface glabrous, apex acute, awnless, clasping at the base of the spikelet. Upper glume separated from lower glume by a short internode, ovate, 2-3 mm long, 0.8-1 time of length as the spikelet, membranous, 5 to 7-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex obtuse, awnless. Lower florets barren. Lower lemma ovate, 2-3 mm long, membranous, 5 to 7-veined, veins glabrous, surface glabrous, margins smooth, apex obtuse, awnless. Lower palea reduced and minute, hyaline. Upper floret yellowish brown. Upper lemma obovate, 2 mm long, coriaceous, surface finely rugose, apex obtuse, awnless. Upper palea obovate, as long as upper lemma, coriaceous, 2-veined, surface smooth or finely rugose. [Taiwan] ILAN: Taipinshan, *Suzuki s. n.* Jul. 16, 1937 (TAI). TAICHUNG: Sungmao, *Kuo, Chuma & Chang 8801* (TAI). NANTOU: Sun-Moon Lake, *Hsu 1334* (TAI). PINGTUNG: Santimen, *Jeng 247* (TAI). TAITUNG: Lanyu, *Hsu 9364* (TAI).

[Notes] This species is widely cultivated in Taiwan, particularly by the aboriginal people and exists in an innumerable number of races differing in size, color of the grains, hairness of the panicle, and in many other ways. The grain is cooked as a porridge or made into liquor, and is also the chief food for cage birds.

**4. *Setaria palmifolia*** (J. König) Stapf in Gibbs, J. Linn. Soc. 42: 186. 1914; Hsu, *Taiwania* 16: 301. 1971; Hsu, *Fl. Taiwan* 5: 604, *pl. 1448*. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 321. 1987; Liu, *Fl. Taiwan. ed. 2, 5: 512. pl. 214.* photo 57. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 532. 2006.

棕葉狗尾草 Pl. 26, Photo 80-81

*Panicum palmifolium* J. König, *Naturforscher.* 23: 208. 1788.



Pl. 26. *Setaria palmifolia* (J. König) Stapf in Gibbs

A. habit; B. ligule; C. spikelet; D. lower glume; E. upper glume; F. lower lemma; G. lower palea; H. upper lemma; I. upper palea; J. lodicules.

Perennials, tufted, with knotty rhizomes. Culms erect or geniculately ascending, robust, 50-200 cm tall, glabrous or puberulent. Leaf sheaths surface sparsely hispid, outer margins glabrous or ciliate near the ligule. Ligule a ciliate membrane, 2-3 mm long. Blades cauline, fusiform-lanceolate, flat, 20-60 cm long, 20-70 mm wide, margins scabrous, apex acuminate, surface glabrous, or sparsely hispid on both sides. Inflorescence in a panicle, loose, axis scaberulous, base exerted from uppermost sheath, with conspicuous branches, branches spreading, some spikelets subtended by a single bristle. Bristles slender, persisting on the axis after the spikelets fall. Pedicels short, angular, with discoid tips, margins scaberulous. Spikelets bisexual, dorsally compressed, lanceolate, 3-4 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate, 1-1.5 mm long, 0.35-0.5 time of length as the spikelet, membranous, 3 to 5-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless. Upper glume ovate, 2-2.5 mm long, 0.5-0.7 time of length as the spikelet, membranous, 5 to 7-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex mucronate, awnless. Lower florets barren. Lower lemma broadly lanceolate, 3-4 mm long, membranous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex mucronate, awnless. Lower palea well developed, membranous, lanceolate, 0.65 time of length as lower lemma, 2-veined. Upper floret pale gray or yellowish brown. Upper lemma lanceolate, 2.5-3 mm long, coriaceous, surface finely rugose, apex acute, awnless. Upper palea lanceolate, 2.5-3 mm long, as long as upper lemma, coriaceous, 2-veined, surface finely rugose.

[Distribution] Tropics of the Old World.

[Habitat] Taiwan, in shady places.

[Taiwan] TAIPEI: Hsiaokotou, *Huang K350* (TAI). ILAN: Shanghsin Garden, *Lin 766* (TNM).

MIAOLI: Tunglo, *Yu 131* (HAST); Nanchuang, *Chen 1801* (TAIE). TAICHUNG: Tatushan, *Yang p22* (TNM). NANTOU: Chungcheng Village, *Chiu 3953* (TNM). CHIAYI: Alishan, *Yang 3805* (PPI). PINGTUNG: Pengchishan, *Tung 4* (PPI). HUALIEN: Hoping, *Chen 642* (PPI). TAITUNG: Tulanshan, *Wu 16-058* (TNM).

**5. *Setaria parviflora* (Poiret) Kerguelen, Lejeunia 120: 161. 1987; Webster, Sida 15: 459. 1993; Veldkamp, Blumea 39: 379. 1994; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 535. 2006. 莠狗尾草 Photo 82-83**

*Cenchrus parviflorus* Poiret in Lamarck, Encycl. 6: 52. 1804.

*Panicum geniculatum* Willd., Enum. Pl. 1031. 1809. (nom. invalid) not Poiret in Lamarck Encycl. 4: 737. 1798.

*Panicum pallide-fuscum* Schumach., Beskr. Guin. Pl. 58. 1827.

*Setaria pallide-fusca* (Schumach.) Stapf & C. E. Hubb., Bull. Misc. Inform. Kew 1930: 259. 1930; Hsu, Taiwania 16: 301. 1971; Hsu, Fl. Taiwan 5: 604. 1978; Liu, Fl. Taiwan. ed. 2, 5: 512. 2000.

*Setaria geniculata* auct. non (Willd.) P. Brauv.: Hsu, Taiwania 16: 301. 1971; Hsu, Fl. Taiwan 5: 600, *pl.* 1446. 1978; Liu, Fl. Taiwan. ed. 2, 5: 510. 2000.

Annuals or short-lived perennial, tufted. Culms erect or geniculately ascending, of moderate

texture, 20-90 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule a ciliate membrane, 1-2 mm long. Blades cauline, linear, flat, 5-30 cm long, 2-8 mm wide, margins scabrous, apex acuminate, surface glabrous, or pilose on adaxial side of basal leaves. Inflorescence in a panicle, contracted, cylindrical, 2-15 cm long, axis pubescent, base exerted from uppermost sheath, without conspicuous branches, branches reduced to a single mature spikelet, spikelets subtended by numerous bristles. Bristles slender, antrorsely barbed, persisting on the axis after the spikelets fall. Pedicels short, terete, with discoid tips, margins scaberulous. Spikelets bisexual, dorsally compressed, elliptic, 2-2.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate, 0.8 mm long, 0.35 time of length as the spikelet, membranous, 3 to 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless, clasping at the base of the spikelet. Upper glume ovate, 1-1.5 mm long, 0.5 time of length as the spikelet, chartaceous, 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma ovate, 2-2.5 mm long, chartaceous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower palea well developed, firmly membranous, oblong, as long as lower lemma, as long as the upper floret but narrower. Upper floret pale yellow. Upper lemma elliptic, 2 mm long, coriaceous, surface finely rugose, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface finely rugose. Anthers 3, 1 mm long.

[Distribution] Originally from tropical America, introduced into other countries.

[Habitat] Taiwan, in moist places.

[Taiwan] TAICHUNG: Nanliao, *Yang 5495* (TNM); Lungchin, *Kuoh s. n.* Apr. 26, 2000 (TNM).

NANTOU: Huisun Forest Farm, *Yang 5253* (TAI), *Chen 4335* (TAIE). PINGTUNG: Lukun, *Chen 603* (PPI); Hsuhai, *Chen 6926* (TAIE). TAITUNG: Lutao., *Hsieh 2626* (PPI); Lanyu, *Yeh 438* (PPI). KINMEN: Taihu, *Wang 5643* (TNM).

6. *Setaria plicata* (Lam.) T. Cooke, Fl. Bombay 2: 919. 1908; Hsu, Taiwania 16: 301. 1971; Hsu, Fl. Taiwan 5: 605, *pl. 1449*. 1978; Koyama, Grass. Jap. Neighb. Reg. 321. 1987; Liu, Fl. Taiwan. ed. 2, 5: 512. *pl. 216*. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 532. 2006. 皺葉狗尾草 Photo 84

*Panicum plicatum* Lam., Tabl. Encycl. 1: 171. 1791.

Perennials, loosely tufted, with knotty rhizomes. Culms erect or decumbent, robust or of moderate texture, 50-130 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins ciliate, joint between sheath and blade pilose. Ligule a ciliate membrane, 1-1.5 mm long. Blades cauline, lanceolate or linear-lanceolate, flat, thin and plicate, 10-40 cm long, 10-30 mm wide, margins scabrous, apex acuminate, surface sparsely hispid with tubercle-based hairs on both sides.

Inflorescence in a panicle, contracted, linear, 15-30 cm long, axis scaberulous, base exerted from uppermost sheath, with conspicuous branches, branches often appressed, some spikelets subtended by a single bristle. Bristles slender, persisting on the axis after the spikelets fall. Pedicels short, terete, with discoid tips, margins scaberulous. Spikelets bisexual, dorsally compressed, ovate-oblong, 3-3.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate-orbicular, 1 mm long, 0.3 time of length as the spikelet, membranous, 3 to 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex obtuse, awnless. Upper glume oblong, 2.5 mm long, 0.7 time of length as the spikelet, chartaceous, 5 to 7-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex obtuse, awnless. Lower florets staminate or barren. Lower lemma broadly lanceolate, 3-3.5 mm long, chartaceous, 5 to 7-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower palea well developed, membranous, oblong, 2-veined, veins narrowly winged. Upper floret pale gray. Upper lemma lanceolate, 3 mm long, coriaceous, surface finely rugose, apex acuminate, awnless. Upper palea lanceolate, as long as upper lemma, coriaceous, 2-veined, surface finely rugose. Anthers 3, 2 mm long.

[Distribution] India, Sri Lanka to China and Japan.

[Habitat] Taiwan, in lowland forest.

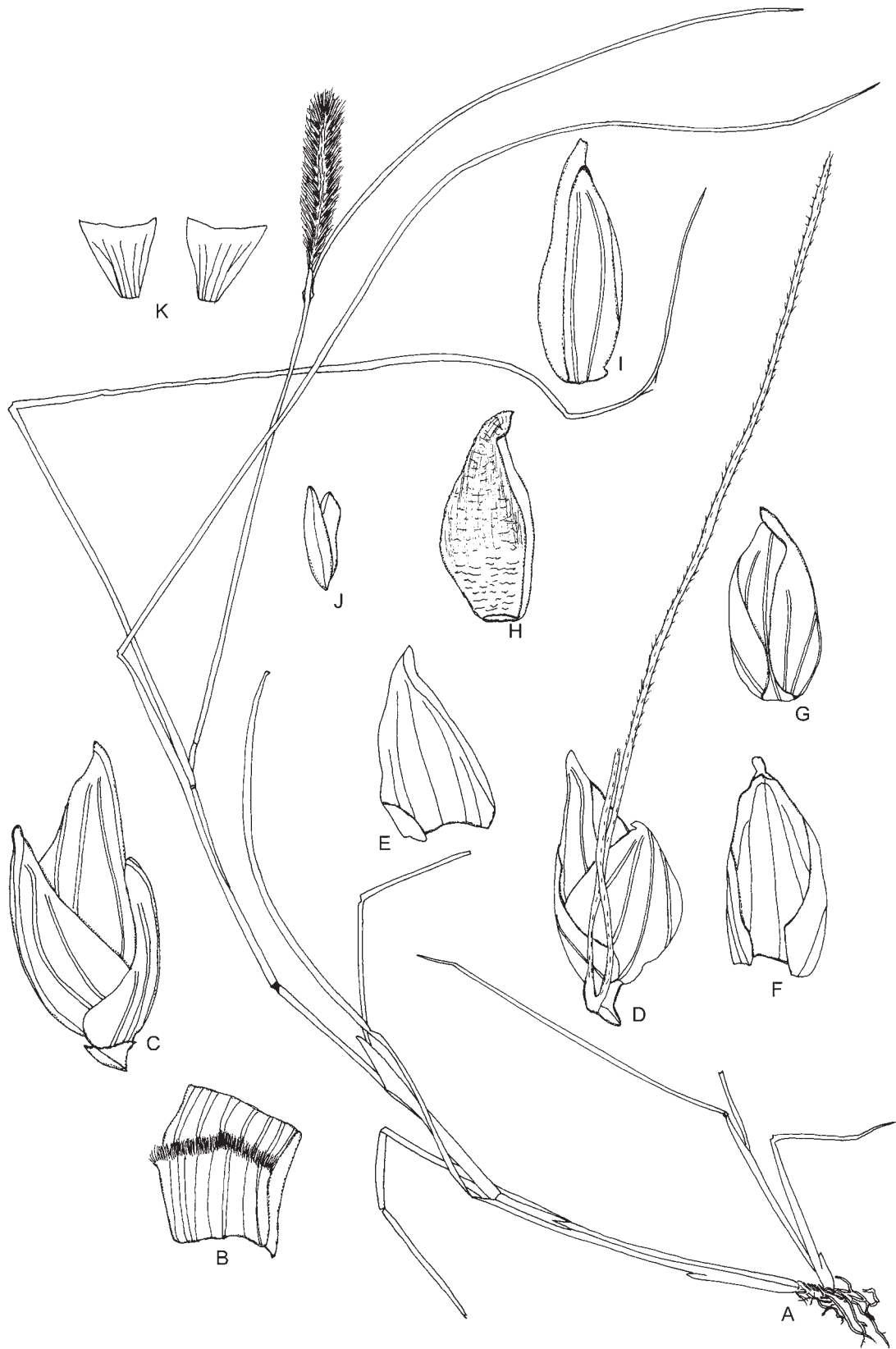
[Taiwan] HSINCHU: Xiakelo Historic Trail, *Lu 20962* (HAST). NANTOU: Fenuangku, *Yang 1649* (TAI). KAOHSIUNG: Sanping, *Kuoh 4085* (TAI). PINGTUNG: Lilungshan, *Ku 1469* (PPI); Tahan Forest Road, *Chen 6888* (TAIE). HUALIEN: *Chen 3330* (TNM).

**7. *Setaria pumila* (Poir.) Roem. & Schult., Syst. Veg. 2: 891. 1817; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 534. 2006. 金色狗尾草 Pl. 27, Photo 85-86**

*Panicum pumilum* Poir. in Lamarck, Encycl., Suppl. 4: 273. 1816.

*Setaria glauca* auct. non P. Beauv.: Hsu, Taiwania 16: 301. 1971; Hsu, Fl. Taiwan 5: 602. 1978; Liu, Fl. Taiwan. ed. 2, 5: 510. 2000.

Annuals, tufted. Culms erect or geniculately ascending, robust or of moderate texture, 20-90 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins glabrous, joint between sheath and blade glabrous. Ligule a ciliate membrane, 1-1.5 mm long. Blades cauline, linear, flat, 5-40 cm long, 2-10 mm wide, margins scabrous, apex acuminate, surface glabrous, or pilose on adaxial side of basal leaves. Inflorescence in a panicle, cylindrical, 3-17 cm long, axis pubescent, base exerted from uppermost sheath, without conspicuous branches, branches reduced to a single mature spikelet, spikelets subtended by numerous bristles. Bristles slender, antrorsely barbed, persisting on the axis after the spikelets fall. Pedicels short, terete, with discoid tips. Spikelets bisexual, dorsally compressed, broadly ovate, 2.5-3.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume ovate, 0.8-1.5 mm long, 0.3-0.5 time of length as the spikelet, membranous, 3-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless, clasping at the base of



Pl. 27. *Setaria pumila* (Poir.) Roem. & Schult.

A. habit; B. ligule; C. spikelet; D. spikelet with bristle; E. lower glume; F. upper glume; G. lower lemma; H. upper lemma; I. upper palea; J. anther; K. lodicules.

the spikelet. Upper glume broadly ovate, 1.5-2 mm long, 0.5-0.7 time of length as the spikelet, membranous, 5-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless. Lower florets staminate or barren. Lower lemma ovate, 2.5-3.5 mm long, membranous, 5-veined, surface glabrous, margins smooth, apex acute, awnless. Lower palea well developed, membranous, ovate, as long as lower lemma, matching the upper floret in size and shape, 2-veined, veins narrowly winged. Upper floret yellowish brown. Upper lemma ovate, 2.5-3.5 mm long, coriaceous, surface coarsely rugose, apex acute, awnless. Upper palea ovate, as long as upper lemma, coriaceous, 2-veined, surface coarsely rugose. Anthers 3, 1 mm long. Caryopsis glabrous, dorso-ventrally compressed, elliptic, 1.5 mm long.

[Distribution] Temperate regions of the Old World, introduced into America, Australia and other countries.

[Habitat] Taiwan, in hillside orchard.

[Taiwan] TAIPEI: Kuanghsing, *Huang 125* (TNM). ILAN: Nanao, *Hsu 8411* (TAI). TAOYUAN: Bianfudong, *Chen 4089* (TNM). MIAOLI: Poingwu, *Yu 195* (HAST). TAICHUNG: Chika, *Huang 7084* (TAI). NANTOU: Meifeng, *Wang 174* (TNM); Luku, *Chen 6839* (TAIE). CHIAYI: Alishan, *Yang 4140* (PPI). KAOHSIUNG: Tengchih, *Wu 1048* (TNM). PINGTUNG: Dahanshan, *Chen 920* (PPI). TAITUNG: Tolan Forest Land, *Yang 1431* (TNM); Lanyu, *Yeh 802* (PPI).

**8. *Setaria sphacelata*** (Schumach.) Moss ex Stapf & C.E. Hubb, Fl. Trop. Afr. 9: 795, 1930; Veldkamp, Blumea 39: 382. 1994; Chen and Kuoh, Endemic Species Research 8: 85. 2006. 南非鴿草 Pl. 28, Photo 87

*Panicum sphacelatum* Schumach., Beskr. Guin. Pl. 58. 1827.

Perennials, tufted. Culms erect or decumbent, robust, 50-200 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, or sparsely pubescent at upper part, outer margins glabrous, joint between sheath and blade puberulent. Ligule a ciliolate membrane, 1-2 mm long. Blades cauline, linear, flat, 10-50 cm long, 5-15 mm wide, margins scabrous, apex acuminate, surface glabrous. Inflorescence in a panicle, linear, 10-50 cm long, base exerted from uppermost sheath, without conspicuous branches, branches reduced to short branchlets bearing several spikelets, spikelets subtended by numerous bristles. Bristles slender, antrorsely barbed, persisting on the axis after the spikelets fall. Spikelets bisexual, dorsally compressed, ovate, 2-2.8 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 1-1.2 mm long, 0.5 time of length as the spikelet, membranous, 3-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless, clasping at the base of the spikelet. Upper glume broadly ovate, 1.5 mm long, 0.7 time of length as the spikelet, membranous, 3 to 5-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless. Lower florets staminate or barren. Lower lemma ovate, 2-2.8 mm long, membranous, 5-veined, surface glabrous, margins smooth, apex acute, awnless. Lower palea well



Pl. 28 *Setaria sphacelata* (Schumach.) Moss ex Stapf & C.E. Hubb

A. habit; B. ligule; C. spikelet with bristle; D. lower glume; E. upper glume; F. lower lemma; G. lower palea; H. upper lemma.

developed, membranous, ovate, as long as lower lemma, matching the upper floret in size and shape, 2-veined, veins smooth. Upper floret pale gray. Upper lemma ovate, 1.8-2 mm long, coriaceous, surface coarsely rugose, apex acute, awnless. Upper palea ovate, as long as upper lemma, coriaceous, 2-veined, surface coarsely rugose. Anthers 3, 1 mm long.

[Distribution] Native to tropical and South Africa; widely introduced to tropical areas worldwide

[Habitat] Cultivated in Taiwan for pasture and erosion control.

[Taiwan] HSINCHU: Kuanhsi, *Yang 8288* (TNM). TAICHUNG: Wujih, *Chen 8831* (TNM); Shengkang, *Wang 11865* (TNM). NANTOU: Hsitou, *Chen 5622* (TAIE). PINGTUNG: Neipu, *Lo 711* (PPI).

[Notes] Escaped and naturalized in the central and northern part of the island.

**9. *Setaria verticillata* (L.) P. Beauv., Ess. Agrostogr. 51 1812; Hsu, Taiwania 16: 301. 1971; Hsu, Fl. Taiwan 5: 608. 1978; Koyama, Grass. Jap. Neighb. Reg. 326. 1987; Liu, Fl. Taiwan. ed. 2, 5: 515. *pl. 216*. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 537. 2006.** 倒刺狗尾草 Photo 88-89

*Panicum verticillatum* L., Sp. Pl. ed. 2. 82. 1762.

Annuals, tufted. Culms geniculately ascending, robust, 20-100 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, or puberulent, outer margins glabrous or ciliate, joint between sheath and blade glabrous. Ligule a ciliate membrane, 0.5-1 mm long. Blades cauline, linear, flat, 5-20 cm long, 5-18 mm wide, margins scabrous, apex acuminate, surface sparsely pilose on both sides. Inflorescence in a panicle, cylindrical, 5-15 cm long, axis hispidulous, base exerted from uppermost sheath, without conspicuous branches, branches reduced to short branchlets bearing several spikelets, spikelets subtended by numerous bristles. Bristles slender, retrorsely barbed, persisting on the axis after the spikelets fall. Pedicels short, terete, with discoid tips, margins scaberulous. Spikelets bisexual, dorsally compressed, elliptic, 1.8-2 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 0.8-1 mm long, 0.35-0.5 time of length as the spikelet, membranous, 3-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless, clasping at the base of the spikelet. Upper glume ovate, 1.8-2 mm long, as long as spikelet, membranous, 5-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma ovate, 1.8-2 mm long, membranous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower palea reduced and minute. Upper floret pale gray. Upper lemma elliptic, 1.5 mm long, coriaceous, surface finely rugose, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface finely rugose. Caryopsis glabrous, dorso-ventrally compressed, elliptic, 1.5 mm long.

[Distribution] Tropical and temperate regions of the Old World.

[Habitat] Taiwan, common in open and waste places.

[Taiwan] TAIPEI: Yehliu, *Kuoh 2345* (TAI). TAICHUNG: Shalu, *Wang s. n.* May 6, 2000 (TNM).

CHANGHWA: Shuiwei Farm, *Yang 7917* (TNM). YUNLIN: Lunpei, *Yang 11333* (TNM).

CHIAYI: Minhsiung, *Chen 2548* (TNM). KAOHSIUNG: Meishan, *Yang 26314* (PPI).

PINGTUNG: Lioukwatsuo, *Hsu 9313* (TAI); Hsiaoliuchiu, *Chen 6832* (TAIE). HUALIEN: Nanhua, *Yang 11611* (TNM); Hualien City, *Peng 9324* (HAST).

**10. *Setaria viridis* (L.) P. Beauv., Ess. Agrostogr. 51. 1812; Hsu, *Taiwania* 16: 301.**

1971; Hsu, *Fl. Taiwan* 5: 608, *pl. 1450*. 1978; Liu, *Fl. Taiwan*. ed. 2, 5: 515. *pl.*

*217. photo 59*. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 537.

2006.

狗尾草 Pl. 29, Photo 90-91

*Panicum viride* L., *Syst. Nat.* ed. 10. 2: 870. 1759.

*Panicum pachystachys* Franch & Sav., *Enum. Pl. Jap.* 2: 594. 1878.

*Setaria viridis* var. *pachystachys* (Franch. & Sav.) Makino & Nemoto, *Fl. Jap.* 1499. 1925; Hsu, *Taiwania* 16: 301. 1971; Hsu, *Fl. Taiwan* 5: 608. 1978.

*Setaria viridis* subsp. *pachystachys* (Franch. & Sav.) Masamura & Yanagih., *Trans. Nat. Hist. Soc. Taiwan* 31: 327. 1941; Koyama, *Grass. Jap. Neighb. Reg.* 328. 1987.

Annuals, tufted. Culms erect or geniculately ascending, of moderate texture, 40-80 cm tall, glabrous, culm nodes glabrous. Leaf sheaths surface glabrous, outer margins ciliate, joint between sheath and blade glabrous. Ligule a ciliate membrane, 1-2 mm long. Blades cauline, linear, flat, 5-20 cm long, 2-18 mm wide, margins scabrous, apex acuminate, surface sparsely pilose with tubercle-based hairs on both sides. Inflorescence in a panicle, cylindrical, 3-8 cm long, axis pubescent, base exerted from uppermost sheath, without conspicuous branches, branches reduced to short branchlets bearing several spikelets, spikelets subtended by numerous bristles. Bristles slender, antrorsely barbed, persisting on the axis after the spikelets fall. Pedicels short, terete, with discoid tips, margins scaberulous. Spikelets bisexual, dorsally compressed, elliptic, 2-2.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume broadly ovate, 0.8 mm long, 0.35 time of length as the spikelet, membranous, 3-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless, clasping at the base of the spikelet. Upper glume ovate, 2-2.5 mm long, as long as spikelet, membranous, 5-veined, not keeled, surface glabrous, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma ovate, 2-2.5 mm long, membranous, 5-veined, surface glabrous, margins smooth, apex acute, awnless. Lower palea reduced and minute, hyaline, 0.3 time of length as lower lemma. Upper floret pale yellow. Upper lemma elliptic, 2 mm long, coriaceous, surface finely rugose, apex acute, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface finely rugose.

[Distribution] Widely distributed in the Old World.

[Habitat] Taiwan, in sandy seahsors.



Pl. 29. *Setaria viridis* (L.) P. Beauv.

A. habit; B. ligule; C. spikelet; D. lower glume; E. upper glume; F. lower lemma; G. upper lemma; H. upper palea; I. lodicules; J. caryopsis.

[Taiwan] TAIPEI: Lungtungchia, *Kao s. n.* May 16, 1992 (TAI). HSINCHU: Chidien, *Huang 1073* (TAI). MIAOLI: Tashan, *Chou s. n.* Jul. 4, 1998 (TNM); Houlung, *Chen 1990* (TAIE). TAITUNG: Lutao, *Chen 9-2* (PPI). PENGHU, *Huang 6833* (TAI), *Yang 4823* (HAST). MATSU: *Lai 1146* (TAI).

21. *Spinifex* L., Mant. Pl. 2: 163, 300. 1771.

濱刺草屬

Perennials; culms stout, solid, hard, glabrous, robust, strongly tufted, with long-creeping and rooting stolons, with groups of short internodes alternating with long internodes. Leaf ligule a fringe of hairs; blades narrowly linear, more or less rigid. Inflorescence a spike-like raceme; pistillate racemes very much reduced, with 1-2 spikelets at base of long stiff rachis, staminate arranged in capitate fascicles, interrupted with accessory spathaceous leaves and prophylls, fascicles solitary or accompanied by another fascicle; rachis of racemes rigid. Spikelets ovate-oblong, subterete, acute, muticous. Staminate spikelets in small numbers, alternate and dorsal in shallow cavities of rachis; lower glume abaxial; spikelets articulate with short pedicel, 2-flowered; palea and lodicules well developed; stamens in each flower 3, anther linear. Pistillate spikelets: rachis with 1 spikelet at base, very rarely with 2 spikelets; spikelets readily deciduous as a whole at maturity, driven by wind along beach, ultimately shedding spikelets in fruit, or getting into sea, and floating to other shores.

About three species distributed in East Asia, Indo-Malay, Australia and Pacific islands; one species in Taiwan.

1. *Spinifex littoreus* (Burm. f.) Merr., Philip. J. Sci. 7: 229. 1912; Hsu, *Taiwania* 16: 301. 1971; Hsu, *Fl. Taiwan* 5: 610, *pl. 1451*. 1978; Koyama, *Grass. Jap. Neighb. Reg.* 384. 1987; Liu, *Fl. Taiwan. ed. 2*, 5: 518. *pl. 218. photo 60*. 2000; Chen & Phillips in Chen *et al.* (eds.), *Fl. China* 22: 553. 2006.

濱刺草 Pl. 30, Photo 92-93

*Stipa littorea* Burm. f., *Fl. Ind.* 29. 1768.

Perennials, dioecious, stoloniferous, rhizomatous. Culms hard, 30-100 cm tall, farinose, much branched above base, rooting from lower nodes. Leaf sheaths surface glabrous, outer margins ciliate, joint between sheath and blade glabrous. Ligule a ciliate membrane, 2-3 mm long. Blades cauline, linear, involute-subulate, tough, 5-20 cm long, 2-3 mm wide, margins scabrous, apex spiny, surface glabrous. Female inflorescence in a large global spiny head, 20-35 cm in diamer. composed of numerous racemes reduced to a single basal spikelet hidden among subtending spathes, rachis prolonged into a long needle-like spine, ca. 10-18 cm long. Female spikelets narrowly lanceolate, 10-12 mm long, with 2 florets, lower floret sterile, upper floret fertile. Lower glume lanceolate, 8-10 mm long, chartaceous, 11-veined, surface glabrous, apex acute. Upper glume lanceolate, 10-12 mm long, chartaceous, 7 to 9-veined, surface glabrous, apex acuminate. Lower floret barren. Lower lemma



Pl. 30. *Spinifex littoreus* (Burm. f.) Merr.

A. habit; B. part of spike; C. lower glume; D. upper glume; E. lower lemma; F. lower palea; G. upper lemma; H. upper palea; I. anther.

broadly lanceolate, 10-12 mm long, chartaceous, 5-veined, surface glabrous, apex acuminate. Lower palea absent. Upper florets pistillate. Upper lemma lanceolate, 10 mm long, subcoriaceous, surface smooth. Upper palea lanceolate, 10 mm long, subcoriaceous, surface smooth. Male inflorescence in umbellate spikes, rachis 4-9 cm long, pointed. Male spikelets oblong-lanceolate, 8-12 mm long, with 2 florets, upper floret subequal to lower floret, but slightly firmer. Lower glume broadly lanceolate, 4-6 mm long, chartaceous, 7 to 9-veined, surface glabrous, apex acute. Upper glume broadly lanceolate, 8 mm long, chartaceous, 7 to 9-veined, surface glabrous, apex acute. Lower lemma lanceolate, 8-10 mm long, chartaceous, 5-veined, surface glabrous, apex acuminate. Lower palea lanceolate, 8-10 mm long, chartaceous, 2-keeled, ciliate on the keels. Anthers 3, 6 mm long.

[Distribution] India, Sri Lanka, Myanmar, Indochina, Malaysia and S. China.

[Habitat] Taiwan, in littoral sand dunes.

[Taiwan] TAIPEI: Chinshan, *DeVol 8180* (TAI); Watzuwei, *Leu 1018* (HAST). TAOYUAN: Kuanin, *Chen 4906* (TNM). HSINCHU: Nanliao, *Chuang 2565* (TAI). TAICHUNG: Taan, *Hsiao 1340* (TNM). CHANGHWA: Chang-Pin Industrial area, *Yang 4093* (TNM). TAINAN: Szutsao, *Yang 14913* (TNM). PINGTUNG: Kenting, *Yang 3318* (TNM). TAITUNG: Tungho, *Hsieh 1474* (PPI); Nantian, *Chen 5916* (TAIE). PENHU: *Jung 460* (PPI).

## 22. *Thuarea* Pers., Syn. Pl. 1: 110. 1805.

### 芻蓄草屬

Perennials; culms solid, prostrate branching into numerous short erect flowering culms. Leaf blade small, expanded, inflorescence a solitary, terminal, shortly pedicellate, short, spike-like secund raceme, before anthesis wrapped-up in uppermost leaf, consisting of very short sheath and spathaceous blade; rachis broad, convex, on hollow side with row of spikelets, lower 1-2 bisexual, upper 2-6 staminate. Bisexual spikelet 2-flowered, persistent; lower glume adaxial, minute, hyaline or 0; upper glume and lower lemma ca. equal, ovate-oblong, obtuse, thinly membranaceous, soft-hairy; lower palea membranaceous, 2-veined, often slitting deeply; lodicules 2, minute; stamens 3; upper palea and lemma thinly chartaceous, glabrous with hairy apex; upper lemma ovate-oblong, margins inrolled, 5-veined; upper palea 2-veined; lodicules and stamens like in lower floret; styles 2, free; stigma plumose, protruding apically. Staminate spikelets 2-flowered, articulate with knob shaped pedicel, soon deciduous after anthesis; lower glume adaxial, absent or minute and hyaline; upper glume and lower lemma ca. equal, oblong, obtuse, soft-hairy; lower palea thinly membranaceous, 2-veined, often deeply slit; stamens 3; upper palea oblong with broadly inflexed margins, soft-hairy at apex.

Two species, Madagascar to China and Polynesia. One species in Taiwan.

1. *Thuarea involuta* (G. Forst.) R. Br. ex Sm. in Rees, Cycl. 35, 2(70): unpagged. 1817; Hsu, Taiwania 16: 302. 1971; Hsu, Fl. Taiwan 5: 612, *pl.* 1452. 1978; Koyama, Grass. Jap. Neighb. Reg. 386. 1987; Liu, Fl. Taiwan. ed. 2, 5: 518. *pl.* 219. 2000; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 525. 2006.

芻蓄草 Pl. 31, Photo 94-95

*Ischaemum involutum* G. Forst., Fl. Ins. Austr. 73. 1786.

Perennials, monoecious, stoloniferous. Culms of moderate texture, 5-20 cm tall, glabrous, rooting from lower nodes, culm nodes pubescent. Leaf sheaths surface glabrous, or pilose, outer margins ciliate, joint between sheath and blade puberulent. Ligule a fringe of hairs, 0.5-1 mm long. Blades cauline, lanceolate, flat, 2-5 cm long, 3-8 mm wide, margins scabrous, apex acute, surface glabrous, or pilose on both sides. Inflorescence in a raceme, comprising lower 1-2 pistillate spikelets and upper 3-6 staminate spikelets, base enclosed within the uppermost spathe-like leaf sheath. Rachis tenacious, broad and winged in lower fertile part, narrowed above in staminate part. Female spikelets ovate-lanceolate, 3.5-4.5 mm long, with 2 florets, lower floret sterile, upper floret fertile. Lower glume reduced, minute, hyaline. Upper glume ovate-oblong, 3-3.5 mm long, chartaceous, 5-veined, surface pubescent, apex obtuse or acute. Lower floret barren. Lower lemma ovate-oblong, 3.5-4.5 mm long, chartaceous, 5-veined, surface pubescent, apex obtuse to acute. Lower palea oblong, 3.5-4.5 mm long, hyaline, surface glabrous, 2-veined. Upper florets pistillate or perfect. Upper lemma broadly lanceolate, 3.5-4.5 mm long, coriaceous, surface smooth and margins pubescent. Upper palea lanceolate, 3.5-4.5 mm long, coriaceous, surface smooth, margins pubescent. Male spikelets oblong-lanceolate, 3-4 mm long, with 2 florets, upper floret subequal to lower floret, but slightly firmer. Lower glume minute, hyaline. Upper glume broadly lanceolate, 3 mm long, chartaceous, 5-veined, surface pubescent, apex acute. Lower lemma broadly lanceolate, 3-4 mm long, chartaceous, 5-veined, surface pubescent, apex acute or apex obtuse. Lower palea lanceolate, 3-4 mm long, hyaline, 2-keeled. Anthers 3, 2 mm long.

[Distribution] Madagascar, India, Sri Lanka, Myanmar, Indochina, Malesia, Australia, southern China and the Ryukyus.

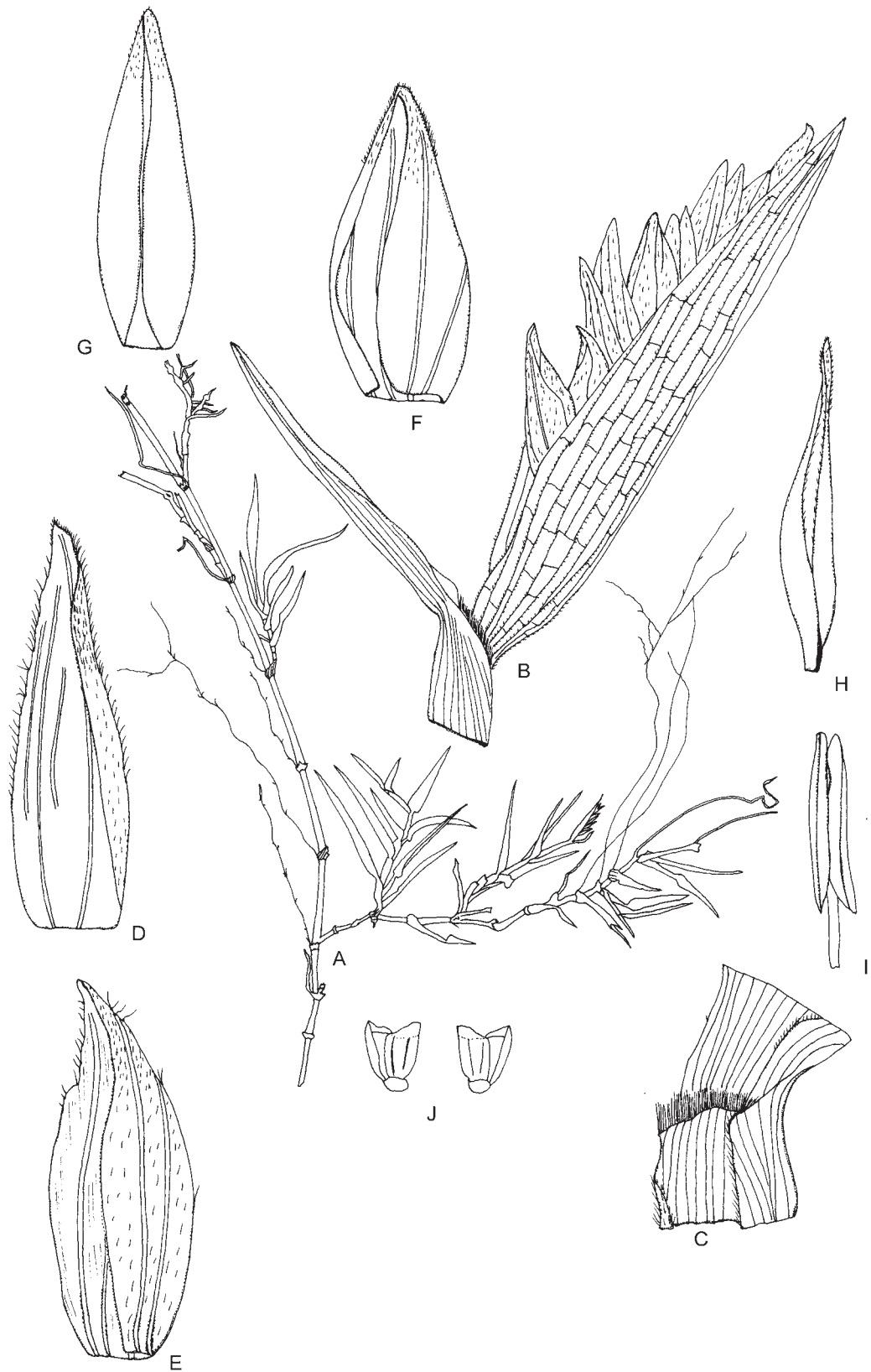
[Habitat] Taiwan, in sandy seashores.

[Taiwan] TAIPEI: Juifang, *Chem* 4888 (TNM). KAOHSIUNG: Jungshatao, *Huang* 16612 (TAI). PINGTUNG: Oluanpi, *Hsu* 512 (TAI). TAITUNG: Tachi, *Ku* 556 (PPI); Lanyu, *Chang* 14605 (TAI), *Leong* 1974 (HAST); Nantian, *Chen* 5914 (TAIE). PENGHU: *Yang* 25779 (PPI).

## 23. *Urochloa* P. Beauv., Ess. Agrostogr. 52. 1812.

尾稈草屬

Annuals or perennials, often coarse and weedy. Leaf blades linear to broadly lanceolate; ligule a ciliate membrane. Inflorescence composed of racemes along a central axis; spikelets single or paired



Pl. 31. *Thuarea involuta* (G. Forst.) R. Br. ex Sm. in Rees

A. habit; B. spike-like raceme enclosed by a spathe; C. ligule; D. lower glume; E. upper glume; F. lower lemma; G. lower palea; H. upper lemma; I. anther; J. lodicules.

on a flattened or triquetrous rachis. Spikelets lanceolate or elliptic, plano-convex, cuspidate to acuminate, florets 2; lower glume abaxial, variable in length; upper glume and lower lemma similar, as long as spikelet, membranous to firmly papery; upper lemma coriaceous, rugulose or granular, margins inrolled, shorter than spikelet with a slender mucro lying within the cuspidate spikelet tip.

Twelve species: tropics of the Old World; two species in Taiwan.

### KEY TO THE SPECIES

1. Lower glume  $2/3$ – $3/4$  spikelet length; spikelets 3.5–4 mm ..... 1. *U. glumaris*  
1. Lower glume less than  $1/3$  spikelet length; spikelets 2–2.5 mm ..... 2. *U. reptans*

**1. *Urochloa glumaris* (Trin.) Veldkamp. Blumea 41: 420. 1996; Huang, Coll. and Res. 18: 33. 2005. 雀稗尾稗草**

*Panicum glumare* Trin., Gram. Pan. 143. 1826.

*Urochloa paspaloides* J. Presl, Reliq. Haenk. 1: 318. 1830; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 523. 2006.

Annuals. Culms rambling, slender, 20–60 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes pubescent. Leaf sheaths surface glabrous, outer margins ciliate, joint between sheath and blade puberulent. Ligule a ciliate membrane, 1–2 mm long. Blades cauline, linear-lanceolate or linear, flat, 5–20 cm long, 3–8 mm wide, margins scabrous, apex acuminate, surface sparsely hispid on both sides. Inflorescence in racemose racemes, 1.5–4 cm long, axis puberulent, base exerted from uppermost sheath. Racemes 2–4, erect to ascending, straight or arcuate, 2–5 cm long. Rachis tenacious, angular, not winged, margins scabrous. Pedicels short, flattened, margins scaberulous. Spikelets bisexual, paired, homomorphic, dorsally compressed, lanceolate, 3.5–4 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume lanceolate, 2.5–3 mm long, 0.6–0.7 time of length as the spikelet, chartaceous, 5 to 7-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acuminate, awnless. Upper glume broadly lanceolate, 3.5–4 mm long, as long as spikelet, chartaceous, 5 to 7-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acuminate, awnless. Lower florets barren, epaleate. Lower lemma broadly lanceolate, 3.5–4 mm long, chartaceous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex acuminate, awnless. Upper floret pale yellow. Upper lemma oblong, 3 mm long, coriaceous, surface finely rugose, apex mucronate, awnless. Upper palea oblong, as long as upper lemma, coriaceous, 2-veined, surface finely rugose.

[Distribution] India, southeastern China, the Ryukyu Islands (Japan), the Philippines, Malaysia, and New Caledonia

[Habitat] Taiwan, at the sides of trails and open places along the southeastern seashore.

[Taiwan] TAINAN: Yujing, *Kuoh 12778* (TNM); TAITUNG: Tulanshan, *Wu 25-076* (TNM), Lanyu,

*Chang 20370* (PPI).

[Note] This species is recorded as a newly recorded species in Taiwan.

**2. *Urochloa reptans* (L.) Stapf**, Fl. Trop. Afr. 9: 601. 1920; Veldkamp, Blumea 41: 427. 1996; Chen & Phillips in Chen *et al.* (eds.), Fl. China 22: 523. 2006.

尾稈草 Photo 96

*Panicum reptans* L., Syst. Nat. ed. 10, 2: 870. 1759.

*Brachiaria reptans* (L.) C. A. Gardner & C. E. Hubb. in Hook., Icon. Pl. 34: 3. t. 3363. 1938; Hsu, Taiwania 16: 275. 1971; Hsu, Fl. Taiwan 5: 530. pl. 1423. 1978; Koyama, Grass. Jap. Neighb. Reg. 363. 1987; Liu, Fl. Taiwan. ed. 2, 5: 458. pl. 191. 2000.

Annuals. Culms rambling, slender, 10-50 cm tall, glabrous, much branched above base, rooting from lower nodes, culm nodes pubescent. Leaf sheaths surface glabrous, outer margins ciliate. Ligule a ciliate membrane, 1 mm long. Blades cauline, lanceolate, flat, 2-6 cm long, 3-10 mm wide, base cordate, margins scabrous to spiny-scabrous, apex acute, surface pilose with tubercle-based hairs on both sides. Inflorescence in racemose racemes, 1-8 cm long, axis scabrous, base exerted from uppermost sheath. Racemes 3-6, ascending, straight, 0.5-4 cm long, pubescent at base. Rachis tenacious, angular, not winged, margins scabrous. Pedicels short, with discoid tips, margins scaberulous, sometimes bearing long stiff hairs. Spikelets bisexual, paired, homomorphic, dorsally compressed, elliptic, 2-2.5 mm long, with 2 florets, lower floret reduced, sterile, upper floret fertile. Lower glume cufflike, 0.3-0.5 mm long, 0.15-0.25 time of length as the spikelet, membranous, 3-veined, not keeled, surface glabrous, apex truncate or rounded, awnless, clasping at the base of the spikelet. Upper glume ovate, 2-2.5 mm long, as long as spikelet, chartaceous, 7 to 9-veined, not keeled, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower florets barren. Lower lemma ovate, 2-2.5 mm long, chartaceous, 5-veined, veins glabrous, surface glabrous, margins smooth, apex acute, awnless. Lower palea well developed, membranous, ovate, as long as lower lemma, 2-keeled, veins narrowly winged. Upper floret pale gray. Upper lemma elliptic, 1.5-2 mm long, coriaceous, surface finely rugose, apex mucronate, awnless. Upper palea elliptic, as long as upper lemma, coriaceous, 2-veined, surface finely rugose. Caryopsis glabrous, dorso-ventrally compressed, elliptic, 1.5-1.8 mm long.

[Distribution] Tropic regions.

[Habitat] Taiwan, weedy in cultivated fields and waste places.

[Taiwan] KAOHSIUNG: Shoushan, *Yeh 1060* (PPI), *Chen 6904* (TAIE). PINGTUNG: Szuchonhsi, *Hsu 13566* (TAI), Hengchun, *Hsu 504* (TAI). TAITUNG: Lutao, *Wu 2719* (TNM). PENGHU: *Chen s. n.* Aug. 24, 1983 (PPI).

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Photo 1 *Alloteropsis semialata*  
by C. J. Lin



Photo 2 *Alloteropsis semialata*  
by C. J. Lin



Photo 4 *Axonopus compressus*  
by C. H. Chen



Photo 3 *Axonopus compressus*  
by C. H. Chen



Photo 5 *Axonopus fissifolius*  
by C. J. Lin



Photo 6 *Axonopus fissifolius*  
by C. J. Lin



Photo 7 *Brachiaria mutica*  
by C. H. Chen



Photo 9 *Brachiaria subquadripara*  
by C. Y. Lin



Photo 8 *Brachiaria subquadripara*  
by C. H. Chen



Photo 11 *Brachiaria villosa*  
by C. H. Chen



Photo 10 *Brachiaria villosa*  
by C. H. Chen



Photo 12 *Cenchrus ciliaris*  
by C. J. Lin



Photo 13 *Cenchrus ciliaris*  
by C. H. Chen



Photo 14 *Cenchrus echinatus*  
by C. H. Chen



Photo 15  
*Cenchrus echinatus*  
by C. Y. Lin



Photo 16 *Cyrtococcum patens* var. *patens*  
by C. H. Chen



Photo 17 *Cyrtococcum patens*  
var. *patens*  
by C. H. Chen



Photo 18 *Cyrtococcum patens* var. *latifolium*  
by S. S. Yang



Photo 19 *Cyrtococcum patens* var.  
*latifolium*  
by S. S. Yang



Photo 20 *Digitaria fauriei*  
by C. Y. Lin



Photo 21 *Digitaria fauriei*  
by C. Y. Lin



Photo 22 *Digitaria henryi*  
by C. Y. Lin



Photo 23 *Digitaria henryi*  
by C. Y. Lin



Photo 24 *Digitaria ischaemum*  
by C. Y. Lin



Photo 25 *Digitaria ischaemum*  
by C. Y. Lin



Photo 26 *Digitaria mollicoma*,  
by C. Y. Lin



Photo 27 *Digitaria radicata*  
by C. Y. Lin



Photo 28 *Digitaria radicata*  
by C. Y. Lin



Photo 29 *Digitaria sanguinalis*  
by C. Y. Lin



Photo 30 *Digitaria violascens*  
by C. H. Chen



Photo 31 *Digitaria violascens*  
by C. H. Chen



Photo 32 *Echinochloa colona*  
by C. H. Chen



Photo 33 *Echinochloa colona*  
by C. H. Chen



Photo 34 *Echinochloa crus-galli*  
by C. H. Chen



Photo 35 *Echinochloa crus-galli*  
by C. H. Chen



Photo 36 *Eriochloa procera*  
by C. Y. Lin



Photo 37 *Eriochloa procera*  
by C. H. Chen



Photo 38 *Eriochloa villosa*  
by C. J. Lin



Photo 39 *Eriochloa villosa*  
by C. J. Lin



Photo 40 *Hymenachne amplexicaulis*  
by C. J. Lin



Photo 41 *Ichnanthus pallens* var. *major*  
by C. H. Chen



Photo 43 *Melinis repens*  
by C. H. Chen



Photo 42 *Ichnanthus pallens* var. *major*  
by C. H. Chen



Photo 44 *Melinis repens*  
by C. H. Chen



Photo 45 *Oplismenus compositus* var.  
*compositus* by C. H. Chen



Photo 46 *Oplismenus compositus* var.  
*intermedius* by C. H. Chen



Photo 47 *Oplismenus undulatifolius* var. *undulatifolius*  
by C. H. Chen



Photo 48 *Panicum brevifolium*  
by C. H. Chen



Photo 50 *Panicum maximum*  
by C. H. Chen



Photo 49 *Panicum brevifolium*  
by C. H. Chen



Photo 51 *Panicum notatum*  
by C. H. Chen



Photo 52 *Panicum repens*  
by C. H. Chen

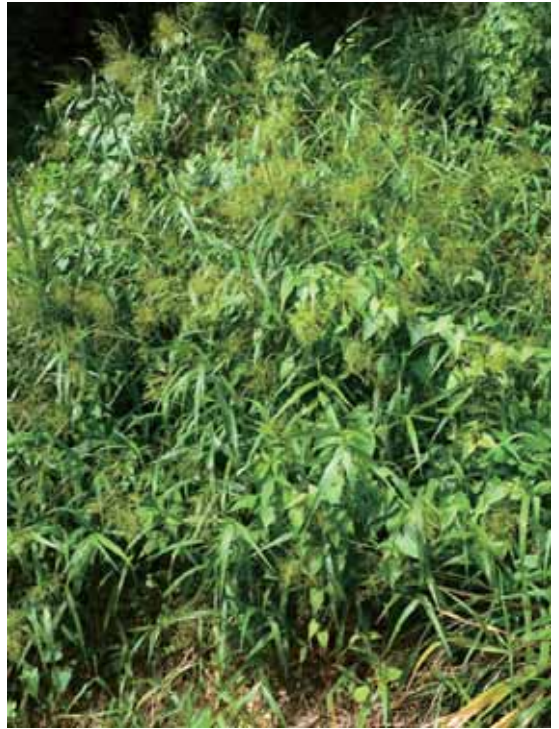


Photo 53 *Panicum sarmentosum*  
by C. H. Chen



Photo 54  
*Panicum sarmentosum*  
by C. Y. Lin



Photo 55  
*Paspalidium flavidum*  
by H. Y. Yeh



Photo 56  
*Paspalidium flavidum*  
by H. Y. Yeh



Photo 57 *Paspalum conjugatum*  
by C. Y. Lin



Photo 58 *Paspalum conjugatum*  
by C. Y. Lin



Photo 59  
*Paspalum dilatatum*  
by C. H. Chen



Photo 60  
*Paspalum distichum*  
by C. Y. Lin



Photo 61  
*Paspalum distichum*  
by C. Y. Lin



Photo 62  
*Paspalum paniculatum*  
by C. H. Chen



Photo 63  
*Paspalum paniculatum*  
by C. Y. Lin



Photo 64  
*Paspalum scrobiculatum* var.  
*scrobiculatum*  
by C. H. Chen



Photo 65  
*Paspalum scrobiculatum* var.  
*scrobiculatum*  
by C. H. Chen



Photo 66  
*Paspalum urvillei*  
by C. H. Chen



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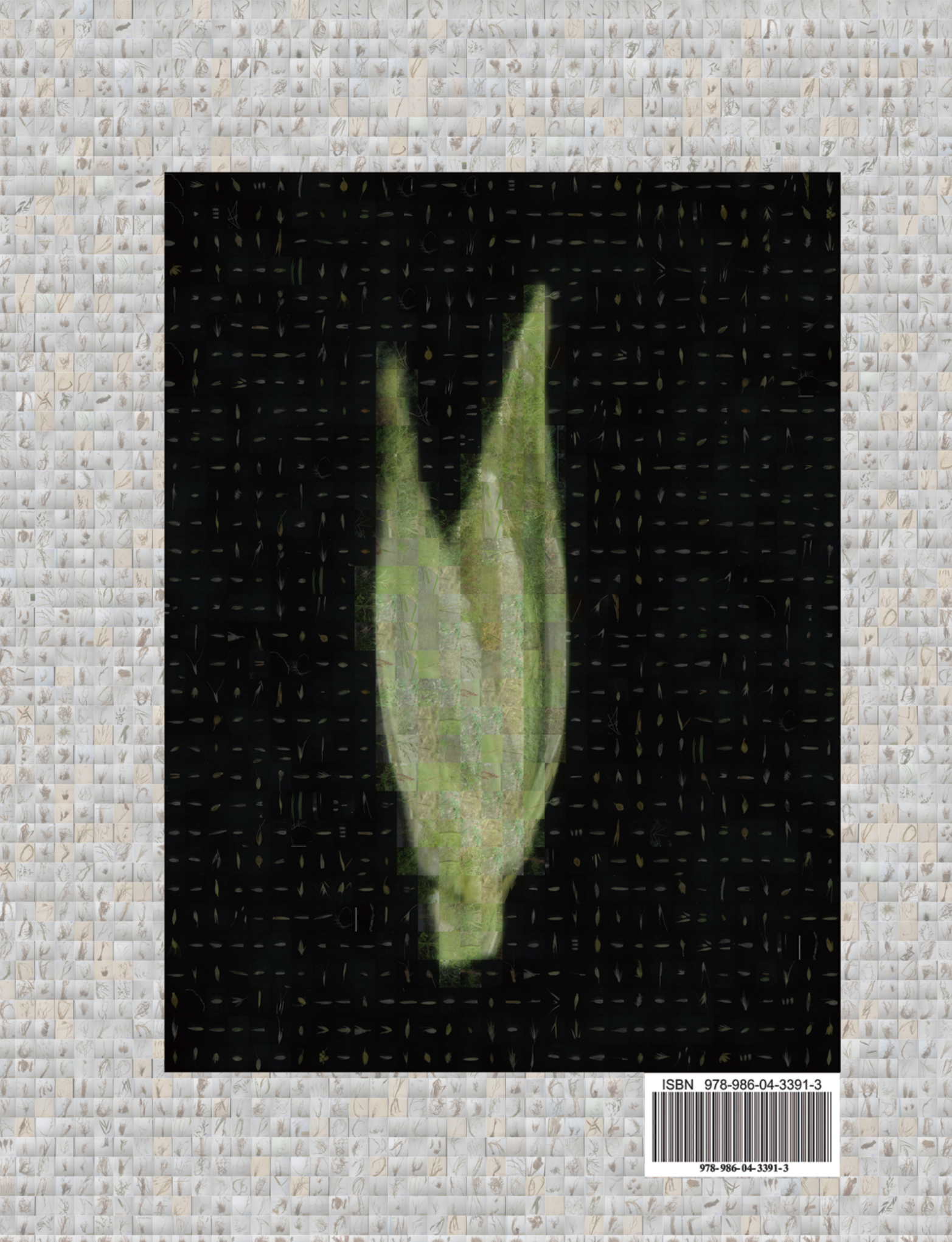
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