# A GUIDE TO THE TAIWAN GRASSES, WITH KEYS TO SUBFAMILIES, TRIBES, GENERA AND SPECIES[2]

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**Abstract:** This is a taxonomic account of Taiwan grasses. A total of 5 subfamilies, 27 tribes, 118 genera, 270 species, 1 subspecies, 39 varieties and 8 forms are recognized in this study, of which two new taxa, 19 new records have been discovered, and 8 new combination of names are proposed. The genus *Leptaspis*, one of the most primitive grasses, is found for the first time from Taiwan. An attempt is made to summarize our present knowledge on Taiwan grases. A newly proposed classification of Taiwan grasses is presented.

## I. INTRODUCTION

Many papers have been published in the past listing the known species of the grass family, Gramineae (Poaceae) of Taiwan, which includes the Pescadores, Green Island and Orchid Island (Botel Tabago). These papers are widely scattered in botanical literature. Most authors published enumerations, but no comprehensive treatment of the Taiwan grasses has been published.

The present paper is an attempt to summarize our present taxonomic knowledge of all Taiwan grasses in an easy form for anyone who is interested in knowing the taxa of any species. This is a first step to the biosystematic investigation of the grass studies.

No descriptions are given for the subfamilies, tribes, genera and species, but the original literature, the type locality, and the basyonyms are listed in detail, together with analytical keys to the subfamilies, tribes, genera, and keys to the species, varieties or forms. A full description of Taiwan grass species and figures are in preparation (Hsu, 1970, in part) and they will be presented later in this series of studies.[3]

Chromosome numbers are cited for Taiwan material (Chen & Hsu, 1961, 1962; Hsu, 1967, 1971 and unpublished data), and for the neighbouring areas. In the latter case, previous records of chromosome numbers are freely cited from the Atlas of Darlington *et al.* (1942; 1955), Cave (1958–1965), Carnahan & Hill (1961), and Ornduff 1967, 1968). Notes on general distribution, local habitats and economical importance are mentioned for most species. These are partly based on reports of Willis (1966), and Bor (1960).

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(3) This will be published separately together with more than 285 detailed original line drawings and full descriptions. It will be entitled "Taiwan Grasses" (臺灣的禾草植物). (The Herbarium, Dept. of Botany, National Taiwan Univ., Taipei, Taiwan, FREE CHINA).

An attempt has been made to give a Chinese name for each species (Section II.) Most of them being newly suggested by the writer (marked with "#"). These names seek to show the meaning of their morphology or their economic values.

The two most important papers dealing with grasses of Taiwan are: Honda's Monograph (1930), and Ohwi's revision (1941–1942). Honda dealing with the Japanese species as well as the Korean and Taiwan species. In his study, detailed synonymy and Latin keys were prepared, but no critical notes or descriptions were given except for some new or recently described taxa. Ohwi on the other hand gave excellent keys and a synopsis in Japanese for the Japanese species, mentioning in notes most of Taiwan taxa.

Several papers dealing with the known species of the grasses of Taiwan and/or its adjacent areas have been written by Hackel (1899, 1904), Rendle (1904), Matsumura & Hayata (1906), Hayata (1918), Camus (1912–1913), Stapf (1917–1920), Merrill (1906; 1922), and then by Masamune (1936, 1954), recently by Keng (1933), Jansen (1953), Hsu (1962, 1963, 1965, 1966, 1970). Among these, Hackel was the pioneer. Hayata (1918) is the first person who make a thorough study on the Taiwan grasses.

Since 1954, extensive collections and comparative studies have beee made on the Taiwan grasses. The author has visited nearly all of the counties throughout the Island, including Green Island and Orchid Island. Many of the types deposited in the Herbarium of University of Tokyo (TI), and Herbarium of University of Kyoto (KYO) in Japan were examined during his stay in Tokyo. Many undeterminated specimens which had been deposited in the Herbarium of National Taiwan University (TAI) have been identified.

As regarding the arrangement of the taxa, the biosystematic information such as chromosome number, the true floral parts (Hsu, 1963, 1965), caryopsis, embryo (Reeder, 1957, 1962), leaf anatomy (Brown, 1958; Metcalfe, 1960), etc. have been taken into consideration. Attention has been paid especially to the nature of the lodicules.

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## II. SYNOPSIS OF CLASSIFICATION

### I. *Oryzoideae* 稻亞科

(1) Tribe Phareae 囊稃竹族(#)
1. *LEPTASPIS* 囊稃竹屬(#)
**1.**[4] *formosana* C. Hsu 囊稃竹(#)

(2) Tribe Oryzeae 稻族
1. *HYGRORYZA* 水禾屬
**2.** *aristata* (Retz.) Nees 水禾
2. *LEERSIA* 李氏禾屬
**3.** *hexandra* Swartz 李氏禾
3. *ORYZA* 稻屬
**4.** *sativa* Linn. 稻

(3) Tribe Zizanieae 菰族
1. *ZIZANIA* 菰屬
**5.** *latifolia* (Griseb.) Stapf 菰

### II. *Arundinoideae* 蘆竹亞科

(1) Tribe Arundineae 蘆竹族
1. *ARUNDO* 蘆竹屬
**6.** *donax* Linn. 蘆竹
**6A.** var. *coleotricha* Hack. 毛鞘蘆竹(#)
**6B.** var. *versicolor* Stokes 變葉蘆竹(#)
**7.** *formosana* Hack. 臺灣蘆竹
2. *NEYRAUDIA* 類蘆屬
**8.** *reynaudiana* (Kunth) Keng 類蘆
3. *PHRAGMITES* 蘆葦屬
**9.** *communis* (Linn.) Trin. 蘆葦
**10.** *karka* (Retz.) Trin. 卡開蘆

(2) Tribe Centotheceae 假淡竹葉族
1. *CENTOTHECA* 假淡竹葉屬
**11.** *lappacea* (Linn.) Desv. 假淡竹葉
2. *LOPHATHERUM* 淡竹葉屬
**12.** *gracile* Brongn. 淡竹葉

(4) This serial number refers also to the number of the Figures and the sequence of species described in the coming publication.

(3) Tribe Thysanolaeneae 粽葉蘆族

1. *THYSANOLAENA* 粽葉蘆屬

**13.** ***maxima*** (Roxb.) O. Kuntze 粽葉蘆

## III. *Festucoideae* 羊茅亞科

(1) Tribe Agrostideae 翦股穎族

1. *AGROSTIS* 翦股穎屬

**14.** ***arisan-montana*** Ohwi 阿里山翦股穎(#)

**15.** ***clavata*** Trin. ssp. ***matsumurae*** (Hack. ex Honda) Tateoka 翦股穎(#)

**16.** ***fukuyamae*** Ohwi 伯明翦股穎(#)

**17.** ***morrisonensis*** Hayata 玉山翦股穎

**18.** ***sozanensis*** Hayata 草山翦股穎(#)

2. *ALOPECURUS* 看麥娘屬

**19.** ***aequalis*** Sobol. var. ***amurensis*** Komar. 看麥娘

**20.** ***myosuroides*** Huds. 大穗看麥娘(#)

3. *ANTHOXANTHUM* 黃花茅屬

**21.** ***formosanum*** Honda 臺灣黃花茅

4. *ARRHENATHERUM* 燕麥草屬

**22.** ***elatius*** (Linn.) Mart. et Koch var. ***bulbosum*** (Willd.) Spenner forma ***variegam*** Hort. 變葉燕麥草(#)

5. *AVENA* 燕麥屬

**23.** ***fatua*** Linn. 野燕麥

**24.** ***sativa*** Linn. 燕麥

6. *CALAMAGROSTIS* 拂子茅屬

**25.** ***epigeios*** (Linn.) Roth 拂子茅

7. *DESCHAMPSIA* 髮草屬

**26.** ***caespitosa*** (Linn.) P. Beauv. 髮草

**27.** ***flexuosa*** (Linn.) Trin. 曲芒髮草

8. *DEYEUXIA* 野青茅屬

**28.** ***arundinacea*** (Linn.) P. Beauv. 類蘆野青茅(#)

**29.** ***formosana*** (Hay.) C. Hsu 臺灣野青茅(#)

**30.** ***matsuda*** (Honda) C. Hsu 松田野青茅(#)

**31.** ***suizanensis*** (Hay.) C. Hsu 水山野青茅(#)

9. *HELICTOTRICHON* 異燕麥屬

**32.** ***abietetorum*** (Ohwi) Ohwi 冷杉異燕麥

10. *PHALARIS* 虉草屬

**33.** ***arundinacea*** Linn. 虉草

11. *PHLEUM* 梯牧草屬

**34.** ***alpinum*** Linn. 高山梯牧草

12. *POLYPOGON* 棒頭草屬

35. *fugax* Nees 棒頭草
36. *monospeliensis* (Linn.) Desf. 長芒棒頭草

13. *TRISETUM* 三毛草屬
37. *bifidum* (Thunb.) Ohwi 三毛草
38. *spicatum* (Linn.) Rich. var. *formosanum* (Honda) Ohwi 臺灣三毛草(#)

(2) Tribe Aristideae 三芒草族

1. *ARISTIDA* 三芒草屬
39. *chinensis* Munro 華三芒草

(3) Tribe Brachypodieae 短柄草族

1. *BRACHYPODIUM* 短柄草屬
40. *kawakamii* Hayata 川上短柄草
41. *sylvaticum* (Huds.) P. Beauv.
41A. var. *kelungensis* (Honda) C. Hsu 基隆短柄草(#)
41B. var. *luzoniense* (Hack.) Hara 呂宋短柄草(#)

(4) Tribe Bromeae 雀麥族

1. *BROMUS* 雀麥屬
42. *catharticus* Vahl 大扁雀麥(#)
43. *formosanus* 臺灣雀麥(#)
44. *morrisonensis* Honda 玉山雀麥(#)
45. *remotiflorus* Ohwi var. *piananensis* Ohwi 卑南雀麥(#)

(5) Tribe Festuceae 羊茅族

1. *AULACOLEPIS* 溝稃草屬
46. *agrostoides* Ohwi var. *formosana* Ohwi 小穎溝稃草(#)
47. *treutleri* (Kuntze) Hack. 溝稃草

2. *BRIZA* 凌風草屬
48. *minor* Linn. 銀鱗草

3. *DACTYLIS* 鴨茅屬
49. *glomerata* Linn. 鴨茅

4. *FESTUCA* 羊茅屬
50. *formosana* Honda 臺灣羊茅(#)
51. *japonica* Makino 日本羊茅
53. *ovina* Linn.
53A. var. *duriuscula* (Linn.) Koch. 濶葉羊茅(#)
53B. var. *ovina* 羊茅
54. *parvigluma* Steud. 小穎羊
55. *rubra* Linn.
55A. var. *nankotaizanensis* Ohwi 南湖紫羊茅(#)
55B. var. *niitakensis* Ohwi 玉山紫羊茅(#)
56. *takasagoensis* Ohwi 高砂羊茅(#)

5. *LOLIUM* 黑麥草屬

57. *multiflorum* Lamk. 多花黑麥草
58. *perenne* Linn. 黑麥草

6. *POA* 早熟禾屬
59. *acroleuca* Steud. 白頂早熟禾
60. *annua* Linn. 早熟禾
61. *formosae* Ohwi 臺灣早熟禾(#)
62. *nankoensis* Ohwi 南湖大山早熟禾
63. *sphondylodes* Trin. var. *kelungensis* (Ohwi) Ohwi 基隆早熟禾(#)
64. *taiwanicola* Ohwi 高山早熟禾(#)
65. *takasagomontana* Ohwi 高砂早熟禾
66. *tenuicula* Ohwi 細稈早熟禾(#)

7. *VULPIA* 鼠茅屬
67. *myuros* (Linn.) C. C. Gmel. 鼠茅

(6) Tribe Meliceae 臭草族
1. *GLYCERIA* 甜茅屬
68. *leptolepis* Ohwi 假鼠婦草
2. *MELICA* 臭草屬
69. *onoi* Franch. et Sav. 小野臭草

(7) Tribe Mileae 粟草族
1. *MILIUM* 粟草屬
70. *effusum* Linn. 粟草

(8) Tribe Phaenospermeae 顯子草族
1. *PHAENOSPERMA* 顯子草屬
71. *globosum* Munro 顯子草

(9) Tribe Stipeae 針茅族
1. *ORYZOPSIS* 落芒草屬
72. *obtusa* Stapf 鈍穎落芒草

(10) Tribe Triticeae 小麥族
1. *AGROPYRON* (*ROEGNERIA*) 鵝觀草屬
73. *formosanum* 臺灣鵝觀草
74. *mayebaranum* Honda 前原鵝觀草
2. *HORDEUM* 大麥屬
75. *vulgare* Linn. 大麥
3. *SECALE* 黑麥屬
76. *cereale* Linn. 黑麥
4. *TRITICUM* 小麥屬
77. *aestivum* Linn. 小麥

## IV. *Eragrostoideae* 畫眉草亞科

(1) Tribe Chlorideae 虎尾草族

1. *CHLORIS* 虎尾草屬
   78. *barbata* Sw. 孟仁草
   79. *formosana* (Honda) Keng 臺灣虎尾草
   80. *gayana* Kunth 蓋氏虎尾草
   81. *virgata* Sw. 虎尾草
2. *CYNODON* 狗牙根屬
   82. *arcuatus* J. S. Presl 恒春狗牙根(#)
   83. *dactylon* (Linn.) Pers. 狗牙根
3. *ENTEROPOGON* 腸鬚草屬
   84. *dolicostachyus* (Lag.) Keng 腸鬚草
   85. *gracilior* Rendle 細穗腸鬚草(#)
4. *EUSTACHYS* 眞穗草屬
   86. *tener* (Presl) A. Camus 眞穗草

(2) Tribe Eragrosteae 畫眉草族

1. *DACTYLOCTENIUM* 龍爪茅屬
   87. *aegyptium* (Linn.) P. Beauv. 龍爪茅
2. *DIPLACHNE* 雙稃草屬
   88. *fusca* (Linn.) P. Beauv. 雙稃草
3. *ELEUSINE* 穇屬
   89. *corocana* (Linn.) Gaertn. 穇子
   90. *indica* (Linn.) Gaertn. 牛筋草
4. *ERAGROSTIS* 畫眉草屬
   91. *amabilis* (Linn.) Wight et Arn. 鯽魚草
   92. *cilianensis* (All.) Vignolo-Lutati 大畫眉草
   93. *ciliaris* (Linn.) R. Br. 毛畫眉草(#)
   94. *cumingii* Steud. 胥氏畫眉草(#)
   95. *cylindrica* (Roxb.) Nees 短穗畫眉草
   96. *fauriei* Ohwi 佛歇里畫眉草(#)
   97. *ferruginea* (Thunb.) P. Beauv. 知風草
   98. *japonica* (Thunb.) Trin. 長穗鯽魚草(#)
   99. *multicaulis* Steud. 多稈畫眉草(#)
   100. *nevinii* Hance 尼氏畫眉草
   101. *nutans* (Retz.) Nees 細葉畫眉草(#)
   102. *pilosa* (Linn.) P. Beauv. 畫眉草
   103. *pilostssima* Lind. 毛葉畫眉草
   104. *pilosiuscula* Lind. 多毛知風草
   105. *poaeoides* P. Beauv. 小畫眉草
   106. *uniolides* (Retz.) Nees 牛虱草
5. *LEPTOCHLOA* 千金子屬
   107. *chinensis* (Linn.) Nees 千金子

108. *panicea* (Retz.) Ohwi 蠅子草

6. *TRIPOGON* 草沙蠶屬

109. *chinensis* Hack. 中華草沙蠶

(3) Tribe Garnotieae 葛氏草族

1. *GARNOTIA* 葛氏草屬

110. *acutigluma* (Steud.) Ohwi 銳穎葛氏草(#)

(4) Tribe Leptureae 細穗草族

1. *LEPTURUS* 細穗草屬

111. *repens* (G. Forst.) R. Br. 細穗草

(5) Tribe Perotideae 茅根草族

1. *PEROTIS* 茅根草屬

112. *indica* (Linn.) O. Kuntze 茅根

113. *macrantha* Honda 大穗茅根(#)

(6) Tribe Sporoboleae 鼠尾粟族

1. *MUHLENBERGIA* 亂子草屬

114. *longistolon* Ohwi 亂子草

2. *SPOROBOLUS* 鼠尾粟屬

115. *diander* (Retz.) P. Beauv. 雙蕊鼠尾粟

116. *fertilis* (Steud.) W. D. Clayton 鼠尾粟

117. *hancei* Rendle 韓氏鼠尾粟

118. *virginicus* (Linn.) Kunth 維地鼠尾粟

(7) Tribe Zoysieae 結縷草族

1. *ZOYSIA* 結縷草屬

119. *japonica* Steud. 日本芝(#)

120. *matrella* (Linn.) Merr. 馬尼拉芝(#)

121. *sinica* Honda 中華結縷草

122. *tenuifolia* Willd. 高麗芝

## V. *Panicoideae* 黍亞科

(1) Tribe Arundinelleae 野古草族

1. *ARUNDINELLA* 野古草屬

123. *hirta* (Thunb.) Tanaka 野古草

124. *pubescens* Merr. et Hack. 毛野古草(#)

125. *setosa* Trin. 刺芒野古草

(2) Tribe Isachneae 柳葉箬族

1. *SPHAEROCARYUM* 秤鎚屬

126. *malaccense* (Trin.) Pilger 秤鎚

2. *ISACHNE* 柳葉箬屬

127. *albens* Trin. 白花柳葉箬

**128.** ***beneckei*** Hack. 本氏柳葉箬

**129.** ***debilis*** Rendle 荏弱柳葉箬

**130.** ***dispar*** Trin. 異花柳葉箬(艹)

**131.** ***globosa*** (Thunb.) O. Ktze. 柳葉箬

**132.** ***kunthiana*** (Wight. et Arn.) Nees 肯氏柳葉箬(艹)

**133.** ***miliacea*** Roth 類黍柳葉箬(艹)

**134.** ***nipponensis*** Ohwi 日本柳葉箬

(3) Tribe Paniceae 黍族

1. *ALLOTEROPSIS* 毛穎草屬

**135.** ***semialata*** (R. Br.) Hitchc. 毛穎草

2. *AXONOPUS* 地毯草屬

**136.** ***compressus*** (Swartz) P. Beauv. 地毯草

3. *BRACHIARIA* 臂形草屬

**137.** ***mutica*** (Forssk.) Stapf 巴拉草

**138.** ***reptans*** (Linn.) Gard. et C. E. Hubbard 尾稃草

**139.** ***subquaripara*** (Trin.) Hitchc. 四生臂形草

**140.** ***villosa*** (Lamk.) A. Camus 毛臂形草

4. *CENCHRUS* 蒺藜草(刺穀草)屬

**141.** ***echinatus*** Linn. 蒺藜草(刺穀草)

5. *CYRTOCOCCUM* 弓果黍屬

**142.** ***accrescens*** (Trin.) Stapf 散穗弓果黍(艹)

**143.** ***patens*** (Linn.) A. Camus 弓果黍

6. *DIGITARIA* 馬唐屬

**144.** ***adscendens*** (H. B. K.) Henr. 升馬唐(假馬唐)

**145.** ***bicornis*** (Lamk.) Roem. et Schult. 粗穗馬唐

**146.** ***fauriei*** Ohwi 佛歐里馬唐

**147.** ***hayatae*** Honda 絨馬唐

**148.** ***henryi*** Rendle 亨利馬唐

**149.** ***ischaemum*** (Schreb.) Schreb. 止血馬唐

**150.** ***leptalea*** Ohwi var. ***reticulmis*** Ohwi 叢立馬唐

**151.** ***longiflora*** (Retz.) Pers. 長花馬唐(鐵線草)

**152.** ***magna*** (Honda) Tsuyama 大絨馬唐

**153.** ***microbachne*** (Presl) Henr. 短穎馬唐(大馬唐)

**154.** ***sanguinalis*** (Linn.) Scop. 馬唐

**155.** ***sericea*** (Honda) Honda 絹毛馬唐

**156.** ***timorensis*** (Kunth) Bal.

**156A.** var. ***timorensis*** 小馬唐

**156B.** var. ***hirsuta*** (Honda) C. Hsu 毛馬唐

**157.** ***violascens*** Link 紫果馬唐

7. *ECHINOCHLOA* 稗屬
   158. ***colonum*** (Linn.) Link 芒稷
   159. ***crusgalli*** (Linn.) P. Beauv.
   159A. var. ***formosensis*** Ohwi 臺灣野稗
   159B. var. ***oryzicola*** (Basing) Ohwi 水稗
   159C. var. ***praticola*** Ohwi 細葉旱稗
   160. ***frumentacea*** Link 湖南稷子
8. *ERIOCHLOA* 野黍屬
   161. ***procera*** Retz. 高野黍(紫野黍)
   162. ***villosa*** (Thunb.) Kunth 野黍
9. *HYMENACHNE* 膜稃草屬
   163. ***pseudointerrupta*** C. Muell. 膜稃草
10. *ICHNANTHUS* 距花黍屬
   164. ***vicinus*** (F. M. Bail.) Merr. 距花黍
11. *MELINIS* 糖蜜草屬
   165. ***minutiflora*** P. Beauv. 糖蜜草
12. *OPLISMENUS* 求米草屬
   166. ***compositus*** (Linn.) P. Beauv.
   166A. var. ***compositus*** 竹葉草
   166B. var. ***intermedius*** (Honda) Ohwi 大屯求米草
   166C. var. ***owatarii*** (Honda) Ohwi 大渡求米草
   166D. var. ***patens*** (Honda) Ohwi 大竹葉草
   167. undulatifolius (Ard.) P. Beauv.
   167A. var. ***imbecillis*** (R. Br.) Hack. 毛求米草
   167B. var. ***japonicus*** (Steud.) Koidzumi 求米草
   167C. var. ***microphyllus*** (Honda) Ohwi 小求米草
13 *OTTOCHLOA* 奧圖草屬
   168. ***nodosa*** (Kunth) Dandy 新店奧圖草
14. *PANICUM* 稷屬(黍屬)
   169. ***bisulcatum*** Thunb. 糠稷
   170. ***brevifolium*** Linn. 短葉黍
   171. ***cambogiense*** Balansa 網脈稷
   172. ***incomtum*** Trin. 藤竹草
   173. ***maximum*** Jacq. 大黍 (毬尼亞草)
   174. ***miliaceum*** Linn. 稷
   175. ***notatum*** Retz. 心葉稷
   176. ***paludosum*** Roxb. 水生黍
   177. ***psilopodium*** Trin. 細柄黍
   178. ***repens*** Linn. 鋪地黍
   179. ***trypheron*** Schult. ***suishaensis*** (Hay.) C. Hsu 水社黍

180. *watense* Mez. 南亞黍

15. *PASPALIDIUM* 類雀稗屬

181. *punctatum* (Burm.) A. Camus 類雀稗

16. *PASPALUM* 雀稗屬

182. *commersonii* Lamk. 臺灣雀稗

183. *conjugatum* Berg. 兩耳草

184. *dilatatum* Poir. 毛花雀稗 (大理草)

185. *distichum* Linn. 雙穗雀稗

186. *fimbriatum* H. B. K. 烈穎雀稗(卄)

187. *longifolium* Roxb. 長葉雀稗

188. *orbiculare* Forst. 圓果雀稗

189. *scrobiculatum* Linn. 鴨跖草

190. *thunbergii* Kunth 雀稗

191. *urvillei* Steud. 吳氏雀稗

192. *vaginatum* Swartz 海雀稗

17. *PENNISETUM* 狼尾草屬

193. *alopecuroides* (Linn.) Spreng. 狼尾草

194. *cladestinum* Hochst. 鋪地狼尾草(卄)

195. *purpureum* Schumach. 象草

196. *setosum* (Sw.) L. C. Rich. 牧地狼尾草(卄)

18. *PSEUDORAPHIS* 僞針茅屬

197. *spinescens* (R. Br.) Vickery 大僞針茅

19. *RHYNCHELYTRUM* 紅毛草屬

198. *repens* (Willd.) C. E. Hubbard 紅毛草

20. *SACCIOLEPIS* 囊穎草屬

199. *indica* (Linn.) A. Chase

199A. var. *indica* 囊穎草

199B. var. *oryzetorum* (Makino) Ohwi 水囊穎草

21. *SETARIA* 狗尾草屬

200. *faberii* Herrm 法氏狗尾草

201. *geniculata* (Lamk.) P. Beauv. 莠狗尾草

203. *glauca* (Linn.) P. Beauv. 御谷(金色狗尾草)

204. *italica* (Linn.) P. Beauv. 小米

205. *pallide-fusca* (Schumach.) Stapf 褐毛狗尾草

206. *palmifolia* (Koen.) Stapf 棕葉狗尾草(鵝鳳草)

207. *plicata* (Lamk.) T. Cooke 皺葉狗尾草

208. *verticillata* (Linn.) P. Beauv. 倒刺狗尾草

209. *viridis* (Linn.) P. Beauv.

209A. var. *vtridis* 狗尾草

209B. var. *pachystachys* (Franch. & Sav.) Makino & Nemoto 海濱狗尾草

22. *SPINIFEX* 濱刺屬(濱刺草屬)

**210.** ***littoreus*** Burm.f. 老鼠芀(濱刺草)

23. *THUAREA* 翦蕾草屬(濱箬草屬)

**211.** ***involuta*** (G. Forst.) R. Br. 翦蕾草(濱箬草)

(4) Tribe Andropogoneae 蜀黍族

1. *APLUDA* 水蔗草屬

**212.** ***mutica*** Linn. 水蔗草

2. *ARTHRAXON* 蘆草屬

**213.** ***hispidus*** (Thunb.) Makino 蘆草

**214.** ***pauciflorus*** Honda 粗梗蘆草(#)

**215.** ***quartinianus*** (A. Rich.) Nash 暖地蘆草(#)

3. *BOTHRIOCHLOA* 孔穎草屬

**216.** ***glabra*** (Roxb.) A. Camus 岐穗臭根子草(#)

**217.** ***intermedia*** (R. Br.) A. Camus

**217A.** var. ***intermedia*** 臭根子草

**217B.** var. ***punctata*** (Roxb.) Keng 孔穎臭根子草

**218.** ***ischaemum*** (Linn.) Keng 白羊草

4. *CAPILLIPEDIUM* 細柄草屬

**219.** ***assimile*** (Steud.) A. Camus 硬稈子草

**220.** ***kwashotensis*** (Hay.) C. Hsu 綠島細柄草(#)

**221.** ***parviflorum*** (R. Br.) Stapf

**221A.** var. ***parviflorum*** 細柄草

**221B.** var. ***spicigerum*** (Benth.) C. Hsu. 多節細柄草(#)

5. *CHRYSOPOGON* 金鬚茅屬

**222.** ***aciculatus*** (Retz.) Trin. 竹節草

6. *COIX* 薏苡屬

**223.** ***lacryma-jobi*** Linn.

**223A.** var. ***formosana*** Ohwi 臺灣薏苡(#)

**223B.** var. ***lacryma-jobi*** 薏苡

**223C.** var. ***maxima*** Makino 念珠薏苡(#)

**224D.** var. ***mayuen*** (Romanet) Stapf 馬圓薏苡(#)

7. *CYMBOPOGON* 香茅屬

**224.** ***citratus*** (DC.) Stapf 檸檬茅

**225.** ***nardus*** (Linn.) Rendle 香茅

**226.** ***tortilis*** (Presl) A. Camus

**226A.** var. ***goeringii*** (Steud.) Hand.—Mazz. 橘草

**226B.** var. ***tortilis*** 扭鞘香茅

**227.** ***winterianus*** Jowitt 爪哇香茅(#)

8. *DICHANTHIUM* 雙花草屬

**228.** *annulatum* (Forssk.) Stapf 雙花草
**229.** *aristatum* (Poir.) C. E. Hubb. 毛梗雙花草(#)

9. *DIMERIA* 觿茅屬
**230.** *falcata* Hack. 鐮形觿茅
**231.** *ornithopoda* Trin. 觿茅

10. *ECCOILOPUS* 油芒屬
**232.** *cotulifer* (Thunb.) A. Camus
**232A.** forma *cotulifer* 油芒
**232B.** forma *sagittiformis* Ohwi 箭葉油芒(#)
**233.** *formosanus* A. Camus
**233A.** var. *formosanus* 臺灣油芒(#)
**233B.** var. *tohoensis* (Hay.) Honda 東埔油芒(#)

11. *EREMOCHLOA* 蜈蚣草屬
**234.** *ciliaris* (Linn.) Merr. 蜈蚣草
**235.** *ophiuroides* (Munro) Hack. 假儉草

12. *ERIANTHUS* 蘆茅屬
**236.** *arundinaceus* (Retz.) Jesw. 斑茅
**237.** *formosanus* Stapf
**237A.** var. *formosanus* 臺蘆茅
**237B.** var. *pollinioides* (Rendle) Ohwi 紫臺蘆茅(#)

13. *EUCHLAENA* 類蜀黍屬
**238.** *mexicana* Schradl 類蜀黍

14. *EULALIA* 金茅屬
**239.** *leschenaultiana* (Decne.) Ohwi 細稈金茅(#)
**240.** *quadrinervis* (Hack.) O. Kuntze 四脈金茅(#)
**241.** *speciosa* (Debeaux) O. Kuntze 金茅

15. *EULALIOPSIS* 擬金茅屬
**242.** *binata* (Retz.) C. E. Hubbard 擬金茅

16. *HACKELOCHLOA* 亥氏草屬
**243.** *granularis* (Linn.) O. Ktze. 亥氏草

17. *HEMARTHRIA* 牛鞭草屬
**244.** *compressa* (Linn.f.) R. Br. 扁穗牛鞭草

18. *HETEROPOGON* 黃茅屬
**245.** *contortus* (Linn.) P. Beauv. 黃茅

19. *IMPERATA* 白茅屬
**246.** *cylindrica* (Linn.) P. Beauv. var. *major* (Nees) C. E. Hubbard 白茅

20. *ISCHAEMUM* 鴨嘴草屬
**247.** *akoense* Honda 屏東鴨嘴草(#)
**248.** *aristatum* Linn.
**248A.** var. *aristatum* 芒穗鴨嘴草

**248B.** var. *momiyamai* (Honda) C. Hsu 毛穗鴨嘴草(#)
**249.** *aureum* (Hook. et Arn.) Hack. 黃金鴨嘴草(#)
**250.** *barbatum* Retz. var. *gibbum* (Trin.) Ohwi
**250A.** forma *gibbum* 瘤鴨嘴草(#)
**250B.** forma *nodulosum* Ohwi 毛瘤鴨嘴草(#)
**251.** *crassipes* (Steud.) Thell. 鴨嘴草
**252.** *indicum* (Houtt.) Merr. 印度鴨嘴草(#)
**253.** *muticum* Linn. 無芒鴨嘴草(#)
**254.** *rugosum* Salisb. var. *segetum* (Trin.) Hack. 田間鴨嘴草
**255.** *setaceum* Honda 小黃金鴨嘴草

21. *MICROSTEGIUM* 蕎竹屬
**256.** *ciliatum* (Trin.) A. Camus 剛蕎竹
**257.** *dilatatum* Koidz. 大穗蕎竹(#)
**258.** *fauriei* (Hay.) Honda 法利蕎行
**259.** *geniculatum* (Hay.) Honda 膝曲蕎竹
**260.** *glaberimum* (Honda) Koidzumi 短軸蕎竹(#)
**261.** *nudum* (Trin.) A. Camus 竹葉茅
**262.** *somai* (Hay.) Ohwi 相馬蕎竹(#)
**263.** *vimineum* (Trin.) A. Camus 柔枝蕎竹

22. *MISCANTHUS* 芒屬
**264.** *flavidus* Honda 黃金芒(#)
**265.** *floridulus* (Labill.) Warb. 五節芒
**266.** *kanehirai* Honda 金平芒(#)
**267.** *sinensis* Anderss.
**267A.** var. *condensatus* (Hack.) Makino 八丈芒(#)
**267B.** var. *formosanus* Hack. 臺灣芒(#)
**268.** *transmorrisonensis* Hayata 高山芒(#)

23. *NARENGA* 河王八屬
**269.** *porphyrocoma* (Hance) Bor 河王八

24. *POGONATHERUM* 金髮草屬
**270.** *crinitum* (Thunb.) Kunth 金絲草
**271.** *paniceum* (Lamk.) Hack. 金髮草

25. *ROTTBOELLIA* 雚氏草屬
**272.** *exaltata* Linn.f. 雚氏草

26. *SACCHARUM* 甘蔗屬
**273.** *barberi* Jesw. 細稈甘蔗(#)
**274.** *officinarum* Linn. 秀貴甘蔗(#)
**275.** *sinensis* Roxb. 甘蔗(#)
**276.** *spontaneum* Linn.
**276A.** var. *spontaneum* 甜根子草

**276B.** var. ***roxburghii*** Honda 羅氏甜根子草(＃)

27. *SCHIZACHYRIUM* 裂稃草屬

**277.** ***brevifolium*** (Sw.) Nees 裂稃草

**278.** ***fragile*** (R. Br.) A. Camus var. ***shimadae*** (Ohwi) C. Hsu 尖葉裂稃草(＃)

28. *SORGHUM* 蜀黍屬

**279.** ***bicolor*** (Linn.) Moench 蜀黍

**280.** ***halepense*** (Linn.) Pers. 詹森草(＃) (強生草)

**281.** ***nitidum*** (Vahl) Pers. 光高粱

**282.** ***propinquum*** (Kunth) Hitchc. 擬高粱

29. *SPODIOPOGON* 大油芒屬

**283.** ***tainanensis*** Hayata

**283A.** form ***hayatai*** (Honda) C. Hsu 雙梗大油芒(＃)

**283B.** forma ***hogoensis*** (Hay.) C. Hsu 短葉大油芒(＃)

**283C.** forma ***tainanensis*** 臺南大油芒

**283D.** forma ***takeoi*** (Honda) C. Hsu 無脈大油芒(＃)

30. *THAUMASTOCHLOA* 假蛇尾草屬

**284.** ***chenii*** C. Hsu 其昌假蛇尾草(＃)

**285.** ***cochinchinensis*** (Lour.) C. E. Hubbard

**285A.** forma ***cochinchinensis*** 假蛇尾草

**285B.** forma ***shimadana*** (Ohwi & Odashima) Ohwi 孔穎假蛇尾草(＃)

31. *THEMEDA* 菅屬

**286.** ***caudata*** (Nees) A. Camus

**286A.** var. ***caudata*** 苞子草

**286B.** var. ***matsudai*** Honda 松田苞子草(＋)

**287.** ***japonica*** (Willd.) C. Tanaka 黃背草

32. *VETIVERIA* 培地茅屬(＃)

**288.** ***zizanioides*** Linn. 培地茅(＃)

33. *ZEA* 玉蜀黍屬

**289.** ***mays*** Linn. 玉蜀黍

## III. A LIST OF NEW TAXA, NEW COMBINATIONS, AND NEW RECORDS

(1) New Taxa:

1. **Leptaspis formosana** C. Hsu.....**Fig. I. (Page 215)**
2. **Thaumastochloa chenii** C. Hsu.....**Fig. II. IIA. (Page 218, 219)**

(2) New Combinations:

1. *Brachypodium sylvaticum* (Huds.) P. Beauv. var. *kelungensis* (Honda) C. Hsu
2. *Capillipedium parviflorum* (R. Br.) Stapf var. *spicigerum* (Benth.) C. Hsu
3. *Deyeuxia formosana* (Hay.) C. Hsu
4. *Deyeuxia matsuda* (Honda) C. Hsu
5. *Deyeuxia suizanensis* (Hay.) C. Hsu

6. *Spodiopogon tainanensis* Hay. forma *hayatai* (Honda) C. Hsu
7. *Spodiopogon tainanensis* Hay. forma *hogoensis* (Hay.) C. Hsu
8. *Spodiopogon tainanensis* Hay. forma *takeoi* (Honda) C. Hsu

(3) New Records:

FESTUCOIDEAE

1. *Agropyron mayebaranum* Honda .....**Fig. VI.** **(Page 248)**
2. *Bromus catharicus* Vahl .....**Fig. IV.** **(Page 238)**
3. *Lolium multiflorum* Lamk. .....**Fig. V.** **(Page 243)**
4. *Arrhenatherum elatius* (L.) Mart. et Koch var. *bulbosum* (Willd.) Spenner forma *variegam* Hort.
5. *Phalaris arundinacea* Linn.

ERAGROSTOIDEAE

6. *Chloris virgata* Sw. .....**Fig. VII.** **(Page 252)**
7. *Eragrostis ciliaris* (Linn.) R. Br. .....**Fig. IX.** **(Page 259)**
8. *Eragrostis ferruginea* (Thunb.) P. Beauv. .....**Fig. X.** **(Page 261)**
9. *Eustachys tener* (Presl) A. Camus. .....**Fig. VIII.** **(Page 255)**

PANICOIDEAE

10. *Arundinella hirta* (Thunb.) Tanaka .....**Fig. XI.** **(Page 268)**
11. *Melinis minutiflora* P. Beauv. .....**Fig. XII.** **(Page 284)**
12. *Paspalum fimbriatum* H. B. K. .....**Fig. XIII.** **(Page 293)**
13. *Pennisetum cladestinum* Hochst. .....**Fig. XIV.** **(Page 296)**
14. *Pennisetum setosum* (Sw.) L. C. Rich. .....**Fig. XV.** **(Page 298)**
15. *Dichanthium annulatum* (Forssk.) Stapf .....**Fig. XVI.** **(Page 313)**
16. *Dichanthium aristatum* (Poir.) C. E. Hubb. .....**Fig. XVII.** **(Page 314)**
17. *Eremochloa ciliaris* (Linn.) Merr. .....**Fig. XVIII.** **(Page 316)**
18. *Eularia leschenaultiana* (Decne.) Ohwi .....**Fig. XIX.** **(Page 319)**
19. *Microstegium dilatatum* Koidz. .....**Fig. XX.** **(Page 326)**

**Leptaspis formosana Sp. Nov.** **Fig. I.**

Gramen perenne caespitosum. Rhizoma erectum, brevissimum. Culmi erecti simplices teretes cum panicula 40–60 cm alti. Vaginae compressae laeves glabrae. Ligulae truncatae, brevissime ciliatae. Laminae breviter petiolatae, petiolis 1–1.5 cm longis, compressis, lanceolatae, basi attenuatae, 10–20 cm longae, 1–1.8 cm latae, glabrae, utrinque scaberulae, tenuiter, inter venas transverse venulosae, margine inferne cum petiolique parce ciliatae. Panicula angustissima, ca. 15–22 cm longa, pauciramosa, ramis primariis adpressis, 1.5–4 cm longis, strictis, rachi tereti, ramulis bispiculosis, superioribus ♂, inferioribus spiculae laterales brevissime pedicellatae. Glumae 2, flavo-bruneae, ovatae, concavae, cuspidatae, dorso minute puberulae. Spiculae ♀: gluma inferior 1 mm longa, uni-nervis; gluma superior 1.6 mm longa, trinervis; lemma membranaceum, circiter 4.6 mm longum, asymmetricum, turbinatopyriforme globosum, flavo-brunneum atque latum 7-costatum, toto pilis brevibus subuncinatis

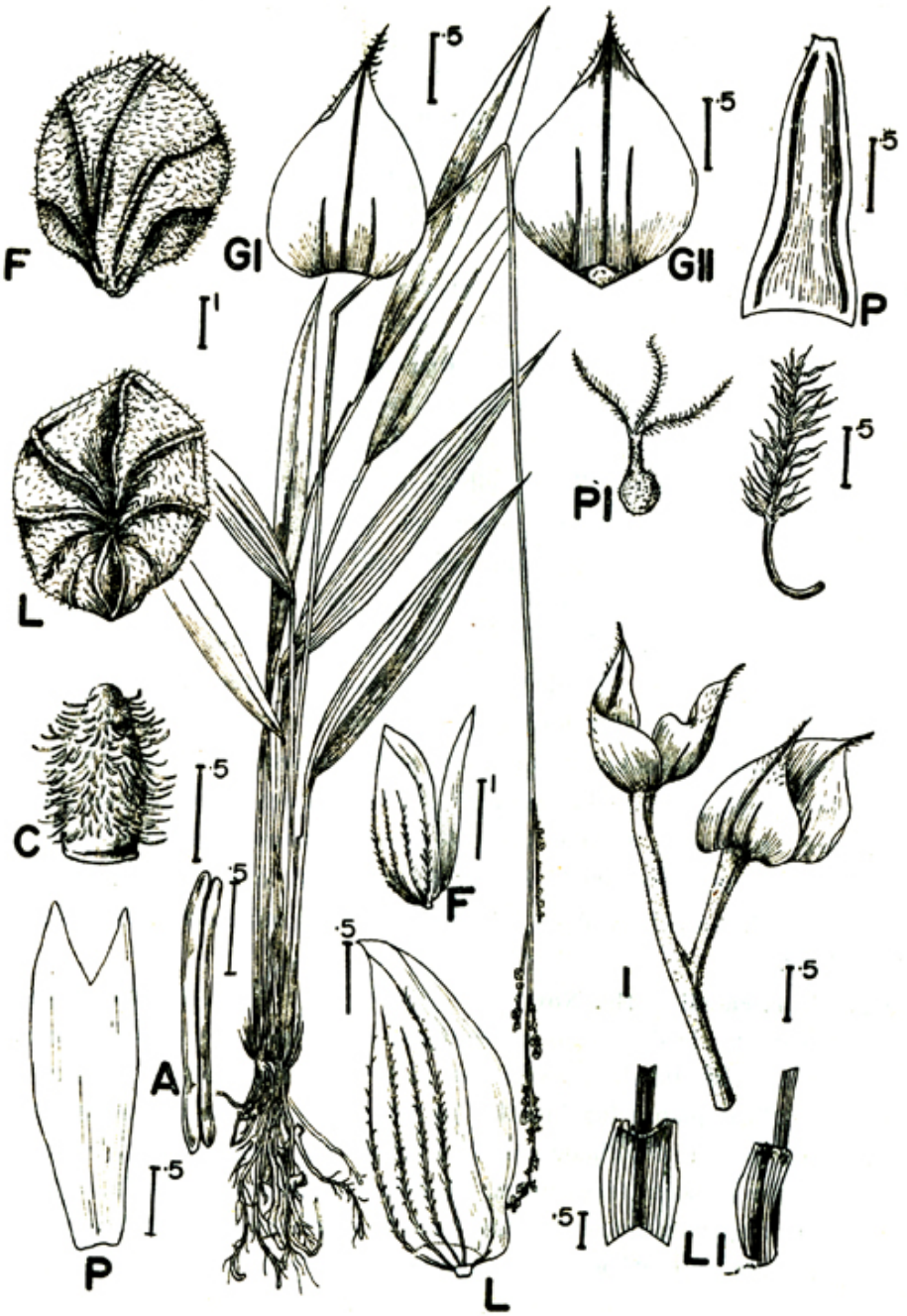


**Fig. I. Leptaspis formosana** C. Hsu

**(臺 稈 竹)**

Loc.: TAITUNG CO.: Chih-pen (知本), Aug. 11, 1958, C. Hsu 318-1 (Type; TAI).

vestitum, intus transverse elevato-striatum; palea angusta, 1,5 mm longa, bifida, 2–carinata; lodiculae nullae; ovarium tomentosae, pilis uncinatis; stylus brevis, 0.7 mm longi, stigmata 3, plumosa. Spiculae ♂: glumae 1.5 mm longae, uni-nerve; lemma 2.3 mm longum, ovatum, acutum, ciliato–7–costatum; palea bifida, lanceolata, ad 2.4 mm longa, carinis minute puberulis; antheris 6, ca. 1.8 mm longis.

Hab. Taiwan: Chi-pen (知本) in Taitung Co., leg. C. Hsu 318–1, 11, VII. 1958 (Type, TAI). In broad-leaved forest of about 100 m above sea level.

Perennial grass, caespitose. Rhizome erect, very short. Culms erect, simple, terete, 40–60 cm high, including panicle. Sheaths compressed, smooth, glabrous. Ligules truncate, very shortly ciliate. Blades shortly petiolate, petioles 1–1.5 cm long, compressed, lanceolate, base attenuate, 10–20 cm long, 1–1.8 cm broad, glabrous or slightly scabrous, fine but conspicuously veined, interveins with transverse veins, inferior margins and petioles slightly ciliate. Panicle very narrow, about 15–22 cm long, few branched, primary branch appressed, 1.5–4 cm long, straight, rachis terete, branchlets with 2 spikelets, loosely arranged, upper one staminate, lower one pistillate, laterally short pedicellate. Glumes 2, yellowish brown, ovate, concaved, cuspidate, dorsally minute pubescent. Pistillate spikelets: lower glume 1 mm long, 1–veined; upper glume 1.6 mm long, 3–veined; lemma membranaceous, about 4.6 mm long asymmetrical, turbinate-pyriform, globose, yellowish brown, with wide 7–costa, clothed all over with short sub-hooked hairs, inside with transversely elevated striated lines; palea narrow, 1.5 mm long, bifid at apex, 2–keeled; lodicules wanting; ovary tomentose, hairs hooked; style one, 0.7 mm long, stigmas 3, plumose. Staminate spikelets: glumes 1.5 mm long, one-veined; lemma 2.3 mm long, ovate, acute, with 7–ciliate costa; palea bifid, lanceolate, about 2.4 mm long, keels minutely pubescent; Anthers 6, 1.8 mm long.

**Thaumastochloa chenii Sp. Nov.** **Fig. II, IIA, Page 217, 219**

Gramen perenne, basi ramosus, caespitosus. Rhizomata erecta, brevissima. Culmi tenues, erecti, striatoangulati, laeves et glabri, 15–30 cm alti. Laminae anguste lineares conduplicatoplanae laeviusculae 10–20 cm longae, 2.5 mm latae, glabrae, apice obtusulae, basi sensim in vaginam subcompressum glabram, striatam, 3–6 cm longam, intus apice parce pilosam transeuntes. Ligula brevissima, truncata, 0.6 mm longa. Inflorescentia unispicate, spicis terminalibus et axillaribus ca. 6 cm longis 2 mm latis erectis, pedunculo sub spica parum incrassato, articulis hemiteretibus, glabris, viridulis 3.5–4 mm longis, recte disjungentibus vertice ventreque profunde excavatis. Gluma inferior coriacea late elliptico-ovata 4.5–5 mm longa parum obtusa, utrinque obsolete, anguste alata, ventre distincte 7–nervis, tessellata extus inter nervos foveolis minutis sed profunde excavatis 6–10 uniseriatim dispositis eximie notata, albostraminea. Gluma superior late ovata hyalina membranacea, ca. 4 mm longa,

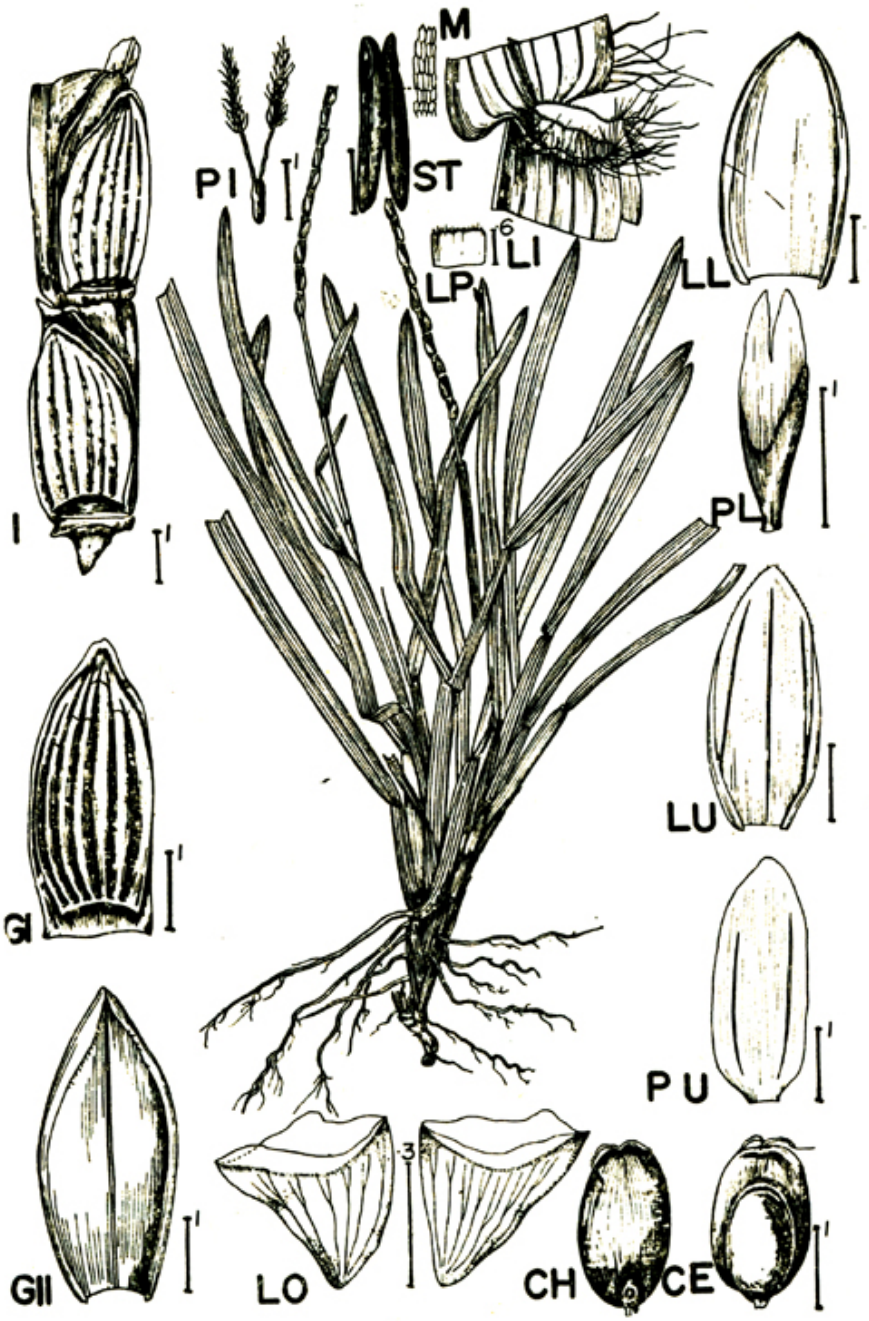


**Fig. II. Thaumastochloa chenii** C. Hsu

**(其昌假蛇尾草)**

Loc.: PINGTUNG CO.: O-luan-pi (鵝鑾鼻), Sept. 21, 1959, C. Hsu 511 (Type; TAI).

acuta, 3–nervis. Lemma inferius ellipticum, ca. 3 mm longum. Palea inferior bifida, ca. 1.4 mm longa. Lemma superius et palea superior ellipticum, ca. 3 mm longum. Antherae 3, ca. 2.8 mm longae.

Hab. Taiwan: O-luan-pi (鵝鑾鼻) in Pingtung Co., leg. C. Hsu 511, 21, IX. 1959 (Type, TAI). On littoral grassland.

The specific epithet is dedicated to Dr. Chi-Chang Chen (陳其昌), who was interested in grass cytotaxonomy with the author as a colleague during the days when they were graduate students.

Perennial grass, base branched, caespitose. Rhizomes erect, very short. Culms slender, erect, finely angular, smooth and glabrous, 15–30 cm high. Blade narrowly linear, conduplicate, smooth, 10–20 cm long, 2.5–5 mm broad, glabrous, apex obtuse, base tapering, sheath subcompressed, glabrous, striate, 3–6 cm long, inner side of sheath apex borderd with long hairs. Ligule very short, truncate, 0.6 mm long. Spike terminal and axillary, ca. 6 cm long, 2 mm wide, erect, peduncle under spike slightly thickened, joint semiterete, glabrous, green, 3.5–4 mm long, soon separating vertically and ventrally, deeply excavate. Lower glume coriaceous, broadly elliptical-ovate, 4.5–5 mm long, slightly obtuse, dorsally obsolete, narrowly winged, ventral side with distinct, tessellate 7–veins, outside of interveins minute but deeply pitted, 6–10 arranged in one series, exceedingly marked, whitish straw colored. Upper glume broadly ovate, hyaline membranous, about 4 mm long, acute, 3–veined. Lower lemma elliptical, about 3 mm long, lower palea bifid, about 1.4 mm long. Upper lemma and upper palea elliptical, about 3 mm long. Anthers 3, 2.8 mm long.

This species is closely related to *Thaumastochloa cochinchinensis*, but the broader leaves and the much larger, distinctly winged lower glume (Fig. IIA, **GI**) of the spikelet immediately separates this species from the latter.

Fig. IIA is the chart of comparison of parts of the spikelets between these two species. The most conspicuous difference is found in the shape of the lower palea: *T. chenii* has a bifid apex while in *T. cochinchinensis* the lower palea is truncate (Fig. IIA, **LP**).

## IV. A LIST OF ABBREVIATIONS USED IN THE ILLUSTRATIONS

In order to save space and to facilitate comparison of the line drawings of different grasses, the following abbreviations have been used to indicate equivalent parts of the spikelets and the plant bodies illustrated. (**Fig. III**)

The measurements on each figure are in the metric system. They are always in milimeters unless otherwise stated.

**A:** Anther.

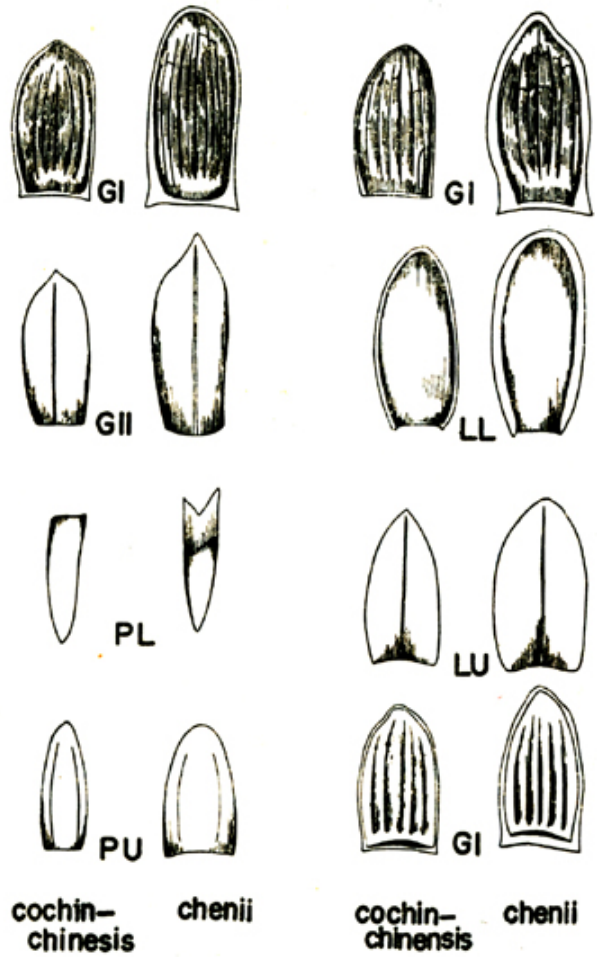


**Fig. IIA. Comparison of parts of the spikelets.**

**AU:** Auricle, a small claw- or ear-like outgrowth at the junction of the sheath and blade of some grasses.

**AW:** Awn, an extending projection of a midvein from the tip or back or sinus of the lemmas and glumes in some grasses.

**BR:** Bristle, one of the metamorphic panicle branches, also applied to the stiff hair or upper part of the awn.

**C:** Caryopsis, grain to which the seed coat is united with the ovary wall.

**CE:** Caryopsis, backside, showing its embryo.

**CH:** Caryopsis, front view, showing its hilum.

**CS:** Caryopsis, side view, showing the position of the embryo and hilum.

**F:** Floret, or florets, the lowest floret is indicated in a many-flowered spikelet; when it is in a 2–flowered spikelet the upper floret is drawn.

**G:** Glumes, usually two, empty bracts at the base of the spikelet, the outer

called lower glume; the inner called upper glume.

**GI:** Lower glume.

**GII:** Upper glume.

**I:** Inflorescence, flower head terminating the culm. (Whole head or part of it.)

**L:** Lemma, lower bract of floret, the upper one is the palea, enclosing the true floral parts.

**LL:** Lower lemma, usually fertile in a many-flowered spikelet; if two-flowered, usually it is sterile or neutral.

**LU:** Upper lemma, usually sterile or smaller in a many-flowered spikelet; but fertile in a two-flowered spikelet.

**LI:** Ligule, outgrowth at the inner junction of the leaf-sheath and blade.

**LP:** Ligule, a part, showing the abaxial side.

**LO:** Lodicules, usually two, sometimes wanting, equivalent to the perianth.

**M:** Marking, surface patterns of caryopsis, etc.

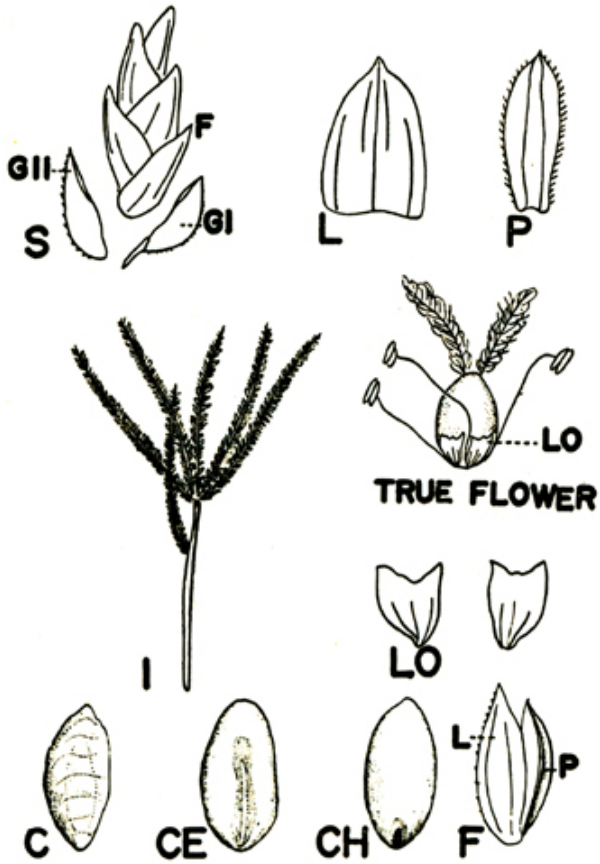


**Fig. III. Eleusine indica** (L.) Gartn., showing various parts of grass structure.

**P:** Palea, upper bract of the floret, enclosing the true floral parts.

**PL:** Lower palea, enclosed by lower lemma, usually sterile in a two-flowered spikelet.

**PU:** Upper palea, usually fertile in a 1-flowered spikelet.

**PI:** Pistil, female organ, including ovary, style and feathery stigmas.

**R:** Rachilla, or rhachilla, central main axis of spikelet.

**RJ:** Rachis-joint, main axis of flower-head, articulating and falling off with the spikelets when mature in Andropogoneae.

**S:** Spikelet, unit of the grass flower-head, generally composed of 2 glumes and one or more florets each borne between a lemma and palea; if the spikelets are paired, the sessile spikelet is drawn.

**ST:** Stamen, composed of anther and filament.

## V. KEYS TO TAXA AND SYSTEMATIC NOTES

### Key to the subfamilies of *Gramineae* (*Poaceae*)

1(2) Culms woody, perennial; blade-base articulating from the sheath, usually petioled ..... ***Bambusoideae***

2(1) Culms herbaceous, if perennial, usually not woody; blade-base not articulating from the sheath:

3(10) Spikelets of one to many florets, if bearing two florets then the lower floret usually perfect; spikelets terete or laterally compressed, breaking up at maturity above the more or less persistent, glumes:

4(5) Glumes usually wanting or inconspicuous; palea of the floret odd-veined, if 2-veined, then linear or enclosed in a sac-like lemma..... ***I. Oryzoideae***

5(4) Glumes distinct; paleas 2-keeled:

6(7) Lemmas 5- to many-veined; blade-base devoid of long hairs; length of embryo less than ¼ as long as the caryopsis; lodicules acute or acuminate, veinless..... ***III. Festucoideae***

7(6) Lemmas 1- to 3-veined, or nearly veinless; blade-base usually with long hairs; length of embryo more than ⅛ as long as the caryopsis; lodicules truncate, veined:

8(9) Lemmas distinctly veined; spikelets nearly terete; usually a tall reed..... ***II. Arundinoideae***

9(8) Lemmas faintly veined; spikelets compressed; small to medium sized grasses..... ***IV. Eragrostoideae***

10( 3 ) Spikelets of two florets (1 floret in *Spharocaryum*), the lower staminate or neutral, the upper mostly perfect, fertile; spikelets usually dorsally compressed, usually falling off entirely together with glumes at maturity; length of embryo more than ⅛ as long as the spikelet; lodicules truncate, veined .....***V. Panicoideae***

## I. Subfamily Oryzoideae

### Key to the tribes and genera of subfamily *Oryzoideae*

1( 4 ) Spikelets unisexual:

2( 3 ) Panicles with upper branches bearing female spikelets; the lower bearing male spikelets....(3) Zizanieae.....*Zizania*

3( 2 ) Panicles often in a group of a few females at the base and male or males terminal on the branchlets; lemmas utricle-like, covered with minute hooked hairs...(1) Phareae .....*Leptaspis*

4( 1 ) Spikelets hermaphrodite, with glumes minute in two semi-circular lips or suppressed.....(2) Oryzeae:

5( 6 ) Florets acuminate and ending in a slender awn, articulating together with part of the elongated callus attached .....*Hygroryza*

6( 5 ) Florets not acuminate, much compressed; not articularing with part of the callus which looks like a pedicel:

7( 8 ) Florets supported by two sterile lemmas (just like glumes); tip of the pedicel with 2 lips .....3. *Oryza*

8( 7 ) Florets not supported by two sterile lemmas nor with 2 lips at the tip of the pedicel.....2. *Leersia*

### I-(1). Tribe Phareae

I-(1)-1. *Leptaspis* R. Br., Prod. Fl. Nov. Holl. 211. 1810.

About 5 species in the world, all tropical. One species has recently been found in Taiwan.

**1.** ***Leptaspis formosana*** C. Hsu. **(Fig. I.)**

Type from Taiwan; Chih-pen (知本), Aug. 11, 1958, Hsu 318-1 (TAI).

Endemic to southern Taiwan.

## I-(2). Tribe Oryzeae

I-(2)-1. *Hygroryza* Nees in Edinb. New Phil. Journ. **15:** 380. 1833.

Only one species distributed in Indo-Malaysia and South-east Asia generally.

**2.** *Hygroryza aristata* (Retz.) Nees ex Wight & Arn. in Edinb. New Phil. Journ. **15:** 380. 1833.

Based on *Pharus aristatus* Retz., Obs. Bot. **5:** 23. 1789.

Type from India.

Chromosome Number: $n=12$ (Chen & Hsu, 1962)—Su-au (蘇澳), Sept. 25, 1960. Hsu 856 (TAI).

Distributed in India, Burma, Vietnam, S. China and South-east Asia generally.

I-(2)-2. *Leersia* Soland. ex Sw., Prod. Veg. Ind. Occ. 21. 1788. Nomen genericum conservandum.

About 15 species in the tropical and warm temperate regions. Marsh grasses like *Oryza*, used as fodder in Asia. Usually forming a large population in shallow water.

**3.** *Leersia hexandra* Swartz, Prod. Veg. Ind. Occ. 21. 1788.

Type from Jamaica.

Chromosome number: $n=24$ (Chen & Hsu, 1962)—Taipei (臺北), Chen 4 (TAI).

BAREET GRASS.

Distributed widely in tropics of the Old and New Worlds.

This is a very common aquatic grass growing in shallow waters or swampy places.

I-(2)-3. *Oryza* Linn., Gen. Pl. ed. 5, 155. 1754 et in Sp. Pl. ed. 1, 333. 1753.

About 25 species in the tropical regions. Including one of the chief food plants of the world, *O. sativa* L. The grain in the husk is known as paddy.

**4.** *Oryza sativa* Linn. Sp. Pl. ed. 1, 333, 1753.

Type from Ethiopia.

Chromosome number: $2n=24$ (Morishima & Oka, 1960).

PADDY, RICE

Cultivated all over the Island in plains and on hill slopes up to about 500 m.

## II-(3). Tribe Zizanieae

I-(3)-1. *Zizania* Linn., Gen. Pl. ed. 5. 427. 1754 et in Sp. Pl. ed. 1, 991. 1753.

One species, *Z. latifolia*, distributed in NE. India, Burma and E. Asia; 2 other species occur in N. America, represented by "wild rice" *Z. aquatica*.

**5.** *Zizania latifolia* (Griseb.) Stapf in Kew Bull. **1909:** 385. 1909.

Based on *Hydropyrum latifolium* Griseb. in Ledeb., Fl. Ross. **4**: 466. 1853.
Chromosome number: $2n=34$ (Hirayoshi, 1937)
VEGETABLE WILD-RICE
Cultivated in swampy cultivated fields as a vegetable for its solid culms. It grows in polluted water and seems strong enough to be resistent insecticides and fungacides.

## II. Subfamily Arundinoideae

### Key to the tribes and genera of subfamily *Arundinoideae*

1( 2 ) Spikelets 2-flowered, the lower empty; spikelets falling off with part of the pedicel attached....(3) Thysanolaeneae....*Thysanolaena*
2( 1 ) Spikelets several flowered:
3( 6 ) Blades broad and tessellate-veined, usually with petiole.... .....(2) Centotheceae:
4( 5 ) Lowest floret fertile, upper lemmas reduced to tufts of bristles; spikelets sessile .....2. *Lophatherum*
5( 4 ) All florets fertile except the uppermost one; lemmas awnless; spikelets pedicelled.....1. *Centotheca*
6( 3 ) Blades linear, veins not tessellate.....(1) Arundineae:
7(10) Callus elongated with silky hairs:
8( 9 ) Lemmas glabrous.....3. *Phragmites*
9( 8 ) Lemmas long ciliate on margins .....2. *Neyraudia*
10( 7 ) Callus not elongated, glabrous; lemmas ciliated.....1. *Arundo*

## II-(1). Tribe Arundineae

II-(1)-1. *Arundo* Linn., Gen. Pl. ed. 5, 35. 1754 et in Sp. Pl. ed. 1, 81. 1753.
About 12 species distributed in the tropical and temperate regions. The stems of *A. donax* are used for sticks, fishing-rods, etc.

### Key to the species and varieties of *Arundo*

1( 2 ) Medium sized petrophilus grasses; hairs on lemma 3 mm long; blades farinose underneath 6-15 mm wide; culms 2-5 mm in diameter.....7. *A. formosana*
2( 1 ) Tall reeds, glumes 6-10 mm long; hairs on lemma 5-6 mm long; blades 2-5 cm wide; culms tall, up to 4 cm in diameter .....6. *A. donax*

3(4) Sheaths and lower axils of panicle branches hairy; blades uniformly green.....6A. var. *coleotricha*

4(3) Sheaths and axils of panicle branches not hairy; blades with white longitudinal stripes; glumes glabrous .....6B. var. *versicolor*

**6.** *Arundo donax* Linn., Gen. Pl. ed. 5, 35. 1754 et Sp. Pl. ed. 1, 81. 1753.
Type from Spain.
Chromosome number: $2n$=c. 100 (Avdulov, 1931); $2n$=110 (Hunter, 1934).

**6A.** var. *coleotricha* Hack. in Bull. Herb. Boiss. **7:** 724. 1899.
Type from Taiwan: "Tamsui" (淡水), leg. Makino.
This is a tall reed common in Taiwan.

**6B.** var. *versicolor* Stokes, Bot. Mat. Med. **1:** 160. 1812.
Specimen gathered in the gardens of Fothergill and Paris.
This is an ornamental plant.

**7.** *Arundo formosana* Hack. in Bull. Herb. Boiss. **7:** 724. 1899.
Type from Taiwan: "Prope Shinchiku" (新竹), leg. Makino
One of the commonest bamboo-like grasses growing on cliffs and usually pendent. The rhizomes have been recently used as a material for doll-making, basket-making. Var. *robusta* Conert has been separated on account of its larger plant and inflorescence.

II-(1)-2. *Neyraudia* Hook. f., Fl. Brit. Ind. **7:** 305. 1896.
Two species in the tropical Africa, Madagascar, China, Indo-Malaysia.
Only one species occurs in southern part of Taiwan.

**8.** *Neyraudia reynaudiana* (Kunth) Keng ex Hitchc. in Amer. Journ. Bot. **21:** 131. 1934.
Based on *Arundo reynaudiana* Kunth, Rév. Gram. **1:** 275, t. 49. 1830.
Type from Burma, leg. Reynaud.
Distributed in Eastern India, Burma, Malaya, and China.
This is one of the tall reeds known only from southern Taiwan. The margins of the lemma are long ciliate in this species.

II-(1)-3. *Phragmites* Trin., Fund. Agrost. 134. 1820.
Three cosmopolitan species in the world.

**Key to the species of *Phragmites***

1(2) Lowest lemma 8–12 mm long; ligule not more than 0.5 mm long, shortly ciliated .....10. *P. karka*

2(1) Lowest lemma 12–16 mm long; ligule up to 1.5 mm long, long ciliated .....9. *P. communis*

9. *Phragmites communis* (Linn.) Trin., Fund. Agrost. 134. 1820.
*Based* on *Arundo phragmites* Linn., Sp. Pl. ed. 1, 81. 1753.
Type from Europe.
Chromosome number: $2n=48$, c. 96 (Avdulov, 1931).
COMMON REED.
Widely distributed in the northern hemisphere.
This is a common reed with a creeping rhizome. The lowest floret of the spikelet is male, the rest are hermaphrodite.

10. *Phragmites karka* (Retz.) Trin. ex Steud., Nom. Bot. ed. 2, **2**: 324. 1841.
Based on *Arundo karka* Retz., Obs. Bot. **4**: 21. 1786.
Type probably from India, leg. Koenig.
Chromosome Number: $2n=48$ (Tateoka, 1956); $2n=36$ (Ramanthan, 1950).
FLUTE REED.
Distributed in India, Burma, Malaysia, China, and extending to Australia and Japan.
Immature states of *Arundo, Neyraudia* and *Phragmites* are very much alike and little can be learned by attempting to dissect the spikelets. *Phragmites* can easily be separated from the other two by the silky beard at the bases of the lowest panicle branches. This beard is not present in *Arundo* nor in *Neyraudia*. The latter genus is rare in Taiwan.

## II-(2). Tribe Centotheceae

II-(2)-1. *Centotheca* Desv. in Nouv. Bull. Soc. Philom. **2**: 189. 1810.
About 4 species distributed in tropical Africa, Asia and Polynesia.

11. *Centotheca lappacea* (Linn.) Desv. Nouv. Bull. Soc. Philom. **2**: 189. 1810.
Based on *Cenchrus lappaceus* Linn., Sp. Pl. ed. 2, 1488, 1763.
Type from India.
Widely distributed in India, South-east Asia, China, Polynesia and tropical Africa.
Chromosome number: $2n=24$ (Darlington & Wylie, 1955).
A forest grass, often found in glades, along forest roadsides and at forest margins. Known only from Botel Tobago in Taiwan. This is an excellent fodder grass. The grains are distributed by the reflexed tubercle-based spines on the lemma becoming attached to the hairs of passing animals.

II-(2)-2. *Lophatherum* Brongn. in Duperr., Voy. Coq. Bot. 49, t. 8. 1831.
Two species distributed in East Asia, Indo-Malaysia and tropical Australia.

12. *Lophatherum gracile* Brongn. in Duperr., Voy. Coq. Bot. 50, t. 8. 1831.
Type probably from Indonesia.

Chromosome number: $n=24$ (Chen & Hsu, 1962)—Yang-ming-shan (陽明山), Oct. 2, 1960, Hsu 930 (TAI).

Distributed in North-east Himalaya, India, Burma, Malaya, Ceylon, China, Japan and Australia.

This is a variable species with tuber-like storage roots. The awns of the lemmas are retrorsely scabrid and by this means the ripe fruits become attached to the fur or hair of passing animals. This grass is essentially a forest grass. It may be found in shady places outside the forest, but it is at its best in moist lowland forest shade.

## II-(3). Tribe Thysanolaeneae

II-(3)-1. *Thysanolaena* Nees in Edinb. New Phil. Journ. **18**: 180. 1835.

Only one species distributed the tropical Asia.

**13.** *Thysanolaena maxima* (Roxb.) O. Ktze., Rév. Gen. Pl. **2**: 794. 1891.

Based on *Agrostis maxima* Roxb., Fl. Ind. **1**: 319. 1820.

Type from India.

Distributed in India to Southeast Asia and China.

A very elegant species, growing in forest margins, the inflorescences of which are used as brooms. It is a tall reed.

## III. Subfamily Festucoideae

### Key to the tribes of subfamily *Festucoideae*

1( 6 ) Ovary with a hairy appendage at the apex; caryopsis adnate to the palea, hilum linear:

2( 5 ) Spikelets sessile or nearly sessile on the rachis of a solitary spike or raceme; lodicules ciliated:

3( 4 ) Spikelets shortly pedicelled, on a raceme; awn terminal .....(3) Brachypodieae .....*Brachypodium*

4( 3 ) Spikelets sessile on opposite sides of the rachis.....(10) Triticeae

5( 2 ) Spikelets pedicelled in a panicle; lodicules not ciliate..(4) Bromeae..*Bromus*

6( 1 ) Ovary glabrous, if hairy without hairy appendage at the apex; caryopsis not adnate to the palea:

7( 8 ) Lemmas 7–11–veined; lodicule one, fleshy, truncate.....(6) Meliceae

8( 7 ) Lemmas mostly 5–veined (7–11–veined in *Avena*); lodicules 2, acute or acuminate:

9(12) Spikelets one- to several-flowered; lemmas not coriaceous,

veins distinct; sheath margins adnate at least at the basal part:

10(11) Glumes distinct, much shorter than the lowest lemma; florets usually more than two.....(5) Festuceae

11(10) Glumes longer or nearly as long as the lowest lemma; florets 1, 3 or several.....(1) Agrostideae

12( 9 ) Spikelets one-flowered; lemmas coriaceous, veins not distinct; sheath margins free:

13(14) Caryopsis large, with a hard beak at the apex.....(8) Phaenospermeae....*Phaenosperma*

14(13) Caryopsis much smaller, without a beak:

15(16) Lemmas awnless; dorsally compressed.....(7) Milieae.....*Milium*

16(15) Lemmas awned, terete:

17(18) Awns trifid.....(2) Aristideae.....*Aristida*

18(17) Awn simple, sometimes flanked by 2 bristles....(9) Stipeae.....*Oryzopsis*

## III–(1). Tribe Agrostideae

### Key to the genera of tribe Agrostideae

1( 6 ) Ovary hairy at the apex; hilum linear:

2( 3 ) Spikelets two-flowered; lower floret male or neuter, awned from the backside of the lemma; upper floret nearly awnless.....4. *Arrhenatherum*

3( 2 ) Spikelets more than two, monomorphic except uppermost floret, awned, if awnless then the lemma more than 1 cm long:

4( 5 ) Spikelets nodding: glumes 7–11–veined, rounded at the backside; cultivated annuals.....5. *Avena*

5( 4 ) Spikelets erect; glumes 1–5-veined, more or less keeled; alpine perennials.....9. *Helictotrichon*

6( 1 ) Ovary glabrous; hilum usually punctiform:

7(14) Spikelets with three or two to many florets:

8(11) Florets 3, lower two florets staminate or neuter:

9(10) Lower two florets reduced to a scale; fertile florets with 3 stamens.....10. *Phalaris*

10( 9 ) Lower two florets not reduced to a scale, brown, larger than the central (fertile) floret; fertile floret with two stamens.....3. *Anthoxanthum*

11( 8 ) Florets two to several:

12(13) Awn of the lemmas arising from middle or below the middle; lemmas truncate and toothed.....7. *Deschampsia*
13(12) Awn of lemmas arising above the middle or wanting.....13. *Trisetum*
14( 7 ) Spikelets with only one floret:
15(22) Inflorescence a panicle; branches open or racemose on the main axis; style very short or wanting; stigmas exserted from both sides of the floret:
16(19) Callus pencillate:
17(18) Rachilla always produced, long; penicillate; lemmas indurate ....8. *Deyeuxia*
18(17) Rachilla reduced, short and restricted at the base of the palea; lemmas membranous and transparent.....6. *Calamagrostis*
19(16) Callus glabrous or nearly glabrous; rachilla reduced:
20(21) Spikelets articulating above the glumes; stamens 3; glumes awnless.....1. *Agrostis*
21(20) Spikelets not articulating below the glumes; glumes awned ....12. *Polypogon*
22(15) Inflorescence a cylindrical contracted panicle; styles elongated, exserted from the tip of the floret; florets compressed:
23(24) Spikelets articulating below the glumes; glumes more or less adnate at the base, awnless; lodicules wanting .....2. *Alopecurus*
24(23) Spikelets articulating above the glumes; glumes free, shortly awned; lodicules present.....11. *Phleum*

III-(1)-1. *Agrostis* Linn., Gen. Pl. ed. 5, 30. 1754 et in Sp. Pl. ed. 1, 61. 1753.
About 150 to 200 cosmopolitan species, chiefly distributed in N. temperate regions.

**Key to the species of *Agrostis***

1( 6 ) Anthers 0.6 mm long; lemmas usually awned:
2( 3 ) Paleas 1/2 as long as the lemma .....16. *A. fukuyamae*
3( 2 ) Paleas less than 1/4 as long as the lemma:
4( 5 ) Spikelets smaller, pale green; growing at low altitudes.....18. *A. sozanensis*
5( 4 ) Spikelets larger, scabrous, brownish; growing at higher altitudes.....17. *A. morrisonensis*
6( 1 ) Anthers 0.3–0.5 mm long; lemmas awnless:
7( 8 ) Paleas more than 1/3 as long as the lemma .....14. *A. arisan-montana*
8( 7 ) Paleas less than 1/5 as long as the lemma .....15. *A. clavata* ssp.

**14.** *Agrostis arisan-montana* Ohwi in Act. Phytotax. et Geobot. **2:** 161. 1933.
Type from Taiwan: "Mt. Arisan in Tainanshu" (阿里山), leg. J. Ohwi 3463 (KYO).
Endemic to Taiwan. It grows at medium altitudes.

**15.** *Agrostis clavata* Trin. ssp. *matsumurae* (Hack. ex Honda) Tateoka in Bull. Nat. Sci. Mus. Tokyo **11**: 161. 1968.
Based on *Agrostis matsumrae* Hack. ex Matsumura in Bot. Mag. Tokyo **11**: 445. 1897.
Type from Meguro, Tokyo, Japan, leg. J. Matsumura, Jun. 13, 1880 no. 37 (TI).
Chromosome number: $n=21$ (Chen & Hsu, 1962)–C48.
Distributed in Japan, Mainland China and Taiwan.

**16.** *Agrostis fukuyamamae* Ohwi in Repert. Sp. Nov. Fedde **36**: 39. 1934.
Type from Taiwan: "Nankotaisan" (南湖大山), leg. J. Ohwi 4147 (KYO).
Endemic at high altitudes, growing on exposed rocks.

**17.** *Agrostis morrisonensis* Hayata, Icon. Pl. Formos. **7**: 86, f. 53. 1918.
Type from Taiwan: "Monte Morrison" (玉山), ad 1,2000 ped. alt. (TI).
Endemic on high mountain peaks.

**18.** *Agrostis sozanensis* Hayata, Icon. Pl. Formos. **7**: 85, f. 52. 1918.
Type from Taiwan: "Sozan, Taihoku" (陽明山).
Chromosome number: $n=21$ (Chen & Hsu, 1962)—Chen 12. reported as *A. canina* var. *formosana*
Distributed in Mainland China and Taiwan.
This species is very common in northern Taiwan at low altitudes.

III–(1)–2. *Alopecurus* Linn., Gen. Pl. ed. 5, 30. 1754 et in Sp. Pl. ed. 1. 60. 1753.
About 50 species distributed in temperate Eurasia, and temperate S. America.

**Key to the species of *Alopecurus***

1(2) Spikelets about 2 mm long, long awned; base of glumes free.....19. *A. aequalis* var.
2(1) Spikelets about 5 mm long, shortly awned; base of glumes fused.....20. *A. myosuroides*

**19.** *Alopecurus aequalis* Sobol. var. *amurensis* (Komar.) Ohwi in Bot. Mag. Tokyo **55**: 360. 1941.
Based on *Alopecurus fulvus* var. *amurensis* Komar., Fl. Manshur. in Act. Hort. Petrop. **20**: 272. 1901.
Type from Siberia.
SHORT-AWN FOXTAIL
Chromosome number: $n=7$ (Chen & Hsu, 1962)—Chen 112, as *A. aequalis;* $n=7$ (Hsu, 1971)—Taipei, 1, IV. 1968. Hsu 4334 (TAI).
Distributed in temperate regions of the World.
One of the common grasses flowering in the early spring in cultivated fields.

**20.** *Alopecurus myosuroides* Huds., Fl. Angl. **23**: 1762.

Type from England.
Chromosome number: $2n=14$ (Kattermann, 1930)
SLENDER FOXTAIL
Distributed in temperate parts of Europe and Asia.
This is scarce in Taiwan, and probably was naturalized.

III-(1)-3. *Anthoxanthum* Linn., Gen. Pl. ed. 5. 17, 1754 et in Sp. Pl. ed. 1. 28. 1753.
About 20 species in N. temperate regions and tropical mountains of Africa, Asia.

**21.** *Anthoxanthum formosanum* Honda in Bot. Mag. Tokyo **40:** 318. 1926.
Type from Taiwan: "Monte Arisan" (阿里山), leg. U. Faurie 232, anno 1914. (TI).
TAIWAN VERNAL-GRASS
Endemic to Taiwan. It grows at medium altitudes.

III-(1)-4. *Arrhenatherum* P. Beauv., Ess. Agrost. 55, t. 11, f. 5. 1812.
About 6 species in Europe and Mediterranian regions, but now introduced to many other countries.

**22.** *Arrhenatherum elatius* (Linn.) Mart. et Koch var. *bulbosum* (Willd.) Spenner forma *variegam* Hort.
RIBBON GRASS
A very leafy species with white stripes. It was introduced and has become naturalized.

III-(1)-5. *Avena* Linn., Gen. Pl. ed. 5, 34. 1754 et in Sp. Pl. ed. 1, 79. 1753.
About 70 species distributed in temperate countries and mountains of tropical regions. Two cultivated species have been introduced to this Island, but as it winter kills, fresh seeds must be imported each year.

**Key to the species of *Avena***

1(2) Lemmas densely bearded, more or less brownish; florets falling off when mature .....23. *A. fatua*
2(1) Lemmas nearly glabrous, greenish; florets persistant .....24. *A. sativa*

**23.** *Avena fatua* Linn. Sp. Pl. ed. 1, 80. 1753.
Type from Europe.
Chromosome number: $2n=42$ (Löve & Löve, 1948).
WILD OAT.
Distributed in Europe to Central Asia, Tibet, India, China.

**24.** *Avena sativa* Linn. Sp. Pl. ed. 1, 79. 1753.
Type from Europe.
Chromosome number: $2n=42$ (Delay, 1950).
OAT.

Commonly cultivated in most temperate areas of the world. It is perhaps derived from *A. fatua*. It forms the staple food of a large part of the world's population. It occurs in two chief forms, the common oat with open spreading panicles, and the Tartarian oat with contracted one-sided panicles.

III–(1)–6. *Calamagrostis* Adans., Fam. Pl. 2. 31. 1763. (excl. *Deyeuxia* Clar. ex Beauv.)
About 80 species in the temperate countries. Only one species occurs in Taiwan.

**25.** *Calamagrostis epigeios* (Linn.) Roth, Tent. Fl. Germ. **1:** 34. 1788.
Based on *Arundo epigeios* Linn., Sp. Pl. ed. 1, 81. 1753.
Type from Europe.
Chromosome number: $2n=42$ (Nygren, 1946, 1948).
WOOD SMALL-REED; BUSH GRASS.
Widely distributed in the temperate regions of the world.
This species grows in open, rather dry habitats. It is eaten by cattle, sheep and goats. It is used as one of the materials for flower-arrangements.

III–(1)–7. *Deschampsia* P. Beauv., Ess. Agrost. 91, t. 18. f. 3. 1812.
About 60 species distributed in the temperate and frigid regions, and also occurs in tropical mountains. Two species are found in Taiwan.

**Key to the species of *Deschampsia***

1(2) Panicle straw-colored; lemmas with short straight-awn; basal blades flat or folded; plant body usually more than 40 cm high .....26. *D. caespitosa* var.
2(1) Panicle purplish; lemmas with bent-awn; basal blades filiform; plant body less than 30 cm high .....27. *D. flexuosa*

**26.** *Deschampsia caespitosa* (Linn.) P. Beauv., Ess. Agrost. 91, 100. 1812.
var. *festucaefolia* Honda in Bot. Mag. Tokyo **41:** 635. 1927.
Type from Japan: Kiusiu in monte Kirishima, prov. Osumi—(K. Mayebara 250, anno 1919)
Chromosome number: $2n=27, 28$ (Tateoka, 1955).
FESCUE-LEAVED TUFTED HAIR-GRASS (H).
One of the typical grasses growing on alpine regions in Taiwan.

**27.** *Deschampsia flexuosa* (Linn.) Trin. in Mém. Acad. St. Péters. VI. Sci. Nat. **21:** 9. 1836. (Bull. Acad. Sci. Pétersb. **1:** 66. 1836).
Based on *Aira flexuosa* Linn., Sp. Pl. ed. 1, 65, 1753.
Type from Europe.
Chromosome number: $2n=32$ (Stebbins, 1950); $2n=42$ (Hedberg, 1952).
WAVY HAIR-GRASS.
Widely distributed in Europe, extending to the mountains of Asia.

This is a typical alpine grass growing on rocky, exposed peaks at high altitudes.

III-(1)-8. *Deyeuxia* Clar. in P. Beauv., Ess. Agrost. 43, t. 9, 1812.
About 200 species growing in temperate regions.
Four species are now recognized in Taiwan.

**Key to the species of *Deyeuxia***

1(2) Anthers about 1 mm long; callus hairs 1/10 as long as the lemma; blades filiform, about 0.3 mm wide .....31. *D. suizanensis*
2(1) Anthers more than 1.6 mm long; callus hairs more than 1/5 as long as the lemma; blades flat, more than 1 mm wide:
3(4) Anthers more than 2 mm long; lodicules bifid at apex ....28. *D. arundinacea*
4(3) Anthers about 1.7 mm long; lodicules acuminate, not bifid at apex:
5(6) Rachilla well developed, 1.5 mm long; lodicules 0.4 mm long; ligule short .....30. *D. matsudana*
6(5) Rachilla less than 1 mm long; lodicules 0.25 mm long; ligule long .....29. *D. formosana*

**28.** *Deyeuxia arundinacea* (Linn.) P. Beauv., Ess. Agrost. 160. 1812.
Based on *Agrostis arundinacea* Linn., Sp. Pl. ed. 1, 61. 1753.
Type from Europe.
Chromosome number: $2n=28$ (Hsu, unpublished)—Hohuanshan (合歡山), Aug. 22, 1967. Hsu 3792 (TAI)

**29.** *Deyeuxia formosana* (Hay.) C. Hsu, **comb. nov.**
Based on *Calamagrostis formosana* Hay., Icon. Pl. Formos. **7:** 88. f. 55. 1918.
Type from Taiwan: "Hakkutaisan" (白狗大山), leg. U. Mori, Sept. 1910 (TI).
Endemic to Taiwan.

**30.** *Deyeuxia matsudana* (Honda) C. Hsu, **comb. nov.**
Based on *Calamagrostis matsudana* Honda in Bot. Mag. Tokyo **40:** 439. 1926.
Type from "Noko-zan" (能高山)—leg. E. Matsuda 25, anno 1919.
Endemic to Taiwan.

**31.** *Deyeuxia suizanensis* (Hay.) C. Hsu, **comb. nov.**
Based on *Agrostis suizanensis* Hayata, Icon. Pl. Formos. **7:** 83. f. 50.
*Calamagrostis suizanensis* (Hay.) Honda in Bot. Mag. Tokyo **40:** 440. 1926.
Type from Taiwan: "Suizan" (水山, 阿里山), leg. Soma, T. Dec. 1914 (TI).
Endemic to Taiwan.

III-(1)-9. *Helictotrichon* Bess. ex Roem. et Schult., Syst. Veg. **2:** Addit. 526. 1827.

About 90 species distributed in Europe, Tropical S. Africa and Asia; 1 from Java, 2 from W. N. America, 1 from temperate S. America. Only one species is reported from Taiwan.

**32.** *Helictotrichon abietetorum* (Ohwi) Ohwi in Act. Phytotax. & Geobot. **6:** 151. 1937. (misspelled *Helictotrichum*)
Based on *Avena abietetorum* Ohwi, l. c. **2:** 162. 1933 (misspelled *abietorum*)
Type from Taiwan: "Niitaka" (玉山)—leg. J. Ohwi 3675 (KYO).
This is one of the alpine grasses, growing at high altitudes.

III-(1)-10. *Phalaris* Linn., Gen. Pl. ed. 5, 29. 1754 et in Sp. Pl. ed. 1, 54. 1753.
About 20 species distributed in N. & S. temperate regions. *P. canariensis* L. (canary grass) seeds are used for cage-birds. Only one introduced grass is found in Taiwan.

**33.** *Phalaris arundinacea* Linn., Sp. Pl. ed. 1, 55. 1753.
Type from Europe.
Chromosome number: $2n=28$ (Hedberg & Hedb., 1964).
REED CANARY GRASS
Widely distributed in the temperate parts of the Northern Hemisphere.
It is a useful grazing or hay grass when young as it yields a large amount of pasture over a long period. Naturalized at medium altitudes such as in the Alishan district.

III-(1)-11. *Phleum* Linn., Gen. Pl. ed. 5, 29. 1754 et in Sp. Pl. ed. 1, 59. 1753.
About 15 species distributed in temperate Eurasia, N. America to Mexico, extending to N. America. *P. pratensis* L. (timothy grass) is a valuable fodder. Only one species is found in exposed alpine rocks.

**34.** *Phleum alpinum* Linn., Sp. Pl. ed. 1, 59. 1753.
Type from Europe.
Chromosome number: $2n=28$ (Tateoka, 1964).
This is a cosmopolitan species growing at cooler regions.
In Taiwan it is found on high mountain peaks.

III-(1)-12. *Polypogon* Desf., Fl. Atlant. **1:** 66. 1798.
About 15 species distributed in the tropical and warm temperate regions. Two species have been reported from Taiwan.

**Key to the species of *Polypogon***

1(2) Awn of the glumes nearly as long as the glume;
length of the callus much longer than the width .....35. *P. fugax*
2(1) Awn of the glumes 2-3-times as long as the glume;
length of the callus slightly longer than the width .....36. *P. monspeliensis*

35. *Polypogon fugax* Nees in Steud., Syn. Pl. Glum. **1:** 184. 1854.
Type from Nepal.
Chromosome number: $n=21$ (Chen, 1962)—Taipei, Chen 9 (TAI).
DITCH POLYPOGON
Flowering in the early spring. It grows in plains and littoral regions.

36. *Polypogon monspeliensis* (Linn.) Desf., Fl. Atlant. **1:** 67. 1798.
Based on *Alopecurus monspeliensis* Linn., Sp. Pl. ed. 1, 61. 1753.
Type from France.
Chromosome number: $2n=28$ (Löve & Löve, 1961).
RABBITFOOT GRASS.
Widespread in Europe and in the temperate parts of Asia and Africa.
This species is very scarce in Taiwan.

III-(1)-13. *Trisetum* Pers., Syn. Pl. **1:** 97. 1805.
About 75 species distributed in N. & S. temperate regions.

**Key to the species of *Trisetum***

1(2) Panicle open; main axis and pedicels not velutinous; ligule about 1 mm long.....37. *T. bifidum*
2(1) Panicle contracted, spike-like; main axis more or less velutinous; ligule about 3 mm long.....38. *T. spicatum* var.

37. *Trisetum bifidum* (Thunb.) Ohwi in Bot. Mag. Tokyo **45:** 191. 1931.
Based on *Bromus bifidus* Thunb., Fl. Jap. 53. 1784.
Type from Isl. of Kiushiu, Japan.
Chromosome number: $n=28$ (Hsu, unpublished)—Pai-yun-shan-chuang (排雲山莊), Sept. 7, 1969, Hsu 6304 (TAI).
Distributed in Japan, Korea and China.
It grows at medium altitudes of about 2,000 m above sea level.

38. *Trisetum spicatum* (Linn.) Rich. var. *formosanum* (Honda) Ohwi in Journ. Jap. Bot. **17:** 443. 1941.
Based on *Trisetum formosanum* Honda in Bot. Mag. Tokyo **41:** 636. 1927 et Monogr. Poac. Jap. 128. 1930.
Type from Taiwan: "monte Nokozan" (能高山), leg. E. Matsuda 29, anno. 1919 (TI).
Chromosome number: $n=14$ (Chen & Hsu, 1962)—Chen 57; $n=14$ (Hsu, unpublished)—Ho-huan-shan (合歡山), 22, Aug. 1967, Hsu 3834. (TAI).
This is one of the typical alpine grasses.

## III-(2). Tribe Aristideae

III-(2)-1. *Aristida* Linn., Gen. Pl. ed. 5, 35. 1754 et in Sp. Pl. ed. 1, 82. 1753.

About 330 species distributed in the temperate and subtropical regions of the world. Only one species is found in Taiwan.

**39.** *Aristida chinensis* Munro, Proc. Amer. Acad. **4:** 363. 1860.
Type from "Whampoa and Cum-sing-moon", China.
Distributed in Vietnam and South China.
This species is scarce in Taiwan.

## III-(3). Tribe Brachypodieae

III-(3)-1. *Brachypodium* P. Beauv., Ess. Agrost. 100. 1812.
About 10 species distributed in temperate countries and tropical mountains.

### Key to the species of *Brachypodium*

1(2) Lemmas villous-tomentose; raceme only with 1- to 3-spikelets; lodicules with swollen and fleshy base .....40. *B. kawakamii*
2(1) Lemmas glabrous or shortly hirsute; racemes usually with more than 3 spikelets; lodicules with a membranous wing, longitudinally attached at the basal part .....41. *B. sylvaticum*
3(4) Leaves hirsute to villous; growing at low altitudes....41A. var. *keelungense*
4(3) Leaves nearly glabrous; glowing on alpine regions .....41B. var. *luzoniense*

**40.** *Brachypodium kawakamii* Hayata in Bot. Mag. Tokyo **21:** 51. 1907.
Type from Taiwan: "Morrison" (玉山)—leg. T. Kawakami et G. Nakahara; et ad 13094 ped. alt. leg. S. Nagasawa, Nov. anno 1905, no. 615 (TI).
Endemic to Taiwan.
This is a small tufted alpine grass growing on exposed rocks above 3,000 m above the sea level.

**41.** *Brachypodium sylvaticum* (Huds.) P. Beauv., Ess. Agrost. 101, 155. 1812.

**41A.** var. *kelungense* (Honda) C. Hsu, **comb. nov.**
Based on *Brachypodium kelungense* Honda in Journ. Jap. Bot. **12:** 153. 1936.
Type from Taiwan: "ins. Kiirun" (基隆嶼), leg. T. Kawakami et S. Sasaki, anno 1910 (TI).

**41B.** var. *luzoniense* (Hack.) Hara in Bot. Mag. Tokyo **52:** 227. 1938.
Based on *Brachypodium sylvaticum* var. *luzoniense* Hack. in Philippine Journ. Sci. **1:** (Suppl. 4): 269. 1906.
Type from Philippine: Luzon, Province of Benguet Pauai, Merrill 4710; (Lepante, Mount Data, Merrill 4536).
Chromosome number: $2n=14$ (Hsu, 1971)—Kuei-hu (魁湖), Aug. 29, 1967. Hsu 3336 (TAI).

## III-(4). Tribe Bromeae

III-(4)-1. *Bromus* Linn., Gen. Pl. ed. 5. 33. 1754 et in Sp. Pl. ed. 1, 76. 1753.
About 50 species distributed in the temperate regions and in tropical mountains.

### Key to the species of *Bromus*

1(2) Spikelets large, more than 3 cm long, strongly laterally compressed .....42. *B. catharticus*
2(1) Spikelets much smaller, more or less terete:
3(6) Lemmas glabrous or shortly pubescent at base of veins:
4(5) Lemmas glabrous.....45. *B. remotiflorus*
5(4) Lemmas pubescent at base of veins.....44. *B. morrisonensis*
6(3) Lemmas villous-tomentose on margins; anthers 2 mm long.....43. *B. formosanum*

**42.** *Bromus catharticus* Vahl, Symb. Bot. **2:** 22. 1791. **(Fig. IV.)**
Type from Lima, Peru.
RESCUE GRASS
This is a new record for the grass flora of Taiwan. It grows gregariously in the Li-shan district (梨山) at about 1,700 m. above sea level.

**43.** *Bromus formosanus* Honda in Bot. Mag. Tokyo **42:** 136. 1928.
Type from Taiwan: "Nankotaizan" (南湖大山), S. Sasaki anno 1922 (TI).
Endemic to Taiwan.

**44.** *Bromus morrisonensis* Honda in Bot. Mag. Tokyo **42:** 137. 1928.
Type from Taiwan: "monte Morrison" (玉山), leg. T. Kawakami et S. Sasaki, anno 1909 (TI).
Endemic at alpine regions of Taiwan.

**45.** *Bromus remotiflorus* Ohwi var. *piananensis* Ohwi in Act. Phytotax. & Geobot. **10:** 106. 1941.
Type from Taiwan: "Inter Pianan-ambu et Shikikun" (思源～四季), leg. J. Ohwi 4258 (KYO).
The variety is an endemic taxon.

## III-(5). Tribe Festuceae

### Key to the genera of tribe Festuceae:

1(2) Inflorescence a spike; spikelets alternate on nodes of the central axis; lower glume absent.....5. *Lolium*

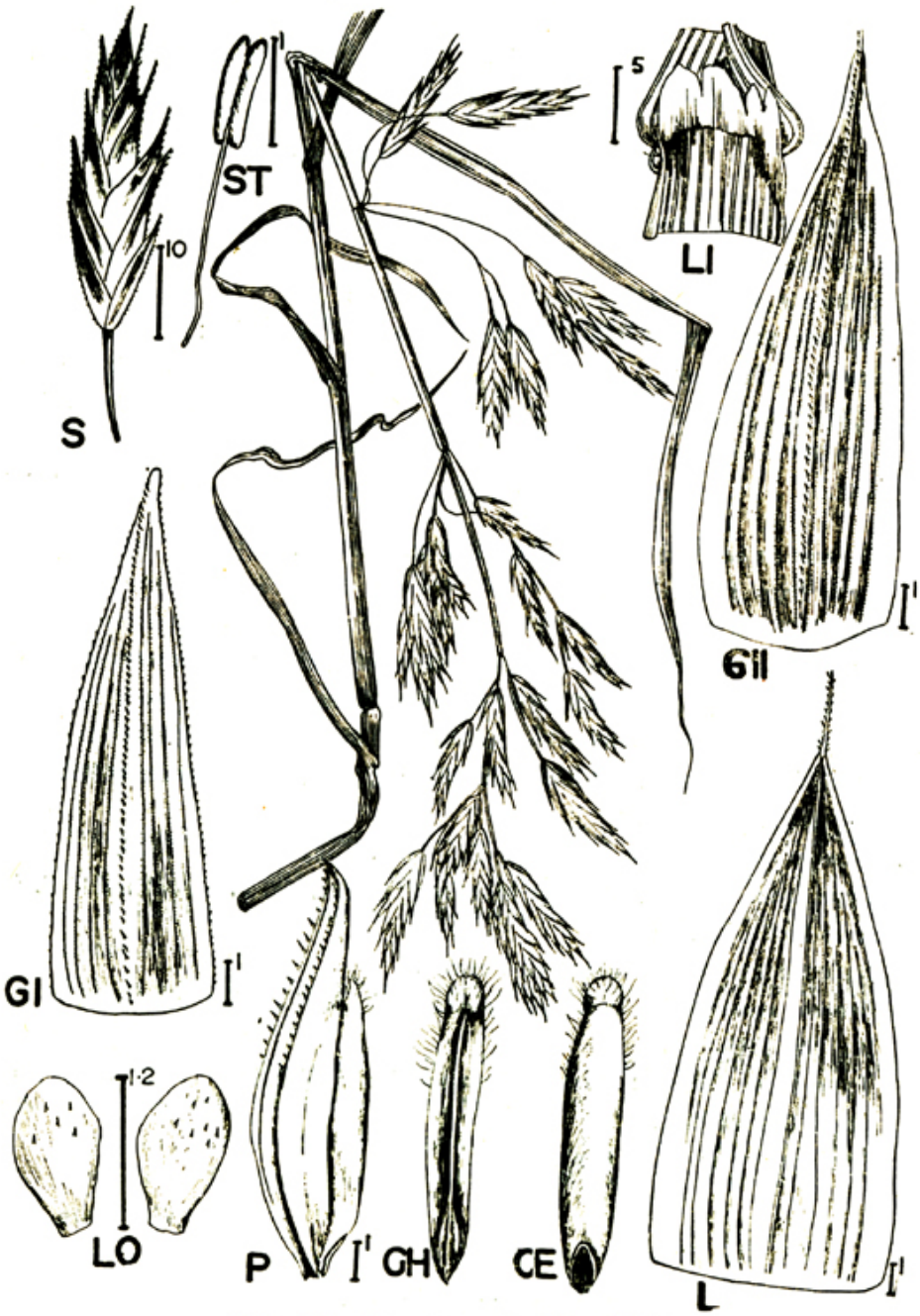


**Fig. IV. Bromus catharticus** Vahl

**(大扁雀麥)**

Loc.: TAICHUNG CO.: Li-shan (梨山), May 6, 1970, C. Hsu & Kuoh 7102 (TAI).

2(1) Inflorescence a panicle, effuse or in dense one-sided clusters; spikelets not as above; lower glume present:
3(4) Spikelets broadly ovate, pendulous; width of the lemmas as long as the length, cordate at the base.....2. *Briza*
4(3) Spikelets not broadly ovate; width of lemmas much shorter than the length:
5(6) Spikelets 1-flowered.....1. *Aulacolepis*
6(5) Spikelets 2- to many-flowered:
7(8) Spikelets extremely compressed; in densely one-sided clusters on the panicle branches.....3. *Dactylis*
8(7) Spikelets more or less compressed but not as above:
9(12) Lemmas glabrous or covered with soft hairs:
10(11) Stamen single; annuals.....7. *Vulpia*
11(10) Stamens three; perennials.....4. *Festuca*
12(9) Lemmas covered with cottony hairs on the veins or only at the base.....6. *Poa*

III–(5)–1. *Aulacolepis* Hack. in Repert. Sp. Nov. Fedde **3:** 241. 1907.
About 4 species distributed in Japan, China, Malaysia and India.

**Key to the species of *Aulacolepis***

1(2) Lower glume minute, up to 0.5 mm long; blades wide 3–5 mm.....46. *A. agrostoides* var.
2(1) Lower glumes 1–2 mm long; blades 5–15 mm wide.....47. *A. treutleri*

**46.** *Aulacolepis agrostoides* Ohwi var. *formosana* Ohwi in Act. Phytotax. & Geobot. **4:** 30. 1935.
Type from Taiwan: "Mt. Taiheizan" (太平山), J. Ohwi 2363 (KYO).
Endemic to Taiwan.

**47.** *Aulacolepis treutleri* (Kuntze) Hack. in Repert. Sp. Nov. Fedde **3:** 242. 1907.
Type of genus *Aulacolepis.*
Based on *Milium treutleri* O. Kuntze, Rév. Gen. Pl. **2:** 780. 1891.
Type from Sikkim, Treuter 486.
*Deyeuxia treutleri* (O. K.) Stapf in Hook. f., Fl. Brit. Ind. **7:** 269. 1896.
Distributed in North-east India, northern Burma and China.
This is an alpine grass growing under *Abies* forests.

III–(5)–2. *Briza* Linn., Gen. Pl. ed. 5, 32. 1754 et in Sp. Pl. ed. 1, 70. 1753.
About 20 species distributed in N. temperate regions and S. America.
Only one species is found in Taiwan.

**48.** *Briza minor* Linn., Sp. Pl. ed. 1, 70. 1753.

Type from Italy.
Chromosome number: $2n=14$ (Gould, F. W., 1958).
LESSER QUAKING GRASS
Distributed originally in the Mediterranean region but now introduced into many countries and often naturalized as an escape in temperate situations. Naturalized around the Yang-ming-shan Park district (陽明山公園) of Taipei, so far only collected in this region.

III–(5)–3. *Dactylis* Linn., Gen. Pl. ed. 5, 32. 1754 et in Sp. Pl. ed. 1, 71. 1753.
About 5 species distributed in the temperate regions of Eurasia.
Only one species has been introduced.

**49.** *Dactylis glomerata* Linn., Sp. Pl. ed. 1, 71. 1753.
Type from Europe.
Chromosome number: $2n=28$ (Titz, 1965).
COCK'S-FOOT, ORCHARD GRASS.
Originally distributed in Europe, North Africa, temperate Asia.
This is a valuable pasture grass, widely naturalized or cultivated in North America, N. Africa and S. Africa.

III–(5)–4. *Festuca* Linn., Gen. Pl. ed. 5, 33. 1754 et in Sp. Pl. ed. 1, 73. 1753.
About 80 species in the world, mostly cosmopolitan in distribution, called FESCUE-Grasses. The leaves roll inwards in dry air. Many are good pasture-grasses. When growing on mountains they are often viviparous.

**Key to the species of *Festuca***

1(2) Blades 6 to 15 mm wide; anthers about 3 mm long.....50. *F. formosana*
2(1) Blades up to 5 mm wide:
3(8) Lower glume very small, much shorter than the lowest lemma, ovate-obtuse to broadly lanceolate:
4(7) Lowest lemma 4.5–7 mm long, awned:
5(6) Blades about 2 mm broad; lemmas obtuse.....54. *F. parvigluma*
6(5) Blades 3–5 mm broad; lemmas acuminate.....56. *F. takasagoensis*
7(4) Lowest lemma 3–4 mm long, awnless.....51. *F. japonica*
8(3) Lower glume more than 1/3 as long as the lowest lemma, lanceolate; panicle contracted:
9(12) New branches partially intra-vaginal; culm bases ascending or decumbent .....55. *F. rubra*
10(11) Lemmas long hirsute; anthers 1–1.5 mm long.....55A. var. *nankotaizanensis*
11(10) Lemmas scabrous; anthers 1.5–2.5 mm long.....55B. var. *niitakensis*
12(9) New branches entirely intra-vaginal; culm bases erect.....53. *F. ovina*
13(14) Blades 0.3–0.6 mm in diameter .....53B. var. *ovina*

14(13) Blades 0.7–1 mm in diameter.....53A. var. *duriuscula*

**50.** *Festuca formosana* Honda in Bot. Mag. Tokyo **42:** 134. 1928.
Type from Taiwan: "Nai-taroko" (內太魯閣), leg. B. Hayata, anno 1917 (TI).
Endemic in limestone areas in north-eastern Taiwan.

**52.** *Festuca japonica* Makino in Bot. Mag. Tokyo **20:** 83. 1906.
Type from Japan—Prov. Tosa: Olunanokawa (K. Watanabe, May 20, 1888).
Chromosome number: $2n=28$ (Tateoka, T., 1955).
Distributed in Japan, Korea and China.

**53.** *Festuca ovina* Linn., Sp. Pl. ed. 1, 73. 1753.
Widely distributed in temperate lands throughout the world, and in the mountains in tropical countries.

**53A.** var. *duriuscula* (Linn.) Koch., Syn. Fl. Germ. Helv. 812. 1837.
Based on *Festuca duriuscula* Linn., Sp. Pl. ed. 2, 108. 1763.
Type from Europe.

**53B.** var. *ovina*
Chromosome number: $2n=28$ (Malik & Thomas, 1966).

**54.** *Festuca parvigluma* Steud., Syn. Pl. Glum. **1:** 305. 1854.
Type from Japan
Chromosome number: $2n=28$ (Moriya & Kondo, 1950; Tateoka, 1953).
Distributed in Japan, Korea and China.

**55.** *Festuca rubra* Linn., Sp. Pl. ed. 1, 74. 1753.
Widely distributed in the Northern Hemisphere.

**55A.** var. *nankotaizanensis* Ohwi in Act. Phytotax. & Geobot. **5:** 52. 1936.
Type from Taiwan: "Props Bunakkei" Mt. Nankotaizan (南湖山莊)—J. Ohwi 4088 (KYO).
Endemic to Taiwan

**55B.** var. *niitakensis* Ohwi in Act. Phytotax. & Geobot. **5:** 53. 1936.
Type from Taiwan: "Mt. Niitaka" (玉山)—leg. J. Ohwi 3725 (KYO).
Endemic to Taiwan

**56.** *Festuca takasagoensis* Ohwi in Act. Phytotax. & Geobot. **2:** 163. 1933.
Type from Taiwan: "Pianan-anbu" (思源), leg. J. Ohwi 2735 (KYO).
Endemic to Taiwan

III–(5)–5. *Lolium* Linn., Gen. Pl. ed. 5, 36. 1754 et in Sp. Pl. ed. 1, 83. 1753.
About 12 species distributed in temperate regions of Eurasia.

**Key to the species of *Lolium***

1(2) Lemmas awned; blades rolled when young .....57. *L. multiflorum*
2(1) Lemmas awnless, blunt or pointed; blades folded when young..58. *L. perenne*

57. *Lolium multiflorum* Lamk., Fl. Franc. **3**: 621. 1778. **(Fig. V.)**
Type from France.
Chromosome number: $2n=14$ (Malik & Thomas, 1966).
ITALIAN RYEGRASS
Distributed in Central and Southern Europe, Northwest Africa and temperate parts of Asia. It has been introduced and naturalized in the temperate parts of the world.

58. *Lolium perenne* Linn., Sp. Pl. ed. 1, 83. 1753.
Type from Europe.
Chromosome number: $2n=14$ (Malik & Thomas, 1966).
PERENNIAL RYEGRASS
Widely distributed in Europe, North Africa and the temperate regions of Asia. It has been introduced into many parts of the world. This species is a very valuable grazing grass.

III-(5)-6. *Poa* Linn., Gen. Pl. ed. 5, 31. 1754 et in Sp. Pl. ed. 1, 67. 1753.
About 300 species distributed throughout the world. Many are useful pasture grasses.

**Key to the species of *Poa***

1(4) Keels of palea long ciliated; anthers about 0.7 mm long:
2(3) Branches of panicle smooth; leaf apex obtuse; lemmas usually woolly all over.....60. *P. annua*
3(2) Branches of panicle scabrous; leaf apex acuminate; lemmas hairy only on lateral veins .....59. *P. acroleuca*
4(1) Keels of palea scabrous; anthers more than 1 mm long:
5(10) Anthers 1 mm long, less than 1/3 as long as the lemma:
6(9) Blades 1.5–2.5 mm broad; lemmas hairy on lateral veins:
7(8) Plant 20–30 cm. high; ligule 1–2 mm long; leaf apex acuminate.....66. *P. tenuicula*
8(7) Plant 8–15 cm high; ligule 2.5 mm long; leaf apex abruptly acute.....62. *P. nankoensis*
9(6) Blades about 3.5 mm broad; panicle branches scabrous; lemmas with a few hairs at base.....61. *P. formosae*
10(5) Anthers longer than 1/3 the length of the lemma:
11(14) Ligule less than 2 mm long:
12(13) Ligule truncate, less than 0.5 mm long; lateral veins of lemma hairy.....64. *P. taiwanicola*
13(12) Ligule acuminate, about 1.5 mm long; lemmas nearly glabrous.....65. *P. takasagomontana*

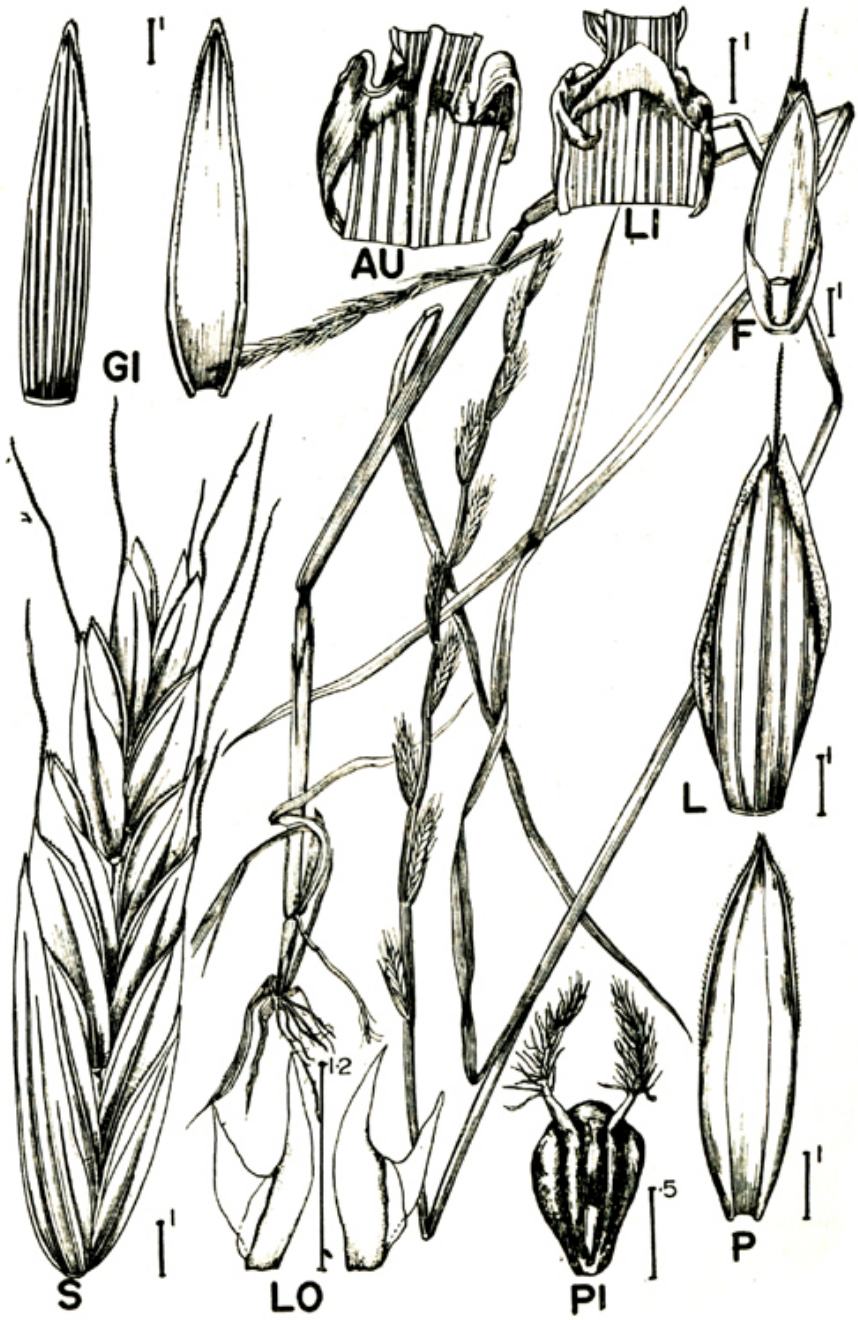


**Fig. V. Lolium multiflorum** Lamk.

(多花黑麥草)

Loc.: I-LAN CO.: Mt. Taipin (太平山), Aug. 25, 1962, Chuang *et al.* 4670 (TAI).

14(11) Ligule more than 3 mm long, littoral.....63. *P. sphondylodes* var.

**59.** *Poa acroleuca* Steud., Syn. Pl. Glum. **1:** 256. 1854.
Type from Japan.
Chromosome number: $n=14$ (Hsu, 1971)—Tung-pu (東埔), Sept. 29, 1967, Hsu 3951 (TAI).
Distributed in Japan, Korea, Mainland China and Taiwan.

**60.** *Poa annua* Linn., Sp. Pl. ed. 1, 68. 1753.
Type from Europe.
Chromosome number: $n=14$ (Chen & Hsu, 1962)—Chen 47, 119 (TAI).
ANNUAL MEADOW GRASS; SPEARGRASS
Cosmopolitan in distribution.
This is one of the commonest grasses growing gregariously in yards. It flowers all the year round.

**61.** *Poa formosae* Ohwi in Repert. Sp. Nov. Fedde **36:** 41. 1934.
Type from Taiwan: "Mt. Nankotaisan" (南湖大山), leg. J. Ohwi 2504 (KYO).
Endemic to Taiwan.

**62.** *Poa nankoensis* Ohwi in Act. Phytotax. & Geobot. **2:** 165. 1933.
Type from Taiwan: "Mt. Nankotaisan" (南湖大山), leg. J. Ohwi 3984 (KYO).
Endemic to Taiwan.

**63.** *Poa sphondylodes* Trin. var. *kelungensis* (Ohwi) Ohwi in Act. Phytotax. & Geobot. **10:** 126. 1941.
Based on *Poa kelungensis* Ohwi, l. c. **4:** 60. 1935.
Type from Taiwan: Kelung (基隆), leg. U. Faurie 753 (KYO).
Locally this species is distributed in the littoral regions in northern Taiwan.

**64.** *Poa taiwanicola* Ohwi in Act. Phytotax. & Geobot. **7:** 131. 1938.
Type from Taiwan: "Mt. Nankotaisan" (南湖大山), leg. J. Ohwi 4115 (KYO).
Endemic in alpine regions of Taiwan.

**65.** *Poa takasagomontana* Ohwi in Repert. Sp. Nov. Fedde **36:** 41. 1934.
Type from Taiwan: "Mt. Nankotaisan" (南湖大山), leg. J. Ohwi 4057 (KYO).
Endemic in alpine regions of Taiwan.

**66.** *Poa tenuicula* Ohwi in Repert. Sp. Nov. Fedde **36:** 42. 1934.
Type from Taiwan: "Mt. Nankotaisan" (南湖大山), leg. J. Ohwi 4078B (KYO).
Endemic in alpine regions of Taiwan.

III–(5)–7. *Vulpia* C. C. Gmel., Fl. Bad. **1:** 8. 1806.
About 25–30 species distributed in temperate countries, especially in Mediterrenian and Pacific N. and S. America.
Only one species found in Taiwan on the mountain range between 2,000 to 3,000 meters above the sea level.

**67.** *Vulpia myuros* (Linn.) Gmel., Fl. Bad. **1:** 8. 1806.

Based on *Festuca myuros* Linn., Sp. Pl. ed. 1, 74. 1753.
Type from Anglis, Italy.
Chromosome number: $2n=14$ (Avdulov, 1928).
RAT'S-TAIL FESCUE.
Generally distributed in Europe, penetrating into the temperate parts of Asia. It grows at the medium altitudes.

## III-(6). Tribe Meliceae

### Key to the genera of tribe *Meliceae*

1(2) Glumes 1–3–veined, much shorter than the lowest lemma; lemmas nearly equal sized .....1. *Glyceria*
2(1) Glumes 3–7–veined, nearly equaling the lowest lemma; lemmas dimorphic, upper ones neutral.....2. *Melica*

III-(6)-1. *Glyceria* R. Br., Prodr. Fl. Nov. Holl. 179. 1810. nom. conserv.
About 40 species, mostly cosmopolitan in distribution, especially rich in N. America. Pasture grasses in wet meadows. Only one species occurs in Taiwan.

**68.** *Glyceria leptolepis* Ohwi in Bot. Mag. Tokyo **45**: 381. 1931.
Type from Japan.
Distributed in Kulie of USSR, Japan, Korea and China.
This species is very rare in Taiwan.

III-(6)-2. *Melica* Linn., Gen. Pl. ed. 5, 31. 1754 et in Sp. Pl. ed. 1, 66. 1753.
About 70 species distributed in N. and S. temperate regions, excluding Australia. Only one species occurs in Taiwan.

**69.** *Melica onoi* Franch. et Sav., Enum. Pl. Japon. **2**: 603. 1879.
Type from Japan.
Chromosome number: $2n=18$ (Tateoka, 1963, '54).
Distributed in Japan, Korea, Northern China and Taiwan.
This species is rare in Taiwan.

## III-(7). Tribe Milieae

III-(7)-1. *Milium* Linn., Gen. Pl. ed. 5, 30. 1754 et in Sp. Pl. ed. 1, 61. 1753.
About 3–4 species distributed in N. temperate regions. Only one species found in Taiwan.

**70.** *Milium effusum* Linn., Sp. Pl. ed. 1, 61. 1753.
Type from Europe.
Chromosome number: $2n=28$ (Bowden, 1960).

WOOD MILLET.
Widely distributed in Europe and Asia.

### III-(8). Tribe Phaenospermeae

III-(8)-1. *Phaenosperma* Munro ex Benth. et Hook. f., Gen. Pl. **3:** 1119.
Only one species distributed in India, Sikkim, Bhutan, South Tibet, Mainland China and Taiwan, extending to Korea and Japan.

**71.** *Phaenosperma globosum* Munro ex Oliver in Hook., Ic. Pl. sub tab. 1991. 1891.
Type from Paris, raised seeds brought from Kiukiang, China (九江).
Chromosome number: $2n=24$ (Tateoka, 1954).
Distributed in Japan, Korea and China.
This is a rare species found in Taroko Gorge.

### III-(9). Tribe Stipeae

III-(9)-1. *Oryzopsis* Michx., Fl. Bor. Amer. **1:** 51. t. 9. 1803.
About 50 species distributed in N. temperate and subtropical regions. Only one species on record in Taiwan.

**72.** *Oryzopsis obtusa* Stapf in Hook. f., Ic. Pl. sub tab. 2393. 1895.
Type from China: prov. Hupeh near Ichang (宜昌附近) (no. 3507) and Banto (no. 3896)), leg. A. Henry.
Distributed in China and Taiwan.

### III-(10). Tribe Triticeae

#### Key to the genera of tribe Triticeae

1(6) Spikelets normally solitary at each node of the spike-axis:
2(3) Spikelets 2-flowered; glumes very narrow, subulate, 1-veined; lemmas stiffly hairy on the keels.....3. *Secale*
3(2) Spikelets usually more than 2-flowered; glumes broader, usually more than 1-veined; lemmas not as above:
4(5) Veins of the lemmas not converging toward the apex; grains free between lemma and palea .....4. *Triticum*
5(4) Veins of the lemma converging toward the apex; grains tightly enclosed between the lemma and palea and adhering to the latter .....1. *Agropyron*
6(1) Spikelets usually more than one at each node of the spike-

axis; spikelets dimorphic, 3 at each node; central one perfect, lateral pairs reduced; glumes standing in front of the spikelet...2. *Hordeum*

III-(10)-1. *Agropyron* (*Roegneria*) Gaertn., Nov. Comm. Ac. Petr. **14:** 539. 1770.
About 100–150 species distributed in temperate countries.

**Key to the species of *Agropyron***

2(2) Lemmas without transparent margins; palea not winged on the keel; awn bending outward.....73. *A. formosanum*

1(1) Lemmas with distinct transparent margins, as long as the palea; palea keeled and winged; awn straight....74. *A. mayebaranum*

**73.** *Agropyron formosanum* Honda in Bot. Mag. Tokyo **41:** 385. 1927.
*Roegneria formosana* (Honda) Ohwi in Act. Phytotax. & Geobot. **10:** 95. 1941.
Type from Taiwan: "Monte No-ko-zan" (能高山), leg. E. Matsuda 13, 30, 1919 (TI).
Endemic in alpine regions of Taiwan.

**74.** *Agropyron mayebaranum* Honda in Bot. Mag. Tokyo **41:** 284. 1927 et Mon. Poac. Jap. 28, 1930, emend. **(Fig. VI.)**
*Roegneria mayebarana* (Honda) Ohwi in Act. Phytotax. & Geob. **10:** 98. 1941.
Type from Japan.
Chromosome number: $n=21$ (Chen & Hsu, 1962)—Ali-shan (阿里山), Sept. 1960, Hsu 1652 (TAI)—reported as *A. formosanum*.
Distributed in Japan and China. Locally this species is newly confirmed by its occurence to medium altitudes such as Mt. Ali (阿里山), and Pah-sien-shan (八仙山).
This is a new record to grass flora of Taiwan.

III-(10)-2. *Hordeum* Linn., Gen. Pl. ed. 5, 37. 1754 et in Sp. Pl. ed. 1, 84. 1753.
About 20 species distributed in the temperate countries. Only one cultivated species is found in Taiwan.

**75.** *Hordeum vulgare* Linn., Sp. Pl. ed. 1, 84. 1753.
Type from Europe.
Chromosome number: $2n=14$ (Bowden, 1965).
BARLEY
Cultivated elsewhere in suitable climates.
This species is occasionally cultivated in Taiwan.

III-(10)-3. *Secale* Linn., Gen. Pl. ed. 5, 36. 1754 et in Sp. Pl. ed. 1, 84. 1753.
About 4 species distributed in Mediterranian, E. Europe to Central Asia; 1 species in S. Africa. Only one cultivated species is occasionally found in Taiwan.

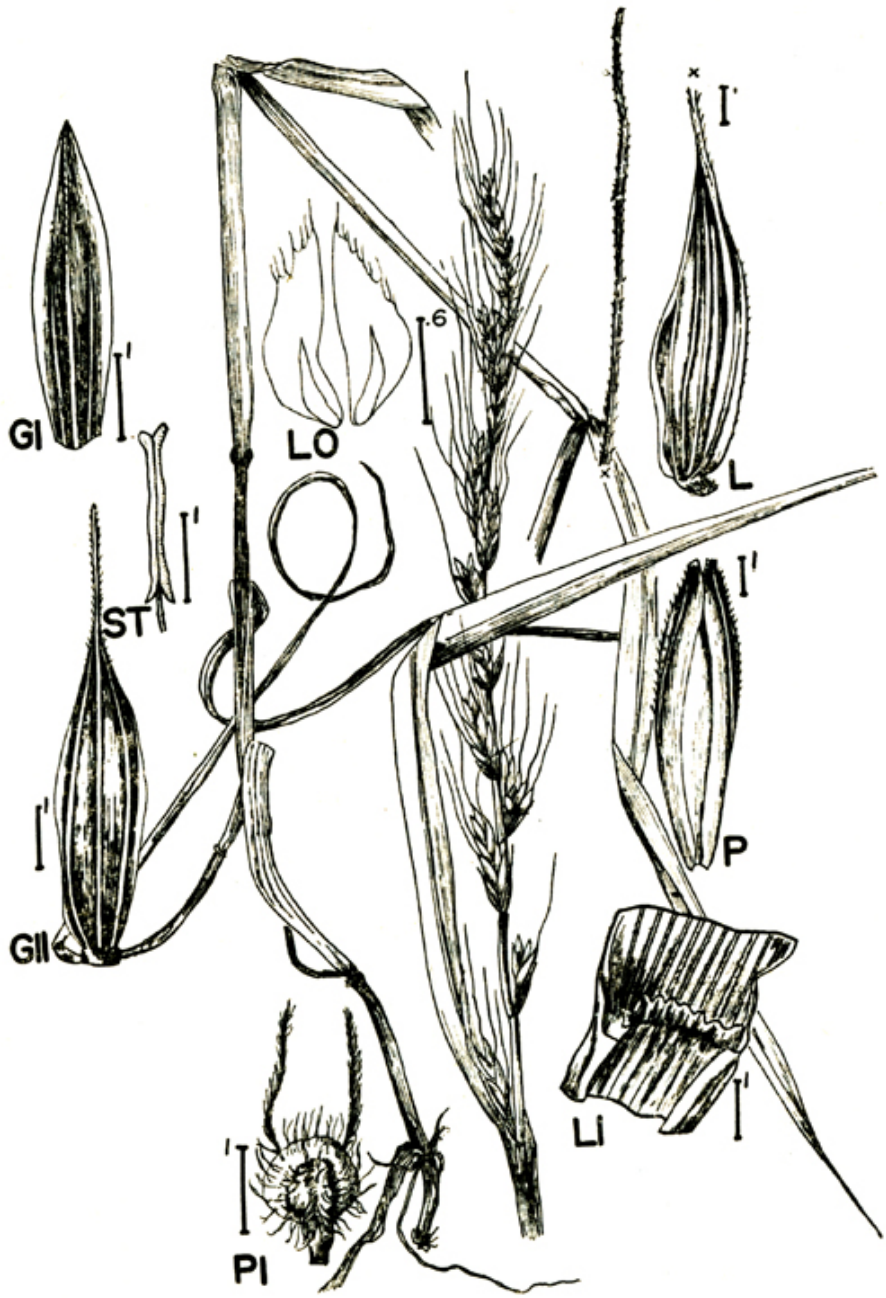


**Fig. VI. Agropyron mayebaranum** Honda
(前原鵝觀草)
Loc.: CHIAYI CO.: Mt. Ali (阿里山), Jan. 6, 1964, M. T. Kao 5627 (TAI).

**76.** *Secale cereale* Linn., Sp. Pl. ed. 1, 84. 1753.
Type from Upsala, cult.
Chromosome number: $2n=14+1$–4b. (Hasegawa, 1934).
RYE
Rye is largely cultivated in Europe as a cereal forming a staple food. This species is scarce in Taiwan.

III–(10)–4. *Triticum* Linn., Gen. Pl. ed. 5, 37. 1754 et in Sp. Pl. ed. 1, 85. 1753.
About 20 species distributed in Europe, the Mediterranian region and W. Asia. Only one species is cultivated in Taiwan.

**77.** *Triticum aestivum* Linn., Sp. Pl. ed. 1, 85. 1753.
Type from Europe.
Chromosome number: $2n=42$ (Chapman & Riley, 1966).
WHEAT
Wheat is widely cultivated in all parts of the world.

## IV. Subfamily Eragrostoideae

### Key to the tribes and genera of subfamily *Eragrostoideae*

1(12) Spikelets with several to many fertile florets...(2) Eragrosteae:
2(7) Lemmas acute or obtuse, entire or shortly awned:
3(6) Inflorescence in digitate, one-sided spikes:
4(5) Upper glume mucronate; axis of spikes terminating in a sharp point .....1. *Dactyloctenium*
5(4) Upper glume not mucronate; axis of spikes terminating into a spikelet.....3. *Eleusine*
6(3) Inflorescence a panicle, open or contracted.....4. *Eragrostis*
7(2) Lemmas distinctly truncate or with bifid apex:
8(9) Spikelets in a terminal solitary spike .....6. *Tripogon*
9(8) Spikelets in panicles or in racemosely arranged spike-like racemes:
10(11) Spikelets subterete; lemmas toothed, more or less rounded on the backside.....2. *Diplachne*
11(10) Spikelets laterally compressed; lemmas entire, keeled on the backside.....5. *Leptochloa*
12(1) Spikelets with only one fertile floret:
13(18) Glumes coriaceous and usually longer than the lemma:
14(17) Inflorescence in a contracted and simplified panicle or a terminal raceme:

15(16) Upper and lower glumes equal in length, both awned; peduncle slender and weak...(5) Perotideae .....*Perotis*

16(15) Upper glume awnless, lower glume minute or wanting; peduncle stout.....(7) Zoysieae.....*Zoysia*

17(14) Inflorescence a spike; spikelets sunken in the rachis joint.... .....(4) Leptureae.....*Lepturus*

18(13) Glumes shorter than the lemma, thinner or as the same texture as the lemma:

19(20) Spikelets cylindrical, falling entire; base of the glumes beared; lemmas awned.....(3) Garnotieae.....*Garnotia*

20(19) Spikelets more or less compressed; base of the glumes not beared:

21(28) Inflorescence in digitate racemes or a terminal spike .....(1) Chlorideae:

22(23) Lemmas awnless.....2. *Cynodon*

23(22) Lemmas awned or mucronate, with sterile florets above:

24(27) Lemmas laterally compressed; veins hairy:

25(26) Lemmas mucronate, dark brown; culms and sheaths strongly compressed; leaf apex abruptly rounded.....4. *Eustachys*

26(25) Lemmas awned, pale or fuscous; plant body not compressed; leaf apex acuminate.....1. *Chloris*

27(24) Lemmas more or less dorsally compressed, veins glabrous.....3. *Enteropogon*

28(21) Inflorescence in an open or contracted panicle....(6) Sporoboleae:

29(30) Lemmas awnless, veins not distinct; fruit usually with a free pericarp.....2. *Sporobolus*

30(29) Lemmas awned, veins distinct; pericap not free.....1. *Muhlenbergia*

## IV-(1). Tribe Chlorideae

IV-(1)-1. *Chloris* Sw., Prod Veg. Ind. Occ. 25. 1788.

About 40 species distributed in tropical and warm temperate regions. Several are useful pasture grasses.

### Key to the species of *Chloris*

1(2) Sterile lemmas narrow and acute; spikelets 4 mm long or more; cultivated.....80. *C. gayana*

2(1) Sterile lemmas broad and truncate:

3(4) Spikelets about 3 mm long; florets two awned.....81. *C. virgata*

4( 3 ) Spikelets about 2.5 mm long; florets 3-awned:
5( 6 ) Length of the sterile lemma nearly as long as the width.....78. *C. barbata*
6( 5 ) Length of the sterile lemma longer than the width .....79. *C. formosana*

78. *Chloris barbata* Sw., Fl. Ind. Occ. **1:** 200. 1797.
Based on *Andropogon barbatum* Linn., Mant. Pl. Att. 302, 1771, non Linn. 1759.
Type from East India.
Chromosome number: $n=20$ (Chen & Hsu, 1962)—Chen 95 (TAI).
$2n=20$ (Gould, 1966).
PEACOCK-PLUME GRASS
Distributed in the tropics of South-east Asia, introduced elsewhere. But some authors have considered it to be a native of tropical America.
Cattle are said to be partial to this grass when it is young, but avoid it when the inflorescence matures. It has purplish inflorescence with a nearly globose sterile lemma.

79. *Chloris formosana* (Honda) Keng, Clav. Gram. Prin. Sinicarum 197. 1957.
Based on *Chloris barbata* var. *formosana* Honda in Bot. Mag. Tokyo **40:** 437. 1920.
Type from Taiwan: "Takao" (高雄)—leg C. Nakahara 635, anno 1905 (TI).
Chromosome number: $n=20$ (Hsu, unpublished)—Kenting (墾丁), Oct. 3, 1967. Hsu 4100 (TAI.)
Locally it grows only in southern Taiwan. The inflorescence is pale yellow and the sterile lemma is wedge-shaped in this species.

80. *Chloris gayana* Kunth, Rév. Gram. **1:** 89. 1829. nomen; 293, t. 58. 1830 ex Stapf in Dyer, Fl. Cap. **7:** 642. 1900.
Type from Senegal, Africa.
Chromosome number: $2n=40$ (Tateoka, 1965); 2n=20, 40 (Singh & Godward, 1963).
RHODES GRASS
Distributed from Senegal eastwards to the Sudan and south to South Africa, in open grassland and savannah.
This is an introduced species. It makes an excellent hay of high nutritive value and is eaten greedily by all stock. Yields are very high in irrigated fields. It is said to be badly affected by frost.

81. *Chloris virgata* Sw., Fl. Ind. Occ. **1:** 203. 1797. **(Fig. VII.)**
Type from Antigua, West Indies.
Chromosome number: $2n=20, 26, 40$ (Pritchard & Gould, 1964)
SHOWY CHLORIS
Widely distributed throughout the tropics of both hemispheres.
It is reputed to be a good fodder grass.

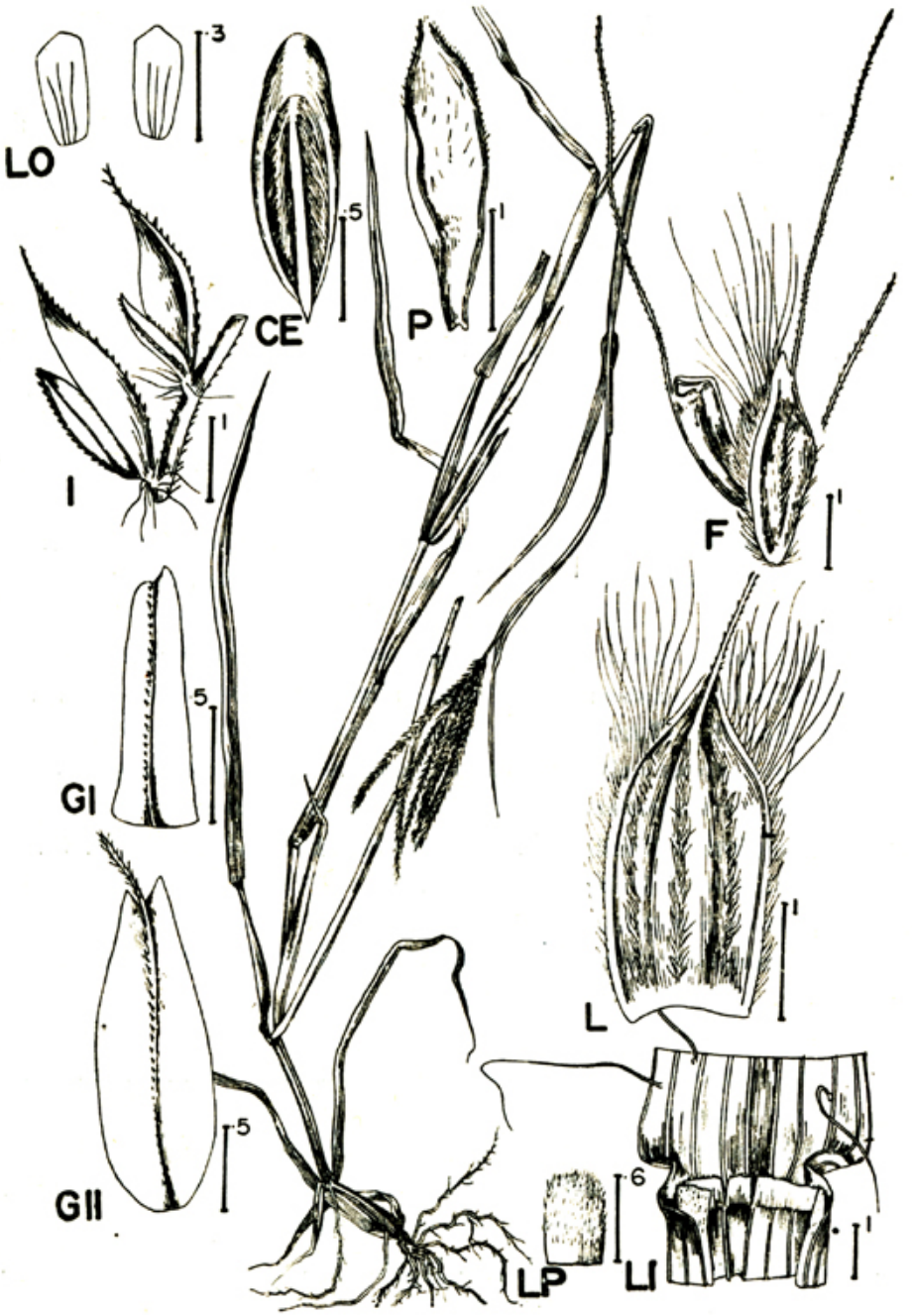


**Fig. VII. Chloris virgata** Sw.

(虎 尾 草)

Loc.: PINGTUNG CO.: Fengkang (楓港), Oct. 9, 1960, C. Hsu 1179 (TAI).

Locally this species is newly found in this study to the grass flora of Taiwan. As far as materials are concerned, it is distributed only at South Peak and Botel Tobago.

IV-(1)-2. *Cynodon* Rich. in Pers., Syn. Pl. **1:** 85. 1805. nomen genericum conservandum.

About 10 species distributed in tropical and subtropical regions.

Two species occur in Taiwan.

**Key to the species of *Cynodon***

2( 2 ) Spikes about 10 cm long; flowering culms more than 25 cm high; ligule membranous.....82. *C. arcuatus*

1( 1 ) Spikes up to 6 cm long; flowering culms less than 15 cm high; ligule a ring of hairs; common.....83. *C. dactylon*

**82.** *Cynodon arcuatus* J. S. Presl ex C. B. Presl, Rel. Haenk. **1:** 290. 1830.

Type from Luzon, Philippine Islands.

Distributed in South India, Burma, South-east Asia, and Malaya.

Locally this species is found only from South Peak, rare.

**83.** *Cynodon dactylon* (Linn.) Pers., Syn. Pl. **1:** 85. 1805.

Based on *Panicum dactylon* Linn., Sp. Pl. ed. 1, 58. 1753.

Type from Europe.

Chromosome number: n=18 (Chen & Hsu, 1962)—Chen 104 (TAI).

BERMUDA GRASS

This grass has an extremely wide distribution, being found in all warm countries and even persisting in colder climates.

IV-(1)-3. *Enteropogon* Nees in Lindl., Introd, Nat. Syst, ed. 2, 448. 1836.

About 6 species distributed in Africa, Madagascar, Seychelles, India, Taiwan, Australia and Pacific Islands.

Two species are on record from Taiwan.

**Key to the species of *Enteropogon***

2( 2 ) Spikes several, digitate and longer; spikelets about 5 mm long; plant about 1.5 m high.....84. *E. dolichostachyus*

1( 1 ) Spike usually one, occassionally three; spikelets 4-4.5 mm long; delicate small grass.....85. *E. gracilior*

**84.** *Enteropogon dolicostachyus* (Lag.) Keng, Clav. Gram. Prin. Sinicarum 197. 1957.

Based on *Chloris dolichostachya* Lagesca, Gen, et Sp. Pl. 5, 1816.

Type from Philippine Islands.

Distributed in Afghanistan through India to South-east Asia and South China.

Locally this species is found in southern Taiwan.

**85.** *Enteropogon gracilior* Rendle in Journ. Linn. Soc. Bot. **36:** 403. 1904.

Type from Taiwan: "Apes' Hill, Takow" (高雄壽山), leg. A. Henry, 1119, 1904. (Mus. Brit.; Herb. Kew).

Chromosome number: $n=20$ (Chen & Hsu, 1962)—Ken-ting (墾丁), Chen 84 (TAI).

Locally this tall grass is distributed only in the southern part of Taiwan.

IV-(1)-4. *Eustachys* Desv., Nouv. Bull. Soc. Philom. Paris **2**: 188. 1810.

About 12 species distributed in the tropical America, West Indies, tropical and and S. Africa. One species is newly discovered to the grass flora of Taiwan.

**86.** *Eustachys tener* (Presl) A. Camus in Rev. Bot. Appl. Agr. Colon. **5:** 208. 1925.; C. E. Hubb., Kew Bull. Misc. Inf. **1941:** 25. 1941. **(Fig. VIII.)**

Based on *Cynodon tener* Presl, Rel. Haenk. **1:** 291. 1830.

Type from Luzon, Philippines.

Known also as *Chloris tenera* Scribn. in Rept. Missouri Bot. Garden **10**: 41, pl. 40. 1899.

Distributed in Vietnam, Philippines, Hainan (China) and Taiwan.

In open places at low altitudes. Locally it is known from the central and southeastern parts of Taiwan.

## IV-(2). Tribe Eragrasteae

IV-(2)-1. *Dactyloctenium* Willd., Enum. Hort. Berol. 1029. 1809.

About 10 species distributed in the warm countries.

Only one species is widely distributed throughout the Island.

**87.** *Dactyloctenium aegyptium* (Linn.) P. Beauv., Ess. Agrost. 15. 1812.

Based on *Cynosurus aegyptius* Linn., Sp. Pl. ed. 1, 72. 1753.

Type from Africa.

Chromosome number: $2n=40$ (Tateoka, 1965)

CROWFOOT GRASS.

Distributed in the tropical regions of the Old World.

This grass is said to be rich in cyanogenetic glycosides and therefore is a danger to stock at certain times. It is found usually in sandy soils.

IV-(2)-2. *Diplachne* P. Beauv., Ess. Agrost. 80, t. 16, f. 9. 1812.

About 15 species distributed in the tropical and subtropical regions.

Only one species is found in littoral soils in Taiwan.

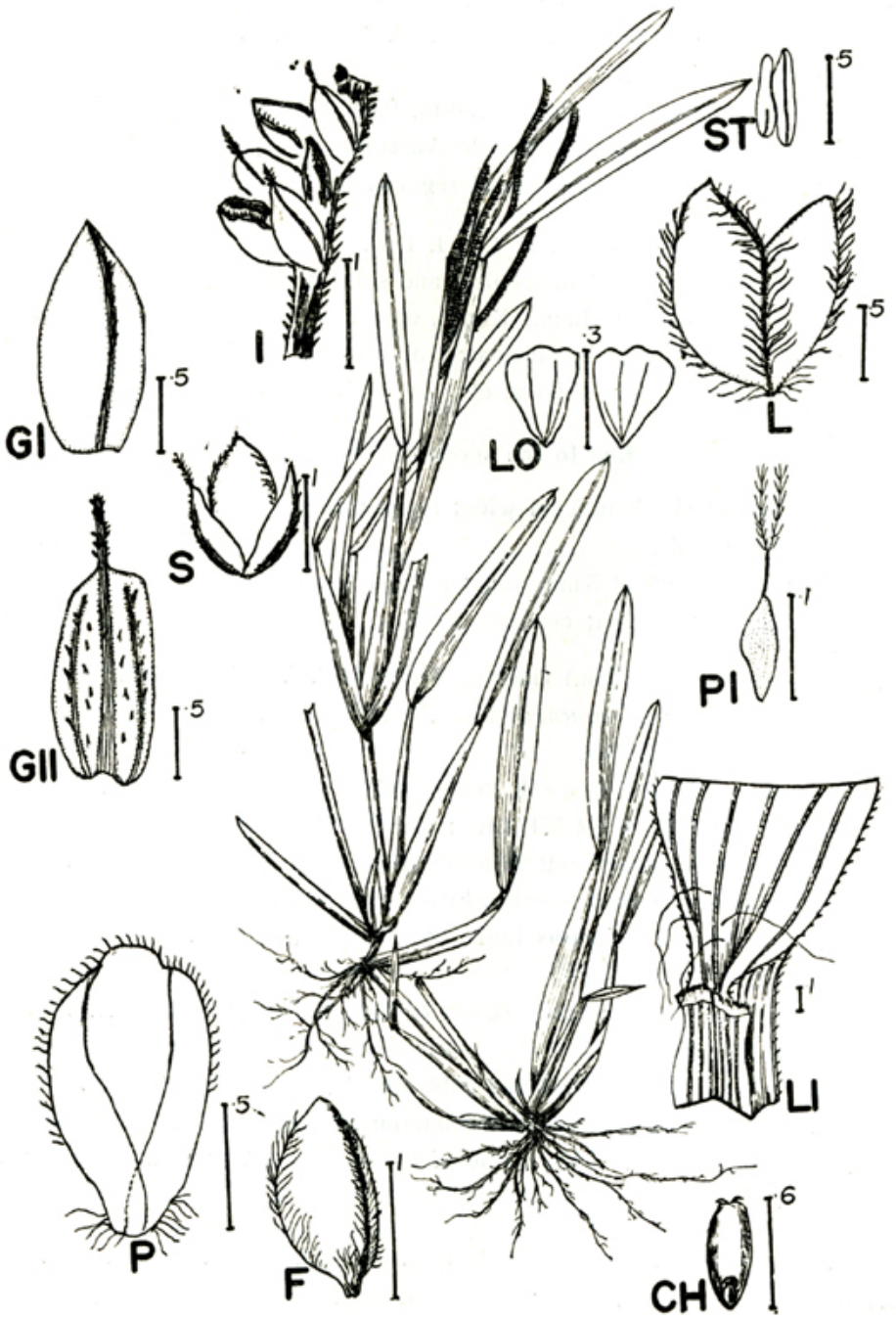


**Fig. VIII. Eustachys tener** (Presl) A. Camus

**(眞 穗 草)**

Loc.: PINGTUNG CO.: "Saiteimon Heito" (屏東山地門), Sept. 1932, S. Suzuki s. n. (TAI).

88. *Diplachne fusca* (Linn.) P. Beauv., Ess. Agrost. 80, 163. 1812.
Based on *Festuca fusca* Linn., Sp. Pl. ed. 2, 109. 1763.
Type from Palestine.
Widely distributed in India, extending from Egypt and Tropical and South Africa through South-east Asia to Australia.
It is usually found in the littoral regions.

IV–(2)–3. *Eleusine* Gaertn., Fruct. **1:** 7, t. 1. 1789.
About 9 species distributed in tropical and subtropical regions.
One species, *E. tristachya* (Lam.) Kunth, occurs in temperate S. America.
*E. coracana* (L.) Gaertn. is cultivated as a cereal and/or for making alcoholic beverage in Ceylon, India, Africa, etc. It is also useful as fodder.

**Key to the species of *Eleusine***

2(2) Spikes incurved, about 1 cm wide; seeds globose; cultivated cereal .....89. *E. coracana*
1(1) Spikes slender, about 5 mm wide; seeds bluntly triangular in x-section; common weed.....90. *E. indica*

89. *Eleusine coracana* (Linn.) Gaertn., Fruct. **1:** 8. f. 1, f. 11. 1789.
Based on *Cynosurus coracanus* Linn., Syst. Nat. ed. 10, **2:** 875, 1759.
Type from East Indies.
Chromosome number: n=18, 2n=36 (Singh & Godward, 1960).
KURAKKAN; FINGER MILLET; AFRICAN MILLET
This species is widely cultivated in the tropics of the Old World.

90. *Eleusine indica* (Linn.) Gaertn., Fruct. **1:** 8. 1789.
*Based* on *Cynosurus indicus* Linn., Sp. Pl. ed. 1, 72. 1753.
Type from India.
Chromosome number: n=9 (Chen & Hsu, 1962)—Chen 27 (TAI).
GOOSE GRASS
Distributed in the tropical and subtropical regions of the world.
The root-systems are deep and numerous, therefore it is not easy to eradicate from the substrate. This is one of the commonest grasses growing everywhere.

IV–(2)–4. *Eragrostis* P. Beauv., Ess. Agrost. 70. 1812. emend. Reichb. 1828.
About 300 species distributed all over the world, mostly in subtropical regions.

**Key to the species of *Eragrostis***

1(6) Florets articulate from above downwards falling together with the rachilla-joints; caryopsis smooth, circular in

x-section; spikelets less than 2 mm long:

2(3) Inflorescence a spike-like contracted panicle; cilia of palea soft, longer than the width of the palea.....93. *E. ciliaris*

3(2) Inflorescence a more or less open panicle:

4(5) Cilia of the lemma ½ as long as the lemma; axil of panicle branches with glands; culms geniculate at basal nodes.....91. *E. amabilis*

5(4) Cilia of the lemma very short, scabrous; axils of panicle branches glabrous; plant devoid of glands; culms erect .....98. *E. japonica*

6(1) Florets falling off from below upwards, but leaving the continuous rachilla; caryopsis with reticulate or tessellate markings; spikelets more than 2 mm long:

7(10) Caryopsis tessellate, subglobose; leaf margins and spikelet glandular:

8(9) Spikelets 1.5–2mm wide; lemmas 1.5–2 mm long .....105. *E. poaeoides*

9(8) Spikelets 2–3 mm wide; lemmas 2–2.2 mm long.....92. *E. cilianensis*

10(7) Caryopsis with netted marking on surface, ovoid in outline, if tessellate then cylindrical and circular or triangular in x-sections; leaf margins and spikelet eglandular:

11(20) Caryopsis compressed; elliptical in x-section:

12(15) Panicle contracted, spiciform; anthers 0.5 mm long:

13(14) Axils of panicle branches long ciliate; paleas entire, straw colored; keels ciliated.....95. *E. cylindrica*

14(13) Axils of panicle branches glabrous; paleas with two-teeth, purplish; keels shortly ciliate.....100. *E. nevinii*

15(12) Panicle open; anthers less than 0.3 mm long:

16(17) Spikelets widely compressed, ovate, more than 2.4 mm wide, straw or reddish in color.....106. *E. unioides*

17(16) Spikelets less than 2 mm wide, lanceolate to linear:

18(19) Lemmas obtuse, mucronate; axils of panicle branches more or less pilose; blades pilose, less than one-third as long as the plant.....104. *E. pilosiuscula*

19(18) Lemmas acute; axils of panicle glabrous; blades not pilose, longer than one-half the length of the plant.....94. *E. cumingii*

20(11) Caryopsis tessellate or pitted, circular or bluntly triangular in x-sections:

21(24) Caryopsis furrowed on one side, bluntly triangular in x-sections:

22(23) Plant eglandular; leaves pilose.....103. *E. pilosissima*

23(22) Plant glandular; leaves nearly glabrous.....97. *E. ferruginea*

24(21) Caryopsis tessellate, circular or elliptical in x-sections:
25(28) Anthers about 0.2 mm long; spikelets less than 1.5 mm wide; annuals:
26(27) Axils of panicle branches and sheath-mouth pilose.....102. *E. pilosa*
27(26) Axils of panicle and sheath-mouth not pilose.....99. *E. multicaulis*
28(25) Anthers longer than 0.5 mm long; spikelets more than 1.8 mm wide; perennials:
29(30) Caryopsis elliptical in x-section; palea persistant; leaves broader.....96. *E. fauriei*
30(29) Caryopsis circular in x-section; palea deciduous; leaves narrower.....101. *E. nutans*

**91.** *Eragrostis amabilis* (Linn.) Wight et Arn. ex Nees in Hook. & Arn., Bot. Beechey Voy. 251. 1838.
Based on *Poa amabilis* Linn., Sp. Pl. ed. 1, 69. 1753.
Type from India.
Chromosome number: $n=10$ (Chen & Hsu, 1962)—Chen 29 (TAI).
FEATHER LOVEGRASS.
Widely distributed in the tropics of the Old World.
This grass is one of the most common weeds in the sugar-cane fields or tea-plantations.

**92.** *Eragrostis cilianensis* (All.) Vignolo-Lutati in Malpighia **18:** 386. 1904.
Based on *Poa cilianensis* All., Fl. Pedem. **2:** 246, t. 91, f. 2. 1785.
Type from Italy.
Chromosome number: $2n=40$ (Ono & Tateoka, 1953); $2n=20$, $n=10$ (Singh & Godward, 1960).
STINKGRASS
Widely distributed in the warmer regions of the world. The caryopsis of this species is subglobose and reddish brown in color, while those of the similar species, *E. poaeoides* are dark brown and broadly oblong. It can be used as a fodder grass.

**93.** *Eragrostis ciliaris* (Linn.) R. Br. in Tuckey, Narr. Exp. Congo, App. 478. 1818.
Based on *Poa ciliaris* Linn., Syst. Nat. ed. 10, **2:** 875, 1759. (**Fig. IX.**)
Type from Eurpe.
Chromosome number: $2n=20$ (Tateoka, 1965).
GOPHER-TAIL LOVEGRASS
Distributed in the tropics and subtropics of the Old World and New World. A sporadic annual in dry places. This is a new record to the grass flora of Taiwan. Probably is a naturalized grass.

**94.** *Eragrostis cumingii* Steud., Syn. Pl. Glum. **1:** 266. 1854.
Type from Philippine Islands, leg. Cuming 672 et 1104.

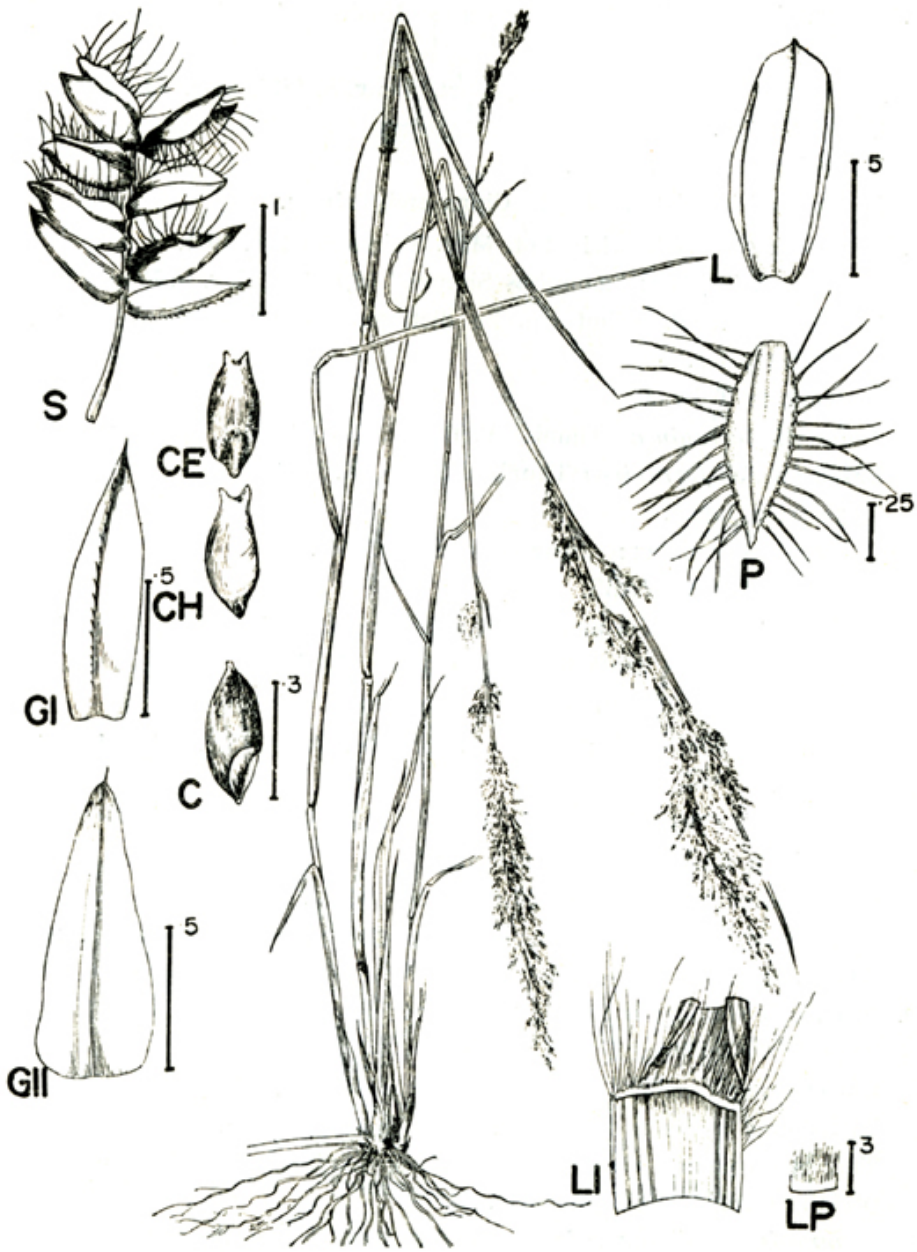


**Fig. IX. Eragrostis ciliaris** (Linn.) R. Br.
(毛畫眉草)
Loc.: TAITUNG CO.: Taitung (臺東), Oct. 7, 1970, T. L. Liu s. n. (TAI).

Distributed in India, Burma, Malaysia, the Philippines, China and extending to Australia.

95. *Eragrostis cylindrica* (Roxb.) Nees ex Hook. et Arn. in Hook. & Arn., Bot. Beechey Voy. 251. 1838.
Based on *Poa cylindrica* Roxb., Hort. Beng, 8, 1814, nom. nud., Fl. Ind. (ed. Carey) **1:** 335. 1820.
Type from Canton, China.
Distributed in Vietnam South China and Taiwan.

96. *Eragrostis fauriei* Ohwi in Bot. Mag. Tokyo **55:** 278. 1941.
Type from Taiwan: "montibus Shinten" (新店山區), leg. U. Faurie **153** (KYO).
Similar to *E. nutans* but can be distinguished by its broader leaves and persistent palea.
Endemic to Taiwan.

97. *Eragrostis ferruginea* (Thunb.) P. Beauv., Ess. Agrost. 71. 1812. **(Fig. X.)**
Based on *Poa ferruginea* Thunb., Fl. Jap. 50. 1784.
Type from Japan.
Chromosome number: $2n=80$ (Tateoka, 1954).
KOREAN LOVEGRASS.
Distributed in Sikkim and Tibet, extending to China and Japan. This is a new record to the grass flora of Taiwan. As for as materials are concerned it has been collected in the hills of northern Taiwan.

98. *Eragrostis japonica* (Thunb.) Trin. in Mém. Acad. Sci. Pétersb., sér. 6, **1:** 405. 1831.
Based on *Poa japonica* Thunb., Fl. Jap. 51. 1784.
Type from Koshido, Nagasaki, Japan.
Chromosome number: $2n=20$ (Avdulov, 1928).
Distributed in India, China, Korea to Japan, extending to Australia and Africa.

99. *Eragrostis multicaulis* Steud., Syn. Pl. Glum. **1:** 426. 1855.
Type from Japan.
Chromosome number: $2n=40$ (Ono & Tateoka, 1953).
Distributed in India, South-east Asia, China to Japan.
This is a common weed growing along roadsides and in waste fields, especially common in flower pots.

100. *Eragrostis nevinii* Hance in Journ. Bot. Brit. & For. **18:** 302. 1880.
Type from China: prov. Cantonense (清遠縣, 廣東), leg. J. C. Nevin, Herb. prop. no. 20602.
Distributed in Vietnam and South China.

100. *Eragrostis nutans* (Retz.) Nees ex Steud., Nom. Bot ed. 2, 563. 1840.
Based on *Poa nutans* Retz., Obs. Bot. **4:** 19. 1786.

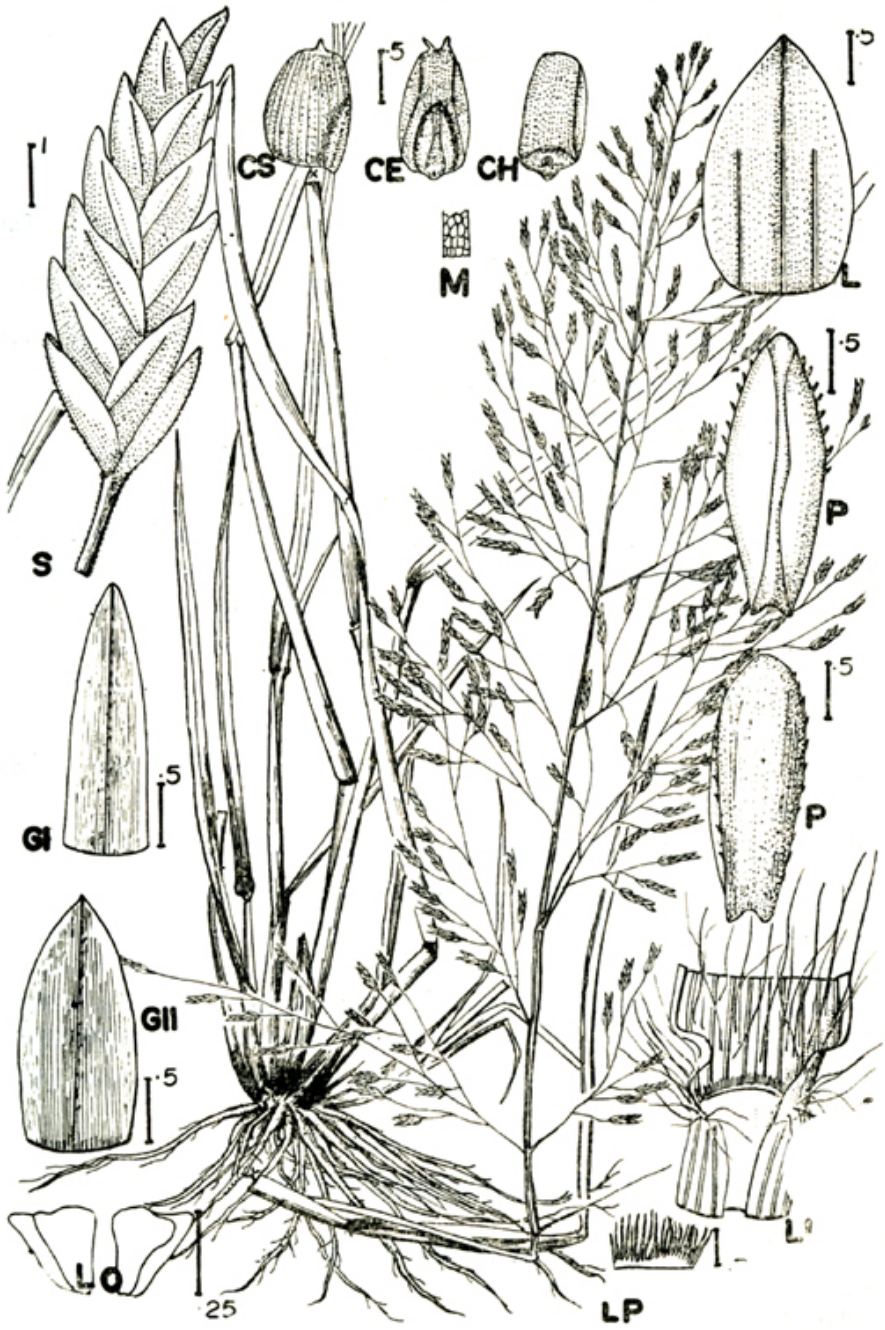


**Fig. X. Eragrostis ferruginea** (Thunb.) P. Beauv.

（知 風 草）

Loc.: TAIPEI CO.: Hsiao-ko-tou (小格頭), Dec. 27, 1968, C. Hsu 9109 (TAI).

Type from Tranqueba, South India.
Chromosome number: $n=30$ (Chen & Hsu, 1962)—Chen 113 (TAI).
Distributed in India and China.

**102.** *Eragrostis pilosa* (Linn.) P. Beauv., Ess. Agrost. 71, 162, 175. 1812.
Based on *Poa pilosa* Linn., Sp. Pl. ed. 1. 68. 1753.
Type from Italy.
Chromosome number: $2n=40$ (Ono & Tateoka, 1953); $2n=60$ (Tateoka, 1965; Bowden & Senn, 1962).
INDIA LOVEGRASS
Very widely distributed in tropical and warm regions of the Old World.

**103.** *Eragrostis pilosissima* Link., Hort. Berol. **1:** 189. 1827.
Type from China (華南).
Distributed in Vietnam and China (Kwangtung, Fukien)

**104.** *Eragrostis pilosiuscula* Ohwi in Bot. Mag. Tokyo **55:** 279. 1941.
Type from Taiwan: "Shinchiku" (新竹), leg. Y. Shimada 4789 (KYO).
Endemic to Taiwan.

**105.** *Eragrostis poaeoides* P. Beauv., Ess. Agrost. 162. 1812.
Type from Italy.
Chromosome number: $2n=40$ (Tateoka, 1954).
LITTLE LOVEGRASS.
Widely distributed in India, China and extending to temperate regions and the Mediterranean area.

**106.** *Eragrostis unioloides* (Retz.) Nees ex Steud., Syn. Pl. Glum. 264. 1854.
Based on *Poa unioloides* Retz., Obs. Bot. **5:** 19. 1789.
Type probably from India.
CHINESE LOVEGRASS.
Distributed in tropical Asia and Africa generally.
This species is very easily recognized by its extremely compressed large spikelets which are pinkish or sometimes pale in color.

IV-(2)-5. *Leptochloa* P. Beauv., Ess. Agrost. 71, t. 15, f. 1. 1812.
About 27 species distributed in tropical and subtropical regions.

**Key to the species of *Leptochloa***

1(2) Plant body glabrous; lowest lemma about 1.5 mm long; upper glume 1.2–2.5 mm long; florets 2 to 7.....107. *L. chinensis*

2(1) Plant body covered with tuberculate hairs; lowest lemma about 1 mm long; upper glume about 1.5 mm long; racemes slender.....108. *L. panicea*

**107.** ***Leptochloa chinensis*** (Linn.) Nees in Syll. Ratisb. **1:** 4. 1824.
Based on *Poa chinensis* Linn., Sp. Pl. ed. 1, 69. 1753.
Type from Kwangtung, China (erroneously reported as India).
Chromosome number: $n=20$ (Chen & Hsu, 1962)—Chen 23 (TAI).
RED SPRANGLETOP
Distributed in South-east Asia generally.
This species is locally very rich in waste field and in paddy field.

**108.** ***Leptochloa panicea*** (Retz.) Ohwi in Bot. Mag. Tokyo **55:** 311. 1941.
Based on *Poa panicea* Retz., Obs. Bot. **3:** 11. 1783.
Type from China.
Distributed in tropical Asia and Africa.
This grass is locally rather scarce.

**IV-(2)-6.** ***Tripogon*** Roem. et Schult., Syst. Veg. **2:** 34. 1817.
About 20 species distributed in tropical Africa and Asia.
Only one species found in Taiwan.

**109.** ***Tripogon chinensis*** Hack. in Bull. Herb. Boiss. II. **3:** 503. 1903.
Type from China (河北百花山).
Distributed in China and East Siberia.
This is a rare species found locally only in southern Taiwan.

## IV-(3). Tribe Garnotieae

**IV-(3)-1.** ***Garnotia*** Brongn. in Duperr., Voy. Coq. Bot. 132, t. 21. 1832.
About 30 species distributed in E. Asia, NE. Australia and Pacific Islands.
Only one species found in Taiwan.

**110.** ***Garnotia acutigluma*** (Steud.) Ohwi in Bot. Mag. Tokyo **56:** 393. 1941.
Based on *Urachne acutigluma* Steud., Syn. Pl. Glum. **1:** 121. 1854.
Type from Japan.
Very rare species grows on coastal regions.

## IV-(4). Tribe Leptureae

**IV-(4)-1.** ***Lepturus*** R. Br., Prodr. Fl. Nov. Holl. 207. 1810.
About 15 species distributed in coasts of E. Africa, Madagascar to Australia and Polynesia.
Only one species found along rocky coral shore.

**111.** ***Lepturus repens*** (G. Forst.) R. Br., Prodr. Fl. Nov. Holl. 207. 1810.
Based on *Rottboellia repens* G. Forst., Prodr. 9. 1786.
Type from Australia.

Chromosome number: $n=27$ (Hsu, unpublished)—Lanhsü (蘭嶼), Aug. 30, 1968. Hsu 4933 (TAI); $2n=54$ (Tateoka, 1958).
Distributed on coasts of Ceylon, Laccadive Islands, Kenya, Mascarenes, Polynesia to Taiwan and Australia.
This specis is usually found on rocky coasts.

## IV-(5). Tribe Perotideae

IV-(5)-1. *Perotis* Ait., Hort. Kew. ed. 1, **1**: 85. 1789.
About 10 species distributed in tropical Africa, S. India, Ceylon, E. Asia and exteinding to Australia.

### Key to the species of *Perotis*

1(2) Spikelets less than 2 mm long; awn about 1 cm long .....112. *P. indica*
2(1) Spikelets more than 3 mm long; awn 2 cm long .....113. *P. macrantha*

**112.** *Perotis indica* (Linn.) O. Kuntze. Rév. Gen. Pl. **2**: 787. 1891.
Based on *Anthoxanthum indicum* Linn., Sp. Pl. ed. 1, 28. 1753.
Type from India.
Widely distributed in India, Ceylon, Burma, Malaya to Southeast Asia generally.
It grows on sandy places in southern Taiwan.

**113.** *Perotis macrantha* Honda in Bot. Mag. Tokyo **41**: 638. 1927.
Type from Taiwan "Anpin": (安平), leg. Y. Yamazaki, anno 1923 (TI).
This species is probably the same with *P. hordeiformis* Nees of which is characterized by its definite lines of hair along the dorsal surface of the glumes.

## IV-(6). Tribe Sporoboleae

IV-(6)-1. *Muhlenbergia* Schreb., Gen. 44. 1789.
About 100 species distributed from Himalaya to China and Japan, N. America and extending to the Andes. Some are useful fodder-grasses.
Only one species found in Taiwan.

**114.** *Muhlenbergia longistolon* Ohwi in Bull. Nat. Sci. Museum (Tokyo) **26**: 3. 1949.
Type from Japan (Yezo, Hondo, Mt. Sasagotoge in Kai), leg. K. Watanabe NSN no. 63003 (NSN).
Distributated in China, Korea, Manchuria and Japan.
Chromosome number: $n=20$ (Chen & Hsu, 1962)—Chen 45 (TAI), reported

as *M. huegelii.*

This species is locally found in mountainous regions along streams in the shade.

IV-(6)-2. *Sporobolus* R. Br., Prodr. Fl. Nov. Holl. 169. 1810.

About 150 species distributed in tropical and warm temperate regions.

**Key to the species of *Sporobolus***

1(4) Upper glume nearly as long as the lemma; blades up to 13 cm long:

2(3) Rhizomatous; culms 5–10-noded; blades involute; anthers 1–1.5 mm long; spikelets 2.5–3 mm long.....118. *S. virginicus*

3(2) Not rhizomatous; culms 1–3-noded; blades flat; anthers ½–2/3 mm long; spikelets up to 2.2 mm long .....117. *S. hancei*

4(1) Upper glume ½–2/3 as long as the lemma; blades 15–50 cm long:

5(6) Racemes slender, open; caryopsis cuneate at base, about 0.9 mm long by 0.5 mm wide .....115. *S. diander*

6(5) Racemes shorter, contracted; caryopsis about 1.1 mm long by 0.6–0.9 mm wide.....116. *S. fertilis*

**115.** *Sporobolus diander* (Retz.) P. Beauv., Ess. Agrost. 26, 147, 178. 1812.

Presumably based on *Agrostis diandra* Retz., Obs. Bot. 5: 19. 1789.

Type from India.

Chromosome number: $2n=24$ (Larsen, 1963).

Very commonly distributed in India, Burma, Ceylon and extending to China, and Australia.

This is one of the common grasses growing on hills and plains in Taiwan, very abundant in southern parts of the Island.

**116.** *Sporobolus fertilis* (Steud.) W. D. Clayton in Kew Bull. **1965:** 291. 1965.

Based on *Agrostis fertilis* Steud., Syn. Pl. Glum. **1:** 170. 1854.

Chromosome number: $n=18$ (Chen & Hsu, 1962)—Chen 7 (TAI), reported as *S. elongatus.*

AUSTRALIAN SMUTGRASS

Distributed in E. Himalaya, India, Ceylon, Burma, Thai, Malasyia, China, and Japan.

This grass is eaten by cattle and sheep. Very Common.

**117.** *Sporobolus hancei* Rendle in Forbes & Hemsley in Journ. Linn. Soc. Bot. **36:** 378. 1904.

Type from China: "Fokien: Hills, Amoy" (福建省厦門), Sampson in Herb. Hance 13055 in part; Kwangtung: Canton (廣州), leg. Hance 13055 in part (Mus. Brit.; Herb. Kew).

Distributed in South China and Taiwan.

It is found in the littoral regions.

**118.** *Sporobolus virginicus* (Linn.) Kunth, Rev. Gram. **1:** 67. 1829.

Based on *Agrostis virginica* Linn., Sp. Pl. ed. 1, 63. 1753.

Type from Virginia.

Chromosome number: $n=10$ (Anderson, 1964).

SEASHORE DROPSEED

Distribured in tropical Asia, Africa and America.

This is a common coastal grass growing along seashores in delta regions.

## IV-(7). Tribe Zoysieae

IV-(7)-1. *Zoysia* Willd. in Neue. Schr. Ges. Naturf. Fr. Berlin **3:** 440. **1801, nomen** genericum conservandum.

About 10 species distributed in Mascarene Islands, India, China, Japan to New Zealand.

### Key to the species of *Zoysia*

1(2) Spikelets usually more than 5 mm long; blades pointing upwards; stolon not developed.....121. *Z. sinica*

2(1) Spikelets less than 4 mm long; stolon well developed:

3(4) Blades filiform, folded; less than 1 mm wide.....122. *Z. tenuifolia*

4(3) Blades flat or margins inrolled:

5(6) Spikelets ovate, more or less aristate; leaves 2–4 mm wide...119. *Z. japonica*

6(5) Spikelets elliptical, accuminate to obtuse; leaves narrower...120. *Z. matrella*

**119.** *Zoysia japonica* Steud., Syn. Pl. Glum. **1:** 414. 1855.

Type from Japan.

KOREA LAWN-GRASS; JAPANESE LAWN-GRASS

This is a very good lawn grass, and it may be found as an escape.

**120.** *Zoysia matrella* (Linn.) Merr. in Philipp. Journ. Sci. Bot. **7: 230. 1912.**

Based on *Agrostis matrella* Linn., Mant. Pl. **2:** 185. 1771.

Type from Malabar, India (Koenig 56).

Chromosome number: $2n=40$ (Forbes, 1952).

MANILA-GRASS

Widely distributed in the tropics of Asia, and now introduced into America as a lawn grass.

It is a good sand-binder and is very common in Taiwan.

**121.** *Zoysia sinica* Hance in Journ. Bot. Brit. & For. **7:** 168. 1869.

Type from China: "Amoy", (厦門). (Exsicc. no 10155).

Distributed in littoral regions of Mainland China and Taiwan.

**122.** *Zoysia tenuifolia* Willd. ex Trin. in Mém. Acad. Sci. Pétersb. sér. 6, **4**: 96. 1836.

Type from Mascarene Islands.

Chromosome number: $n=20$ (Chen & Hsu, 1962)—Chen 105 (TAI).

MASCARENE-GRASS

Reputed to be excellent for lawns. It is common in littoral regions in Taiwan, and is also found in Lanhsü (蘭嶼).

## V. Subfamily Panicoideae

### Key to the tribes of subfamily *Panicoideae*

1(4) Spikelets articulating above the glumes, if articlating below the glumes, then 1-flowered and lemma membranous:

2(3) Callus glabrous; spikelets one or 2-flowered, usually awanless .....(2) Isachneae

3(2) Callus hairy; spikelets 2-flowered, awned ..... (1) Arundinelleae—*Arundinella*

4(1) Speiklets articulating below the glumes spikelets usually 2-flowered, paired or solitary:

5(6) Upper lemma and palea coriaceous; thicker than the glumes.....(3) Paniceae

6(5) Upper lemma and palea membranous; thiner than the glumes.....(4) Andropogoneae

### V-(1). Tribe Arundinelleae

**V-(1)-1.** *Arundinella* Raddi, Agrost. Bras. 36, t. 1. 1823.

About 55 species distributed in the warmer regions of the world.

### Key to the species of *Arundinella*

1(2) Lemmas with a well developed awn and 2 lateral awns.....125. *A. setosa*

2(1) Lemmas without lateral awns on each side of the awn base:

3(4) Lemmas mostly awned; leaves basal, less than 10 cm long..124. *A. pubescens*

4(3) Lemmas usually awnless; leaves cauline, more than 15 cm long .....123. *A. hirta*

**123.** *Arundinella hirta* (Thunb.) Tanaka in Bull. Sci. Fac. Terk. Kyushu Imp. Univ. **1**: 4, 195. 1925. **(Fig. XI.)**

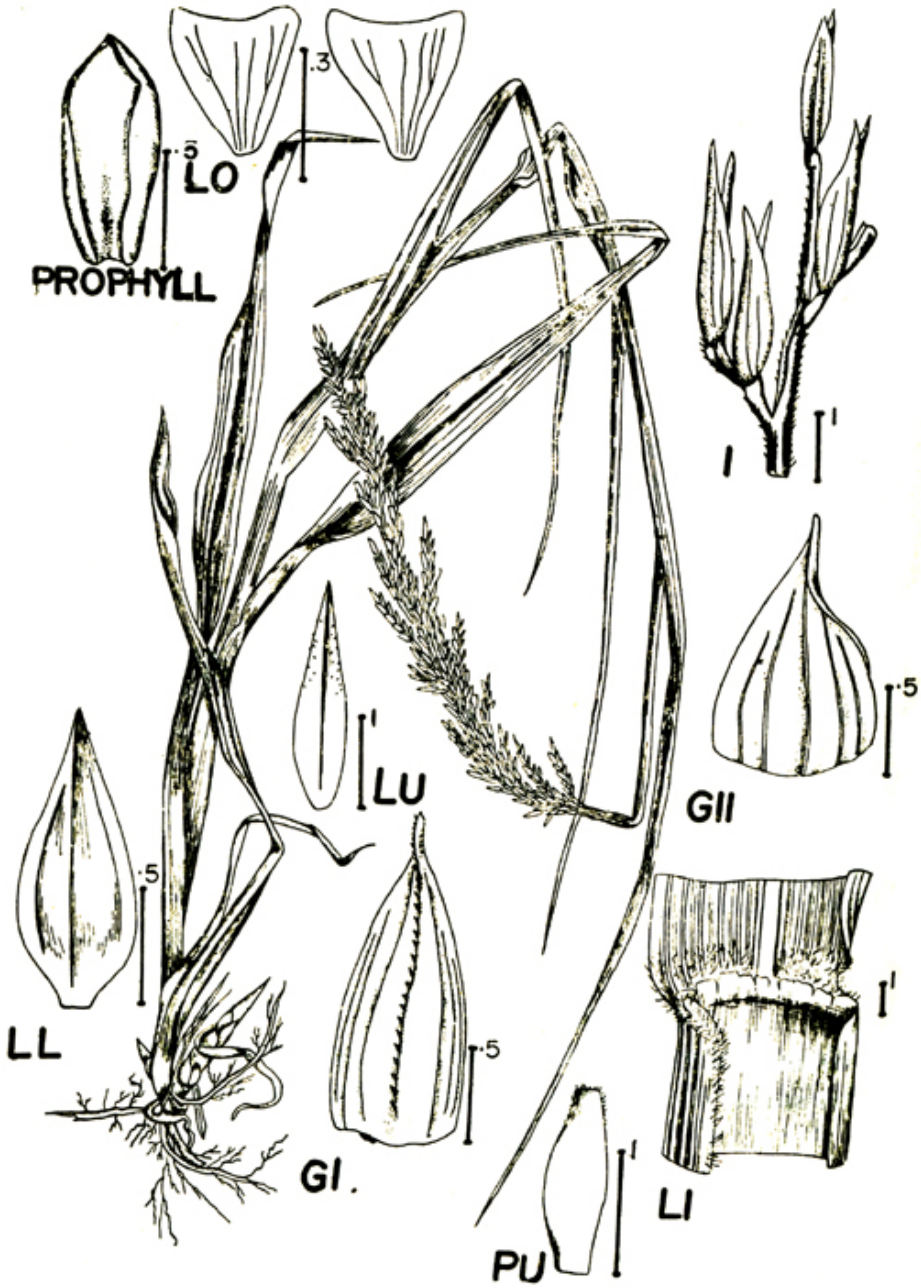


**Fig. XI. Arundinella hirta** (Thunb.) Tanaka
(野 古 草)
Loc.: NANTOU CO.: "Niitaka, Zenzan" (玉山前山), Nov. 1, 1933, S. Suzuki, s. n. (TAI).

Based on *Poa hirta* Thunb., Fl. Japon. 49. 1784.
Type from Japan.
Chromosome number: $2n=14$ (Tateoka, 1953, 1954).
Distributed in Japan, Korea and China.

**124.** *Arundinella pubescens* Merr. et Hack. ex Hack. in Philippine Journ. Sci. **2:** 419. 1907.
Type from the Philippines: Palawan, prope Iwahig (Type destroyed in World War II).
Distributed in the Philippines and Taiwan.

**125.** *Arundinella setosa* Trin., Gram. Panic. 63. 1826.
Type from Nepal (Lindley)
Chromosome number: $2n=54$ (Li *et al.*, 1966).
Widely distributed in South-east Asia generally.
This is a variable species with a bent awn flanked by two bristles on its lemma. The pedicels of the spikelets are most usually decorated with well-defined bristles or setae.

## V-(2). Tribe Isachneae

### Key to the genera of tribe Isachneae

1(2) Spikelets 1-flowered, glabrous .....1. *Sphaerocaryum*
2(1) Spikelets usually 2-flowered, globose, more or less hairy .....2. *Isachne*

V-(2)-1. *Sphaerocaryum* Nees ex Hook. f., Fl. Brit. Ind. **7:** 246. 1896.
Only one species distributed in India to S. China and Taiwan, also in Malay Penninsula.

**126.** *Sphaerocaryum malaccense* (Trin.) Pilger in Repert. Sp. Nov. Fedde. **45:** 2. 1938.
Based on *Panicum malaccense* Trin., Gram. Panic. 204. 1826.
Type from Malacca.
Chromosome number: $n=9$ (Chen & Hsu, 1962)—Sun-Moon Lake (日月潭), Oct. 28, 1960, Hsu 1319 (TAI).
This is a broad-leaved delicate species growing in damp swampy places.

V-(2)-2. *Isachne* R. Br., Prodr. Fl. Nov. Holl. 196. 1810.
About 60 species distributed in the tropical and subtropical regions of the world.

### Key to the species of *Isachne*

1(4) Florets dissimilar in shape and texture, the lower glabrous

and papery, the upper pubescent and indurate; florets articulated with a small rachilla-joint:

2( 3 ) Blades 1 cm wide, margins cartigenously thickened .....130. *I. dispar*

3( 2 ) Blades 3–5 mm wide, margins slightly thickened .....133. *I. miliacea*

4( 1 ) Florets more or less the same in shape and texture, both indurate and usually pubescent; florets almost continuous:

5( 6 ) Florets distinctly different in size, glabrous except margins; glumes not bristled; pedicels usually with glandular bands ....131. *I. globosa*

6( 5 ) Both florets nearly the same in size, pubescent; glumes bristled at least on upper part:

7(10) Panicle more than 10 cm long; medium sized grass; culms tufted; blades linear:

8( 9 ) Spikelets pale; leaves 7–14 cm long, 6–11 mm wide.....127. *I. albens*

9( 8 ) Spikelets usually purplish or greenish; leaves 3–7 cm long, 0.5 cm wide.....128. *I. beneckei*

10( 7 ) Panicle up to 10 cm long; small grass with prostrate culms; leaves broadly lanceolate to ovate:

11(12) Spikelets about 2 mm long; glumes scabrous and densely covered with bristles along veins; branches of panicle stout; leaf margins hard and thickened.....132. *I. kunthiana*

12(11) Spikelets less than 1.5 mm long; glumes glabrous on lower part, upper part bristled; branches of panicle not stout:

13(14) Panicle ovate, spikelets densely crowded on the branches; pedicells smooth; blades 3–5 mm wide, usually hairy and no distinctly thickened part on margins .....129. *I. debilis*

14(13) Panicle deltoid in form, lower branches naked; pedicels scabrous; spikelets few on the branches; blades 7–15 mm wide, sparingly pilose with distinct white thickened margins.....134. *I. nipponensis*

**127.** ***Isachne albens*** Trin., Sp. Gram. 1, t. 85. 1826.

Type from Nepal.

Chromosome number: $n=30$ (Chen & Hsu, 1961)—Chen 44 (TAI).

Widely distributed in Southeast Asia.

Locally grows at medium altitudes along forest margins.

This is a very common and abundant grass at medium altitudes.

**128.** ***Isachne beneckei*** Hack., Oesterr. Bot. Zeitschr. **51**: 459. 1901.

Type from Java (Prope Peigen et Tosarie, leg. Benecke, anno 1891).

Distributed in Malaysia, Vietnam, S. China, Philippines and Java.

This is not a common grass, of which reported from the low altitudes in southern Taiwan.

**129.** *Isachne debilis* Rendle in Journ. Linn. Soc. Bot. **36**: 322. 1904.
Type from Formosa: "Tamsui" (淡水), Oldham. 605 (Mus. Brit.; Herb. Kew).
Chromosome number: $2n=20$ (Hsu, unpublished)—Mt. Seven-Star (七星山), July 15, 1967, Hsu, 3212 (TAI).
Distributed in S. China, Taiwan to the Philippines.
It grows on moist ground or newly exposed soil along ditches at low altitudes.

**130.** *Isachne dispar* Trin., Sp. Gram. 1, t. 86. 1828.
Type from Nepal.
Distributed throughout the hottest parts of India and Burma, extending through South-east Asia to Australia.
This grass is often found growing gregariously in swamps.

**131.** *Isachne globosa* (Thunb.) O. Ktze., Rév. Gen. Pl. **2**: 778. 1891.
Based on *Milium globosum* Thunb., Fl. Jap. 49. 1784.
Type from Japan.
Chromosome number: $n=30$ (Chen & Hsu, 1961)—Chen 103 (TAI).
Widely distributed in South-east Asia, extending to Japan and Australia.
This is a very common aquatic grass growing in plains, in rice fields and in shallow water. This grass is acceptable to grazing animals, and as it is common it is of considerable importance. Sometimes it is a troublesome weed in rice fields.

**132.** *Isachne kunthiana* (Wight. et Arn.) Nees ex Steud., Syn. Pl. Glum. **1**: 96. 1854. as syn. *Panicum kunthianum* Wight & Arn.; publ. as species Thawites, Enum. Pl. Aeyl. 362. 1864., Wight & Arn as author.
*Isachne kunthiana* (Wight & Arn.) Thawites is the correct name and authority.
Type from Peninsula India Orientalis.
Chromosome number: $n=10$ (Hsu, unpublished)—Chu-sui-po (出水坡), July 31, 1967, Hsu 3436 (TAI).
Distributed in swampy ground in mountainous regions in South India, Ceylon and South-east Asia generally.
Locally this species is found in moist ground at low elevations along forest margins.

**133.** *Isachne miliacea* Roth, Nov. Pl. Ind. Or. 58. 1821.
Type from India.
Distributed in India and South-east Asia, and extending to China.
Locally this is of rare occurence in swampy low hillsides.

**134.** *Isachne nipponensis* Ohwi in Act. Phytotax. & Geobot. **4**: 30. 1935.
Type from Japan (Hondo, Shingu in Kii, leg. J. Ohwi et N. Tagawa no. 91 (KYO).
Chromosome number: n=20 (Chen & Hsu, 1961)—Chen 14 (TAI).
Distributed in Southern Japan, China, and Taiwan.

This is a grass growing on low elevations in different localities. It likes shade and grows gregareously in half-shade forests.

## V-(3). Tribe Paniceae

### Key to the genera of tribe Paniceae

1( 4 ) Spikelets mostly unisexual; plants littoral:
2( 3 ) Plants monoecious; spikelets in a simple spike, the lower 1 or 2 pistillate (or hermaphroditic) the upper 4–6 sessile, staminate; rachis flattened but broadened and partially enclosing the spikelets at maturity .....23. *Thuarea*
3( 2 ) Plants dioecious; pistillate spikelets in clustered head-like spike, with spiny subtending bracts; staminate spikelets in an umbellate-branched rachis.....22. *Spinifex*
4( 1 ) Spikelets bisexual:
5(10) Spikelets enclosed in a globose spiny bur or subtended by 1 to many free bristles; spikelets falling off with the bur or bristles:
6( 7 ) Bristles united at base into a spiny bur, enclosing several spikelets.....4. *Cenchrus*
7( 6 ) Bristles free, if adnate at base, not forming spiny bur:
8( 9 ) Bristle single, below each spikelet; plant aquatic, floating...18. *Pseudoraphis*
9( 8 ) Bristles numerous, below each spikelet; plant neither aquatic nor floating, terrestrial.....17. *Pennisetum*
10( 5 ) Spikelets not enclosed in a spiny bur, if bristled then bristles persistent, and spikelets deciduous:
11(28) Inflorescence of loose, open or densely contracted spike-like panicles; spikelets usually distinctly pedicelled, not arranged in one-sided racemes:
12(13) Spikelets with one to several persistent bristles at the base of the spikelet .....21. *Setaria*
13(12) Spikelets without bristles at their bases:
14(17) Panicle cylindrical, densely set with spikelets:
15(16) Upper glume inflatted-saccate; upper lemma papery-indurate, usually pubescent; florets pedicelled.....20. *Sacciolepis*
16(15) Upper glume lanceolate; upper lemma glabrous, membranous; florets sessile.....9. *Hymenachne*
17(14) Panicle loosely opened, usually sparingly set with spikelets:
18(21) Upper glume and lower lemma awned or pointed, at least the latter awned from the sinus:

19(20) Upper glume and lower lemma not beaked, strongly 5–7 veined.....11. *Melinis*
20(19) Upper glume and lower lemma beaked, long ciliate .....19. *Rhychelytrum*
21(18) Upper glume and lower lemma entire at apex:
22(23) Spikelets truncate, gibbose, strongly and laterally compressed..5. *Cyrtococcum*
23(22) Spikelets not gibbose, nor truncate, dorsally compressed:
24(25) Upper florets with scars at base .....10 *Ichnanthus*
25(24) Upper florets without lateral appendages at base:
26(27) Upper glume as long as the spikelet .....14. *Panicum*
27(26) Upper glume up to ½ as long as the spikelet.....13. *Ottochloa*
28(11) Inflorescence of digitate or racemose racemes; spikelets sessile or shortly pedicelled, arranged in one-sided racemes:
29(42) Upper glume and upper lemma with their back to the floral axis:
30(33) Upper lemma with hyaline margins:
31(32) Upper lemmas awnless .....6. *Digitaria*
32(31) Upper lemmas awned .....1. *Alloteropsis*
33(30) Upper lemmas with inrolled margins:
34(35) Lower glume usually wanting, if present, only in some of the spikelets.....16 *Paspalum*
35(34) Lower glume present, if wanting then callus well developed:
36(39) Glumes and lower lemma acute, awnless; upper florets transversely rugose:
37(38) Upper lemma acute, not mucronate; aquatic.....15. *Paspalidium*
38(37) Upper lemma mucronate or very shortly awned; terrestrial .....(*Urochloa*)
39(36) Glumes and lower lemma acuminate or awned; upper lemma smooth:
40(41) Blades lanceolate to broadly ovate; culms partly creeping.....12. *Oplismenus*
41(40) Blades linear, narrow; culms erect or suberect .....7. *Echinochloa*
42(29) Lower glume and lower lemma with their back to the floral axis:
43(44) Base of spikelets thickened into a callus; lower glume wanting..8. *Eriochloa*
44(43) Base of spikelets not thickened into a callus:
45(46) Lower glume present; inflorescence racemose .....3. *Brachiaria*
46(45) Lower glume absent; inflorescence of subdigitate racemes .....2. *Axonopus*

For further notes on the following panicoid genera, refer to the previous papers by the auther:

(1) Hsu, C. (1963): The paniceae (Gramineae) of Formosa. in Taiwania **9**: 33–57.

(2) Hsu, C. (1963): A study on Formosan *Panicum* (Gramineae), with special reference to their lodicules. in Journ. Jap. Bot. **38**: 75–86.

(3) Hsu, C. (1965): The Classification of *Panicum* (Gramineae) and its Allies, with Special Reference to the Characters of Lodicules, Style-base and Lemma. in Journ. Fac. Sci. Univ. Tokyo Sec. III. **9**: 43–150.

(4) Hsu, C. (1966): Gramineae in Hara, H., The Flora of Eastern Himalaya, Univ. Press, Tokyo. pp. 349–379.

V–(3)–1. *Alloteropsis* J. S. Presl. ex C. B. Presl, Rel. Haenk. 343 t. 47. 1830. emend. Hitchc. in Contrib. Unit. Stat. Nat. Herb. **12**: 210. 1909.

About 10 species distributed in the tropical regions of Africa and Asia.

**135.** *Alloteropsis semialata* (R. Br.) Hitchc. in Contrib. U. S. Nat. Herb. **12**: 210. 1909.

Based on *Panicum semialatum* R. Br., Prodr. Fl. Nov. Holl. 192. 1810.

Type from Australia.

Chromosome number: $n=9$ (Chen & Hsu, 1962)—Hsinchu (新竹), Chen 137 (TAI).

Distributed in Himalayas, India, Burma extending to China, Australia and Tropical Africa.

This species grows in exposed red-soil hillsides. It has woolly swollen old sheaths.

V–(3)–2. *Axonopus* P. Beauv., Ess. Agrost. 12, 154. 1812.

About 35 species distributed in the tropical regions of S. America, now introduced to many warmer countries.

**136.** *Axonpus compressus* (Swartz) P. Beauv., Ess. Agrost. 12, 154, 167. 1812.

Based on *Milium compressum* Swartz, Prodr. Veg. Ind. Occ. 24. 1788.

Type from Jamaica.

Chromosome number: $2n=40$, 60 (Delay, C., 1950).

CARPET GRASS.

Distributed in Southern United States, Mexico to Brazil. Introduced into many warm countries.

This species has been introduced into Taiwan where it has become naturalized. It flourishes on moist soils and it seems strong enough to grow in shady places. It is a most excellent pasture grass. Encouraged by close grazing it usurps the territory occupied by other grasses.

V–(3)–3 *Brachiaria* Griseb. in Ledeb., Fl. Ross. **4**: 469. 1853.

About 50 species distributed in the warmer countries.

## Key to the species of *Brachiaria*

1( 2 ) A tall grass; culms 5–8 mm in diameter, nodes villous; racemes more than 10 cm long.....137. *B. mutica*

2( 1 ) A slender grass; culms less than 3 mm in diameter; racemes less than 5 cm long:

3( 4 ) Spikelets more than 3.5 mm long, narrowly elliptical...139. *B. subquadripara*

4( 3 ) Spikelets about 2 mm long, ovate:

5( 6 ) Spikelets paired, lower glume truncate, about ¼ as long as the spikelet; whole plant glabrous except hispid leaf bases .....138. *B. reptans*

6( 5 ) Spikelets solitary, lower glume obtuse, about ½ as long as the spikelet; whole plant covered with short soft hairs ....140. *B. villosa*

**137.** *Brachiaria mutica* (Forssk.) Stapf in Prain, Fl. Trop. Afr. **9**: 526. 1919.
Based on *Panicum muticum* Forssk., Fl. Aegypt.-Arab. 20. 1775.
Type from Egypt.
Chromesome number: $2n=36$ (Nath & Swamiratham, 1957).
PARA GRASS; WATER GRASS.
Distributed in tropical regions of Africa and America, introduced into many warm countries.
It is a vigorous species, growing gregariously by vegetative reproduction along ditches, hedges and producing a large quantity of fodder, and is relished by stock.
It seldoms to flowers. It is considered to be one of the best tropical grasses for general pasture.

**138.** *Brachiaria reptans* (Linn.) Gard. et C. E. Hubbard in Hook., Icon. Pl. sub. tab. 3363. 1938.
Based on *Panicum reptans* Linn., Syst. Nat. ed. 10, 870, 1759.
Type from Jamaica.
Chromosome number: $n=7$ (Chen & Hsu, 1961)—Chen 70 (TAI).
Distributed in tropics of the Old and New World, Polynesia to northern Australia, and China.
A weed grows on cultivated ground and waste places. It is said to be a good fodder for cattle.

**139.** *Brachiaria subquadripara* (Trin.) Hitchc. in Lingnan Sci. Journ. **7**: 214. 1931.
Based on *Panicum subquadriparum* Trin., Gram. Pan. 145. 1826.
Type from Ins. Marianne Pacific.
Chromosome number $n=36$ (Hsu, unpublished)—Lanhsü (蘭嶼), 28, VIII. 1968. Hsu 4916 (TAI).
Distributed in tropics of the Old World, and introduced into the New World.

This species is said to thrive in dry conditions and to show some promise as a forage grass.

It is a very common grass in cultivated fields, and is a troublesome weed which is very difficult to eradicate from the field due to its stolongiferous habit.

**140.** *Brachiaria villosa* (Lamk.) A. Camus in Lecomte, Fl. Gén. de l'Indo-Chine **7**: 433. 1922.

Based on *Panicum villosum* Lamk., Tab. Encycl. Meth. Bot. **1**: 173. 1791. in part.

Type from India.

Chromosome number: $n=18$ (Chen & Hsu, 1961)—Chen 109 (TAI).

Distributed in tropics of South-east Asia, and China.

This is a weed in waste places and hillsides, even growing on rocks or mountain slopes.

V-(3)-4. *Cenchrus* Linn., Gen. Pl. ed. 5, 470. 1754 et in Sp. Pl. ed. 1, 1049. 1753.

About 25 species distributed in the tropical and warm temperate regions of the world.

Spikelet surrounded by an involucre of sterile panicle branches, which in some species become hard and prickly, surrounding the fruit and acting as a means of distribution by animals. *Cenchrus tribuloides* Linn., is a very troublesome pest in the wool-growing districts of N. America.

**141.** *Cenchrus echinatus* Linn., Sp. Pl. ed. 1, 1050. 1753.

Type from Jamaica.

Chromosome number: $n=34$ (Hsu, unpublished)—Ken-ting (墾丁), 5, X, 1967, Hsu 4186 (TAI).

SOUTHERN SANDBUR.

Distributed originally in tropical America, but naturalized in many warmer regions of the world.

It is a troublesome weed when mature due to its spiny burs, but has considerable fodder value when young. It grows in sandy soils.

V-(3)-5. *Cyrtococcum* Stapf in Prain, Fl. Trop. Afr. **9**: 745. 1920.

About 12 species distributed in paleotropical regions.

**Key to the species of *Cyrtococcum***

1(2) Spikelets less than 1.4 mm long, usually dark purple in color; blades and panicles large .....142. *C. accrescens*

2(1) Spikelets more than 1.5 mm long, green with tinge of purple; panicles opened or contracted, much smaller.....143. *C. patens*

**142.** *Cyrtococcum accrescens* (Trin.) Stapf in Hook., Icon. Pl. sub tab. 3096. 1922.
Based on *Panicum accrescens* Trin., Sp. Gram. Ic. 1. t. 88. 1828.
Type from Nepal.
Distributed in tropics of South-east Asia, Mainland China and Taiwan.
This is a grass which must have moisture and shade. It grows gregariously on hillsides as an undergrowth.

**143.** *Cyrtococcum patens* (Linn.) A. Camus in Bull. Mus. Hist. Nat. Paris **27**: 118. 1921.
Based on *Panicum patens* Linn., Sp. Pl. ed. 1, 58. 1753.
Type from India.
Chromosome number: $n=18$ (Chen & Hsu, 1961)—Sun-Moon Lake (日月潭), 28, X, 1960, Hsu 1339 (TAI).
Widely distributed in South-east Asia.
This is a much more common species than the former. It also grows gregariously as an undergrowth of *Acacia confusa* Merr. forests.

V.-(3)-6. *Digitaria* Heist. ex Fabricius, Enum. ed. 1, 207. 1759.
A large genus of about 380 species distributed in warmer parts of the world. Some of them are excellent fodder grasses.

**Key to the species and varieties of *Digitaria***

1(16) Spikelets 2.5–4 mm long, acuminate, narrowly lanceolate; pedicels winged:
2(3) Rachis triangular, shining; spikelets dimorphic, sessiled glabrous, pedicelled villous; lower lemma with convex stout veins (veins much broader than the space between veins)....145. *D. bicornis*
3(2) Rachis flat; spikelets monomorphic; lower lemma with fine veins:
4(5) Racemes closely contracted; sheaths glabrous; spikelets about 2.5 mm long .....148. *D. henryi*
5(4) Racemes partially contracted or spreading:
6(9) Margins of rachis-wing entire or serrulate; racemes 2–4, slender .....156. *D. timorensis*
7(8) Leaves glabrous, base of blades scattered with long hairs; growing in shady soils.....156B. var. *timorensis*
8(7) Leaves densely hirsute; growing on rocky cliffs.....156A. var. *hirsuta*
9(6) Margins of rachis-wing serrate:
10(11) Lower glume wanting; upper glume less than 1/8 as long as the spikelet; sheaths hispid.....153. *D. microbachne*
11(10) Lower glume small but distinct, ovate; upper glume more than 1/2 as long as the spikelet:

12(13) Plant hairy; nodes bearded; upper glume about 3/4 as long as the spikelet.....155. *D. sericea*

13(12) Plant glabrous; nodes glabrous; upper glume ½ as long as the spikelet or longer:

14(15) Spikelets 3–3.5 mm long; interveins of lower lemma broader at middle .....154. *D. sanguinalis*

15(14) Spikelets 3 mm long; interveins of lower lemma evenly distributed .....144. *D. adscendens*

16(1) Spikelets up to 2.2 mm long, acute, elliptical or ovate; pedicels terete, smooth:

17(22) Upper florets pale at maturity; blades less than 10 cm long; pedicels shorter than the spikelet:

18(19) Culms stoloniferous; sheaths more or less pubescent, at least on lower ones; spikelets 1.2–1.5 mm long, sparingly pubescent; racemes 2–6 cm long .....151. *D. longiflora*

19(18) Culms erect or decumbent; both lower blades and sheaths villous; spikelets 1.5–2.2 mm long:

20(21) Racemes 3–5 cm long; blades 2–4 cm long .....147. *D. hayatae*

21(20) Racemes 5–10 cm long; blades 7–10 cm long .....152. *D. magna*

22(17) Upper florets brown in color at maturity:

23(24) Spikelets distinctly shorter than the pedicel; racemes 0.3–0.4 mm wide; spikelets 1.2–1.5 mm long; upper florets light brown in color.....150. *D. leptalea* var.

24(23) Spikelets as long or longer than the pedicel; racemes more than 0.5 mm wide; upper lemmas dark brown:

25(26) Upper glume ¼–½ as long as the spikelet .....146. *D. fauriei*

26(25) Upper glume nearly as long as the spikelet:

27(28) Spikelets about 1.8 mm long; lower glume wanting.....157. *D. violascens*

28(27) Spikelets more than 2 mm long; lower glume if present, membranous .....149. *D. ischaemum*

**144.** *Digitaria adscendens* (HBK) Henr. in Blumea **1**: 92. 1934.
Based on *Panicum adscendens* HBK., Nov. Gen. et Sp. Pl. **1**: 97. 1816.
Type from Venezuela.
Chromosome number: $n=27$ (Hsu, unpublished)—Lanhsü (蘭嶼), 1, IX, 1968, Hsu 4969 (TAI).
This species is so common in all wayside places and open ground generally, that it is of great importance as a fodder grass. Grazing animals eat it with relish.

**145.** *Digitaria bicornis* (Lamk.) Roem. et Schult. ex Loud., Hort. Brit. 24, n. 1578. 1830.

Based on *Paspalum bicorne* Lamk., Tab. Encycl. Meth. Bot. **1**: 176. 1791.
Type from India.
Chromosome number: $n=18$ (Chen & Hsu, 1961)—Chen 97 (TAI).
Distributed in Tropical Asia.
The stiff pair of racemes of heteromorphic spikelets distinguish this species from all its congeners.
It grows along railroads in southern Taiwan, and also in littoral regions.

146. *Digitaria fauriei* Ohwi in Act. Phytotax. & Geobot. **11**: 31. 1942.
Type from Taiwan: "Tamsui" (淡水), leg. U. Faurie 109. (KYO).
The only collection is the Faurie's type deposited at Kyoto University. It has been not collected since.

147. *Digitaria hayatae* Honda in Journ. Fac. Sci. Univ. Tokyo Sect. III. Bot. **3**: 291. 1930. as syn. of *Syntherisma hayatae* Honda as valid species: Honda ex Ohwi in Act. Phytotax. & Geobot. **11**: 30. 1942.
Based on *Syntherisma hayatae* Honda, l. c.
Type from Taiwan: "ins. Hattanto" (八担島), leg. B. Hayata, anno 1919 (TI).
Endemic on coastal regions of Taiwan.
It grows on dry sandy soils near seashore.

148. *Digitaria henryi* Rendle in Journ. Linn. Soc. Bot. **36**: 323. 1904.
Type from Taiwan: "Ape's Hill, Takow" (壽山, 高雄), leg. A. Henry, 1031(K).
Chromosome number: $n=18$ (Chen & Hsu, 1961)—Chen 30, 32, 83 (TAI).
Distributed in Vietnam, S. China and Taiwan.
This is a very common species especially in littoral regions.

149. *Digitaria ischaemum* (Schreb.) Schreb. ex Muhl., Descr. Gram. Plant. Calam. 131. 1817.
Based on *Panicum ischaemum* Schreb. in Schw., Fl. Erlang. 16. 1804.
Type from Pennsylvania, U. S. A.
Chromosome number: $n=36$ (Brown, 1951).
SMOOTH FINGER-GRASS.
Distributed in the temperate regions of the world, including the Himalaya and Tibet.
It is certainly eaten by all grazing animals. This grass is found in the northeastern regions of Taiwan.

150. *Digitaria leptalea* Ohwi var. *reticulmis* Ohwi in Act. Phytotax. & Geobot. **11**: 32. 1942.
Type from Taiwan: "Inter Boryo et Daihyrin in Takaoshu" (枋寮, 屏東縣), leg. J. Ohwi 317 (KYO).
Chromosome number: $n=18$ (Hsu, unpublished)—Lanhsü (蘭嶼), 1, IX, 1968, Hsu 4975 (TAI).

This species is a stoloniferous grass with culm bases tufted and hairy, it grows usually along railway or dry hillsides.

151. *Digitaria longiflora* (Retz.) Pers., Syn. Plan. **1**: 85. 1805.
Based on *Paspalum longiflorum* Retz., Obs. Bot. **4**: 15. 1786.
Type from India.
Chromosome number: $n=9$ (Chen & Hsu, 1961)—Hu-wei (虎尾), 26, VIII, 1959, Hsu 471 (TAI).
Distributed widely in the tropics of the Old World.
A widely creeping grass which rapidly occupies open, sunny places. It is therefore frequent along roadsides or dykes between the rice-fields. All grazing animals eat it.
It also grows along riverbanks as a carpet-like covering and take some part in soil and water conservation.

152. *Digitaria magna* (Honda) Tsuyama in Journ. Jap. Bot. **18**: 13. 1942.
Based on *Syntherisma hayatae* Honda var. *magna* Honda in Bot. Mag. Tokyo **38**: 128. 1924.
Type from Taiwan: "circa Shochikaku" (小池角附近), leg. B. Hayata, anno 1911 (TI).
Chromosome number: $n=18$ (Chen & Hsu 1961)—Chen 96 (TAI).
Endemic to Taiwan.

153. *Digitaria microbachne* (Presl) Henr. in Meded. Rijks Herb. n. 16, 13. 1930.
Based on *Panicum microbachne* J. S. Presl ex C. B. Presl, Rel. Haenk. 1. 298. 1830.
Type from the Philippines.
Chromosome number: $n=36$ (Hsu, unpublished)—Lanhsü (蘭嶼), 28, VIII, 1968, Hsu 4910 (TAI).
Distributed widely in tropical Asia.
This is a valuable fodder grass found in open waste places throughout the Island.
This species can be distinguished from the others by its stiff hairy sheaths and the spikelets which the lower glume is wanting.

154. *Digitaria sanguinalis* (Linn.) Scop., Flor. Carn. ed. 2, **1**: 52. 1772.
Based on *Panicum sanguinale* Linn., Sp. Pl. ed. **1**: 57. 1753.
Type from South Europe.
Chromosome number: $2n=36$ (Tateoka, 1965).
HAIRY FINGER-GRASS.
Widely distributed in the temperate and warm regions of the earth.
This species is occasionally found as a naturalized grass around villages or waste places.

155. *Digitaria sericea* (Honda) Honda in Journ. Fac. Sci. Univ. Tokyo Sect. III.

Bot. **3:** 298. 1930. in syn. of *Syntherisma sericea* Honda ex Ohwi in Act. Phytotax. & Geobot. **11:** 28. 1942.

Based on *Syntherisma sericea* Honda, l. c.

Type from Taiwan: "ins. Agincort" (基隆嶼), leg. T. Kawakami 36. anno 1904 (TI).

Chromosome number: $n=27$ (Chen & Hsu, 1961)—Chen 53 (TAI).

Endemic to Taiwan.

This is a littoral species growing on sandy soils.

**156.** ***Digitaria timorensis*** (Kunth) Bal. in Moret, Journ. de Bot. **4**: 138. 1890.

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

Type from Ins. Timor.

Distributed in South-east Asia, China and Polynesia.

This is an important fodder grass found in open situations or in rather shady places.

**156A.** var. ***timorensis***

Chromosome number: $n=9$ (Chen & Hsu, 1961)—Chen 31, 37 (TAI).

**156B.** var. ***hirsuta*** (Honda) C. Hsu in Taiwania **9:** 43. 1963.

Based on *Digitaria chinensis* Hornem var. *hirsuta* Ohwi in Act. Phytotax. & Geobot. **11:** 29. 1942.

Type from Ketana, Okinawa

Chromosome number: $n=9$ (Chen & Hsu, 1961)—Sih-men (石門), 23, X, 1960. Hsu 1250 (TAI).

**157.** ***Digitaria violascens*** Link, Hort. Berol. **1:** 229. 1827.

Type from Brazile.

Chromosome number: $n=18$ (Hsu, unpublished)—Tanshui (淡水), 9, IV, 1968, Hsu 4403 (TAI).

Distributed in the tropical regions of both hemispheres.

This beautiful grass is of frequent occurence in Taiwan and as is often very leafy so it must be considered as forming an important part of the available fodder. The upper floret of this species is dark violet when mature.

**V-(3)-7.** ***Echinochloa*** P. Beauv., Ess. Agrost. 53, 161. 1812.

About 30 species distributed in the warmer regions of the world.

**Key to the species and varieties of *Echinochloa***

1(8) Racemes approximate, the upper shorter than the lower; spikelets irregularly crowded; lower glume ⅓–⅔ as long as the spikelet, if ⅓ then spikelets 4–5 mm long:

2(3) Spikelets broadly ovate to globose; racemes thickened, sometimes incurved; grains persistant .....160. *E. frumentacea*

3(2) Spikelets ovate to elliptical; grains deciduous.....159. *E. crus-galli*

4( 5 ) Lower lemma not polished; blades 2–10 mm wide; culm bases and spikelets usually brownish purple in color.....159C. var. *praticola*

5( 4 ) Lower lemma usually coriaceous and shining; culms and spikelets greenish:

6( 7 ) Spikelets 3–4 mm long; lower glume ⅔ as long as the spikelet.....159A. var. *formosensis*

7( 6 ) Spikelets about 5 mm long; lower glume ½–⅔ as long as the spikelet.....159B. var. *orizicola*

8( 1 ) Racemes distant, nearly of equal length; spikelets in 4–rows; lower glume ½ as long as the spikelet; leaf margins not thicken into a white band.....158. *E. colonum*

**158.** *Echinochloa colonum* (Linn.) Link, Hort. Berol. **2**: 209. 1833.
Based on *Panicum colonum* Linn., Syst. Nat. ed. 10, **2**: 870. 1759.
Type from Jamaica.
JUNGLE RICE; WILD MILLET.
Widely distributed in the tropics of Asia and Africa.
This species can grow on drier soils than those of *Echinochloa crus-galii*.

**159.** *Echinochloa crus-galli* (Linn.) P. Beauv., Ess. Agrost. 53, 161. 1812.
Based on *Panicum crusgalli* Linn., Sp. Pl. ed. 1, 56. 1753.

**159A.** var. *formosensis* Ohwi in Act. Phytotax. & Geobot. **11**: 38. 1942.
Type from Taiwan: "Taihohu" (臺北), leg. J. Ohwi 2137 (KYO).
Chromosome number: $n=27$ (Chen & Hsu, 1961)—Chi-pen Hot-Spring (知本溫泉), Oct. 8, 1960, Hsu 982 (TAI).

**159B.** var. *oryzicola* (Vasing) Ohwi in Act. Phytotax. & Geobot. **11**: 38. 1942.
Based on *Panicum oryzicola* Vasing, Bull. Appl. Bot. **254**: 125. 1931.
Type from Eastern Asia.
Chromosome number: $n=27$ (Chen & Hsu, 1961)—Kao 3526 (TAI).
BARNYARD GRASS.
This is a troublesome weed in the rice fields.

**159C.** var. *praticola* Ohwi in Act. Phytotax. & Geobot. **11**: 37. 1942.
Type from Japan: Kiushiu, Mt. Kujusan, leg. U. Faurie 2646.
A weed grows on rather sunny drier waste places.

**160.** *Echinochloa frumentacea* Link, Hort. Berol. **1**: 204. 1927.
Type from India.
JAPANESE MILLET; BILLION DOLLA GRASS.
Chromosome number: $n=36$ (Yabuno, T., 1953), reported as *E. utilis* Ohwi et Yabuno.
Widely cultivated in the warmer parts of Asia and Africa. It is also a nice fodder grass.

V-(3)-8. *Eriochloa* Kunth in Humb. et Bonpl., Nov. Gen. et Sp. **1:** 94. t. 30, 31. 1816.
About 20 species distributed in the tropical and subtropical regions of the world. Some are used as fodder.

**Key to the species of *Eriochloa***

1( 2 ) Spikelets about 2 mm broad; pedicels villous; plant villous ....162. *E. villosa*
2( 1 ) Spikelets 1 mm wide; pedicels scattered with several long hairs; plant usually glabrous.....161. *E. procera*

**161.** *Eriochloa procera* (Retz.) C. E. Hubbard in Kew Bull. **1930:** 256. 1930.
Based on *Agrostis procera* Retz., Obs. Bot. **4:** 19. 1786.
Type from India.
Chromosome number: $n=18$ (Chen & Hsu, 1961)—Chen 74 (TAI).
TROPICAL CUP-GRASS.
Distributed in India, Burma, Ceylon and South-east Asia generally.
This species has a wide distribution and is very common in the central and southern parts of Taiwan, but never found in the northern part. It often favours damp places, ditches and the edges of paddy fields.

**162.** *Eriochloa villosa* (Thunb.) Kunth, Rev. Gram. **1:** 30. 1829.
Based on *Paspalum villosum* Thunb., Fl. Japon. 45. 1784.
Type from Nagasaki (長崎), Japan.
Chromosome number: $2n=54$ (Tateoka, 1954).
HAIRY CUP-GRASS.
Distributed in Vietnam, China and Japan.
This species is rather rare in occurence. It grows on the hillsides.

V-(3)-9. *Hymenachne* P. Beauv., Ess. Agrost. 48. t. 10, f. 8, 1812.
About 8 species distributed in the tropical regions.

**163.** *Hymenachne pseudointerrupta* C. Muell. in Bot. Z. **19:** 333. 1861.
Type from India orientalis.
Distributed in Assam, Burma, Malaya to Indo-China, China and Polynesia.
This aquatic grass is found in swamps, on margins of ponds or slow-flowing streams. The stems in such places become soft and spongy and the nodes produce numerous feathery rootlets. It is eaten by livestock.

V-(3)-10. *Ichnanthus* P. Beauv., Ess. Agrost. 56, t. 12, f. 1. 1812.
One species in Indo-malaysia and Australia; 25 species distributed in the tropical America, especially in S. America.

**164.** *Ichnanthus vicinus* (F. M. Bail.) Merr. in Enum. Philipp. Fl. Pl. **1:** 70. 1923.
Based on *Panicum vicinum* F. M. Bail., Syn. Queens. Fl. Suppl. **3:** 82. 1890.
Type from Australia.

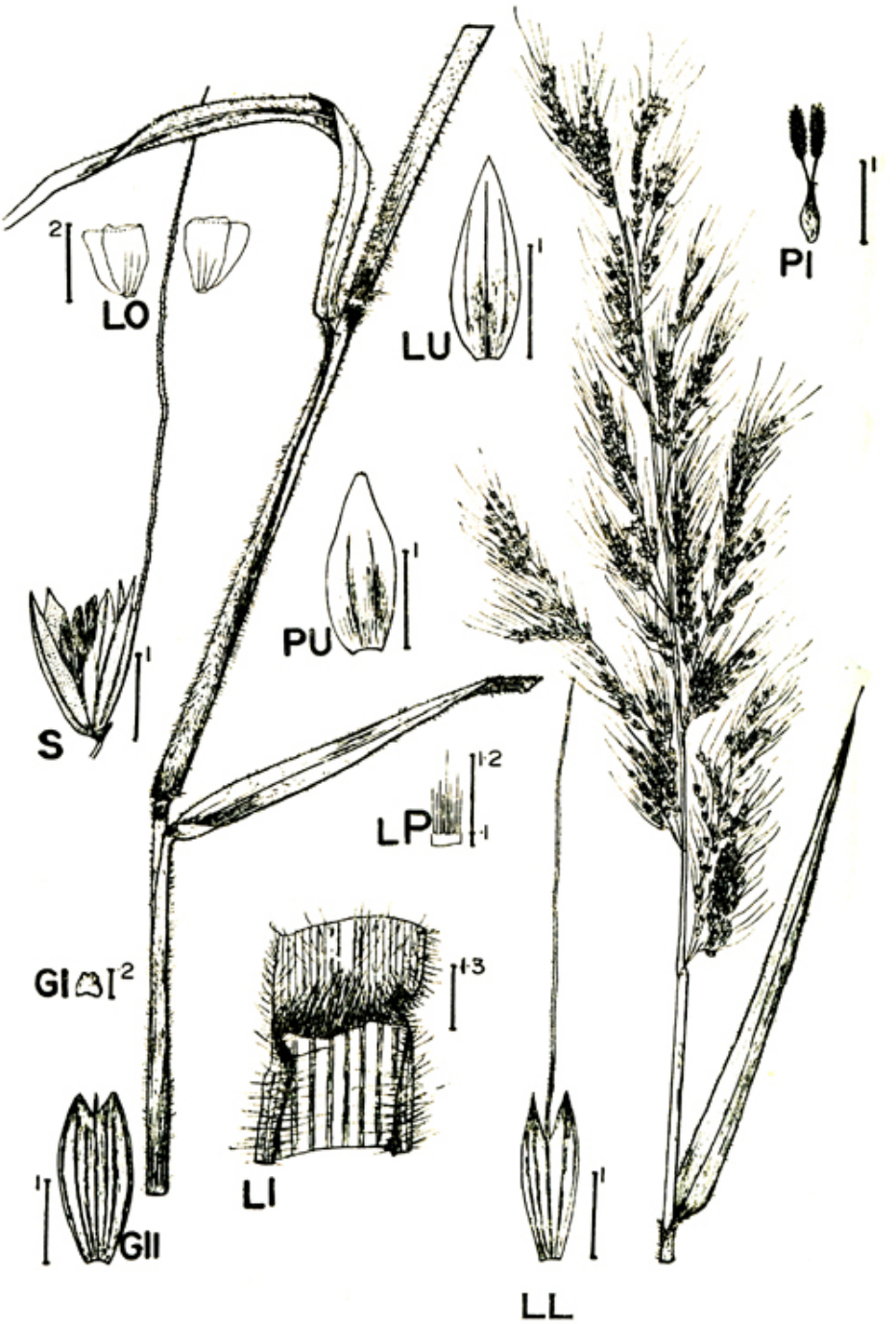


**Fig. XII. Melinis minutiflora** P. Beauv.

(糖 蜜 草)

Loc.: NANTOU CO.: Yu-chu (魚池), Dec. 20, 1969, Chia Huang s. n. (TAI).

Chromosome number: $n=20$ (Chen & Hsu, 1961)—Yang-ming-shan (陽明山), Oct. 2, 1960, Hsu 904 (TAI).

Distributed in India, Malaysia, Polynesia to the Philippines and Queensland. A forest grass often found along paths and in clearings, growing gregariously and covering considerable areas. It trails over other vegetation and sends down roots from the nodes. It is readily eaten by cattle.

V-(3)-11. *Melinis* P. Beauv., Ess. Agrost. 54, t. 11, f. 4. 1812.

One species in tropical S. America, and West Indies; about 17 species distributed in the tropical S. Africa, and Madagascar. Some of them are used as fodder.

**165.** *Melinis minutiflora* P. Beauv., Ess. Agrost. 54, t. 11, f. 4. 1812. (**Fig. XII.**)

Type from Brazil.

Chromosome number: $2n=36$ (Avdulov, 1931).

Distributed originally in Africa, but now introduced into many tropical countries as a fodder grass.

MOLASSES GRASS.

This grass has a characteristic odour, and moreover the leaves and sheaths are covered with hairs which secrete a viscous oil with the odour of cumin.

V-(3)-12. *Oplismenus* P. Beauv., Fl. Oware et Benin **2:** 14, t. 58. 1807.

About 15 species distributed in the tropical and subtropical regions of the world.

**Key to the species and varieties of *Oplismenus***

1(6) Inflorescence of groups of fascicled spikelets alternate along the axis, rarely racemes 1.5 cm long.....167. *O. undulatifolius*

2(3) Main axis of inflorescence papillose-villous; leaves hairy..167A. var. *imbecillis*

3(2) Main axis of inflorescence not papillose-villous; leaves nearly glabrous:

4(5) Rachis of racemes reduced; spikelets 1–3; blades 1–3 cm long.....167C. var. *microphyllus*

5(4) Rachis of racemes up to 1.5 mm long; spikelets 3–30 per raceme; blades 4–7 cm long.....167B. var. *japonicus*

6(1) Inflorescence racemose; rachis of raceme prolonged; lower racemes 2–5 cm long, rarely 0.7 cm long.....166. *O. compositus*

7(8) Spikelets 5 mm long; tip of the upper florets with an erect, short spine; blades 2–3.5 cm broad, less hairy.....166D. var. *patens*

8(7) Spikelets 3–4 mm long; tip of the upper florets acute or mucronate, bending forwards; blades 0.5–2.4 cm broad:

9(10) Rachis with short hairs, not papillose-villous .....166A. var. *compositus*

10(9) Rachis papillose-villous:

11(12) Racemes 1–3 cm long; spikelets densely crowded; blades less than 9 cm long, margins scabrous.....166B. var. *intermedius*

12(11) Racemes 3–6 cm long; spikelets rather far apart on rachis; blades 10–16 cm long, margins hispid, at least at base .....166C. var. *owatarii*

**166.** *Oplismenus compositus* (Linn.) P. Beauv., Ess. Agrost. 54, 168, 169. 1812.
Based on *Panicum compositum* Linn., Sp. Pl. ed. 1, 57. 1753.
Type from Ceylon.
Distributed in the tropical regions of the Old World and New World.
This species is a true forest grass and appears in gregarious patches along forest paths as well as in glades and in open shady places. The awns are sticky and the ripe spikelets become attached to passing animals and humans, thereby distributing the seeds.

**166B.** var. *intermedius* (Honda) Ohwi in Act. Phytotax. & Geobot. **11:** 35. 1942.
Based on *Oplismenus burmannii* P. Beauv. var. *intermedius* Honda in Bot. Mag. Tokyo **38:** 191. 1924.
Type from Taiwan: "Suiteiryo" (水底寮), leg. C. Owatari, anno 1898 (TI).
Chromosome number: $n=36$ (Chen & Hsu, 1961)—Yang-ming-shan (陽明山), Oct. 2, 1960, Hsu 908, 924 (TAI).

**166C.** var. *owatarii* (Honda) Ohwi in Act. Phytotax. & Geobot. **11:** 35. 1942.
Based on *Oplismenus owatarii* Honda in Repert. Sp. Nov. Fedde **20:** 361. 1924.
Type from Taiwan: "Suiteiryo" (水底寮), leg. C. Owatari, anno 1898 (TI).
Chromosome number: $n=36$ (Chen & Hsu, 1961)—Chen 106 (TAI).

**166D.** var. *patens* (Honda) Ohwi, Fl. Japan 149. 1953.
Based on *Oplismenus patens* Honda in Repert. Sp. Nov. Fedde **20:** 360. 1924.
Type from Japan: Kiusiu, Ins. Ohshima, prov. Ohsumi, leg. T. Ochiyama, anno 1900.

**167.** *Oplismenus undulatifolius* (Ard.) P. Beauv., Ess. Agrost. 54. 1812.
Based on *Panicum undulatifolium* Ard., Animad. Spec. Alt. 14, t. 4. 1764.
Type probably from Italy.
Chromosome number: $2n=54$ (Tateoka, 1954).
Distributed in Southern Europe eastwards through the warm temperate parts of Asia.
This is also a forest grass and the awns are viscid as in *Oplismenus compositus*. It seems this species has higher distribution than the former species locally.

**167A.** var. *imbecillis* (R. Br.) Hack. in Gov. Lab. Publ. Man. Philipp. **25:** 82. 1905.
Based on *Orthopogon imbecillis* R. Br., Prodr. Fl. Nov. Holl. 194. 1810.
Type from Australia.

**167B.** var. *japonicus* (Steud.) Koidzumi in Bot. Mag. Tokyo **39:** 302. 1925.
Based on *Panicum japonicum* Steud. in Flora **29:** 18. 1846.
Type from Japan.

**167C.** var. *microphyllus* (Honda) Ohwi in Bot. Mag. Tokyo **55:** 546. 1941.
Based on *Oplismenus microphyllus* Honda in Journ. Fac. Sci. Univ. Tokyo, Sect. III, Bot. **3:** 274. 1930.
Type from Japan: Hondo, Mt. Nachi, prov. Kii, leg. C. Ui, anno 124 (TI).

V–(3)–13. *Ottochloa* Dandy in Journ. Bot. **69:** 54. 1931.
About 6 species distributed in Indo-malaysia and Queensland.

**168.** *Ottochloa nodosa* (Kunth) Dandy in Journ. Bot. **69:** 55. 1931.
Based on *Panicum nodosum* Kunth, Enum. Pl. **1:** 97. 1833.
Type from the Philippines.
Distributed in India, Ceylon, Burma, extending to Taiwan, Malaysia and the Philippines.
This grass, usually found along the forest margins, can also exist as a true forest grass. It is probably eaten by stock. It grows on hillsides in northern Taiwan.

V–(3)–14. *Panicum* Linn., Gen. Pl. ed. 5, 29. 1754 et in Sp. Pl. ed. 1, 55. 1753.
A large genus of about 500 species distributed in the tropical and warmer temperate regions of the world.

**Key to the species of *Panicum***

1( 8 ) Upper floret ridged, triangular in cross-section; lodicules thin and transparent, 3–7–veined:
2( 3 ) Leaves linear.....169. *P. bisulcatum*
3( 2 ) Leaves ovate to linear-lanceolate:
4( 5 ) Grasses with weak, usually decumbent culms; blades thin, amplexicaular; lower glume as long as the spikelet..170. *P. brevifolium*
5( 4 ) Grasses with wire-like struggling culms; blades hard in touch:
6( 7 ) Blades ciliate at margins; lower palea absent.....175. *P. notatum*
7( 6 ) Blades not ciliate at margins; lower palea as long as the spikelet .....172. *P. incomtum*
8( 1 ) Upper floret plano-convex or lentiform in cross-section; lodicules thicker, numerous-veined:
9(10) Upper florets transversely rugose; cultivated tall grass....173. *P. maximum*
10( 9 ) Upper florets not transversely rugose:
11(14) Aquatic or on moist soils; lower glume truncate, 1/5 as

long as the spikelet; upper floret nearly plano-convex in cross-section; spikelets about 3.5 mm long:

12(13) Lower palea present; rhizomatous; culms hard.....178. *P. repens*

13(12) Lower palea absent; not rhizomatous; culms spongy.....176. *P. paludosum*

14(11) Not aquatic; lower glume more than ⅛ as long as the spikelet; upper floret lentiform in cross-section:

15(16) Spikelets usually reddish purple, about 1.5 mm long.....180. *P. watense*

16(15) Spikelets more than 2 mm long:

17(18) Plant not covered with tubercle-based hairs.....177. *P. psilopodium*

18(17) Plant covered with tubercle-based hairs:

19(20) Vein of glumes and lower lemma anastomosing.....171. *P. cambogiense*

20(19) Vein of glumes and lower lemma not anastomosing:

21(22) Lower lemma 7-veined; not cultivated .....179. *P. trypheron* var.

22(21) Lower lemma 11-veined; cultivated .....174. *P. miliaceum*

**169.** *Panicum bisulcatum* Thunb. in Nov. Act. Soc. Sc. Upsal. **7:** 141. 1815.
Type from Japan.
Chromosome number: $n=18$ (Chen & Hsu, 1961)—Yang-ming-shan (陽明山), Oct. 2, 1960, Hsu 937 (TAI).
Distributed in India extending to Cnina and Japan.
This species grows in very swampy places from plains to low altitudes in Taiwan. Often it is found in clearings in the forest.

**170.** *Panicum brevifolium* Linn., Sp. Pl. ed. 1, 59. 1753.
Type from India.
Chromosome number: $n=18$ (Chen & Hsu, 1961)—Sun-Moon Lake (日月潭), Oct. 28, 1960, Hsu 1333 (TAI).
Distributed in tropical Africa and Asia.
The ovate-elliptic-acute leaves and slightly gibbous spikelets distinguish this species at once. It grows in moist shady situations, particularly on the forest margins and in clearings, where it often scrambles over other vegetation or creeps over the soil.

**171.** *Panicum cambogiense* Balansa in Morot, Journ. de Bot. **4:** 142. 1890.
Type from Cambodia.
Distributed in Ceylon, Burma, extending to the Philippines and New Guinea.
This grass is also characterized by its glumes and lower lemmas anastomosing in venation.

**172.** *Panicum incomtum* Trin., Gram. Panic. 200. 1826.
Type from the Philippines.
Chromosome number: $n=18$ (Chen & Hsu, 1961)—Sun-Moon Lake (日月潭), Oct. 28, 1960, Hsu 1332 (TAI).

Distributed in India, Burma, China, the Philippines and New Guinea.

This is a very common grass at low altitudes. It has been much confused with *Panicum notatum*. It grows in forest margins and forming a considerably large areas, straggling on other plants.

**173.** *Panicum maximum* Jacq., Collect. Bot. **1:** 76. 1786; Ic. Pl. Rar. 1, 2. t. 13. 1781–86.

Type from from Guadeloupe, West Indies.

Chromosome number: $n=16$ (Chen & Hsu, 1961)—Pu-li (埔里), Oct. 29, 1960, Hsu 1389 (TAI).

GUINEAGRASS

Distributed originally tropical Africa, but now introduced into many warm countries.

One of the best fodder grasses which is eaten greedily by cattle. It is cultivated on a very large scale in Taiwan and the yields are very high.

**174.** *Panicum miliaceum* Linn., Sp. Pl. ed. 1, 58. 1753.

Type from India.

Chromosome number: $2n=36$ (Sirrgh & Godward, 1960).

BROOMCORN MILLET; PROSO MILLET; INDIAN MILLET

Cultivated in India, China and Japan.

It has been grown as a hot weather crop in warmer countries both as a grain crop and as a green fodder. It produces a large amount of leaf.

**175.** *Panicum notatum* Retz., Obs. Bot. **4:** 18. 1786.

Type probably from Sumatra.

Formerly known as *Panicum montanum* Roxb.

Chromosome number: $n=18$ (Chen & Hsu, 1961)—Chen 51 (TAI); $n=18$ (Hsu, unpublished)—Ken-ting (墾丁), Oct. 3, 1967, Hsu 4140 (TAI).

Distributed in tropics of South-east Asia in plains and hills.

This species has leaf bases rounded and decorated with tubercle-based hairs, a feature which is absent from the leaves of *P. incomtum*.

**176.** *Panicum paludosum* Roxb., Fl. Ind. **1:** 310. 1820.

Type from India.

Chromosome number: $n=27$ (Chen & Hsu, 1961)—Chen 78; Kao 3561 (TAI).

Distributed in tropics of Asia, south-eastwards to Australia.

This species is often confused with *Panicum repens* Linn., and may even be the aquatic form of the latter. Buffaloes and elephants are very fond of this species which often grows very thickly at the margins of shallow water.

**177.** *Panicum psilopodium* Trin., Gram. Panic. 217. 1826.

Type from India.

Chromosome number: $n=18$ (Chen & Hsu, (1961)—Ta-pu (大埔), March 27, 1960, Hsu 602 (TAI).

Distributed in India, Ceylon, Malaysia, China and the Philippines.
This grass is usually found in rather dry situations, common in sugar-cane plantations, tea plantations, etc.

**178.** *Panicum repens* Linn., Sp. Pl. ed. 2, 87. 1762.
Type from Southern Europe.
Chromosome number: $2n=18\,II+9\,I$ (Chen & Hsu, 1961)—Chen 1 (TAI).
TORPEDO GRASS; COUCH GRASS.
Distributed in tropical and subtropical areas of both hemispheres.
This grass is propagated by its strong and well developed rhizomes. It provides a very nutritious and productive pasture, but on occasions it may become a very pernicious weed.

**179.** *Panicum trypheron* Schult. var. *suishaensis* (Hay.) C. Hsu in Journ. Jap. Bot. **38:** 84. 1963.
Based on *Panicum suishaensis* Hayata, Icon. Pl. Formos. **7:** 62, f. 33. 1918.
Type from Taiwan: "Suisha" (水社), leg. B. Hayata, anno 1912 (TI).
Distributed in Taiwan, Southern China, and Malaysia.

**180.** *Panicum watense* Mez. in Bot. Jahrb. Engler **34:** 146. 1904.
Type from Africa.
Known by the name of *Panicum austo-asiatioum* Ohwi.
Distributed in North Tropical Africa, E. Himalaya, India, Ceylon, Thailand, South China, Formosa and Malaysia.
This delicate species is found in rather dry soils in the tea plantation and hillsides.

V-(3)-15. *Paspalidium* Stapf in Prain, Fl. Trop. Africa **9:** 582. 1920.
About 20 species distributed in warmer regions especially in the Old World.

**181.** *Paspalidium punctatum* (Burm.) A. Camus in Lecomte, Fl. Gén. de. l'Indo-Chine **7:** 419. 1922.
Type from India.
Based on *Panicum punctatum* Burm., Fl. Ind. 26. 1768.
Distributed in tropical Asia.
This grass is found in wet places, in ponds in southern Taiwan.

V-(3)-16. *Paspalum* Linn., Syst. Nat. ed. 10, 855. 1759.
A large genus of about 250 species distributed in warm lands. In tropical America they form a large proportion of the pasture of the campos, pampas, etc. Many of them are good fodders.

**Key to the species of *Paspalum***

1(4) Racemes 2, subopposite; spikelets acute; culms long creeping:
2(3) Upper glume usually pubescent, lower glume present in

some of the spikelets; spikelets twice as long as broad.....185. *P. distichum*

3( 2 ) Upper glume glabrous; lower glume wanting; spikelets three times as long as broad.....192. *P. vaginatum*

4( 1 ) Racemes 2 or more, alternate; spikelets obtuse; culms not creeping (except *P. conjugatum*):

5(10) Spikelets villous on margins, hairs 1–2 mm long:

6( 7 ) Racemes 2, paired, slender; spikelets 1.5–2 mm long, pale yellow in color; culms long creeping .....183. *P. conjugatum*

7( 6 ) Racemes more than 3; culms tufted:

8( 9 ) Racemes 3–7; spikelets 3–4 mm long.....184. *P. dilatatum*

9( 8 ) Racemes more than 10; spikelets 2–3 mm long.....191. *P. urvillei*

10( 5 ) Spikelets glabrous, or with short hairs less than 0.25 mm long:

11(12) Spikelets fimbriate; upper glume and lower lemma broadly winged and fimbriate on margins.....186. *P. fimbriata*

12(11) Spikelet not fimbriate nor broadly winged:

13(16) Sheaths and blades villous or hirsute:

14(15) Spikelets rather far apart on rachis; floret light yellow in color at maturity; upper glume and lower lemma 3-veined..190. *P. thunbergii*

15(14) Spikelets crowded; upper floret brown at maturity; upper glume and lower lemma 5-veined.....182. *P. commersonii*

16(13) Sheaths and blades nearly glabrous:

17(18) Spikelets paired, apiculate, 4-rowed, more or less covered with short hairs; racemes 7–20, rarely 4.....187. *P. longifolium*

18(17) Spikelets solitary, 2-rowed, glabrous; racemes 2–7:

19(20) Spikelets about 2 mm long, orbicular.....188. *P. orbiculare*

20(19) Spikelets up to 2.5 mm long, broadly elliptical .....189. *P. scrobiculatum*

**182.** *Paspalum commersonii* Lamk., Encycl. Meth. Bot. **1:** 175, t. 43. f. 1. 1791.
Type from Mauritius
Chromosome number: $n=20$ (Chen & Hsu, 1961)—Chen 25 (TAI).
Distributed in tropics and subtropics of the Old World.
It is found throughout the plains of Taiwan. It grows in moist places and is grazed by cattle and buffaloes.

**183.** *Paspalum conjugatum* Berg. in Act. Helv. Phys. Math. **7:** 129, t. 8. 1772.
Type from Dutch Guiana.
Chromosome number: $n=20$ (Chen & Hsu, 1961)—C28. (TAI).
SOUR GRASS.
Distributed very widely in the tropics of the Old World, and in the warmer parts of America and Africa.
This is one of the commonest grasses in Taiwan. It can stand a rather

shady place.

184. *Paspalum dilatatum* Poir. in Lamk., Encycl. Meth. Bot. **5:** 35. 1804.
Type from Argentina.
Chromosome number: $2n=50$ (20 II+10 I, asynaptic) (Chen & Hsu, 1961)—Chen 8 (TAI).
DALLIS GRASS; PROSTRATE PASPALUM; GOLDEN CROWN GRASS.
A native of South America from Brazil to Argentina.
This extremely valuable species has been introduced into Taiwan and can now be considered to have established itself, as it is found on nearly all waste grounds in northern Taiwan.

185. *Paspalum distichum* Linn., Syst. Nat. ed. 10, **2:** 855. 1759.
Type from Jamaica.
Chromosome number: $n=20$ (Chen & Hsu, 1961)—Chen 135 (TAI); $n=30$ (Chen & Hsu, 1961)—Chen 134 (TAI).
KNOTGRASS
Distributed in tropics and subtropics of the world.
This species resembles *Paspalum vaginatum* very closely, but is distinguished from it by the hairy upper glume.
This species is usually found in pollated shallow waters around a village and along irrigation ditches, but is never found in a salt water situation (*P. vaginatum* does occur in salt water).

186. *Paspalum fimbriatum* H. B. K., Nov. Gen. & Sp. **1:** 93. 1815. (**Fig. XIII.**)
Type from Colombia.
Chromosome number: $n=10$ (Banks, 1964).
It is recently naturalized in Taiwan, and is easily separable from the others by its fimbriate spikelet.

187. *Paspalum longifolium* Roxb., Fl. Ind. **1:** 283. 1820.
Type from India.
Chromosome number: $n=20$ (Chen & Hsu, 1961)—So-an (蒜安), Oct. 9, 1960 (TAI).
Distributed in tropics of Asia and north Australia.
The axils of the racemes are usually covered with long hairs in this species.

188. *Paspalum orbiculare* Forst., Fl. Insul. Austr. Prodr. **7:** 1786.
Type from Society Islands.
Chromosome number: $2n=60$ (Chao, 1965).
DITCH MILLET.
Distributed in South-east Asia generally, extending to Polynesia and Australia.

189. *Paspalum scrobiculatum* Linn., Mant. Pl. **1:** 29. 1767.
Type from India.
Chromosome number: $2n=40$, 60 (Chen in Fang & Li, 1966).

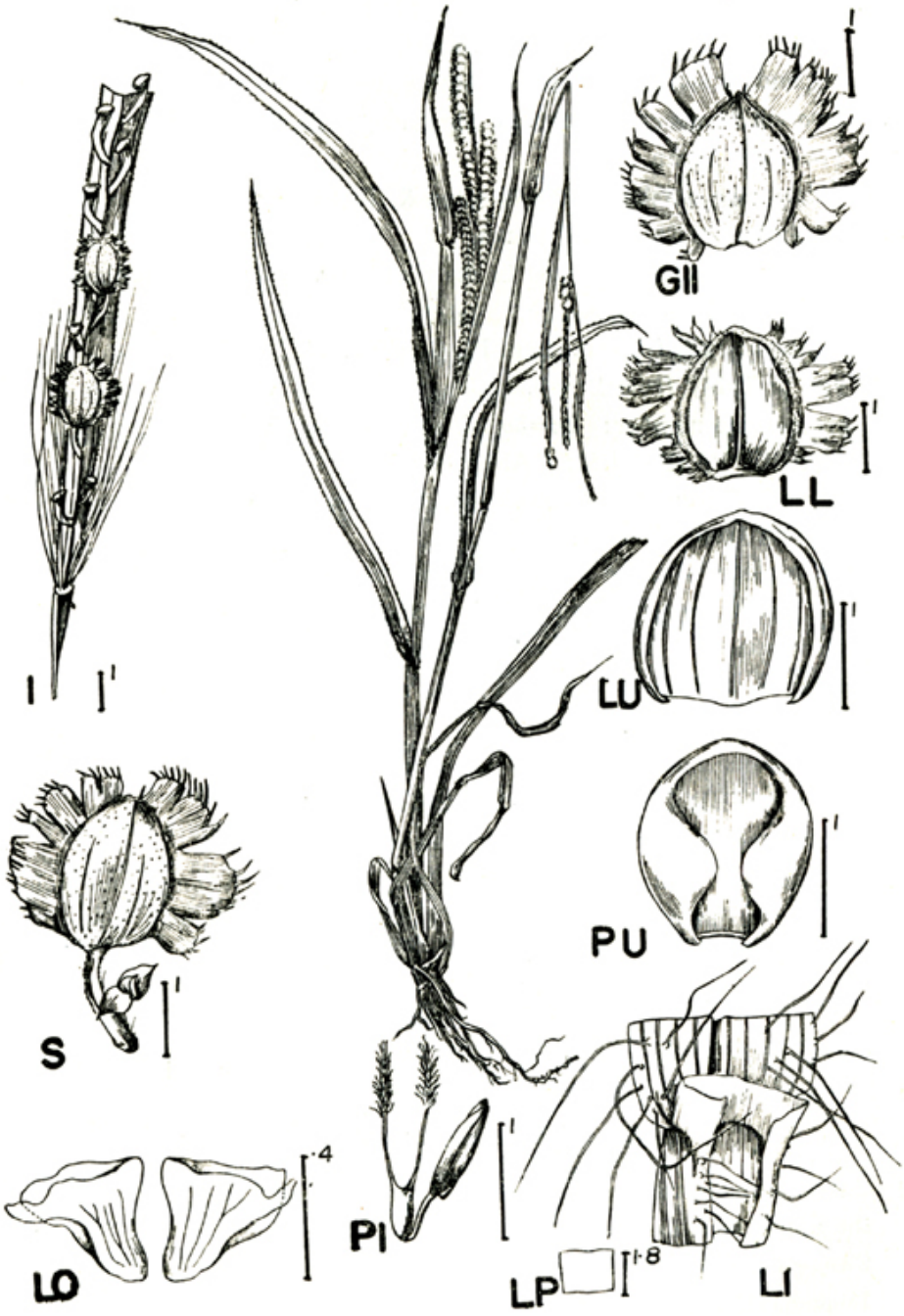


**Fig. XIII. Paspalum fimbriatum** H. B. K.

**(裂頴雀稗)**

Loc.: MICRONESIA: near Harmon Village, Apr. 9, 1962, B. C. Stone 4055 (TAI).

INDIA PASPALUM.

Distributed in India, and tropical regions of Asia.

It is said that true *P. scrobiculatum* Linn. is the plant cultivated on poorer soils and in some districts of South India.

**190.** *Paspalum thunbergii* Kunth ex Steud., Syn. Pl. Glum. **1:** 28. 1854.

Type from Japan.

Chromosome number: $2n=40$ (Ono & Tateoka, 1953).

Distributed in China and Japan.

This species seems confined in distribution only to the mountainous regions of northern Taiwan.

**191.** *Paspalum urvillei* Steud., Syn. Pl. Glum. **1:** 24. 1854.

Type probably from Brazil.

Chromosome number: $2n=40$ (Chen in Foung & Li, 1966).

UPRIGHT PASPALUM; VASEY GRASS.

Native to Uraguay and Argentina, but now introduced into many countries, including tropical Asia.

It is considered to be a very valuable pasture grass for dairy cattle, though it is much coarser than *P. dilatatum* which it resembles in appearance. Unfortunately it becomes very coarse and somewhat unpalatable with age.

**192.** *Paspalum vaginatum* Swartz, Prodr. Veg. Ind. Occ. 21. 1788.

Type from Jamaica.

Chromosome number: $n=10$ (Chen & Hsu, 1961)—Chen 21 (TAI).

SALTWATER COUCH; SEASHORE PASPALUM.

Distributed in tropics and subtropics of the world.

This species with its system of widely creeping rhizomes and stolons is of the utmost importance on the low sandy coasts of Taiwan, where it acts as a most efficient sand-binder.

V-(3)-17. *Pennisetum* Rich. in Pers., Syn. Pl. **1:** 72. 1805.

About 30 species distributed in warmer parts of the world.

Some of them are cultivated for pastures.

**Key to the species of *Pennisetum***

1(2) Culms stoloniferous; inflorescence nearly enclosed in the upper sheaths when flowering .....194. *P. clandestinum*

2(1) Culms not stoloniferous; inflorescence exserted:

3(4) Lemmas of two shapes; the inner bristles densely silky-plumose at the base .....196. *P. setosum*

4(3) Lemmas of one shape; the inner bristles not plumose:

5(6) Spikelets with 2–3 mm long pedicel; anthers without a tuft of hairs at one end .....193. *P. alopecuroides*

6( 5 ) Spikelets sessile on hairy main axis; anthers with a tuft of hairs at one end.....195. *P. purpureum*

**193.** *Pennisetum alopecuroides* (Linn.) Spreng., Syst. Veg. **1:** 303. 1825.
Based on *Panicum alopecuroides* Linn., Sp. Pl. ed. 1, 55. 1753.
Type from China.
Chromosome number: $n=9$ (Chen & Hsu, 1961)—Yang-ming-shan (陽明山), Oct. 2, 1960, Hsu 936 (TAI).
CHINESE PENNISETUM.
Distributed in Burma, through Malaya, Polynesia, China, Japan to Australia.
It is a common grass with extensively well developed deep root system so that it is not easy to eradicate the plant.

**194.** *Pennisetum cladestinum* Hochst. ex Chiov. in Ann. Ist. Bot. Roma **8:** 41. t. 5, f. 2. 1903. **(Fig. IV.)**
Type from Abyssinia. (leg. Schimper 2084)
Chromosome number: $2n=36$ (Nunez, 1952).
KIKUYUGRASS.
Distributed in tropical East Africa, but introduced into many other countries.
This is a grass now naturalized in the central part of Taiwan on hillsides or newly exposed road-cuts as a soil-binder. It grows very rapidly and the reproduction is mainly by vegetative propagation.

**195.** *Pennisetum purpureum* Schumach., Beskr. Guin. Pl. 44. 1827.
Type from Guiana, Africa.
Chromosome number: $2n=28$ (Nunez, 1952).
ELEPHANT GRASS; NAPIER GRASS.
A native of tropical Africa, but now introduced into many other tropical countries.
This species is commonly cultivated in Taiwan.

**196.** *Pennisetum setosum* (Swartz) L. C. Rich. in Pers., Syn. Pl. **1:** 72. 1805. **(Fig. XV.)**
Based on *Cenchrus setosus* Swartz, Prodr. Veg. Ind. Occ. 26. 1788.
Type from India.
Chromosome number: $2n=54$ (Avdulov, 1931).
WESTINDIES PENNISETUM
Distributed in tropical America and Africa, but is now introduced to many countries.
This species is a large reed-like plant and is a new record to the grass flora of Taiwan.

V-(3)-18. *Pseudoraphis* Griff. in Notulae **3:** 29, 30. 1851.
About 7 species distributed in India, China, Japan and extending to Australia.

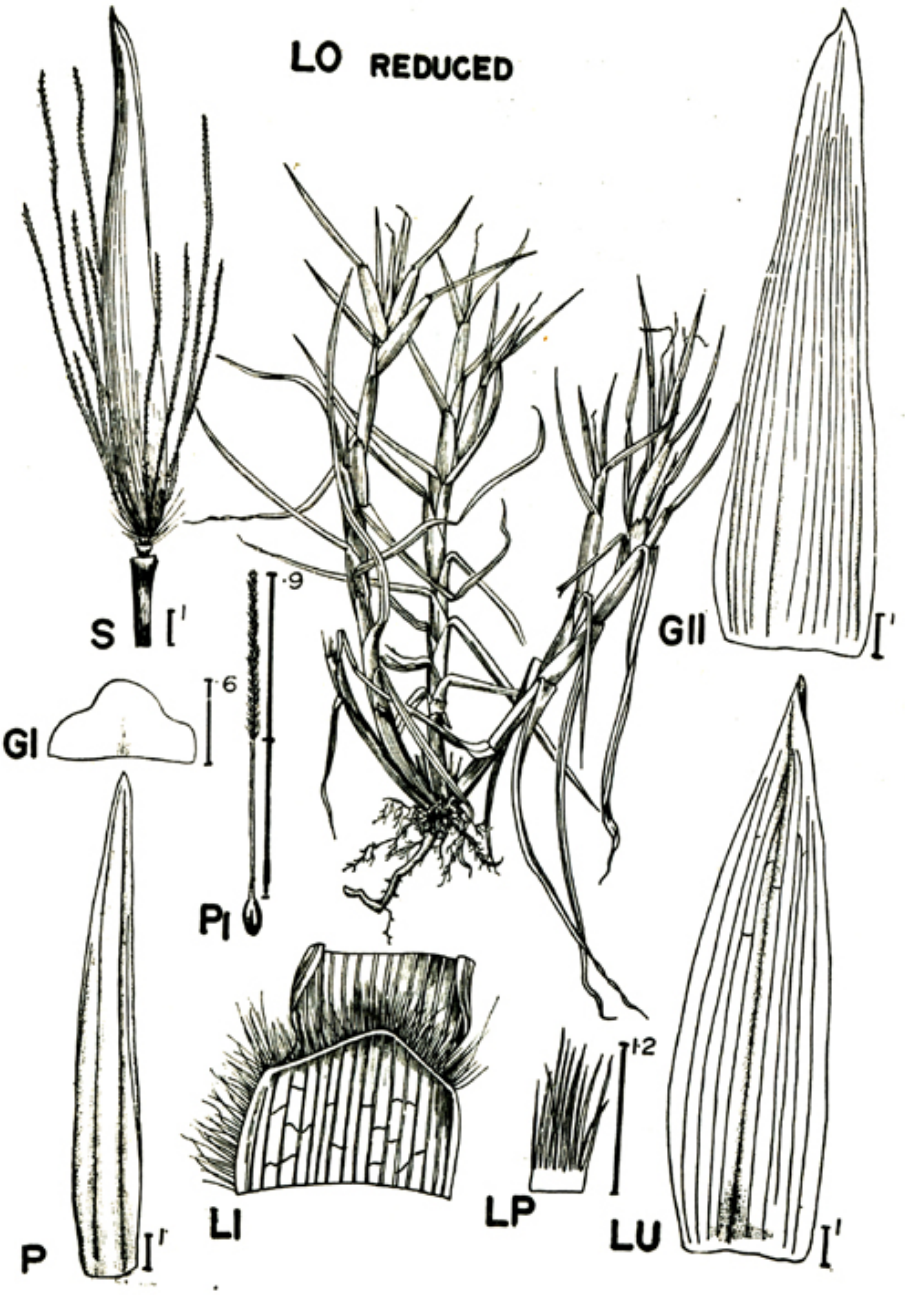


**Fig. XIV. Pennisetum cladestinum** Hochst.

(舖地狼尾草)

Loc.: NANTOU CO.: Chian-tzen (前鎮), Aug. 29, 1963, C. Huang 7 (TAI).

**197.** *Pseudoraphis spinescens* (R. Br.) Vickery in Proc. Roy. Soc. Queensl. **62:** n. 7, 69. 1952.

Based on *Panicum spinescens* R. Br., Prod. Fl. Nov. Holl. 193. 1810.

Type from Australia.

Chromosome number: $n$=c. 20 (Chen & Hsu, 1961)—Hsin-hua (新化), March 29, 1960, Hsu 614 (TAI)., reported as *P. squarrosa.*

Distributed in India, Ceylon, Burma and South-east Asia generally, extending to China, Japan and Borneo, and from New Guinea to Australia.

This species produces roots when growing in shallow water and floats upon the surface when growing in deep water of ditches and in ponds.

V-(3)-19. *Rhynchelytrum* Nees in Lindley, Nat. Syst. ed. 2, 446. 1836.

About 37 species distributed in the tropical Africa, Madagascar, Arabia to Vietnam.

**198.** *Rhynchelytrum repens* (Willd.) C. E. Hubbard in Kew Bull. **1934:** 110. 1934.

Based on *Saccharum repens* Willd., Sp. Pl. **1:** 322. 1798.

Type from Guinea

Chromosome number: $2n$=36 (Avdulov, 1931; Tateoka, 1965).

NATAL GRASS.

Distributed in tropical South Africa, now introduced into most warm countries.

The pink feathery panicles of this grass make it a desirable object in tropical gardens. It is not of much account as a fodder grass. It can grow even on the roof of a house and is usually found in railroads in the southern Taiwan.

V-(3)-20. *Sacciolepis* Nash in Britton, Man. Fl. North. Stat. Canada 89. 1901.

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

**199.** *Sacciolepis indica* (Linn.) A. Chase in Proc. Biol. Soc. Wash. **21:** 8. 1908.

Based on *Aira spicata* Linn., Sp. Pl. ed. 1, 63. 1753.

Type from India.

**199A.** var. *indica*

Chromosome number: $2n$=18 (Tateoka, 1965).

INDIA CUPSCALE.

Distributed in tropical and subtropical India, tropical Asia, China, Japan, Polynesia to Australia.

This species is common in the plains and hillsides. It is often gregarious in swampy places.

**199B.** var. *oryztorum* (Makino) Ohwi in Bull. Tokyo Sci. Mus. no. **18:** 3. 1947.

Type probably from Japan.

Based on *Panicum indicum* var. *oryzetorum* Makino in Bot. Mag. Tokyo **27:** 28. 1913.

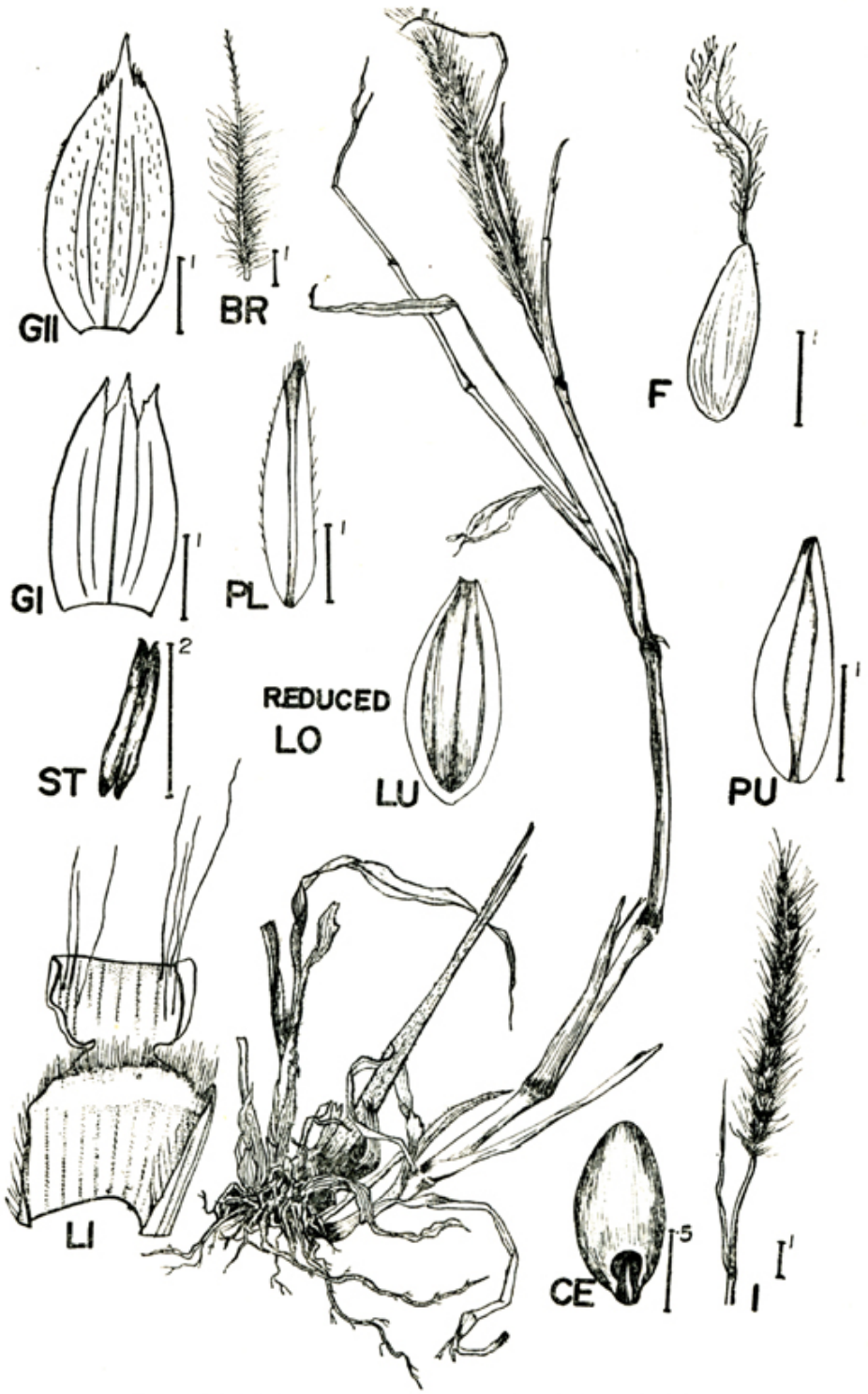


**Fig. XV. Pennisetum setosum** (Sw.) L. C. Rich.
（牧地狼尾草）
Loc.: KAOHSIUNG CO.: Ta-shu (大樹), Jan. 16, 1970, F. C. Lin, s. n. (TAI).

V-(3)-21. *Setaria* P. Beauv., Ess. Agrost. 51. t. 13, f. 3. 1812. Nomen gener. conserv. About 140 species distributed in the tropical and warm temperate regions of the world.

**Key to the species and varieties of *Setaria***

1(4) Panicle loosely open; only part of spikelets with bristle arising from its base; blades folded, fan-fashion between the longitudinal veins:
2(3) Upper floret ovate, obscurely rugose; blades 3–7 cm wide ..206. *S. palmifolia*
3(2) Upper floret narrowly ovate; transversely rugose; blades 1–3 cm wide .....207. *S. plicata*
4(1) Panicle contracted, cylindrical; spikelets almost covering main axis; blades not plicate:
5(10) Lower palea broadly ovate to ovate, as long as the lower lemma; upper floret obviously rugose; sheath margins glabrous:
6(7) Spikelets 3–4 mm long; bristles golden in color .....203. *S. glauca*
7(6) Spikelets 2–2.8 mm long; bristles purplish brown in color:
8(9) Rhizomatous, perennial .....201. *S. geniculata*
9(8) Not rhizomatous, annual.....205. *S. pallide-fusca*
10(5) Lower palea distinctly shorter than the lower lemma or reduced; sheaths at least hairy on margin:
11(12) Main axis of panicle serrulate; bristles retrorsely barbed..208. *S. verticillata*
12(11) Main axis of panicle hairy; bristles antrorsely barbed:
13(14) Upper glume 2/3–3/4 as long as the spikelet; blades more or less hairy .....200. *S. faberii*
14(13) Upper glume as long as the spikelet or nearly so; lower palea less than ½ as long as the spikelet:
15(16) Glumes and lower lemma persistant; upper floret deciduous; cultivated .....204. *S. italica*
16(15) Glumes and lower lemma falling off together with upper floret; not cultivated .....209. *S. viridis*
17(18) Anthers purplish black in color .....209B. var. *viridis*
18(17) Anthers yellowish brown; bristles long .....209A. var. *pachystachys*

**200.** *Setaria faberii* Herrm, Beitr. Biol. Pflanz. **10:** 51. 1910.
Type from China: "Szechuen" (四川), leg. Faber 582–1182. (Herb. Wien).
Formerly this spesis was known as *Setaria autumnalis.*
Chromosome number: $2n=36$ (Tateoka, 1954).
Distributed in Vietnam, China and Japan.

**201.** *Setaria geniculata* (Lamk.) P. Beauv., Ess. Agrost. 51, 169, 1812.
Based on *Panicum genicluatum* Lamk., Encycl. Meth. Bot. **4:** 727. 1798.
Type from Lesser Antilles, West Indies
Chromosome number: $n=36$ (Hsu, unplished)—Lanhsü (蘭嶼), Aug. 28, 1968, Hsu 4911 (TAI); Ta-tung-shan (大桶山), Oct. 10, 1969, Hsu 6409 (TAI).
KNOT-ROOT BRISTLE-GRASS.
Distributed in tropices and subtropics of the Americas, introduced into other countries.
This species is extremely like *S. glauca* or *S. pallide-fusca* but is a perennial with short branching knotty rhizomes.

**203.** *Setaria glauca* (Linn.) P. Beauv., Ess. Agrost. 51, 169, 178. 1812.
Based on *Panicum glaucum* Linn., Sp. Pl. ed. 1. 56, 1753.
Type from Mexico.
Chromosome number: $2n=18$, 36 (Avdulov, 1931).
YELLOW BRISTLE-GRASS.
Native of the warm temperate zone of the Old World, introduced into America, Australia and other countries.
This species is rare in Taiwan. Most common species are the *S. geniculatum* and *S. pallide-fusca.*

**204.** *Setaria italica* (Linn.) P. Beauv., Ess. Agrost. 51, 170, 178. 1812.
Based on *Panicum italicum* Linn., Sp. Pl. ed. 1. 56, 1753.
Type from India.
Chromosome number: $2n=18$ (Avdulov, 1931).
ITALIAN MILLET; FOXTAIL MILLET.
This species is widely cultivated in Taiwan, particularly by the mountain tribal peoples and exists in an incredible number of races differing in size, colour of the grains, hairiness of the panicle, and in many other ways. The grain is made into a kind of porridge or into beer, also is a food for cage birds.

**205.** *Setaria pallide-fusca* (Schumach.) Stapf et C. E. Hubbard in Kew Bull. **1930:** 259. 1930.
Based on *Panicum pallide-fuscum* Schumach., Beskr. Guin. Pl. 58. 1827.
Type from Guinea, Africa.
Chromosome number: $2n=18$, 36 (Sing & Godward, 1960).
KAVATTA GRASS.
Distributed in tropics of the Old World.
This is the native species which has been very often determinated as *S. glauca* or *S. geniculata.* Very common in grassland, yards and roadsides.

**206.** *Setaria palmifolia* (Koen.) Stapf in Journ. Linn. Soc. Bot. **42:** 186. 1914.
Based on *Panicum palmaefolium* Koenig in Naturf. **23:** 208. 1788.

Type probably from Siam (Thailand).
Chromosome number: $n=27$ (Chen & Hsu, 1961)—Chen 13 (TAI).
Distributed in tropics of the Old World.
This is a true forest grass and is found scrambling over other vegetation, often in dense shade. A very common tall grass with large plicate boat-shaped leaves. It is said that the number of cross-markings on the leaves indicates the number of typhoon per year expected by native peoples. This grass has some ornamental value.

**207.** *Setaria plicata* (Lamk.) T. Cooke, Fl. Bombay **2:** 919. 1908.
Based on *Panicum plicatum* Lamk., Encycl. Meth. Bot. **4:** 736. 1797.
Type from insula Franciae.
Formerly this species was known as *Panicum excurrens* or *Setaria excurrence.*
Chromosome number: $2n=72$ (Tateoka, 1954).
Distributed in India, Ceylon to China and Japan. This is a forest grass much smaller than *Setaria palmifolia.* It also has plicate leaves and is much rarer in occurence.

**208.** *Setaria verticillata* (Linn.) P. Beauv., Ess. Agrost. 51, 178. 1812.
Based on *Panicum verticillatum* Linn., Sp. Pl. ed. 2. 82, 1762.
Type from South and East Europe.
Chromosome number: $n=18$, $2n=36$ (Willweber-Kish, 1962).
BUR BRISTLE-GRASS; HOOKED BRISTLE-GRASS.
Distributed in the tropics and temperate regions of the Old World.
This is a common grass growing around villages.

**209.** *Setaria viridis* (Linn.) P. Beauv., Ess. Agrost. 51, 171, 178. 1812.
Based on *Panicum viride* Linn., Syst. Nat. ed. 10, **2:** 870. 1759.
Type from Europe.

**209B.** var. *viridis*
Chromosome number: $n=9$, $2n=18$ (Willweber-Kish, 1962).
GREEN FOXTAIL; GREEN BRISTLE-GRASS.
Distributed in the Old World generally.
This species is found in Taiwan only in littoral regions.

**209A.** var. *pachystachys* (Franch. & Sav.) Makino & Nemoto, Fl. Jap. 1499. 1925.
Based on *Panicum pachystachys* Franch. & Sav., Enum. Pl. Jap. **2:** 594. 1879.
Type from Japan.
Chromosome number: $n=9$ (Chen & Hsu, 1961)—Chen 20 (TAI).

V-(3)-22. *Spinifex* Linn., Mant. **2:** 163. 1711.
About 3 species distributed in E. Asia, Indo-Malay, Australia, and Pacific Islands.

**210.** *Spinifex littoreus* (Burm. f.) Merr. in Philip. Journ. Sci. Bot. **7:** 229. 1912.

Based on *Stipa littorea* Burm. f., Fl. Ind. 29. 1768.
Type from East Indies.
Chromosome number: $n=9$ (Hsu, 1971)—Ken-ting (墾丁), Oct. 5, 1967, Hsu 4190 (TAI).
Distributed in the sandy coasts of India, Ceylon, Burma, extending to S. China, the Philippines and Malaysia.

V-(3)-23. *Thuarea* Pers., Syn. Pl. **1**: 110. 1805.
One species distributed in Madagascar; one species distributed in India, Indo-Malaysia regions and S. China.
It grows on the coast.

**211.** *Thuarea involuta* (G. Forst.) R. Br. ex Roem. et Schult, Syst. Veg. **2**: 808. 1817.
Based on *Ischaemum involutum* G. Forst., Fl. Ins. Austr. Prodr. 73. 1786.
Type from Society Islands, Pacific Ocean.
Chromosome number: $n=9$ (Chen & Hsu, 1961)—Ta-wu (大武海岸), Oct. 8, 1960, Hsu 1025 (TAI).
Distributed on the shores of South-east Asia, including Madagascar, India, Malaysia, S. China, Liukyu and extending to Australia.

V-(3)-0. *Urochloa* P. Beauv., Ess. Agrost. 52, t. 11, fig. 1. 1812.
About 25 specis distributed in the tropical Africa and Asia.
Taiwan species under this genur is referred to the genus *Brachiaria*.

## V-(4). Tribe Andropogoneae

### Key to the genera of tribe *Andropogoneae*

1(6) Spikelets unisexual, the staminate and pistillate in different parts of the same inflorescence or in different inflorescences:
2(3) Pistillate spikelets enclosed in a hard bead bead-like involucre .....6. *Coix*.
3(2) Pistillate spikelets not enclosed in an involucre as above:
4(5) Pistillate spikelets in crowded longitudinal rows on a very thick axis; staminate spikelets in an ample terminal panicle .....2. *Zea*
5(4) Pistillate spikelets not enclosed in a hardened lower glume, usually sunk in the slotted rachis-joint .....13. *Euchlaena*
6(1) Spikelets not unisexual; hermaphrodiate or much reduced:

7( 8 ) Spikelets solitary, laterally compressed, rachis continuous; inflorescence of a single raceme or of several one-sided racemes ..... 9. *Dimeria*

8( 7 ) Spikelets in pairs or in threes, mostly dorsally compressed or cylindrical; rachis articulating:

9(32) Paired spikelets monomorphic, both fertile; rachis-joints slender, usually swollen at base of spikelets:

10(23) Spikelets arranged in more or less ample panicles or compound racemes arranged along an elongated central axis:

11(18) Rachis of racemes tough or tardily breaking up; spikelets articulating from their pedicels:

12(17) Upper lemma not or hardly two-toothed:

13(14) Panicle cylindrical; spikelets awnless, lower glume membranous, not distinctly keeled; lodicules wanting; anther 1–2....19. *Imperata*

14(13) Panicle large, plume-like; spikelets awned or awnless; lower glume keeled; lodicules 2; anthers 3:

15(16) Panicle oblong; lower glume coriaceous, brown or reddish brown; spikelets one pedicelled, and the other sessile, paired.....23. *Narenga*

16(15) Panicle fan-shaped; lower glume papery; spikelets all pedicelled.....22. *Miscanthus*

17(12) Upper lemma 2-toothed; lower glume coriaceous, rounded and lacks a keel; panicle branches whorled.....10. *Eccoilopus*

18(11) Rachis of the racemes articulating; lower spikelets falling off together with the rachis-joint:

19(20) Raceme with a naked stalk; lower glume not distinctly keeled; 5–9-veined; upper lemma deeply 2-clefted, awned from the sinus.....29. *Spodiopogon*

20(19) Raceme nearly without stalk; lower glume 2-keeled:

21(22) Culms solid; upper lemma reduced, awnless.....26. *Saccharum*

22(21) Culms hollow; upper lemma developed, 2-toothed with a long awn .....12. *Erianthus*

23(10) Spikelets arranged in a single or in several racemes, the latter being digitate or subdigitate; lower glume furrowed or flat on the backside:

24(25) Lower glume glabrous, deeply furrowed; blades lanceolate.....21. *Microstegium*

25(24) Lower glume flat; blades usually linear:

26(27) Upper lemma 2-toothed, awned .....15. *Eulaliopsis*

27(26) Upper lemma deeply 2-clefted, awned from the sinus:
28(31) Lower glume long hairy, 2-keeled, depressed between the keels:
29(30) Upper glume not awned or shortly so (less than 3 mm long).....14. *Eulalia*
30(29) Upper glume with a long, slender awn of 7-15 mm long .....(*Pseudopogonatherum*)
31(28) Lower glume convex on the backside; raceme solitary.....24. *Pogonatherum*
32( 9 ) Paired spikelets dimorphic, if more or less similar then the joints of the raceme and the pedicel thick and swollen:
33(54) Joints of the rachis and the pedicel slender, if swollen, only at the top:
34(39) Inflorescence a panicle, not interrupted by spathes; pedicels usually with a translucent longitudinal groove:
35(36) Spikelets dorsally compressed; callus not elongated.....28. *Sorghum*
36(35) Spikelets laterally compressed; callus obliquely elongated; sharply pointed:
37(38) Spikelets in groups, each consisting of a sessile and two pedicelled spikelets; lower glume not tuberculate .....5. *Chrysopogon*
38(37) Spikelets with many pairs of spikelets arranged in whorled racemes; lower glume tuberculate.....32. *Vetiveria*
39(34) Inflorescence in a single raceme or digitate racemes, if in a panicle, interrupted by spathes or not; pedicels with a translucent longitudinal groove:
40(41) Awn of the upper lemma (in lower spikelet) arising from backside of the base; lower glume papillate; blades lanceolate or ovate.....2. *Arthraxon*
41(40) Awn of the upper lemma arising from the tip or the sinus of bifid apex; lower glume not papillate:
42(45) Lower glume of lower spikelet cylindrical, not keeled nor grooved: callus more or less elongated and sharp-pointed; awns hairy:
43(44) Spikelets many, imbricate in single raceme, not in a compound false panicle.....18. *Heteropogon*
44(43) Spikelets several in compound false panicle, interrupted by involucre; raceme with two pairs of empty spikelets at base.....31. *Themeda*
45(42) Lower glume of lower spikelet 2-keeled or grooved; callus rounded:
46(51) Inflorescence in panicle or in digitate racemes, rarely single:

47(48) Lower glume of lower spikelet obtuse or rounded; pedicels evenly thickened, not grooved .....8. *Dichanthium*

48(47) Lower glume of lower spikelet lanceolate to acute; pedicels with a translucent longitudinal groove:

49(50) Racemes digitate or paniculate; rachis-joints many to several.....3. *Bothriochloa*

50(49) Racemes in panicle; rachis-joints 5 to only one; panicle branches and pedicels capillary .....4. *Capillipedium*

51(46) Inflorescence a single raceme, on top of culm or tip of branches:

52(53). Racemes paired, subtended by spathes, often collected into large panicles; plants aromatic.....7. *Cymbopogon*

53(52) Raceme solitary; plants not aromatic; low grasses with weak culms .....27. *Schizachyrium*

54(33) Joints of the rachis and pedicels swollen, 3–angled, rounded or flattened:

55(58) Joints of the rachis and pedicels usually ciliate; upper lemma bifid of 2-clefted, if awned, from the sinus:

56(57) Racemes two, several-noded, usually contracted in a cylinder when young .....20. *Ischaemum*

57(56) Raceme solitary, terminal, one-jointed, subtended by a spathe; spikelets 3 .....1. *Apluda*

58(55) Joints of the rachis and pedicels glabrous; upper lemma awnless:

59(66) Rachis-joints easily articulating; upper spikelets more or less reduced:

60(63) Lower spikelets not sunken in rachis; rachis-joints compressed:

61(62) Lower spikelets compressed, the glume spiny on margins.....11. *Eremechloa*

62(61) Lower spikelets globose, the glume pitted all over, without spiny margins.....16. *Hackelochloa*

63(60) Lower spikelets sunken in cylindrical rachis-joints:

64(65) Upper spikelet staminate or neuter; the pedicel free from the rachis-joint, never fused.....25. *Rottboellia*

65(64) Upper spikelet completely reduced; the pedicel fused with rachis-joint; spikelets alternate on the rachis:.....30. *Thaumastochloa*

66(59) Rachis-joints tardily articulating; upper and lower spikelets nearly monomorphic .....17. *Hemarthria*

V-(4)-1. *Apluda* Linn., Gen. Pl. ed. 5, 35. 1754 et in Sp. Pl. ed. 1, 82. 1753.

Only one species distributed in Martitius and Socotra to China, Taiwan and extending to New Caledonia.

**212.** *Apuluda mutica* Linn., Sp. Pl. ed. 1, 82. 1753.

Type from India.

Chromosome number: $n=10$ (Chen & Hsu, 1962)—Chen 88 (TAI).

Distributed in India, extends into Southeast Asia and as far as Australia.

A very common grass all over the Island in plains and hills. It is considered to be a god fodder when it is young, but it is discarded if other more palatable grasses are available. It is often found in hedges and bushes, but also in forest margins and along irrigation ditches.

V-(4)-2. *Arthraxon* P. Beauv., Ess. Agrost. 111, t. 11, f. 6. 1812.

About 20 species distributed in tropical Africa, Madagascar, Martitius, Indo-Malaya, China to Japan.

Three species are reported from Taiwan.

**Key to the species of *Arthraxon***

1( 2 ) Peduncles erect, stout; spikelets in 2–3, rarely in single raceme.....214. *A. pauciflorus*

2( 1 ) Peduncle slender; spikelets in 2 to several digitate or paniculate racemes:

3( 4 ) Spikelets 5 mm long; anthers 1.5–2 mm long .....215. *A. quartinianus*

4( 3 ) Spikelets 2–3 mm long; anthers less than 1 mm long .....213. *A. hispidus*

**213.** *Arthraxon hispidus* (Thunb.) Makino in Bot. Mag. Tokyo **26:** 214. 1912.

Based on *Phalaris hispida* Thunb., Fl. Jap. 44. 1784.

Type from Japan.

Chromosome number: $n=18$ (Chen & Hsu, 1962)—Chen 126 (TAI).

Distributed in Caucasus, India, China, and Japan.

This is a very common grass in Taiwan.

**214.** *Arthraxon pauciflorus* Honda in Bot. Mag. Tokyo **39:** 276. 1925.

Type from Taiwan: "Insula Kotosho" (蘭嶼), leg. S. Sasaki, no. KO-22. anno 1924 (TI).

This is an endemic species found in Botel Tobago only, where it grows gregariously on dykes between cultivated fields of Yam.

**215.** *Arthraxon quartinianus* (A. Rich.) Nash in N. Amer. Flora **17:** 99. 1912.

Based on *Alectoridia quartiniana* A. Rich., Tent. Fl. Abyss. **2:** 448, t. 99. 1851.

Typ from Abyssinia.

Chromosome number: $2n=36$ (Gould, 1966).

Distributed in India, Malaysia and China.

This species is found in southern Taiwan, and it seems to be limited in occurene.

V-(4)-3. *Bothriochloa* O. Ktze., Rev. Gen. Pl. **2:** 762. 1891.

About 20 species distributed in in warm regions of the world.

Three species occur in Taiwan very commonly.

**Key to the species and varieties of *Bothriochloa***

1(2) Main axis of the inflorescence shorter than the lower racemes, in digitate racemes.....218. *B. ischaemum*

2(1) Main axis of the inflorescence longer than the lower racemes, in panicle:

3(6) Panicle branches simple, rarely once divided in lower ones, usually peduncled .....217. *B. intermedia*

4(5) Sessile spikelets not pitted in the central part of the lower glume.....217A. var. *intermedia*

5(4) Sessile spikelets with a concaved spot in the central part of the lower glume.....217B. var. *punctata*

6(3) Panicle branches 4-8-divided; partially not peduncled in lower branches.....216. *B. glabra*

**216.** *Bothriochloa glabra* (Roxb.) A. Camus in Ann. Soc. Linn. Lyon, 1930, n. s. **76:** 164. 1931.

Based on *Andropogon glaber* Roxb., Fl. Ind. **1:** 271. 1820.

Type from India.

Chromosome number: $n=20$ (Chen & Hsu, 1962)—Chen 98; O-luanpi (鵝鑾鼻), Sept. 21, 1959, Hsu 509 (TAI); Tai-nan (臺南)—Sept. 23, 1959, Hsu 536 (TAI).

Distributed in India, Sino-Malaya region.

One of the common grasses in Taiwan. This is a rather coarse grass but it is said to be an excellent fodder. Much commoner in the southern part of Taiwan than in the northern part.

**217.** *Bothriochloa intermedia* (R. Br.) A. Camus in Ann. Sco. Linn. Lyon, 1930, n. s. **76:** 164. 1931.

Based on *Andropogon intermedius* R. Br., Prodr. Fl. Nov. Holl. 202. 1810.

Type from Australia.

**217A.** var. *intermedia*

Chromosome number: $2n=40$ (Celarier *et al.* 1961).

AUSTRALIAN BLUESTEM.

Distributed in tropical Asia, Pacific Islands to Australia and tropical Africa.

This is a good fodder grass.

**217B.** var. *punctata* (Roxb.) Keng, Clav. Gram. Prim. Sin. 244. 1957.
Based on *Andropogon punctatus* Roxb., Fl. Ind. **1**: 268. 1820.
Type from India.

**218.** *Bothriochloa ischaemum* (Linn.) Keng in Contr. Biol. Lab. Sci. Soc. China, Bot. Ser. **10**: 201. 1936.
Based on *Andropogon ischaemum* Linn.. Sp. Pl. ed. 1, 1047. 1753.
Type from Europe (Europae australioris).
Chromosome number: $2n=40$, 50, 60 (Halan & Celarier, 1955).
EASTINDIES BLUESTEM.
Widely distributed in North-west Himalaya, ascending to the Tibetan plateau at 4,000 m. Also found in southern Europe, North Africa, extending to China and Taiwan.
A very common grass grows in dry poor soils in southern Taiwan.

V-(4)-4. *Capillipedium* Stapf in Prain, Fl. Trop. Afr. **9**: 169. 1917.
About 10 species distributed in the warm regions of the Old World.
Three species are on record from Taiwan.

**Key to the species and varieties of *Capillipedium***

1(2) Leaves usually hirsute all over the surfaces; blades 10–25 cm long.....220. *C. kwashotensis*
2(1) Leaves bristled only at base of the blade, more than 30 cm long:
3(4) Culms decumbent, branching at the nodes; axils of panicle branches with 1–2 mm long hairs; lower glume of the sessile spikelets flat on the back; leaf bases tapering..219. *C. assimile*
4(3) Culms erect, sparingly branched; axils of panicle branches glabrous or with less than 1.5 mm long hairs; lower glume of the sessile spikelet grooved; leaf bases more or less rounded.....221. *C. parviflorum*
5(6) Racemes less than 3-jointed, with 3–7-spikelets.....221A. var. *parviflorum*
6(5) Racems 3–8-jointed, with more than 7 spikelets.....221B. var. *spicigerum*

**219.** *Capillipedium assimile* (Steud.) A. Camus in Lecomte, Fl. Gén. de l'Indo-Chine **7**: 314. 1922.
Based on *Andropogon assimilis* Steud. in Zoll. Syst. Verz. 58. 1854 et in Syn. Pl. Glum. **1**: 397. 1854.
Type probably from India.
Chromosome number: $n=20$ (Chen & Hsu, 1962)—Hsiang-pi (象鼻), Oct. 9, 1959, Hsu 549 (TAI).
Distributed in India, Burma ascending in the hills to 2,000 m, extending to

Thailand, China and Taiwan.

This is a grass growing in the hills and often appears gregariously on mountain slopes. It is said to be eaten by cattle and buffaloes but the culms eventually become very woody and are not relished in this state. The woody culms are bamboo-like in appearence, it distinguishes this species from *C. parviflorum*.

220. *Capillipedium kwashotensis* (Hay.) C. Hsu in Journ. Jap. Bot. **37**: 280 1962.

Based on *Andropogon kwashotensis* Hay., Icon. Pl. Formos. **7**: 80. 1918.

Type from Taiwan: "Insul. Kwashoto" (蘭嶼).

Chromosome number: $n=20$ (Hsu, unpublished)—Lanhsü (蘭嶼), Aug. 27, 1968, Hsu 4876 (TAI).

This grass is endemic on the littoral regions of Botel Tobago, Green Island and probably the eastern part of Taiwan. Locally it is abundant in occurence and may be one of the valuable fodder grasses.

221. *Capillipedium parviflorum* (R. Br.) Stapf in Prain, Fl Trop. Afr. **9**: 169. 1917.

Based on *Holcus parviflorus* R. Br., Prodr. Fl. Nov. Holl. 199. 1810.

Type from Australia.

Two varieties are recognized based on its number of rachis-joints.

221A. var. *parviflorum*

Chromosome number: $n=20$ (Chen & Hsu, 1962)—Kwuan-ying-shan (觀音山), Nov. 21, 1959, Hsu 583 (TAI).

SCENTED GOLDEN-BEARD.

Widely distributed in tropics of the Old World, including Japan, China, Polynesia, Malaysia, Australia and Abyssinia.

221B. var. *spicigerum* (Benth.) C. Hsu, **comb. nov.**

Based on *Chrysopogon parviflorus* (R. Br.) Benth. var. *spicigerus* Benth., Fl. Austral. **7**: 538. 1878.

*Capillipedium spicigerum* S. T. Blake, Queensl. Univ. Dept. Biol. pappers. **2**(3): 43. 1944.

Chromosome number: $2n=40$ (Harlan & Celarier. 1955), reported as *C. spicigerum*.

V-(4)-5. *Chrysopogon* Trin., Fund. Agrost. 187. 1820. nomen genericum conservandum.

About 25 speies distributed in the tropical and subtropical regions, especially in the Old World.

One cosmopolitan species is found very commonly in Taiwan.

222. *Chrysopogon aciculatus* (Retz.) Trin., Fund. Agrost. 188. 1820.

Type from Amboyna, Malay Archipelago.

Based on *Andropogon aciculatus* Retz., Obs. Bot. **5**: 22. 1789.

Chromosome number: $n=10$ (Chen & Hsu, 1962)—Chen 26 (TAI).

LOVE GRASS.

Widely distributed in the tropics of Asia in hills and plains. An extremely common grass in village pastures on the plains where the prostrate creeping stems resist overgrazing and trampling. It is one of the best soil and water conservation grasses occuring on the river banks and on exposed hillside slopes.

V-(4)-6. *Coix* Linn., Gen. Pl. ed. 5, 419. 1754. et in Sp. Pl. ed. 1, 972. 1753.

About 5 species distributed in the tropical Asia.

One species is cultivated for food and medicine in Taiwan.

**223.** *Coix lacryma-jobi* Linn., Sp. Pl. ed. 1, 972. 1753.

Type locality unknown.

Chromosome number: $2n=20$ (Longley, 1924).

JOB'S TEARS.

A tall grass which is cultivated in many parts of the tropics. There are several varieties cultivated in Taiwan. Very recently it was extended to cultivate for its grains in medicinal purposes and also for food.

**Key to the varieties of *Coix lacryma-jobi***

1(4) Involucre very hard, not easily cut by finger nail:
2(3) Involucre ovate, 8–11 mm long by 6–7 mm wide.....223B. var. *lacryma-jobi*
3(2) Involucre globose, about 1 cm in diameter.....223C. var. *maxima*
4(1) Involucre soft, thin, easily cut by finger nail:
5(6) Involucre subglobose, 9–10 mm long by 8–9 mm broad...223A. var. *formosana*
6(5) Involucre elliptical, 8–10 mm long by 4–4.5 mm broad.....223D. var. *mayuen*

**223A.** var. *formosana* Ohwi in Act. Phytotax. & Geobot. **11**: 119. 1942.

Type from Taiwan: "Inter Reikan et Masuhoraru, Kizangun in Takaoshiu" (旗山山區), Leg. S. Okamoto (KYO).

**223B.** var. *lacryma-jobi*

**223C.** var. *maxima* Makino in Bot. Mag. Tokyo **20**: 10. 1906.

Type from Japan. Rare.

**223D.** var. *mayuen* (Romanet) Stapf ex Back., Handb. Fl. Java Afl. **2**: 33. 1928. in Dutch. "vorm" (means forma).

Based on *Coix mayuen* Romanet in Bull. Soc. Acclim. Paris, sér. 3, **8**: 422. 1881.

Type from Java.

Distributed in Southeast Asia generally.

V-(4)-7. *Cymbopogon* Spreng., Pl. Pugill. **2**: 14. 1815.

About 60 species distributed in the tropical and subtropical regions of Africa

and Asia.

Several species yield essential aromatic oils, e.g. *C. nardus* (L.) Rendle and others (citronella), *C. citratus* (DC.) Stapf (lemongrass), *C. martini* (Roxb.) Watts (palma rosa or geranium oil), used in soaps, perfumery, etc.

**Key to the species and varieties of *Cymbopogon***

1(4) Lower spikelets awned; not cultivated.....226. *C. tortilis*
2(3) Lower spikelets 3.5–5 mm long; false panicle large, compound.....226B. var. *tortilis*
3(2) Lower spikelets 5–6 mm long; false panicle loosely spreading.....226A. var *goeringii*
4(1) Lower spikelets awnless, if awned not exceeding the spikelet; cultivated:
5(6) Lower spikelets linear-lanceolate, 5–6 mm long, 0.7 mm wide ..224. *C. citratus*
6(5) Lower spikelets oblong; 3.5–5.5 mm long, 1–1.2 mm wide:
7(8) Panicle contracted; lower glume without distinct veins.....225. *C. nardus*
8(7) Panicle opened; lower glume with 3 distinct veins.....227. *C. winterianus*

**224.** *Cymbopogon citratus* (DC.) Stapf in Kew Bull. **1906**: 357. 1906.
Based on *Andropogon citratus* DC., Cat. Hort. Monsp. 78. 1813. nom. nud.; DC. ex Nees, Allgeum. Gartenz. **3**: 267. 1835.
Type: Cult. Hort. Monspe. Source not given.
Chromosome number: $2n=40$ (Gupta, 1965).
LEMON-GRASS
Found in cultivation only, but it is grown on a vast scale in parts of South America, in Africa and in Vietnam.

**225.** *Cymbopogon nardus* (Linn.) Rendle in Cat. Welw. Afr. Pl. **2**: 155. 1899.
Based on *Andropogon nardus* Linn., Sp. Pl. ed. 1, 1046. 1753.
Type from India.
Chromosome number: $2n=20, 40$ (Gupta, 1965).
CITRONELLA-GRASS.
Distributed in Southeast Asia.
Extensively cultivated in Taiwan, but this species is not often found in flower as its harvested prior to flowering.

**226.** *Cymbopogon tortilis* (Presl) A. Camus in Rev. Bot. Appl. Agr. Celon. **5**: 206. 1925.
Based on *Anthistiria tortilis* Presl, Rel. Haenk. **1**: 347. 1830.
Type from the Philppines.
Distributed in S. China, the Philippines and Vietnam.
One of the common grasses found on hillsides, especially in red-soil areas.

**226A.** var. *goeringii* (Steud.) Hand.-Mazz., Symb. Sinicae **75**: 1314. 1936.
Based on *Andropogon goeringii* Steud. in Flora **31**: 22. 1846.
Type from Japan.
Distributed in Vietnam, S. China, Korea to Japan.

**226B.** var. *tortilis*
Chromosome number: $n=10$ (Chen & Hsu, 1962)—Chen 99 (TAI).
Distributed in Vietnam S. China, and the Philippines.

**227.** *Cymbopogon winterianus* Jowitt in Ann. R. Bot. Gdns., Peradniya **4**: 189. 1908.
Type from Ceylon (A. W. Winter, s. n.) (K).
Chromosome number: $2n=20$ (Gupta, 1965).
MAHA PENGIRI; OLD CITRONELLA GRASS; WINTER'S GRASS.
Distributed in many parts of the world as a cultivated plant for its valuable citronella oil.

V-(4)-8. *Dichanthium* Willemet in Usteri, Neue Ann. der Bot. **18**: 11. 1796.
About 15 species distributed in the paleotropical regions.

**Key to the species of *Dichanthium***

1(2) Peduncle of the racemes hairy.....229. *D. aristatum*
2(1) Peduncle of the racemes glabrous .....228. *D. annulatum*

**228.** *Dichanthium annulatum* (Forssk.) Stapf in Prain, Fl. Trop. Afr. **9**: 178. 1917. **(Fig. XVI.)**
Based on *Andropogon annulatus* Forssk., Fl. Aegypt.-Arab. 173. 1775.
Type from Egypt.
Chromosome number: $n=20$, 40 (Harian *et al.*, 1964).
Widely distributed in India, Burma, Tropical and North Africa, now introducd as a fodder to many countries.
It is a very excellent fodder grass which is sought out by stock from a mixture of grasses and eaten in preference to all others.

**229.** *Dichanthium aristatum* (Poir.) C. E. Hubb. in Kew Bull. **1939**: 654. 1939. **(Fig. XVII.)**
Base on *Andropogon aristatus* Poir. in Lamk., Encycl. Meth. Bot. Suppl. **1**: 585. 1810.
Type from Mauritius, Africa.
Chromosome number: $2n=20$, 40, 60 (de Wet, Menno & Boerg, 1961).
Distributed in India and now introduced into Australia, Africa and America.
This is an excellent fodder grasses locally naturalized in southern Taiwan, even growing on rocks.

V-(4)-9. *Dimeria* R. Br., Prodr. Fl. Nov. Holl. 204. 1810.
About 40 species distributed in Mascarine Islands, SE. Asia, Indo-Malaysia, Polynesia and Australia.

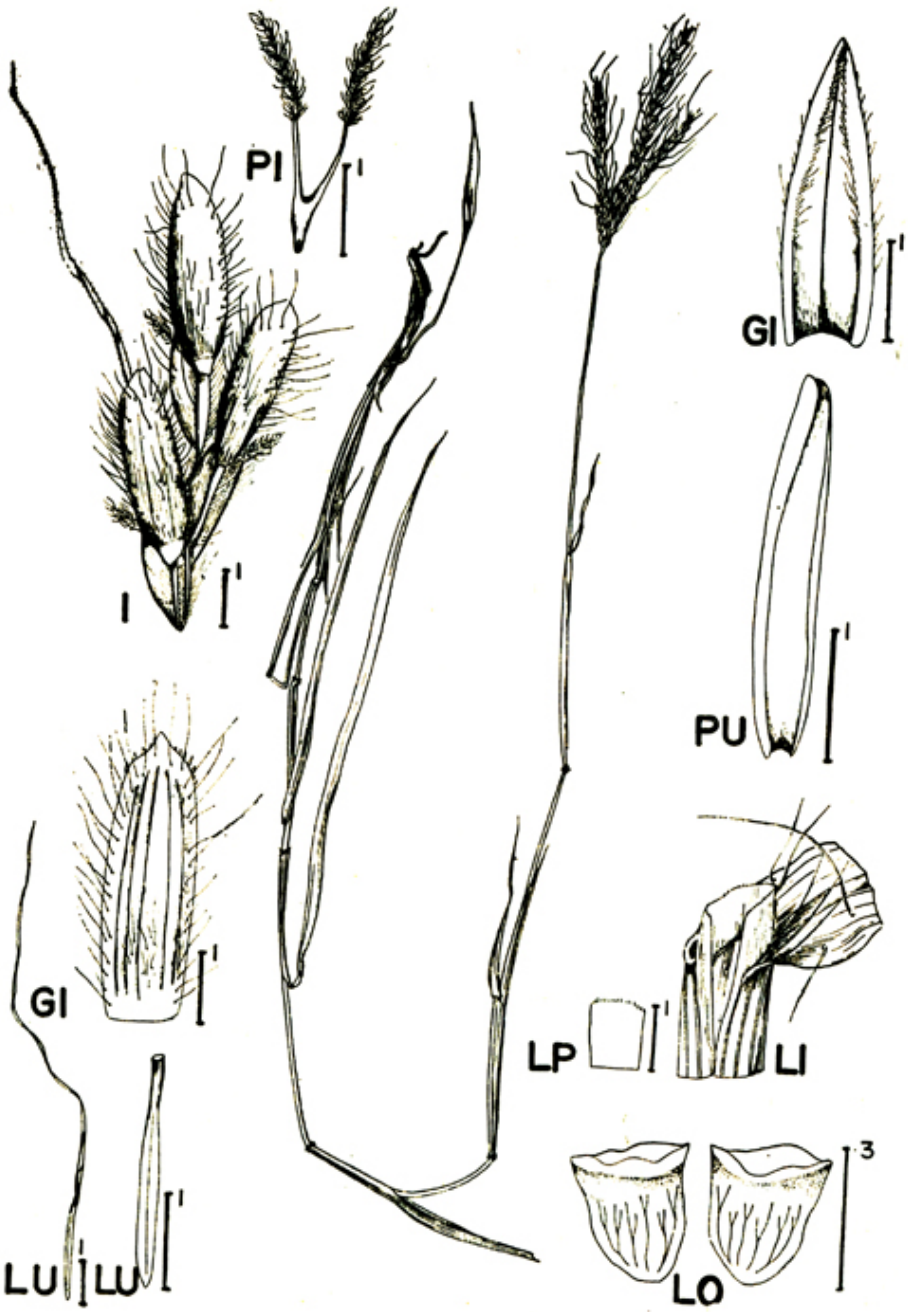


**Fig. XVI. Dichanthium annulatum** (Forssk.) Stapf
**(雙 花 草)**

Loc.: PINGTUNG CO.: Pingtung (屏東), Nov. 8, 1969, C. Chang s. n. (TAI).

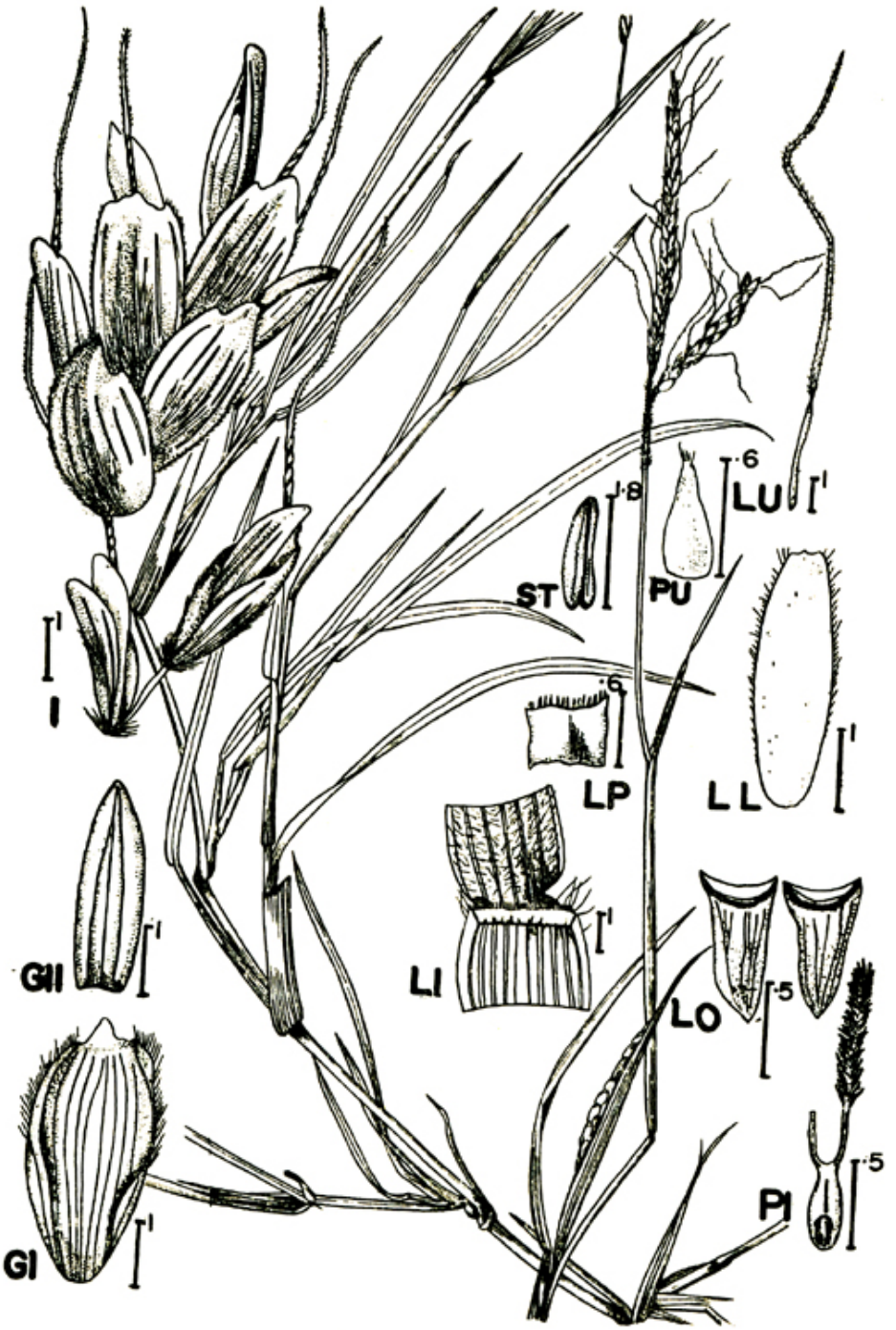


**Fig. XVII. Dichanthium aristatum** (Poir.) C. E. Hubb.
(毛梗雙花草)
Loc.: PINGTUNG CO.: O-luan-pi (鵝鑾鼻), Jan. 7, 1960, T. I. Chuang 3043 (TAI).

### Key to the species of *Dimeria*

1(2) Anthers ½ as long as the spikelet; leaves sericious all over the surface.....230. *D. falcata*

2(1) Anthers minute; leaves if hairy, only on margins.....231. *D. ornithopoda*

**230.** *Dimeria falcata* Hack. in DC., Monogr. Phan. **6**: 85. 1889.
Type from China (Canton, Hance 1385)
Distributed in S. China to Vietnam.
This is a grass not commonly found.

**231.** *Dimeria ornithopoda* Trin., Fund., Agrost. 167, t. 14. 1820.
Type from India.
Distributed in India, China, Japan, and extending to Australia.

V-(4)-10. *Eccoilopus* Steud., Syn. Pl. Glum. **1**: 123. 1854.
About 4 species distributed in N. India, Mainland China, Japan and Taiwan.

### Key to the species, varieties and forms of *Eccoilopus*

1(4) Spikelets ovate to elliptical, less than 4.5 mm long, shortly awned or awnless.....233. *E. formosanus*

2(3) Spikelets elliptical, acute, awnless, nearly glabrous ....233A. var. *formosanus*

3(2) Spikelets ovate, obtuse, shortly awned, long ciliated when young .....233B. var. *tohoensis*

4(1) Spikelets lanceolate, about 6 mm long, awn well developed...232. *E. cotulifer*

5(6) Leaves petiolate, base tapering.....232A. forma *cotulifer*

6(5) Leaves epetiolate, saggitate at base.....232B. forma *sagittiformis*

**232.** *Eccoilopus cotulifer* (Thunb.) A. Camus in Ann. Soc. Linn. Lyon, n. s. **70**: 92. 1923.
Based on *Andropogon cotulifer* Thunb., Fl. Jap. 41. 1784.
Type from Japan.

**232A.** forma *cotulifer*
Chromosome number: $n=20$ (Chen & Hsu, 1962)—Nan-fang-ao (南方澳), Sept. 25, 1960, Hsu 834 (TAI).
Distributed in Himalaya, India, China to Japan.
Usually it is found on sunny hill-slopes.

**232B.** forma *sagittiformis* Ohwi in Act. Phytotax. & Geobot. **11**: 153. 1942.
Type from Taiwan: "Between Gani and Bibyu, Kizangun in Takaoshu" (旗山山區), leg. M. Tagawa 1242 (KYO).

**233.** *Eccoilopus formosanus* (Rendle) A. Camus in Ann. Soc. Linn. Lyon **70**: 93. 1923.
Based on *Spodiopogon formosanus* Rendle in Journ. Linn. Soc. **36**: 351. 1904.

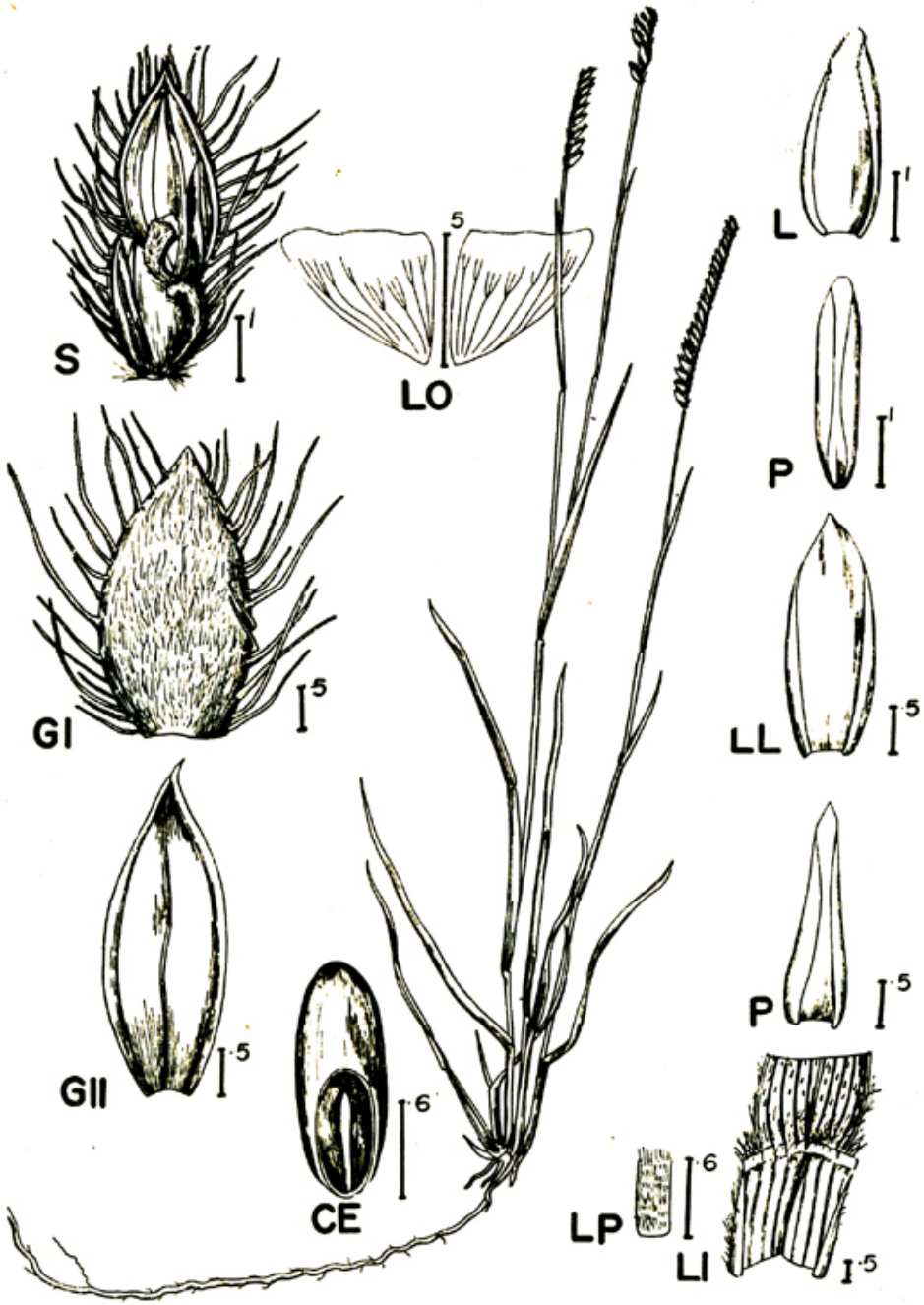


**Fig. XVIII. Eremochloa ciliaris** (Linn.) Merr.
(蜈 蚣 草)
Loc.: CHANGHUA CO.: Tien-tou (田頭), Nov. 25, 1629, S. Sasaki, s. n. (TAI).

Type from Taiwan: Planted by savage in mountains near "Bankinsing" (嵩金), leg. A. Henry 76 (K).

**233A.** var. *formosanus*

Type from "Rokki" (六龜), leg. S. Okamoto 51, anno 1938 (TI).

Endemic to Taiwan.

**233B.** var. *tohoensis* (Hayata) Honda in Bot. Mag. Tokyo **39**: 69, 267. 1925.

Based on *Spodiopogon tohoensis* Hayata, Icon. Pl. Formos. **7**: 69, f. 38. 1918.

Type from Taiwan: "Mt. Tohozan, 6,500 ped. alt." (東埔山), leg. S. Sasaki Oct. 1905 (TI).

Probably this variety is the same as *Eccoilopus taiwanicus* Honda in Bot. Mag. Tokyo **56**: 15, 1942.

V-(4)-11. *Eremochloa* Büse in Miquel, Pl. Junghn. **1**: 357. 1854.

About 8 species distributed in India, Ceylon, S. China, SE Asia, W. Malaysia and Australia.

Two species in Taiwan. *Eremochloa ciliaris* is a new record to Taiwan.

**Key to the species of Eremochloa**

1( 2 ) Lateral spines slender, nearly as long as the hairy glume.....234. *E. ciliaris*

2( 1 ) Lateral spines stout, much shorter than the glabrous glume .....235. *E. ophuroides*

**234.** *Eremochloa ciliaris* (Linn.) Merr. in Philipp. Journ. Sci. **1**: Suppl. 4: 331. 1906. **(Fig. XVIII.)**

Based on *Nardus ciliaris* Linn., Sp. Pl. ed. 1, 53. 1753.

Type from India.

Distributed in India, Burma, Malaya, Siam and S. China.

Locally it has been found only once on the plain in central Taiwan. It is a first time report in this study.

**235.** *Eremochloa opiuroides* (Munro) Hack. in DC., Monogr. Phan. **6**: 261. 1889.

Based on *Ischaemum ophiuroides* Munro, Proc. Amer. Acad. **4**: 363. 1860.

Type from China: "Whampoa" (廣州黃埔).

Chromosome numbe: $2n=18$ (Brown, W. V., 1950).

CENTIPEDE-GRASS.

Distributed in S. China to Vietnam.

This is a promising lawn grass in Taiwan. It has stoloniferous stems and the leaves are fairly nice looking, usually forming dense, flat mat in poor soils on hill-slopes.

V-(4)-12. *Erianthus* Michx., Fl. Bor. Amer. **1**: 54. 1803.

About 28 species distributed in tropical America, S.E. Europe, to E. Asia, Indo-Malaysia, and Polynesia. 1 species in Sahara, and 1 species in Madagascar.

Two species are found in Taiwan.

**Key to the species and varieties of *Erianthus***

1(2) Spikelets awnless, if awned, awn at least not exceeding the spikelet .....236. *E. arundinaceus*

2(1) Spikelets awned, awn well developed, far exceeding the spikelet .....237. *E. formosanus*

3(4) Callus hairs reddish purple in color.....237B. var. *pollinoides*

4(3) Callus hairs silky.....237A. var. *formosanus*

**236.** *Erianthus arundinaceus* (Retz.) Jesw., Arch. Suikerind. Nederl. Indie **33:** 399. 1925.

Based on *Saccharum arundinaceum* Retz., Obs. Bot. **4**: 14. 1786.

Type from Transquebar, India.

Chromosome number: $n=15, 20, 25, 30$ (Babu & Srinivasan, 1960).

Distributed in Malaysia, Liukyu and S. China.

A tall reed grows along river.

**237.** *Erianthus formosanus* Stapf in Kew Bull. Misc. Inf. **1898:** 228 1898.

Type from Taiwan: "Ape's Hill" (壽山), leg. Playfair 314.

Chromosome number: $2n=60$ (Darlington & Wylie, 1955).

**237A.** var. *formosanus*

Endemic to Taiwan.

**237B.** *pollinioides* (Rendle) Ohwi in Act. Phytotax. & Geobot. **11:** 152. 1942.

Based on *Erianthus pollinioides* Rendle in Journ. Linn. Soc. **36:** 350. 1904.

Type from Taiwan: "Takow" (高雄), leg. A. Henry 1143. (Mus. Brit., Herb. Kew.)

V-(4)-13. *Euchlaena* Schrad. in Linnaea **8:** 25. (Litt.-Bericht). 1833.

About 2 species distributed in Mexico.

Only one species is reported from Taiwan in cultivation.

**238.** *Euchlaena mexicana* Schradl, Ind. Sem. Hort. Goettingen 1832. reprinted in Linnaea **8:** 25. (Litt.-Bericht). 1833.

Type from Mexico.

Chromosome number: $2n=20$.

TEOSINTE

Distributed in Mexico, but introduced to many parts of the world for fodder.

No one collection has been made since the World War II.

V-(4)-14. *Eulalia* Kunth, Rév. Gram. **1:** 160. 1829.

About 30 species distributed in the tropical and subtropical regions of Africa and Asia.

Two species are found in Taiwan.

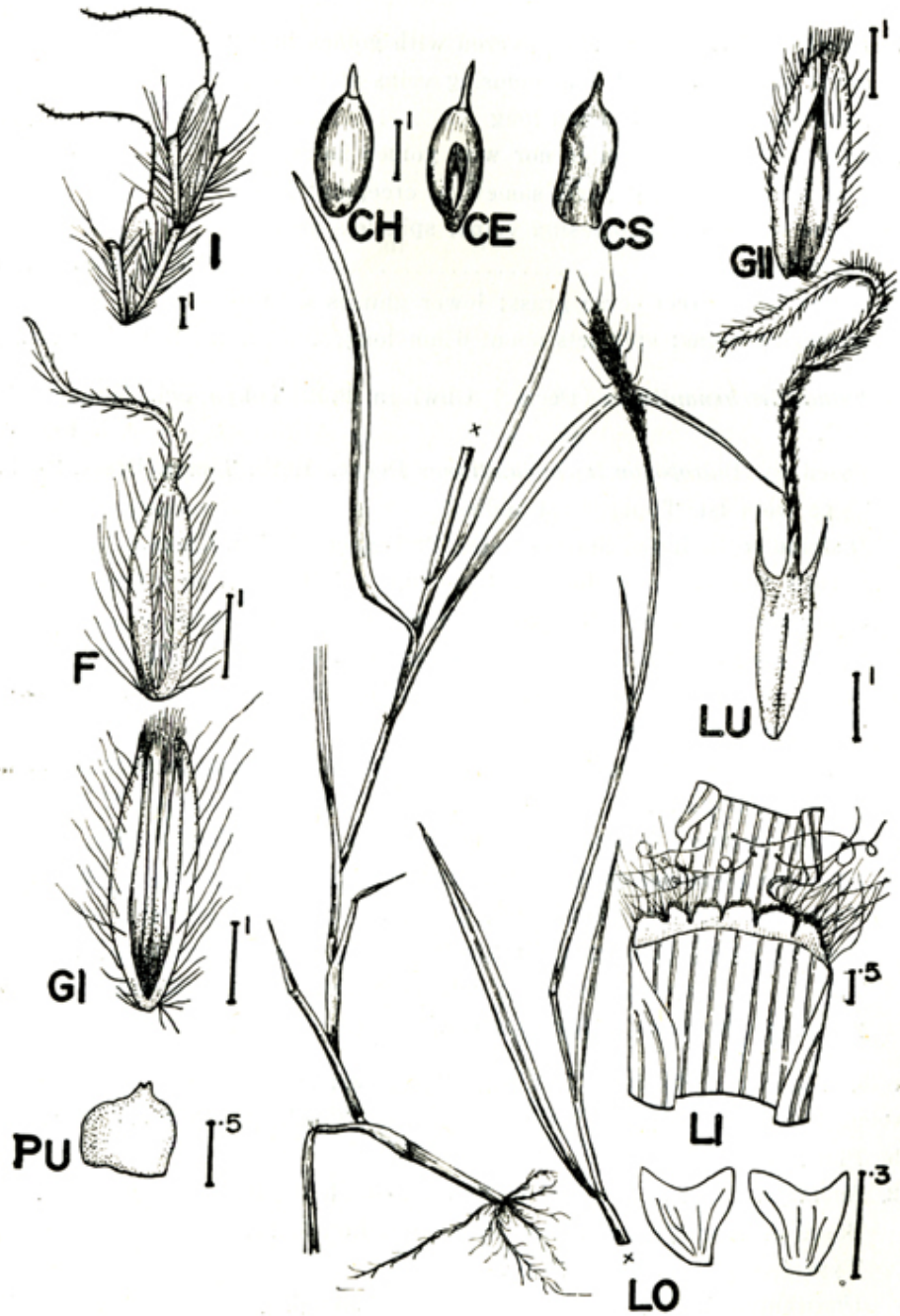


**Fig. XIX. Eularia leschenaultiana** (Decne.) Ohwi
(細稈金茅)

Loc.: PINGTUNG CO.: Ssu-chung-chi (四重溪), Oct. 10, 1960, C. Hsu 1167 (TAI).

**Key to the species *Eulalia***

1(2) Basal sheaths swollen and covered with golden hairs; lower glumes without anastomosing veins at the upper part; spikelets about 4 mm long .....241. *E. speciosa*

2(1) Basal sheaths not swollen nor with golden hairs;

3(4) Culms slender, basal parts somewhat creeping; lower glume without anastomosing veins; spikelets about 3 mm long .....239. *E. leschenaultiana*

4(3) Culms stout, erect corse grass; lower glumes with anastomosing veins; spikelets about 6 mm long.....240. *E. quadrinervis*

**239.** ***Eulalia leschenaultiana*** (Decne.) Ohwi in Bull. Tokyo Sci. Mus. no. **18**: 2. 1947. **(Fig. XIX.)**

Based on *Andropogon leschenaultianus* Decne., Herb. Timor. Descr. 29. 1835.

Type from Isl. Timor, East Indies.

Distributed in India, Malaysia, the Philippines and S. China.

Locally this is a new find in Ssu-chung-chi (四重溪), on a dry exposed hill slope, and is a new record to the grass flora of Taiwan.

**240.** ***Eulalia quadrinervis*** (Hack.) O. Kuntze, Rev. Gen. Pl. **2**: 775. 1891.

Based on *Pollinia quadrinervis* Hack. in DC., Monogr. Phan. **6**: 158. 1889.

Type from Hongkong, China.

Distributed in Himalaya, India, Burma, Thailand, China, Japan and extending to the Philippines.

**241.** ***Eulalia speciosa*** (Debeaux) O. Kuntze, Rev. Gen. Pl. **2**: 775. 1891.

Based on *Erianthus speciosus* Debeaux in Act. Soc. Linn. Bord. **32**: 53. 1878.

Type from China: "Tché-fou" (山東烟台), alt. 1,000–1,100 m.

Distributed in India, extending to Thailand, China, Korea and Japan.

This is a hill species found at low altitudes. It is eaten by cattle when young but becomes rather coarse with age.

V–(4)–15. ***Eulaliopsis*** Honda in Bot. Mag. Tokyo **38**: 56. 1924.

About 2 species distributed in India, Burma, Thailand, China and extending to the Philippines.

**242.** ***Eulaliopsis binata*** (Retz.) C. E. Hubbard in Hook., Ic. Pl. sub tab. 3262. 1935.

Based on *Andropogon binatus* Retz., Obs. Bot. **5**: 21. 1789.

Type from Travanoore, India.

Distributed widely in India, Burma, Thailand, China and extending to the Philippines.

V–(4)–16. ***Hackelochloa*** O. Ktze., Rev. Gen. Pl. **2**: 776. 1891. (=*Rytilix* Rafin.)

Only one or two species in the tropical regions of the world.

**243.** *Hackelochloa granularis* (Linn.) O. Ktze., Rev. Gen. Pl. 776. 1771.
Based on *Cenchrus granularis* Linn., Mant. **2:** 575. App. 1771.
Type from India.
Chromosome number: $2n=14$? (Celarier, R. P., 1957).
PITSCALE-GRASS.
Locally it is found in low altitudes, but not aboundant in occurence.

V-(4)-17. *Hemarthria* R. Br., Prodr. Fl. Nov. Holl. 207. 1810.
Abount 10 species distributed in the tropical Africa, Madagascar, E. Asia, Indo-Malaya, China and Japan.
Only one species is found in Taiwan.

**244.** *Hemarthria compressa* (Linn. f.) R. Br., Prodr. Fl. Nov. Holl. 207. 1810.
Based on *Rottboellia compressa* Linn. f., Suppl. 114. 1781.
Type from India.
Chromosome number: $n=27$ (Chen & Hsu, 1962)—Chen 34 (TAI).
Distributed widely throughout India, Ceylon, Burma, Malaysia, China, and Japan.
Usually the culms are straggling in bushes or hedges. It is grazed and liked by all stock. It is a very variable species in its hight, and shape of the plant.

V-(4)-18. *Heteropogon* Pers., Syn., Pl. **2:** 533. 1807.
About 12 species distributed in tropical regions.
Only one species is found in Taiwan.

**245.** *Heteropogon contortus* (Linn.) P. Beauv. ex. Roem. et Schult., Syst. Veg. **2:** 836. 1817.
Based on *Andropogon contortus* Linn., Sp. Pl. ed. 1, 1045. 1753.
Type from India.
Chromosome numbe: $2n=40$ (Tateoka, 1965).
SPEAR GRASS
Widely distributed in the tropics, ascending in the Himalaya to 2,000 m.
Locally this grass is usually found in the southern parts of Taiwan along railways.

V-(4)-19. *Imperata* Cyr., Pl. Rar. Neap. **2:** 26, t. 11. 1792.
About 10 species distributed in the tropical regions and subtropical regions.
One species occurs in Taiwan.

**246.** *Imperata cylindrica* (Linn.) P. Beauv. var. *major* (Nees) C. E. Hubbard ex Hubb. et Vaughan, Grass. Maur. 96. 1940.
Based on *Imperata koenigii* var. *major* Nees, Fl. Afr. Austr. 90. 1841.

Type from Africa.

Chromosome number: $n=10$ (Chen & Hsu, 1962)—Chen 3 (TAI).

LALANG GRASS.

Distributed in Warm and temperate parts of Asia, extending to Australia, East and South Africa.

This is one of the most common grasses found in sunny exposed soils. The rhizomes are solded in Taiwan for medicinal purposes.

V–(4)–20. *Ischaemum* Linn., Gen. Pl. ed. 5, 469. 1754 et. in Sp. Pl. ed. 1, 1049. 1753.

About 50 species distributed in the tropical and subtropical regions.

A very common grass on plains and littoral regions.

**Key to the species, varieties and forms of *Ischaemum***

1( 8 ) Lower glume of sessile spikelets transversely rugose:

2( 5 ) Lower glume with 2–4 discontinuous ridges; pedicels and rachis-joints not thickened:

3( 4 ) Dorsal part of sessile spikelets not villous.....250A. *I. barbatum* var.

4( 3 ) Dorsal part of sessile spikelets more or less villous.....250B. *I. barbatum* var. *gibbum* f.

5( 2 ) Lower glume with 4–5 continuous ridges; pedicels and rachis-joints thickened:

6( 7 ) Spikelets about 5.5 mm long; plant body 60–70 cm high...254. *I. rugosum* var.

7( 6 ) Spikelets about 4 mm long; plant body up to 30 cm high.....247. *I. akoense*

8( 1 ) Lower glume of sessile spikelet not transversely rugose:

9(10) Sessile spikelets up to 5 mm long, obovate to oblong; pedicelled spikelets with a geniculate awn; culms creeping...252. *I. indicum*

10( 9 ) Sessile spikelets 6–9 mm long, lanceolate; pedicelled spikelets awnless or with a straight awn:

11(12) Racemes not exceeding the uppermost sheath; leaves petiolate.....253. *I. muticum*

12(11) Racemes far exceeding the uppermost sheath; leaves not petiolate:

13(18) Lower glume of sessile spikelets flattened and veined on upper part, coriaceous below middle; if awned column of awn not exceeding the spikelet:

14(15) Sessile spikelets bearing a geniculate awn; lower glume lanceolate, narrowly winged .....251. *I. crassipes*

15(14) Sessile spikelets awnless or straight awned; lower glume broadly elliptic, broadly winged.....248. *I. aristatum*

16(17) Lower glume of sessile spikelet, peduncle and sheaths not villous.....248A. var. *aristatum*

17(16) Lower glume of sessile spikelet pilose; peduncle and sheaths villous .....248B. var. *momiyamae*

18(13) Lower glume of sessile spikelets, flat, slightly coriaceous at base; internode of rachis yellow, villous; column of awn far exceeding spikelet:

19(20) Lower glume of sessile spikelets keeled but wingless, narrow; ligule truncate .....249. *I. aureum*

20(19) Lower glume of sessile spikelets keeled and winged, broadly lanceolate; ligule tongue-like.....255. *I. setaceum*

**247.** *Ischaemum akoense* Honda in Bot. Mag. Tokyo **37:** 120. 1923 (in Japanese); **38:** 50. 1924. (Latin descr.)
Type from Taiwan: "Ako" (屏東), leg. E. Matsuda no. A 132 (TI).
Endemic to Taiwan.
This species is growing in southern Taiwan along irrigation ditches.

**248.** *Ischaemum aristatum* Linn., Sp. Pl. ed. 1, 1049. 1753.
Type from China (Osbeck.)

**248A.** var. *aristatum*
Chromosome number: $n=36$ (Chen & Hsu, 1962)—Chen 35, 122 (TAI).
Distributed in China and Japan.
This is a very common grass in Taiwan.

**248B.** var. *momiyamai* (Honda) C. Hsu in Journ. Jap. Bot. **37:** 277. 1961.
Based on *Ischaemum crassipes* var. *momiyamai* Honda, in Journ. Fac. Sci. Univ. Tokyo Sect. III, Bot. **3:** 355. 1930. Monogr.
Type from Japan.
This is a littoral form growing in sandy soils and is much limited in distribution.

**249.** *Ischaemum aureum* (Hook. et Arn.) Hack. in DC., Monogr. Phan. **6:** 224. 1889.
Based on *Sporobolus aureus* Hook. et Arn., Bot. Beech. Voy. 273. 1841.
Type from Liukyu: "Ins. Loo-Choo" (琉球).
Endemic on littoral regions of Liukyu and Taiwan.

**250.** *Ischaemum barbatum* Retz., Obs. Bot. **6:** 35. 1791. var. *gibbum* (Trin.) Ohwi in Act. Phytotax. & Geobot. **11:** 175. 1942.
Based on *Ischaemum gibbum* Trin. in Mém. Acad. Pétersb. **6:** 2. 295. 1833.
Type from Philippine Islands.

**250A.** forma *gibbum*
Chromosome number: $n=18$ (Chen & Hsu 1962)—Chen 131 (TAI); Kuan-ying-shan (觀音山), Oct. 16, 1960, Hsu 1122 (TAI); Ssu-chung-chi (四重溪)—Oct. 10, 1960, Hsu 1119 (TAI).
Endemic to the Philippines and Taiwan.

**250B.** forma *nodulosum* Ohwi in Act. Phytotax. & Geobot. **11:** 175. 1942.
Based on *Ischaemum nodulosum* Honda in Bot. Mag. Tokyo **37:** 120. 1923. (in Japanese); **38:** 50. 1924. et Monogr. 363. 1930. (Latin descr.)
Type from Taiwan: "Okaseki" (鶯歌石), leg. U. Faurie 710, anno 1924 (KYO).

**251.** *Ischaemum crassipes* (Steud.) Thell. in Repert. Sp. Nov. Fedde, **10:** 289. 1912.
Based on *Andropogon crassipes* Steudel, Synops. **1:** 375. 1854.
Type from Japan (Herb. Mus. Leiden)
Chromosome number: $n=30$ (Celarier, 1957).
Distributed widely in Japan, Korea and N. China.

**252.** *Ischaemum indicum* (Houtt.) Merr. in Journ. Arn. Arbor. **19:** 320. 1938.
Based on *Phleum indicum* Houtt., Nat. Hist. II, **13:** 198, t. 90, f. 2. 1782.
Type from Java.
Chromosome number: $n=18$ (Chen & Hsu, 1962)—Chen 107 a, b. (TAI).
Distributed in peninsular India and South-east Asia generally.
Locally this species is very abundant and is common on open grasslands.

**253.** *Ischaemum muticum* Linn., Sp. Pl. ed. 1, 1049. 1753.
Type from India.
Distributed in Liukyus, Taiwan, Indo-Malaysia and N. Australia.
This is a littoral plant with somewhat broader leaves.

**254.** *Ischaemum rugosum* Salisb. var. *segetum* (Trin.) Hack. in DC., Monogr. Phan. **6:** 208. 1889.
Based on *Ischaemum segetum* Trin. in Mém. Acad. Sci. Pétersb. sér. 6, **2:** 294. 1832.
Type from Manila, Philippine Isl.
Chromosome number: $2n=18$ (Celarier & Harlan, 1957).
Distributed in India, Burma, Malaya, Thailand to China.
A very variable species which is found in wet or dry habitats. *Ischaemum akoense* might be but an extreme form of this species.

**255.** *Ischaemum setaceum* Honda in Bot. Mag. Tokyo **37:** 122. 1923. (in Japanese); **38:** 54, 1924. (Latin descr.)
Type from Taiwan: "Kotosho" (蘭嶼), leg. S. Sasaki 7–1911 (TI).
This is also a littoral grass, endemic to Botel Tobago.

V–(4)–21. *Microstegium* Nees in Lindley, Nat. Syst. ed. 2, 447. 1836.
About 30 species distributed in the tropical and subtropical regions of Africa and Asia.
This is a group of plants growing on forest margins. Usually it has lanceolate leaves and is abundant in Taiwan, sometimes ascending to about 2,000 m above the sea level.

**Key to the species of *Microstegium***

1(12) Lower palea reduced, less than ½ as long as the spikelet; anthers 3; keels of lower glume usually bristled:

2(5) Anthers of two kinds, the smaller about 0.5 mm long and the larger ones more than 1 mm long; the former in upper floret and the latter in lower floret:

3(4) Plant large; spikelets more than 4.5 mm long.....257. *M. dilatatum*

4(3) Plant medium in size; spikelets less than 4 mm long.....263. *M. vimineum*

5(2) Anthers of one kind, linear, more than 1 mm long:

6(9) Rachis-joint shorter than lower spikelets; lower glume of the lower spikelets deeply furrowed:

7(8) Spikelets about 3 mm long; ligule usually shorter than 1 mm long.....260. *M. glaberrimum*

8(7) Spikelets more than 3.5 mm long; ligule 1.5–2 mm long.....256. *M. ciliatum*

9(6) Rachis-joint longer or as long as the lower spikelet; lower glume of the lower spikelet concaved, not deeply furrowed:

10(11) Upper glume acuminate; lower palea ½ as long as the spikelet, acute; leaves tomentose.....259. *M. geniculatum*

11(10) Upper glume ending in a short awn; tip of lower palea with a sinus, less than ⅓ as long as the spikelet; leaves not tomentose.....258. *M. fauriei*

12(1) Lower palea well developed, slightly shorter than the spikelet; anthers 2; keels of lower glume scabrous, not bristled:

13(14) Spikelets all pedicelled; lower glume 2-clefted.....262. *M. somai*

14(13) Spikelets one pedicelled, the other sessile; lower glume acuminate.....261. *M. nudum*

**256.** *Microstegium ciliatum* (Trin.) A. Camus in Ann. Soc. Linn. Lyon, n. s. **68**: 201. 1921.

Based on *Pollinia ciliata* Trin. in Mém. Acad. Sci. Pétersb. sér. 6, **2**: 306. 1832. Type from India.

Chromosome number: $n=20$ (Chen & Hsu, 1962)—C 108, CY 12, CY 14 (TAI).

Distributed in India, Burma, Indo-China to S. China.

Locally this is a common grass growing in shady places.

**257.** *Microstegium dilatatum* Koidz., Fl. Symb. Or.-Asiat. 38. 1930. (**Fig. XX.**)

Type from Yokoyama, Japan., leg. Faurie 6410, 7. VIII. 1890. (Herb. Mus. Paris.)

Distributed in Japan.

This species is very close to *Microstegium viminum*, but the plant body and spikelets are much larger, it might be the extreme form of the latter species.

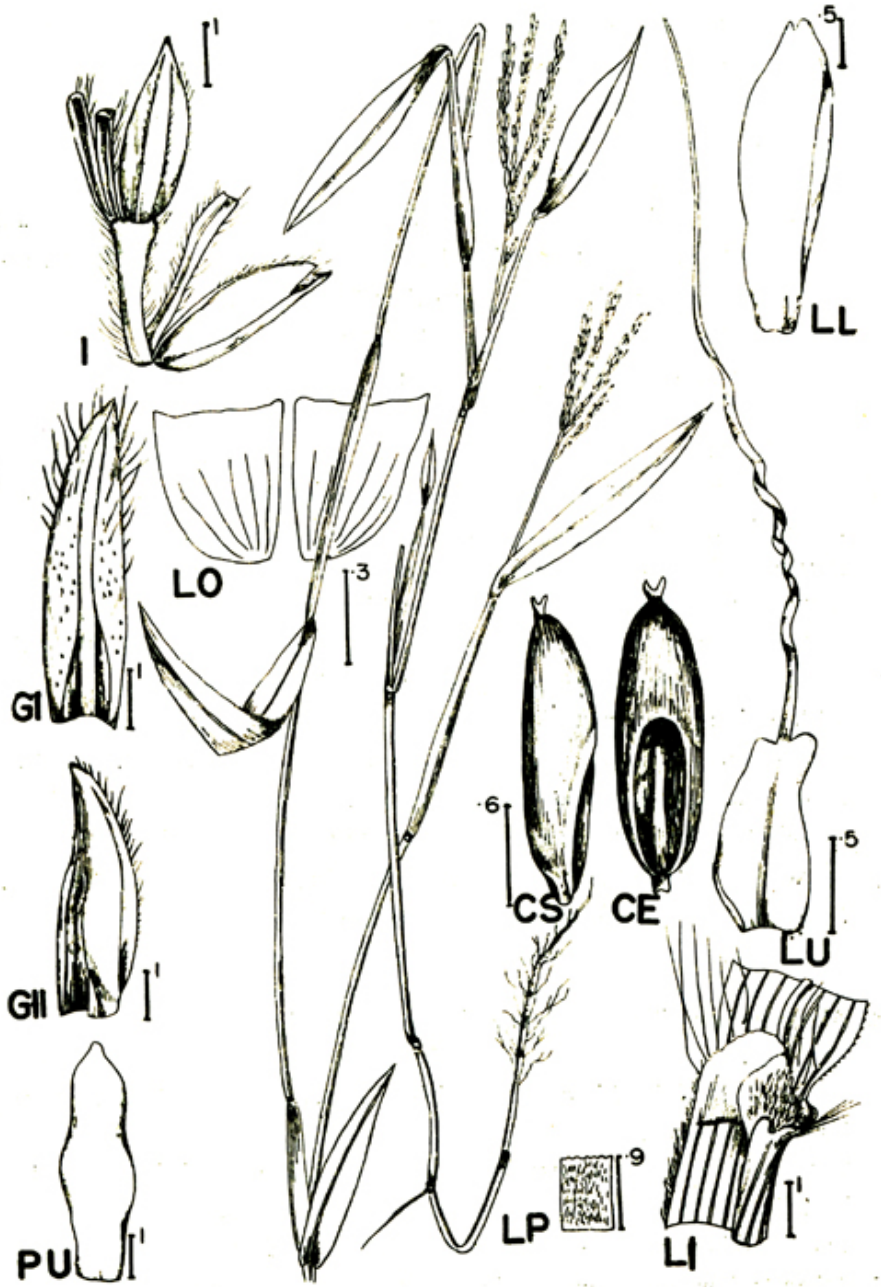


**Fig. XX. Microstegium dilatatum** Koidz.

(大穗蒿竹)

Loc.: CHIAYI CO.: Ali-shan (阿里山), Oct. 25, 1962, M. T. Kao 4890 (TAI).

258. *Microstegium fauriei* (Honda) Honda in Journ. Fac. Sci. Univ. Tokyo Sect. III, Bot. **3:** 410. 1930. (Monogr. Poac.).
Based on *Pollinia fauriei* Hayata, Icon. Pl. Formosa. **7:** 73. 1918.
Type from Taiwan: "Arisan" (阿里山), ad 2,500 m alt., leg. U. Faurie, Dec. 1914 (TI).
Chromosome number: $n=20$ (Chen & Hsu, 1962)—Chen 58; Alishan (阿里山), Sept. 1960, Hsu 1677 (TAI).
Endemic at medium altitudes in Taiwan.

259. *Microstegium geniculatum* (Hay.) Honda in Journ. Fac. Sci. Univ. Tokyo Sect. III. Bot. **3:** 410. 1930.
Based on *Pollinia geniculata* Hayata, Icon. Pl. Formosa. **7:** 73. 1918.
Type from Taiwan: "Arisan" (阿里山), B. Hayata anno 1912 (TI).
Endemic in mountainous regions of Taiwan.

260. *Microstegium glaberimum* (Honda) Koidzumi in Bot. Mag. Tokyo **43:** 394. 1929.
Based on *Pollinia glaberrima* Honda in Bot. Mag. Tokyo **39:** 42. 1925.
Type from Taiwan: "Monte Mentenzan" (面天山), leg. T. Soma, anno 1914 (TI).
Endemic on hillside of Taiwan.
This species might be a form of *Microstegium ciliatum*.

261. *Microstegium nudum* (Trin.) A. Camus in Ann. Soc. Linn. Lyon, n. s. **68:** 201. 1921.
Based on *Pollinia nuda* Trin. in Mém. Acad. Sci. Pétersb. sér. 6, **2:** 307. 1832.
Type from Nepal.
Chromosome number: $2n=20$ (Celarier, R. P., 1956).
Widely distributed in India, extending into South-east Asia, to Japan.
A very common grass grows in the hills, often in light shade.

262. *Microstegium somai* (Hay.) Ohwi in Act. Phytotax. & Geobot. **11:** 155. 1942.
Based on *Polliniopsis somai* Hayata, Icon. Pl. Formosa. **7:** 76. 1918.
Type from Taiwan: "Mentenzan" (面天山), leg. T. Soma, Nov. 1914 (TI).
This species is closely related to *Microstegium nudum*.

263. *Microstegium vimineum* (Trin.) A. Camus in Ann. Soc. Linn. Lyon, n. s. **68:** 201. 1921.
Based on *Andropogon vimineus* Trin. in Mém. Acad. Sci. Pétersb. sér. 6, **2:** 268. 1832.
Type from Nepal.
Chromosome number: $2n=40$ (Celarier, R. P., 1956).
Distributed in North-eastern India to South-east Asia, China and Japan.
This is a common grass growing along ditches close to hillsides.

V–(4)–22. *Miscanthus* Anderss. in Oefvers. Svensk. Vet-Akad. Förh. 165. 1855.

About 20 species distributed in the Pacific Islands, the Philippines, China and Japan.

**Key to the species and varieties of *Miscanthus***

1(6) Main axis of inflorescence longer than the raceme; racemes more or less branched:
2(3) Spikelets 2–4 mm long, inflorescence usually more than 30 cm long; growing on plains.....265. *M. floridulus*
3(2) Spikelets more than 5 mm long; inflorescence less than 20 cm long; growing on mountainous regions:
4(5) Inflorescence not exceeding the uppermost sheath; spikelets about 5 mm long; sheaths shinny .....266. *M. kanehirai*
5(4) Inflorescence far exceeding the uppermost sheath; spikelets usually more than 5.5 mm long; sheaths not shinny.....264. *M. flavidus*
6(1) Main axis of inflorescence shorter than the racemes; racemes corymbose, not branched.....267. *M. sinensis*
7(8) Littoral; leaves softer, 20–40 mm wide; lower surface usually farinose.....267A. var. *condensatus*
8(7) Not littoral; leaves rigid, scabrous, less than 15 mm wide:
9(10) Racemes yellowish; leaves 6–10 mm wide.....267B. var. *formosanus*
10(9) Racemes brownish; leaves less than 4 mm wide...268. *M. transmorrisonensis*

**264.** *Miscanthus flavidus* Honda in Bot. Mag. Tokyo **37:** 113. 1923.
Type from Taiwan: "Tentyozan" (天長山), leg. E. Matsuda, Aug. 4, 1919. no. Gram. 21 (TI).
Endemic on mountainous regions of Taiwan.

**265.** *Miscanthus floridulus* (Labill) Warb. ex Schum. & Laut. Fl. Deutsch. Schutzgeb. Sudesee 166. 1901.
Based on *Saccharum floridulum* Labill, Sert. Austro-Caled. 13. Pl. 18. 1824.
Type from New Caledonia.
Chromosome number: $n=19$ (Chen & Hsu, 1962)—Chen 16, 17 (TAI).
JAPANESE SILVER-GRASS.
Distributed in Far East to Polynesia.
This is a very common and abundant tall reed familiar by the local peoples for its beautiful inflorescences in the autumn time and for its economic importance. It is distributed here and there in the plains, also cultivated as a windbreak between cultivated fields, used as hedges, or for ornamental purposes. Cattle feed on this grass in time of need, and it is a good fodder

grass.

**266.** *Miscanthus kanehirai* Honda in Bot. Mag. Tokyo **42:** 132. 1928.
Type from Taiwan: "in carumine australi montis Kiraishuzan" (嘉萊主山南峯), leg. R. Kanehira et S. Sasaki 74. anno 1918 (TI).
Endemic to Taiwan.
This is a species growing on mountainous regions where the vegetation has been destroyed. It is close to *Miscanthus floridurus*, but differs from it by its larger spikelets and golden colored inflorescence.

**267.** *Miscanthus sinensis* Anderss., Oefv. Svensk. Vet. Akad. Förh. 166. 1855.
Type from China (Cap. Sying-Moon, Meyen 1837)
Chromosome number: $n$=19 (Chen & Hsu, 1962)—Chen 55, 59, 66 (TAI).
CHINESE SILVER-GRASS.
Distributed in China and Japan.

**267A.** var. *condensatus* (Hack.) Makino in Bot. Mag. Tokyo **27:** 254. 1913.
Based on *Miscanthus condensatus* Hack. in Bull. Herb. Boiss. **7:** 639. 1899.
Type from Japan: Ins. Hachijoo, prov. Izu, leg. Matsumura.
Distributed in littoral regions of Japan and Taiwan.

**267B.** var. *formosanus* Hack. in Bull. Herb. Boiss. 2 sér. **4:** 562. 1904.
Type from Taiwan: "Polisya" (埔里社), leg. Matsumura (TI).
Endemic at low altitudes of Taiwan.

**268.** *Miscanthus transmorrisonensis* Hayata in Journ. Coll. Sci. Univ. Tokyo **30:** 404. 1911.
Type from Taiwan: "Randaizan" (檜大山), leg. B. Hayata et U. Mori, nos. 1826 et 7065 (TI).
This species is distributed very commonly on the exposed mountain slopes at medium to higher altitudes throughout the Island.

V-(4)-23. *Narenga* Bor in Indian For. **66:** 267. 1940.
About 2 species distributed in NE. India to Borneo, China and Formosa.
Only one species is found in Taiwan.

**269.** *Narenga porphyrocoma* (Hance) Bor (in Indian For. Records n.s. Bot. **2:** 153, pl. 38, 39. 1941) in Indian Forest. **66:** 267. 1940.
Based on *Eriochrysis porphyrocoma* Hance ex Trin. in Journ. Bot. **14:** 294. 1876.
Type from China: "In provincia Cantonensi, secus amnenm Lien Chau, Oct. 1875. Herb. propr. no. 19285"
Chromosome number: $n$=15 (Jagathesan & Sveen, 1966).
Widely distributed in the tropical parts of South-east Asia.

V-(4)-24. *Pogonatherum* P. Beauv., Ess. Agrost. 56. 176. 1812.
About 2 species distributed in India to China and Japan.

**Key to the species of *Pogonatherum***

1(2) Culms stout; anthers about 1.5 mm long, 2; lower spikelets 2.5–3 mm long; lower florets staminate.....270. *P. paniceum*

2(1) Culms slender: anther about 1 mm long, usually 1; lower spikelets about 2 mm long; lower florets empty or obsolete....271. *P. crinitum*

**270.** *Pogonatherum crinitum* (Thunb.) Kunth, Enum. Pl. **1:** 478. 1833.
Based on *Andropogon crinitus* Thunb., Fl. Jap. 40. t. 7. 1784.
Type from Japan.
Chromosome number: $n=10$ (Chen & Hsu, 1962)—Chen 11 (TAI).
Distributed in India, ascending in the hills to 1,500 m, extending to China, Malay, and Japan.
This grass is often gregarious on newly exposed soil such as where there have been landslides and by stream-bank. It has a golden colored inflorescence and is said to be a medicinal plant for sunstroke or people overcome with heat.

**271.** *Pogonatherum paniceum* (Lamk.) Hack. in Allg. Bot. Z. **12:** 178. 1906.
Based on *Saccharum paniceum* Lamk., Encycl. Meth. Bot. **1:** 595. 1785; Tab. Encycl. **12:** 155, t. 40, f. 3. 1791.
Type from East Indies (leg. Sonnerat).
Chromosome number: $2n=20$ (Celarier, R. P., 1956).
BAMBOO GRASS.
Dirstributed in India, Burma and Ceylon and grows in rather hotter and lower situations than *Pogonatherum crinitum*. Also found in Vietnam, Malaysia and extending to Australia.
This species is much rarer in Taiwan. Often it is found in tufts on rocky banks.

V-(4)-0. *Pseudopogonatherum* A. Camus in Ann. Soc. Linn. Lyon, n. s. **68:** 202. 1921.
About 2 species distributed in the tropical Asia.
All Taiwan species under this genus are referred to the genus *Eulalia*.

V-(4)-25. *Rottboellia* Linn. f., Dissert. Nov. Gram. Gen. 22. 1779. nomen genericum conservandum.
About 4 species distributed in tropical and subtropical Africa and Asia.
Only one species is found in Taiwan.

**272.** *Rottboellia exaltata* Linn. f., Nov. Gram. Gen. 40, t. 1. 1779 et in Suppl. Pl. 114. 1781.
Type probably from India.
Chromosome number: $n=30$ (Chen & Hsu, 1962)—Chen 86 (TAI).

ITCH-GRASS.

Commonly distributed in tropical Asia and Africa, Malaysia, Australia, and China.

This grass is usually growing among bushes along streams.

V-(4)-26. *Saccharum* Linn., Gen. Pl. ed. 5, 28. 1754 et Sp. Pl. ed. 1, 54. 1753.

About 5 species distributed in the tropical and subtropical regions of the world.

**Key to the species of *Saccharum***

1(2) Peduncle not hairy below the panicle.....274. *S. officinarum*
2(1) Peduncles hairy below the panicle:
3(6) Lodicules ciliate; leaf margins revolute when dry, 3–8 mm wide; wild plant.....276. *S. spontaneum*
4(5) Top of lodicules tapering and ending in bristles at one side; flowering between Oct. and Nov.....276B. var. *roxburghii*
5(4) Top of lodicules not tapering and ending in bristles at one side; flowering between July and August.....276A. var. *spontaneum*
6(3) Lodicules not ciliate, glabrous; leaves flat, more than 1 cm wide; cultivated:
7(8) Leaves 2–5 cm wide; culms tall, robust.....275. *S. sinense*
8(7) Leaves less than 1 cm wide; culms slender, shorter.....273. *S. barberi*

273. *Saccharum barberi* Jeswiet in Arch. Sukerind. Nederland.-Ind. **33:** (Mededeeling.): 404. 1925. (Meded. Proefst. Java-Suikerind. **12:** 396. 1925.).
Type from British India.
Chromosome number: $2n=82$–$124$ (Celarier, R. P., 1956).

274. *Saccharum officinarum* Linn., Sp. Pl. ed. 1, 54. 1753.
Type from India.
Chromosome number: $2n=80$ (Price, 1961).
SUGAR-CANE.
Cultivated in many parts of the tropics. The dyed inflorescences are often used for ornament.
The sugar is contained in the soft central tissues of the stem; the canes are cut before flowering and crushed between rollers to extract the juice; afterwards it is boiled down under reduced pressure to produce crystals.

275. *Saccharum sinensis* Roxb., Pl. Coromand. 3, t. 232. 1818.
Type originally from China. (cult. in Bot. Garden, Culcutta).
Chromosome number: $2n=116$–$120$ (Moriya, A., 1949).
This name is applied to the Chinese and Japanese canes, cultivated to a limited extent in subtropical regions.

**276.** *Saccharum spontaneum* Linn., Mant. Alt. 183. 1771.
Type from India.

**276A.** var. *spontaneum*
Chromosome number: $n=56$ (Chen & Hsu, 1962)—Chen 92 (TAI).
WILD-SUGARCANE.
Widely distributed in the warmer regions of the Old World.
It is very common in gravelly river beds which are nearly dry except during floods. These form a large area in Taiwan.

**276B.** var. *roxburghii* Honda in Bot. Mag. Tokyo **39:** 38. 1925.
Type from Taiwan: "Koryu, in littore Chikunan, prov. Shinchiku" (後龍, 竹南海岸), leg. S. Sasaki 5, anno 1924.

V-(4)-27. *Schizachyrium* Nees, Agrost. Bras. 331. 1829.
About 50 species distributed in the tropical regions of the world.
Two species were found in Taiwan.

**Key to the species of *Schizachyrium***

1(2) Leaf apex obtuse; rachis and pedicels not ciliate; lower spikelets 2–2.5 mm long.....277. *S. brevifolium*
2(1) Leaf apex acute; rachis and pedicels ciliate; lower spikelets 3.5 mm long.....278. *S. fragile*

**277.** *Schizachyrium brevifolium* (Sw.) Nees ex Büse in Miquel, Plant. Junghn. 359. 1854.
Based on *Andropogon brevifolius* Sw., Prodr. Veg. Ind. Occ. 26. 1788.
Type from Jamaica.
Chromosome numer: $2n=20$ (Tateoka, 1955)—reported as *Andropogon brevifolia.*
Widely distributed in the Old World.
This delicate annual is found in waste fields and on hillsides. As the species matures the leaves and sheaths turn a rosy red. It is rather rare in occurence.

**278.** *Schizachyrium fragile* (R. Br.) A. Camus var. *shimadae* (Ohwi) C. Hsu in Journ. Jap. Bot. **37:** 279. 1962.
Based on *Andropogon shimadae* Ohwi in Act. Phytotax. & Geobot. **4:** 68. 1935.
Type from Taiwan: "Nanto" (南投), leg. T. Shimada 4754 (KYO).
It was found on the hillside in the central and southern parts of Taiwan. Rare.

V-(4)-28. *Sorghum* Moench. Pl. 207. 1794.
About 60 species distributed in the tropical and subtropical regions of the world.
*Sorghum bicolor*, Millet or Guinea corn, is largely cultivated as a cereal.

From the culm of the var. *saccharatum*, sugar is sometimes prepared.
Only one species is native to Taiwan, but there are several cultivated species.

**Key to the species of *Sorghum***

1( 2 ) Sheath-node densely beared; primary branches of the panicle simple.....281. *S. nitidum*
2( 1 ) Sheath-node not densely beared; primary branches at least once divided:
3( 6 ) Perennials with distinct elongate rhizomes:
4( 5 ) Lower spikelets more or less obtuse, elliptical; glumes coriaceous; lower glume with the keels ending in distinct but minute 3-teeth, subhyaline at tip; panicle contracted after flowering, 5 cm wide, lower branches 5–8 cm long; blades 0.5–2 cm wide .....280. *S. halepense*
5( 4 ) Lower spikelets abruptly acute with a fine short point; glumes subcoriaceous with somewhat papery tips; lower glume with keels ending without or with only obscure teeth; panicle large, lower branches 15–20 cm long; blades 3–5 cm wide .....282. *S. propinquum*
6( 3 ) Annuals or tufted perennials, without rhizomes; caryopsis not exposed; lower glume of lower spikelets veinless except at the tips .....279. *S. bicolor*

**279.** *Sorghum bicolor* (Linn.) Moench, Meth. Pl. 207. 1794. (=*Sorghum vulgare* Pers.)
Based on *Holcus bicolor* Linn., Mant. Alt. 301. 1771.
Type from Persia.
Chromosome number: $2n=20$ (Celarier, R. P., 1958).
SORGHUM.
This is a cultivated species with many cultvars.

**280.** *Sorghum halepense* (Linn.) Pers., Syn. Pl. **1**: 101. 1805.
Based on *Holcus halepensis* Linn., Sp. Pl. ed. 1, 1047. 1753.
Type from Suria.
Chromosome number: $2n=20, 40$ (E. K. J., 1945).
JOHNSON-GRASS.
This grass was introduced at some early period, however, it is now naturalized in waste places. It has been widely cultivated as a fodder.
It is said that the tissues of the plant under certain circumstances contain hydrocyanic acid and are a positive danger to stock.

**281.** *Sorghum nitidum* (Vahl) Pers., Syn. Pl. **1**: 101. 1805.
Based on *Holcus nitidus* Vahl, Symb. Bot. **2**: 102. 1791.

Type from India.

Chromosome number: $n=5$ (Chen & Hsu, 1962)—Chen 41 (TAI).

Distributed in India, Ceylon, Burma, extending through Thailand, Vietnam, China to Australia.

This grass grows on open mountain slopes at low altitudes. The chromosomes are fairely large and the number are only 5 in haploid cells.

**282.** *Sorghum propinquum* (Kunth) Hitchc. in Lingnan Sci. Journ. **7:** 249. 1931.

Based on *Andropogon propinquus* Kunth, Enum. Pl. **1:** 502. 1833.

Type from Luzon, the Philippines.

Chromosome number: $n=10$, $2n=20$ (Magon & Shambulinappa, 1961).

Distributed in Malay Peninsula, China and the Philippines.

V-(4)-29. *Spodiopogon* Trin., Fund. Agrost. 192, t. 17. 1820.

About 10 species distributed in Asia.

One species grows in Taiwan, it varies in spikelets, and in this study several forms are recognized.

**283.** *Spodiopogon tainanensis* Hayata in Bot. Mag. Tokyo **21:** 53. 1907 et Icon. Pl. Fromos. **7:** 71. 1918.

**Key to the forms of *Spopiopogon tainanensis***

1(6) One spikelet pedicelled, the other sessile; lodicules not sharp pointed:

2(3) Culm bases frequently branching, woody.....283B. f. *hogoensis*

3(2) Culm bases sparsely branching:

4(5) Lower lemma 1-2-veined; lodicules 0.5 mm wide.....283C. f. *tainanensis*

5(4) Lower lemma veinless; lodicules 0.35 mm long by 0.25 mm wide.....283D. f. *takeoi*

6(1) Spikelets all pedicelled; lodicules sharp-pointed at one side....283A. f. *hayatai*

**283A.** forma *hayatai* (Honda) C. Hsu, **comb. nov.**

Based on *Spodiopogon hayatai* Honda in Bot. Mag. Tokyo **39:** 268. 1925.

Type from Taiwan: "Kishirei" (關子嶺), leg. T. Kawakami et U. Mori 1855, anno 1906 (TI).

**283B.** forma *hogoensis* (Hay.) C. Hsu, **comb. nov.**

Based on *Spodiopogon hogoensis* Hayata, Icon. Pl. Formos. **7:** 70. 1918.

Type from Taiwan: "Musha, Hogo, ad 4,000 ped. alt." (霧社山地), leg. B. Hayata, Apr. 1916 (TI).

**283C.** forma *tainanensis*

Type from Taiwan: Tainan (嘉義, 竹仔崎庄), leg. G. Nakahara, Oct. anno 1905 (TI).

Chromosome number: $n=20$ (Chen & Hsu, 1962)—CY 6 (TAI).
Distributed on hillsides at low elevations.

**283D.** forma *takeoi* (Honda) C. Hsu, **comb. nov.**
Based on *Spodiopogon takeoi* Hayata, Icon. Pl. Formos. **7:** 71. f. 39. 1918.
Type from Taiwan: "Nanto, Shijo" (南投山地), leg. T. Ito, Oct. 1916 (TI).

V-(4)-30. *Thaumastochloa* C. E. Hubbard in Hook., Icon. Pl. sub tab. 3313, 3314. 1936.
About 6 species distributed in NE. India, SE. Asia to Taiwan, the Philippines, Marianne & Caroline Islands, Moluccas, N. Australia & Queensland.
Two species grow in Taiwan.

**Key to the species and forms of *Thaumastochloa***

1( 2 ) Spikelets about 5 mm long by 2 mm wide; leaves about 5 mm wide.....284. *T. chenii*
2( 1 ) Spikelets about 3 mm long by 1.2 mm wide; leaves about 3 mm wide.....285. *T. cochninchinensis*
3( 4 ) Lower glume of the lower spikelets with 10 to many pits between the veins.....285B. f. *shimadana*
4( 3 ) Lower glume devoid of such pits.....285A. f. *cochinchinensis*

**284.** *Thaumastochloa chenii* C. Hsu (**Fig. II.**, Page 217)
Type from Taiwan: "O-luan-pi" (鵝鑾鼻)—Chen 87 et 123 (TAI).
Chromosome number: $n=18$ (Chen & Hsu, 1962)—Chen 87, 123.
Endemic to Taiwan, known only from the southernmost littoral region.

**285.** *Thaumastochloa cochinchinensis* (Lour.) C. E. Hubbard in Hook., Icon. Pl. sub tab. 3313, 3314. 1936.
Based on *Phleum cochinchinense* Lour., Fl. Cochinch. **1:** 48. 1970.
Type from Cochin-China.

**285A.** forma *cochinchinensis*
Distributed in India, Burma, Thailand, China, extending to the Philippines.
This grass is found in the southern parts of China, locally it is also found only in littoral parts.

**285B.** forma *shimadana* (Ohwi & Odashima) Ohwi in Act. Phytotax. & Geobot. **11:** 178. 1942.
Based on *Ophiurus shimadanus* Ohwi & Odashima in Act. Phytotax. Geobot. **5:** 185. 1936 et **6:** 151. 1937.
Type from Taiwan: "Shinchiku" (新竹), leg. Y. Shimada 4852 (KYO).

V-(4)-31. *Themeda* Forssk., Fl. Aegypt.-Arab. 178. 1775.
About 10 species distributed in warmer regions of Africa and Asia.
Two species are reported from Taiwan.

**Key to the species and variety of *Themeda***

1(4) Upper spikelets with hairs all over the spikelet; ligule arc-shaped, 1 mm long .....286. *T. caudata*

2(3) Involucral spikelets pilose; hairs of upper spikelets yellowish .....286A. var. *caudata*

3(2) Involucral spikelets glabrous or scabrous; hairs of upper spikelets brown in color.....286B. var. *matsudai*

4(1) Upper spikelets with hairs only on upper part; ligule cylindrical, 2 mm long.....287. *T. japonica*

**286.** *Themeda caudata* (Nees) A. Camus in Lecomte, Fl. Gen. de l'Indo-Chine **7:** 364. 1922.

Based on *Anthistiria caudata* Nees in Hook. et Arn., Bot. Beechey Voy. 245. 1838.

Type from Macao, China.

**286A.** var. *caudata*

Distributed in India, Burma, Vietnam to China.

This is a tall, reed-like grass growing on the hillsides.

**286B.** var. *matsudai* Honda in Bot. Mag. Tokyo **40:** 108. 1926.

Type from Taiwan: "Buizan" (武威山), leg. E. Matsuda, H 357, anno 1918 (TI).

**287.** *Themeda japonica* (Willd.) C. Tanaka in Bull. Sci. Fak. Terkult. Kjusu Imp. Univ. **1:** 194, 207. 1925.

Based on *Anthistiria japonica* Willd., Sp. Pl. **4:** 901. 1806.

Type from Nagasaki, Japan.

Distributed in China, Korea and Japan.

This species is closely related to *Themeda triandra* Forssk., a widely distributed species which grows in the warm and tropical regions of the world.

V-(4)-32. *Vetiveria* Lem.-Lisanc. in Bull. Soc. Philom. **1822:** 43. 1822.

About 10 species distributed in the tropical Africa, Asia and Australia.

Only one species is in cultivation and has escaped and grows wild.

**288.** *Vetiveria zizanioides* (Linn.) Nash in Small, Fl. South-east U. S. 67. 1903.

Based on *Phalaris zizanioides* Linn., Mant. Pl. **2:** 183. 1771.

Type from India.

Chromosome number: $2n=20$ (Celarier, R. P., 1959).

VETIVER; KHUS-KHUS.

Distributed in India, Burma, Ceylon, South-east Asia to tropical Africa.

Locally this species was found only in southern Taiwan.

V-(4)-33. *Zea* Linn., Gen. Pl. ed. 5, 419. 1754 et in Sp. Pl. ed. 1, 971. 1753.

Only one species is found only in cultivation.

**289.** *Zea mays* Linn., Sp. Pl. ed. 1, 971. 1753.

Type from America.

Chromosome number: $2n=20+$B's (Delay, D., 1950).

CORN.

A native of America but now cultivated in all warm countries throughout the world.

This is a most important cereal. The grain is made into flour (Indian meal) or cooked without grinding; green corn (unripe cobs) forms a favorite vegetable; the dry cobs as fuel; the spathes are used in making paper and so on.

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## VII. INDEX

The names and numbers in **bold** indicate the subfamilies, tribes or the principal page of the names of taxa accepted.