台灣省飄拂草屬形態及分佈之研究

Note on the Morphology and Geographical Distribution of Formosan Fimbristylis (Cyperaceae)*

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摘 要

台灣地處亞熱帶與熱帶。為飄拂草類盛產之所，該屬佔台灣產莎草科種數的1/6為、不少。本文特就各種群花序、果實之形態詳細觀察作成合用之檢索表。此外調查各種之生活習性，花期和地理分佈等資料，綜合分析此屬在台灣的生長情形。並試圖藉此提供選擇該屬可供海埔新生地利用栽植之優良莎草。此外土城飄拂草（*F. macassarensis*）為作者首次發現於台灣之新記錄種。

緒 言

台灣產飄拂草屬植物有23個種群之多。關於該屬之研究僅為日人在有關論文或植物誌中附帶一提（J. ohwi 1944, 1965, T. Koyama 1961, Hatushima 1971）缺少有系統而完整的報告。台灣地狹人稠，土地之開拓與充分利用實為當務之急。台灣四面環海，海埔新生地之拓增實為良策。本文特注意該屬之生長習性，花期及分佈之了解以提供飄拂草類作為有望適於海埔地利用之優良雜草。

材料及方法

(1)種群之確定～以實體解剖顯微鏡（Olympus SZ-TR）觀察存於台灣大學植物系標本館（TAI）及筆者多年(1969-1976)採集之標本。就花序，小穗及花果作詳盡之比較與分析其變異情形。並繪製成圖表。

(2)生活習性及花期之了解～以多年野外採集之實地記錄資料為主，另以大量標本上標籤之記載為輔製成習性與花期表。

(3)在台灣分佈情形之分析～在台灣之分佈以野外採集之紀錄配合標本之統計在預印之地圖上圈出產地，製成分佈圖，以觀各種群在台灣分佈情形。

結 果

1. 台灣產飄拂草屬的特徵：

飄拂草屬的模式種為兩岐飄拂草〔F.dichotoma(L.)Vahl〕全世界約200種，台灣產經筆者研究確認有23個種群。該屬之特徵描述如下，各種之變異則以圖表示。

Fimbristylis Vahl

Spikelets mosly ovoidal or ellipsoidal, terete or more or less laterally compressed; solitary or in cluster. Floral scale numerous, spirally imbricated(Sect. Fimbristylis) or some becoming distichous (Sect. Abildgardia), neary all alike in shape, size and texture, and bearing a bisexual flower, at times basal 1 to few empty, membranous to chartaceous, rarely coriaceous and shiny, with 1- or 3-nerved keel. Flowers all bisexual and fruit-bearing. Hypogynous bristles none. Stamens 2 or 3, rarely 1 as in F. aestivalis. Achenes(Fig. 1)

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trigonous to lenticular, at times pentagonous in F. ovata, smooth or cancellated with transverse row of cells, often verruculose, sometimes bearing a stipe-like gynophore; styles trigonous or compressed, the latter type usually with fimbriate margins, the style base dilated and jointed at base when the achene mature, hence falling free from the achene.

Perennial or annual sedges. Culms erect, leaved at base, trigonous or laterally compressed. Leaves bladed or reduced to bladeless sheaths; blades mostly flat, rarely laterally compressed such as F. miliacea and becoming ensiform; sheaths closed, cylindrical or laterally compressed with acute keel; ligules much reduced existing as a fringe of pubescence or entirely none. Inflorescence (Fig. 2) corymbose, head-like or reduced to a single terminal spikelet; mostly stable but variable in F. cymosa and F. schoenoides. Bracts leafy, setaceous, or scale-like, not sheathing.

2. 台灣產飄拂草屬共種的檢索表：

Key to species of the genus Fimbristylis

1 (2) Achenes oblong-cylindrical. (Sect. 3. Mischospora) ..... 23. F. tetragona

2 (1) Achenes broadly obovate or obovate.

3 (6) Floral scales mostly distichous or at least on the lower part of a spikelet. (Sect. 2. Abildgaardia)

4 (5) Floral scales usually 2-ranked at lower part of a spikelet; achenes white. ..... 21. F. ovata

5 (4) Floral scales wholely 2-ranked; achenes straw color ..... 22. F. eragrostis

6 (3) Floral scales spirally imbricated (Sect. 1. Fimbristylis)

7(26) Style not markedly flattened; floral scales with keel.

8(21) All leaves surrounding culm-base bladed.

9(16) Ligule a fringe of pubescence; achenes whitish-yellowish.

10(11) Achenes obtusely trigonous, ca. 2mm long ..... 1. F. thomsonii

11(10) Achenes trigonous, less than 1.5 mm long.

12(13) Floral scales more than 3 mm long. ..... 2. F. complanata

13(12) Floral scales 1-2 mm long.

14(15) Floral scales 1-1.5 mm long, anther 0.25-0.3 mm long ..... 3a. F. autumnalis taiwanica

15(14) Floral scale 1.5-2 mm long, anther 0.5-1 mm long ..... 3b. F. autumnalis tainanensis

16 (9) Ligule absent; achenes brown to dark brown.

17(18) Leaves and culm densely pubescent. ..... 4. F. sericea

18(17) Leaves and culm glabrous.

19(20) Spikelets solitary, floral scale ovate to rhomboid, achenes biconvex; in middle & northern part of Taiwan ..... 5a. F. cymosa cymosa

20(19) Spikelets cluster, floral scale elliptic , achenes trigonous;

in south cap and Botel-tobacco. ..... 5b. F. cymosa umbellato-capitata

21 (8) Some of the leaves at culm-base reduced to bladeless sheaths.

22(23) Leaves laterlly compressed. ..... 8. F. miliacea

23(22) Leaves dorsiventrally compressed.

24(25) Floral scales ovate, round or contracted to mucronate apex. ..... 6. F. quinquangularis

25(24) Floral scales quadrate or obovate, apex sinus. ..... 7. F. macassarensis

26 (7) Style markedly compressed, fimbriate or ciliate on margins; floral scales without keeled on back.

27(32) Achenes cancellate with transversely cells.

28(29) Achenes brown at maturity. ..... 9. F. shimadana

29(28) Achenes whitish to yellowish.

30(31) Floral scales dull, membranous; spikelets 1.5-2 mm wide. ..... 11. F. bisumbellata

31(30) Floral scale shiny, chartaceous; spikelets 3-5 mm wide. ..... 10. F. dichotoma

32(27) Achenes smooth or verruculose.

33(34) Achenes lightly yellow at maturity, style hardly ciliate on margins. ..... 12. F. globulosa

34(33) Achenes brown or lightly br[illegible]y; style fimbriate.

35(42) Ligule a fringe of pubescen[illegible] ciliate auricle.

36(39) Floral scales distinctly [illegible]ral nerved.

37(38) Style more than 3 mm long, floral scales 5-7 mm long. ..... 13. F. subbispicata

38(37) Style less than 2 mm long; floral scales 3-3.5 mm long. ..... 14. F. schoenoides

39(36) Floral scales 1-nerved except at very base.

40(41) Inflorescence of a single spikelets, rarely of 2 or 3 spikelets. ..... 15. F. polytrichoides

41(40) Inflorescence corymbose with many spikelets ..... 16. F. sieboldii

42(35) Ligule abscence.

43(46) Spikelets 1.5 mm wide; small annuals.

44(45) Stylebase pilose with long pendent white hairs. ..... 17. F. squarrosa

45(44) Stylebase glabrous. ..... 18. F. aestivalis

46(43) Spikelet 3-4 mm wide; medium sized perennial.

47(48) Inflorescence of a terminal, single inclined spikelet. achenes transversely wrinked. ..... 19. F. nutans

48(47) Inflorescence of a single spikelet or corymbose with many spikelets; achene cancellate with transversely oblong cells.

3. 飄拂草屬各種的習性及花期：

由表一可以看出台灣產飄拂草屬23種中，生長於潮濕處及水田者有十一種之譜，其中五稜稈飄拂草及水虱草更可見於沼澤地。生長於海邊的則有七種，依次爲山邊草地五種，沙地四種，沼澤處則有三種。花期也因種類不同，差異頗大；整年幾乎均可採到花穗的有佛焰苞飄拂草，水虱草，兩岐飄拂草，夏飄拂草等。花期較短的則如西南飄拂草，在五月間抽穗，垂穗飄拂草在七～八月間開花，四稜飄拂草在九～十月間可採到花穗。整屬分析則知有二十個種類可在八月找到花穗。十二月最少，一月次之，逐次增多至八月份爲最多，再逐漸減少。

4. 各種的分佈情形：

全台灣包括澎湖、綠島及蘭嶼，目前23種的分佈情形，由北而南，依行政區表示如次。(1)台北縣（包括台北市）～共12種。夏飄拂草特別集中此區。(2)基隆市～共5種。臨海飄拂草此固有種僅見於此區。(3)桃園縣～共3種。長果節的唯一種四稜飄拂草見於此區。(4)新竹縣～共6種。齊苞節兩種之一的知風飄拂草見於此區。(5)苗栗縣～共3種。(6)台中縣～共3種。(7)彰化縣～共2種。(8)雲林縣～共7種。(9)嘉義縣～共5種。(10)台南縣～共10種。(11)高雄縣～共3種。(12)屏東縣～共9種。知風飄拂草也見於此區。(13)台東縣～共3種。固有種知本飄拂草僅見於此區。(14)花蓮縣～共3種。(15)宜蘭縣～共3種。(16)南投縣～共6種。新紀錄種土城飄拂草（Fig. 4）僅見於此區（Fig. 3）。(17)澎湖縣～只1種。(18)綠島～共3種。(19)蘭嶼～共7種。

討　論

由上列研究結果，分別討論如次：

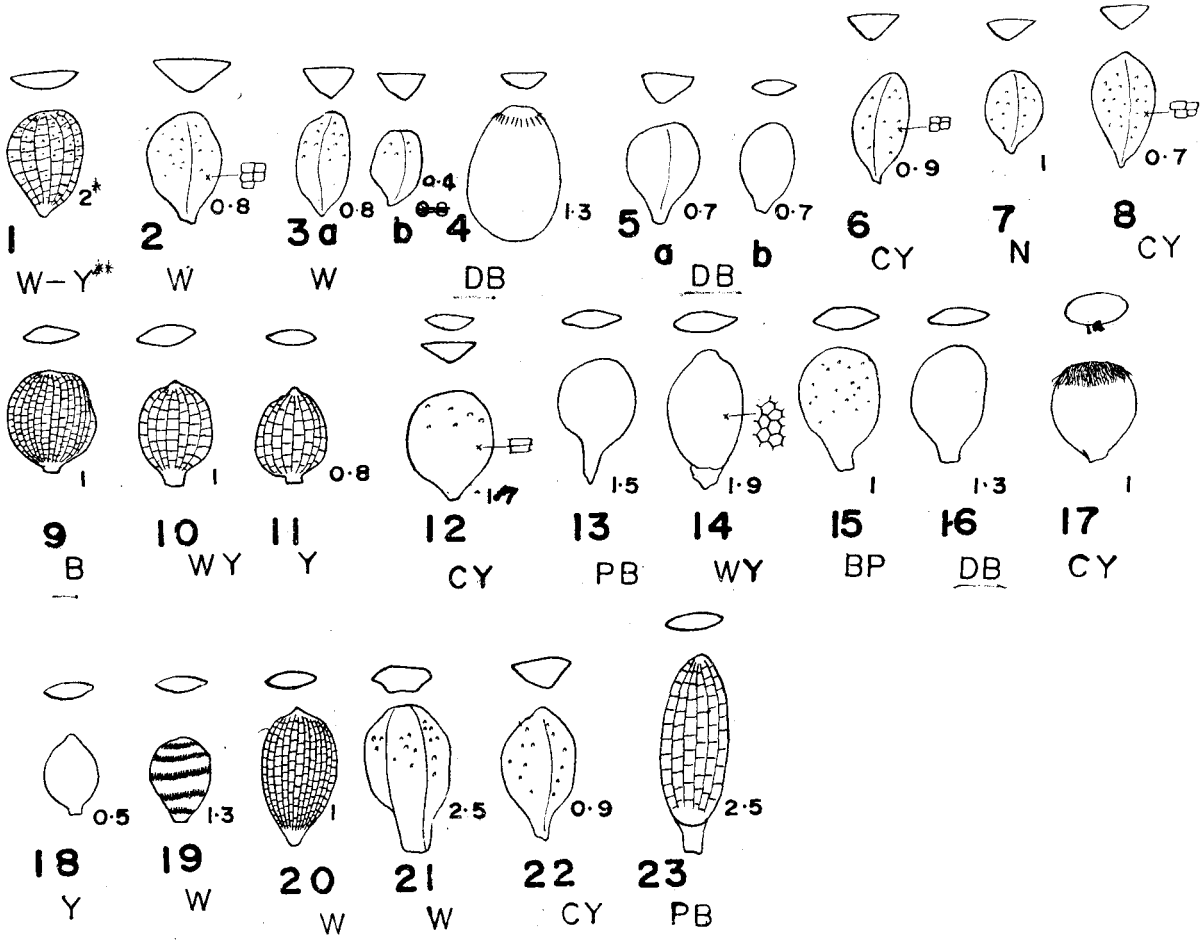
1. 台灣產飄拂草屬植物各種的鑑別，由花序及小穗外形，加上果實的特徵即可初步辨認。一些較相近的種類再依檢索表查對就能確定。
2. 就各種之生長習性觀之，欲選擇栽植於海埔新生地者，當以七種生於海邊的種類爲優先。其中絹毛飄拂草，雙穗飄拂草，細葉飄拂草及銹鱗飄拂草生長於沙地，且個體數多，更爲合適之材料（Fig. 3）。
3. 由花期分析結果得知，七月至九月是台灣該屬開花結果繁盛時期，是採集的最適期。莎草植物的鑑定，小穗是必要的依據，因之選擇正確的海埔地飄拂草類材料也於此時進行最易。
4. 此次研究所發現之新紀錄種土城飄拂草（F. maxcassarensis）其分佈僅見於爪哇及台灣南投縣土城。此種斷續分佈情形非常奇特，爲其它莎草植物中所罕見，頗值得進一步研究其傳播之機製（Dispersal mechanism）。

Fig. 1. Achens of the genus Fimbristylis

1. F. thomsonii
2. F. complanata-Shimada 301B.
3. F. autumnalis var. tainanesis--Shimada 309 B.
4. F. sericea--Kuoh 1684.
5a F. cymosa subsp. cymosa--Kuoh 1641.
5b F. cymosa subsp. umbellato-capitata--Kuoh 4910.
6. F. quinquangularis--Wang 10027.
7. F. macassarensis--Kuoh 3868.
8. F. miliacea--Kuoh 1028.
9. F. shimadana--Odashima 17809.
10. F. dichotoma--Kuoh 2111.

11. F. bisumbellata--Kuoh 2692.
12. F. umbelaris.
13. F. subbispicata--Shimada 734.
14. F. schoenoides--Hsu and Kuoh 8088.
15. F. polytrichoides--Hsu and Kuoh 13660A.
16. F. sielboldii--Kuoh 1639.
17. F. squarrosa-- Kuoh 2758.
18. F. aestivalis--Hsu 3510.
19. F. nutans--Masamune 3569.
20. F. subinclinata--T. Koyama 13070.
21. F. ovata--Kuoh 4886.
22. F. eragrostis-- Shimada 302B.
23. F. tetragona--S. Sasaki; Oct. 31, 1925. Toyen.

Note: * length (in mm)
** color--B-Brown; BP-Brownish purpule; CY-Creamy yellow; DB-Dark brown; N-Negro; W-White; WY-Whitish yellow; Y-Yellow.



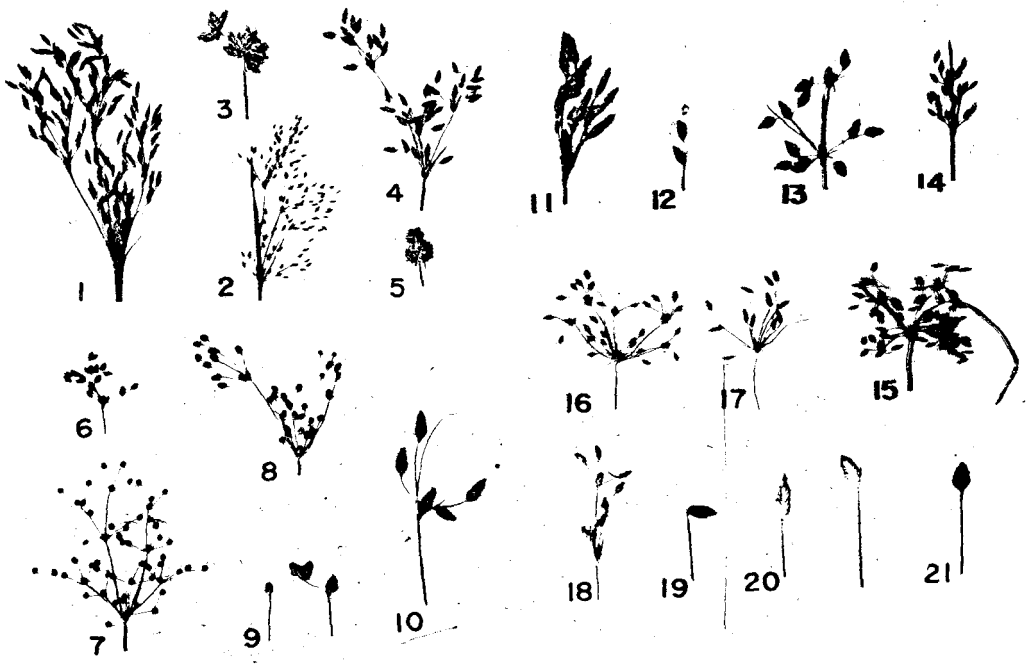


Fig. 2. Inflorescence and spikelets of the genus Fimbristylis

1. F. complanata--Matuda 207.
2. F. autumnalis--Hsu 9150.
3. F. sericea--Kuoh 4150.
4. F. cymosa Sub-sp. Cymosa--Wang 10098.
5. F. cymosa Sub-sp. umbellatocapitata--Hsu 13608.
6. F. quinquangularis--Wang 10027.
7. F. miliacea--Kuoh 1028.
8. F. miliacea--Kuoh 2219.
9. F. schoenoides--Hsu 12780.
10. F. shimadana--Odashima 17809.
11. F. sie boldii--Kao 5690.
12. F. polytrichoides--Chuang 3015.
13. F. dichotoma--Kao 2963.
14. F. dichotoma--Hsu 14169.
15. F. bisumbellata--Hsu 13075.
16. F. squarrosa--Morrimoto 209.
17. F. aestivalis--Kuoh 2224.
18. F. subinclinata--T. Koyama 13070.
19. F. nutans--Masamune 3569.
20. F. ovata--Kuoh 4886.
21. F. tetragona--Sasaki, s.n. Toyen, Oct. 31, 1925.

表一：飄拂草屬之生長習性與花期

	H/M	1	2	3	4	5	6	7	8	9	10	11	12
1. thomsonii	G					----							
2. complanata	G			----------									
3. autumnalis	W							----------					
4. sericea	SC			----------									
5. cymosa	C	----------											
6. quinquangularis	WM					----------							
7. macassarensis	W							-------					
8. miliacea	WM	----------											
9. shimadana	C	?											
10. bisumbellata	W	----------											
11. dichotoma	WG	----------											
12. umberallis	M								--------				
13. subbispicata	SC								----------				
14. schoenoides	W								----------				
15. polytrichoides	SC			' ----------									
16. sieboldii	SC					----------							
17. squarrosa	W					-------							
18. aestivalis	W	----------											
19. nutans	W							----					
20. subinclinata	W	?											
21. ovata	GC	---		----------									
22. eragrostis	G						----------						
23. tetragona	M									-----			

Note: H-Habitat
M-Month
W-Wet place, paddy field etc.
G-Grassy hillside.
S-Sandy place.
C-Coastal region.
M-Marshy place.

Fig. 3. 圖示新紀錄種（★）及分佈沿海沙地的種類

Note: ★ F. macassarensis
× F. sericea
○ F. subbispicata
▲ F. polytrichoides
■ F. sieboldii

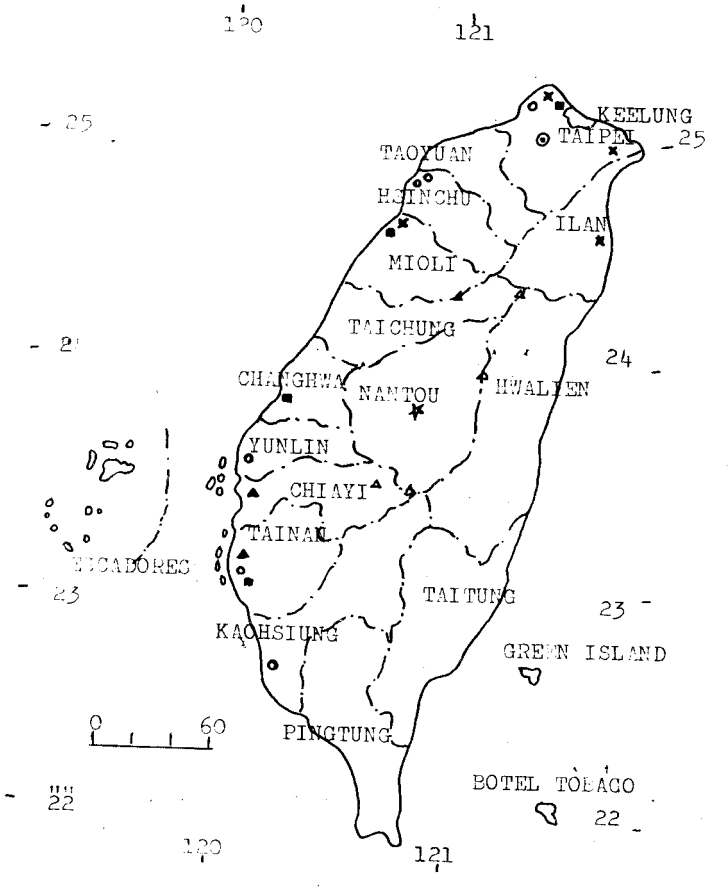
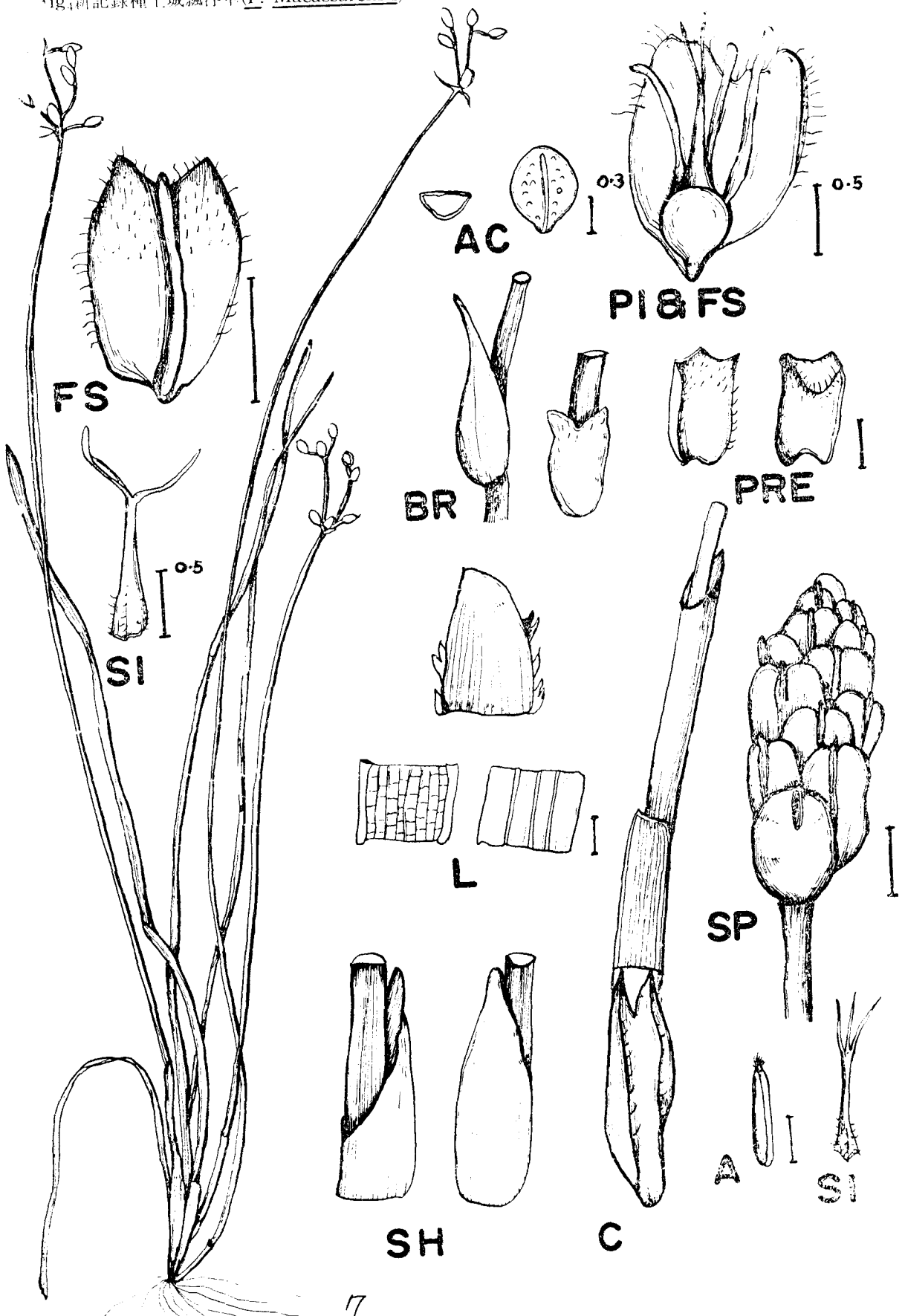


Fig. 新記錄種土城瓢浮草(F. Macassarensis)



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Abstract

The genus Fimbristylis is a large genus of Formosan Sedge. It numbered around one sixth species in the family Cyperaceae in Taiwan, which located in subtropics. There were only few reports in the past dealing with Formosan Fimbristylis. A more systematic treatment of the genus Fimbristylis is yet to be done.

In this study, we report the detailed morphology of inflorescence, fruits and the flowering time and habitat of 23 species. The geographical distribution of the genus is also presented. The presence of F. macassarensis in Taiwan (Formosa) is reported for the first time in this article.