

THE SPARGANIACEAE AND ITS NOTEWORTHY ASSOCIATES FOUND IN TAIWAN

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The representation of the family Sparganiaceae on the island of Taiwan was unknown and no specimens were collected until last summer when a group of botanists from Taiwan Forestry Research Institute and Tunghai University visited Yüan-Yang Lake (Mandarin Duck Lake) for the third time and several graduate students of the department of Botany of National Taiwan University were encouraged to make a brief excursion to the lake area in their company and brought back specimens collected in this area. Some of these specimens of leaves were noted by Yang to be possibly representative of Sparganiaceae. Hsu was later sent out to make additional collections of good specimens including the flowering or fruiting phase of the plant expected for further identification and to investigate its ecology. Further examination and detailed study of some of his collections of flowering as well as fruiting phase indicate that they indeed represent Sparganiaceae, a taxon that was previously unrecorded from this part of the world. As a consequence, the plant is apparently a welcome addition to the flora of Taiwan.

Sparganiaceae

Aquatic perennial herbs from a creeping rhizome. Stems simple or branched, leafy. Leaves elongate, alternate but often appearing 2-ranked, sheathing at base, floating and flaccid or erect and stiffer. Flowers unisexual, densely crowded in globose heads on the upper stem and branches, the male heads above the female in each inflorescence. Perianth of a 3 to 6 chaffy elongated scales. Staminate flowers of 3 or 6 stamens; filaments free or partly united; anthers oblong, basifixed; pollen grains globose. Pistillate flowers with a sessile mostly 1-celled ovary narrowed at base; style simple or forked, with a unilateral stigma; ovule 1, pendulous. Fruits nutlike, indehiscent, crowded, narrowed at base. Seed with a thin testa and the straight embryo in copious mealy endosperm.

The family is composed of the genus *Sparganium*, which includes about 15 species, occurring in cool and temperate regions of the Northern and Southern hemispheres and in Australasia, absent from Tropical and South Africa and South America.

Sparganium (Tourn.) L.

Sparganium [Tourn. ex Linn., Syst. ed. 1 (1753)] Linn., Sp. Pl. ed. 1, 971 (1753).

Characters of family. Only a single species occurs in Taiwan.

Sparganium fallax Graebn.

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Sparganium fallax Graebn., in Allg. Bot. Zeitschr. 4: 32 (1898), nomen et in Engl.

Pflanzenreich 2 (IV. 10): 15 (1900). (Pl. I; Photogr. 1 & 2)

Stems erect, 40-80 cm. long; leaves erect, longer than the stem, 4-10 mm. wide, keeled beneath; spikes erect, the lower bracts about as long as the spike; staminate heads 4-7, perianth-scales 6, membranous, about 1.4-2 mm. wide and 2.3-3 mm. long; filaments about 4-4.5 mm. long, exerted; anthers oblong; pollen grain monotreme and globose, sexine finely reticulate, 23-25 microns in diameter; the pistillate 4-7, relatively wide apart, usually sessile or the lowest head pedunculate, 2-2.5 cm. in diameter; ovary 1-chambered; style simple, about 2 mm. long; stigma oblong and beaklike; fruits rhombic-ovoid, about 5 mm. long and 2 mm. in diameter.

Specimens examined: K. S. Hsu 2683 & 3021.

Locality: Yüan-Yang Lake, Chien-shih Hsiang, Hainchu County (新竹縣尖石鄉鴛鴦湖), alt. 1400 m.

Distribution: Japan, Burma and India.

A number of herbs of marsh are found to be in association with *Sparganium fallax* in the lake shore. Noteworthy among them are the following species.

Galium trifidum Linn.

Galium trifidum Linn., Sp. Pl. ed. 1, 105 (1753).

Herbs of marsh; stems delicate and decumbent, much branched; leaves in verticils of 4's or rarely of 5's, about 0.5 cm. long, obtuse to rounded at apex; flowers white, 3-lobed, stamens 3; fruitlets globose and glabrous.

Specimen examined: K. S. Hau 2936

Distribution: China mainland.

This plant is a new addition to the flora of Taiwan!

Carex onoei Fr. et Sav.

Carex onoei Fr. et Sav., Enum. Pl. Jap. 2: 554 (1879).

Herbs of marsh; rhizomes short, densely tufted; culms 15-35 cm. long, soft, acutely angled, scabrous on the angles; leaves flat, soft, about 1.5 mm. wide; spikes terminal and solitary, about 1 cm. long; perigynia 2.5-3 mm. long, ovate, compressed-triangular, faintly nerved, abruptly very short-beaked, 2-toothed at tip; achene enclosed in a perigynium, trigonous.

Specimen examined: K. S. Hsu 2561

Distribution: China mainland, Korea, Japan, and Ussuri.

This species is a new addition to the flora of Taiwan!

Rhynchospora alba (Linn.) Vahl

Rhynchospora alba (Linn.) Vahl, Enum. Pl. 2: 236 (1806).

Slender herbs of marsh; culms tufted, about 10-35 cm. long, smooth; leaves filiform, involute, 0.5-1.5 mm. wide; corymbs somewhat globose, 2-3, loosely arranged; spikelets

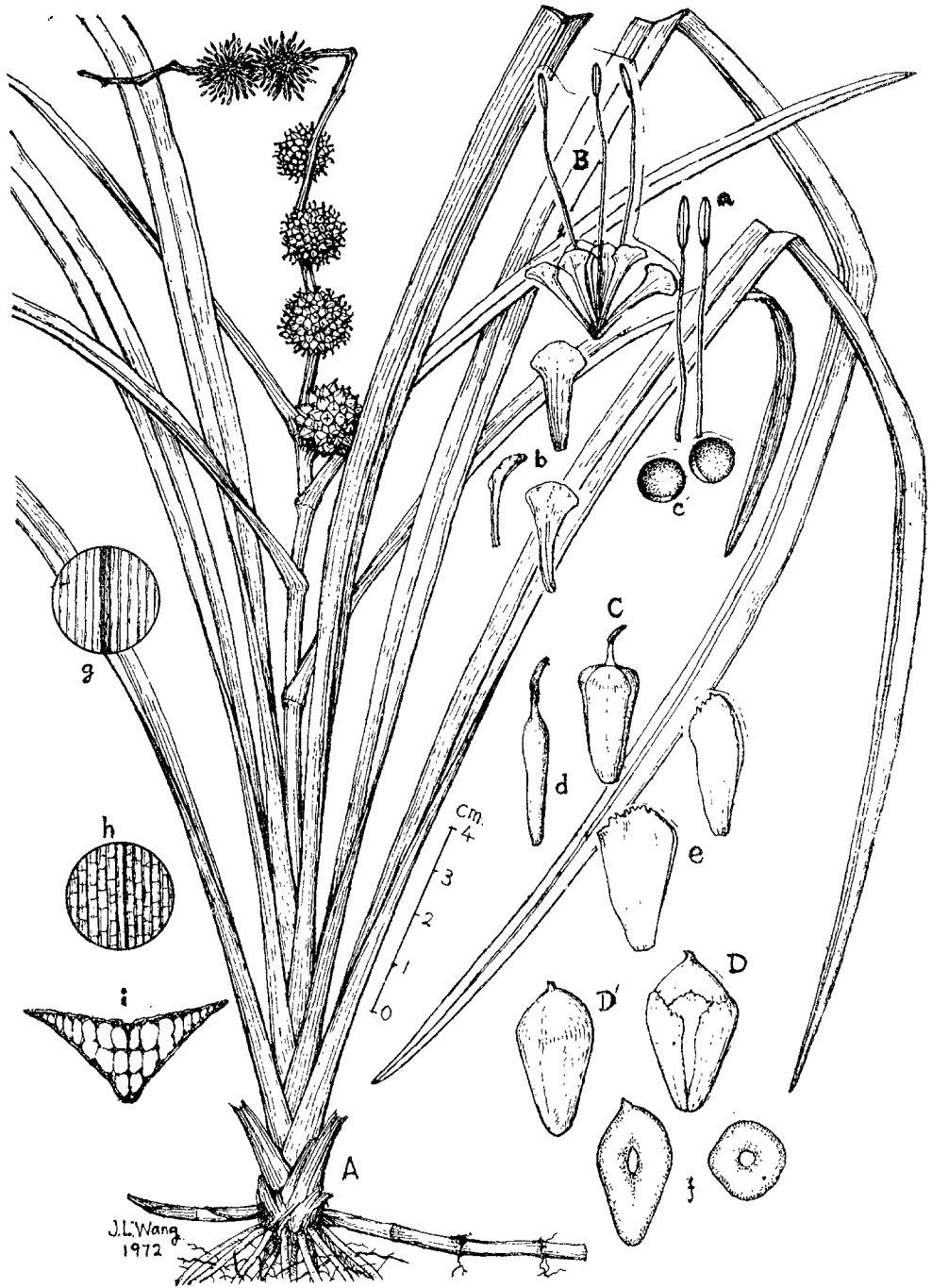


Plate I. *Sparganium fallax* Graebn. A. Whole plant; B. male flower; C. female flower; D-D'. fruit; a. stamen; b. petal of male flower; c. pollen grain; d. pistil; e. petal of female flower; f. cross and longitudinal section of fruit; g. portion of leaf upper surface; h. portion of leaf lower surface; i. cross section of leaf.



Photogr. 1. The inflorescence of *Sparganium fallax* Graebn.



Photogr. 2. The community of *Sparganium fallax* that skirts Yüan-Yang Lake.

whitish, 4-6 mm. long; achenes obovate, 2mm. long, with faint transverse wrinkles, the beak as long as the achene; bristles about 14, retrorsely scabrous.

Specimen examined: K. S. Hsu 3020

Distribution: Europe, Asia, and e. North America.

This plant is a new addition to the flora of Taiwan!

Acknowledgements

We are indebted to Mr. J. L. Wang, Division of Forest Biology, TFRI, Taipei, for his drawings shown in the plate.

Summary

It is found that Sparganiaceae has a representation of a single species on the island of Taiwan, i. e., *Sparganium fallax*, a plant which was previously unrecorded from this area under consideration. In addition, a number of herbs of marsh are found to be associated with the above named plant, and among these may be mentioned *Galium trifidum*, *Carex onoei* and *Rhynchospora alba*, which are recognized to be new additions to the flora of Taiwan.

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台灣前未發現之黑三稜科及其伴生植物新記錄種

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黑三稜科之分佈於臺灣向無記載，直到一九七二年夏季筆者等始在新竹鸞鴦湖發現該科之在臺代表，即東亞黑三稜 (*Sparganium fallax*)。此外尚在其伴生植物之間發現小葉四葉葎 (*Galium trifidum*)，針葉薹 (*Carex onoei*) 及白刺子莞 (*Rhynchospora alba*) 皆屬臺灣新記錄種。爰就調查研究所得新知草成此文，俾供國內外同好參考。