Taiwania, 55(1): 86-89, 2009

NOTE

Hedyotis pinifolia Wall. ex G. Don (Rubiaceae), a New Record to the Flora of Taiwan

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(Manuscript received 17 July 2009; accepted 8 September 2009)

ABSTRACT: *Hedyotis pinifolia* Wall. ex G. Don, a species of Rubiaceae, was found recently in Taiwan. It represents a new record for the flora of Taiwan, and a range extension of the species to the northeast. The present study provides the species description, illustrations, and SEM micrographs of seeds and pollen grains. Furthermore, a comparison of diagnostic characters between this species and a related species, *H. tenelliflora* Bl. is made.

KEY WORDS: *Hedyotis pinifolia* Wall. ex G. Don, Rubiaceae, Taiwan, Taxonomy, Weed.

INTRODUCTION

Hedyotis L. is a large heterogenous genus of more than 250 species, almost all of which are widely distributed in tropical and subtropical regions of the world, with the largest number in the Old World (Fukuoka, 1970; Wagner, et al., 1999; Dutta and Deb, 2004). Taiwan is comparatively poor in species, with only 11 species are presently known (Boufford, et al., 2003). In the course of a biosystematic study of *Hedyotis*, an unknown taxon assignable to the genus (*Chen & Ho 106*) was found. After a preliminary survey of the genus *Hedyotis* based on specimens from HAST, TAI, TAIF, NHU, it turned out that this collection represents *H. pinfolia* Wall. ex G. Don, a species not previously reported in literature pertaining to the flora of Taiwan. *Hedyotis pinifolia* might be indigenous to Taiwan but avoided collection until recently because it is a low inconspicuous annual, and is usually under the shelter of other plants.

Hedyotis pinifolia grows in sandy soils of grassy openings on the east coast of Taiwan. It is a widespread species in southeastern Asia, which bears some resemblance to a more common species viz., *H. tenelliflora* Bl. but differs in habitat and in several characters. The present study gives the species description and illustrations, including morphology of seeds and pollon grains by means of scanning electron microscopy (SEM), based on live plant materials from Taiwan. Furthermore, a comparison of the diagnostic characters between this species and *H. tenelliflora* is made.

TAXONOMIC TREATMENT

Hedyotis pinifolia Wall. ex G. Don, Gen. Syst. 3: 526. 1834; Hook. f. Fl. Brit. India 3: 60. 1880; Backer & Bakh. f., Fl. Java 2: 285. 1965; Fukuoka, in S. E. Asian Studies 8 (3): 234. 1970; Sasidharn & Nambiar, Indian J. Forest. 6(3): 234 & f. 1. 1983; Ko in Lo , H. S. (eds.), Fl. Reip. Popul. Sin. 71(1): 43 & f. 4: 9-14. 1999. 松葉耳草 Figs. 1-3

Annual herbs, profusely branching from the base, 5-15 cm long, with a stout, long taproot 5- 10 cm long. Stems erect, subquadrate, 0.8- 1.2 mm wide, narrower at base, with long slender, internodes 1-5 cm long, green flushed with purplish red. Leaves opposite, sessile, hard and straight, strigillose above; blades linear, 1- 3.5 cm long, 1-1.2 mm wide, acute to aristate at apex, rounded at base, revolute at margin, the midrib sunken above, raised below and strigillose; stipules adnate to the leaf-base, deltoid, 1 mm long and wide, hispidulous, with 2- 3 reddish, glabrous bristles 2- 4 mm long on upper margin. Flowers 1- 5, in terminal and axillary fascicles, sessile or subsessile; bracts narrowly elliptic, 2 mm long, hypanthium 2 mm long, 1 mm wide, quadrangular, green flushed with purplish red, hispid; Calyx 4-lobed, the lobes lanceolate, acuminate, 2 mm long, 0.8 mm wide, reddish aristate at apex, hirsute on margin. Corolla tubular- funnelform, 4-lobed, 6 mm long, white, usually externally flushed with purplish red toward apex, tube 3.5 mm long, 2 mm wide, glabrous outside, sparsely pilose on lower inside, lobes erect or slightly spreading, oblong, obtuse at apex, 2.5 mm long, 1 mm wide, glabrous; stamens 4, white, adnate to upper corolla tube, filaments 2 mm long, anthers oblong, 1 mm long; style 4 mm wide, white, glabrous, stigmas 2, clavate, 1 mm long, white. Capsules ovoid, 2.5- 3 mm across, sclerified, loculicidally dehiscent from the apex,

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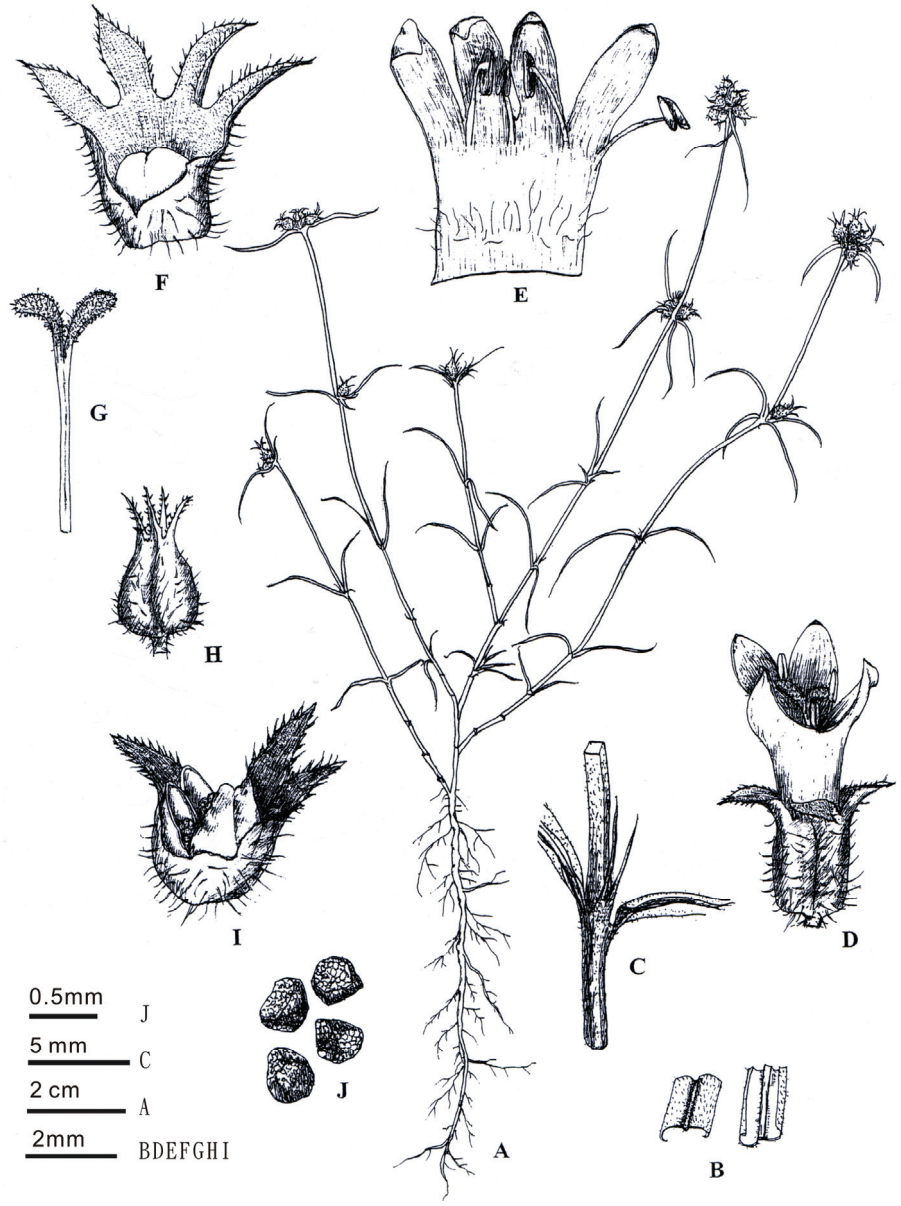


Fig. 1. *Hedyotis pinifolia* Wall. ex G. Don . A: Habit. B: Portion of leaf blade, adaxial (left) and abaxial (right) surfaces. C: Detail of stem node, showing stipule. D: Flowers. E: Corolla dissected, stamens and long, soft hairs. F: Hypanthium partly dissected, showing inner surface and ovary. G: Style showing stigma. H: Capsule surrounded with hypanthium. I: Dehiscing capsule with a calyx lobe removed. J: Seeds.

surrounded with persistent calyx. Seeds numerous, 0.3-0.4 mm long, brownish, angled to depressed obconic; hilum punctiform, situated on a conspicuous central ridge, testa reticulate, areoles polygonal, with distinct areole walls, testa surface verrucose (Figs. 3A-B). Pollen grains 3-colporate, with microechinate and micro-perforate tecta (Figs. 3C-D). Flowering and fruiting are throughout the year.

Specimen examined: TAIWAN: Hualien Co.: Shou-Fong Hsiang, Ling-ding, elev. ca. 20-50 m, in grasslands, along sandy beach, *Chen & Ho 106*, 5 Apr. 2008, *Chen s. n.*, and *Su 676* (All at NHU). CHINA: Hainan: Chim Fung Mt., near Fong Ngau Po Village, Kan-en District, *Lau 5663* (HAST).

Distribution: *Hedyotis pinifolia* is indigenous to S. E. Asia, distributed throuth southern India, Thailand, Java, to Malaysia and Singapore, and to southern China (Backer and Bakhuizen, 1965; Fukuoka, 1970; Sasidharan and Nambiar, 1983; Ko, 1999). Our collection represents a new record for the species in Taiwan, and a range extension for this species to the northeast (Fig. 4).

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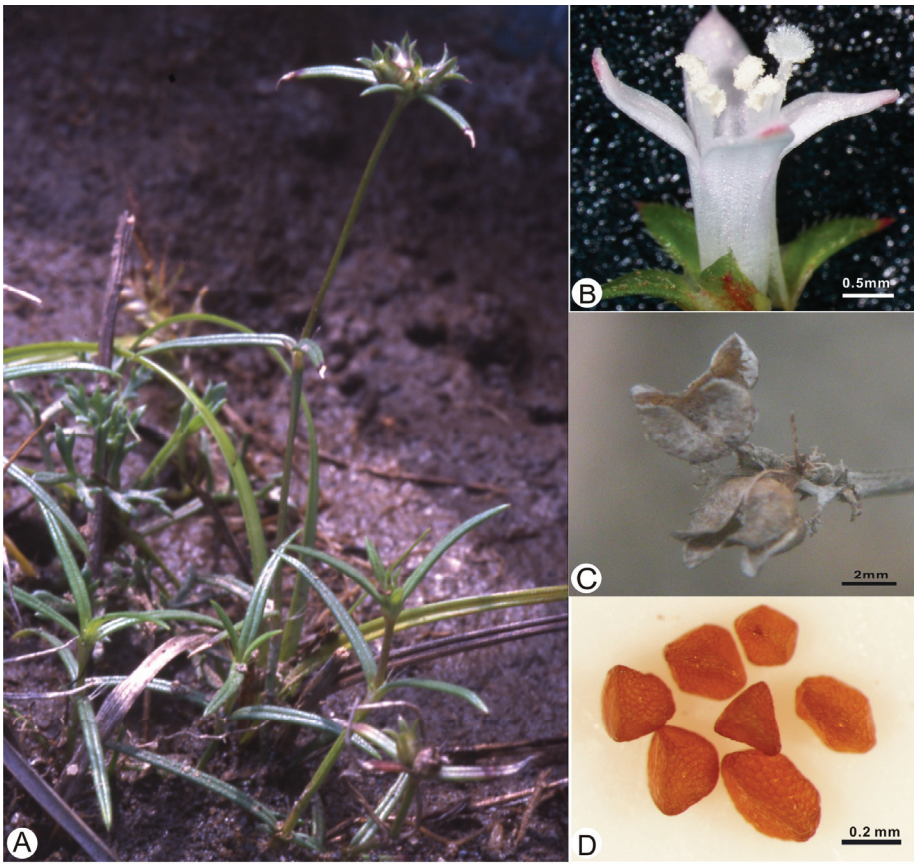


Fig. 2. *Hedyotis pinifolia* Wall. ex G. Don A: Habit. B: Flower. C: Capsules. D: Seeds.

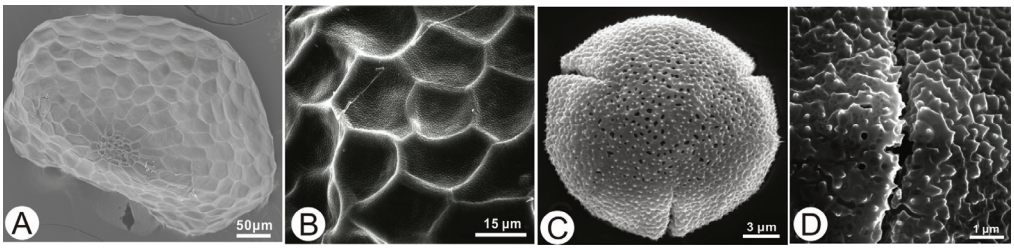


Fig. 3. *Hedyotis pinifolia* Wall. ex G. Don, seeds and pollen grains examined by SEM A: Seed, ventral view showing centric hilum. B: Seed, showing testa surface and polygonal areoles. C: Pollen grain, polar view. D: Pollen grain, showing exine pattern.

Habitat and Ecology: This species is found on sandy soils, along seashores of the eastern part of Taiwan. It is scattered in rather dry sites of grasslands, associated with common seaside plants such as *Justicia procumbens* L. var. *hayatae* (Yamamoto) Ohwi, *Artemisia japonica* Thunb., *Aster hispidus* Willd., *Carex pumila* Thunb., *Silene fortunei* Vis. var. *kirunisularis* (Masamune) S. S. Ying, *Scaevola sericea* Forst. F. ex. Vahl, *Chloris barbata* (L.) Sw., *Cynodon dactylon* (L.) Pers., *Arundo formosana* Hack., *Cassytha filiformis* L., *Dianella ensifolia* (L.) Redoute, and *Ipomea pes-caprae* (L.) R. Br. subsp. *Brasiliensis* (L.) Ooststr.; weedy plants occurring as adventive in Taiwan such as *Bidens pilosa* L. var. *radiata* Sch. F., *Lepidium virginicum* L., *Oenothera laciniata* Hill. *Alysicarpus vaginalis* (L.) DC. *Leucaena leucocephala* (Lam.) de Wit., *Melilotus indicus* (L.) All., and *Portulaca pilosa* L.

Notes: *Hedyotis pinifolia* Wall. ex G. Don is superficially similar to *H. tenelliflora* Bl., a widespread species on the island, and might be mistaken for that completely separate taxon at first sight. The differences between the two taxa are as appear from the characters tabulated in Table 1.

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Table 1. Comparison of *Hedyotis pinifolia* Wall. ex G. Don and *H. tenelliflora* Bl.

Characters	*H. pinifolia* Wall. ex G. Don	*H. tenelliflora* Bl.
Habitat	sandy areas of seacoast	waste sites, woods and deforested areas
Habit	annual herbs, 5- 15 cm tall	annual to perennial herbs, 20- 40 cm tall
Taproot	well developed	less developed
Leaves	linear, ca. 1- 1.2 mm wide	linear lanceolate, ca. 2- 5 mm wide
Inflorescence	terminal and axillary	axillary
Corolla lobes	not recurved	recurved
Corolla tube	sparsely pilose on lower inside	glabrous
Capsule	hispid	glabrous

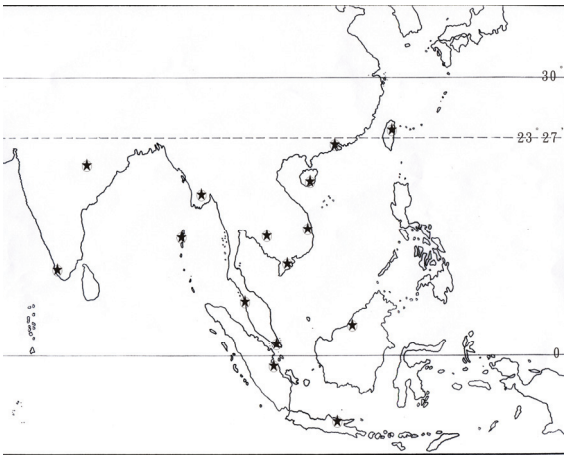


Fig. 4. Distribution map of *Hedyotis pinifolia* Wall. ex G. Don

ACKNOWLEDGEMENTS

We thank the curators of the herbaria (TAI, HAST) for making specimens available for study. This work was supported in part by a National Science Council grant (NSC 96-2621-B-259-002-My3) to M.-J. Wu and a research grant from the Ministry of Education, Taiwan, ROC. to S.-H. Chen.

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臺灣新紀錄植物－松葉耳草

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(收稿日期：2009 年 7 月 17 日；接受日期：2009 年 9 月 8 日)

摘要：松葉耳草(*Hedyotis pinifolia* Wall. ex G. Don)為臺灣新紀錄茜草科植物，臺灣為其地理分佈北限。本文描述這植物，除提供形態、解剖及花粉與種子 SEM 圖幅外，並報告其分佈、生態及與相近種之差異。

關鍵詞：松葉耳草、茜草科、臺灣、分類學、雜草。

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