

A newly naturalized species in Taiwan: *Hibiscus asper* Hook.  
f. (Malvaceae)

臺灣錦葵科木槿屬新歸化植物—糙葉木槿

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## Abstract

*Hibiscus asper* Hook. f. (Malvaceae), a native to tropical Africa, has recently been found in abandoned lands of central Taiwan. The species is distinguishable by its stems with sparse pricks, the calyx with dense bristles and red protuberances, light yellow flowers with a red-purple center, and the hilum of seed surrounded by hairs. Line-drawing, photographs and a distribution map of this newly naturalized species are provided to aid its identification.

## 摘 要

糙葉木槿原產於熱帶非洲，近期於臺灣中部廢耕地發現。本種辨識特徵為莖具稀疏的刺毛，花萼密生刺毛與紅色突起，花淡黃色中央為紫紅色，種臍周圍生有毛。本文提供該種植物的手繪圖、彩色照片及分布地點供識別之用。

**Key words:** *Hibiscus asper* Hook. f., Malvaceae, newly naturalized, Taiwan

**關鍵詞：**糙葉木槿、錦葵科、新歸化、臺灣

Received: December 10, 2013

Accepted: May 28, 2014

收件日期：2013年12月10日

接受日期：2014年05月28日

## Introduction

The genus *Hibiscus* Linnaeus belongs to the family Malvaceae. It comprises about 200 species distributed in tropical and subtropical areas (Tang *et al.* 2007). Most species of this genus are of economic importance as fibers, ornamentals, medicine, victuals and cosmetic products (Holland 1918, Ayanbamiji *et al.* 2012). According to records, only seven species have been recorded in Taiwan (Chang 1993, Yeh 2005). Recently in 2013, two newly naturalized

species of this genus have been added (Liu *et al.* 2013, Wang and Li 2013). Besides the nine species recorded, another newly naturalized species *Hibiscus asper* Hook. f. was also found in central Taiwan during our field research.

*H. asper* was described in 1849 by J. D. Hooker from the specimen collected in Sierra Leone (Sprague 1913). Later, *H. asper* was reduced along with other species to *H. cannabinus* by Masters in 1868 (Sprague 1913). Hochreutiner in 1900 progressed further more in extending the category of *H. cannabinus*, which

he considered to be very variable. The study of the material of the Kew Herbarium shows that *H. asper* can be distinguished from *H. cannabinus* by several characteristics - the repand lobing of the leaf segments, the small subglobose capsule, and the smaller but more rounded minutely and densely tubercled seeds with a setose sinus, all of which warrant its restoration to its own rank (Sprague 1913). *H. asper* is native and widespread in tropical Africa, from Senegal to Ethiopia, Angola, Zambia, Mozambique and Madagascar (Sprague 1913, Hutchinson and Dalziel 1931, Wilson 1999). It is a weed species that grows in abandoned farm fields, savannas, grassland, river alluvium, moist rock basins and edges of gallery forest. However, *H. asper* has not been recorded in Asia before.

In recent two years (2012–2013), there have been at least five recorded localities of this species in central Taiwan. Based on the fact, we believe that its population has survived in abandoned fields and reproduced without continuing human efforts and that this species has been naturalized. Characteristics of this newly naturalized species are described and illustrated below.

## Taxonomic treatment

*Hibiscus asper* Hook. f., Niger. Fl.: 228. 1849; Wilson in Bull. Nat. Hist. Mus. 29: 68. 1999. 糙葉木槿 (Figs. 1, 3 A–F).

*H. cannabinus* auct. non Masters in Oliv. Fl. Trop. Afr. Vol. 1: 204. 1868; Hochreutiner in Annuaire Conserv. & Jard. Bot. Genève, Vol. 4:

114. 1900.

Herbs up to 1.3 m tall. Stems sparsely aculeate or with fine, simple to stellate hairs; branches well-developed or not, often becoming very short on distal end of stems or aged ones; stipules narrowly lanceolate, 0.3–0.4 cm long, often red, shortly pubescent; petioles 0.5–5 cm long, with pubescence like that of the stems and a more dense pubescent line on upper side; blades variable in size and shape, those on general stem and branches 5–9 cm long, rhombic, deeply 3–5-lobed, lobes 0.8–1.3 cm wide, those on shortened axile branches 2–5 cm long, strap-like or lanceolate, 0.5–1 cm wide, simple or shallowly 2–3-lobed, the abaxial surface with simple to tessellate bristles on ribs and veins, more sparse and shorter on adaxial surface, the margin serrate or irregularly fine toothed, the nectary on the rib 0.1–0.15 cm long, pigmented when fresh, slit-like when dry. Flowers solitary, axillary, 2–2.8 cm long, 2.8–3.2 cm across; peduncles 0.2–0.5 cm long, articulating at base, with straight simple bristles; involucellar bracteoles often 9, rarely 7–11, lanceolate, 0.5–0.8 cm long, 0.2–0.25 cm wide, with simple bristles; calyx 1.2–1.4 cm long, the lobes broadly lanceolate, 0.38–0.42 cm wide, with long or short bristles, the bristles arising from a dark red and swollen base; corolla light yellow with a red-purple center, petals obliquely triangular-obovate, 2.7 cm long, 2.3 cm wide, minutely and shortly pubescent on adaxial side and margin, glabrous abaxially; staminate column 0.6–0.8 cm long, orange-red, filament 0.03–0.1 cm long; anther 2-celled; pistil ca. 1.5

cm long, style 5-branched at apex, branches ca. 1 mm long, exposed beyond the staminate column, purple-red and minutely tessellate above, glabrous and light colored below, stigma purple-red, with minute spine hairs, ovary sub-conic, with long antrorse bristle hairs, 0.4–0.5 cm tall, 0.4–0.5 cm in diameter. Fruit a capsule, included, enveloped with persistent calyx and epicalyx before ripen, compressed globose, ca. 1.3–1.5 cm tall, 1.5–1.8 cm in diameter, carpels 5, loculicidal dehiscent, covered with long compressed hairs; seeds many, subreniform, ca. 4.2–4.8 × 3.8–4 × 2 mm, brown or dark brown, with sub-concentric striations and minute protuberances 0.1–0.3 mm long, the hilum minute, dark brown, surrounding with longer hairs to 3–4 mm long.

**Specimens examined:** Taiwan, Yunlin County, Mailiao Township, 17 Nov. 2012, *Lee C. T.* 066 (PPI); same locality, 12 Jan. 2013, *Lee C. T.* 087 (TAIF), 090 (TAI); Linnei Township, 12 Jan. 2013, *Lee C. T.* 091 (TAIF); Mailiao Township, 2 Nov. 2013, *Lee C. T.* 122 (TAIF), Baozhong Township, 4 Nov. 2013, *Lee C. T.* 129 (TAIF); Taixi Township, 4 Nov. 2013, *Lee C. T.* 131 (TAIF); Changhua County, Fangyuan Township, 4 Nov. 2013, *Lee C. T.* 134 (TAIF). Herb. Kew. No. K000240761, K000240763, photo! Herb. HNBU. No. 01583, photo!

Distribution: *H. asper* widely occurs in tropical Africa and Madagascar (Sprague 1913, Wilson 1999). In Taiwan, *H. asper* occurs in the western Yunlin County near the seashore and in the east Yunlin County near the Nantou and Changhua County (Fig. 2). It also occurs in

Changhua County. The species is found on the roadsides and abandoned lands. There are more than ten individuals in the Taiwanese locations mentioned above.

Note: *H. asper* is close to *H. cannabinus* (Fig. 3 G–J) (Hutchinson and Dalziel 1931, Wilson 1999), but can be distinguished by some morphological characteristics. A further detailed comparison of the two species is made in Table 1.

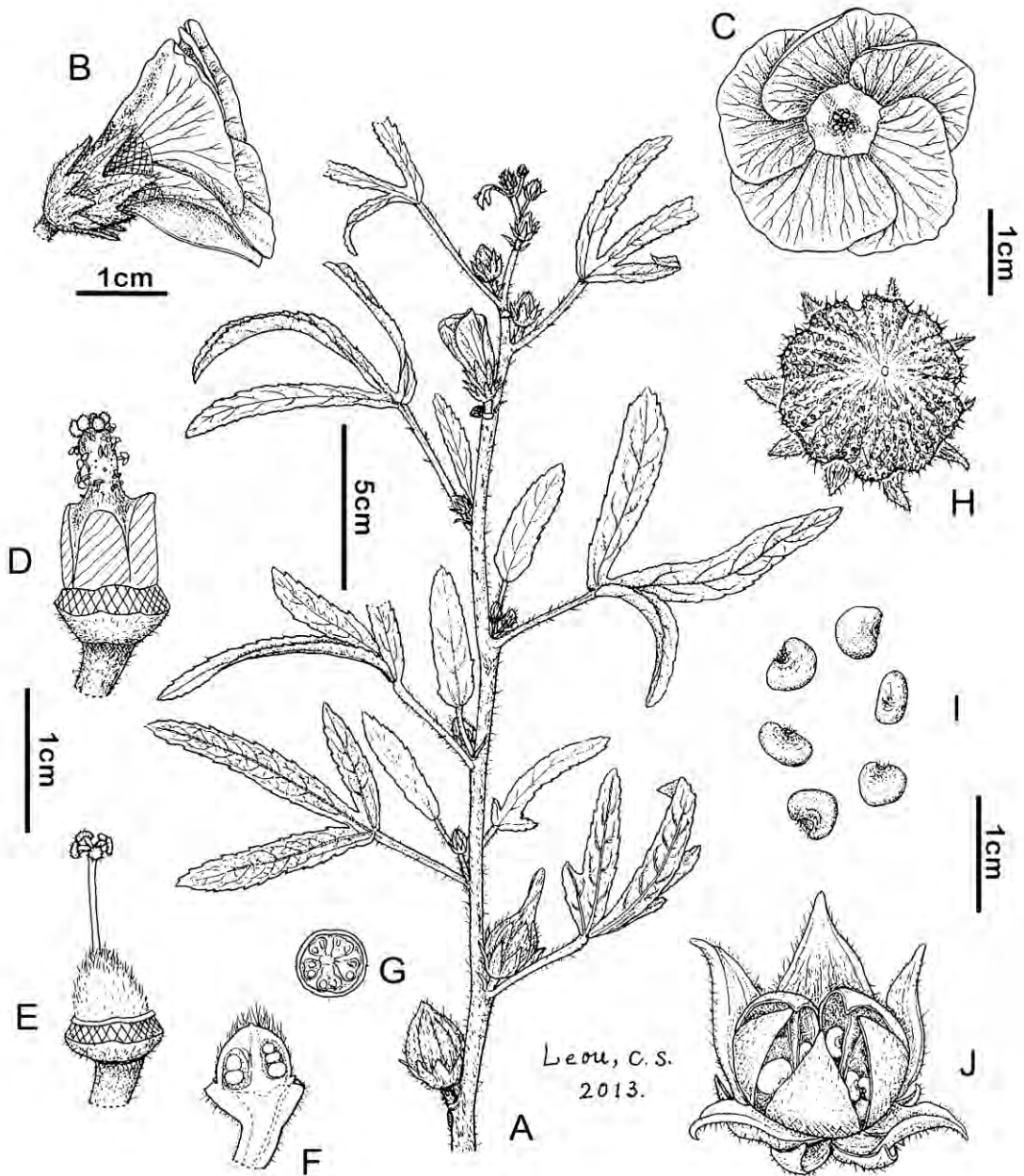
## Acknowledgments

We are indebted to Ms. Fang-Ting Liu and Hsiao-Yun Chang (The Affiliated Taichung Agricultural Vocational Senior High School of NCHU) for revising the English writing. Thanks are also given to Mr. Chang-Lang Liu for offering information and support of fieldwork.

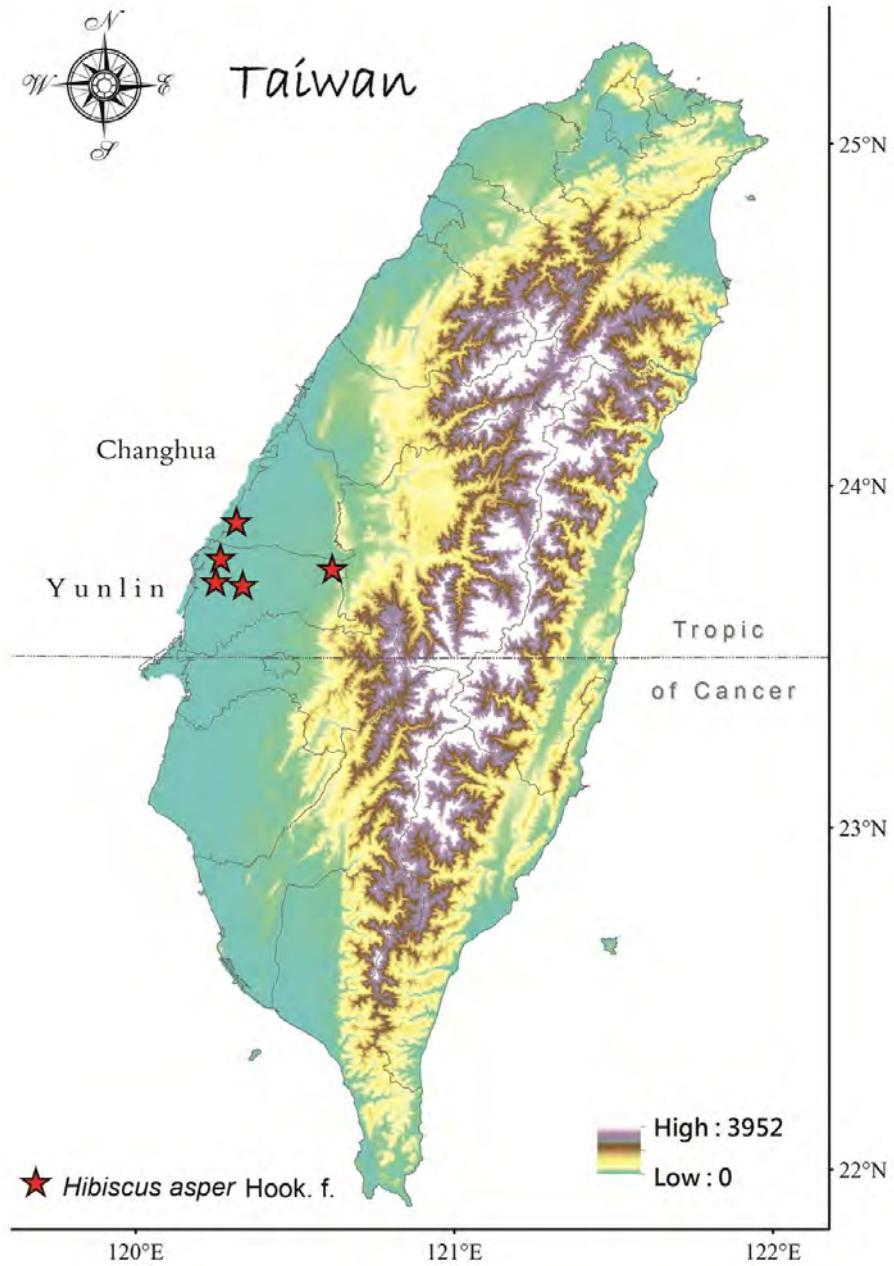
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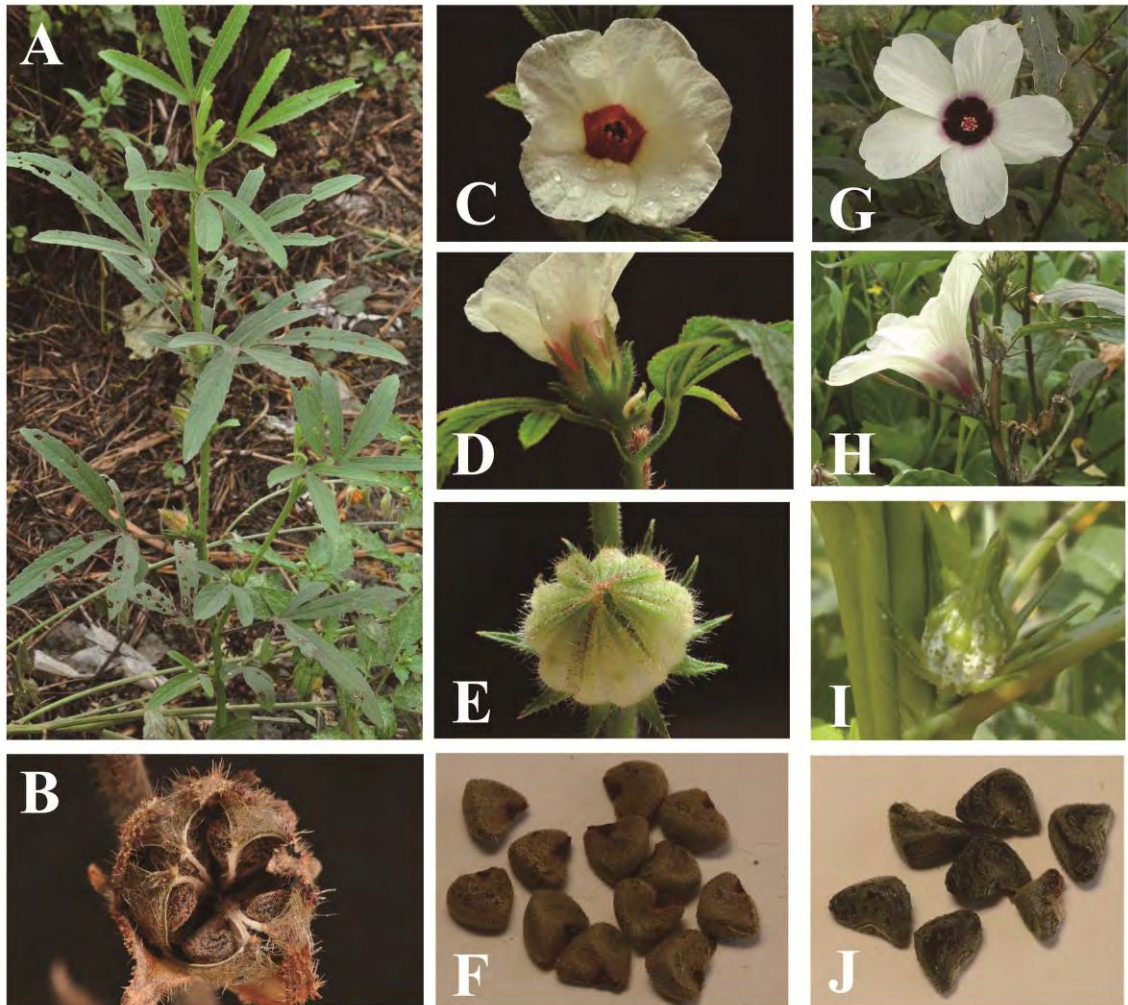
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**Fig. 1.** *Hibiscus asper* Hook. f. A: Flower branch. B: Flower, side view. C: Flower, front view. D: Stigma and staminal column, side view. E: Pistil, side view. F: Ovary and receptacle, longitudinal section. G: Ovary, cross section. H: Immature fruit. I: Seeds, various view. J: Mature capsule with persistent calyx and epicalyx.



**Fig. 2.** Distribution of *Hibiscus asper* Hook. f. in Taiwan.



**Fig. 3.** Photographs of *Hibiscus asper* Hook. f. (A–F) and *H. cannabinus* L. (G–J). A: Habit. B: Mature capsule with persistent calyx and epicalyx. C: Flower. D: Flower, side view. E: Immature fruit. F: Seeds. G: Flower. H: Flower, side view. I: Immature fruit. J: Seeds. (Photos G–J by courtesy of Mr. Chang-Lang Liu)

**Table 1.** Main differences in morphology between *H. asper* and *H. cannabinus* (Hutchinson and Dalziel 1931; Wilson 1999; Liu *et al.* 2013)

Characters	<i>H. asper</i>	<i>H. cannabinus</i>
Stems	surface with sparse pricks	smooth surface or surface with few pricks
Calyx	dense bristles, and bristles arising from the dark red and swollen base	spiny and white tomentose, each with a gland at base
Flowers	light yellow with a red-purple center; petal triangular-obovate	off-white, cream, or various shades of purple with a deep purple center; petal oblong-obovate
Fruits	the hilum of seed surrounded by hairs	the seeds with glabrous hilum