

Research note

**Two Newly Naturalized Plants of the Boraginaceae  
in Taiwan: *Trichodesma indicum* (L.) Lehm.  
and *Trichodesma zeylanicum* (Burm.f.) R. Br.**

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**[ Summary ]**

*Trichodesma indicum* (L.) Lehm., an herb native to Asia and Africa, and *Trichodesma zeylanicum* (Burm.f.) R. Br., one native to Africa, tropical Asia, and Australasia, were recently found in west-central Taiwan. Both species are considered to be newly naturalized. This report gives taxonomic descriptions, illustrations, and distribution maps. Photographs are also provided to help with identification.

**Key words:** *Trichodesma indicum*, *Trichodesma zeylanicum*, Boraginaceae, naturalized plant, Taiwan.

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## 研究簡報

## 兩種新歸化的紫草科植物： 印度碧果草及斯里蘭卡碧果草

王秋美<sup>1)</sup> 張坤城<sup>2,3)</sup>

### 摘要

原產於熱帶亞洲及非洲的印度碧果草與斯里蘭卡碧果草(亦見於澳洲)最近發現於臺灣中部。這兩種紫草科植物，均為新近歸化於臺灣的外來種。本文提供此兩物種的分類特徵描述，手繪圖，以及在臺灣的分布點以供區分鑑定。

關鍵詞：印度碧果草、斯里蘭卡碧果草、紫草科、歸化植物、臺灣。

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### INTRODUCTION

The Boraginaceae comprises about 156 genera and 2500 species which are distributed in temperate and tropical regions, and centered in the Mediterranean region (Zhu et al. 1995). In the *Flora of Taiwan* 2<sup>nd</sup> edition, there are 12 genera and 24 native or naturalized species recorded (Hsiao et al. 1998). After that, 2 species within the Boraginaceae, *Trigonotis peduncularis* Benth. ex Barker & S. Moore (Wang and Shen 2001) and *Myosotis arvensis* (L.) Hill (Hsu et al. 2002) were reported for the flora of Taiwan. Recently, 2 species were found in central Taiwan and considered to be newly naturalized plants, *Trichodesma indicum* (L.) Lehm. and *T. zeylanicum* (Burm.f.) R. Br. Both of them are common weed species in areas like roadsides and abandoned agriculture fields. This paper provides descriptions, illustrations, distribution maps, and color photos.

*Trichodesma* is comprised of about 40–45 species (Nasir 1989, Verdcourt 1991, Zhu et al. 1995) mainly in western and central Asia, with a few species in Africa and Australia

(Weigend et al. 2013), and is characterized by the connective of the anthers prominently subulate and spirally twisted. In the *Flora of Taiwan* 2<sup>nd</sup> edition, only *T. calycosum* Collett & Hemsl. was recorded in Taiwan.

### Key to species of *Trichodesma* in Taiwan

1. Nutlets with winged serrate margins, teeth drawn out, and faces with glochidiate setae ..... *T. calycosum*
1. Nutlets smooth and shiny, margins not raised
  2. Calyx base hastate or cordate ..... *T. indicum*
  2. Calyx base rounded ..... *T. zeylanicum*

### TAXONOMIC TREATMENT

**1. *Trichodesma indicum* (L.) Lehm., Pl. Asperif. Nucif. 193. 1818.**

*Borago indica* L., Sp. Pl. 1: 137. 1753....

.....印度碧果草 Figs. 1, 3A-D, 4

An annual herb with much-branched spreading and densely hairy branches, 15–50 cm tall, young stems sometimes reddish;

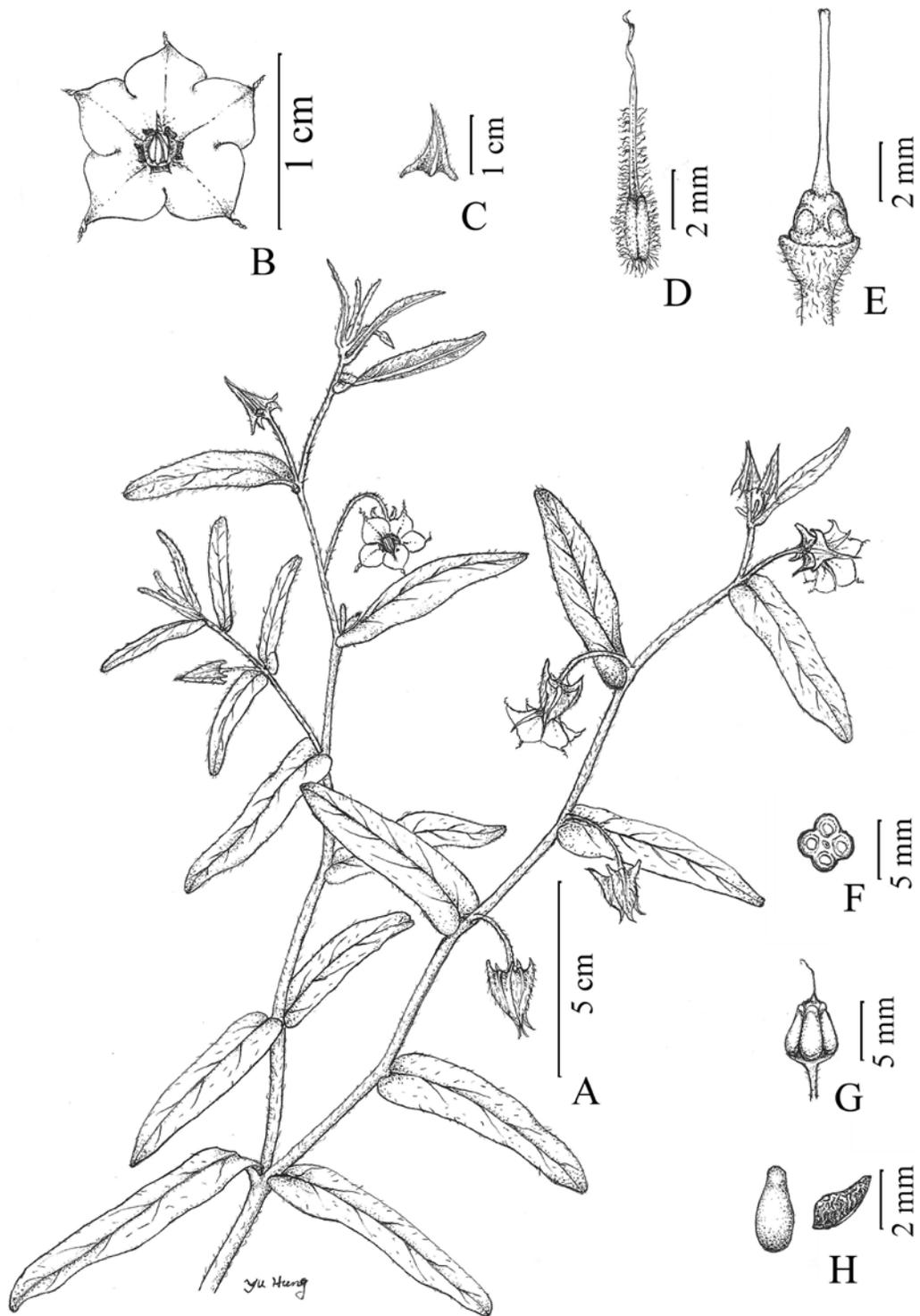


Fig. 1. *Trichodesma indicum* (L.) Lehm. A, Habit; B, section of a flower; C, calyx; D, stamen with hairs removed; E, pistil; F, cross section of ovary; G, nutlet; H, seeds.

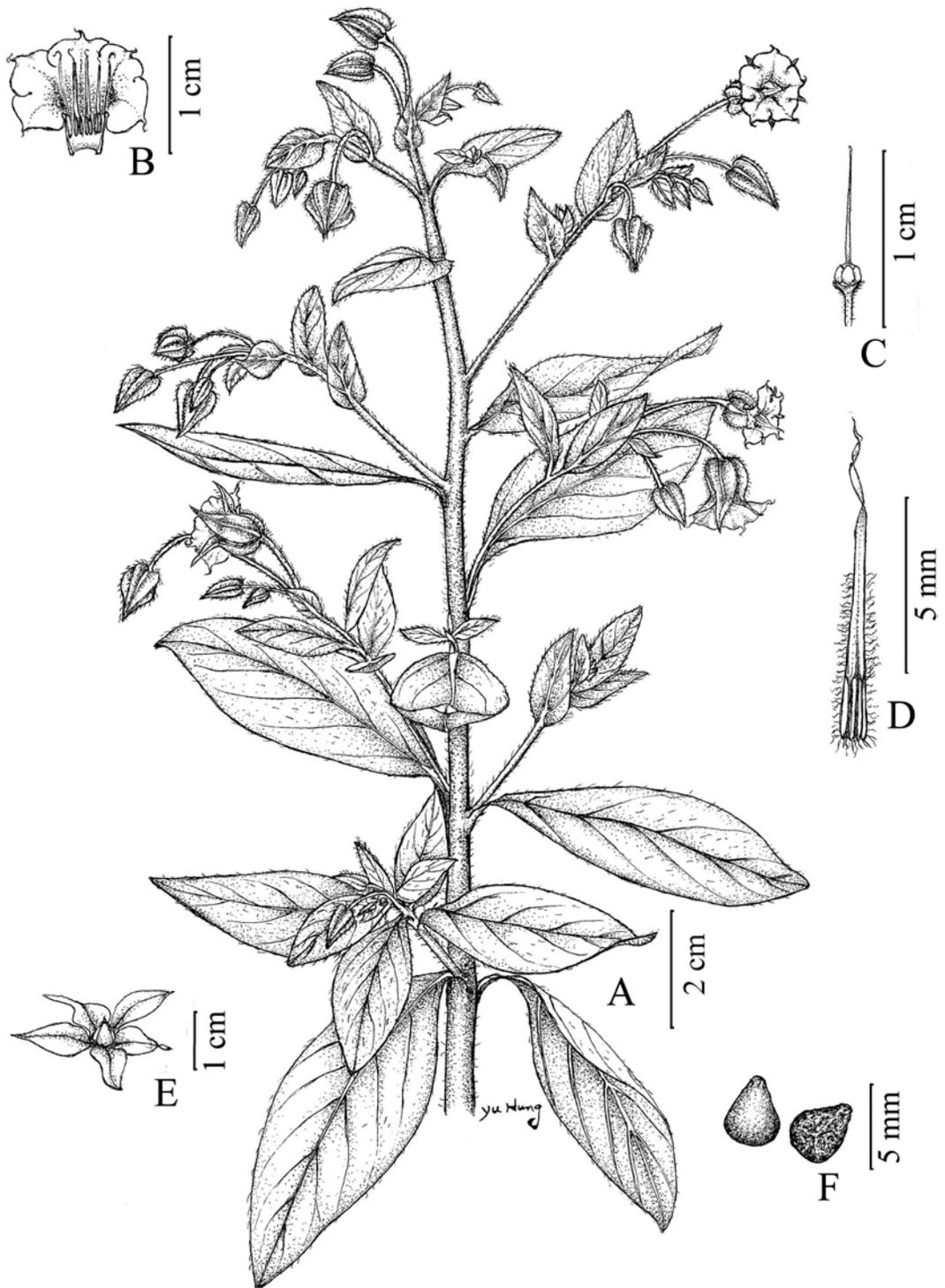


Fig. 2. *Trichodesma zeylanicum* (Burm.f.) R. Br. A, Habit; B, section of a flower; C, pistil; D, stamen; E, nutlet and calyx; F, seeds.

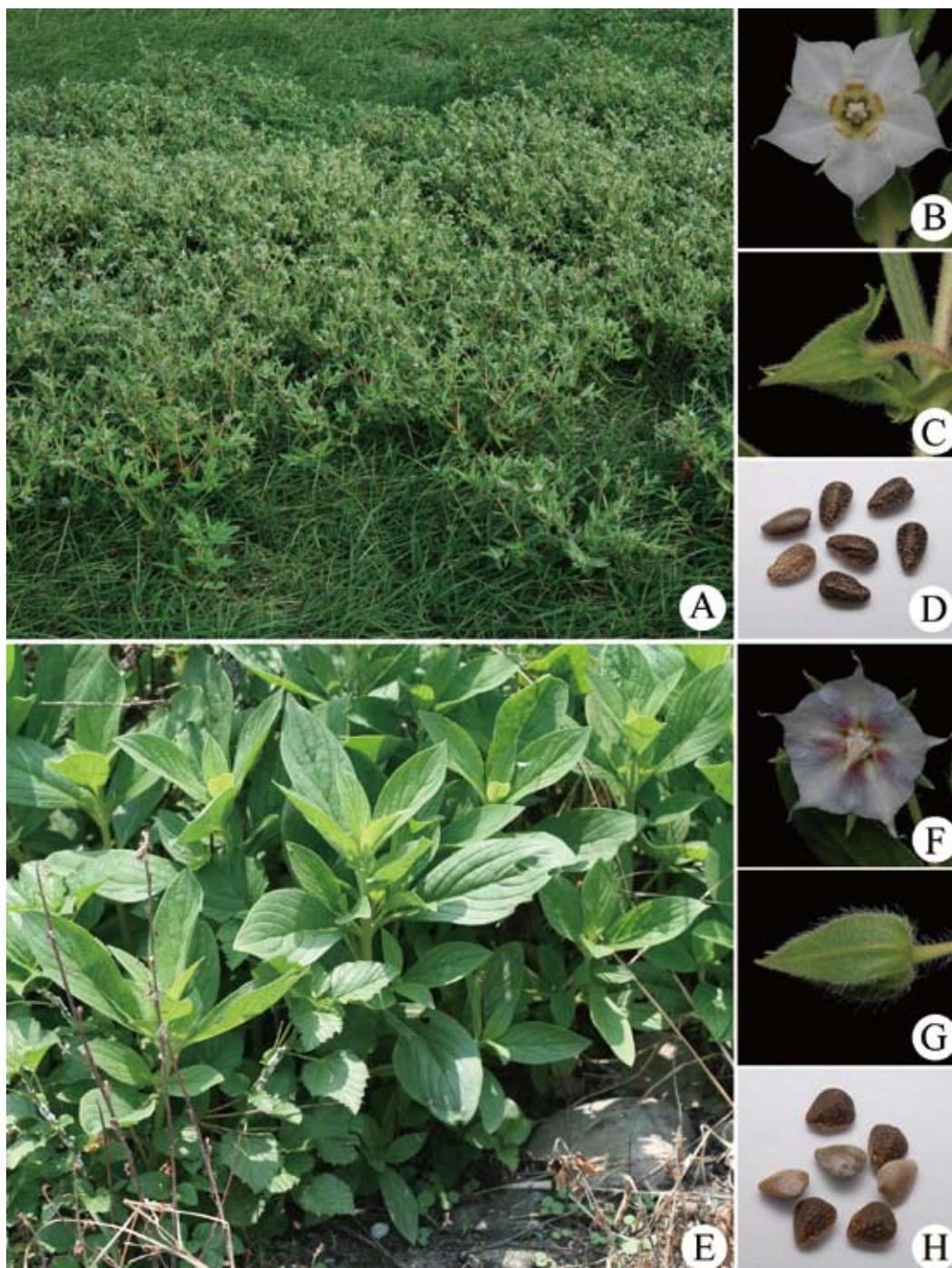
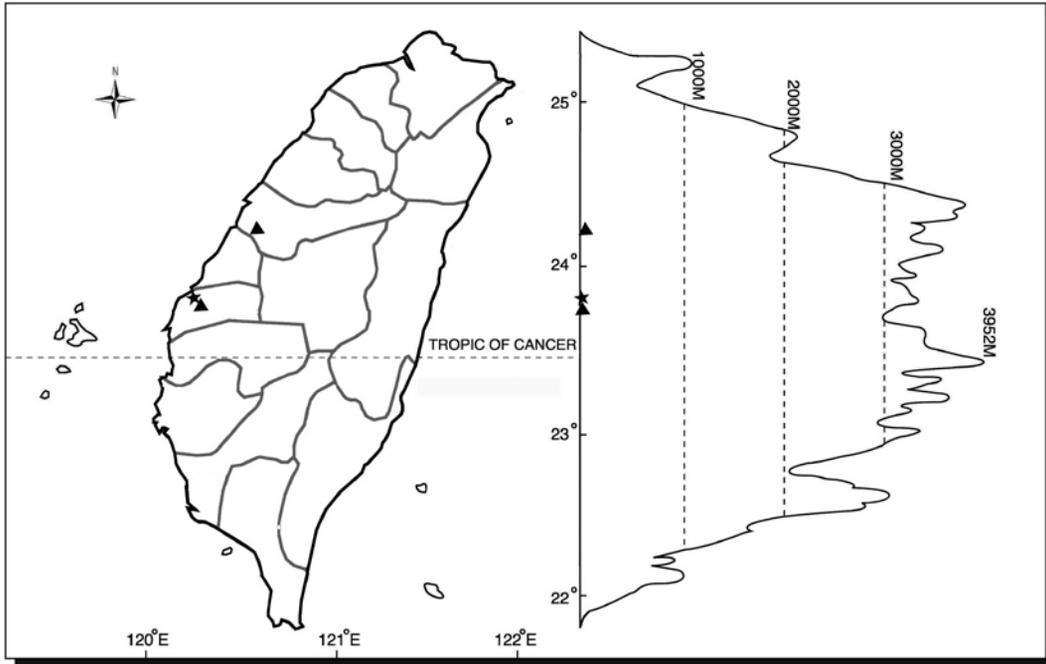


Fig. 3. *Trichodesma indicum*. A, Habit; B, flower; C, calyx; D, seeds. *Trichodesma zeylanicum*. E, Habit; F, flower; G, calyx; H, seeds.



**Fig. 4.** Distribution map of *Trichodesma indicum* (star) and *Trichodesma zeylanicum* (triangles) in Taiwan.

hairs dimorphic; shorter ones thin, appressed, up to 0.3 mm long; longer ones white bristly tubercle-based, up to 1.2 mm long. Leaves oblanceolate to lanceolate, 4~7×0.8~2.0 cm, rounded to subacute at apex, amplexicaul at base, sessile, with bristly hairs and ring of cystoliths around their base and often densely gray-pubescent. Flowers drooping, in lax few-to many-flowered cymes or solitary; pedicels recurved, 0.8~1.2 cm long, spreading hairy; bracts similar to leaves but much smaller. Calyx-lobes triangular, 1~1.5 cm long, 4~8 mm wide, hastate at base, with coarse tubercle-based white bristly hairs on margins, midnerve, and pubescence. Corolla mauve to pinkish-blue or lilac, with yellowish-brown oblong mark at base of each lobe; corolla exceeding calyx in length, 12~14 mm long, abruptly and narrowly cuspidate, glabrous on both sides. Stamens inserted on lower part of corolla tube, anthers whitish, 8 mm long,

and densely short-haired outside; exerted 6 mm including twisted glabrous connective-appendage tips; with hairs tufts at face. Style 6.5~8 mm long, stigma obscure. Nutlets 4, splitting off and leaving a quadrangular central column, grayish-buff or brown with dark-brown spots, compressed ovoid, 5 mm long, 3 mm wide, smooth and shiny outside, strongly corrugated inside.

**Distribution:** This species is native to Africa (Kenya, Tanzania, Mauritius), and Asia (Afghanistan, Pakistan, India, the Philippines); presumably introduced into East Africa (Nasir 1989, Verdcourt 1991). It usually occurs in low elevations of sand, sand above the high-water mark, waste ground, coconut plantations, and roofs of old houses (Verdcourt 1991). This species was found growing in open area such as roadsides, upland fields, and open sunny soils in low elevations of central Taiwan. It could have been introduced

into Taiwan by agricultural activities. It is a naturalized species, and its population has survived in abandoned fields and reproduced without human efforts.

**Specimens examined:** **Taiwan, Yunlin Co.:** Sansheng Village, Mailiao Township, *C. M. Wang* 1416, 15140, 15141, 15162, 15236 (TNM).

**2. *Trichodesma zeylanicum* (Burm. f.) R. Br.,** *Prodr. Fl. Nov. Holl.:* 496, 1810.

*Borago zeylanica* Burm. f., *Fl. Indica* 41. 1768.....斯里蘭卡碧果草 Figs. 2, 3E-H, 4

An annual or perennial herb, erect and usually branched or sub-shrubby 0.3~1.5 m tall from a taproot; stems densely pubescent and scabrid with tubercle-based hairs 1~2.5 mm long. Lower leaves opposite or subopposite, oblong to lanceolate, up to 13 cm long, 4 cm wide with a petiole 0.2~1 cm long, scabrid with tubercle-based hairs above, tubercles ringed with cystolith-cells, rough beneath, densely pubescent to gray-tomentose with tubercle-based hairs on nerves; upper leaves sessile, alternate, oblong to oblong-lanceolate, 2.5~4 cm long, 0.6~2 cm wide, narrowing to apex, rounded to subcordate at base. Flowers drooping, in lax few- to many-flowered cymes; bracts similar to leaves 1.2~3 cm long, 0.3~1 cm wide, often cordate at base; pedicels slender, 0.5~2.5 cm long, with both short and long hairs. Calyx-lobes ovate-lanceolate, 7~10 mm long, 3.2~3.5 mm wide, enlarged when fruiting, acute to acuminate at apex, pubescent inside, gray-tomentose and with intermingled long tubercle-based hairs particularly on midnerve and margins outside. Corolla bluish, with a dark-reddish-purple spot at base of each lobe; tube funnel-shaped, 4~5 mm long; glabrous outside, inside at base on both sides of anther-insertions with cushions of scales; lobes 5, broadly ovate, 4~4.5 mm long, 3.8~6 mm wide, with an abruptly narrowly triangular acute twisted acumen 2.5~3 mm

long. Stamens sessile; anthers lanceolate, thecae 2.5 mm long, with a tuft of hairs at base and connective-appendages as long as the thecae or up to 4 mm, twisted together. Ovary 1.5~2 mm in diameter, glabrous, 4-lobed; style 6~8 mm long, with obscurely subglobose stigma. Nutlets 4, gray marbled brown, compressed ovoid, 4 mm long, 3.2 mm wide, external face slightly convex, shiny; internal face 3-angled, rugose and tuberculate.

**Distribution:** *Trigonotis zeylanicum* is native to Africa (Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Sudan, Swaziland, Tanzania, Uganda, Zaire, Zambia, Zimbabwe), Asia (India, the Philippines, Malaysia), and Australasia (Australia and Fiji) (Verdcourt 1991, Mobot 2009). It is a common weed in old and new cultivations and a pioneer on disturbed ground (Verdcourt 1991). In Taiwan, this species was found in an exposed area in the central part of western Taiwan, mixed with low grasses and weeds on a roadside. Since 2007, populations in Taiwan have been stable during field observations.

**Specimens examined:** **Taiwan, Taichung City:** Yongzhe Lane, Nantun Dist., *C. M. Wang* 15297, 15473 (TNM); **Yunlin Co.:** Sansheng Village, Mailiao Township, *C. M. Wang* 15850 (TNM).

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