

Research note

***Polycarpon tetraphyllum* (L.) L. (Caryophyllaceae),  
a Newly Naturalized Species in Northern Taiwan**

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**[ Summary ]**

The newly naturalized genus, *Polycarpon* Loefl. ex L. (Caryophyllaceae), and a newly naturalized species to the flora of Taiwan, *P. tetraphyllum* (L.) L., are described and illustrated herein. Based on its floral morphological characters, we can distinguish this alien species naturalized on the plains and roadsides in northern Taiwan from other relatives in Taiwan.

**Key words:** Caryophyllaceae, newly naturalized, *Polycarpon*, Taiwan.

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## 研究簡報

## 四葉多莢草(石竹科)，台灣北部新馴化植物

鍾明哲<sup>1,2)</sup>

## 摘 要

本文描述原產北美洲的台灣石竹科新馴化屬：多莢草屬(*Polycarpon* Loefl. ex L.)及該屬一新馴化種：四葉多莢草(*P. tetraphyllum* (L.) L.)，藉由花部形態特徵，有助於區分此一新馴化於北台灣平野路旁的外來種與台灣產相近類群。

關鍵詞：石竹科、新馴化、多莢草屬、台灣。

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Members of the Caryophyllaceae are some common weeds of the native flora and naturalized plants in Taiwan. In the past few decades, 4 species including *Drymaria villosa* Schltld. & Cham., *Sagina procumbens* L., *Silene firma* Siebold & Zucc., and *S. gallica* L., were reported as newly recorded or newly naturalized plants to the flora of Taiwan (Liu 2001, Liao et al. 2006, Liang and Wang 2012, Hsu and Chung 2014), after publication of the *Flora of Taiwan*, second edition (Ying 1996, Boufford et al. 2003). Recently, a strange Caryophyllaceae species which is similar to *Stellaria* spp. was found on the plains and roadsides in northern Taiwan, but was nearly glabrous in outline and with a dominant and scarious keel on each sepal, which differ from known species recorded in Taiwan. Based on further comparisons (Lu and Gilbert 2001, Rabeler and Hartman 2005), we confirmed that this strange species was *Polycarpon tetraphyllum* (L.) L. which is native to Europe, and is the type species of *Polycarpon* Loefl. ex L. The genus *Polycarpon* includes 9~15 species, broadly distributed globally (Lu and Gilbert 2001, Rabeler and Hartman 2005). Members of this genus have been recorded and naturalized globally, and *P. tetraphyllum*

is the most broadly distributed one (Rabeler and Hartman 2005). This weed was reported to be a cleistogamous and self-compactable plant (Rabeler and Hartman 2005). Herein, we describe this newly naturalized herb, the genus to which it belongs, and its naturalization on the plains and roadsides in northern Taiwan (Fig. 1), and offer a taxonomic key to of genera the Caryophyllaceae in Taiwan to assist in identification.

## Key to of the genera Caryophyllaceae in the flora of Taiwan

1. Sepals connate, at least below.
  2. Styles 2; calyx without commissural veins. .... *Dianthus*
  2. Styles 3~5; calyx with commissural veins.
    3. Sepals 1-ridged (or 1-keeled), totally glabrous. .... *Polycarpon*
    3. Sepals nerved.
      4. Fruit baccate, tall scramblers. ....  
..... *Cucubalus*
      4. Fruit not baccate, usually a capsule, not tall scramblers. .... *Silene*
1. Sepals free to base.
  5. Stipules present, small and bristle-like. ...  
..... *Drymaria*

- 5. Stipules absent.
  - 6. As many capsule teeth or valves as styles. .... *Sagina*
  - 6. Twice as many capsule teeth as styles.
    - 7. Petals bifid to 1/2 length or more. ....  
..... *Stellaria*
    - 7. Petals entire or bifid to < 1/2 length.
      - 8. Seeds with a strophiole; leaves more or less ovate, petiolate, 3-nerved.  
..... *Moehringia*
      - 8. Seeds without strophiole; leaves various, not usually as above.
        - 9. Petals entire; capsules straight.  
..... *Arenaria*
        - 9. Petals divided to at least 1/3 their length or sometimes emarginated; capsules sometimes curved.  
..... *Cerastium*

**Taxonomic treatment**

*Polycarpon* Loefl. ex L. Syst. Nat. (ed. 10) 2: 881, 859, 1360. 1759. Lu and Gilbert Fl Reipubl Pop Sin 6: 6. 2001; Rabeler and Hartman, Fl N Am 5: 25. 2005. ....

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*Polycarpon tetraphyllum* (L.) L. Syst. Nat. (ed. 10) 2: 881. 1759. ....

四葉多莢草 Figs. 2, 3.

Herb annual, to 10 cm tall. Stems prostrate to erect, branched, internodes terete to finely ridged, robust or slender. Leaves opposite or 4-leaved in a whorl, petiolate; stipules 2 per node, lanceolate to triangular-ovate, 1~2 mm long, margins entire, apex acuminate to aristate, membranous; blade 1-veined, spatulate, oblanceolate, ovate, or elliptic, 3~8 mm long, to 5 mm wide, apex obtuse, base

☆: *Polycarpon tetraphyllum*

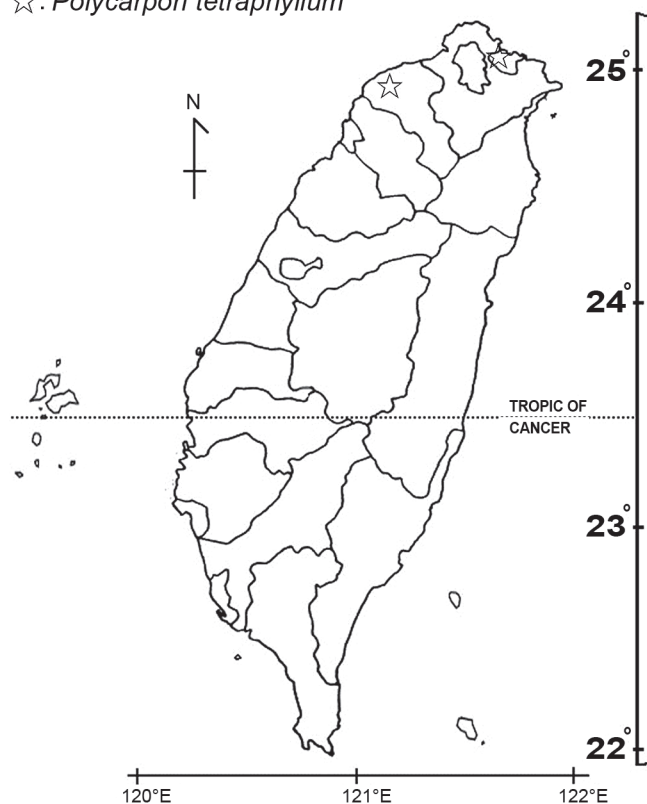


Fig. 1. Distribution map of *Polycarpon tetraphyllum* (L.) L.

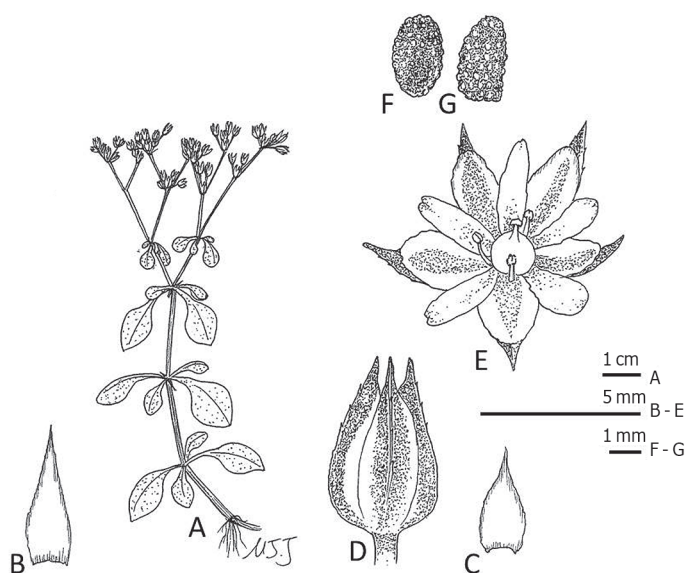


Fig. 2. *Polycarpon tetraphyllum* (L.) L. A, Habit; B, stipule; C, bract; D, flower bud, showing the keeled sepals with scarious ridges; E, flower with 3 stamens; F and G, seeds, G: lateral view.

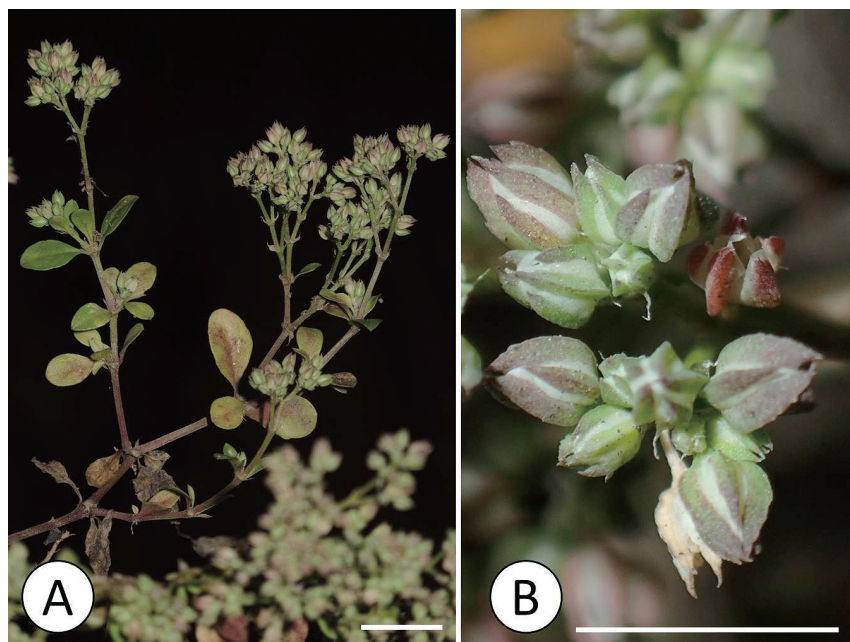


Fig. 3. *Polycarpon tetraphyllum* (L.) L. A, Habit; B, closer view of dichasium and buds, showing the keeled sepals on each bud. (scale = 1 cm)

attenuate, herbaceous. Inflorescence a terminal dichasium, axillary occasional, dense, or lax; bracts paired or absent, to 4 mm long,

similar to stipule in outline. Floral hypanthium minute, cup-shaped, not abruptly expanded distally; sepals green, ovate, conspicuously

keeled, 1~5 mm, herbaceous, margins white, scarious on keel, apex acute, aristate; petals oblanceolate to oblong, often fugacious, 5, shorter than sepals, white, apex emarginated or round; stamens 3~5, filaments shortly connate distally around ovary; style obscurely 3-branched, filiform, 0.1~0.3 mm, glabrous proximally; stigmas 3, linear. Capsules ovoid to spherical, opening by 3 incurved valves; carpophore present. Seeds ca. 8~15, whitish, ovoid to lenticular or triangular, laterally compressed to angular, papillate.

**Specimens examined:** TAIWAN. Keelung City, Anle District, Yingge, 16 May 2015, *Ming-Jer Jung 6082* (TAIF), same loc., 15 May 2015, *Ming-Jer Jung 6081* (TAIF, transplanted and cultivated individual); Taoyuan City, Zhongli District, Guoling, 7 May 2015, *Ming-Jer Jung 6080* (TAIF). SPAIN. Balearic Is., Son Serra, 15 May 1977, *E. Jacques 10364* (TAIF).

**Notes:** Vernacular names of *P. tetraphyllum* are the fourleaf allseed and fourleaf manyseed, which is native to Europe and is now cosmopolitan (Lu and Gilbert 2001, Rabeler and Hartman 2005). Locally, this alien weed is naturalized on the plains and roadsides in northern Taiwan. In outline, this alien weed is glabrous, and has dominant stipules, spatulate leaves, and a conspicuous keel per sepal, which differ from any other recorded and naturalized Caryophyllaceae species in Taiwan. When the phyllotaxis is whorled, there are always 2 longer opposite blades and 2 shorter ones arranged as a decussate set. In Keelung City, this newly naturalized weed coexists with *Stemodia verticillata* (Mill.) Hassl. (Plantaginaceae), another alien weed naturalized in the past 5 yrs (Liang et al. 2011). In addition, *Plantago virginica* L. (Plantaginaceae) coexists with *Polycarpon tetraphyllum* at both naturalization sites in Keelung and Taoyuan Cities.

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