



## Four New Species of Lepidostomatid Caddisflies (Trichoptera) from Taiwan 【Research report】

### 臺灣產鱗石蛾科之四種新種 (毛翅目) 【研究報告】

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#### Abstract

Four new species of *Goerodes* Ulmer (Trichoptera: Lepidostomatidae) are studied from Taiwan. Both male and female of *Goerodes taichungensis* n. sp. and *G. quadrispinus* n. sp. and male only of *G. weirjeinsis* n. sp. and *G. tanmounensis* n. sp. are described and illustrated.

#### 摘要

本文描記四種臺灣地區的鱗石蛾科昆蟲之新種，其中包括 *Goerodes taichungensis* n. sp. 及 *G. quadrispinus* n. sp. 兩種之雄蟲及雌蟲，*G. weirjeinsis* n. sp. 及 *G. tanmounensis* n. sp. 兩種之雄蟲。

**Key words:** Lepidostomatidae, *Goerodes*, new species, Taxonomy, Taiwan.

**關鍵詞:** 鱗石蛾科，毛翅目，分類，新種，臺灣。

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# Four New Species of Lepidostomatid Caddisflies (Trichoptera) from Taiwan

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## ABSTRACT

Four new species of *Goerodes* Ulmer (Trichoptera: Lepidostomatidae) are studied from Taiwan. Both male and female of *Goerodes taichungensis* n. sp. and *G. quadrispinus* n. sp. and male only of *G. weirjeinsis* n. sp. and *G. tanmounensis* n. sp. are described and illustrated.

**Key words:** Lepidostomatidae, *Goerodes*, new species, Taxonomy, Taiwan.

## Introduction

Caddisflies are poorly known insects in Taiwan. Previously, only 3 species of lepidostomatid caddisflies were recorded from Taiwan: *Goerodes ebenacanthus* Ito (1992), *G. doligung* Malicky (Weaver, 1989; Ito, 1992), and *Dinarthrum taiwanense* Ito (1992). Here we describe 4 new species and add to the caddisfly fauna of Taiwan. All specimens were collected from 1991 to 1995 by the senior author, unless otherwise indicated. The insects were captured with light traps or by sweeping with net along the riverside. The holotypes and parts of paratypes specimens of all species described here will be deposited in the National Museum of Natural Science of Taiwan (NMNS), other paratypes will be deposited in the Department of Biology, Tunghai University, Taiwan (BTHU). The terminology of Weaver (1989) is followed in the descriptions of male and female specimens in this paper.

## Descriptions of New Species

### *Goerodes taichungensis* n. sp. (Figs. 1-6)

**Male:** Body brown, ca. 8.1 mm. Head dorsum with 1 pair of large setal warts, scape 1.8 mm long, straight, cylindrical, with midmesal process at 1/2, mesal surface bearing brush with long setae, apical part of setae of scape and head warts white; maxillary palpi 2-segmented, 1st segment stout, curved dorsad, ventral part pale, 2nd segment with mesal groove and bearing dense brush of long setae, labial palpi 3-segmented. Forewing ca. 9.4 mm long, thyridial cell about 2X as long as discoidal cell, f1 and f2 present, anal vein reduced; hindwing ca. 7.2 mm long, with scales on dorsal surface, discoidal cell small, thyridial open, f1 present. Genitalia: Segment X: Dorsomesal processes short and finger-like. Ventrolateral processes asymmetrically blade-shaped with right process longer than left, curved, each process elongate and curved downward with apex bifurcated and pointed. Basodorsal process slender and elongated, apex pointed. Inferior ap-

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pendage: Main article elongated, curved and pointed apically, basomesal process triangular, 2nd article small and slightly truncated apically. Phallus short, apex membranous.

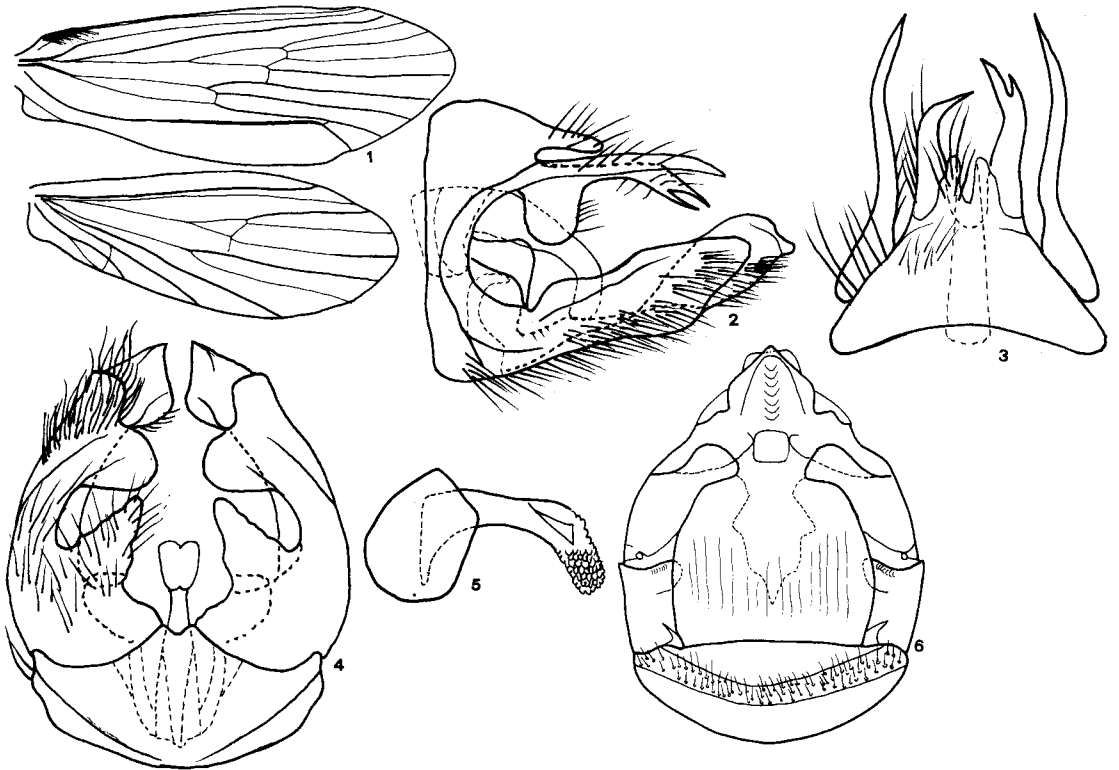
**Female:** Head with 2 pairs of setal warts on dorsum, scape 1.9 mm long. Forewing 7.4 mm long. Genitalia: VIII tergite end rounded, lateral plate rounded apically, subgenital plate rounded and semisclerotized; IX segment narrow and separated from X segment; spermatheca sclerite forked and pointed apically, base slightly stalked.

**Type materials:** Holotype ♂, TAI-CHUNG: Shiwen Stream, 700m, 2-IX-1991 (NMNS). Paratype: 5♂ 4♀, same data as holotype (BTHU); 1♂ 1♀, 21-X-1991; 2♂ 1♀, TAICHUNG: Wuling Stream, 2200m, VII-18-1988, E. Chen (NMNS).

**Etymology:** Latinization, *taichungensis*, from Taichung.

***Goerodes quadrispinus* n. sp. (Figs. 7-11)**

**Male:** Body brown, ca. 5.1 mm long, covered with setae and scales, head dorsum with 2 pairs of setal warts, densely covered with dark, stout setae. Scape 1.4 mm long, with small basomesal process, midmesal process with 2 long brown spines, flexible at 1/3 near apex, inner margins with long black setae. Maxillary palpi 2-segmented, apical segment covered with long setae, slightly curved up; labial palpi 3-segmented, straight and thin. Wing elliptical, brown, densely covered with setae and scales. Forewing ca. 5.2 mm long, f1, f2, and f3 present, discoidal cell small, thyridial



Figs. 1-6: *Goerodes taichungensis* n. sp. 1, male wings; 2-5: male genitalia. 2, lateral; 3, dorsal; 4, ventral; 5, phallus, lateral; 6, female genitalia, ventral. The scale lines in the figure represent 1 mm.

cell elongated, with a crossvein near posterior of thyridial cell, forming small pentagonal cell; hindwing with f1, discoidal cell small, thyridial cell open. Genitalia: IX segment dorsad and ventrad broad. X segment small. Dorsomesal process rounded in lateral view, with small tubercle distally. Inferior appendage stout, with 4 black spines near apex; basomesal process finger-like, apicodorsal process small, tubercle-shaped; ventroapical process elongated and slender, 2X length of inferior appendage. Parameres 2 branched, blade-shaped. Phallus slender, apex membranous.

**Female:** Body brown, length ca. 5.1 mm long. Scape 1.25 mm long. Wings uniform brown, loosely covered with setae. Forewing ca. 6.2 mm long. Genitalia: IX segment tergite subtriangular, subdivided posteriorly; sternite pentagonal, extended posteriorly, semicircular. X segment small. Spermathecal sclerite

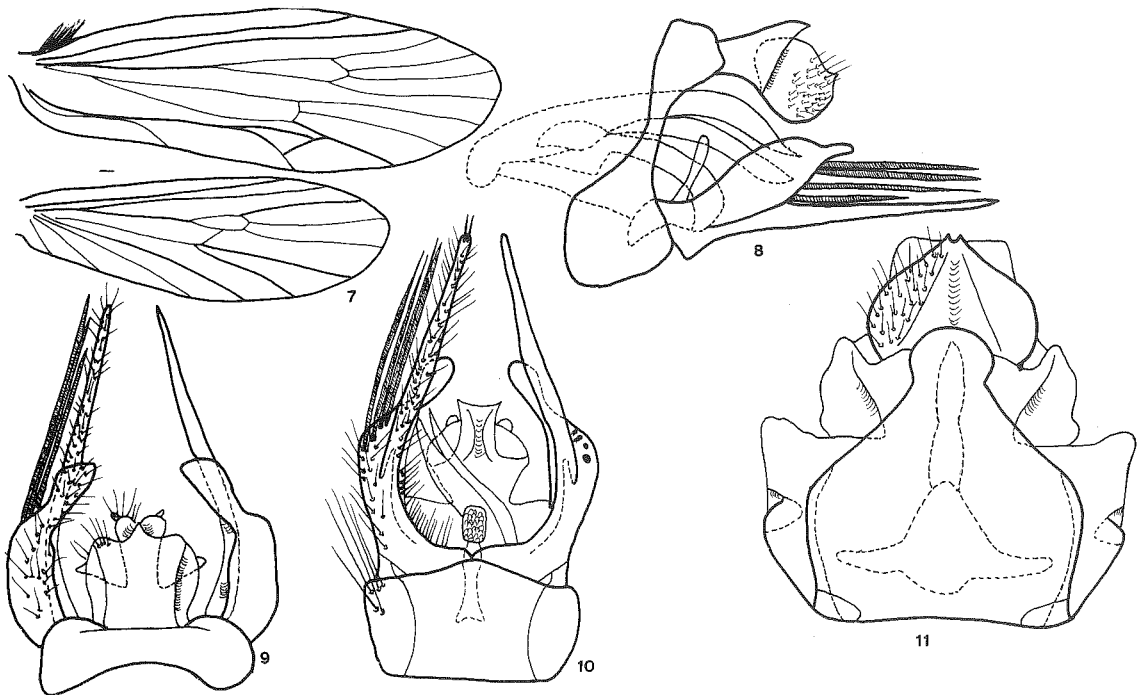
basolateral extended, apex tube-like.

**Type materials:** Holotype ♂, TAOYUAN: Koyu Stream, 1700, 29-VI-1988, E. Chen (NMNS). Paratype: 10 ♂ 22 ♀, same data as holotype (NMNS).

**Etymology:** Latin, *quadri*, four; *spina*, spine.

***Goerodes weirjinensis* n. sp. (Figs. 12-15)**

**Male:** Body brown, ca. 4.3 mm long. Head slender, dorsum with 1 pair of large setal warts, scape 3.3 mm long, slender, twisting at 1/5, basomesal process small. Maxillary palpi 2-segmented, covered with dense brown setae. Forewing ca. 5.0 mm, with setae and scales, thyridial cell elongated and about 2x length of discoidal cell, f1 and f2 present, fold along Cu2; hindwing ca. 4.3 mm long, with long fringe setae, discoidal cell small, thyridial cell open, f1 present. Genitalia: IX segment moderated, tergite extended late-



Figs. 7-11: *Goerodes quadrispinus* n. sp. 7, male wings; 8-10: male genitalia. 8, lateral; 9, dorsal; 10, ventral; 11, female genitalia, ventral. The scale lines in the figure represent 1mm.

rally, sternite rectangular. X swollen, ventrolateral process paired, slender and elongated, curved ventrad, twisting at 1/2, apex bi-branched, each branch pointed apically. Inferior appendage elongated, base stout, constricted at 1/2, slender and finger-like; basodorsal process slender, curved, apex rounded, with small process near base; basomesal process slender, cylindrical. Phallus small, goose head-like in lateral view, without phallosome, apex membranous.

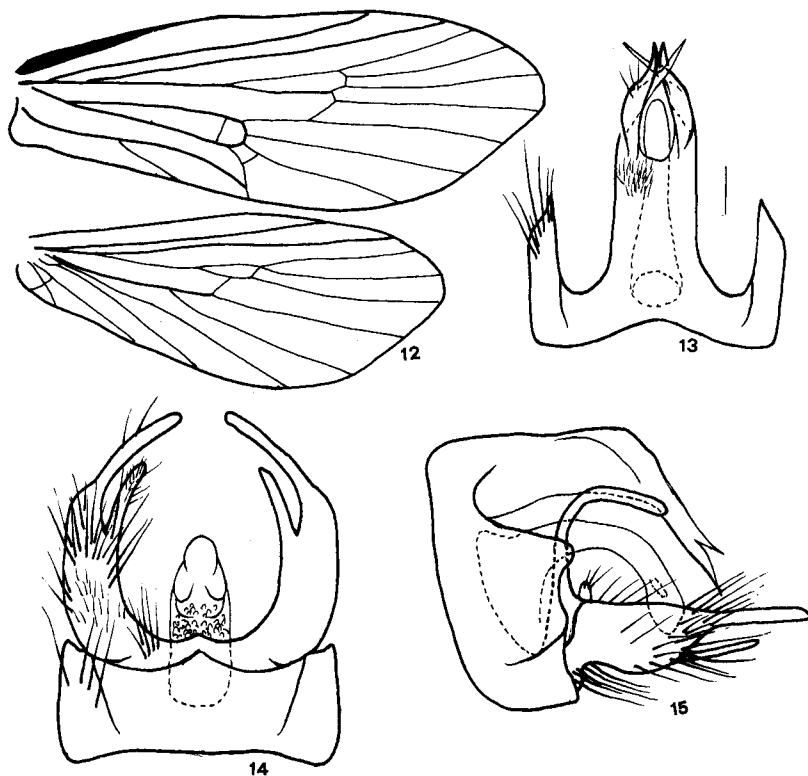
**Female:** Unknown.

**Type materials:** Holotype ♂, KAOHSIUNG: Weirjein Stream, 1200m, 11-XI-1995 (NMNS). Paratype: 1 ♂, same data as holotype (NMNS); 10 ♂ 10 ♀, ILAN: Minchi, 1200m, 16-VII-1995 (BTHU); 1 ♀, Zernjeir Spring, 460m, 24-X-1995; 10 ♂ 14 ♀, TAOYUAN: Koyu Stream, 1700m, 9-VI-1988, E. Chen (NMNS).

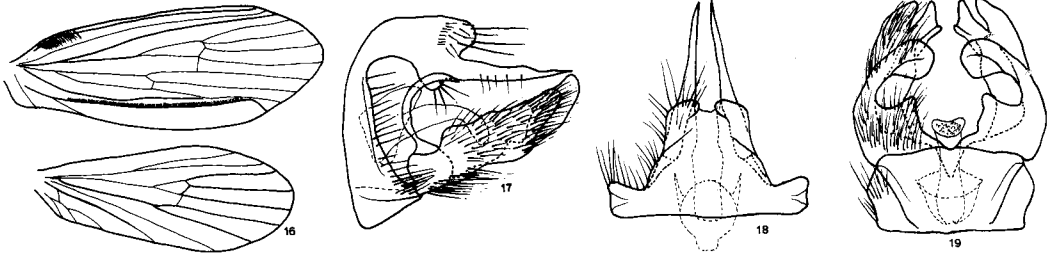
**Etymology:** Latinization, *weirjeinsis*, from Weirjein Stream.

***Goerodes tanmounensis* n. sp.** (Figs. 16-19)

**Male:** Body brown to dark brown, ca. 6.4 mm long, densely covered with setae and scales. Scape 1.0 mm long, cylindrical, covered with scales and setae, without processes. Maxillary palpi 2-segmented, basal segment stout, slightly curved, 2nd segment base slender and apex swollen and rounded; labial palpi 3-segmented, about equal length, covered with thin setae. Wings elliptical, brown and densely covered with setae and scales. Forewing ca. 6.2 mm long, discoidal cell smaller than thyridial cell, f1 and f2 present, fold along Cu; hindwing ca. 5.1 mm long, rounder than forewing, discoidal cell small, thyridial cell open, f1



Figs. 12-15: *Goerodes weirjeinsis* n. sp., male. 12, wings; 13-15: genitalia. 13, lateral; 14, dorsal; 15, ventral. The scale lines in the figure represent 1 mm.



Figs. 16-19: *Goerodes tanmounensis* n. sp., male. 16, Wings; 17-19: genitalia. 17, lateral; 18, dorsal; 19, ventral. The scale lines in the figure represent 1mm.

present. Genitalia: IX segment small, tergite extended posteriorly, sternite pentagonal. X segment subdivided and membranous, ventral process paired, elongated, apex pointed, left one curved dorsad, right one curved ventrad. Inferior appendage 2-segmented, basal segment stout with irregular margins, 2nd segment small, apex membranous; basomesal process hook-like, slender and apex pointed. Phallus small, with phalotheca, curved ventrad, apex membranous.

**Female:** Unknown.

**Type materials:** Holotype ♂, TAIPEI: Tanmoun, 50m, 12-VII-1988, E. Chen (NMNS). Paratype: 1 ♂, same data as holotype (NMNS).

**Etymology:** Latinization, *tanmounensis*, from Tanmoun.

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# 臺灣產鱗石蛾科之四種新種(毛翅目)

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## 摘 要

本文描記四種臺灣地區的鱗石蛾科昆蟲之新種，其中包括*Goerodes taichungensis* n. sp.及*G. quadrispinus* n. sp.兩種之雄蟲及雌蟲，*G. weirjeinsis* n. sp.及*G. tanmounensis* n. sp.兩種之雄蟲。

**關鍵詞：**鱗石蛾科，毛翅目，分類，新種，臺灣