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【Research report】

臺灣小繭蜂科(膜翅目)之分類III.高腹繭蜂亞科【研究報告】

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Abstract

摘要

高腹繭蜂亞科(Cenocoeliinae)隸膜翅目、小繭蜂科，乃天牛科、吉丁蟲科、小蠹蟲科及象鼻蟲科等鞘翅目昆蟲之天敵。全世界已知之類約4屬、65種。臺灣已記錄者有Cenocoelius eous Wilkinson 及 C. koshunensis Watanabe 2種。本文描述臺灣產之2新種C.longius及 C.taiwanensis。文中並附分種檢索表及性狀圖。

Key words:

關鍵詞: 膜翅目、小繭蜂科、高腹繭蜂亞科、高腹繭蜂屬、新種、臺灣。

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The Braconidae (Hymenoptera) of Taiwan

III. Cenocoeliinae

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ABSTRACT

Four species of *Cenocoelius* Haliday (Hymenoptera: Braconidae: Cenocoeliinae) are reported in this paper. Two new species are described and illustrated: *C. longius* and *C. taiwanensis*. A key to the species of Taiwanese *Cenocoelius* is also presented.

Key words: Hymenoptera, Braconidae, Cenocoeliinae, *Cenocoelius*, new species, Taiwan.

臺灣小繭蜂科（膜翅目）之分類

III. 高腹繭蜂亞科

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摘 要

高腹繭蜂亞科 (Cenocoeliinae) 隸膜翅目、小繭蜂科，乃天牛科、吉丁蟲科、小蠹蟲科及象鼻蟲科等鞘翅目昆蟲之天敵。全世界已知之種類約4屬、65種。臺灣已記錄者有

Cenocoelius eous Wilkinson 及 *C. koshunensis* Watanabe 2種。本文描述臺灣產之2新種 *C. longius* 及 *C. taiwanensis*。文中並附分種檢索表及性狀圖。

關鍵詞：膜翅目、小蘗蜂科、高腹蘗蜂亞科、高腹蘗蜂屬、新種、臺灣。

Introduction

Cenocoeliinae Szépligeti are a rather small subfamily, including the genera *Cenocoelius* Haliday *Foenomorpha* Szépligeti, *Iseura* Spinola and *Plectobrucon* Brèthes (Shenefelt, 1970). Its hosts include Buprestidae, Cerambycidae, Curculionidae and Scolytidae (Coleoptera) (Saffer, 1982; Achterberg, 1984). Achterberg (1984) indicated that the Cenocoeliinae form an isolated group on account of an extremely high inserted metasoma and subpetiolate first metasomal tergum. The absence of a transverse scutellar depression, and the more or less developed postpectal carina are other remarkable characters.

The terminology used for wing veins is illustrated and explained by Sharkey (1988). Most terms and measurements used follow Achterberg (1988). Others are defined here. The letter OD is the greatest diameter of a posterior ocellus. The length of eye and temple are measured in lateral view. The length of head is the greatest length of head in lateral view. The ocello-ocular distance is the shortest distance between posterior ocellus and eye. The tentorial index is tentorio-ocular line over intertentorial line. All specimens (including types) are deposited at the Taiwan Agricultural Research Institute, Wufeng, Taichung, Taiwan, ROC.

Genus *Cenocoelius* Haliday

Cenocoelius Haliday, 1840 in Westwood: Introd. mod. Class. Insects 2. Synops.: 62, Type species: *Cenocoelius flavifrons* Haliday Monobasic and original designation. -- Saffer, 1982. Polskie Pismo ent. 52:83.

Capitonius Brullé, 1846 in Lepeletier: Hist. nat. Insectes, Hym. 4: 544. Type species: *Capitonius bifasciatus* Brullé. Monobasic.

Laccophrys Foerster, 1862. Verh. naturh. Ver. presuss. Rheinl. 19:257. Type species: *Laccophrys magdalini* Foerster. Monobasic and original designation.

Lestricus Reinhard, 1865. Berl. ent. Z. 9:265. Type species: *Alysia rubriceps* Ratzeburg. Designated by Musesebeck and Walkley, 1951.

Aulacodes Cresson, 1865. Proc. ent. Soc. Philad. 4:8. Type species: *Aulacodes nigriventris* Cresson. Monobasic.

Promachus Cresson, 1887. Trans. amer. ent. Soc., Suppl. p. 61. Type species: *Promachus sanguineiventris* Ashmead. Designated by Viereck, 1914.

The genus *Cenocoelius* Haliday is characterized by the following characters: Frons deeply excavated medially, this depression usually carinate laterally and usually with a progressively higher lamella medially; occiput completely margined; notauli wide, strongly crenulate; propodeum sharply truncate behind; fore wing with veins 2-RS and r-m; metasoma inserted high above hind coxae; first metasomal tergum usually subsessile; ovipositor very long. About 58 species are known worldwide, of which two are previously recorded from Taiwan (Wilkinson, 1932; Watanabe, 1934, 1937). In this paper two new species are added to the *Cenocoelius* fauna of Taiwan.

Key to species of *Cenocoelius* from Taiwan

1. Head yellowish brown; scape and pedicel dark

- brown3
- Head black; scape and pedicel reddish or yellowish brown, if dark brown then head densely setose2
 - 2. Scape as long as flagellomeres 1 + 2; wings slightly infuscated; vein 1m-cu interstitial or slightly antefurcal; ovipositor as long as metasoma, sheath entirely black; body length 3-4.5 mm *eous* Wilkinson
 - Scape a little longer than first flagellomere; wings subhyaline; vein 1m-cu antefurcal; ovipositor as long as mesosoma and metasoma together, sheath black with paler ring at apex; body length 5-7 mm. *koshunensis* Watanabe
 - 3. Antenna 30-segmented; fore wing very faintly brownish hyaline, brown apically; stigma longer than veins 1-R1 + 2R1; vein 1m-cu interstitial; palpi yellowish brown; body length 3.8-4.7 mm. *taiwanensis* Chou & Lee sp. n. cv.
 - Antenna 33-segmented; fore wing brownish hyaline; stigma shorter than veins 1-R1 + 2R1; vein 1m-cu postfurcal; palpi dark brown; body length 6.0 mm.
..... *logius* Chou & Lee sp. nov.

Cenocoelius eous Wilkinson

Cenocoelius eous Wilkinson, 1982. Stylops 1:86. -- Watanabe, 1934, Insecta matsum. 8(4): 203. -- Watanabe, 1937. J. Fac. Agric. Hokkaido (imp.) Univ. 42(1): 161.

The following characters are based on Wilkinson's (1932) original description. Specimens were not available to us for direct study.

Female: Head wider than mesosoma; face and clypeus with distinct, fairly close punctures, remainder of head smooth and shining with only sparse punctation; facial depressions considerably nearer to each other than to eyes; greatest length of eye greater than malar space; median ocellus just inside frontal depression; frons and vertex otherwise evenly rounded; posterior ocelli about equidistant from each other and eyes or rather nearer to eyes. Antenna 26-30-segmented; scape longer than flagellomeres 1 + 2.

Mesonotum short, shorter than apical

breadth of first tergum, smooth and with only minute punctation; notauli well marked and crenulate; disc of scutellum virtually entirely smooth; propodeum coarsely reticulate. Fore wings: 1-RS cell rarely noticeably narrowed apically, variable in shape, 3-RS slightly shorter to definitely longer than vein r; stigma as long as vein 1-R1 + 2R1. Hind tibia very noticeably thickened in apical three-fourths.

Metasoma smooth except for a deep fovea on each side at extreme base of first tergum, these creating a raised median area with some weak defining carination; first tergum with sides strongly diverging, but towards apex slightly rounded and approaching parallel, apex straight, tergum about 1.2 times as long as wide apically, apical breadth 3 times basal breadth of first tergum and 1.5 times median length of second tergum; second suture straight; ovipositor sheaths about as long as metasoma.

Color: Black; antenna (except at least apical half of flagellum brown), all femora at apex, fore and mid tibiae, hind tibia at base, all tarsi, reddish yellow; femora and hind tibia otherwise reddish brown to black; ovipositor red; wings very faintly infuscated; stigma and veins brown.

Body length: 3.0-4.5 mm.

Male: Similar to female. Black; antenna (except apex of flagellum brown), legs reddish yellow; wings very faintly infuscated; stigma and veins brown.

Distribution: India, Taiwan.

Hosts: Wood and bark-boring cerambycids and buprestids (Shenefelt, 1970).

Cenocoelius koshunensis Watanabe

Cenocoelius koshunensis Watanabe, 1934. Insecta matsum. 8(4):203. -- Watanabe, 1937. J. Fac. Agric. Hokkaido (imp.) Univ. 42(1):161.

Female: Head 1.8 times as wide as long and 1.2-1.3 times as wide as mesonotum. Eye 1.4 times as long as temple. Vertex very densely minutely punctate and setose. POL/OOL = 0.50-0.54; OOL/OD = 2.2; POL/OD = 1.1-1.2.

Frons densely punctate and setose laterally; frontal depression not carinate laterally; median lamella completely developed, rather higher anteriorly and somewhat triangular in lateral view. Antenna 28-segmented (Watanabe, 1934); scape 2.7-2.9 times as long as wide, 1.1 times as long as first flagellomere, and 0.58-0.63 times as long as flagellomeres 1 + 2; first flagellomere 3.2-3.4 times as long as wide, and 1.1-1.4 times as long as second; second flagellomere 2.5-2.8 times as long as wide. Face 0.55-0.59 times as high as wide and 1.4 times as wide as eye height and 0.58-0.61 times as wide as head; face densely punctate to rugose, setose; face with median callus and more or less distinct median longitudinal ridge; clypeus densely punctate and setose, with median apical tooth. Tentorial index 0.95-1.1. Malar space 2.0-2.2 times basal width of mandible and 0.81-0.86 times eye height. Temple densely minutely punctate and setose.

Mesosoma 1.4-1.5 times as long as high, and 1.2-1.3 times as wide as mesoscutum length. Pronotum densely minutely punctate and setose, crenulate medially. Mesoscutum densely minutely punctate and setose; notauli deep, crenulate; scutellum sparsely setose. Mesopleuron: anterior subalar depression rather narrower, crenulate; epicnemial area crenulate; disc somewhat densely minutely punctate and setose; precoxal sulcus wide, somewhat densely punctate to foveolate. Mesosternum densely setose. Metanotal flange weak. Metapleuron densely punctate dorsally, reticulate rugose ventrally; setose. Propodeum 0.48-0.52 times as long as mesosoma width; areolate, densely setose. Fore wing 2.9 times as long as wide; stigma 2.4-2.5 times as long as wide, 0.55-0.61 times veins 1-R1 + 2-R1; $r/3-RS = 0.44-0.47$; vein 1m-cu antefurcal; vein lcu-a postfurcal. Hind wing 4.3 times as long as wide; $M + Cu/1-M = 3.9-4.9$. Hind femur 3.6 times as long as wide; hind tibia 1.3-1.4 times as long as hind femur and 2.2-2.4 times as long as basitarsomere; fifth tarsomere 0.92-1.0 times as long as second; hind tibial spur 0.29-0.30 times as long as basitarsomere.

Metasoma smooth. First tergum faintly

costulate medially; 1.6-1.9 times as long as wide apically; dorsal carinae somewhat developed. Ovipositor sheath 1.3 times as long as fore wing and 1.1-1.3 times as long as mesosoma and metasoma united.

Color: Blackish brown. Antenna dark brown. Legs dark brown to blackish brown; tibiae and tarsi brown. Wings hyaline; stigma and veins dark brown. Ovipositor sheath blackish brown, brown apically.

Body length: 5.8-8.4 mm. Fore wing length 4.7-5.8 mm. Ovipositor sheath length 6.3-7.8 mm.

Male: Similar to female. Legs brown to dark brown. Antenn slender, 28-30-segmented (Watanabe, 1934).

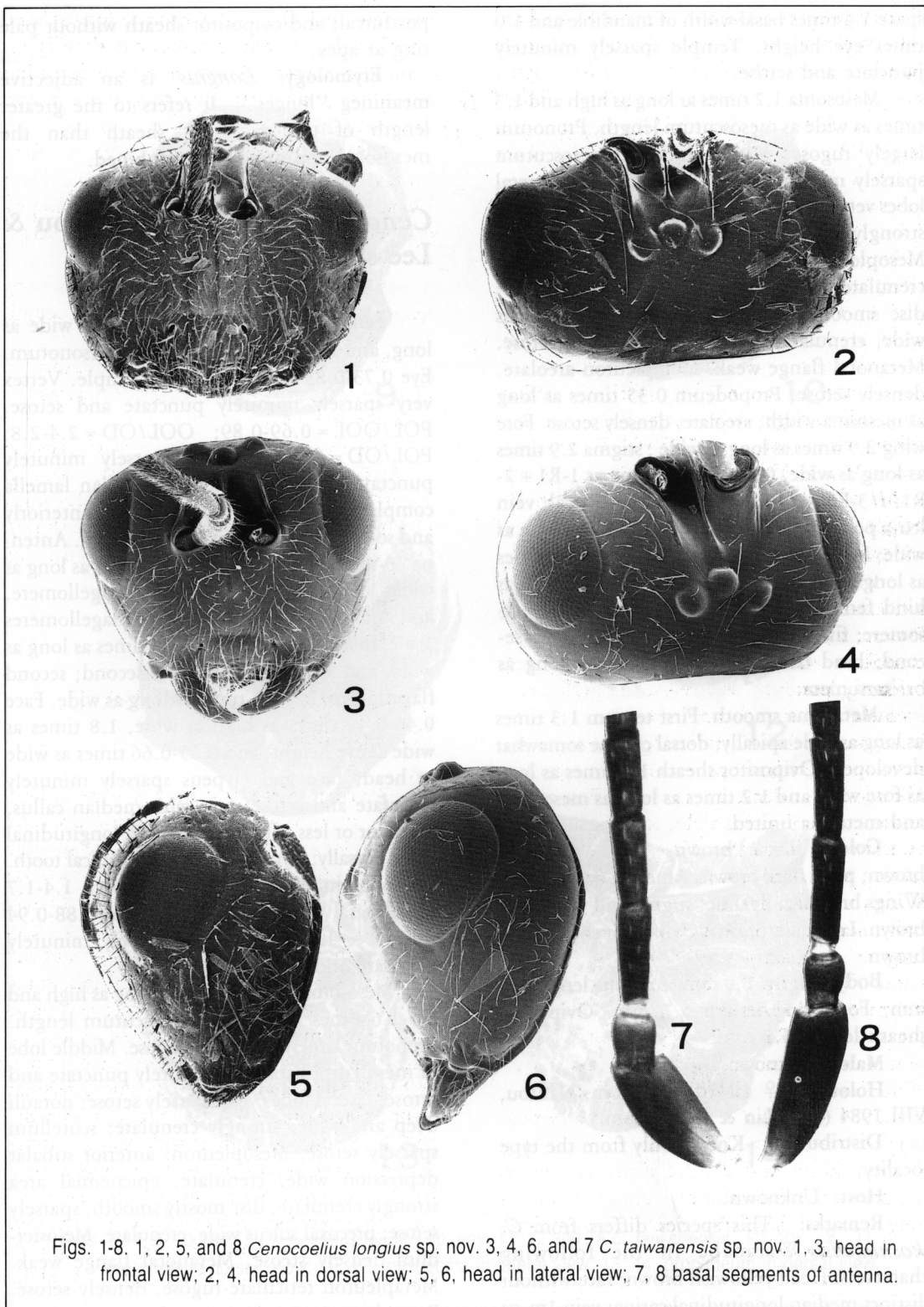
Specimens examined: Chiayi, Alishan (= Arishan), 1 ♀, 29.IV.1931 (J. Sonan). Hualien (= Karenko), 1 ♀, VII.20-VII.4 (T. Okuni, J. Sonan, K. Miyake & M. Yoshino). Ilan, Lotung (= Rato), 1 ♀, 1 ♂, 24.VIII.1923 (J. Sonan).

Distribution: Taiwan.

Host: Unknown.

Cenocoelius longius Chou & Lee sp. nov.

Female: Head 1.6 times as wide as long and 1.4 times as wide as mesonotum. Eye 0.67 times as long as temple. Vertex very sparsely minutely punctate, setose. $POL/OOL = 0.51$; $OOL/OD = 3.9$; $POL/OD = 2.0$. Frons sparsely minutely punctate and setose laterally; median lamella absent posteriorly, this lamella triangular in lateral view. Antenna 33-segmented; scape 2.9 times as long as wide, 1.6 times as long as first flagellomere, and 0.85 times as long as flagellomeres 1 + 2; first flagellomere 3.5 times as long as wide, and 1.2 times as long as second; second flagellomere 3.5 times as long as wide. Face 0.78 times as high as wide and 2.1 times as wide as eye height and 0.68 times as wide as head; face and clypeus sparsely minutely punctate and setose; face with median callus, without distinct median longitudinal ridge; clypeus with median apical tooth. Tentorial index 1.3. Malar



Figs. 1-8. 1, 2, 5, and 8 *Cenocoelius longius* sp. nov. 3, 4, 6, and 7 *C. taiwanensis* sp. nov. 1, 3, head in frontal view; 2, 4, head in dorsal view; 5, 6, head in lateral view; 7, 8 basal segments of antenna.

space 1.4 times basal width of mandible and 1.0 times eye height. Temple sparsely minutely punctate and setose.

Mesosoma 1.2 times as long as high and 1.7 times as wide as mesoscutum length. Pronotum largely rugose. Middle lobe of mesoscutum sparsely minutely punctate and setose; lateral lobes very sparsely setose; notauli deep and wide, strongly crenulate; scutellum sparsely setose. Mesopleuron: anterior subalar depression wide, crenulate; epicnemial area strongly crenulate; disc smooth, sparsely setose; precoxal sulcus wide, crenulate. Mesosternum densely setose. Metanotal flange weak. Metapleuron areolate, densely setose. Propodeum 0.35 times as long as mesosoma width; areolate, densely setose. Fore wing 2.9 times as long as wide; stigma 2.9 times as long as wide, 0.82 times as long as 1-R1 + 2-R1; $r/3-RS = 0.91$; vein 1m-cu postfurcal; vein lcu-a postfurcal. Hind wing 4.1 times as long as wide; $M + Cu/1-M = 2.9$. Hind femur 3.9 times as long as wide; hind tibial 1.4 times as long as hind femur and 2.5 times as long as basitarsomere; fifth tarsomere 1.2 times as long as second; hind tibial spur 0.32 times as long as basitarsomere.

Metasoma smooth. First tergum 1.3 times as long as wide apically; dorsal carinae somewhat developed. Ovipositor sheath 1.0 times as long as fore wing and 1.2 times as long as mesosoma and metasoma united.

Color: Dark brown. Head yellowish brown; palpi dark brown. Antenna dark brown. Wings brownish hyaline; stigma and veins dark brown. Legs dark brown. Ovipositor sheath dark brown.

Body length: 6.0 mm. Antenna length 6.2 mm. Fore wing length 5.7 mm. Ovipositor sheath length 5.8 mm.

Male: Unknown.

Holotype: ♀, Meifeng 2150m, Nantou, VIII. 1984 (K.S. Lin & K. C. Chou).

Distribution: Known only from the type locality.

Host: Unknown.

Remarks: This species differs from *C. koshunensis* Watanabe in the following characters: Head yellowish brown; face without distinct median longitudinal carina; vein 1m-cu

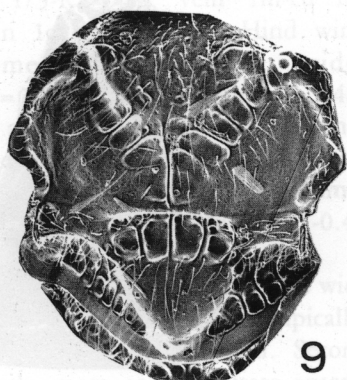
postfurcal; and ovipositor sheath without pale ring at apex.

Etymology: *Longius* is an adjective meaning "longer";. It refers to the greater length of the ovipositor sheath than the mesosoma and metasoma combined.

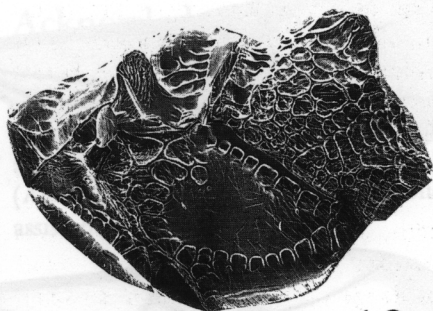
Cenocoelius taiwanensis Chou & Lee sp. nov.

Female: Head 1.6-1.7 times as wide as long, and 1.3-1.4 times as wide as mesonotum. Eye 0.73-0.83 times as long as temple. Vertex very sparsely minutely punctate and setose. $POL/OOL = 0.69-0.89$; $OOL/OD = 2.4-2.8$; $POL/OD = 1.9-2.0$. Frons sparsely minutely punctate and setose laterally; median lamella completely developed, rather higher anteriorly and somewhat triangular in lateral view. Antenna 30-segmented; scape 2.3-2.7 times as long as wide, 1.2-1.4 times as long as first flagellomere, and 0.69-0.79 times as long as flagellomeres 1 + 2; first flagellomere 2.9-3.2 times as long as wide, and 1.3 times as long as second; second flagellomere 2.1-2.5 times as long as wide. Face 0.46-0.49 times as high as wide, 1.8 times as wide as eye height, and 0.65-0.66 times as wide as head; face and clypeus sparsely minutely punctate and setose; face with median callus, and more or less with short median longitudinal ridge dorsally; clypeus with median apical tooth. Tentorial index 1.5-1.6. Malar space 1.4-1.7 times basal width of mandible and 0.88-0.94 times eye height. Temple sparsely minutely punctate and setose.

Mesosoma 1.2-1.4 times as long as high and 1.5-1.6 times as wide as mesoscutum length. Pronotum largely reticulate-rugose. Middle lobe of mesoscutum sparsely minutely punctate and setose; lateral lobes very sparsely setose; notauli deep and wide, strongly crenulate; scutellum sparsely setose. Mesopleuron: anterior subalar depression wide, crenulate; epicnemial area strongly crenulate; disc mostly smooth, sparsely setose; precoxal sulcus wide, crenulate. Mesosternum densely setose. Metanotal flange weak. Metapleuron reticulate-rugose, densely setose. Propodeum 0.35-0.42 times as long as mesosoma



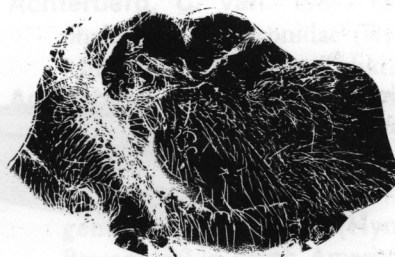
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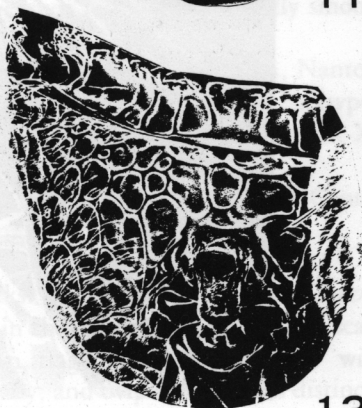
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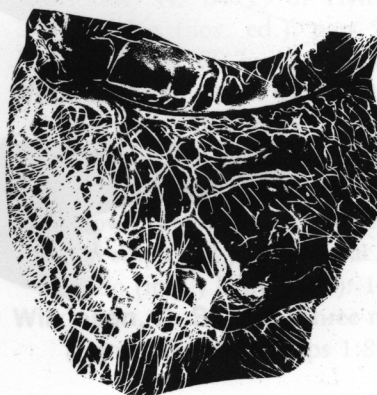
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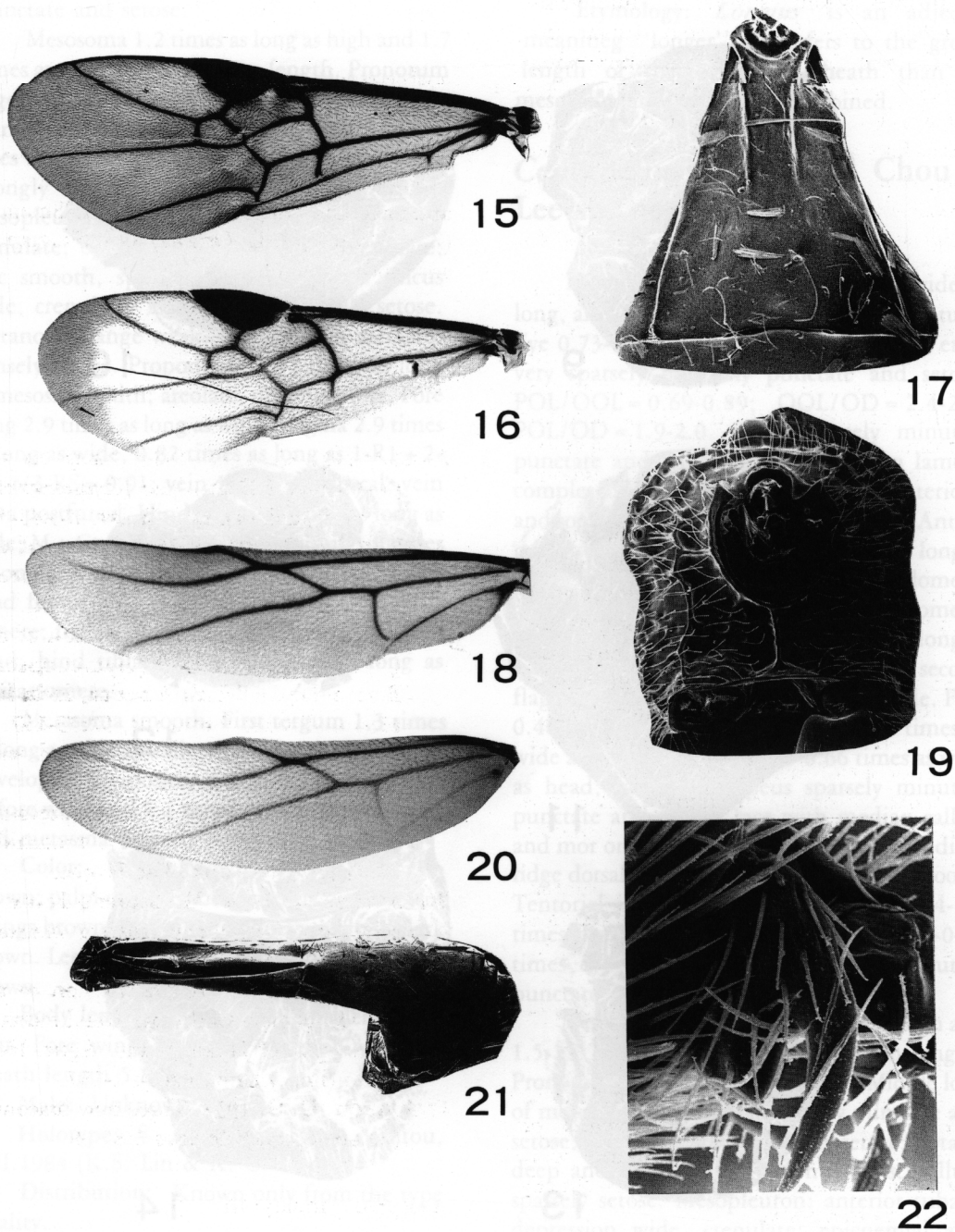


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Figs. 9-14. 9, 10 and 13 *Cenocoelius longius* sp. nov. 11, 12 and 14 *C. taiwanensis* sp. nov. 9, 11, mesonota in dorsal view; 10, 12, mesosoma in lateral view; 13, 14, propodeum in dorsal view.



Figs. 15-22. 15, 17, 18 and 21 *Cenocoelius longius* sp. nov. 16, 19, 20 and 22 *C. taiwanensis* sp. nov. 15, 16, fore wings; 17, first metasomal tergum in dorsal view; 18, 20, hind wings; 19, propodeum in posterior view; 21, metasoma in lateral-dorsal view; 22, hind claw.

width; reticulate-rugose, densely setose. Fore wing 2.6-2.8 times as long as wide; stigma 2.7-3.0 times as long as wide, 1.1 times veins $1-R_1 + 2-R_1$; $r/3-RS = 1.0$; vein $1m-cu$ interstitial; vein $1cu-a$ postfurcal. Hind wing 3.6-3.7 times as long as wide; $M + Cu/1-M = 3.0-3.3$. Hind femur 3.7-4.1 times as long as wide; hind tibia 1.4-1.6 times as long as hind femur and 2.4-2.7 times as long as basitarsomere; fifth tarsomere 1.2-1.3 times as long as second; hind tibial spur 0.31-0.43 times as long as basitarsomere.

First tergum 1.1-1.2 times as long as wide apically; costate, more or less smooth apically; dorsal carinae somewhat developed. Second tergum smooth, more or less costate antero-laterally; remainder of metasoma smooth. Ovipositor sheath 0.71-0.80 times as long as fore wing and 0.78-0.87 times as long as mesosoma and metasoma united.

Color: Dark brown to blackish brown. Head yellowish brown; palpi yellowish brown. Antenna dark brown. Wings faintly brownish hyaline, fore wing brown apically; stigma and veins dark brown. Legs dark brown; tarsi more or less lighter. Ovipositor sheath dark brown.

Body length: 3.8-4.7 mm. Antenna length 3.4-3.5 mm. Fore wing length 3.8-4.2 mm. Ovipositor sheath length 2.9-3.0 mm.

Male: Similar to female. Antenna 29-31-segmented. First tergum mostly smooth to weakly costate.

Holotype: ♀, Meifeng 2150m, Nantou, IX, 1984 (K.S. Lin & K.C. Chou). Paratypes: Sungkang 2100m, Nantou, 2♀♀, 3♂♂, IX-XI, 1985 (K.S. Lin)

Distribution: Known only from Central Taiwan.

Hots: Unknown.

Remarks: This species differs from *C. eous* Wilkinson in the head yellowish brown; scape shorter than flagellomeres 1 + 2; fore wing brown apically; and ovipositor sheath distinctly longer than metasoma.

Etymology: *Taiwnensis* is an adjective meaning "from Taiwan"

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