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A taxonomic study on Chironominae from China V. Genus Cladotanytarsus Kieffer, 1921

(Diptera, Chironomidae)

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Abstract

Four new species of the genus *Cladotanytarsus* KIEFFER, 1921, found in China are described: *C. parvus* **sp. nov.**, *C. digitalis* **sp. nov.**, *C. palmatus* **sp. nov.** and *C. frontalis* **sp. nov.** Following *Cladotanytarsus*-species are reported as new records to China: *C. pseudomancus* (GOETGHEBUER, 1934), *C. nigrovittatus* (GOETGHEBUER, 1922), *C. conversus* (JOHANNSEN, 1932) and *C. vanderwulpi* (EDWARDS, 1929). A revised key of the Chinese species of *Cladotanytarsus* is given. - Key words: Chironomidae, *Cladotanytarsus*, new species, new records, China.

Zusammenfassung

Vier neue Arten der Gattung *Cladotanytarsus* werden aus China beschrieben: *C. parvus* **sp. nov.**, *C. digitalis* **sp. nov.**, *C. palmatus* **sp. nov.** und *C. frontalis* **sp. nov.** Folgende *Cladotanytarsus*-Arten werden als neu für China nachgewiesen: *C. pseudomancus* (GOETGHEBUER, 1934), *C. nigrovittatus* (GOETGHEBUER, 1922), *C. conversus* (JOHANNSEN, 1932) und *C. vanderwulpi* (EDWARDS, 1929). Es folgt ein revidierter Bestimmungsschlüssel für die chinesischen Arten der Gattung *Cladotanytarsus*.

Introduction

Cladotanytarsus is a member of the Tanytarsini, Chironominae, created by KIEFFER in 1921. Subsequently, *Cladotanytarsus pallidus* (KIEFFER) was fixed as its type species in 1922. This genus is close to *Tanytarsus* v.d.WULP, 1874, *Paratanytarsus* THIENEMANN & BAUSE, 1913, and *Rheotanytarsus* THIENEMANN & BAUSE, 1913, and can be recognized by the following charcters: Macrotrichia restricted to wing apex; anal point usually with cluster of spinules between longitudinal crests; digitus projecting beyond margin of superior volsella; lamelliform setae of median volsella branched.

So far, more than 20 species have been recorded from Palearctic, Nearctic, Oriental and Afrotropical Region (ASHE & CRANSTON 1990, CHAUDHURI & GUHA 1987, FITTKAU & REISS 1978, FREEMAN & CRANSTON 1980, SASA 1989, SUBLETTE & SUBLETTE 1965, 1973). In China only one species, *C. yunnanensis* WANG & ZHENG, 1990, was reported. This paper describes 4 new species found in China, and 4 other species are reported here as new records to China with taxonomic notes and figures of hypopygium.

Methods and morphology

All specimens studied in detail were mounted in Canada Balsam. Terminology follows that of SAETHER (1980). Length measurements are in micron except marked. Type material is deposited in the Biology Department of Nankai University, Tianjin, China.

Systematic account

Cladotanytarsus parvus sp. nov.

Holotype: Male, China, Guangdong Province, Fengkai, 23.4°N / 111.4°E, 20.IV.1988 (X. WANG).

Etymology: Referring to the small body size.

Description, male: Total length 1.52 mm, Wing length 1.03 mm.

Head: Pale green. Antenna pale brown, with 13 flagellomeres and well developed plumes; groove beginning from flagellomere II; flagellomere XIII with 3-4 long sensilla chaetica. AR 1.2. Frontal tubercles absent. Temporals 10 in one row. Clypeus with 20 setae in a raised semicircular area. Tentorium as in fig.1. Maxillary palp 5-segmented. Length of segments 2-5: 25, 77.5, 82.5, 92.5.

Thorax: Groundcolor of thorax yellowish green, antepronotum and scutellum pale green, with brown to dark brown scutal stripes, superalar callus, ventral half of preepisternum and postnotum. Antepronotum separated medially, anterior margin of scutum raising above antepronotum remarkably. Acrostichals 6, dorsocentrals 4, scutellars 2, prealars 1.

Wing: With weakly developed anal lobe. Costa not produced beyond R4+5. R1 and R4+5 near the ventral margin. All veins and membrane cells of r4+5, m3+4 and m1+2 with macrotrichia.

Legs: Pale green, apex of front tibia with a slender spur and a weak scale. Middle and hind tibiae have two separated combs, each of them with a longer spur. Pulvilli absent. Length and proportion of legs:

	fe	ti	ta1	ta2	ta3	ta4	ta5	LR
P1	490	230	580	290	235	188	93	2.52
P2	470	350	203	95	65	38	38	0.58
P3	500	470	275	168	153	103	65	0.59

Abdomen: Pale green. Segments I-VII are about equal in width, Segment VIII distinctly narrower than others. Chaetotaxy of tergites arranged in 2-3 horizontal lines. Setae sparse.

Hypopygium (fig.2): Light brown. Gonostylus rather short and thin, about equal in length with gonocoxite. Anal point triangular, with tapered apex and broad base; dorsal side of anal point has 5 spinules between high longitudinal crests and 12 short oral setae. Superior volsella with an elongate tapering apex, inner margin bearing 2 long setae and 3 short setae on dorsal side. Digitus long, projecting beyond inner margin of superior volsella remarkably, with sharp apex. Inferior volsella extending beyond base of gonostylus. Median volsella slender, with numerous branched lamellae distally.

Female and immature stages unknown.

Remarks: The male of *C. parvus* sp. nov. is quite similar to that of *C. linearis* (FREEMAN, 1954) from Africa in the shape of anal point and body coloration, but differs in having rather short and thin gonostylus, different shape of superior volsella and larger LR1, AR ratio (in *linearis* LR1 = 1.8, AR = 0.75).

***Cladotanytarsus digitalis* sp. nov.**

Holotype: Male, China, Ningxia Autonomus Region, Mt. Liupan, 35.4°N / 106.2°E, 7.VIII.1987 (X. WANG).

Etymology: Referring to the remarkably shaped digitus of this species.

Description, male: Total length 2.42 mm, Wing length 1.63 mm.

Head: Pale yellowish green. Antenna with 13 flagellomeres and developed plumes; groove beginning on flagellomere II; 4 long sensilla chaetica present on flagellomere XIII. AR 1.31. Eyes widely separated. Front tubercles absent. Temporals 8, in one row. Clypeus with 9 setae. Tentorium as in fig.3, with a slightly curved and sharp apex. Mouthpart elongate, maxillary palp 5-segmented. Length of segments 2-5: 38, 108, 113, 183.

Thorax: Yellowish green. Acrostichals 6, dorsocentrals 5, scutellars 4, prealars 1.

Wing: Broad, 0.53 mm in width. Anal lobe weakly developed. Costa not produced beyond R4+5, R2+3 indistinct. Wing macrotrichia sparsely and restricted to apex (r4+5, m1+2, m3+4 cells).

Legs: Pale green in coloration. Front tibia with a slender spur, spurs of mid and hind tibial comb not equal in length. Length and proportions of legs:

	fe	ti	ta1	ta2	ta3	ta4	ta5	LR
P1	690	330	905	430	355	290	120	2.74
P2	690	510	315	160	100	70	60	0.61
P3	720	680	480	290	250	170	95	0.71

Abdomen: Pale yellowish green. Segments VII, VIII narrower than I-VI. Chaetotaxy of tergites sparse.

Hypopygium (fig.4): Pale green. Gonocoxite broad, gonostylus shorter than gonocoxite, inner margin bearing 7 setae. Inferior volsella with several long setae at apex. Superior volsella slightly triangular in shape, with elongate apex, inner margin bearing 3 strong setae, outer surface with 4 short setae, microtrichia absent. Digitus long, projecting beyond the superior volsella, with a bluntly rounded and expanded apex. Anal point short and broad, slightly triangle-shaped, apex blunt, with 2 spinules and several short oral setae. Crests developed. Median volsella long, branched lamellae distally.

Female and immature stages unknown.

Remarks: The present species shares some features with *C. mancus* (WALKER, 1856), differs in having longer and apically expanded digitus, fewer anal point spinules, higher value of LR1 and different thorax coloration.

***Cladotanytarsus palmatus* sp. nov.**

Holotype: Male, China, Hainan Province, Xinglong, 18.7°N / 110.1°E, 21.V.1988 (X. WANG).

Etymology: Referring to the palmate median volsella.

Description, male: Total length 1.97 mm, Wing length 1.0 mm.

Head: Pale yellowish green. Antennal flagellomeres light brown. Antenna with 13 flagellomeres and well developed plumes; groove beginning from flagellomere II; long sensilla chaetica present on flagellomere II, III and XIII. AR 0.76. Eyes slightly comma-shaped, with broad ventral part and tapering dorsal part. Frontal tubercles absent. Temporal setae 10. Clypeus with 14 setae. Length of maxillary palp segments (seg. 2-5): 20, 73, 78, 128.

Thorax: Pale green. Antepronotum with lobes widely separated medially. Scutum clearly overreaching antepronotum. Acrostichals 4, dorsocentrals 5, prealars 1.

Wing: Short, with weakly developed anal lobe. Wing macrotrichia sparse, distributed on R, M1+2 and cells of r4+5, m1+2. Macrotrichia only presenting on m3+4, 3-4 in number. Vein M, A and cells (m, an, cu and r) lacking macrotrichia.

Legs: Weak, pale green. Length and proportions of legs:

	fe	ti	ta1	ta2	ta3	ta4	ta5	LR
P1	470	170	415	290	240	170	80	2.44
P2	470	352	223	95	68	45	55	0.63
P3	520	490	310	200	167	107	75	0.63

Abdomen: Pale green. Chaetotaxy of tergites arranged in 2-3 horizontal lines. Setae sparse.

Hypopygium (fig.5): Light brown. Gonocoxite short and broad. Gonostylus thin, apical margin bearing 5 setae. Anal point short, apex sharp, with 3 spinules and 7 short oral setae. Inferior volsella normally developed. Superior volsella slightly rectangular in shape, apex elongated, inner margin having 2 strong setae and outer surface with 2 short setae, without microtrichia. Digitus extremely slender, apex pointed. Median volsella thick, with a palmate apex, branched lamellae numerous.

Female and immature stages unknown.

Remarks: The male of *C. palmatus* sp. nov. differs from the known species of *Cladotanytarsus* in its unique structure of the superior volsella, digitus, median volsella and anal point.

Cladotanytarsus frontalis sp. nov.

Holotype: Male, China, Hainan Province, Xinglong, 18.7°N / 110.1°E, 21.V.1988 (X. WANG).

Paratypes: 3 males, same data as holotype.

Etymology: Named for the remarkable frontal tubercles.

Description, male (n = 4): Total length 1.90 - 2.03 (1.97) mm, Wing length 0.94 - 1.07 (1.0) mm.

Head: Pale green. Antenna with 13 flagellomeres and well developed plumes; groove beginning on flagellomere II. Sensilla chaetica present on flagellomeres II-VI and XIII. AR 0.76 - 0.96 (0.84). Frontal tubercles cone-shaped, long, about 18 in length and 8 in width, densely covered with microtrichia. Temporals 9. Clypeus 12. Tentorium as in fig.6, with longer apex. Average length of maxillary palp segments 2-5 (n = 4): 29, 65, 75, 130.

Thorax: Yellowish green. Acrostichals 9, dorsocentrals 5-10, scutellars 2, prealars 1.

Wing: Anal lobe undeveloped. Veins clear, light brown in coloration. All veins and cells with linearly arranged macrotrichia except M stem and cell r and m. Costa not produced beyond R4+5, R2+3 running close to R4+5, reaching about middle between R1 and R4+5.

Legs: Yellowish green. Front tibia with a slender spur, middle and hind tibiae with two separated combs, each with an elongate spur subequal in length. Middle and hind tarsi with long beard. Frontal beard lacking. Length and proportions of legs:

	fe	ti	ta1	ta2	ta3	ta4	ta5	LR
P1	480-510 (493)	215-225 (220)	600-645 (615)	290-315 (302)	230-250 (243)	130-185 (161)	70-90 (83)	2.72-2.86 (2.79)
P2	445-515 (503)	360-390 (373)	217-250 (236)	113-123 (118)	80-80 (80)	50-55 (52)	45-48 (47)	0.60-0.64 (0.62)
P3	500-550 (520)	460-515 (485)	315-330 (325)	192-200 (194)	175-180 (175)	110-120 (115)	70-75 (72)	0.64-0.68 (0.67)

Abdomen: Pale green. Long setae of tergites sparse, chaetotaxy arranged in 2 horizontal lines.

Hypopygium (fig.7): Light brown. Gonocoxite short. Gonostylus with 5-6 inner apical setae. Anal point long, reaching apex of gonocoxite, with broad base and sharp apex, abour 20 spinules and 5-7 oral setae on dorsal surface. Superior volsella with an elongate apex and 4 short lateral setae in one row. Digitus curved, with a tapering apex. Inferior volsella normally developed. Median volsella slender, with numerous branched lamellae distally.

Female and immature stages unknown.

Remarks: The hypopygium and LR1 of *C. frontalis* sp. nov. resemles *C. pseudomancus* (GOETGHEBUER, 1934) from Africa and *C. vanderwulpi* (EDWARDS, 1929) from Europe, but can be distinguished by the color pattern of the thorax and abdomen.

***Cladotanytarsus pseudomancus* (GOETGHEBUER, 1934)** (figs.8, 9)

Tanytarsus pseudomancus GOETGHEBUER, 1934.

Cladotanytarsus pseudomancus (GOETGHEBUER, 1934) - FREEMAN 1955, 1957.

Examined material: China, Hainan Province: 4 males, Diaoluo, 18.7°N / 109.8°E, 20.V.1988; 3 males, Dongzhaigang, 19.6°N / 110.7°E, 22.V.1988; 2 males, Bawangling, 19.0°N / 109.0°E, 11.V.1988 (X. WANG).

Distribution: Africa (Egypt, Sudan, Nigeria, Belgian Congo, South Africa, Madagascar).

Remarks: The Chinese specimens we examined have remarkable frontal tubercles and lower valvae of AR (0.83 - 0.94), while FREEMAN (1957) has mentioned that frontal tubercles are not visible in the African specimens and their AR value is 1.2.

***Cladotanytarsus nigrovittatus* (GOETGHEBUER, 1922)** (Figs. 10, 11)

Tanytarsus nigrovittatus GOETGHEBUER, 1922.

Cladotanytarsus nigrovittatus (GOETGHEBUER, 1922) - BRUNDIN 1947, LINDEBERG 1964, PINDER 1978.

Examined material: China: 1 male, Ningxia Hui Autonomus Region, Yinchuan, 38.4°N / 106.2°E, 2.VIII.1987; 1 male, Inner Mongolia Autonomus Region, Alax Zouqi, 38.8°N / 105.7°E, 30.VII.1987 (X. WANG).

Distribution: Europe.

***Cladotanytarsus conversus* (JOHANNSEN, 1932)** (Figs. 12, 13)

Tanytarsus conversus JOHANNSEN, 1932.

Cladotanytarsus conversus (JOHANNSEN, 1932) - SUBLETTE & SUBLETTE 1973.

Examined material: 1 male, China, Yunnan Province, Menglong, 21.5°N / 100.6°E, 12.IV.1987 (H. ZOU).

Distribution: Indonesia (Sumatra).

***Cladotanytarsus vanderwulpi* (EDWARDS, 1929)** (Figs. 14, 15)

Tanytarsus vanderwulpi EDWARDS, 1929.

Cladotanytarsus vanderwulpi (EDWARDS. 1929) - BRUNDIN 1947, PINDER 1978.

Examined material: 6 males, China, Tianjin, Jixian, 40.0°N / 117.3°E, 12.VIII.1986 (X. WANG).

Distribution: Europe, Lebanon.

Key to males of *Cladotanytarsus* known from China

1	Frontal tubercles present	2
-	Frontal tubercles absent	6
2	Anal point short and tapering, spinules absent	*conversus*
-	Anal point spinules present	3
3	Spinules of anal point less than 5, LR1 < 2	*nigrovittatus*
-	Spinules of anal point more than 15, LR1 > 2	4
4	Body uniformly green	*frontalis* sp. nov.
-	Thorax or abdomen marked	5
5	Abdomen with dark band, apex of digitus pointed	*pseudomancus*
-	Abdomen unmarked, apex of digitus blunt	*vanderwulpi*
6	Anal point slender and short, superior volsella not elongate	*palmatus* sp. nov.
-	Base of anal point broad, with elongated superior volsella	7
7	Body uniformly green, apex of digitus expanded	*digitalis* sp. nov.
-	Thorax marked	8
8	Anal point with 2 basally joined tooth-shaped spinules	*yunnanensis* (fig.16)
-	Anal point with 5 small scattered spinules	*parvus* sp. nov.

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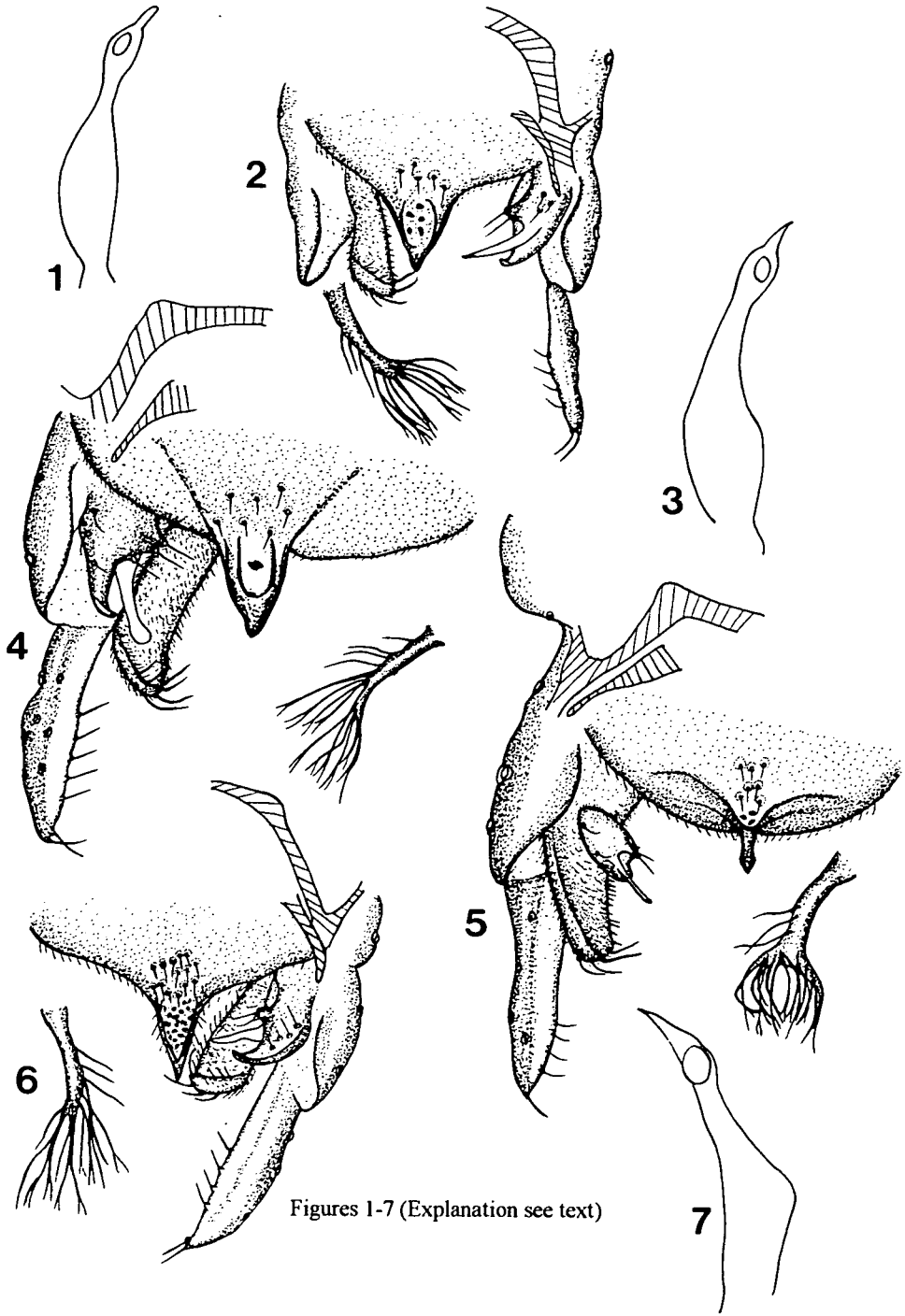
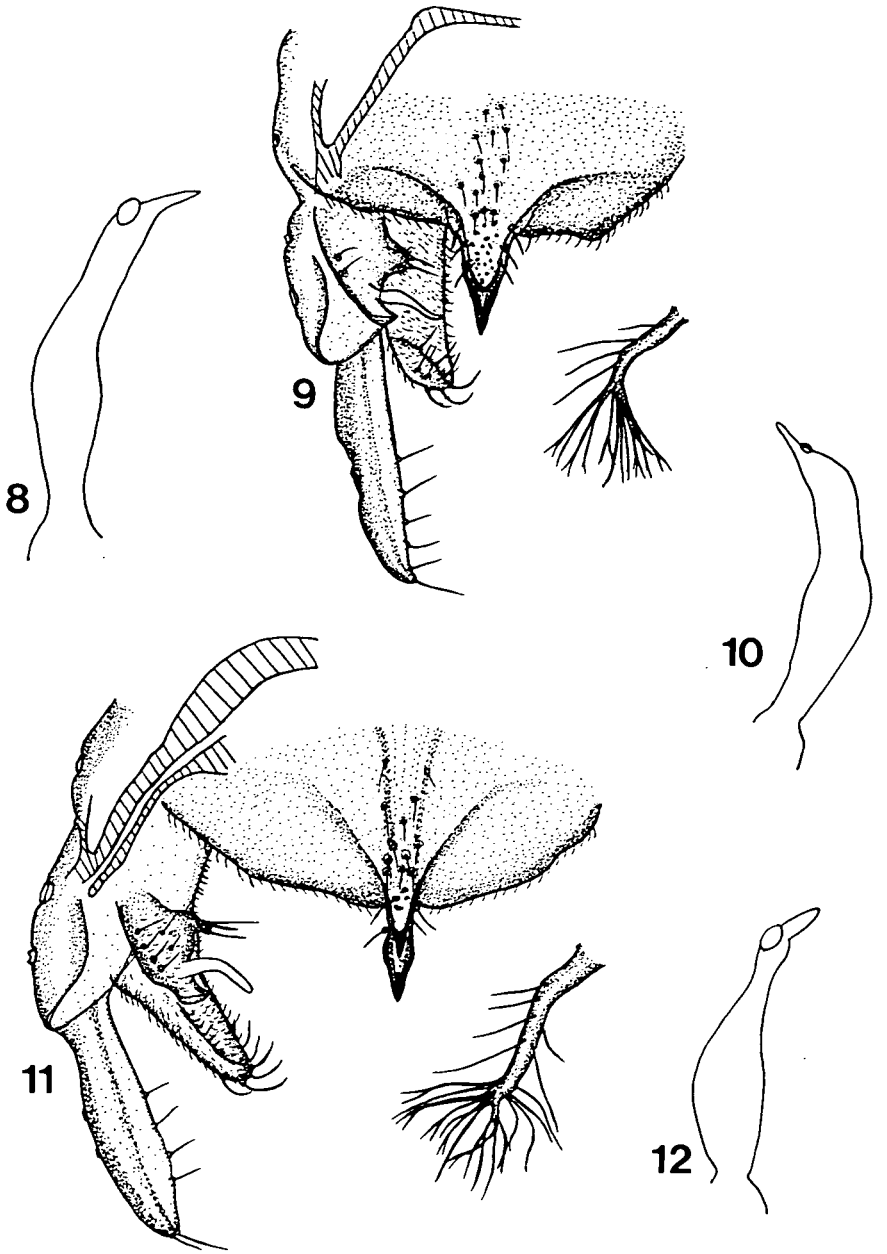
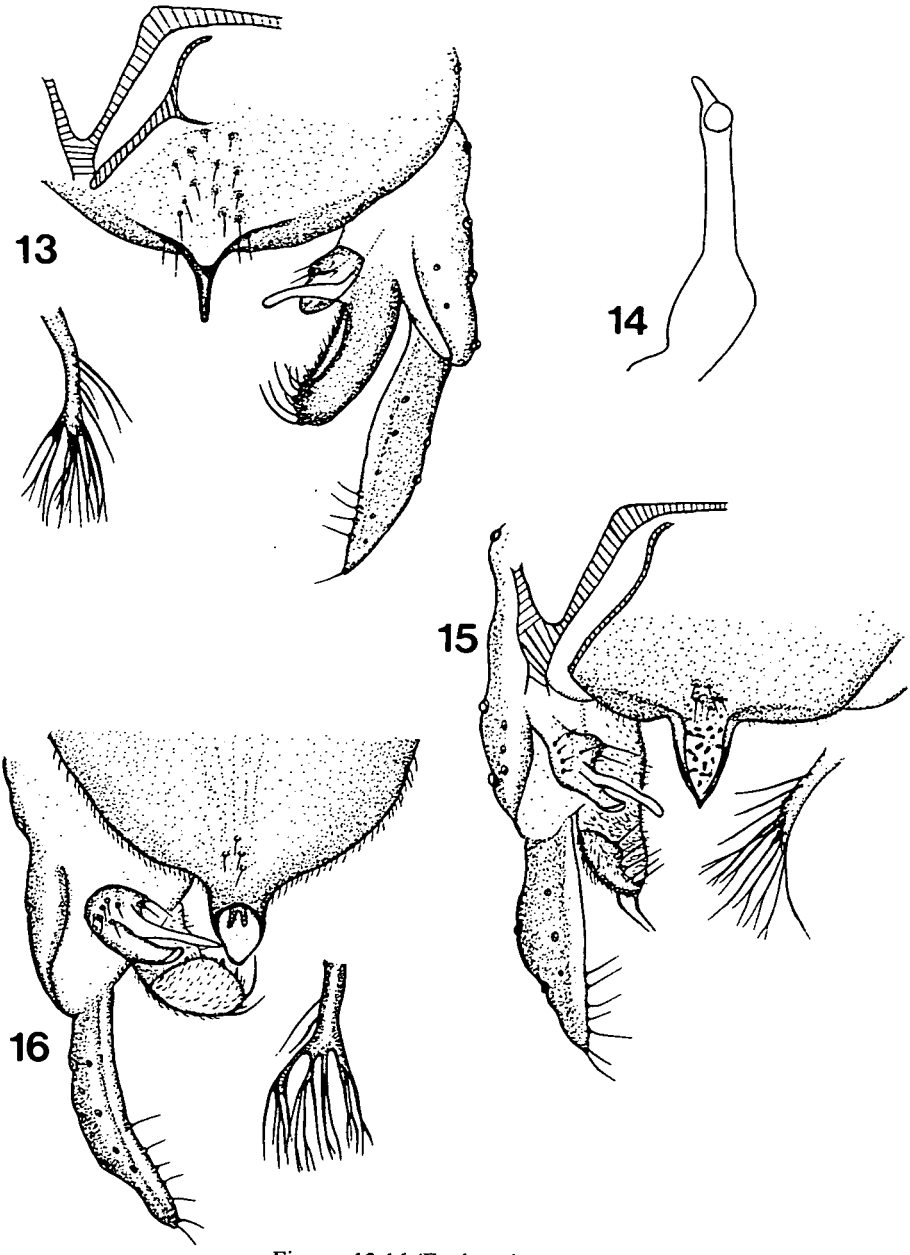


Figures 1-7 (Explanation see text)



Figures 8-12 (Explanation see text)



Figures 13-16 (Explanation see text)

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