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# Life Histories and Ecology of Iowa Midges (Tendipedidae). I. The Genus Tanytarsus

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# LIFE HISTORIES AND ECOLOGY OF IOWA MIDGES (TENDIPEDIDAE). I. THE GENUS *TANYTARSUS*

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As defined by Edwards (1929) the genus *Tanytarsus* differs from *Chironomus* (*Tendipes*) in its hairy wings, bare squamae, and the horizontal or indistinct radio-medial cross vein (r-m). However, the status of the genus is very unsatisfactory and a revision of the group and its related genera will probably result in placing the species here described into another genus, probably into more than one genus.

Moreover, the group has had little attention in this country and there are few types available for comparison. Under the circumstances any attempt to classify specimens is done subject to future corrections. The assignment of the following described specimens, therefore, to one or the other of the species named by various investigators is strictly provisional. But contributions of this kind are badly needed if eventually someone is to revise the group on a satisfactory basis.

The author wishes to thank Dr. Robert L. King at whose suggestion these studies were undertaken at Okoboji in 1939 for his continued interest in the work.

## *TANYTARSUS* (*MICROPSECTRA*) *NIGRIPILUS* JOH.

Johannsen 1905, p. 287, adults.
Malloch 1915, p. 487, adults.

Adults: Hind tibial combs broad, confluent, without spurs. Pulvilli absent. L. R. about 1.15, male fore tarsi with long beard. Male antennae 14-segmented, A. R. about 1.3; antenna of female 6-segmented. No frontal tubercles. Cephalic aspect of eyes similar to that of *T. dissimilis* (Plate I, fig. A). Pronotum well developed, deeply divided at apex. Hypopygium as in plate I, fig. 1.

All black or brownish black, 3-4 mm. long.

The immature stages are in a general way similar to those of *T. dives* Joh. as described by Johannsen 1937, p. 13. Larva: Blood red, 5 mm. long. Antennae (fig. 11) 0.37 mm. long exclusive of long petioled lauterborn organs; 1st segment 3 times as long as 2nd; lateral bristle about ⅝ of the distance from the base; spur on antennal protuberance .01 mm. long (Johannsen 1937 has .10 mm. for the spur on *Micropsectra;* this evidently should read .01 mm.) Labial plate and mandibles as in figures 12 and 14. Premandibles (fig. 13) bifid with a tuft of fine hairs. Epipharyngeal comb trifid, each segment with five blunt teeth (fig. 13).

The larvae, which are found in large numbers in March and April, occupy heavily felted tubes some of them nearly an inch long and loosely attached to dead leaves and other partly submerged debris in

slow moving creeks and ponds. The larva is very small in comparison to the size of the tube, but it shifts the tube about a little at a time with jerky movements. Specimens are easily reared in the laboratory.

Pupa: About 5 mm. long. The respiratory organ (fig. 15) is 0.9 mm. long with rather sparse hairs except on the basal third which is bare. Tergites 2-6 (fig. 25) with rather large shagreened areas; tergite 3 has two diverging bands of stout spinules on the distal half; tergites 4 and 5 each have transverse bands toward the anterior margin and tergite 2 is rather heavily shagreened with a conspicuous oval clear spot in the mid apical region. The comb on the posterolateral angle of the 8th segment has 5 to 8 marginal teeth and a few smaller ones set back (fig. 16); there are four long filaments on the lateral margin of segment 8. The anal fin has a fringe of about 35 filaments and one long filament on the disk. The cephalic tubercles are inconspicuous and without bristles.

The chaetotaxy is like that of *T. gmundensis* Eggers (Johannsen 1937, Pl. I, fig. 15) except that the latter has two longitudinal bands of coarse spinules on segment 4 in addition to the two transverse bands.

The immature stages trace to the *Eutanytarsus* group of Thienemann and to the subgroup which includes *Micropsectra*. (Thienemann 1929).

This species is very common in and near Davenport from March to May. It has not been taken at other seasons.

### *TANYTARSUS (MISCROPSECTRA), SP.*

A number of adults collected at Okoboji, Iowa, in August 1939 and 1940 can be distinguished from *T. nigripilus* only by their smaller size (2.5-2.75 mm.) and somewhat lighter color. The hypopygium (fig. 2) seems identical with that of *T. nigripilus*. It may be *T. deflectus* of Johannsen 1905, (p. 288). It may possibly be a summer variety; and it may become advisable to group a number of described species and establish one variable species. Immature stages are needed.

### *TANYTARSUS DISSIMILIS* JOH.

(*Tanytarsus str. sens.* Group *A* of Edwards)

Johannsen 1905, pp. 292-293, larva, pupa, adults.
Johannsen 1937, pp. 11-12, larva, pupa, L. R. and A. R. of adult.
Malloch 1915 keys this species but does not describe it.

Adults: hind tibial combs very narrowly separated, each with a short spur; pulvilli absent. L. R. 1.5 but variable. Male fore tarsi without beard. A. R. about 1.1; antennae of female 6-segmented (2 and 3 fused, 6 and 7 separate). Cephalic aspect of eyes as in plate I, fig. A. The pronotum fades out toward the top. r-m longer than the basal section of Rs. Wings quite hairy. Hypopygium as in figure 3 but appendage la variable as to length.

Dark green, vittae shining brown to yellowish. Length 2.5-3.0 mm., somewhat larger than Johannsen's specimens. Wing length 2.5 mm.

Johannsen (1937) puts this species in Group D of Edwards, but our adults definitely belong in Group A; they are quite similar to *T. tenuis* (Mg) Goet. as described by Edwards (1929) p. 410.

The larvae are as described by Johannsen (1937, p. 11). See figure 17 of antenna and figure 18 of the epipharyngeal comb. The lauterborn organs are about .012 mm. long (not 0.12 as in Johannsen's key for *Paratanytarsus*, p. 7). The larvae are common in shallow ponds in March and April and are easily reared. The larval tubes are about 6 mm. long and are constructed of debris which is thoroughly felted. According to Johannsen (1937, p. 11) this species often reproduces parthenogenetically and may do so paedogenetically.

The pupae agree with Johannsen's description except for a somewhat larger size (3.5 to 4 mm.). The patches of coarse spinules (fig. 26) vary considerably from specimen to specimen.

The immature stages belong in Thienemann's *Paratanytarsus* section which may briefly be described as follows: The larvae have sessile or subsessile lauterborn organs on the antennae; the pupae have a characteristic chaetotaxy which includes a median area of coarse spinules on tergite 4, a moderately long respiratory organ which is hairy throughout its entire length, and a single filament on the disk of the anal fin.

Common in the neighborhood of Davenport in March and April. Specimens from Clinton County, Iowa in June belong here though some of them, at least, differ in having much less hair on the wings, and the L. R. is 1.8.

### *TANYTARSUS PUSIO* MEIGEN (?)

(T. str. sens., Group B of Edwards, *Calopsectra* Kieff.)
Meigen 1830.
Johannsen 1905, p. 291, adults.
Malloch 1915, p. 490, adults.
Leathers 1922, ecology, etc.

Adults: hind tibial combs narrow, well separated, each with a rather long spur. Pulvilli well developed. L. R. 1.9; male force tarsi not bearded. A. R. about 1.3 Cephalic aspect of eyes as in Plate I, fig. B. Wings moderately hairy, f-cu well beyond r-m.

Thorax green, with vittae and posterior half of postnotum yellow to brown; abdomen green, legs yellowish. Length (dry) 2.9 mm., wing length 1.8 mm.

I have seen no figure of the hypopygium of this species; ours (fig. 4) is quite similar to Edward's figure of *T. gregarius* (1929, fig. 14e) but the latter figure shows no appendage 1a.

Our collection has only one adult taken at night on July 14, 1941 at Davenport. Its identification is based on the descriptions of Johannsen and Malloch.

I have not seen the immature stages, but they should belong in the *Gregarius* group of Bause 1914; and our collection has two pupae which belong here and are described below as *Calopsectra* A and B. It is hoped that further efforts to rear specimens of this group will be successful.

## *TANYTARSUS (CALOPSECTRA)* SP. A.

A green pupa with indefinite red areas, 5 mm. long, was reared from material taken from shallow water among weeds and willows on June 28, 1939 at Okoboji, Iowa. It died on July 20, and unfortunately its preservation is not very good. Its chaetotaxy (fig. 28) and comb on the poster-olateral angle of the 8th segment are similar to Johannsen's figure for *T. flavellus* (1937 Pl II, figs. 16 and 17, and text p. 15); and they also match more or less closely Bause's figures of *T. bathophilus* and *T. gregarius* (1914, Pl. VI, figs. 61 and 62, and text pages 95-96). The respiratory organs are about 0.4 mm. long, slender and smooth (Compare Bause 1914, fig. 67).

The specimen very definitely belongs in Bause's *Gregarius* group for the immature stages, which correspond to *Calopsectra* Kieff in adult taxonomy, the group to which *T. pusio* belongs.

## *TANYTARSUS (CALOPSECTRA)* SP. B.

A dead pupa and a larval cast were found in some pond material at Davenport on April 28, 1943. The material had been gathered on April 7 and small quantities put in separate jars so that there is but little doubt that the larval cast and the pupa belong together.

The antennal protuberance of the larva has no spur; the lauterborn organs are long petioled; the lateral bristle is 3/5 of the distance from the base of the first antennal segment and the second segment 1/6 as long as the first; the labium is 11-toothed, the middle tooth rather broad; the epipharyngeal comb is three parted, each part with four or five long blunt teeth.

The pupa (fig. 29) is 4.7 mm. long with chaetotaxy similar to that of *T. bathophilus* as figured by Bause 1914, fig. 61. The respiratory organs are not preserved. There are five marginal filaments on the 8th segment the second of which is placed medially with respect to the others. The comb of the postero-lateral angle of the 8th segment is broad with seven straight, sharp marginal teeth and 16 to 20 smaller teeth on its disk. There are two long filaments on the disk of the anal fin and about 40 filaments on the marginal fringe.

The hypopygium was removed from the dead pupa and mounted (fig. 9) though it is in poor condition.

This pupa and larva also fall in the *Gregarius* group of Bause.

## *TANYTARSUS EXIGUUS* JOH.

(*T.* str. sens., Group C of Edwards, *Rheotanytarsus* Bause, Kieff)
Johannsen 1905, pp. 294-6, larva, pupa, adults.
Malloch 1915, pp. 405-6, larva, pupa, adults.
Johannsen 1937, p. 12, larva and pupa.

Adults: hind tibial combs separated, both combs spurred, the inner comb longer. Pulvilli absent. L. R. about 2.0 (Johannsen has 1.75), male fore tarsi bare. A. R. about 1.0, antenna of female 7-segmented. No frontal tubercles. Cephalic aspect of eyes similar to that of *T. dissimilis* (Plate I, fig. A). Pronotum poorly developed, not reaching to top; scutum projecting. Wings rather densely hairy, $R_{2+3}$ apparently absent as $R_1$ and $R_{4+5}$ are very close together. $R_{4+5}$ ends

just beyond the tip of $Cu_1$. Hypopygium (fig. 5) has tapering and suddenly constricted styles and a long anal point. The constricted styles are readily recognizable in the dry specimen.

All pale yellow, abdomen greenish yellow, vittae very pale. Length about 2.4 mm. wing length 1.8 mm.

Our specimens are difficult to trace in Johannsen and Malloch because of the variability in size and L. R.

Common in Davenport in May and June especially near the river. They were not reared.

*TANYTARSUS* (*RHEOTANYTARSUS*) SP. (?)

Other specimens of *Rheotanytarsus* from Okoboji and some from near Davenport have not been satisfactorily identified. Most of them have a very high L. R. (3.00) and they may belong to the species reported as *T. flavellus* Zett.

*TANYTARSUS NEOFLAVELLUS* MALL.

(T. str. sens. Group D, series 1, of Edwards.)

Malloch 1915, p. 489, adults.

Adults: Hind tibial combs separated, each with a longish spur. Pulvilli absent or at least very indistinct. L. R. 2.7, fore tarsi of male bare. A. R. about 1.3; antennae of female 5-segmented (2-3 and 6-7 fused). Cephalic aspect of eyes similar to that of *T. ejuncidus* (Plate I, fig. C). Pronotum fades out toward apex. Wings moderately hairy. Hypopygium (fig. 6) with a longitudinal row of dots on the anal point, appendage 1a rather long, appendage 2 broad apically in the dorso-ventral plane.

Thorax yellow, vittae pale or quite indistinct, abdomen greenish, legs yellow. Length about 3 mm.

Common in July and August at Okoboji, Iowa. Not reared.

*TANYTARSUS EJUNCIDUS* WALKER (?)

(T. str. sens. Group D, series 1, of Edwards.)

Edwards 1929, p. 414, adults.

Adults: combs of hind tibiae separated, each with a well-developed spur. Pulvilli absent. L. R. varies from 2.3 to 2.7; front tarsi of male not bearded. A. R. 1.3; antennae of female 5-segmented. Frontal tubercles present. Cephalic aspect of eyes as in Plate I, fig. C. Pronotum well developed. Wings milky, faintly purplish by transmitted light, distal half in males, entire wings in females, hairy. The hypopygium (fig. 7) has a row of 4 to 6 dots on the anal point; dististyles rather heavy and slightly tapering; appendage 1 twice as long as broad, slightly narrowed apically with several long hairs on the inner side; 1a broad at base, tapering, entirely hidden under 1; appendage 2 swollen apically; 2a rather short with long hairs.

All green, drying to pale yellow except the abdomen which often remains greenish; no distinct vittae; legs and halteres pales. Length (fresh) 3-3.5 mm., wing length 1.7-2.1 mm.

Pupa: (figs. 19, 20, 21, 30) length 4-4.5 mm. Tergites 3, 4 and 5 have pairs of longitudinal bands of strong black bristles, the anterior pair with the bristles spiny and quite long, though the specimens vary

considerably on this point. The row of spinules on the posterior margin of tergite 2 is short, extending over about one third of the width of the tergite; and there are patches of fine spinules on tergite 3 anterior to the bands. There are four filaments on the lateral margin of the 8th segment and the postero-lateral comb has about 6 (4-8) strong teeth on its edge and a number of smaller ones on its disk. There are two filaments on the disk of the anal fin which has a fringe of about 40 filaments. The respiratory organs are .45 mm. long, tapering, the distal half covered with short hairs. The cephalic tubercles are rather slender, curved, each with a long hair from the apex.

The larvae were not studied.

Identification of this species is based on close agreement of the adults with Edward's (1929) description. I have seen no description of the immature stages.

The pupa belongs in the *Gregarius* group of Bause (p. 90) but there are no patches of coarse spinules on segment 6 as postulated by Bause. I can find no species described with pairs of longitudinal bands on segments 3, 4, 5 only and none on segment 6. However, according to Thienemann (1929, p. 95) "the chaetotaxy of this group seems to vary even within a species; hence it cannot be used for the certain identification of a species." On Thienemann's scheme for classification of the immature stages this species belongs in the section *Eutanytarsus*.

All our specimens are from the neighborhood of Davenport; common in the Duck Creek Park ponds from March to the middle of June.

### *TANYTARSUS MANCUS* WALKER

(T. str. sens. Group *F* of Edwards, *Cladotanytarsus* Kieff.)

Edwards 1929, p. 418, adults.

Bause 1914, p. 92 and figs. 83, 84, 85 (Pupa of "undetermined type III").

Zavrel 1934, pp. 154-162 and fig. 4d.

Adults: hind tibial combs well separated, pulvilli absent. L. R. 1.7; male fore tarsi bare. A. R. about 1.5; antennae of female 5-segmented (2-3 and 6-7 fused). Cephalic aspect of eyes as in Plate I, fig. D. Pronotum well developed, reaching to top where it is widely cleft. Wings milky, brownish purple by transmitted light, hairy at tip only. r-m longer than short basal section of Rs; fCu well beyond r-m. Hypopygium (fig. 8) with anal point rather long and ending in a sharp point which is hooked ventrad; dististyle short; appendage 1a like "superior appendage" of *T. conversus* (Johannsen 1932, p. 543, and fig. 32) i.e., "two-branched, the longer branch slender and bare, the shorter with bristles at apex"; ours have about three long bristles on this shorter branch. Appendage 2a long, branched.

Green, vittae and postnotum dark brown; female paler; scutellum and halteres pale. Length 2.5 mm. wing length 1.7 to 1.9 mm.

Pupa: 3.3 mm. long. Respiratory organ (fig. 24) .08 mm. long, swollen and with long bristles. Tergites 2-6 each with a pair of small oval patches toward the anterior end (fig. 27). 8th segment

with 5 (3 and 2) lateral filaments and a broad comb of 6-10 marginal teeth and several smaller ones set back from the edge, and a spur with hairs on its medial edge (fig. 23). Anal fin with two filaments on disk. Cephalic tubercles with a long terminal hair. See also figures of Bause and Zavrel indicated above.

Larvae of this group are described by Zavrel 1934, pp. 157-158.

According to Edwards (1929) this species belongs in Group *F. Cladotanytarsus* Kieff.; but Zavrel (1934) puts the immature stages in a special group, *Atanytarus*, and calls attention to the unsatisfactory status of *Cladotanytarsus*.

Davenport, March and April, in shallow water, ponds and slow-moving streams; also one male at Okoboji, Iowa, August 6, 1940. This is a European species not reported, to my knowledge, from America. The published descriptions of both adults and pupa agree so well with our material that there seems no reason to hesitate about the accuracy of our determination.

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## EXPLANATION OF THE PLATES

### Plate I

Hypopygia and cephalic aspect of eyes of *Tanytarsus.*

1. *T. nigripilus* x 140;
2. *T.* (*Micropsectra*) sp. *A* x 215;
3. *T. dissimilis* x 210;
4. *T. pusio* x 210, showing two positions of appendage 1a;
5. *T. exiguus* x 225;
6. *T. neoflavellus* x 190, appendage 2 also shown in side view;
7. *T. ejuncidus* x 225;
8. *T. mancus* x 190, appendages 1a and 2a detached;
9. *T.* (*Calopsectra*) sp. B x 210, removed from dead pupa, anal point broken off.
10. Tibial comb of *T. dissimilis.*

A. Cephalic aspect of eyes of *T. dissimilis;*
B. of *T. pusio;*
C. of *T. ejuncidus;*
D. of *T. mancus.*

### Plate II

Details of immature stages of *Tanytarsus.*

*T. nigripilus*:

11. larval antenna x 150;
12. labium of larva x 300;
13. epipharynx of larva x 450;
14. mandible of larva x 300;
15. respiratory organ of pupa x 70;
16. comb on 8th segment of pupa x 275.

*T. dissimilis*:

17. antenna of larva x 335;
18. epipharyngeal comb x 1000;

*T. ejuncidus*:

19. respiratory organ of pupa x 90;
20. cephalic tubercle of pupa x 450;
21. comb on 8th segment of pupa x 450;

*T. mancus*:

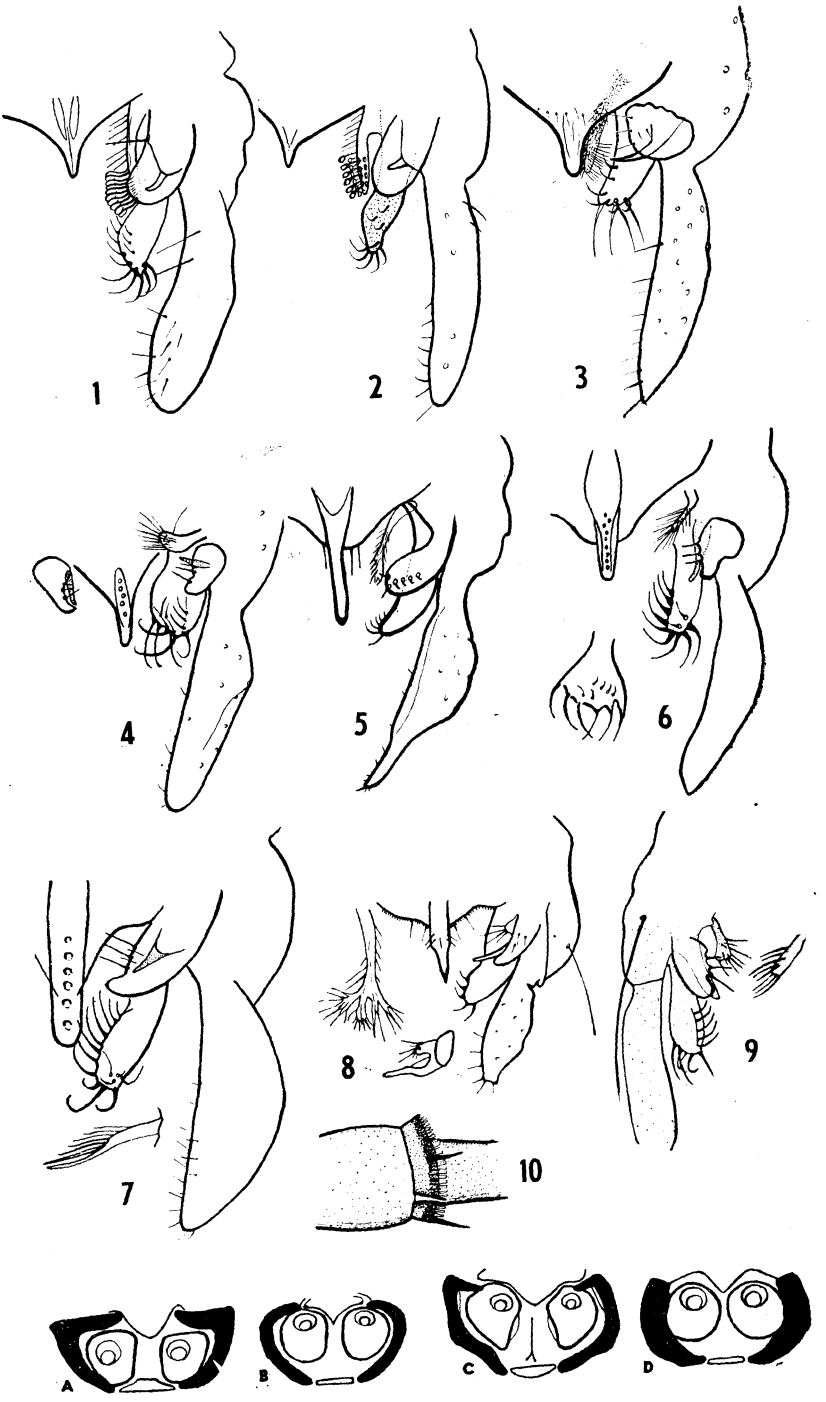
22. cephalic tubercle of pupa x 150;
23. lateral half of 8th segment of pupa x 150;
24. respiratory organ of pupa x 250;

### Plate III

Chaetotaxy of pupae of *Tanytarsus.*

25. *T. nigripilus* x 60; tergites 3-5.
26. *T. dissimilis* x 70; tergites 3-5.
27. *T. mancus* x 60; tergites 2-6.
28. *T.* (*Calopsectra*) sp. *A.* x 40; tergites 3-6.
29. *T.* (*Calopsectra*) sp. *B* x 70; tergites 3-6.
30. *T. ejuncidus* x 50. tergites 3-5.

Plate I.



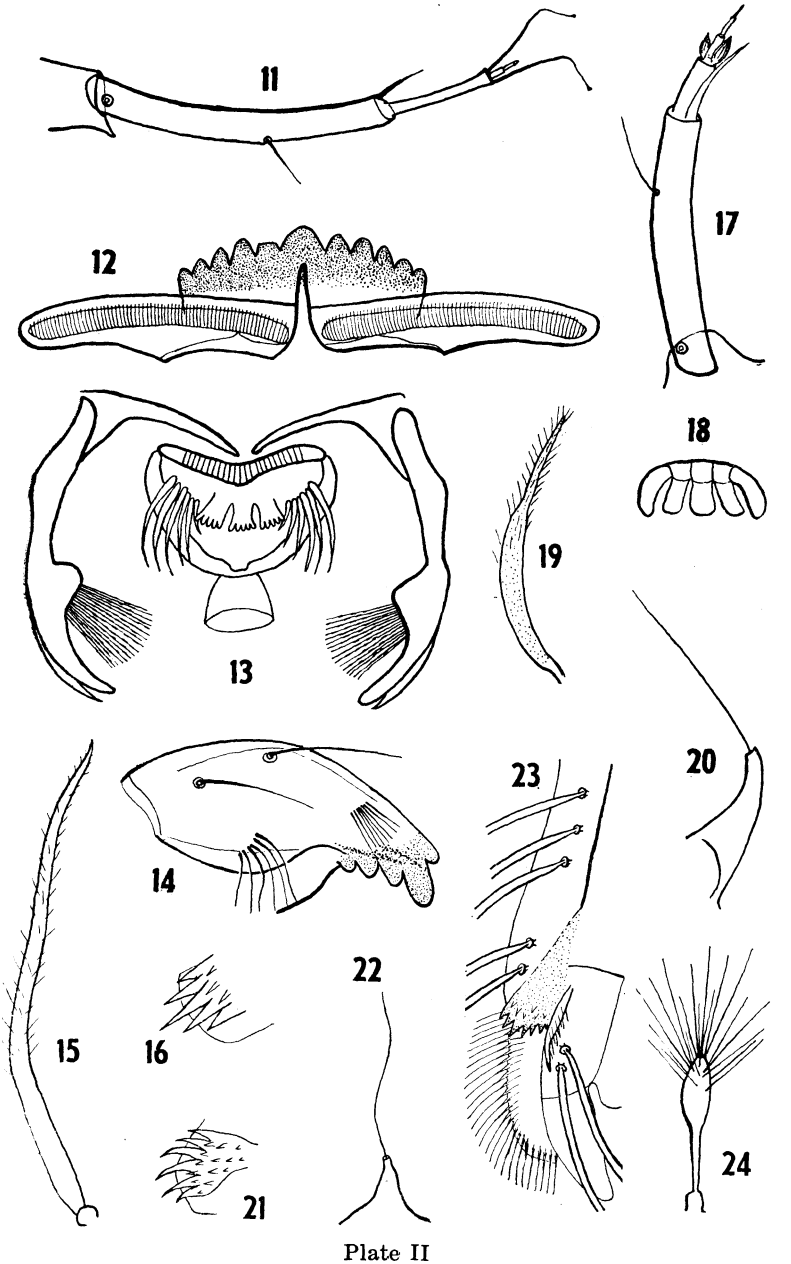



Plate II

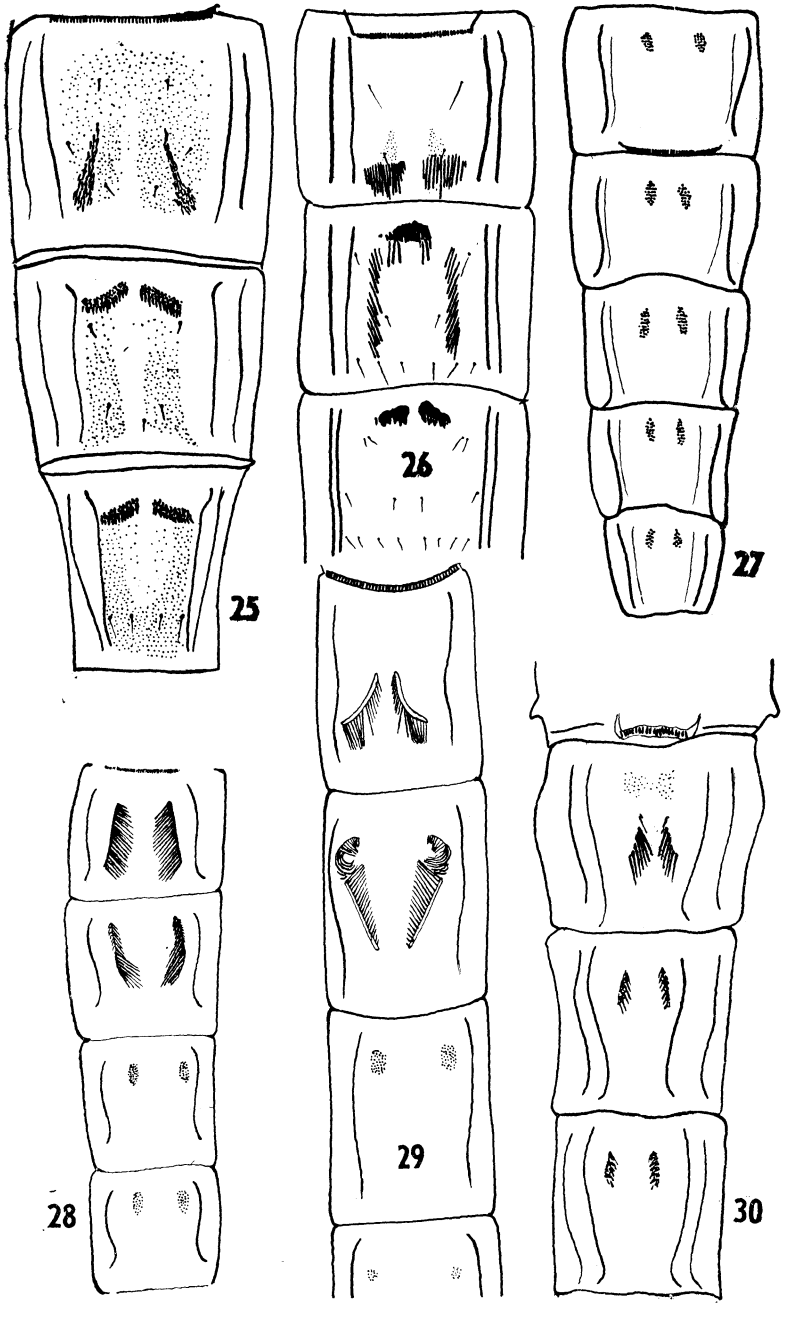



Plate III