

SUBFAMILY  
TANYPODINAE

## 4

**DIAGNOSIS:** **Antennae** retractile into head capsule, 4 segmented in southeastern United States taxa. **Labrum** with sensillae usually simple, occasionally multibranched, on pedicels or with expanded bladder-like bases. Labral lamellae absent. **Mentum** with large membranous triangular M appendage; dorsomental teeth present as separate or fused transverse plates, in longitudinal rows, or as a few usually blunt teeth located laterad, or apparently absent; ventromental plates and beard absent. **Premenum** bears a large, well sclerotized 4-7 toothed ligula. **Body** with well developed anterior and posterior parapods; with or without lateral fringe of setae, sometimes with long setae; procerci present and well developed. Anal tubules usually well developed in freshwater forms; reduced in brackish water taxa.

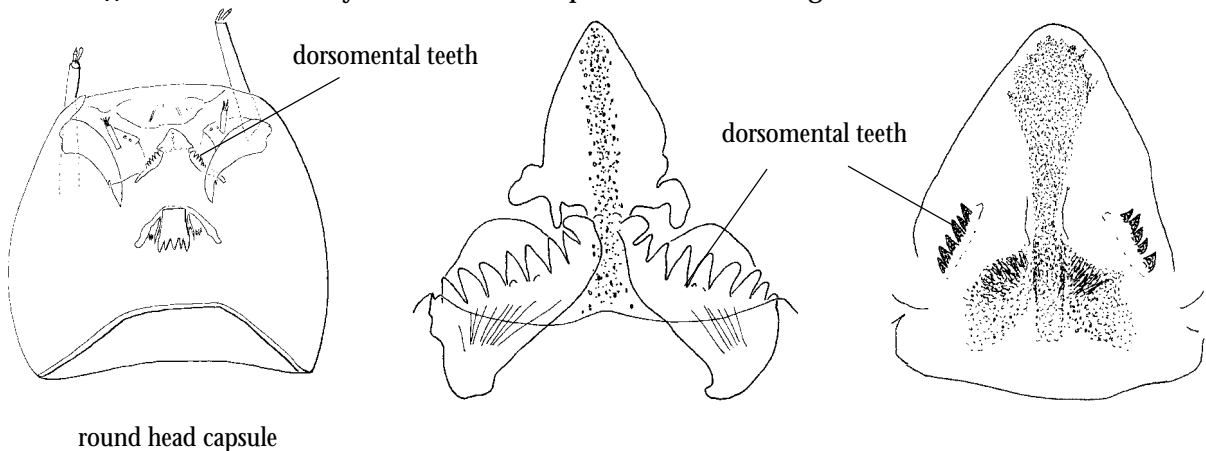
**NOTES:** Most members of this subfamily are free swimming or crawling predators; some burrow in bottom mud. Larvae are found in a variety of habitats, including water held by bromeliads or pitcher plants, as well as the more normal aquatic habitats such as springs, seeps, ditches, marshes, streams, rivers, ponds and lakes; one species is symbiotic in unionid mussels.

At the generic level the larvae of all southeastern tanypod genera are known. However, all are not easily identified. A particular problem exists with one group of the tribe Pentaneurini, the *Thienemannimyia* group. In the Carolinas the group includes *Conchapelopia*, *Hayesomyia*, *Helopelopia*, *Meropelopia*, *Rheopelopia* and perhaps *Telopelopia* and *Thienemannimyia* (not yet recorded from the Carolinas). While mature larvae of some of these genera can be easily identified, you may have to be happy with an identification of "*Thienemannimyia* group sp." for many early instar larvae of this complex of closely related genera. Mature fourth instar larvae with developing pupal characters may be positively identified by the internally developing thoracic horn; this structure is illustrated for each of these genera in the diagnoses and in the key below.

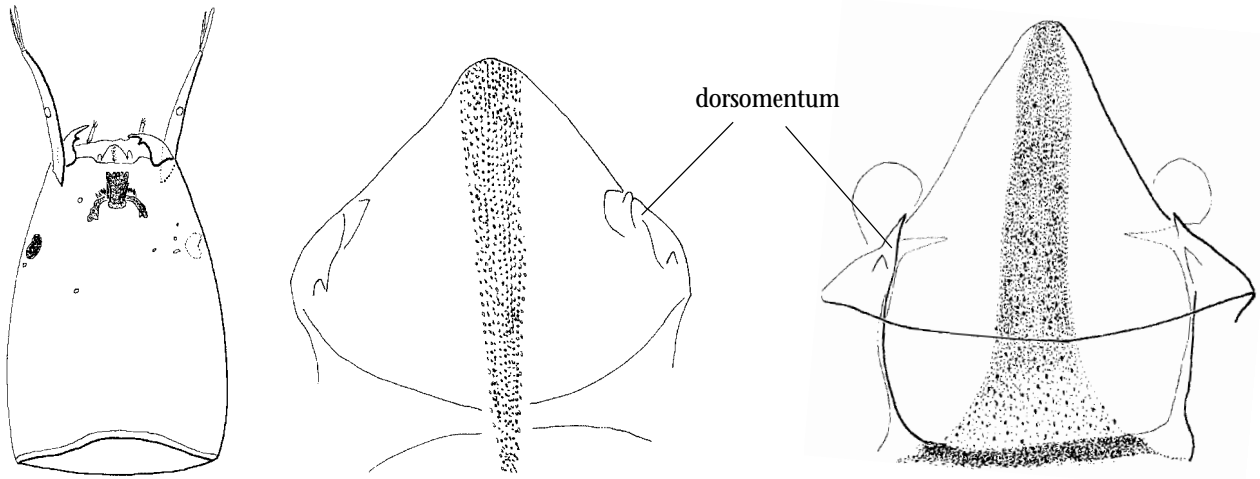
A very useful paper for confirming some genus level identifications by using the setae and sensillar structures of the tanypod head capsule is Kowalyk (1985)

**Key to the genera of larval Tanypodinae of the southeastern United States**

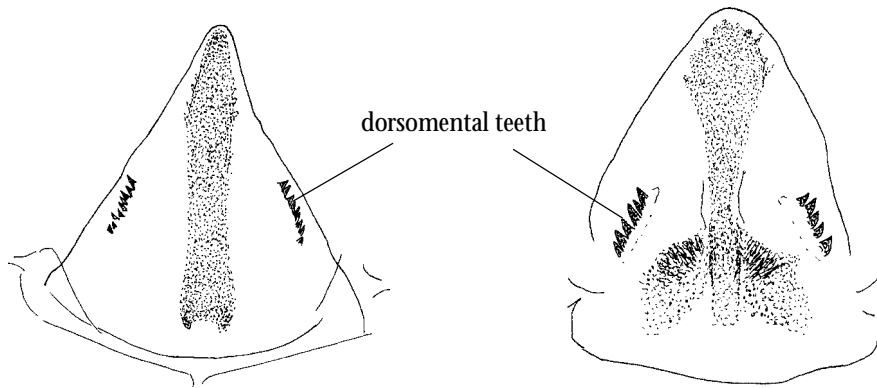
- 1 Head capsule rounded to oval; dorsomental teeth present in well developed transverse plates or in longitudinal rows; body with well developed lateral setal fringe ..... 2



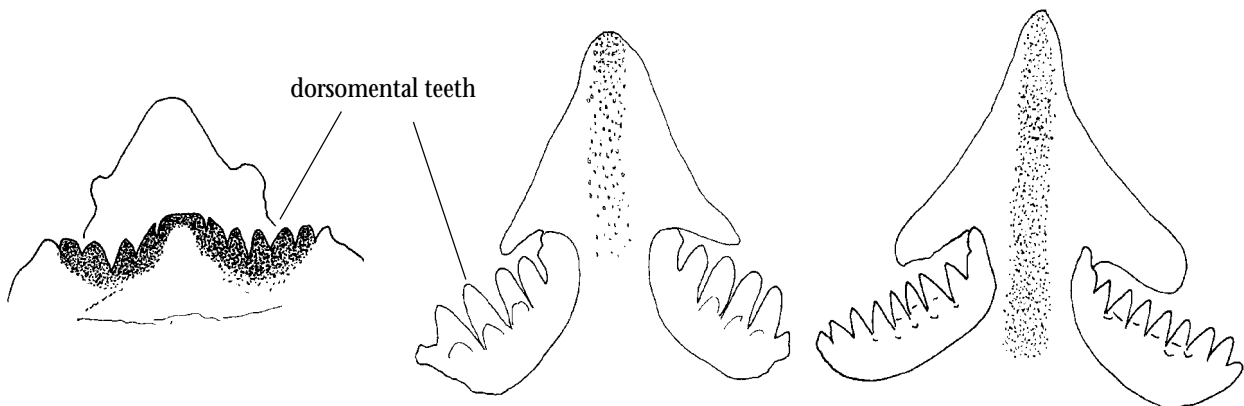
- 1' Head capsule more elongate; dorsomentum without well developed teeth in transverse plates or longitudinal rows; body without well developed lateral fringe of setae (a small partial fringe of 4 setae is present in *Natarsia*) ..... 14



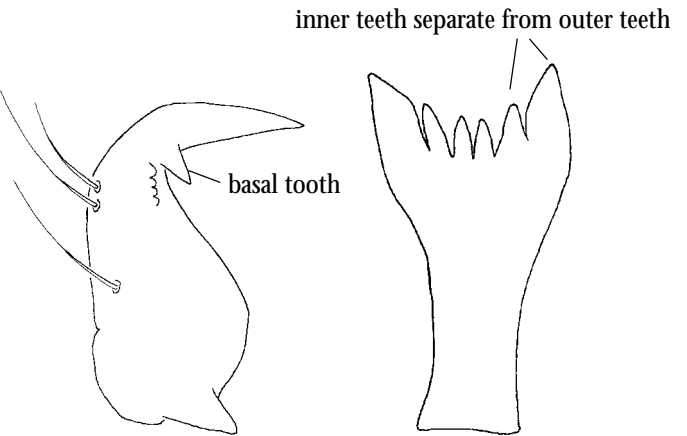
- 2(1) Dorsomental teeth arranged in longitudinal rows ..... 3



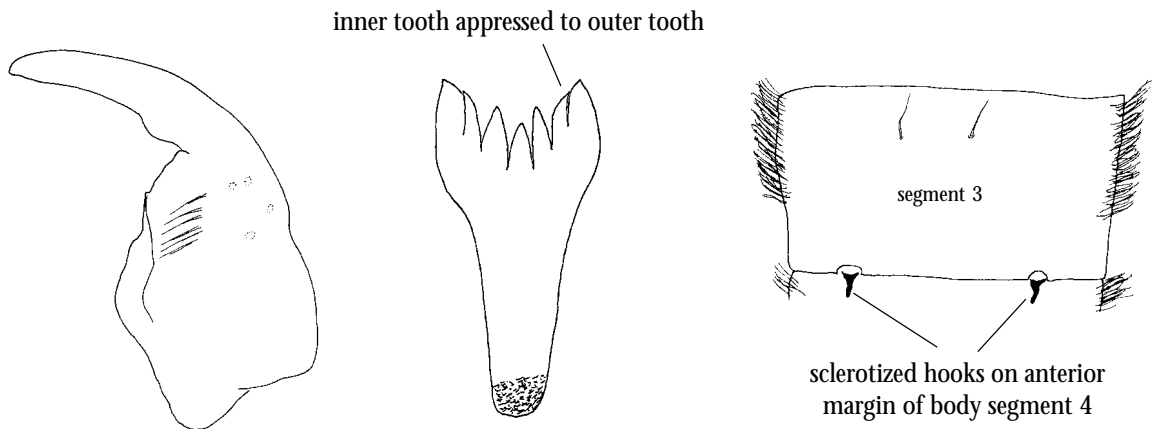
- 2' Dorsomental teeth arranged in transverse or somewhat diagonal plates ..... 4



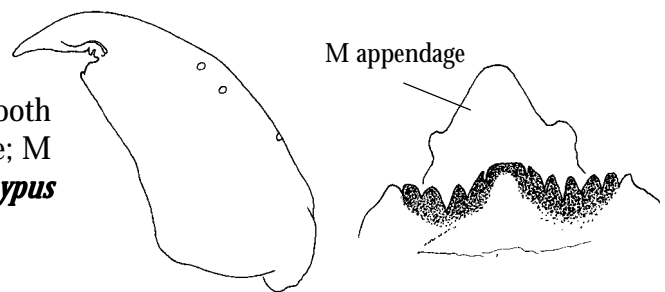
- 3(2) Mandible with apical tooth strongly hooked and with large pointed basal tooth; ligula usually with even number of teeth, inner teeth separate from outer teeth; dorsal anterior margin of body segment 4 (abdominal segment 1) without a pair of small sclerotized hooks ..... ***Clinotanypus***



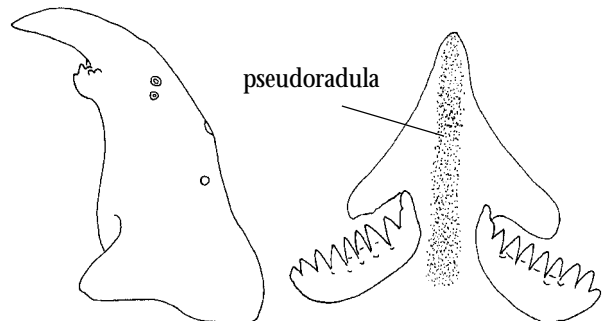
- 3' Mandible with apical tooth gently curved, with basal tooth low and rounded; ligula usually with odd number of teeth, with outermost inner teeth appressed to outer teeth; dorsal anterior margin of body segment 4 (abdominal segment 1) with a pair of small sclerotized hooks ..... ***Coelotanypus***



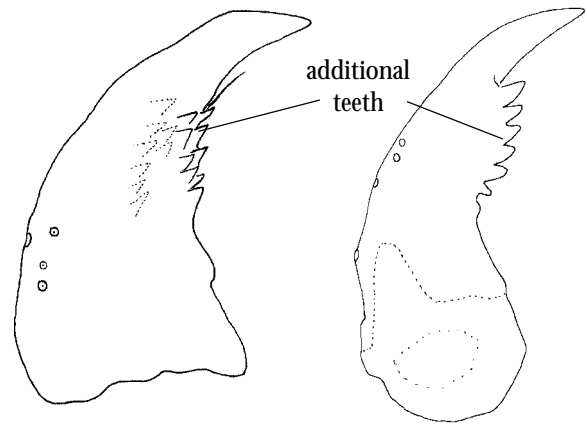
- 4(2') Mandible with stout base, so that apical tooth appears small in relation to rest of mandible; M appendage without a pseudoradula .... ***Tanypus***



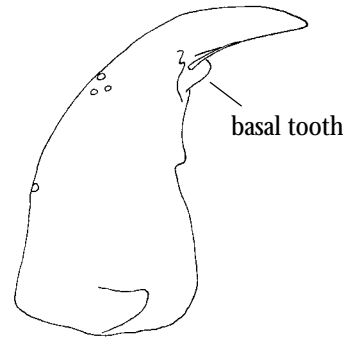
- 4' Mandible not as stout, apical tooth appears large in relation to rest of mandible; M appendage with a pseudoradula ..... 5



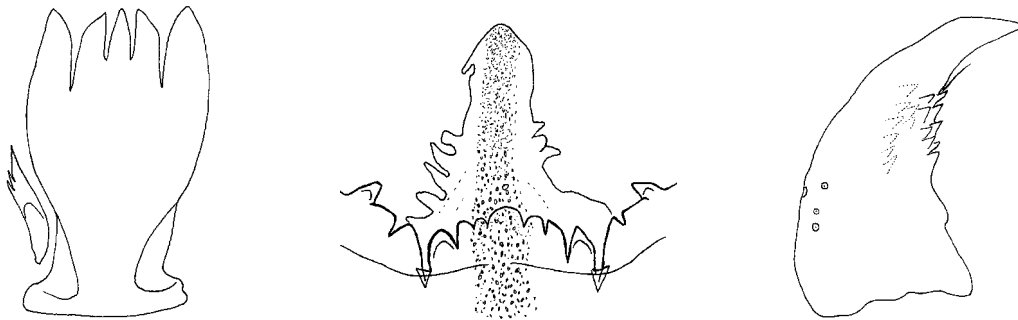
5(4') Mandible with numerous additional teeth, either in several dorsal and ventral rows or arranged on inner side of mandible ..... 6



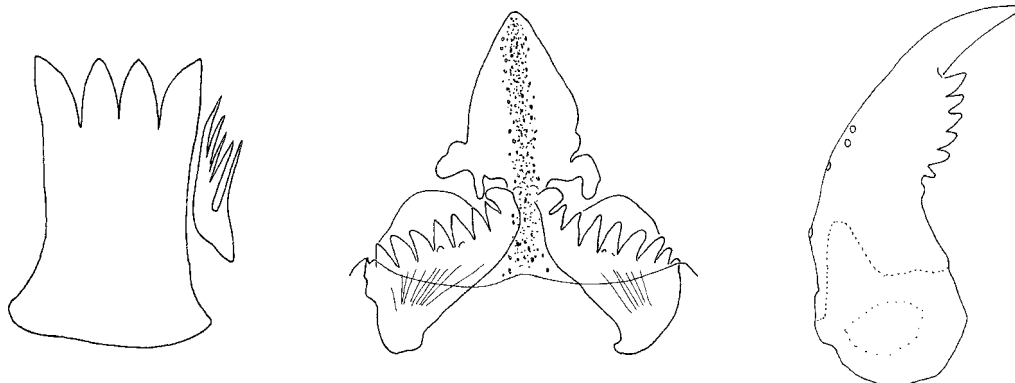
5' Mandible with basal tooth and 1 or 2 accessory teeth .. 7



6(5) Ligula with 5 teeth, inner teeth slanted towards median tooth; dorsomental teeth arranged in concave arch; mandible with several rows of additional small dorsal and ventral teeth .. *Fittkauimyia*

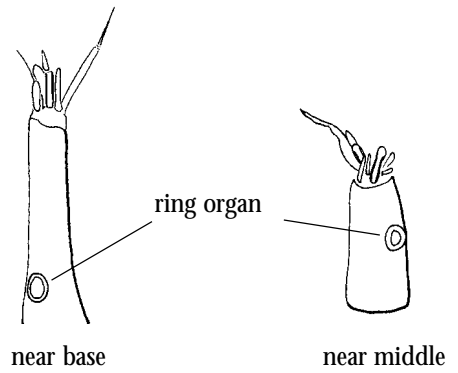


6' Ligula with 4 straight teeth; dorsomental teeth in straight transverse row; mandible with row of additional teeth on inner side ..... *Psectrotanypus*

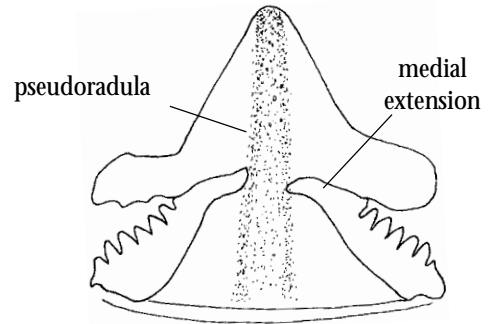


7(5') Ring organ of maxillary palp located near base .... 8

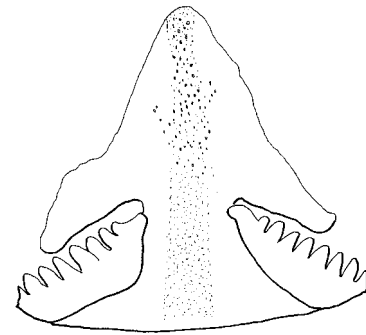
7' Ring organ of maxillary palp located near middle or apex ..... 9



8(7) Dorsomental plates each with 5 large teeth (excluding the innermost and outermost teeth) and extended medially to reach or almost reach the pseudoradula ..... ***Bethbilbeckia***

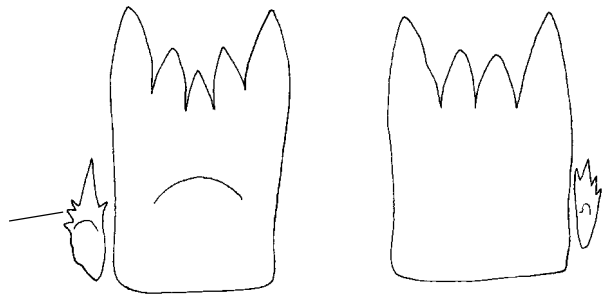


8' Dorsomental plates each with 6 large teeth (excluding the innermost and outermost teeth), with medial extension not reaching pseudoradula ..... ***Macropelopia***

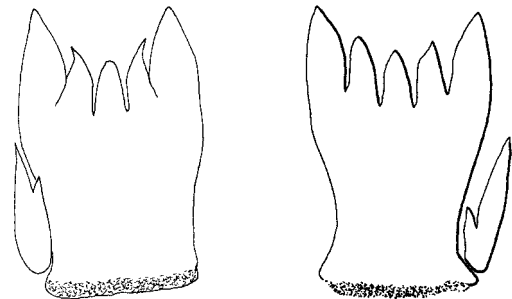


9(7') Ligula with black or dark brown teeth; paraligula with teeth on outer side ..... 10

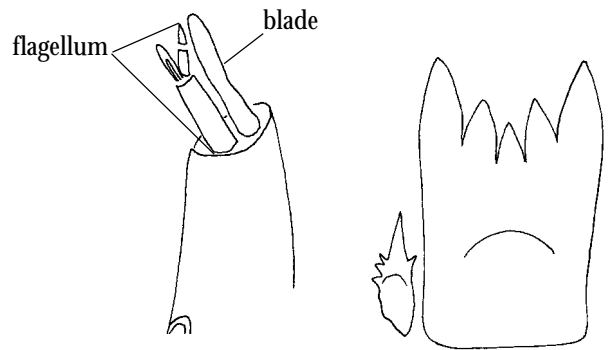
paraligula with teeth on outer side



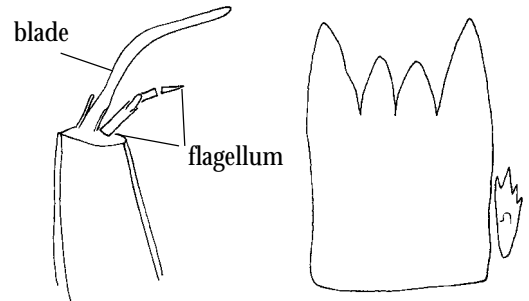
9' Ligula yellow-brown to reddish-brown; paraligula with one tooth on inner side ..... 11



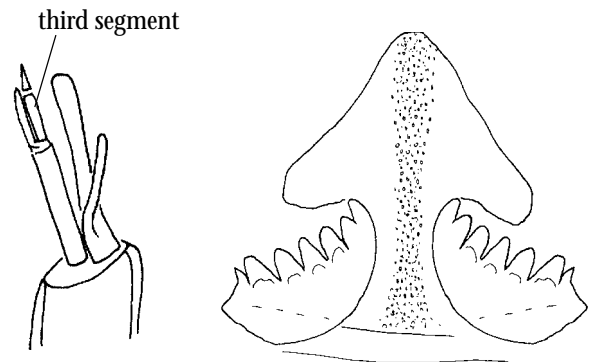
10(9) Antennal blade subequal to length of flagellum; ligula with 5 teeth (4 teeth in aberrant specimens) ..... *Procladius*



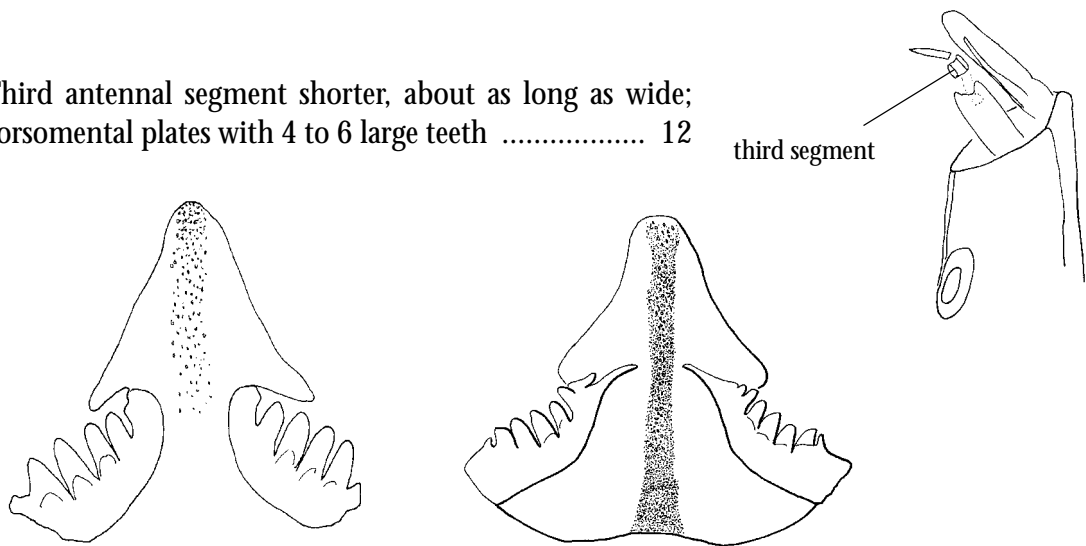
10' Antennal blade about twice as long as flagellum; ligula usually with 4 teeth, but may have 5 teeth ..... *Djalmabatista*



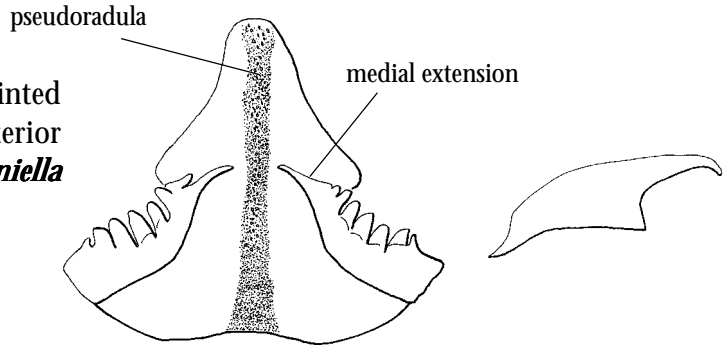
11(9') Third antennal segment about twice as long as wide; dorsomental plates each with 5-7 large teeth ..... *Alotanypus*



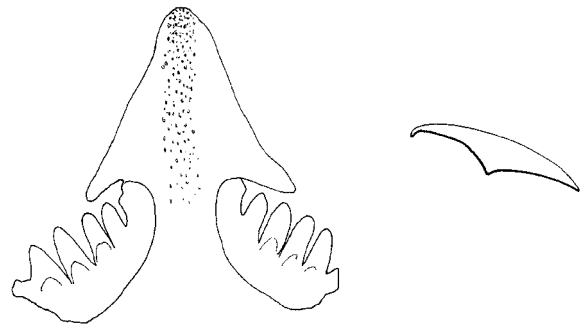
11' Third antennal segment shorter, about as long as wide; dorsomental plates with 4 to 6 large teeth ..... 12



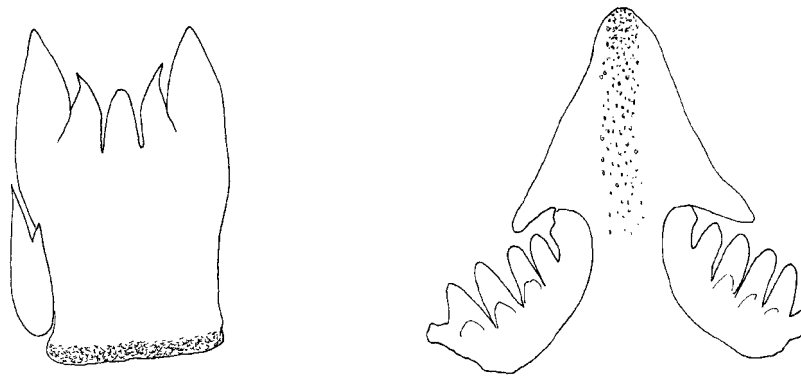
12(11') Apex of dorsomental plates with pointed medial extension; small claw of posterior parapod with expanded base ... **Brundiniella**



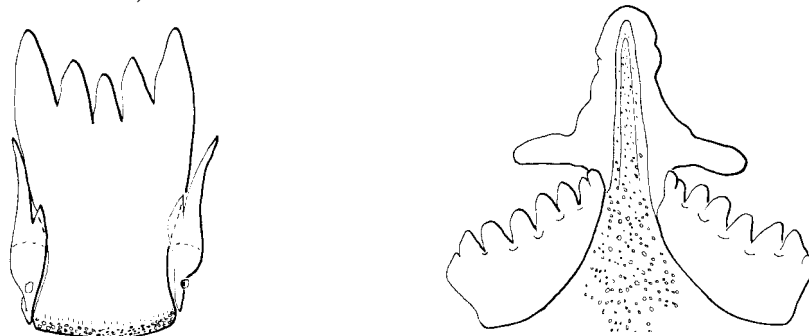
12' Apex of dorsomental plates not medially pointed; small claw of posterior parapod without expanded base ..... 13



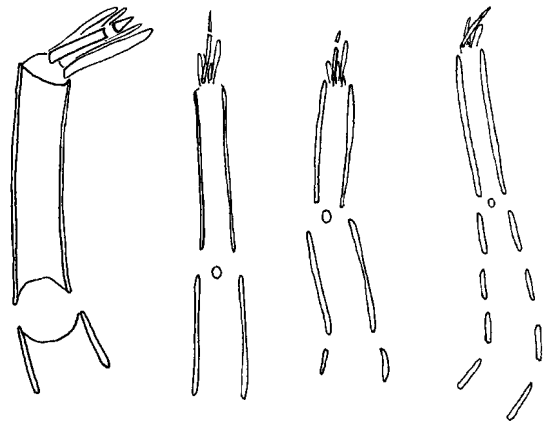
13(12') Inner teeth of ligula curve outward; dorsomental plates with 4 large teeth ..... **Apsectrotanypus**



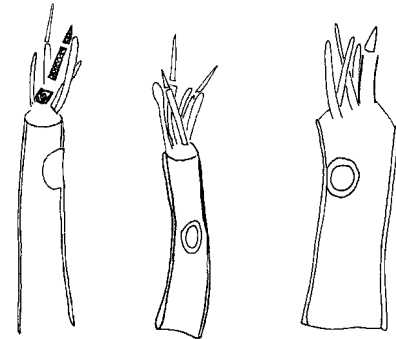
13' Inner teeth of ligula directed forward; dorsomental plates with 5 large teeth ..... **Radotanypus**  
(not recorded from the Carolinas)



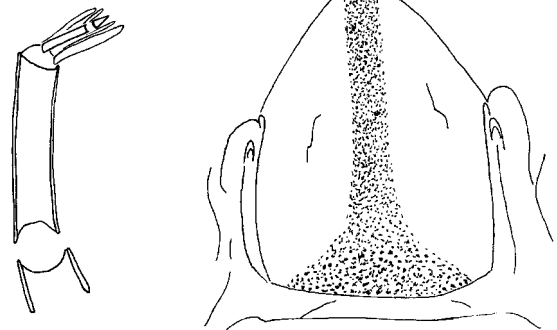
14(1') Maxillary palp with 2 or more sclerotized sections ..... 15



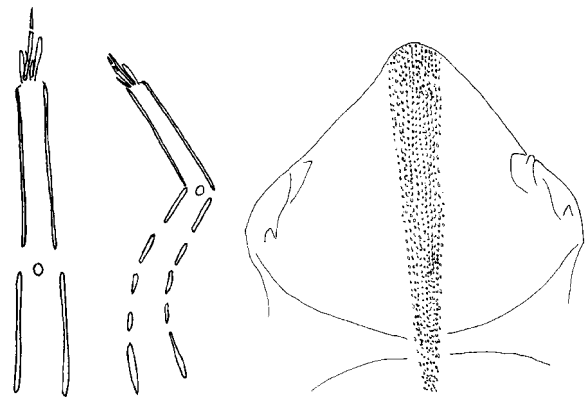
14' Maxillary palp with single sclerotized basal segment .. 16



15(14) Maxillary palp with 2 unequal segments, basal segment less than 1/2 length of second segment; pseudoradula broadened posteriorly, appearing attached to transverse bar, with granules of pseudoradula not arranged in longitudinal rows ..... *Paramerina*



15' Maxillary palp with 2-6 segments; if only 2 segments then segments subequal in length or basal segment greater than 1/2 length of apical segment (note that in some species with more than 2 segments, basal segment may be very small); pseudoradula not broadened posteriorly, not appearing attached to transverse bar; with granules of pseudoradula often arranged in longitudinal rows ..... *Ablabesmyia*

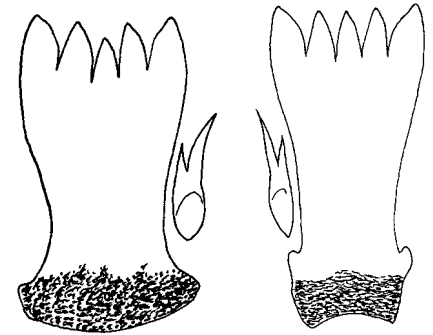




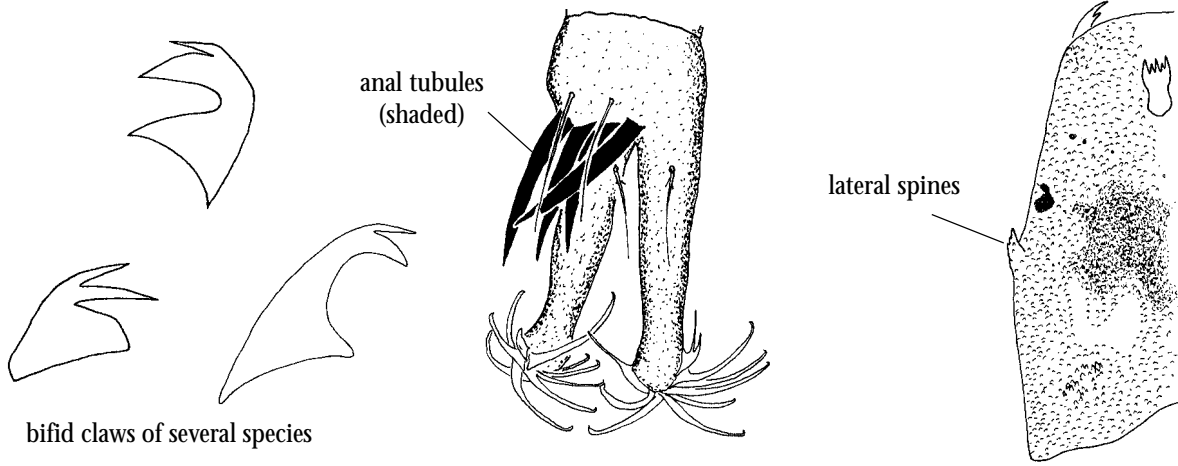
16(14') Median tooth of ligula longer than inner teeth, reaching or surpassing level of outer teeth ..... 17



16' Median tooth of ligula less than or equal to inner teeth .. 18

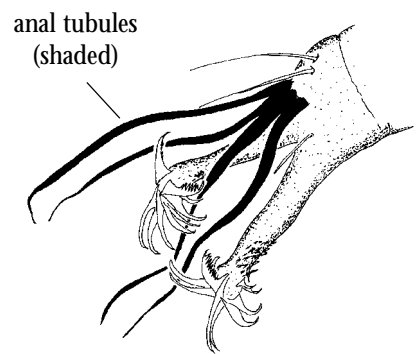


17(16) One small claw on posterior parapod bifid; anal tubules shorter than posterior parapods; head usually with lateral spines or covered with numerous small points or granules, or both, or rarely head capsule smooth ..... *Labrundinia* (in part)

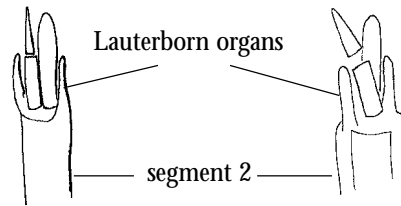


bifid claws of several species

17' One small or medium claw on posterior parapod pectinate or with inner serrations; anal tubules as long as or longer than posterior parapods; head never with lateral spines or covered with small points or granules ..... *Nilotanypus*



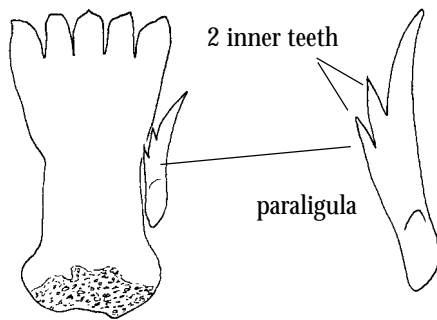
18(16') Apex of antennal segment 2 with large Lauterborn organs, appearing like a tuning fork ..... 19



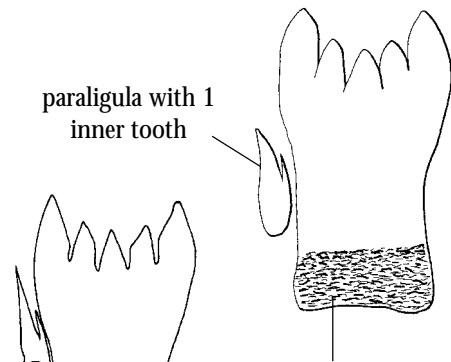
18' Lauterborn organs smaller, apex of second antennal segment not appearing like a tuning fork ..... 23



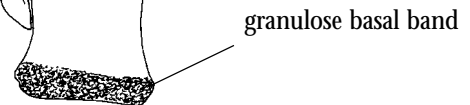
19(18) Paraligula with 2 inner teeth; small claws of posterior parapod with large inner tooth; all claws of posterior parapod pale ..... *Denopelopia*  
(not recorded from the Carolinas)



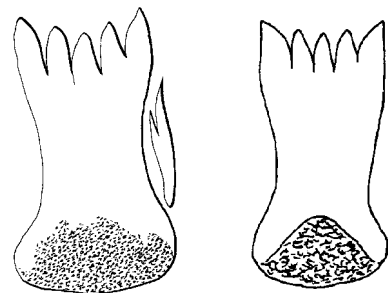
19' Paraligula with one inner tooth; posterior parapod with either pale simple claws or one dark claw and/or one or more small, transparent pectinate claws ..... 20



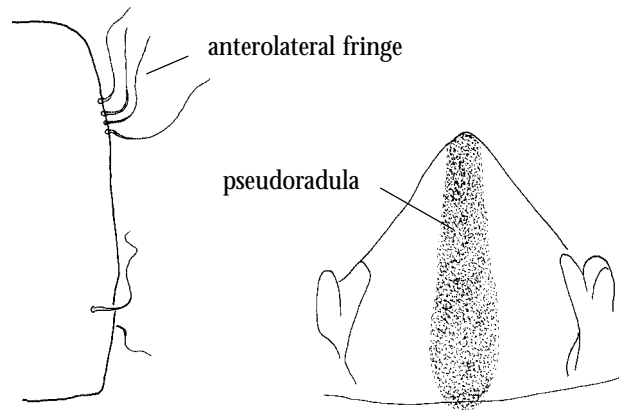
20(19') Granulose area at base of ligula forming a band .. 21



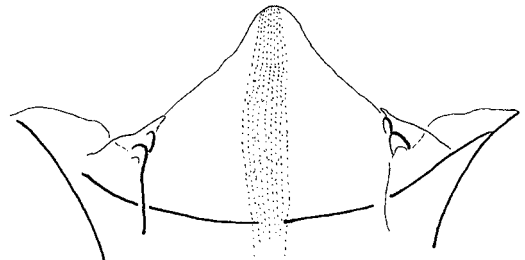
20' Granulose area at base of ligula roughly triangular or ovoid .. 22



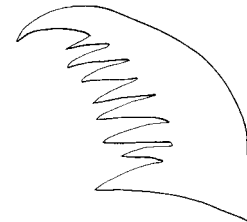
21(20) Body segments 4-10 with a small anterolateral fringe of 4 larger setae; pseudoradula with fine, uniform granulation ..... *Natarsia* (in part)



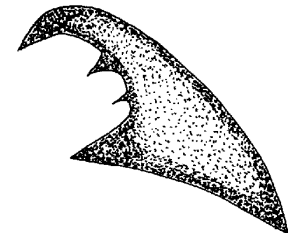
21' Body without small anterolateral fringe of 4 setae; granulation of pseudoradula coarse and arranged in longitudinal rows ..... *Krenopelopia*



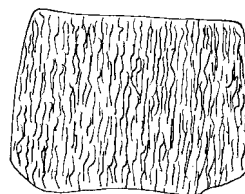
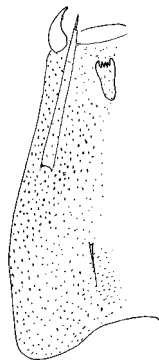
22(20') Posterior parapods with all claws transparent to pale yellowish-brown, with 3 smaller pectinate claws ..... *Cantopelopia*



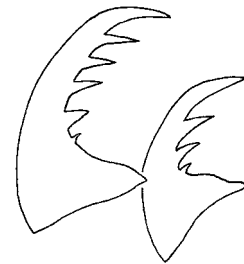
22' Posterior parapods each with one small dark claw OR, if all claws transparent to pale yellowish-brown, then with either no pectinate claws or at most 2 pectinate claws ..... *Monopelopia*



23(18') Surface of head granulose; body surface with undulating longitudinal wrinkles; 2-3 small claws of posterior parapod with 3 or more inner teeth ..... *Guttipelopia*

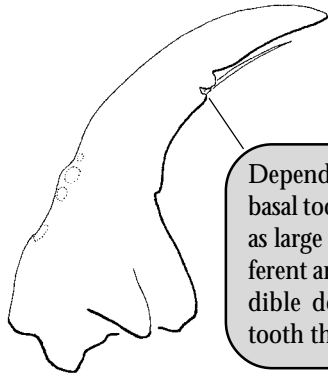


body segment

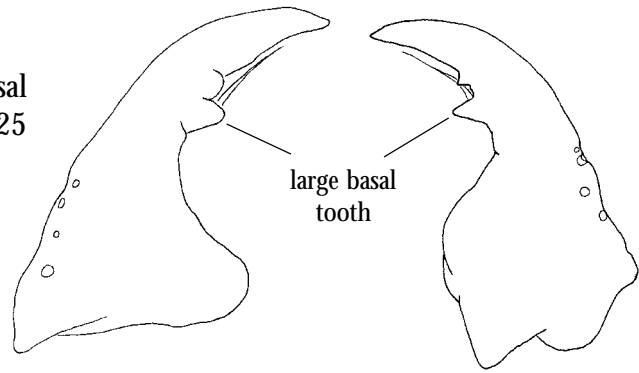


23' Surface of head usually smooth (covered with spinules in one species of *Labrundinia*, couplet 27); body surface smooth; at most 1 small claw of posterior parapod with a single inner tooth ..... 24

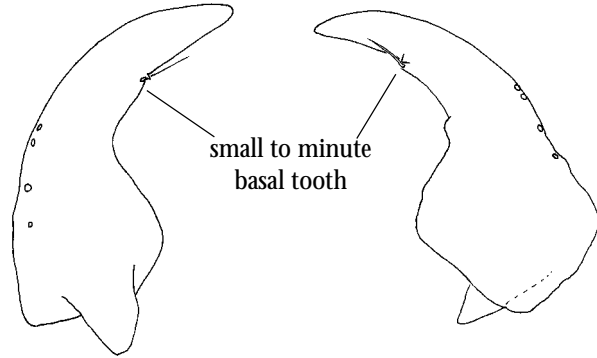
24(23') Mandible with a moderately large to large basal tooth ..... 25



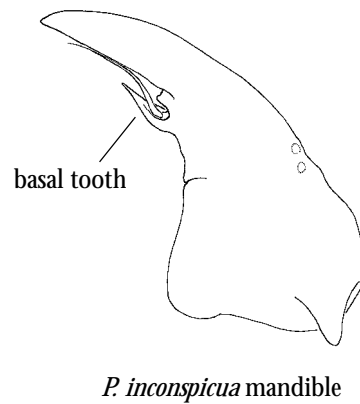
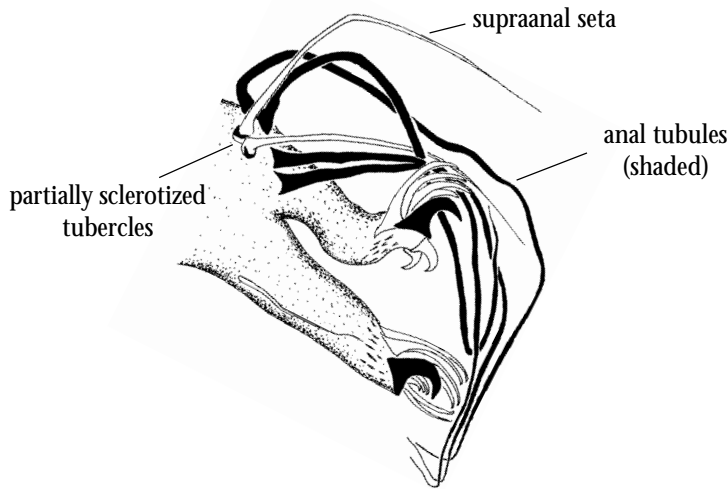
Depending on orientation, the basal tooth may not appear to be as large as when viewed at a different angle. This *Reomyia* mandible does have a larger basal tooth than those figured below!



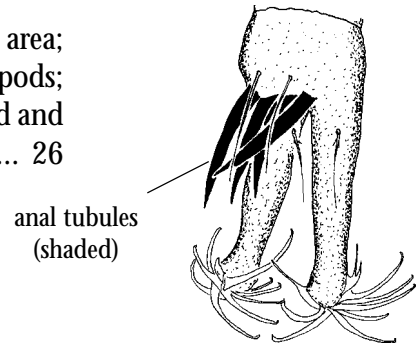
24' Basal tooth of mandible small to minute ... 32



25(24) Supraanal setae arising from large tubercles with dark sclerotized area; (in the most common species, *P. inconspicua*, anal tubules are long and thin, greatly exceeding length of posterior parapods and mandible with large, sharply pointed, apically directed basal tooth; these characters are absent in another species tentatively placed here; see *Pentaneura*) ..... ***Pentaneura***



25' Supraanal setae not arising from large tubercles with sclerotized area; anal tubules elongate-conical, at most subequal to posterior parapods; basal tooth of mandible variable, but never large, sharply pointed and directed apically (see figures above) ..... 26

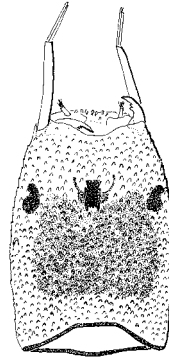


26(25) One small claw of posterior parapod with inner tooth or apically bifid ..... 27



26' Small claws of posterior parapod simple ..... 29

27(26) Head covered with spinules and with weak, blunt, lateral and ventral spines; inner tooth of small bifid claw on posterior parapod subequal to or longer than upper tooth ..... **Labrundinia** (in part)  
(*L. sp. A*, not known from the Carolinas)



27' Head smooth, without lateral or ventral spines; inner tooth of small claw on posterior parapod much shorter than upper tooth ..... 28



28(27', 30) Ring organ of maxillary palp 0.3-0.4 from base; basal segment about 6 times as long as wide ..... **Reomyia**



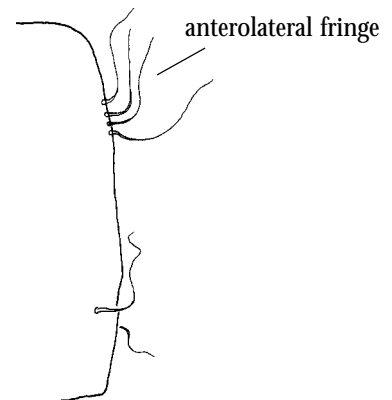
*Reomyia*

28' Ring organ of maxillary palp 0.5-0.7 from base; basal segment about 4 times as long as wide ..... **Zavreliomyia**



*Zavreliomyia*  
(apical sensilla omitted)

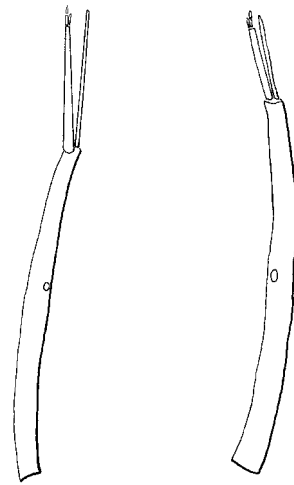
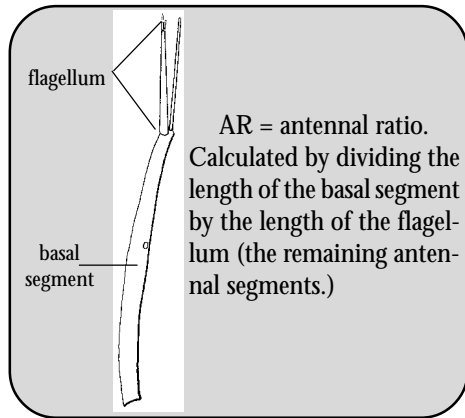
29(26') Body segments 4-10 with a small anterolateral fringe of 4 larger setae ..... **Natarsia** (in part)



29' Body segments without such a fringe ..... 30

30(29') Second antennal segment long, with AR 2.4-3.4 .. back to 28

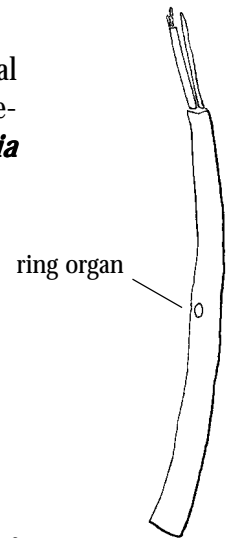
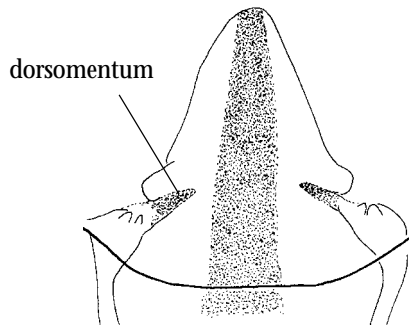
30' Second antennal segment shorter, with AR 3.5-5.0 ..... 31



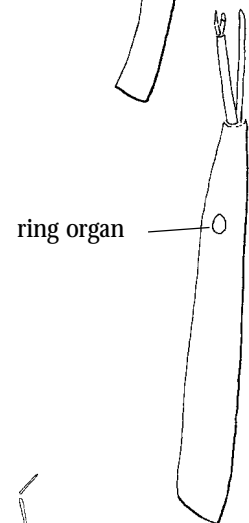
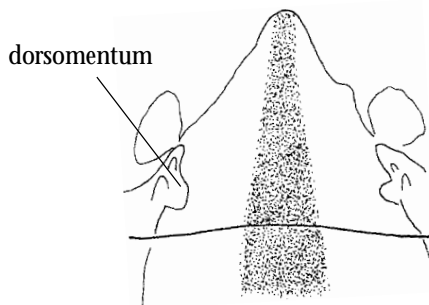
long segment 2

short segment 2

31(30') Antennae long, about 3.5X length of mandible, with ring organ of basal segment near middle; inner apical margin of dorsomentum directed medially; common ..... **Larsia**

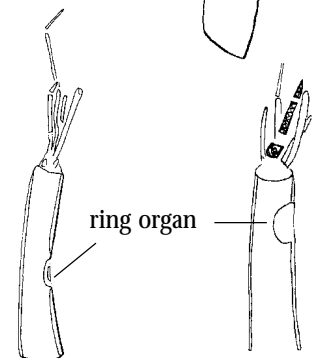


31' Antennae shorter, about twice as long as mandible, with ring organ of basal segment near bottom of distal third; inner apical margin of dorsomentum directed apically; rare ..... **Telopelopia**  
(not recorded from the Carolinas)

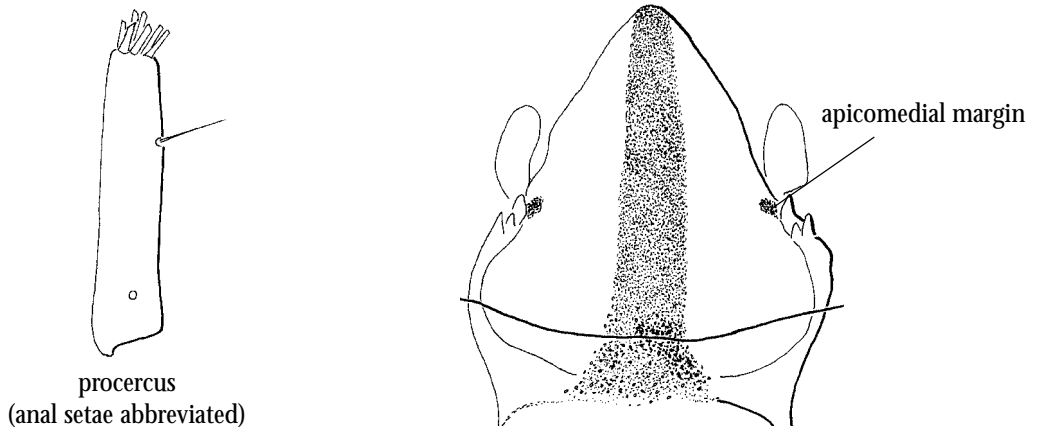


32(24') Ring organ of maxillary palp near middle of basal segment .. 33

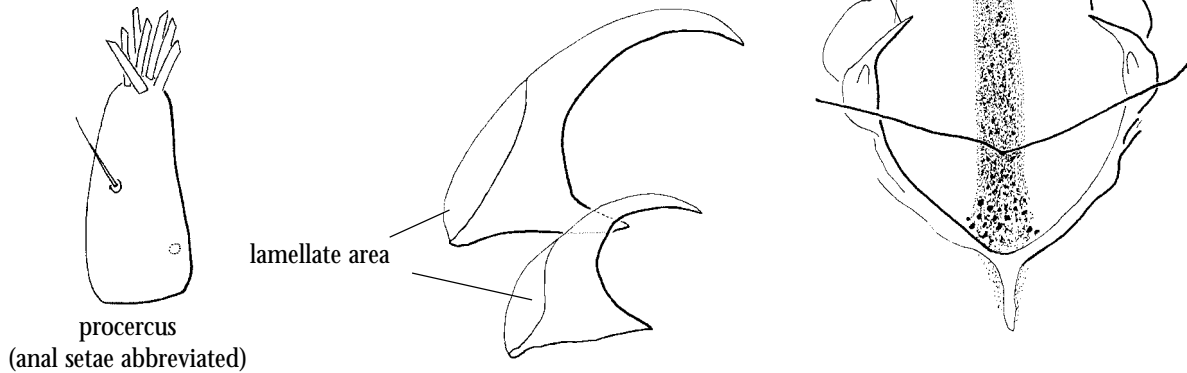
32' Ring organ of maxillary palp near apex of basal segment .... 34



33(32) Procercus 4 or more times as long as wide; claws of posterior parapod without extensive thin lamellate outer margin; apicomedial margin of dorsosentum rounded ..... *Hudsonimyia*



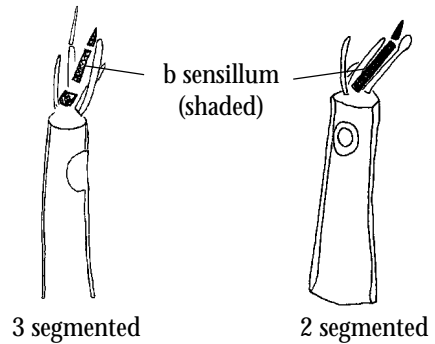
33' Procercus 2.5-3.5 times as long as wide; most claws of posterior parapod with very thin, extensive lamellate outer margin; apicomedial margin of dorsosentum produced to a fine point ..... *Trissopelopia*



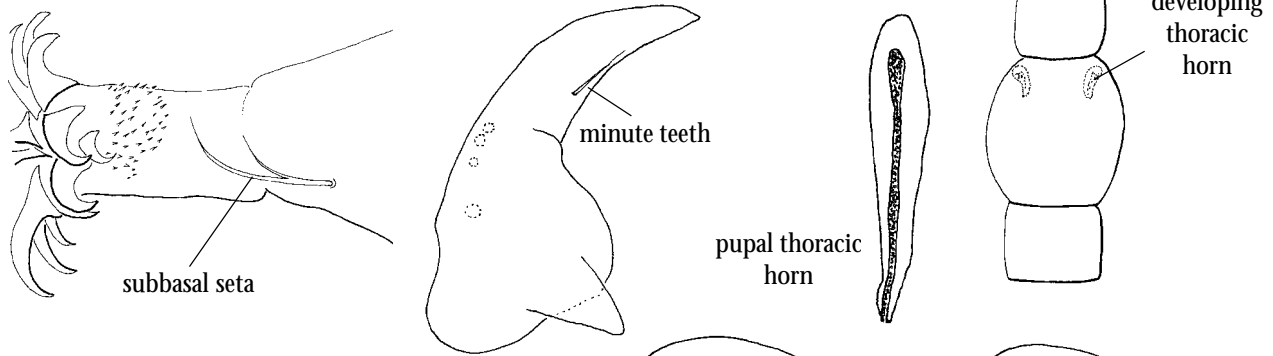
Beginning with couplet 34 below, the remainder of this key deals with the *Thienemannimyia* group. In the Carolinas the group includes *Conchapelopia*, *Hayesomyia*, *Helopelopia*, *Meropelopia*, *Rheopelopia* and perhaps *Telopelopia* (see couplet 31) and *Thienemannimyia*. While mature larvae of some of these genera can be easily identified, you may have to settle for an identification of "*Thienemannimyia* group sp." for many larvae of this complex of closely related genera. Mature fourth instar larvae with developing pupal characters (prepupae) may often be positively identified by the developing thoracic horn; a typical example of this structure is illustrated for each of these genera in the key below.

34(32') Maxillary palp with b sensillum 3 segmented ... 35

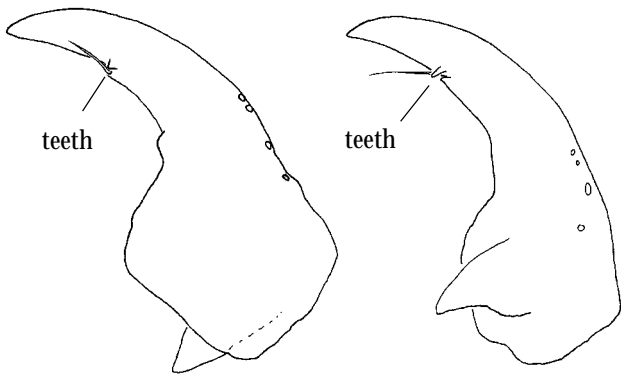
34' Maxillary palp with b sensillum 2 segmented ... 37



35(34) Basal and accessory teeth of mandible extremely reduced, accessory tooth visible only at 1000X; subbasal seta of posterior parapod unevenly bifid; pupal thoracic horn simple, saccoid ..... *Rheopelopia* (in part)

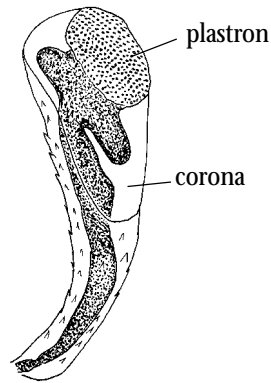
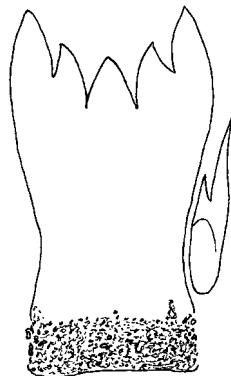


35' Basal and accessory teeth larger, visible at 400X; subbasal seta of posterior parapod simple; pupal thoracic horn with plastron (see below) ..... 36



36(35') **Fourth instar only:** first antennal segment length > 375 µm; length of basal segment of maxillary palp > 70 µm; central tooth of ligula about as long as wide; pupal thoracic horn with small plastron plate and large corona (clear area) ..... *Helopelopia*

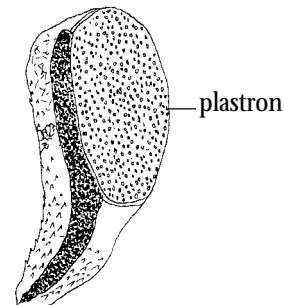
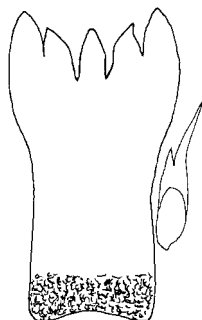
**NOTE:**  
4th instar larvae are necessary for accurate measurements!!



pupal thoracic horn

36' **Fourth instar only:** first antennal segment length < 375 µm; length of basal segment of maxillary palp < 70 µm; central tooth of ligula about twice as long as wide; pupal thoracic horn with large plastron plate, corona variable ..... *Conchapelopia*

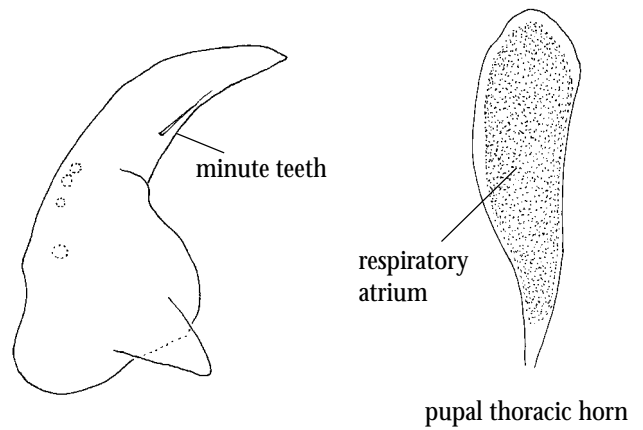
**NOTE:**  
4th instar larvae are necessary for accurate measurements!!



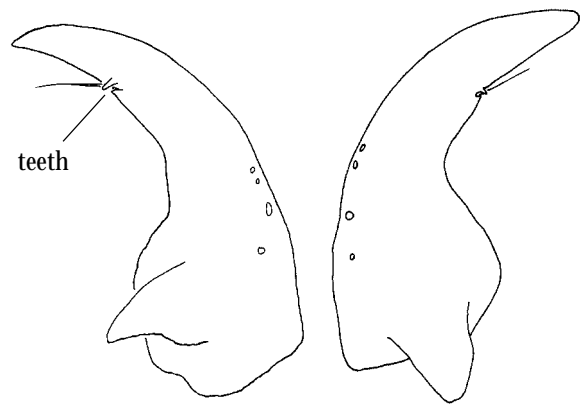
pupal thoracic horn



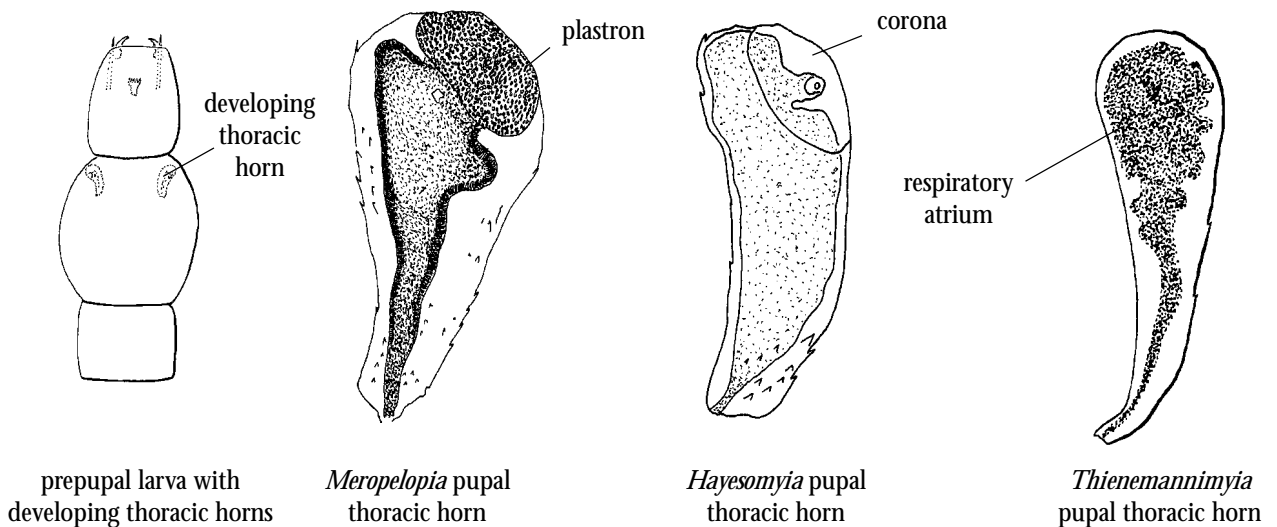
37(34') Basal segment of maxillary palp shorter than antennal segment 2; basal and accessory teeth of mandible extremely reduced, accessory tooth visible only at 1000X; pupal thoracic horn simple, saccoid, with indistinct respiratory atrium ..... *Rheopelopia* (in part)



37' Basal segment of maxillary palp longer than second antennal segment; basal and accessory teeth larger, visible at 400X; pupal thoracic horn with plastron or respiratory atrium convoluted (see below) ..... 38

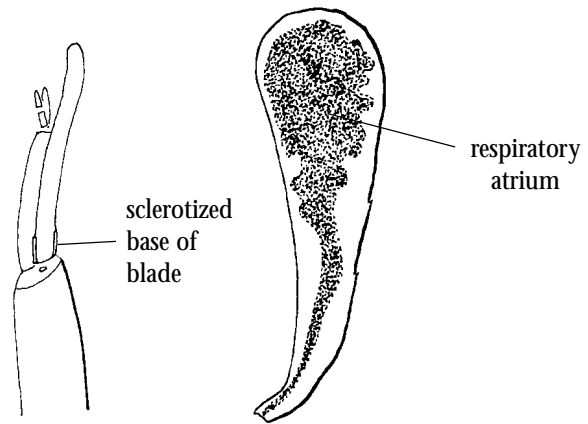


38(37') Posterior margin of head capsule pale; length of antennal segment 1 divided by mandible length greater than 1.75; pupal thoracic horn with plastron and without a corona (clear area near apex) ..... *Meropelopia*

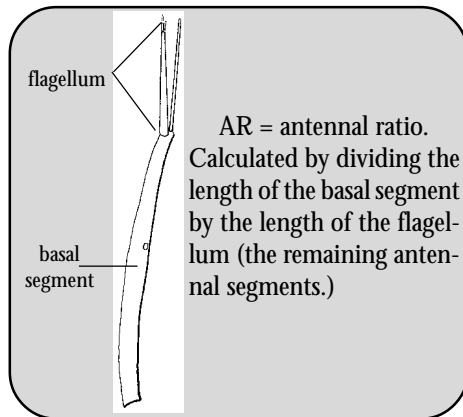


38' Posterior margin of head capsule brown **OR** pale; length of antennal segment 1 divided by mandible length less than 1.90 (usually less than 1.50); pupal thoracic horn without plastron, corona present or absent ..... 39

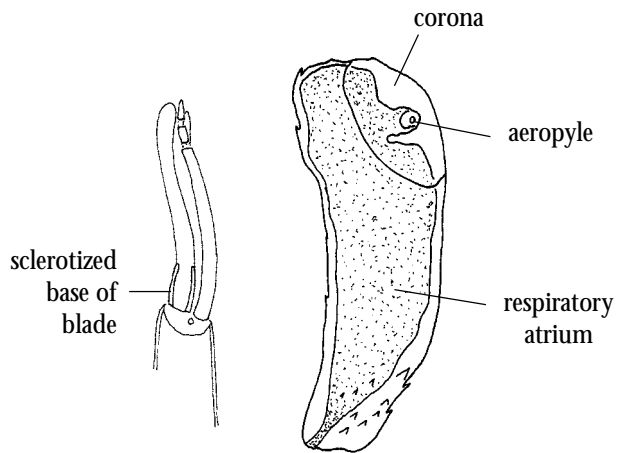
39(38') **Fourth instar only:** AR > 5.0; second antennal segment length about 40 μm; sclerotized base of antennal blade about as long as wide; pupal thoracic horn without corona, respiratory atrium with numerous convolutions ..... *Thienemannimyia* (not recorded from the Carolinas)



**NOTE:**  
4th instar larvae are necessary for accurate measurements!!



39' **Fourth instar only:** AR < 5.0; second antennal segment length about 50 μm; sclerotized base of antennal blade about twice as long as wide; pupal thoracic horn with a distinct aeropyle surrounded by a corona, respiratory atrium with only one or two convolutions ..... *Hayesomyia*



Genus *Ablabesmyia*

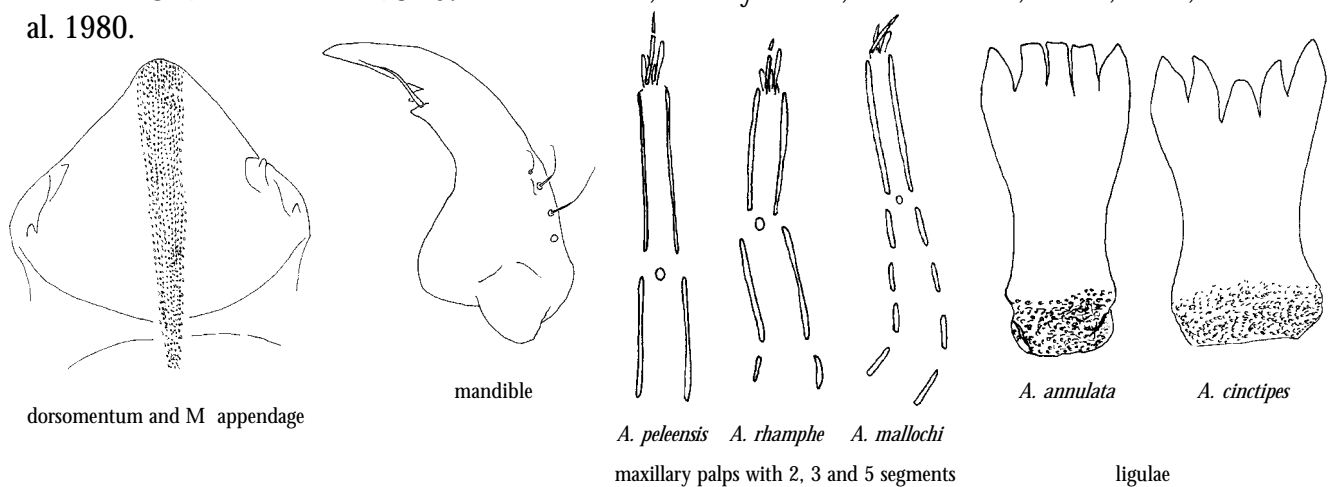
**DIAGNOSIS:** The anteriorly narrowed, elongate-oval head capsule; large basal tooth of the mandible; maxillary palpus with 2 or more segments, with the ring organ small (about 1/3 to 1/2 width of basal palpal segment) and located between the apical two segments; pseudoradula not broadened posteriorly, not connected to a transverse bar, and with its granules arranged in longitudinal rows, will distinguish this genus.

**NOTES:** *Ablabesmyia* is a common and widely distributed genus in the Southeast US; almost every described species known from the eastern U.S. has been recorded from the Carolinas. It is doubtful that all the *Ablabesmyia* species recorded from the two states actually occur there; some records are apparently based on larvae that were misidentified (many misidentifications are due to the use of older, incorrect literature, such as Beck 1976, 1979). I have not been able to see Carolinas material of all the purported species. The genus is represented in the Nearctic by three subgenera - *A. (Ablabesmyia)*, *A. (Asayia)* and *A. (Karelia)*. Larvae of the latter two subgenera have maxillary palpi with only two segments; with the exception of *A. annulata*, these larvae may be very difficult to separate. Species-level identifications of larvae of the subgenus *Karelia* must be viewed with skepticism unless accompanied by associated pupae or adult males. Most members of the *A. (A.) rhamphe* group can not be reliably identified as larvae without associated adult males.

Roback (1985) noted that *Ablabesmyia* larvae were found over a pH range of <4.1 - >8.1, but were predominantly found in a circumneutral range of 6.1-7.0. He observed that they preferred softer, less alkaline water (but see *A. cinctipes* under Notes on species). Roback also stated that larvae of the subgenus *Karelia* were most often encountered in lakes, ponds and swamps, but were also found in large shallow streams. Most other species in the genus were found in flowing water; at least one "form" of one species (*A. janta*) is known to live within freshwater mussels. It appears that *A. mallochi* is the most common and widespread species in streams and rivers throughout the Carolinas and the Southeast US.

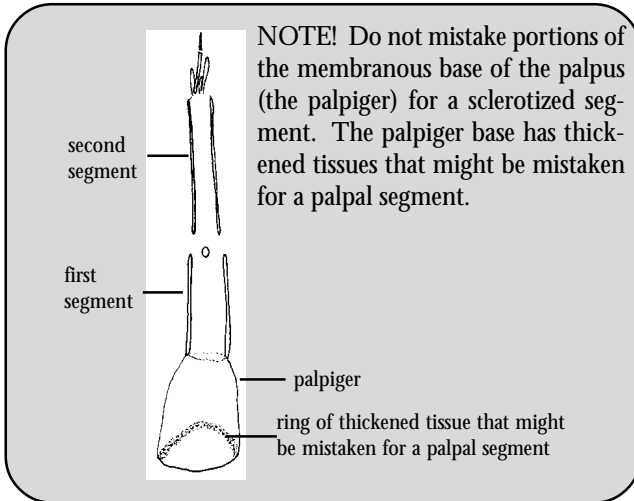
Many name changes have taken place in this genus; see the checklist and Notes on species following the key for synonyms. Roback (1985) described several "varieties" for several *Ablabesmyia* species, but considered that he did not have enough data to justify establishing them as different species. Identification of many larvae to the species level is difficult, especially in the subgenus *Karelia*; in many instances, your best identification with this group may be to subgenus. **Note** that early instar larvae may not possess the full complement of maxillary palpus segments! Larvae must be reared to positively identify several species!

**ADDITIONAL REFERENCES:** Caldwell 1993; Kowalyk 1985; Roback 1971, 1982a, 1985; Roback et al. 1980.

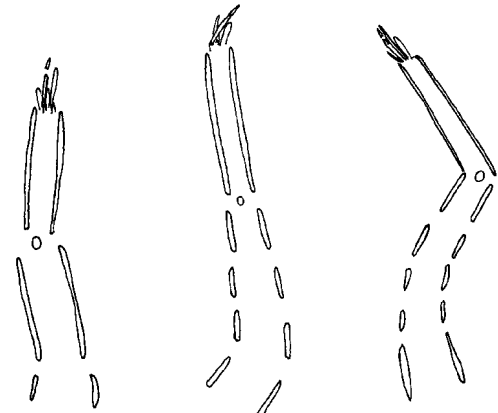


**Key to *Ablabesmyia* larvae of the southeastern United States**

1 Maxillary palpus with 2 sclerotized segments ..... 2



2 segments



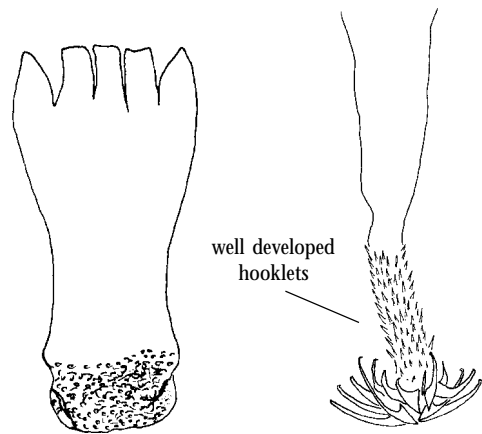
3 segments

5 segments

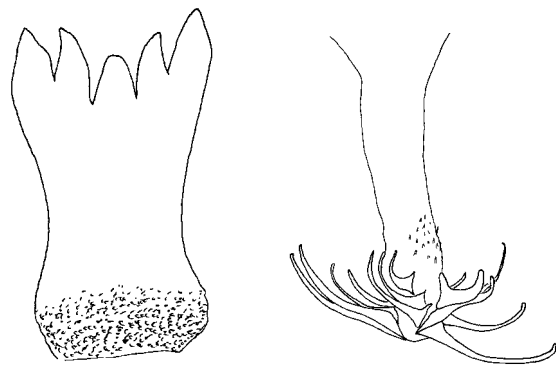
6 segments

1' Maxillary palpus with 3 or more sclerotized segments (the basal segment may be small) .. *Ablabesmyia (Ablabesmyia)* sp. .... 8

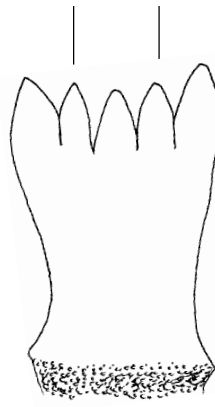
2 (1) Apices of ligula teeth even, with 3 middle teeth apically truncate; procercus length 7-8X width; numerous well developed lateral hooklets on distal 4/10 of posterior parapod ..... *A. (Asayia) annulata*



2' Apices of ligula teeth form a concave arc, middle teeth pointed; procercus length 2-4X width; lateral hooklets on posterior parapod smaller and less numerous ..... *A. (Karelia) sp.* ..... 3  
 (most of these species are difficult to separate; reared associations are necessary for accurate species determination; in most instances your most accurate identification may be "*A. (Karelia) sp.*")



3(2') Apex of inner tooth of ligula directed relatively straight forward; 1-3 dark claws on posterior parapod ..... *A. peleensis*



*A. peleensis*

3' Apex of inner tooth of ligula directed slightly outward; 0-3 dark claws on posterior parapod ..... 4



*A. cinctipes*

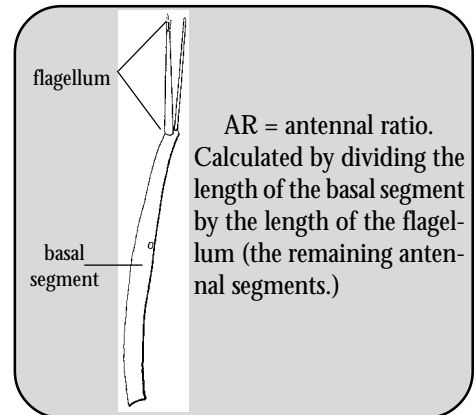
4(3') Posterior parapod with all claws pale; length of apical palpal segment 1.7-3X length of basal segment ..... *A. philosphagnos*

4' Posterior parapod with 1-3 claws darker than others (difference in color may be slight); length of apical palpal segment 0.9-1.7X length of basal segment ..... 5  
(separation of the taxa beyond this couplet is very difficult; reared material is necessary; your best identification will probably be *A. (Karelia)* sp.)

**NOTE:**  
4th instar larvae are necessary for accurate measurements!!

5 (4') Posterior parapod with 3 darker claws; ratio of length of apical palpal segment/basal palpal segment 0.9-1.3 (mean 1.2); AR = 4.6-5.2 (mean 4.8) ..... *A. cinctipes*

5' Posterior parapod with 1-2 darker claws; apical palpal segment/basal palpal segment 1.2-2.3 ; AR 4.0 -6.1 ..... 6



6(5') One dark claw on posterior parapod much longer than the other dark claw; length of first antennal segment > 600 μm; length of second antennal segment > 96 μm (4th instar only!) ..... *A. illinoensis*

(see Notes on species!)

**NOTE:**  
4th instar larvae are necessary for accurate measurements!!



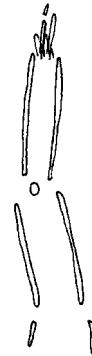
6' Dark claws of posterior parapod about the same size (although one may be larger than the other, but not to the extent as in *A. illinoensis*); length of first antennal segment < 600 μm; length of second antennal segment < 90 μm (4th instar only!) ..... 7



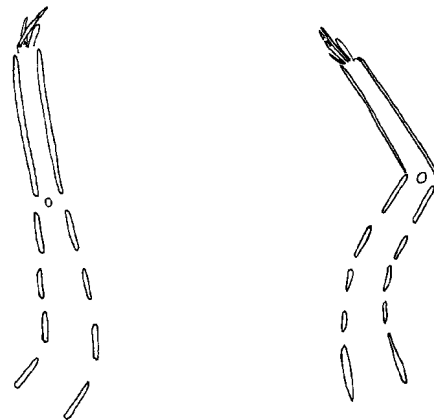
- 7(6') AR 5.2- 6.1; basal antennal segment > 500 μm ..... ***A. idei***
- 7' AR 4.0-4.9; basal antennal segment < 425 μm ..... ***A. sp. A***  
(known only from Florida)

NOTE:  
4th instar  
larvae are necessary  
for accurate  
measurements!!

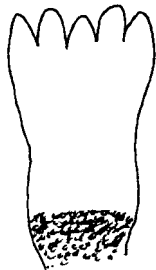
- 8(1') Maxillary palpus with 3 sclerotized segments ..... 9



- 8' Maxillary palpus with 5-6 segments ..... 12



- 9(8) Apices of ligula teeth even or almost so ..... ***A. janta*** (in part)



Two "varieties" of *A. janta* will key here;  
see Notes



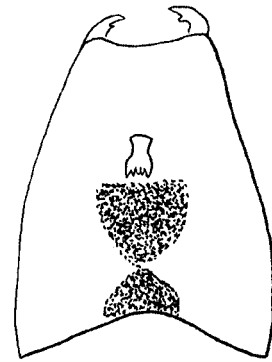
*A. janta* variety I has 1-2 slightly infuscated posterior parapod claws and is found only associated with unionid mussels

*A. janta* variety II has 2 dark posterior parapod claws and is free-living

- 9' Apices of ligula teeth form a concave arc ..... 10



10(9') Head capsule with two large ventral spots; at most one dark claw on posterior parapod; no truncate-based claw present on posterior parapod ..... *A. simpsoni*



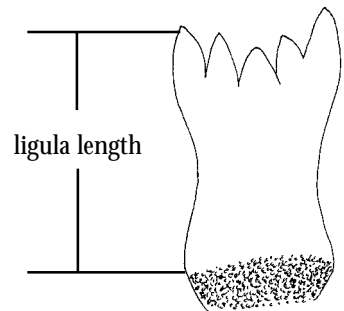
10' Head capsule with at most a diffuse ventromesal spot; posterior parapod with 2 dark claws; a truncate-based claw present on posterior parapod ..... 11



truncate-based claw

11(10') Ligula > 80 μm; mandible > 155 μm ..... *A. monilis*  
(see Notes)

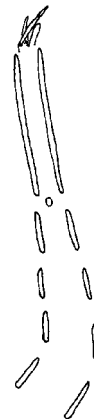
**NOTE:**  
4th instar  
larvae are necessary  
for accurate  
measurements!!



ligula length

11' Ligula usually < 80 μm; mandible < 155 μm .... *A. rhamphe* group  
(larvae of *A. janta* var. III, *A. parajanta* and *A. rhamphe* are inseparable without associated adult males; see Notes)

12(8') Maxillary palpus with 5 segments; small claw of posterior parapod without an expanded base ..... *A. mallochi*



12' Maxillary palpus with 6 segments; small claw of posterior parapod with or without an expanded base ..... 13

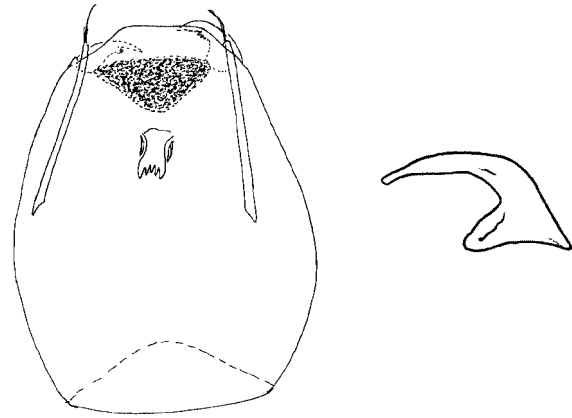


claw with expanded base



claw without expanded base

- 13(12') Head with a dorsal anteromesal brown spot;  
small claw of posterior parapod without ex-  
panded base ..... *A. hauberi*



- 13' Head without a dorsal anteromesal brown spot;  
small claw of posterior parapod with expanded  
base ..... *A. aspera*



### Notes on species

- A. annulata* - This large species is unmistakable with its two-segmented maxillary palp, the ligula with the median teeth even and usually apically truncated, and the numerous large spines on the shaft of the posterior parapods. This species is apparently uncommon but widespread throughout the Southeast. This species is not keyed correctly in Beck (1976, 1979) and Webb & Brigham (1982).
- A. aspera* - An uncommon species in the Southeast; this species is very closely related to *A. hauberi*. Adults and pupae of *A. aspera* and *A. hauberi* are very difficult to separate, but the larvae are usually distinct. However, I have seen Florida *A. aspera* larvae with a small amount of brown anteromesally, but not as large or as dark as that of *A. hauberi*. Be sure to examine the small claw of the posterior parapod. Roback (1985) did not record *A. aspera* from the Carolinas, but I've seen material from the Piedmont (Barnwell Co.) in South Carolina; its presence in Florida and Georgia, and in Pennsylvania and West Virginia indicates that it should be found throughout the Carolinas. I have seen some larvae from Florida with a six-segmented palp, no head spot and a small claw on the posterior parapod without an expanded base. Whether this represents a hybrid or a distinct, separate taxon is unknown; none of the larvae were associated with other life stages.
- A. cinctipes* - The immature stages of this species have been described recently by Caldwell (1993). He found larvae living in a shallow, well-water fed pond with a high pH (7.6-8.8) and conductivity (410-494  $\mu\text{mhos/cm}$  @ 25°C), the highest values published for an *Ablabesmyia* sp. However, larvae have been collected in Florida from an excavated pond with a conductivity value of 3465  $\mu\text{mhos}$  (R. Rutter, pers. com.). Differences in coloration of the claws of the posterior parapod are subtle and make this species, as with the majority of species in the subgenus *Karelia*, difficult to identify. It will not key correctly in Beck (1976; 1979). It is likely that this species name has been misidentified often, and most records of *A. cinctipes* based on larvae are probably erroneous.
- A. hauberi* - This species is usually easily recognized as a larva; it is closely related to *A. aspera* (see above) and may be a southern form of that species. It is recorded from most of the states in the Southeast; it may reach its northern limit in North Carolina.



- A. ideii* - Roback (1971) considered this species a synonym of *A. illinoensis*, but in 1985 returned it to species status. This member of the subgenus *Karelia* is not easily identifiable as a larva; larvae should be associated with a pupa (which is distinctive; see Roback (1985)) or an adult male. Unless accompanied by such an association, larvae should be identified as "*A. (Karelia)* sp." Roback recorded this species from South Carolina; I have also seen adults referable to this species from South Carolina (Barnwell Co.). It is also recorded from Pennsylvania and New York and thus probably occurs throughout the Carolinas.
- A. illinoensis* - This is a northern species recorded for the Carolinas by Hudson et al. (1990) and Caldwell et al. (1997); Roback (1985) did not record this species from further south than New York. I have not examined any material referable to this taxon from the Carolinas (or from anywhere in the Southeast) and doubt that it occurs there. The size differential of the dark claws of the posterior parapod should identify the larvae of this species, but any identifications of this taxon should be backed by associated or reared material.
- A. janta* - An enigmatic species - Roback (1985) recorded three varieties based on larvae and pupae; adult genitalia were similar for all three varieties. *Ablabesmyia janta* var. I is found associated with unionid clams (see Roback et al. 1980 and Roback 1982a) and is recorded from Florida, Oklahoma, Tennessee and Texas. Varieties II and III are free living; var. II has been recorded from South Carolina (Keowee Res., Oconee Co.) by Roback (1985). Variety III is based on a single rearing from Florida that may be missassociated. Unless larvae distinctly belong to varieties I or II, this taxon must be identified as "*A. rhamphe* group sp.", since larvae are indistinguishable from the other members of that group (see *A. rhamphe*).
- A. mallochi* - A very common and widespread species in lotic habitats throughout the eastern US. The names *auriensis*, *ornata* and *tarella* are considered synonyms, although *ornata* may represent a distinct species. Roback (1985) considered two varieties of *A. mallochi* larvae: var. I was distinguished by the longest dark claw of the posterior parapod being 105-121  $\mu\text{m}$  in length; in var. II the longest dark claw was 30-95  $\mu\text{m}$  long. Roback (1985) considered that he did not have enough evidence to justify establishing two species from his material; if the varieties were elevated to species rank, var. II would correspond with *A. ornata*. Roback (1985) recorded both varieties from Florida, Georgia, Kentucky and North and South Carolina in the Southeast. More data, based on reared material, are needed.
- A. monilis* - Another difficult to identify (as a larva) species that apparently reaches its southern limit in South Carolina. Roback (1985) used ligula and mandible length to separate *A. monilis* larvae from the *A. rhamphe* group. However, I have reared a specimen of *A. parajanta* from north Florida in which the larval ligula is 80  $\mu\text{m}$  long, the lower limit for Roback's *A. monilis*. Larval *A. monilis* should only be identified to the species level with associated material.
- A. parajanta* - A member of the *A. rhamphe* group found throughout the Southeast; this species is not identifiable to the species level as a larva. Records of this species based solely on larvae should be corrected to "*A. rhamphe* group sp."
- A. peleensis* - Another member of the subgenus *Karelia*; larvae are usually identifiable because of the forward pointing inner teeth of the ligula. This character can be quite variable and is dependent on the angle at which the ligula is viewed. Roback (1985) noted two larval types based on differences of the dark claws on the posterior parapods. Larval type 1, recorded by Roback (1985) from Florida, Georgia, Kentucky, South Carolina and Tennessee, has the base of one of the dark claws expanded; larval type 2, recorded from Florida and Georgia, does not.
- A. philosphagnos* - This species, like *A. cinctipes*, will not key correctly in Beck (1976, 1979) and Webb & Brigham (1982), perhaps due to confusion concerning the coloration of the posterior parapod claws. Older records of *A. cinctipes* that may be based on identifications using those keys should be viewed with skepticism.

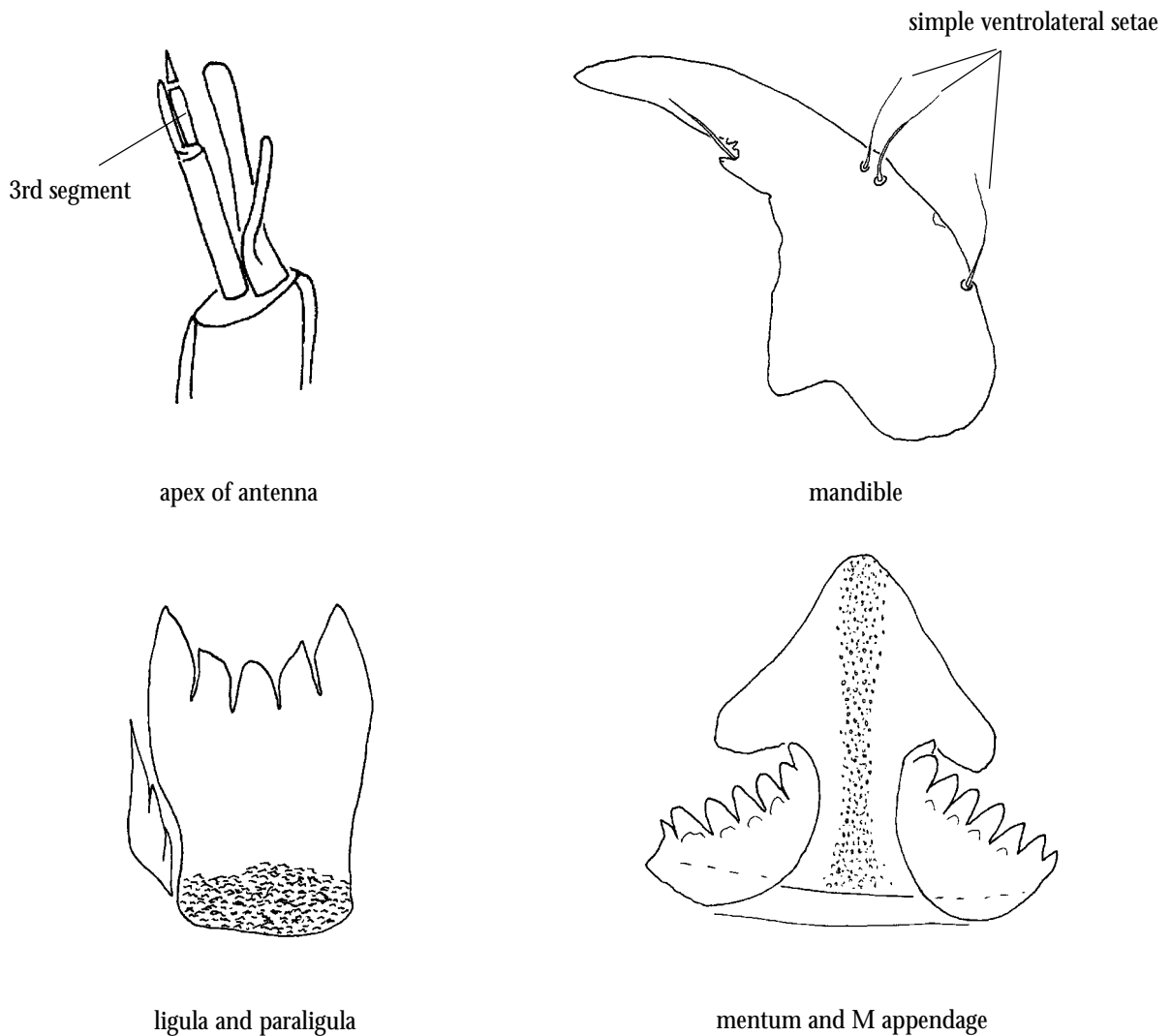
- A. rhamphe* - As a larva, not separable from *A. janta* type III and *A. parajanta*. Larvae should be identified as “*A. rhamphe* group.” Associated adult males are necessary for correct species level identification.
- A. simpsoni* - Roback (1985) described this new species based on a reared specimen from New York; he also recorded a single larva from the Savannah River in South Carolina. I have seen a specimen from the Coastal Plain of North Carolina (Tar River in Edgecombe Co.) that also fits this distinctively marked species.
- A. sp. A* - A member of the subgenus *Karelia* known only from Florida. Epler (1995) considered two undescribed taxa (sp. A and sp. B) to be present in south Florida. However, further examination of reared material showed overlap of measurements; based on material currently available, it appears that *A. sp. A* and sp. B should be lumped as *A. sp. A*. This taxon is very similar to *A. ideii* and *A. illinoensis*, but based on adult male genitalia, appears to be an undescribed species.

Genus *Alotanypus*

**DIAGNOSIS:** *Alotanypus* can be distinguished by the rounded head capsule; the long third antennal segment (at least twice as long as wide); yellow-brown ligula; maxillary palp with ring organ near middle; well developed dorsomental plates with 5-7 large and 1 or 2 small teeth; mandible with all ventrolateral setae simple; and the lateral fringe of setae on the body.

**NOTES:** One species, *A. aris*, occurs in the eastern United States. It is recorded from Alabama, northern Florida, Georgia and North and South Carolina in the Southeast. Larvae of this uncommon species have been found in acid water (pH 3.9-4.0) in springs, seeps and bogs (Roback 1978; 1987b). Note that the dorsomental plates on the specimen illustrated below have six large teeth on one side, five on the other; five large teeth is the normal number for *A. aris*. A western species, *A. venustus* (Coquillett), has six large teeth on its dorsomental plates.

**ADDITIONAL REFERENCES:** Roback 1971, 1978a, 1987b.



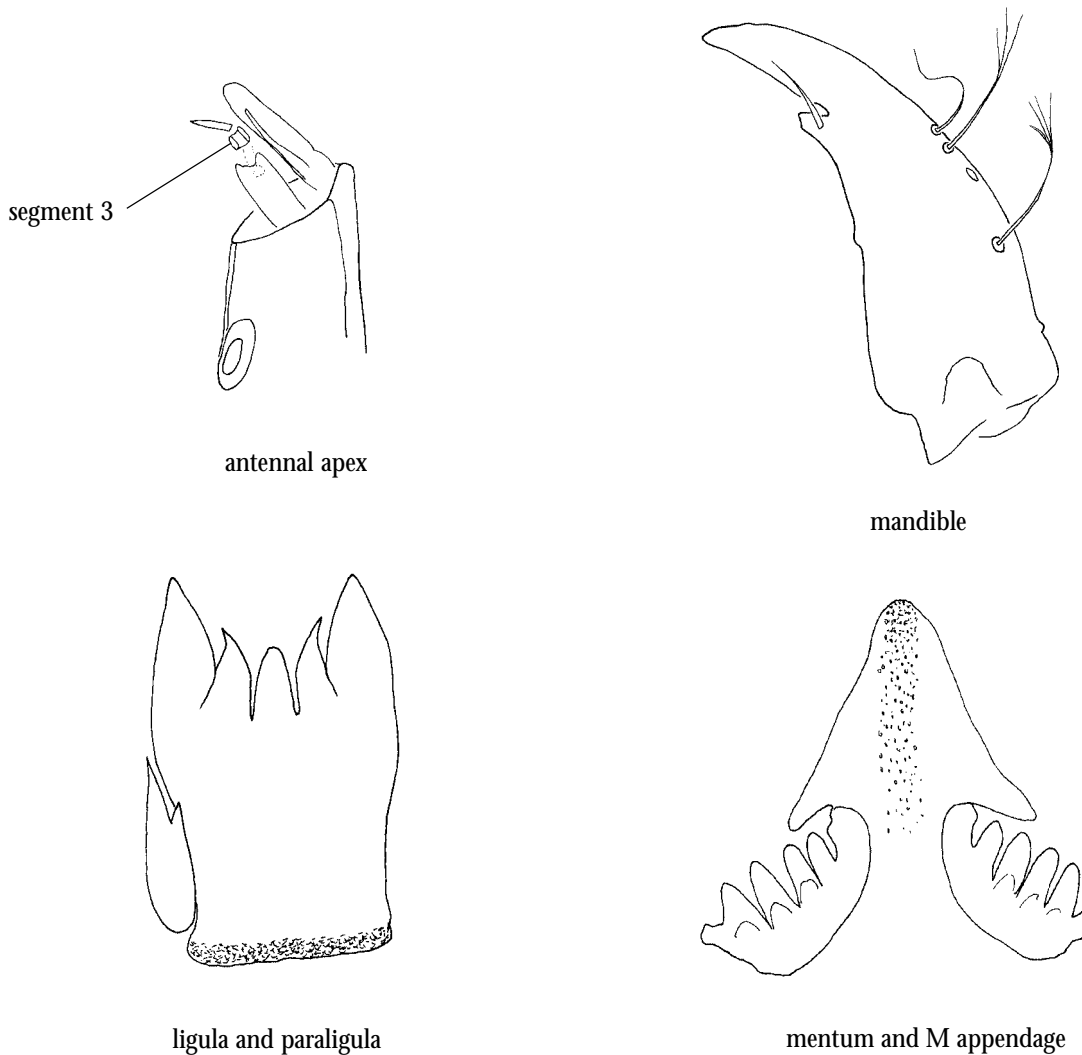
Genus *Apsectrotanypus*

**DIAGNOSIS:** This genus is recognized by the rounded head capsule; the short antennal segment 2 (about twice as long as wide) and very small segment 3; yellowish-brown ligula with inner teeth turned out; well developed dorsomental tooth plates, each with 4 large and 1 small tooth; maxillary palp with ring organ near its middle; the branched ventrolateral setae 2 and 3 of the mandible; posterior parapod without a small claw with an expanded base; and the lateral setal fringe of the body.

**NOTES:** Only one species, *A. johnsoni*, is known from the eastern U.S. In the Southeast, it has been recorded from the Carolinas, Georgia and northern and western Florida. *Apsectrotanypus* larvae are usually found in cool mountain streams, but have been found on the Piedmont and Coastal Plain.

Once considered a member of *Macropelopia* and *Psectrotanypus*, *Apsectrotanypus* has also been confused with *Bethbilbeckia*; the characters given in the diagnosis above will distinguish *Apsectrotanypus* from those taxa.

**ADDITIONAL REFERENCES:** Roback 1971, 1978a.



*Apsectrotanypus johnsoni*, larval structures

Genus *Bethbilbeckia*

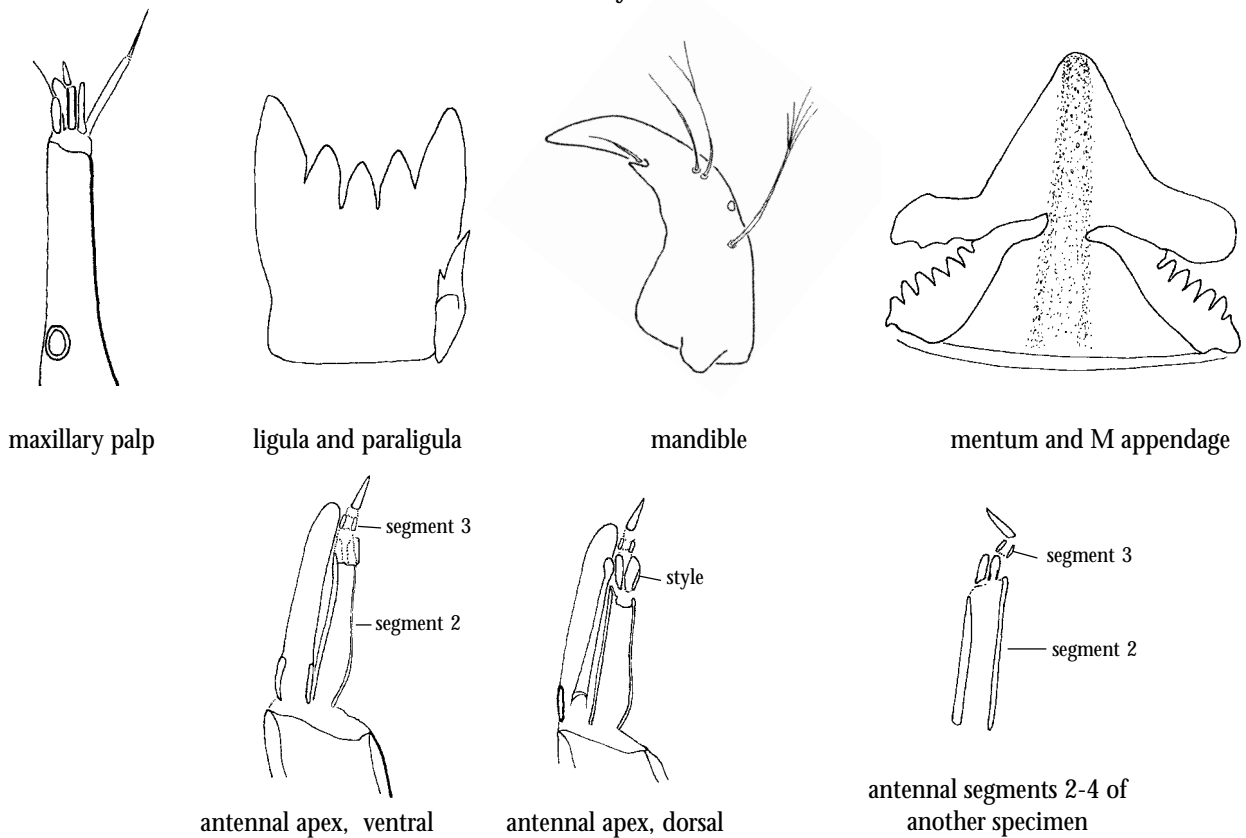
**DIAGNOSIS:** Distinguished by the rotund head capsule; ring organ in bottom third of maxillary palp; yellow-brown ligula with inner teeth directed forward; and dorsomental plates with 6 (5 large, 1 small) teeth each and with a medial extension that reaches or almost reaches the pseudoradula; and the weak lateral fringe of setae along the body.

**NOTES:** Only one species, *B. floridensis*, is described for this genus; it has been confused with *Apsectrotanypus* and *Macropelopia*. However, an additional undescribed larva (with pharate pupa) has been found in eastern North Carolina; unless associated with an adult or pupa, larvae should be identified as "*Bethbilbeckia* sp.". Originally described from northern Florida, *B. floridensis* has also been collected in Georgia and South Carolina in the Southeast. Its presence in Ohio (Bolton 1992) and Virginia (collection of Charles Watson) indicates that it should also be found in North Carolina; it has been collected in the Coastal Plain, Piedmont and Mountain regions from blackwater streams, seeps and small mountain streams.

Fittkau & Murray (1988) stated that mandibular ventrolateral seta 3 is simple. However, their illustration (fig. 15) shows this seta as bifid. On one unassociated larval specimen from Florida that I've examined this seta is multibranched. This specimen also has 6 large teeth on one side of the mentum; the lateral fringe of body setae is weak.

Fittkau & Murray (1988) and Epler (1995) described the antenna as 5 segmented. However, Charles Watson has pointed out to me that the antenna is actually 4 segmented. In all specimens I've examined in which the antennal segments are clearly visible, there is an extended membranous area between segments 2 and 3; apparently the base of the style (or a wide peg sensillum or Lauterborn organ?) seen through this membranous area has been mistaken for a third segment.

**ADDITIONAL REFERENCES:** Fittkau & Murray 1988.



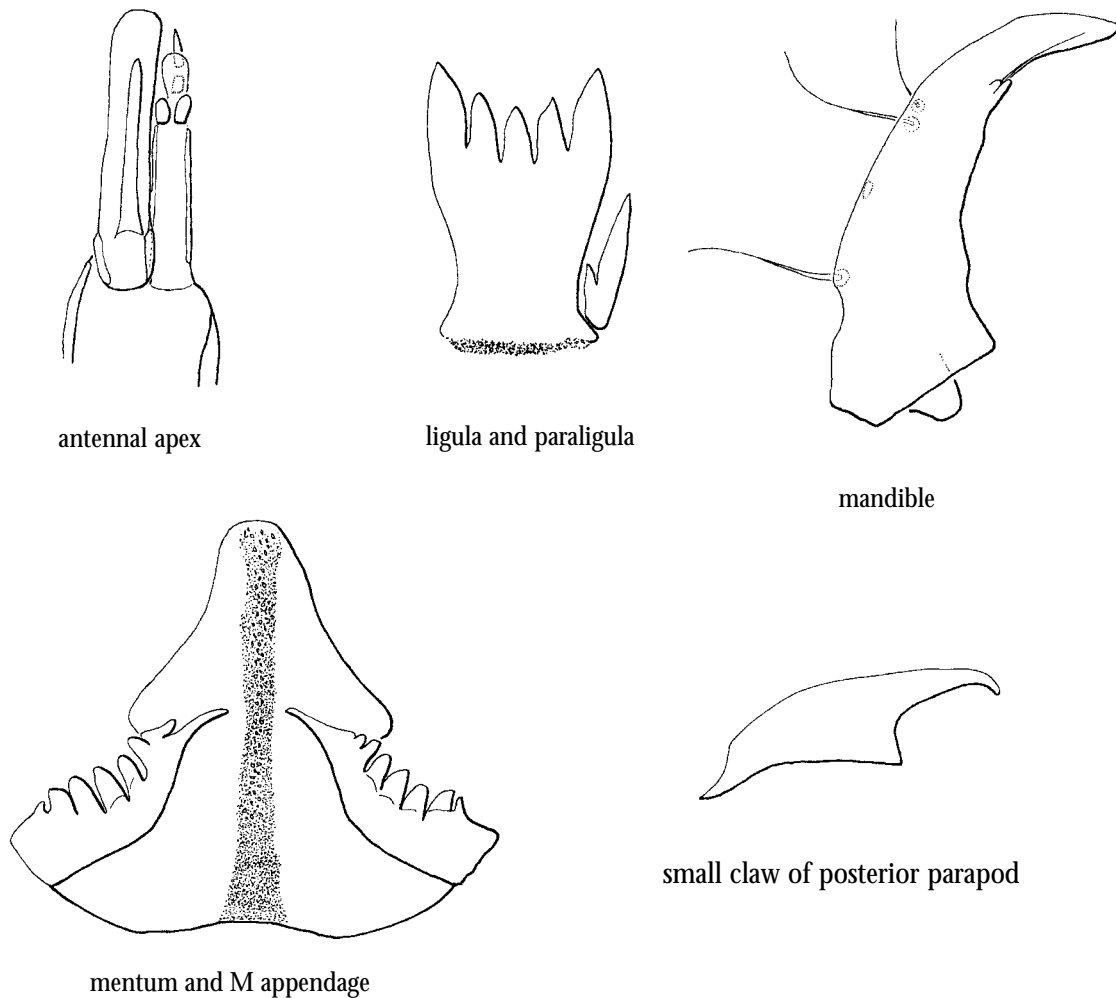
Genus *Brundiniella*

**DIAGNOSIS:** Distinguished by the weak lateral setal fringe on the body; maxillary palp with ring organ near middle; rounded head capsule; yellow-brown ligula with inner teeth directed more or less straight forward; well developed dorsomental plates each with 5 large teeth and two smaller teeth, and with a thin, pointed, medial extension that reaches or almost reaches the pseudoradula; and the expanded base of the small claw of the posterior parapod.

**NOTES:** One species, *B. eumorpha*, is known from the Carolinas and Georgia in the Southeast, where it may be relatively common in mountain and upper Piedmont streams. The species was formerly placed in *Psectrotanypus*, Roback (1978a) established a new genus, *Brundinia*, for it but it was later (Roback 1978b) discovered that the name was preoccupied and it was replaced by the name *Brundiniella*.

Roback (1978a) and Fittkau & Roback (1983) illustrated ventrolateral setae 2 and 3 of the mandible as multibranched. However, in one specimen I've examined (and figured below) from North Carolina all the ventrolateral setae are simple.

**ADDITIONAL REFERENCES:** Kowalyk 1985; Roback 1978a, 1978b.



*Brundiniella eumorpha*, larval structures

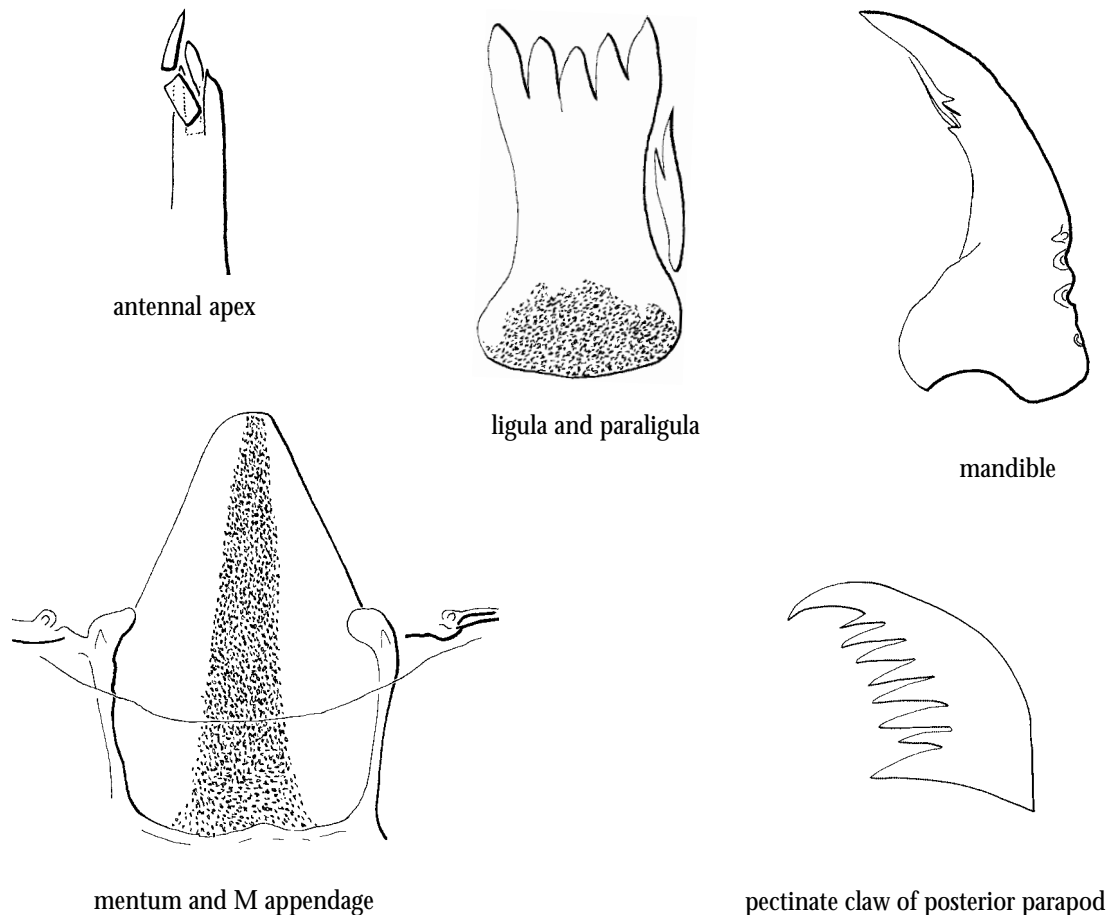
Genus *Cantopelopia*

**DIAGNOSIS:** This genus is distinguished by the large, well sclerotized Lauterborn organs at the apex of antennal segment 2 that resemble a tuning fork; the triangular rugose area at the base of the ligula; the lack of well-developed dorsomental teeth; and posterior parapods with transparent claws and three smaller claws on each parapod with large inner teeth.

**NOTES:** One species, *C. gesta*, occurs in the Southeast US. Larvae have been collected from a creek in Georgia, from creeks and ponds in northern Florida and from sphagnum mats in an Ohio bog.

Until recently, the immature stages of *C. gesta* were unknown. The larva referred to as an “apparently undescribed, species of *Monopelopia*” in Epler & Janetzky (1999: 222) is the larva of *C. gesta*. This presents a problem in tanypod taxonomy, because the larva and pupa of *C. gesta* are very similar to those of some *Monopelopia* (e.g., *M. tillandsia* from Florida and *M. mikeschwartzi* from Jamaica), and it had been assumed that *Cantopelopia* was more closely related to *Paramerina*. However, the only differences noted between adult male *Cantopelopia* and *Monopelopia* are the two tibial spurs of *Cantopelopia* (*Monopelopia* bears a single tibial spur) and the apically wide gonostylus of *Cantopelopia* compared to the apically attenuated gonostyli of all described *Monopelopia* species. Perhaps *Cantopelopia* should be considered at most to be a subgenus of *Monopelopia*.

**ADDITIONAL REFERENCES:** Roback 1971; Epler & Janetzky 1999.



*Cantopelopia gesta*, larval structures

Genus *Clinotanypus*

**DIAGNOSIS:** This genus is distinguished by the strongly hooked apical tooth and large pointed inner tooth of the mandible; dorsomental teeth in longitudinal rows on the M appendage; ligula usually with an even number of teeth, with outer pairs not closely appressed; absence of sclerotized hooks on the dorsal anterior margin of body segment 4 (abdominal segment 1); and well developed lateral setal fringe.

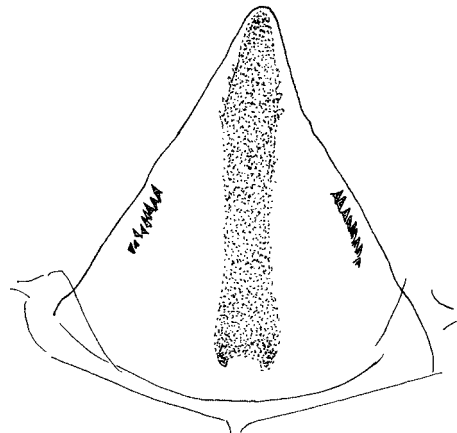
**NOTES:** Larvae occur in ponds and lakes as well as streams and rivers. They prefer soft sediments and can be found in “clean” water or water that has been organically enriched. Roback (1976) recorded the following water chemistry parameters for the genus: pH < 4.0-9.0, with a mean of 6.2; total hardness 0-300 ppm, mean 69.8; alkalinity 0-200, mean 47.8; specific conductivity 0-600  $\mu\text{mhos}$  @ 25 °C, mean 140.6. It has been found in water with a dissolved oxygen level of less than 4 ppm (Roback 1974b).

One species, *C. pinguis*, is widely distributed in the eastern United States, and is the only species recorded from the Carolinas, where it is most common on the Coastal Plain. Three additional species are recorded from Florida. Because these 3 species are so poorly known, and because few workers collect or identify adults, any of these 3 species may also occur in the Carolinas. The immature stages of *C. aureus* were described by Roback (1976) from a single reared specimen from silt in a small, slow stream at the bottom of Devil’s Millhopper, a large sinkhole near Gainesville, FL. I have reared a single specimen of *C. wirthi* from a small stream feeding a lake in south central Florida. Roback (1976) separated the larvae of *C. aureus* and *C. pinguis* on measurements of the first antennal segment and the maxillary palpus; the single associated larva of *C. wirthi* has a longer first antennal segment (790  $\mu\text{m}$ ) than those measurements given by Roback (1976: 197) for *C. pinguis*; the basal palpal segment fits in the range for *C. pinguis*. With such a small sample size, the range of variation is unknown; all of these species may be variants of a single species. Adults are necessary for species level identification; unless reared, all *Clinotanypus* larvae should be identified as “*Clinotanypus* sp.”.

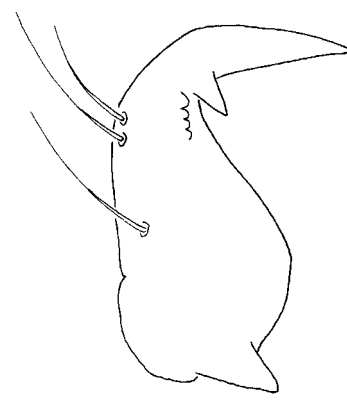
**ADDITIONAL REFERENCES:** Boesel 1974; Kowalyk 1985; Roback 1971, 1976.



ligula



mentum and M appendage



mandible



Genus *Coelotanypus*

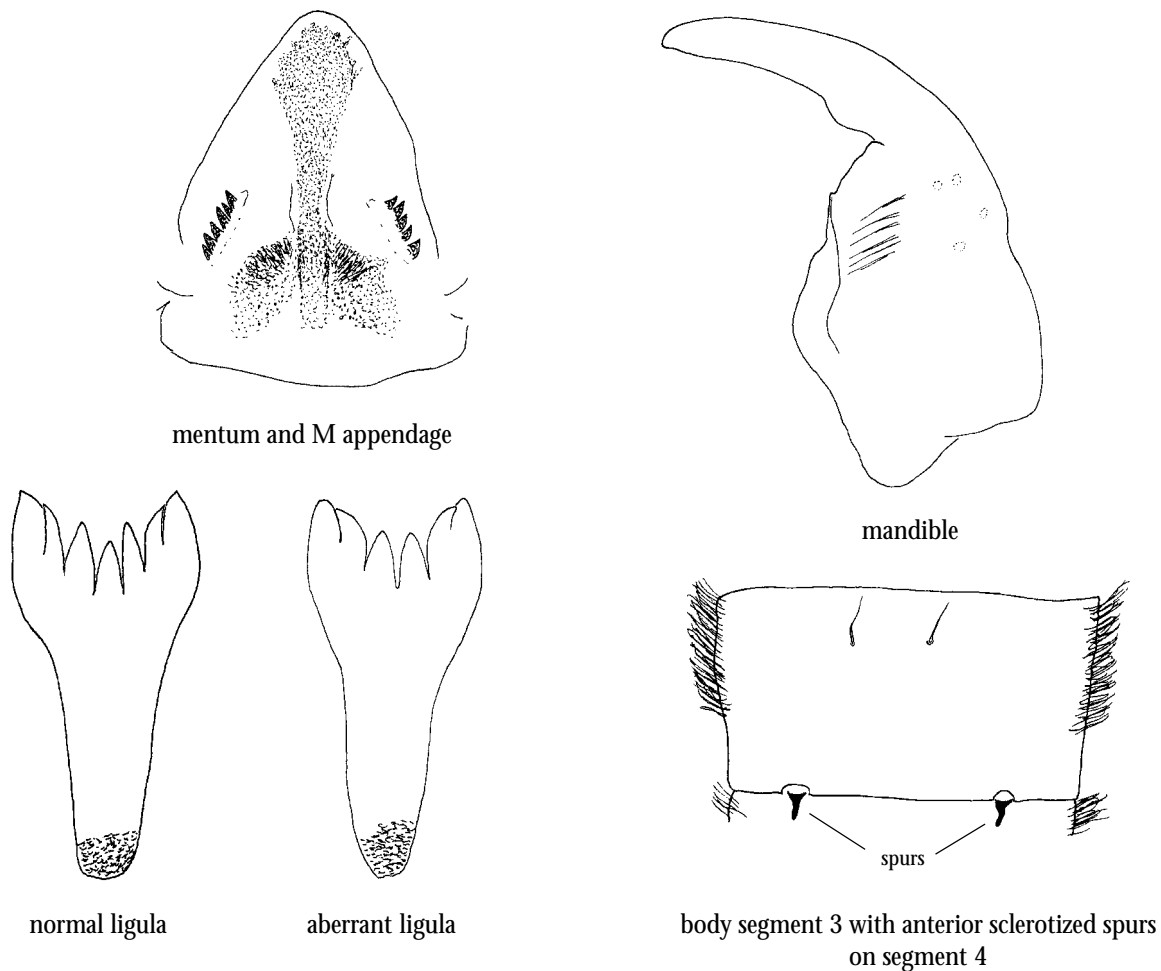
**DIAGNOSIS:** The well developed lateral setal fringe; smoothly curved apical tooth with low, rounded basal tooth of the mandible; dorsomental teeth in longitudinal rows; ligula usually with an odd number of teeth, with outer pairs closely appressed; and a pair of small, sclerotized hooks on the dorsal anterior margin of body segment 3 (abdominal segment 1) will distinguish this genus.

**NOTES:** Three species of *Coelotanypus* are recorded from the eastern United States; two additional species, undescribed as larvae, are found from Louisiana north to the Great Plains and westward. *Coelotanypus* larvae are found in or on bottom sediments in marshes, ponds, lakes and the slower portions of streams and rivers. At least one species, *C. concinnus*, can be found in, but is not necessarily limited to, extremely eutrophic water bodies.

Although most *Coelotanypus* larvae possess a ligula with an odd number of teeth, specimens are often found with an even number of teeth. The converse may also be true with the closely related genus *Clinotanypus*. Note that the sclerotized spurs on the dorsal anterior margin of body segment 4 can be observed on larger specimens while under a dissecting microscope.

The key which follows is constructed from data in Roback (1974a); the data are based on 4th instar larvae which were reared to the adult stage. The antennal ratios should work for most 3rd instar larvae as well, but measurements of the basal segment of the maxillary palpus will hold true only for 4th instar larvae.

**ADDITIONAL REFERENCES:** Boesel 1974; Kowalyk 1985; Roback 1971; 1974a.



**Key to *Coelotanypus* larvae of the eastern United States**

1      Mentum with 9 or more teeth on each side .... ***C. tricolor***

1'     Mentum with 5-8 teeth on each side ..... 2

2 (1') AR = 7.0 or more; basal segment of maxillary palp > 70  $\mu$ m (4th instar larvae only!) .....  
 ..... ***C. concinnus***

2'     AR < 6.7; basal segment of maxillary palp < 70  $\mu$ m (4th instar larvae only!) ..... ***C. scapularis***



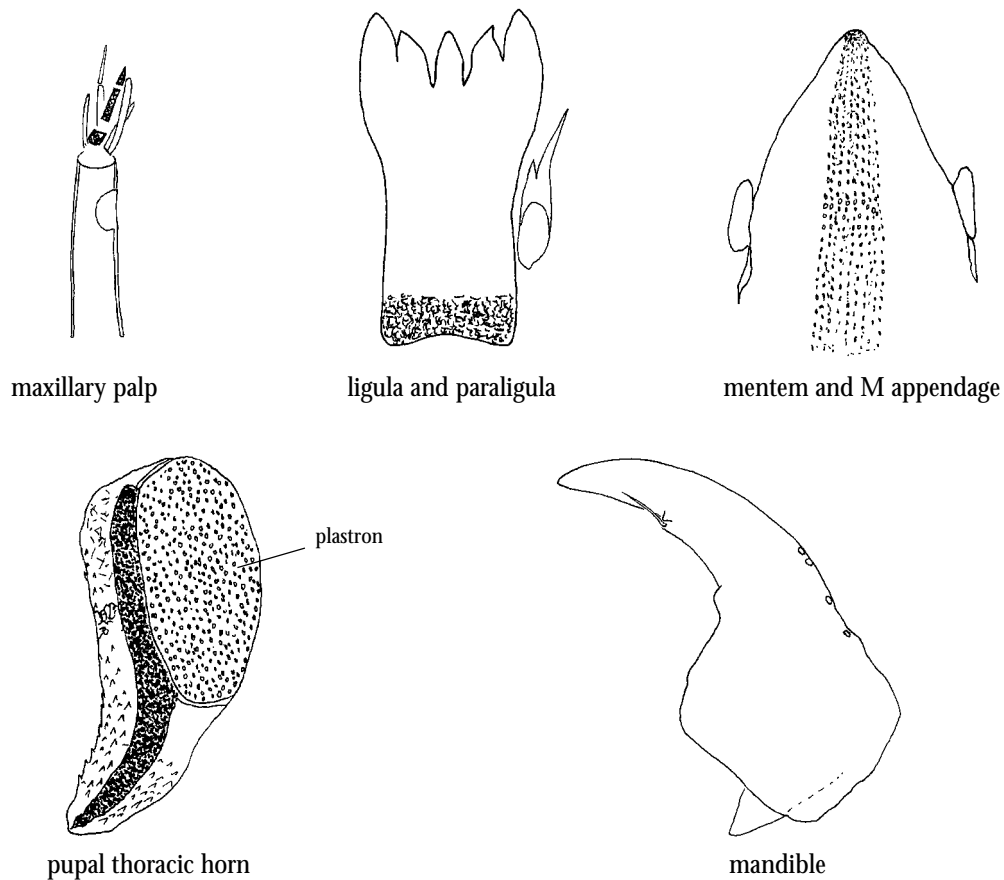
Genus *Conchapelopia*

**DIAGNOSIS:** *Conchapelopia* larvae are distinguished by long scattered body setae; first antennal segment < 370  $\mu\text{m}$ ; the 3 segmented b sensillum on the maxillary palp; ring organ in distal third of maxillary palp; basal segment of maxillary palp < 70  $\mu\text{m}$ ; mandible with small basal and accessory teeth; ratio of maxillary palp length/width at ring organ 4.4 or less; pseudoradula with 8-12 rows of coarse granules; central tooth of ligula about twice as long as wide; and the simple subbasal seta of posterior parapod.

**NOTES:** Five species are recorded from the Carolinas; species separation of unassociated larvae is not practically possible. *Conchapelopia* is a member of the *Thienemannimyia* group. Separation of the larvae of the genera of this group, which in the Carolinas includes *Conchapelopia*, *Hayesomyia*, *Helopelopia*, *Meropelopia*, *Rheopelopia* and perhaps *Telopelopia* and *Thienemannimyia*, can be difficult. Late 4th instar *Conchapelopia* larvae can be positively identified if the developing pupal thoracic horn is visible (see figure below); note the large plastron plate. Fittkau & Murray (1983) stated that *Conchapelopia* larvae have a pseudoradula of about 8 longitudinal rows of granules. This character may be difficult to discern, and many associated larvae I've examined have about 10-12 rows of granules in the pseudoradula.

*Conchapelopia* larvae have been recorded from waters with a pH range of 5.1-8.0, with most records at a pH of < 7.0; specific conductivity ranged from 0-400  $\mu\text{mhos}$  @ 25°C, with most records below 300; total hardness from 0-250+ ppm, most records below 200; alkalinity 0-200 ppm, most below 40; and water temperatures ranged from 9-28°C.

**ADDITIONAL REFERENCES:** Beck & Beck 1966; Roback 1971; 1981.

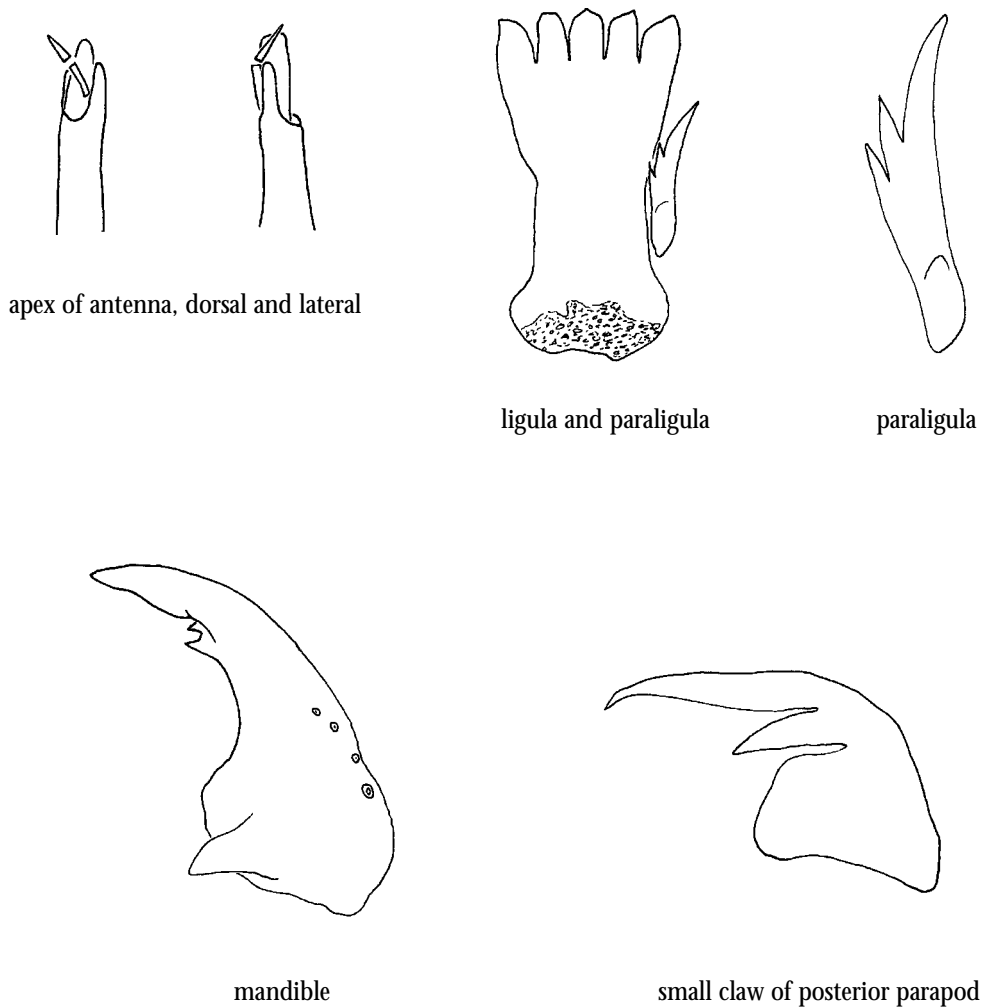


Genus *Denopelopia*

**DIAGNOSIS:** *Denopelopia* larvae are distinguished by the large Lauterborn organs “fused” to the apex of antennal segment 2, giving a tuning fork appearance; the trifid paralogula; lack of well developed dorso-mental tooth plates; 2 small claws of posterior parapod with a large inner tooth; and all claws of posterior parapod pale.

**NOTES:** One species, *D. atria*, is described for this genus. *Denopelopia* has not been recorded from the Carolinas, but it may eventually be found on the Coastal Plain in South or North Carolina. The northernmost specimens I’ve seen are from the Orlando, Florida, area. I’ve also reared this species from a vegetation-choked pond in a cattle pasture in southwestern Costa Rica. The immature stages occur in shallow water and can withstand low DO (0.3 mg/l) and high iron (108 mg/l) levels.

**ADDITIONAL REFERENCES:** Roback & Rutter 1988.



*Denopelopia atria*, larval structures

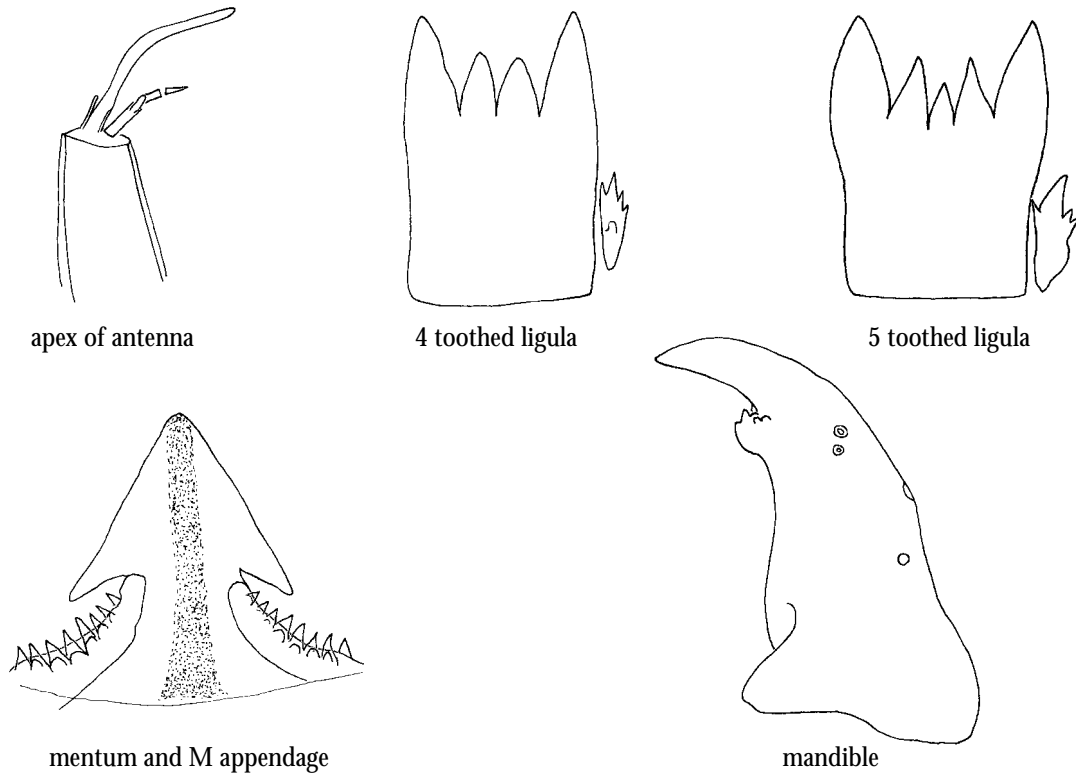
Genus *Djalmabatista*

**DIAGNOSIS:** This genus closely resembles *Procladius*, but may be separated by the long antennal blade, which is about twice (or more) the length of the flagellum (segments 2-4); the apically bilobed basal tooth of the mandible; and by its (usually) 4 toothed ligula. Like *Procladius*, it has a well developed lateral setal fringe and well developed dorsomental teeth arranged on plates.

**NOTES:** One species, *D. pulchra*, is known from North America. It was formerly placed in the genus *Procladius*, subgenus *Calotanypus*, as *P. (C.) pulcher*, *P. (C.) maculatus* is considered a junior synonym. Although this species usually has a 4 toothed ligula, 5 toothed "variants" may be encountered. Roback (1980) noted that some South American species of *Djalmabatista* had 5 toothed ligulae. Thus, some 5 toothed "variants" may represent a different species; Caldwell et al. (1997) list 5 toothed larvae as an undescribed species. Tennessen & Gottfried (1983) found high variation in ligula tooth numbers in *D. pulchra* from northern Alabama, but apparently none of their material was reared and no analysis of pupal and adult characters was done. I have examined a single reared male collected from Greenville Co., SC, by Charles Watson; the adult is apparently inseparable from *D. pulchra*; the pupa bears more taeniate setae (about a dozen) on the anterolateral margin of T III than described for *D. pulchra*. However, until more material is reared and the range of character variation is assessed, no definite statements on the taxonomic position of larvae with 5 toothed ligulae can be made. It may be wisest to note the existence of these 5 toothed taxa as "*Djalmabatista pulchra* variant".

*Djalmabatista* larvae occur in ponds, lakes, streams and rivers. They apparently prefer soft water, low alkalinity, a slightly acidic to circumneutral pH, and are tolerant of moderate levels of iron (Roback & Tennessen 1978).

**ADDITIONAL REFERENCES:** Kowalyk 1985; Roback 1971, 1980, 1989; Roback & Coffman 1977; Roback & Tennessen 1978; Tennessen & Gottfried 1983.



Genus *Fittkauimyia*

**DIAGNOSIS:** *Fittkauimyia* is easily diagnosed by the dorsomental teeth arranged in a concave arc; multiple dorsal and ventral accessory teeth on the mandible; and its distinctive ligula.

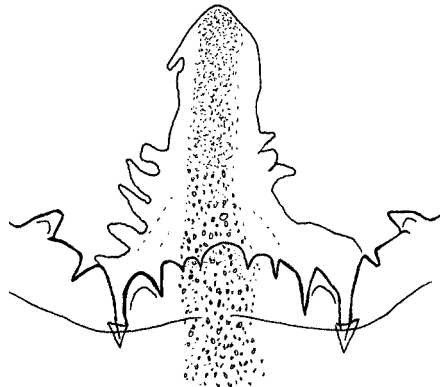
**NOTES:** One species, *Fittkauimyia sarta*, is known from North America, where it is found as far west as Texas and Oklahoma and at least as far north as North Carolina (New Hanover Co.) in the East. The larva still has not been conclusively associated with the adult, which was formerly classified in the monotypic genus *Parapelopia*. *Parapelopia* was tentatively synonymized with *Fittkauimyia* by Roback (1982b), based on associated specimens of another species from Australia; Oliver et al. (1990) list *Parapelopia* as a junior synonym of *Fittkauimyia*. Roback's (1982b) larval species *Fittkauimyia* sp. 2 is the only species known (as a larva) from the SE US and is most likely the larva of *F. sarta*.

*Fittkauimyia* larvae are found in marshes, ponds, lakes, streams and rivers.

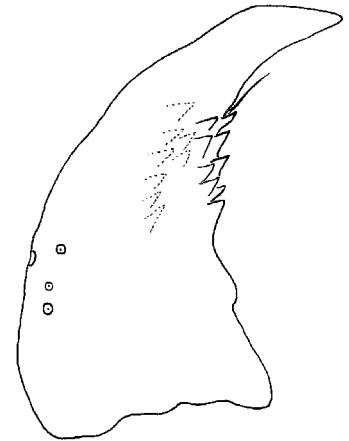
**ADDITIONAL REFERENCES:** Davis 1992; Roback 1971; 1982b.



ligula and paralingula



mentum and M appendage



mandible

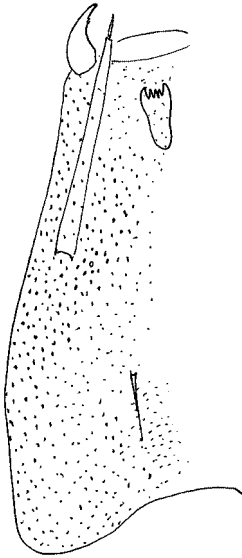
Genus *Guttipelopia*

**DIAGNOSIS:** The granulose surface of the head capsule; longitudinally wrinkled body surface; posterior parapods with 2-3 small claws, each with 3 or more inner teeth; and at least 3 darker claws on the posterior parapods distinguish *Guttipelopia*.

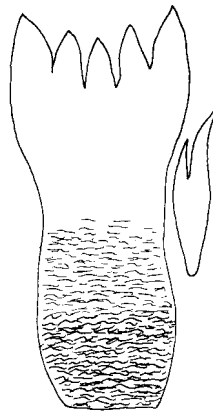
**NOTES:** One species, *Guttipelopia guttipennis*, occurs in the Southeast US. It was formerly considered a separate species, *G. currani*, but was synonymized by Bilyj (1988). A second species occurs in Canada in Manitoba and Ontario.

Larvae are most often found in sphagnum bogs, ditches, ponds and lakes, but may occur in streams on the Coastal Plain.

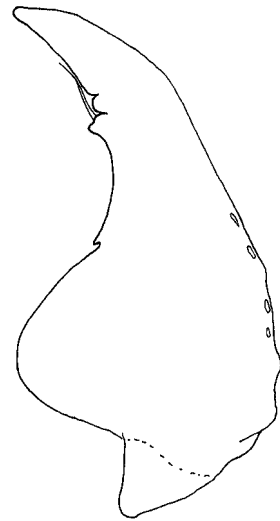
**ADDITIONAL REFERENCES:** Beck & Beck 1966; Bilyj 1988; Kowalyk 1985; Roback 1971.



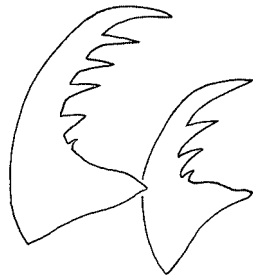
head capsule



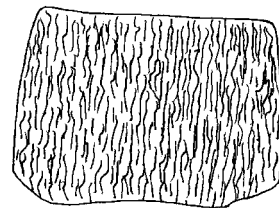
ligula and paralingula



mandible



small claws of posterior parapod



body segment

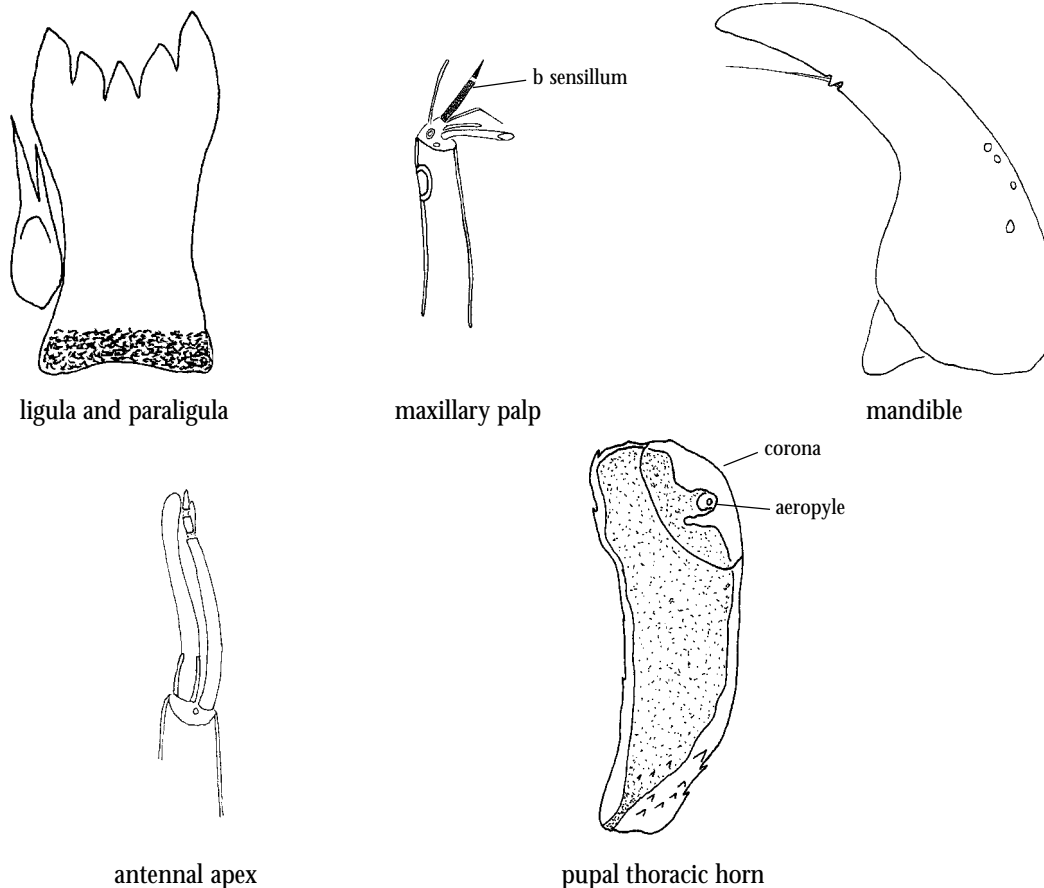
Genus *Hayesomyia*

**DIAGNOSIS:** Larvae of this genus are distinguished by the 2 segmented b sensillum of the maxillary palp; ring organ in distal third of basal segment of maxillary palp; second antennal segment length about 50-60  $\mu\text{m}$ ; length of basal antennal segment divided by mandible length less than or equal to 1.8; sclerotized base of the antennal blade almost twice as long as wide; AR <5.0; small basal and accessory teeth of the mandible; and the long scattered body setae. The pupal thoracic horn has a distinct aeropyle surrounded by a corona, respiratory atrium with only one or two convolutions.

**NOTES:** One species, *Hayesomyia senata*, is described from North America; it occurs throughout the continental US. A member of the *Thienemannimyia* group, *H. senata* was formerly placed in *Thienemannimyia* (q.v.). *Hayesomyia* larvae are extremely difficult to separate from those of *Meropelopia* and *Thienemannimyia*, and one may have to be content with an identification of "*Thienemannimyia* group sp." or "*Hayesomyia/Meropelopia* sp." for many specimens encountered. Late fourth instar larvae with a pharate, internally developed pupal thoracic horn may be positively identified; note the distinctive aeropyle and corona. The dark coloration on the caudal margin of the head capsule referred to by Epler (1992, 1995) is variable; some *Hayesomyia* head capsules are pale or only slightly darkened on the posterior margin of the small triangular posteroventral sclerite.

*Hayesomyia senata* larvae are most often found in rivers. Roback (1981) supplied the following water chemistry data: specific conductivity 301-400  $\mu\text{mhos}$  @ 25°C; pH 7.1-8.0; total hardness 51-150 ppm; alkalinity 41-200 ppm; temperature 19-28°C.

**ADDITIONAL REFERENCES:** Murray & Fittkau 1985; Roback 1971; 1981.





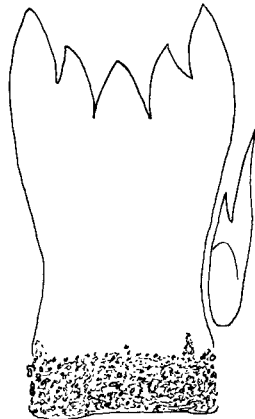
Genus *Helopelopia*

**DIAGNOSIS:** *Helopelopia* is similar to *Conchapelopia* in having a 3 segmented b sensillum on the maxillary palp; ring organ in distal third of palp; and small basal and accessory teeth on the mandible. It may be separated by the longer first antennal segment ( $> 375 \mu\text{m}$ ) and basal segment of the maxillary palp ( $> 70 \mu\text{m}$ ); smaller central tooth of the ligula (about as long as wide); ratio of length of maxillary palp/width at ring organ 4.6 or more; and pseudoradula with about 12 longitudinal rows of coarse granules.

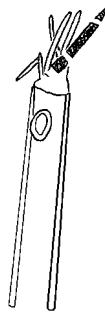
**NOTES:** This genus, a member of the *Thienemannimyia* group of genera, was formerly included as a subgenus of *Conchapelopia*. Two species are known from the Nearctic; both occur in the Carolinas. Species level identification of larvae without associated adults is not possible for only *H. cornuticaudata* is described in the immature stages. Positive separation of *Helopelopia* from *Conchapelopia* may be achieved with late 4th instar larvae; note that the developing pupal thoracic horn has a much smaller plastron plate. Also note that the corona in *Conchapelopia* is quite variable in size.

*Helopelopia cornuticaudata* larvae are found over a wide range of total hardness (0-250 ppm) and alkalinity factors (0-200 ppm); they are found in waters with a pH of 5.1- $> 8.1$  and at water temperatures from 14-28°C (Roback 1981). They are most often found in small streams to large shallow streams.

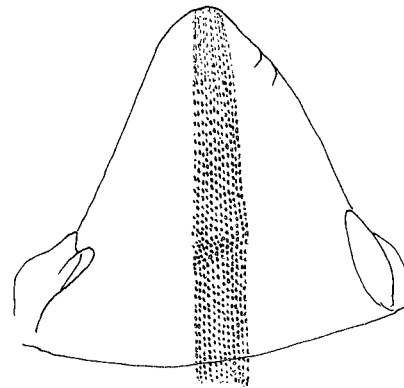
**ADDITIONAL REFERENCES:** Roback 1971; 1981.



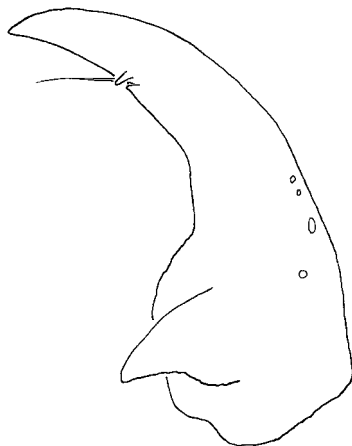
ligula and paralingula



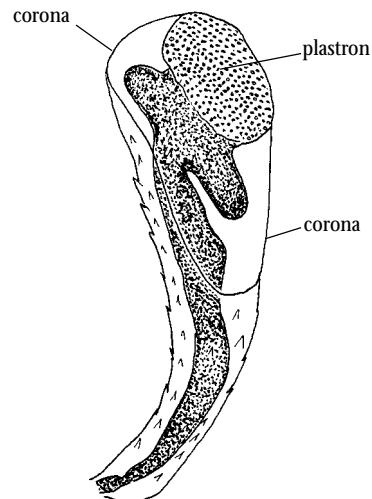
maxillary palp



mentum and M appendage



mandible



pupal thoracic horn

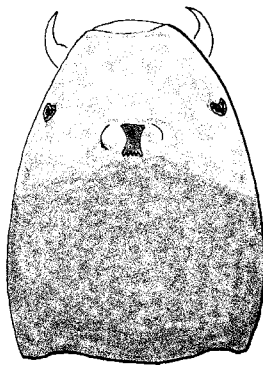
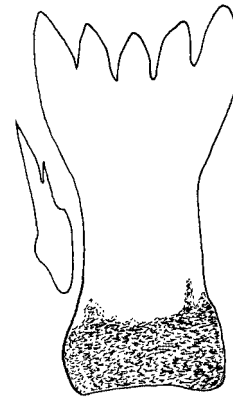
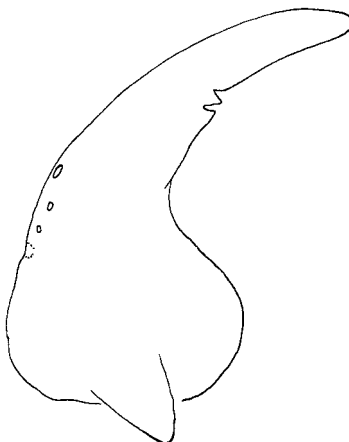
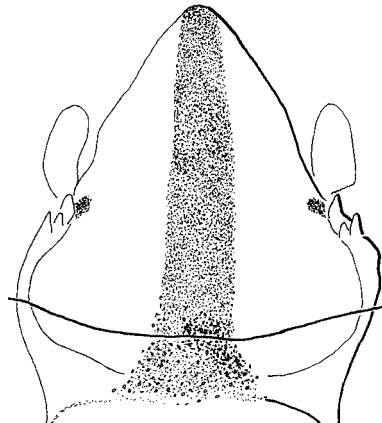
Genus *Hudsonimyia*

**DIAGNOSIS:** The lack of well developed dorsomental tooth plates, each with three small teeth and apicomedial margin rounded; maxillary palp with ring organ proximal to or at middle of segment; small accessory and basal teeth on mandible; basal outer margin of larger posterior parapod claws not extensively lamellate; procercus about 4 times as long as wide; and lack of a setal fringe will distinguish this genus.

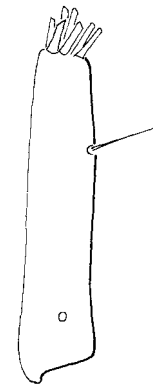
**NOTES:** Two species are described from the Southeast; *H. karelena* from both Carolinas and Georgia, and *H. parrishi* from northern Georgia. Larvae of *H. parrishi* were collected from shallow (1 cm) water flowing over granitic bedrock covered with moss, algae and detritus; *H. karelena* larvae collected in South Carolina were found in a blue-green algae mat on steep granite outcrops with a low flow of water. The two species may be separated by coloration: the head capsule and posterior parapod claws of *H. parrishi* are yellowish brown; the head capsule and posterior parapod claws of *H. karelena* are brown, with the posterior portion of the head capsule usually much darker than the anterior. An apparent third species reported from NW Florida by Epler (1995) is not a *Hudsonimyia*, but is a *Thienemannimyia* group member, probably a *Meropelopia*.

Sublette & Sasa (1994) relegated *Hudsonimyia* to subgeneric status under *Pentaneura*; immature stages linked to adults of a new species described from Guatemala were only provisionally associated and present an apparent mix of characters. Given the substantial differences between the two taxa in the larval and pupal stages, for the present I'm retaining the generic status of *Hudsonimyia*, a position also adopted by Caldwell et al. (1997).

**ADDITIONAL REFERENCES:** Caldwell & Soptonis 1982; Kowalyk 1985; Roback 1971; 1979a; Sublette & Sasa 1994.

*H. karelena*, head capsule*H. parrishi*, maxillary palp*H. parrishi*, ligula and paraligula*H. parrishi*, mandible

mentum and M appendage

procercus  
(anal setae abbreviated)

Genus *Krenopelopia*

**DIAGNOSIS:** *Krenopelopia* larvae may be distinguished by the large Lauterborn organs on the apex of antenna segment 2, giving the appearance of a tuning fork; bifid paraligula; pseudoradula with small coarse granules in longitudinal bands; ligula with granulose area forming a basal band; lack of well developed dorsomental tooth plates; large basal tooth on the mandible; and the lack of any lateral setal fringe on abdominal segments (lateral setae are present, but none in fringe rows).

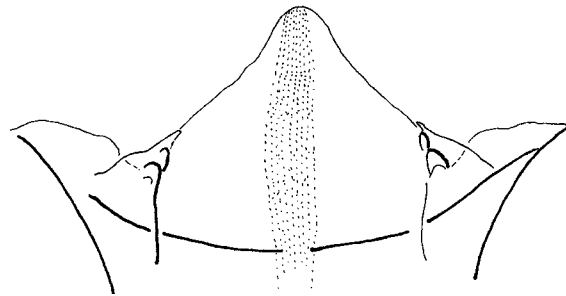
**NOTES:** Larvae of the only described southeastern species, *K. hudsoni*, were reported from South Carolina living in muddy seeps along the borders of small springs or spring-fed streams (Roback 1983). Caldwell et al. (1997) reported *K. hudsoni* from North Carolina; I've also examined material from a spring near a bog in Ohio.

The single larval specimen of an apparently undescribed species of *Krenopelopia* from northern Florida reported by Epler (1995) is a *Natarsia* (aberrant?) with extremely long Lauterborn organs (see *Natarsia*).

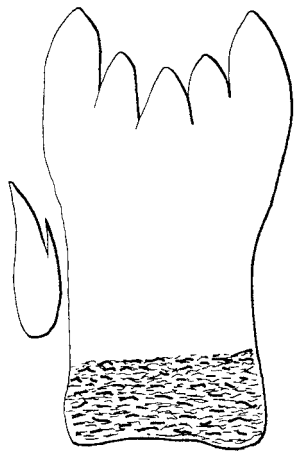
**ADDITIONAL REFERENCES:** Kowalyk 1985; Roback 1983.



apex of antenna



mentum and M appendage



ligula and paraligula



mandible

*K. hudsoni*, larval structures

Genus *Labrundinia*

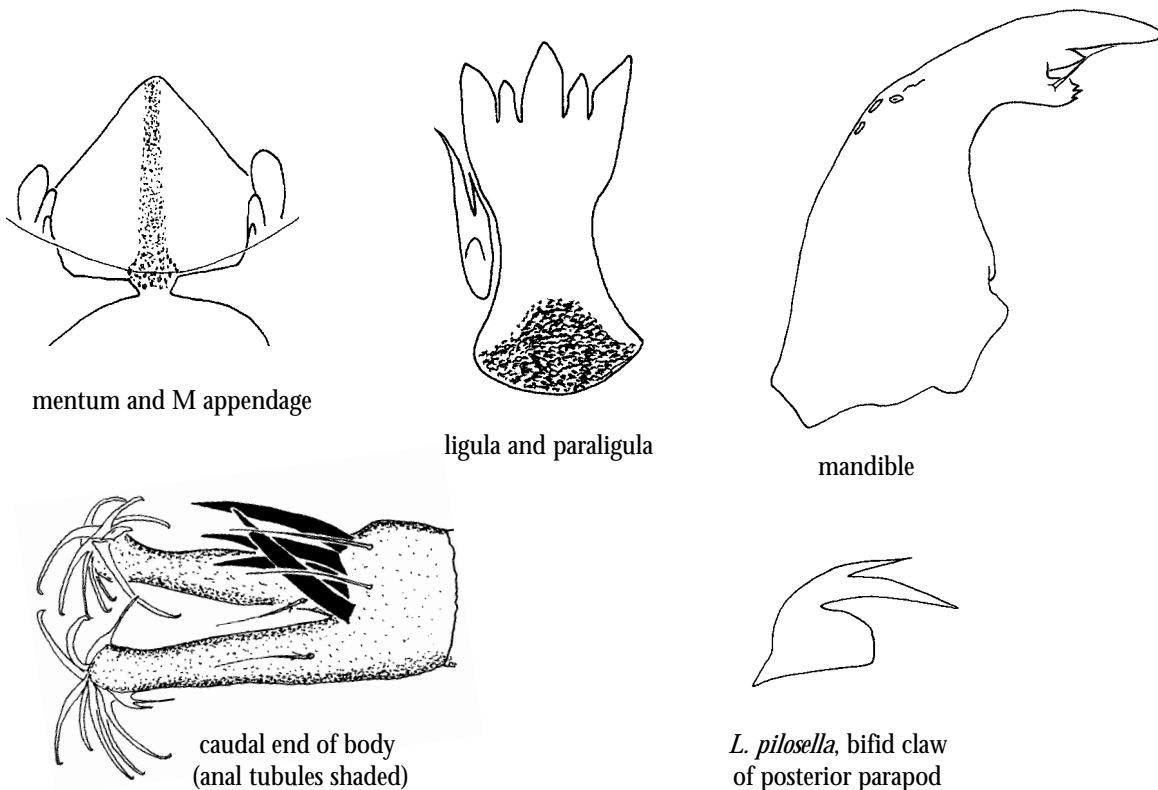
**DIAGNOSIS:** This genus is distinguished by the median tooth of the ligula usually longer than the inner teeth (one species in FL has the median tooth equal to or less than inner teeth); head capsule usually covered with spinules/nodules/granules **or** with small to large lateral spines along the side of the head near the middle (one species in FL with no lateral spines), **or** with both head nodules and lateral spines; pseudo-radula slightly broadened posteriorly; mandible with large basal tooth; one small bifid claw on posterior parapod; and anal tubules shorter than posterior parapods.

**NOTES:** *Labrundinia* larvae are found in herbaceous marshes, ponds, lakes and the slower moving portions of streams and rivers. Roback (1987a) noted larvae occurring at the following water chemistry parameters: pH 4.5-7.2 (most around 7.0); total hardness 19-94 ppm; alkalinity 0-82 ppm; specific conductivity 48-197  $\mu\text{mhos}$  @ 25°C; temperature 19-24°C.

As can be seen from the diagnosis above, no one character will identify all *Labrundinia* larvae. Contrary to the diagnosis provided in Fittkau & Roback (1983), the pseudoradula is broadened posteriorly in many species, but not to the extent shown in *Nilotanytus*, a genus which may be confused with *Labrundinia*.

Roback (1987a) reviewed the genus and recorded 6 described species from the Southeast; all are found in the Carolinas. Two additional larval species which he gave number designators (sp. 3 nr *virescens* (see Notes) and sp. 6) also occur in the Carolinas. I've examined material very similar to Roback's *L.* sp. 8 from Florida; these three species and three additional unnamed taxa (*L.* spp. A, B and C) from Florida are included in the following key. A species known only from pupae, *L.* sp. 10, occurs in Georgia. The existence of at least six unassociated larval taxa indicates that more work on the genus is needed. Benthic workers can contribute greatly by attempting to rear these taxa.

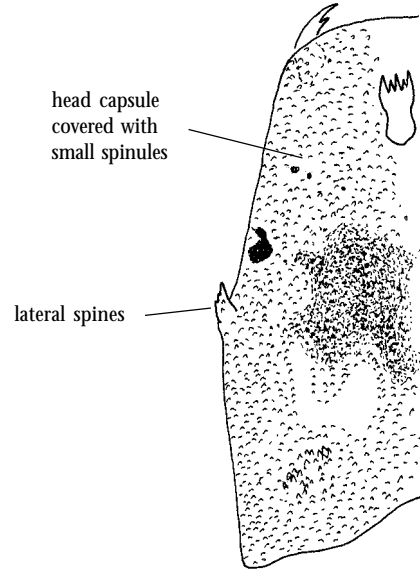
**ADDITIONAL REFERENCES:** Beck & Beck 1966; Kowalyk 1985; Roback 1971, 1987a.



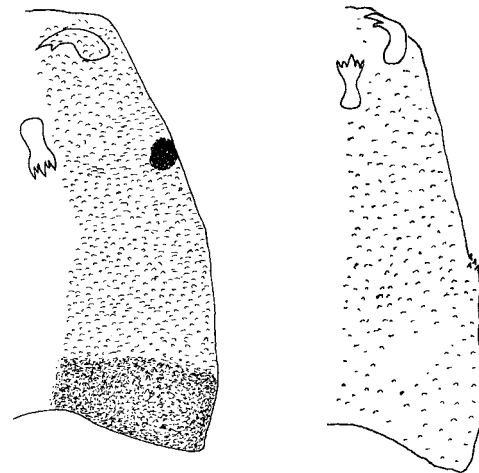
**Key to *Labrundinia* larvae of the southeastern United States**

1 Surface of head capsule covered with small spinules or nodules; lateral spines present or absent near middle side of head ..... 2

1' Surface of head capsule smooth; lateral spines or spurs usually present (lacking in one species) near middle side of head ..... 7

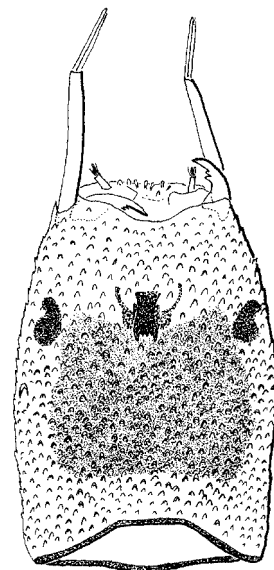


2 (1) Head without ventral darker area near center of head, although caudal margin of head may be darkened; lower spur of bifid posterior parapod claw longer than upper ..... 3

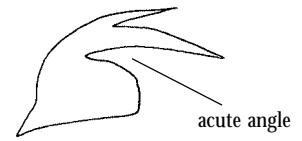
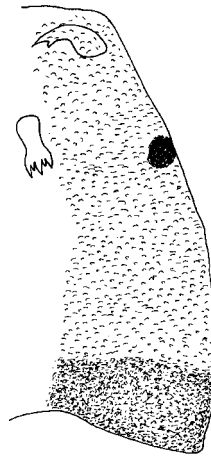


posterior parapod claws

2' Head with ventral darker area near center of head; lower spur of bifid posterior parapod claw subequal to or shorter than upper ..... 4



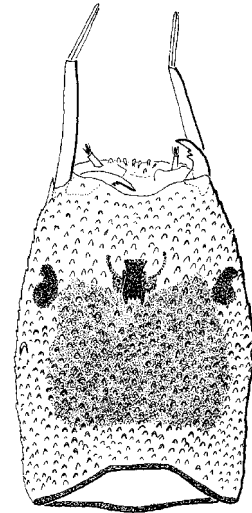
3 (2) Head without lateral spines; caudal margin of head may be darkened; lower groove of bifid posterior parapod claw forming an acute angle ..... *L. pilosella*



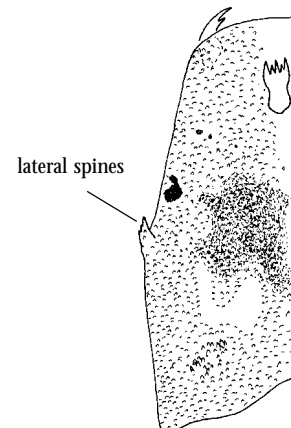
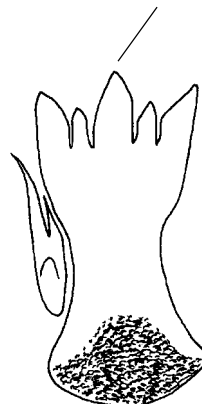
3' Head with small lateral spines; caudal margin of head not darkened; lower groove of bifid posterior parapod claw forming a U-shaped angle ..... *L. maculata*



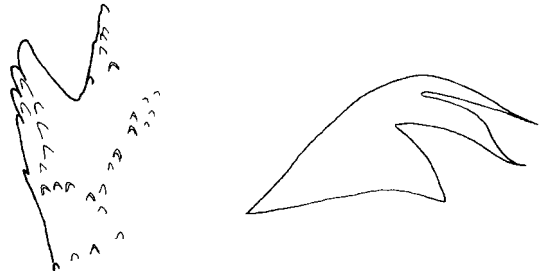
4 (2') Median tooth of ligula subequal to or shorter than inner teeth; lateral spines of head weakly developed ..... *L. sp. A*  
(not recorded from the Carolinas)



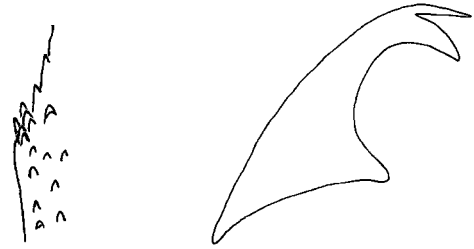
4' Median tooth of ligula much longer than inner teeth; lateral spines/spurs of head weakly or well developed ..... 5



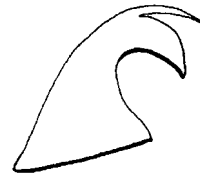
- 5 (4') Lateral spine group of head consists of a large spur; lower groove of bifid posterior parapod claw forms an acute angle ..... **L. sp. B**  
 (not recorded from the Carolinas)



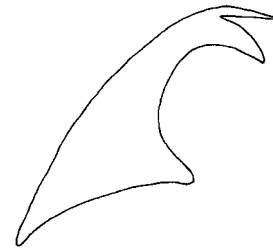
- 5' Lateral spine group of head consists of several small spines; lower groove of bifid posterior parapod claw broadly U-shaped ..... 6



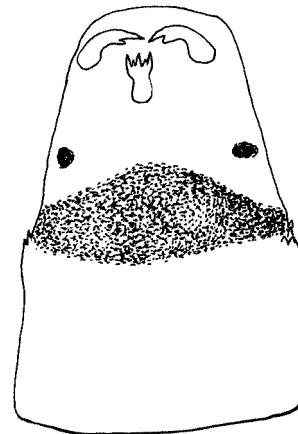
- 6 (5') Bifid claw of posterior parapod short .....  
 ..... **L. sp. 8**  
 (not recorded from the Carolinas; see Notes)



- 6' Bifid claw of posterior parapod more elongate ..... **L. sp. 6**



- 7 (1') Head with medial brown transverse band ...  
 ..... **L. johannseni**



- 7' Head without dark medial transverse band, although caudal margin may be darkened ..... 8

8 (7') Head without a lateral spur or group of spines ..... **L. sp. C**  
 (not recorded from the Carolinas; see Notes)

8' Head with a single large lateral spur or group of small spines ..... 9

9 (8') Bifid claw of posterior parapod with U-shaped lower groove and lower tooth broad ..... **L. neopilosella**



9' Bifid claw of posterior parapod with V-shaped lower groove and lower tooth narrower ..... 10



10 (9') Lateral spine group of head consists of a single large spur about 20-25  $\mu\text{m}$  long .....  
 ..... **L. sp. 3 nr. virescens**

10' Lateral spine group of head consists of about 2-7 small spines ..... 11

11(10') Lower spur of bifid posterior parapod claw short ..... **L. becki**



11' Lower spur of bifid posterior parapod claw elongate ..... **L. virescens**





**Notes on species**

- L. becki* - A relatively common species known to occur from Florida north to Pennsylvania. Roback (1971) noted that Beck & Beck (1966) had misinterpreted *L. pilosella*; he described this taxon as new. It is not keyed correctly in Beck & Beck (1966) and Beck (1976, 1979).
- L. johannseni* - An easily recognized species because of the distinctive dark band across the middle of the head capsule. Recorded from Florida to Tennessee.
- L. maculata* - An apparently uncommon species. Roback (1987a) recorded it from California, Kansas, North Carolina and Texas; it has also been found in Florida and Georgia. The nodules/spinules of the head capsule may be weakly developed; use caution when keying any *Labrundinia* larva!
- L. neopilosella* - A common species found throughout the Southeast. The middle tooth of the ligula is almost always longer than the other teeth; however, this character state may occur in other *Labrundinia* species. Roback (1987a) described five varieties (including the nominal species) of this species; two (varieties 1 and 2) are recorded only from Alaska and Canada; var. 3 is known from Louisiana and Florida, var. 4 from Florida and Kentucky. The forms are separated on the basis of minor differences in the bifid posterior parapod claws, subbasal setae of the posterior parapods and the number of head capsule spines; see Roback (1987a) for more information.
- L. pilosella* - The most common and widespread of *Labrundinia* species in the eastern US. It is keyed as *L. floridana*, a junior synonym, in Beck & Beck (1966) and Beck (1976, 1979). In North Carolina, most stream records of *Labrundinia* are for *L. pilosella*; other species are less common, usually lentic and are usually found on the Coastal Plain.
- L. virescens* - Hudson et al. (1990) stated that this species, along with *L. pilosella* and *L. neopilosella*, was among the most common and widespread *Labrundinia* in North Carolina. However, Roback (1987a) and Epler (1995) found this species to be scarce and uncommon; material that I've examined from North Carolina determined as *L. virescens* has been misidentified *L. becki* and *L. pilosella*.
- L. sp. 3* nr. *virescens* - This species was described (Roback 1987a) from pupae only; Caldwell et al. (1997) reported that associated material showed that this taxon is the same as Roback's *L. sp. 4* (described from larvae only). It is found throughout the Southeast; Hudson et al. (1990) reported *L. sp. 4* to be common in Mayo Reservoir in North Carolina.
- L. sp. 6* - Recorded from Florida, Georgia, Kentucky, North Carolina and Tennessee.
- L. sp. 8* - I've examined a larva from south Florida that is probably this species, described by Roback (1987a) from Cuba. The specimen does not appear to have the apparent spur on the mandible below the inner teeth. Roback noted that this taxon may be the same as his *L. sp. 7* from Colombia (which lacks the apparent spur on the mandible).
- L. sp. A* - Known only from Florida, it is unusual for Nearctic species in that the middle tooth of the ligula is subequal to or shorter than the other ligula teeth. Since this species and *L. sp. B* occur in northern Florida, they will probably eventually be found on the Coastal Plain in the Carolinas.
- L. sp. B* - Known only from Florida; found throughout the peninsula.
- L. sp. C* - Known only from Florida. This taxon is very similar to *L. becki* (similar bifid posterior parapod claws) and may be a variety of that species that lacks lateral spine groups on the head.
- Labrundinia sp. 10* is a pupal species recorded only from Georgia (Roback 1987a).

Genus *Larsia*

**DIAGNOSIS:** The basal segment of maxillary palp with ring organ located near the middle to near the distal end of segment; apical portion of dorsomentum directed medially; large basal tooth of mandible; long antennae ( $\frac{1}{2}$  length of the head and at least 3X mandible length); AR 3.5-5.0; ring organ of basal antennal segment near middle; and the lack of any setal fringe will distinguish species of *Larsia*.

**NOTES:** Four described species are known from North and South Carolina; *L. decolorata* and *L. bernerii* appear to be the most common species encountered in the Southeast. At least two undescribed species are known from the Carolinas; both are included in the following key. The South Carolina record for *L. planensis* in Hudson et al. (1990) and Caldwell et al. (1997) is unconfirmed; it is not included in the following key. *Larsia lurida*, described and keyed in Beck & Beck (1966), is a junior synonym of *L. decolorata* (Roback 1971). Although Oliver et al. (1990) follow Roback (1971) and list *L. indistincta* as a junior synonym of *L. decolorata*, Bilyj (pers. comm.) considers it a valid species; it is treated as a distinct species in this manual.

*Larsia* larvae are most often found in marshes, ponds and the littoral zone of lakes, but can also be found in the slower moving portions of rivers and streams; at least one species has been collected from hot springs in Colorado.

*Larsia* is currently being revised by B. Bilyj (BIOTAX, Etobicoke, Ontario, Canada). He has graciously provided much of the following information. I have adapted a key to species he has provided; head capsule figures are adapted from his illustrations. The placement of ventral head capsule setae S9 and S10, and the ventral pore (VP), are of importance in separating *Larsia* species; Kowalyk (1985) provides an in-depth study of the setae of the tanypod head.

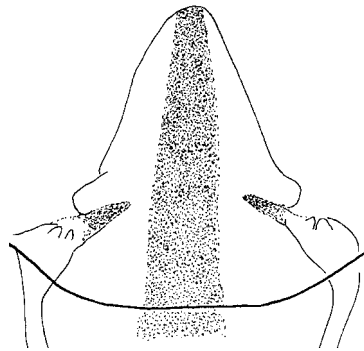
**ADDITIONAL REFERENCES:** Beck & Beck 1966; Bilyj 1984; Kowalyk 1985; Roback 1971; Sublette & Sasa 1994.



ligula and paralingula



maxillary palp



mentum and M appendage



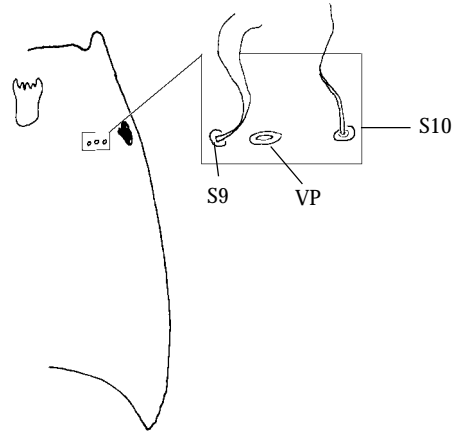
mandible



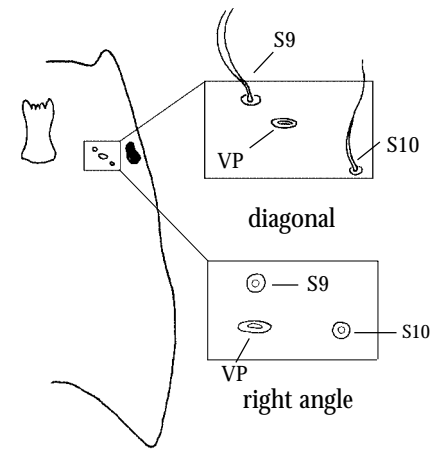
antenna

Key to *Larsia* larvae of the southeastern United States

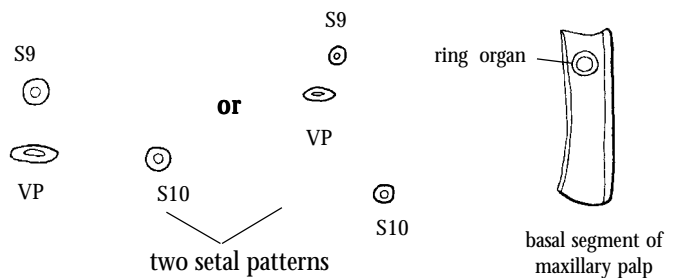
- 1 Ventral cephalic setae S9 and S10 and ventral pore (VP) forming a more or less straight line perpendicular to longitudinal axis of head capsule ..... *L. beneri*



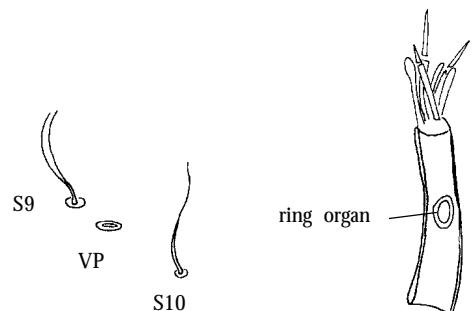
- 1' S9, S10 and VP forming a right angle or a straight line diagonal to longitudinal axis of head capsule ..... 2



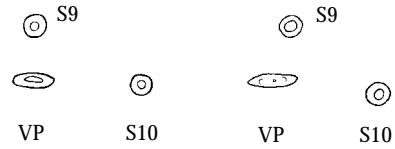
- 2(1') S9, S10 and VP forming an approximate right angle; if angle > 90°, then S9 is directly anterior or anterolateral to VP; ring organ of maxillary palp located 0.6-0.8 from base ..... 3



- 2' S9, S10 and VP forming a diagonal straight line; if angle < 180°, then S9 is anteromedial to VP; ring organ of maxillary palp located 0.5-0.6 from base ..... 5

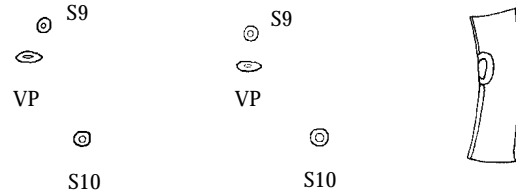


3(2) S9, S10 and VP forming an 80°-90° angle with S9 usually anterior to VP, but if slightly anterolateral then S10 more or less lateral to VP; ring organ of maxillary palp located 0.52-0.56 or 0.73-0.81 from base ..... 4



variation in ventral setae

3' S9, S10 and VP forming a 90°-110° angle with S9 anterolateral to VP and S10 distinctly posterior to VP; ring organ of maxillary palp located 0.60-0.68 from base ..... **L. sp. A**



variation in ventral setae

4(3) Ring organ located 0.73-0.81 from base ..... **L. canadensis**



*L. canadensis*

4' Ring organ located 0.52-0.56 from base ..... **L. sp. B**



*L. sp. B*

5(2') Ligula with inner lateral teeth subequal to outer teeth and turned slightly inward (ligula must be flat to observe this!) ..... **L. decolorata**



5' Ligula with inner lateral teeth distinctly shorter and parallel to outer teeth (ligula must be flat to observe this!) ..... **L. indistincta**

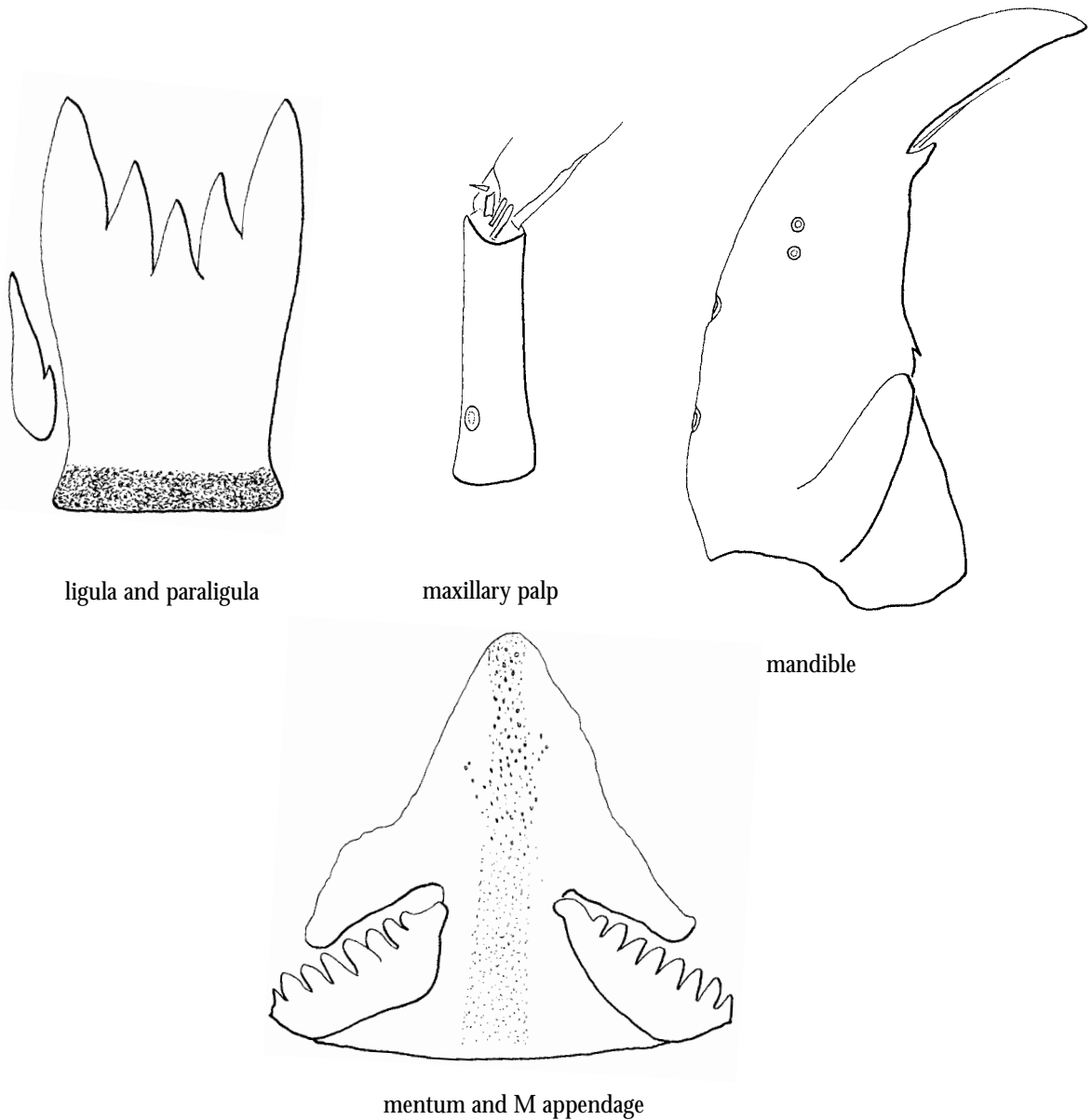


Genus *Macropelopia*

**DIAGNOSIS:** Distinguished by the rotund head capsule; pseudoradula composed of coarse granules that fade away basally; maxillary palp with ring organ near base; reddish-brown ligula with 5 teeth; dorsosomal plates with medial apex not reaching pseudoradula, each plate with 6 larger teeth with a smaller tooth at each end; small claws of posterior parapods without expanded bases; and the weak lateral setal fringe.

**NOTES:** Only one species, *M. decedens*, is known from the eastern United States. I have not seen any adults or pupae from the Carolinas but have seen *Macropelopia* larvae from a bog and streams in and around Great Smoky Mountains National Park, from a tributary to the South Toe River in Yancey County and the Elk River in Avery County in North Carolina. These are the southernmost records for the genus in the eastern United States; records of *Macropelopia* from Florida in Oliver et al. (1990) refer to *Apsectrotanypus* or *Bethbilbeckia* (see Epler 1995). *Macropelopia* larvae may be found in springs, small streams, ponds and bogs.

**ADDITIONAL REFERENCES:** Kowalyk 1985; Roback 1971, 1978a.



Genus *Meropelopia*

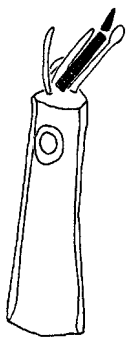
**DIAGNOSIS:** *Meropelopia* larvae are distinguished by the long scattered body setae; pale posterior margin of head capsule; 2 segmented b sensillum of the maxillary palp; ring organ in distal third of maxillary palp; basal segment of maxillary palp equal to or longer than second antennal segment; length of basal antennal segment/mandible length greater than 1.75; sclerotized base of the antennal blade about twice as long as wide; and mandible with small basal and accessory teeth.

**NOTES:** Two species, *M. americana* and *M. flavifrons*, are described from North America; both occur in the Carolinas. Larvae of the two species are separable only by size (data from **reared 4th instar** larvae from Roback (1981): *M. flavifrons* has basal segment of maxillary palp < 60  $\mu\text{m}$ , first antennal segment < 300  $\mu\text{m}$ ; *M. americana* is larger); pupae and adults are more easily separated. Species level identification of *Meropelopia* larvae would be suspect without associated pupae or adults. Consider yourself fortunate if you can identify these larvae to genus, let alone species!

*Meropelopia* was formerly considered a subgenus of *Conchapelopia*, from which it is easily separated by the 2 segmented b sensillum of the maxillary palp (*Conchapelopia* has a 3 segmented b sensillum). It is more difficult to separate *Meropelopia* from *Hayesomyia* and *Thienemannimyia*, and one may have to be content with an identification of "*Thienemannimyia* group sp." for many specimens. As with other members of the *Thienemannimyia* group, mature 4th instar larvae may be identified to genus with certainty if the developing pupal thoracic horn is visible; note the lack of a corona.

*Meropelopia flavifrons* occurs in streams and rivers. Roback (1981) recorded the following water chemistry data for *Meropelopia*: total hardness 0-150 ppm, most < 50; alkalinity 0-80 ppm, most < 40; specific conductivity 0-300  $\mu\text{mhos}$  @ 25° C, most < 100; pH 4.1-8.0, most from 6.1-7.0; temperature 9-28° C, most from 9-18.

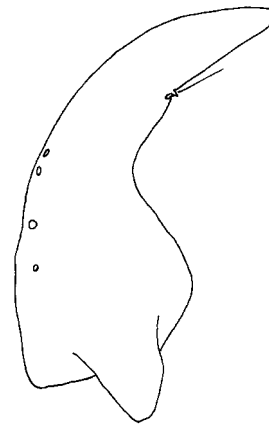
**ADDITIONAL REFERENCES:** Roback 1971, 1981.



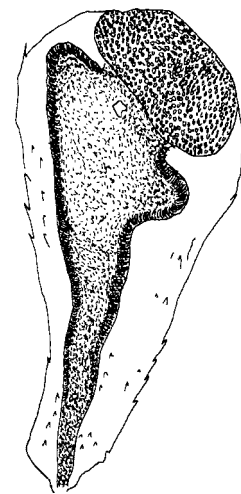
maxillary palp  
(b sensillum shaded)



ligula and paralingula



mandible



thoracic horn of pupa

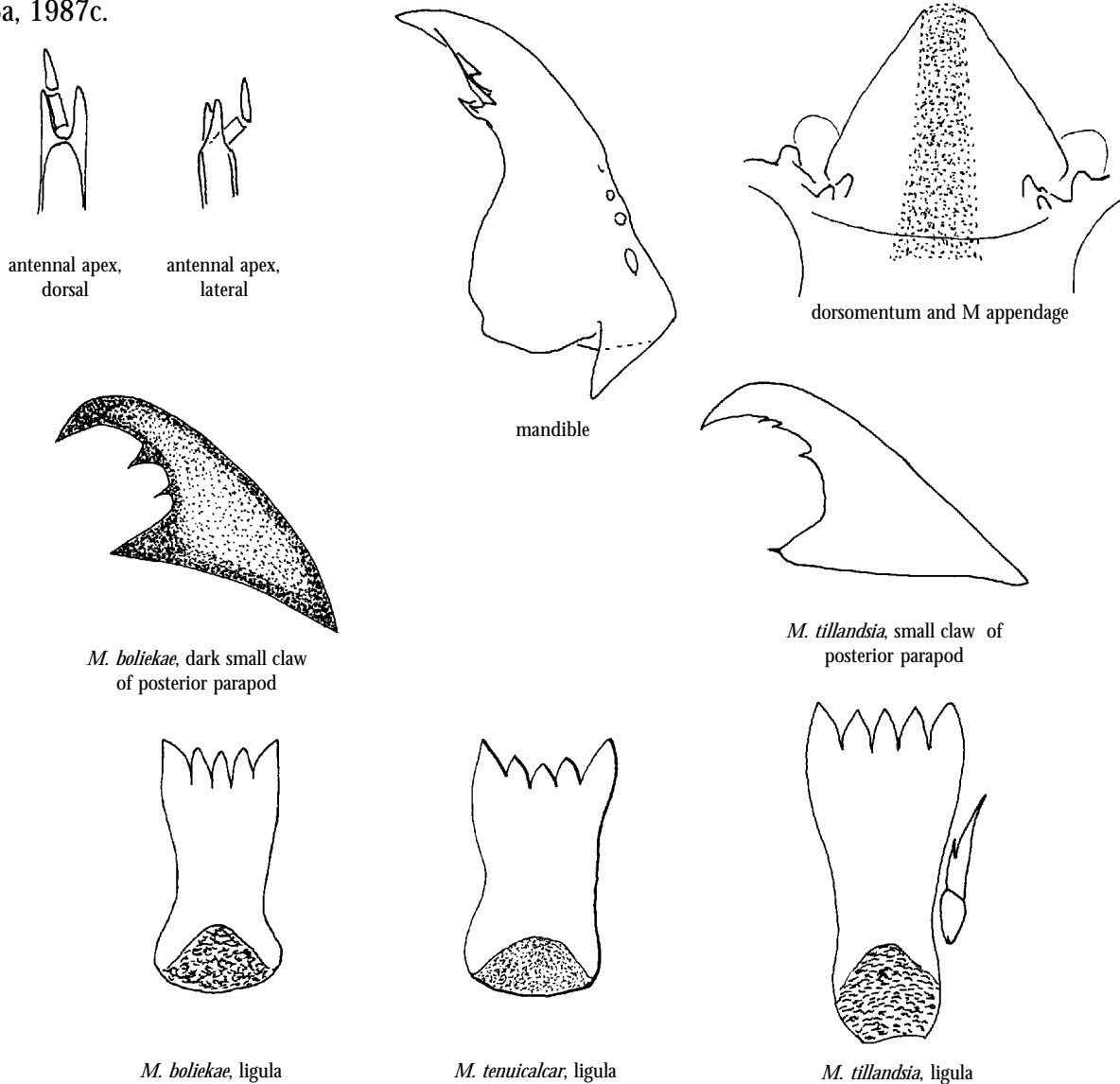
Genus *Monopelopia*

**DIAGNOSIS:** This genus is distinguished by the large, well sclerotized Lauterborn organs at the apex of antennal segment 2 that resemble a tuning fork; the triangular rugose area at the base of the ligula; the lack of well-developed dorsomental teeth; and posterior parapods with at least one dark claw or with all claws transparent; if all claws transparent then smaller claws have large inner teeth and only two such claws present on each parapod (this last character only found on a Jamaican species not known from the US).

**NOTES:** Only one species of *Monopelopia*, *M. boliekae*, is known for certain from the Carolinas. Two other described species are recorded from Florida and another species is known from phytotelmata in Jamaica. The larva of *Cantopelopia gesta* is very similar and is included in the following key; see also *Cantopelopia*.

*Monopelopia* larvae are usually found in small bodies of water such as ponds and marshes; they are also sometimes encountered in streams. Two species, *M. tillandsia* (Nearctic and perhaps Neotropical), and *M. mikeschwartzi* (Jamaica) live (exclusively?) in bromeliad phytotelmata.

**ADDITIONAL REFERENCES:** Beck & Beck 1966b; Epler & Janetzky 1999; Kowalyk 1985; Roback 1986a, 1987c.

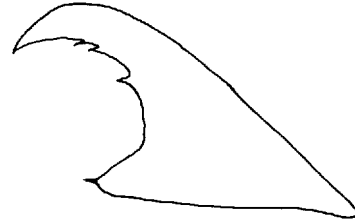


**Key to *Monopelopia* larvae of the southeastern United States**

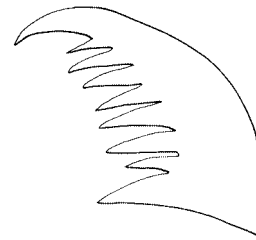
1 All claws of posterior parapod pale yellow-brown or colorless ..... 2

1' At least one dark claw on posterior parapod ..... 3

2(1) Small claws of posterior parapod with at most a few small teeth on inner surface .....  
 ..... *M. tillandsia*  
 (not known from the Carolinas)



2' Three small claws on posterior parapod with many large inner teeth ..... *Cantopelopia gesta*



3(2') Teeth of ligula in relatively straight line; procercus length/width 3.0 or less; relatively common ..... *M. boliekae*



*M. boliekae*

3' Teeth of ligula in concave arc; procercus length/width > 4.0; rare ..... *M. tenuicalcar*  
 (not known from the Carolinas)



*M. tenuicalcar*

**Notes on species**

*M. boliekae* - The only species in the genus known from the Carolinas; found on the Coastal Plain; also known from Cuba. It apparently is most common in weedy ponds, but also occurs in streams.

*M. tenuicalcar* - This Holarctic species is recorded only from Florida in the SE U.S. Roback (1986a) also recorded this species from New Brunswick, Newfoundland and Ontario in eastern Canada, and I've examined material from Ohio; given such a distribution, it should also occur in the Carolinas.

*M. tillandsia* - Recorded with certainty only from southern Florida, where it lives in bromeliad phytotelmata. An additional phytotelmatic species, *M. mikeschwartzi*, is known from Jamaica. The larva of *M. mikeschwartzi* can be separated from *M. tillandsia* and *C. gesta* by the 2 pectinate smaller claws on each of its posterior parapods. Records of *M. tillandsia* from North Carolina (Caldwell et al. 1997) probably refer to *C. gesta*.

*Cantopelopia gesta*, known from Florida, Georgia and South Carolina in the SE US, is included in the key above because of its similarity to *Monopelopia* larvae; see *Cantopelopia* for more information.



Genus *Natarsia*

**DIAGNOSIS:** The short antennae (about 1/3 length of head and twice the length of the mandible); large basal tooth of the mandible; absence of well developed dorsomental tooth plates; pseudoradula with fine granules not in longitudinal rows; basal segment of maxillary palp with ring organ in apical third; and the anterolateral fringe of 4 larger setae on body segments 4-10 are distinctive.

**NOTES:** Two taxa of the genus *Natarsia* are known from the Southeast; both have been recorded from the Carolinas. However, the taxonomy of the two species, *N. baltimorea* and *N. sp. A*, is unclear. Although most larvae of the two taxa are distinctive, pupa and adults can only be separated by size. Roback (1978) also described larval variants of each species; a variant of *N. baltimorea* had a long, thin spine on the apex of antennal segment 2 (Roback 1978: 196); while a variant of *N. sp. A* (based on a larva with discernable pupal characters; these pupal characters placed the specimen in *N. sp. A*) possessed a ligula with apically even teeth. Additional variants are discussed under Notes on species.

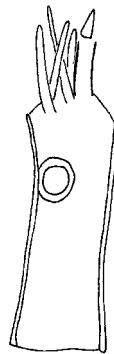
The Lauterborn organs of some *Natarsia sp. A* type larvae are extremely elongate, surpassing antennal segment 3 and, as in one specimen illustrated below, most of the length of antennal segment 4. These long Lauterborn organs may cause workers to confuse such specimens with *Krenopelopia* (q.v.) or other taxa.

*Natarsia* larvae are found in streams and marshes; they can apparently withstand organic and toxic discharges, especially sewage (Hudson et al. 1990). Roback (1978) gave the following water chemistry data for *N. sp. A*: pH 5.1-7.0; total hardness 0-100 ppm; alkalinity 0-40; specific conductivity 0-300  $\mu\text{m}$  @ 25°C; temperature 14-28°C.

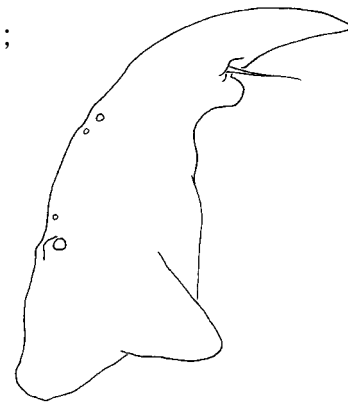
**ADDITIONAL REFERENCES:** Kowalyk 1985; Roback 1971;



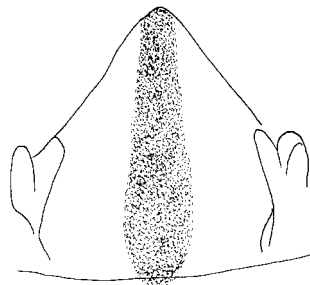
*N. sp. A* ligula and paralingula



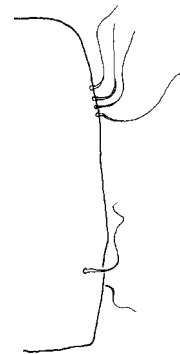
*N. sp. A* maxillary palp



mandible



mentum and M appendage



body segment showing anterolateral fringe of 4 setae

**Key to *Natarsia* larvae of the southeastern United States**

1 Ligula apically concave ..... *N. sp. A*

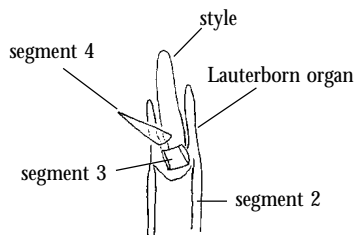


1' Ligula apically straight ..... *N. baltimorea*



**Notes on species**

*N. sp. A* - Roback (1971) had concluded that larger specimens incorrectly identified by Malloch (1915) as *Tanypus hirtipennis* represented a junior synonym, in part, of *N. baltimorea*. Because of differences in the larvae, Roback later (1978) believed that these larger specimens of *N. baltimorea* represented another species and tentatively named them *Natarsia* sp. A. More reared material is needed before this taxon can be redescribed and, if it represents a new species, given a new name. This taxon displays some variation in the length of the Lauterborn organs and antennal segment 3. Variations I've observed are illustrated below. Larvae with very long Lauterborn organs have been mistaken for *Krenopelopia*. It is not known if larvae with long Lauterborn organs and/or a short antennal segment 3 represent another species of *Natarsia* or are just the extreme end of a range of variation.



*N. sp. A*  
N FL specimen



*N. sp. A*  
N FL specimen



*N. sp. A*  
SC specimen



*N. baltimorea*  
SC specimen

Antennal apices of *Natarsia* species

Genus *Nilotanypus*

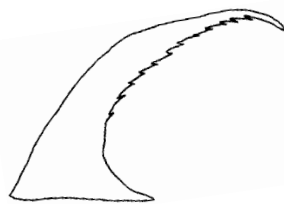
**DIAGNOSIS:** This genus is distinguished by its small size; head without nodules/spinules or lateral spines; ligula with the median tooth longer than the inner teeth; at least one small or medium claw of the posterior parapod pectinate or with several small spines; pseudoradula with fine granules and greatly broadened posteriorly; and the long anal tubules that exceed the posterior parapods.

**NOTES:** Four taxa assigned to *Nilotanypus* have been recorded from the US (Roback 1986b). Two species, *N. americanus* and *N. fimbriatus*, are known from North and South Carolina. I have also seen an adult male specimen from SE Alabama which fits the description for *N. kansensis*; this species may also occur in the Carolinas. Some taxonomic uncertainty exists, for the male of *N. americanus* remains undescribed. Roback (1986b) also described a larval type from Texas (incorrectly located on his map, fig. 91). Species separation of the larvae of *N. americanus* and *N. kansensis* is difficult and impossible without 4th instar larvae (which should be reared to confirm identification); the pectinate small claw on the posterior parapod of *N. fimbriatus* easily distinguishes that species. Specimens of *Nilotanypus* which are not clearly assignable to *N. fimbriatus* should be identified as "*Nilotanypus* sp."

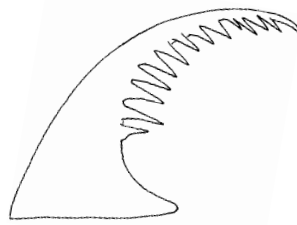
*Nilotanypus* can be confused with some *Labrundinia* larvae because of the similar ligula morphology; the two may be difficult to separate if the posterior portion of the body is missing. Note that the mandible's basal tooth is much larger in *Labrundinia* than in *Nilotanypus*.

*Nilotanypus* larvae are usually found in clean, relatively shallow sand bottomed streams, but also occur commonly in large coastal plain rivers. Some populations are apparently not tolerant of some forms of pollution, and may serve as indicators of good water quality. Roback (1986b) gave the following water chemistry data associated with *N. americanus*: alkalinity < 20 ppm; DO 4.6-9.4 mg/l; pH 4.7-7.0; total hardness 16-44 ppm; specific conductivity 32-92  $\mu\text{mhos}$  @ 25°C; temperature 15-18°C. The larva of *N. kansensis* is known from moss along the margins of springs.

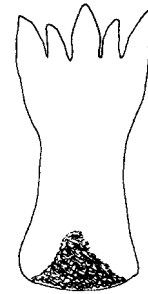
**ADDITIONAL REFERENCES:** Kowalyk 1985; Roback 1971; 1986b.



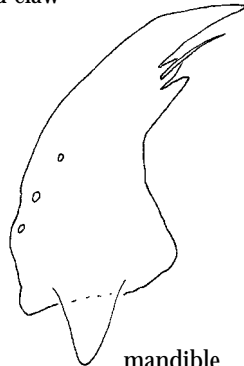
*N. americanus* posterior  
parapod claw



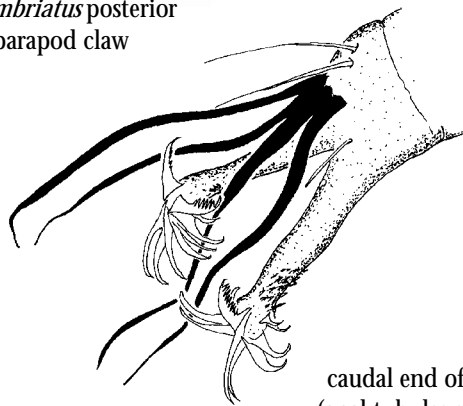
*N. fimbriatus* posterior  
parapod claw



ligula



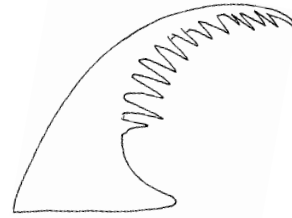
mandible



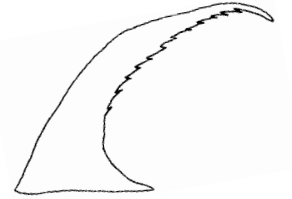
caudal end of body  
(anal tubules shaded)

**Key to *Nilotanypus* larvae of the southeastern United States**

- 1 One medium claw of posterior parapod pectinate  
..... *N. fimbriatus*



- 1' One or more medium claws of posterior parapod with  
inner row of small spines/serrations, never pectinate  
..... 2



**NOTE:**  
4th instar  
larvae are necessary  
for accurate  
measurements!!

- 2 Length of antenna segment 2 < 44 $\mu$ m; head length usually < 326  $\mu$ m ..... *N. americanus*
- 2' Length of antenna segment 2 > 44 $\mu$ m; head length usually > 326  $\mu$ m ..... *N. kansensis*  
(not known from the Carolinas)

Genus *Paramerina*

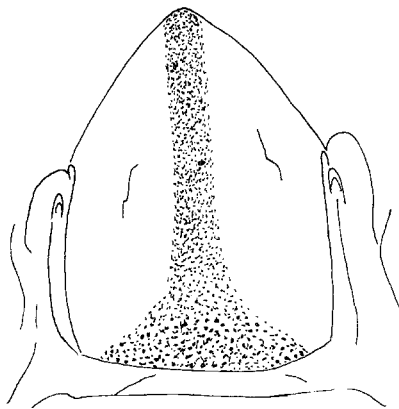
**DIAGNOSIS:** Larvae of this genus are distinguished by the large basal tooth of the mandible; the two segmented maxillary palp, with the proximal segment  $< \frac{1}{2}$  length of the distal segment; and the pseudo-radula broadened posteriorly, appearing attached to a transverse bar and consisting of small granules not arranged in parallel rows.

**NOTES:** Three species are known from the Southeast; two species are known from the Carolinas: *P. anomala* and *P. fragilis*. A third species recorded from Florida and Texas, *P. testa*, may occur in the Carolinas. The immature stages of the latter two species are undescribed; the larva of *P. anomala* was described by Beck & Beck (1966). It *may* be possible to distinguish *P. anomala* by the darkened caudal margin of the head capsule; however, specimens should be reared for correct identification. Note that identifications based solely on unassociated larvae can not be positive. Unless reared and identified to species as adults, larvae should be identified as "*Paramerina* sp."

Although Fittkau & Roback (1983) stated that the claws of the posterior parapods were simple, some species possess bifid small claws.

Larvae are found in marshes and streams.

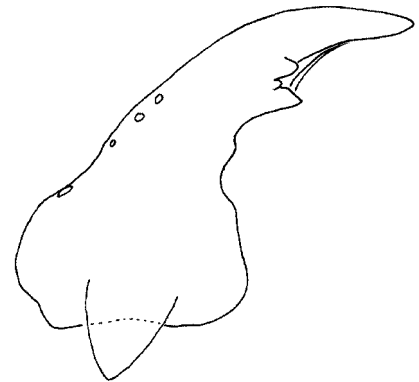
**ADDITIONAL REFERENCES:** Beck & Beck 1966; Kowalyk 1985; Roback 1971; Sublette & Sasa 1994.



mentum and M appendage



maxillary palp



mandible



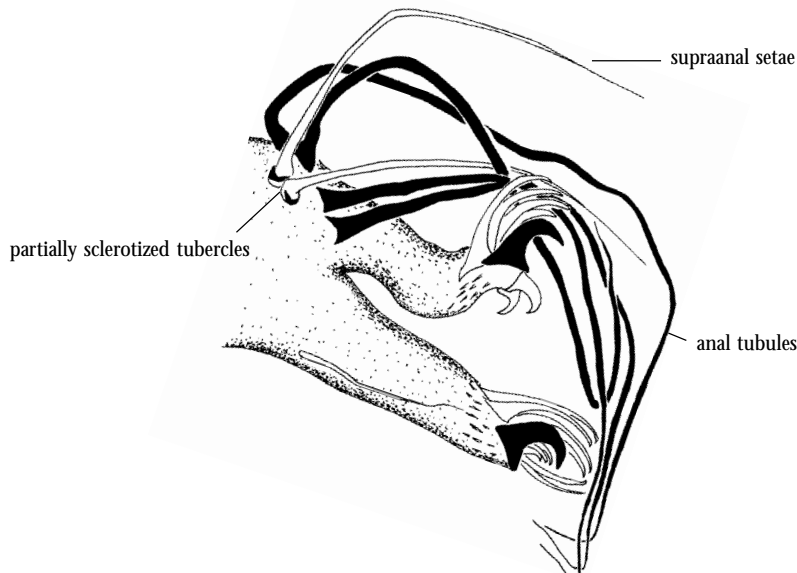
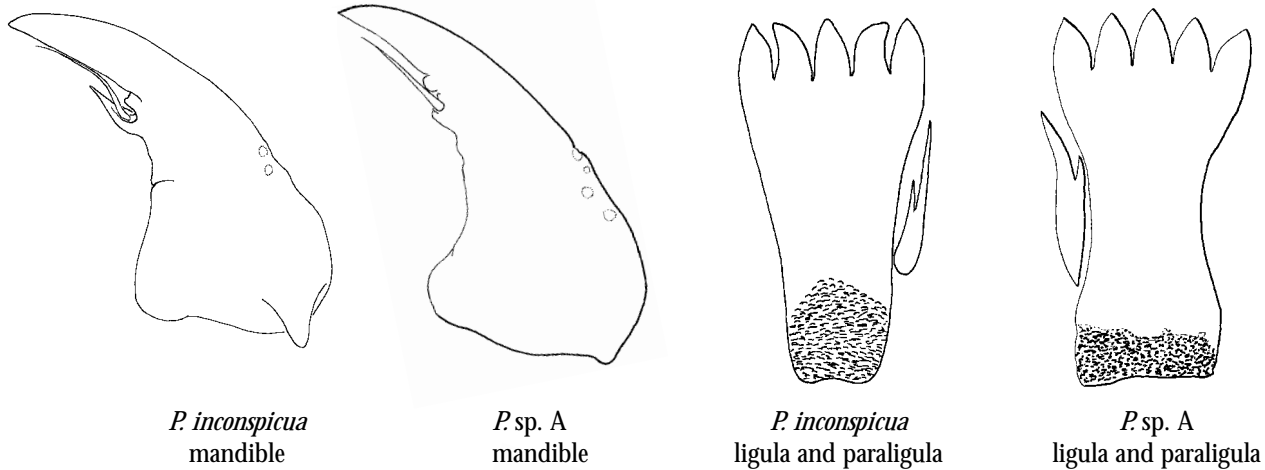
ligula and paralingula

Genus *Pentaneura*

**DIAGNOSIS:** Larvae are distinguished by the sclerotized tubercle at the base of each supraanal seta, long procerci (6 or more times as long as wide) and lack of a setal fringe. The common species *P. inconspicua* is distinguished by the large, pointed, apically directed basal tooth of the mandible; apices of ligula teeth even or almost so; ring organ in apical third of basal maxillary palp segment; lack of well developed dorsomenta teeth; one dark claw on each posterior parapod; and anal tubules longer than posterior parapods.

**NOTES:** One species, *P. inconspicua*, is common throughout the Southeast in rivers and streams. The species *P. inculta* was synonymized with *P. inconspicua* by Roback (1971). Mike Bolton (Ohio EPA) has provided a reared female and additional larva of another species from Ohio which may belong in *Pentaneura*, tentatively included here as *Pentaneura* sp. A. This species lacks the pointed basal tooth of the mandible, long anal tubules, dark claw on the posterior parapod and the ligula is different from *P. inconspicua*. Pupal characters place this enigmatic taxon in *Pentaneura*; more material is needed. This species has not been found in the Southeast, but Hudson et al. (1990) noted an undescribed species based on an adult from South Carolina's Savannah River Plant. I have not seen this specimen and do not know if it is conspecific with *P. sp. A*.

**ADDITIONAL REFERENCES:** Beck & Beck 1966; Kowalyk 1985; Roback 1971.



*P. inconspicua*, caudal end of body

Genus *Procladius*

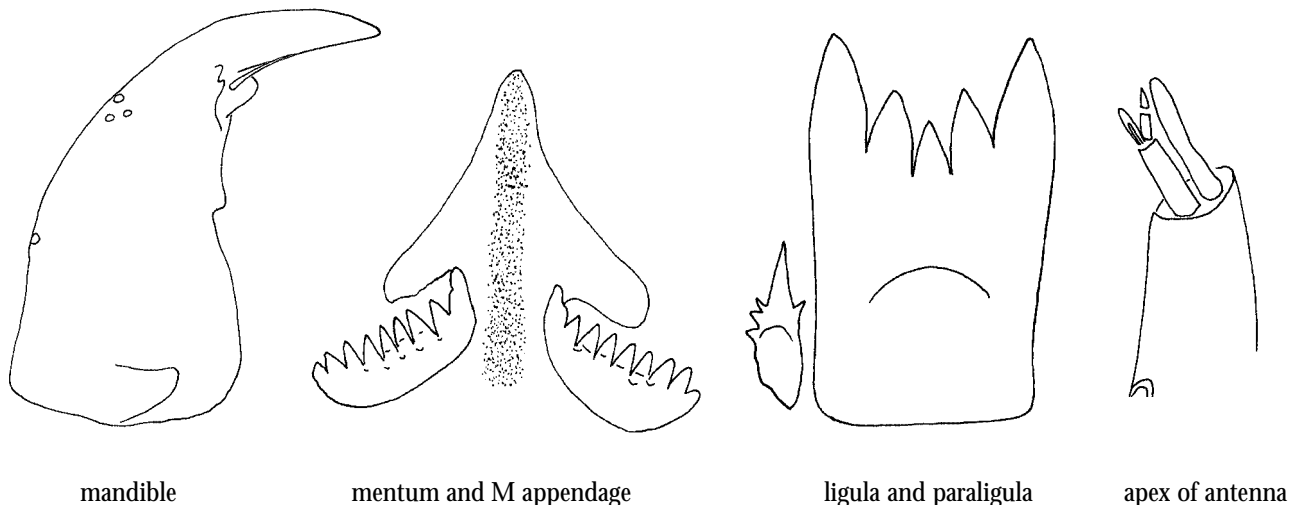
**DIAGNOSIS:** *Procladius* larvae are distinguished by the rotund head capsule; well developed dorsomen-tal tooth plates; mandible with large blunt basal tooth; black/dark brown five toothed ligula; paraligula with numerous small teeth; antennal blade subequal to the flagellum; and body with well developed lateral setal fringe.

**NOTES:** Four *Procladius* species are recorded from the Carolinas. Two subgenera occur in the Southeast: *P. (Psilotanytus)* with one species, *P. bellus*; and *P. (Holotanytus)* [referred to as *P. (Procladius)* in Roback (1980) and Webb & Brigham (1982)] with three species, *P. denticulatus*, *P. freemani* and *P. sublettei*; *P. wilhmi* is known from Arkansas and Tennessee and may also occur in the Carolinas. Note that characters of the pecten hypopharyngis used to separate subgenera in Webb & Brigham (1982: 11.61) will not work consistently. The length of the apical tooth of the paraligula is variable, and may not be useful as a character to separate the two subgenera in the Southeast, contrary to the key in Fittkau & Roback (1983: 64). Some larvae may be identified to subgenus, but with the exception of *P. bellus*, species identification of un-reared larvae is not possible. *Procladius bellus* and *P. sublettei* are by far the most common species in the Southeast. Earlier records of *P. culiciformis* from the Southeast (Florida) are most likely referable to *P. freemani* or *P. sublettei*.

*Procladius* larvae are found in the bottom sediments of bogs, ponds, lakes and the slower moving portions of streams and rivers. Roback (1980) recorded the following water chemistry data: pH , 4.1-8.0; total hardness (ppm CaCo<sub>3</sub>) < 50-260, with most records < 51; alkalinity < 40-200, with most < 41; specific conductivity < 100-500 μmhos @ 25°C, with most < 200; and water temperature < 8-28°C, with most records for 19-23°. Larvae may be found in heavily polluted conditions, and are subject to numerous deformities (see Warwick 1989; 1990).

Larvae with a 4 toothed ligula may be confused with *Djalmabatista*, but may be separated by the shorter antennal blade in *Procladius*. The small claws of the posterior parapod do allow identification of some forms of *P. bellus*; other specimens are best identified as "*Procladius* sp."

**ADDITIONAL REFERENCES:** Kowalyk 1985; Roback 1971, 1980; Sublette et al. 1998; Warwick 1989, 1990.

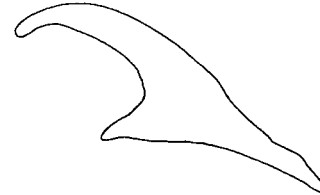


**Key to *Procladius* larvae of the southeastern United States**

- 1 One or two of the smallest claws on the posterior parapods with large inner teeth ..... ***P. bellus*** (in part) ..... 2



- 1' Smallest claws of posterior parapods without large inner teeth ..... 3



- 2(1) Each posterior parapod with 1 toothed small claw ..... ***P. bellus* var. 2**

- 2' Each posterior parapod with 2 toothed small claws ..... ***P. bellus* var. 3**

- 3(1') Apices of several larger claws of posterior parapod drawn out to hair-like extension and smallest claws without expanded bases ..... ***P. (Holotanypus)* sp.**



- 3' Apices of larger claws of posterior parapod with simple point and smallest claws with expanded bases ..... ***P. bellus* var. 1**



**Notes on species**

*P. bellus* - A widespread and abundant species. Roback (1980) noted three varieties of *P. bellus*, all of which have been found in the Southeast; some of these may represent different species (see Hudson et al. 1990), but much more work is needed. Roback (1971) noted that the holotype of *P. riparius* was different from the rest of the type series; he partially synonymized *P. riparius* with *P. bellus*. Oliver et al. (1990) listed *P. riparius* as a separate species. Sublette et al. (1998) synonymized *P. riparius* with *P. bellus*, noting that the slide of the *P. riparius* holotype's genitalia was actually that of a *Coelotanypus*. Charles Watson (pers. comm.) has pointed out the hair-like apices of some of the large claws of the posterior parapod of *P. (Holotanypus)* species; use caution when identifying larvae for it is not known if that character is found in all species. Reared material is a definite asset, and in most cases a necessity, for the identification of *Procladius* larvae to the species level.



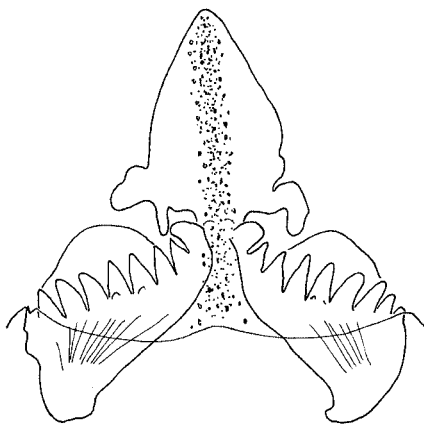
Genus *Psectrotanypus*

**DIAGNOSIS:** Distinguished by the well developed, transverse dorsomental tooth plates; mandible with several large inner teeth; a pale ligula with 4 even teeth; numerous long apicolateral branches on the paraligula; and body with a lateral setal fringe.

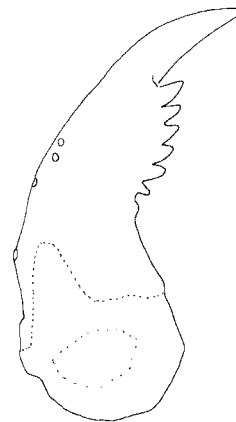
**NOTES:** Two taxa, *Psectrotanypus dyari* and *Ps.* sp. A, are known from the Carolinas; a third species, *Ps. discolor*, may also occur. *Derotanypus*, in the US found mostly in the northern west, is similar to *Psectrotanypus*, but differs mainly in possessing numerous small dorsal teeth on the mandible and the ventromental plates are concave, not straight as in *Psectrotanypus*.

Larvae are found in bogs, ponds, springs, streams and small rivers. *Psectrotanypus dyari* is tolerant of organic pollution.

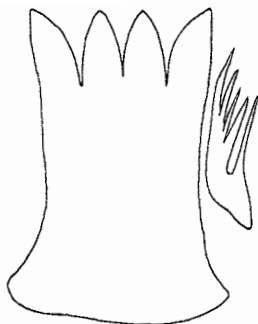
**ADDITIONAL REFERENCES:** Kowalyk 1985; Roback 1971; 1978a.



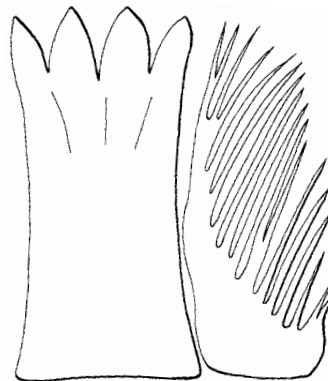
*Ps. dyari* mentum and M appendage



*Ps. dyari* mandible



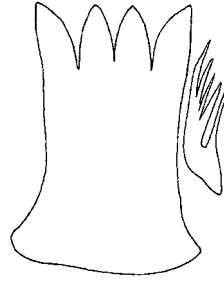
*Ps. dyari* ligula and paraligula



*Ps.* sp. A ligula and paraligula

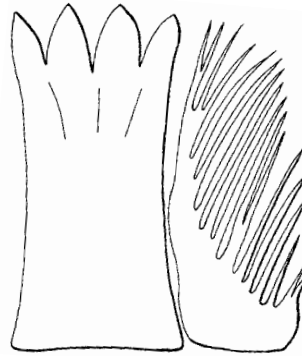
**Key to *Psectrotanypus* larvae of the southeastern United States**

- 1 Ligula short and squat; paralogula with 10 or fewer lateral branches; small claw of posterior parapod with ovoid base ..... *Ps. dyari*



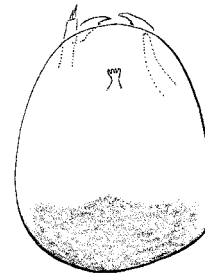
posterior parapod claw

- 1' Ligula longer and narrower; paralogula with more than 12 branches; small claw of posterior parapod simple ..... 2



posterior parapod claw

- 2(1') Head capsule yellow-brown, with a posterior dark dorsal mark ..... *Ps. sp. A*



- 2' Head capsule yellowish-brown, without dark marking ..... *Ps. discolor*  
(not known from the Carolinas)

**Notes on species**

*Ps. discolor* - Not recorded from the Carolinas, but known from West Virginia and may eventually be found in the Smoky Mountains. Roback (1978a) found *Ps. discolor* larvae in a sphagnum bog and nearby stream, in acid conditions (pH 3.9-4.0); I've collected it from peat bogs in Maine. See also *Ps. sp. A* below.

*Ps. dyari* - Found throughout the eastern US, usually in organically enriched water. Roback (1978) noted that *P. dyari* appeared to be the only member of its tribe (the Macropelopiini) tolerant of high levels of organic pollution. He gave the following water chemistry parameters for the species: pH 6.1-8.0; total hardness 51-200 ppm; alkalinity < 40-200 ppm; specific conductivity < 100-400  $\mu$ mhos @ 25°C; temperature 9-23°C.

*Ps. sp. A* - Charles Watson (pers. comm.) has reared this cold stenotherm species from depositional areas of springs and headwater streams in Virginia, Tennessee and both Carolinas. *Psectrotanypus sp. A* may be a southern variant of *Ps. discolor* but it differs in coloration in all life stages and is probably specifically distinct from that species. Pupae show the only structural differences, mainly in the shape of the anal fin, which is asymmetrical in *Ps. sp. A* and symmetrical in *Ps. discolor*.

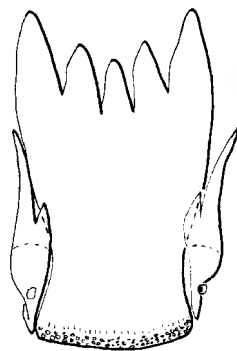
Genus *Radotanypus*

**DIAGNOSIS:** Distinguished by the rotund head capsule; ring organ near middle of maxillary palp; ligula with inner teeth directed forward; dorsosomal plates with 5 large teeth, a bifid innermost tooth and a small outer tooth, plates without medial extension; small claw of posterior parapod without an expanded base; and the lateral setal fringe on the body.

**NOTES:** *Radotanypus* has not been collected in the Southeast, but its presence in Ohio (Bolton 1992) indicates that it may eventually be found in the mountains. There appears to be only one species in the Nearctic, *R. florens* (Johannsen) (formerly placed in *Apsectrotanypus*); B. Bilyj (pers. comm.) considers *R. submarginella* (Sublette) to be a junior synonym. *Radotanypus* larvae are very similar to *Apsectrotanypus*, *Bethbilbeckia* and *Brundiniella*.

Larvae have been collected in a stream and a small river in Wyoming, and from a spring and streams in an alkaline fen in Ohio.

**ADDITIONAL REFERENCES:** Fittkau & Murray 1985; Epler 1986b.



ligula and paralingula



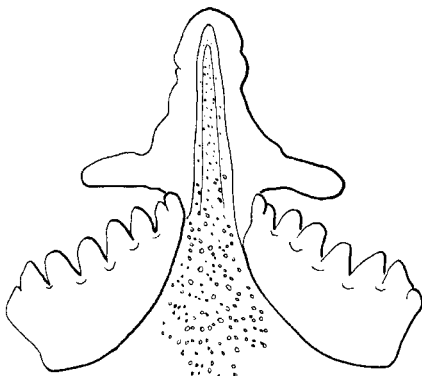
mandible



antenna



apex of antenna



mentum and M appendage

small claw of  
posterior parapod

maxillary palp

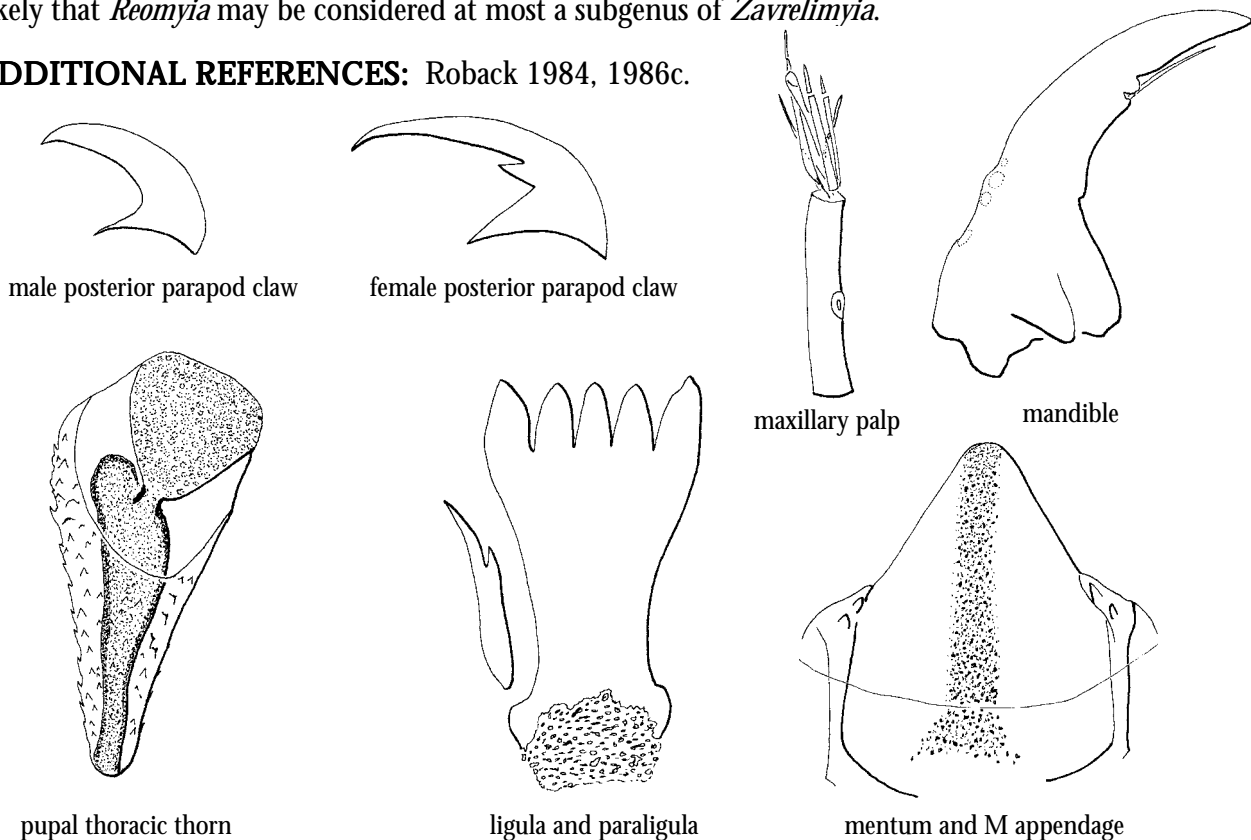
Genus *Reomyia*

**DIAGNOSIS:** Larvae of this genus are not readily separable from *Zavreliomyia*; associated pupae will aid in accurate identification. Larvae are distinguished by the elongate, smooth head capsule; lack of well developed dorsomenta teeth; pseudoradula with moderately fine, scattered granulation and broad base; long, thin basal segment of the maxillary palp (5.8-6.0 times as long as wide) with ring organ 0.30-0.39 from base; large basal tooth on the mandible; AR 2.4-2.6; posterior parapods with or without one small to medium claw with an inner tooth; and body without a fringe of swim setae.

**NOTES:** At least one undescribed species is known from the Southeast that can provisionally be placed in *Reomyia*. Broughton Caldwell (pers. comm.) has reared this species from Coweeta in North Carolina; Leeper & Taylor (1998) recorded a *Reomyia* from South Carolina near the Savannah River Site.

*Reomyia wartinbei*, a western North American species and the type species of the genus, was originally described as a *Zavreliomyia* (Roback 1984) but elevated to generic status in Roback (1986c). The pupa of *Reomyia* was included in Fittkau & Murray (1986) as Tanypodinae genus III; the larva has remained undescribed. *Reomyia* is very similar to *Zavreliomyia* and may not be separable from that genus in the larval stage. The North Carolina *Reomyia* sp. A material has a mix of characters that confuse the boundaries of *Reomyia* and *Zavreliomyia*; pupal characters such as the thin, elongate D setae will place it in *Reomyia* (these setae are shorter and rounded in true *Zavreliomyia*). In the adult Coweeta *Reomyia* specimens, wing vein  $R_3$  does not attain the costa, a scutal tubercle is present (however, at least one species of *Zavreliomyia* has a scutal tubercle (B. Bilyj, pers. comm.)) and the lengths of the fourth and fifth tarsomeres of the mid leg fit within the limits of *Reomyia*. There is variation in the larvae of *R.* sp. A; some (two female larvae with *Reomyia*-type pupae) possess a posterior parapod claw with an inner tooth, while apparently conspecific specimens (two male larvae with *Reomyia*-type pupae) do not; however, another female larva was reared without the inner tooth. A revision of *Zavreliomyia* is needed to clearly define the generic limits of *Reomyia* and *Zavreliomyia*; it is likely that *Reomyia* may be considered at most a subgenus of *Zavreliomyia*.

**ADDITIONAL REFERENCES:** Roback 1984, 1986c.



Genus *Rheopelopia*

**DIAGNOSIS:** Distinguished by the lack of dorsomental teeth; 2 or 3 segmented b sensillum; maxillary palp with ring organ in distal third; basal portion of maxillary palp usually shorter than antennal segment 2; mandible with an extremely reduced basal tooth and apparently absent accessory tooth; and the long, thick, radially arranged body setae;

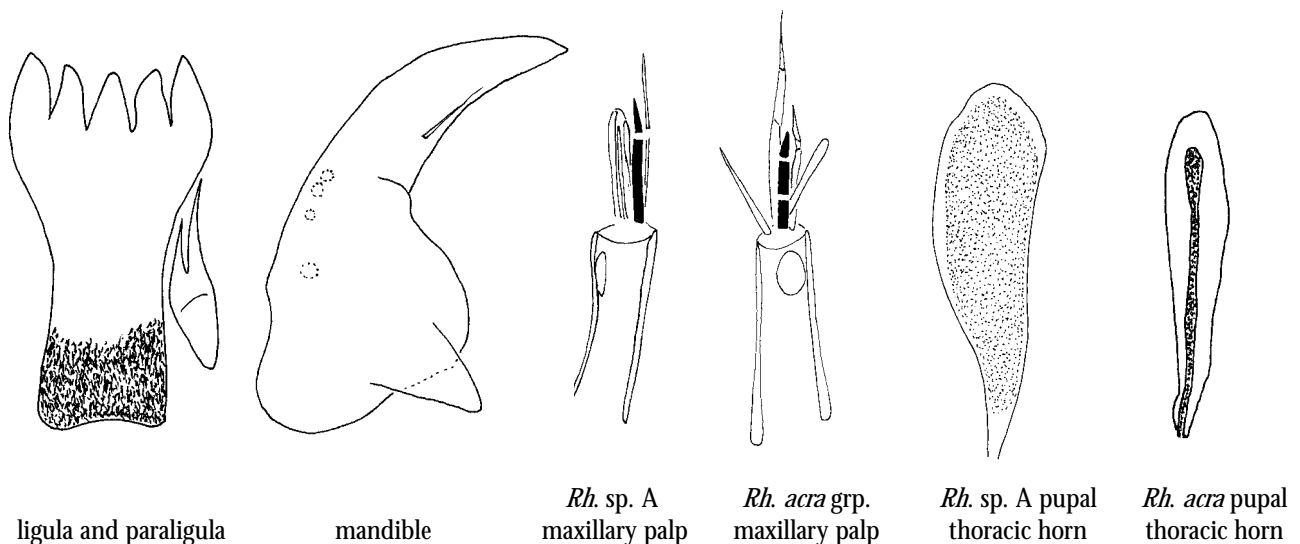
**NOTES:** The taxonomy of larval *Rheopelopia* is poorly understood. At least three taxa are known from the Carolinas, but only one, *Rh. acra*, is known from adult specimens; the other taxa, a probable *Rh. paramaculipennis* and *Rh. sp. 3* Roback, are known only from unassociated larvae. Two other "species" of *Rheopelopia* are known from the Southeast: *Rh. sp. A* Epler is known from the Suwannee River system in northern Florida (Epler 1992, 1995) and *Rh. sp. 2* Roback is known from Georgia and Canada (Roback 1981). *Rheopelopia sp. A* may be a southern form of *Rh. paramaculipennis* with a darker head capsule. Note that the latter two taxa have a 2 segmented b sensillum of the maxillary palp, rather than the 3 segmented b sensillum diagnosed in Fittkau & Roback (1983).

The *Rheopelopia acra* group is apparently the most commonly encountered taxon of the genus in the Carolinas. There are at least two species in this group, *Rh. acra* and *Rh. perda*; only *Rh. acra* has been recorded from the Southeast. The two taxa may be variants of the same species (Roback 1981). I've examined one larva that may be *Rh. paramaculipennis* from the Dan River in Caswell Co., NC; *Rheopelopia sp. 3* is rare in mountain streams.

*Rheopelopia* larvae may be difficult to separate from other members of the *Thienemannimyia* group, although the almost toothless mandible is distinctive; developing pupal structures within the larval cuticle will help in identification. The spineless, saccoid type of pupal thoracic horn illustrated below is found in *Rh. paramaculipennis*, *Rh. sp. A* and *Rh. sp. 2*; the thoracic horn of the *Rh. acra* group species bears small spines apically (see also Roback 1981: 115).

*Rheopelopia* larvae are usually, as their name implies, found in running water.

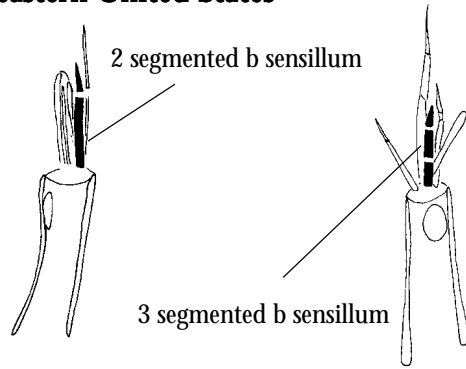
**ADDITIONAL REFERENCES:** Roback 1971, 1981.



**Key to *Rheopelopia* larvae of the southeastern United States**

1 Maxillary palp with b sensillum 2 segmented .. 2

1' Maxillary palp with b sensillum 3 segmented .. 3



2(1) Head capsule light yellow-brown ..... *Rh. paramaculipennis*

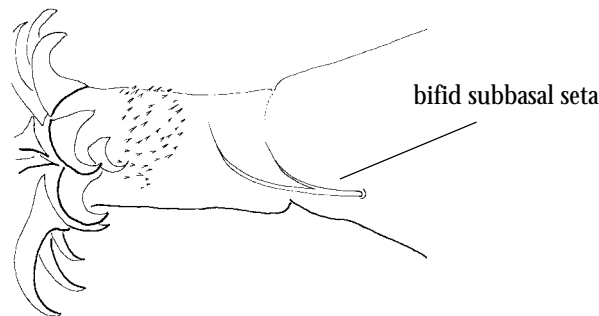
2' Head capsule brown ..... *Rh. sp. A*  
(not recorded from the Carolinas)

3(1') Posterior 2/3 of head capsule dark brown .. *Rh. sp. 3*



3' Dark brown coloration, if present, limited to posterior margin of head capsule ..... 4

4(3') Subbasal seta of posterior parapod unevenly bifid ..... *Rh. acra* group



4' Subbasal seta of posterior parapod simple ..... *Rh. sp. 2*  
(not recorded from the Carolinas)

Genus *Tanypus*

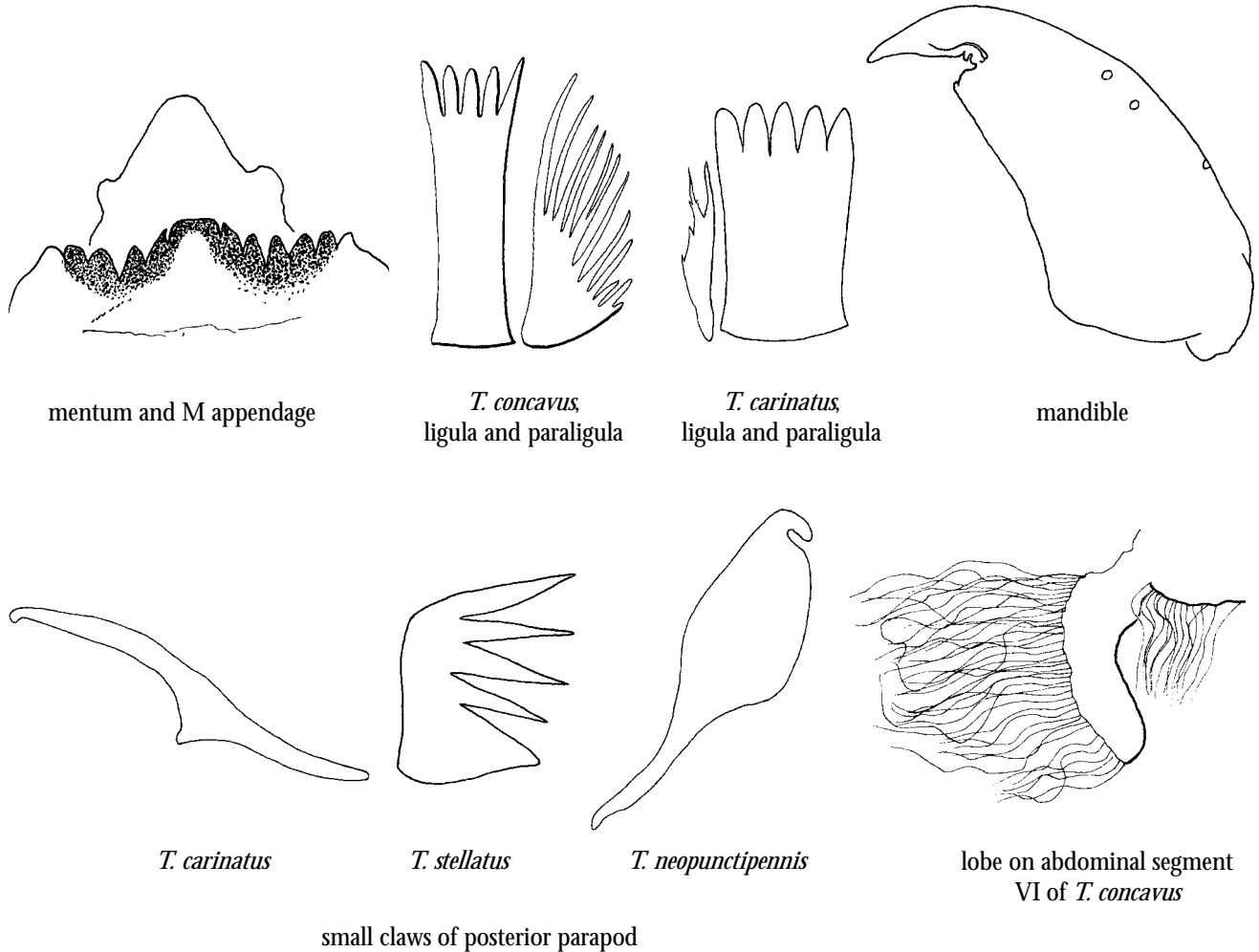
**DIAGNOSIS:** *Tanypus* larvae may be distinguished by the stout mandible (the apical tooth appears small in relation to the remainder of the mandible); well developed, transverse dorsomental teeth; lack of a pseudoradula; and the well developed lateral setal fringe on the body.

**NOTES:** Six *Tanypus* species are recorded from the Carolinas; a seventh species, *T. telus* Roback, is known only from Florida; its larva is undescribed. In the Carolinas, *Tanypus* is basically a genus of the Piedmont and Coastal Plain regions.

Larvae are usually found in or on soft sediments of marshes, ponds and lakes but also occur in the slower portions and side pools of streams and rivers. *Tanypus carinatus* and *T. neopunctipennis* can be common in organically enriched systems. Data in Roback (1977) indicate that *Tanypus* larvae are found in a pH range of <4-8.0, an alkalinity range of <40-160 ppm, a total hardness range of <50-200 ppm and a specific conductivity range of <100-400  $\mu\text{mhos}$  @ 25°C. The larvae feed on the soft parts of chironomid larvae (the head capsule is not engulfed as in many other Tanypodinae), worms, diatoms and plant parts.

Larvae of four southeastern species (*T. carinatus*, *T. concavus*, *T. punctipennis* and *T. stellatus*) possess a pair of ventral "lobes" posterolaterally on abdominal segment VI; the two other species (*T. clavatus* and *T. neopunctipennis*) have a more simple, mesally infolded line of setae at the same position.

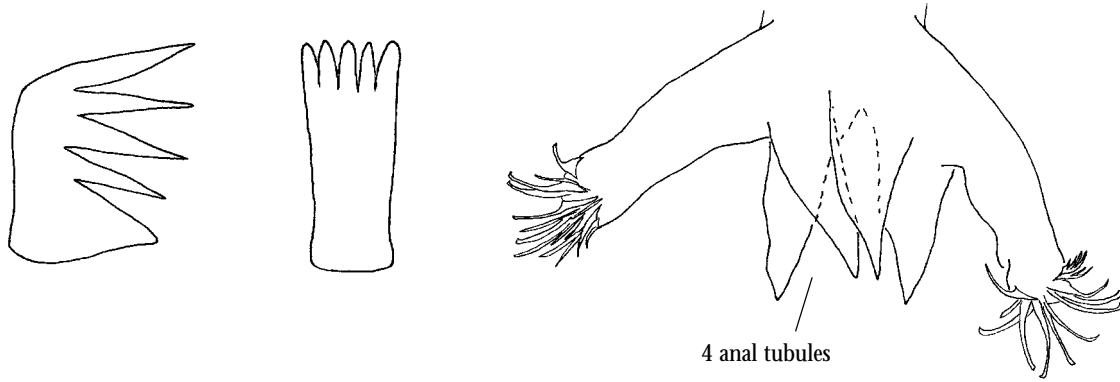
**ADDITIONAL REFERENCES:** Kowalyk 1985; Roback 1969, 1971, 1977.



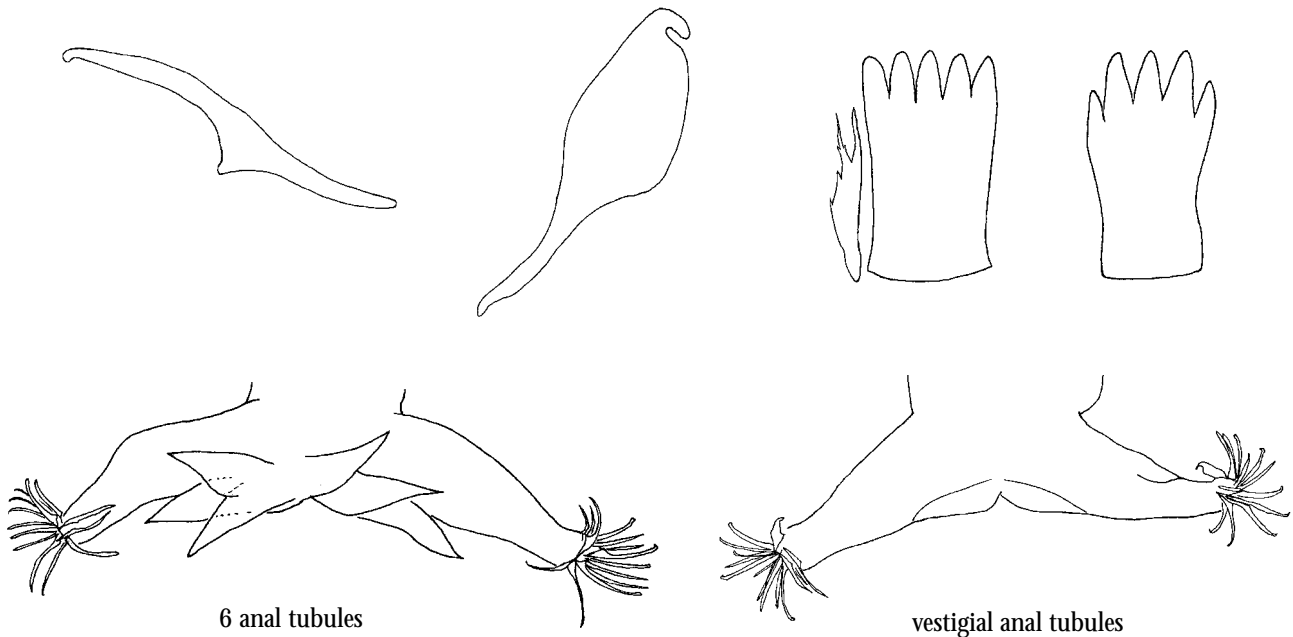
**Key to *Tanypus* larvae of the southeastern United States**

(the larva of *T. telus*, a Florida species, is undescribed)

- 1 Smaller claws of posterior parapods pectinate; ligula pale, relatively long and narrow; 4 anal tubules present ..... 2

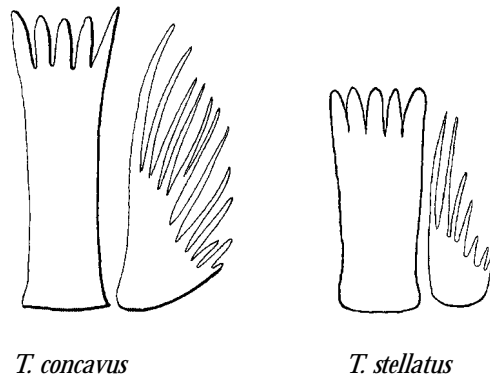


- 1' Smaller claws of posterior parapods simple or expanded, with at most a serrate inner margin; ligula darker, shorter and wider; 6 anal tubules present **or** tubules vestigial ..... 3



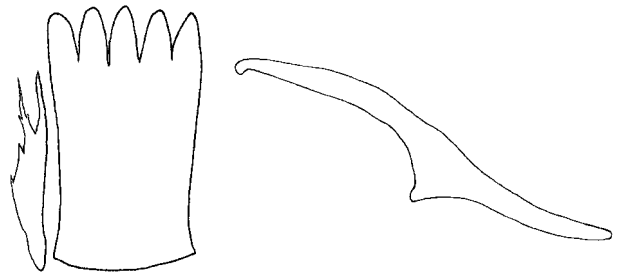
- 2(1) Ligula long and narrow, about 5 times as long as width near middle; paraligula with 8 or more branches ..... ***T. concavus***

- 2' Ligula shorter and not as narrow, about 2-3 times as long as width near middle; paraligula with 7 or fewer branches ..... ***T. stellatus***

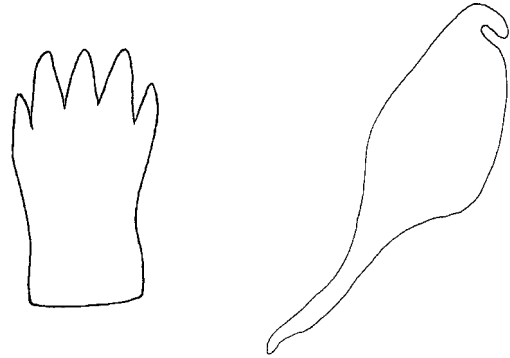




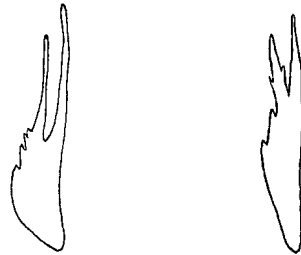
3 (1') Teeth of ligula in even arc; smaller claws of posterior parapods simple ..... 4



3' Median 3 teeth of ligula much longer than outer teeth; smaller claws of posterior parapods with expanded base ..... 5



4(3) Paraligula deeply divided to about 1/2 its length; head capsule pale ... ***T. punctipennis***

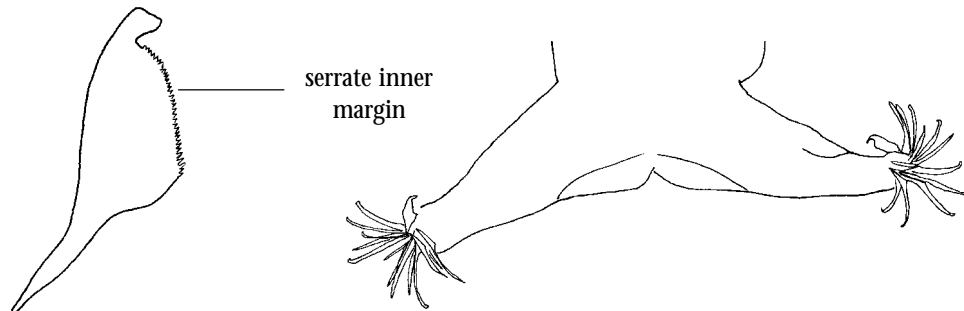


*T. punctipennis*

*T. carinatus*

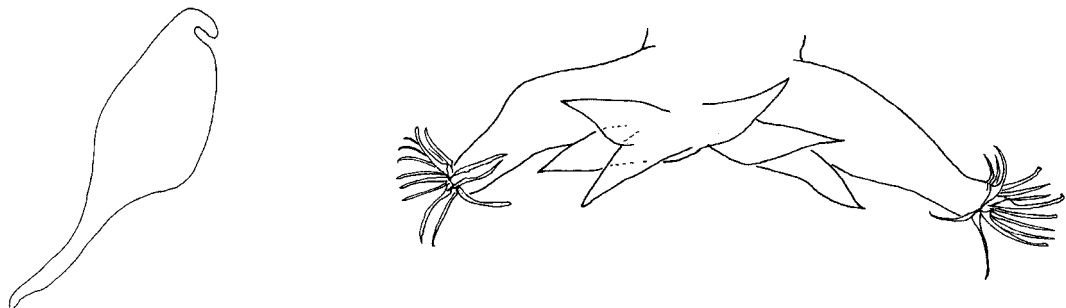
4 Paraligula not as deeply divided, at most about 1/3 of its length; head capsule darkened ..... ***T. carinatus***

5(3') Smaller claws of posterior parapod with serrate inner margin; anal tubules reduced; usually found in brackish water ..... ***T. clavatus***



serrate inner margin

5' Smaller claws of posterior parapod with smooth inner margin; 6 anal tubules present; not commonly found in brackish water ..... ***T. neopunctipennis***



**Notes on species**

- T. carinatus* - A common and widespread species; Roback (1977) noted that it occupied the widest range of physicochemical parameters in the genus. I've encountered it most often in waters with low dissolved oxygen and high organic content.
- T. clavatus* - Apparently a brackish water species, although Oliver et al. (1990) list it for Kentucky. As with their putative record of *Thalassomya bureni* from Kentucky (see p. 2.3), the Kentucky record is probably a misidentification. They also record *T. clavatus* for North Carolina. Although I've seen no specimens from the Carolinas, with its salt marsh Atlantic shore line, their record for North Carolina is probably valid; if true, it should also occur in South Carolina. Roback (1977) gave a salinity range of 5-25 ‰ for this species. As with many brackish water species of Chironomidae, the anal tubules are vestigial.
- T. concavus* - The larva of this species has still not been positively associated with the adult, but the taxon keyed here probably is *T. concavus*; (Roback (1977) called it *T. poss. concavus*. I've seen numerous adults from Pen Branch at the Savannah River Site in South Carolina and several larvae from North Carolina.
- T. neopunctipennis* - This species can apparently tolerate brackish water; Roback (1977) recorded it from water with a salinity of 4.45 ‰ in Florida. It often occurs with *T. carinatus* (Roback 1977; Epler 1995).
- T. punctipennis* - Roback (1977: 64) noted that *T. punctipennis* apparently tolerated a wide range of environmental conditions ranging from "a clean, clear, slightly brown-water stream to a large turbid river". Note that the taxon called *T. punctipennis* in the Nearctic is probably not the same as the species originally described from Europe; more revisionary work is needed.
- T. stellatus* - This species is often found in deeper water than other species of the genus. Roback (1977) recorded it from depths of up to 14 meters in Tennessee.

Genus *Telopelopia*

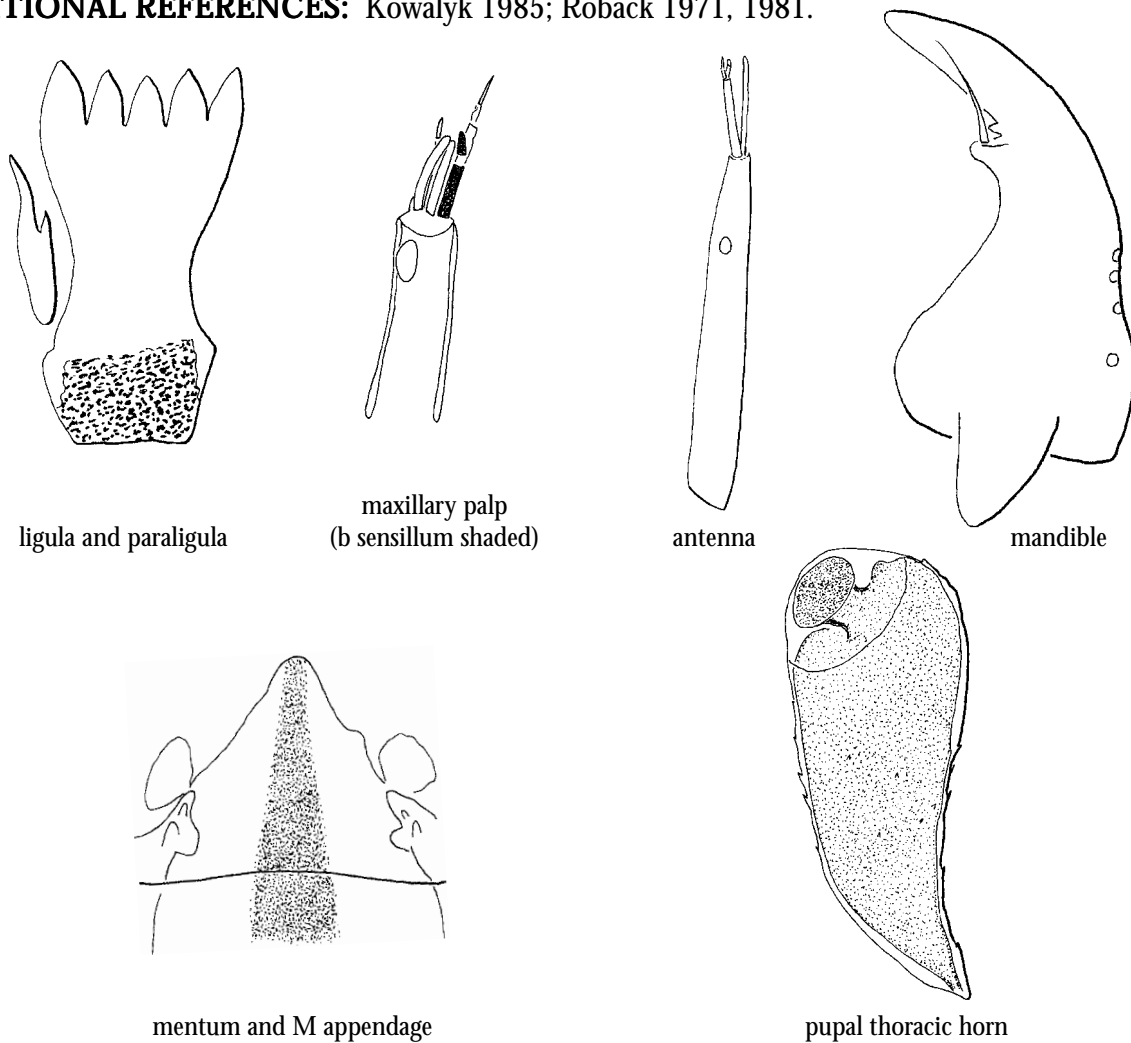
**DIAGNOSIS:** This genus is distinguished by the lack of dorsomental teeth; 2 segmented b sensillum; maxillary palp with ring organ in distal third; apical portion of dorsomentum directed apically; large basal tooth of the mandible; AR around 3.8; ring organ of basal antennal segment in distal third; and lack of a setal fringe (long, thin scattered body setae present).

**NOTES:** One species, *T. okoboji* (Walley), is known from the United States. The larval stage is the most easily distinguished member of the *Thienemannimyia* group because of the large basal tooth of the mandible. It has not been collected in the Carolinas but its presence in Ohio, Maryland and Virginia (Oliver et al. 1990) indicates that it may eventually be collected in the Carolinas.

Roback's (1981) larval description and the diagnosis in Fittkau & Roback (1983) stated that the b sensillum of the maxillary palp is two segmented. However, Fig. 5.33F in Fittkau & Roback (1983) shows the b sensillum as three segmented. The b sensillum was two segmented on the only specimen I've examined, a larva (with a well developed pharate pupa within) from Ohio, illustrated below. The pupal thoracic horn is similar to that of *Conchapelopia*, *Hayesomyia*, *Helopelopia* and *Meropelopia*, but pupae can be distinguished by the well developed thoracic comb of *Telopelopia*.

*Telopelopia* larvae are apparently most often found in rivers, but also occur in lentic situations.

**ADDITIONAL REFERENCES:** Kowalyk 1985; Roback 1971, 1981.



Genus *Thienemannimyia*

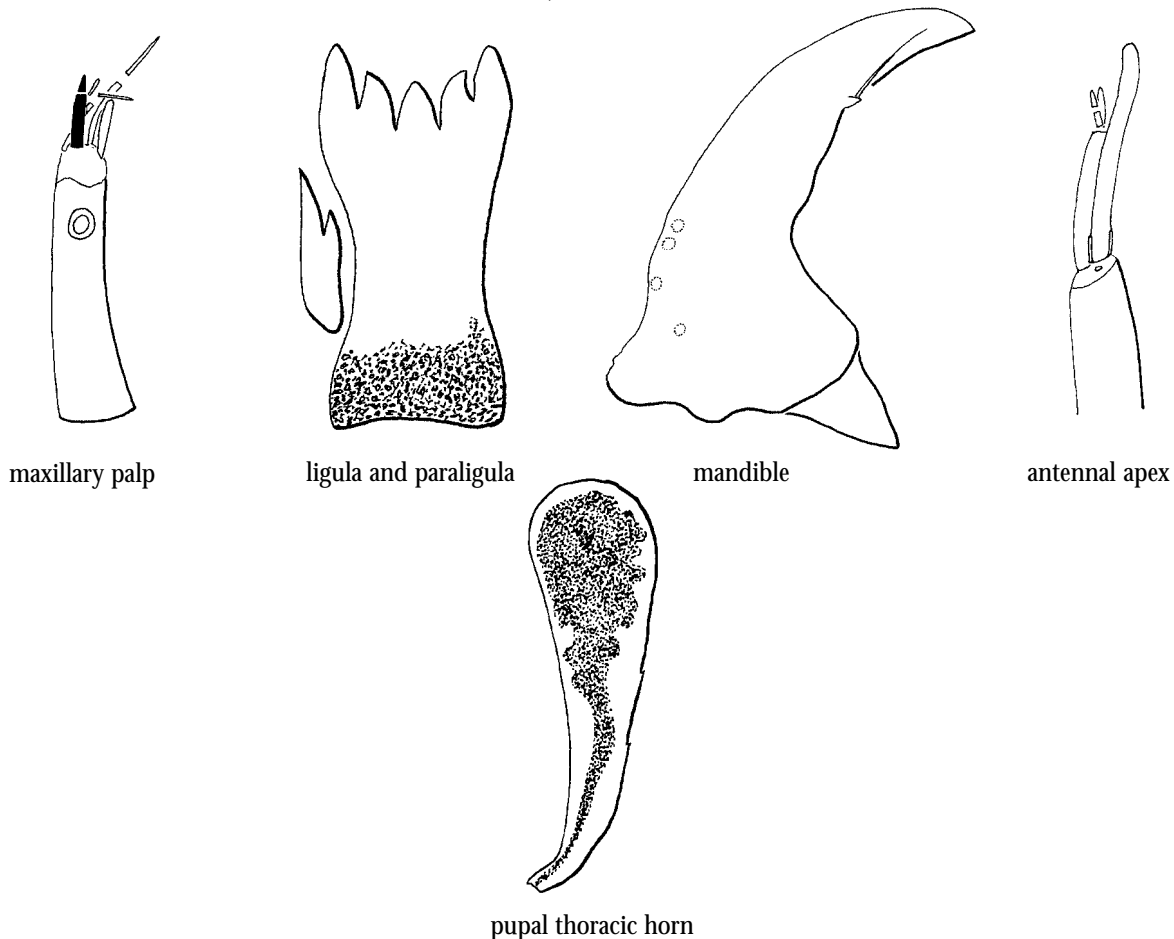
**DIAGNOSIS:** Distinguished by the lack of well developed dorsomental teeth; ring organ in distal third of maxillary palp; 2 segmented b sensillum; antennal segment 2 length about 40  $\mu\text{m}$ , shorter than basal segment of maxillary palp; sclerotized base of the antennal blade as long as wide; AR 5.3 or more; mandible with small basal and accessory teeth; and the long scattered body setae. The pupal thoracic horn lacks a corona; respiratory atrium with numerous convolutions.

**NOTES:** Following the reassignment of *Th. senata* to *Hayesomyia* (q.v.), there are no described species of *Thienemannimyia* known from the Southeast. The single described eastern US species, *Th. norena* (Roback), has not been recorded south of Pennsylvania in the eastern US. It may eventually be found in the mountains of the Carolinas; Caldwell et al. (1997) report an undescribed *Thienemannimyia* from Alabama.

Head capsule coloration mentioned in the literature may be deceiving. Roback (1981) stated in couplet 3 of his key "caudal margin of head dark brown". None of Roback's material that I examined had head capsules with the entire caudal margin dark brown; all were light brown with only the posterior margin of the small triangular posteroventral sclerite a dark brown. Note that of the characters given in couplet 1 in the revised key offered by Murray & Fittkau (1985), only the AR of 6 and the length/width of the basal sclerotized area of the antennal blade may be useful to separate *Thienemannimyia* larvae from those of *Hayesomyia* or *Meropelopia* in the material that I've examined.

Larvae of *Thienemannimyia* are recorded from creeks, streams and rivers.

**ADDITIONAL REFERENCES:** Roback 1971, 1981.



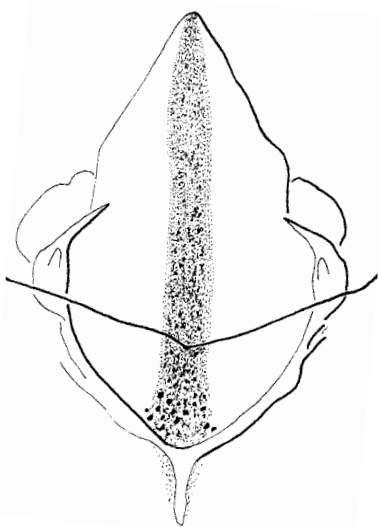
Genus *Trissopelopia*

**DIAGNOSIS:** This genus is distinguished by the long, slender basal segment of the maxillary palp, with ring organ near middle; apicomedial margin of dorsomentum produced as a single fine point; long, slender mandible; procercus 2.5-3.5 times as long as wide; basal outer margin of some posterior parapod claws flattened as a lamella; and lack of a setal fringe.

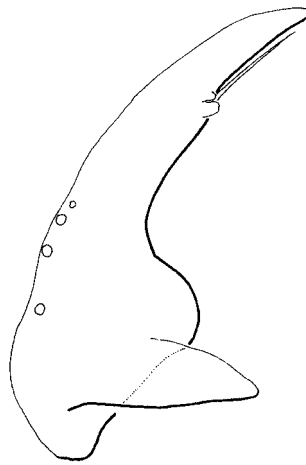
**NOTES:** One species, *T. ogemawi*, is known from the eastern United States; in the Southeast, it has been recorded from Georgia and both Carolinas.

Larvae are usually found in seeps, springs and cool streams.

**ADDITIONAL REFERENCES:** Kowalyk 1985; Roback 1971.



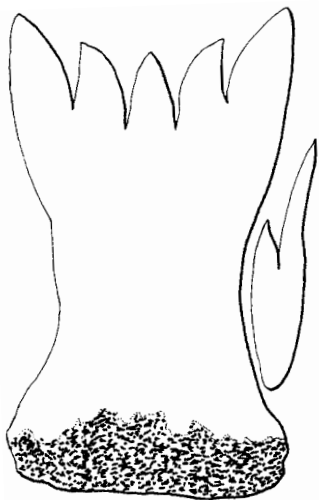
mentum and M appendage



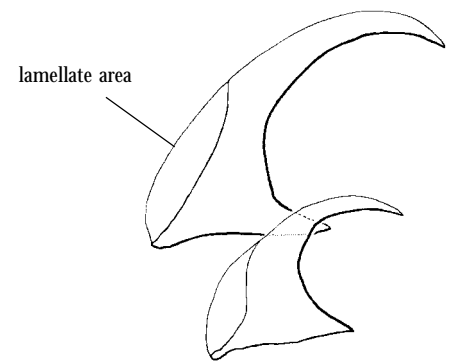
mandible



maxillary palp



ligula and paralingula

procercus  
(anal setae abbreviated)

posterior parapod claws

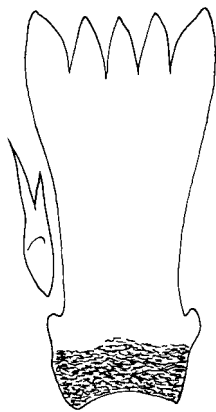
Genus *Zavrelimyia*

**DIAGNOSIS:** This genus may be distinguished by the lack of well developed dorsomental teeth; maxillary palp with ring organ 0.52 or more from base; basal segment of maxilla about 4 times as long as wide; ligula usually with small lateral projections near base; mandible with large basal tooth; AR 2.4-3.4; one small claw on each posterior parapod usually (some taxa lack this claw) with an inner tooth; and body lacking a setal fringe. See also *Reomyia*.

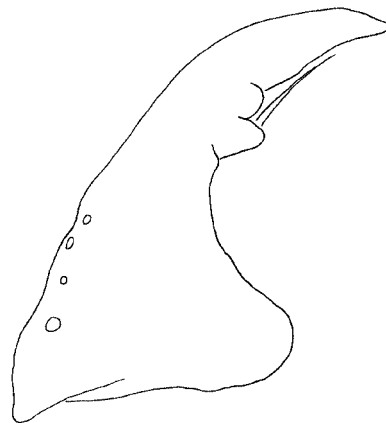
**NOTES:** Caldwell et al. (1997) list three taxa for the Carolinas; however, *Z. sinuosa* and *Z. thryptica* both apparently represent species complexes. *Zavrelimyia* is in great need of taxonomic revision; it will be difficult to determine how many species are present in the Carolinas until such a revision is completed. The situation is further complicated by the presence of at least one species that conforms to the closely related genus *Reomyia* in the Southeast; larvae of the two genera are very difficult to separate, but *may* be distinguishable by the position of the ring organ of the maxillary palp, which is closer to the base in *Reomyia* (see *Reomyia*). The inner tooth found on a small claw of the posterior parapod, long considered a key character for identifying *Zavrelimyia* larvae, is absent in *Z. bifasciata* and some *Z. thryptica* complex specimens; this inner tooth also may be present or absent in *Reomyia*.

*Zavrelimyia* larvae are found in springs, spring-fed streams and pools, and the littoral zone of lakes; they are relatively common in streams and rivers throughout North Carolina. I've collected and reared larvae of the *Z. sinuosa* complex from amphibian egg masses in a bog in Maine.

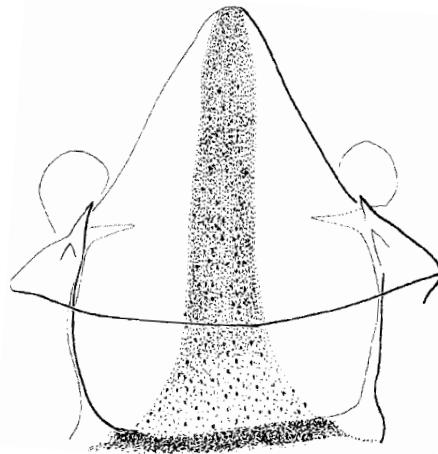
**ADDITIONAL REFERENCES:** Kowalyk 1985; Roback 1971.



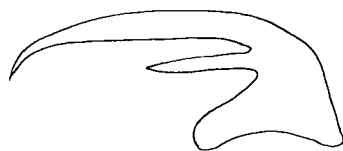
ligula and paralingula



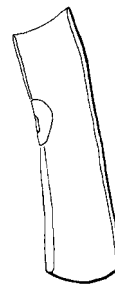
mandible



mentum and M appendage

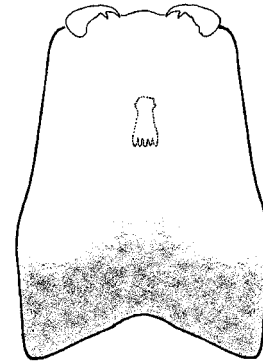


small claw of posterior parapod

*Z. sinuosa* complex, basal segment of maxillary palp*Z. thryptica* complex, basal segment of maxillary palp

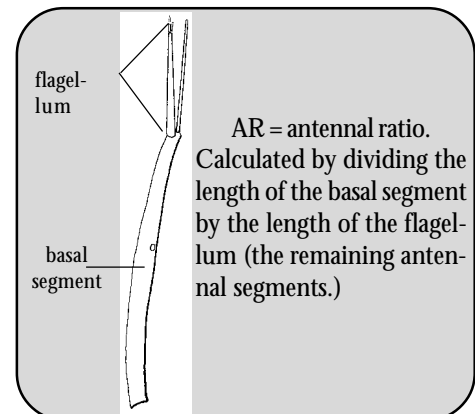
**Preliminary key to *Zavrelimyia* larvae of the southeastern United States**

- 1      Posterior 1/4 of head capsule dark brown .... **Z. sp. A**  
 1'     Head capsule basically unicolorous ..... 2



- 2(1') Larger, head capsule length about 0.83 mm; AR 3.17; small claw of posterior parapod without inner tooth ..... **Z. bifasciata**  
 2'     Smaller, head capsule length 0.62-0.64 mm; AR less than 3.05; small claw of posterior parapod with or without inner tooth ..... 3

- 3(2') AR 2.42-2.68 ..... **Z. thryptica complex**  
 3'     AR 2.70-3.04 ..... **Z. sinuosa complex**



**Notes on species**

- Z. bifasciata* - Apparently the largest species of *Zavrelimyia* in the eastern United States. Caution must be used in identifying this larva, because the data above are based on a single reared specimen from Ohio. AR 3.17, ring organ 0.54 from base.
- Z. sinuosa* complex - Apparently a complex of species (B. Bilyj, pers. comm.). Note that the two complexes are based on adult characters and may not correlate with larval characters, although there seems to be a range in the small sample of reared material examined. This "range" could disappear with more rearings!
- Z. thryptica* complex - This complex is more common than the *sinuosa* complex in the South. See the *sinuosa* complex above.
- Z. sp. A* - Based on a few unassociated larvae from North Carolina; AR 2.43-3.10, ring organ 0.56-0.59 from base. This taxon may belong to the *Z. sinuosa* complex, but is easily recognized by the head capsule coloration.