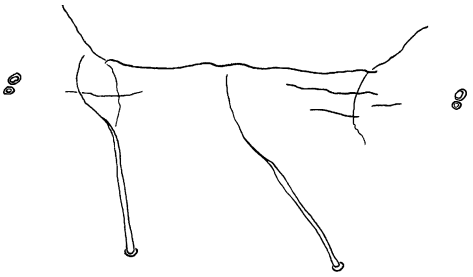
SUBFAMILY
DIAMESINAE 5

DIAGNOSIS: Antennae 5 segmented, 3rd segment annulated in Southeast US genera. **Labrum** with simple S setae (S III may be bifid). Labral lamellae present, may be obscure. Premandibles present. **Mentum** with 0 to more than 15 teeth; ventromental plates present, may be vestigial; beard absent. **Prementum** with setose median ligula and pair of paraligulae, appearing as 3 brushes. **Body** with well developed anterior and posterior parapods. Procerci present, vestigial or absent. Anal tubules present.

NOTES: Members of this subfamily tend to be, in general, cool-adapted, flowing water inhabitants, but some are also found in springs and lakes. Two additional diamesine genera that have not been found in the southeastern US, and are not included in the key below, are *Boreoheptagyia* and *Protanypus*. Serra-Tosio (1989) noted that the New York record for *B. lurida* (Garrett) was an error; this species apparently does not inhabit the eastern US. The larva is distinctive, with several tubercules on the head, patterned body and circular groups of spines on the posterior parapods. *Protanypus* is also distinctive with 4-segmented antennae (no annulate 3rd segment) and a head capsule beset with numerous short setae (see Sæther 1975b).

Key to the genera of larval Diamesinae of the eastern United States

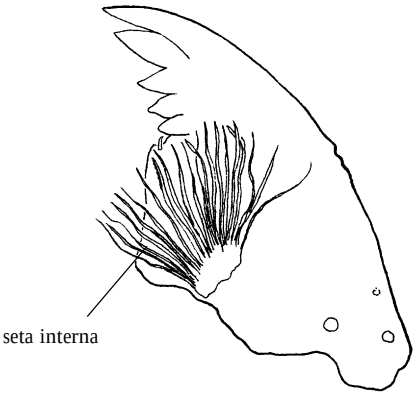
1 Mentum without teeth; mandible without seta interna .... ***Potthastia*** (in part, *longimana* group)



Potthastia lomgimana mentum

1' Mentum with teeth (may be hidden below ventromentum); mandible with well developed seta interna 2

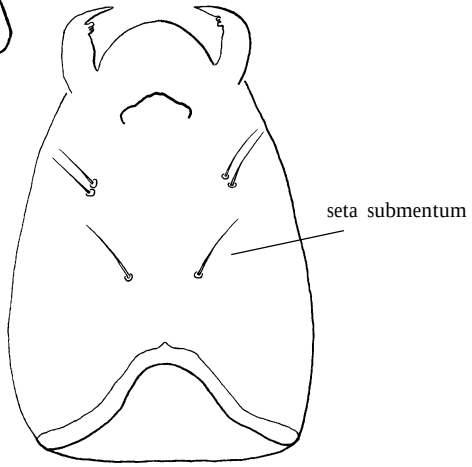
P. longimana mandible without seta interna



Diamesa mandible

2(1') Setae submenti displaced posteriorly, closer to postocciptal margin than mentum ..... ***Pagastia***

2' Setae submenti in normal position, closer to mentum than postoccipital margin 3



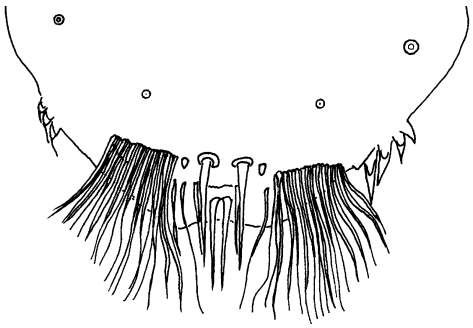
3 (2') Premandible apically simple, with at most 1-4 small inner teeth 4

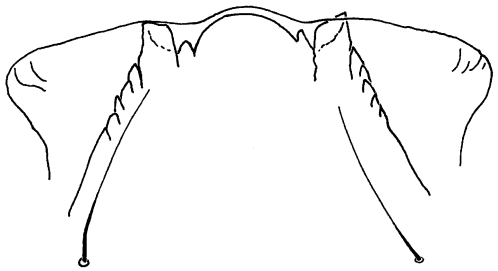
3' Premandible with numerous apical, preapical or inner teeth 7

apically simple premandibles

premandible with multiple inner teeth

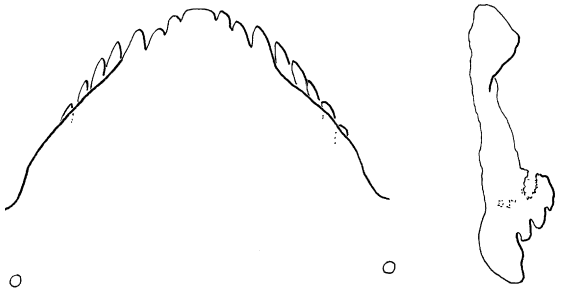
4(3) Labrum with numerous long, thin lamellae; teeth of mentum usually completely covered by ventromentum; mentum with broad ventromental plates ..... **Diamesinae genus P**



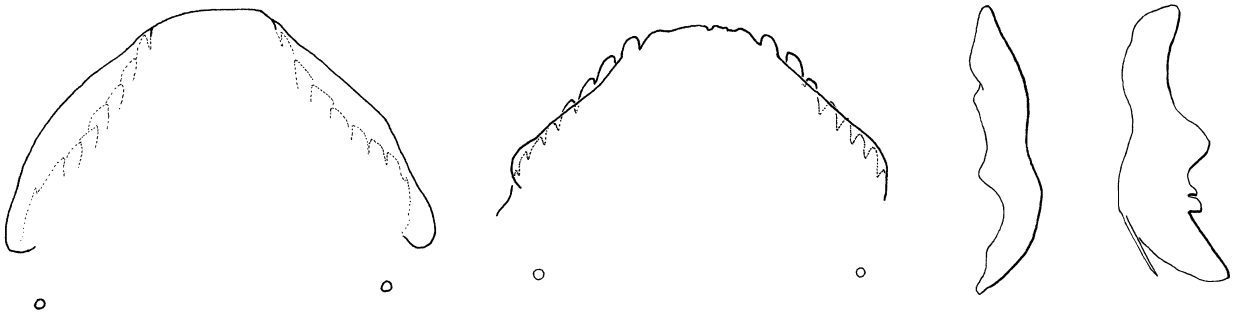


4' Labrum with various chaetae and lamellae, never almost completely covered by lamellae; if mental teeth covered by ventromentum, ventromental plates not as above 5

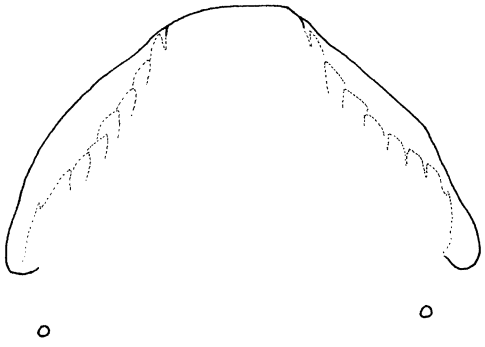
5(4') Median tooth of mentum about 2-3 times width of first lateral teeth; premandible with 3-4 inner teeth ..... ***Lappodiamesa***
(not known from the Carolinas)



5' Median tooth of mentum 3 to more than 5 times greater than width of first lateral tooth, or median tooth weakly bilobed, premandible with 1-2 inner teeth, or none 6

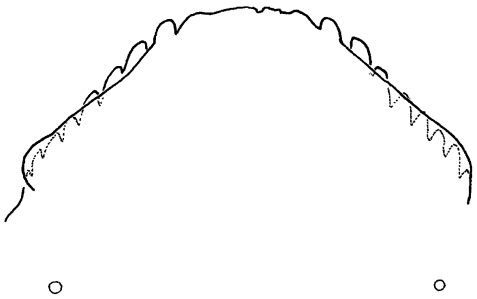


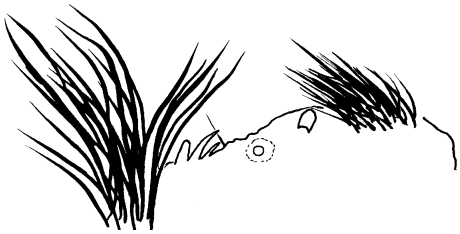
6(5') Median tooth of mentum at least 5X width of first lateral tooth; galea of maxilla with row of about 5-7 peg-like lamellae in addition to setae-like lamellae ..... ***Potthastia*** (in part, *gaedii* group)



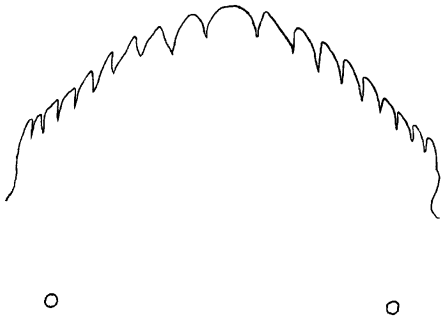
maxilla

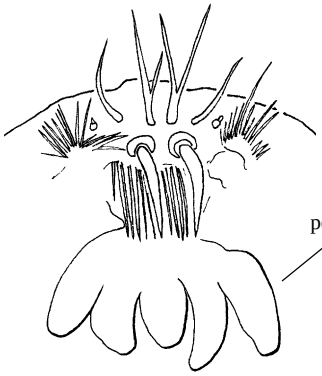
6' Median tooth of mentum less than 4X width of first lateral tooth, or median tooth weakly bilobed; maxilla with galea bearing mostly setae-like lamellae ..... ***Sympotthastia***





7(3') Mentum with median teeth subequal; pecten epipharyngis with 5 scales; procercus vestigial, at most a small sclerotized ring, bearing 4 (usually) anal setae ..... ***Diamesa***

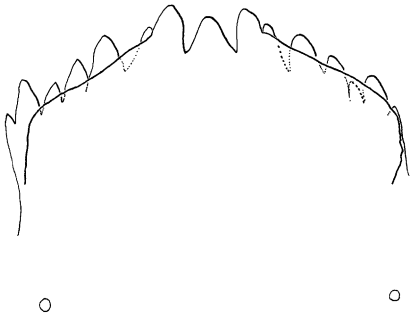


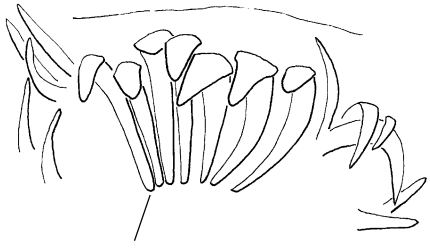


pecten epipharyngis

7' Mentum with 3 large triangular median teeth; pecten epipharyngis with 7 or more scales/spines; procercus well developed/sclerotized, with 5-9 anal setae ..... ***Pseudodiamesa***

(not known from the Carolinas)





pecten epipharyngis

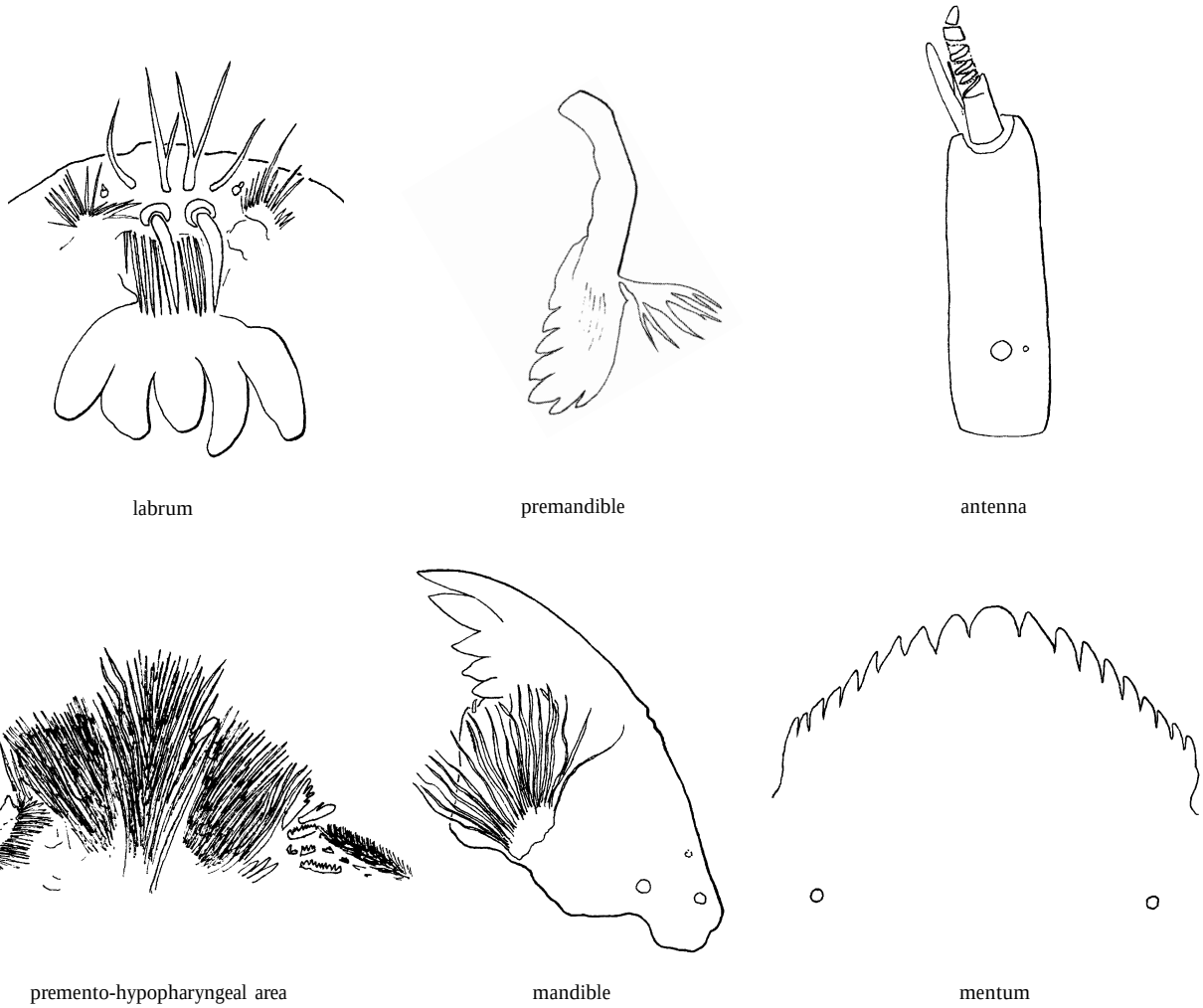
Genus *Diamesa*

DIAGNOSIS: The pecten epipharyngis with 5 scales; premandible with 5 or more teeth and a branched lateral spine; mentum with more than 15 teeth; and vestigial to reduced procerci will distinguish eastern Nearctic members of this genus.

NOTES: Caldwell et al. (1997) list two species of *Diamesa* for the Southeast, utilizing records of adult specimens. Based on a limited amount of larval material, none of it associated with adults, there appear to be at least three species of *Diamesa* in the Carolinas. Each of these taxa may represent more than one species. In the following key *Diamesa* sp. B is probably *D. nivoriunda*, but without associated adult specimens identification remains tentative.

Diamesa larvae are usually found in cool running water. Hudson et al. (1990) noted that *D. nivoriunda* tolerates high turbidity and siltation.

ADDITIONAL REFERENCES: Doughman 1983; Hansen & Cook 1976; Makarchenko 1986.

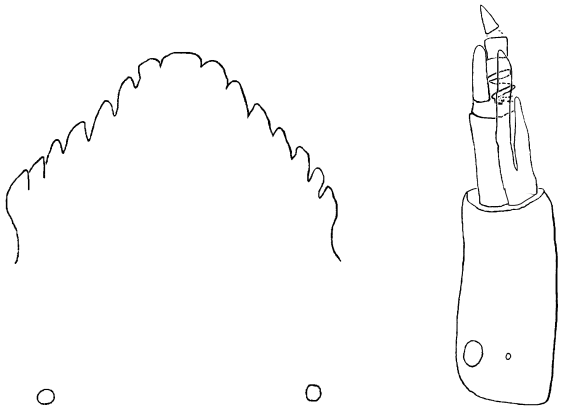


labrum premandible antenna

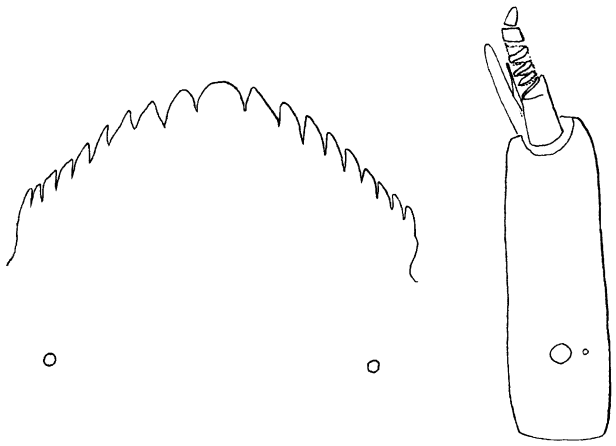
premento-hypopharyngeal area mandible mentum

Diamesa larval structures

Key to *Diamesa* larvae of the Southeast United States

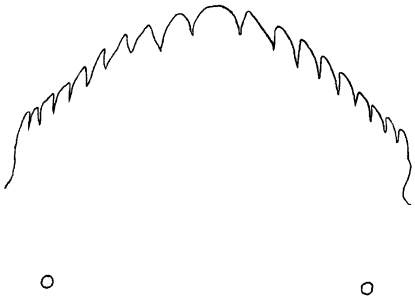


1 Head capsule very dark brown, almost as dark as postocciput; basal segment of antenna subequal to length of flagellum; mentum more strongly arched ..... ***D*. sp. C**



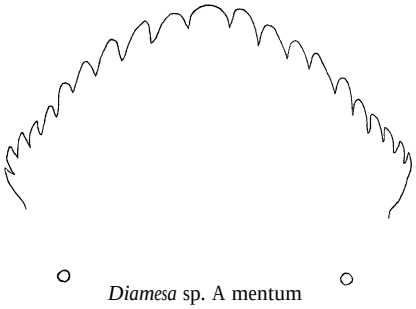
1' Head capsule light brown to brown, postocciput much darker than remainder of head capsule; basal segment of antenna about twice as long as flagellum; mentum not as strongly arched 2

2(1') S III bifid; mentum with 17-19 teeth ..... ***D*. sp. B**



Diamesa sp. B mentum

2' S III simple; mentum with 19-21 teeth ..... ***D*. sp. A**



Diamesa sp. A mentum

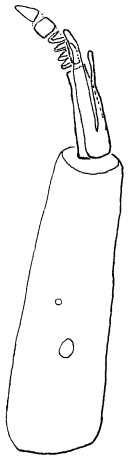
Genus *Lappodiamesa*

DIAGNOSIS: The 7-9 scaled pecten epipharyngis; premandible with simple apical tooth and 3-4 smaller inner teeth; mentum with convex median tooth flanked by smaller lateral teeth; and well developed procerci serve to distinguish this genus.

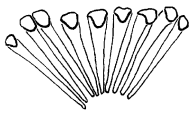
NOTES: This genus has not yet been found in the Carolinas, but the occurrence of *L. boltoni* Sæther & Willassen in Ohio indicates that this taxon may eventually be found in the SE US. In Ohio, M. Bolton (pers. comm.) found the species in shallow vernal woodland runs and pools.

Although Sæther & Willassen (1988) described the pecten epipharyngis with 7 scales, two larvae I've examined appear to possess 9 scales in the pecten epipharyngis.

ADDITIONAL REFERENCES: Sæther & Willassen 1988.

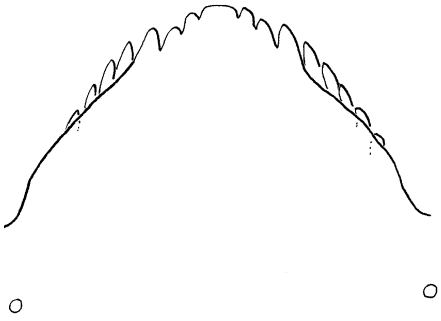


antenna

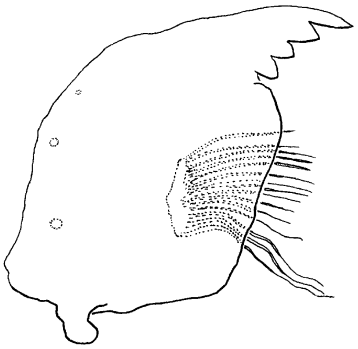


pecten epipharyngis

premandible



mentum



mandible

Lappodiamesa boltoni larval structures

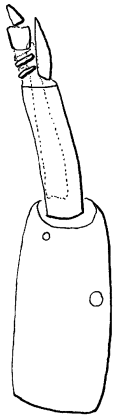
Genus *Pagastia*

DIAGNOSIS: The mentum, with teeth almost completely coverd by the ventromentum; and the posteriorly displaced setae submenti will distinguish this genus from other eastern US diamesines.

NOTES: One species, *P. orthogonia*, is known from the Southeast US. It occurs mainly in mountain streams, but also has been found in springs.

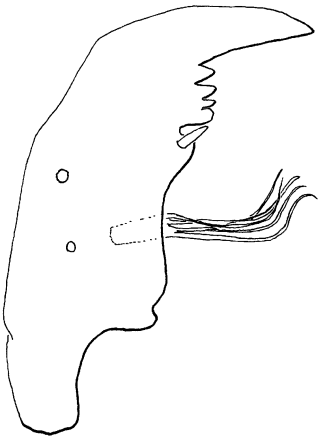
The teeth of the mentum are often difficult to discern because of the dark coloration of the ventromentum; note also the distinctive mandible of *P. orthogonia* (which is similar to that of the western Nearctic species *P. sequax* (Garrett)).

ADDITIONAL REFERENCES: Makarchenko & Makarchenko 2000; Oliver & Roussel 1982.

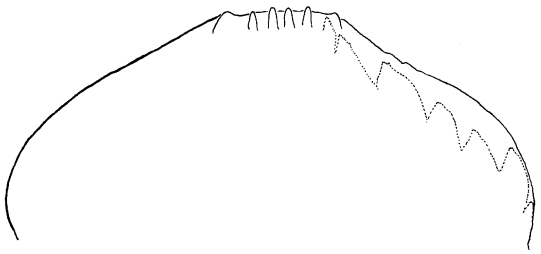


antenna

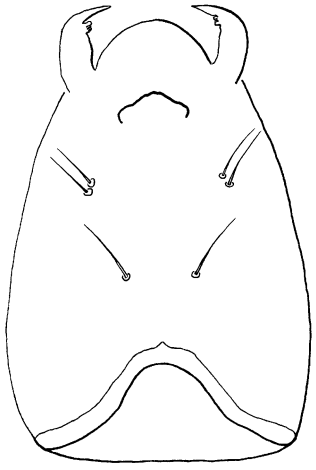
premandible



mandible



mentum



head capsule

Pagastia larval structures

Genus *Potthastia*

DIAGNOSIS: Two larval types are included in this genus: the *longimana* group is characterized by the premandible with broad apex bearing numerous teeth; the complete absence of teeth on the mentum; and mandible without a seta interna. The *gaedii* group is characterized by the simple premandible, with no inner teeth; mentum with median tooth 5 or more times the width of first lateral tooth; maxilla with galea bearing about 5 peg-like lamellae. Both larval types have well sclerotized procerci.

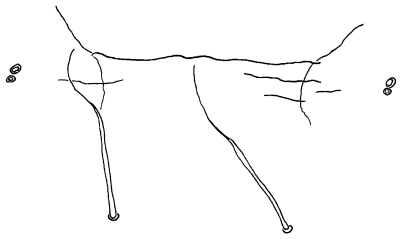
NOTES: Three species of *Potthastia* are found in the Southeast US; *P. longimana* appears to be the commonest and most widespread. It appears that our Nearctic representative of the *longimana* group is *P. longimana*. However, I am not convinced that the two species of the *gaedii* group found in the SE US are conspecific with the Palaearctic species *P. gaedii* and *P. montium*. I have seen reared males of a species which is close to *P. montium*, but with slightly different genitalia. I've also examined a NC male that appears similar to *P. gaedii*, but is slightly different; it bears a determination label by Sæther that reads "n. sp. nr. *gaedii*". Examination of more reared material from both the Nearctic and Palaearctic will be necessary to confirm identifications.

Note also that Oliver (1983) described the premandible of *gaedii* group larvae as being simple, with the lateral spine absent. However, the premandible of *P*. cf. *montium* bears a thin lateral spine, as figured below and by Doughman (1985a: fig. 30).

ADDITIONAL REFERENCES: Doughman 1985a.

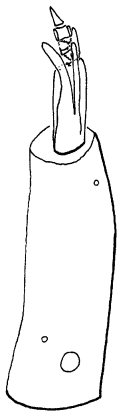
P. longimana antenna

P. longimana mandible



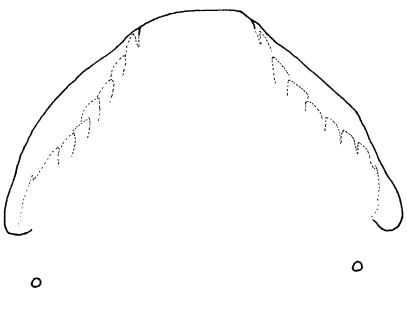
P. longimana mentum

P. cf. *montium* maxilla



P. cf. *montium* antenna

P. cf. *gaedii* mandible



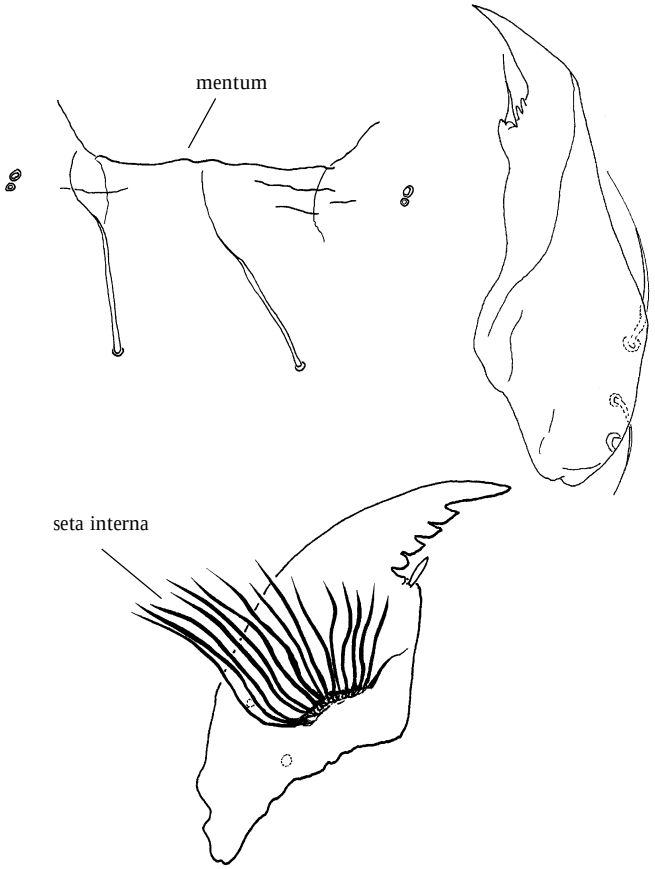
P. cf. *gaedii* mentum

P. longimana premandible

P. cf. *gaedii* premandible

P. cf. *montium* premandible

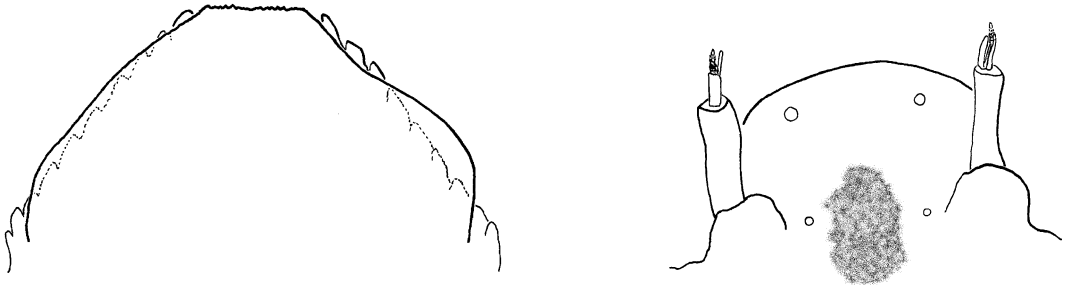
Key to *Potthastia* larvae of the southeastern United States



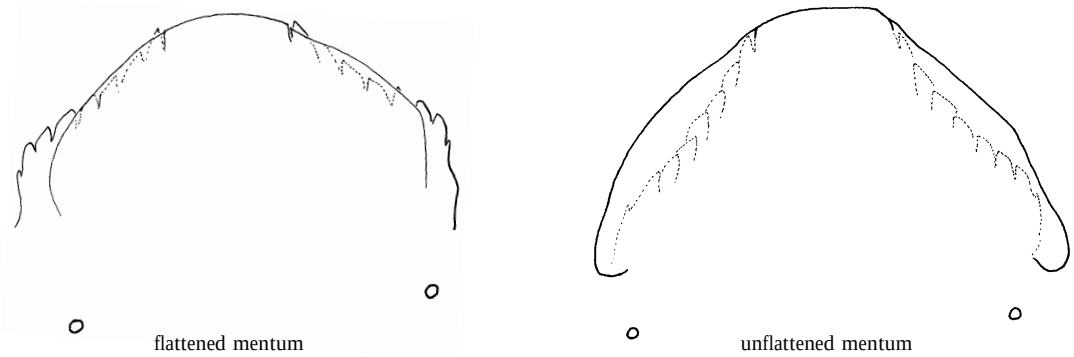
1 Mentum without teeth; mandible without seta interna ..... ***P. longimana***

1' Mentum with teeth; mandible with seta interna 2

2(1') Median tooth of mentum as dark as lateral teeth; an irregular dark spot present between bases of antennae ..... ***P.* cf. *montium***



2' Median and first lateral teeth of mentum lighter than remaining teeth; no spot present between antennal bases ..... ***P.* cf. *gaedii***



Genus *Pseudodiamesa*

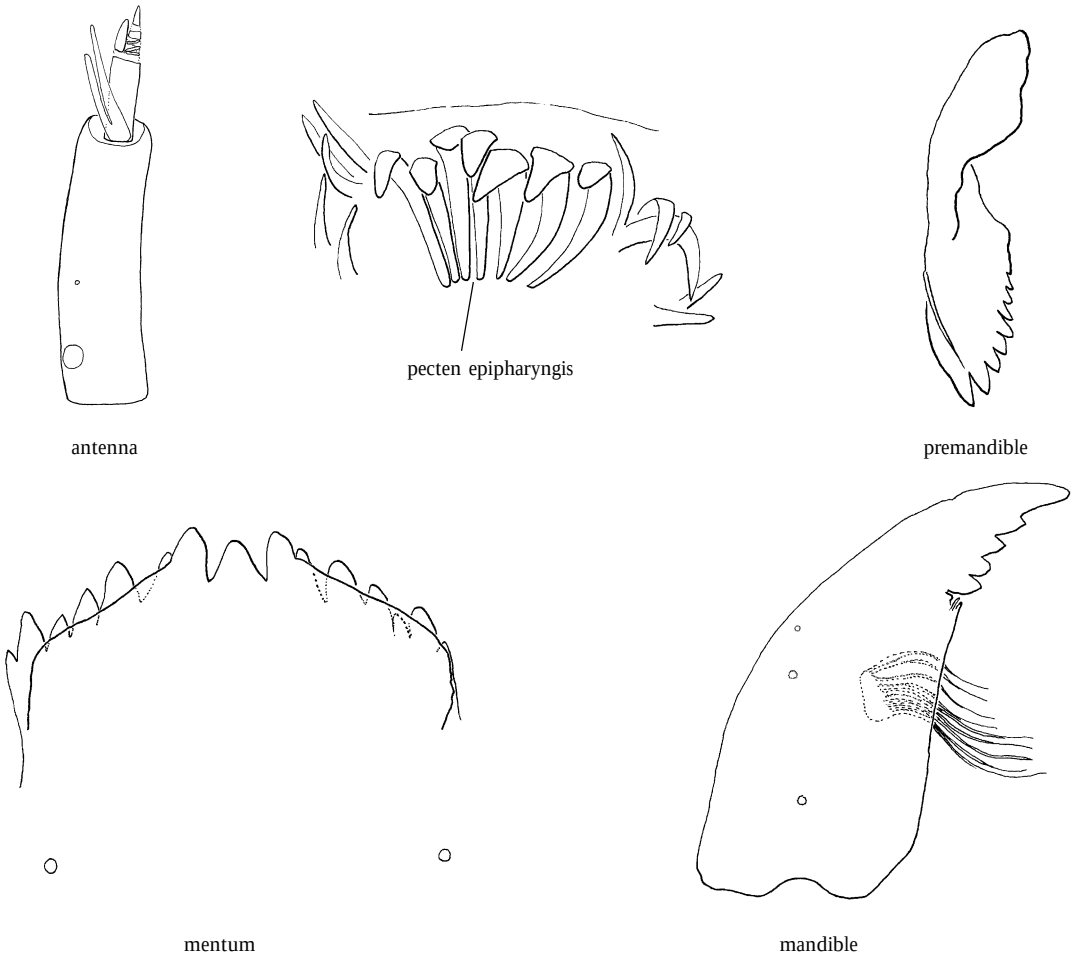
DIAGNOSIS: The 7-scaled pecten epipharyngis; multitoothed premandible; mentum with 3 large triangular median teeth and well developed ventromental plates (that may obscure the mental teeth); and well developed procerci identify this genus.

NOTES: *Pseudodiamesa* has not been recorded from the Carolinas. It is included here solely on the basis of a questionable record of a single larva of *Ps. pertinax* (Garrett) from a Tennessee quarry by Beck (1980); I have not examined this specimen nor seen any material of the genus from the eastern US. With the exception of Beck's record, the 3 Nearctic species of *Pseudodiamesa* are known only from the western and northern US and Canada.

Johannsen (1937a) was incorrect in stating that the larval ventromental plates (as "paralabial plates") were lacking in *Ps. pertinax*; they are present and well developed. Note that in the same publication, Johannsen also erroneously stated that ventromental plates were absent in *Sympotthastia* (as *Diamesa (Psilodiamesa)*) *fulva* (which has lead to some confusion; see *Sympotthastia*).

Larvae are known from springs, streams and lakes, including the profundal zone.

ADDITIONAL REFERENCES: Johannsen 1937a; Oliver 1959, 1976.



Pseudodiamesa pertinax larval structures

Genus *Sympotthastia*

DIAGNOSIS: This genus is distinguished by the premandible with simple apex, with 1-2 (4?) small inner teeth; maxilla with galea bearing mostly setae-like lamellae; median tooth of mentum less than 4X width of first lateral tooth, or median tooth weakly bilobed; and the well developed procerci.

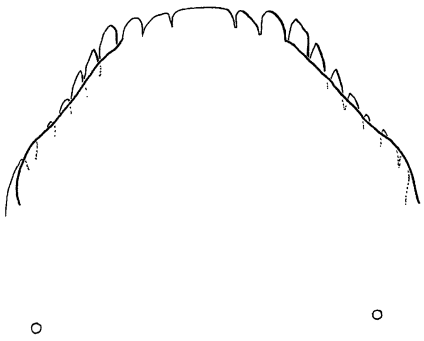
NOTES: Oliver et al. (1990) record *S. fulva* from NC and SC and *S. zavreli* from NC. However, Caldwell et al. (1997) did not accept the Carolinas record of *S. fulva* and listed *S. zavreli* "with reservations". It has not been conclusively demonstrated that NC *Sympotthastia* larvae are conspecific with the Palaearctic species *S. zavreli;* I know of no records based upon adult or pupal specimens that will corroborate Doughman's (1985b) identification of this species; thus it is treated in this manual as *S.* cf. *zavreli*.

Johannsen's (1937a) and Doughman's (1985b) descriptions of the larva of *S. fulva* are incorrect in stating that ventromental plates are absent. My examination of the allotype's larval exuviae revealed that the head capsule has been split in two and is excessively flattened. The lateral teeth of the mentum have been forced to the outside of the ventromentum, which is produced at its lateral edge as a ventromental plate.

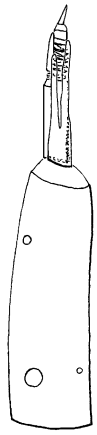
The maxilla of *Sympotthastia* may bear one or two peg-like lamellae or sensory bodies on the galea, but never the row of 4-5 peg-like lamellae found in members of the very similar *Potthastia gaedii* group.

ADDITIONAL REFERENCES: Doughman 1985b.

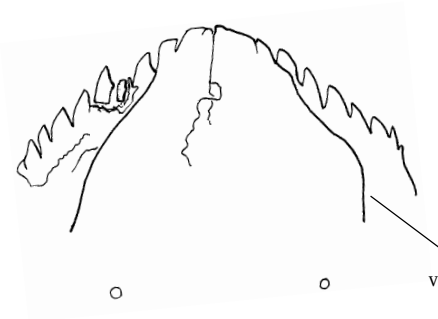
S. cf. *zavreli* mentum with worn median tooth, NC



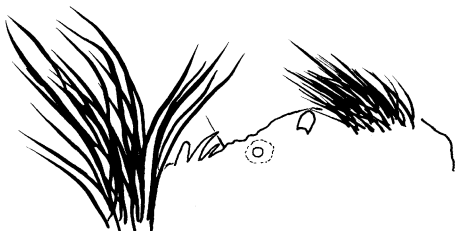
S. cf. *zavreli* mentum with intact median tooth, OH



S. fulva antenna



reconstructed mentum of *S. fulva* allotype



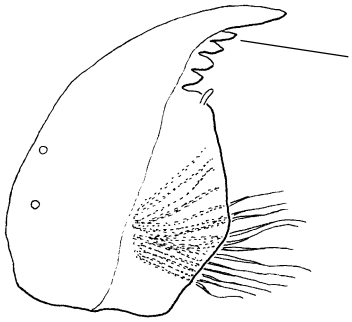
S. cf. *zavreli* maxilla

S. cf. *zavreli* premandible

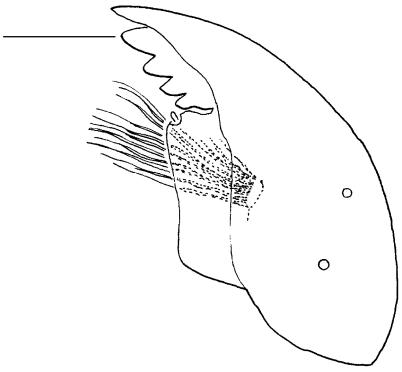
Sympotthastia spp. larval structures

Key to *Sympotthastia* larvae of the eastern United States

1 Mandible with distal inner tooth subequal to remaining inner teeth; AR about 1.50; procercal setae more than twice as long as supraanal setae ..... ***S. fulva***
(not recorded from the Carolinas?)



1' Mandible with distal inner tooth larger than remaining inner teeth; AR 1.84-2.17; procercal setae 1.4-1.8 X length of supraanal setae ..... ***S.* cf. *zavreli***

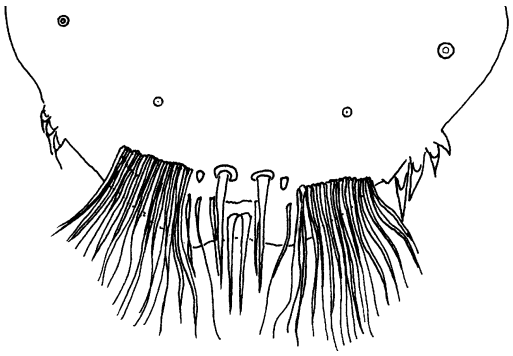


Diamesinae genus P

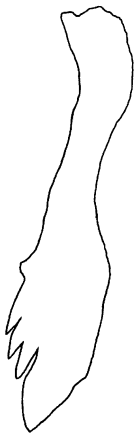
DIAGNOSIS: The labrum, with numerous long, thin lamellae; premandible with several inner teeth; mentum with 7 pairs of lateral teeth and dome-shaped median tooth, all teeth usually completely covered by ventromentum; broad ventromental plates; and well sclerotized procerci will distinguish this taxon.

NOTES: This taxon has been reported from sand-bottomed streams in Alabama, Florida and Georgia in addition to North Carolina. Adults and pupae are unknown.

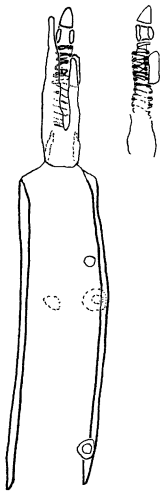
ADDITIONAL REFERENCES: Doughman 1985a.



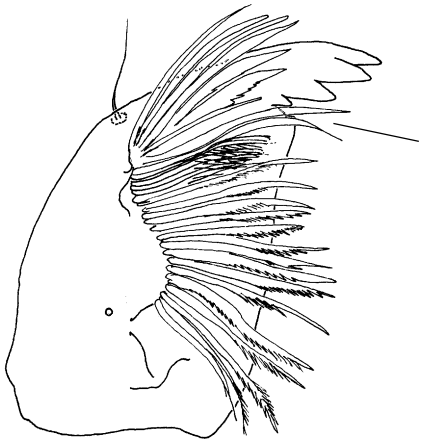
dorsum of labrum



premandible

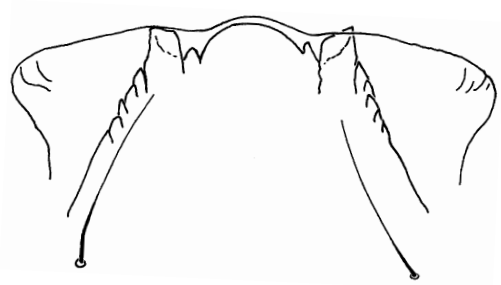


antenna



mandible

seta interna



mentum

Diamesinae genus P larval structures