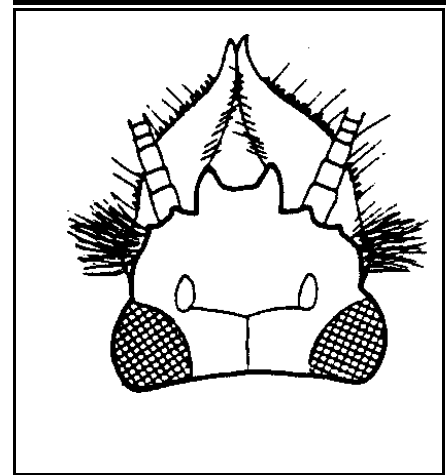


Mayfly Nymphs (Ephemeroptera)

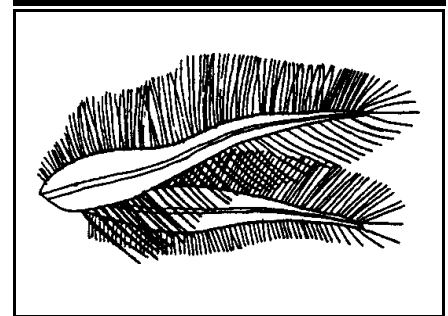
Mayfly families do not have widely used common names.

-
- 1**
- a. Mandibles have large tusks projecting forward and visible in dorsal view (from the top); fringed gills are lateral and dorsal on abdominal segments 2-7 2
 - b. Mandibles without projecting tusks; fringed gills absent from segments 2-7 or present but projecting ventrolaterally (below and to the sides) 4
-
- 2**
- a. Gills lateral, projecting from sides of abdomen; protibia (forearm of front leg) slender and nearly cylindrical **Potamanthidae**
These burrowing nymphs occur in medium to large streams where they most often sprawl on gravel and sand in shallow runs. [X/1/1/R]
 - b. Gills dorsal, curving up over abdomen; protibiae adapted for burrowing 3
-

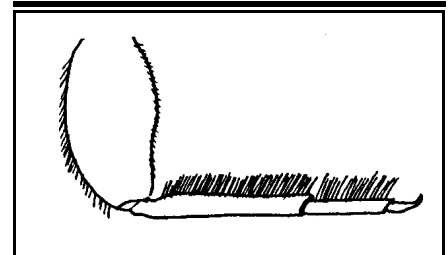
Tusks projecting from mandibles, dorsal view (1a)



Fringed gills on abdominal segments (1a)



Potamanthidae front leg (2a)



- a. Tusks in lateral view curving downward; apex of metatibiae (hindmost forearms) rounded
 **Polymitarcyidae**

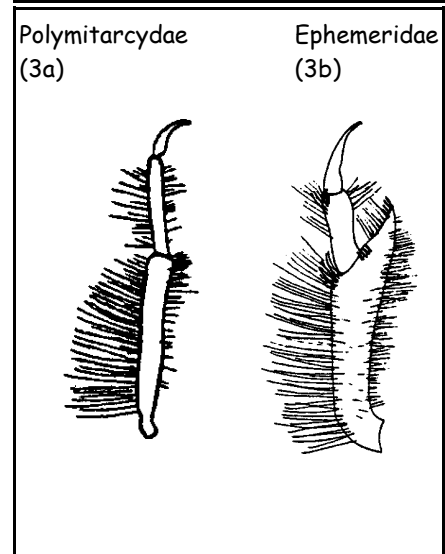
These nymphs filter algae and detritus from the water they circulate through their burrows. They also graze on algae and detritus. They are found in silt, clay, or silt-gravel substrates of medium to large streams or lakes. [X/X/1/R]

3

- b. Tusks in side view curving upward; front end of metatibiae forms an acute point on the lower edge
 **Ephemeridae**

Ephemeridae inhabit sandy or silty substrates of streams and clean lakes. They filter food from water circulated through their burrows and graze on algae and detritus. [M/2/3/C]

Metatibiae of Polymitarcyidae and Ephemeridae (3a/3b)



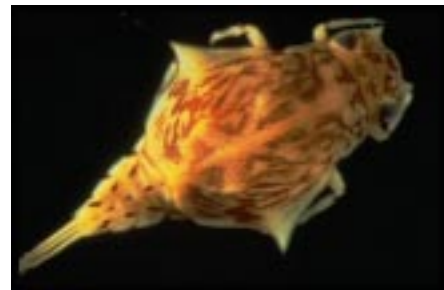
- a. Mesonotum (shield-like dorsal portion of middle thoracic segment) projecting back to cover the gills on abdominal segments 1-6
 **Baetiscidae**

4

Baetiscidae partially burrow into silty and sandy sediments on the margins of streams and clean lakes. [M/1/1/C]

- b. Mesonotum not projecting backwards, gills exposed
 5

Baetiscidae (4a)

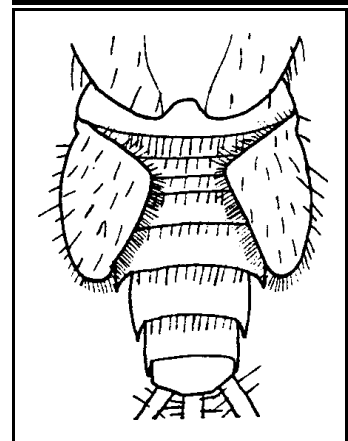


- a. Gills on abdominal segment 2 operculate (covering all or most of the following gills)
 6

5

- b. Gills on abdominal segment 2 similar to those on following segments or absent
 8

Mayfly with operculate gills on 2nd abdominal segment (5a)



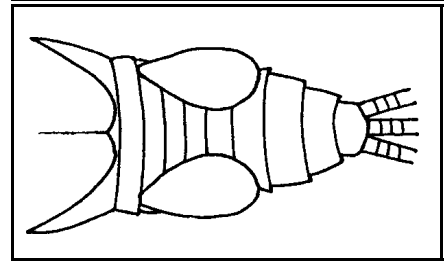
- a. Operculate gills oval or roughly triangular, separated from each other; gills on segments 3-6 without fringed margins
 **Tricorythidae**

6

Nymphs are far ranging and are found in detritus, silt and gravel in streams of all sizes. Some species are tolerant of low dissolved oxygen levels. [X/o/1/R]

- b. Operculate gills rectangular and meeting or overlapping on inside edge; gills on segments 3-6 with fringed margins
 7

Tricorythidae with oval operculate gills (6a)



Operculate gills on Neophemeridae and Caenidae (7a/7b)

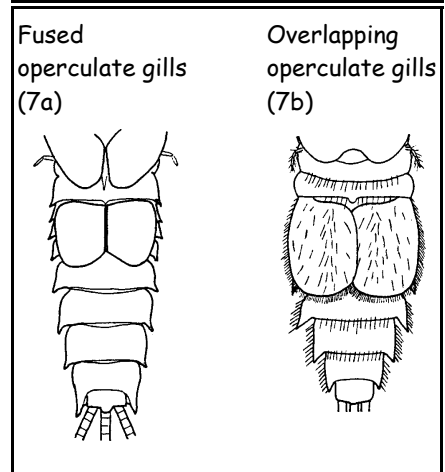
- a. Operculate gills fused together along inside edge; mesonotum with distinct rounded lobe on anterolateral corners
 **Neophemeridae**

These nymphs are found clinging to vegetation, debris or the underside of rocks in slow to rapid flowing streams. They are more common in southern states. [X/o/1/R]

7

- b. Operculate gills not fused but overlapping on inside edge; mesonotum without anterolateral lobes
 **Caenidae**

In a wide variety of water types, the Caenidae inhabit sediments and are often covered in silt. They are more tolerant of low dissolved oxygen levels than other families. [H/1/2/C]



- a. Gills on abdominal segment 2 absent, gills may be absent from segments 1 and 3 also, gills on segments 3 or 4 may be operculate; paired tubercles often present on abdominal (dorsal) terga
 **Ephemerellidae**

8

These nymphs generally inhabit leaf litter or eddies of clean streams. Some are more tolerant and some inhabit lake shores. Most are herbivores and detritivores. [M/5/6/C]

- b. Gills on abdominal segments 1 or 2 to 7
 9

Ephemerellidae (8a)



- a. Head and body flattened top to bottom, eyes and antennae on top of head
..... **Heptageniidae**
- 9** *Heptageniidae* cling to rocks and woody debris in currents of all types. [M/7/10/A]
- b. Head and body not flattened top to bottom; eyes and usually antennae on sides of head
..... 10

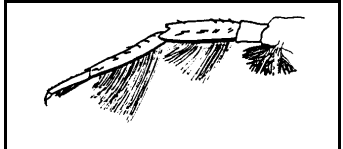
Heptageniidae (9a)



- a. Claws of front legs noticeably shorter than those of middle and hind legs and bifid
..... **Metretopodidae**
- 10** *These nymphs are found along banks and in vegetation of medium to large streams. They are excellent swimmers.* [L/1/2/R]
- b. Claws of all legs similar in length
..... 11

- a. Front femur (upper leg) with a dense row of setae (hairs) along the inner margin
..... 12
- 11**
- b. No dense row of setae on femur
..... 13

Row of dense setae on femur (11a)

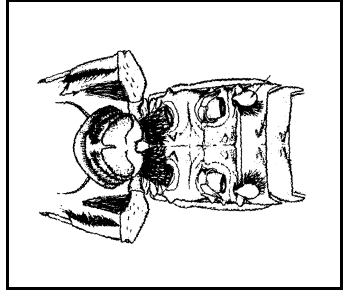


- a. Gills on abdominal segment 1 dorsolateral (on top-sides), similar to gills on other segments; nymphs minnow-like
..... **Isonychiidae**
- 12** *Isonychiidae* were only recently recognized as distinct from the *Oligoneuriidae*. Both families filter the water for algae and diatoms with the long setae of their front legs. [L/1/X/C]
- b. Gills on abdominal segment 1 ventrolateral (on under-side)
..... **Oligoneuriidae**

Isonychiidae (12a)



Oligoneuriidae showing ventrolateral gills (12a)



These are more common in southern states and may not occur at all in Maryland.

Fig. 12a - From *An Introduction to Aquatic Insects of North America*, Third Edition by R.W. Merritt and K.W. Cummins. Copyright © 1996 by Kendall/Hunt Publishing company. Used with permission.

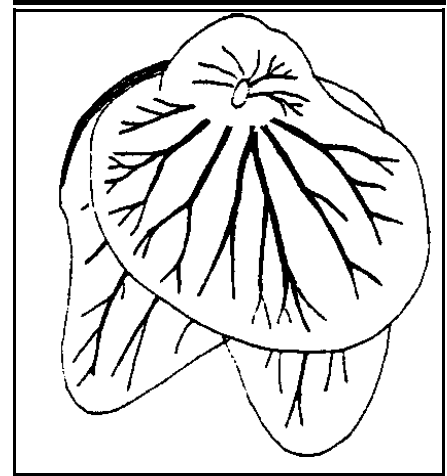
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- a. Gills on abdominal segments 2-7 either forked, in tufts, with all margins fringed, or with double layers terminating in points; dense brush of hairs on apicolateral margin of maxillae (outside end of mouthparts behind mandibles) **Leptophlebiidae**

13 *These nymphs live in a variety of streams, in slow or fast currents, and on all types of coarser substrates. [M/3/5/C]*

- b. Gills single or double layers, oval or heart shaped; apicolateral margin of maxillae without dense brush of hairs (though Ameletidae have comb-like spines) 14

Double layered gills (13b)

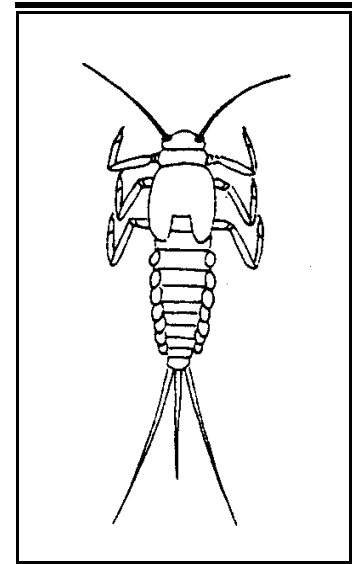


- a. Middle caudal (tail) filament reduced **or** absent **or** antennae more than twice as long as head width **Baetidae**

14 *The baetids are active swimmers, abundant in streams and lakes. [H/8/8/A]*

- b. Middle caudal filament as long as others **and** antennae less than twice width of head 15

Baetidae (14a)



- a. Maxillae with comb-like spines; oval gills with a hardened band on the edge and usually down the middle **Ameletidae**

15 *Until recently, the Ameletidae were part of the Siphoneuridae family. They are swimmers and clingers found in all types of streams. [L/1/1/R]*

- b. Maxillae without comb-like spines; gills variable **Siphoneuridae**

This family of swimmers and clingers is quite variable in habitat preferences and feeding behavior. [H/1/2/C]

Ameletidae with comb-like spines on maxillae (15a)

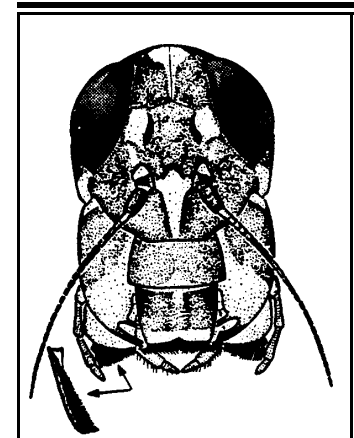


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