
True Fly Larvae (*Diptera*)

Many true fly families have common names. These names are given in the key immediately before the latin name.

- a. Mandibles moving against one another side to side; head capsule complete and visible (exception: head capsule in Tipulidae is within thorax and small)
..... suborder **Nematocera**...2

1

- b. Mandibles moving up and down and parallel to each other; head capsule partially or entirely retracted into thorax and usually small
..... suborder **Brachycera**...12
-

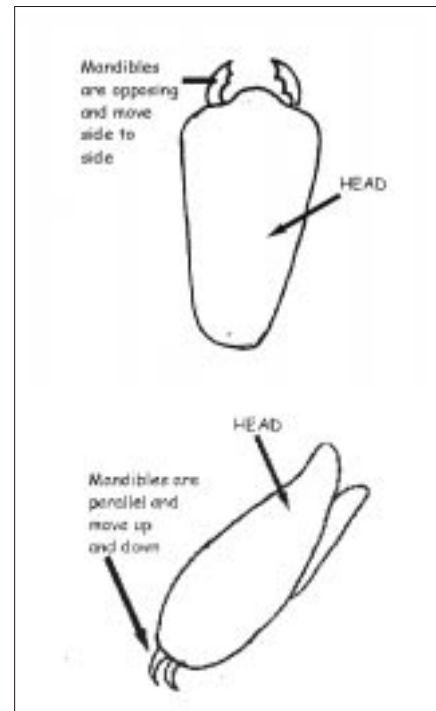
- a. Head capsule partially to fully retracted within thorax; anal spiracles (respiratory openings) usually bordered by 1-3 or 5-7 pairs of short lobes that are often fringed with setae (hairs)
..... *Crane Flies, Tipulidae*

2

This is the largest family of flies, though most of the genera are not aquatic. The habitat and feeding habits of aquatic larval Tipulids are diverse, but they commonly burrow in stream sediments. Adult Tipulids are very short lived and resemble large, long-legged mosquitos.
[M/13/19/C]

- b. Head capsule complete and visible; anal spiracles without fringed lobes
..... 3
-

Diptera Heads (1a and 1b)



Tipulidae (2a)



- a. Head not distinctly separated from thorax; body flattened and divided into 7 segments; segments 1-6 each with a single suction disk
 *Net-Winged Midges,*
Blephariceridae

3

The Blephariceridae cling to rocks in flowing water and feed on diatoms and other algae.
 [L/1/1/R]

- b. Head and thorax separated by a constriction; no suction disks
 4

Blephariceridae (3a)



4

- a. Abdomen ending in a long, slender telescopic (retractile) respiratory tube; abdominal segments 1-3 with small prolegs; body with many ridges or rows of setae
 *Phantom Crane Flies,*
Ptychopteridae

The Ptychopteridae inhabit clumps of detritus in shallow water, extending the breathing tube above the surface. [M/1/3/R]

- b. Not with the above characters
 5

5

- a. Thoracic segments appear as a single segment, wider than abdominal segments; fan-like tufts of setae on thorax and abdomen and/or fan of setae on last abdominal segment
 6
- b. Thoracic segments distinguishable and about as wide as abdomen; setae on thoracic and abdominal segments not tufted and anal fan absent
 7

- a. Antennae prehensile (grasping) and with long setae; prominent mouth brushes absent
 *Phantom Midges, Chaoboridae*

The Phantom Midges are so-called because they are nearly transparent. They are usually found in lakes and use their antennae to capture prey. [L/1/3/R]

- 6** b. Antennae not prehensile and with short setae; prominent mouth brushes present on either side of labrum (upper lip)
 *Mosquitos, Culicidae*

The Mosquitos have a swollen thoracic section and swim in still water with a flip-flop motion. They obtain oxygen at the water's surface through an abdominal tube. They feed on detritus and microorganisms. [H/7/10/C]

Culicidae (6b)



- a. Pairs of prolegs with crochets (hooks) on 1st and usually 2nd abdominal segments; 2 flattened lobes behind anal spiracles with fringed margins above the hard anal segment with papillae (lobes)
 *Dixid Midges, Dixidae*

- 7** *These midges are found near the surface in still water, where they obtain air through their spiracles. They feed of detritus and microorganisms in the surface film. [M/1/2/R]*

- b. No prolegs on 1st and 2nd abdominal segments; no flattened lobes as above
 8

Dixidae (7a)



- a. First thoracic segment with 1-2 prolegs
 9

- 8** b. First thoracic segment lacking prolegs
 11

- a. Head capsule usually with a pair of folding fans at the upper sides of mouth; abdominal segments 5-8 swollen; last segment with a ring of tiny hooks
 *Black Flies, Simuliidae*

9

Black Flies attach to rocks, wood or vegetation in the bottom of streams. They filter food from the current using their mouth fans. [H/4/8/A]

- b. No folding fans near mouth; abdomen not swollen; no ring of hooks as above
 10

- a. Back of all body segments with prominent tubercles (elevated fleshy projections) and/or setae
 *Biting Midges, Ceratopogonidae*
 (in part)

Biting midges, also known as No-See-Ums, typically do not have prolegs and are therefore identified through couplet 11b. Larvae are extremely small, swim like snakes, and are predators. The family is diverse and includes riparian and terrestrial forms. As adults, some will bite people for a blood meal. [M/8/15/C]

10

- b. No prominent tubercle or setae on back of body
 *Midges, Chironomidae*

Chironomids are the largest family of aquatic insects. Most have both anterior and posterior pairs of prolegs but are quite diverse in this feature as well as in form and size. Because of the size and diversity of the family, they can be found in almost all aquatic habitats, and some species are highly tolerant of pollution and low levels of oxygen. They are mostly herbivores, detritivores and predators and are also an important food source for fish. [H/86/151/A]

Simuliidae (9a)



Chironomidae (10b)



- a. All body segments divided into 2-3 sub-segments, some or all with hardened plates on back; dark spots where hardened plates are lacking; anal spiracles on short tube

..... *Moth Flies, Psychodidae*

The Moth Flies, also called Drain Flies, are found among debris and vegetation in shallow areas of ponds and still margins of streams. They are commonly associated with organically polluted water and can even live in sink and floor drains. They feed on detritus and microorganisms in the surface film. [M/1/4/C]

11

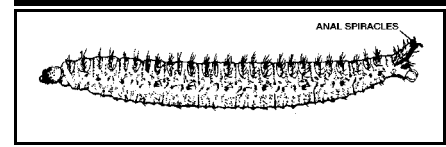
- b. Body segments not subdivided; surface smooth and white with a few setae on last segment; no anal spiracles but sometimes an anal proleg

..... *Biting Midges, Ceratopogonidae*
(in part)

See comments in couplet 10a above. [M/8/15/C]

Psychodidae

(11a)



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- a. Head capsule mostly visible; body somewhat flattened dorsoventrally, skin tough and leathery; usually with distinctive eye bumps; anal spiracles surrounded with long hairs

..... *Soldier Flies, Stratiomyidae*

Many Soldier Flies develop in terrestrial habitats, but a few live among vegetation in the shallow margins of lakes. As well as the above characteristics, they are often covered with calcium carbonate crystals. They live just below the water's surface and feed on algae and detritus. [M/1/7/R]

12

- b. Head capsule mostly internal; body usually cylindrical; no distinctive eye bumps; no long hairs at anal spiracle

..... 13

Stratiomyidae

(12a)



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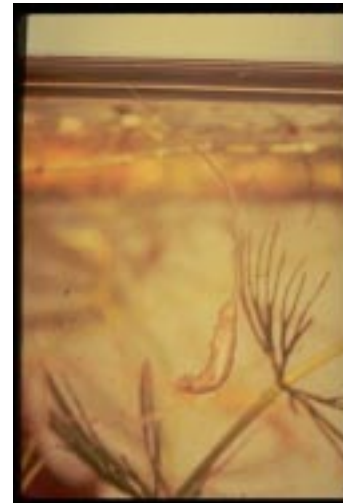
- a. Retractable respiratory tube at least half as long as body
 *Flower Flies, Syrphidae*

These dipteran larvae are also called Rat-tailed Maggots. Most of the Syrphidae have prolegs and compared to other Brachycerans, are broader and blunter near the head. They live in shallow and still water, especially where decomposing organic matter is abundant, including in sewage lagoons. Larvae feed on detritus and microorganisms and adults feed on nectar from flowers. [M/1/6/C]

13

- b. No retractable respiratory tube
 14

Syrphidae (13a)



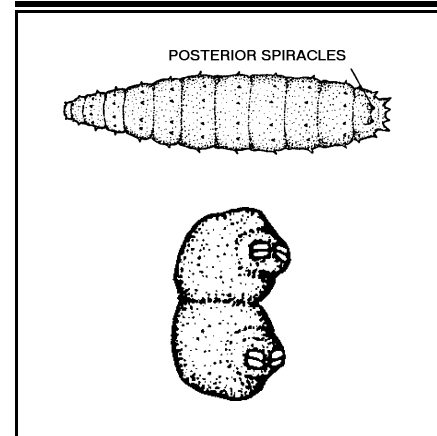
- a. Anterior spiracles simple, each with 1 to several openings arranged around the end of a short projection; body often flattened and with several tubercles; posterior spiracles on 2 short stalks, each with 2 pairs of openings arranged one behind the other
 **Phoridae**

14

The Phoridae mostly feed on detritus and microorganisms and live in sediments of lakes and streams. One species is a predator of Psychodidae. They are sometimes found in trickling filter beds of sewage treatment plants. [X/o/1/R]

- b. Not with the above combination of characteristics
 15

Phoridae, showing enlargement of posterior spiracles (14a)



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- a. Body terminating in a short divided tube or in a pair of spines
 *Shore and Brine Flies, Ephydriidae*

The many genera of Ephydriidae are quite diverse in habitat preferences. Most are only semi-aquatic, but the aquatic types live among vegetation and debris in shallow water or in unusual habitats such as ponds containing oil. They feed on algae and detritus. Some have prolegs on the abdomen. [X/X/X/C]

15

- b. Body not terminating in a short divided tube or in a pair of spines
 16

Ephydriidae (15a)



Fig. 14a - 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.

- a. Posterior spiracular disk with branched hairs and surrounded by 8-10 lobes, some very short; body wrinkled, with segments often covered with short, fine hairs; posterior segment often somewhat tapered
 *Marsh Flies, Sciomyzidae*

16

The Marsh Flies are predators or parasites of snails and clams. They live in still water near their prey. They breathe air through their spiracle at the water surface and swallow an air bubble to keep themselves and their prey floating. [X/X/12/R]

- b. Posterior spiracular disk without hairs; if surrounded by lobes, body not wrinkled
 17

- a. Abdominal segments 1-7 girdled by 3-4 pairs of creeping welts; spine or vertical bar between posterior spiracles; no other projections from the abdomen
 *Horse and Deer Flies, Tabanidae*

17

The Tabanidae live in riffles, stream margins, and among vegetation in lakes. They are predators of other macroinvertebrates as larvae and are blood-suckers as adults. [M/2/8/C]

- b. Distinct prolegs, paired creeping welts paired terminal processes present, but no girdles of creeping welts
 18

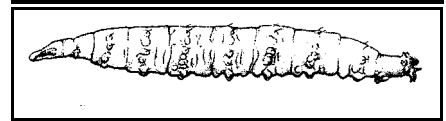
- a. Body terminating in a spiracle pit with four pointed lobes
 .. *Long-Legged Flies, Dolichopodidae*

18

This family is represented by several terrestrial species as well as a few aquatic species. They live in a variety of stream and lake habitats and are predaceous. [M/X/X/C]

- b. Body not terminating in a spiracle pit with four pointed lobes
 19

Sciomyzidae (16a)

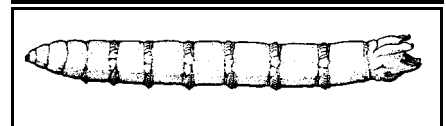


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Tabanidae (17a)



Dolichopodidae (18a)



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- a. Body terminating in a pair of hairy divergent projections; abdomen with prolegs on 8 abdominal segments
 **Athericidae**

19

The Athericidae are represented by the single genus Atherix in Maryland. They are found in riffles and among vegetation in streams and feed on insect larvae. [L/1/1/R]

- b. Divergent projection absent or not hairy; with or without prolegs
 **20**

Athericidae (19a)



- a. Some external head structure visible, with palpi and antennae usually present; abdomen usually with prolegs and elongate, paired terminal appendages or a swollen segment
 **Dance Flies, Empididae**

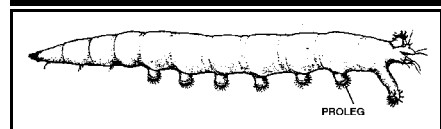
20

The aquatic larvae of Dance Flies are small (< 7 mm), predaceous, and live in fast currents of streams. [M/3/7/C]

- b. No visible external head structure; abdomen often with creeping welts and usually short paired terminal appendages
 **Muscidae**

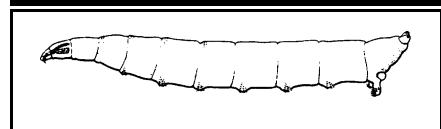
The Muscidae are predators living in streams, marshes and ponds. [M/1/X/C]

Empididae (20a)



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Muscidae (20b)



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