

## SUPERGENERIC GROUPS OF MOSQUITOES

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True mosquitoes comprise the family Culicidae. For practical purposes there are two groups (subfamilies), the Anophelinae and the Culicinae. They may be distinguished by the novice by the attitudes assumed by the larvae and adults. Anopheline larvae lie parallel to the surface of the water whereas culicine larvae hang from the surface by their air tubes. Anopheline adults "stand on their heads," the proboscis and body forming a straight line at an angle to the surface upon which they are resting or biting, whereas culicine adults stand with the body more nearly parallel to the surface.

Actually there are three easily recognized subfamilies of mosquitoes and the largest of these, the Culicinae, is divisible into four tribes. They may be identified and separated in most stages of their development by the accompanying key.

### KEY TO MAJOR GROUPS OF MOSQUITOES

1. EGG boat-shaped, with lateral floats, darkening soon after being laid;  
LARVA without air tube; with palmate hairs on certain body segments;  
PUPA with peg-like setae at hind

- angles of abdominal segments 3-7;  
ADULT with abdomen devoid of  
scales, at least ventrally; female  
palpi as long as the proboscis .....  
..... ANOPHELINAE, *Anopheles*
- EGG without lateral floats; LARVA  
with air tube on 8th abdominal  
segment, without palmate hairs;  
PUPA without such peg-like  
spines; ADULT with abdomen  
scaled; female palpi shorter than  
proboscis ..... 2
2. EGG ovoid, chalky white; LARVA  
with some extremely stout, spin-  
ulose hairs; most body segments  
with 3 pairs of sclerotized lateral  
platelets; mouth brushes reduced  
to 10 stout rods; PUPA paddle  
with outer part extending beyond  
midrib; ADULT proboscis taper-  
ing, flexed downward on apical  
half ..... TOXORHYNCHITINAE,  
*Toxorhynchites*
- EGG elongate, darkening soon  
after being laid; LARVA without  
extremely stout hairs and 3 pairs  
of platelets laterally; mouth  
brushes of very numerous hairs;  
PUPA paddle with outer part not  
extending beyond the midrib;  
ADULT proboscis straight, not  
tapering ..... CULICINAE 3
3. EGG subcylindrical, laid individu-  
ally on or above the water level in  
water-holding plants; LARVA  
with a pair of ventrolateral hairs  
but no ventral brush on anal seg-  
ment; PUPA with large, equal,  
multifid hairs on hind angles of  
abdominal segments 7-8; ADULT  
squama not fringed; pronotal lobe  
larger than meron; postnotum  
with a tuft of scales ... SABETHINI,  
*Wyeomyia*
- EGG described in couplet 4;  
LARVA with ventral brush on  
anal segment; PUPA without such  
multifid hairs on hind angles of  
both segments; ADULT squama  
fringed with hairs (except *Uran-  
otaenia*); pronotal lobe larger than
- meron; postnotum without a  
patch of scales ..... 4
4. EGGS rather spindle-shaped, taper-  
ing at both ends, with surface  
sculpturing commonly of hexag-  
onal pattern, laid individually  
and usually hatch after prolonged  
drying; LARVA with dorsal sub-  
median prothoracic hair groups  
moderately separated, not arising  
from platelets; PUPA paddle with  
a single terminal seta; ADULT  
female abdomen tapering, the cerci  
exposed; male basistyle usually  
membranous along its length on  
inner margin (*Aedes*, at least)  
..... AEDINI, *Aedes*, *Psorophora*,  
*Haemagogus* and *Orthopodomyia*
- EGGS cylindrical, non-sculptured,  
laid usually in rafts on water's  
surface and usually hatch in a few  
days; LARVA with dorsal sub-  
median prothoracic hair groups  
close set and each arising from a  
platelet (platelet absent in sub-  
genus *Mansonia*); PUPA paddle  
with 2 or no terminal setae; FE-  
MALE abdomen blunt-tipped,  
with cerci concealed; MALE  
basistyle completely sclerotized .... 5
5. LARVA head ovoid, longer than  
wide, with gular sutures absent;  
elongate lateral hairs absent on  
abdominal segments 3-6; PUPA  
paddle with inner part wider than  
outer part; ADULT wing with  
apical (second marginal) cell less  
than half as long as its petiole;  
proboscis slightly swollen apically  
..... URANOTAENINI,  
*Uranotaenia*
- LARVA head rounded, wider than  
or as wide as long, with gular  
sutures present; PUPA paddle  
with inner part narrower than  
outer part; ADULT wing with  
apical cell more than half as long  
as its petiole; proboscis not swol-  
len ..... CULICINI, *Mansonia*,  
*Culiseta*, *Culex* and *Deinocerites*

Of importance to the North American mosquito control worker are the Anophelinae, the Culicini and the Aedini. These groups comprise all the pest mosquitoes in the United States and Canada. The Toxorhynchitinae are actually beneficial because their larvae destroy other mosquito larvae and the adults do not suck blood; native *Uranotaeniini* feed only on amphibians, as far as known; the Sabethini (sometimes elevated to subfamily rank) are very important in the tropics where there are many genera and species, some of which transmit diseases. Our pitcher plant Sabethines, genus *Wyeomyia*, are not known to take a blood meal, but the bromeliad breeders in southern Florida are said to bite man readily.

The above classification is in accordance with the Stone *et al.* (1959) catalogue, except that *Uranotaenia* and *Aedes* and its allies are split from the Culicini and elevated to tribal rank. Belkin (1962) reduces mosquitoes to subfamily rank and divides them into 12 tribes of equal valence, of which 9 are represented in the North American fauna. The monotypic tribes based on *Orthopodomyia*, *Mansonia* and *Culiseta* are not recognized here. The writer believes *Culiseta* to be very closely allied to *Culex*; there is better reason to elevate *Orthopodomyia* and *Mansonia* to tribal rank.

#### URANOTAENINI

**MORPHOLOGY.** Worldwide, the *Uranotaeniini* comprise but one well-marked genus, *Uranotaenia*, chiefly tropical in distribution. Galindo *et al.* (1954) give an excellent revision of Panamanian species, in which they point out the unsuccessful nature of efforts to split this large genus into subgenera.

**ADULTS.** Apical wing cell less than half as long as its petiole; proboscis swollen at tip; microtrichiae of wing very minute. The short apical cell allies this genus with *Toxorhynchites*; the absence of a fringe on the squamae is typical of the Sabethines.

**LARVAE.** Head "prognathous," in contrast to other culicine genera, which may

be termed "hypognathous." The elongation of the gula and total absence of gular sutures in all instars sets this genus apart from all other genera of mosquitoes known to the writer. The gular sutures are entire in other culicine tribes; strongly abbreviated in Anophelinae and Toxorhynchitinae (Dodge, 1945). Corresponding with reduction of the gular sutures and elongation of the gula, the *Uranotaeniini*, Anophelinae and Toxorhynchitinae all have the maxilla greatly reduced in size, not exceeding the maxillary palpus and lacking the usual apical brush of strong hairs. The reduction of the lateral hairs of abdominal segments 3-6 to short, tufted hairs is unparalleled in other genera of mosquito larvae.

**HABITS.** The adults are not known to feed on mammalian blood; one report of *U. geometrica* feeding on man has been discredited (see Galindo *et al.* 1954). Apparently the only precise record of feeding habits of any species is by Remington (1945), who experimented with *U. lowii*. They fed upon frogs, toads and a lizard (genera *Rana*, *Hyla*, *Bufo* and *Desmognathus*) but refused reptilian and mammalian hosts. However, *Uranotaenia* is reported to feed upon birds (see Belkin, 1962).

*U. sapphirina* (Osten Sacken), though one of our smallest mosquitoes, lays a raft of relatively few (45-50) large eggs. The first stage larva which results has a head capsule as large as or larger than a second instar *Anopheles*. Some *Uranotaenia* lay eggs individually, not in rafts (Belkin, 1962).

The larvae of *U. sapphirina* are inveterate and indiscriminate browsers. When closely confined with other mosquito larvae they will reduce the major body hairs to stubs. Probably filamentous algae are their preferred diet—surely a tastier and more nutritious fare!

#### AEDINI

The Aedine genera *Aedes*, *Psorophora* and *Haemagogus* comprise some of the most vicious mosquito pests of man. *Aedes*,

especially, is a pest from the tundra to the tropics. The tapering female abdomen, with exposed cerci is characteristic. Aedines seem allied to the Sabethines in their habits (many tropical species share the same breeding habitat of tree holes, bromeliads, and artificial receptacles) and larval morphology (dorsal submedian prothoracic hair group without platelet). However, *Aedes (Finlaya) elsiae* and possibly other exotic species have three pairs of large platelets on the thorax, including the dorsal submedian prothoracic hair group. The writer suspects that this is an acquired character, not typical of the first instar larvae.

#### SUMMARY

The North American genera of mosquitoes, with their respective subgenera, may be arranged in the following sequence:

#### ANOPHELINAE

*Anopheles*, with 14 species of 3 subgenera:

(*Anopheles*), (*Coelodiazesis*) and (*Nyssorhynchus*).

#### TOXORHYNCHITINAE

*Toxorhynchites*, with 2 subspecies of one subgenus (*Lynchiella*).

#### CULICINAE

##### SABETHINI

*Wyeomyia*, subgenus (*Wyeomyia*), 4 species.

##### AEDINI

*Orthopodomyia*, 4 species.

*Psoorophora*, with 3 subgenera and about a dozen species.

(*Psoorophora*), (*Grabhamia*) and (*Janthinosoma*).

*Aedes*, with 5 subgenera and many species.

(*Ochlerotatus*), (*Finlaya*), (*Stegomyia*), (*Aedimorphus*) and (*Aedes*).

*Haemagogus*, with 2 species in one subgenus (*Longipalpifer*).

#### URANOTAENIINI

*Uranotaenia*, 4 species.

#### CULICINI

*Mansonia*, with 3 species in 2 subgenera:

(*Mansonia*), (*Coquillettidia*).

*Culiseta*, with 8 species in 3 subgenera:

(*Culiseta*), (*Culicella*) and (*Climacura*).

*Culex*, with 28 species in 4 subgenera:

(*Culex*), (*Neoculex*), (*Melanoconion*), (*Mochlostyrax*).

*Deinocerites*, with 2 species.

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