

United States Department of Agriculture,

BUREAU OF ENTOMOLOGY,

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KEY TO THE KNOWN LARVÆ OF THE MOSQUITOES OF THE UNITED STATES.¹

By HARRISON G. DYAR.

1. Larvæ without a distinct air tube, the air hole with flaps but no elongated sides; floating at surface of water in a horizontal position. The malaria carriers Subfamily ANOPHELINÆ 3
- Larvæ with a distinct elongated air tube; floating below the surface of water, usually obliquely, hanging by the tube 2
2. The last segment, beyond the air tube, with a ventral brush or rudder in the middle of the segment behind Subfamily CULICINÆ 6
- Last segment without a median brush, the hairs paired on the two sides, none on mid-ventral line Subfamily SABETHINÆ.
- Only one species, in leaves of pitcher plants in cold bogs.
Wyeomyia smithii Coquillett.
3. Abdomen with plumose lateral hairs on the first three segments only; head with plumose hairs 4
- Abdomen with plumose hairs to the sixth segment; head without plumose hairs. Lives in hollow trees *Anopheles barberi* Coquillett.
4. Lateral comb (on the eighth segment below the air hole) with one long lower tooth followed by four little ones *Anopheles franciscanus* McCracken.
- Lateral comb with one long lower tooth followed by three little ones.
Anopheles punctipennis Say.
- Lateral comb with the lower long tooth followed by another as long or nearly so 5
5. Lateral comb with the upper tooth short... *Anopheles maculipennis* Meigen.
- Lateral comb with the upper tooth long... *Anopheles crucians* Wiedemann.
6. Mouth brush folded outward when not in use, not vibratile, used to seize prey only. Predaceous on other mosquito larvæ 7
- Mouth brush folding inward, tufted, vibratile, usually continually in motion. Feed on microscopic organisms and vegetable detritus 9
7. A plate on the side on the eighth abdominal segment. Only one species, living in hollow trees and water barrels; beneficial.
Megarhinus portoricensis von Röder.
- A patch of small scales on the side of the eighth abdominal segment. Living in temporary puddles; beneficial species 8
8. Labial plate (mentum) of head with the teeth regular and alike.
Psorophora ciliata Fabricius.
- Labial plate with the next to the basal tooth much enlarged.
Psorophora howardii Coquillett.

¹The generic names here used have been made uniform with those of Technical Series No. 11, of this Bureau, to facilitate cross reference. In case of discrepancy in specific names, the names employed in that publication are given in footnotes.

9. Antennæ with tuft outwardly placed, in a notch, the apical part of antenna slender; air tube long, over three times as long as wide 10
 Antennæ with the tuft at or before the middle, the apical part not more slender; air tube usually shorter than three times its width 17
 10. Lateral comb of the eighth segment a patch of spines 11
 Lateral comb of the eighth segment a row of bars 16

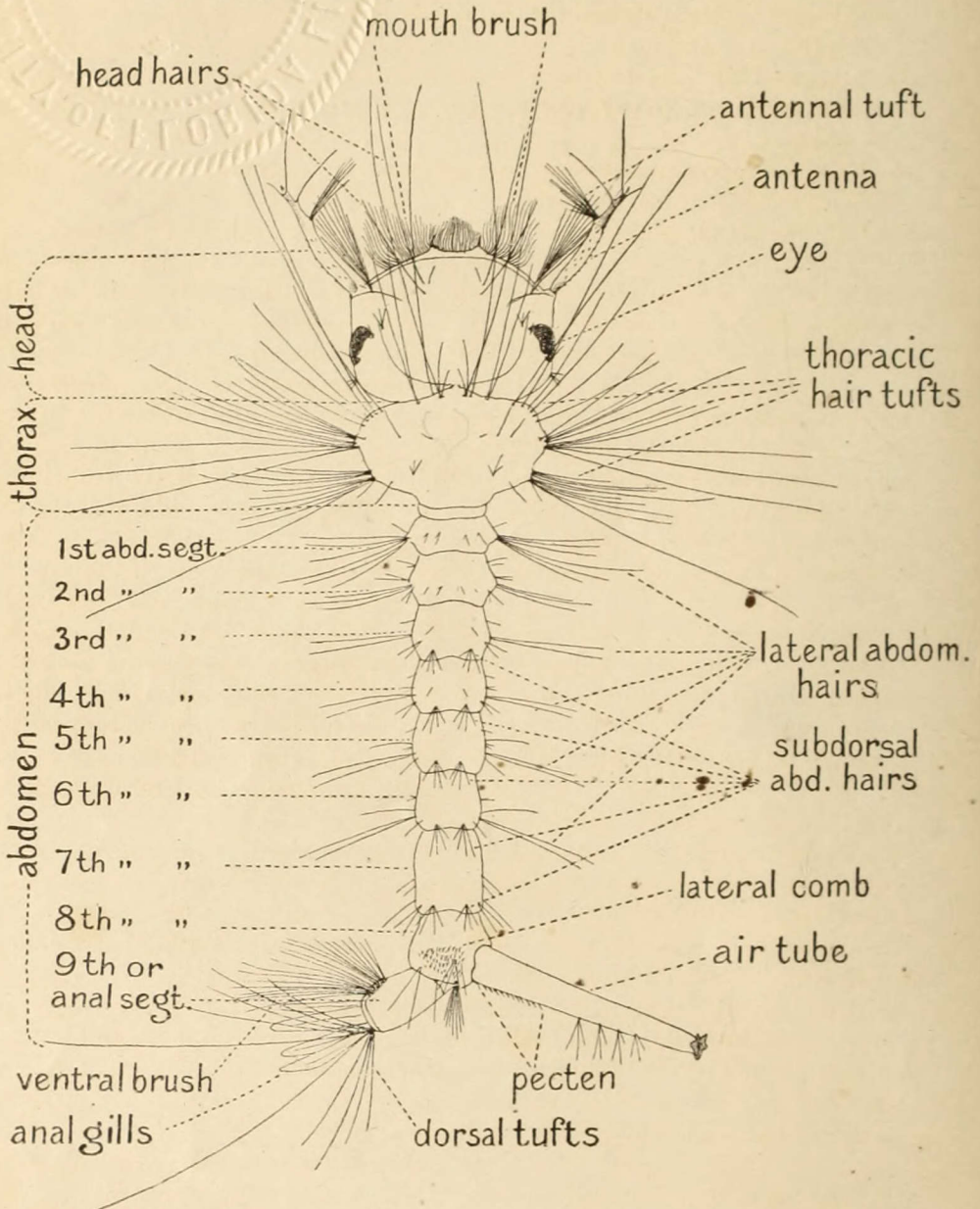


FIG. 1.—Diagram of a mosquito larva (*Culex salinarius*), with names of the parts referred to in the key (original).

11. Anal segment with a row of hairs along the ventral line to base; an early spring species *Culicella dyari* Coquillett.
 Anal segment without any tufts in front of the ventral brush 12
 12. Air tube with four paired tufts posteriorly outwardly, the subapical one moved sideways out of line 13
 Air tube with four to ten paired tufts along the posterior line in a straight row, none displaced 15

13. Air tube over five times as long as wide, nearly straight, without marked tapering; living in fresh-water pools, rain barrels, etc.

Culex salinarius Coquillett.

Air tube less than five times as long as wide, tapering rather rapidly after the middle, somewhat fusiform in shape..... 14

14. Air tube five times as long as wide, its pecten of 15 teeth; subdorsal hairs of third and fourth abdominal segments double. Introduced domestic mosquito..... *Culex pipiens* Linnaeus.

Air tube four times as long as wide, its pecten of nine teeth; subdorsal hairs of the third and fourth abdominal segments single. Southern domestic mosquito..... *Culex fatigans* Wiedemann.¹

15. Air tube slightly expanded at tip. Summer swamp mosquito. The adult does not bite..... *Culex territans* Walker.

Air tube evenly tapered to tip. Living in permanent pools all summer.

Culex tarsalis Coquillett.

16. Bars of comb in a perfectly regular row; skin smooth. Hibernates as fully grown larva in permanent pools..... *Melanoconion melanurus* Coquillett.

Bars of comb in an irregular row; skin minutely pilose.

Mochlostyrax erraticus Dyar and Knab.²

17. Air tube strongly inflated; anal segment with a chitinous ring, pierced by a row of tufts along the ventral line..... 18

Air tube not inflated; anal segment not ringed, or, if so, without tufts along the ventral line..... 20

18. Antennæ long and prominent..... 19

Antennæ less long, moderate only. Developing rapidly in rain puddles.

Grabhamia jamaicensis Theobald.

19. Lateral comb of the eighth segment of six or seven nearly equal teeth. Developing rapidly in rain puddles... *Janthinosoma sayi* Dyar and Knab.³

Lateral comb of the eighth segment of five teeth, the upper and lower ones small..... *Janthinosoma varipes* Coquillett.

20. Antennæ inflated and bent. Rapidly developing in rain puddles.

Grabhamia discolor Coquillett.

Antennæ not markedly inflated or bent..... 21

21. Head with a lateral prominent angle which receives a process on the mandible. In crab holes on the Florida coast... *Deinocerites cancer* Theobald.

Head without such an angle..... 22

22. Head with thick club-like hairs..... Genus *Uranotania*.⁴

Head with the usual fine hairs only..... 23

23. Air tube without pecten; several chitinous plates on the abdominal segments. In hollow trees and rain barrels... *Pneumaculex signifer* Coquillett.

Air tube with pecten; abdominal segments without any plates before the air tube..... 24

24. Air tube bottle-shaped, the outer half linear.

Taniorhynchus perturbans Walker.

Air tube regularly tapered..... 25

25. Air tube with a row of hairs beyond the pecten, the pair of tufts at base of tube..... 26

Air tube without a row of hairs; the tuft at or beyond the middle of the tube..... 28

¹ *Culex pipiens* (in part). Not the true *fatigans* of India, but so called by Theobald. The proper name of our species appears to be *Culex cubensis* Bigot.

² *Melanoconion atratus* (in part).

³ *Janthinosoma posticata*.

⁴ Three species differentiated by minute characters. Only one species is at all common, *Uranotania sapphirina* Osten-Sacken.

26. Lower head tuft with three long hairs, the upper multiple. In permanent water, with a northern distribution. ----- *Culiseta absobrinus* Felt.
Lower and upper head tufts alike, multiple ----- 27
27. Basal pecten teeth of the air tube with one branch. In pools, barrels, etc., with western distribution ----- *Theobaldia incidens* Thomson.
Basal pecten teeth of air tube with several branches. In pools, with eastern and southern distribution ----- *Culiseta consobrinus* Desvoidy.
28. Air tube with several hair tufts ----- 29
Air tube with only one pair of tufts ----- 30
29. Air tube long; anal segment with a complete ring. Living in pools and rain barrels ----- *Culex restuans* Theobald.
Air tube short; anal segment not fully ringed. An early spring species.
Ochlerotatus trichurus Dyar.¹
30. Air tube with the hair tuft within the pecten ----- 31
Air tube with the hair tuft beyond the pecten ----- 33
31. Anal segment ringed with a horny plate ----- 32
Anal segment not ringed. In pot holes in rocks.
Ochlerotatus atropalpus Coquillett.
32. Lateral comb of the eighth segment a few scales in a row. In swamps, with a southern distribution ----- *Aedes tormentor* Dyar and Knab.²
Lateral comb of the eighth segment a large patch of scales.
Ochlerotatus bimaculatus Coquillett.
33. Pecten of the air tube with detached teeth outwardly ----- 34
Pecten of the air tube with all the teeth evenly spaced ----- 38
34. Air tube four times as long as wide; lateral comb of the eighth segment a patch of scales three rows deep. An early spring species.
Ochlerotatus abfitchii Felt.
Air tube three times as long as wide or less; lateral comb of the eighth segment of few scales ----- 35
35. Antennæ enlarged basally; tuft rather beyond the middle. An early spring species ----- *Ochlerotatus aurifer* Coquillett.
Antennæ moderate only; the tuft before the middle ----- 36
36. The two rows of the pecten of the air tube approximate behind; dorsal plate of anal segment a saddle only. An early spring species.
Ochlerotatus impiger Walker.
The two rows of pecten well separated; dorsal plate more than half encircling the anal segment ----- 37
37. Tuft of the tube before the outer third; anal gills blunt. In rain puddles.
Ochlerotatus sylvestris Theobald.
Tuft of tube beyond the outer third; anal processes pointed. In rain puddles.
Aedes fuscus Osten-Sacken.
38. Comb scales few, in a single or irregularly single row ----- 39
Comb scales more numerous to many, in a patch ----- 43
39. Anal segment ringed by the plate ----- 40
Anal segment not completely ringed by the plate ----- 42
40. Anal gills moderate, normal ----- 41
Anal gills very long with stout central trachea. In pools, not coming to the surface; distribution southern ----- *Ochlerotatus dupreei* Coquillett.
41. Pecten of air tube running about one-third; anal segment not longer than wide. An early spring species ----- *Ochlerotatus punctor* Kirby.
Pecten of air tube running about one-half; anal segment longer than wide.
Aedes atlanticus Dyar and Knab.²

¹ *Ochlerotatus cinereoborealis*.² *Ochlerotatus serratus* (in part).

42. Scales of the comb of the eighth segment smooth, bluntly rounded. In hollow trees and rain barrels *Ochlerotatus triseriatus* Say.
Scales of comb sole-shaped with trifid apex. The yellow-fever mosquito. *Stegomyia calopus* Meigen.
43. Anal segment ringed by the plate 44
Anal segment not completely ringed by the plate 50
44. Air tube over twice as long as wide, its pecten of 19 to 22 teeth 45
Air tube twice as long as wide or less, its pecten of 12 to 14 teeth 48
45. Scales of the comb with the central spinule shorter than the body of the scale; pecten of the air tube of equal teeth 46
Scales of the comb with central spinule as long as the body of the scale; pecten of the air tube longer outwardly 47
46. Air tube two and one-half times as long as wide; comb scales moderate. The Atlantic coast salt-marsh mosquito. *Ochlerotatus sollicitans* Walker.
Air tube three times as long as wide; comb scales long. In rain puddles, with a southern distribution *Ochlerotatus mitchellæ* Dyar.
47. Air tube pecten reaching to beyond the middle of the tube; lateral comb of 21 scales in nearly three rows *Ochlerotatus trivittatus* Coquillett.
Air tube pecten not reaching to the middle of the tube; comb of 17 scales in two imperfect rows. An early spring species. *Ochlerotatus auroides* Felt.
48. Scales of the comb feathered on the sides, with central thorn. *Aedes infirmatus* Dyar and Knab.¹
Scales of the comb evenly feathered; no central thorn 49
49. Air tube one and one-half times as long as wide; pecten teeth broadly elliptical. In puddles along the Atlantic seaboard. *Ochlerotatus damnosus* Say.²
Air tube twice as long as wide; pecten teeth narrowly elliptical. An early spring species *Ochlerotatus inconspicuus* Grossbeck.
50. Air tube four times as long as wide; tracheæ narrow, angled. An early spring species *Ochlerotatus fitchii* Felt and Young.
Air tube three times as long as wide or less 51
51. Anal plate small; gills very large, sack like, spotted. *Ochlerotatus varipalpus* Coquillett.
Anal plate over half encircling the segment; anal gills moderate or small. 52
52. Comb scales tapered, a single median spinule stouter or larger than the rest 53
Comb scales bluntly rounded, the median spinule resembling the others. 59
53. Both of the hair tufts on the front of the head multiple 54
The lower head tuft single or double (rarely three) 56
54. Subdorsal prothoracic hairs single. In temporary pools. *Ochlerotatus canadensis* Theobald.
Ochlerotatus nivitarsis Coquillett.³
Subdorsal prothoracic hairs multiple 55
55. Weakly colored; tufts of ventral brush short-stemmed. In puddles near the sea along the Atlantic coast *Ochlerotatus cantator* Coquillett.
Darkly colored; tufts of the ventral brush long-stemmed. An early spring species in the Northwest *Ochlerotatus pullatus* Coquillett.
56. Lower head hair double (or triple) 57
Lower head hair single 58

¹ *Ochlerotatus confirmatus* (in part).² *Ochlerotatus tæniorhynchus*.³ Imperfectly known.

57. Comb scales with lateral spinules as long as the apical one. An early spring species.----- *Aedes grossbecki* Dyar and Knab.¹
 Comb scales with the lateral spinules very short. An early spring species.
Ochlerotatus pretans Grossbeck.
58. Apical spinule of the comb scale sharp and distinct An early species in the Northwest----- *Ochlerotatus aestivalis* Dyar.
 Apical spinule of comb scale not sharply distinct. An early spring species in the Northeast ----- *Ochlerotatus subcantans* Felt.
59. Anal gills moderately long. An early spring species in the Northeast.
Ochlerotatus lazarensis Felt.
 Anal gills very short, bud-shaped. The Pacific coast salt-marsh mosquito.
Aedes quaylei Dyar and Knab.²

¹ *Lepidoplatys squamiger* (in part).

² *Ochlerotatus lativittatus*.

Approved :

JAMES WILSON,
 Secretary of Agriculture.

WASHINGTON, D. C., April 27, 1906.

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When + how do they discharge?

(4) Occupying most of disc note stomach. obs. that first inside + mouth it divides into pouches (cardiac pouches). How many? The pyloric pouches come next after a slight constriction. What is their relation to the liver? Note carefully the mesentery or membrane which attaches liver to roof of rays. The intestine is very short + leads ^{from} the pyloric portion of stomach to the anus in center of disc.

2. Reproductive system Find ovaries + testes - racemose structures - near angles of rays. How many + where do they discharge?

3. Ambulacral system. Determine structure of ambulacral foot. obs. ampullae + their relation to feet. Relation of feet to radial water tube. Note circum oral water tube. Its relation to radial tubes. The stone canal leads from the circum oral tube to the madreporite.

4. Respiratory System

5. Circulatory "

6. Nervous "

Echinodermata Star fish



I. External anatomy

a. Shape etc. Note central disk & arms & rays, how many rays, are all alike? Obs madreporic body, a small circular body on the disk near the junction of two rays called the trivium. The remaining rays constitute the trivium.

What is the symmetry of the animal.

Note differences between the oral (ventral) & aboral (dorsal) surfaces.

b. Miscel. structures Spines - note size, arrangement & skin - does it cover all parts? Obs. small papillae aboral tentacles - on skin.

Obs. mouth in center of disk on oral side, & note ambulacral grooves radiating from it. In " " " note ambulacral feet.

How many? How arranged. The radial water tube runs ~~at~~ along the vertebral ridge of the ray.

II The skeleton is made up of a large no. of bony elements (ossicles). Is there any differences in their arrangement? Composition

III Internal anatomy

Digestive system Cut off tip end of rays & with strong scissors cut along to remove roof. Continue cut to sides of disk back & observe body cavity & its continuations.

scraping up rays note liveris. How many