Key to Genera of Adult Females

1. Palpi as long as proboscis (fig.1), scutellum rounded (fig.2) — Anopheles

Palpi shorter than proboscis (fig.3), scutellum three-lobed (fig.4) — 2

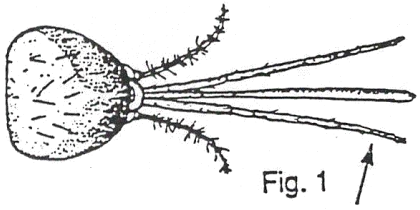


Fig. 1

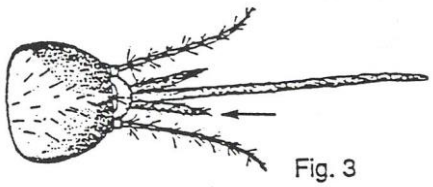


Fig. 3

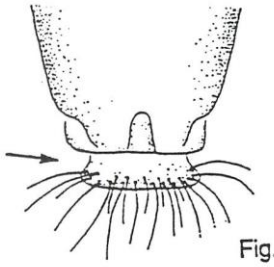


Fig. 2

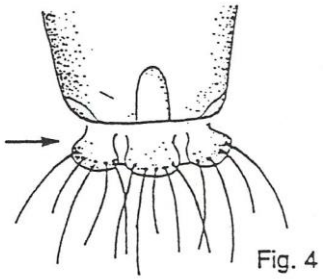


Fig. 4

2. Proboscis long, curved downward (fig.5); a very large mosquito with blue-green coloration – *common* — *Toxorhynchites rutilus septentrionalis*

Proboscis not long and curved (fig.6); mosquito generally not large — 3

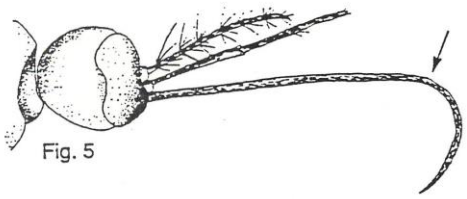


Fig. 5

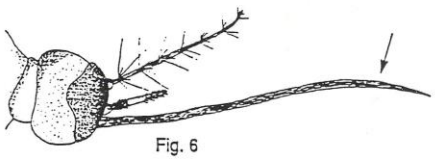


Fig. 6

Note: this is a reproduction of the Slaff/Apperson Key, edited by Dr. Bruce Harrison and Parker Whitt. Where this version differs from the original, the changes are in italics.

3. Dorsal half of abdomen dark, ventral half white (fig.7); *meso*-postnotum of thorax with setae (fig.8); pitcher plant mosquito – uncommon — *Wyeomyia smithii/haynei*

Abdominal colors not divided as above (fig.9*); meso*-postnotum without setae (fig.10) — 4

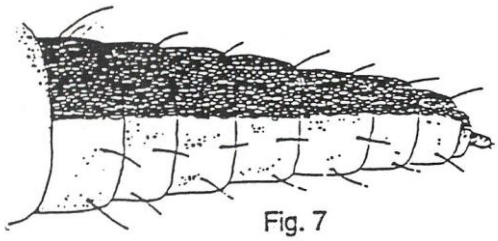


Fig. 7

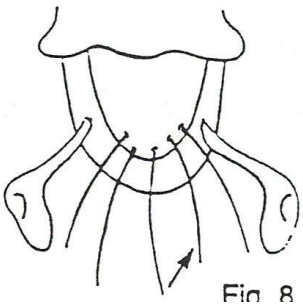


Fig. 8

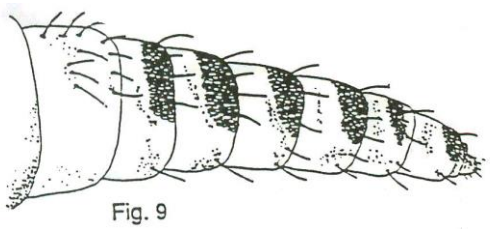


Fig. 9

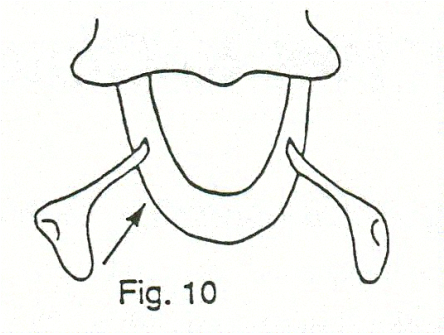


Fig. 10

4. Lines of iridescent blue scales along midline of head, thorax and wings; second marginal cell of wing less than half the length of its stalk (figs. 11, 12); *wing vein 1A ends before the level of the CU fork (fig.12)* — *Uranotaenia*

Iridescent scales absent; second marginal cell of wing longer than its stalk (fig.13); *wing vein 1A extends beyond the CU fork (fig. 13)* — 5

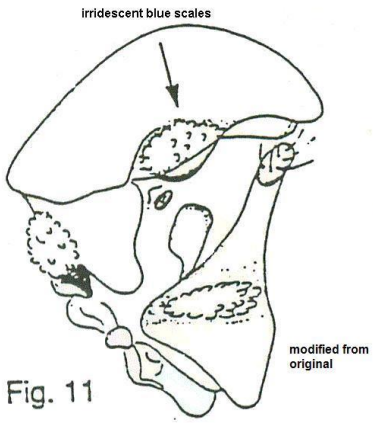


Fig. 11

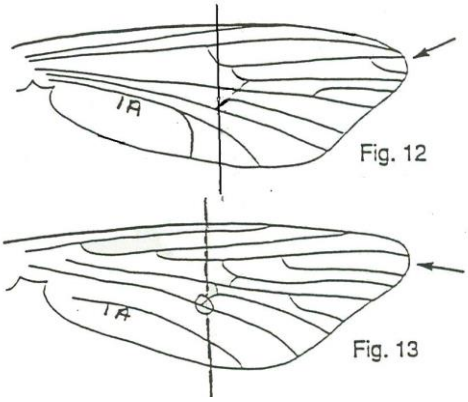


Fig. 12

Fig. 13

5. Abdomen pointed at tip (fig.14), *8 abdominal segments are visible and the end view appears hollow if the cerci are retracted, segment 8 is long* 6

Abdomen rounded at tip (fig.15), *last abdominal segment is short* 7

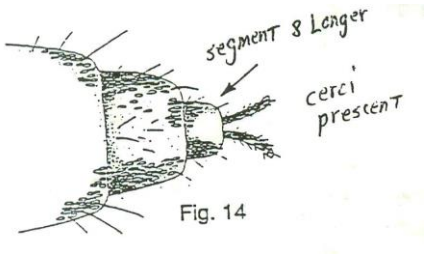


Fig. 14

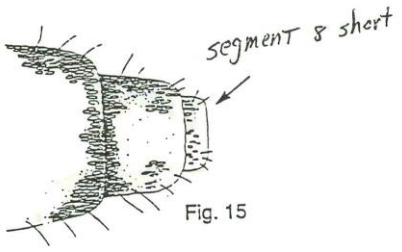


Fig. 15

6. White scales on upper surface of abdominal segments are apical *(toward tip of abdomen)* (fig.16), or if no white scales, with erect scales on hind tibia; pre-spiracular setae present (fig.17) *Psorophora*

White scales on abdominal segments at base of segments (toward head) (fig.18); hind tibia without erect scales; pre-spiracular setae absent *Aedes / Ochlerotatus*

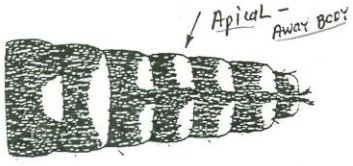


Fig. 16

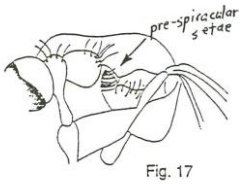


Fig. 17

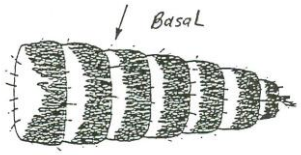


Fig. 18

7. Wing scales narrow, mostly dark (fig.19) 8

Wing scales *very* broad, dark and light (fig.20) 9

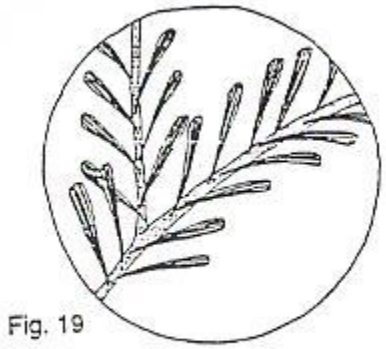


Fig. 19

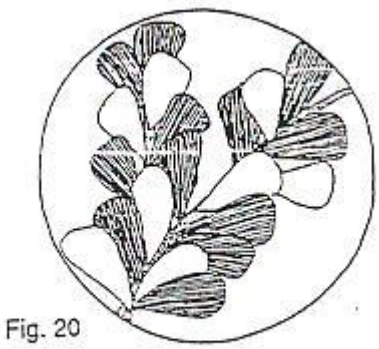


Fig. 20

8. Tuft of *setae* on underside at base of wing vein 2 (fig.21); pre-spiracular setae present (fig.22); proboscis usually greater than 1/3 body length, *at least 1.2 times the length of the front femur.*

Note which sclerite the pre-spiracular setae are on – they have to be on the same sclerite as the spiracle and usually lay across the spiracles. *Culiseta*

No tuft of *setae on underside of* wing vein 2 (fig.23), pre-spiracular setae absent; proboscis usually less than 1/3 body length, *usually approximately equal to the length of the front femur.*

No pre or post spiracular setae *Culex*

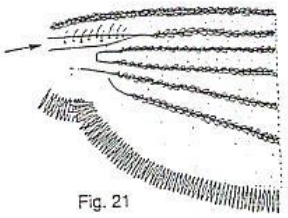


Fig. 21

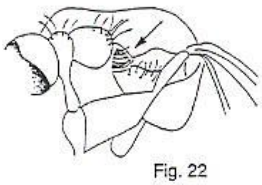


Fig. 22

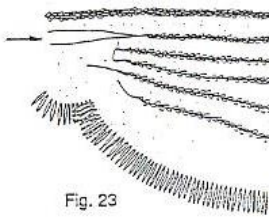


Fig. 23

9. *Scutum* with *very* fine white lines (fig 24); hind tarsi banded across joints (fig.25), *apical and basal bands on hind tarsi*; *dark and light wing scales* *Orthopodomyia*

Scutum lacking *fine white* lines (fig.26); hind tarsi banded at base of segments (fig.27); *pre-apical pale band on the hind tibia – common,* the 'salt and pepper' mosquito *Coquillettidia perturbans*

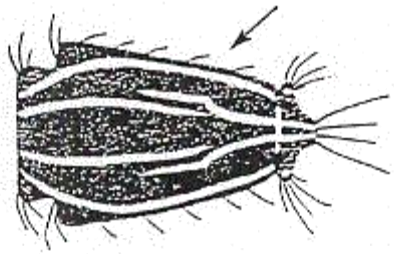


Fig. 24

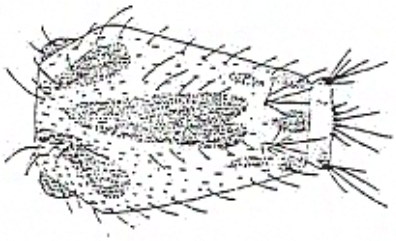


Fig. 26

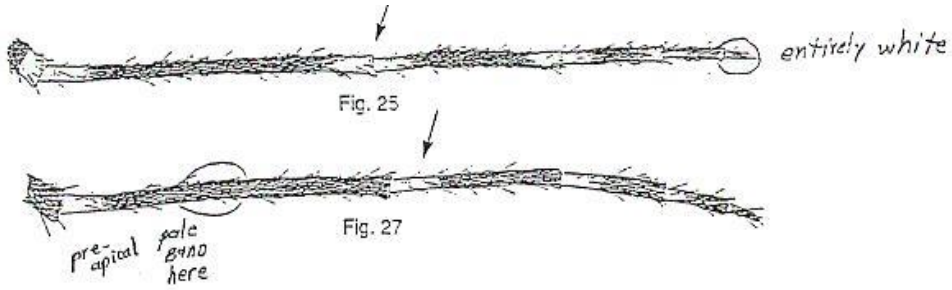


Fig. 25

Fig. 27

KEY TO ADULT *AEDES*/*OCHLEROTATUS*

General Characteristics of Aedes/Ochlerotatus:

- *Palpi shorter than proboscis*
- *Proboscis not curved*
- *Abdomen pointed, white scales on abdominal segments basal*
- *Abdomen not dorsal/ventral color pattern*
- *Wing vein 1A extends beyond Cu fork*
- *Generations vary by species and/or season*

1. *Hind* tarsi banded (fig.28) 2

Hind tarsi unbanded (fig.29) 13

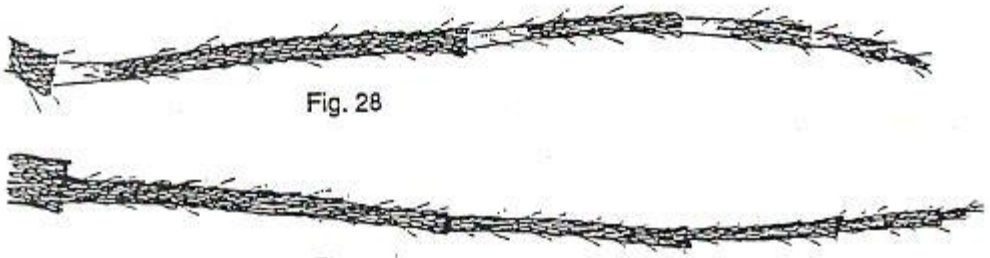


Fig. 28

Fig. 29

2. Hind tarsi banded across joints (fig.30) 3

Hind tarsi banded *only* at base of segments (fig.31) 5

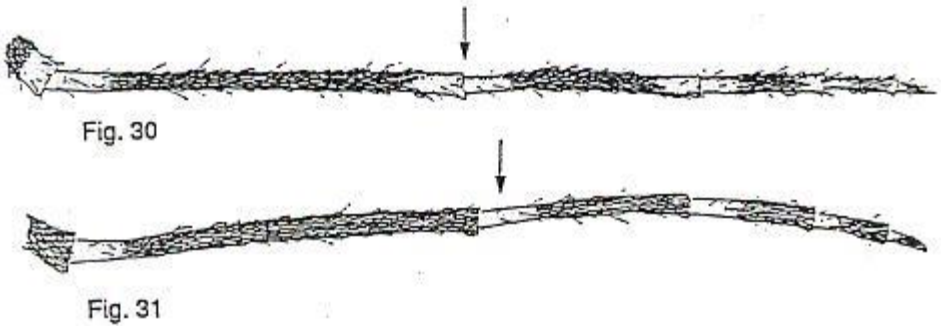


Fig. 30

Fig. 31

3. Wing with patch of white *on* base of costa (first wing vein) (fig.32); thorax light with dark medial portion (fig.33); larvae in rock holes, tires- common. *Ochlerotatus atropalpus*

Wing without white *on* base of costa (fig.34); thorax evenly reddish or golden brown (fig.35) 4

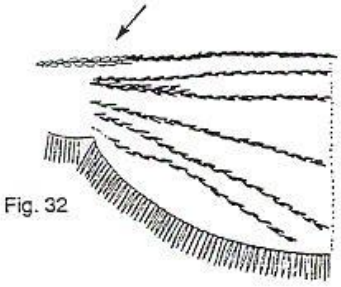


Fig. 32

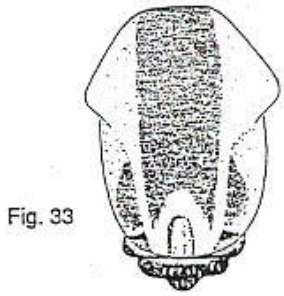


Fig. 33

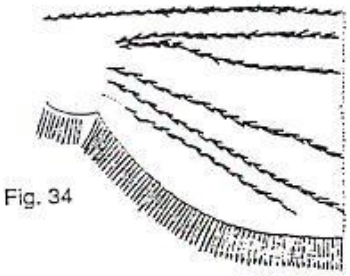


Fig. 34

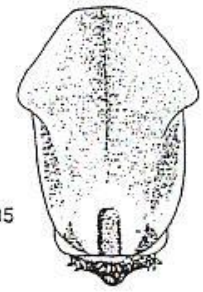


Fig. 35

4. Tarsi distinctly banded across joints; tip of *hind* tarsi completely pale (fig.36); spring, woodland pool – common *Ochlerotatus canadensis canadensis*

Tarsal bands less distinct, across only first two segments; tip of *hind* tarsi dark (fig.37 *and fig 159 Darsie and Ward*); spring, woodland pool, ***not currently in N.C***. (S.C. is northern limit) *Ochlerotatus canadensis mathesoni*

Fig. 36

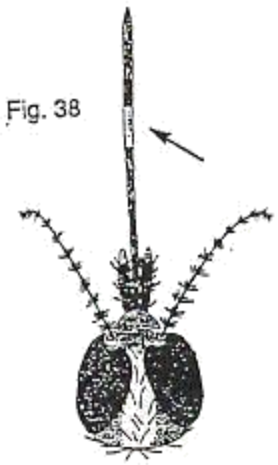
Fig. 37

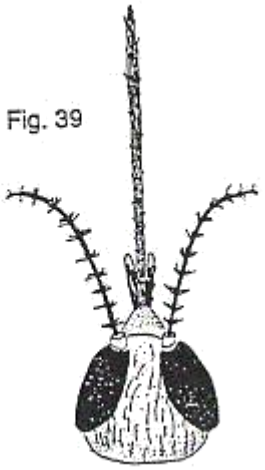
Fig. 159. Hindleg: *Oc. c. mathesoni*

Figure 159: Darsie & Ward, page 40

5. Proboscis banded (fig.38) 6

Proboscis unbanded (fig.39) 8





6. Abdomen without *median* longitudinal *pale* stripe (fig.40); *wing scales black; abdomen with white patches on sides*; black, salt-marsh mosquito – abundant on coast. *Ochlerotatus taeniorhynchus*

Abdomen with *median* longitudinal *pale* stripe (fig.41); *wing scales black & white* 7

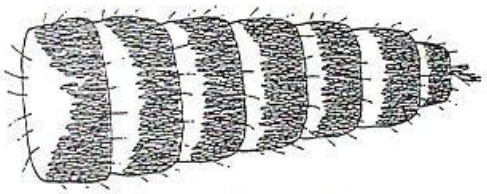


Fig. 40

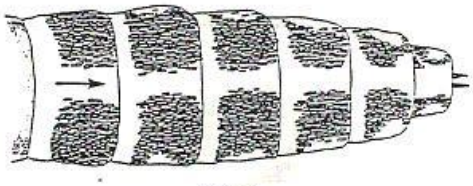


Fig. 41

7. Wing scales entirely dark (fig.42); *speckled fore femur and fore tibia;* small, freshwater mosquito- uncommon. *Ochlerotatus mitchellae*

Wing scales mixed dark and light, (fig.43); *1st hind tarsal segment with pale band (fig. 59-Darsie&Ward)*, large fierce day-biting salt marsh mosquito – abundant *Ochlerotatus sollicitans*

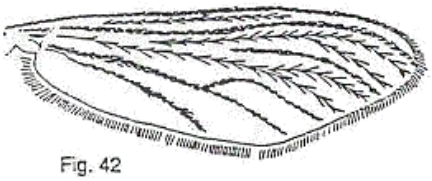


Fig. 42

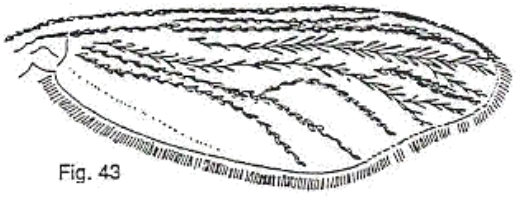


Fig. 43

Fig. 59. Hindtarsomeres: *Oc. sollicitans*

Figure 59: Darsie & Ward, page 27

8 *Hindtarsomeres 1-3 with basal pale bands, 4-5 entirely dark (Fig. B); scutum with median longitudinal yellow-gold stripe (Fig. A); abdomen without complete basal pale bands, but with large lateral silver patches; found in rock holes, tires – common in the western part of N.C., spreading east* *Oc. j. japonicus*

Hindtarsomeres 1-5 with broad or narrow basal pale bands, 5 may be entirely pale (Fig. C); scutum without yellow-gold median longitudinal stripe, but may have white median longitudinal stripe or other longitudinal stripes; abdomen with broad or narrow pale bands. *8a*

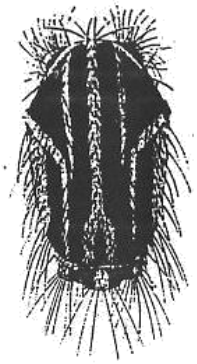


Figure A

Figure B

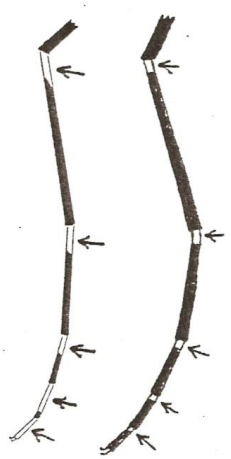


Figure C

8*a* Thorax with white, lyre-shaped markings (fig.44); *silver scales on clypeus; abdomen, venter pale;* domestic container mosquito – *rare*. *Ae. aegypti*

Thorax not as above (fig.45) 9

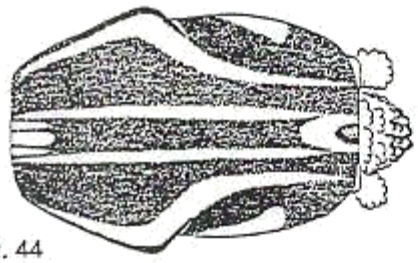


Fig. 44

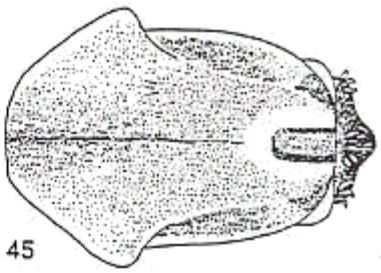


Fig. 45

9. Thorax with *median* narrow *white stripe* (fig.46); *dark scales on clypeus, abdomen venter dark*; domestic container and tree hole mosquito – *abundant* *Ae. albopictus*

Thorax without such a *stripe* 10

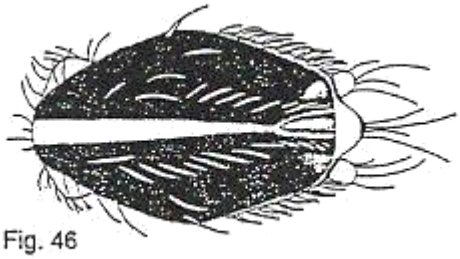


Fig. 46

10 Bands on hind tarsi narrow, no wider than diameter of segment (fig.47) 11

Bands on hind tarsi broad (fig.48) 12

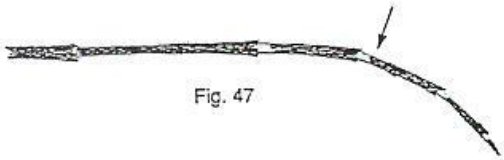


Fig. 47

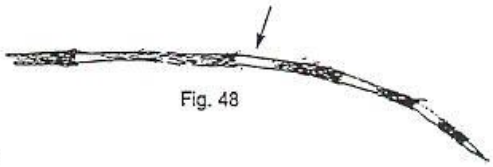


Fig. 48

11 Abdominal bands with a notch (fig.49); summer, fresh floodwater mosquito – abundant *Aedes vexans*

Abdominal bands without a notch (fig.50); spring, salt-marsh mosquito – ~~*NOT IN NC*~~; Va. is southern limit *Ochlerotatus cantator*

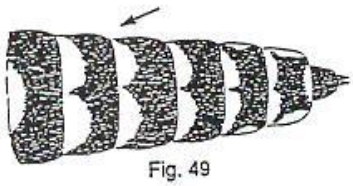


Fig. 49

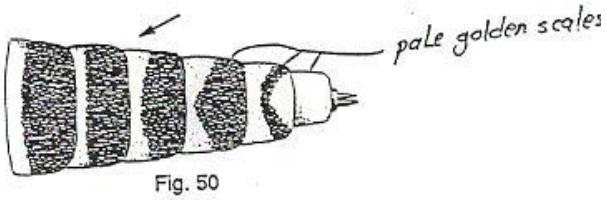


Fig. 50

12 Wings with broad, light and dark scales (fig.51); late winter/early spring, woodland pool – rare — *Ochlerotatus grossbecki*

Wing scales narrow (fig.52); early spring, woodland pool – <u>*NOT IN NC;*</u> Va. is southern limit — *Ochlerotatus stimulans*

Fig. 51

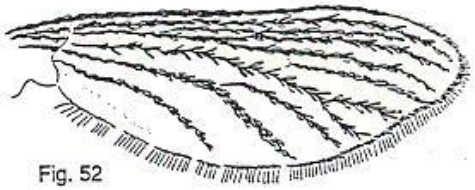


Fig. 52

13 Thorax bright yellow with two lateral dark spots (fig.53); deep woods mosquito – *uncommon* — *Ochlerotatus fulvus pallens*

Thorax not as above — 14

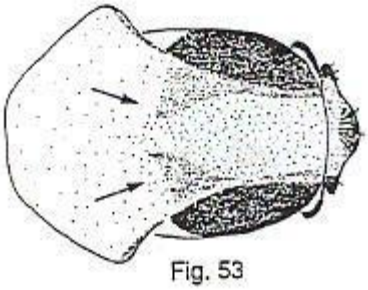


Fig. 53

14 *Thorax with one median longitudinal white stripe, or 2 narrow sub-median white stripes separated by a narrow dark stripe;* thorax with one or two stripes of white scales in middle, flanked by dark scales (fig.54) 15

Thorax without white stripes in middle (fig.55) 18

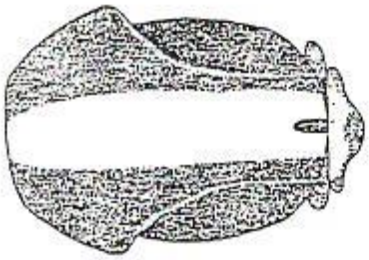


Fig. 54

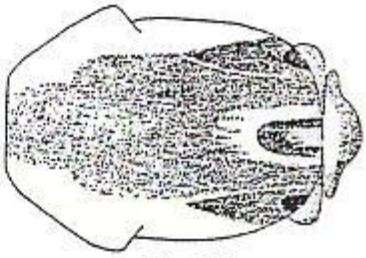


Fig. 55

15 Thorax with two *submedian* yellowish *cream* white stripes separated by medial dark stripe (fig.56*), paratergal lobe without scales*; summer, woodland pool or floodwater mosquito – uncommon. *Ochlerotatus trivittatus*

Thorax with one medial white stripe (fig.57) 16

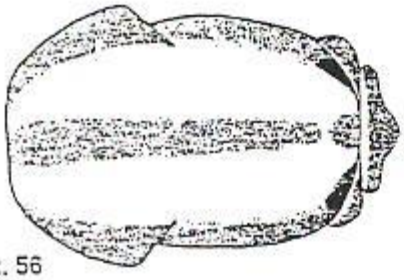


Fig. 56

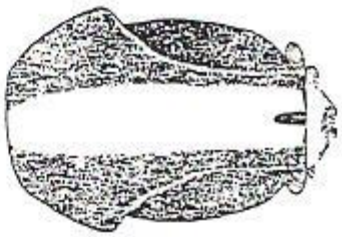


Fig. 57

16 *White* stripe *broad*, ending ¾ of the way down the thorax *(at the pre-scutellar area) (fig.58) If scales are rubbed, distinguish from atlanticus by looking at the sub-spiracular area – if white patch of scales is present it's infirmatus;* summer, temporary pool mosquito, common in the woods — *Ochlerotatus infirmatus*

White stripe *narrower*, extending *on*to *scutellum* — 17

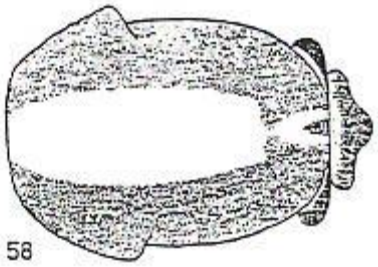


Fig. 58

17 *White* thoracic stripe narrow, extending to head (fig.59); *no pale scales on subspiracular area;* woodland temporary pools – abundant. — *Ochlerotatus atlanticus / tormentor*

White thoracic stripe broader, head (occiput) is completely white (fig.60); small mosquito, woodland pool – rare/uncommon. — *Ochlerotatus dupreei*

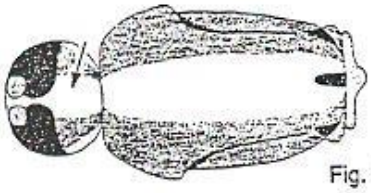


Fig. 59

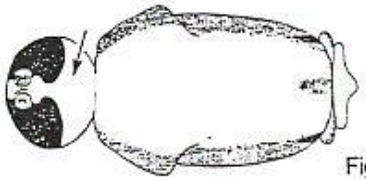


Fig. 60

18 Thorax is uniformly dark, *red/orange*; abdomen with lateral white stripe, *ventral half of abdomen is white* (figs.61, 62); spring, woodland pools – rare. *Aedes cinereus*

Thorax with *cream*, white or silver scales 19

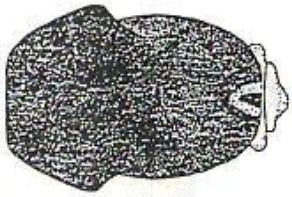


Fig. 61

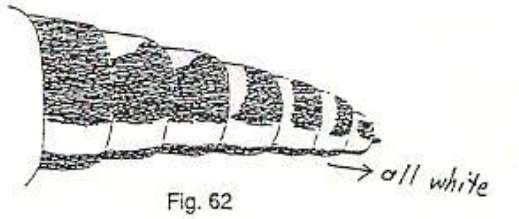


Fig. 62

19 Sides of thorax with broad, bright, *large*, silvery scales (fig.63) 20

Sides of thorax with narrow *cream*, brown or yellow scales 21

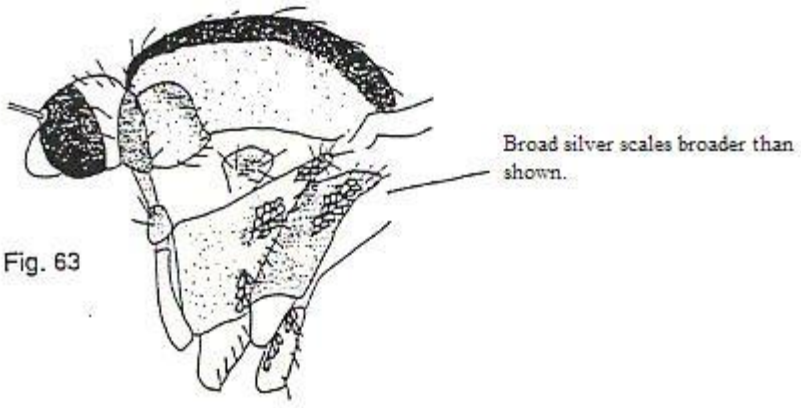


Fig. 63

20 *Dark central stripe is convex laterally*, thorax mostly dark (fig.64); tarsal claws on fore- and mid-legs evenly curved (fig.65), *tooth short; last two segments of abdomen are flattened laterally*; tree holes and tires –very common. *Ochlerotatus triseriatus*

Dark central stripe is concave laterally, thorax mostly white (fig.66); tarsal claws are abruptly curved, *tooth long* (fig.67); elevated tree holes, tires – common. *Ochlerotatus hendersoni*

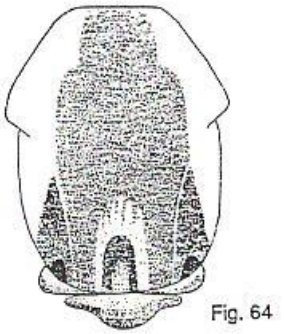


Fig. 64

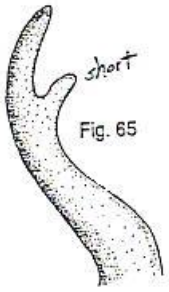


Fig. 65

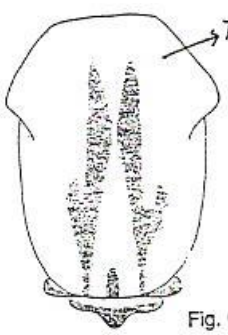


Fig. 66

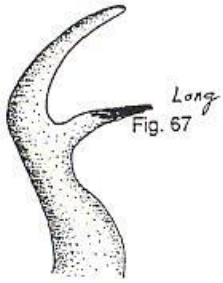


Fig. 67

21 *Lateral pale scales on scutum cream or white*, upper surface of abdominal segments clearly banded (fig.68), sides of thorax covered with *cream*, yellowish scales, *paratergal lobe with cream scales*; dark areas of legs speckled with white; spring, river floodplains- common *Ochlerotatus sticticus*

Lateral pale scales on scutum golden yellow, upper surface of abdominal segments without bands or very narrow bands on less than half the segments (fig.69); sides of thorax without yellowish, *grey or white* scales; legs uniformly dark. 22

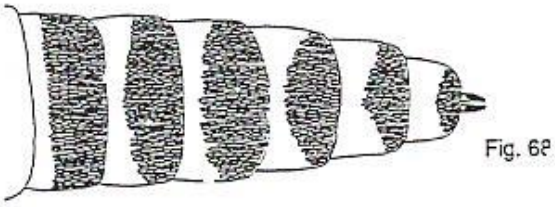


Fig. 68

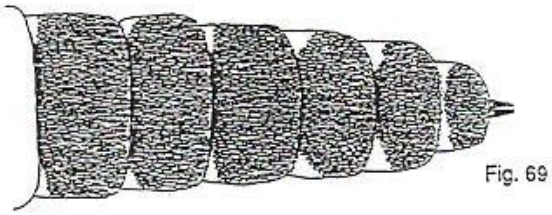


Fig. 69

22 Thorax with dark stripe that widens gradually (fig.70); underside of abdomen is completely pale (fig.71); spring, acid soil areas, ~~*NOT IN N.C.*~~, Va. is southern limit — *Ochlerotatus aurifer*

Thorax with dark stripe widening abruptly (fig.72); underside of abdomen with dark scales (fig.73); spring, tree rot hole mosquito – rare. — *Ochlerotatus thibaulti*

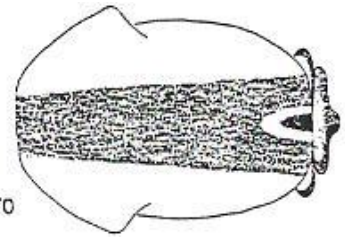


Fig. 70

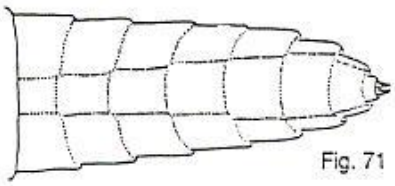


Fig. 71

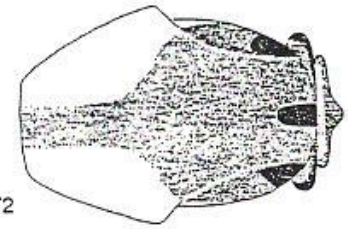


Fig. 72

Fig. 73

KEY TO ADULT *ANOPHELES*

1. Wing scales with distinct pale scaled areas (fig.74) 2

Wing scales dark, often with dark spots (fig.75) 4

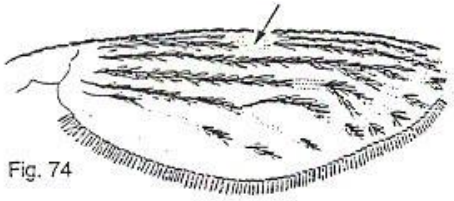


Fig. 74

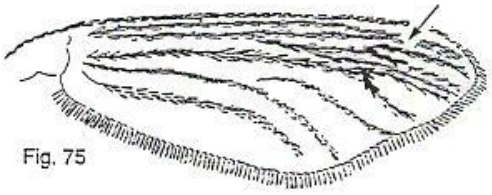


Fig. 75

2. Wing with pale scales at outer tip only, *wing vein 1A with 3 dark spots,* (fig.76), palpi banded (fig.77)

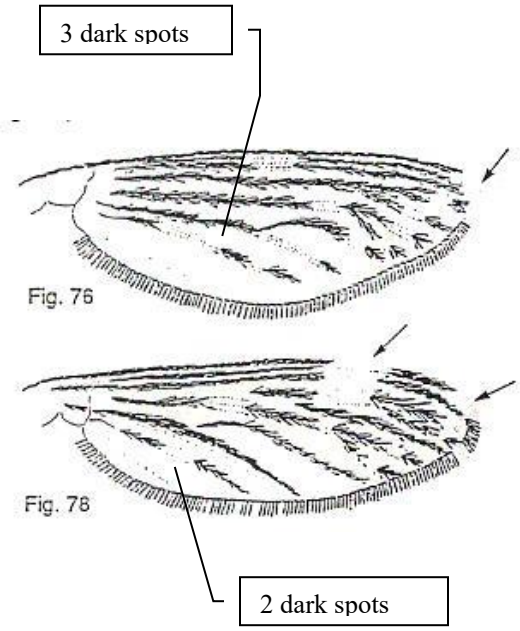
Freshwater swamps – uncommon - ……..crucians

Freshwater swamps and seepages – rare - ……georgianus

Salt marsh – common, *coast-* ……...bradleyi

Anopheles crucians ***complex***

Wing with patches of pale scales on tip and on front margin, *wing vein 1A with 2 dark spots* (fig.78); palpi unbanded (fig.79) 3



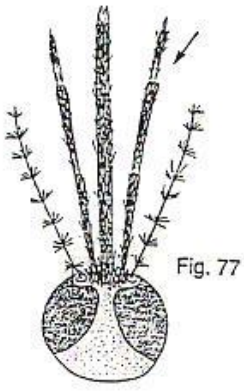


Fig. 77

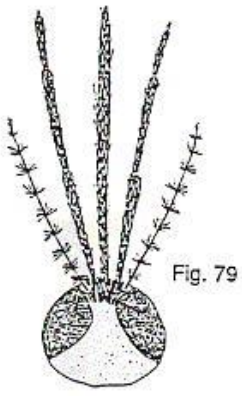


Fig. 79

3. Frontal light patch on wing half or more as long as the dark area between the two light patches *(Note: not a true distinguishing character, look at habitat)* (fig.80); spring and fall mosquito, very common — *Anopheles punctipennis*

Frontal light patch on wing very small (fig.81); limestone spring and freshwater swamp mosquito – uncommon. — *Anopheles perplexens*


Fig. 80

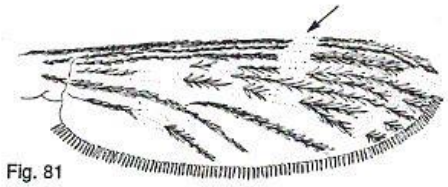


Fig. 81

4. Wings without dark spots (fig.82); , *pale scales behind eyes; scutal setae longer; found in* tree holes – uncommon — *Anopheles barberi*

Wings with dark spots (fig.83) — 5


Fig. 82

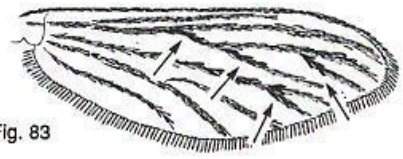


Fig. 83

5. Wings with four distinct dark spots (fig.84); interocular tuft of setae with some pale scales,(fig.85); *no dark scales on front forecoxa; wing vein 6 all dark;* summer, freshwater swamp and pond – common. — *Anopheles quadrimaculatus*

Wing spots less distinct or absent; interocular tuft dark (fig.86); *dark scales on front forecoxa* — 6


Fig. 84

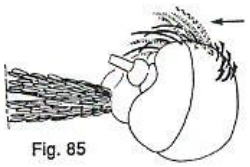


Fig. 85

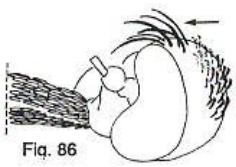
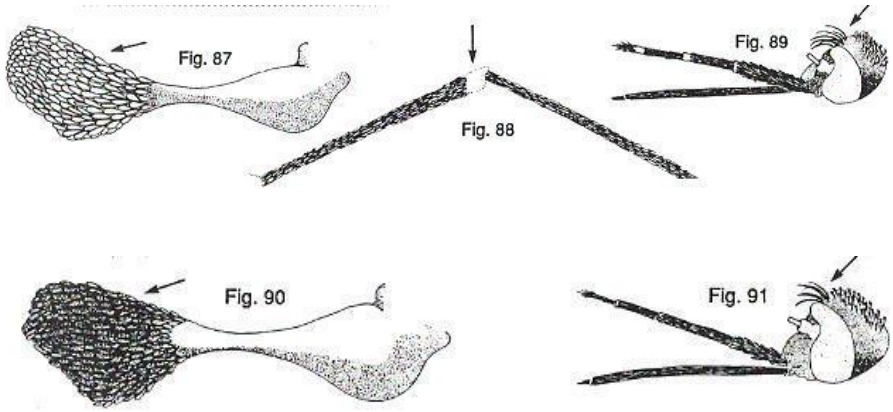


Fig. 86

6. Halteres pale scaled (fig.87); femur with area of pale scales (fig.88); palpi banded (fig.89); head with patches of short pale setae *within the interocular tuft* (fig.89); freshwater swamp – *rare*. *Anopheles walkeri*

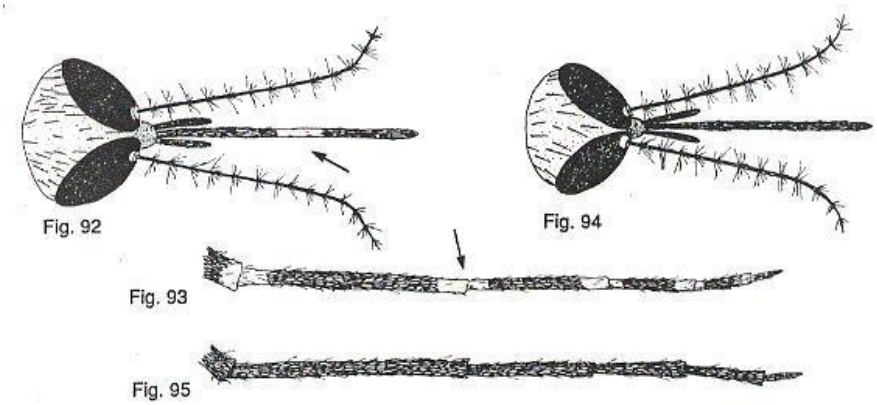
Halteres dark (fig.90); femur dark, palpi unbanded (fig.91), head with dark setae *within the interocular tuft* (fig.91)*;* late season (fall), salt marsh mosquito *–common along coast (wings may not show dark spots)* *Anopheles atropos*



KEY TO ADULT *CULEX*
no pre or post spiracular setae

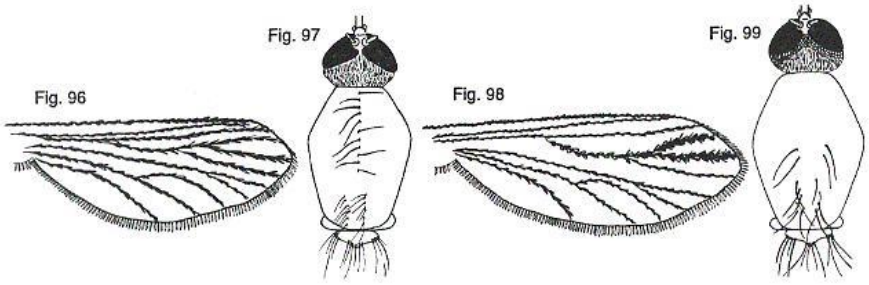
1. Proboscis (fig.92) and tarsi banded (fig.93); fresh or foul standing water – <u>*NOT IN NC*</u>, found in Tenn., S.C., Ga. *Culex tarsalis*

Proboscis (fig.94) and tarsi unbanded (fig.95) 2



2. Wing scales narrow *on vein R_2* (fig.96); occiput with narrow scales (fig.110), scutum with midline of setae (fig.97)*, subgenus Culex and Neoculex* 3

Wing scales broad *on vein R_2* (fig.98), occiput with broad scales, scutum without midline of setae (fig.99), *subgenus Melanoconion* 7



3. Upper surface of abdomen *with apical bands* (fig100), freshwater swamp, feed*s* only on reptiles and amphibians, abundant — *Culex territans*

Upper surface of abdomen *with basal bands* or unbanded (fig.101) — 4

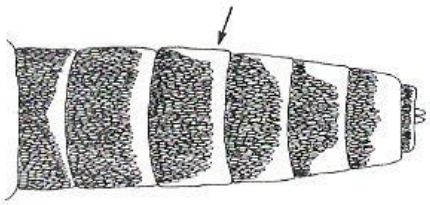


Fig. 100

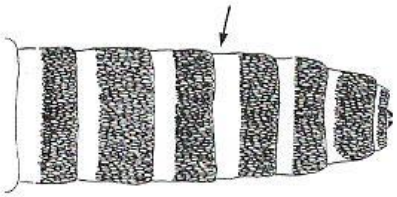


Fig. 101

4. Bands on upper surface of abdomen narrow or incomplete (fig.102); *abdominal segments I &II without pale bands, midlobe of scutellum with brown scales* — 5

Bands on upper surface of abdomen distinct (fig.103)*, abdominal segments I & II with pale bands, midlobe of scutellum with cream scales* — 6

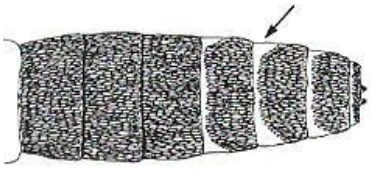


Fig. 102

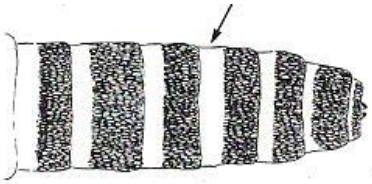


Fig. 103

5. Bands yellowish and narrow, last abdominal segment covered with pale scales (fig.104), many scales on sides of thorax *(fig. 413, Darsie & Ward)*, brackish and freshwater mosquito – abundant — *Culex salinarius*

Bands incomplete and appear as white spots laterally, last abdominal segment dark scaled (fig.105), fewer than six scales on sides of thorax, *no scale patch on the side of the thorax (mesepimeron) (fig. 411 Darsie & Ward);summer*, freshwater swamp mosquito, limited to southeastern N.C. – *common locally.* — *Culex nigripalpus*

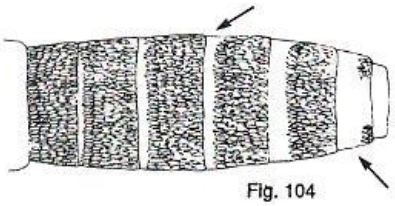


Fig. 104

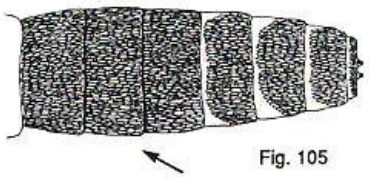


Fig. 105

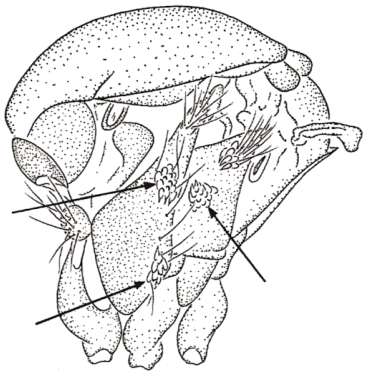


Fig. 413. Lateral view of thorax: *Cx. salinarius*

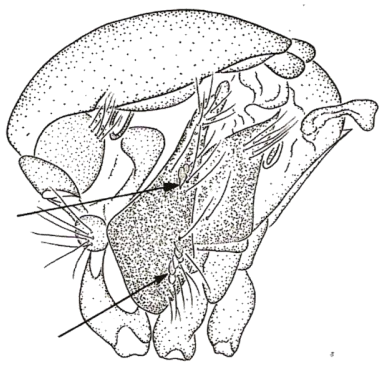


Fig. 411. Lateral view of thorax: *Cx. nigripalpus*

Figure 413&411: Darsie & Ward, page 78

6 Bands on upper surface of abdomen half-moon shaped, flaring laterally (fig.106), thorax without pale spots (fig.107), *thorax has cream bands with white lateral patches; scutum has a "scruffy" appearance; head scales with a median light patch;* summer, foul water mosquito – abundant, . *Culex pipiens / quinquefasciatus*

Bands on upper surface of abdomen broad and nearly straight across (fig.108), thorax may have pale spots (fig.109), *scutal scales fine and short; head scales all dark;* spring, freshwater swamp mosquito – very common. *Culex restuans*

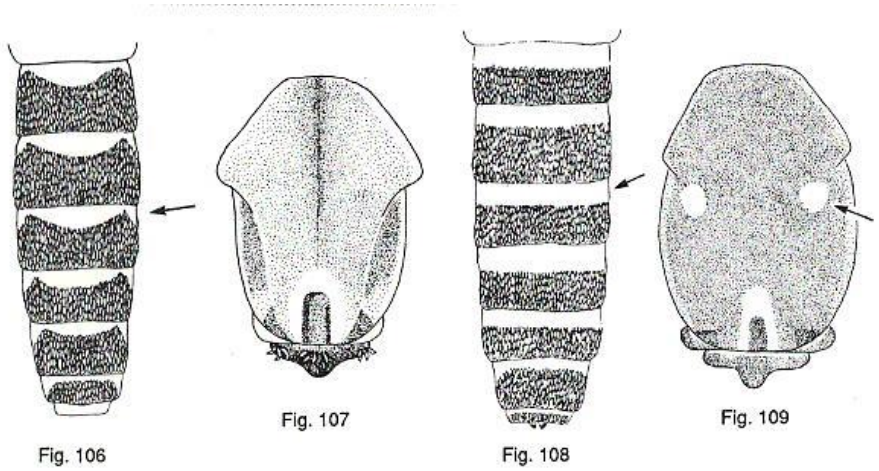


Fig. 106 Fig. 107 Fig. 108 Fig. 109

7. Broad scales on head (occiput) only bordering eyes (fig.110); sides of thorax *on* mesanepimeron with broad pale scales (fig.111), abdominal bands usually distinct, grassy pools, pond margins – common. *Culex erraticus*

Broad scales on much of head (occiput) (fig.112), sides of thorax *on* mesanepimeron without broad pale scales, abdominal bands indistinct. 8

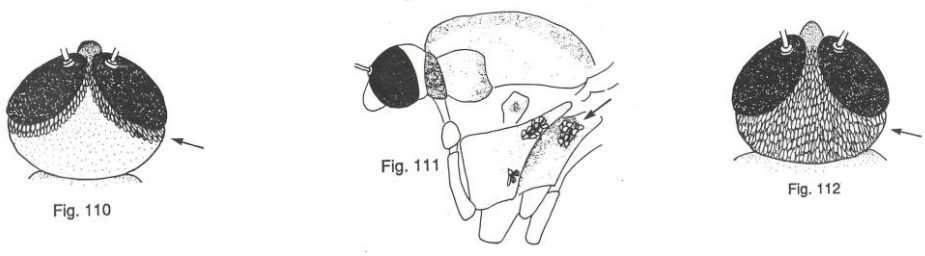


Fig. 110 Fig. 111 Fig. 112

8. Sides of thorax (upper mesokatepisternum) with five or more pale scales (fig.113), grassy pools and freshwater swamps – common in southeastern N.C., uncommon elsewhere — *Culex peccator*

Sides of thorax (upper mesokatepisternum) with fewer than five pale scales (fig.114), grassy pools and freshwater swamps in eastern ¾ of N.C. – rare. — *Culex pilosus*

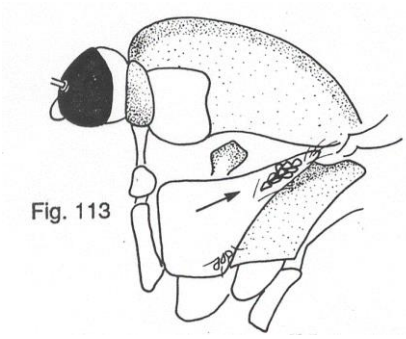


Fig. 113

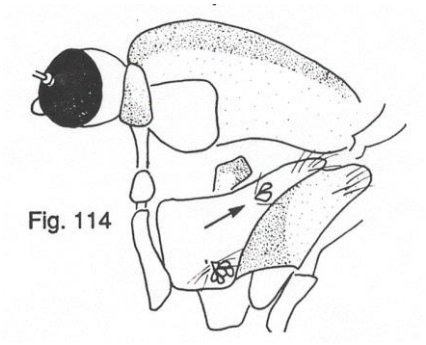


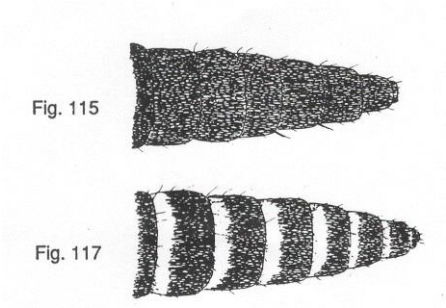
Fig. 114

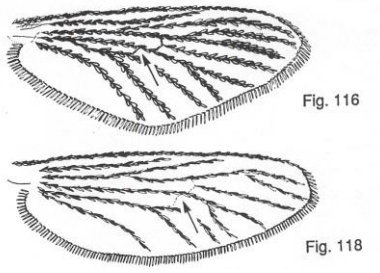
KEY TO ADULT CULISETA

has prespiracular setae

1. *Costal scales all dark, wing less lobed,* ~~*Upper surface of abdomen unban*~~n~~*ded*~~ (in spring they can have pale bands) (fig115), cross veins separated by more than the length of either vein (fig 116*)*, small, bird feeding mosquito – abundant. *Culiseta melanura*

Costal scales light and dark, wing more lobed, ~~*Upper surface of abdomen banded (fig.117),*~~ cross veins separated by less than the length of either vein (fig.118), large mammal feeding mosquito, active in winter – uncommon. *Culiseta inornata*





KEY TO ADULT *ORTHOPODOMYIA*

1. Four or more setae on sides of thorax (lower mesokatepisternum) (fig.119), base of wing vein 4-5 pale (fig.120); tree hole mosquito – common — *Orthopodomyia signifera*

Zero to two setae on sides of thorax (lower mesokatepisternum) (fig.121), base of wing vein 4-5 dark (fig.122); tree hole mosquito – rare. — *Orthopodomyia alba*

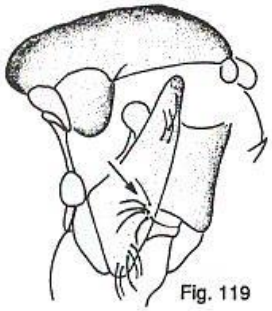


Fig. 119

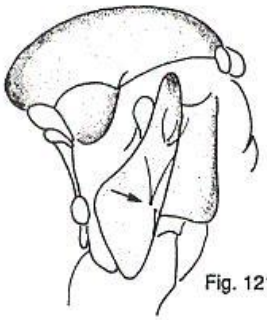
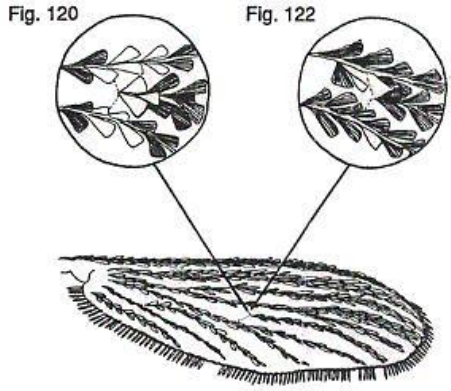


Fig. 121



KEY TO ADULT *PSOROPHORA*

1. Wing scales *broad,* white and dark (fig.123), *pre-apical pale band on hind femur* (fig.124) 2

Wing scales, *narrow,* mostly or all dark (fig.125), *no pre-apical pale band on hind femur* (fig.126) 3

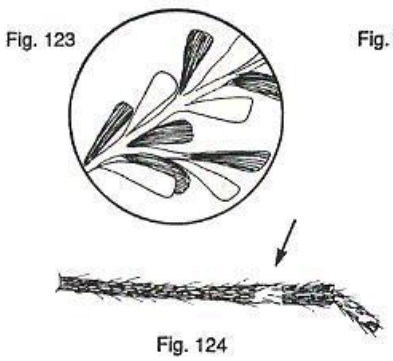


Fig. 123

Fig. 124

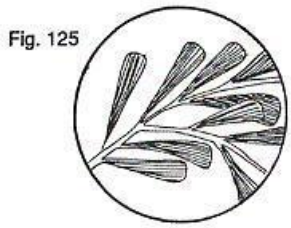


Fig. 125

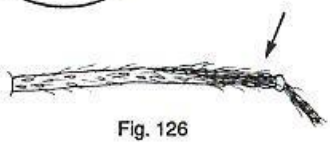


Fig. 126

2. *Black and white mosquito,* first hind tarsal segment *with pale band in* center (fig.127), wings speckled uniformly (fig.128); summer field and floodwater mosquito – abundant. *Psorophora columbiae*

Brown and white mosquito; first hind tarsal segment dark in center (fig.129), distinct broad white and dark patches on wings (fig.130), *abdomen entirely white,* summer floodwater mosquito – *rare*. *Psorophora discolor*

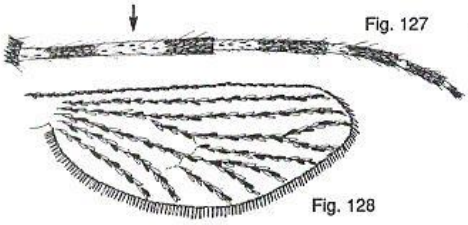


Fig. 127

Fig. 128

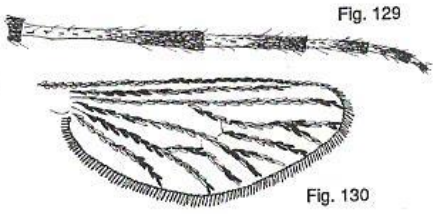


Fig. 129

Fig. 130

3. *Hindtarsomeres entirely dark (fig. 135); abdomen with broad apical patches of golden scales (Fig. 136); early to midsummer mosquito, open field, pastureland - rare* *Psorophora cyanescens*

Hindtarsomeres with basal pale bands on some segments, or with 1 to 2 tarsomeres entirely white (Fig.131 & Fig. 140) *4*

Fig. 135

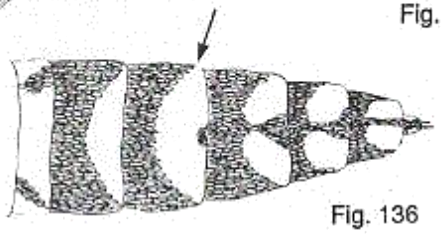


Fig. 136

Fig. 131

Fig. 140

4. *Palpi 1/3 or more as long as proboscis(Fig 505); hindtarsomeres with basal pale bands on some segments (Fig. 131); extremely large mosquitoes* *5*

Palpi less than 1/3 the length of the proboscis (Fig. 521); hindtarsomeres with 1 to 2 distal segments entirely white (Fig.140); medium sized mosquitoes *6*

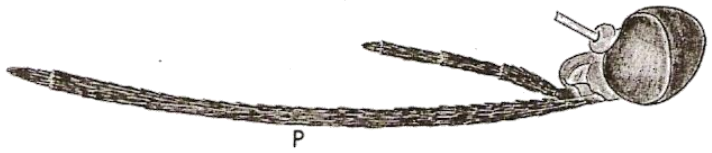


Fig. 505. Lateral view of head: *Ps. howardii*

Figure D: p 92, Darsie & Ward

Fig. 131

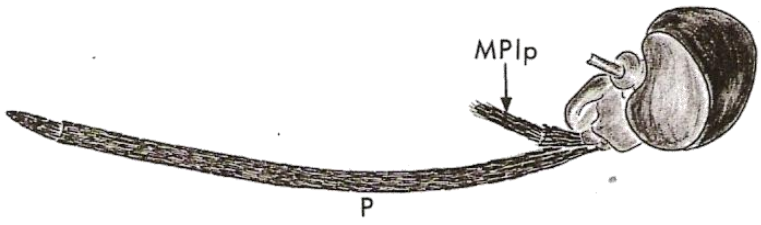


Fig. 521. Lateral view of head: *Ps. horrida*

Figure E: p 94, Darsie & Ward

Fig. 140

5. *Scutum with medial longitudinal stripe of yellow or golden scales (Fig. 502); distal half of proboscis with pale scales (Fig. 503);* summer, temporary rain pools - *common* — *Psorophora ciliata*

Scutum with broad median longtitudinal stripe of dark brown-black scales (Fig. 504); distal half of proboscis entirely dark scaled (Fig. 505); summer, temporary rain pools - *common* — *Psorophora howardii*

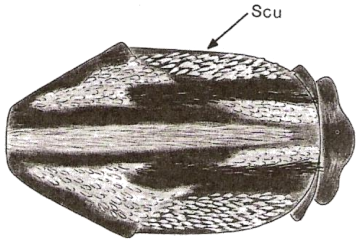


Fig. 502. Dorsal view of scutum: *Ps. ciliata*

Fig. 503. Lateral view of head: *Ps. ciliata*

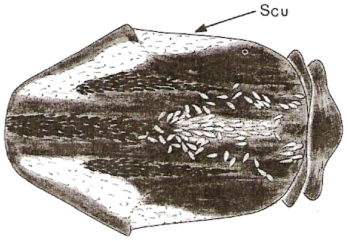


Fig. 504. Dorsal view of scutum: *Ps. howardii*

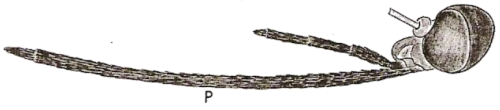


Fig. 505. Lateral view of head: *Ps. howardii*

Figure F: Graphics above are from Darsie & Ward, page 92

6. *Hindtarsomeres 4 and 5 with white scales (fig 140); postspiracular area of thorax with thick patch of white scales* — *7*

Hindtarsomere 4 only with white scales, 5 is dark (fig 139); postspiracular area of thorax without patch of white scales; woodland pools - rare — *Psorophora mathesoni*

7. *Scutum dark, speckled with golden scales in no distinct pattern (fig. 143); abdominal tergum I with median patch of purple scales (fig. 517, Darsie & Ward); subspiracular area of thorax with many white scales*; woodland pools - abundant — *Psorophora ferox*

Scutum with distinct dark median longitudinal stripe and pale scaled areas laterally (fig. 145); abdominal tergum I with creamy white scales (fig. 519, Darsie & Ward); subspiracular area of thorax without white scales woodland pools - rare — *Psorophora horrida*

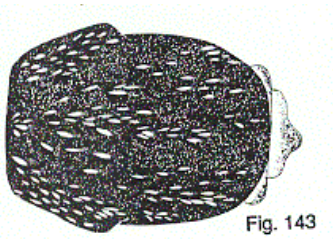


Fig. 143

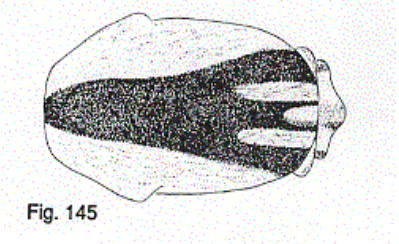


Fig. 145

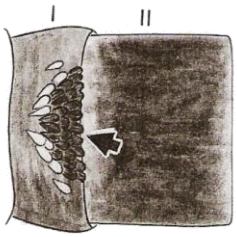


Fig. 517. Dorsal view of abdominal segments I,II: *Ps. ferox*

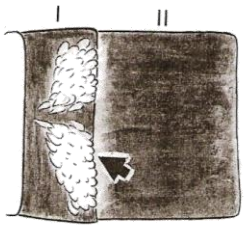


Fig. 519. Dorsal view of abdominal segments I,II: *Ps. horrida*

Figure G: From Darsie & Ward, page 94

KEY TO ADULT *URANOTAENIA*

1. Hind tarsi white tipped (fig.146); grassy pond margins; *scutum without median longitudinal iridescent stripe,* feed*s* on reptiles and amphibians – rare. *Uranotaenia lowii*

Hind tarsi dark (fig.147); *scutum with median longitudinal iridescent stripe,* grassy pond margins, feed*s* on reptiles and amphibians – common. *Uranotaenia sapphirina*

Fig. 146

Fig. 147