

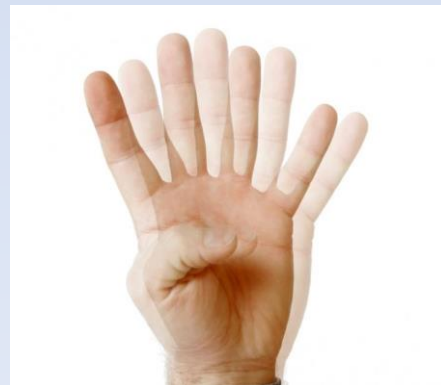
Proper Microscope Use and Mosquito Manipulation

By Jay Kiser

Dissecting Microscope and Light Sources



Setting Up Your Microscope



- Adjust seat height so your eyes are comfortably at eye pieces
 - Back straight
 - Feet flat on floor
 - Keep your neck straight
- Turn light source on
 - Start on low and turn up gradually
- Put specimen under the scope
 - In a petri dish for easy manipulation
- Adjust eye piece stems so you are not seeing double
 - Bringing stems closer together or farther apart
- Close one eye and adjust focus
 - Zoom in on body part and bring into focus
 - Use course and fine adjustment knobs
- With other eye open only, adjust eye piece focus
 - Some scopes may only have adjustment on one eye
 - Focus on same body part as with the other eye
- You are set up to ID
- When finished IDing specimens, turn light to low, turn off light after a few moments
- Cover scope to keep clean

Specimen Manipulation

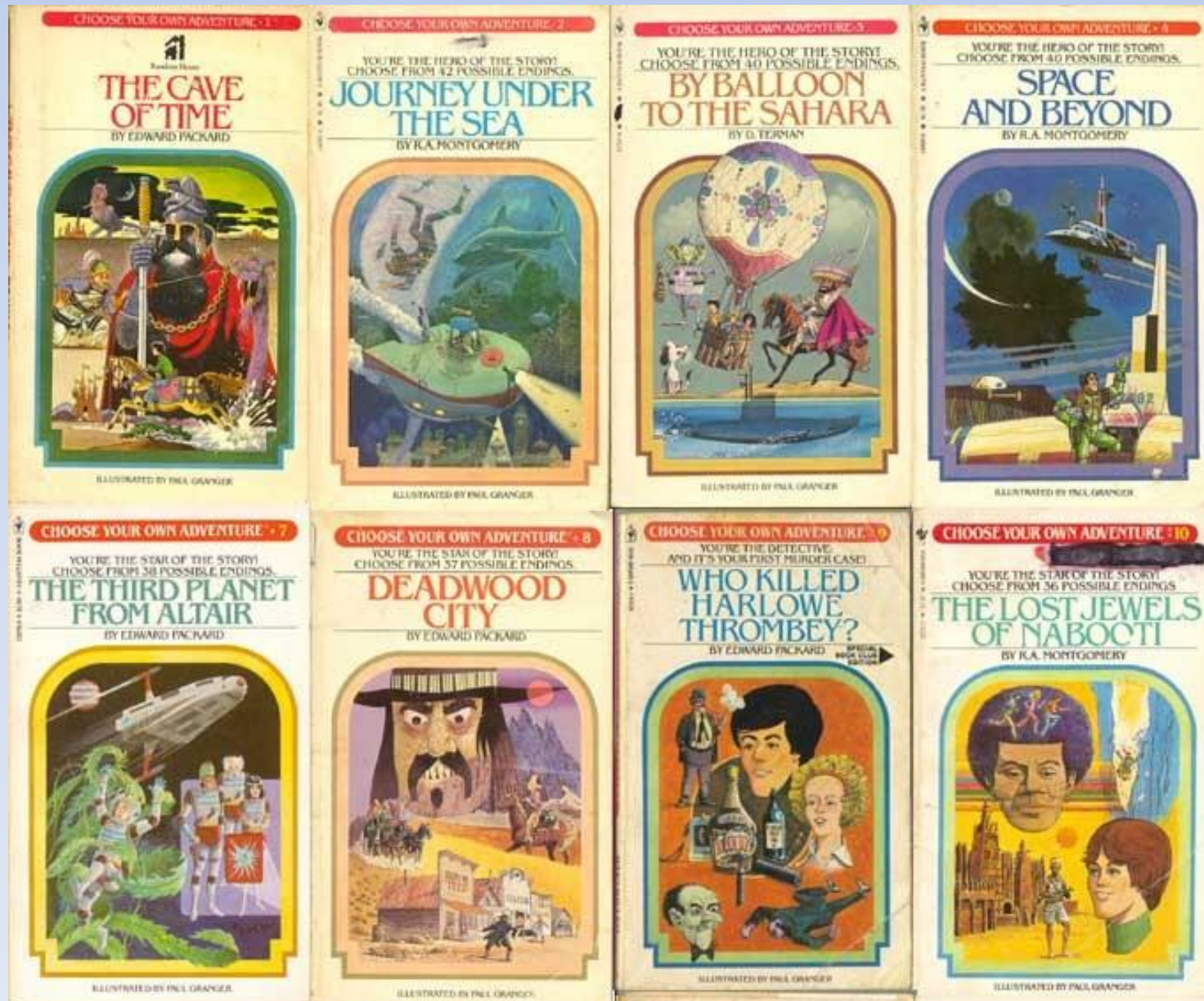


- Using forceps
 - Gently
 - Light pressure
 - Avoid very tip of forceps
 - The older the specimen the more fragile they will be
- Pick up by:
 - Legs (try to avoid hindleg)
 - Wings
 - Proboscis
- Avoid picking up by:
 - Abdomen
 - Thorax
 - Head
- Keeping pressure on forceps, twist wrist to get view you need
 - Think of the view you want and pick specimen up at an angle that makes sense

Using a Dichotomous Key

By Jay Kiser

Choose Your Own Adventure

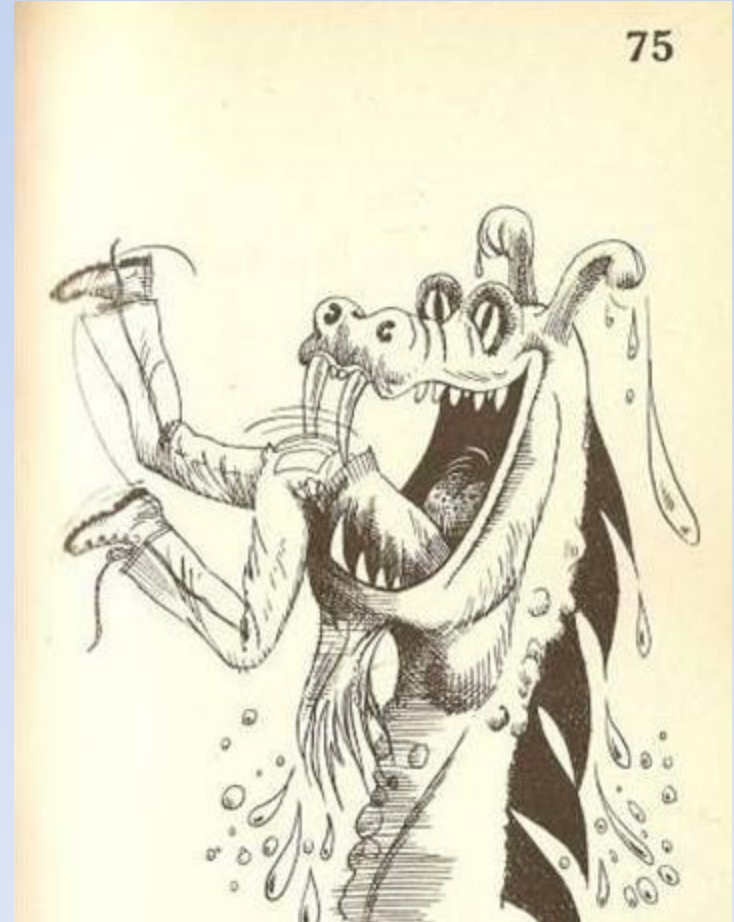


Choose Your Own Adventure

You stumble onto a dragon as you are hiking through a cave....

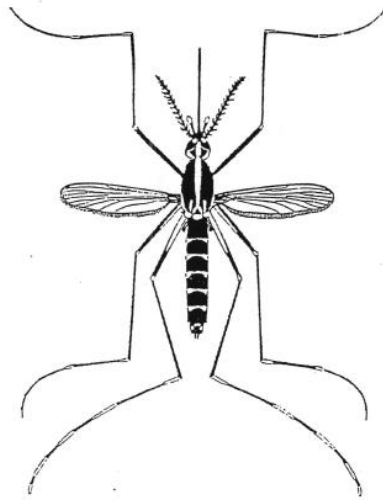
Turn to page 65 if you want to run.

Turn to page 75 if you want to stand your ground and fight it off.



Various Choices when Choosing a Dichotomous Key

KEY TO FEMALES OF 40 MOSQUITO
SPECIES OF PUBLIC HEALTH IMPORTANCE
IN THE MID-ATLANTIC REGION



By

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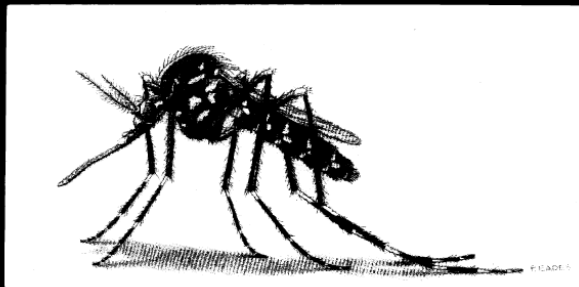
Identification and Geographical
Distribution of the
Mosquitoes of North America,
North of Mexico

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RONALD A. WARD

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Dichotomous Key Used in this ID Course

A Key to the Mosquitoes of North Carolina and the Mid-Atlantic States



Publication AG-412

Agricultural Extension Service • North Carolina State University

Genus *Aedes* Meigen

aegypti (Linnaeus)
albopictus Skuse
atlanticus Dyar & Knab
atropalpus (Coquillett)
aurifer (Coquillett)
canadensis canadensis (Theobald)
canadensis mathesoni (Middlekauff)
cantator (Coquillett)
cinereus Meigen
dupreei (Coquillett)
fulvus pallens Ross
grossbecki Dyar & Knab
hendersoni Cockerell
infirmatus Dyar & Knab
mitchellae (Dyar)
vexans (Meigen)
solicitans (Walker)
sticticus (Meigen)
stimulans (Walker)
taeniorhynchus (Weidemann)
thibaulti Dyar & Knab
tormentor Dyar & Knab
triseriatus (Say)
trivittatus (Coquillett)

Genus *Anopheles* Meigen

atropos Dyar & Knab
barberi Coquillett
bradleyi King
crucians Weidemann
georgianus King
perplexens Ludlow
punctipennis (Say)
quadrinaculatus Say
walkerii Theobald

Genus *Coquillettidia* Dyar

perturbans (Walker)

Genus *Culex* Linnaeus

erraticus (Dyar & Knab)
nigripalpus Theobald
peocator Dyar & Knab
pilosus (Dyar & Knab)
piplens Linnaeus/*quinquefasciatus* Say
restuans Theobald
salinarius Coquillett
tarsalis Coquillett
territans Walker

Genus *Culiseta* Felt

inornata (Williston)
melanura (Coquillett)

Genus *Orthopodomyia* Theobald

alba Baker
signifera (Coquillett)

Genus *Psorophora* Robineau-Desvoidy

ciliata (Fabricius)
columbiae (Dyar & Knab)
cyaneescens (Coquillett)
discolor (Coquillett)
ferox (von Humboldt)
horrida (Dyar & Knab)
howardii Coquillett
mathesoni Belkin & Heinemann
varipes (Coquillett)

Genus *Toxorhynchites* Theobald

rutilus septentrionalis (Dyar & Knab)

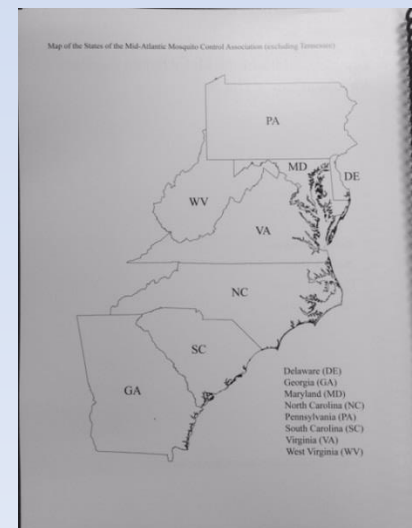
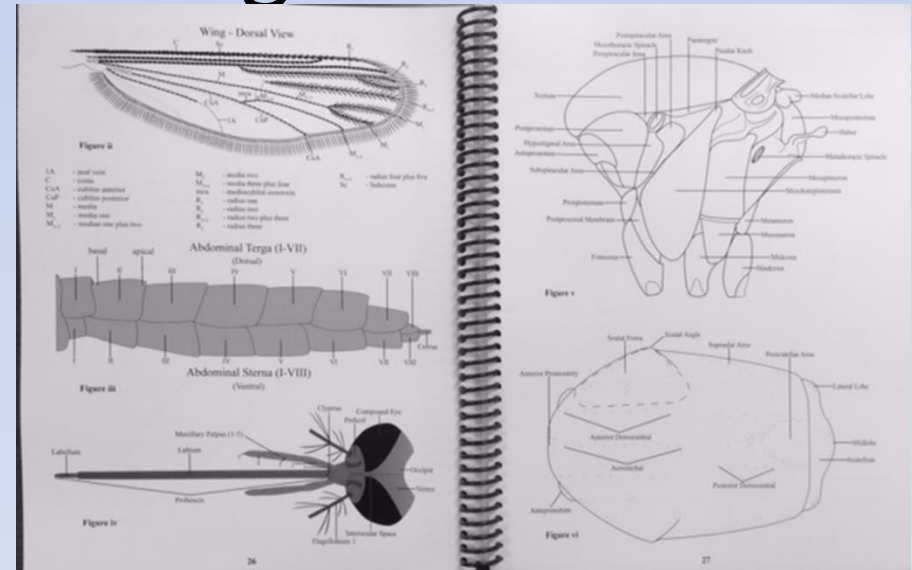
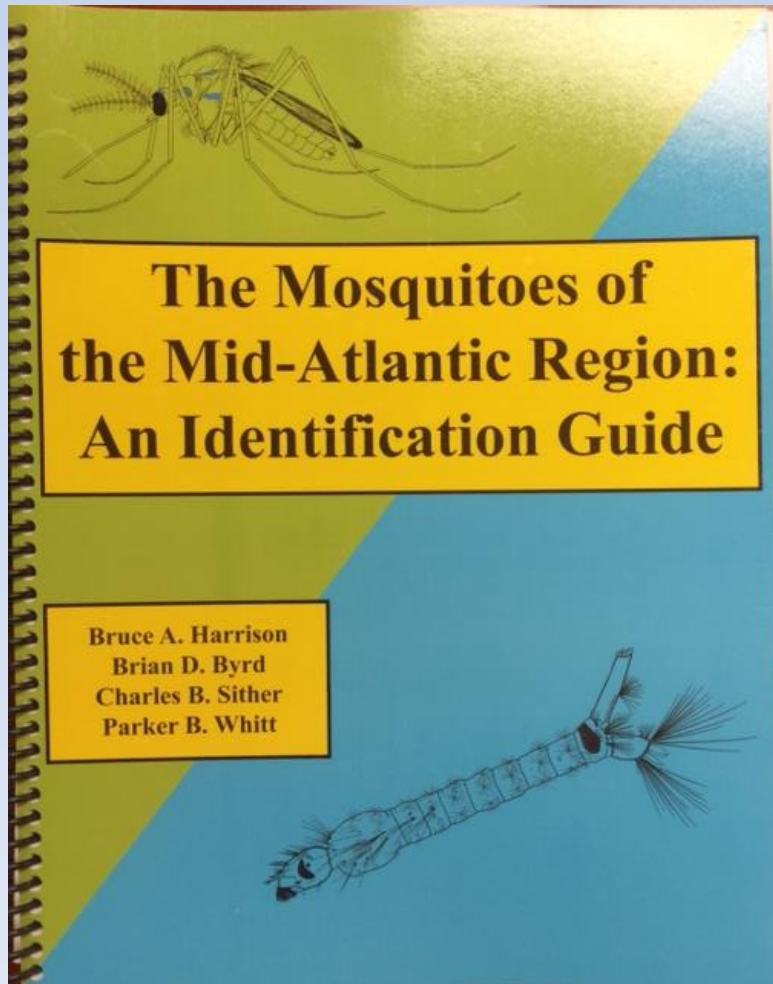
Genus *Uranotaenia* Lynch Arribalzaga

lowii Theobald
sapphirina (Osten Sacken)

Genus *Wyeomyia* Theobald

smithii (Coquillett) /*haynei* Dodge

New Dichotomous Key for Mid-Atlantic Region



Key Mosquito Anatomy

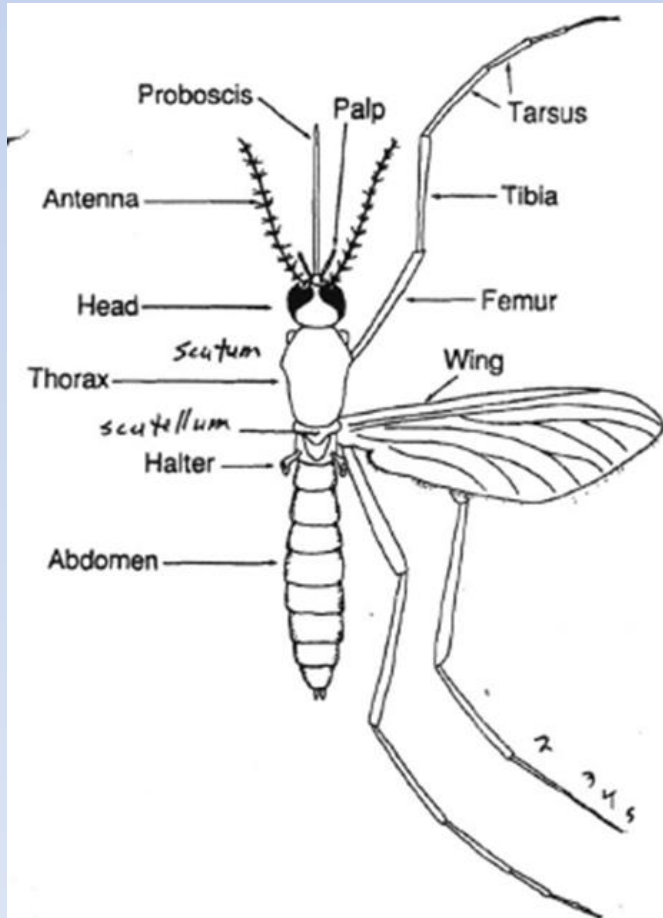


Figure 1. Characteristics used to identify adult female mosquitoes.

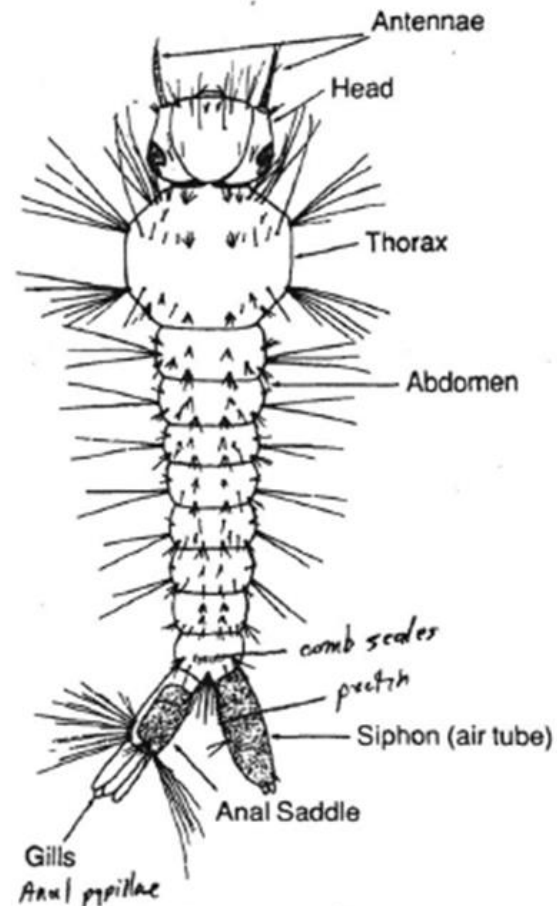
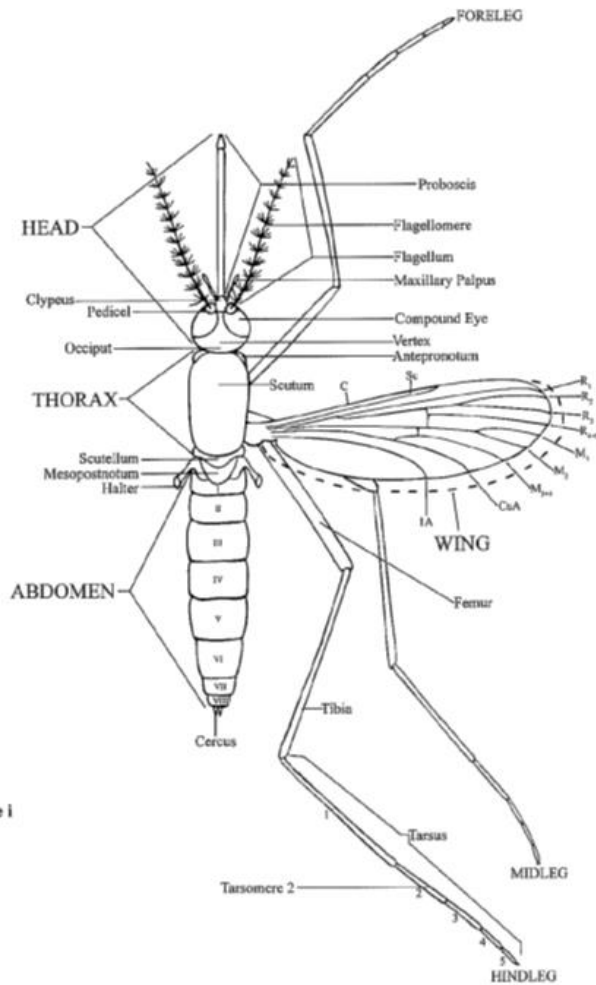


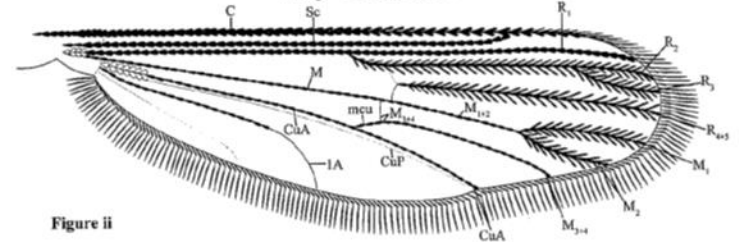
Figure 2. Characteristics used to identify fourth instar (last stage) larvae.

Key Mosquito Anatomy

ADULT MORPHOLOGY



Wing - Dorsal View



- | | | |
|----------------------------------------|------------------------------------------|------------------------------------------|
| IA - anal vein | M ₂ - media two | R ₄₊₅ - radius four plus five |
| C - costa | M ₃₊₄ - media three plus four | Sc - Subcosta |
| CuA - cubitus anterior | mcu - mediocubital crossvein | |
| CuP - cubitus posterior | R ₁ - radius one | |
| M - media | R ₂ - radius two | |
| M ₁ - media one | R ₂₊₃ - radius two plus three | |
| M ₁₊₂ - median one plus two | R ₅ - radius three | |

Abdominal Terga (I-VII)

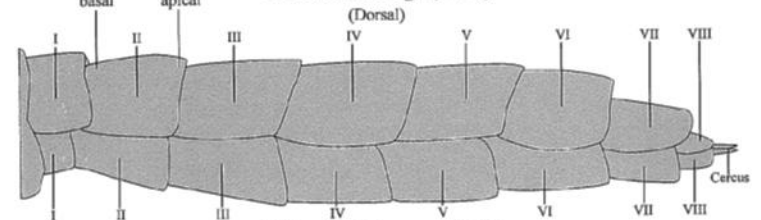


Figure iii

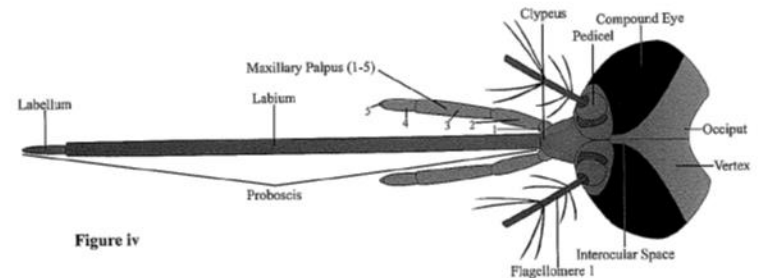


Figure iv

Key Mosquito Anatomy

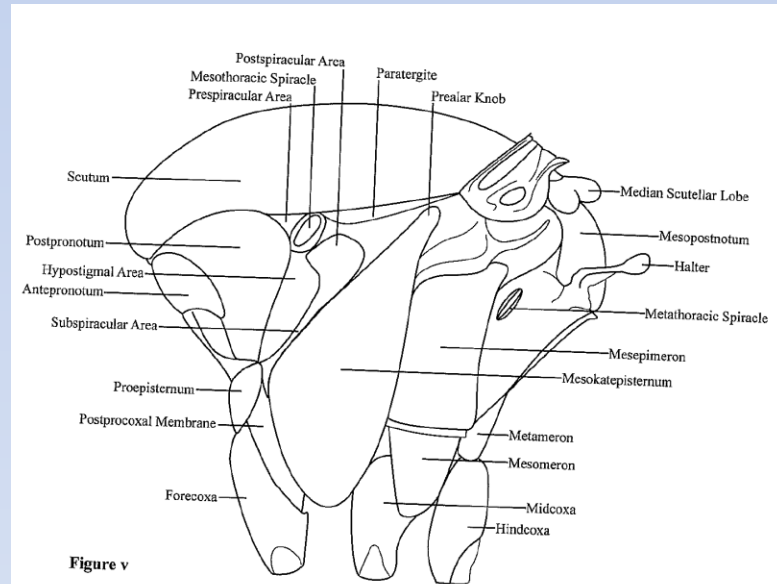


Figure v

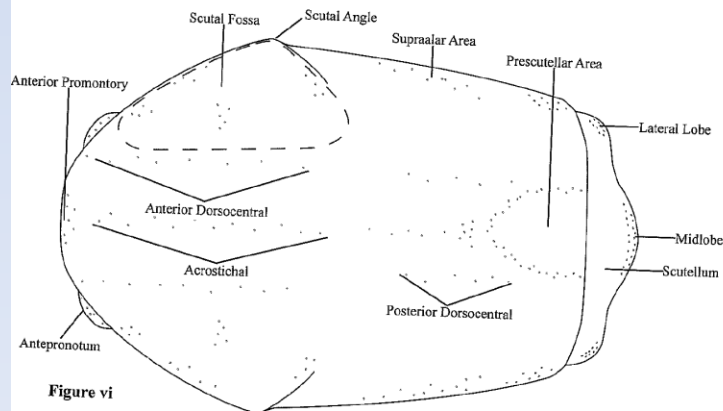


Figure vi

Identifying to Genus



Identifying to Genus



Key to the Female Genera

1. Palpus longer than antennae (Fig. 1); scutellum evenly rounded, with continuous row of posterior setae (Fig. 2)..... 2
Palpus much shorter than antennae (Fig. 3); scutellum with 3 distinct lobes, long setae confined to the 3 lobes (Fig. 4)..... 3



Fig. 1

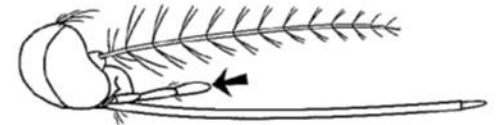


Fig. 3

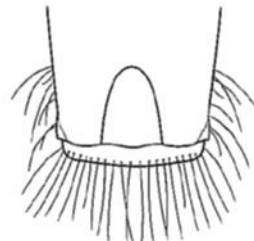


Fig. 2

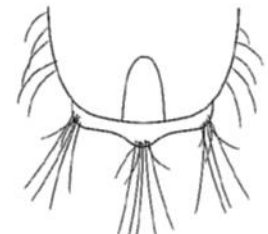
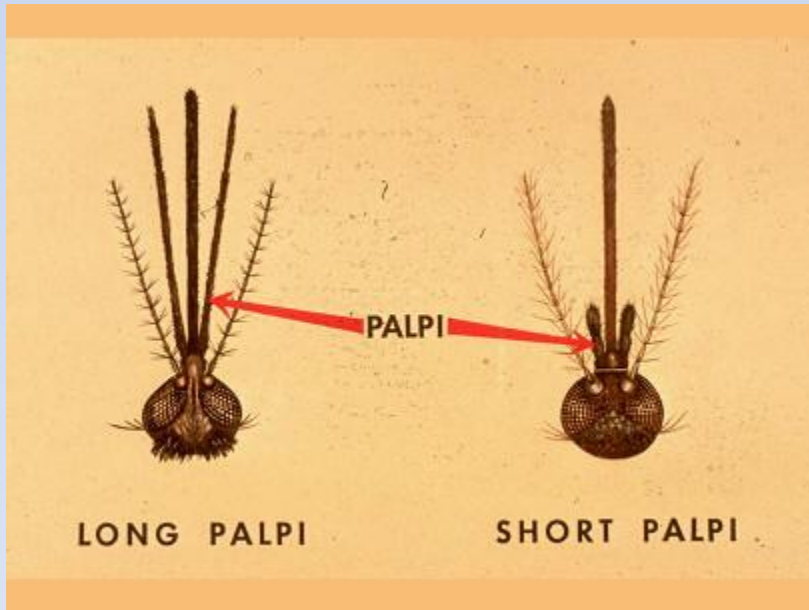


Fig. 4

Palps as Long as antennae



Palps as Long as Antennae

Large Mosquito, Bright Colored Scales



Long Palps

- 2(1). Proboscis strongly bent downward, much thicker at base than at apex (Fig. 5); palpus approximately 0.5-0.6 length of proboscis (Fig. 5). *Toxorhynchites rutilus rutilus*
Toxorhynchites rutilus septentrionalis
(See Note 1)

Proboscis nearly straight, approximately as wide at apex as at base (Fig. 6); palpus approximately equal to length of proboscis (Fig. 6). *Anopheles* (p. 55)

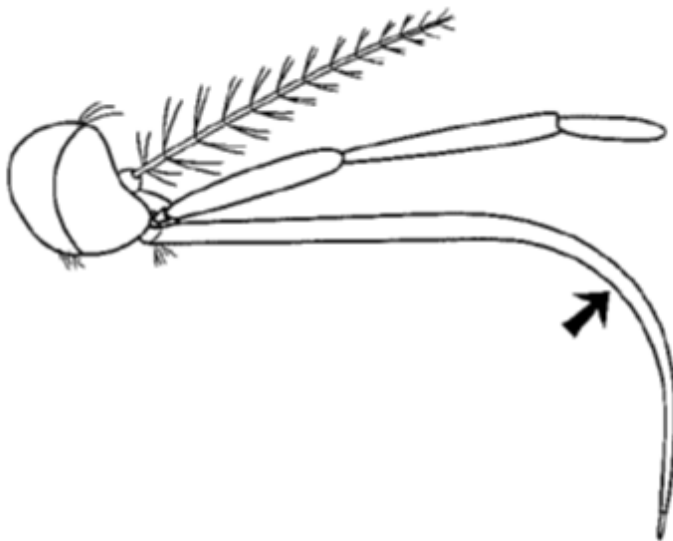


Fig. 5



Fig. 6

Identifying to Genus



3(1). Scutum and scutellum with setae and small scales, but integument clearly visible; mesopostnotum without setae or scales (Fig. 7)..... 4

Scutum and scutellum covered with round flat scales; mesopostnotum with small patch of setae (Fig. 8); small species found in pitcher plants *Wyeomyia smithii* (See Note 2)

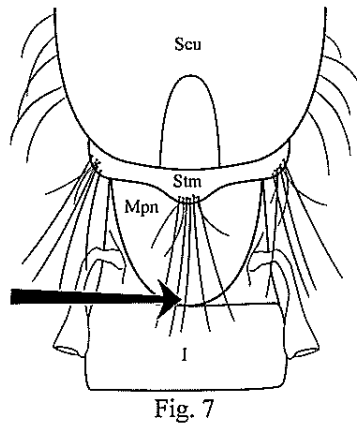


Fig. 7

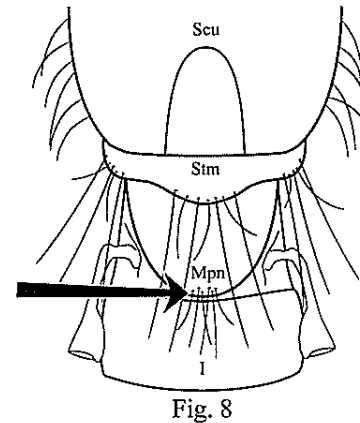
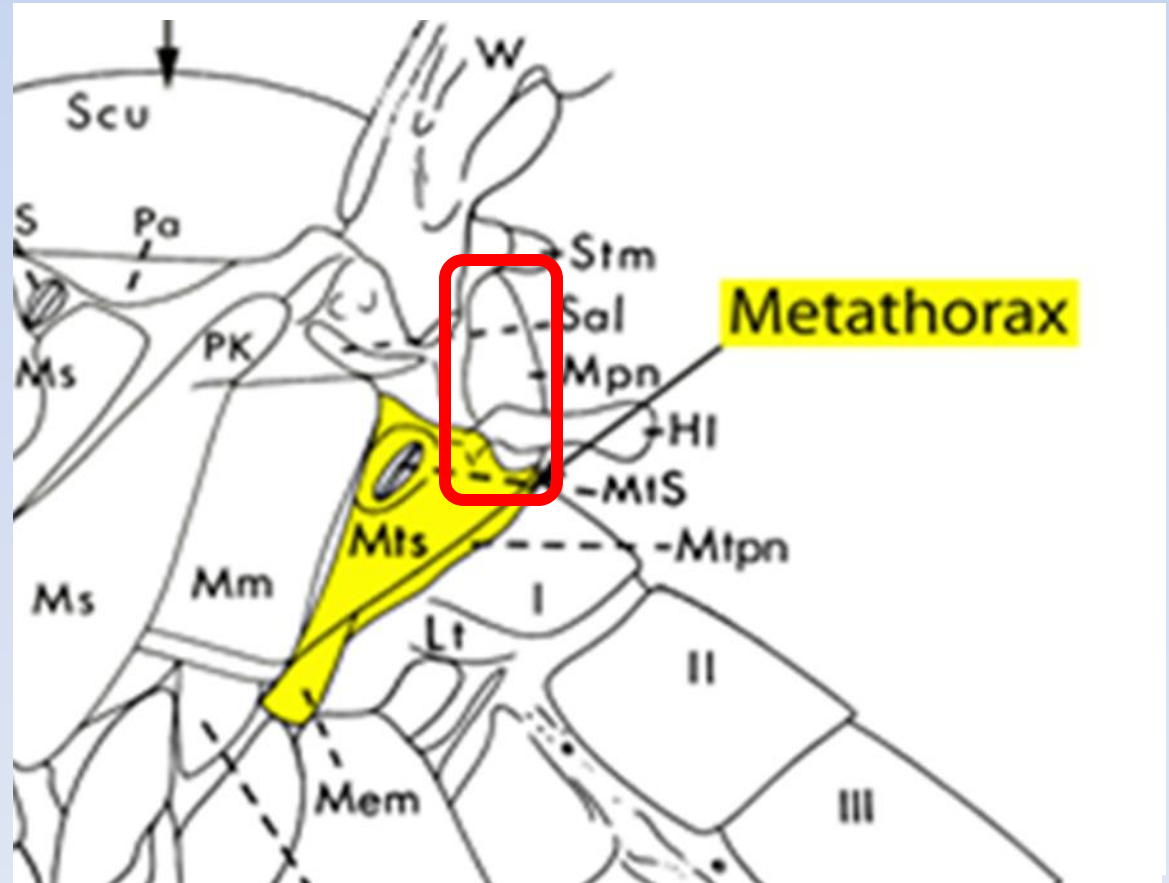
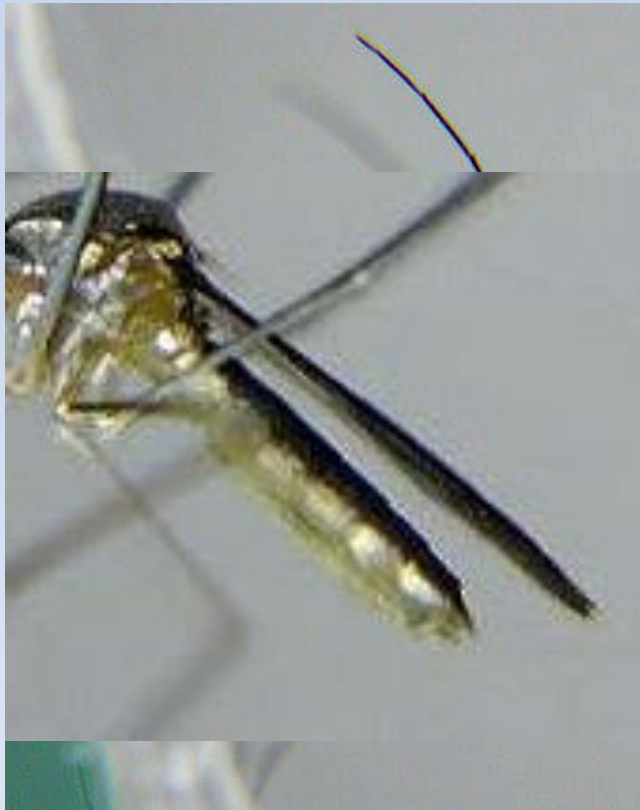


Fig. 8

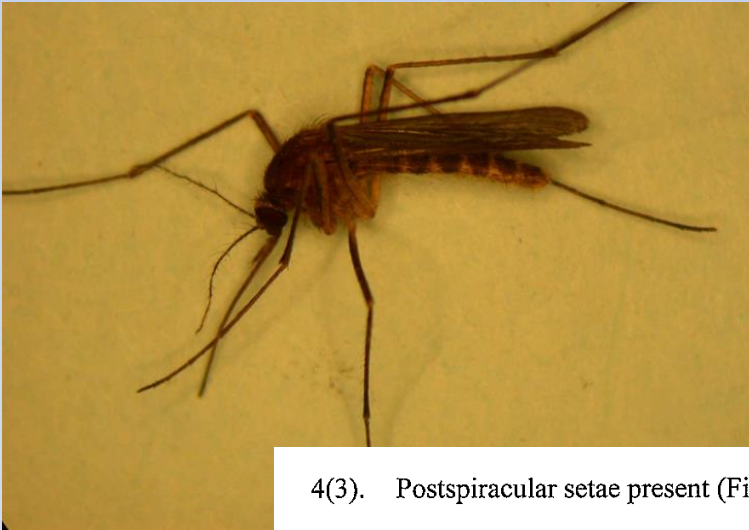
Abdomen Laterally Divided, Scales on Meso-postnotum



No Scales on Meso-postnotum



Identifying to Genus



- 4(3). Postspiracular setae present (Fig. 9)..... 5
Postspiracular setae absent (Fig. 10)..... 7

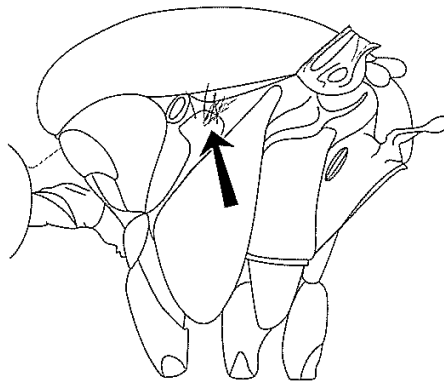


Fig. 9

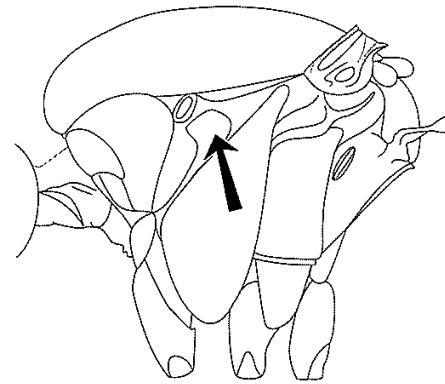


Fig. 10

Area of Postspiracular Setae

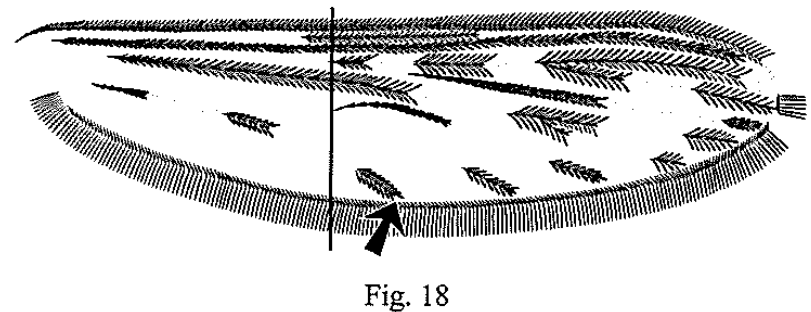
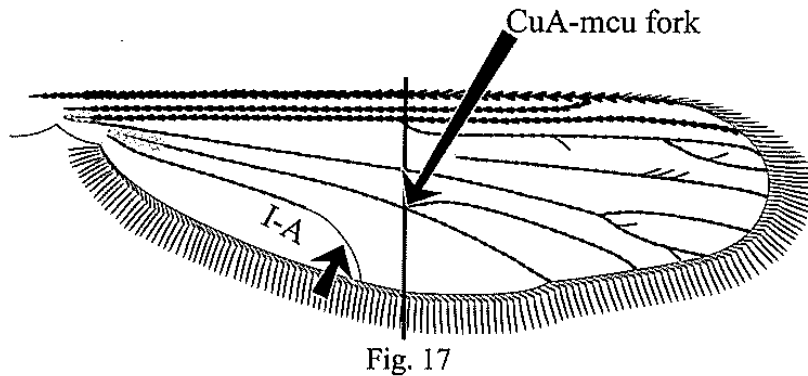




Identifying to Genus

7(4). Head, thorax, and wings with rows of metallic blue scales; wing with tip of vein 1A reaching wing margin before a perpendicular line drawn from front margin through vein CuA-mcu fork (Fig. 17); very small species *Uranotaenia* (p. 76)
(See Note 3)

Head, thorax, and wings without rows of metallic blue scales; wing with tip of vein 1A reaching wing margin beyond a perpendicular line drawn through CuA-mcu fork (Fig. 18); 8



Metallic Blue Scales, Small Size



Identifying to Genus

8(7). Base of subcostal vein on underside of wing without small patch of setae (Fig. 19); prespiracular setae absent (Fig. 20)..... 9

Base of subcostal vein on underside of wing with patch of short fine setae (Fig. 21); prespiracular setae present (Fig. 22)..... *Culiseta* (p. 66)

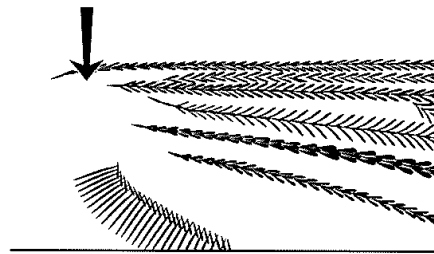


Fig. 19

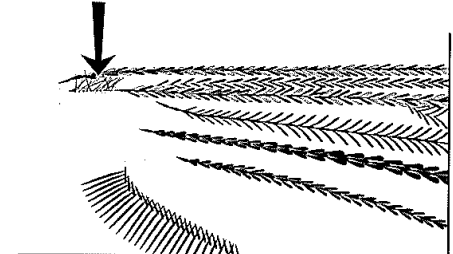


Fig. 21

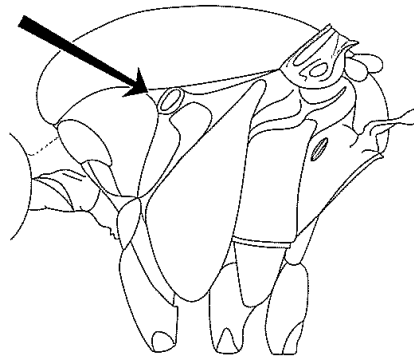


Fig. 20

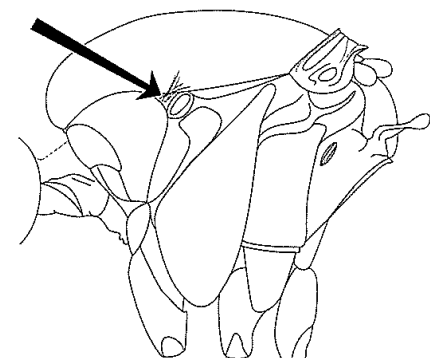
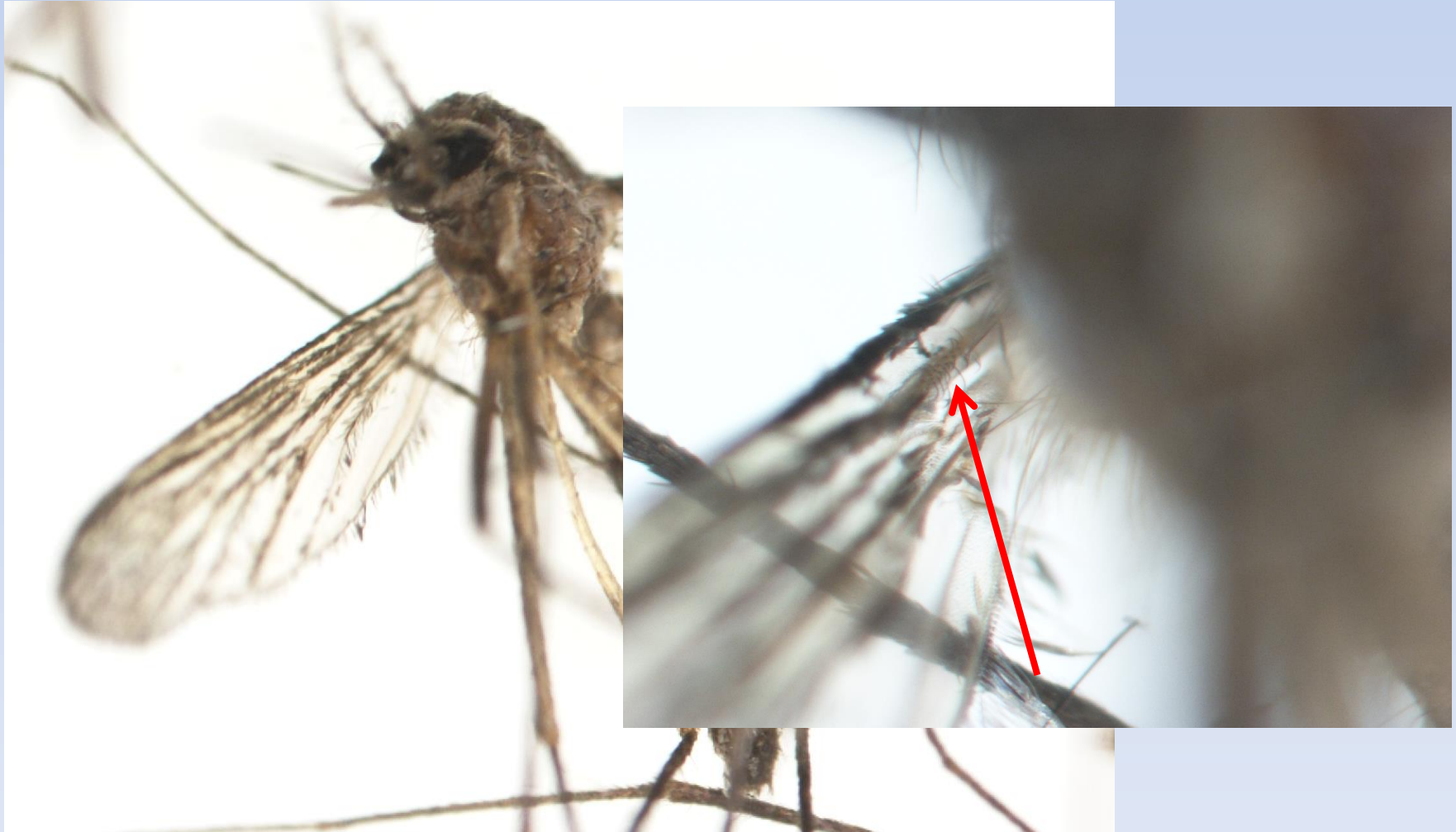
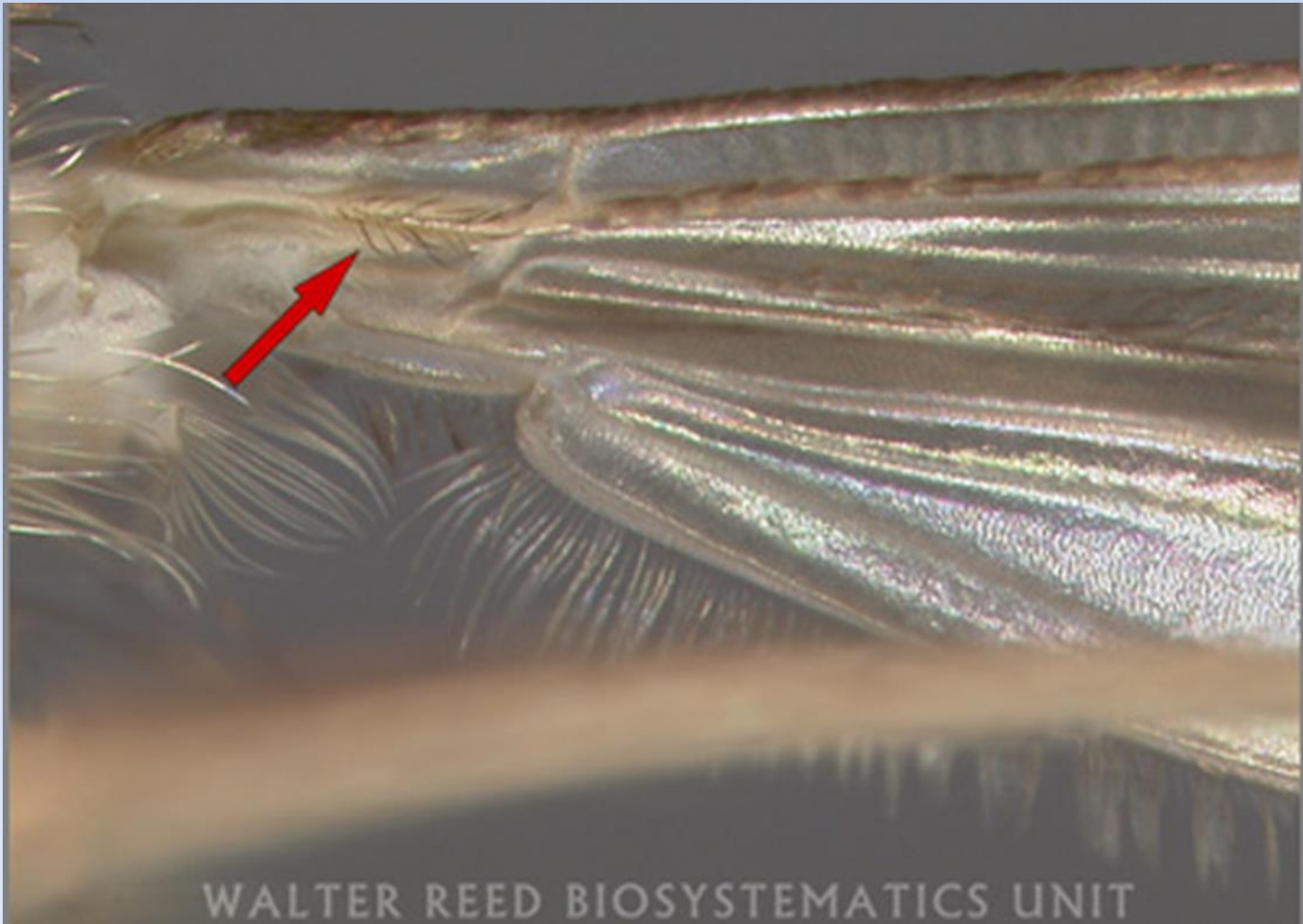


Fig. 22

Setae on Underside of Wing



Setae on Underside of Wing



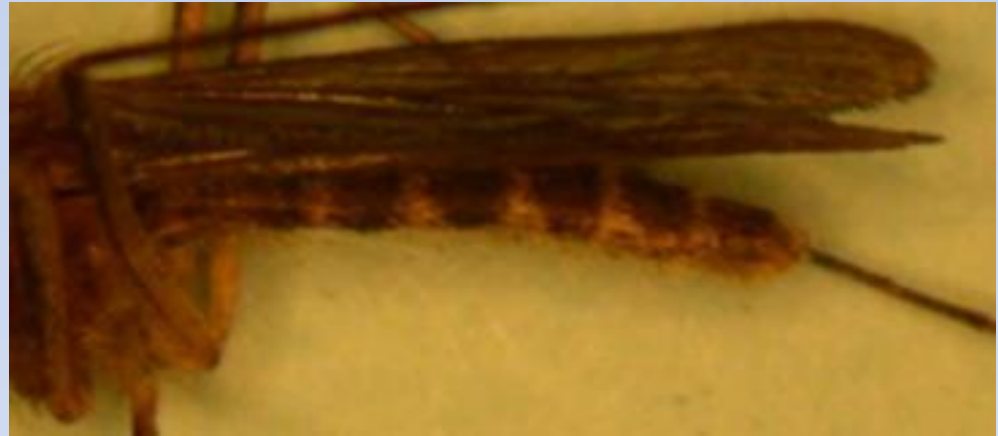
Prespiracular Setae



Genus *Culiseta*



Identifying to Genus (older Key)

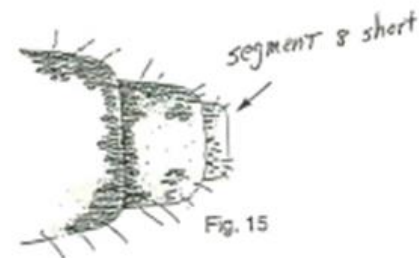
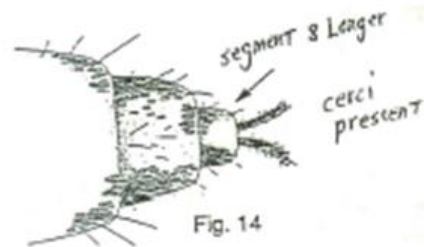


5. Abdomen pointed at tip (fig.14), 8 abdominal segments are visible and the end view appears hollow if the cerci are retracted, segment 8 is long

6

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

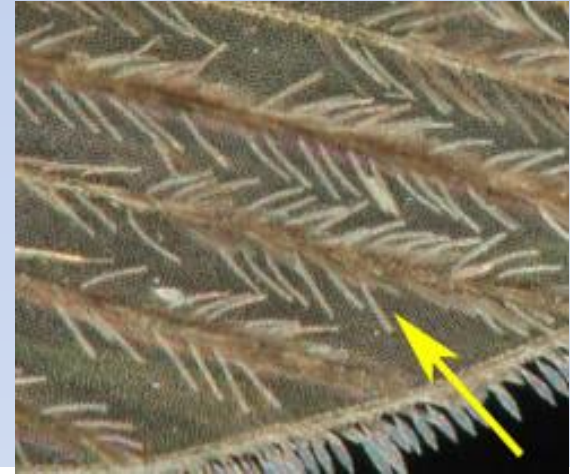
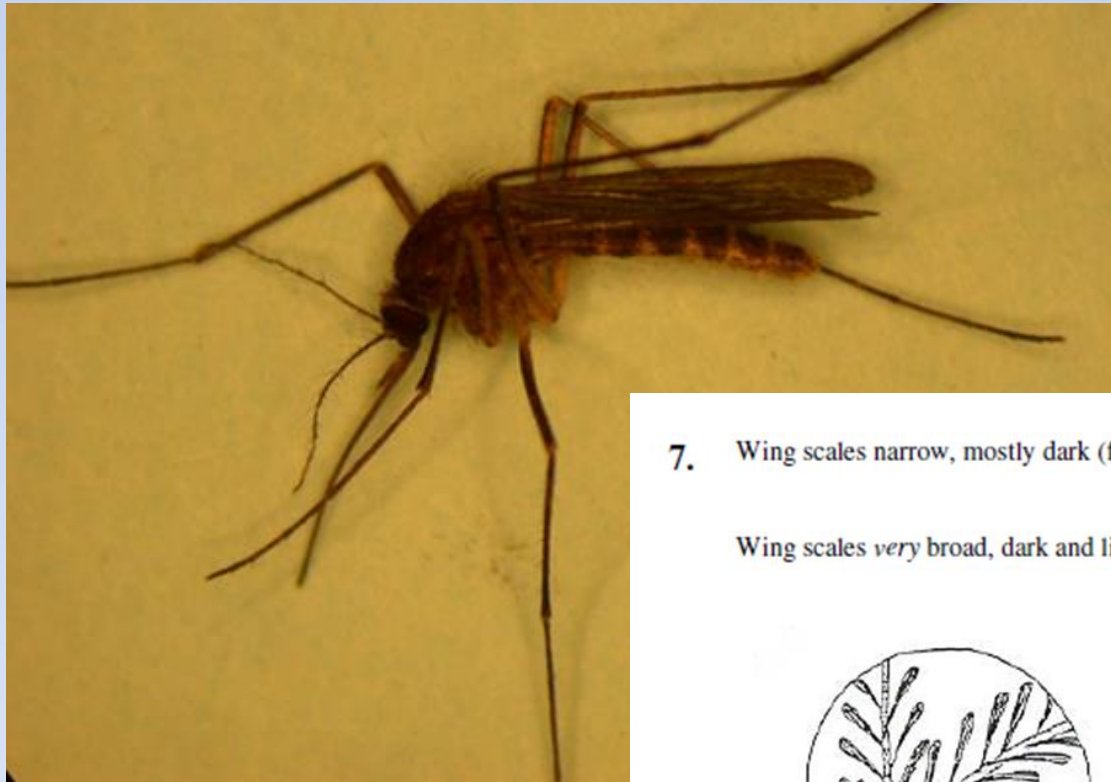
7



Apical Shape of Abdomen



Identifying to Genus



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

8

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

9

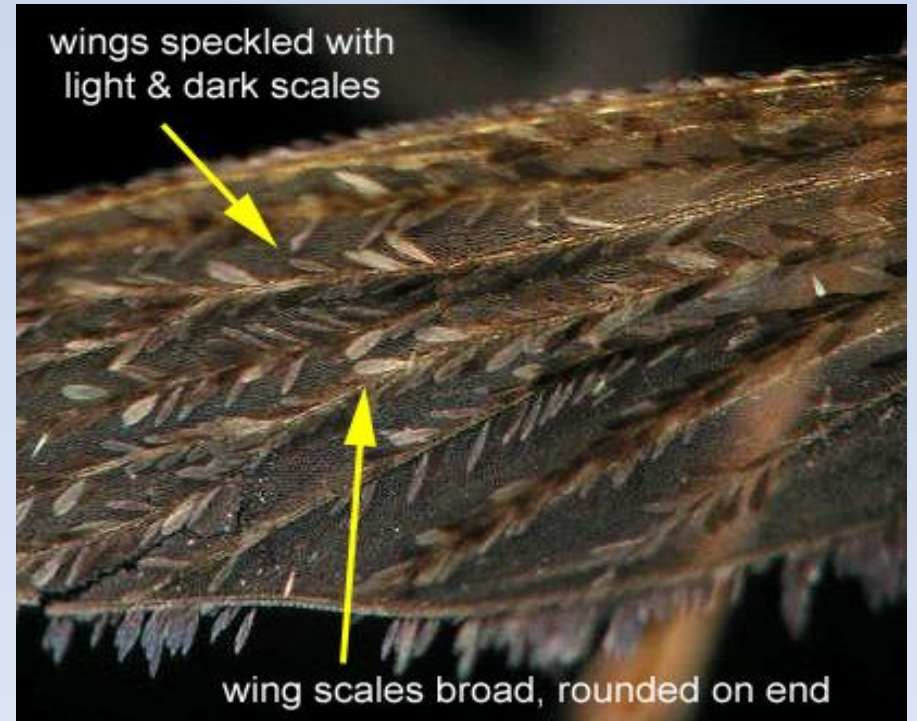
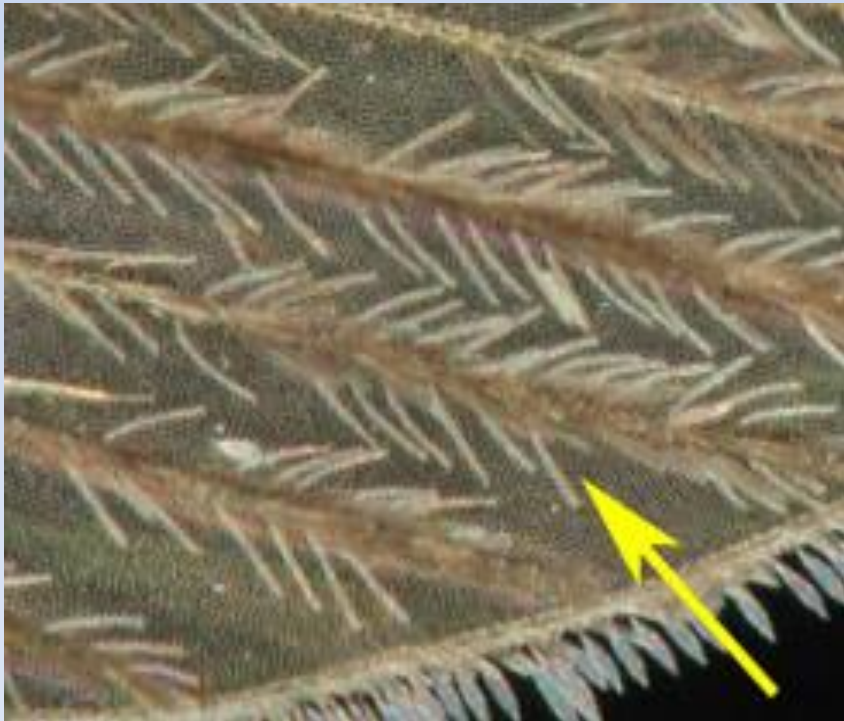


Fig. 19



Fig. 20

Wing Scales



Identifying to Genus

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

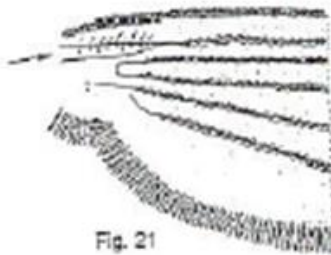


Fig. 21



Fig. 22

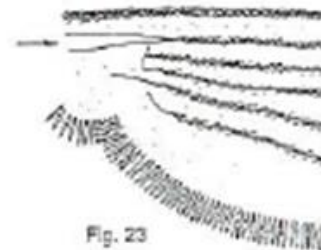
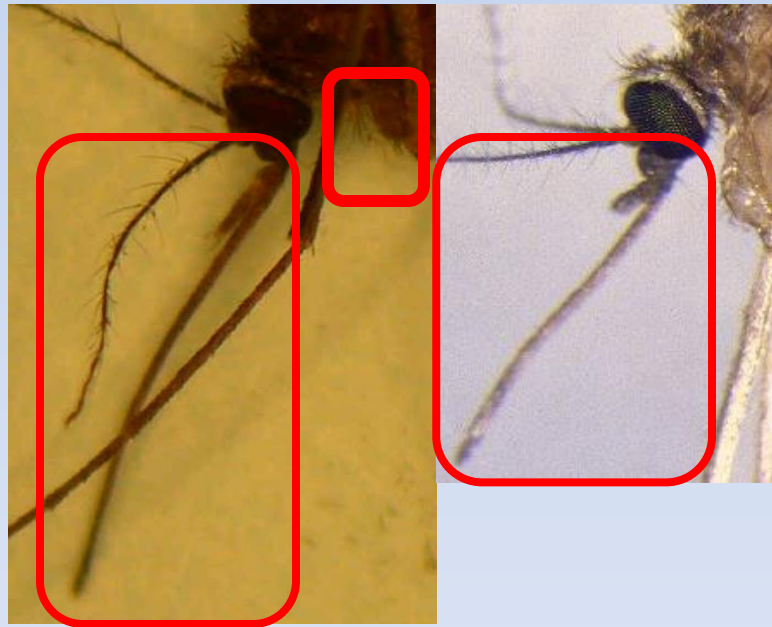


Fig. 23

Proboscis Length



Hairy Chest

Identifying to Genus

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

