

# Arizona Mosquito Identification 101

(for the non-entomologist)

**T. Michael Fink, MA**

Vector-Borne & Zoonotic Diseases Program  
Arizona Department of Health Services  
Phoenix, Arizona



*Leadership for a Healthy Arizona*

# Things to Remember from the Start

- A common opinion in the state: **Mosquitoes! What mosquitoes? This is Arizona & it's too hot here to have mosquitoes.**
- Well---we may not have the mosquito load that many other states have, but what we lack in quantity we make up for in quality.
- There are currently 46 recognized mosquito species in Arizona.
- While most of these can be categorized as non-disease carrying 'pest' or 'nuisance' species, several these are known transmitters (vectors) of arboviruses (WNV, SLE, WEE), malaria, dengue & yellow fever.
- **This presentation focuses on 13 species including vector species.**



# Arizona Species

Updated 2004 by Dr. Frank Ramberg, U of A Entomology Dept.  
(**vector species**/ discussed in this talk)

- **Aedes:** aegypti, vexans
- **Anopheles:** hermsi, franciscanus, judithae
- **Culex:** tarsalis, quinquefasciatus, erraticus, erythrothorax, apicalis, arizonensis, coronator, nigripalpus, restuans, salinarius (?), stigmatosoma, territans, thriambus
- **Culiseta:** incidens, inornata, particeps
- **Ochlerotatus:** burgeri, cataphylla, dorsalis, epactius, fitchii, implicatus, monticola, muelleri, nigromaculis, papago, purpureipes, sollicitans, taeniorhynchus, thelcter, trivattatus, varipalpus, ventovittis
- **Orthropodomyia:** kummi, signifera
- **Psorophora:** columbiae, discolor, howardii, signipennis
- **Toxorhynchites:** moctezuma
- **Uranotaenia:** anhydor anhydor



# Important Genus Change

- Except for four species, the North American ***Aedes*** mosquito species have been reclassified to the genus ***Ochlerotatus***.
- The four exceptions are:
  - Aedes aegypti*** (Arizona species)
  - Ae. albopictus*** (two isolated finds in the state but not an Arizona species)
  - Ae. vexans*** (Arizona species)
  - Ae. cinereus*** (as close as Utah & Colorado borders but not identified in Arizona)

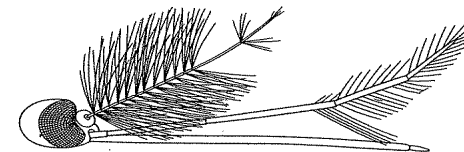
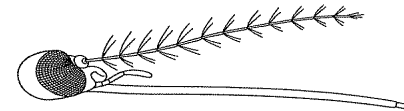
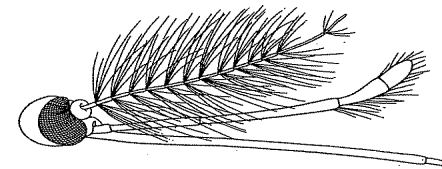
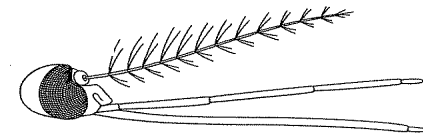
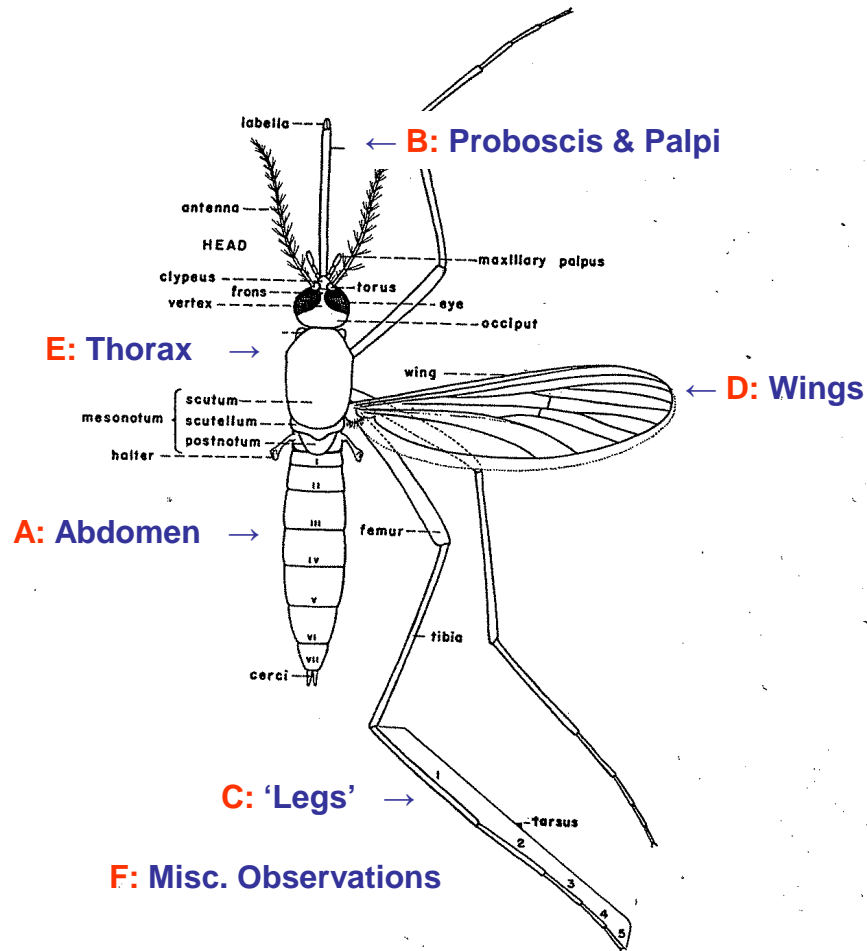


# Acknowledgement

- Most of the mosquito illustrations used in this presentation are from:  
*Mosquitoes of North America (North of Mexico)* Stanley J. Carpenter and Walter J. LaCasse Berkeley: University of California Press, 1955.
- Permission to post these illustrations was granted 4/8/2010 by the University of California Press.
- The diagrams to follow illustrate females only (unless otherwise stated).

# External Anatomy

## Traits to Focus on for Species Identification



**Remember:** scales fade or fall off during a mosquito's lifetime as well as when handled in the field or lab. Take this into account when sorting 'skeeters'.

‘Why are the antennae & palpi different in males & females? Just what function do they serve?’

Basically they are sensory organs.

**Females:**

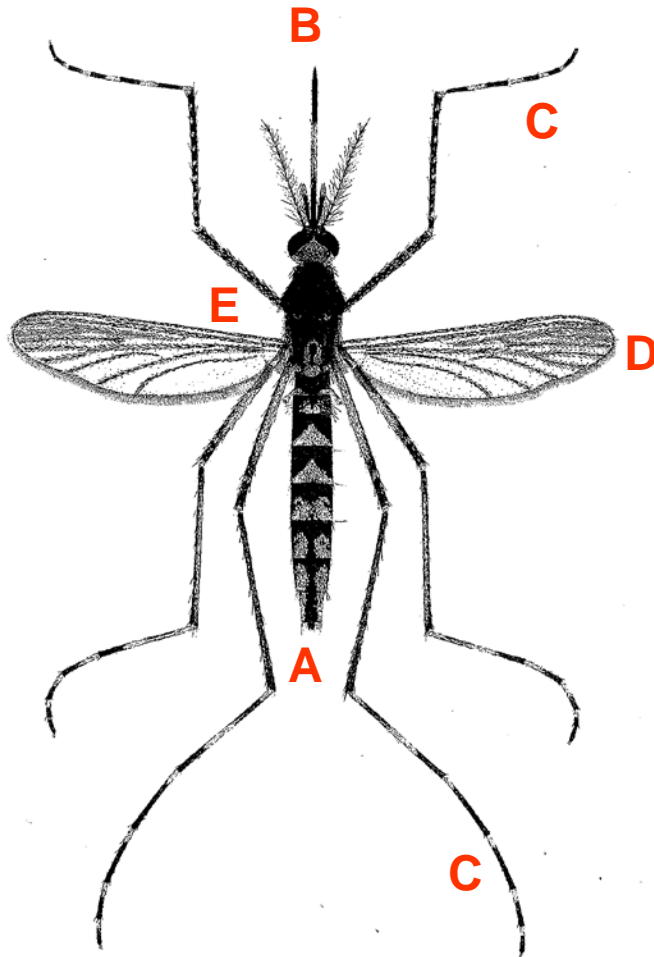
Antennae for detecting smell (olfactory), temperature (thermoreceptived), sound & touch (mechanoreceptive); palpi mostly for smell (olfactory).

**Males:**

Same, but also for hearing & detecting the frequency of wing beat of females.

# *Psorophora columbiae*

Temporary/Flood Water Mosquito  
Nuisance, non-vector species



- Ubiquitous throughout the state.
- Generally a day-time biter but will feed 'anytime, anywhere'.

- Characteristics

**A:** Abdomen pointed w/ triangular or pyramid-shaped light scales on the 2<sup>nd</sup> & 3<sup>rd</sup> tergites; end-most segments have hiatus running mid-line between the light scales.

**B:** Proboscis dark w/ wide pale band; palpi short w/ white tips.

**C:** Legs have pale scales on upper halves & light bands on lower halves.

**D:** Wing scales broad; speckled dark brown & white scales; fringe entirely dark; rear edge w/ spiracle bristles.

**E:** Thorax dark w/ some light scaled patches.

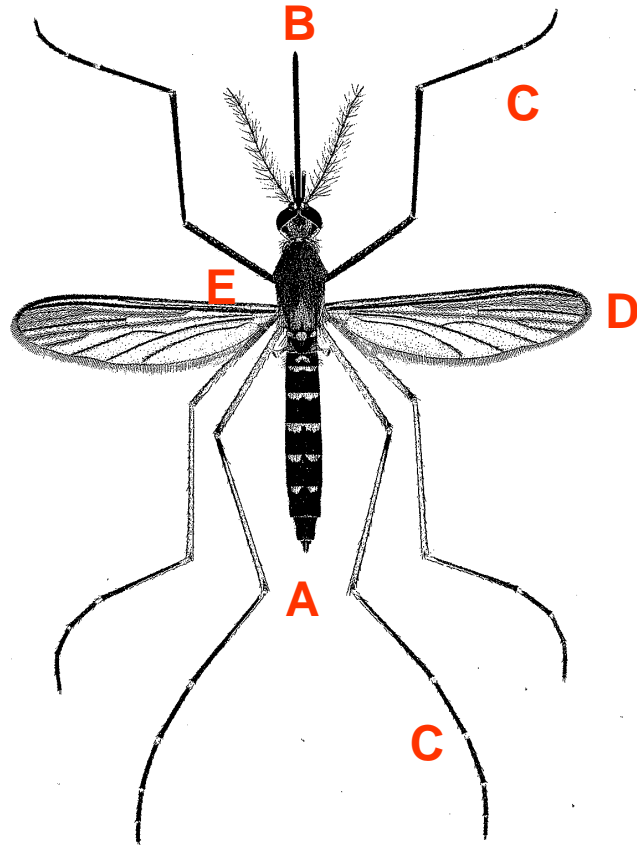
**F:** Nasty, vicious biter.



# Aedes vexans

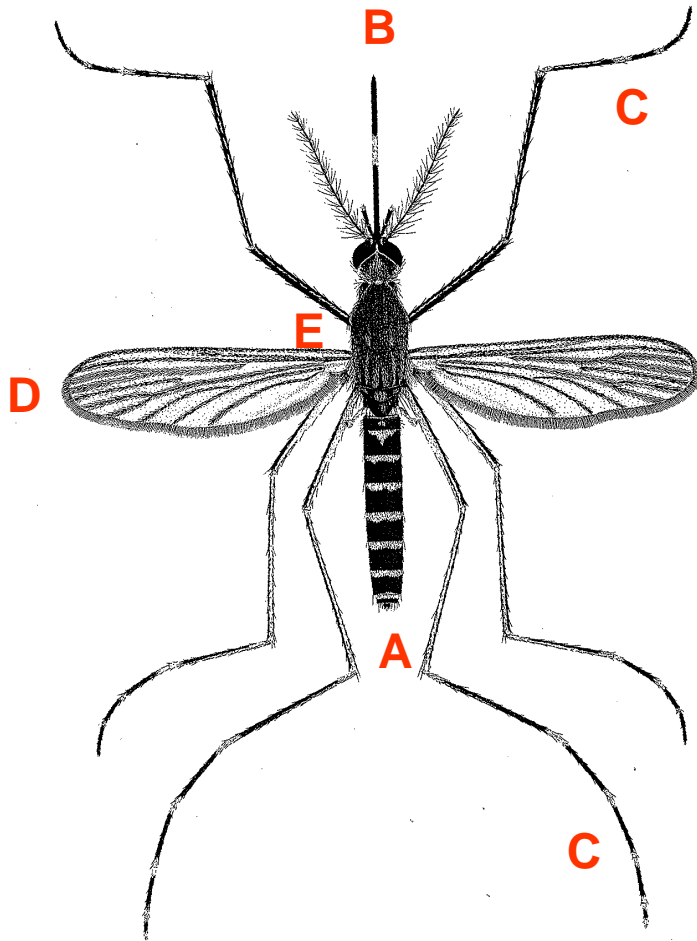
## Temporary/Flood Water Mosquito

### Nuisance, non vector species



- **Ubiquitous throughout the state.**
- Generally a day-time biter but will feed 'anytime, anywhere'.
- 
- Characteristics (dark brown in color)
  - A:** Abdomen pointed w/ 'baby's bottoms' or 'B'-looking scale pattern on tergites.
  - B:** Proboscis dark, no band; palpi short, tipped w/ white scales.
  - C:** Legs have scattered pale scales on upper halves of back legs, dark scales on front legs & light bands on lower halves of all 6.
  - D:** Wing scales narrow & dark.
  - E:** Thorax clothed in golden-brown scales dorsally w/ an arrow-like patch on the posterior edge.
  - F:** Nasty, vicious biter.

## Arizona Public Health Enemy #1

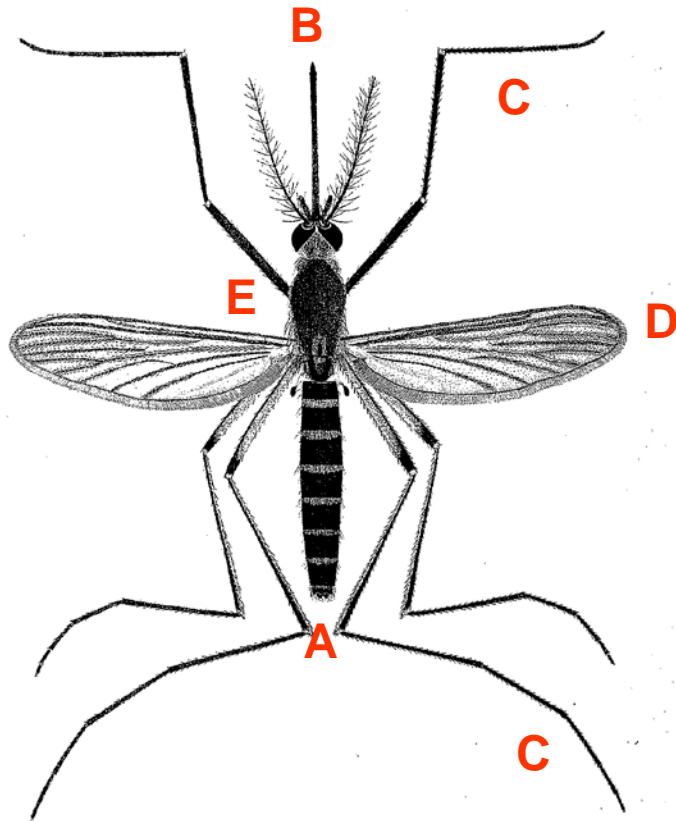


# *Culex tarsalis*

## Permanent Water Mosquito

### Vector of WNV, SLE, WEE

- Found throughout the state.
- Night-time biter active at dusk & continuing until dawn.
- Characteristics (dark brown in color)
  - A:** Abdomen blunt or rounded; light scales on 2<sup>nd</sup> tergite triangular (or like chocolate 'Kiss'); other tergites display more rounded bands (some almost 'baby's bottoms', but not as expressive as *Ae. vexans*).
  - B:** Proboscis dark scaled w/ wide band at mid-point going completely around its circumference; palpi short w/ white scales at tips.
  - C:** Legs dark w/ lower portions having white scales on both sides of the joint; upper posterior portions of the hind legs w/ pale scales.
  - D:** Wing scales narrow & dark.
  - E:** Thorax: dark-brown to black; some golden-brown scales dorsally.



# Culex

## quinquefasciatus

Permanent Water & Domestic Mosquito

Vector of WNV, SLE, WEE

- Found throughout the state especially around human domiciles.
- Night-time biter active at dusk & continuing until dawn.
- Nickname: 'quinques'

- Characteristics (medium brown in color)

**A:** Abdomen blunt or rounded; pale banded scales on tergites.

**B:** Proboscis dark scaled w/ no band; some pale scales may be present; palpi short & dark.

**C:** Legs dark w/ pale scales on upper portions; no banding.

**D:** Wing scales narrow & dark.

**E:** Thorax: dark-brown to black; a spot of golden-brown scales dorsally.

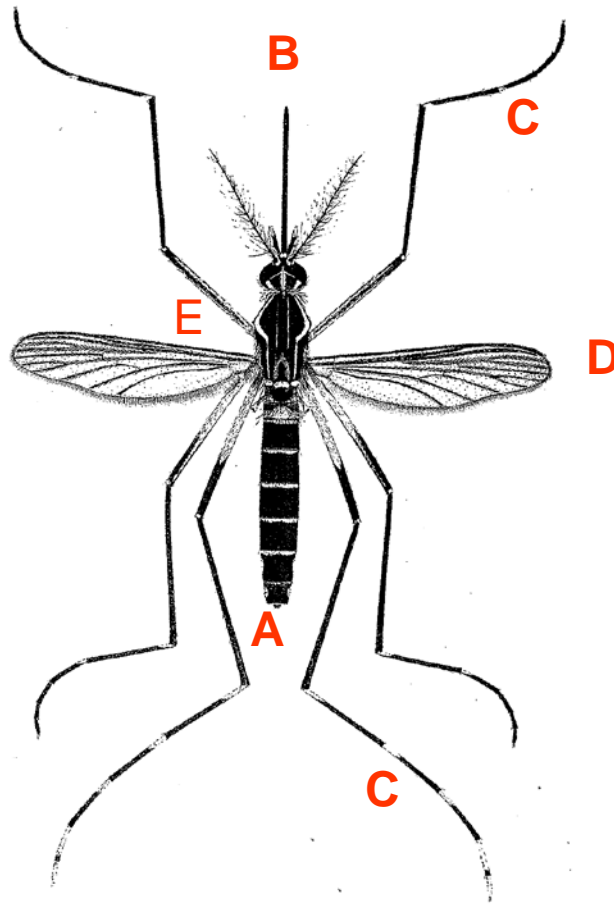
**F<sup>1</sup>:** Basically an undecorated *Cx. tarsalis*.

**F<sup>2</sup>:** *Cx. erythrorhax* similar appearance but rusty-red in color.

# *Aedes aegypti*

## Domestic Mosquito

### Vector of Yellow Fever, Dengue



- Common name is 'Yellow Fever Mosquito'.
- Strongly anthropophilic & container mosquito.
- Found in western & southern U.S. (AZ, FL, GA, LA, NM, TX), Mexico, Central & South America, parts of Asia & Africa (latter point of origin).
- Characteristics (dark brown-blackish in color)
  - A:** Abdomen blunt or rounded w/ thin silver-white banded scales on tergites.
  - B:** Proboscis dark scaled w/no band; palpi short w/ silver-white tips.
  - C:** Legs dark, w/ silver-white band on lower halves.
  - D:** Wing scales narrow & dark.
  - E:** Thorax: dark-brown to blackish w/ dorsal surface outlined by silvery-white scales forming lyre pattern w/ pair of silver-white scales forming the strings of the lyre; patch of golden-brown 'wishbone or tuning fork-shaped' scales on back half; patches of white scales on sides.
  - F:** Think 'dark mosquito w/ silver-white bands & a lyre on its back'.

# Historic Note

- Formerly called *Culex faciatus*, *Culex aegypti*, *Stegomyia fasciatus* & *Stegomyia aegypti*.
- You will see these older names when reading historic accounts of the U.S. Army's Yellow Fever Board or other histories of yellow fever or dengue research.
- Don't be confused—it's the same mosquito, *Ae. aegypti*, the 'arch enemy' of Carlos Finlay & Walter Reed.

# Aedes albopictus

## Forest Day Species

Vector of Dengue; potential vector of Yellow Fever & other Arboviruses

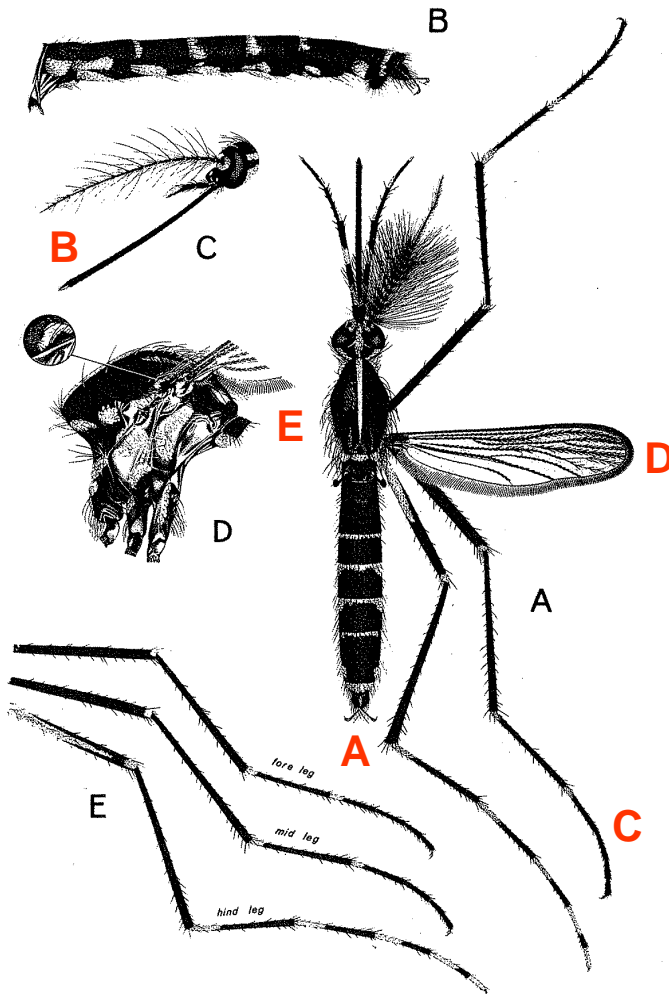
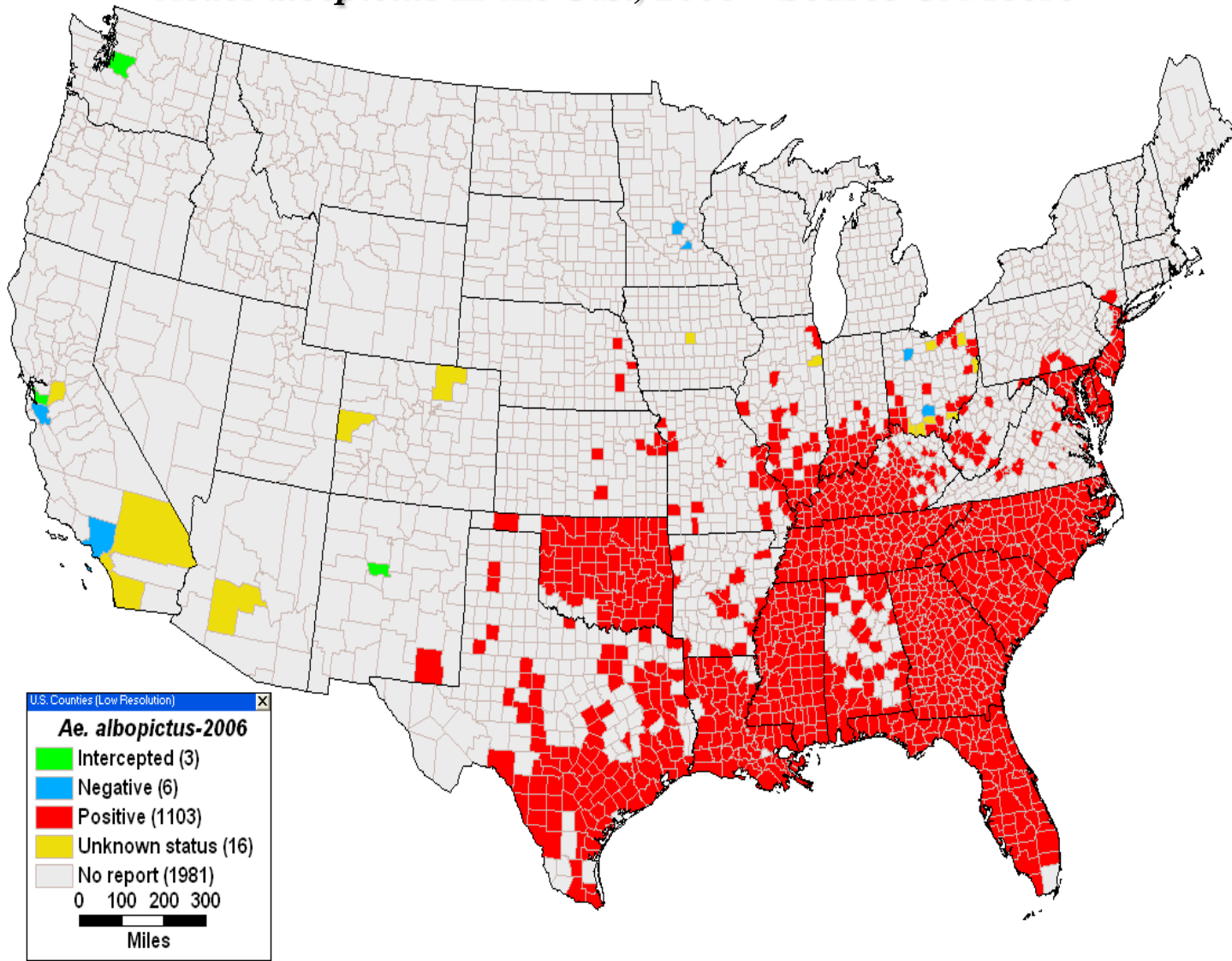


Fig. 2. Morphology of adult *Aedes albopictus*. A, dorsal aspect of the male; B, lateral aspect of the male abdomen; C, lateral aspect of the female head; D, lateral aspect of the male thorax; E, anterior surface of the male legs. [reproduced from Huang (1972)].

From: *The Biology of Aedes albopictus*, W.A. Hawley, J. Am. Mosq. Control Assoc., Supplement #1, Dec. 1988.

- Common name is the 'Asian Tiger Mosquito'
- A container mosquito
- Found in the central & SE U.S. (see map), Mexico, South America & Asia (latter point of origin).
- Characteristics (dark brown-blackish in color)
  - A:** Abdomen blunt or rounded w/ thin silver-white banded scales on tergites & broaden on the side.
  - B:** Proboscis dark scaled w/ no band; palpi short w/ silver-white tips.
  - C:** Legs dark, w/ silver-white band on lower halves.
  - D:** Wing scales narrow & dark.
  - E:** Thorax: dark-brown to blackish w/ single silver-white stripe running down middle of dorsal surface.

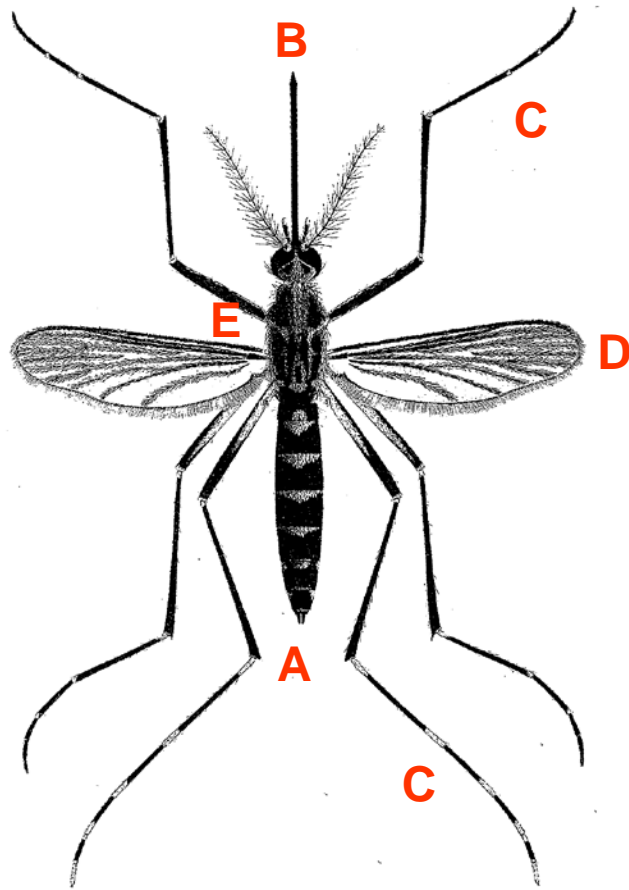
# *Aedes albopictus* in the U.S., 2006 – Source C. Moore



# *Ochlerotatus varipalpus*

Treehole Mosquito

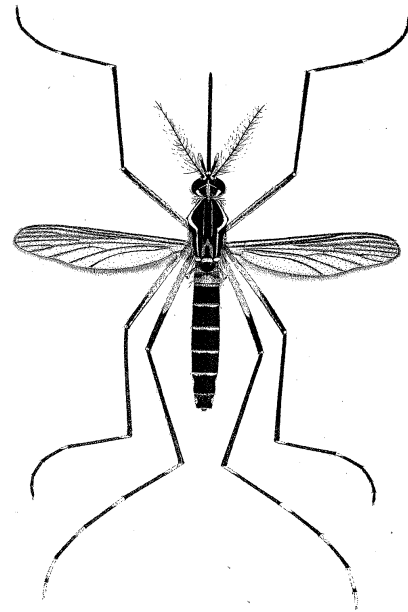
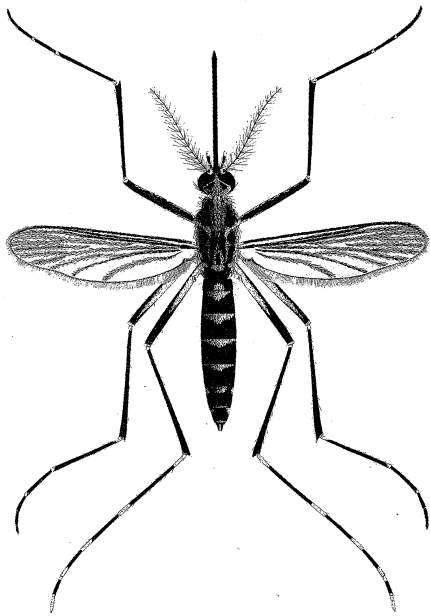
Nuisance, non vector species



- Common name is the 'Western Treehole Mosquito'
- Day time biter.
- Characteristics (black-dark brown color)
  - A:** Abdomen pointed w/ triangular or pyramid-shaped light scales on tergites 2-5.
  - B:** Proboscis dark, no band; palpi short w/white tips.
  - C:** Legs have upper part dark w/speckled white scales & light bands on the joints of the lower halves.
  - D:** Wing scales broad & dark.
  - E:** Thorax dark w/ narrow median patch of golden-brown scales on front half; linear silver-white scales on each side; patch of silvery 'wishbone/ tuning fork-shaped' scales on rear half; narrow linear silver scales on each side starting at posterior border, traversing forwards to mid-point, angling off to the upper joints of front legs; patches of white scales on sides.



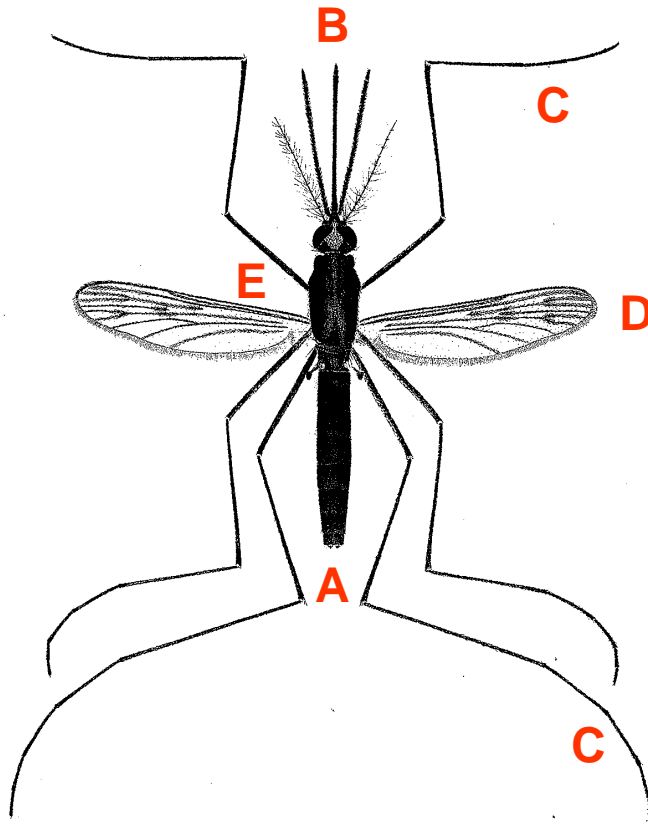
# Compare the Two: *Oc. varipalpus* vs. *Ae. aegypti*



# *Anopheles hermsi*

## Permanent Water Mosquito

### Vector of Malaria



- Associated w/ riparian, riverine & natural wetlands, marshes, ciénegas, etc.
- Anthropophilic & endophilic (making it a competent vector species).
- Sibling species to *An. freeborni*.
- Characteristics (dark brown in color)
  - A:** Abdomen blunt or rounded & covered w/ dark scales.
  - B:** Proboscis dark scaled w/ no band; palpi as long as proboscis; together they look like a pitch-fork or gig attached to head.
  - C:** Legs dark, no banding but femora & tibiae tipped w/ pale scales.
  - D:** Wings have 4 lateral darken spots on outer surface w/ anterior or front edge uniformly dark.
  - E:** Thorax: dark-brown to black; an median, anterior stripe of golden-brown scales that becomes bifurcated at mid-point.
  - F:** Think a 'dark mosquito w/ dark spots on wings & 3-bladed pitch-fork attached to it's head.

***Residual Anophelism in the Verde Valley, Yavapai County Anopheles hermsi Collected 2004-2009***

<b>Camp Verde</b>	
<b>Year</b>	<b>Number Collected</b>
2004	1
2005	30
2006	192
2007	13
2008	33
2009	1
<b>Total</b>	<b>270</b>

<b>Cottonwood</b>	
<b>Year</b>	<b>Number Collected</b>
2004	4
2005	108
2006	22
2007	49
2008	8
2009	7
<b>Total</b>	<b>198</b>

# Residual Anophelism in the Verde Valley, Yavapai County

## *Anopheles hermsi* Collected 2004-2009

<b>Clarkdale<sup>1</sup></b>	
Year	Number Collected
2004	356
2005	283
2006	458
2007	45
2008	32
2009	1
<b>Total</b>	<b>1175</b>

<b>Miscellaneous Sites<sup>2</sup></b>	
Year	Number Collected
2004	1
2005	11
2006	9
2007	5
2008	3
2009	5
<b>Total</b>	<b>34</b>

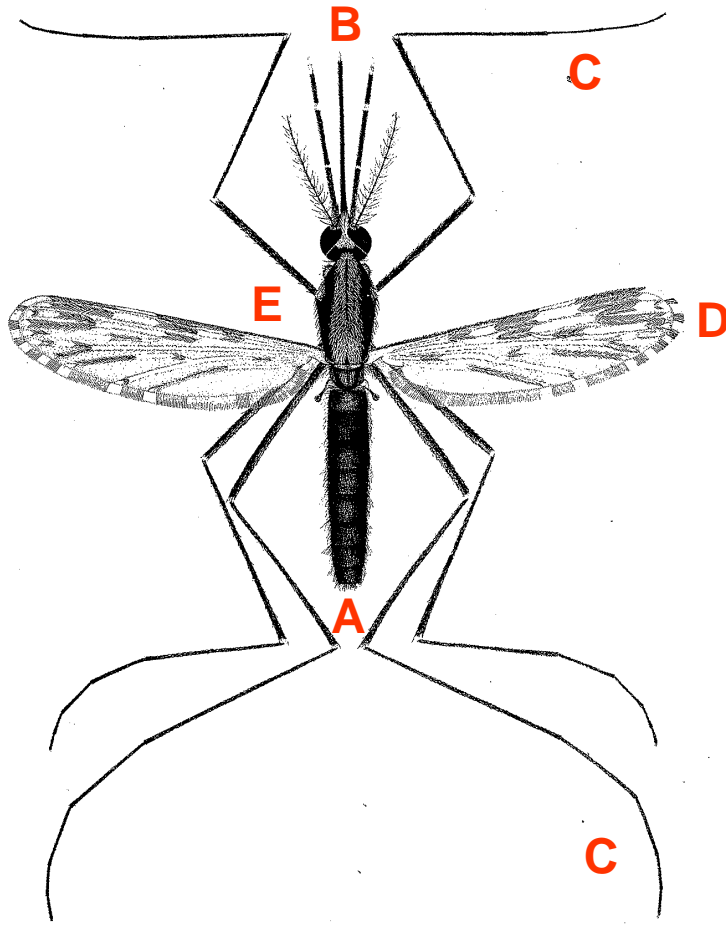
<sup>1</sup>Location of Pecks Lake & Tavasci Marsh

<sup>2</sup>Cornville, Lake Montezuma & Rimrock

# Anopheles franciscanus

Permanent Water Mosquito

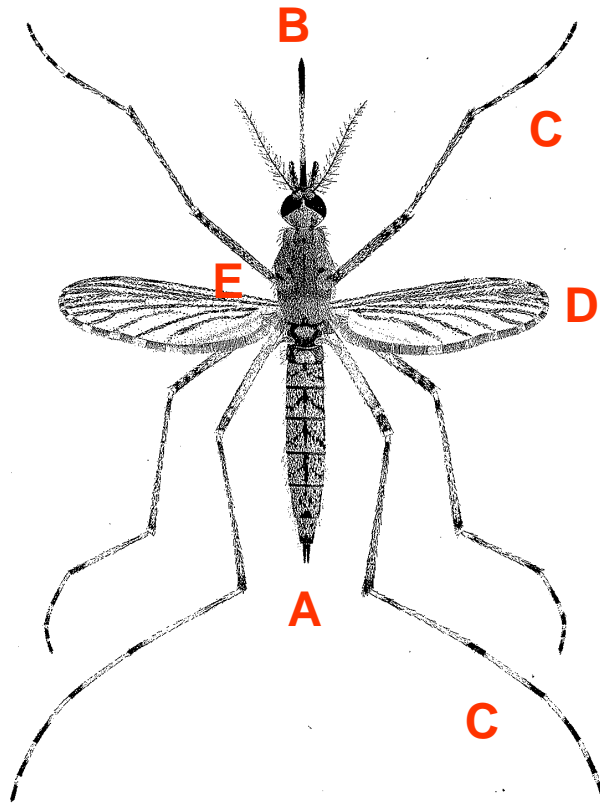
Vector capacity not fully established



- Ubiquitous throughout the state.
- associated w/ riparian, riverine & natural wetlands (marshes, ciénegas, etc).
- Zoophilic & exophilic (making it poor vector species).
- Characteristics (brown in color)
  - A: Abdomen blunt or rounded & darkly scaled.
  - B: Proboscis dark scaled tipped w/ white scales; palpi as long as proboscis (pitch-fork/ gig look) w/ two narrow white rings.
  - C: Legs dark, femora & tibiae tipped w/ pale scales.
  - D: Wings w/ alternating patches of light & dark scales along outer edges.
  - E: Thorax dark w/ wide pale dorsal stripe.
  - F: If you find lots of hares/ rabbits at a trapping site, you'll probably come up with lots of *Cx. franciscanus* (they like 'wabbit' blood).

# *Psorophora signepennis*

## Temporary/Flood Water Mosquito Nuisance, non-vector species



- Very common in the state
- Day-time biter but will feed 'anytime, anywhere'.

- Characteristics

**A:** Abdomen pointed with speckled tergites w/ dark scaled 'peace signs' running dorsally on mid-three segments.

**B:** Proboscis dark w/ broad speckled pale band at mid-point; palpi short, dark speckled w/ few pale scales.

**C:** Legs speckled w/ pale scales on upper half & alternating pale & dark bands on lower half.

**D:** Wings w/ alternating patches of light & dark scales along outer lateral & posterior edges.

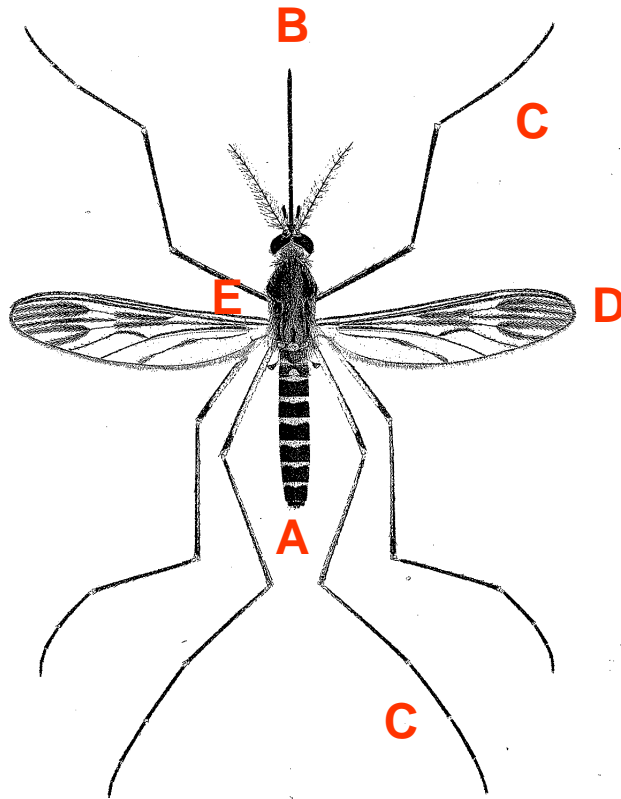
**E:** Thorax covered w/ fine golden-brown scales dorsally, pale on sides.

**F:** Nasty, vicious biter.

# Culiseta incidens

## Permanent Water Mosquito

### Non-vector species

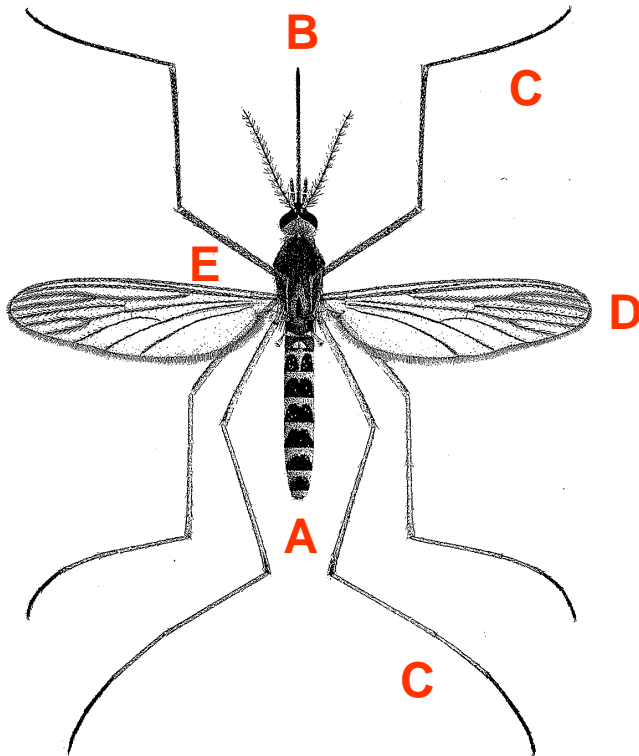


- Common throughout state
- Predominantly zoophilic preferring to feed on large mammals (horses, cattle, elk, etc.), but will feed on humans.
- Characteristics (dark brown in color)
  - A:** Abdomen blunt or rounded & darkly scaled; w/ pale triangular bands varying in size posterior tergites.
  - B:** Proboscis long & dark w/ a few pale scales; palpi dark & short, speckled w/ pale scales.
  - C:** Legs dark w/ pale scales on lower halves.
  - D:** Wing scales dark w/ some thick patches.
  - E:** Thorax has wide linear golden-brown/ yellow scales on each side starting at posterior border, traversing forwards to mid-point, angling off to upper joints of front legs; a patch of yellowish 'wishbone-shaped' scales on the posterior half. Scale pattern poorly defined.
  - F<sup>1</sup>:** Usually a fall mosquito.
  - F<sup>2</sup>:** Large mosquito (looks like a big *Culex*).

# Culiseta inornata

## Permanent Water Mosquito

### Non-vector species

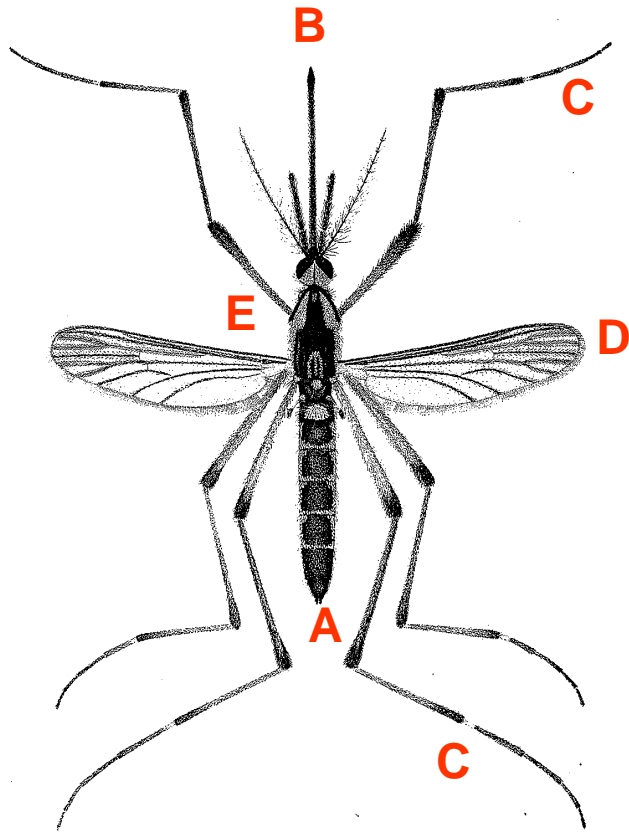


- Common throughout state
  - Predominantly zoophilic preferring to feed on large mammals (horses, cattle, elk, etc.), but will feed on humans.
  - Characteristics (dark brown in color)
    - A:** Abdomen blunt or rounded & darkly scaled; pale bands on 2<sup>nd</sup> - 7<sup>th</sup> tergite that broaden to cover the sides.
    - B:** Proboscis dark speckled w/ pale scales.
    - C:** Legs dark brown speckled w/ pale scales.
    - D:** Wing scales dark & narrow.
    - E:** Thorax has narrow linear golden-brown/ yellow scales on each side starting at posterior border, traversing forwards to mid-point, angling off to upper joints of front legs; a patch of yellowish 'wishbone-shaped' scales on posterior half.
- F<sup>1</sup>:** Usually a fall mosquito.
- F<sup>2</sup>:** Large mosquito (looks like a big *Culex*).



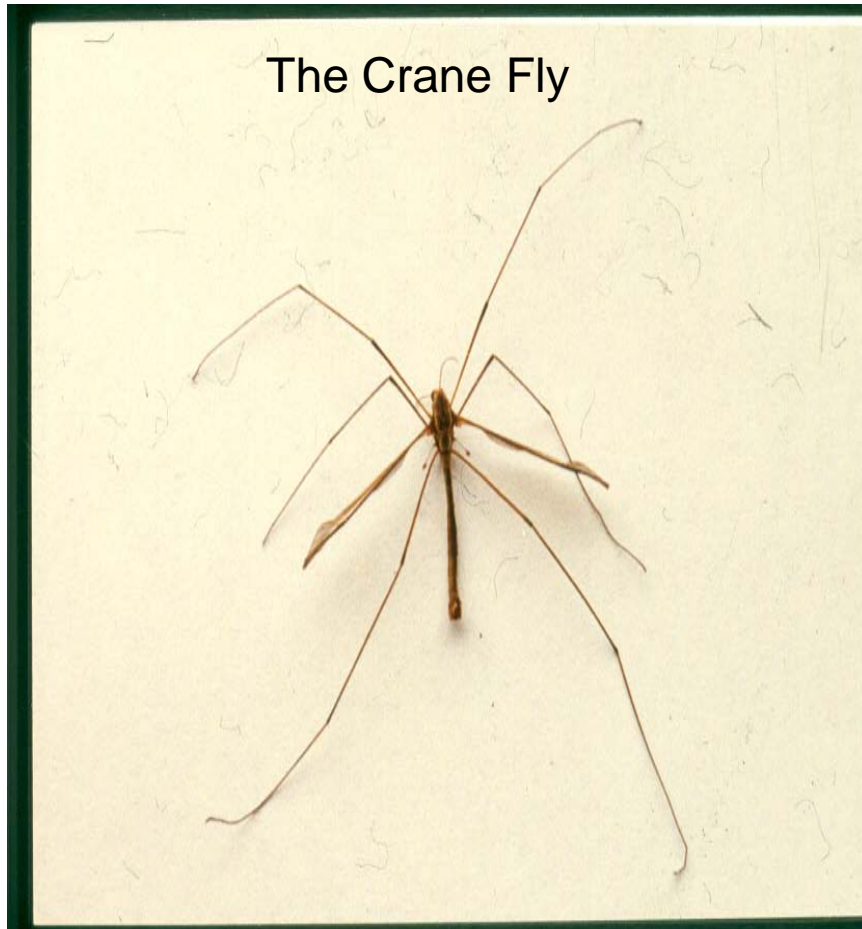
# *Psorophora howardii*

## Temporary Water Mosquito Non-vector species



- Will aggressively feed on animals & humans when their breeding sites are invaded.
- Characteristics (blue black in color)
  - A:** Abdomen pointed w/ broad pale band on 1<sup>st</sup> tergite w/ blue-black dorsal scales & white scales along the side of remaining segments.
  - B:** Proboscis long, basically brown becoming darker at end; palpi brown & almost half as long as proboscis.
  - C:** Legs long w/ femora & tibiae yellow-scaled, tibiae also having purple scales. Tarsus also yellow & purple scaled but w/ narrow pale bands on lower segments.
  - D:** Wing scales dark & narrow.
  - E:** Thorax w/ dark bronze-like dorsal scales & broad white scales & grayish-white scale patches on the sides.
  - F:** Its big, really big!

# 'A Case of Mistaken Identity'



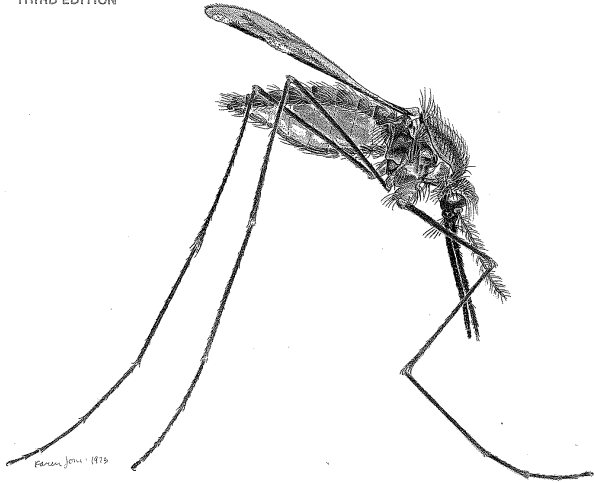
- Are somewhat mosquito-like but its not a mosquito.
- It has no proboscis.
- It does not bite or suck blood.
- It feeds on decaying plant material.
- Larvae live in water or moist soil.
- Adults are common near water sources.
- Common in the spring.
- 1500 different species in North America.

# Other References

## Mosquitoes of California

R. M. Bohart and R. K. Washino

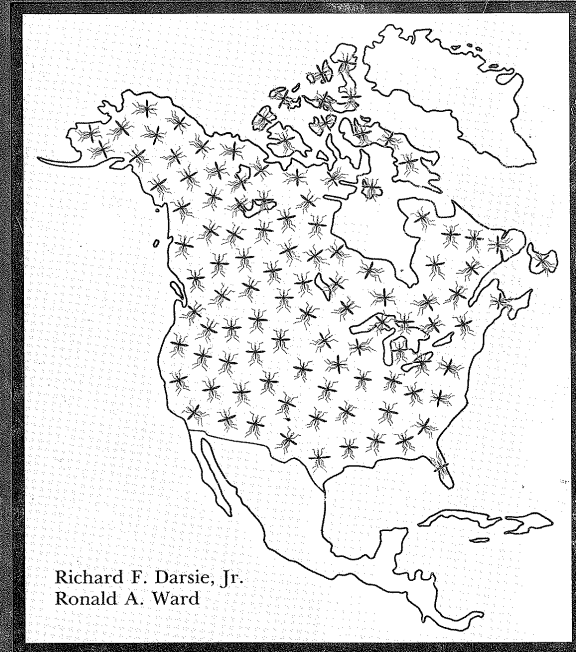
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## Identification and Geographical Distribution of the Mosquitoes of North America, North of Mexico



Richard F. Darsie, Jr.  
Ronald A. Ward

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Produced in 1973

## Mosquitoes of Arizona

Technical Bulletin 205



Agricultural Experiment Station  
The University of Arizona  
Tucson



# And...

Be sure to use  
internet sources  
including the  
CDC.

*CDC's Neato Mosquito*



This still remains useful though certainly not up to date. If your agency has a copy keep it handy.

*Leadership for a Healthy Arizona*

