# GLOBE Mission Mosquito presents a series of mosquito tutorials

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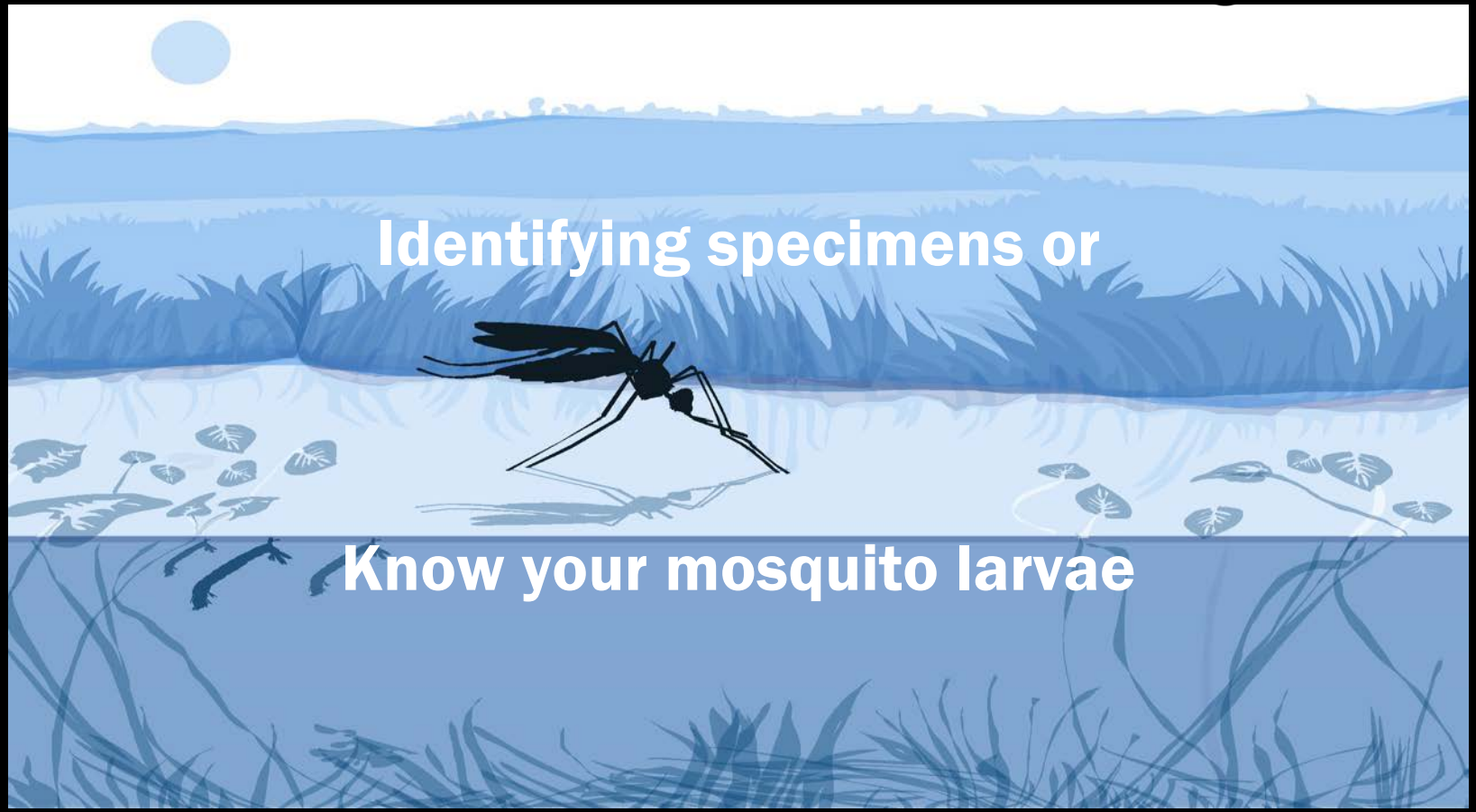
Identifying specimens


Identifying specimens or
Know your mosquito larvae

# Knowing your mosquito larvae involves ….

- Recognizing the gross morphological characteristics of mosquito larvae.
- Learning the morphological features used in identifying a larva.

**You will investigate and identify the larvae of three genera of mosquitoes:**

- ***Anopheles***
- ***Aedes***
- ***Culex***

These three genera are of interest because they contain species that can transmit pathogens to humans and cause disease.
To know  differences between the larvae of these three genera, you will examine the terminal abdominal segments (8-10).

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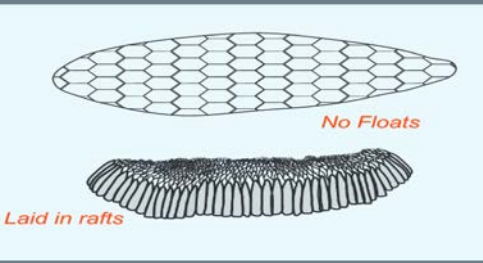
# *Anopheles*

- *Anopheles* mosquito larvae are found in a wide variety of habitats. Many species of Anopheles prefer open-water pools with little vegetation, but others have adapted to other habitats.

- *Anopheles* species lay individual eggs supported by floats on the water surface or on moist soil immediately adjacent to fluctuating water bodies.

*Anopheles gambiae*
*Credit: James Gathany*
*Source: CDC*

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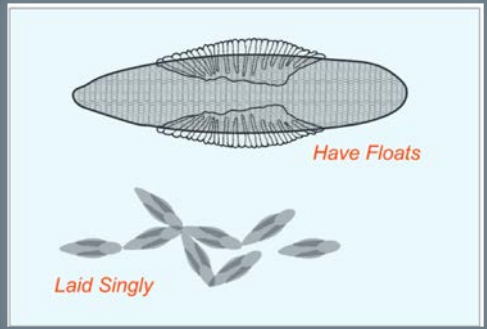
# *Culex*

*Culex* mosquitoes breed in stagnant water found in:

- Sewage systems
- Drainage systems
- Septic tanks
- Containers:  tires, buckets and rain barrels
- Open surface water habitats: swamps, marshes, bogs, rice fields, pastures

They prefer to lay eggs in rainwater barrels, storm drains, and septic tanks.  Eggs are laid in rafts that float on the water surface.

*Culex quinquefasciatus*
*Credit: Jim Gathany*
*Source: CDC*

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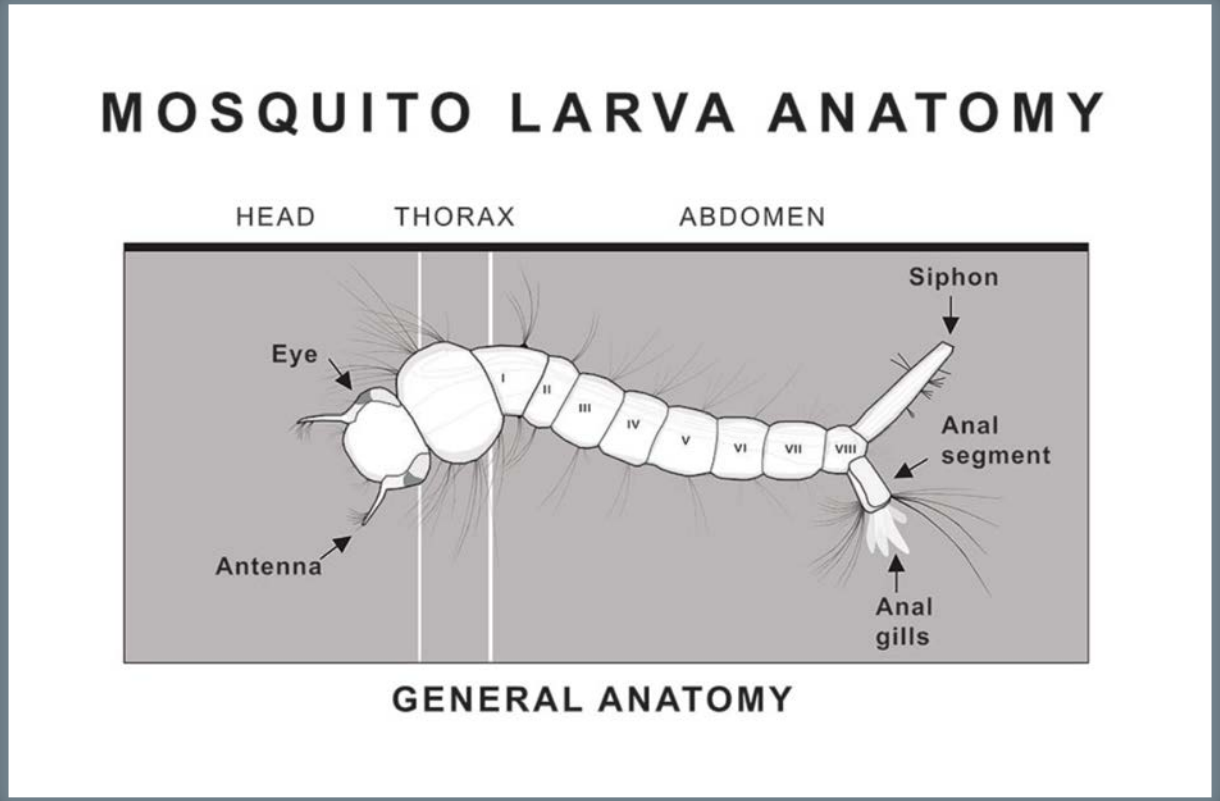
# Mosquito larva anatomy

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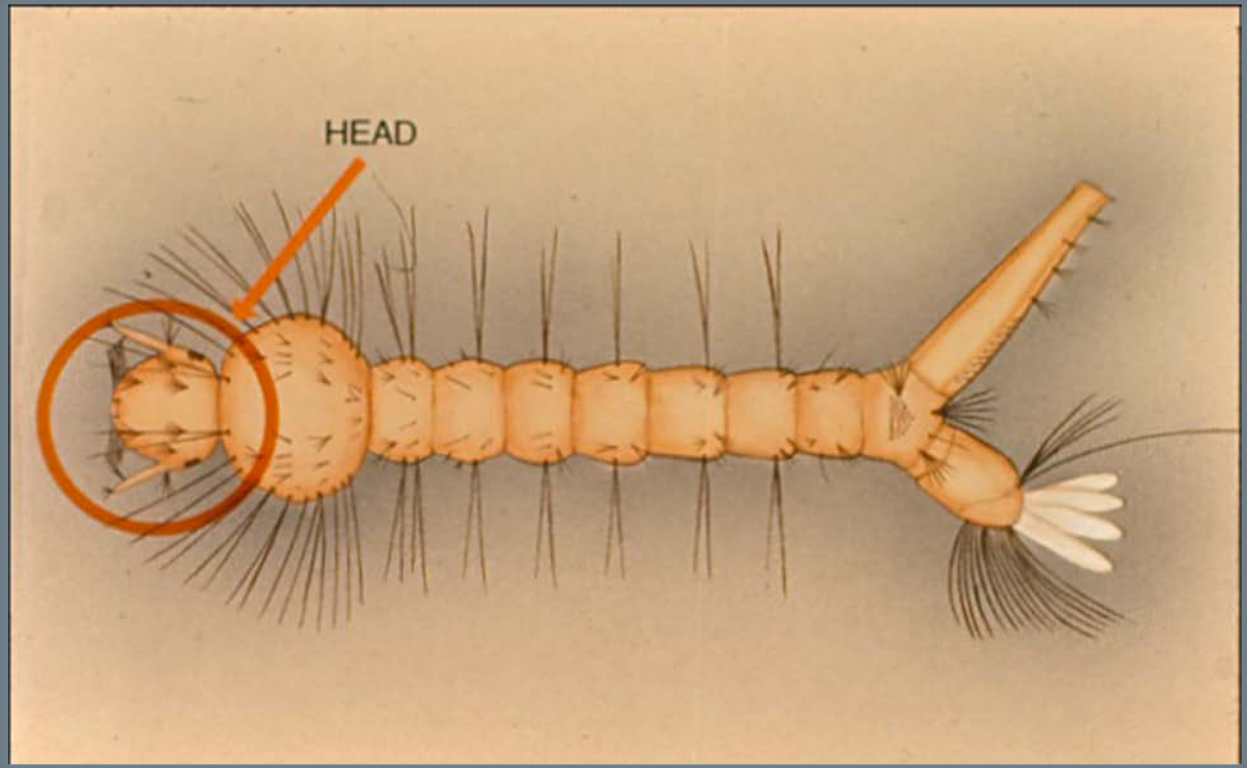
# Head

The head is round or slightly oblong and slightly flattened

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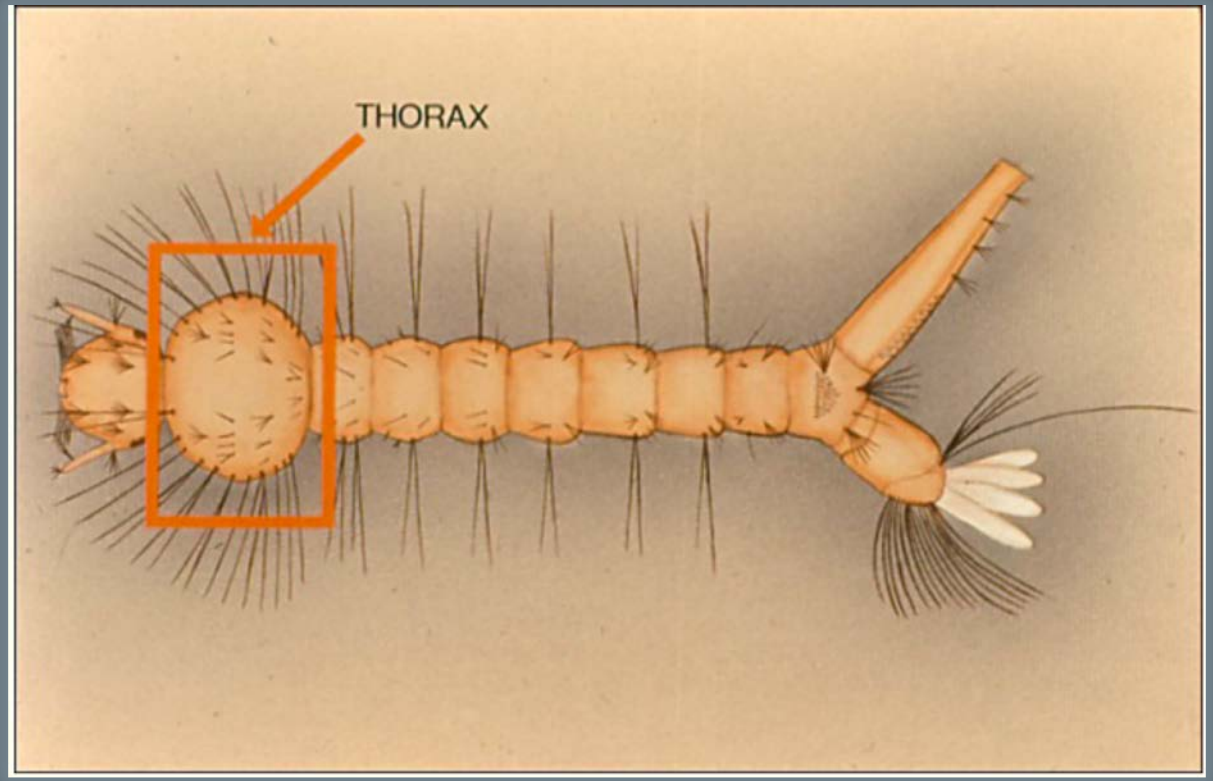
# Thorax

**The thorax** appears distinct from the head, separated by a very narrow neck.

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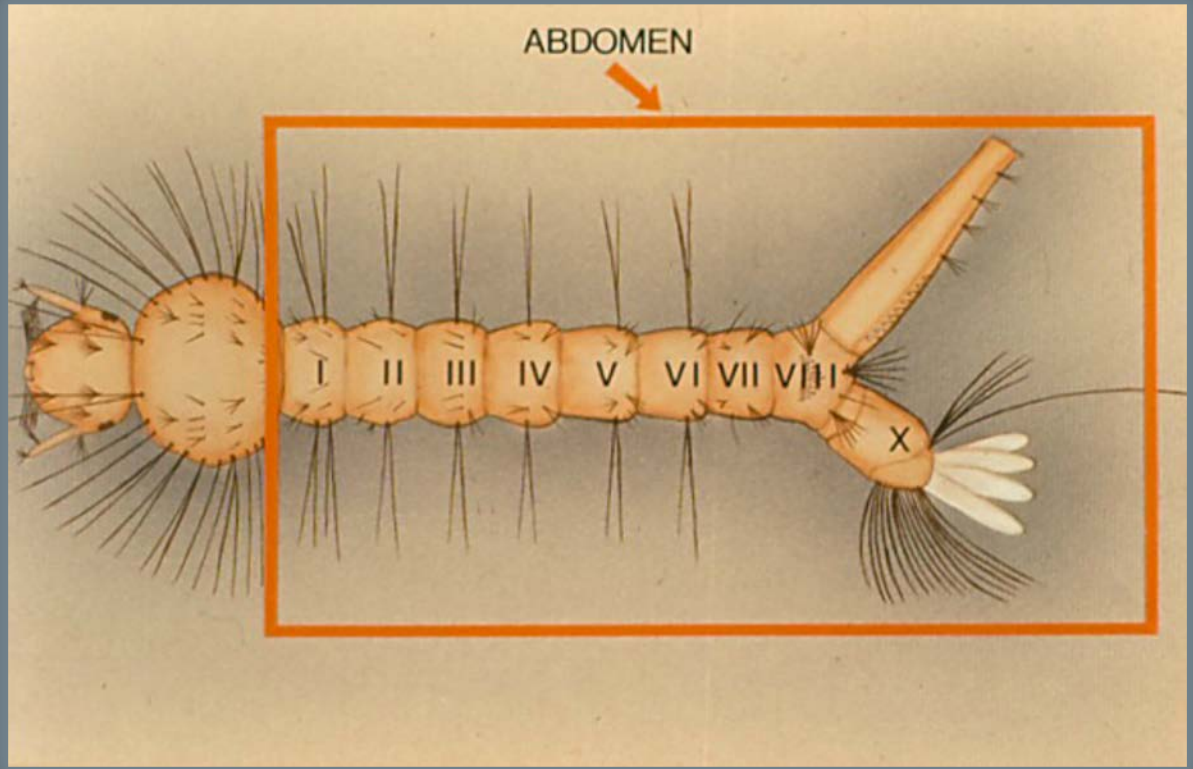
# Abdomen

**The abdomen is the** segmented section behind thorax.

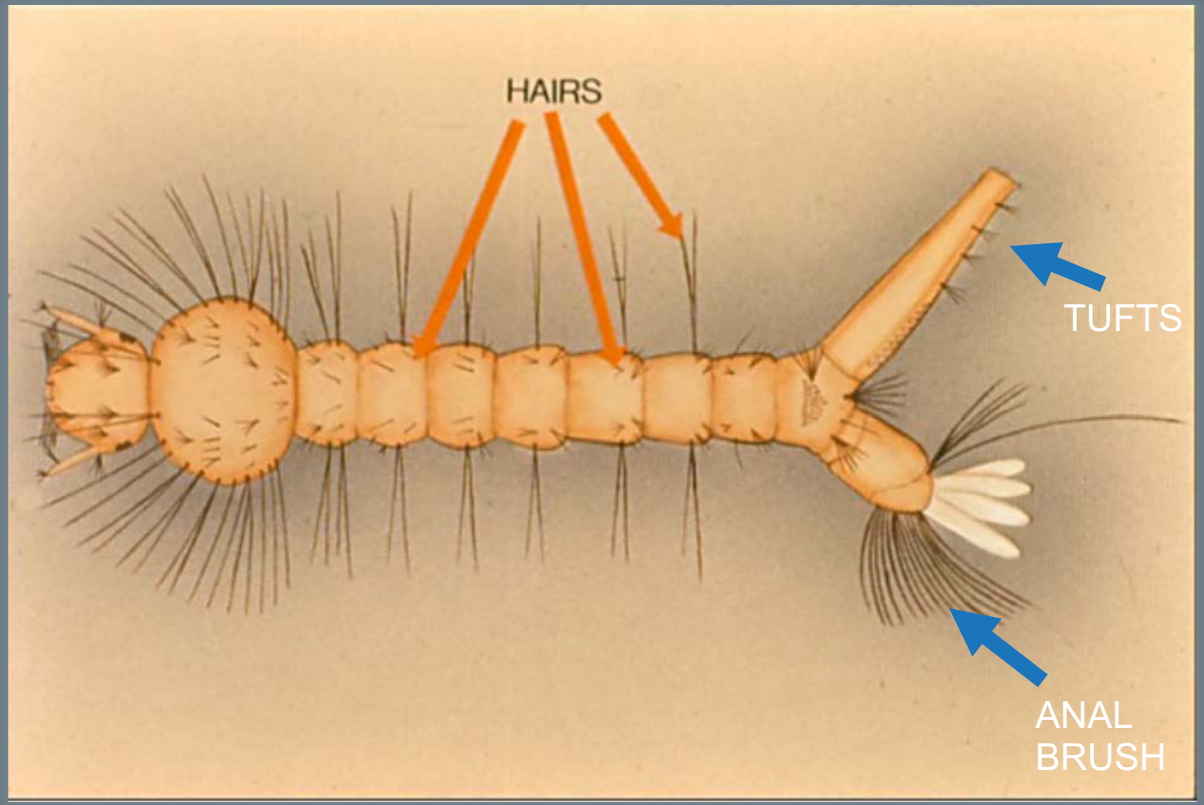
The abdomen has 10 segments, but not all are distinct. In *Aedes* and *Culex*, the ninth segment is not distinct; in *Anopheles*, the tenth.

The four white protrusions on the anal segment are anal papillae which perform osmotic regulation of the organism.



# Hairs

**The** number, position and arrangement of hairs on the larva can be diagnostic.



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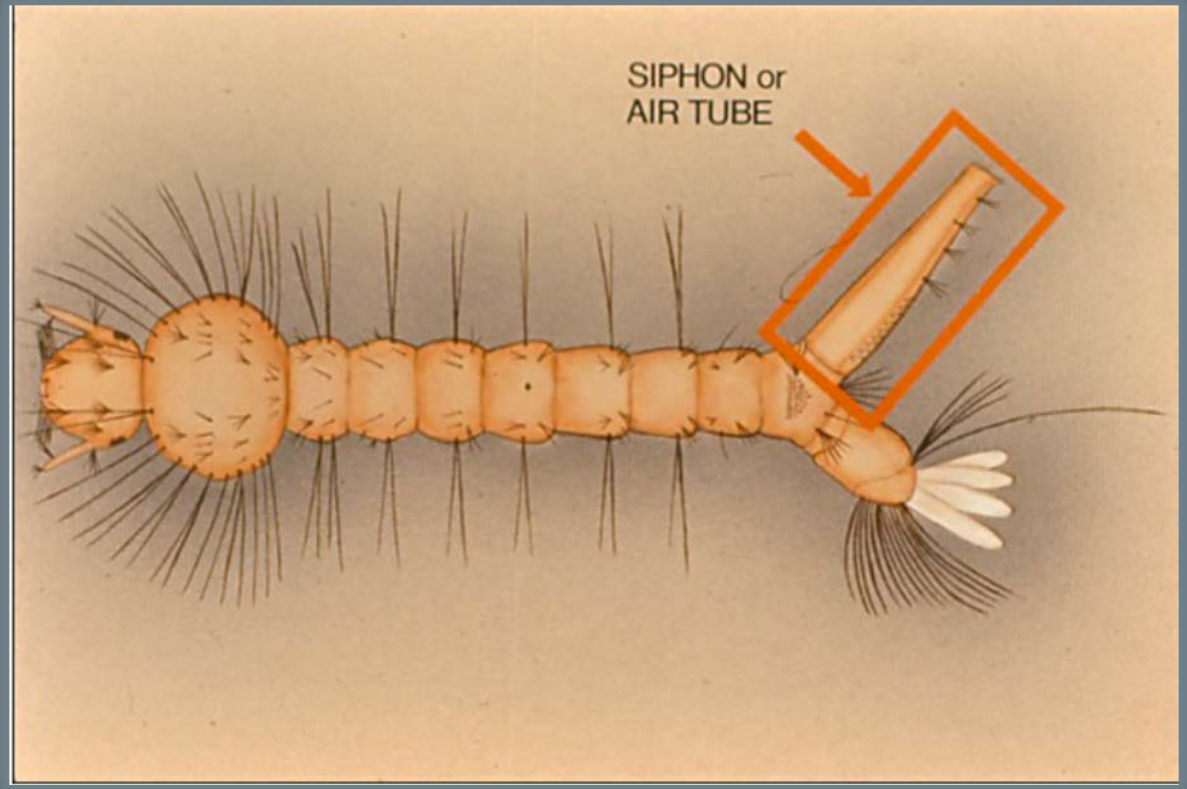
# Siphon

**The siphon is** an air tube on the 8th abdominal segment. All genera – except one- have a siphon.

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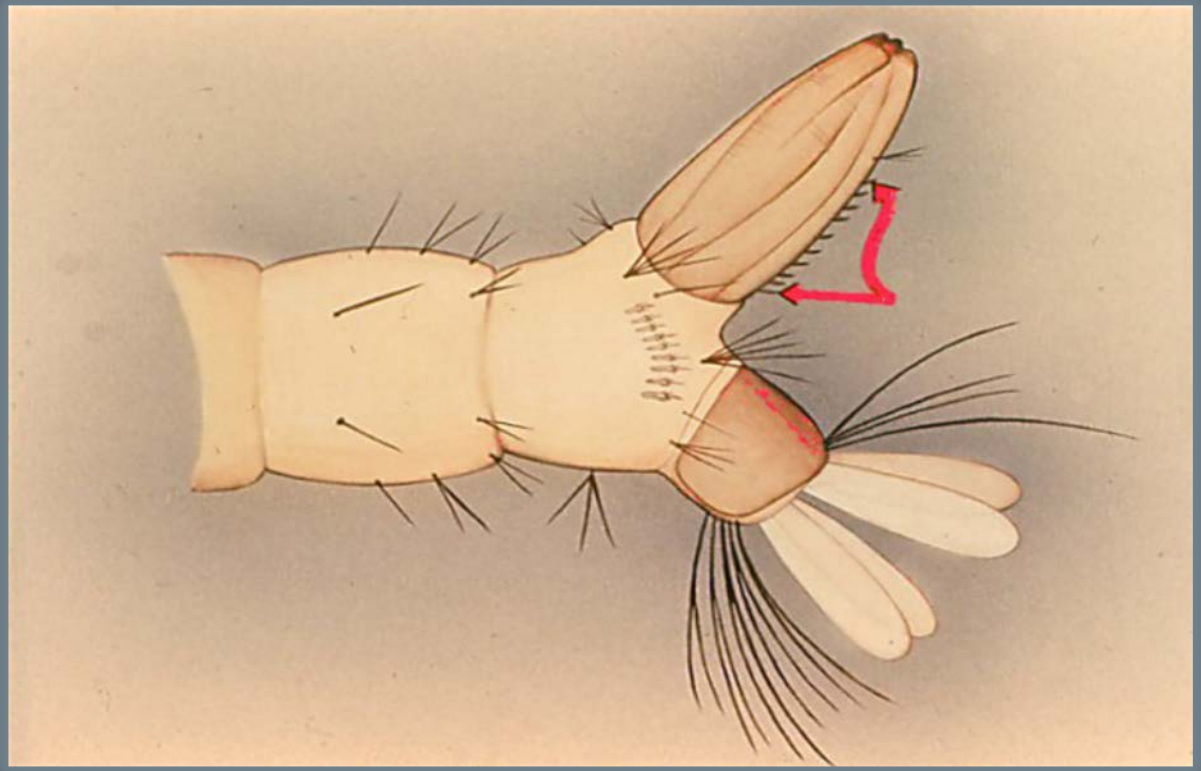
# Pecten

Pecten are a row of closely set teeth or spines on each side of the siphon.



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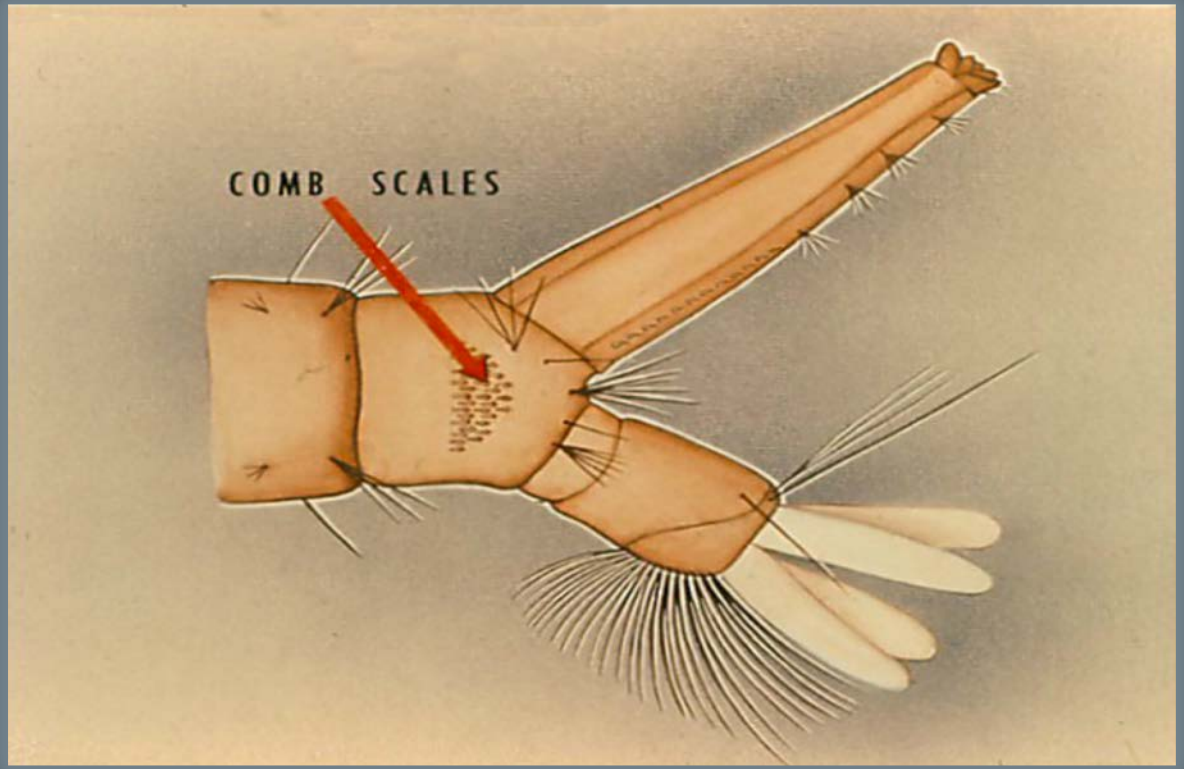
# Comb Scales

A line or patch of scales found on the 8th abdominal segment in most genera.

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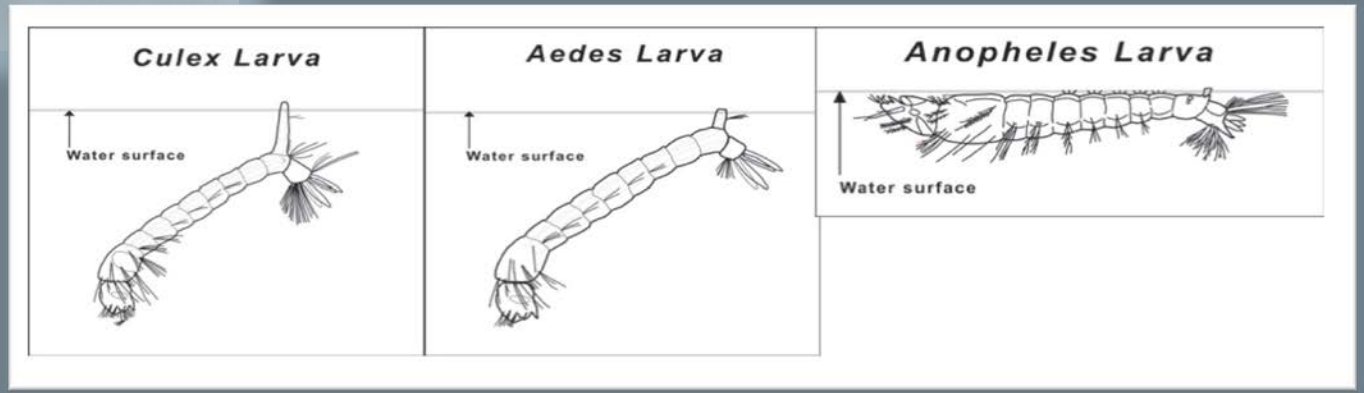
# First step in mosquito larvae identification

- Place the larvae in cups, vials or plastic bags.
- Observe them to see how they suspend from the surface of the water.
- If the larvae are lying flat on the surface, they are from the genus *Anopheles.* This is the only genus of mosquito that lies flat on the surface; all others are suspended from the surface at an angle.

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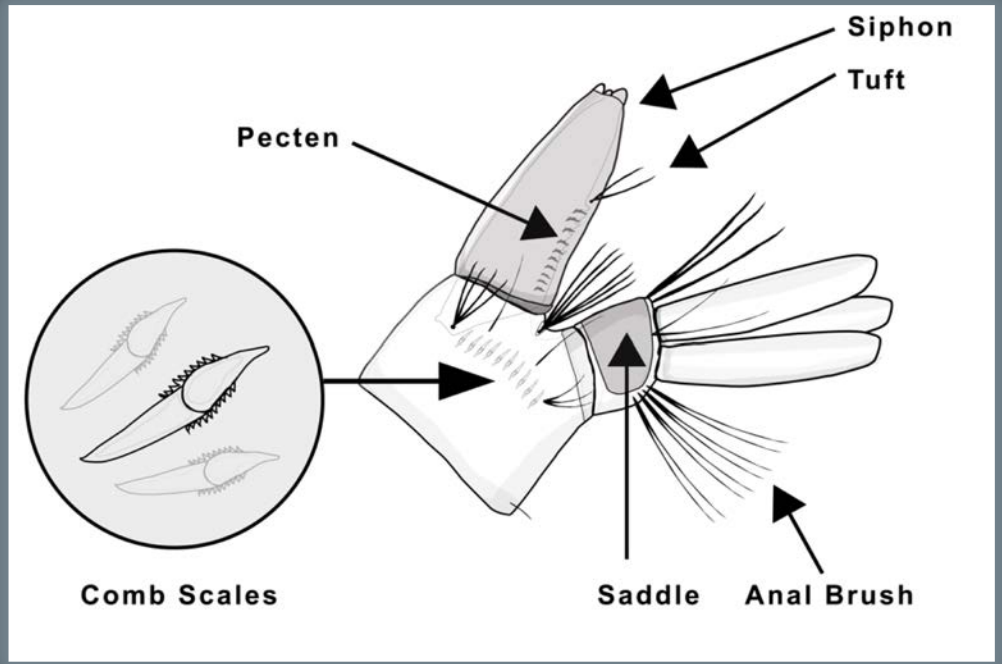
# Details of abdominal morphology

Key features are often found on the anal segment and the siphon.




**Siphon**: the air tube used by some species of mosquito to breathe. (more on next slide).

**Saddle**: a dark, thickened band on the anal segment. It can ring the segment, be in two pieces, or appear like it does here, as a saddle.

**Comb scales**: scaly or spiny spicules found in rows or a patch on the abdomen.

**Pecten**: an even row of tiny spines found on the siphon.

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# Siphon

- The siphon is an air tube located on the abdomen of the larva.
- Because the larva hatches from the egg and lives in the water, the siphon allows the larva to breathe.
- Most species, including those in the genera *Culex* and *Aedes*, have a siphon and spend most of their time on the surface breathing.
- *Anopheles* does not have a siphon. Instead, it lays parallel to the surface and breathes through openings on its 8$^{th}$ abdominal segment (spiracles).
- Some species have specialized siphons and attach to emergent plants found in water, using the plant tissue to access air to breathe.

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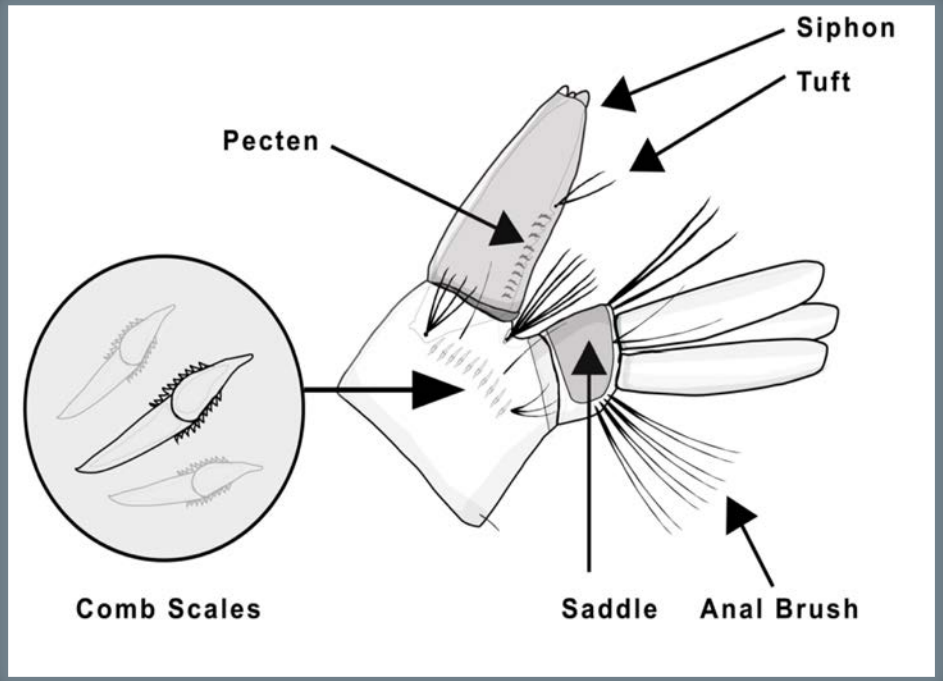
# Abdominal Hairs




The placement and number of hairs on the abdomen can be diagnostic.

Setae, Brushes, Tufts and Hairs:

Setae: another word for insect “hair”

Brush: a clump of tufts

Anal Brush: the anal brush is is used like a rudder when the larva is swimming

Tuft: more than one hair growing together.

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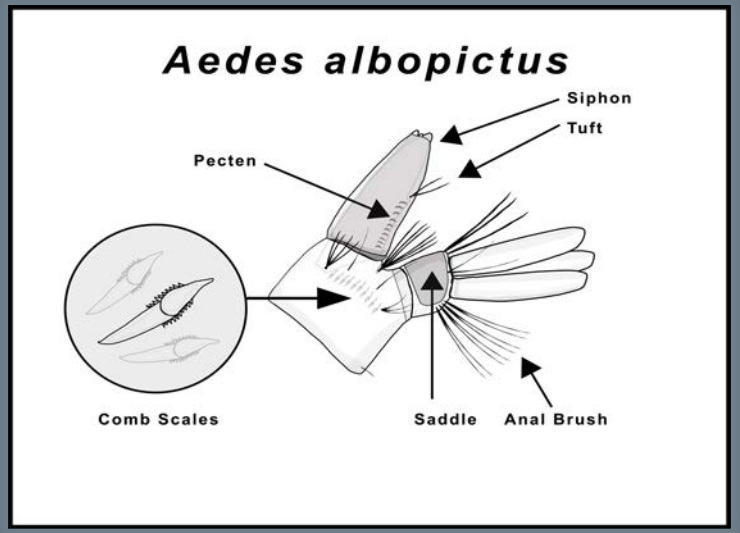
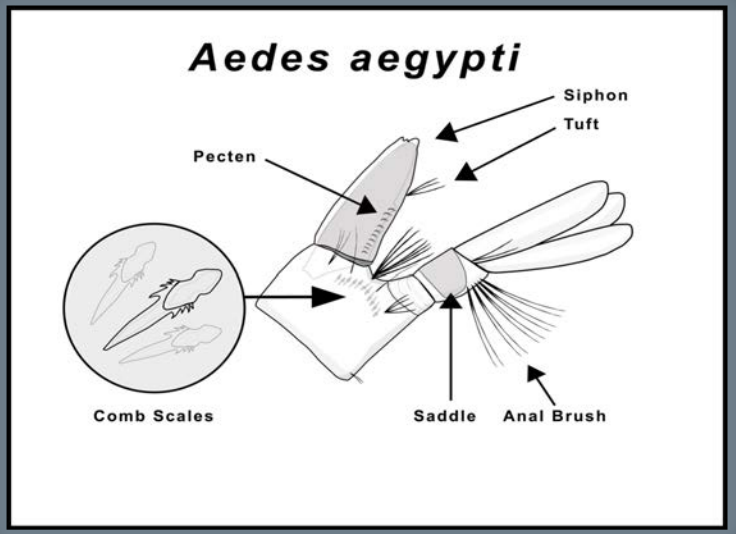
# Look closely

Distinguishing between ***Aedes albopictus*** and ***Aedes aegypti*** requires at least 35x magnifier.




You will need to look at the **comb scales**.
Note the differences shown in the diagrams above.

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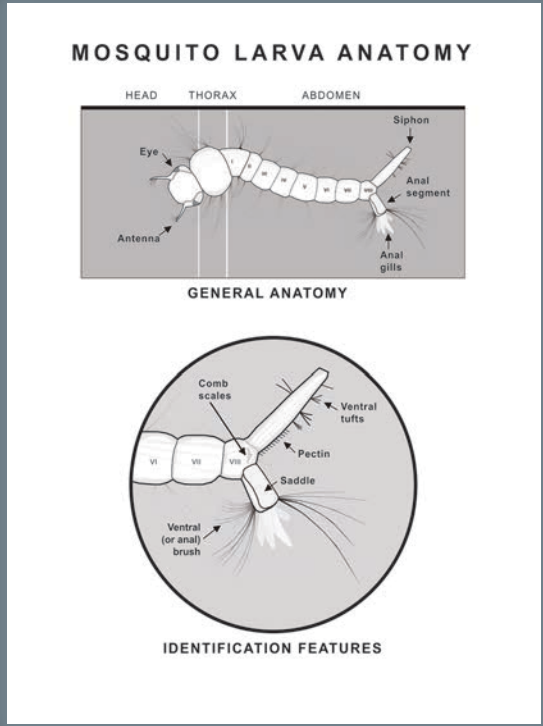
# Mosquito Larva Anatomy

## Identifying mosquito genera and species in your area

Familiarize yourself with the general anatomy of the mosquito larvae and the key features that distinguish those genera or species that are found in your locality. Consult with mosquito experts or mosquito identification keys for your locality to identify important species in your region.

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# Acknowledgements

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# Identifying specimens

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