

Gross Anatomy of an Adult Culex Mosquito

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Abstract: Mosquitoes are responsible for the transmission of various dreadful diseases. Culex is a carrier of viral encephalitis, filariasis, these mosquitoes are hardy and are able to survive extreme conditions. Culex mosquito is probably the most abundant house mosquito in towns and cities of the tropical countries. Since Culex mosquito is very common and the dreadful disease caused by this mosquito is important to know the anatomy in order to differentiate with other species. Scaling patterns on the dorsal and lateral sides of the thorax and the abdominal segments are helpful in identification of Culex mosquitoes. Other anatomical features were also discussed.

Keywords: culex mosquito and gross Anatomy

1. Introduction

Mosquito is any member of a group of about 3500 species of small insects belonging to the order diptera. Within diptera, mosquitoes constitute the family culicidae. Eggs are laid on the water surface they hatch into mobile larvae that feed on aquatic algae and organic material. The adult females of most species have tube like mouth part called proboscis that can pierce the skin of a host and feed on blood. Thousands of mosquito species feed on the blood of various hosts vertebrate including mammals, birds, reptiles, amphibians and some fish. The mosquitoes saliva is transferred to the host during the bite and can cause an itchy rash. Mosquitoes are important vectors of diseases such as malaria, yellow fever, chikungunya, west Nile, dengue fever, filariasis, Zika and other arboviruses. Culex mosquitoes grow well in standing water such as polluted ponds, marshes, tanks, street gutters, tin cans, barrels, ornamental ponds, puddles, creeks and ditches. Lifecycle usually 10-14 days. Adult mosquitoes, like other insects, have three body regions: the head, the thorax, and the abdomen. Each of these regions is further subdivided into segments, which may or may not be discernible as distinct units. The front wings have long thickenings, called veins, which give the wing rigidity. The veins are covered with scales, which can be dark or light in coloration. There are six major veins, with several subdivisions and cross veins. The major veins are the Costal, Subcostal, Radial, Medial, Cubital and Anal veins. The legs are divided into five segments. The coxa is the basal segment, and is followed by the trochanter, the femur, the tibia and finally the tarsus (plural tarsi). The tarsus is further divided into five subunits, called tarsomeres. The apical tarsomere terminates in a claw. Mosquitoes technically have four wings, but only the front wings of mosquitoes are used for flying. The hind wings, called "halteres", are small and do not resemble true wings at all. The halteres are short knoblike and used to help maintain balance during flight. The membranous portions of the wing between the veins are called cells, and are named after the vein that they follow, for example, radial cell, costal cell. The apical tip and posterior margins of the wings are bordered with long, narrow setae, called (collectively) the wing fringe. The major dorsal portion of the thorax is the scutum. The scutum of some mosquitoes is covered in dark and light scales that can form striking patterns. Posterior to the scutum is the scutellum, and posterior to the scutellum is the

mesopostnotum. The lateral portion of the thorax is the pleuron. The pleuron has several exoskeletal plates, called sclerites. Two of the larger sclerites are the mesokatepisternum and mesepimeron. The arrangements of setae and scales on the mesokatepisternum and mesepimeron are often used in mosquito identification. The pleuron also bears two large spiracles, openings in the exoskeleton through which the adult mosquito breathe. Abdomen, the posterior-most region of the body, is the primary site for digestion, excretion and reproduction. It is divided into ten segments, each composed of a dorsal and ventral plate. The dorsal plates are called tergites, and the ventral plates are called sternites.

2. Materials and Methods

Mosquitoes were collected by hand catch method, total catch method, human and animal bait method. In hand catch method and total catch method, mosquitoes were collected from pit shelters, human and animal places. Human and animal bait using light trap method. Easy accessible pool of standing water outside animal enclosures was inspected. Mosquitoes were collected by dipping or with plastic pipettes. Collected mosquitoes were killed and placed in 70 percent ethanol and kept in the dark to avoid bleaching. Specimens were examined microscopically. Species identification was based on (Belkin 1962).

3. Results and Discussion

Morphology/Gross Anatomy

In the head and thorax the segments are mostly fused and not easily distinguished as it was described by (Burkett 2013) in mosquitoes, the abdomen are generally evident. The mosquito head is the body's sensory center. The head is nearly spherical in shape and is dominated by two large compound eyes, which are excellent visual organs, even in low-light situations. The surface of the eye is divided into many small units, called facets. The paired antennae arise between the eyes and serve as both chemosensory and mechanosensory (sound-detecting) organs. The antenna is divided into three regions. The flagellum is the long, segmented, whip-like portion of the antenna. Each segment of the flagellum (flagellomere) bears a whorl of sensory setae. The pedicel is basal to the flagellum and appears as a swollen or bulbous segment. Neurosensory cells within the

pedicel receive vibratory signals from sensory setae of the flagellum. The scape is the ring-like or cup-like basal segment of the antenna. Below the antennae is the clypeus, which covers the forward-projecting portion of the head that gives rise to the paired maxillary palps and the proboscis. The maxillary palps (often referred to simply as the palps), are jointed chemosensory and mechanosensory sensory appendages that flank the proboscis. In most mosquitoes, the palps are shorter in the females than in the males. The proboscis is the conspicuous elongate projecting mouthparts of the adult mosquito. It is composed of a ventral sheath,

which holds the styliform (needle like) elements that pierce host flesh, deliver mosquito saliva and transport blood. At the tip of the proboscis are the labella, two sensory lobes (usually appearing fused) that mosquitoes use to locate host blood vessels thorax, located between the head and the abdomen, bears the legs and wings, and is therefore the locomotary center of the adult mosquito. Adult mosquitoes have six legs, of which the hind legs are the longest (fig 1) as it was observed by (Burkett 2013) in mosquitoes.

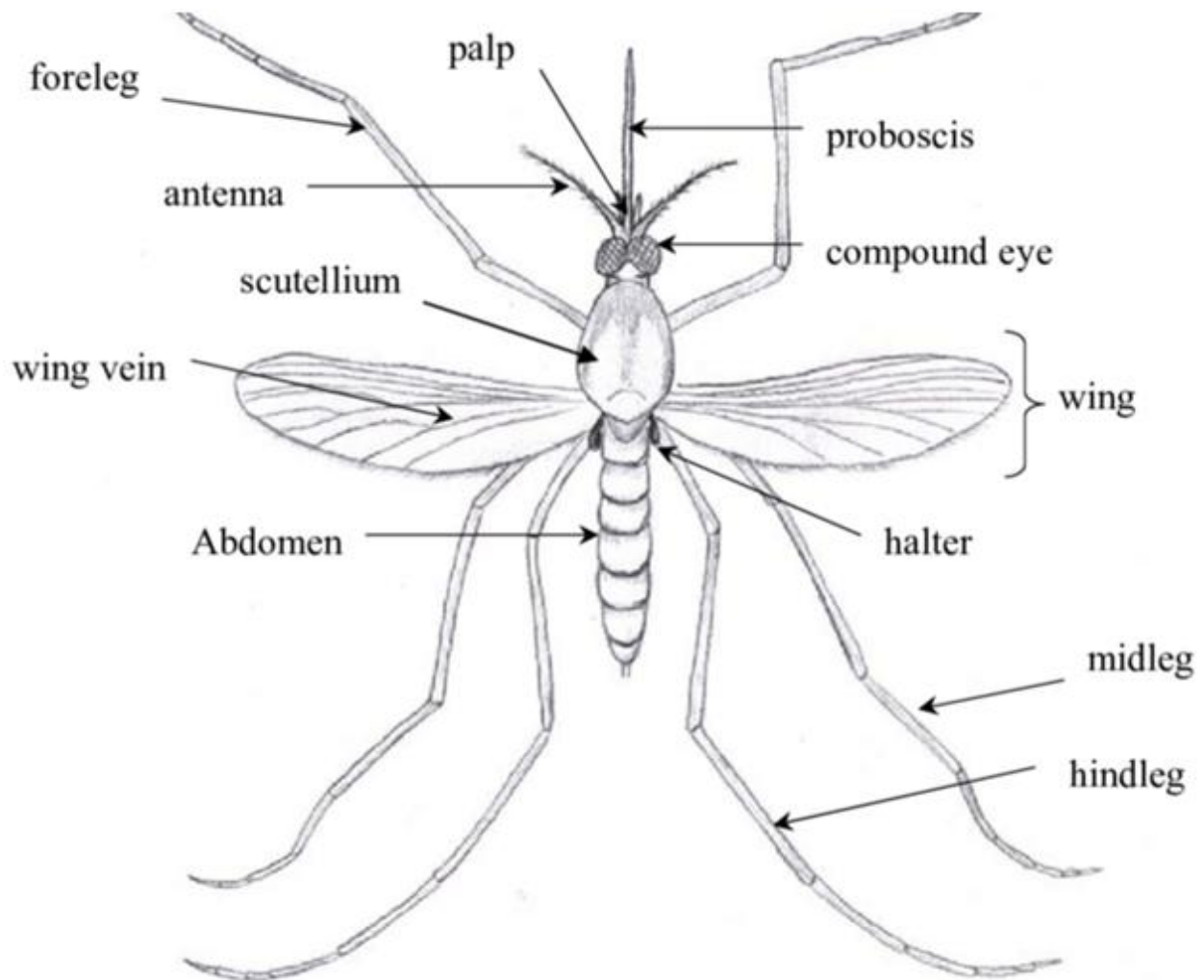


Figure 1

In this present study, adult culex mosquitoes measured around 6.7mm (millimetres) (fig 2) an adult culex mosquito may measure from 4-10mm



Figure 2: Adult culex mosquito measured 6.7 mm

as it was mentioned by (Belkin 1962). The adult morphology is typical of flies the head, thorax and abdomen with 2 forewings held horizontally over the abdomen when at rest (fig 3)



Figure 3

As it was observed by (Snell 2005) in culex mosquitoes. As in flight the 2 pair of wings is reduced and modified into tiny inconspicuous halteres. It holds its body parallel to the resting surface and its proboscis is bent downward relative to the surface. The wings with scales on the veins and the margin are uniform in colour (fig 4) as it was mentioned by (Graham 1929) in Mosquitoes.

The tip of abdomen is blunt and has retracted cervical (fig 4) as it was reported by (Belkin 1962 and Snell 2005) in mosquitoes.



Figure 4



Figure 5: Blunt and retracted cervical (tip of the abdomen)

Eggs laying on almost any body of fresh water, including standing polluted water. The long and slender culex larva have breathing tubes that contain hair tufts. They hang head downward at an angle of 45 degree celcius from the water surface. The palpi are shorter than the proboscis. The scutellum in the thorax is trilobed (fig 6) as it was reported by (Belkin 1962) in culex mosquitoes.



Figure 6: Trilobed Scutellum

Pale and dark bands are prominent in the abdominal segments (fig 7) as it was observed by (Laird 1995)



Figure 7: Prominent pale and dark bands

4. Conclusion

Culex mosquitoes can be easily differentiated from other mosquitoes, gross anatomically by the shorter palpinear proboscis, transparent wings, body lies parallel to the surface at rest with stouter legs and also by the presence of dark and white bands in abdomen.

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