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# A Review: Mosquito In Medical Entomology

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**Introduction:**

Mosquitoes are small, flying insects known for transmitting diseases through their bites. There are more than 3500 species of mosquito all over the world. Mosquito spread many diseases like malaria, dengue, Zika, and West Nile virus. Mosquito undergoes four life stages like: egg, larva, pupa, adult. An entomologist must focus this life cycle to take control measure against all types of mosquitos. More than 80% of the global population faces a major risk of serious vector-borne diseases, with mosquito-borne diseases (MBDs) being the largest contributors (Franklinos Lhv *et al,* 2019). There are more than 220 million cases of malaria witb 4 lakhs death in every year.

**Morphological Characteristics of Mosquitoes**

**Antenna:**

The antenna of mosquito contains 3 parts of antenna: Scape, pedice and flagellum. Control of the antennal direction is done in part by the scape, but the scape is not relevant to the present study. The pedicel houses some 16,000 sensory neurons (Boo KS, Richards AG,1975) and many motor neurons also, the majority of which are used for acoustic detection in mosquito's antenna.

**Mouthparts:**

Mosquito is the major human pest in all over world. Mosquito is under the order Diptera and the family culicidae. A mosquito (female mosquito) which is able to spread disease has piercing and sucking type mouthparts/dipterous/mosquito type mouthparts. A female mosquito has an elongated labium forming a gutter which encloses six stylets. The Labrum-epipharynx, hypophyrnx,two maxillae and mandibles are present in the stylets . Mandilary and maxillary stylets are saw like. Females pierce human beings into which injects a fluid which contains anticoagulant.

**Legs:**

Mosquitoes have six legs, just like other insects. Their legs are divided into five segments: the coxa, trochanter, femur, tibia, and tarsus as the sequence. The tarsus is further

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divided into five subunits which is called tarsomeres. In these six legs hind legs are long in nature.

**Types of Mosquitoes**

Basically 3 types of mosquitoes are found all over India and they are transmitted diseases rapidly.

**Anopheles Mosquito**

There are 57 species of mosquito present all over India and 400 species are present worldwide). The eggs are basically boat shaped with an upper deck having a micropile at one end. Anopheles lays the eggs singly. Optimum temperature for hatching the eggs is about to 25-30°c about to 36-48 hours. Mosquito has four larval instars before it converts into pupal stage. Head of larva is able to rotate at 180° to enable sap more intensely and vigorously. Pupa is actually coma shaped in nature. Pupal development completes in about 48 hours. Soon after adults emerge from pupa and flies to suitable place.

Anopheles mosquito is easily identified for their colour patterns mostly on palpi, wings, and legs. The most widely evaluated species are An. *Gambiae* in Africa and An. *Culicifacies* in India.

**Ades Mosquito**

The eggs of these mosquito are very small, about 1mm in length, torpedo shaped, black in colour. Heads captures one-third of the egg-volume. Eggs are easily identified for its polygonal markings. The thin, usually black body of an adult Aedes mosquito sets it separate from other species, as do the alternating bands of light and dark on its legs and the distinctive patterns of light and dark scales on its abdomen and thorax.

**Culex Mosquito**

The colour of Culex mosquitoes varies, although they usually have grey bodies with iridescent blue, silver, white, or green scales. Culex mosquitoes typically measure between 1/4 to 3/8 of an inch in length, while their actual body size may vary significantly based on when they last fed. Because of their small size and the fact that they are most active at dawn and dusk, mosquitoes can be quite difficult to identify when they fly.

**Mosquito Borne Diseases**

**Chikungunya**

This disease is basically found in Asia and Africa in 2013. Typically, symptoms start to show up a week after infection. Joint pain and fever come out of suddenly. There may also

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be rash, exhaustion, headaches, and muscle soreness. Five thousand cases are shown in India per year.

**Maleria**

An infection contracted through mosquito bites carrying the plasmodium parasite. The primary method by which malaria is transmitted to humans is by female Anopheles mosquito bites. Symptoms are fever and sweating, usually are occurred a few weeks after being bitten. Malaria can also be spread by contaminated needles and blood transfusions.

**Dengue**

Dengue can present as a simple infection or illness or as a severe condition. It is estimated that 1 in 4 cases of dengue virus infection have symptoms. A mild to severe acute fever is the most common presentation of a symptomatic dengue virus infection. Pain in the muscles and joints, rash, headache, and high temperature are among the symptoms. Vomiting and nausea may also result from it. Severe haemorrhage and shock are present in some situations, and they may be fatal.

**Yellow Fever**

Acute viral hemorrhagic fever, or yellow fever, is spread by infected mosquitoes. The term "yellow" relates to the jaundice that certain people experience. Yellow fever symptoms include high body temperature, headache, jaundice, sore muscles, nausea, vomiting, and exhaustion. Renal and hepatic dysfunction are reversed in the majority of instances. Thirty to fifty percent of individuals with severe illness die.

**Zika Virus**

About 80% of Zika patients, or 4 out of 5 cases, do not become ill and show no symptoms at all. Despite the event that you do experience Zika symptoms, they typically start two to seven days after the infection is first discovered. Zika virus is primarily transmitted by infected mosquitoes of the Aedes (Stegomyia) genus, mainly *Aedes aegypti*, in tropical and subtropical regions. Aedes mosquitoes usually bite during the day.

**Mosquito Control: An Integrated Approach**

**Remove Mosquito Habitats**

Eliminate standing water from toys, rain gutters, tyres, buckets, plastic covers, and any other container that could serve as a breeding ground for mosquitoes. To get rid of possible mosquito homes, empty and replace the water in bird baths, fountains, wading pools, rain

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barrels, and potted plant trays at least once a week. Temporary water ponds should be drained or filled with earth. Keep the water in the swimming pool treated and moving.

**Manage Mosquitoes During Their Larval Phase**

Mosquito populations will be most affected when they are confined to one area, motionless, and easily accessible. This emphasis is on managing the immature stages (egg, larva, and pupa) of the mosquito population before they emerge as adults. This method reduces the amount of pesticides used from widespread application while increasing the effectiveness of pesticide application. Prior to the larvae in the breeding habitat reaching adulthood and dispersing, they are the target of larvicides. The adult mosquito population in surrounding areas is decreased by treating breeding sites with larvacide.

**Control Adult Mosquitoes**

Sprays known as ultra-low volume (ULV) are used to control mosquito populations. Extremely tiny droplets are sprayed using ULV sprayers. For example, the insecticide naled employs particles no larger than 80 microns, meaning that a single pea-sized object might contain hundreds of thousands of droplets. These microscopic droplets are designed to kill mosquitoes in the air upon contact and to remain in the air for as long as possible after being released from an aircraft. In order to better safeguard people and the environment, less pesticide is needed because to the pesticide's small droplet size.

**Mosquito Predators**

Reducing Culicidae populations can be aided by natural enemies that prey on mosquito larvae and pupae in watery habitats (Kumar R., Hwang J.S., 2006). In numerous regions of the world and across a range of environments, it has been shown that larval mosquito populations can be significantly decreased by predatorous fish.

**Conclusion**

A million or more people worldwide die from mosquito-related illnesses each year, of which 500 million are infected. Although vector control efforts have helped to eradicate many mosquito-borne diseases recently, some remain harmful and uncontrolled, posing a serious threat to human health. Effective control programmes are a better method to lower the illness burden because there is currently no vaccination against these diseases, hence controlling the mosquito population is urgently needed. Some botanicals are also used as repellent in house. It also reduces the using of synthetic Insecticides indiscriminately.

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