

Relationship between mosquito breeding and environment



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Mosquitoes are widely known throughout the world and mosquito using several water bodies for breeding (WHO, 1982). Larval species can be found in almost every type of non-flowing aquatic habitat from the marshy edges of large lakes, provided that fish or tadpoles are not present through swamps and marshes of all types and sizes along sections of rivers, streams, or ditches where the water is not flowing to small collections of water in rock crevices, tree or stump holes, leaves of pitcher-plants and artificial containers (Wood, Dang and Ellis, 1979). The climatic and environmental factors are influenced directly and indirectly to the distribution of mosquitoes (Mafiana et al., 1998).

Mosquitoes prefer an environment with certain resources which are food, shelter, favourable temperature, rainfall, breeding site and suitable humidity in sufficient amount and at the appropriate time for survival and development for the eggs of female mosquito to hatch (Romoser & Stoffolano, 1998). The breeding of various mosquito species is recently increase contributed of the recent increase in ecological and environmental modification due to agricultural activities and urbanization (Amusan et al., 2005).

Temperature and the availability of appropriate aquatic breeding habitats are the two environmental variables that most impact the abundance of mosquitoes. Temperature impacts both the survivorship and developmental rate of mosquitoes; surface wetness, as mentioned above, limits the population size of sub-adult mosquitoes. These two parameters, temperature and surface wetness, will be used to force the model mosquito population (Kettle, 1995). Constant studies on biology and larval ecology of mosquitoes <https://assignbuster.com/relationship-between-mosquito-breeding-and-environment/>

have been observed as important tools in mosquito control. Such studies will help to determine the existing and disappearing mosquito species and the extent of their distribution (Mafiana et al., 1998 & Anyanwu et al., 1999).

Mosquito can cause more human suffering than any other organisms.

Mosquito bite cause severe skin irritation through an allergic reaction to the mosquito's saliva which can cause human skin red bump and itching.

Mosquito also carry disease that afflict human such as malaria, yellow fever, encephalitis and dengue virus which a mosquito bites infected the host, the virus will be transferred into it, and the transmission chain starts again (WHO, 1997).

The life cycle of the mosquito is begins with the female mosquito will lay eggs at any surface water, which hatches as a larvae in the right conditions. The larvae then develop into several instar stages before entering pupation. After the pupation, the mosquito emerges as an adult which is also called as amigo. Adults generally mate within the first few hours of emergence, and then the adults will rests on the surface water for a short time to allow itself to dry and all its body parts to harden. Blood feeding does not occur for a couple of days after the adults emerge including the mating. Once fully developed, the female mosquito will proceed to find a protein source for their eggs which is blood. After biting, the female rests while take care of their eggs and repeat thegonotrophic cycle again.

1. 3 Significances of study

Environment plays an important role on life cycle of mosquito. So, in this study and research, it can show us the interactions between environment

and life cycle of mosquito. In this research study, I would like to know the effects of environmental factors such as pH, rainfall and temperature of the site on mosquito abundance by using the larvae one. Mosquito abundance is actually relate with the amount of rainfall and contribute to increase the number of larval breeding sites, the spatial relationship between larval habitat availability and adult mosquito abundance is not clear.

In these study also, I would know the disease that mosquito can bring which effect the human health. We can know that mosquitoes are a vector agent that carries disease causing viruses and parasites from person to person without catching the disease themselves. Furthermore, I will know the methods used for mosquito control that can reduce the disease that mosquito can bring to human. Depending on the situation, source reduction, biocontrol, insecticides to kill larvae and to be specific, the adults may be used to manage mosquito populations.

In these research study also, we would like to know when the suitable breeding time for mosquito is actually. It is said that many species disappear almost completely during the dry season and it will be most productive towards the end or just after the wet season, when most species will have built up to a peak and the limits of the breeding sites have temporarily stabilized.

1. 4 Problem Statement

Mosquito had been known for a century which is they carry diseases which can cause human to death. These can be described as the mosquito can cause more human suffering than any other organism. Furthermore, <https://assignbuster.com/relationship-between-mosquito-breeding-and-environment/>

mosquito bite can cause severe skin irritation through an allergic reaction to the mosquito's saliva which can cause human's skin itching and red bump. Mosquito carry several diseases which are malaria, filarial diseases (dog heart worm), viruse dengue, encephalitis and yellow fever. These diseases can suffer human being and can cause human being to death.

Nowadays, mosquito distribution is increasing in Malaysia because of certain conditions that contribute to mosquito breeding. More than that, population in Malaysia also increases by year to year. So, this also will increase the number of cases that inflict the human by mosquito.

CHAPTER 2

LITERATURE REVIEW

2. 1 Environment

In general, environment is actually referred to the surrounding of something or an object. The natural environment is contrast with the built environment which includes the areas and components that are strongly influenced by the human. An ecosystem is a kind of natural which include all of plants, animals and microorganisms in an area functioning together with all of the non-living physical factors of the environment.

There have been several studies that have focused on how environmental factors affect the mosquitoes breed (Yee 2008). The environmental factors and climatic are influenced the distribution of mosquitoes which in directly or not (Mafiana et al., 1998). Mosquitoes prefer an environment with certain

condition that help their breeding which in appropriate amount and time for survival and development (Romoser & Stoffolano, 1998).

2. 2 Biodiversity

2. 3 Mosquito

Mosquitoes are insects belonging to the order Diptera, the True Flies. Like all True Flies, they have two wings, but unlike other flies, mosquito wings have scales. Female mosquitoes' mouthparts form a long piercing-sucking proboscis. Males differ from females by having feathery antennae and mouthparts not suitable for piercing skin. A mosquito's principal food is nectar or similar sugar source. There are over 2500 different species of mosquitoes throughout the world; about 200 species occur in the United States with 77 species occurring in Florida (Darsie et al., 2002).

2. 3. 1 Life Cycle of Mosquito

The mosquito is actually been through four separate and distinct stages of its life cycle which are egg, larva, pupa and adult. Eggs are laid one at a time or attached together to form "rafts". They float on the surface of the water. Most eggs hatch into larvae within 48 hours, others might withstand subzero winters before hatching. Water is a necessary part of their habitat.

The larva lives in the water and comes to the surface to breathe. Larvae shed their skins four times, growing larger after each shed. The larvae feed on microorganisms and organic matter in the water. During the fourth molt the larva changes into a pupa.

The pupa stage is a resting time which is non-feeding stage of development but pupa are mobile, responding to the light changes and moving with a flip of their tails towards the bottom or protective areas. This is the time the mosquito changes into an adult. When development is complete, the pupa skin splits and the adult mosquito (imago) emerges.

The newly emerged adult rests on the surface of the water for a short time to allow itself to dry and all its body parts to harden. The wings have to spread out and dry properly before it can fly. Blood feeding and mating does not occur for a couple of days after the adults emerge.

2. 3. 2 Transmission

Virus transmission of mosquito will affect the human after being bitten and human is the reservoir of the virus. In mosquito, the virus will take for about 8 to 10 days to develop. A female mosquito may transmit the virus to its progeny through transovarian transmission, but it is not frequent. These virus or disease from mosquito will transmit into human circulation during the blood meal time. The virus will develop in the human circulation which the human incubation period takes about 3 to 14 days. If a mosquito bites, the virus will then transmit into the host and the transmission chain starts again (WHO, 1997). Vertical transmission of dengue virus is very rare. Nonetheless, 2 cases were reported in Malaysia in 1996 (Chye et al., 1997).

2. 3. 3 Factor Contribute to the Disease Outbreak

The occurrence of mosquito disease is depends of several factors, including the density of mosquito vectors. For example the dengue virus which is

carried by the *Aedes aegypti* that is needed to sustain dengue virus transmission epidemically or endemically has yet to be determined. Virus transmission increased by denser human population. Urbanization in tropical countries has resulted in both a proliferation of *Aedes aegypti* and an increase in the number of susceptible human hosts (WHO, 1997).

According to McMichael and Woodruff (2008), mosquito borne infections tend to increase with warming and certain changes in rainfall pattern. Higher rainfall will heighten the disease transmission. Therefore, climate change will affect the potential, seasonal transmission and geographic range of various vector borne diseases. These diseases would include all water borne diseases, such as malaria, dengue fever and yellow fever (Haines et al., 2006).

Climate change will affect the biodiversity and the ecosystem goods and services that we rely to human health. Changes in temperature and rainfall effect the distribution of the diseases vectors, such as *Aedes* mosquitoes (Haines et al., 2006). Recent reviews suggest that dengue's range and incidence may be changing as a result of climate change (Gubler, 2002).

Most of the transmissions of mosquito borne diseases are sensitive to weather conditions for several reasons here, mosquito need standing water to breed, and a warmer temperature is critical to adult feeding behavior, the rate of larval development and speed of replicate of virus (Hales and Panhius, 2001).

Haines et al., (2006) stated that changes in climate that can affect the transmission of vector borne infectious disease include temperature, rainfall
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changes, humidity, soil moisture and sea level rise and it will cause the variation of the overall incidence of the disease, where less, the geographical distribution of disease also change.

2. 3. 4 Breeding and Larval Habitat

According to Queensland Government (2005), the mosquito is frequents backyards in search of containers holding water inside or outside the home. For example cans, buckets, jars, pot plants dishes, vases, birdbaths, boats, discarded with no rims tyres, roof gutters blocked by leaves, containers, tarpaulins and black plastic. It also can breed in natural containers like fallen palm fronds. Besides that, even in a drier condition it also breeds in water in subterranean sites such as wells, telecommunication pits, sump pits and gully traps.

Furthermore, according to Queensland Government (2005) also stated that climate of tropical and subtropical regions are very suitable for mosquito breeding. This is because of high temperature and high appearance of quiescent water body. With this, it makes the climate in Malaysia is tropical and the temperature are within 20°C to 30°C throughout the year and with high average rainfall which is almost 2500mm in the Peninsular Malaysia and it is become the most suitable breeding conditions and habitat for mosquito.

2. 2. 5 Ecology of the Mosquito Breeding Site