

## *Aedes albopictus* (Asian Tiger Mosquito)

Order: Diptera (Flies)

Class: Insecta (Insects)

Phylum: Arthropoda (Arthropods)



**Fig. 1.** Asian Tiger Mosquito, *Aedes albopictus*.

[[http://civr.ucr.edu/asian\\_tiger\\_mosquito.html](http://civr.ucr.edu/asian_tiger_mosquito.html), downloaded 16 February 2015]

**TRAITS.** Although commonly called the forest day mosquito in its native range in Asia, it also achieved the name Asian tiger mosquito because of the prominent white stripes over its black body (Walton, 2014). A single white stripe runs from the middle of the eyes, over the dorsal side of the thorax, and numerous white bands cover the palps and tarsi, which are the appendages found near the mouth. Another easily recognizable characteristic of *Aedes albopictus* is the bold, black, shiny scales that cover its back (Leung, 2004). This mosquito may range up to 10mm in length, and males are typically 20% smaller than females (Rios and Maruniak, 2004). The sexes of this mosquito are differentiated by the male's antennae having more feathers than the female's and possessing auditory receptors to sense the female's whine. Additionally, the male's mouthpart is altered to allow nectar feeding (Rios and Maruniak, 2004).

**DISTRIBUTION.** *Aedes albopictus*, although native to Asia, was first collected in Texas in 1985 (Leung, 2004). It is currently known as the most invasive mosquito in the world, extending its range via shipments of lucky bamboo, moist plants and water containers, and most commonly, the international trade of used tyres (Benedict et al., 2007). It was initially endemic, or restricted, to the subtropical regions around the world, such as Asia and some Pacific islands, with introductions into the Caribbean, but over time it has invaded Europe, Africa and North and South America (Fig. 2) due to climate change and its increasing ability to adapt. The first appearance of the Asian tiger mosquito in Trinidad and Tobago was in 1983 (ISC, 2009).

**HABITAT AND ACTIVITY.** The habitat of *Aedes albopictus* includes any small bodies of water that is enclosed with dense vegetation and adequate shading. The requirements of its habitat are large availability of food and proper breeding and reproduction locations (Hartman, 2011). Thus, it is able to colonize artificial habitats in urban areas such as flower pots, bird baths, abandoned containers and obstructed gutters (Fig. 3). The most suitable artificial habitat for this mosquito is tyres because they are normally stored outside and collect rainwater, which it holds for a long period, allowing enough time for reproduction. The habitat must have vegetation and trees because when leaves decay, they produce chemicals that this mosquito favours for breeding (ISC, 2009). When the mosquito chooses its habitat, it remains there for its entire lifetime since this species are typically weak fliers. *Aedes albopictus* is diurnal, meaning that it is active during the day. However there are times when low temperatures inhibit their feeding during normal hours or when heavy cloud shade and higher humidity levels promote it (Russell et al., 2013).

**FOOD AND FEEDING.** One reason why *Aedes albopictus* is able to adapt to a range of habitats is because it is an opportunistic feeder, meaning that it chooses its host based on availability. It feeds on many different species of birds and mammals such as humans, deer, dogs, rabbits, turtles, rats, cats, raccoons and squirrels. The mosquito larvae however feed on fine, particulate organic matter in the water (Leung, 2004). The females of this species maintain a blood diet for the development of their eggs but, like the males do, they can also survive on plant juices that contain sugar (Hartman, 2011). The females are known as solenophages, blood-feeders whose mouthparts pierce directly into a blood vessel to feed (Dictionary of Invertebrate Zoology, 2013). The mosquito's behaviour is nonspecific while searching for a host but its feeding behaviour is very specific: when it approaches and lands on the host, its mouthpart, which is also called the proboscis, is inserted into the skin and consequently blood vessel, where it receives blood.

**POPULATION ECOLOGY.** While many members of this species may be found in one habitat, males and females only pair off to mate and then separate, never interacting again (Hartman, 2011). Researchers found that the lifespan of an *Aedes albopictus* depends on the environmental conditions in its habitat. In the wild, where the climate is moderate and the humidity is high, the female mosquito may live up to 30-40 days. According to the results of an experiment conducted on a mosquito held in captivity, if it is able to live in optimum conditions at all times, it would be able to survive for 117 days (Hartman, 2011). The male's lifespan however, is shorter than the female's since they do not feed on blood. In one year, there may be 5-17 generations of mosquitoes. The abundance of *Aedes albopictus* in any geographic region is seasonal, so when temperatures are high, it would be abundant due to an increased rate of larval development and thus an increased adult population (ECDC, 2005). The rate at which immature mosquitoes develop is also increased by high temperatures.

**REPRODUCTION.** *Aedes albopictus*'s system of reproducing is polygynandrous, meaning that multiple males can mate with multiple females, and this occurs during the rainy season to ensure that the eggs develop as fast as possible (Hartman, 2011). If the female has a relatively long lifespan, it can mate up to four times. After the males form swarms and attract the females, they exude stimulants, including one for the females' ovarian growth. The mosquitoes then mate mid-flight for approximately 15 seconds and the females begin their gonotrophic cycles. A gonotrophic cycle is the process of feeding on blood and laying a batch of eggs, and in *Aedes albopictus*, it lasts for roughly four days. After these four days, the female lays her eggs in different habitats and from here on there is no parental involvement (Hartman, 2011). In one year, 45-200 eggs may be laid. Once immersed in water, the eggs hatch to produce larvae (Fig. 4), also referred to as active-feeders because they feed on fine particulate organic matter and they occasionally move to the water surface for oxygen (Rios and Maruniak, 2004). The hatching of eggs is affected by oxygen tension while temperature determines the length of time larvae take to develop. In about 10 days, the larvae are fully developed into pupae (Fig. 5) and for only two days, the pupae will move about without feeding and finally become adult mosquitoes.

**BEHAVIOUR.** Being a solitary and sedentary species, *Aedes albopictus* does not have a lot of behaviours other than its feeding and mating. From the moment of adulthood, mosquitoes search for food at two different times during the day since they are diurnal and after feeding, their search for a mate begins. These mosquitoes only fly around a distance of 500m since they are known as weak fliers (Hartman, 2011). Other than feeding and mating, *Aedes albopictus* has been observed resting in canopies, open clearings or water containers. It does not have any anti-predator behavior so flatworms, spiders, swimming beetles and other natural enemies are easily able to feed on the larvae. Members of this species rarely communicate with one another besides when mating. Females possess a characteristic whine to allow the males to detect them with the auditory receptors on their antennae and the males invite females to mate with them when they congregate a few feet above to ground to form a swarm (Hartman, 2011).

**APPLIED ECOLOGY.** As a strongly invasive species and an aggressive biter with a wide variety of hosts, *Aedes albopictus* is a pest to be controlled rather than conserved. It is also a notorious vector of chikungunya virus, dengue virus and dirofilariasis (ECDC, 2005). In order to prevent the spread of these diseases, preventative methods such as removing any possible artificial habitats around homes and wearing insect repellent must be taken since this mosquito can tolerate many insecticides (Rios and Maruniak, 2004).

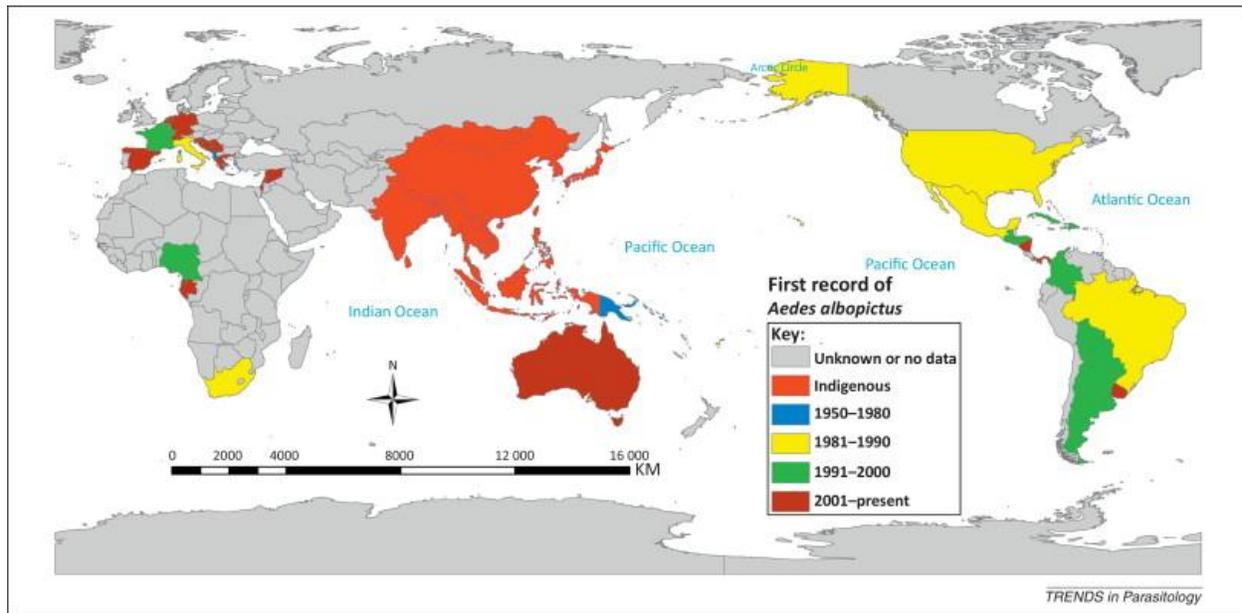
## REFERENCES

- Benedict, M.Q., Levine, R. S., Hawley, W. A. and Lounibos, L. P. (2007). Spread of the Tiger: Global Risk of Invasion by the mosquito *Aedes albopictus*. *Mary Ann Liebert, Inc.* 7: 76 – 85.
- Dictionary of Invertebrate Zoology. (2013). Solenophage. <http://species-id.net/zooterms/solenophage>
- European Centre for Disease Prevention and Control. (2005). *Aedes albopictus*. <http://ecdc.europa.eu/en/healthtopics/vectors/mosquitoes/Pages/aedes-albopictus.aspx#C3>
- Hartman, K. (2011). Animal Diversity Web. *Aedes albopictus*. [http://animaldiversity.org/accounts/Aedes\\_albopictus/#development](http://animaldiversity.org/accounts/Aedes_albopictus/#development)
- Invasive Species Compendium. (2009). *Aedes albopictus* (Asian Tiger Mosquito). <http://www.cabi.org/isc/datasheet/94897> downloaded February 20<sup>th</sup>, 2015.
- Leung, Richard. (2004). Species *Aedes albopictus*. <http://bugguide.net/node/view/7644>
- Rios, L. and Maruniak, J. E. (2004). University of Florida Entomology and Nematology. Asian Tiger Mosquito. [http://entnemdept.ufl.edu/creatures/aquatic/asian\\_tiger.htm](http://entnemdept.ufl.edu/creatures/aquatic/asian_tiger.htm), downloaded February 17<sup>th</sup>, 2015.

Russell, R. C., Otranto, D. and Wall, R. L. (2013). The Encyclopedia of Medical and Veterinary Entomology. America: Micellaneous Publications of the Entomological Society.  
Walton, W. (2014). Center for Invasive Species Research. Asian Tiger Mosquito.  
[http://cistr.ucr.edu/asian\\_tiger\\_mosquito.html](http://cistr.ucr.edu/asian_tiger_mosquito.html)

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**Fig. 2.** Geographic distribution map of the Asian tiger mosquito, *Aedes albopictus*.  
[<http://www.sciencedirect.com/science/article/pii/S1471492213001086>, downloaded 20 February 2015]



**Fig. 3.** Habitats of the Asian tiger mosquito, *Aedes albopictus*, in urban areas.

[<http://reference.medscape.com/features/slideshow/vhf>, downloaded 20 February 2015]



**Fig. 4.** A larva of the Asian tiger mosquito, *Aedes albopictus*.

[[http://entnemdept.ufl.edu/creatures/aquatic/asian\\_tiger.htm](http://entnemdept.ufl.edu/creatures/aquatic/asian_tiger.htm), downloaded 23 February 2015]



**Fig. 5.** A pupa of the Asian tiger mosquito, *Aedes albopictus*.

[[http://entnemdept.ufl.edu/creatures/aquatic/asian\\_tiger.htm](http://entnemdept.ufl.edu/creatures/aquatic/asian_tiger.htm), downloaded 23 February 2015]

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