

***Aedes albopictus* EGG COLLECTIONS - A MULTI-YEAR REVIEW**

DAVID MULLINS, Field Biologist

Central Mass. Mosquito Control Project
111 Otis Street Northborough, MA 01532
(508) 393-3055 • www.cmmcp.org • cmmcp@cmmcp.org

ABSTRACT

Aedes albopictus, referred to as the Asian Tiger Mosquito or ATM, is a vector of many arboviruses including the Zika virus. Originating in Asia, ATM has quickly become an invasive species on other continents. The Central Massachusetts Mosquito Control Project monitors for the presence of the Asian Tiger Mosquito in member communities by setting traps that this species of mosquito finds an appealing place to lay their eggs.

INTRODUCTION

Aedes albopictus mosquitoes are native to areas that have warm, tropical climates. Indigenous to Asia, it is believed that they have traveled throughout the world as dormant eggs in used tires or imported plants such as the Lucky Bamboo plant (*Dracaena sanderana*)ⁱ. Over time, they have evolved to survive in areas that have cooler and drier climates. They can now be found on every continent with the exception of Antarcticaⁱⁱ. *Aedes* mosquitoes lay their eggs just above the water line in artificial containers such as old tires, birdbaths, flower pots and tarps that have collected water. However, the amount of water it takes to fill a water bottle cap is an adequate environment for *Aedes albopictus* to lay eggs. The eggs dry or desiccate and can remain dried out for years before they are rehydrated and the mosquito life cycle continues.

Beginning in 2016, the Central Massachusetts Mosquito Control Project (CMMCP) began conducting surveillance to determine if the *Aedes albopictus*

mosquito has made its way into our participating towns. CMMCP uses gravid traps and CDC traps to catch adult flying mosquitoes. However, the *Aedes albopictus* mosquitoes are not attracted to either of these mosquito traps. Research suggests the mosquitoes are attracted to ovitraps because it provides them a supply of clean water to lay their eggs. The use of ovitraps can help to determine if *Aedes albopictus* has made its way into the Central Mass Mosquito Control Project service area.

Adult male *Aedes albopictus* feed on nectar and do not bloodfeed. Adult female *Aedes albopictus* mosquitoes are persistent and painful daytime biters that need to take a blood meal in order to lay their eggs. Frequently, they are not able to take a full blood meal from a single host. Although they prefer human blood, they are opportunistic feeders and will feed on other mammals and birds. This makes them very effective vectors of diseaseⁱⁱⁱ.

MATERIALS AND METHODS

Ovitrap provide an artificial breeding site for mosquitoes that prefer to lay their eggs in containers. The trap consists of a 5.5 inch (13.5 centimeter) black plastic cup. Holes are drilled into the cup 1.5

inches (3.8 centimeters) from the top to prevent the cups from overflowing during rainfall (figure 1). The cups hold approximately 11 ounces (310 milliliters) of water.

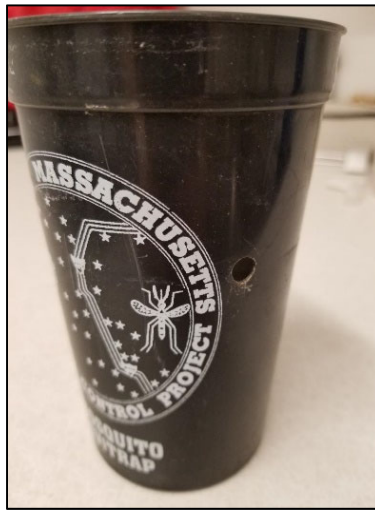


Figure 1

Oviposition paper (aka seed germination paper) lines the inside of the cup. The paper has a rough, textured surface which allows the eggs to adhere to the

paper (figure 2). The cup is then filled to the holes with tap water that has been left to allow chlorine in the water to dissipate (figure 3).



Figure 2



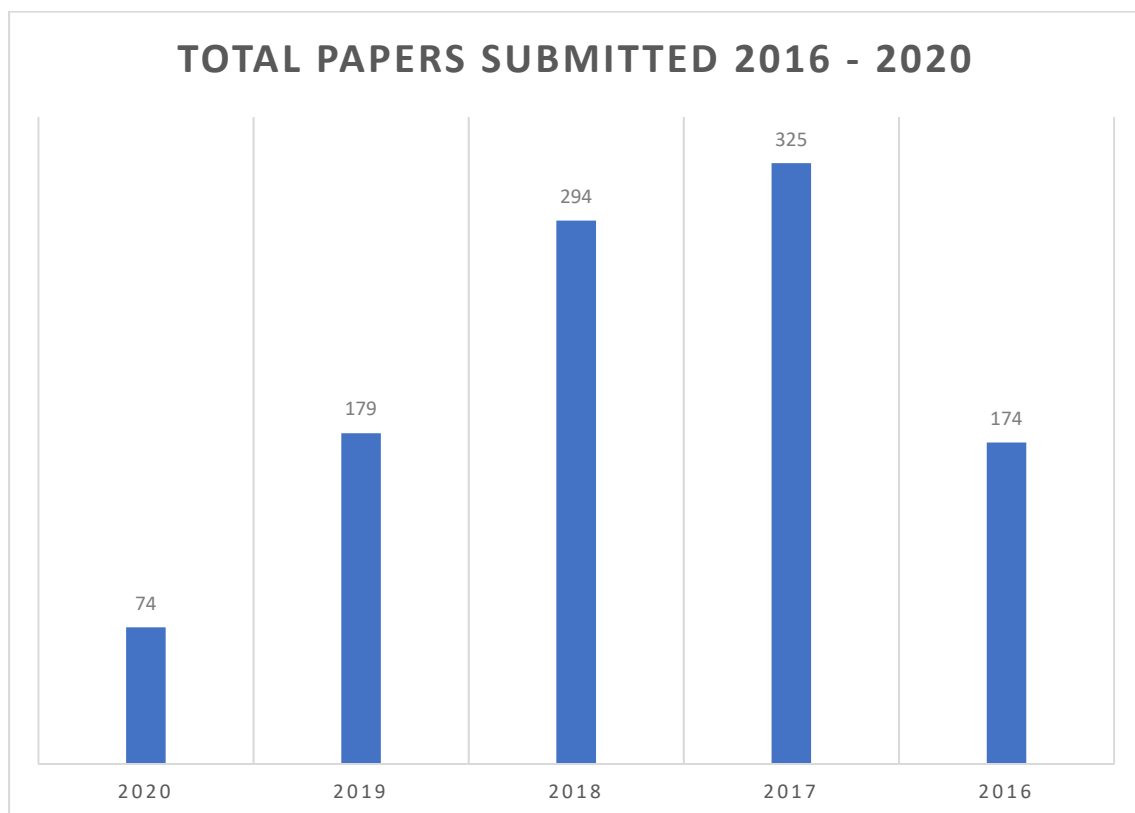
Figure 3

If an *Aedes* mosquito finds the cup and is ready to lay eggs, it will lay them just above the water line. Five traps are left at each trap site and remain at that location for up to fourteen days. Traps are set in areas where *Aedes albopictus* mosquitoes are most likely to be found. The small water requirement and their preference for human blood meals make urban areas a likely habitat for *Aedes albopictus* mosquitoes. Upon retrieval of the ovitraps, the papers are air dried. Once desiccated, the papers are examined under microscope for the presence of mosquito eggs. If there are mosquito eggs, they are counted before being transported to the Massachusetts Department of Public Health (MDPH) for rearing. In an insectary at the MDPH, the papers are rehydrated. After the eggs hatch and the mosquitoes continue their

life cycle, they are identified to species. If *Aedes albopictus* are identified in our towns, appropriate measures are taken with hopes of preventing their spread. Rearing the mosquitoes in an insectary will prevent the release of individuals into the ecosystem.

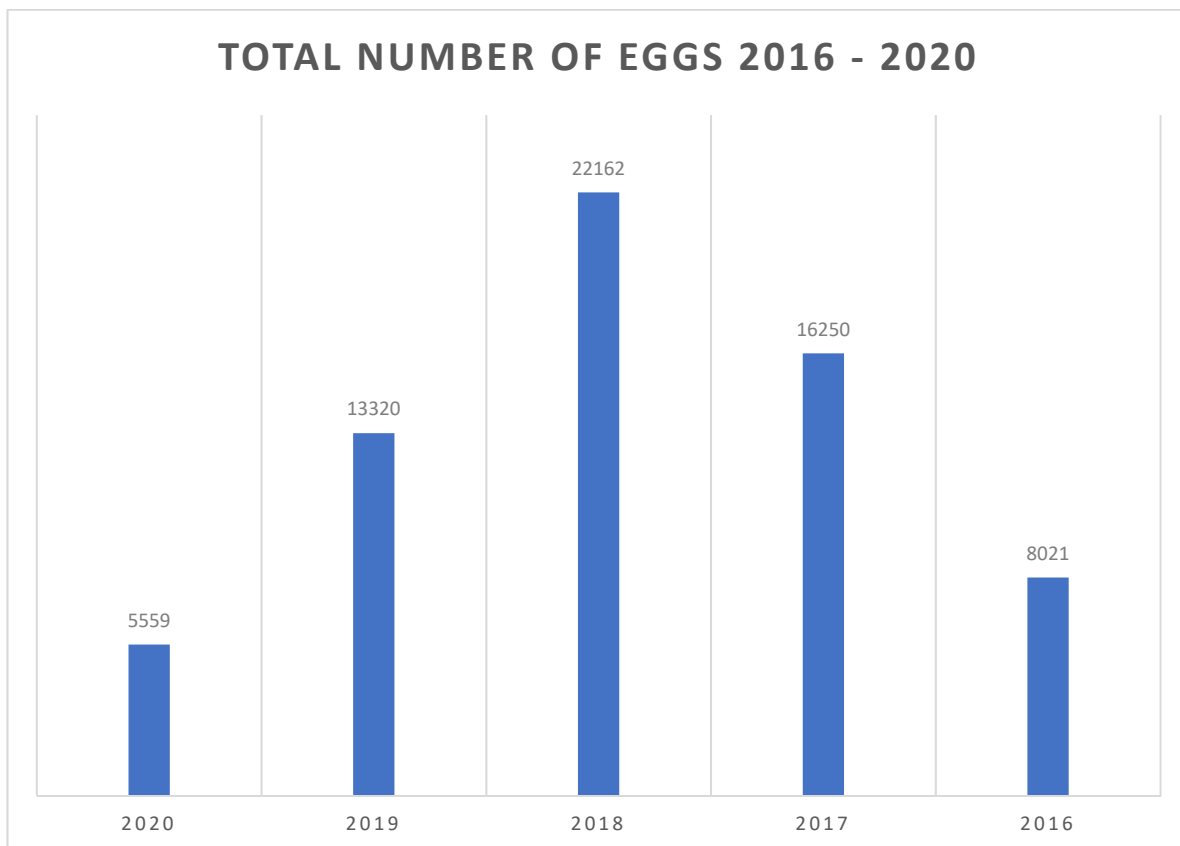
RESULTS

Since 2016, CMMCP has worked diligently to increase the number of trap sites as well as the number of traps that are placed. The graph below shows the number of mosquito papers that have been submitted to the Massachusetts Department of Public Health for rearing. It should be noted that the numbers do not reflect the number of traps that were set out, only the number of papers that had eggs.



The preceding chart shows the number of eggs that were submitted to the Department of Public Health since 2016. The number of eggs found does not coincide with the number of papers submitted. There can be thousands of eggs found on a single paper and one

egg on the next paper from the same trap site. It is difficult to make a comparison between the two numbers. Note: in 2020 submissions were stopped due to lab constraints from COVID-19 testing at the MDPH lab in Jamaica Plain.



Since the inception of this program, no *Aedes albopictus* eggs have hatched into larvae. As the territory of the *Aedes albopictus* mosquito continues to expand, CMMCP will continue to increase the number of traps that we utilized, as well as the areas in which we place the traps. If found, CMMCP can increase measures to help prevent further spread of the invasive species

and the potential for it to vector mosquito-borne disease.

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