# Survey of *Aedes* Mosquitoes in Dominica, W.I.

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**Abstract:**

Traps with oviposition strips that were placed in black glass containers were placed in three different locations in the Springfield area for about a week. Eggs were trapped and grown to the larval stage. They were identified as *Aedes aegypti* or *Aedes albopictus*. A second species of *Aedes* was identified, but I do not know what type of species it is.

**Introduction:**

In Dominica there have been reports about dengue. Dengue is a deadly disease vectored by mosquitoes, primarily *Aedes aegypti* and the *Aedes albopictus*. They are found around water and generally breed in containers and tree holes, after associated with human interaction (Olson, personal communication). I want to see which type of mosquito we can find here in Dominica during our three-week stay. Traps have been put all over the Archbold Research Center and up in the Bee House. We found a couple of *Aedes* and an *Aedes* species that we do not know what type it is.

The two mosquitoes I investigated were *Aedes aegypti* and the *Aedes albopictus.* These mosquitoes belong to the Order Diptera and are in the Family Culicidae. *Aedes aegypti* is a carrier of the vector of “urban yellow fever and dengue” (Stone 5). The characteristics that define these mosquitoes is that they have long and narrow wings, scales on the veins and margins of the wings. Their mouth parts consist of long, slender beak or probosis, and the wingtip has a straight, unbranched vein reaching the margin between two branched veins. These types of mosquitoes are found in aquatic environments, typically the larvae can be found in pools, containers filled with water,

ponds, etc. These mosquitoes serve as vectors for many important human diseases, which include dengue and yellow fever. They usually lay their eggs in the surface or near the water. Larvae breathe through a tube that is in the posterior of their bodies. The female mosquitoes are the ones that suck on blood; the males do not suck on blood. The males feed on nectar. The male's antennae are plumose while the female's antennae have short hairs.

Samples were taken at Springfield station, Dominica, during a one week period from June 1, 2002- June 7, 2002. During that week black containers with 2x11cm strips of pertide strips inside of them were used to catch the eggs of the mosquitoes. Then from June 8, 2002- June 10, 2002 larvae were collected from water that was around the station. A lot of eggs and larvae was catch during this period of time. After that the larvae was boiled to be able to identify.

**Materials and Methods:**

9-12 black containers

48-50 oviposition strips, 2x11cm pieces of partide board

10-15 white plastic trays, 18x24x3cm

water grass (regular water and grass)

fish food

tweezers

2-3 1ml pipette

petri dish (to mix fish food with regular water)

regular water

a bucket

boiling water

small plastic containers (tube like)

Turkey baster

dissecting microscope

scintillation vials

low-acid paper for specimen

pigment pens

alcohol

watch glass

To prepare water attractive to the female mosquitoes I cut some grass, put it in a bucket, and filled it up with regular water. This was put outside in the sun for 24hrs. This grass water was poured to 1/3$^{rd}$ full in the black glass containers. An oviposition strip was placed in each container. It is important to make sure that the rough side is facing up and that the smooth side is facing down. Oviposition strips were checked, and taken back to the lab for examination under the microscope to see if any eggs were present. Tweezers were used to see if there are any eggs hiding on the edges of the oviposition strip. The eggs are small and black oval shape. Eggs were counted and ovipositon strips were placed in the white plastic trays. Trays were filled with regular water to 1/3$^{rd}$ full making sure that the water covered up the oviposition strip. About 3-4 drops of fish food slurry were put in each tray. To make the fish food slurry mix about 1 teaspoon of fish food and about 1-2 milliliters of water. Trays were labeled with the date that I checked the oviposition strip and the location of the oviposition strip. If you find eggs follow the procedure mention above, but if you find no eggs you can leave the same oviposition

strip in there, but change it after it has been used at least twice. If you find eggs replace the oviposition strip with another one. This was continued for about a week. The eggs should hatch in a couple of days. Because eggs did not seem to hatching I looked around Springfield for old tires, flower pots, trees that have holes, a pool, or anything that had water that had been there for a while. I used a turkey baster and small clear plastic containers to obtain samples of insect larvae in those locations. I found that in some of this places the eggs had already hatched and samples contained mosquito larvae.

*Aedes* species have four larval instars, followed by an aquatic mobile pupal stage. 1st instar is when the larvae is still very small, 2nd instar is when it is a little bigger, 3rd in star are still larger. 4th instar is when the larvae are ready to be identified. Larvae were placed in boiling water to fix the tissues and prevent rot. Then a scintillation vial was filled with alcohol and the cooked larvae were put in there with a label stating where I got it, day, my name using the low-acid paper and pigment pens. After, we were ready to identify the type of mosquito larvae that I had.

**Results:**

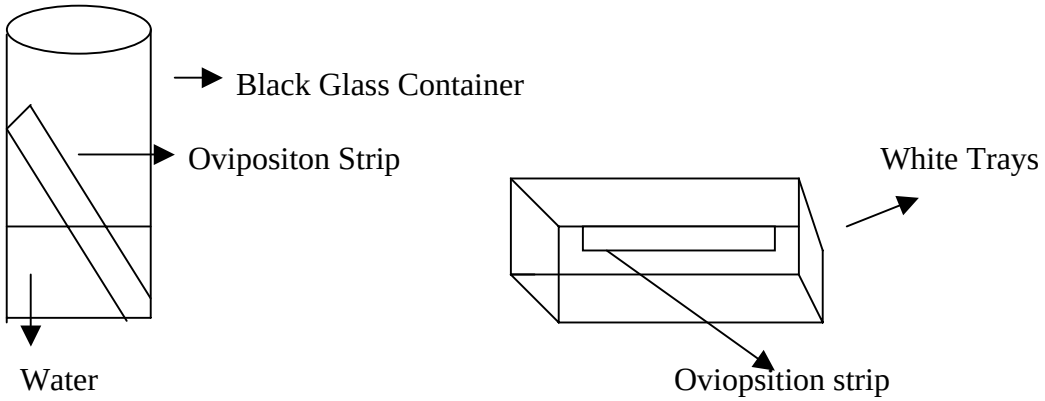
Table 1: Numbers of eggs collected in oviposition strips (w=white, b=black).

| Table 1 | 6/3/02 | 6/4/02 | 6/5/02 | 6/6/02 | 6/7/02 | 6/8/02 |
|---|---|---|---|---|---|---|
| Springfield | 6w | 11w/5b | 2w/15b | 0 | 1b | n/a |
| Bee House | n/a | 1w | 0 | 0 | 0 | 57-60b |
| Stream House | 0 | 0 | 0 | 1w | 0 | n/a |

In here it shows what was collected in that one week. The eggs were captured in the oviposition strips that were put in the black containers. The not applicable stands for

that it was not checked on that day, and for June 8, 2002 it means that we did not have the traps on that day. They were taken down. The table shows that more eggs were found in the Springfield section.

Figure 1




Larvae were found in the black glass containers, and they were placed in the white trays. On June 7, 2002 we poured out the water from all the containers, and in one of the Springfield containers we found larvae. There were about 48 of them. On June 8, 2002 we found 3 larvae in the water from the Bee House. All the larvae found in the Springfield containers were 2nd instar, and the ones from the Bee House range from 1st-3rd instar.

On June 11, 2002 we started to cook some of the larvae, and we were able to identify most of the larvae. We found *Aedes* larvae. The next day in the morning we looked at them again, and we were able to identify for sure that they were *Aedes* and probably *Aedes aegypti* or *albopictus* (J. Olson, personal communication) based on the conformation of the terminal abdominal segments (Figs. 1 and 2). One larva that was

found in the Springfield flower pot appears to be another species of *Aedes*, but we do not know what species of *Aedes* it is, (Figure 3).

**Discussion:**

This project took a lot of time because we needed to start as soon as we got to Dominica so that we could start catching the eggs. This way we could catch a lot and be able to identify them. In the process of doing the experiment we encounter a few problems. When we cut the grass we had to dump it because we accidentally put lemon grass inside the bucket. Lemon grass works as a repellent, and we do not want that. The first night that we looked at the oviposition strips I found some black eggs and white eggs. I had no idea what the white eggs were, but I still put them in the white plastic trays. In some of the traps I found eggs and in others I found nothing. A week had gone by and the eggs had not hatched yet, so we started to get worried. We decided to go around the Springfield station to see if we could find any larvae. I looked in Bromeliads, and a flower pot. This two things had standing water in them for a while. I found a larva in the flower pot that ended up being *Aedes*. *Aedes* is really common in standing water. It is not good to leave standing water outside for a long time, because the female mosquitoe lays her eggs in that water. It is important to use proper sanitation when it comes to standing water. *Aedes* carries the vector for dengue and yellow fever. We do not want to get infected with the disease, so it is important to throw away water that has been in the same place for a while. Once we started to find larvae we had a lot. We found some in the water that had been in the black glass containers for a while.

In all, the project was a success because we were able to get larvae, and adults of *Aedes.* We just had to be patient and take different approaches to be able to find what we

needed to make the project work. Working with mosquitoes is a bit hard because you have to catch the eggs, wait for them to hatch, get the larvae, and identify them, but it was an interesting project, and I enjoyed doing it.

**Acknowledgements:**

I would like to thank Dr. Woolley for helping with this project. If it had not been for his help I would have had no clue has to what I was doing. I would like to thank Dr. Woolley and Dr. Lacher for giving a chance to participate in this neat experience. I had a blast here in Dominica. I would like to thank Dr. Jimmy Olson for providing the equipment, literature, training and encouragement that made the project possible.

## Literature Cited

Borror, Donald J., et al. 1989. An Introduction to The Study of Insects. Saunders College Publishing, Philadelphia, 1-874.

Borror, Donald J. and Richard E. White. 1970. A Field Guide to The Insects of America North of Mexico. Houghton Mifflin Company, Boston, 1-404.

Castner, James L. 2000. Photographic Atlas of Entomology and Guide to Insect Identification. Feline Press, Gainesville, 1-174.

Stone, Alan. 1969. Bredin-Archold-Smithsonian Biological Survey of Dominica: The Mosquitoes of Dominica (Dipteria: Culicidae). Smithsonian Contributions to Zoology, No. 16, 1-8.

**Addendum**

**Identifications of mosquito specimens at Texas A&M University**

**June-July 2002**

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All mosquito specimens collected during Sidia Moreira's project were sorted to species and examined in Woolley's laboratory. Using primarily Belkin et al. (1970) and Berlin (1969), it was determined that the larval specimens represent four species (Table 2). All adults collected were *Culex quinquefasciatus*. Voucher specimens of all four species will be returned to ATRC, Springfield.

Table 2. Identifications of larval mosquito specimens

| | | |
|---|---|---|
| *Aedes aegypti* | 1 larva | Flower pot<br>Springfield<br>9.vi.2002 |
| *Aedes busckii* | 2 larvae | bee house<br>black jar<br>8.vi.2002 |
| | 12 larvae | Springfield<br>black jar<br>3.vi.2002 |
| *Wyeomyia* sp. | 1 larva | Springfield<br>black jar<br>7.vi.2002 |
| | 1 larva | Bee house<br>black jar<br>8.vi.2002 |
| *Culex quinquefasciatus* | many larvae | bee house<br>black jar<br>4.vi.2002 |

| | |
|---|---|
| many larvae | Springfield<br>black jar<br>7.vi.2002 |
| 1 larva | bee house<br>black jar<br>8.vi.2002 |
| many larvae | Springfield<br>black glass<br>7.vi.2002 |
| many larvae | Springfield<br>black glass<br>7.vi.2002 |
| many larvae | bee house<br>black glass<br>4.vi.2002 |

***Aedes aegypti*** (Figure 3), As noted in Sidia's report, this mosquito is known to occur on Dominica (Belkin and Heinemann 1976). It is a common vector of both yellow fever and dengue in other countries. It does not appear to be common at Springfield.

***Aedes busckii.*** This species was originally described from Dominica (Belkin 1969, Stone 1969). It is not known to vector disease.

***Culex quinquefasciatus*** (Figures 1 and 2). This species is also known as the 'Southern house mosquito", and it is widespread and common throughout the tropical, subtropical and warm temperate regions of the world (Belkin et al. 1970). It appears to be the most common container breeding mosquito at Springfield. It is known to vector diseases such as *Wucheria bancrofti* (nocturnal periodic Bancroftian filariasis) (Stone 1969) and several strains of encephalitis (Belkin et al. 1970)

## Additional References Cited

Belkin, J.N. and S.J. Heinemann. 1976. Collection records of the project "Mosquitoes of Middle America" 6. Southern Lesser Antilles: Barbados, Dominica, Grenada, St. Lucia, St. Vincent. Mosquito Systematics 8(3): 237-297.

Belkin, J.N., S.J. Heinemann and W.A. Page. 1970. Mosquito Studies (Diptera, Culicidae). XXI. The Culicidae of Jamaica. Contributions of the American Entomological Institute 6(1): 5-458.

Berlin, O.G.W. 1969. Mosquito Studies (Diptera: Culicidae). XII. A revision of the Neotropical subgenus Howardina of Aedes. Contributions of the American Entomological Institute 4(2): 3-190..