

Mosquito Control: Who are those midnight skulkers with cages?

By Jeffrey Stivers, Special to the Daily News

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Operational research is an integral part of any forward-thinking mosquito control operation. The Collier Mosquito Control District (CMCD) is no exception and maintains a very active research program to support mosquito control operations.

Mosquito control research is often conducted in a variety of areas, such as mosquito biology and genetics, surveillance equipment and techniques, mosquito-borne disease transmission insecticide application equipment and methods, insecticide efficacy and resistance, and biological control methods. The CMCD has been involved in research in all of these areas but focuses on different research programs based on operational needs at any given time.

This past mosquito season the CMCD focused on insecticide efficacy. Specifically, we tested the control efficiency of an insecticide which could serve as an alternative to the current aerially applied insecticide. Having a replacement insecticide ready is necessary in case mosquitoes develop resistance to the current insecticide or the use of the material is limited by regulatory actions.

Testing an insecticide may sound simple, but it is a lengthy and demanding process if the information derived from the testing is to be trusted.

The first order of business, once an insecticide has been selected, is to find an area to test the material. A straight area, several miles long and oriented parallel to the prevailing wind is essential. The site, usually a road, should have relatively little traffic between 11 p.m. and 5 a.m., have few houses along it, and generally have few tall trees bordering the road. Sample stations are then established along the road at 1,000-foot intervals.

The next step is a lot of fun and District residents are welcome to help out if they have a couple of hours free. Mosquitoes are collected by standing out in the woods, no repellent allowed, waiting for the mosquitoes to land on the collectors. Once a mosquito lands, and hopefully before it bites, it is sucked into a plastic tube, called an aspirator, and then very, very gently blown into a cage. The caged mosquitoes are used the same day they are collected.

To perform the actual test, one or more cages of mosquitoes are placed at each sample site, where it is suspended about four feet above the ground. A piece of filter paper mounted on an aluminum foil covered board is placed on the ground at each sample site. This filter paper is used to collect the microscopic insecticide droplets to determine if the

material actually reached the sample site. This setup is all being done at about midnight, of course, since CMCD applications are normally made after that time.

With the caged mosquitoes and filter paper in place, it is time for the actual test application. The application, made by one of the CMCD's aircraft, takes an hour or so. During the application the ground crew leaves the test area and puts out mosquitoes and filter paper to serve as untreated samples. The ground crew then waits, and waits, and waits for the invisible cloud of insecticide droplets to drift through the treatment area. This can take between two and four hours, depending on the wind speed and the size of the treatment area.

At the end of the waiting period the mosquitoes are collected and number of dead mosquitoes in each cage is noted. The filter paper is also collected and placed into glass vials. With all of the samples collected, the mosquitoes are transferred from the treatment cages to clean holding cages. The filter paper is treated to inhibit the breakdown of the insecticide and sealed to prevent leakage. With those tasks accomplished, it is back to the lab.

In the lab, the mosquitoes are fed with sugar water and observed for 24 hours. At the end of the observation time, final mortality is recorded for each cage. The filter paper samples are immediately packaged and shipped to a laboratory in Panama City to be analyzed for the presence of insecticide.

Keeping in mind that this whole procedure, with the exception of the observation period, is accomplished in roughly 28 hours, it is easy to see that this type of test makes for some long days and nights with little sleep. And this isn't a one-night stand, either. The test has to be repeated at least three times for both the test insecticide and the current insecticide in order to get reliable data.

What were the results of last year's testing, other than a number of very tired CMCD employees? The test insecticide provided inconsistent results, with good mortality at some sites but not others, and considerable variation in mortality from one test to another. The insecticide currently in use provided much higher levels of mosquito mortality more consistently.

This season the CMCD will be performing more tests with the new insecticide. The objective of this testing will be to try to determine what causes the variability in the observed mosquito mortality. Knowing the reasons for the variability may make it possible to make modifications to CMCD's application equipment and/or techniques to have a reliable backup insecticide ready if it is needed.

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