

Research Spotlight

by Chloé Lahondère, Virginia Tech



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When you think about mosquitoes, the first things that probably come to your mind are “annoying,” “pest,” and “can we just get rid of them all please?” I definitely get it: if there is one mosquito in a room, it will most likely come after me. Mosquitoes have been ranked by the WHO to be the deadliest animal on earth due to the terrible diseases they transmit to humans and other animals (e.g. malaria, dengue, Zika). They cause more than one million deaths per year worldwide.

Studying mosquitoes is more important than ever. Indeed, control strategies are starting to fail due to resistance to insecticides that have been observed in several populations. To develop efficient tools to control mosquitoes, it is essential to have a good understanding of their basic biology and ecology. And this is, in part, the focus of our work at MLBS.

The very first time I visited MLBS at the end of winter this year, I thought “This is such a perfect place to conduct field work!” Apparently there were not a lot of mosquitoes seen around the station or bothering people. But among the 3500 existing mosquito species, only 38 are blood feeders and they don’t always feed on humans, so we gave it a shot and found what we came for: mosquitoes!

Since May, we have been collecting mosquitoes weekly with Elizabeth Bose and Sarah Tartabini, both undergraduate researchers, and Joanna Reinhold, PhD student in my lab at Virginia Tech. We have been using different techniques to collect these mosquitoes. Indeed, we found that most species at MLBS are not really interested in the commonly used carbon dioxide traps. We thus started collecting larvae in ponds in containers, placed oviposition traps and cups in tree holes, and hand caught adults. This allowed us to target a larger spectrum of species that occupy different ecological niches and make an inventory of the mosquitoes present at this quite high elevation location, a first important step before starting our experiments. So far, we have found more than 10 different species from 4 genera, including an invasive species, *Ochlerotatus japonicus*. Some of these mosquitoes specialize on birds and humans while others bite preferentially frogs, annelids, or snakes. We are currently working on three different projects involving mosquitoes from MLBS.

This spring, we obtained a grant from the Eppley Foundation for research to study the sugar feeding behavior of invasive mosquito species in Virginia. Indeed, mosquitoes are not only feeding on blood but need sugars to survive. For this project, we compare mosquito sugar feeding and access to nectar at MLBS where native plants are present, with urban areas where ornamental plants are abundant. The main aim of this project is to understand how invasive species adapt to local plants and see if we might contribute to the establishment of invasive species with ornamental plants in urban areas by providing them sugar resources.

A second project, in collaboration with Luis Escobar from Virginia Tech, consists of using the data collected this year (e.g. abundance, type of species) to study the evolution of mosquito populations at the station, and build predictive models to

estimate population changes over the next few decades. The goal is to determine what is likely to happen in the context of climate change.

Finally, while identifying mosquitoes from MLBS, one species especially caught our attention: *Culex territans*. This species feeds primarily on amphibians and reptiles and can transmit several pathogens to these animals.

We have started working with David McLeod, James Madison University, who was studying amphibians at MLBS this Summer, to investigate the relationship between these mosquitoes and local frogs and identify the factors mediating these interactions.

This first field work season has been really awesome so far, and we are looking forward to pursuing our work at MLBS once the mosquitoes return next spring!



Uranotaenia sapphirina



Sarah Tartabini collecting larvae and pupae at the Sylvatica pond on a very foggy day.



Culex territans mosquitoes, larvae, pupae, and adults collected at the Sylvatica pond.



Elizabeth Bose and Joanna Reinhold placing oviposition cups in tree holes.