

## Host Plant Preferences of *Philaenus spumarius*, the meadow spittlebug

Zoe Wood, Class of 2018

I had the exciting opportunity this summer to work with a system that no one had previously examined in depth on Kent Island: *Philaenus spumarius*, the meadow spittlebug. While Kent is a wonderful place to study seabirds and migrating birds, it also contains a wealth of insect and plant life that make great subjects.

Spittlebugs are small but visible crop pests that are easily recognized by the frothy spittle masses the nymph creates on the plant it feeds on. Spittlebugs are generalist xylem-sap feeders, meaning they are not host-plant specific to any one species but rather are versatile in their feeding behavior. Nevertheless, they still have preferences for certain plants, including but not limited to nitrogen-fixing angiosperms, suggesting the role of nitrogen content as a potential factor in host plant selection<sup>1</sup>. Plants with higher nitrogen content may consequently be a richer source of amino acids for the xylem-feeding insects. My project aimed to characterize the 1) diversity of the plants on Kent found to be spittlebug hosts, 2) density and performance of nymphs on different plant species, 3) and changes in density on goldenrod (*Solidago rugosa*) over the course of eight weeks with nitrogen fertilizer application.

So far, I've been able to identify 32 host plants and trees species, including several flowering plants and some conifers. I measured nymph body sizes on some of these plants as a proxy for performance, and found that on average, nymphs on goldenrod were larger than nymphs on sheep sorrel. For my density censuses, I created paired goldenrod plots (half fertilized, half unfertilized) around the island and measured plant height and number of nymphs over the course of the summer. I found that the density of nymphs in the nitrogen treated plots decreased over time at a faster rate than the nymphs in control plots, suggesting either 1) a faster growth rate and earlier adult emergence, or 2) higher rates of depredation. As the nymphs molted into adults, I also began to notice different morphs or color patterns around the island. Several studies have examined the polymorphism of the meadow spittlebug, and most have identified the three most common morphs as *populi* (POP), *typicus* (TYP), and *trilineatus* (TRI)<sup>2</sup>. In my last couple weeks on Kent, I collected and attempted to categorize the different morphs I saw in both my fertilized and unfertilized plots, but I didn't detect any difference in the frequencies of the three common morphs.

On the side of studying spittlebugs, I maintained an insect collection, learned the names of plant and moth species, and, of course, how to do a headstand. The isolation of Kent Island allowed for a summer free of distractions in which I was also able to take advantage of my time to read, write, draw, and wander. I look forward to continuing to work with my data and questions about spittlebug-plant interactions in the coming academic year.

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<sup>1</sup> Thompson, Vinton. 1999. Spittlebugs associated with actinorhizal host plants. *Can. J. Bot.* 77(9):1387-1390.

<sup>2</sup> Yurtsever, Selçuk. 1999. On the Polymorphic Meadow Spittlebug, *Philaenus spumarius* (L.) (Homoptera: Cercopidae). *Turk. J. Zool.* 24 (2000) 447-459.