

## Field Notes Summer 2015

### Hopkins Forest: *Home Field Advantage*

As this summer rolls along, and June's rains finally give way to July's swelter, student and faculty researchers will be busy at work in the fields and meadows of Hopkins Forest. It may seem surprising to some but, in a landscape dominated by thousands of acres of towering hardwoods, recent research efforts have honed in on just a few acres of meadows and their assemblages of various grasses, wildflowers and insects. As it turns out, these seemingly insignificant vestiges of a formerly dominant agrarian landscape are proving to hold insights into many salient issues in modern ecology – ranging from basic food web dynamics, to adaptation and resilience in a changing climate, to land use effects on biodiversity.

Bugs, in particular, are at the forefront of Hopkins Forest researchers' attention this summer. In the small field just beyond the apple grove, tiny leaf hoppers and ants are being manipulated within waist-high, screened boxes. This array is at the heart of Manuel Morales' investigation of the broader effects of mutualistic interactions between these two types of insects. In this mutualism, larger ants protect diminutive, defenseless aphid like-bugs, which exude a sweet residue on which the ants rely for food. This works out well for the species at the center of this symbiosis, but what about the host plants, the goldenrods? As the sap-sucking bugs thrive, aided by their six-legged body guards, one might expect a defensive response -- perhaps in the form of increased production of chemicals -- that would render these plants less palatable or nutritional over time. This NSF-funded study, in its initial year, seeks to quantify these effects and to track the fates of subsequent generations of leaf hoppers that will have to depend on these same, albeit better defended, host plants to thrive.



*Ellie DeVeaux and Hallie Walker  
at work in the goldenrod field.*

A few hundred yards away, along the southern edge of the property, Dr. Adam Rosenblatt, a Yale University Post-doctoral fellow, is also using enclosures to track the fortunes of local meadow dwelling arthropods. Dr. Rosenblatt's work has broader implications; he is trying to simulate conditions that could help predict possible responses of arthropods to a warming climate. In so doing, Rosenblatt will collect spiders and grasshoppers from the fields in Hopkins Forest and introduce them to very similar controlled environments in southern Connecticut where the average temperature is several degrees (F.) higher. At the conclusion of this phase in September, he will use physiological and morphometric parameters to compare the performance of the spiders and grasshoppers in their native Williamstown fields to those that were reared in a new and warmer environment. Rosenblatt expects those transplanted individuals to undergo different physiological responses than their cohorts in the control group, perhaps leading to increased stress with corresponding implications for survival.

Back up the Lower Loop trail, in the field behind the weather station, this summer's work will take on a more mechanical tone. In late July tractors will brush-hog four randomly selected 24x24 meter plots. Joan Edwards' goal for this study to assess the impacts of different field mowing schedules on resident aster and goldenrod populations. Also of interest is the fate of the various insects that pollinate these plants. Which will be most threatened by earlier and more frequent mowing schedules? Will there be any beneficiaries? Last fall, Julie Jung '15 spent many hours in this meadow tending automated field cameras in order to capture imagery and frequency data on a variety of insects ranging from flies to bees to moths to borers. Julie's initial findings -- set out in her recent honors thesis entitled, "*The influence of land management practices on the abundance and diversity of fall-blooming Asteraceae and their pollinators*" -- will be augmented by the work of future biology students who will continue in her path. Indeed, it may take a few years for the differences in mowing approaches -- late vs. early season and annual vs. biennial -- to be fully revealed in these fields.

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