Attack of the Parasitic Wasps: Controlling Emerald Ash Borer with Natural Predators

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An ash bolt containing parasitic wasp larvae ready to feed on emerald ash borer.

A parasitoid wasp lays eggs on an emerald ash borer larva in an ash log. Photo courtesy of Houping Liu, Michigan State University, Bugwood.org

Ray Boivon, NH Division of Forests and Lands Entomologist, attaches an ash bolt to an ash tree in Concord.

Molly Heuss, NH Division of Forests and Lands Forest Health Specialist, attaches a sign to an ash tree that explains the reason for the ash bolts.

On a cool, dreary, late May afternoon (the temperature in Concord was 48 degrees), eight hardy souls from the New Hampshire Division of Forests and Lands, UNH Cooperative Extension, and the New Hampshire Department of Agriculture, Markets & Food could be seen traipsing through a stand of ash trees in south Concord. Their mission? To deploy eight six-inch bolts containing parasitic wasp larvae. Their target? *Agrilus planipennis*…emerald ash borer.

The bolts came from ash trees carefully harvested in Brighton, Michigan, by the USDA Animal and Plant Health Inspection Service (APHIS) at its biological control production facility. The facility was created for producing parasitoids (i.e., organisms that prey on others) to fight emerald ash borer infestations across the country. APHIS, the U.S. Forest Service and others have conducted studies in the native range of emerald ash borer to find predators that could be used in the United States as biocontrols and they found three candidate wasp species that are now reared at the Michigan APHIS laboratory. One of the parasitic wasp species feeds on emerald ash borer eggs; the other two prey on the larvae.

The bolts that were deployed on that dreary day in Concord contained one of the latter. The adult wasps injected their eggs into emerald ash borer larvae living in the ash bolts at the APHIS laboratory in Michigan. (Each emerald ash borer larvae produce more than 130 wasps!) The bolts were shipped overnight to the N.H. Division of Forests and Lands and were released within two hours at the Concord site.

What happens inside the bolts sounds like a scene from a horror movie. The wasp eggs develop inside the emerald ash borer larvae, eating their way out. The wasps will further develop inside the ash bolt before emerging as adults shortly after being introduced to their new site in New Hampshire. Nearly 4,000 adults will emerge from the ash bolts. And then, their fun begins. The adult wasps will continue to feed on emerald ash borer larvae found at the site. Eventually, they will be joined by other wasps, including one that feeds on the emerald ash borer eggs. The parasitic wasps can produce several generations in one year. Their only competition will be woodpeckers that find and feed on emerald ash borer larvae under the bark. (We saw a woodpecker in action during our visit.)

Two more deployments will occur this year; one in the summer, when emerald ash borer adults are laying their eggs on the bark of ash trees, and one in the fall, when the emerald ash borer larvae are developing under the bark. The whole process will be repeated next year.

The site was chosen according to guidelines provided by APHIS. This is an expensive undertaking and APHIS wants to ensure a high probability of success. The site has a high density of ash with moderate emerald ash borer infestation. It’s a naturally wooded area with a range in size of ash trees, from saplings to large, mature trees.

This site, and two others, will be monitored over the next two years to see what progress is being made. We hope that this “movie” will end with the parasitic wasps as the victor. Only time will tell.