REGULATORY ENTOMOLOGY – ENGAGING THE PUBLIC

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INTRODUCTION

The United States Department of Agriculture and states' departments of agriculture are charged with safeguarding the commercial plant resources that support America's agricultural industries. These industries are varied and complex. The high yields required to keep crop production businesses profitable are partly dependent on protecting plants from a wide variety of insect pests. According to the United States Department of Agriculture, agriculture is the largest industry and employment sector in the United States, with more than $1 trillion in annual economic activity (USDA 2014). Invasive pests and animal diseases present the greatest risk to the success of this industry, causing $138 billion in economic and environmental losses annually (USDA 2000). The USDA and state departments of agriculture utilize the legal authority granted to them in a series of plant pest and nursery laws to search for and eradicate or minimize the spread of a wide variety of invasive insect pests. The science that facilitates development of plant protection laws and regulatory actions is known as regulatory entomology.

Much of the work of regulatory entomology takes place far away from the general public's eye and consciousness. Trapping and detection work are conducted in fields and forests. Cargo and containers are inspected at ports of entry. Yet enforcement of plant pest laws and quarantines requires public cooperation and understanding of the risks posed by these pests. Effective outreach is essential for public engagement and understanding, alerting people to key insect pests, highlighting the pathways by which pests enter the US and invade new territory, and showing the public what they can do to slow or stop the spread of these insect pests. The Delaware Department of Agriculture, Plant Industries, has undertaken several outreach programs to alert the public to these pests, and inform them on actions they can take to limit their spread.

FOREST PEST BASICS

For the past several years, the Delaware Department of Agriculture has been conducting forest pest outreach programs. The specific forest pests of regulatory significance are Emerald ash borer, *Agrilus planipennis* (Coleoptera: Buprestidae) and the Asian longhorned beetle, *Anoplophora glabripennis* (Coleoptera: Cerambycidae). The focus of this paper and presentation is the Emerald ash borer (EAB), first discovered in the US in 2002, near Detroit, Michigan. This

insect probably arrived in the US on solid wood packing material carried in cargo ships or airplanes from its native range in Asia. The EAB has now been found in 25 states, has killed millions of ash trees, and cost the US government, and taxpayers, municipalities, property owners, nursery owners and forest products industries tens of millions of dollars. This insect is spread primarily through human assistance, such as the transport of infected nursery stock, wood chips, green lumber and most importantly, the movement of infested firewood. Although EAB spreads by natural dispersal from infested areas, some new detections have occurred hundreds of miles from the nearest known infestations. As these new detections occurred in campgrounds and other recreational areas, researchers have determined that the movement of firewood was associated with these new introductions. Although the Asian longhorned beetle (ALB) arrived in the United States on solid wood packing material that originated in China, it's movement on tree trimmings and firewood within the United States has been demonstrated (Jacobi et.al., 2013).

Currently there are no national regulations that require firewood to be treated or labeled before use or sale. States and the Federal government have discussed firewood regulations as a way to reduce the introduction and spread of invasive insects and diseases, however after several years of trying, involving national regulatory groups such as the National Plant Board, national firewood regulation remains unfinished business. In a national survey of retail outlets selling untreated firewood in 18 states, over half the firewood came from sources outside of the state, (Jacobi et.al., 2013). This study also showed that retail firewood travels hundreds of miles across state and national borders, and approximately 47% of the firewood was infested with live insects.

At this time, half of the states in the US are quarantined for EAB, either as full state or county quarantines. The Federal quarantine §301.53-2 states that firewood of all hardwood (non-coniferous) species; nursery stock, green lumber, and other material living, dead, cut, or fallen, including logs, stumps, roots, branches, and composted and uncomposted chips of the genus *Fraxinus* cannot be moved outside of the quarantined area without a permit or compliance agreement. Because firewood represents a significant pathway by which EAB and ALB are spread to uninfested states, and because Delaware has become increasingly become surrounded by states where EAB has been detected and populations are spreading, the Delaware Department of Agriculture focused on the message "Don't Move Firewood" in our Forest Pest outreach program.

DON'T MOVE FIREWOOD

One of the first challenges was figuring out who was the target audience for our outreach, so we could effectively tailor our messages and materials. Firewood is sold in a wide variety of settings, from grocery and big box retailers to side of the road stands. Because there is no primary type of firewood retailer, and because there are no Federal laws about firewood (other than quarantines), educational and regulatory actions are aimed at the general public, and

different types of firewood users. We first developed a list of who would buy or transport firewood. Campers, hunters, and outdoor enthusiasts topped our list. We suspected that many of these people would be visiting Delaware's state campgrounds from out of state, and also from states already infested with EAB and/or ALB. We worked with our State Parks administration and determined that this was correct. A "Don't Move Firewood" pop-up on the Campground reservation system was installed. When campers checked in, they were reminded not to bring in firewood. A letter about the potential dangers of transporting non-local firewood was sent to Delaware's private campgrounds, followed up with a personal visit by a Plant Industries' staff member. We have placed "Don't Move Firewood" rack cards in campground offices, and also in the main (and only) Delaware rest stop on Interstate 95. After one Department of Agriculture employee told us that he noticed piles of firewood on the ferry that runs between Cape May, NJ and Lewes, DE, we put rack cards in the Ferry office.

To reach a wider audience, we have hosted displays at a variety of venues where we might encounter people who would purchase firewood, those who might sell it, and/or encounter EAB or ALB in firewood they were harvesting or using. These venues have included nursery industry and arborist trade shows, outdoor festivals, insect shows, and the Delaware State Fair. Our display tables feature Cornell drawers with insect specimens, examples of insect-damaged commodities, and fact sheets. We also have handouts that show consumers the USDA seals to look for when buying packaged firewood. We have displays with all life stages of EAB and ALB, and cards with our contact information if someone notices an insect that looks like either one of these pests. The issue of firewood as a potentially dangerous commodity is not intuitive for many people, thus sometimes a display needs a bit of dazzle to attract attention. Insect costumes, fashioned to represent EAB or ALB have proven to be attention getters.

BIOSURVEILLANCE

The highly visible purple prism traps perched high in trees along the highway have generated inquiries from the public. They want to know what the traps are for, and how do they work. These calls provide us with a chance to talk about EAB, ALB and the dangers of moving firewood. Early warning of EAB is critical to protecting ash trees from infestation. However, EAB has proven difficult to detect using the traditional methods of ground/visual surveys and sticky traps. These are labor intensive and usually require supplemental funding to conduct. Biosurvellience, or the use of one species to detect another, has been developed as an alternative approach for the Emerald ash borer (EAB). *Cerceris fumipennis* (Hymenoptera: Crabionidae) is a native wasp that provisions its nest with Buprestid beetles. *Cerceris fumipennis* is the only species of buprestid-hunting wasp in this family, and is found throughout the continental U.S. east of the Rockies, from Texas to Florida and north to Canada (Careless et.al. 2009). The wasps nest in open areas of hard-packed soil, such as baseball diamonds, parking lots, roadsides and foot paths. These are solitary wasps, but females tend to build their nest close to those of other

Cerceris. A female *C. fumipennis* will attack a Buprestid by alighting on it, stinging it, and then flying it back to her nest to use as provision for her young. In the literature there are prey records listing 96 species of buprestids which have been taken by *Cerceris*[1].

Philip Careless at the University of Guelph, Ontario, Canada studied C. *fumipennis* biosurveillance as part of his master's thesis work. The US Forest Service tested this insect as an early warning system for EAB. Colleen Teerling, a forest entomologist with the Maine Department of Agriculture, Conservation and Forestry was instrumental in setting up a *C. fumipennis* volunteer program, called the Wasp Watchers. This program has since been adopted by other states.

PUBLIC ENGAGEMENT

Outreach generally involves communicating information to the general public. Outreach can be simply informative, or it can be engagement, a call to action that motivates the public to act in ways that will help slow the spread of invasive insect pests. "Don't Move Firewood" is one type of engagement, a simple call to action. Wasp Watchers are another type of public engagement. Ash is not a common component of Delaware's forests, so EAB does not present a significant threat to our forest resources. However, some communities in the northern part of the state planted ash as their major street tree when these communities were built 30 or 40 years ago. When EAB arrives in the state, communities with a high percentage of ash as street trees will then have to manage a highly destructive pest. The Delaware Department of Agriculture has been working with these communities, and the city of Wilmington, to develop ash management plans, thus engaging the public in helping to manage this pest.

REFERENCES

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FOOTNOTES

1 Known Prey Diversity of *Cerceris fumipennis*. Pdf file, http://www.cerceris.info/pdflist.html, accessed 7/20/2015.