

In the discussions on whether/when to use controls of emerald ash borer (EAB) in Colorado I would like to introduce some other points, related to risk assessments. The pest potential of emerald ash borer to cause damage to susceptible hosts (in this case all North American *Fraxinus* species) is quite unlike anything that has previously reached this state. It is without a doubt the most destructive invasive species affecting trees in North America in generations. Its damage potential rivals, if not surpasses, previous invasive organisms such as the fungus that wiped out the American chestnut in the early 1900s and the fungus/beetle vector associated with Dutch elm disease. Both of these previous invasives caused incalculable, permanent damage to natural ecosystems and have had enormous economic impacts. It is the new “10” if one were to make a sliding scale of all insects present in North America that damage woody plants. In comparison, the worst wood borers we presently have to deal with in Colorado (e.g., lilac/ash borer, peachtree borer, Zimmerman pine moth) I would rank by comparison as around a “2” or “3”, depending on the situation. In normal course, without intervention, EAB will always kill the host tree, usually in five years or so after the beetles first reach the tree and initiate its infestation. To get a sense of the scope of this tragedy one needs only to look to the broad areas of the Midwest where EAB has already devastated ash in just the past decade. (EAB was only first detected in North America, near Detroit, in 2002.)

Therefore, once EAB is present and has begun to attack a tree one needs to decide whether to try and control it (with effective insecticides) or whether to let the tree die and remove it. At this point (*after EAB is actually present in/on the tree!*) the use of insecticides will become almost as essential to maintaining the health of that plant as is having some available water. When EAB is present at a site and producing immediate risk, treatments are not done for cosmetic/discretionary/elective purposes; they become essential maintenance.

In a recent previous posting Fred Berkelhammer made the comment “I’ve witnessed the movement of our industry away from the IPM model, and toward increasing prophylactic and routine use of neonicotinoids..... “ I have been thinking about this idea quite a bit recently, particularly following some discussions I had late last month with Scott Hoffman-Black, Executive Director of the Xerces Society for the Conservation of Invertebrates, an organization centrally involved in identifying potential risks to native insects (including certain pollinators) and other invertebrates. (I have appended at the end of this posting some of the recent publications by this organization.) He also raised the point that one of his greatest concerns are that neonicotinoids have often subverted the use of IPM (Integrated Pest Management) practice. And I have to agree with him that this has all too often been the case. At its heart, the IPM approach involves making decisions based on risk/benefit calculations. Part of this is an assessment of the risk at hand, based on some sort of

sampling or other information that allows one to evaluate the immediate pest risk present at the site. Then one considers what are all the options for managing this situation, reviewing advantages and disadvantages of each. These considerations involve not just direct treatment costs but also the indirect costs (human health, ecological, economic, social) from the use of the management options. Obvious examples of the latter include adverse effects on natural enemies of the pest or impacts on other desirable non-target species, such as pollinators.

Unfortunately management options are quite limited once EAB has established in your neighborhood and has begun to attack your ash tree. And you are then faced with a clear and undeniable risk to the tree – it will die in a few years without intervention. The owner of the tree then has to make the decision as to whether the costs of this tree loss outbalance the costs (direct and indirect) of treatment.

The direct costs are pretty straightforward. These are the costs of treatments, which might range from \$30-60/year with homeowner applied imidacloprid to considerably more with the annual (imidacloprid soil application, dinotefuran soil or trunk spray) or biannual (emamectin benzoate/TREE-Age) trunk injections that must be done professionally. (I have not forgotten TreeAzin. If I find data that suggests it is sufficiently reliable for this use I will recommend it. So far everything I have seen suggests that its ability to manage this pest is insufficient, more in the

“suppression” arena. But I welcome learning about any information that includes scientifically conducted studies of its efficacy so that I can be better informed.)

Indirect costs? Effects on natural enemies are not an issue with this introduced pest insect as there are presently no sufficiently effective natural enemies. Potential insecticide movement into waters does need to be considered if a tree is located in riparian areas – treatment options may be much more limited at those sites. Risks to honey bees? The big question people have been raising in this forum. At this point in time, based on what I know, *I feel this a risk of very small potential, particularly when considered against the benefit (survival of the plant)*. And even any potential risk that may exist can be greatly mitigated if applications are made after flowering. (Ash flowers in very early spring, before leaves emerge.) In essence, I do think that the EAB treatments *made on trees that are in immediate risk* is a type of pest management decision consistent with the IPM philosophy.

In finishing this posting I would like to return to the comments of Fred and Scott about the undermining effects of some neonicotinoid uses on IPM practice. Fred’s comment on ash sawfly is a good example – if anyone is still treating prophylactically for that insect they have way too much money. I would also argue that the overwhelmingly greatest use of neonicotinoids, its near universal use on every kernel of seed corn planted in the US, is similarly not justified from an IPM approach. (FYI, a map of neonicotinoid use in the US is essentially a map of

the US corn acreage. The uses we are talking about here, on shade trees, are a minute fraction of the use/market for these insecticides in North America.)

And I would similarly argue that making any treatment for EAB when it is not present is also unjustifiable from any perspective. Yet we are already (within two weeks!!!) seeing in many areas the unleashing of some intense marketing to get homeowners to get in EAB treatment programs. Marketing being done in areas where there is zero risk of any significant EAB infestation in 2014 (Denver, Fort Collins.....)

This marketing I feel is unethical and harmful. And its harm is not just to the homeowners who are duped into paying for something they do not need (yet) but to the industry. Presently neonicotinoids are under intense regulatory review and it is likely some changes in labeling will result and perhaps some whole uses will be removed. Personally, I think that there are many cases when neonicotinoids are not only effective, but are also the best option from an IPM approach. I would hate to see these uses lost. However, it becomes much more difficult to make the arguments to justify a use when there are such clear cases where unjustified uses are occurring. It is possible (perhaps not likely, but possible) that the continued misuse of these insecticides in applications where they are not needed will tip the regulatory assessment so that uses important to the industry will be denied in the future. Right now there are companies pushing EAB treatments in Fort Collins and

people are asking me what I think about whether they should start them. What I tell them is “No, not yet. Emerald ash borer is not here yet, although it will be a few years from now. And when it does get here then you will have to decide what to do.

“But right now, make a note of what company is knocking on your door. A few years from now, when you have to decide to treat your ash tree or remove it, you likely will need to hire a company to help you out. There will be many good ones to choose from. But to make the choice a bit easier, remember the name of that company knocking on your door selling you a service in 2013 (or 2014, 2015...) that was unneeded and inappropriate. And then hire someone other than that company.”

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Beyond the Birds and the Bees

Effects of Neonicotinoid Insecticides on Agriculturally Important Beneficial Insects

<http://www.xerces.org/beyond-the-birds-and-the-bees/>

By Jennifer Hopwood, Scott Hoffman Black, Mace Vaughan, and Eric Lee-Mäder.

Beyond the Birds and the Bees moves the spotlight from the risks neonicotinoids pose to bees to the impacts of

neonicotinoids to invertebrates such as earthworms or lady beetles. The report provides a comprehensive review of published articles and pulls together the growing body of research that demonstrates risks from neonicotinoids to these beneficial insects. These risks occur particularly in agricultural systems, but are also found in urban and suburban ornamental landscapes.

Are Neonicotinoids Killing Bees?

A Review of Research into the Effects of Neonicotinoid Insecticides on Bees, with Recommendations for Action.

<http://www.xerces.org/neonicotinoids-and-bees/>

By Jennifer Hopwood, Mace Vaughan, Matthew Shepherd, David Biddinger, Eric Mader, Scott Hoffman Black, and Celeste Mazzacano.

A possible link between neonicotinoids and honey bee die-offs has led to controversy across the United States and Europe. Beekeepers and environmentalists have expressed growing concern about the impact of neonicotinoids, concern based on the fact that neonicotinoids are absorbed into plant tissue and can be present in pollen and nectar, making them toxic to pollinators.

This report details potential negative impacts of neonicotinoids insecticides to honey bees and other important pollinators. It also makes recommendations on how we can better protect bees.

Ecologically Sound Mosquito Management in Wetlands

An overview of mosquito control practices, the risks, benefits, and nontarget impacts, and recommendations on

effective practices that control mosquitoes, reduce pesticide use, and conserve wetlands.

<http://www.xerces.org/mosquito-management-wetlands/>

By Celeste Mazzacano and Scott Hoffman Black.

This report reviews current mosquito control practices in the United States, describes risks and benefits associated with different types of mosquito control—including direct and indirect impacts of chemical and biological controls on nontarget organisms—and provides recommendations on how to develop effective practices to manage mosquito populations while reducing pesticide use and conserving wetlands.