

EAB Insecticides and Bee Decline

It appears that our pollinators are stressed whether they are native or not, and whether or not they provide an economic advantage to crop production. That leaves us with the question, "Will we damage bee populations by treating individual ash trees with insecticides to control Emerald Ash Borer?" All ash trees that would be treated for EAB are wind pollinated. Their pollen is not a food source used by bees and other pollinators. So the short answer is, "No, treating ash will not directly impact bees." As with all certainties there are exceptions. If you treated your tree with a soil drench of imidacloprid and also have a butterfly bush growing right next to it, the odds are good that the butterfly bush will also acquire the insecticide. If the insecticide gets into the pollen of the butterfly bush, then it could presumably also get collected by bees in pollen or by nectar feeding insects. These are the questions that are being asked by the next generation of research for all insecticides that are currently being used in the landscape. The same questions need to be asked of all products in the marketplace to see what "non-target" effects they may have on other plants, insects and the environmental.



The Rainbow Treecare Perspective

At this juncture, with the scientific data we have to work with, we feel certain that correctly using either product to save our trees from Emerald Ash Borer is not harmful to the environment. We do recommend that our clients seek professional assistance with the application to reduce the potential for misapplication of products. We also recommend that clients with trees near water or in planting beds with insect pollinated perennials consider using an injectable product (drill and fill) to reduce the potential for indirect effects of the soil applied products. As with any of our products and services, one size does not fit all our client's landscapes. It is therefore imperative that a joint decision be made on protecting your ash tree with the input of a Rainbow Consulting Arborist.

An integrated approach

When caring for urban trees it is important to make a complete evaluation of all environmental conditions to accurately diagnose all stress factors and prescribe care based on specific circumstances. This prescriptive care will help your tree meet its full potential.

©2011 Rainbow Treecare



For Your Information



BACHMAN'S

Emerald Ash Borer - Insecticides - and Bees

Can We Protect Our Ash Trees And At The Same Time Not Add to Honeybee Decline?

The news media and different environmental organizations have raised the concern about using pesticides to control Emerald Ash Borer and the potential impact these treatments may have on honeybees. At Rainbow Treecare one of our first concerns is the environmental impact that any of our service treatments and protocols may have. We base all our services on scientific research that documents either their benefits or the problems they may create. When there is a documented potential for problems, we will not use the products in our services.

Emerald Ash Borer (EAB) Treatments

Ash trees are wind pollinated, meaning pollinators, such as honeybees, are not directly affected from treatments made to control EAB in trees. At Rainbow Treecare we are using two insecticides on ash that have both been effective at keeping trees from dying due to EAB. We currently have research trials in place in Ohio and Illinois to look at the long-term effects of these two products in managing EAB. Our policy is, if effectiveness or environmental problems with the products are observed, we will share it with our clientele and change our services to adjust to the new knowledge.



The flowers of ash trees (green ash pictured) occur very early in spring. They are small, do not have petals and are pollinated by wind, not insects. Photo: www.iowadnr.gov/forestry/eab/ash.html

The two products we are currently using are:



Xytect® /Optrol® (applied using soil injection or soil drench)



Tree-age® (applied by tree trunk injection)

Emmamectin benzoate (trade name Tree-äge®) is a bacterially derived toxin that is directly injected into the tree. It is a *restricted use* insecticide and is currently labeled for use on ash trees only by professionals.

The benefits of this product are:

- Its longevity in the tree (currently labeled for 2 years, but could possibly be extended to 3 or 4 years on trees less than 15" DBH),
- It is fully contained within the tree, meaning less potential for leaching or soil contamination,
- It is effective at killing caterpillars and other pests that may also feed on ash trees.

The concerns with this product are:

- It creates wounds in the tree,
- It lasts a long time,
- It is a broad spectrum insecticide
- It is too new to have any long-term data on what happens with the product contained in plant tissues when leaves drop in the fall (what is its biodegradability?).



Imidacloprid (trade name Xytect®) is a plant derived compound that is closely related to the nicotine molecule from tobacco plants. It is available over the counter for homeowner use as well as by professionals.



The benefits of this product are:

- It is easily available in many forms,
- It has been around for a long time, so its fate in the environment has been well documented,
- It can be applied to the soil as a drench or through a soil injection system,
- It is only effective on sucking insects and chewing beetles (it doesn't harm caterpillars)
- It is labeled for homeowner use.

The concerns with this product are:

- It is applied to the soil so runoff or leaching could occur if it isn't applied correctly,
- Research has shown that some of the product can make its way into the pollen on treated plants ,
- It is labeled for homeowner use which means it can be easily misapplied by people who don't read or understand the label or directions.

Honey Bee Decline



Above: The imported and naturalized European honeybee (*Apis mellifera*)



Native to North America are pollen bees, such as the bumble bee shown above.

The honeybee is not native to North America. The most common honeybee used for honey production in the United States (*Apis mellifera*) was imported from Europe in the 1800's, where it was first domesticated for human uses back before the times of the Pharaohs. After the honeybee was introduced into the U.S., it escaped cultivation and became naturalized as a wild bee. Since most native North American bees were inferior as pollinators of crops brought in from Europe, beekeepers developed a system where they would transport commercial colonies around the country to assist with the pollination of orchard crops and other agronomic commodities. Beekeepers could get double the bang for the buck, by serving as commercial pollinators as well as honey producers.

Honeybee failures prior to the 1960's were usually associated with a fungus which caused foul brood disease. The disease could usually be stopped by using sanitary practices to maintain healthy colonies. In the 1970's and 1980's colony collapses became a more persistent problem.

It was later discovered that it was due to two mites, Varroa mites and tracheal mites. Both of these mites are parasitic on honeybees and greatly reduce their resistance to other diseases and environmental stress. The more that commercial hives interacted with naturalized bees, the more likely they were to become infected with the mites. Mites replaced foul brood disease as the curse for beekeepers during that era. Control for mites is difficult as both the bee and the mite are arthropods and are susceptible to the same chemicals (insecticides).



Varroa mites on honey bee pupae

Since the late 1990's a steady decline in honeybee populations has been observed around the world, not just in the United States. In addition to the mites, many other factors are stressing honeybees. The collective phenomenon is now coined "colony collapse disorder" or CCD. Initially the suspects were pesticides. Many crops are treated with insecticides that can be toxic to bees. Imidacloprid is the most broadly applied insecticide in the world, so obviously it is a suspect. Research has found that "sub-lethal" doses of imidacloprid will cause honeybees to lose focus and abandon good hive behaviors. While it could still be a contributing factor, this alone is not enough to cause the significant decline that is happening world-wide. Honeybees have continued to decline in areas and countries where imidacloprid use has been halted for over 5 years. Recent studies now suggest a complex factor of mites, viruses, and fungal pathogens may be the primary cause of honeybee decline. Unfortunately, scientists have also discovered decline in other native bee populations in North America. These declines occurred in areas where pesticides have never been used and the researchers suggest that it may be related to phenological alterations in flowering times of native plants. The flowers bloom before the bees arrive to harvest their pollen due to earlier spring temperatures brought about by climatic shifts in weather patterns (aka, global climate change).