

## **Borer Control in Nursery Grown Dogwood, Ash, Maple & Oak Trees**

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This factsheet contains major revisions based on research that proved Chlorpyrifos (Dursban) to be less effective than bifenthrin, permethrin and imidacloprid on FHAB borer control in nursery grown dogwood, ash, maple and oak trees.

Dogwood trees are going to be attacked by the **Dogwood Borer** and the trunks must be sprayed faithfully in **late-April and mid-July**. Spray trees of all ages annually. The female moth lays her eggs in bark crevices or rough bark on both healthy and stressed plants. Soil applied imidacloprid is not effective on this pest. Perm-Up 3.2EC, Onyx Pro and Dursban are all providing control of the dogwood borer as far as we know.

The **Lilac Borer and Banded Ash Clearwing Borer** will attack and cull healthy ash trees in the nursery unexpectedly. The lilac borer will also attack lilac as its name suggests. Trees (all ages) should have the entire trunk and bark of the main scaffold limbs sprayed annually during **mid-April and again in mid-July**.

**Flatheaded Appletree Borers (FHAB)** are considered opportunists because they often attack stressed deciduous trees. Newly transplanted trees (into the nursery and landscape) and older weakened or injured trees are particularly susceptible to attack by the FHAB. Trees should be irrigated adequately during dry weather. They can attack some 30 species of woody plants, but maple, hickory, linden, oak, sycamore, tulip poplar, dogwood, and crabapple are the most commonly infested.

This on-line UT factsheet contains great images and the life cycle  
<https://utextension.tennessee.edu/publications/Documents/SP503-I.pdf>

**Contact insecticides:** Spray trunk-applied contact insecticides (e.g., Perm-Up 3.2EC, Onyx Pro Insecticide, Dursban) twice annually, in early May and mid June (previously mid May and late June). Rates provided below. Adult beetles have recently been trapped locally earlier than the previously suggested spray date of mid-May, causing this revision.

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**Soil-applied insecticides:** The soil-applied systemic insecticide imidacloprid (Discus, Marathon 60WP, Marathon 1G, Merit) can be applied one time between April 1-15 to prevent the FHAB on maple and other trees listed above (not effective on dogwood borer). A systemic insecticide like imidacloprid must be applied early enough to translocate into the trunk to be effective at preventing FHAB but there is concern by some researchers that it might leach or be removed by March rains if applied before the roots could take it up. (Without conclusive research the application timing is debatable, but April 1-15 is our best guess based on what is presently known.)

Liners are particularly susceptible to attack during the transplanting year because of stress. Stress could be caused by drought, cold injury or excess moisture after being transplanted or stress (cold injury, dehydration) prior to being transplanted. Research has confirmed that FHAB continues to attack nursery stock during the second and third years after transplanting, making continued protection of trees essential.

In a multi-year insecticide evaluation, one application of imidacloprid at the labeled rate protected new 6 foot maple cultivar liners against FHAB and leafhoppers for 3 years. We are still refining the lowest rate of imidacloprid required to provide 3 years of control. It is also believed by some researchers that imidacloprid is taken up by weeds and therefore reduces the amount of imidacloprid available to the crop, thus reducing the control.

A producer must weigh pesticide cost against superior control, 1 trip vs 6 trips (2/yr) with a contact spray for borers and another 9 to 12 trips (3-4/yr) for leafhoppers. Every row must be driven to apply the imidacloprid as a soil-applied treatment rather than using an air blast sprayer.

We have not figured out an accurate, practical application method yet. Band spraying the row would be wasteful, expensive and exceed the per acre limit per year allowed by the label. A tractor mounted pto tank or even an electric motor on a 25 gal spot sprayer could be used with a stop watch to dispense the predetermined volume of solution from a handgun. Buckets and measuring cups can be used to pour the correct amount around each root system, once the bucket carries the correct solution.

One cup of the imidacloprid solution is a convenient amount to give each  $\frac{3}{4}$  to 1 inch diameter transplant. A greater water volume could be used, but the solution must not be allowed to run away from the root system. If you decide to treat 1 and 2 yr old transplants, larger trees will require more imidacloprid, in more water and applied to a larger circle (root zone).

Mix and treat the inventory in groups by trunk diameter or caliper (referred to as the diameter at breast height or DBH) because different size plants will require different concentrations of the imidacloprid solution. Determine the average diameter (to nearest quarter inch) of the transplants to be treated (measured 4.5' above the root collar), the number of plants to be treated, the percent active ingredient of the imidacloprid selected

and the size of the spray tank in order to calculate the amount of imidacloprid to add to the tank. Let's discuss this prior to purchasing the imidacloprid.

The appropriate amount of imidacloprid and water can be mixed in a tank or a number of 5 gallon buckets. Two fl oz or 60 ml is considered the minimum amount of solution to be used on 3/4 to 1 inch diameter trees. The target area (root zone) is assumed to be approximately one square foot. Insecticide applied between the plants is wasted. Labels suggest how to apply to individual container trees.

For example: 20 ml Discus is suggested to be applied to the root system of each 3/4 to 1 inch diameter tree. Decide how much water the chemical will be mixed with for each plant. 216 ml for example. That way 216 mls of water + 20 mls imidacloprid = 236 ml or 1 cup would be poured around each 3/4 to 1 inch diameter tree.

A 5 gal bucket would be convenient to mix 11 qts of water with 30 fl oz of Discus. Stir. Pour 1 cup of this solution around each 3/4 to 1 inch diameter tree. Wear the proper PPE (Personal Protective Equipment) when doing this (the approximate 3 gallons of solution will treat 48 - 3/4 to 1 inch diameter trees). Keep the solution within the root zone.

It is possible to mix the appropriate amount of imidacloprid and water in a tractor mounted pto tank and dispense the correct amount of solution to each tree by doing a test with water to determine the number of seconds required to dispense 1 cup (8 fl oz or 236.6ml) or a larger amount if desired by holding a hose with a shower wand over the root zone.

A stop watch should be used to ensure the correct amount is applied (to ensure enough is applied but none wasted). Counting one Mississippi, two Mississippi, three Mississippi is not sufficiently accurate as labor will speed the count later in the day. Too much is at stake to ruin the accuracy by hurrying and doing a sloppy job and wasting an expensive pesticide.

A grower explained to me how they remove the tip from 2 TeeJet handguns attached to 2 hoses coming off the rear of a tractor mounted pto tank. The tractor slowly drives each middle. Two laborers carry a 2 cup measuring cup but they only fill it to the 1 cup line which is marked boldly. Each fills the cup with 1 cup of the solution using the handgun while walking to the next tree. They pour the solution around the stem, over the root zone. The larger cup size allows for some splash and wobble while walking.

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**General comments about all trees and all borers mentioned above:** Borers frequently attack trees following the stress caused by the transplant into the nursery field and then later into the landscape. We are not always aware when a plant is stressed.

Try to avoid stress in these plants: avoid severe root pruning, protect roots from drying out, irrigate when ever needed following transplant, avoid wounds, do not plant too deep (which starves roots of oxygen), etc. Consider planting 5 feet rather than 7 feet shade tree liners to gain more roots to shoot ratio. Greater root mass and less height also reduces the need for stakes.

Contact insecticides are most likely to work when properly mixed and applied at the correct times. Do not apply if rain is expected. Wet the entire trunk from two sides with a back-pack sprayer or hand-gun at the following rates. The best control of FHAB will probably be achieved with the higher rates.

### **The Contact Insecticides**

**Perm-Up 3.2EC** (Permethrin) is labeled 1-2 qts/100 gal for the ash borers & dogwood; 2-5 qts/100 gal for FHAB.

**Onyx Pro 23.4% Insecticide**, (Bifenthrin) is labeled 6.4 to 12.8 fl oz/100 gal for all borers listed above.

**Dursban 4E (Chlorpyrifos)**: 2 teaspoons/gallon or 1 pint/50 gallon or **1 quart/100 gallon**. The rate is 1 qt/A if an air blast sprayer is used. Dursban 4E is more economical and safer to plants than 2E, since it has less chemical carrier in the formulation. Make the rate per 100 gal the rate per acre when using an air blast sprayer.

omm/Insects/Borer/Borer Control

### **Precautionary Statement**

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

### **Disclaimer**

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication. Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product. The author(s), Tennessee State University, the University of Tennessee Institute of Agriculture and University of Tennessee Extension assume no liability resulting from the use of these recommendations.

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