Bees And Trees

By Jill R. Sidebottom, North Carolina State University

We have lots of clover in our Christmas tree fields now. That's great news. Clover adds nitrogen to the soil and reduces erosion. It also provides forage for bees. That's a wonderful thing – most of the time. However, when a Christmas tree grower needs to apply an insecticide, having bees actively foraging in the field can present a problem.

Being insects, it is perhaps not surprising that most insecticides are toxic to bees. Even some organic insecticides will kill bees. The wrong pesticide, applied at the wrong time, will not only kill the bees foraging at the site but can be carried back and kill the entire colony. The good news is that pesticide poisoning of honey bees can usually be kept to a minimum if beekeepers and pesticide applicators take certain precautions.

Most pesticide labels have a special warning about bees and other beneficial arthropods. For example, the label from Dimethoate reads as follows:

> *ENVIRONMENTAL HAZARDS*
> *This pesticide is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.*

This language clearly places the responsibility for the safe use of this pesticide squarely on the applicator. Beekeepers can help applicators by making them aware of their hive locations, covering their hives with wet burlap, or even moving the hives during times of pesticide exposure. But the responsibility ultimately falls back on the pesticide applicator to make sure that bees are kept safe.

In The NCSU beekeepers note, "Reducing the Risk of Pesticide Poisoning to Honey Bees" (found at http://entomology.ncsu.edu/apiculture/PDF%20files/2.12.pdf) contains a table with different pesticides and their relative toxicity to honey bees. I have reproduced the tables, in part, showing the materials that are used in western North Carolina on Christmas trees.

GROUP 1 – HIGHLY TOXIC. Severe bee losses may be expected if the following pesticides are used when bees are present, or if the product is applied near beehives or within a day after application to foraging bees in the pesticide application area:

Abamectin
Acephate (Orthene)
Carbaryl (Sevin)
Chlorpyrifos (Lorsban)
Dimethoate
Imidacloprid (Provado, Merit)
Malathion
Permethrin (Astro)
Spinosad
Thimethoxam (Flagship)

GROUP 2 – MODERATELY TOXIC. These pesticides can be used in the vicinity of bees IF dosage, timing, and method of application are correct; but these products should never be applied directly on bees in the field or at the colony location (apiaries):

Bifenazate (Floramite)
Disulfoton (Di-Syston)
Endosulfan (Thiodan)
Fluvalinate (Mavrik)

GROUP 3 – RELATIVELY NONTOXIC. These pesticides can be used around bees with a minimum of injury if the dosage, timing, and method of application are correct. Never apply pesticide directly to the beehive:

Diflubenzuron (Dimilin)
Esfenvalerate (Asana)
Pymetrozine (Endeavor)

If the pesticide you are interested in is not listed here, you can sometimes find the LD50's for bees under the MSDS (Material Safety Data Sheets). A material is considered 'highly toxic' if the LD50 is less than 2 μg (microgram or 1/1,000.000 of a gram) per bee. It is 'moderately toxic' if the LD50 is 2 to 10.99 μg per bee; 'slightly toxic' if it is from 11 to 100 μg per bee; and 'practically non-toxic' if it is from 50 to 100 μg per bee. For instance, the contact LD50 for bifenthrin (Talstar) is reported as 0.01462 μg/bee, which would make it highly toxic.

The LD50's for bees can be somewhat misleading, though, because they express the pesticide toxicity to the individual bee. A product that is moderately toxic but that is

applied in a form that is similar to pollen and is collected and concentrated along with the pollen can kill the entire colony.

On the other hand, highly toxic materials may cause less of a problem if bees are not actively foraging in the area. Be sure to check fields the day before spraying to determine if bees are actively foraging. For instance this summer, some of the clover flowers are drying up because of the drought, and bees are no longer present. Also, if materials are applied in the late afternoon (after 3 pm) or even at night, the impact on bees will be reduced. Some growers have successfully used Dimethoate, for instance, near hives if the material is applied in the late evening and is dried before the bees start foraging the next day.

Reducing drift is also important in reducing the likelihood that the material contacts beehives. Air-blast sprayers are more dangerous than pressurized-pump sprayers. If a pesticide application is being made by air, then it is the contractor's responsibility to notify any beekeepers that have "registered" apiaries (one or more hives of bees) within 2 miles of the area to be aerially sprayed. These regulations are defined in the NC Pesticide Laws and the person responsible for the notification is the person who contracts for the aerial application.

More information on bees can be found at the apiculture program at NCSU at: http://entomology.ncsu.edu/apiculture. Another important link is to the North Carolina State Beekeeper's Association website at: http://www.ncbeekeepers.org. This is a good place to look to see if the county you have Christmas trees in has a beekeepers association that you can contact about the location of hives near your Christmas tree fields. Finally, you can contact the NCDA&CS Apiary Inspection Service at http://www.ncagr.com/plantindustry/plant/apiary/index.htm for official apiary records and registration.

The NCCTA is currently advertising the environmental benefits of Christmas trees. If bee kills are associated with Christmas tree production, however, it will be hard to defend such a claim.

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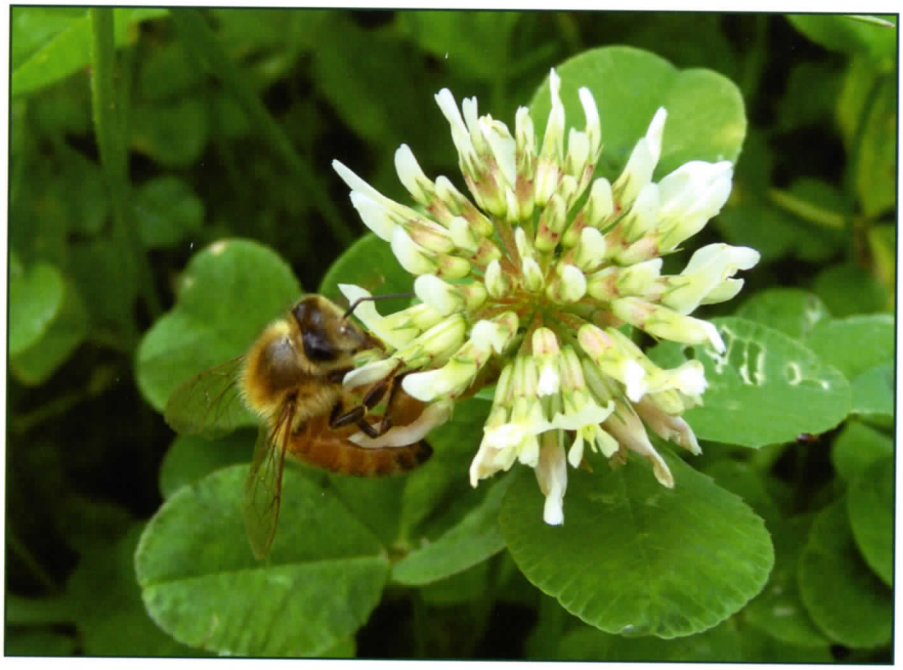

Above: Bees foraging in white clover.

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