

## **Best Practices for Pesticide Use and Bee Safety in Tree Fruit Production**

**Author:** Dr. Julianna K. Wilson, Department of Entomology, Michigan State University

Tree fruit crops grown in Michigan are dependent upon bees for pollination and good fruit set. However, pollination alone is not enough to produce a marketable crop. There is zero tolerance in the market for fruit infested or damaged by insect pests or blemished by disease. To maintain healthy and productive orchards requires an integrated approach to pest management that results in the control of target pests and diseases while doing the least harm to beneficial organisms, including bees.

Bees may be exposed to pesticides directly when spray drifts off-target or when bees (either adults or larvae) ingest nectar or pollen that contains pesticide. Certainly most insecticides are toxic to bees, which is why their use is restricted during bloom. But other pesticides – including miticides used in hives and fungicides to control plant diseases during bloom – are starting to share in the blame for declining honey bee health.

Given that pesticides are important tools for controlling pest insects, diseases, and weeds in fruit plantings, it is imperative that growers begin to make pollinator stewardship a priority, as they risk both lower yields and the potential loss of important crop protection products down the line if they ignore this issue.

For honey bees, pollinator stewardship begins with good communication between growers and beekeepers. Discussions during the winter can set the stage for how many hives will be needed and when and where to put bees on the farm. As the season starts, making good pre-bloom decisions and avoiding exposure of bees to toxic pesticides are essential. Communication among growers and their neighbors is also important to avoid potential drift onto neighboring properties.

### **Pre-bloom considerations**

- Draft a written contract with your beekeeper to clarify expectations on both sides. This contract should include expectations about record keeping (by both the grower and the beekeeper), where the hives will be placed, and when the hives will be delivered and then removed.
- If a contract is not used, be sure to communicate clearly with your beekeeper, discuss best management practices and ensure that there are no surprises.
- Keep good records of everything you apply so that if a complaint arises, you can show that you did everything according to label.
- Provide sufficient time between pre-bloom sprays and placement of hives to avoid exposing bees to lethal residues. Remember that re-entry intervals (REIs) on pesticide labels should not be violated by a beekeeper placing colonies or removing them from your crop.

### **When honey bees are delivered**

- Select a location for hives on the farm that is protected from potential spray drift. Honey bees are highly mobile, so for maximum safety, hives should be placed on the perimeter of plantings rather than along drive lanes within or close to the planting. This also minimizes the chance of colonies being disturbed by tractors.
- In the company of the beekeeper, examine delivered hives to know the health and strength of the hives you are renting. Hives with 6-8 frames that all have 70-75% brood per frame are considered to be strong colonies for the beginning of pollination season in Michigan.

## Best Practices for Pesticide Use and Bee Safety in Tree Fruit Production

### During bloom considerations

- At all times, follow the current label for a pesticide or pesticides being applied. New EPA pesticide labels have bee-specific language and it is anticipated that more pesticide labels will include bee-specific labeling in the future.
- Select least toxic insecticides whenever possible. Consult the Michigan Fruit Management Guide E-154 for the table of insecticide toxicity ratings for honey bees.
- Provide notice of pesticide application and list of intended/potential products to beekeeper, or, at the very least, keep good records to show that you are applying according to label.
- Bees are less active in cool temperatures and low light, so spraying pesticides after sunset can greatly reduce the risk of direct exposure, as can spraying when temperatures are below 55 degrees Fahrenheit.
- Avoid applying insecticides permitted for use during crop bloom while bees are foraging, and avoid tank mixes that include insecticides to control pests in the immediate post-bloom period – even when not labeled as bee toxic.
- Drift prevention should include turning off the sprayer near hives, avoiding spraying under windy conditions, and using equipment calibrated or designed to produce low drift.
- Clean equipment and dispose of pesticide products safely – do not leave contaminated water where bees can access it. Prevent pesticide contamination of open water sources that bees might use for consumption.

### Petal-fall and post-bloom considerations

- Do not apply bee-toxic insecticides until crop flowering is complete and all petals have fallen; if you are unsure whether bees have finished foraging in your crop or not, spray after sunset or when air temperatures are below 55 degrees Fahrenheit to minimize exposure of remaining bees to pesticides.
- Use selective herbicides to eliminate flowering weeds from drive lanes or mow before spraying to reduce flowering weeds in the crop field.
- Provide non-crop flowering plants elsewhere on the farm to divert bees from fruit plantings (i.e., meadows that contain bee-attractive plants or summer-flowering cover crops like buckwheat).