Working with Beekeepers When Applying Pesticides

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Fruit growers want to maximize fruit production and beekeepers want to maintain their colonies healthy and productive. Sometimes there can be a conflict between the two when bees are placed in orchards for pollination and spraying is needed for disease or pest control. Because bees are insects, most insecticides will have some toxicity to bees, so close cooperation is needed to protect bees against poisoning among growers, pesticide applicators and beekeepers.

Bee poisoning can be subtle

Some types of poison cause direct kill of foragers. This happens when bees are on flowers when the pesticide application is conducted or when the pesticide used is highly toxic to bees. The highly toxic pesticides actually leave no evidence because nearly all bees die in the field, before bees make their way home. Other types of pesticides allow bees to return home, and then die inside the hive. This type of poisoning is the easiest to diagnose with a large pile of dead bees in front of a bee hive, usually with their tongues sticking out. Some chemicals do not directly harm adult bees, so they are brought back to the colony and cause damage to young, immature stages of bees (brood). Captan is of this type and does not kill adult bees but larvae exposed to it die or develop into malformed adults. The French beekeepers have experienced the "mad bee disease" recently, in which millions of bees simply become disoriented and do not find their way home. The culprit was suspected to be a chemical called Gaucho (active ingridient: imidacloprid), applied to sunflowers to protect against parasites. The French government in 2001 ordered a two-year extension of a ban on spraying this chemical on sunflowers to allow more study of its impact on the nervous systems of bees. The take-home message is that diagnosis of bee poisoning can be difficult.

Formulations and time of application

As a rule of thumb, if you have the same pesticide in both dust and liquid form, use the liquid form. Because bee morphology has been designed to maximize pollen collection (a dust), pesticides applied as dusts are more hazardous than sprays to honey bees. Micro-encapsulated pesticides are worse because bees sometimes mistake these granules as pollen (bees are like us, they make mistakes!) and bring them home, causing long-term, chronic damage to the entire colony. Spray of pesticide directly (e.g. ULV) is more toxic to bees because of its higher concentration. Aerial application of pesticides is bad news because many bees in flight will be hit. Time of application can be important because many foragers will die when sprayed pesticides land on bees directly or is mixed with nectar and bees are foraging on it. Consider working with beekeepers on the spray schedule. Give him/her some options considering the chemical sprayed and the schedules of both the grower and beekeeper. For example, tell the beekeeper a spray is really necessary but you are concerned about his bees. "Should I spray tonight 7:00-9:00 PM, when bee activity is minimal; or do you think it is better to close the colonies tonight and I spray tomorrow morning 7:00-9:00 AM, and then release the bees around noon?2 This type of discussion will often lead to satisfactory comprise for both sides. It does not cause any harm to bees for the colonies to be closed for a few hours. During a very hot day, overheating can be an issue, but can be worked out also, if water is provided abundantly (use soaked burlap to clog the entrance and apply water every two hours in July to September).

Use a less toxic chemical for bees

Use a specific pesticide targeting the pest you want to control is often better for you (less harm to other beneficial insects) and for the beekeeper. Most pesticides are labeled as not toxic, moderately toxic, or highly toxic to honey bees. A list of pesticides of low, moderate and high toxicity, as well as considerations for both growers and beekeepers, can be found online at: http://ohioline.osu.edu/hyg-fact/2000/2161.html

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url: http://cyberbee.msu.edu/column/stinging/bumble.pdf