

servation Service (ASCS) personnel, State Bee Inspectors, or other local officials whose role is usually construed as being more objective in the sampling process.

Protecting Bees From Pesticides

Most major bee poisoning incidents occur when plants are in bloom. However, bees can be affected in other circumstances as well. Keep the following suggestions in mind when applying pesticides.

Use pesticides only when needed: Foraging honey bees, other pollinators, and insect predators are a natural resource and their intrinsic value must be taken into consideration. Vegetable, fruit, and seed crop yields in nearby fields can be adversely affected by reducing the population of pollinating insects and beneficial insect predators. It is always a good idea to check the field to be treated for populations of both harmful and beneficial insects.

Do not apply pesticides while crops are in bloom: Insecticide should be applied only while target plants are in the bud stage or just after the petals have dropped (Figure 2).

CONTROL SPRAYING TO PREVENT BEE LOSSES.

Activity	SPRAY	NO SPRAY	SPRAY
Plant	 bud	 bloom	 petal fall
Attractiveness To Bees	NOT ATTRACTIVE	ATTRACTIVE	NOT ATTRACTIVE

Figure 2: Control spraying to prevent bee losses.

Apply pesticide when bees are not flying: Bees fly when the air temperature is above 55-60°F and are most active from 8 a.m. to 5 p.m. Always check a field for bee activity immediately before application. Pesticides hazardous to honey bees must be applied to blooming plants when bees are not working, preferably in the early evening. Evening application allows time for these chemicals to partially or totally decompose during the night.

Do not contaminate water: Bees require water to cool the hive and feed the brood. Never contaminate standing water with pesticides or drain spray tank contents onto the ground, creating puddles.

Use less toxic compounds: Some pest control situations allow the grower-applicator a choice of compounds to use. Those hazardous to honey bees must state so on the label. Select other materials or vary dosages, based on the honey bee mortality predictor model to be discussed in a later section of this publication. When in doubt, consult your County Agricultural Extension Agent for details, recommendations and further information about the toxicity of specific compounds to honey bees.

Use less toxic formulations: Not all insecticides have the same effects when prepared in different formulations. Research and experience indicate:

- New microencapsulated insecticides are much more toxic to honey bees than any formulation so far developed. Because of their size, these capsules are carried back to the colony and there can remain poisonous for long periods. These insecticides should never be used if there is any chance bees might collect the microcapsules. Always consider using another formulation first.
- Dusts are more hazardous than liquid formulations.
- Emulsifiable concentrates are less hazardous than wettable powders.
- Ultra-low-volume (ULV) formulations are usually more hazardous than other liquid formulations.

Identify attractive blooms: Before treating a field with pesticides, it is a good idea to check for the presence of other blooming plants and weeds which might attract bees. In many instances bees have been killed even though the crop being sprayed was not in bloom. Many times these attractive blooms can be mowed or otherwise removed, although mowing can result in destroying other beneficial insect habitat or force destructive insects into the crop being cultivated.

Notify beekeepers: If beekeepers are notified in advance of application, colonies can be moved or loosely covered with burlap or coarse cloth to confine the bees and yet allow them to cluster outside the hive under the cloth. Repeated sprinkling each hour with water prevents overheating (Figure 3) **Never screen or seal up colonies and do not cover with plastic sheeting.** This can result in overheating leading to bee suffocation and death. Florida law requires every apiary or bee yard to be plainly marked with the owner's name, address and telephone number.

Specific Problems

The following problem areas concerning application of pesticides deserve special attention.