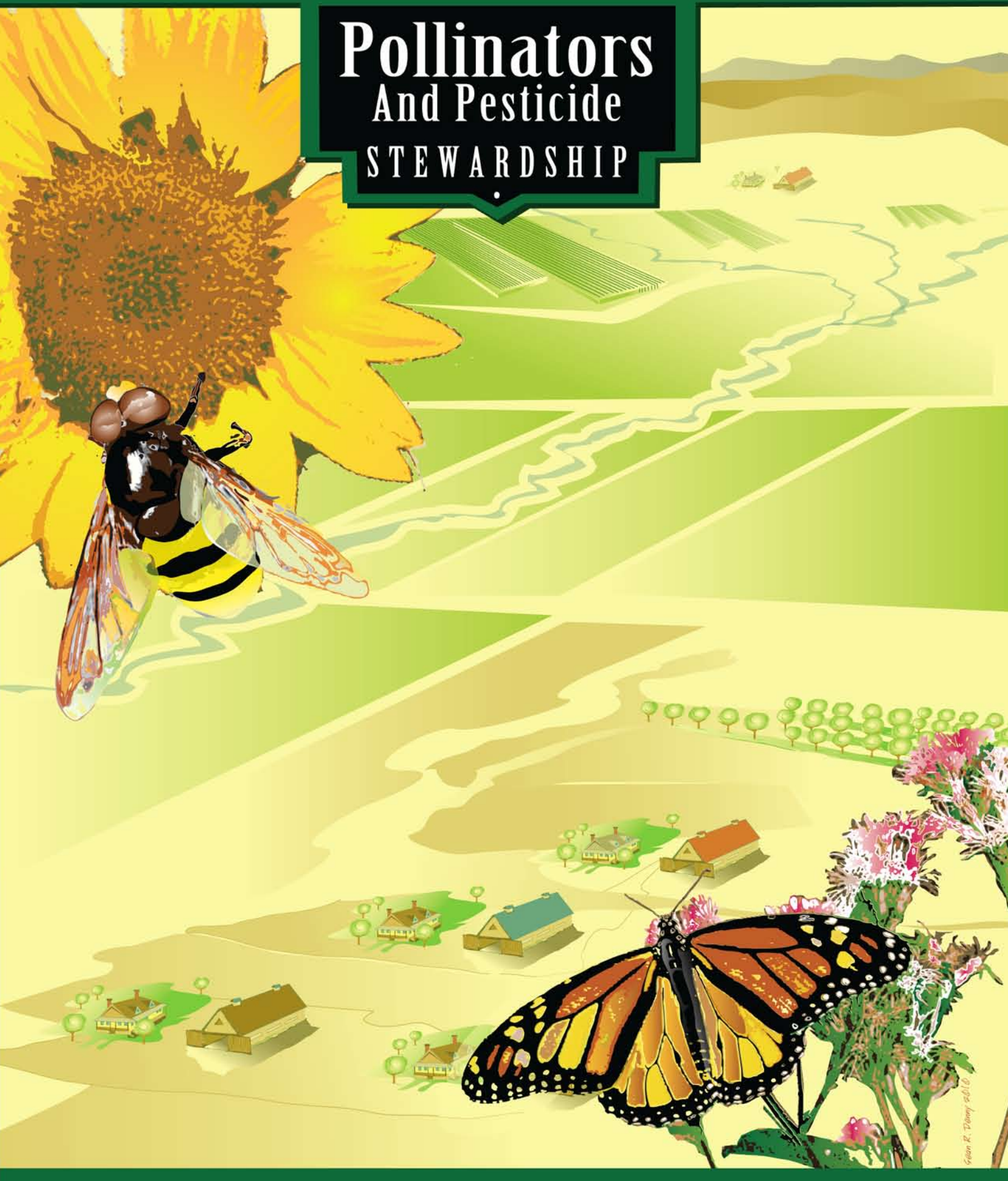
Pollinators And Pesticide STEWARDSHIP



Protecting Pollinators on Farms and Urban Landscapes

Pollinators And Pesticide STEWARDSHIP

Pesticides play an important role in controlling insect, weed, and disease pests on farms and in urban landscapes. The areas treated for pests are often shared by pollinators which are attracted to blooming flowers for pollen and nectar. These pollinators can include not only honey bees but other insects such as other bee species, butterflies, beetles, wasps and flies, and also birds and bats.

Pollinator habitat includes both crop and non-crop areas. Pollinators are attracted to a variety of blooming flowers on crops, trees, shrubs, weeds, and native vegetation, and will visit multiple plant species for nectar and pollen throughout the growing season. In forested and other natural areas, pollinators assist in the production of fruits and seeds that are essential to the diets of wildlife such as small and large mammals and especially migratory birds and game birds. In addition to European or western honey bees, there are more than 4000 bee species and various other pollinators in North America.

Most pesticides can be used safely around honey bees and other insect pollinators when label directions are followed. Some labels require very specific practices and precautions to minimize pollinator exposure. As a general rule, insecticides are more toxic to pollinators than fungicides and herbicides, but not all insecticides are toxic to pollinators. (Any pesticide that is toxic to insect pollinators is referred to in this brochure as a "pollinator-toxic pesticide" or a "PTP").

Proper pesticide use minimizes harm to pollinators and can serve to protect their food sources, water and habitat. Proper pesticide use starts with following the product label. Also, the use of Integrated Pest Management (IPM) and good pesticide stewardship practices wherever pollinators are present will reduce the potential for exposure of pollinators to PTPs.

Read and Follow All Pesticide Label Directions and Precautions

Pesticide label directions are designed to protect wildlife, including bees and other pollinators. Should a pesticide be potentially toxic to honey bees, the product label will list precautions that need to be taken during application. For example, a label may prohibit applications when honey bees are foraging or plants are in bloom.

Determine If the Pesticide May Be Toxic to Pollinators

Most PTPs are insecticides, but not all insecticides are toxic to bees and other pollinators. **READ THE LABEL** carefully to understand the pollinator-relevant precautions and/or restrictions for the specific pesticide.

EPA is now also requiring the addition of a bee advisory box to certain labels:

PROTECTION OF POLLINATORS

APPLICATION RESTRICTIONS EXIST FOR THIS PRODUCT BECAUSE OF RISK TO BEES AND OTHER INSECT POLLINATORS. FOLLOW APPLICATION RESTRICTIONS FOUND IN THE DIRECTIONS FOR USE TO PROTECT POLLINATORS.

Look for the bee hazard icon  in the Directions for Use for each application site for specific use restrictions and instructions to protect bees and other insect pollinators.

This product can kill bees and other insect pollinators.

Bees and other insect pollinators will forage on plants when they flower, shed pollen, or produce nectar.

Bees and other insect pollinators can be exposed to this pesticide from:

- Direct contact during foliar applications, or contact with residues on plant surfaces after foliar applications
- Ingestion of residues in nectar and pollen when the pesticide is applied as a seed treatment, soil, tree injection, as well as foliar applications.

When Using This Product Take Steps To:

- Minimize exposure of this product to bees and other insect pollinators when they are foraging on pollinator attractive plants around the application site.
- Minimize drift of this product on to beehives or to off-site pollinator attractive habitat. Drift of this product onto beehives or off-site to pollinator attractive habitat can result in bee kills.

Information on protecting bees and other insect pollinators may be found at the Pesticide Environmental Stewardship website at:
http://pesticidestewardship.org/PollinatorProtection/Pages/default.aspx.

Pesticide incidents (for example, bee kills) should immediately be reported to the state/tribal lead agency. For contact information for your state, go to: www.aapco.org/officials.html. Pesticide incidents should also be reported to the National Pesticide Information Center at: www.npic.orst.edu or directly to EPA at: beekill@epa.gov

Extensive research has been conducted to prepare the Environmental Hazard section of a label which will indicate if a PTP is moderately or highly toxic to honey bees when the application contacts them directly. The Honey Bee Acute Contact LD_{50} indicates the contact dose that will kill 50% of the exposed bee population in a laboratory test. PTPs are either moderately toxic (LD_{50} greater than 2 micrograms/bee but less than 11 micrograms/bee) or highly toxic (LD_{50} of 2 micrograms/bee or less) to bees in laboratory tests.

In addition to toxicity caused by direct contact, PTPs may or may not have extended residual toxicity to bees and other pollinators. When a PTP has extended residual toxicity, it can not only harm pollinators when the application contacts them directly, **but also** residues on the plants can harm pollinators that visit the treated area later ("visiting"). If a PTP does not have extended residual toxicity, it can harm pollinators exposed to direct treatment only ("actively visiting"). A PTP that does not have extended residual toxicity can often be applied after evening pollinator foraging is complete without harming pollinators that arrive the following day. A PTP with extended residual toxicity can require additional application restrictions. In either case, follow the label directions and precautions carefully.

Environmental conditions can also affect residual toxicity. When low temperatures or heavy dews are forecast for the night following application of PTPs, duration of residual toxicity may increase.

The pesticide registration process considers these and other characteristics of the pesticide prior to approving label directions and precautions that allow the PTP to be used without harming pollinators, and requires additional studies when warranted.

Certain pesticides (for example, some systemic pesticides and insect growth regulators) are now being evaluated for their potential to have sublethal, indirect, or delayed effects on adult honey bees and bee brood, as well as other beneficial insects. Research is also being conducted to determine if certain application methods or formulations can increase the chance of pollinator exposure. The pesticide manufacturer can provide up-to-date product-specific information on stewardship measures that can help protect pollinators. Your pesticide label, supplier or the internet can provide contact information for individual pesticide manufacturers.

Understand Local Pollinator Visitation Habits

Bees and other pollinators are most at risk of being affected when PTPs are applied to crops, weeds or other vegetation that is blooming. The blossom is often the only part of a plant that pollinators will visit, but understand the pollination characteristics of the specific crop before making an application. To avoid exposing pollinators, strictly observe the application ***timing*** on the label relative to the blooming stage of the crop and other plants in the area. In addition, realize that the application ***window*** (period when the timing is right) may be reduced due to factors such as extended crop bloom or unfavorable weather conditions.

Pollinators can forage several miles from their hives. The time and intensity of pollinator visitation to a crop or vegetated area depends on the abundance and attractiveness of the bloom. Agricultural experts can help determine when blooming plants are attractive to pollinators. Evening or nighttime applications are generally the least harmful to honey bees and other pollinators that typically forage during the daytime, but further application restrictions may be indicated on the label when a PTP has extended residual toxicity.

Use an Integrated Pest Management (IPM) Approach

An Integrated Pest Management (IPM) approach considers all suitable practices – chemical, cultural, mechanical, biological, genetic, etc. – for controlling pests. Select the best combination of pest control options that minimizes risks to pollinators. Basic steps of IPM include:

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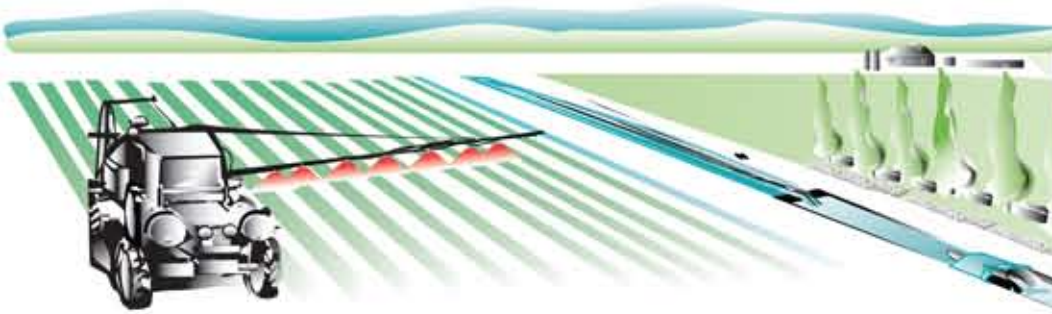


- Use cultural practices that discourage pests from using a crop or landscape as habitat.
- Carefully diagnose your pest problem.
- Monitor and assess pest populations to determine if levels warrant pesticide treatment.
- Determine your best combination of pest control options.
- Use the recommended pesticide at the lowest appropriate labeled rate with the proper timing and placement. Do not use amounts below the labeled rate because this could result in loss of control and development of pest resistance.

Always Follow Good Pesticide Stewardship Practices

Honey bees provide important pollination to millions of acres of fruits, nuts and vegetables across North America. All pesticide users must take precautions that minimize risks to both honey bees and native pollinators. Stewardship must be practiced throughout the life cycle of every pesticide, from storage to application to disposal. Good stewardship will provide benefits that extend far beyond protecting pollinators and their habitat.

Minimize Spray Drift

Specific Label Information Takes Precedence

- Establish appropriate buffers (no-spray zones) between treated areas and pollinator habitat or hives.
- Check the weather forecast before application and be mindful of changing weather conditions during application. Preferred conditions for application of pesticides include:
  - Wind Speed 3 to <10 mph (5 to <16 km/hr), no gusty conditions, and do not apply during periods of dead calm.
  - Wind Direction - away from adjoining crops or sensitive areas, including hives.
  - Temperature - below 90° F (32° C).
  - Humidity - above 50% RH.
- Do not spray when wind is blowing toward pollinator habitat or areas where beehives are located.
- Calibrate the sprayer often, checking individual nozzle output and pattern.
- Always shut off the sprayer when making turns at the end of fields or gardens.
- Shut off the sprayer near ponds, irrigation ditches and other sources of water that may be used by pollinators. Pesticide labels typically prohibit applications in close proximity to surface water.
- Shut off sprayer or individual nozzles where it is not necessary to spray, such as gaps in the crop or shrubbery.
- Consider sprayer technologies that reduce drift, such as hooded, tower, wrap-around, tunnel and target-sensing sprayers.
- Choose low pressure or low-drift nozzles that reduce drift by producing a medium to coarse droplet size spectrum and minimizing the fine droplets less than 150 microns, which tend to drift further.

Minimize Vapor Drift

Specific Label Information Takes Precedence

Vapor drift can occur after applications of certain pesticides, particularly those formulated as emulsifiable concentrates (ECs).

- Spray during cool temperatures to minimize vaporizing action of the product.
- Soil-incorporate volatile products soon after application.
- Minimize vaporization during applications by using a relatively coarse spray.

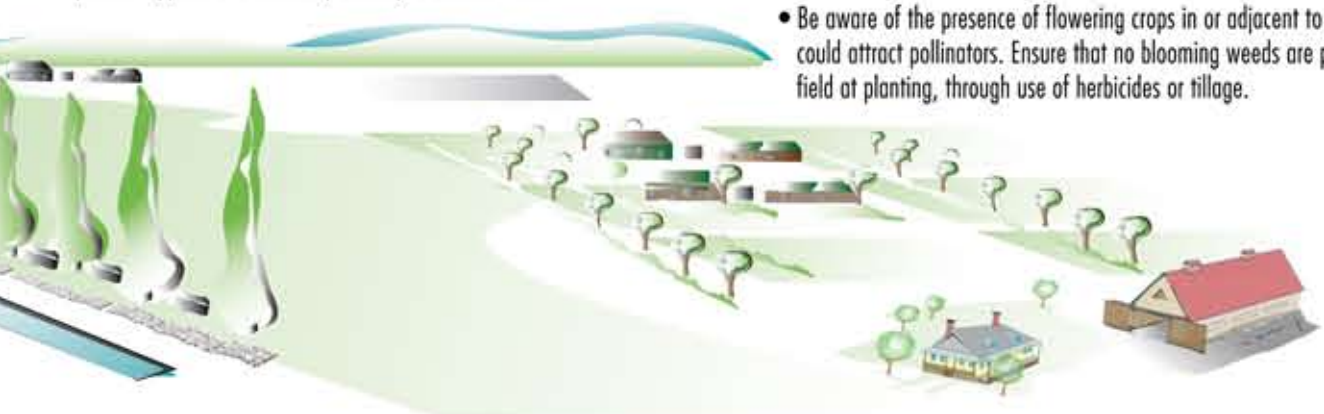
PTP Pollinator Toxic Pesticide

Minimize Off-Site Drift of Seed Treatment Materials

Specific Label Information Takes Precedence

ASTA Seed Treatment Stewardship Guide (www.seed-treatment-guide.com)

- Always use high quality seed free from excessive dust.
- For seed types which require that pesticides be coated onto the seed, always use an appropriate coating system that keeps abrasion of coated pesticide to a minimum.
- Follow planter manufacturer recommendations for use of talc, graphite or other flow agent. Avoid excess use to minimize dust.
- Consider using the Bayer Fluency Agent, a new seed lubricant for corn and soybeans to be used in place of talc, graphite, and talc/graphite-blended seed lubricants. Fluency Agent helps reduce the amount of total dust and further minimizes the amount of active ingredient potentially released in treated seed dust during planting, thus decreasing the potential risk of exposure to foraging honey bees and other pollinators.
- Avoid releasing dust from seed treatments into the air. When opening seed containers and during filling, emptying, or cleaning of the planting equipment, avoid dust movement that could cause exposure.
- Avoid off-site movement of dust from treated seeds during planting. Be aware of wind speed and direction.
- To protect birds and mammals, treated seeds must be incorporated into the soil at proper planting depth, in particular at row ends and field corners.
- Be aware of the presence of flowering crops in or adjacent to the field which could attract pollinators. Ensure that no blooming weeds are present in the field at planting, through use of herbicides or tillage.



Cooperate and Communicate with Others Who are Concerned About Preserving Beneficial Insects, Including Pollinators

Cooperation and communication among growers, applicators, beekeepers, crop advisors and local officials greatly increase the likelihood of success in protecting pollinators, their hives and habitats from PTPs.

Grower and Commercial Beekeeper Cooperation

Cooperation between the grower and beekeeper is essential. Specifically, growers and beekeepers should work together to:

- Review the cropping system and pest management practices in the area before the honey bee hives are delivered.
- Develop a written agreement outlining the crop timing, period for using the hives and important considerations.
- Clearly define responsibilities for providing supplemental water and food sources and for protecting the hives.
- Place hives away from areas that may be exposed to PTPs during the pollination period.
- Protect water sources from contamination by pesticides.
- Inform neighboring growers and custom applicators operating in the area where hives are located so precautions can be taken when treating nearby fields.
- If possible, remove hives if PTPs will be applied in the immediate vicinity.
- If PTP applications near honey bee hives are unavoidable, shield hives with wet burlap to confine and protect the bees, but ensure that bees are kept cool at all times.
- Post the beekeeper's name and contact information near the hives.

Grower and Aerial Applicator Cooperation

Growers and the aerial applicators they hire must cooperate when aerial applications are made in areas where honey bee hives are located. Specifically, growers and applicators should work together to:

- Accurately identify the proper site for application. Use GPS coordinates if the applicator has this capability. Review a sketch of the field and surrounding areas.
- Accurately identify and confirm the location of hives near the treatment site or on neighboring fields.
- Check to ensure weather conditions are appropriate for aerial applications by reviewing the 1 to 6 hour forecast prior to initiating treatments.
- Never make treatments when application conditions are marginal. Doing so can be illegal and can jeopardize the applicator's licenses as well as the industry standard for stewardship.
- Make sure aerial applications are done properly, avoiding direct overspray of beehives or off-site movement toward beehives and other sensitive sites.
- Mount the spray boom on the aircraft so as to minimize drift caused by wing tip vortices. The minimum practical boom length should be used and must not exceed 75% of the wing span or rotor diameter.
- Release spray at the lowest possible height consistent with pest control and flight safety. Applications more than 10 feet above the crop canopy should be avoided.

PTP
Pollinator
Toxic
Pesticide

Know the Common Symptoms of Honey Bee Exposure to Pesticides and What Other Stressors Impact Bee Health

Common symptoms of honey bee exposure to pesticides are:

- Excessive numbers of dead bees in front of hives.
- Lack of the usual numbers of foraging bees (if not weather-related).
- Bees in front of hives that appear disoriented and are unable to fly.

Healthy hives may experience daily die-off up to approximately 100 dead bees per day per hive. Higher numbers may be a sign of pesticide exposure, but can also be caused by other stressors such as colony starvation and nutritional deficiency, excessive cooling or heating of the colony and brood, as well as parasites and pathogens.

Check for Specific Local Ordinances Pertaining to Pollinators, Especially Beehive Locations or Designated Preserves (if Applicable)

In many farming areas, provincial, state or county departments of agriculture can provide information about pollinator protection. Some regions require that commercial honey bee hive operations register the location where hives are being kept. Review all appropriate product-specific restrictions and recommendations for pollinator-toxic pesticides.

Sources

Pollinator experts, pesticide product labels and other sources including:

Protecting Honey Bees From Pesticides; Alabama Cooperative Extension
http://www.aces.edu/pubs/docs/A/ANR-1088/#

Protecting Honey Bees From Pesticides;
http://edis.ifas.ufl.edu/AA145

This publication can be viewed or downloaded at the following websites:
http://www.curesworks.org/home.asp
http://www.bayercropscience.us/our-commitment/bee-health
http://www.syngentacropprotection.com/Env_Stewardship/
http://www.pesticidestewardship.org/Pages/default.aspx

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Pollinator Protection Checklist

Most pesticides are not toxic to honey bees and other insect pollinators. As a general rule, insecticides are more toxic to pollinators than fungicides and herbicides, but not all insecticides are toxic to pollinators. Any pesticide that is toxic to insect pollinators is referred to in this brochure as a "pollinator-toxic pesticide" or a "PTP". Please follow these guidelines before treating an area with pesticides when pollinators are present:

1. Read and follow all pesticide label directions and precautions.
2. Determine if the pesticide may be toxic to pollinators.
3. Understand local pollinator visitation habits.
4. Use an Integrated Pest Management (IPM) approach.
5. Always follow good pesticide stewardship practices.
6. Cooperate and communicate with others who are concerned about preserving beneficial insects, including pollinators.
7. Know the common symptoms of honey bee exposure to pesticides and what other stressors impact bee health.
8. Check for specific local ordinances pertaining to pollinators, especially beehive locations or designated preserves (if applicable), and notification requirements if PTPs are planned to be applied in close vicinity to hives or active pollinator activity.

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