



State of Delaware

Managed Pollinator Protection Plan

Delaware Department of Agriculture

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Introduction

In recent years there has been an increased concern over the health of managed and wild pollinators. This concern is widespread and is not just an issue in the United States; it has become a global issue. Managed pollinators face many stresses which can cause a decline in overall colony health. Some of these factors include; parasites, mites and diseases, new or more virulent pathogens, lack of genetic diversity, poor nutrition due to use in monocultures, stress in adult bees caused by transportation and overcrowding, and exposure to pesticides both from use in the hives and from exposure during foraging. When these variables are combined in the hive it can lead to overall colony collapse.

Pollinator health is a key component of U.S agriculture. Delaware is no exception to this. Over 90 crops in the U.S., including almonds, tree fruits, cotton, berries, and many vegetables, are dependent on insect pollinators, such as the honey bee, for reproduction (USDA 2013). Bee-pollinated crops account for 15 to 30 percent of the food we eat (USDA 2013). Other crops may not be completely dependent on managed pollinators, but benefit from bee pollination. Delaware growers produce several crops which require insect pollination. These crops include watermelons, cucumbers, strawberries, cantaloupes, apples, blueberries, cranberries, squash, pumpkins and brambles. Watermelons make up the largest segment of these crops. In 2014, a total of 2600 acres of watermelons were planted in Delaware. The full list of acreage can be found in the attached spreadsheet provided by the Delaware Agricultural Statistics Service. The production of watermelons and cucumbers requires between 2500-3000 bee colonies to be brought into the state to maximize pollination of these crops. In addition to the colonies brought in for production, Delaware has approximately 173 registered beekeepers who manage 1500 resident hives in Delaware.

Delaware's Pollinator Protection Plan

This plan was developed using several state plans for guidance including the North Dakota Department of Agriculture plan and Maine Department of Agriculture, Conservation and Forestry plan. Stakeholder meetings were also held throughout the state, attended by more than 1,000 stakeholders. The Department received eight (8) written comments on the draft plan. Many of the comments covered similar ideas or concerns. The draft version was changed to reflect some of these comments. The framework of the current document is meant to serve as a **Best Management Practice (BMP)** guide for the different stakeholder groups and foster better communication between all of these groups. By providing education and improved communication between the stakeholders, it is hoped that the Delaware Pollinator Protection Plan will increase awareness of the issues faced by all groups involved in the production of agricultural commodities, thus strengthening these relationships.

Challenges Faced by Beekeepers

Beekeepers face a challenging task of keeping colonies alive with the threat of Colony Collapse Disorder, Varroa mites, Tracheal mites, small hive beetles, bacterial, fungal and viral diseases, declining quality forage, and pesticide exposure. Nationally, year to year colony survival is variable with some beekeepers reporting losses as high as 30%.

While growers and pesticide users cannot help beekeepers manage threats from mites, beetles and the microbes that weaken their hives, they can help with reducing their exposure to pesticides and improving the quality of forage available. Even though Varroa is considered the greatest threat to honey bee colonies, a strong colony can handle the pressures of this tiny creature better than one exposed to various pesticides and poor forage.

Honey bees feed on pollen for their protein source, and utilize nectar for carbohydrates. They must obtain these nutrients from a variety of plants in order to obtain all the essential amino acids and nutrients required to build and maintain a strong hive. Bees can become easy targets for pests, predators and pathogens when they do not obtain the proper balance of nutrients. Bees provided with high quality forage are better able to handle stressors from all directions including pesticides.

Honey bees are commonly exposed to pesticides either intended for use in agricultural production or in an attempt to rid them of the Varroa mite. Agriculturally applied pesticides can impact bees from either direct contact or by contaminated forage. Beekeepers worry not only about immediate lethal effects from exposure but also the more subtle sub-lethal impacts such as increased brood mortality and reduced adult longevity.

Challenges Faced by Growers

Growers face many challenges in an attempt to obtain acceptable yields. Growers contend with insect pests, diseases, weeds, drought, overland flooding and other factors that impact crop production and quality. They have a variety of pest management tools and strategies to choose from. They also must consider the timing of pesticide applications with respect to harvest and rotational intervals. Even with integrated pest management systems, pests often are able to adapt quickly to different methods, rotations, or pesticides, or reproduce so quickly that they seem to explode within a short amount of time. Because of the nature of such pests, making timely chemical applications as part of an IPM plan are often essential to manage pests effectively.

Growers face difficult decisions when managing pests and minimizing impact to pollinators. Growers in Delaware also face the challenge of agricultural lands intertwined with residential landscapes. These residential areas can contain sensitive plants and bee colonies kept by homeowners. This underscores the need for growers to be aware of their surroundings when planning crops and pesticide applications.

Challenges Faced by Pesticide Users

There are over 10,000 registered pesticides in Delaware that are used to manage agricultural and non-agricultural pests. In many cases, pesticide applicators have a limited time frame to make an application. Factors such as pest infestation levels, temperature, precipitation, wind speed, water levels, use buffers and pollinator presence all affect pesticide choices and decisions on when, where, and how to apply pesticides. Applicators also must pay attention to the location of sensitive sites adjacent to treatment areas, such as surface water, endangered species, organic fields, vineyards and beehives. The ideal time to apply many of these chemicals is likely to coincide with when the pollinators are most active, putting pesticide applicators in a difficult position of balancing pest management needs and protecting pollinators.

Best Management Practices

The Pollinator Plan contains **voluntary Best Management Practices (BMPs)** for pesticide users, landowners/growers, and beekeepers in hopes of creating the following positive outcomes:

- Ensuring positive relationships and peaceful co-existence among beekeepers, landowners, and pesticide applicators;
- Reducing pesticide exposure and subsequent risk of pesticides to pollinators;
- Ensuring both a robust apiary industry and agriculture economy; and
- Continued high compliance with state pesticide and apiary requirements.

Best Management Practices for Beekeepers

Work with landowners to choose hive locations. Ideal hive locations will have minimal impact on agricultural activities but will still have adequate access to forage and water. Avoid low spots to minimize impacts from drift or temperature inversions on hives. Give consideration to timing after rain events when determining which roads to travel. Discuss with landowners preferred roads/trails to use. Beekeepers should also request contact information for applicators, producers/growers, and neighbors (if applicable).

Be aware of neighbors when placing and moving hives. Neighboring landowners often use the same roads and trails. Do not block these right-of-ways or place hives so close they may cause problems for other land-users. Take appropriate steps to ensure that bees do not negatively affect operations of neighboring landowners, such as considering proximity of hives to neighbor's yard, bins, equipment, or storage sites. This planning process may reduce accidental or purposeful damage to hives placed in areas which cause a hardship for neighbors.

Work constructively with applicators when notified of upcoming pesticide applications. One of the recommended BMPs for pesticide applicators is to contact nearby beekeepers prior to making pesticide applications. Block, move, or net hives when applicators inform you they are going to apply pesticides, or find other strategies to allow pesticide applicators to manage pests while minimizing pesticide exposure to bees.

Notify landowners and applicators when arriving and when moving hives. If possible, notify nearby pesticide applicators and landowners when you place or move beehives. This will ensure they are aware of current hive locations and can notify you before making pesticide applications. Contact information for nearby pesticide applicators can usually be obtained from landowners.

Obtain landowner permission for hive placement every year and keep in contact. Producer/grower information may change year to year. It is important that everyone involved with the land usage is aware of the bee activity and also that the bees are not placed without permission or in an area that will have a negative impact on field production.

Report all suspected pesticide-related bee kills to the DDA pesticide program immediately. The DDA is the lead pesticide regulatory agency in the state. DDA will respond to complaints, including the collection of dead bee and site swab samples. These are then analyzed for pesticide residues. Some pesticides degrade rapidly, and timely reporting will aid the pesticide investigation. Beekeepers can report suspected pesticide incidents by calling 302-698-4500 and asking to speak to a representative from the pesticide section.

Use registered pesticides according to the label. When pesticide use is necessary to manage pests within hives, use registered pesticides and comply with all restrictions, precautions, and directions found on the pesticide label. Failure to comply with the label directions may decrease the effectiveness of pesticides, increase the risk of adverse effects to bees, cause unsafe pesticide residues in honey and other products, and potentially lead to pesticide resistance. Contact the DDA pesticide section with any questions on pesticide labeling or to determine whether a pesticide is registered in the state. Products can also be checked for registration by visiting de.gov/pesticides.

Comply with all requirements of the Delaware beekeeping law.

§ 7504 Registration of bees with State Apiarist.

All persons keeping bees in this State shall notify the State Apiarist in writing within 10 days of the time the bees are acquired, of the number and location of colonies they own, or rent, or which they keep for anyone else, whether the bees are located on their own or someone else's property. All persons keeping bees in the State shall annually register any and all of their colonies and apiary locations with the Department on forms supplied by the Department on or before January 30th of each year.

Ensure hives are easily visible to applicators. Hives that are visible allow applicators to locate them before spraying. Painting hives white, or any other color that stands out from the surrounding area, is one way to make the hives visible.

DriftWatch Specialty Crop Site Registry. This website allows beekeepers to register their hive locations. This site also has new **BeeCheck** specialized portal for beekeepers. This site now offers **flags** that may be used to increase the visibility of the hives. Information about this site and flags can be found at www.fieldwatch.com.

Best Management Practices for Landowners/Producers/Growers

Work with beekeepers to choose hive locations. Ideal locations for hives will have minimal impact on farming operations, but will still allow bees to access forage and water. Communicate with beekeepers as to which roads/trails can be problematic when wet and any preferred traffic routes. Landowners may also want to provide contact information for applicators, producer/grower, and neighbors (if applicable).

Communicate with producers leasing land about pollinators. Renting land for agricultural production is a common practice. Landowners and producer/growers should discuss bee issues, such as who has authority to allow bees, how long they will be allowed, and hive placement. Rental contracts should include details on any paid pollinator services associated with the land to be rented.

Determine who will contact beekeepers and neighbors. When contracting with commercial pesticide applicators, make sure that there is a clear understanding of who has the responsibility to identify hive locations and communicate with beekeepers. Applicators may do this as part of their standard procedures, but some landowners/producers may prefer to contact beekeepers themselves. Clearly identifying who will contact beekeepers prior to any pesticide applications will remove confusion.

Communicate with technical advice givers (agronomists, horticulturalists, private consultants, etc.) about considering pollinator impacts when making pesticide recommendations.

Landowner/producers/growers should ensure that all listed above consider pollinator issues when making pesticide recommendations, including product choices and pesticide timing.

Consider planting bee forage. Planting flowering plants, trees and shrubs improves bee forage, especially in non-farmable or non-crop areas. Doing so provides forage and it may also concentrate bees away from fields to be treated with pesticides, thereby minimizing impacts to pollinators. Please refer to the plant guides list on the Delaware Department of Agriculture Managed Pollinator Protection page, which can be found at de.gov/pollinatorplan. Many pesticide labels require untreated vegetative buffer strips around sensitive sites. Planting flowering plants in those buffer strips could provide additional bee forage. If planting **cover crops**, add flowering plants into the mix. Even a small percentage of flowering plants can provide a considerable amount of forage for pollinators.

Best Management Practices for Pesticide Users – anyone who is applying pesticides for the purpose of controlling a pest (insects, diseases, weeds) on their property or the property of others.

Use Integrated Pest Management (IPM). IPM involves proper pest identification, sampling, the use of economic thresholds, pest prediction using weather models and integrated practices (such as tillage, using resistant varieties, and using native biological control agents) to determine if insecticides/fungicides/herbicides are required to manage pests. When pesticides are required, try to choose materials with low toxicity to bees, short residual toxicity, or repellent properties towards bees.

Use caution around flowering plants. Pesticide applicators should pay special attention when making applications on or near plants that are or will soon flower. Follow all pesticide labels for pollinator protection requirements and application restrictions.

- Some insecticides have use restrictions prohibiting applications when bees are foraging in the treatment area. Some labels prohibit applications when crops/weeds are blooming and require that the applicator notify beekeepers in the area prior to application. Prior to application or purchase, check the product label for any changes that may prohibit the use of the pesticide in the manner in which you intend to apply it.
- While not always possible, try to avoid applying insecticides which are acutely toxic during bloom, especially if the pesticide label prohibits it. Many crops require certain pesticide applications during bloom; ensure that all pesticides in the tank mix are labeled for these types of applications. Example: If you have to spray a fungicide which is labeled to control a particular disease that attacks during bloom, do not tank mix with a product that is acutely toxic to bees.
- Identify weeds which are attractive to bees; note when they bloom. While weeds are normally not allowed to reach bloom in most field situations, some weather conditions may prohibit normal farming practices to occur allowing weed species to bloom. Bee health should be considered when control methods are used on these weeds.
- When possible, mow flowering weeds prior to application so that bees will not be foraging on them during application.

Pesticide label language is developed to ensure that pesticides will not pose a risk of unreasonable adverse effects to human health or the environment. Failure to comply with the label not only puts humans and the environment at risk, it is also illegal. Applicators are bound by all directions precautions, and restrictions on pesticide labeling, even when following other BMPs. Contact the DDA pesticide section with any questions on pesticide label language.

When possible, apply pesticides in the early morning or in the evening when bees are not apt to be foraging in the crop. Pollinators are most active during daylight hours and when the temperature is over 55 degrees Fahrenheit. Apply pesticides early in the morning or preferably in the evening when bees are less active to reduce the chances that bees will be foraging in or near the treatment site. This will reduce direct contact, but also be aware of possible toxic residues when planning the timing of certain applications.

- Be cognizant of temperature restrictions on pesticides. The efficacy of some pesticides is reduced at certain temperatures. This is important because while it is a good thing to try to spray early or late in the day,

this might also be the coolest or hottest part of the day. These temperature lows and highs could be referenced under the use precautions.

- Be aware of temperature inversions when choosing the best time for applications.
- Applying pesticides in the early evening allows them to decompose during the night. Unusually low temperatures can increase the time that toxic residual remains on the crop.

Avoid drift. Pesticide drift involves the off-site movement of pesticides through the air from the treatment site to adjacent areas, either in the form of mist, particles or vapor. Drift reduces the effectiveness of the chemical applied, since only part of the applied amount reaches the target. Drifting chemicals also pose a risk to non-target organisms that come in contact with the off-target residues. Drifting insecticides can negatively affect bees and other beneficial insects by direct contact or by contaminating forage and habitat. Drifting herbicides have the potential to further reduce quality forage available to pollinators.

When possible, identify and notify beekeepers in the area prior to pesticide applications. Bees will fly several miles to find quality forage. Therefore, it would be ideal to identify and notify beekeepers within two miles of a site to be treated. Timely notification will help ensure ample time for the beekeeper and applicator to develop a mutually acceptable strategy to manage pests while mitigating risk to pollinators. This may include covering hives, moving hives, or choosing the time of day to apply. ***Notifying beekeepers does not exempt applicators from complying with pesticide label restrictions. Many insecticide labels prohibit use if pollinators (bees) are present in the treatment area.***

The Delaware Department of Agriculture is a member of the DriftWatch Specialty Crop Site Registry presented by FieldWatch, www.fieldwatch.com. This site may be used to register and identify bee yards and other pesticide sensitive sites.

Supporting Pollinator Forage and Habitat

Bee Forage. Everyone can plant forage for bees. Plants that support pollinators are also beneficial for other wildlife, are often visually attractive, and can help improve soil health. Flowers often come to mind when thinking about bees, but bees also utilize trees, shrubs, and other less-noticeable plants for pollen and nectar sources. It is important to consider diversity when choosing plants to ensure adequate forage for the entire growing season. Diversity will also ensure pollinators have access to all of the nutrients they require to be healthy. Easy, efficient ways to improve pollinator forage include:

- Plant trees, shrubs and flowers that provide good forage for all types of pollinators. Diversity is important. The pollen and nectar of each species carries a different nutrient load for the pollinators. Diversity can be worked into new plantings. Every time a plant is added and/or replaced, choose a variety that will contribute to pollinator forage. Foraging honey bees are typically not aggressive.
- Create bee forage along secondary roads. Secondary road ditches often contain several species of plants that provide forage for pollinators. It is a common practice to mow ditches for the safety of motorists and to prevent drifting snow. Consider spot spraying noxious weeds and mowing ditches later in the year to ensure that bee forage is available. Incorporate short forbs into secondary road ditches to minimize attracting large wildlife. A forb (sometimes spelled phorb) is an herbaceous flowering plant that is not a grass, sedge or rush.
- Put out flower pots, create flowerbeds, plant trees or shrubs, or establish gardens to provide forage. Create habitat for beneficial, wild pollinators. Roughly 70 percent of native bees nest in the ground. They burrow into areas of well drained, bare, or partially vegetated soil. Other bees nest in abandoned beetle houses

or in soft centered hollow twigs and plant stems. Bees will also utilize dead trees and branches. Habitats can be created by leaving dead trees and brush piles as nesting habitat. Consider the type of habitat you wish to create and pollinators you want to attract.

- When mowing is necessary to maintain large open spaces, try to limit frequency of the mowing. Also mowing after bloom or during times of less bee activity can help reduce the number of bees lost to the mowing process.

Quarterly Pest Control Applications

Quarterly pest services. When hiring pest control companies to perform pest control around businesses, homes and outbuildings, make sure the company performing the work is licensed with the DDA and holds the proper categories on their license. When treating around structures, the licensed company should have category 7A (General Pest); if the company is venturing out into the yard to control pests in the turf, they need category 03 (Ornamental & Turf). Always ask to view a copy of the label of the product being used. There are restrictions on labels which must be followed during the application. When pollinators are present or when habitats which may have pollinators exist, many labels restrict the use of the pesticide in these areas.

Integrated pest management (IPM). Homeowners and Pest Control Professionals (PCOs) should consider basic IPM strategies when confronting a pest situation. The use of a pesticide is not always needed to control insect infestations, weed problems, and plant diseases. Sometimes simple changes in environmental conditions can aid in the elimination of a pest. This includes removing potential food sources, removing shelter, and sealing off or limiting entry of a pest into the area. So, for example, dumping out containers holding stagnant water eliminates a potential breeding site for mosquitoes. Removing food sources such as outdoor pet food bowls can discourage ant infestation. And mowing grass at a higher setting can choke out weed species. There are many other examples of environmental changes that can be made to eliminate a pest, thus reducing the need to spray pesticides. More information about IPM around the home can be found at [HTTP://npic.orst.edu/pest/ipm.html](http://npic.orst.edu/pest/ipm.html).

Mosquito Control

- The Department of Natural Resources and Environmental Control's Mosquito Control Section (MCS) has implemented tools to assist beekeepers and the public to stay informed on their mosquito control activities. One such tool is the Spray Zone Notification System (SZNS) which can be accessed at: <http://www.dnrec.delaware.gov/fw/mosquito/Pages/MC-Spray-Info.aspx>. This system allows users to receive information on when and where mosquito control activities will be conducted.
- Adult Mosquito Control and Domestic Honeybees – Standard Operating Procedures (*a two page document*) -- now also posted at <http://www.dnrec.delaware.gov/fw/mosquito/Pages/MC-Spray-Info.aspx> (and then click the SOP link).
- Adult Mosquito Control and Domestic Honeybees – Background and Rationale for SOPs (*a ten page document*) – now also posted at <http://www.dnrec.delaware.gov/fw/mosquito/Pages/MC-Spray-Info.aspx> (and then click the Background/Rationale link).
- For more information, the Mosquito Control Section website can be found at <http://www.dnrec.delaware.gov/fw/mosquito>. The Mosquito Control Hotline number is 1-800-338-8181.

Delaware Managed Pollinator Protection Plan Future Considerations

- The Delaware Managed Pollinator Protection Plan is considered a working document. The Delaware Department of Agriculture plans to periodically update this document to reflect current working conditions and regulatory requirements. These changes will be done through the use of a committee appointed by the Secretary of Agriculture, and to include representatives of the pesticide industry, beekeepers, public health and specialty crop growers.
- In conjunction with the Managed Pollinator Protection Plan the Department of Agriculture is working on a Specialty Crop Block Grant (SCBG) project titled “Promoting the Health and Safety of Bees for Delaware’s Specialty Crop Growers and Honey Producers.”
- This 3-year project aims to engage specialty crop growers and beekeepers in the development and implementation of the pollinator protection plan, to reduce bees’ risk of pesticide exposure. We also plan to develop and model best management practices for improving the availability and quality of bee forage, which are key to improving honey and native bees’ nutrition. Both efforts combined will improve the health and vitality of bees, which will in turn enhance specialty crop pollination and allow for increased production of honey.
- The SCBG will also be used to create demonstration and education sites where the public can learn about the types of forage and land management practices that favor honey and native bees and promote honey production. These sites will be specific to Delaware’s physiographic regions, namely Piedmont: UD Apiary and bee forage, Meadows Tract, Delaware Forest Service; Transition area – Kent County, TBD and Coastal zone, TBD. Update: Since the draft of the plan the Meadows Tract already had demonstration hives placed (July 2016).