STATE OF DELAWARE

MANAGED POLLINATOR PROTECTION PLAN

DRAFT

January 2016

PREPARED BY

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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; known 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 they do 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 270 registered beekeepers who manage between 2000-3000 resident hives in Delaware.

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DELAWARE'S POLLINATOR PROTECTION PLAN

This plan was developed using several state layouts including the North Dakota Department of Agriculture's plan and the Maine Department of Agriculture, Conservation and Forestry plan. Future versions of the plan will take into account input from various stakeholder meetings. The Delaware Department of Agriculture (DDA) is currently planning these stakeholder meetings. 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 to the issues faced by all groups involved in the production 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%.

Growers and pesticide users cannot help beekeepers manage threats from mites, beetles and the microbes that weaken their hives. They can however, 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 that weaken the hive.

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 direct contact with the insect or by contaminating 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.

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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. While growers do not have to try to kill a mite on an insect, they often need to eliminate pests and competing plants without impacting yields. 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, of 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.

Beekeepers can have difficulty finding land that will not be exposed to pesticides. 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 may even contain bee colonies kept by homeowners. This increases the need for growers and bee keepers to be aware of the surroundings when planning crops or placing hives.

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 presence of pollinators 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 sites, 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.

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BEEKEEPER BMPS

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, renters, and neighbors (if applicable).

Be cognizant of neighboring landowners 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.

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. Landowner 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.

Report all suspected pesticide-related bee kills to the DDA pesticide program immediately. Inspect bee behavior regularly. The DDA is the lead pesticide regulatory agency in the state. The DDA will respond to complaints, including collecting and analyzing the location 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 ask 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 must be visible so applicators can locate them before spraying. It is strongly suggested that hives are painted white, or a color that stands out from the surrounding area. DDA uses the Driftwatch Specialty Crop Site Registry website to help beekeepers register their hive locations. 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.

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LANDOWNER/GROWER BMPS

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 which roads/trails can be problematic when wet and any preferred traffic routes. Landowners may also want to provide contact information for applicators, renters, and neighbors (if applicable).

Communicate with renters about bee issues. Renting land for agricultural production is a common practice. Landowners and renters should discuss bee issues, such as who has authority to allow bees, how long they will be allowed, and hive placement. These issues should be addressed and included when rental agreements are negotiated.

Communicate with pesticide applicators whose responsibility it is to look for hives, notify neighbors, etc. 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 may prefer to make beekeeper contacts themselves.

Agronomists should consider pollinator impacts when making pesticide recommendations. Ensure that agronomists and crop consultants consider pollinator issues when making pesticide recommendations, including product choices and pesticide timing decisions.

Plant bee forage. Plant flowering plants, trees and shrubs to improve 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.

• Many pesticide labels require untreated vegetative buffer strips around sensitive sites. Plant flowering plants in those buffer strips to 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.

Utilize alternatives to talc/graphite in planters. When planting seeds treated with insecticides, utilize alternatives to talc/graphite as they become available. The talc and graphite can abrade the insecticide treatment off of the seeds, thereby creating insecticide containing dust that can drift onto hives and flowering plants.

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PESTICIDE USER BMPS

Use Integrated Pest Management (IPM). Utilize economic thresholds and integrated pest management (IPM) to determine if insecticides are required to manage pests. When insecticides are required, try to choose insecticides 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.

• Many pesticides, especially insecticides, have use restrictions prohibiting applications when bees are foraging in the treatment area. Some labels prohibit applications when crops are blooming and require that the applicator notify beekeepers in the area prior to application. Check with the University of Delaware Cooperative Extension at least annually for up to date product recommendations.

• Avoid applying any pesticides, including fungicides, during bloom.

• Identify weeds which are attractive to bees; note when they bloom.

• Check fields for bee activity prior to making applications.

• When possible mow flowering weeds prior to application so that bees will not be foraging on them during application.

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Use registered pesticides according to label. 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 early morning or in the evening. 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.

• Be cognizant of temperature restrictions on pesticides. The efficacy of some pesticides is reduced at certain temperatures.

• 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. These insecticides can negatively affect bees and other beneficial insects by direct contact or by contaminating their forage and habitat. Drifting herbicides have the potential to further reduce quality forage available to pollinators. Contact the University of Delaware Extension Service for more information on how to reduce pesticide drift.

Identify and notify beekeepers in the area prior to pesticide applications. Bees will fly several miles to find quality forage. Therefore, pesticide applicators should 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 honey bees. 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 DDA 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.

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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.

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

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 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. Examples of this include: removal of food sources, i.e. dog food left out for ants to infest, dumping of stagnant water sources which mosquitoes lay eggs in, mowing grass at a higher setting, this chokes out weed species. There are many other instances of environmental change that can be made to eliminate a pest, thus reducing the need to spray pesticides which may adversely affect pollinators around the home. More information about IPM around the home can be found at http://npic.orst.edu/pest/ipm.html.

MOSQUITO CONTROL

• Delaware 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 2-pg document) -- now also posted at www.dnrec.delaware.gov/fw/mosquito/Documents/MC-Honeybees-SOP.pdf.

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• Adult Mosquito Control and Domestic Honeybees – Background and Rationale for SOPs (a 10-pg document) – now also posted at www.dnrec.delaware.gov/fw/mosquito/Documents/MC-Honeybees-Rationale.pdf.

• If Internet access is limited, 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) titled "Promoting the Health and Safety of Bees for Delaware's Specialty Crop Growers and Honey Producers."

This three-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.

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WE NEED YOUR FEEDBACK | Comments and feedback on this plan are welcome. Please write comments below, or in a separate letter or message, and submit them by one of the methods below. **Comments are due March 15, 2016.**

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Send comments via mail to:

Chris Wade, Pesticides Administrator
Delaware Department of Agriculture
2320 South DuPont Highway
Dover, DE 19901

Or via email to dda.marketing@state.de.us

Delaware Agricultural Statistics Service
2320 South DuPont Highway, Dover, Delaware 19901

Vegetables for Fresh Market, Delaware, 2012–2014

Crop	Year	Acres		Production		Season Average Price	Value of Production
		Planted	Harvested	Per Acre	Total		
				Cwt.[1]	Thous. Cwt.[1]	$/cwt.[1]	Thous. Dollars
Beans, Snap	2012	640	630	46	29.0	21.00	609
	2013	590	550	49	27.0	22.00	593
	2014	570	550	51	28.0	30.00	842
Cabbage	2012	450	400	200	80.0	13.00	1,040
	2013	600	600	217	130.2	14.00	1,823
	2014	500	500	220	110.0	17.00	1,870
Cantaloupes	2012	200	200	99	19.8	31.00	614
	2013	150	140	100	14.0	28.00	392
	2014	140	140	102	14.3	25.00	357
Potatoes	2012	1,400	1,400	255	357.0	19.00	6,783
	2013	1,400	1,400	280	392.0	19.20	7,526
	2014	1,200	1,200	290	348.0	14.80	5,150
Pumpkins	2012	800	800	120	96.0	25.00	2,400
	2013	800	800	115	92.0	23.00	2,116
	2014	780	780	117	91.0	23.00	2,099
Strawberries	2012	70	70	31	2.1	120.00	260
	2013	70	70	32	2.2	119.00	267
	2014	60	60	34	2.0	118.00	241
Sweet Corn	2012	3,300	3,100	107	332.0	28.00	9,296
	2013	3,500	3,400	104	354.0	25.00	8,850
	2014	3,600	3,500	102	357.0	25.00	8,925
Tomatoes	2012[3]	100	100	128	12.8	33.00	422
	2013	80	70	130	9.1	30.00	273
	2014	80	80	127	10.2	30.00	305
Watermelons (All)	2012	2,800	2,800	375	1,050	13.00	13,650
	2013	2,800	2,700	320	864	12.00	10,368
	2014	2,600	2,500	333	833	13.00	10,829
Watermelons Seedless	*2012*	*2,300*	*2,300*	*370*	*851.0*	*13.00*	*11,063*
	2013	*2,200*	*2,200*	*315*	*693.0*	*12.00*	*8,316*
	2014	*2,100*	*2,100*	*322*	*676.0*	*13.00*	*8,788*
Other Vegetables [2]	2012	480	480	---	66.0	---	2,229
	2013	470	470	---	57.0	---	2,178
	2014	370	370	---	59.2	---	1,465
Total	2012	10,240	9,980	---	2,044.7	---	37,303
	2013	10,460	10,200	---	1,941.5	---	34,386
	2014	9,900	9,680	---	1,852.7	---	32,083

[1] cwt. = hundredweight or 100 pound unit
[2] Other vegetables include: asparagus, beets, broccoli, cauliflower, cucumbers, eggplant, green peas, green onions, herbs, honeydew, hot and sweet peppers, lettuce, lima beans, okra, radishes, spinach, sweet potatoes, squash and turnips. 3 Revised.

Delaware Department of Agriculture and National Agricultural Statistics Service/USDA cooperating
302-698-4538 or 800-282-8685 fax 302-697-4450 e-mail *Debbie.Lindgren@state.de.us*
Visit our web site at *http://www.nass.usda.gov/de*
Agriculture Counts