



Department of  
Environmental  
Conservation

Agriculture  
and Markets

# New York State Pollinator Protection Plan Update

June 2018





# State Initiatives

## Department of Agriculture and Markets

### APIARY PROGRAM

The Department of Agriculture and Markets (DAM) currently employs two seasonal apiary inspectors, both of whom have official stations in Wayne County. At this time, the Department estimates that there are approximately 3,000 beekeepers in the state. These range from large commercial migratory operations to hobbyists with a few colonies. The large commercial operations tend to be in the rural parts of the state, but the smaller operations can be found anywhere, including heavily populated areas of the state such as New York City and Long Island. The current location of DAM bee inspectors in Wayne County facilitates the inspection of commercial migratory beekeepers who require inspection certificates for interstate transportation of their colonies. The growing number of hobbyist and sideliner beekeepers around the state and the risk that these operations pose in spreading parasites and pathogens to the whole apiary industry underscores the need for innovative inspection and outreach approaches for all members of the apiary industry. Despite the significant challenges associated with the apiary inspection program, in 2017 DAM's two apiary inspectors and state apiculturist:

- Inspected 205 apiaries and 4,000 colonies for American Foulbrood (AFB) disease, as well as Varroa mites and Nosema. 72 colonies of bees, owned by 18 beekeepers, tested positive for American Foulbrood and were destroyed. This is the third consecutive year with an increased incidence of American Foulbrood-diseased colonies. By way of comparison, from 2010 to 2014 incidence of American Foulbrood ranged from three to eight cases a year.
- Certified approximately 44,800 colonies to exit the state in the fall by inspecting approximately 4,000 colonies or 8.9% of the colonies destined for out-of-state shipment.
- Implemented a new program, inspecting starter unit colonies (nucleus colonies or NUCS) for American Foulbrood disease that are for sale to other New York State beekeepers. In the spring of 2017, over 600 NUCS were inspected, and that number is expected to reach 1,000 NUCS in the spring of 2018.

### NATIONAL HONEY BEE SURVEY

DAM continues to work with the USDA/APHIS/ARS to create a baseline of honey bee information for New York State and the United States. The Department surveys 24 beekeepers each year to develop a track record of each honey bee operation. The inspectors collect bee and pollen samples and these samples are sent to the USDA for analysis. The bee samples are examined for pests like the Varroa mites and pathogens, like the fungal disease *Nosema*, and seven viruses. Additionally, the pollen samples are analyzed for pesticides.

The baseline results collected over the past eight years has identified differences among the various beekeepers' operations. Beekeepers with lower colony losses seem to have their pests and pathogens under control and have lower levels of pesticides present in their hives. Conversely, beekeepers with heavy losses are having difficulty controlling some of the pests and pathogens and, in some cases, have higher levels of pesticides. The individual beekeepers receive their test results and the Department compiles all the beekeepers' results and submits a final yearly report to the USDA/APHIS/ARS.

This National Honeybee Survey provided insight regarding problems New York State beekeepers were experiencing in 2017, and as a result, DAM was able to recommend different approaches beekeepers can use to improve their bee operations.

## **APIARY INDUSTRY ADVISORY COUNCIL**

The pollinator health information that has been gathered over the past several years and the research, inspection, and extension resources that have been devoted to the apiary industry have demonstrated the state's strong commitment to this industry.

Upon release of the Pollinator Protection Plan, DAM's Commissioner Richard Ball reconstituted and reinvigorated the Apiary Industry Advisory Council (AIAC). The group now represents the diversity of apiary operations around the state by including beekeepers from areas that had been under-represented in the past. The Commissioner has enhanced the group's role in providing the best information available to the beekeeping community and policymakers, and in making recommendations regarding pollinator protection efforts.

Recent declines in pollinators have demonstrated to the industry the importance of inspection and the need for registration. The apparent increase in reported American Foulbrood cases, as well as new federal restrictions on the use of antibiotics, have resulted in increased concern among commercial beekeepers and some level of tension between commercial beekeepers and smaller operations. In 2017, the AIAC and the Empire State Honey Producers discussed the idea of statewide registration of apiaries to improve disease control by outreach and inspection. Support for this concept grew in 2017, with the Empire State Honey Producers passing a formal resolution in support of hive registration.

## **Department of Environmental Conservation**

### **EMPIRE STATE NATIVE POLLINATOR SURVEY**

To fill an information need identified in the Pollinator Protection Plan, from October 2016 to June 2017 the New York Natural Heritage Program (NYNHP) developed a study plan for a four-year statewide survey effort for a variety of native insect pollinators, including bees, beetles, hoverflies, and moths. The study plan was written with the input of an advisory committee consisting of pollinator experts from government, academia, and nonprofit organizations. The study involves surveys across the State in key habitat types to determine the distribution and status of hundreds of species, plus targeted surveys for species already of conservation concern. NYNHP completed the study plan in June 2017; with funds remaining from the initial appropriation they pilot-tested field methods for the statewide survey and developed a scope of work and budget for the four-year project.

The NYNHP began full implementation of the DEC-funded Empire State Native Pollinator Survey in January 2018. Multiple partnerships with universities and other state agencies are key to successful implementation. A graduate student and field assistant from SUNY ESF will conduct the "extensive survey" of pollinators all around New York, with additional surveys to be completed as part of NYNHP's partnerships with OPRHP and the DEC Division of Lands and Forests. NYNHP staff will survey for select at-risk species already known to be of conservation concern, such as those of demonstrated rarity or known population declines. The New York State Museum has offered laboratory and storage space for the project's duration. Contracts with Cornell University and SUNY Cobleskill will allow NYNHP to take advantage of others' expertise in pollinator identification.

### **SARATOGA TREE NURSERY**

DEC's Saratoga tree nursery uses an integrated pest management (IPM) approach in growing trees and flowers. The nursery takes into account flower production in the fields, as well as weather and other factors to minimize their use of pesticides. The nursery also advertised the benefits of tree and shrub packets by highlighting those beneficial for pollinators with a small, "bee friendly" symbol next to the description of the packet.

## **Office of Parks Recreation and Historical Preserve**

### **ENHANCING BUTTERFLY GARDENS ACROSS LONG ISLAND**

This \$17,000 project established or enhanced Butterfly Gardens in multiple parks throughout the Long Island region. Pollinator plants have been planted in Orient Beach, Heckscher, Bethpage, Robert Moses, Caleb Smith Connetquot and Belmont Lake State Parks. Fencing has been installed at Robert Moses, Caleb Smith, Heckscher, and Orient Beach. Remaining funding will be dedicated to the construction of interpretive educational signs to better inform visitors on the importance of pollinators to the area.

## POLLINATOR HABITAT RESTORATION

Pollinator habitat restoration continued in 2017 by the Preserve's Natural Resource Stewards, interns and volunteers. Five sites in the Preserve being managed to favor native wildflowers and native pollinators were planted with pollinator foodplants leading to a greater diversity of foodplants, and larger clumps of foodplants. Management included planting of purchased plants, wild seed collection, propagation and planting, invasive species control, and revised mowing regimes. Over 500 plugs and potted plants were purchased such as *Asclepia*, *Pycnanthemum*, *Symphotrichum*, *Solidago*, *Lobelia* and *Monarda*. As a result of this restoration effort over one hundred species of wild bees were documented in the Preserve as of the end of 2017.

In addition, several sites are being restored at Ganondagan State Historic Site. This includes a 60 acre old field, a three acre grassland, and a trail. These areas are being restored for their ecological importance to birds, mammals, and pollinators and historical interpretation. State Parks has contributed almost \$12,000 in matching funding for these projects.

## Department of Transportation

### REGION 4 AND SENECA PARK ZOO SOCIETY'S POLLINATOR PROTECTION PROJECT

In 2015, DOT Region 4 modified the mowing schedule for a six-mile section of Interstate I-390 between Route 408 (Mt. Morris) and Route 258 (Sonyea) near Rochester. This 93-acre area offers refuge for migrating monarch butterflies and other pollinators. As a result, there are now more than 18 species of naturally regenerating wildflowers and grasses providing food and habitat for pollinators. Bees and butterflies are now able to successfully complete their life-cycle without being disrupted or damaged by mowing. DOT Region 4 is working in partnership with the Seneca Park Zoo Society and two interpretive gardens are now thriving at the Mount Morris and Geneseo Rest Areas. Nearly 13,300 vehicles travel this section of I-390 each day. Educational signs at the gardens give rest area visitors information about the plight of pollinators and provide tips about what New Yorkers can do to protect these important species.

## Office of General Services

### INTERAGENCY COMMITTEE ON SUSTAINABILITY AND GREEN PROCUREMENT

Executive Order 4 established the Interagency Committee on Sustainability and Green Procurement, which is co-chaired by the OGS and DEC Commissioners. This Interagency Committee is responsible for the creation of green procurement lists and specifications for commodities, services and technology to be used by State agencies and authorities during their procurements. Three of these specifications in particular consider the impact on pollinators: Sustainable Landscaping, Pest Management, and Turf and Ornamental Management. These existing specifications can be modified, as needed, as the agencies continue to understand more about pollinator protection. Additionally, the Interagency Committee is attempting to identify relevant commodities, services and technology in order to create new specifications that can be adopted to protect pollinators.

The Interagency Committee is also tasked with drafting progress reports regarding, among other things, the adoption of sustainable practices and operations by State government. During the 2015-2016 fiscal year, pursuant to the Pollinator Task Force recommendation, several pollinator-related questions were added to the annual survey that is completed by State agencies and authorities in order to compile the progress report. The responses to these survey questions will help to give a clearer picture of what State agencies are currently doing (or not doing) to protect pollinators throughout the State.

### MANAGEMENT OF STATE PROPERTY

OGS real property and facilities management is currently looking into planting pollinator friendly environments that contain native vegetation at State-owned and -managed buildings and facilities. OGS is also assessing the most viable and beneficial sites for these pollinator friendly environments. OGS currently maintains the Empire State Plaza without the use of chemical pesticides. The limitation of pesticides helps enhance the habitat of native and managed pollinators.





# Education and Outreach

## Department of Agriculture and Markets

### BEE CLUBS

Since the release of the New York State Pollinator Protection Plan, the State Apiculturist has given presentations, largely focusing on how to identify American Foulbrood in a bee colony, to 21 bee club meetings across the state. The result of this is an increased awareness of American Foulbrood and members of the bee clubs now know to seek assistance when they suspect they have this disease.

### MASTER BEEKEEPER PROGRAM

In 2017, a state of the art, Master Beekeeper Program was launched by Cornell to train beekeepers on best management practices and honey bee biology. This 15-month program had 50 students in the 2017/2018 class. There are 54 currently in the 2018/2019 class, and there are already more than 30 beekeepers on the wait list for 2019/2020.

Additionally, the Master Beekeeper Program hosted a queen rearing workshop in June of 2017, and will host a similar workshop in June of 2018 at the Dyce Lab in Ithaca. The queen rearing workshops provide professional leadership for participants to learn the fine points and methods of raising breeder queens, grafting larvae, assessing queen cells, and managing mating yards.

### POLLINATOR NETWORK WEBSITE

Cornell established a pollinator network website (<https://pollinator.cals.cornell.edu/>), which receives ~30,000 page views annually, and new Cornell Dyce Lab for Honey Bee Studies Facebook page (<https://www.facebook.com/DyceLab/>), which currently has 275 followers, the majority of which are NYS beekeepers. Continuation and expansion of this citizen science program is likely to increase both awareness and knowledge regarding effective *Varroa* control strategies among NYS beekeepers.

## Department of Environmental Conservation

### PESTICIDE APPLICATORS

DEC is making a concerted effort to identify ways to advance pollinator protection awareness among the regulated community of pesticide applicators, distributors and manufacturers, and the general public. Since the Plan was released, DEC has approved 19 recertification courses addressing pollinators. In fact, since 2013, at least 39 such courses have been approved. In addition, the Core training manual produced by Cornell and used for training pesticide applicators covers protection of bees and other beneficial insects.

DEC Pesticides staff continue to provide outreach on the Plan, as well as the federal requirements to protect managed pollinators, at trade shows, conferences, and meetings. Copies of the NYS Pollinator Protection Plan were produced and provided to DEC field staff for distribution at these events and during inspections of the regulated community. Pesticides staff are also exploring ways to promote pollinator protection training to the regulated community through re-certification courses and showcase pollinator protection to the public at the New York State Fair through annual and perennial flower displays that are attractive to pollinators, seed packs to give out to children, scavenger hunts, and other means.

### ENVIRONMENTAL EDUCATION CENTERS

In response to the Pollinator Protection Plan, DEC has made active bee hives available at Five Rivers (Albany County) and Reinstein Woods (Erie County) environmental education centers to allow visitors to look at the colony up close and learn more about how vital pollinators are to New York State firsthand. As part of the Monarch Larva Monitoring Project, Five Rivers staff train citizen scientists to look for monarch eggs, caterpillars, pupae and adults and record their findings to help understand butterfly ecology and migration. Reinstein Woods staff raise caterpillars during the summer months as part of their pollinator exhibit; they also partner with the Eastern Monarch Butterfly Farm to provide outreach and education during festivals at both sites. Stony Kill Farm (Dutchess County) has field hives, and 3,000 people attend



their Butterfly Festival each August. The Stony Kill Foundation Beekeepers Association meets at the center monthly and offers presentations open to the public on topics like starting a beehive or improving honey production. Each center has interpretive displays and programs about pollination.

## YOUTH OUTREACH

In 2017, all 1,383 campers at DEC's four summer youth camps participated in field studies, learning about plants, insects and other animals found in New York. The importance of pollinators is emphasized. The After School Conservation Club, which is a 10-week program to teach upper elementary students environmental concepts through fun, hands-on activities, and Albany Goes Green, another education program, both work with school gardens, including information on pollination. In addition, DEC produced an issue of *Conservationist for Kids* magazine dedicated to pollinators. The issue, entitled "What's the Buzz About Pollinators," was distributed to all *Conservationist* subscribers and to all fourth-grade classrooms in public schools throughout the state (approximately 240,000 students). In addition to tangible communication products, the Division has produced multiple digital and electronic messages which include pollinator information.





# Research

## Department of Agriculture and Markets

### POLLINATOR TECHNOLOGY TRANSFER – (TECH TEAM)

The Department of Agriculture and Markets announced the development of the NYS Beekeeper Tech Team in 2016. The Tech Team is an interdisciplinary group of professionals that works directly with beekeepers to improve honey bee health, reduce colony losses and increase profitability of the beekeeping industry. The Tech Team transfers information, tools and resources to individual hobbyist, sideline and commercial beekeepers.

Beginning in 2016, the Tech Team members visited beekeepers' bee yards to gather data on parasite and pathogen levels, pesticide residues, colony losses, honey production, and management practices. The Tech Team synthesizes this data, then meets with participants to discuss results from their own colonies and share customized recommendations. In 2017, an agricultural economist was added as another professional to the Tech Team. Beekeepers were then able to receive a complete business analysis of their beekeeping operation. In its first year, the Tech Team worked with 30 beekeepers in Central, Western, and Northern NY. The team provides technical assistance such as:

- Monitoring colonies for parasites, pathogens, and pesticides;
- Customized reports for beekeepers that compare results from their operation to other operations in New York State;
- Access to the annual Tech Team summary report;
- An in-person meeting to review the report to discuss individualized goals and recommendations; and
- An optional beekeeping business analysis.

Participation in the Tech Team program is completely voluntary and all information gathered from beekeepers is confidential. Beekeepers who receive Tech Team services are expected to participate in colony sampling, and to complete an annual survey that documents apiary characteristics and management practices.

Key Findings of the Tech Team to date include:

- Beekeepers monitored more frequently and treated more aggressively for *Varroa* in 2017. Between 2016 and 2017, the percentage of operations that reported monitoring for *Varroa* mites more than doubled, from 36% to 89%. Those that monitored for mites were significantly more likely to apply a *Varroa* treatment to their colonies. The percentage of beekeepers that used at least one chemical treatment to control *Varroa* increased from 73% to 86%. Use of amitraz, a highly effective *Varroa* treatment with relatively few side effects to honey bees, more than tripled from 11% of survey respondents in 2016 to 36% in 2017.
- *Varroa* mite populations were controlled more effectively in June and August 2017. Average *Varroa* mite levels were lowest in June (1.4 mites per 100 bees), when honey bee population and brood levels were also lower. Mite levels increased significantly in August (2.4 mites per 100 bees), yet they remained lower than the levels recorded in September 2016 (6.3 mites per 100 bees). Just 19% of colonies in June and 24% of colonies in August had *Varroa* mite levels above the recommended treatment threshold.

- Honey bees are exposed to various agrochemicals, yet acute pesticide kills are rare. Residues of 34 different pesticides were detected in wax samples taken from honey bee colonies in September 2016. Colonies contained 5.5 different pesticides, on average, yet no colony had pesticide levels high enough to trigger concerns about acute toxicity. Coumaphos is a persistent miticide in wax and was detected in 51% of colonies. It is known to negatively impact bee health and to synergize with other pesticides. Beekeepers should limit exposure to pesticides when they can, especially insecticides, persistent miticides, and pesticide synergists (including EBI fungicides), to reduce the risk of chronic, sublethal, and synergistic effects. Only one beekeeper reported observing symptoms of an acute pesticide kill in 2017.

## Cornell University

### NYS INTEGRATED PEST MANAGEMENT (IPM) PROGRAM

The New York State Integrated Pest Management Program (IPM) is a 35-year partnership between NYS government and Cornell University. This long-standing program has provided research and training on best management practices related to pest control in agriculture and communities. The IPM program has changed the behavior of farmers and pest managers in New York State and beyond by teaching the concepts of pest monitoring and exclusion, using population and weather modeling to apply pest controls more efficiently, and the use of biological controls. In 2017, IPM calculated an EIQ (Environmental Impact Quotient) value for seven new active ingredients. The EIQ determines the environmental impact of commonly used pesticides in agriculture and horticulture. The values obtained from these calculations can be used to compare the environmental impact, including the toxicity to bees, of different pesticides and pest management programs.

In addition, between 2016-2018 the Cornell IPM team initiated the development of a set of best management practices to assist pollinators:

- for Spotted Wing Drosophila (SWD) management in brambles, which includes identifying pollinator-risky products with a bee logo.
- to validate a cranberry fruit worm model in Network for Environment and Weather Applications (NEWA) for blueberry, to better time insecticides that are reduced risk to pollinators since the time for control measures occurs around the end of bloom when the insect is laying eggs, and before egg hatch.
- to validate NEWA models for fungicide applications against strawberry Botrytis and anthracnose. Fungicides used against these diseases are applied during bloom. The NEWA models could reduce the number of applications made by growers for these diseases, thus decreasing the load of chemicals on the pollinators visiting strawberries.

The IPM program also implemented pollinator protection projects. The program established:

- Pollinator habitat plantings on Christmas Tree plantation borders, and
- A pollinator and beneficial insect habitat demonstration project at the NYS Agricultural Experiment Station in Geneva. In 2017, IPM developed lists of species to include, sourced the plant materials and researched information on methods of establishment.

### HONEY BEE RESEARCH

New York State is a leading producer of specialty crops that require or benefit from pollination, such as apples, pears, cherries, strawberries, pumpkins, squash, beans, and cucumbers. These pollination-dependent crops contribute \$1.2 billion annually to the state's agricultural economy. The Western honey bee (*Apis mellifera*) provides 50% of crop pollination services in NYS, yet honey bees are currently experiencing unprecedented losses. In recent years, honey bee colony losses have impacted beekeeper viability, grower expenses for pollination, and the stability of pollination services throughout North America. For example, of the 80,000 honey bee colonies that are present in NYS each year, between 43.8-54.2% were estimated to be lost in each of the past three years. While stresses on bees are numerous, The Cornell research project has identified three particular areas where stress can be reduced via novel management strategies implemented by NYS beekeepers and growers.

First, remarkably little was known regarding the magnitude of pesticide risk to honey bees during pollination of major crops, such as NYS apples. It was recently found that pesticide risk to bees was above regulatory agency levels of concern for acute or chronic exposure at 5 and 22 of the 30 NYS apple orchards, respectively, where Cornell placed 120 experimental hives. Surprisingly, foraging on apple was a poor predictor of pesticide risk to the bees. Instead, risk was positively related to foraging on non-apple pollen sources. Furthermore, over 60% of pesticide risk was attributed to pesticides that were not sprayed during the apple bloom period but are known to be environmentally persistent (e.g. neonicotinoids). These results suggest the majority of pesticide risk to honey bees providing pollination services came from residues in non-apple pollen, likely wildflowers or other sources that became contaminated via pesticide drift. Cornell's current work is testing whether particular pesticide application practices (e.g. different spray technologies) and weed management practices (e.g. mowing in lanes between rows during apple bloom) can reduce pesticide risk to bees. Such practices may be easily implemented by growers without compromising protection against important crop pests and pathogens.

Second, a parasitic mite of honey bees, *Varroa destructor*, is at epidemic levels in New York State. Cornell's data from 60 beekeepers and 309 colonies sampled in 2016 found that 90% of colonies had mites and 78% of operations had one or more colonies that exceeded the treatment threshold. The NYS Beekeeper Tech Team is working closely with 34 beekeepers to increase monitoring and treatments to control *Varroa*. Between the first and second year of the existence of the Tech Team (2016 to 2017), the percentage of operations that reported monitoring for *Varroa* more than doubled, from 36% to 89%. Those that monitored for mites were significantly more likely to apply a *Varroa* treatment to their colonies. In addition, in summer 2017 Cornell initiated the NYS *Varroa* Survey. This citizen science research project involved an additional 90 beekeepers that received free *Varroa* monitoring in return for providing information regarding their treatment practices. With a sample size of 124 NYS beekeepers (34 from the Tech Team and 90 from the NYS *Varroa* survey), Cornell was able to assess particular *Varroa* control strategies that were more effective than others in 2017.

Finally, a new project on the horizon is titled "*Combining natural and artificial selection to improve the sustainability of honey bee queen genetics for NYS beekeepers.*" Although several breeding programs for *Varroa*-resistant bees exist in the United States, few beekeepers are aware of or purchase the genetics for their operations. In addition, most NYS beekeepers obtain their bees from queen producers in the southern and western US, where drastically different environments (e.g. lack of harsh winters) shape queen traits. Cornell researchers plan to obtain several *Varroa*-resistant genetic lines of queens and mate them to locally-adapted male bees from a genetically distinct feral honey bee population in the Arnot Forest region of NYS. This feral population has persisted through the current *Varroa* epidemic and possesses several desirable traits. They will rapidly screen the resulting lines for *Varroa* resistance, productivity (honey production) and overwintering success, assess and communicate the economic benefits of the new genetics, then promote and distribute the best genetics to interested NYS beekeepers. The goal is to measurably improve honey bee genetics, health and the NYS beekeeping industry within the 2-year duration of the project.

## WILD BEE RESEARCH

Similar to honey bees, wild pollinators are currently in decline throughout North America. Of the 414 species of wild bees present in NYS, 53 species (13%) are known to be experiencing range contractions and one species, *Bombus affinis*, is on the Federal Endangered Species List. These are likely underestimates of the true scope of declines due to limited sampling and knowledge of most wild bee species. Similar to honey bees, stresses on wild bees are numerous, research is beginning to identify two particular areas where stress can be reduced via novel management strategies.

First, Cornell has been monitoring colonies of the common eastern bumble bee (*Bombus impatiens*) in four NYS habitats: natural areas, suburban areas, organic agricultural, and conventional agricultural. In both 2016 and 2017, colonies in suburban areas performed worse than all other locations. There was no difference in performance between the natural areas, organic agricultural, and conventional agricultural locations. To understand why bees performed worse in suburban areas, we assessed pesticide residues in the colony wax. Researchers found a total of 26 different pesticide compounds in wax across all



locations. However, pesticide risk was generally low (below EPA-determined levels of concern at all locations) and we found no relationship between pesticide residues and performance of the hives. The greatest pesticide residues were found in colonies in conventional agricultural settings. Cornell is currently using a new floral resource prediction algorithm to assess whether suburban sites have fewer flower resources available to bees. Preliminary results suggest this may be the case. If so, results could provide an opportunity for suburban homeowners across NYS to have a meaningful positive impact on wild pollinators by increasing the quantity of flowers on their properties.

Second, Cornell recently found that the best predictor of pathogen prevalence (i.e. disease) and range contractions of declining United States bumble bees is exposure to fungicides, especially the dominant fungicide used in the US, chlorothalonil. There are several possible reasons for this non-intuitive result. First and foremost, many fungicides are known to interact with insecticides and greatly increase their toxicity. For example, studies have shown that chlorothalonil can increase the toxicity of organophosphate insecticides up to five-fold. Some ergosterol biosynthesis-inhibiting fungicides (e.g. propiconazole, myclobutanil) are known to increase the toxicity of pyrethroid insecticides up to 1000-fold. However, very few studies have addressed this topic and scientists are far from being able to predict which fungicide-insecticide combinations are worse than others. We are currently working with NYS strawberry growers to understand which fungicides and insecticides are commonly used at the same time, then bringing those specific combinations into the laboratory and testing for synergisms. Like many NYS fruits and vegetables that rely on pollination, strawberry blooms and requires pollination by bees at the same time that it is susceptible to fungal pathogens (e.g. gray mold, anthracnose) and insect pests (e.g. tarnished plant bug). Thus, many growers apply pesticides while the plant is flowering, potentially exposing bees to harmful residues. The goal of this research is to understand which particular fungicide-insecticide combinations are worse than others. To date, research shows that interactions between a commonly used neonicotinoid insecticide (thiamethoxam) and commonly used ergosterol biosynthesis-inhibiting fungicide (myclobutanil) greatly increase bee mortality, while several other insecticide-fungicide combinations do not result in harmful synergisms.

## New York Farm Viability Institute

The New York Farm Viability Institute (NYFVI) is a farmer-led not-for-profit that provides grant funds for applied research and outreach education projects that help farms increase profits and provide models for other farms. To date, the NYFVI has provided grant funds for three pollinator-related research studies, including:

- Balancing pest control with pollination services in NY strawberry: identifying effective low-risk pesticides to bees that ensure optimal pollination. (Cornell University)
- Assessing the impact of pesticides on honey bee health in New York. (Cornell University)
- Northeast Pollinator Partnership: developing cost-effective pollinator management for New York apple growers. (Cornell University)

# Future Recommendations

## Department of Agriculture and Markets

### ARTICLE 15 REVIEW

Article 15 provides the Commissioner of the Department of Agriculture and Markets the authority to develop regulations related to apiary health. The current Article is mostly focused on American Foulbrood, which is in line with other states. DAM will conduct a review as to the appropriateness of revision to include additional diseases/pathogens/parasites.

### APIARY REGISTRATION

Article 15 provides the Commissioner access to all apiaries, structures, appliances, or premises where bees or honey or comb used in apiaries may be. While the industry historically has been concerned about registering their operations with DAM, the recent decline in pollinators, presence of American Foulbrood and other diseases within the hives, and movement of bees and equipment have caused the industry to revisit their position. In 2017, the industry made a significant shift towards supporting an apiary registration program. The Empire State Honey Producers passed a resolution in support of registration at their last annual meeting. The objective of registration is to understand the depth and breadth of the industry, identify who is involved in the industry, and develop a better understanding of where the industry is geographically. This will help DAM make staffing decisions regarding the apiary program, as well as allow the agency to reach out to beekeepers in a given area when issues are reported. The Commissioner has met with the Apiary Industry Advisory Committee (AIAC) to discuss a proposed approach to registration and to obtain feedback.

### BUILDING INSPECTION CAPACITY

The Department of Agriculture and Markets will continue to maintain and, if possible, enhance the current seasonal apiary inspection staff. In addition, DAM will implement new innovative approaches to apiary regulatory work. In cooperation with the Division of Animal Industry, Cornell University, and USDA, DAM will begin training and certifying private veterinarians in pollinator health. This is based on the highly successful model in the animal health field where the majority of the inspection and certification is done by certified private veterinarians. This will also assist with developing the relationships between beekeepers and veterinarians who will need to be working with one another when beekeepers need to apply antibiotics for foulbrood (per veterinary feed directive). In addition, DAM will train existing horticultural inspectors in each region of the state to develop a network of “rapid responders” who can procure samples from beekeepers and supervise destruction of infested hives.

### EXPANSION OF TECH TEAM

In 2018, the Tech Team anticipates adding five additional beekeepers to the program. This will expand New York State beekeepers access to the interdisciplinary team of agricultural experts. Expand region and type of operation served. Each of these beekeepers must earn at least \$1000.00 from their beekeeping enterprise, and must agree to participate in the beekeeping business analysis program. Additionally, for the 2018 season, the Tech Team will increase their pesticide sampling efforts, as this has been raised by many Tech Team participants as an area of concern.

## Department of Environmental Conservation

### EXPANDING OUTREACH

DEC will continue to find ways to educate growers, beekeepers, pesticide applicators, homeowners, and other stakeholders on the protection of pollinators. Possible future activities include:

- Exploring the possibility of conducting or participating in a short course at an accredited institution and offer DEC pesticide credits for certified applicators.
- Updating pollinator information on the Pest Management webpage, including information on: How to recognize and report pollinator incidents; Cornell's research about the potential negative impacts on pollinators from certain insecticides and the emerging role of fungicides.
- Releasing a series of GovDelivery messages about pollinators to the over 25,000 pest management subscribers.
- Sending targeted messages about the emerging role of fungicides to potential users of products containing chlorothalonil in areas of the state where highest usage has been reported.
- Promoting DEC's Be Green Organic Yards New York Program. Homeowners and commercial businesses that are interested in managing their properties without the use of synthetic pesticides, some of which may be harmful to pollinators, can take advantage of the Be Green program. DEC designed the program to empower customers and ensure that Be Green businesses provide organic yard care management services in accordance with clear guidelines and avoid the use of synthetic pesticides. Information about the program can be found on DEC's website at <http://www.dec.ny.gov/public/65071.html>.











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