NORTH DAKOTA POLLINATOR PLAN

A North Dakota Department of Agriculture Publication

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North Dakota is a giant in production agriculture. Our state leads the nation in the production of many grains, oilseeds, legumes and other crops. To the surprise of some, North Dakota is also the national leader in honey production. Relations between our farmers and beekeepers have traditionally been cordial, even friendly, but in recent years some tensions have arisen over unexplained increases in honey bee mortality, a phenomenon some have blamed on agriculture.

The North Dakota Pollinator Plan was developed in response to a growing need for a balanced public policy that mitigates risk to honey bees, while minimizing the impact of that mitigation on production agriculture.

Reducing honey bee exposure to pesticides is ideal. Our hope is to achieve this while continuing to provide access to habitat that supports bee health and derived benefits to agriculture.

This pollinator plan is not a static document, but a work in progress. We intend to revisit this document annually and update as needed. Far too little is known about the factors that may affect honey bee health. Research focusing on nutrition, bee repellants and the effects of pesticides is important. Other research into honey bee health, disease and parasite resistance and genetic diversity is also urgently needed so that more effective and comprehensive strategies can be put in place. We believe research can provide new answers and better solutions to the current dilemma.

Finally, effective communication among all parties is essential to the success of this plan. Unless we communicate freely and openly with one another, the rest of our goals cannot be reached.

Working together – farmers, beekeepers, pesticide applicators, scientists – North Dakota can protect its honey bees, while maintaining its position as a leading supplier of food, feed, fiber, and fuel for our nation and the world.

Sincerely,

Doug Goehring
Agriculture Commissioner

Introduction

North Dakota leads the nation in the production of over a dozen commodities including flax, sunflower, dry beans, canola, spring wheat, etc. North Dakota is also the top honey producing state in the nation. Beekeepers bring approximately half a million hives into North Dakota each year. With such a large number of hives in the state, and with over 90 percent of North Dakota acreage being used for agriculture, it is inevitable that hives will be placed in close proximity to areas where a variety of crops are grown and pesticides are commonly used.

Managed bees and wild pollinators are important to U.S. agriculture. 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). Although not completely dependent on insect pollination, crops such as canola, dry edible beans, buckwheat, and sunflowers have been shown to greatly benefit from bee pollination. Almost all of the honey bees found in ND spend their winters in warmer climates contributing to the success of agriculture nationwide. North Dakota has been referred to as the "last frontier" where beekeepers can bring their bees to recover from the stress of pollination services and have adequate forage to produce high quality honey. This resting period is an important factor contributing to their winter survival.

A common misconception about ND beekeepers is that none of them are ND residents. This is not true; many of our 205 beekeepers consider ND their home and only follow their bees out of state for a few months each year.

Beekeepers have suffered significant colony losses over the past decade, raising questions about the sustainability of managed colonies in the U.S. This issue has gained national attention, and in response the U.S. Department of Agriculture (USDA) created the Colony Collapse Disorder (CCD) Steering Committee in 2007. Made up of personnel from USDA's Office of Pest Management Policy, National Institute of Food and Agriculture, Agricultural Research Service, Animal and Plant Health and Inspection Service, and the Natural Resources Conservation Service, as well as staff from the U.S. Environmental Protection Agency (EPA), and public and private partners, the CCD Steering Committee was formed to look at factors contributing to bee decline.

The CCD Steering Committee hosted the National Honey Bee Health Stakeholder Conference in October 2012 to discuss multiple factors influencing honey bee health. The committee concluded that there are multiple factors impacting the decline of the honey bee in the United States and that no one factor can be blamed for the declines. These factors include pests, parasites, diseases, low genetic diversity and poor nutrition. The Steering Committee also concluded that additional research is needed to determine to what extent pesticides are contributing to the declines.

Even with significant losses by some beekeepers each year, North Dakota produced over 34 million pounds of honey in 2012, which made up over 23 percent of the honey produced nationally (USDA 2013). In addition to honey, the wax, pollen and propolis is also collected and sold in a variety of products including soaps, lotions, and vitamins.

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.

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, 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.

Beekeepers can have difficulty finding land that will not be exposed to pesticides. Growers face difficult decisions when managing pests and minimizing impacts to pollinators. This plan should demonstrate how they can do both. Following the Best Management Practices (BMPs) within this document will help ensure abundant, affordable, safe, and nutritious food for years to come.

Challenges Faced by Pesticide Users

Pesticide users face many challenges in North Dakota. There are over 12,000 registered pesticides in North Dakota that are used to manage agricultural and non-agricultural pests. In many cases, pesticide applicators have a limited time window 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.

The Plan

The goal of this plan is not to eliminate pesticide use or to ban pesticides in hives or in close proximity to hives. Instead, the goal is to bring awareness to the issues faced by all parties and find a way for everyone to be part of a solution. The following Best Management Practices (BMPs) were developed with this in mind.

The North Dakota Department of Agriculture (NDDA) hosted two multi-stakeholder discussions in the past year focused on pollinator issues. These provided an opportunity for landowners, beekeepers, pesticide users, government officials, and other stakeholders to discuss pollinator/pesticide issues and offer input on reasonable practices that beekeepers, landowners, and pesticide applicators could do to protect pollinators and minimize impacts to livestock and crop producers.

The Pollinator Plan contains voluntary 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.

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, trails, and section lines. 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 the 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 by 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.** As landowner information changes, it is important to ensure everybody is aware and bees are not placed without permission. This step is imperative to ensure hives to do not become a nuisance.

  **During the 2015 legislative session we will seek changes in our beekeeping law that would eliminate the submission of signed landowner forms. If passed, beekeepers will need to obtain permission for hive placement every year, but will not need to submit forms to NDDA.*

- **Report all suspected pesticide-related bee kills to the NDDA pesticide program immediately.** Inspect bee behavior regularly. The NDDA is the lead pesticide regulatory agency in the state. The NDDA 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 1-800-242-7535 or 701-328-2231 and asking to speak to a representative from the pesticide program.

- **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 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 NDDA pesticide program with any questions on pesticide labeling or to determine whether a pesticide is registered in the state.

- **Comply with all requirements of ND beekeeping law**.
    - Obtain Beekeeper's License each year
    - Register all apiary (hive) locations
    - Clearly post contact information at all hive locations

Continue to provide up to date hive locations throughout the season. This ensures that all locations are accurate when applicators attempt to locate them.

- **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.

Landowner/Grower BMPs

- **Work with beekeepers to choose hive locations.** Ideal locations for hives will have minimal impact on farming/ranching 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.

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 registered pesticides according to the 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. 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. Always comply with these and other label restrictions to reduce risks. Applicators are bound by all directions, precautions, and restrictions on pesticide labeling, even when following other BMPs. Contact the NDDA 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 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.

- **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 NDSU 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 at least 48 hours prior to application or as soon as possible. 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 NDDA has created an interactive searchable map where pesticide applicators can identify registered bee yards and other pesticide-sensitive sites. The GIS Map for Applicators also contains beekeeper contact information and can be found on the NDDA homepage (http://www.nd.gov/ndda/).

- **Choose products with lower risk to bees.** Avoid dusts and wettable powder insecticide formulations. Dust and wettable powder pesticide formulations can leave a powdery residue which sticks to hairs on bees. Bees then bring the pesticide back to the hive and potentially expose the entire hive to the pesticide for an unknown amount of time. Granular and liquid formulations are safer for pollinators since granules are not typically picked up by bees, and liquids dry onto plant surfaces. Also choose products with lower residual toxicity to bees.

Note that the NDDA will be working with NDSU to develop guidance on product choices to reduce risk to bees.

Supporting Pollinator Forage & 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. Here are some easy, efficient ways to improve pollinator forage.

    - **Municipalities** can 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. This can be worked into new plantings, every time a plant is added/replaced choose a variety that will contribute to pollinator forage. Foraging honey bees are typically not aggressive.

    - **Counties** can 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.

    - **Homeowners** can put out flower pots, create flowerbeds, plant trees or shrubs, or establish gardens to provide forage. Homeowners should also take special precaution when applying pesticides. The pesticide user BMPs apply to anyone using pesticides. Remember, the pesticide label is the law and it is in place to minimize risk to the environment and human health.

- **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 snags 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. Be cognizant that certain structures might attract other animals such as fox, coyote, skunks, and porcupines.

- **Public land access**. Public land typically does not incorporate crop production and large scale insecticide use. There are some agencies that allow beekeepers to place honey bees on state and federal lands. Contact NDDA for more information. Permission must be obtained and locations placed on state or federal lands also need to be registered with the NDDA.