Losses of Bee Populations—One Contributing Factor?

By Joel DeJong, ISU Extension & Outreach Field Agronomist

Recently there have been many articles written about the reduction in the pollinator or bee population across the country. Several different factors have been identified that contribute to the reduction in bee populations. One is the concern about insecticides as a factor in this problem. Recently Erin Hodgson, ISU Extension Entomologist, wrote an article about a recent study conducted at Purdue University looking at some seed treatments and how they might be a part of the concern. The following is an article she wrote and published in the ISU Integrated Crop Management Newsletter on April 6 of this year. It was titled “Insecticidal Seed Treatments can Harm Honey Bees.”

Here’s the article:

Neonicotinoids are a relatively new class of chemistry to control insects. They are now widely adopted because they are persistent and systemic in plant tissues. Most field crops in Iowa have a neonicotinoid seed treatment. Common examples of neonicotinoids include: clothianidin (Poncho®), thiamethoxam (Cruiser®), and imidaclorpid (Gaucho®). Active ingredient rates range from 0.25-1.25 milligrams per kernel (sold as 250-1,250 rates).

Neonicotinoids are extremely toxic to bees. Lethal LD50 rates (the rate at which half of the exposed population dies) for clothianidin are 22-44 nanograms per bee for direct contact and 2.8-3.7 nanograms per bee for oral ingestion. In other words, a single corn kernel with a 1,250 rate of neonicotinoid seed treatment contains enough active ingredient to kill over 80,000 honey bees.

There has been an increased public awareness of pollinator health and the decline of bees in North America. Researchers have identified multiple contributing factors for honey bee decline, including: Varroa mites, disease-causing pathogens, habitat loss, malnutrition, the intensity of migratory pollination services and pesticides.

Bees are susceptible to many broad spectrum insecticides, but how are they getting exposed to a chemistry largely used for seed treatments? Christian Krupke, a field crops entomologist at Purdue University, and several others took a closer look at how honey bees might be interacting with neonicotinoids. They published a recent article (found here: http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0029268) reporting several potential exposure routes. Here is a summary of their findings:

- Bees, pollen and nectar were collected from an apiary during the corn planting season in Indiana. All dead and dying bees had traces of clothianidin, and stored pollen had high neonicotinoid levels.
- Soil samples collected from fields not planted with a seed treatment for two years still contained detectable levels of clothianidin.
- Dandelions collected from around field edges before planting had detectable levels of neonicotinoids (Fig. 2).
- Talc used as an additive for planting treated seed had extremely high levels of neonicotinoids. Planter exhaust expelling tainted talc could be coming in contact with bees or plants they forage.
- Corn pollen collected by honey bees later in the season was screened; half of the corn pollen samples analyzed had neonicotinoids.

Their paper makes the following summary: neonicotinoid exposure is likely a combination of direct contact; indirect contact with dosed weeds/crops, talc or soil; and through ingestion from pollen in dosed plants. This year, approximately 200 million acres of crop land will be planted with crops that are treated with neonicotinoids, 94 million with corn alone. This means that some exposure is inevitable, but the following recommendations may help minimize the danger to honey bees during the planting season:

- Farmers should communicate with nearby beekeepers or apiaries about your intentions to plant. Visit the Iowa Department of Agriculture and Land Stewardship Sensitive Crops website for more information.
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- Beekeepers should move hives away from production fields during the planting period if possible.
- Always use the recommended amount of talc to allow proper planting, removing this lubricant is not recommended.
- Do not clean planter equipment/hoppers near fields, especially around flowering plants.

Because of the importance of pollinators and the prevalence of these insecticides in our cropping systems, there is a great deal of research on this topic in independent labs all over the world. We will likely see more studies that explore the linkage between pollinator decline and pesticides in the near future, so stay tuned. For now, the best thing to do is minimize the high level exposures during planting as much as possible using the steps outlined above.

Feedlot Runoff Pumping Project 2011
By Kris Kohl, ISU Extension & Outreach Ag Engineer

The results of a 2011 feedlot pumping demonstration project show that using small electric sewage pumps can be a cost effective way to reduce the risk of feedlot runoff from leaving farms. This is primarily an application for feedlots that have less than 1,000 head.

Cost- Benefits
The cost of the systems has ranged from $2 to $18 per head for all components and an electricity cost of less than $0.03 per head. In general, the electric wire and installation are about one-third of the total cost, the pump is about one-third of the total cost, and the movable distribution system and plumbing is about one-third of the total cost. The high end of the cost range was an all-weather installation that worked automatically next to a high visibility location on a small feedlot. The more cattle that can be serviced with a single pump and movable distribution system the cheaper the fixed cost per head will be.

The benefits are reduced risks of runoff from the feedlot causing a water quality violation and that the runoff water can benefit adjacent crop fields if managed properly especially in a dry year. A study of the 24 hour rainfall events at the Armstrong farm in Southwest Iowa shows that a one-half horse power pump has the capacity to pump most of the runoff from the one acre feedlot if sufficient runoff storage capacity is provided. Over the 16 years of records, only seven rainfall events exceeded the capacity of the pump in a 24-hour day. This is less than one rainfall event per year that it overflows. Even when the system is overwhelmed with an extreme rainfall event, the pump would handle the first part of the runoff event which contains the highest pollution potential.

The runoff is applied to the crop field where the nutrients and water can benefit the crop. The flexible hose provides a means to change the location of the runoff distribution system so that the soil is not overloaded with water or nutrients. In the 2011 crop year every site showed a yield increase where the feedlot runoff water was applied. Management is required to move the hose to a new location after each large rain event to prevent overloading the soil.

The system needs to be designed to have adequate solids settling and water storage so that the float does not turn on and off too frequently. The pump needs to be sized to deliver the water to the field with a distribution system to run down every other row. This allows the corn roots to have one dry side and one wet side which has shown fast infiltration into the soil and has benefited the corn.

We have used flexible lay flat hose so that it can be moved to a new location after each big rain – one-half to three quarters of an inch. This should take less than 5 minutes and should only have to be done 20 times per year.

Feel free to contact me at 712-730-5068 to discuss a system that helps you sleep better at night knowing that you are protecting Iowa’s water quality while growing more corn.

Vitamin D in Swine Production
By Dave Stender, ISU Extension & Outreach Swine Program Specialist

Over the past couple years there has been structural problems reported from various swine herds and an effort to diagnose the problem. Swine producers have been adding vitamin D to diets and oral dosing pigs. Recently at the Midwest Animal Science meetings in Des Moines a seminar topic on the subject was presented that outlined some of the issues. The talk highlighted the fact that we don’t know as much as we would like regarding this issue. Here is a simple summary of the discussion.

In the 1970s there was an explosion of experiments with new information regarding vitamin D metabolism in swine. One of the examples of knowledge was that vitamin D does not work directly, but has to be structurally altered to a hydroxyl form of vitamin D \(\{1, 25 (OH)_{2}D_{3}\}\). In the 1980’s a couple of experiments by Crenshaw et al., tried to show a vitamin D deficiency with pigs fed a corn soy diet in the dark. No performance differences were found. Vitamin D was not considered a problem from that time until recently.

During the last couple of years an unusual number of swine cases with symptoms of Vitamin D deficiency have been sent to animal diagnostic labs. This has stimulated a renewed research interest in Vitamin D metabolism and a special symposium topic at the Midwest Animal Science meetings in Des Moines this spring. The traditional pathway of Vitamin D is being re-examined. Dr Tom Crenshaw at the University of Wisconsin had been doing research with vitamin D since 2004, when in 2008 a deficiency symptom, humpback pigs,
Farm Employee Management: Evaluation and Selection of Job Candidates
By Melissa O'Rourke, ISU Extension & Outreach Farm & Agribusiness Management Specialist

Significant time and energy goes into the employee recruitment and interview process. The farm employer has invested effort in various stages such as: (1) Analysis of labor needs; (2) writing position descriptions; recruitment of candidates; (3) scheduling and conducting well-planned interviews. When the interview process is complete, the employer will check references, evaluate the candidates, and hopefully extend a job offer.

The process of evaluating the candidates following the interview and reference-checking stage should be given the same attention as other steps in the employment process. Ideally, the recruitment and interview steps have yielded several candidates from which to choose. It is important to reflect on the candidates and take the time to make a good selection. Farm producers know the investment necessary to hire and train employees.

First, go back to the position description and review the necessary qualifications for the job. Make an assessment of how well each candidate meets the basic qualifications and rank them on this basis.

Second, consider and rank the candidates in regard to other traits that you want to see in your team members. These include attributes such as dependability, positive attitude, aptitude and ability to get along with co-workers. Your interview process and reference checks will help you to gather information on these characteristics.

In an ideal world, the job applicant who is most highly qualified in terms of experience and education will also possess the skills to work well with others along with dependability, a positive attitude, and willingness to learn. However, we sometimes find extremely qualified individuals who lack the attitudinal skills.

Surveys show that a number of top reasons for employee termination are unrelated to job task performance, but rather connected to employee inabilities to appropriately interact with co-workers and supervisors. Problems include the refusal to follow directions, talking too much, and causing conflict with co-workers resulting in reduced productivity. Interview techniques can give the employer insight into these issues and assist in evaluating the candidates. Reference checks can also be of some assistance.

As you narrow your choices, remember that a job applicant with the right attitude and people skills may be a better choice even if the individual is lacking in some specific job skill. It may be worth the employer’s time and investment to provide some training for particular tasks to a willing learner. It is much more difficult – if not impossible – for the employer to teach attitudinal skills that were missing long before the applicant came to your farm. It may be preferable to select the candidate who will fit into the make-up of your farm team if you can provide training for work duties.

Once your employment offer has been accepted, bring the new employee in as soon as possible to complete the paperwork, forms and procedures necessary for compliance with state and federal law. See the Checklist for Iowa Agricultural Employers for a list of those forms and links to instructions. Get your new employee off to a good start with a planned orientation program as well as initial and ongoing training opportunities.

As always, feel free to contact me with any of your farm employee management questions at 712-737-4230 or morourke@iastate.edu.

Transition & Estate Planning Workshop
Designed to Aid Farm Businesses to Evaluate Plans
By Melissa O’Rourke, ISU Extension & Outreach Farm & Agribusiness Management Specialist

Farmers are unique. There isn’t a distinct moment when they just walk out the workplace door to retirement as someone in a regular wage-earning job might do. Rather, farm families often need to think about how to transition the farm business to the next generation during lifetime, as well as having an estate plan in place. That’s why Iowa State University Extension offers an “Evaluating Your Estate Plan” workshop to answer transition and estate planning questions and help families prepare for the future.

Date: June 19, 2012
Time: 9:30 a.m. to 4:00 p.m.
Place: Northwest Iowa Community College--Sheldon
Cost: $50 per person, includes lunch and materials. Pre-registration required.

For more information and to register: Call Sioux County Extension at 712-737-4230 or e-mail Melissa O’Rourke, Farm & Agribusiness Management Specialist.