Stewardship Guidelines and Best Management Practices for Neonicotinoid Insecticide-Treated Seed

Using pesticide treated seeds can be a beneficial practice for Minnesota farmers. However there can be a potential risk to pollinators and the environment from the use of treated seed primarily due to potential for seed treatment dust drifting during planting. The Minnesota Department of Agriculture (MDA), in cooperation with the University of Minnesota Extension and others, has developed the following Best Management Practices (BMPs) for pesticide treated seed to help address this concern.

Insect Pollinators

- Insect pollinators play an important role in maintaining biodiversity and ecological balance in natural ecosystems throughout Minnesota. Pollination activity indirectly provides food and habitat for other wildlife species.
- Managed honey bees (*Apis mellifera*) alone pollinate more than $17 billion worth of crops in the United States each year. For example, several crops in Minnesota, such as apple, blueberry, sunflower, clover, and canola, depend on pollinators for reproduction.

While the focus of this stewardship plan is on neonicotinoid-treated seed, most of the suggested Best Management Practices are applicable to seed treated with other pesticides. The aerial drift of abraded dust generated during planting of neonicotinoid-treated seed raises a variety of environmental concerns, particularly its potential impact on pollinators (wild and managed). Seed treated with pesticides, including insecticides, are considered "Treated Articles" and are exempt from the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Treating seed with insecticides protects emerging seeds and young plants against early season soil and above-ground insects, reduces potential risks to workers, and lowers the overall amount of insecticide usage per acre. However, wide-scale and prophylactic use of seed treated with insecticides, such as neonicotinoids, may enhance the risk to insect pollinators and their environment.

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Risks of Neonicotinoid-Treated Seed to Pollinators

- Over the last few decades, pollinators have faced a number of stressors that impact their health and survival including insect and mite pests, diseases, poor nutrition, loss of bee-friendly habitat, and a wide variety of insecticides used in agricultural and urban landscapes as well as in the hive. For example, the planting of neonicotinoid-treated seeds can result in the abraded dust expelled from the planter potentially affecting pollinators directly and indirectly. Abraded dust contains concentrations of neonicotinoid pesticides that can be lethal to pollinators, if the pollinators come in contact with dust. Pollinators could be directly 'powdered' by insecticides if their flight path goes through airborne dust. Pollinators may also be indirectly exposed to water or vegetation on which the dust has settled during planting.
- The amount of neonicotinoid residues in the planting dust coming off from treated seed depends upon the dose on the seed, the type of planter, and seed lubricant used. The risk of pollinator exposure to planting dust containing neonicotinoid residues depends on application distance from pollinator habitat, and weather conditions such as temperature, relative humidity, wind speed, and wind direction. In-field risks of pollinator exposure to neonicotinoid dust during the 3-4 week planting time in Minnesota is an active area of research.
- A key cause of seed abrasion is airborne soil dust stirred up by planting equipment being sucked into the air intakes of seed metering devices of pneumatic planters (aka vacuum planters). The abraded dust from the pesticide-treated seed can then be released as contaminated dust into atmosphere.

Neonicotinoid-Treated Seed Best Management Practices

The risks of pollinator exposure to abraded dust from neonicotinoid-treated seed are related to both neonicotinoid toxicity and the level of neonicotinoid exposure. To minimize pollinator exposure to abraded dust, potentially containing neonicotinoid or other pesticide residues, follow these Best Management Practices.

Follow BMPs to minimize the exposure of pollinators to dust abraded from pesticide-treated seed.

Reduce Need for Seed Treatments

- **Adopt an Integrated Pest Management (IPM) Approach:** Learn which crop production practices (tillage, weed management, manure, cover crops) increase or reduce risk of attack from stand-reducing insects. Where possible, use multiple methods, such as cultural, mechanical, and biological control methods, to avoid or reduce pest risk. The adoption of an IPM approach can tailor use of treated seed to higher risk situations, decrease costs of chemical control, and minimize harmful effects on pollinators.
- **Don't Rely Solely on Seed Treatments:** Use information on field risk to target use of neonicotinoid seed treatments. If risk is low, consider seeds not treated with a neonicotinoid, if available. Keep records of pest infestations over time and use that information to guide your decisions in similar situations where a seed treatment may or may not be advisable. If there is a need for neonicotinoid-treated seed and your seed source offers various rates of neonicotinoid treatment, use appropriate rates that can effectively manage target pests.

Become Familiar with Neonicotinoid Seed Issues

- **Follow Directions on Treated Seed Bag:** Before planting neonicotinoid-treated seed, carefully read and follow the directions given on the neonicotinoid-treated seed bag for its proper handling during transport, storage, and use. Take extra care while adding treated seed to your planter to reduce dust occurring due to abrasion and avoid loading seed into planters near pollinator habitat and foraging areas. Plant neonicotinoid-treated seeds at the recommended rate and depth.
- **Understand Hazard Statements Related to Pollinators:** Carefully read and follow directions on the seed bag or seed container while using treated seed to minimize dust and, consequently, the impact on pollinators.
- **Attend Outreach Programs:** Attend education and outreach programs periodically organized by the seed production industry or university extension offices which promote advancements in seed treatment technology focused on minimizing dust production.

Always read the label on the seed bag before planting.

Prepare for Planting Neonicotinoid Seed

- **Assess Your Planting Equipment:** Ensure that the planter is functioning properly per manufacturer's latest recommendations to reduce the abrasion of treated seeds during planting. Check if your pneumatic planter can be modified to minimize the drift of dust. Re-configure planters such that only clean air enters the seed metering devices. When contemplating the purchase of a new planter, consider how it handles dust generated during planting. Consult with planter manufacturers or university extension educators to get updates on the latest technology.

- **Ensure Proper Calibration and Maintenance of Planters:** Proper calibration before use and proper maintenance of planters can help to reduce dust at the time of planting. Pneumatic planters can create more dust than other planters during planting of insecticide-treated seed. Follow directions from manufacturers for proper use and calibration of planter.

- **Select Appropriate Lubricants:** Use dust reducing lubricants with proven results. Add these lubricants at the recommended rate to decrease abrasion, which consequently reduces residues in dust. Uniformly mix the lubricant into neonicotinoid-treated seed. Avoid using lubricants that increase seed dust due to abrasion. For example, the use of talc, graphite, or talc/graphite combinations may increase pesticide residues in seed dust as a result of increased abrasion. Regularly consult with seed dealers and industry representatives to receive updates on new lubricants that may significantly reduce the abrasion of treated seeds.

Carefully inspect your planting equipment prior to use.

Exercise Caution When Planting Neonicotinoid Seed

- **Plant Treated Seed during Appropriate Weather Conditions:** Be aware of weather conditions (especially relative humidity and wind) that can increase the likelihood of off-site drift of treated seed dust to pollinator habitat. Avoid planting neonicotinoid-treated seed if the wind is blowing toward pollinator attractive plants, their habitat, and water bodies. Windy conditions (>15 mph) can move abraded contaminated seed dust coming off the planter to off-target sites.

- **Prevent Spillage of Treated Seed:** Take extra precautions to prevent seed spillage during transport, handling, and planting of neonicotinoid-treated seed. Any spilled seeds should be properly disposed of to prevent exposure to humans, animals, and their environment. Follow directions given on the neonicotinoid-treated seed bag to properly collect and dispose of seed. Follow the stewardship steps developed by the American Seed Trade Association (ASTA) for managing treated seed spills: https://seed-treatment-guide.com/wp-content/uploads/2018/03/Treated-Seed-Stewardship-for-Handling-Spills.pdf

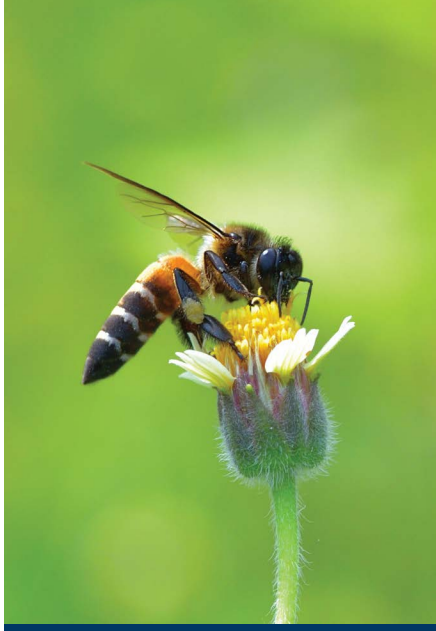
- **Minimize Post Planting Dust:** Carefully follow instructions given on the seed bag or container for disposing of leftover neonicotinoid-treated seed and seed bags. Take extra care while cleaning the planter used for planting treated seed to minimize any aerial movement of leftover dust on the filters/deflectors. Make sure cleaning operations are performed away from areas where pollinators are foraging for pollen, nectar, and water.

Properly dispose of any spilled neonicotinoid-treated seed.

Work with Others to Reduce Potential Impacts on Pollinators

- **Use the Three Cs:** Utilize Communication, Cooperation, and Collaboration among growers, beekeepers, and other parties to reduce the risk of neonicotinoid-treated seed dust exposure. Inform beekeepers well in advance and recognize pollinator habitats in proximity to the field before planting neonicotinoid-treated seed. Be aware of nearby apiary locations through an online BeeCheck apiary registry program hosted by FieldWatch (see References).

- **Pollinator-Friendly Habitat:** Become familiar with existing pollinator-friendly habitat on and near your farm(s). Manage some space on your farmland for growing pollinator-attractive plants that enhance pollinator-friendly habitat. Consider planting strips with seed mixtures of flowering plants that do not bloom during planting of neonicotinoid-treated seed. If you have a pneumatic planter, avoid planting treated seed when these plants are blooming and bees are foraging. Do not plant treated seed when the wind is blowing in the direction of foraging bees and sites with flowers to minimize the drift of seed dust. Avoid spraying insecticides directly on these vegetative strips. Follow MDA BMPs to promote Pollinators in Agricultural Landscapes: www.mda.state.mn.us/sites/default/files/inline-files/pollinatorsagland.pdf



Avoid planting pesticide-treated seed when bees are foraging.

- **Bee Death Incidents:** The MDA investigates incidents of honeybees allegedly killed by pesticide poisoning. The MDA responds to formal and written complaints on bee death incidents related to pesticides. www.mda.state.mn.us/beekillcompensation

For detailed information on handling, storage, and disposal of treated seed, visit the guidelines developed by the American Seed Trade Association and CropLife America. The MDA has also developed separate voluntary BMPs to promote pollinator habitat in agricultural landscapes, yards and gardens, and rights-of-way (see References).

Consider creating pollinator-friendly habitat.

References

Best Practices for Treated Seed

- The Guide to Seed Treatment Stewardship
  https://seed-treatment-guide.com/about
- Guide to Treated Seed Stewardship
  http://cdnseed.org/wp-content/uploads/2015/05/Guide-to-Treated-Seed-Stewardship-May-20151.pdf
- Safe Handling of Treated Seed
  https://drive.google.com/file/d/0B_QbgSRrAB35VFNGWGxTNDAzMTg/view

Special Reports on Neonicotinoids and Pollinators

- Special Registration Review of Neonicotinoid Insecticides
  www.mda.state.mn.us/neonicsreview
- Review of Neonicotinoid Use, Registration, and Insect Pollinator Impacts in Minnesota
  www.mda.state.mn.us/sites/default/files/inline-files/neonicreviewrpt2016.pdf
- Pollinator Report: Pollinator Bank, Habitat Protection, and Pesticide Special Review
  www.mda.state.mn.us/sites/default/files/inline-files/legrpt-pollinators14.pdf

Best Management Practices on Treated Seed and Pollinators

- Pollinator Protection: Reducing Risk from Treated Seed
  www.hc-sc.gc.ca/cps-spc/pubs/pest/_fact-fiche/pollinator-protection-pollinisateurs/index-eng.php
- Pollinator Protection and Responsible Use of Insecticide Treated Seed
  www.hc-sc.gc.ca/cps-spc/alt_formats/pdf/pubs/pest/_fact-fiche/pollinator-protection-pollinisateurs/treated_seed-semences_traitees-eng.pdf
- Best Management Practices for Pollinators
  www.mda.state.mn.us/pollinators
- Best Management Practices for Farmers Using Seeds Treated With Neonicotinoid Insecticides
  www.dem.ri.gov/programs/agriculture/documents/pwg_docs_seeds_neonicotinoids.pdf

Miscellaneous

- Minnesota Pesticide Sales Information
  www.mda.state.mn.us/minnesota-pesticide-sales-information
- Pesticide Investigation into Honey Bee Death
  www.mda.state.mn.us/beekillcompensation
- Welcome to BeeCheck
  https://beecheck.org
- Planter Preparation, Maintenance, and Calibration
  www.uaex.edu/publications/PDF/FSA-1047.pdf
- Planter Clean-Out Procedures for Corn & Soybeans
  www.youtube.com/watch?v=WDKBQLrG3ro