

Bird Deterrence Crop Seed Stewardship Program

Arkion Life Sciences

Ken Ballinger

2019



Compounds in the EPA Spotlight

- Imidicloprid
- Thiacloprid
- Clothianidin
- Thiomethoxam
- Acetomiprid
- Mitenpyram
- Dianotefuran (Fipronil)

Direct Effects on Birds

Bird Species	Imidacloprid	Clothianidin	Fipronil
Mallard	283	5,000	97
Grey Partridge	13.9	>35 reproduction	
Red-Legged Partridge			34
Feral Pigeon	25-50		>2000
House Sparrow	41		
Field Sparrow	6 Neurobehavior		1120
Sharp Tailed Grouse			
Prairie Chicken/Chicken			37.5 reproduction
Ring Necked Pheasant			31
Northern Bobwhite Quail	152	>52 reproduction	11.3
Zebra Finch			310
Rabbit Reproduction	72	>25	

Indirect Effects on Birds

- Intoxication Effects (Mineau and Palmer 2013) found imidicloprid treated crop seed caused intoxication when only a few seeds were consumed. They used corn, oilseeds and cereals.
- There is a correlated decrease in songbird populations and Neonic use. This in part resulted in loss of neonics in Europe. Bee effect was the primary reason.
- Loss of insect populations in fields affects many species food sources.
- One cause may be the dusting off of neonic treatment. Mostly affects bees.
- Many birds are able to eat or at least peck at spilled seed.

Current Stewardship Mitigation Steps

- Label and Bag Tag instructions to growers: bury spilled seed
 - DNR in Minnesota surveyed 38 Minnesota townships from Iowa to Canadian border. They found 15,000 large seed spills in a single season (a few thousand seeds per spill). September 2017
- Use polymer to enhance adhesion and prevent dust off.
 - Has been used for some time, the problem persists.
- Make seeds larger to prevent songbird and prairie birds from taking corn seed.
 - Not a practical solution. Birds will peck at it anyway.
- Winfield could offer a real solution to growers that deflects local pressure from environmental issues.
 - Deterrence level certified by the USDA.

Current Management Effects

- Colorants create short term neophobic effects. Avery did the science on this and is part of the NWRC research community. AQ is more effective.
- Reduction of insect food sources did not affect horned lark populations which is a good indication that use of insecticides does not necessarily reduce bird levels due to lack of insects in a field.
- Dusting off could be modulated with the overcoating of AQ treatment.
- Syngenta announced Agrisure Duracade as an expressed protein in seed to kill wireworm. Other insects will be targeted with other proteins using CRISPR editing.

US Government actions

- EPA has talked to the Neonic Consortium of 5 registrants. There is an acceptance of the label language to bury the seed.
 - This will transfer the liability for the issue to the farmer.
 - Meredith Laws is fully aware of the deterrence offered by Arkion and has stated her support that this is an acceptable mitigation.
- Arkion has the USDA NWRC data to back up the deterrence claim.

Winfield plus Arkion Initiative

- The Neonic Consortium will probably not defend use of neonics over time. Introducing new CRISPR inserted proteins will command a higher price on the market. Our offer would be a much lower cost alternative offering a wider variety of seed.
- We can protect growers from complaints about songbird populations.
- We can do the right thing with a proven protection for treated seed.
- We can start a public relations campaign this spring and be first to claim the benefits of solving this problem.

EPA Registration of Deterrence Application

- EPA discussed the possibility that there is no registration needed for use on seed treatment for deterrence.
 - Songbirds are not damaging crops and are not pests.
 - Deterrence protects songbirds from spilled seed so it is not a toxicant, it is the opposite.
 - In summary, there may be a position that this use does not meet registration requirement.
- Arkion is presenting the formulation to EPA in 2019 anyway for replacement of Avipel for corn seed for the higher repellency rate. The agency has already seen the package and is bridging the acute tox requirements.