

Title: Open Field Study with “Avipel Shield” Seed Treatment on Field Corn to Deter Birds from Feeding on Corn Seedlings

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Background:

Crows, ravens, black birds, starlings, grackles, Canada geese and wild turkeys have been a pest problem annually for corn growers in Delaware County in the Catskills Mountains. This problem has been increasing over the last 15 years for unknown reasons. Damage to corn stands occurs when planted corn emerges and birds pull the seedling corn out of the soil to eat the seed. This damage reduces the corn plant population dramatically, negatively impacting yield. Several producers have had to replant fields due to bird damage. Bird damage many times is most extreme where soils are stony, and planting depth is shallow as a result of soil conditions. Increases in bird damage can be tied to an increased use of no-till corn planting methods, which have resulted in shallow planting depths where soil conditions (stones, compaction) cause shallow. However, damage has also been observed in fields that have received full tillage and where farmers have tried to plant deeper to deter birds. Many fields have had economic losses due to the birds feeding. Here to fore, farmers have not had easy and time efficient methods to prevent this bird damage, as planting deeper had not worked universally, nor is easy to achieve consistently, and shooting of birds (which is permissible) is not practical from a time and labor standpoint for most farms. Avipel Shield™ is a liquid seed treatment that is classified as a bio-pesticide designed to deter birds from feeding on the corn seed in a nontoxic manner. Avipel active ingredient is “anthraquinone.” This is a chemical found in many species of plants (notably rhubarb). The company states that the birds will ingest a few of the treated seeds and it will have an unpleasant stomach reaction that causes the birds to forage food elsewhere. Hodne-Ficher (2009) found there was less corn seed eaten by ring neck pheasants when treated with anthraquinone vs and control of non-treated seed in newly planted corn. Scott et al. (2009) suggest that Avipel seed treatments effectively conditioned avoidance of treated seeds among Canada geese, red-winged blackbirds, and ring-necked pheasants in a laboratory study when offered corn seed treated with anthraquinone and without. The company claims that in studies it showed a statistical response to repelling Sandhill cranes to corn seed treated with anthraquinone.

Study

We conducted this pilot study to confirm anecdotal reports from other farms and states of the effectiveness of Avipel Shield in deterring birds from feeding on seed in newly planted corn. The pilot study was located in Delaware County in small fields.

We planted treated (Avipel Shield) and non-treated corn seed in plots and evaluate the efficacy of Avipel Shield to wild birds that feed on newly planted corn. The corn selected for the study was a 97day hybrid from Dairyland (HiDF 3197RA). The treatment with Avipel Shield™ occurred in Wisconsin and was sent to Delaware County Cornell Cooperative Extension.

We worked closely with 5 dairy producers that grow corn as silage to feed dairy cattle. These dairy producers have had past history of birds feeding on their newly planted corn. Each producer was provided with one bag of Avipel treated seed and one bag of untreated seed of the same hybrid. They planted the seed in blocks within a field. The remainder of the field was planted to a similar maturity hybrid provided by the farm.

Fields were scouted several times during May and June, and plant populations were determined after corn had reach a stage where corn pulling by birds had ceased.

Cornell Cooperative Extension of Delaware County providing \$1,941 for corn seed in addition to staff time to conduct stand counts etc. NYS IPM provided \$1294 for addition corn seed.

Plant population results from two field sites are included below. Mean plant population for Dairyland hybrid treated with Avipel Shield™ was 2,632 plant per acre greater than the same hybrid untreated. Compared to the farmer hybrids in the same field, the mean treated Dairyland hybrid plant population was 3,495 plants per acre greater. While this study was not designed to compare between hybrids, as there may be confounding effects due to hybrid, the results are worth noting.

Greater predation of farmer hybrids in the same fields may possibly be due to ability of birds to recognize visual differences between hybrids and bias against predation of the Dairyland hybrid regardless of treatment due to learned behavior of adverse reaction to treated Dairyland hybrid. In at least two study site, there were visible differences in corn plant appearance between Dairyland and farmer hybrids noted by researchers.

Final plot configurations and staff availability made yield estimates impractical.

References:

- Hodne-Fishcer, Emily A. 2009. Anthraquinone Corn Seed Treatment (Acitec TM) as a Feeding Repellent for Ring-Necked Pheasants (*Phasianus Colchicus*) on Newly Planted Corn in Eastern South Dakota. Master of Science Thesis. Major in Wildlife and Fisheries Sciences South Dakota State University
- Werner, Scott J.; Carlson, James C.; Tupper, Shelagh K.; Santer, Michele M. and Linz, George M. 2009. Threshold Concentrations of an Anthraquinone Based Repellent for Canada Geese, Red-Winged Blackbirds, and Ring-Necked Pheasants. USDA National Wildlife Research Center - Staff Publications. DigitalCommons@University of Nebraska – Lincoln

Table 1: Effect of “Avipel Shield” Seed Treatment on Field Corn plant population,

Delaware County, NY 2016

Farm	Town	Treated, Dairyland Hybrid		Untreated, Dairyland Hybrid		Farmer Hybrid Untreated		Diff. Treated - Untreated	Diff. Treated - Farmer
		-----Plant Population Results, plants per acre-----							
		Mean	Std. dev	Mean	Std. dev	Mean	Std. dev		
Holley	Walton	29737	3238	27073	4876	25700	5158	2664	4037
Hanselman	Stamford	33120	1985	31760	1726	30960	2586	1375	2292
Burgin	Delhi	28208	1841	26709	2440	26750	1894	1499	1458
Pieper	Walton	26458	1956	25417	2358	26250	2674	1041	208
Keator	Davenport	33655	2616	27073	2942	24175	3984	6582	9480
	Average	30237		27604		26742		2632	3495

n=12; n=24 for Holley