Cornell Cooperative Extension | Cornell Vegetable Program

BIRD DAMAGE

management options in sweet corn production

NEW YORK SWEET CORN PRODUCTION

#4
RANK IN NATION

26,700+
ACRES PLANTED

$22M
FRESH MARKET VALUE

2017 statistics

INTRODUCTION

Wildlife damage, especially bird damage, is a persistent problem for vegetable producers. Sweet corn is noted to have the greatest direct damage by birds but other crops are also impacted – including the consumption of direct-seeded crops after planting, reduced quality from pecking, loss of crop stands by direct feeding, and implications with food safety rules. Not only does bird damage lead to yield loss, but the possibility of microbial contamination from bird droppings poses a huge food safety issue, as recognized in the Food Safety and Modernization Act. Many growers are attempting proactive measures to minimize bird damage but continue to have mixed results leading to crop losses.

New York sweet corn production ranks 4th in the US with over 26,700 acres planted. Fresh market sweet corn in New York had an estimated value in production of $22 million[1] in 2017. A recent survey of fresh market vegetable growers in western NY found that 66% grew sweet corn on an average of 3.4 acres (0.1 acre to >20 acres). Of those growers, 84% reported that they had bird damage with a 16% average estimated yield loss to birds (losses ranged from 3 to 40%). A loss of 3% has the potential to cost $102 in production per acre, 16% loss reduces value by $542 per acre, and growers experiencing a 40% yield reduction may lose over $1,300 per acre. The severity of damage caused by birds varies depending on location, maturity of sweet corn, and bird migration. In New York, we continue to see this pest problem grow and it is exceedingly costlier and much harder to handle. One farmer states he "had problems from the day seed hit the ground," while a single farm reported a loss of over 5,000 dozen ears at a location where multiple tactics were being utilized (nuisance permits and gas-fired cannons), and another reported a $1,500 loss for the 2017 season. The variability in effectiveness of current options, the continued loss of fresh market sweet corn to bird damage, and future food safety issues demonstrated the need for continued research to identify and evaluate options that may prove to be more effective in managing bird pests.

In an attempt to help growers mitigate bird damage in sweet corn, a New York Farm Viability Institute supported research project was initiated to evaluate bird deterrent options. We identified two new products – a chemical deterrent, Avian Control®, and an air dancer – that had shown promise in preliminary trials as bird repellents. In addition, we evaluated the effectiveness of other existing techniques in reducing bird damage in sweet corn: detasseling and scare eye balloons. Since producers have indicated that bird damage in sweet corn is one of their biggest management issues, this research focused on alleviating bird pests in sweet corn, but the information generated by this research may provide for use in other fresh market vegetable commodities with avian pests.

1 Vegetables 2017 Summary.2018. USDA NASS. ISSN:0884-6413 pg.

METHODS EVALUATED

Twelve on-farm trials evaluated bird management options from 2015-2017. At each location, the number, identity, and activity of birds flying in and out of the field trials were enumerated; data on sweet corn maturity and damage was also collected. Images of bird movement, activity (dropping on plants and surrounding areas), and damage were documented (Figures 1-3). For each of the four deterrents we evaluated, we have identified best management practices for their use.

Figure 1. Bird Movement
A flock of red-winged blackbirds in flight after being scared out of sweet corn plots.

Figure 2. Bird Droppings
Bird droppings on plants and surrounding areas pose a potential food safety concern.

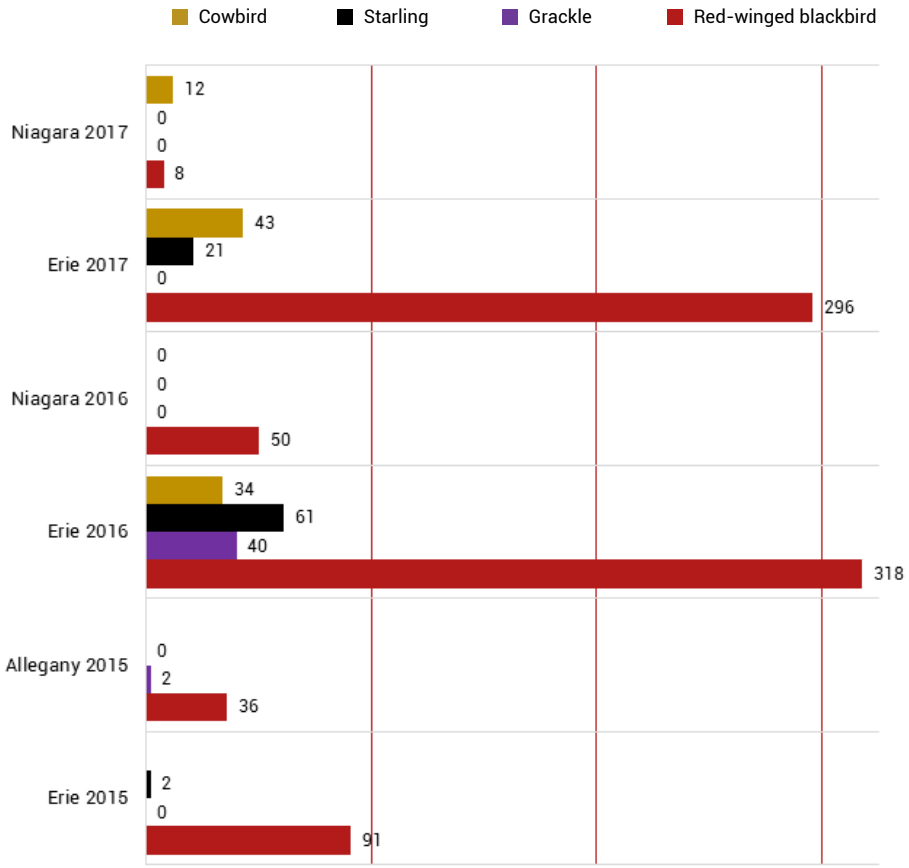
Figure 3. Bird Damage
Sweet corn damage caused by bird feeding.

SUMMARY OF RESULTS

Bird Type and Quantity

The red-winged blackbird (*Agelaius phoeniceus*) was the most abundant and most often observed bird at all sites in all three years (Figure 4), followed by the brown-headed cowbird (*Molothrus ater*). Other bird species observed feeding in sweet corn trials included European starling (*Sturnus vulgaris*) and common grackle (*Quiscalus quiscula*).

Figure 4. Total Number of Birds Observed in On-farm Trials by Year and County



SUMMARY OF RESULTS

Bird Damage

Birds caused an average of 2.8 to 11.5% loss in untreated plots (Figure 5). We did not find significant differences between treatments in individual years but, when combined, the balloons, air dancer, and detasseling tools all significantly reduced damage when compared to the untreated (Figure 5). Bird damage was reduced 38% with Avian Control, 63% with balloons, 77% with the air dancer, and 85% with detasseling as compared to the non-treated control (Figure 6).

During this study, it was noted that once deterrent tools were placed in a field, birds tended to fly over the entire research site and search out other sweet corn locations. When available, we evaluated damage in these off-site sweet corn fields and saw damage ranging from 15-50%. Averaging over all locations and years, we found that the untreated plots in our treatment sites had over 70% less damage as compared to the nearby sweet corn fields as the birds completely avoided the trial after tools were in place (Figure 7). The detasseling and air dancer treatments had over 90% less damage, while the Avian Control and balloon treatments had 80% less damage than these off-site sweet corn fields (Figure 7).

Figure 5. Percent Sweet Corn Ear Damage Due to Birds

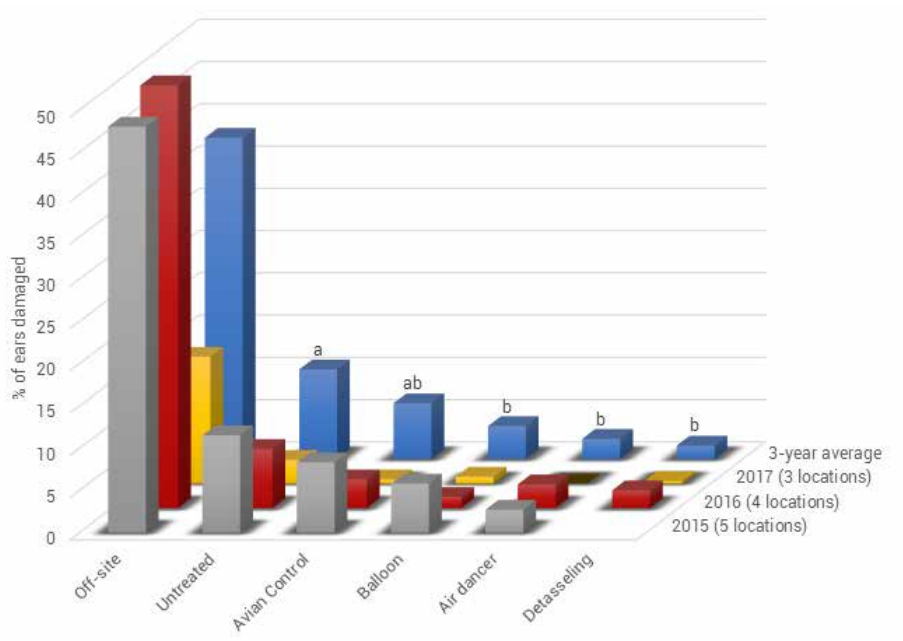


Figure 6. Three-year Average Reduction in Ear Damage for Deterance Tools as Compared to Untreated

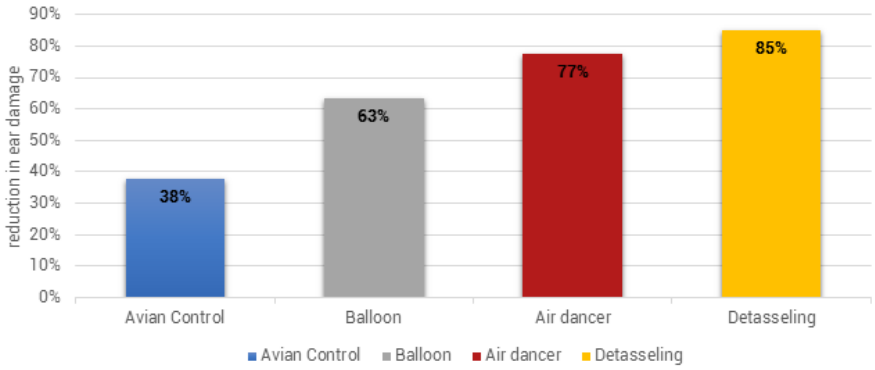
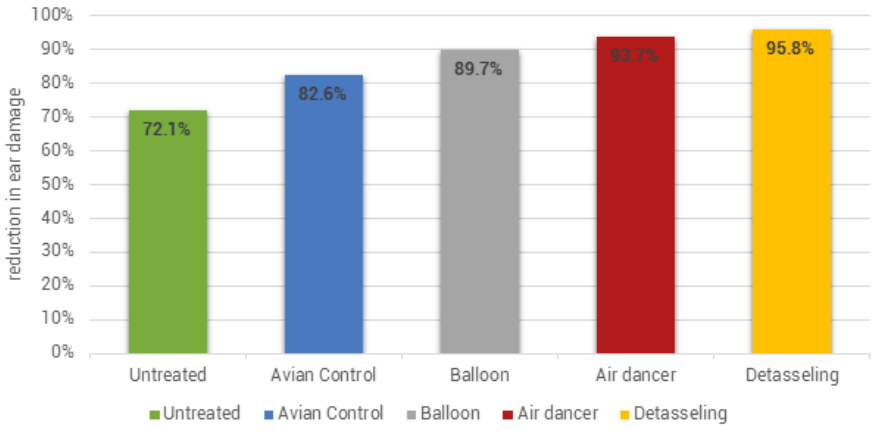


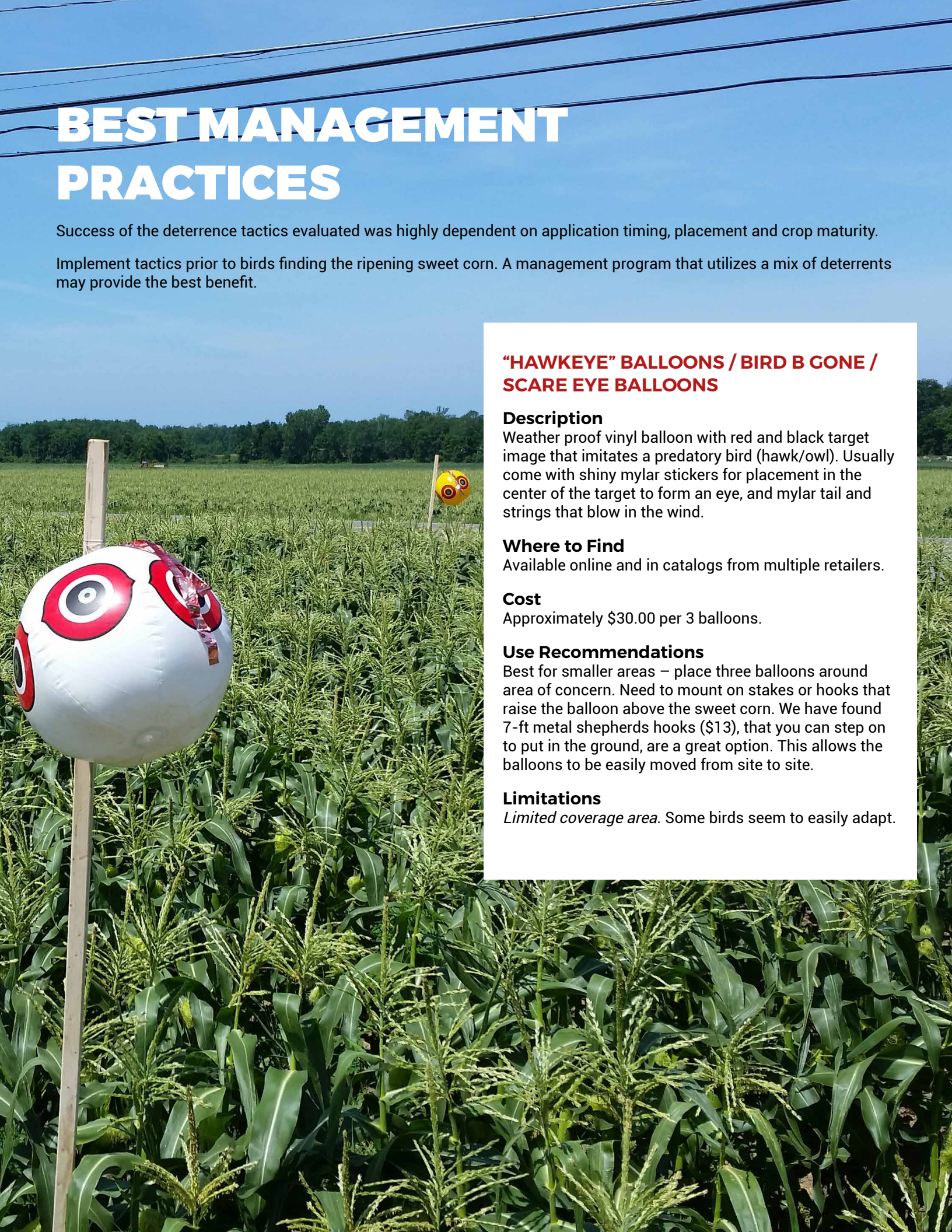
Figure 7. Three-year Average Reduction in Bird Damage to Sweet Corn Ears as Compared to Off-site Locations



BEST MANAGEMENT PRACTICES

Success of the deterrence tactics evaluated was highly dependent on application timing, placement and crop maturity.

Implement tactics prior to birds finding the ripening sweet corn. A management program that utilizes a mix of deterrents may provide the best benefit.



"HAWKEYE" BALLOONS / BIRD B GONE / SCARE EYE BALLOONS

Description
Weather proof vinyl balloon with red and black target image that imitates a predatory bird (hawk/owl). Usually come with shiny mylar stickers for placement in the center of the target to form an eye, and mylar tail and strings that blow in the wind.

Where to Find
Available online and in catalogs from multiple retailers.

Cost
Approximately $30.00 per 3 balloons.

Use Recommendations
Best for smaller areas – place three balloons around area of concern. Need to mount on stakes or hooks that raise the balloon above the sweet corn. We have found 7-ft metal shepherds hooks ($13), that you can step on to put in the ground, are a great option. This allows the balloons to be easily moved from site to site.

Limitations
Limited coverage area. Some birds seem to easily adapt.

AIR DANCER

Description
A brightly colored air tube that inflates and then partially deflates over and over again, creating a very tall and foreboding presence by constantly jumping up noisily and shaking at random to provide a “scare” to keep birds at bay. We set our timer with a 10-minute on/off cycle from before sunrise to dusk.

Where to Find
Available online from various retailers.

Cost
Approximately $200 for air dancer and fan; additional costs for power source.

Use Recommendations
Reusable scare tactic.

Limitations
Power source. If local electric power is readily available, it is very simple to hook up with power extension cords and timer. Generated power is an option; both 1800 ($180) watt and 3500 ($370) watt generators were used in this study. The limitation on using generators is that they need to run continuously, unless turned on and off at sunrise and sunset, to keep timer on track, requiring a daily fuel refill. Solar power could be a future option, but currently the cost is prohibitive due to the energy storage required to keep the timer and fan running.

Limited coverage area.

CHEMICAL DETERRENT

Description
For our trials, we evaluated Avian Control® Bird Repellent (methyl anthranilate). It is a primary chemical repellent that stimulates temporary pain in receptors associated with taste and smell rendering the food source unpalatable. This product is also labeled for use in other vegetable and fruit crops. See the label for crop specific information.

Rate
12 oz - 42 oz/A

Re-entry interval = 4 hrs, Pre-harvest interval = 0 days.

No fogging or irrigation application in New York.

Reapplied on 6-8 day intervals.

Where to Find
Available for online purchase through Avian Enterprises, LLC or various retailers ($96 for 64 oz).

Cost
32 oz/A rate = $48 (~ $96 per acre when sprayed twice at 32 oz/A rate).

Use Recommendations
Initial application should be applied when sweet corn is two weeks from harvest, prior to birds discovering food source, and then re-applied 7-days later. Reapplication is needed if the product is washed off by rainfall. Application rate is 12 oz - 42 oz/A; we evaluated at 32 oz/A.

Limitations
Not an organic option.

Application needs to be made prior to birds finding food source.

Reapplication required if washed off by rain.

DETASSELING

Description
Tassels were removed after pollination and two weeks prior to crop maturity. The tassel and upper leaves were removed just above ripening ear to eliminate a perching site for the birds.

Cost
By-hand using handheld clippers: 1 hr = 5000 ft^2 = 8.7 hours for 1 acre @ $10.50/hour = $91.35 per acre.

Use Recommendations
Use new clippers and move down one row at a time.

Limitations
Labor intensive or expensive mechanized options for tassel removal, although harvest crews may prefer working in the fields where tassels have been removed.

May not be compatible with mechanical harvesting equipment that grasp tops of the cornstalks.

CONCLUSIONS

Initial bird damage on the first picking of sweet corn can be extremely high. We had a site experience 86% loss of ears overnight due to the migration of red-winged blackbirds. 10% damage was observed even when air cannons and nuisance permits were being deployed.

Birds would completely avoid the research sites if tactics were deployed prior to them finding the food source. The flock would fly over the research sites to other, unprotected locations.

Success of the four deterrence tactics was highly dependent on application timing, placement and crop maturity.

We cannot stress enough the importance of implementing these tactics prior to birds finding the ripening sweet corn. We evaluated these tactics individually and suggest a management program that utilizes multiple tactics may provide the best benefit.

FUTURE DIRECTIONS / RECOMMENDATIONS

There are a number of bird lasers on the market with a wide range of costs. Dr. Rebecca Brown at the University of Rhode Island has developed a laser scarecrow that might be a great low-cost option. The laser scarecrow is not commercially available, but you can access the specs if you want to build your own.

https://sites.google.com/view/urilaserscarecrow/

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