Minimizing Wildlife Impacts in Vegetables by Utilizing Repellency Tactics

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CCE Cornell Vegetable Program

Background

- Wildlife damage leads to yield loss and potential for microbial contamination
- Bird damage continues to be persistent problem for vegetable growers
- In 2014 survey of sweet corn growers 84% reported bird damage with an average loss of 16% in yield
- Single farm with 20 acres could have >$10,000 loss in revenue
- Many proactive measures being deployed have had mixed results
- A grower stated “had problems from the day seed hit the ground”
- Single farm reported a loss of over 5,000 ears even with multiple tactics being utilized (nuisance permits and gas-fired canons)

Objectives

- Explore wildlife control methods
  - what tools are available and best practices

- Look at an example of current research in New York for bird management in sweet corn

Wildlife Control Methods

- Habitat modification
- Exclusion
- Frightening devices
- Repellents
- Toxicants
- Shooting
- Trapping
- Other methods

Habit Modification

- All animals need water, food and shelter – eliminate any of these and animals cannot survive
- Habit modification addresses all these life requisites
- Typical habitat modifications
  - Cutting back bushes and trees to reduce cover
  - Remove vegetation near building foundations
  - Eliminate brush, woodpiles and junk
  - Mow tall grass to reduced presence of voles vs. let grass grow to discourage geese

Exclusion

- Use of barriers
  - Nets
  - Cylinders
  - Fences
- High levels of protection over the short- and long-term
- Costly when large areas need protection

Frightening Devices

Scare wildlife from a location through non-chemical means

1. Visual - plastic owls, scary-eye balloons, Mylar® tape, scarecrows, strobe lights
2. Audio – propane cannons and distress calls
3. Audio-visual – fireworks- based noisemakers
4. Biological – guard animals (dogs), hawks, falcons

Wildlife often quickly habituate to frightening devices, except, perhaps biological

Repellents

- Chemicals that deter animal activity through pain, fear, touch, and aversive conditioning
- Most states require pesticide applicator license

Two brands of polybutene-based caulks used to deter birds

Toxicants

- Chemical compounds that are used to kill problem animals such as mice, rats, pigeons, starlings and house sparrows
- Care must be taken to minimize risk to non-target animals such as other wildlife, livestock, pets and people
- Toxicants should be integrated with other wildlife methods to increase effectiveness

Three formulations of rodenticide bait (blocks, pellets, place pacs). Photo by LiphaTech®.

Shooting

- Shooting is appropriate for medium to large mammals, birds, reptiles
- Requires training and skill
- The most viable and cost-effective way to deal with wildlife conflict
- Safety concerns and legal restrictions must be considered
- Local, state and federal regulations and ordinances must be followed
  - NY it is illegal to discharge a bow or firearm within 500 feet of a building without landowner permission

Trapping

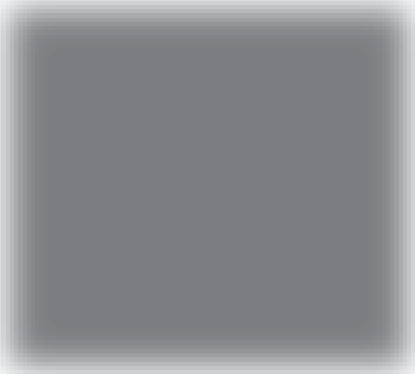
- Most common tools used to manage wildlife
- Cage or box traps
- Mouse and rat snap traps
- Lures and baits can help bring target animal to trap – lures are concentrated odors that may be detected from long distances.

Others

- Biological control – introduction of a disease or predator to manage a target population
- Fertility control – most are still in experimental phase. Ferel pigeon product that may stop them from laying fertilized eggs.

Evaluating Techniques

- Avian control (methyl anthranilate)
- Air-dancer
- Detassel treatment
- Scare-eye-balloon



Avain Control (*Methyl anthranilate*)

- Crops – root and tuber vegetables, leaves of root and tuber vegetables, bulb vegetables, leafy vegetables (except brassica), brassica leafy vegetables, legume vegetables, fruiting vegetables, cucurbit vegetables, and others
- No fogging application in NY or irrigation application
- Application rate: 12 oz – 42 oz/A
- REI = 4 hours; PHI = 0 days
- Can be reapplied 6-8 day intervals

ACCEPTED
VIA NOTIFICATION
LABEL NOT REVIEWED

SEP 22 2015

New York State Department
of Environmental Conservation
Division of Materials Management
Pesticide Product Registration

Doc ID: 543348

Avian Control®

Bird Repellent

To be used on Agricultural Commodities (root and tuber vegetables (Crop Group 1), leaves of root and tuber vegetables (Crop Group 2), bulb vegetables (Crop Group 3-07), leafy vegetables (except brassica) (Crop Group 4), brassica leafy vegetables (Crop Group 5), legume vegetables – including soybeans (Crop Group 6), Foliage of legume vegetables (Crop Group 7), fruiting vegetables (Crop Group 8-10), cucurbit vegetables (Crop Group 9), citrus fruits (Crop Group 10-10), berry and small fruit crops (Crop Group 13-07), pome fruit (Crop Group 11-10), stone fruit (Crop Group 12), cereal grains (Crop Group 15), tree nuts (Crop Group 14), forage fodder and straw of cereal grains (Crop Group 16), grass forage fodder and hay (Crop Group 17), nongrass animal feed (forage, fodder, straw and hay) (Crop Group 18), herbs and spices (Crop Group 19), oilseeds – including sunflowers (Crop Group 20), edible fungi (Crop Group 21), tropical fruits and miscellaneous crops) and Non-Agricultural Sites including Turf, Hydroseeding, Landfills, Non-fish bearing bodies of water, Buildings and Structures

ACTIVE INGREDIENT	
Methyl Anthranilate (MA), methyl 2-aminobenzoate	20.0%
OTHER INGREDIENTS	80.0%
TOTAL	100.0%

This product contains 1.65 pounds of Methyl Anthranilate per gallon of product.

KEEP OUT OF REACH OF CHILDREN

CAUTION

EPA REG. No. 88889-1
EPA EST. No. 33162-MI-01

FIRST AID: IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice. **IF ON SKIN OR CLOTHING:** Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice. Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact the National Poison Control Center at 800-900-4044 for emergency medical treatment information.

See back/side panel for Directions for Use including Storage and Disposal instructions.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS & DOMESTIC ANIMALS

CAUTION. Causes moderate eye irritation. Harmful if absorbed through skin. Avoid contact with skin, eyes, and clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet.

ENVIRONMENTAL HAZARDS

For terrestrial uses, do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate. This pesticide is slightly toxic to fish and aquatic invertebrates.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Applicators and other handlers must wear:

• Long-sleeved shirt and long pants • Waterproof gloves • Shoes plus socks

In California, pesticide handlers (mixers, loaders, applicators) must also wear coveralls over normal work clothes and must not prepare spray solutions using more than 50 gallons of ***Avian Control®*** per day. Harvesters must wear gloves and long-sleeved shirts.

Persons occupying an enclosed cockpit may substitute work clothing (i.e., long sleeved shirt, long pants, shoes and socks) for label-specified personal protective equipment.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

Users should:

- Remove clothing immediately if pesticide gets inside. If pesticide gets inside, then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

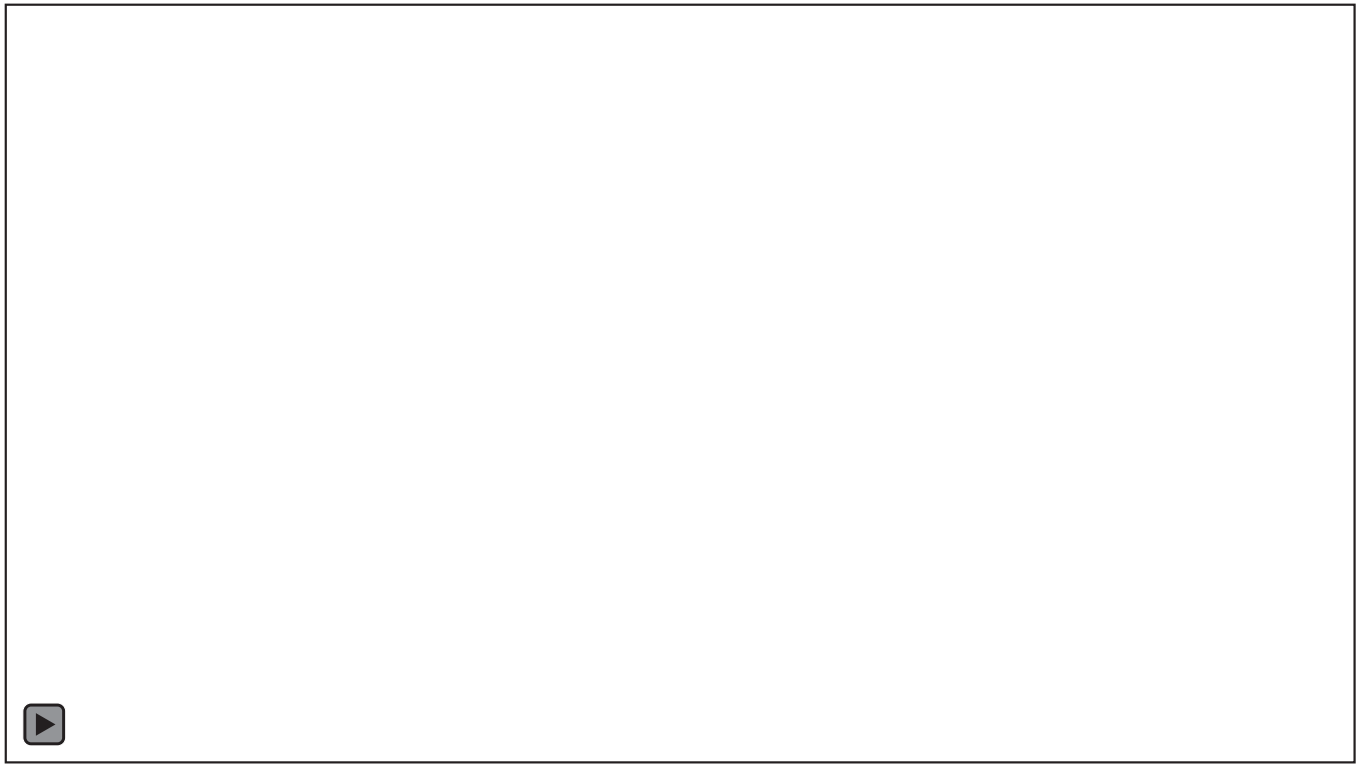
Batch No.:

Manufactured for: Avian Enterprises, LLC
221 Ocean Grande Blvd. Suite 801 Jupiter, FL 33477 Copyright © 2015, Avian Enterprises, LLC
Patent Pending

Net Contents:

☐ 1 Gallon ☐ 2.5 Gallons ☐ 5 Gallons ☐ 15 Gallons ☐ 30 Gallons ☐ 55 Gallons ☐ 275 Gallons

Air Dancer, Scare-eye Balloons, Detassel



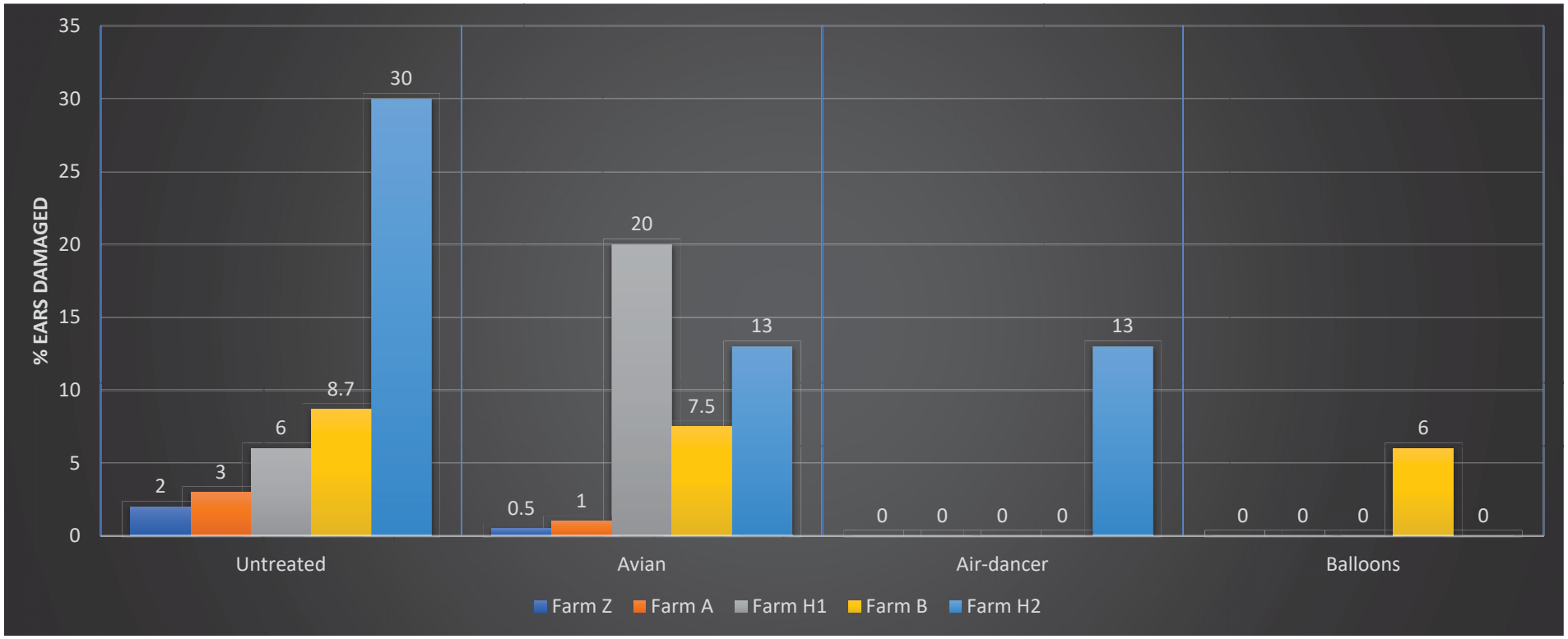
Can these bird repellants reduce damage? Are they economical?

- Avian Control (methyl anthranilate)- 32 oz/A - $36.25/application, 2x = $72.25/A
- Mylar hawk-eye balloons ($10/balloon) – 3 per location - $30
- Air-dancer – ($200 for fan and dancer, plus $400 for generator) ~$862 to set-up and run, electric source reduce cost.
- Detasseling treatment – 2 weeks prior to maturity remove tassel and stalk just above ripening ear. Approx. 1 hr 5000 sq/ft =8.7 hr labor/A @$10.40 = $90.48/A
- Untreated

Data collection

- Monitor crop maturity starting at silking
- Monitor bird activity – counts
- Determine crop maturity –100 plants determine number with brown silk
- Index bird activity – counts of bird droppings (20 locations) on ground and in plants, number of ears damaged and extent of damage (# kernals)
- Number of harvestable ears
- Post trial survey with cooperators on their thoughts of utility of treatments, perceived effectiveness and future uses.

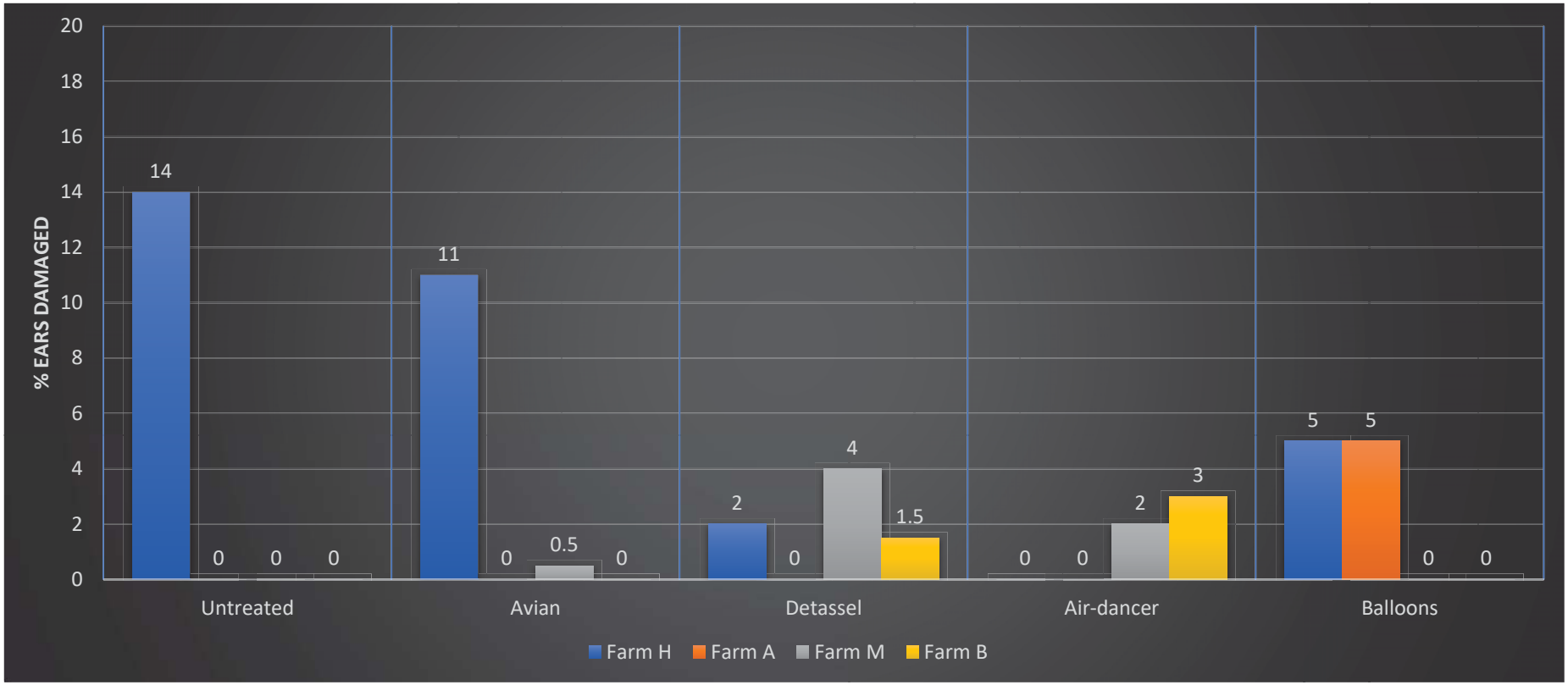
% Ear Damage, 2015



Summary, 2015

- Initial bird damage was high 86% damaged ears in one location – migration happened over night
- 10% damage where other tactics were being deployed – air cannon and nuisance permit
- Bird flew over research site to other ripe fields
- Untreated plots experience 2 to 30% damage
- Average harvestable ears were increased 4.2% with two applications of Avian Control
- Air-dancer will work on small scale 9% increased yield compared to untreated plots
- Avian Control and the “air-dancer” successfully dissuaded birds at all farms increasing yield 1 to 19% at $22-$418/A
- Success was highly dependent on application timing, placement, and crop maturity
- Growers will be implementing one or a few techniques in future seasons

% Ear Damage, 2016



Summary of Trials in 2016

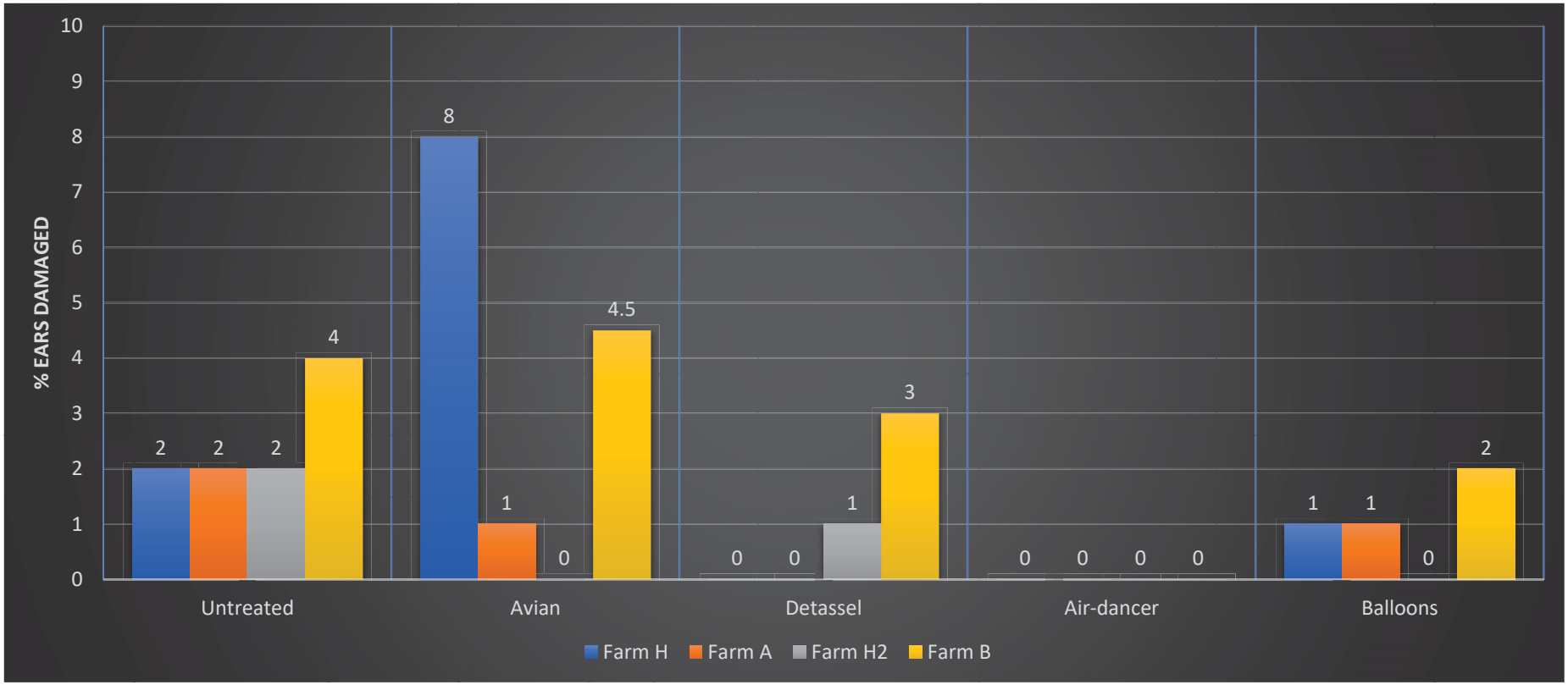
- Research trials set-up on six farms. First bird migration was noted on June 30 and trials were initiated there after based on crop maturity and bird movement on that specific farm
- Trials ran from July 7 until the end of August
- Four farms evaluated the various tactics – chemical, air-dancer, balloons and detassel
- Chemical timing was evaluated in three locations no damage was recorded at two sites at the third site – 6% damage across all treatments
- Bird migration into non-research sites caused 10 to 90% damage on cooperating farms
- Preliminary data review found at one location
  - 14% damage in untreated
  - 11% in Avian control applied 2x at 7 day intervals starting 2-weeks prior to harvest
  - 5% in scare-eye balloon
  - 2% in detasseled
  - 0% in air-dancer

Summary of Trials in 2016

- At a second location all treatments had little to no damage as the birds seemed to avoid the entire field after treatments placed.
- Success was highly dependent on application timing, placement, and crop maturity
- Growers have implemented a few techniques. One stated that he utilized the chemical treatment in his early corn near a location with historical damage and saw good results.
- Importance of implementing tactics before birds learn to feed
  - disrupt their nesting sites
  - avoid the susceptible areas

My two-cents : success of chemical deterrent – make application early to areas susceptible to damage – start 50% brown tassel – two application at mid to highest labelled rate.

2018 Results



Summary of Trials

- Success was highly dependent on application timing, placement, and crop maturity and year
- Importance of implementing these tactics before birds learn about food source
- BMP's for Avian Control – initial application two weeks (50% brown silk) prior to crop maturity, followed by 2nd application one week later
- Air-dancer – effective for small area near bird migration, power biggest limitation
- Detasseling – effective to remove tassels two weeks prior to maturity, increase ease of manual harvest, not for mechanical harvesting
- Scare-eye balloons – would recommend using in combination with other tactics (had most damage out of treatments tested)
- Growers excited about using some of these techniques. One stated that he utilized the chemical treatment in his early corn near a location with historical damage and saw good results

New Research on Laser Scarecrow

- Dr. Rebecca Brown at University of Rhode Island
- Standard lasers used by airports $$$$$
- Designed a do-it-yourself if you want to try
- More information: https://sites.google.com/view/urilaserscarecrow/

- A couple of growers in western NY are going to try to build
- We will keep you posted….

Thank you

- Funding
  - NESARE (2015)
  - New York Farm Viability Institute (2016-2017)
- Collaborators
  - Robert Hadad, CCE – Cornell Vegetable Program
  - Marion Zuefle – NYS Integrated Pest Management
- Technical staff
  - Gretchen Seigworth, summer intern
  - Jodi Callwood, summer intern
  - Amy Celentano, CVP Technician

NY farm viability INSTITUTE

NORTHEAST SARE Sustainable Agriculture Research & Education