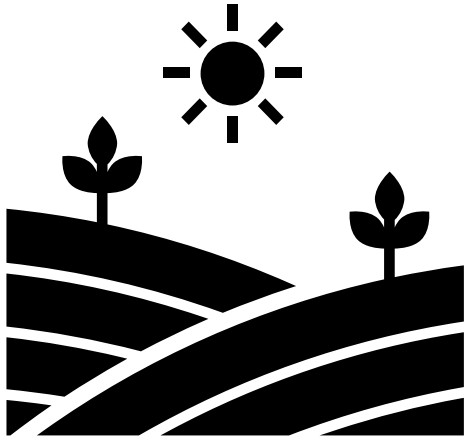
Sweet Corn Production in New England

Dr. Rebecca Nelson Brown, University of Rhode Island

THE UNIVERSITY OF RHODE ISLAND COOPERATIVE EXTENSION

Agriculture in New England

30,700 farms

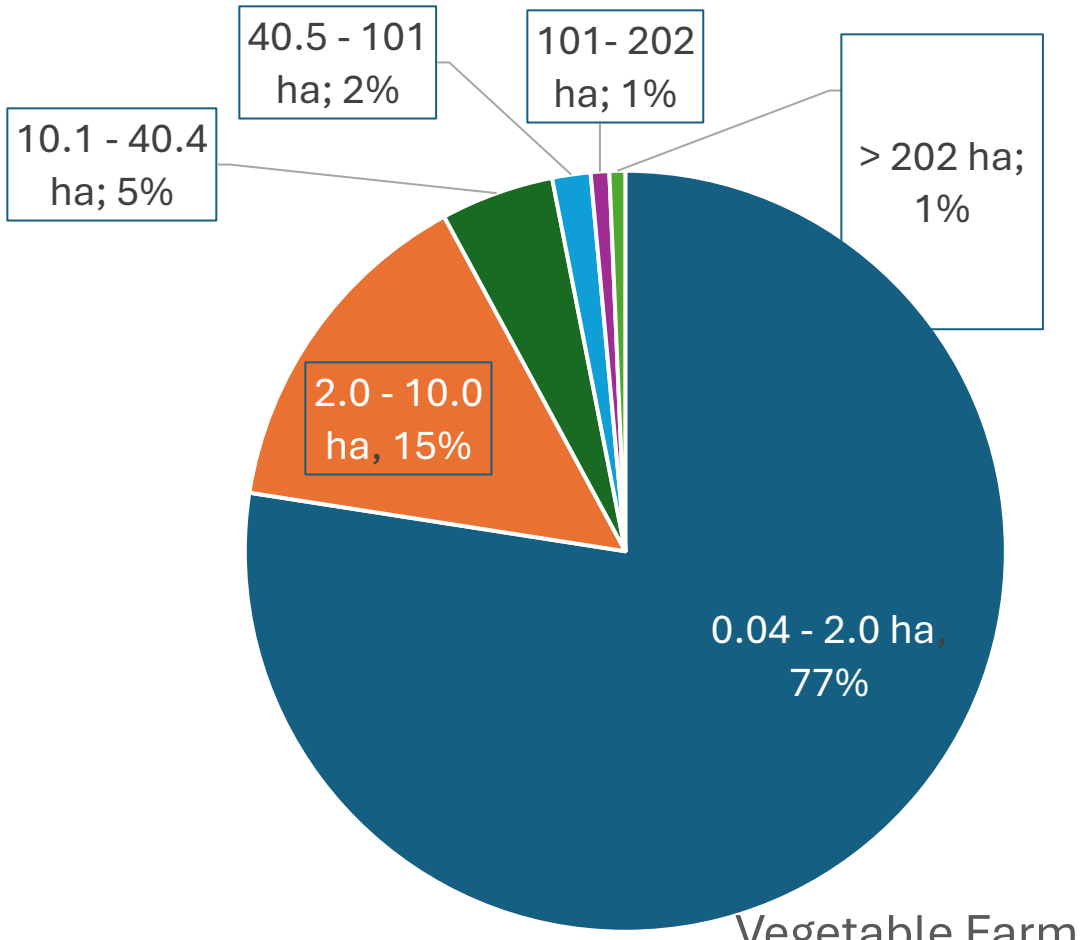


1,505,431 hectares

40,241 hectares
In vegetables

Vegetable Production in New England

- 5,217 farms growing vegetables
- 92% grow < 10 ha
- Most vegetables grown for fresh market
- Most farms sell directly to local consumers



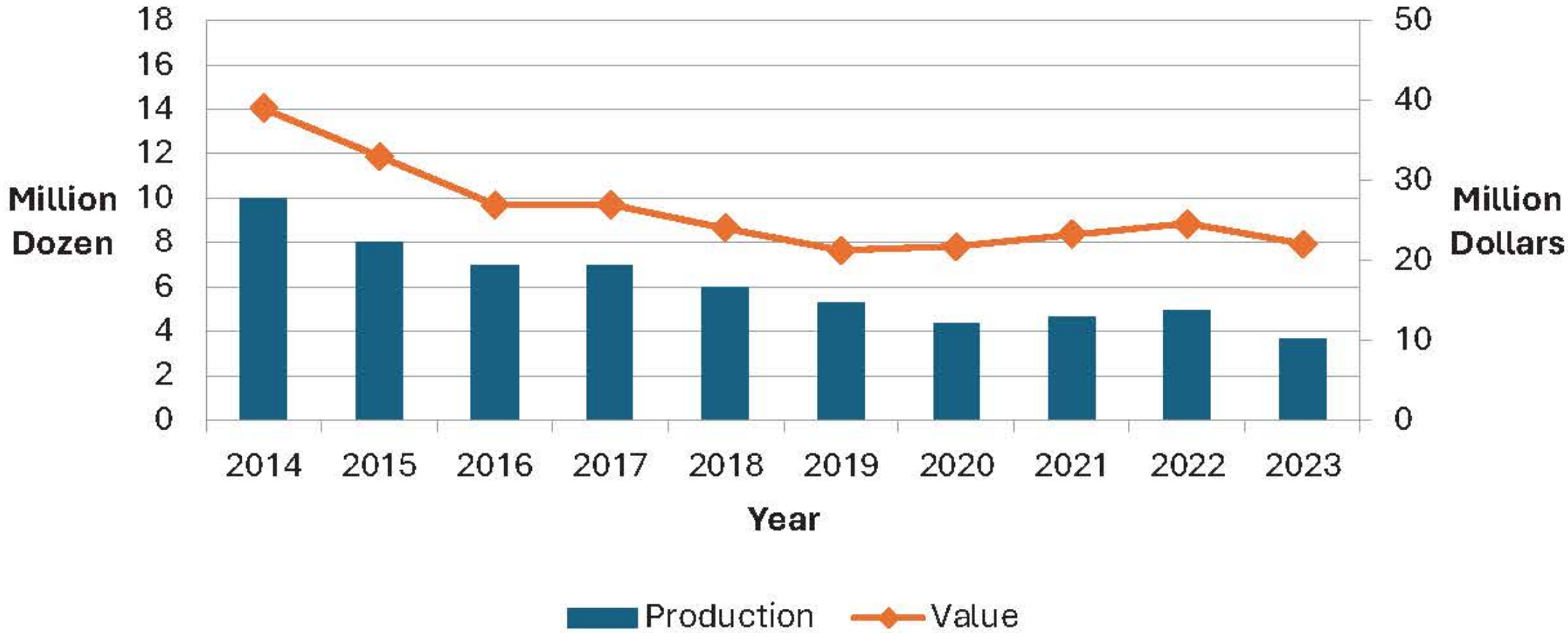
Vegetable Farms by Size

2024 Sweet Corn Statistics

- 3,095 hectares planted
- 428,000 cwt produced; 146 cwt per ha
- 5,032,000 dozen ears
- Average price $5.53 per dozen; up to $12 per dozen retail

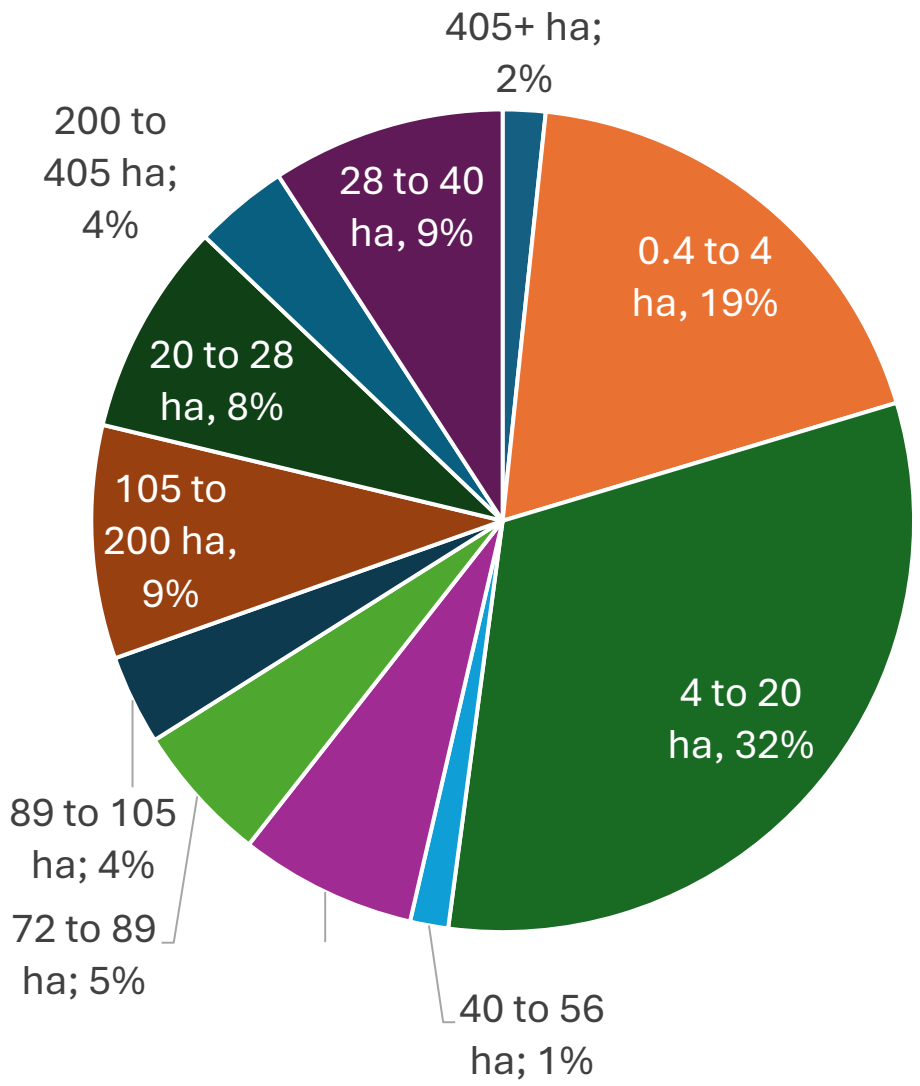
Sweet Corn Production and Value — New England: 2014-2023

For Fresh Market



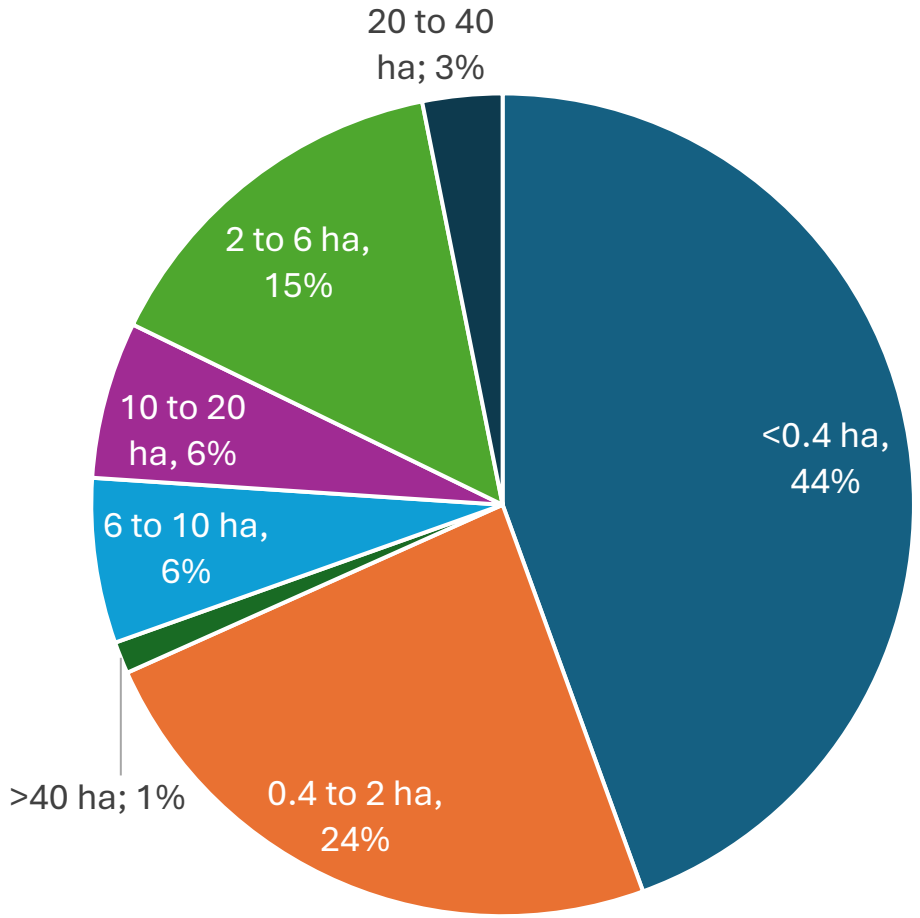
Sweet Corn Farm Size

- 1134 farms growing sweet corn in 2022
- Most are larger than 2 ha
- 51% are smaller than 20 ha
- Largest vegetable farms disproportionately grow sweet corn



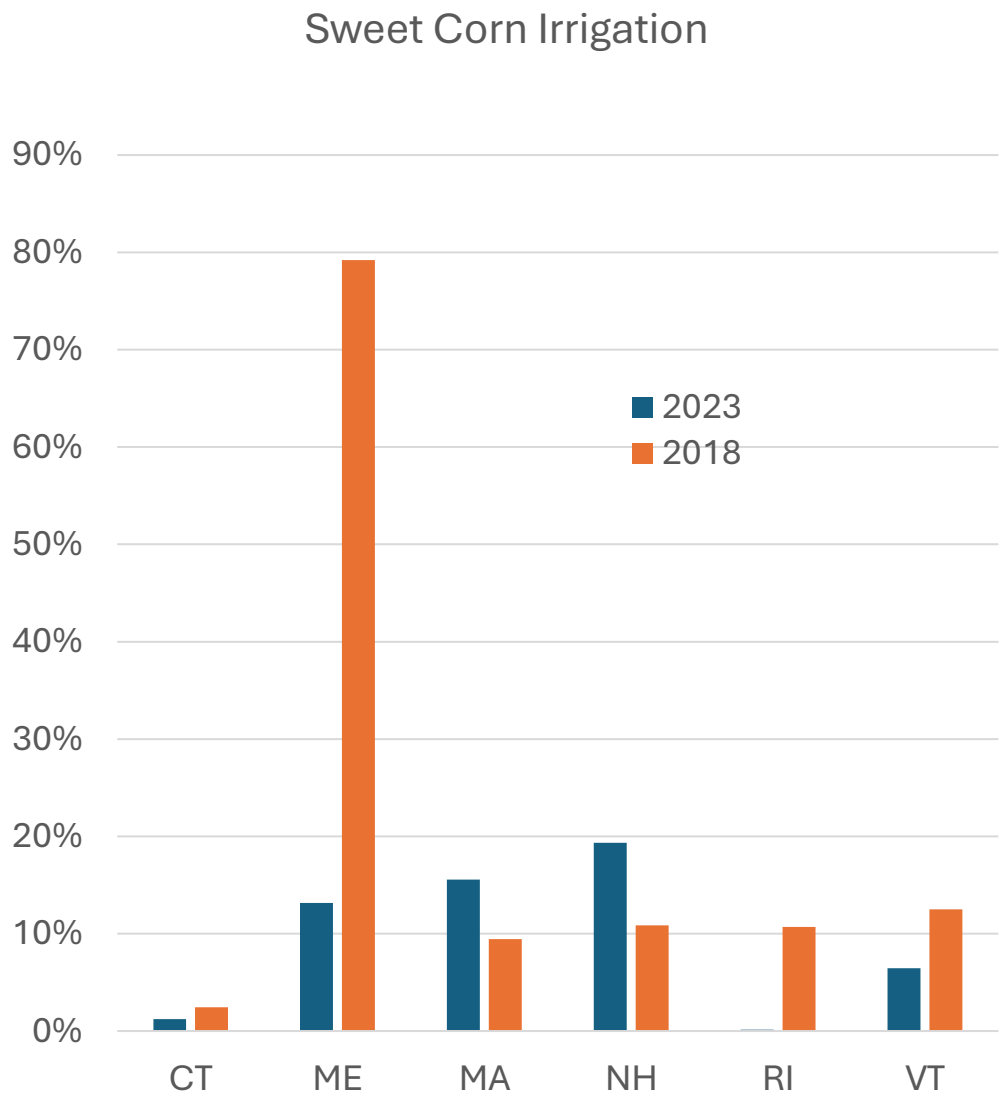
Sweet Corn Area per Farm

- Data only available for Connecticut, Maine, Massachusetts, New Hampshire (956 farms)
- 68% of farms grow <2 ha of sweet corn
- Only 1% of farms grow >40 ha of sweet corn
- 64 farms in Rhode Island grow sweet corn
- 190 farms in Vermont grow sweet corn



Sweet Corn Production Practices

- Sweet corn is leading vegetable crop by area except in Maine
- Not usually irrigated but can be
- 67 farms grow organically – 5.9%
- >99% of acreage is conventional
- No data on use of GMO varieties



Sweet Corn Production

- Most plantings are <5 ha; growers have many separate fields, mix of owned and rented
- Succession planting for continuous harvest
- In southern New England harvest July - September
- Growers use plastic mulch and rowcovers to speed maturity of earliest plantings

Sweet Corn Marketing

- Farms with >10 ha in sweet corn sell to local supermarkets
- Farms with 2 ha to 10+ ha in sweet corn often have farmstands
- Farms with <2 ha in sweet corn sell at farmers' market or to community supported agriculture program members
- Most farms grow many vegetables, not just sweet corn

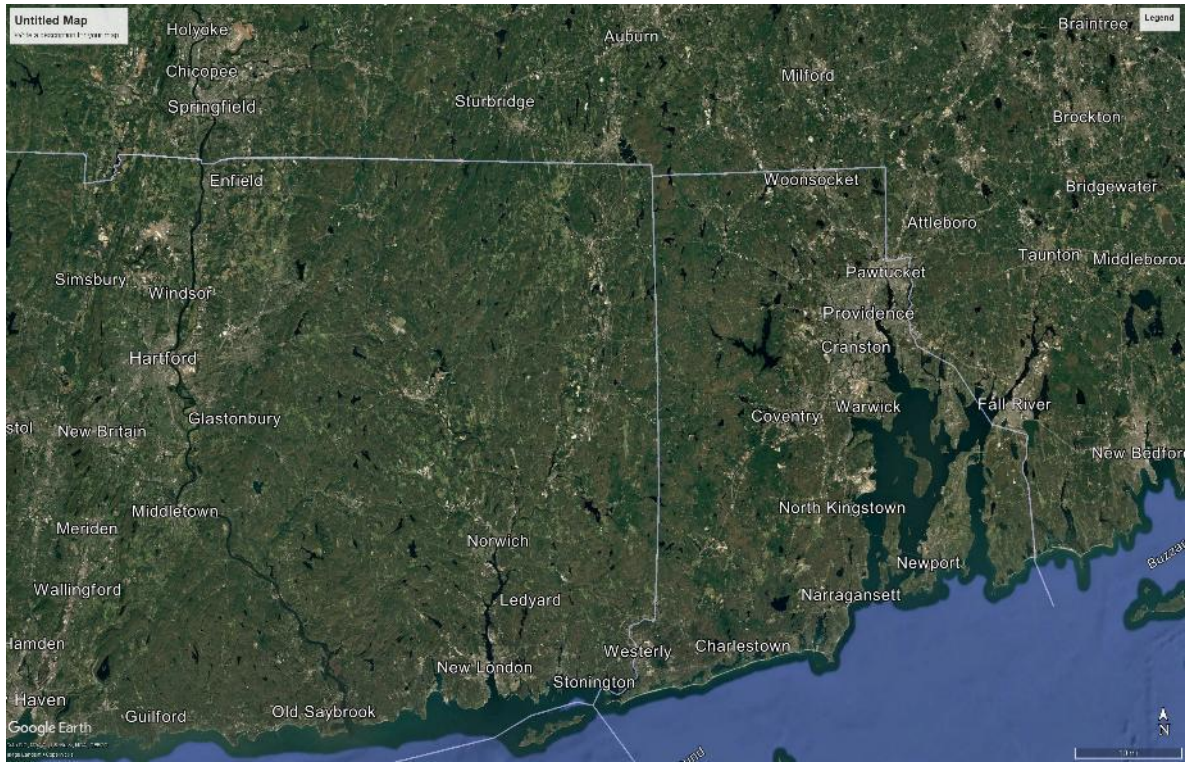
Sweet Corn Production in Rhode Island

- 1,054 farms
- 303 vegetable farms
- 64 farms grow sweet corn
- ~25% grow sweet corn as a major crop
- Most vegetable farms are market gardens

- Farms with sweet corn as major crop plant winter rye cover crop after corn
- Other farms use many different cover crops

Sweet Corn Production Challenges

Why Birds?


Untitled Map
Legend
Holyoke
Chicopee
Springfield
Auburn
Sturbridge
Milford
Braintree
Brockton
Enfield
Woonsocket
Bridgewater
Attleboro
Taunton
Middleborou
Simsbury
Windsor
Pawtucket
Providence
Cranston
Hartford
Glastonbury
New Britain
Coventry
Warwick
Fall River
New Bedfor
Middletown
Meriden
North Kingstown
Norwich
Newport
Wallingford
Ledyard
Narragansett
Westerly
Charlestown
New London
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Haven
Guilford
Old Saybrook
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Untitled Map
Legend
Rawdon
Joliette
Sorel-Tracy
Sainte-Julienne
Sainte-Adèle
Saint-Sauveur
Prévost
Saint-Lin-Laurentides
L'Assomption
Saint-Guillaume
Drummondville
Saint-Germain-de-Grantham
Saint-Jérôme
Mascouche
Repentigny
Sainte-Hélène-de-Bagot
Lachute
Mirabel
Blainville
Terrebonne
Varennes
Laval
Saint-Hyacinthe
Acton Vale
Boucherville
Saint-Eustache
Montréal
Pointe-Claire
Brossard
Chambly
Roxton Pond
Vaudreuil-Dorion
Saint-Césaire
Granby
Châteauguay
Waterloo
Beauharnois
Bromont
Salaberry-de-Valleyfield
Farnham
Lac-Brome
Cowansville
Bedford
Dunham
Sutton
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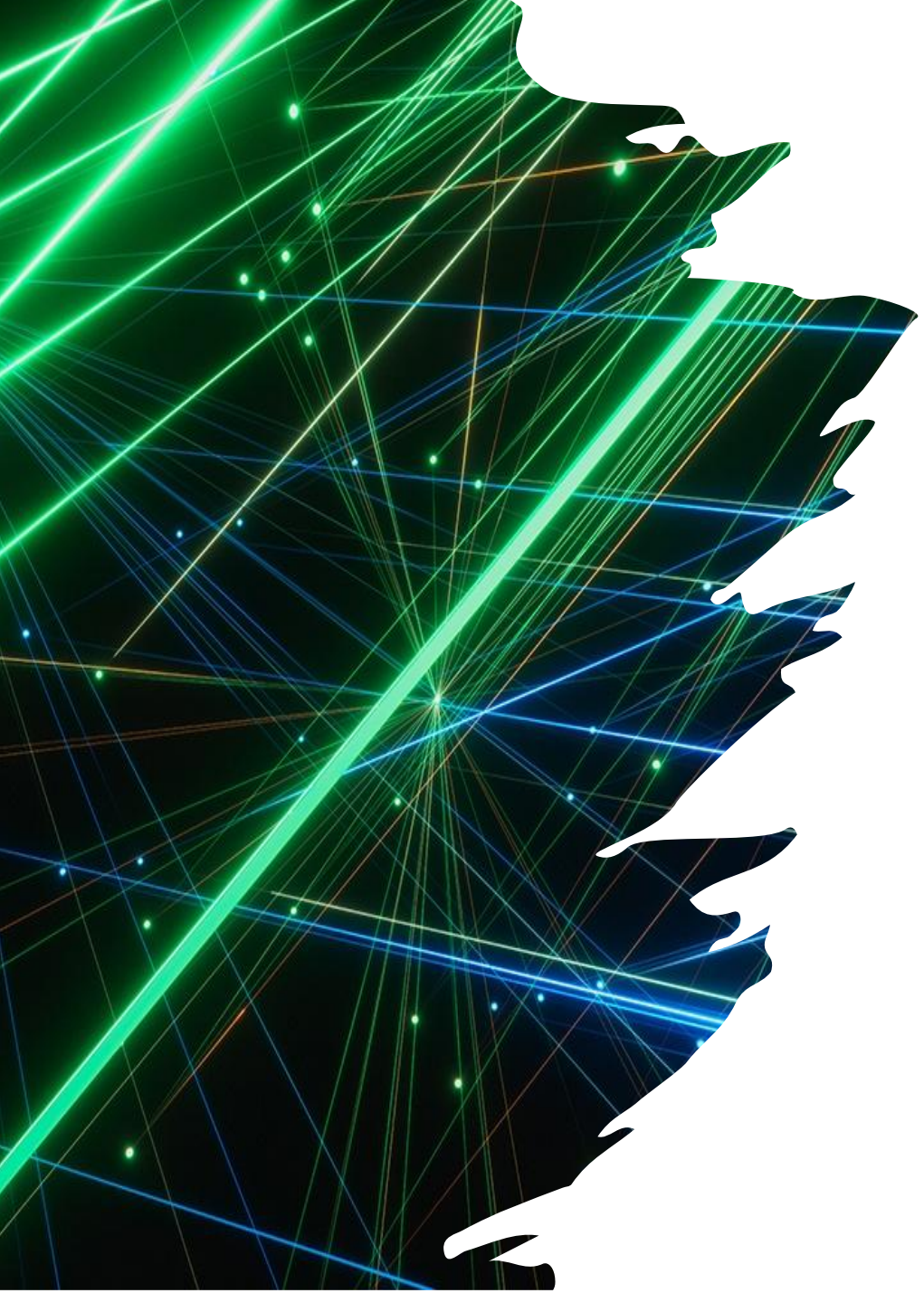
The Problem

Usual Solutions

- Bird Scare Cannons
- Pyrotechnics
- Birdshot
- Repellents
- Scary Eye Balloons
- Effigies
- Accept the losses



Advantages of Lasers as Bird Deterrents

- Minimal labor required to set up/take down
- A single unit can cover a large area
  - Coverage depends on laser power, crop, and terrain
- Area of impact can be controlled
- No interference with field access or crop management
- Laser beams are not affected by wind or rain
- Quiet – won’t alarm or annoy neighbors
- Can be fully automated and movement can be randomized

Bird Vision is more sensitive than Human

- Able to see a wider range of colors than humans and to better distinguish between colors
- More sensitive to motion
- Able to process visual signals more quickly

- Birds can see laser beams when humans cannot

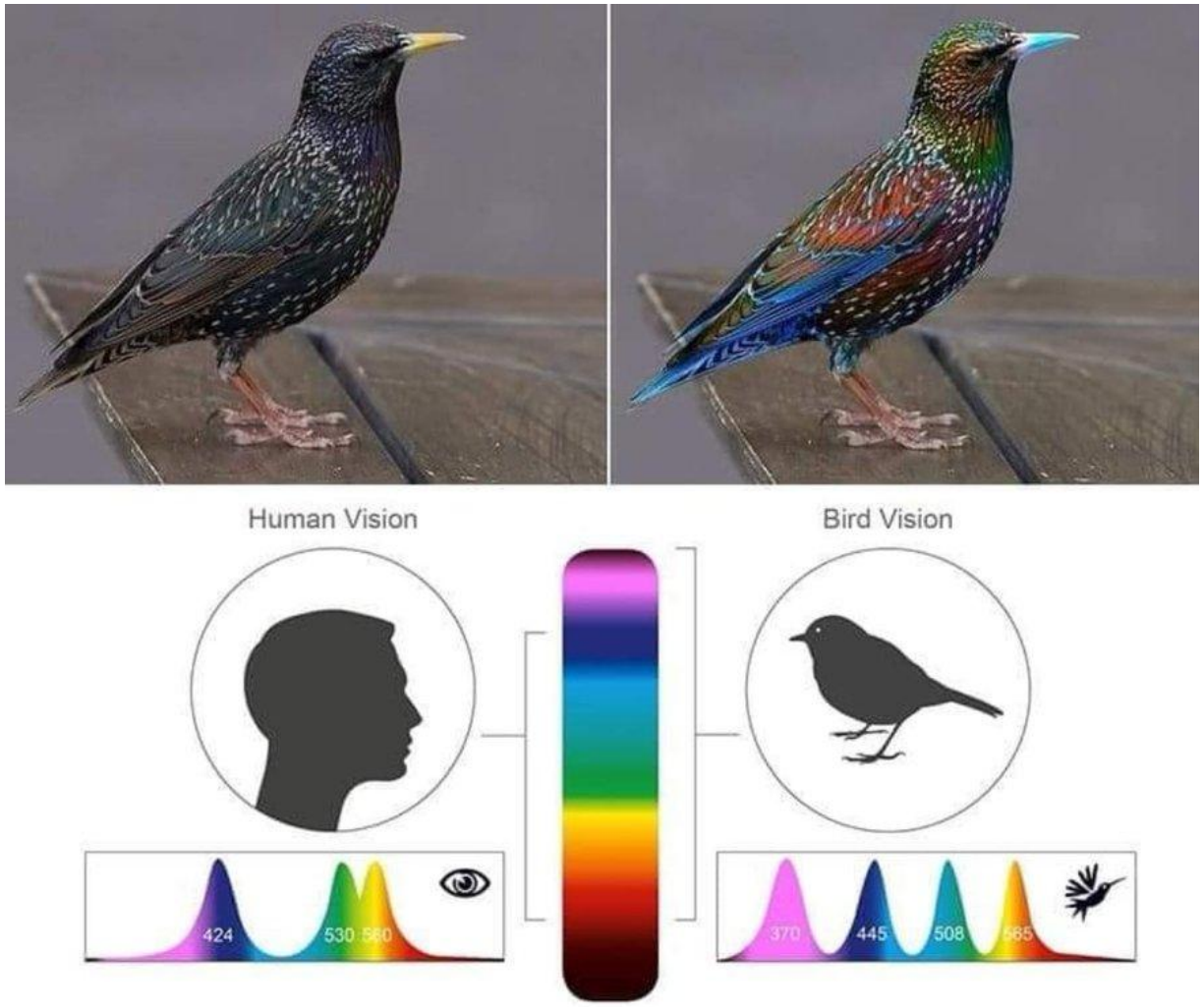
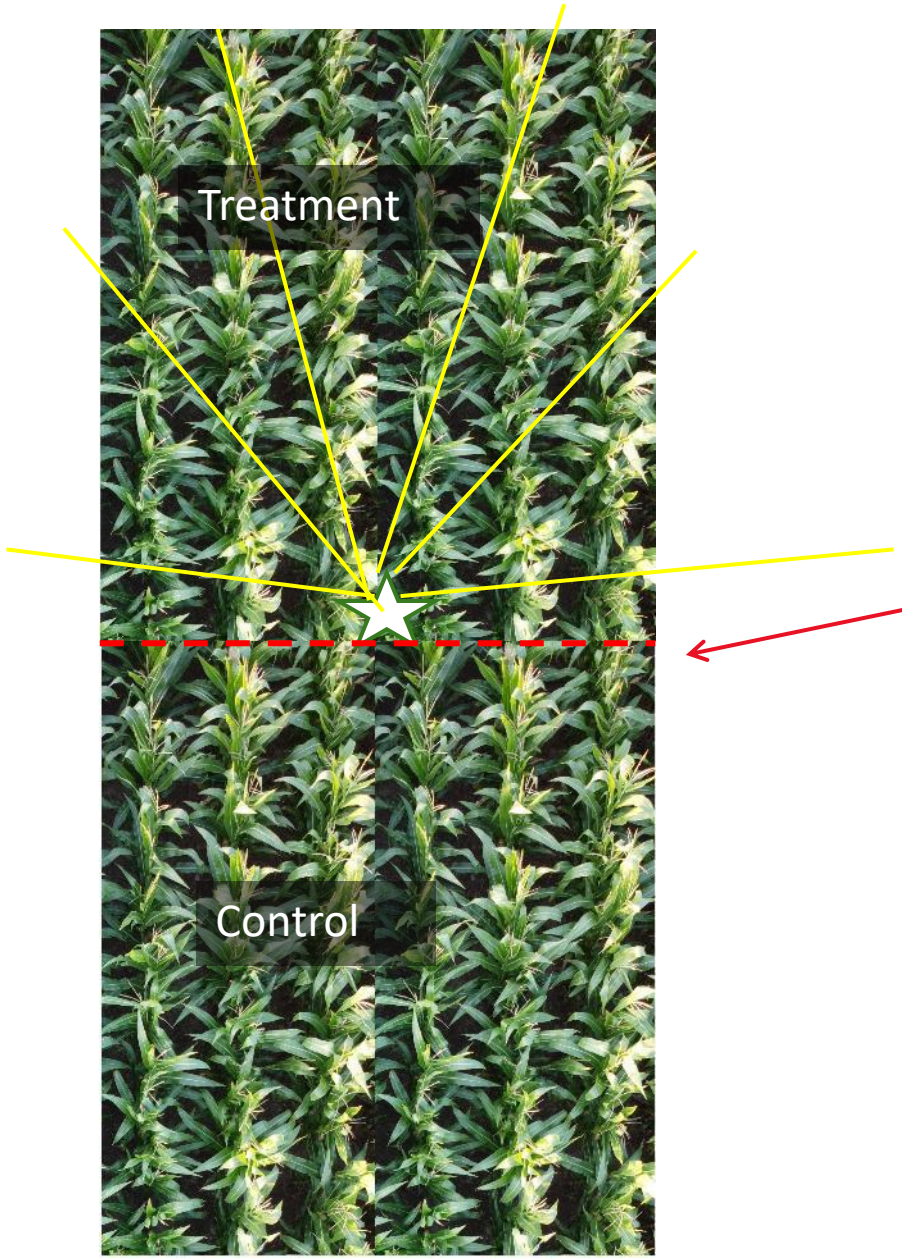


Illustration from
https://i.redd.it/uwlwfydt4x991.png

Photo by
Julie Kikkert

Open Field Trials

Laser versus No Bird Control

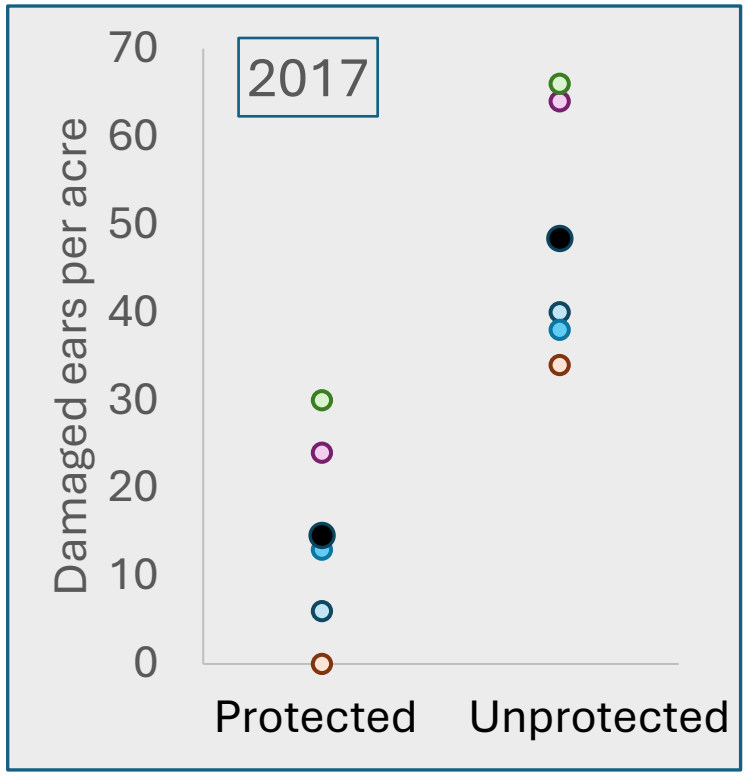


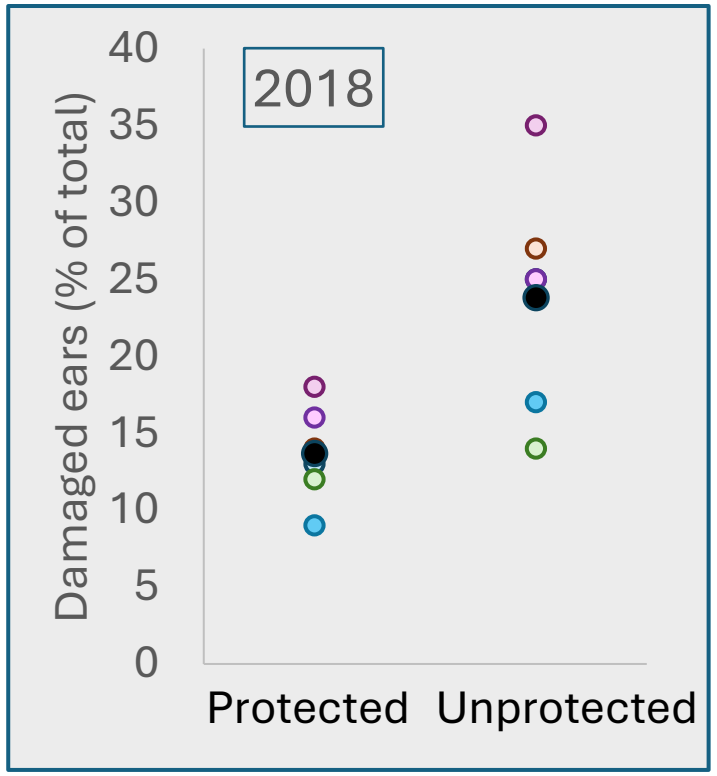
Methods

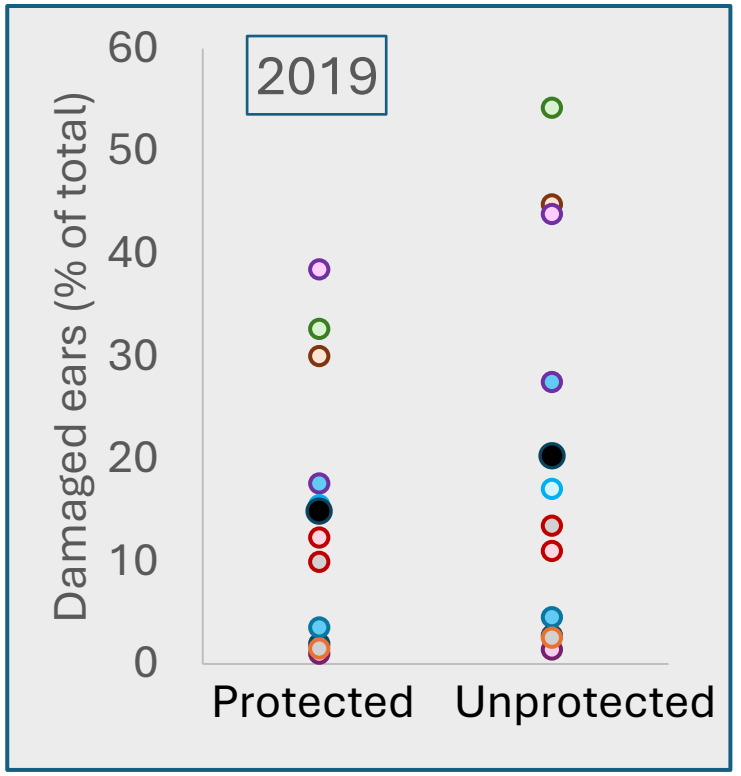
- Three years of trials in Rhode Island – research farm and commercial farms
- Split field design with replication over time
  - Half of field was protected by laser, half was unprotected as control
  - Each corn planting or sampling date serves as experimental unit
- Counted damaged ears in each plot at harvest
- Analysis using paired T-test

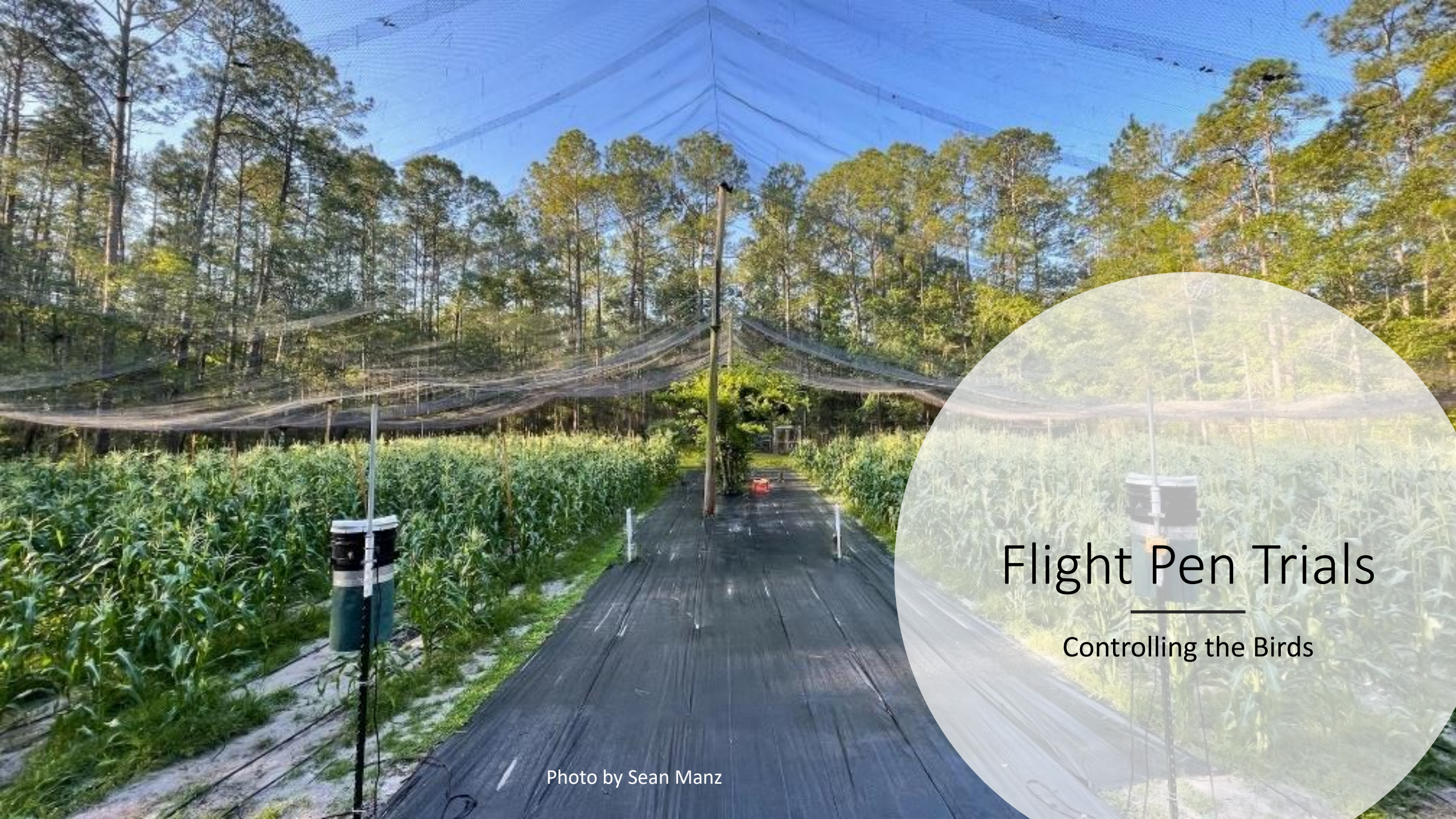
Results

Year	T-test Significance
2017	*P* = 0.0002
2018	*P* = 0.0046
2019	*P* = 0.0332









Flight Pen Trials

Controlling the Birds

Photo by Sean Manz

Methods

- Conducted in a 0.2 ha flight pen at the National Wildlife Research Center Florida Field Station in Gainesville, FL Fall 2021 and Spring 2022
- Multiple cohorts of European Starlings; 10 birds per cohort
  - Each cohort tested on 5 days
- Pen contained two planting areas (A and B) each ~0.06 ha planted to sweet corn

Two Types of Tests

- Stick Corn using purchased ears
- Natural Corn

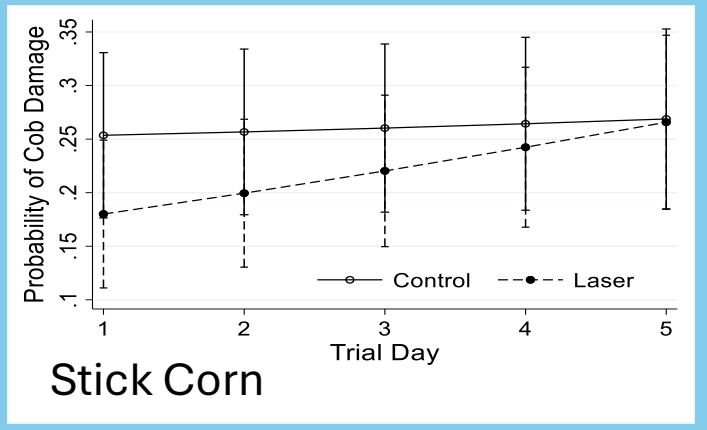
Photos by Sean Manz

Questions

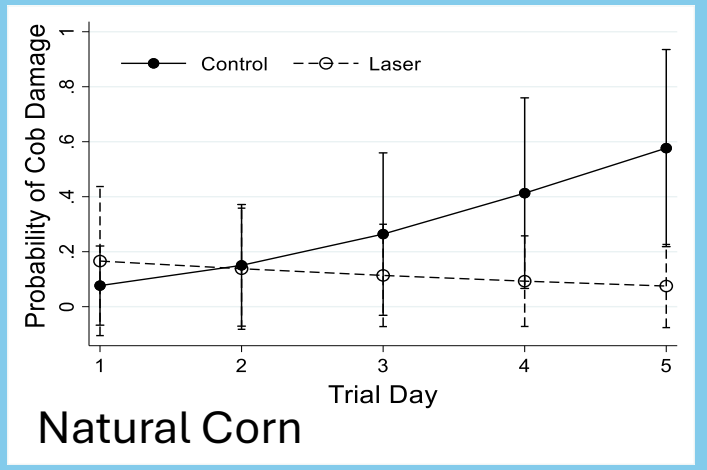
1. Does the laser decrease the likelihood of damage to ears?
2. Do the birds habituate to the laser?

Results

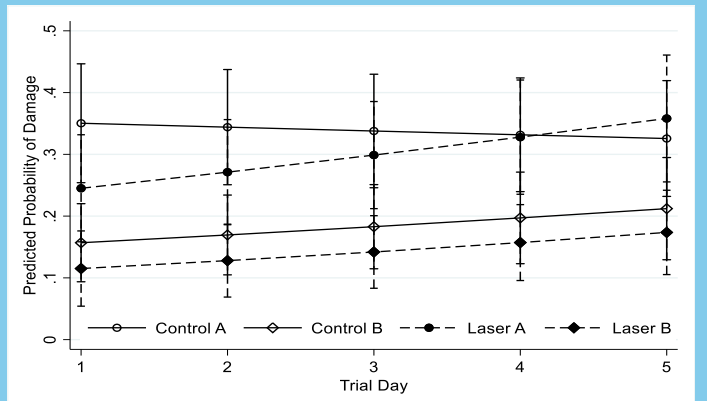
- Stick corn in Laser Plot had 74% lower probability of damage than control
- Natural corn in Laser Plot had 1000% lower probability of damage than control
- Damage was much more likely in Field A, closest to roosting area
- Probability of damage in Laser Plot increased over time in stick corn but not in natural corn (habituation)
- Habituation only occurred in Field A



Stick Corn



Natural Corn



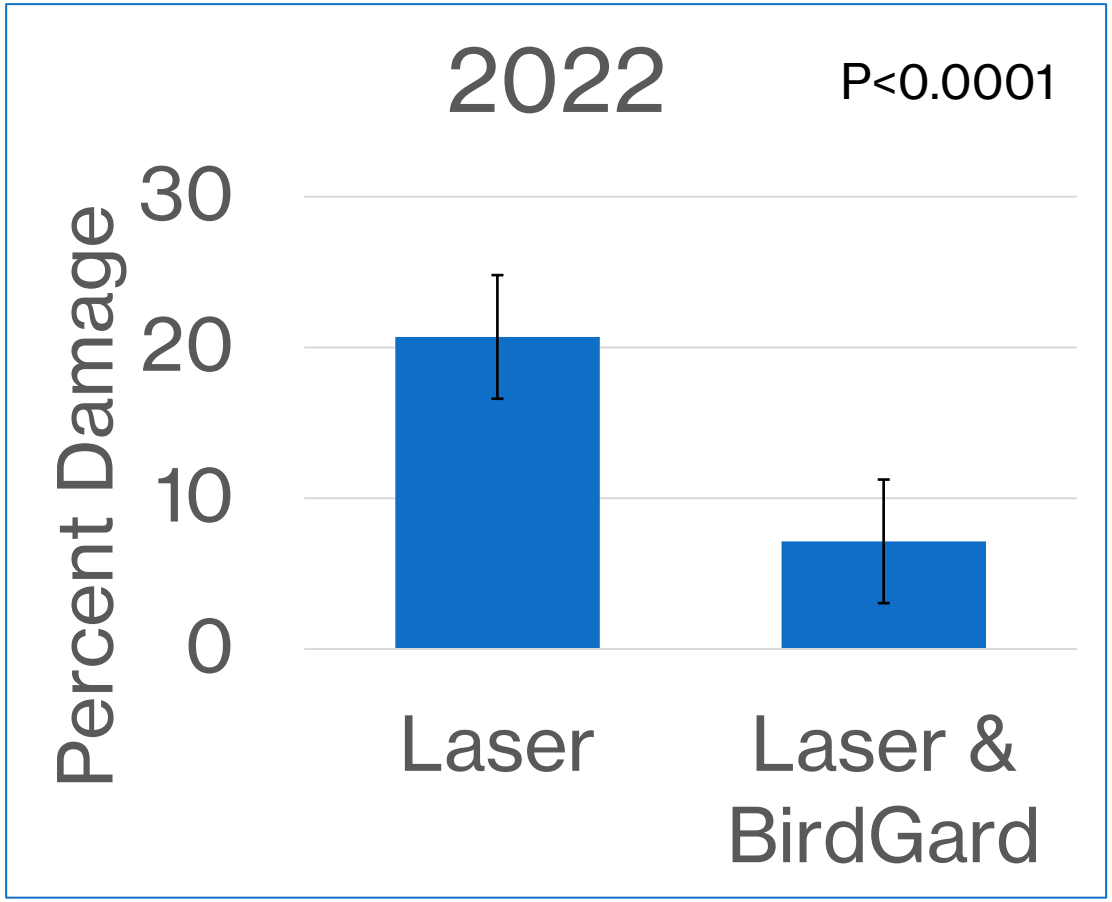
Field Preference

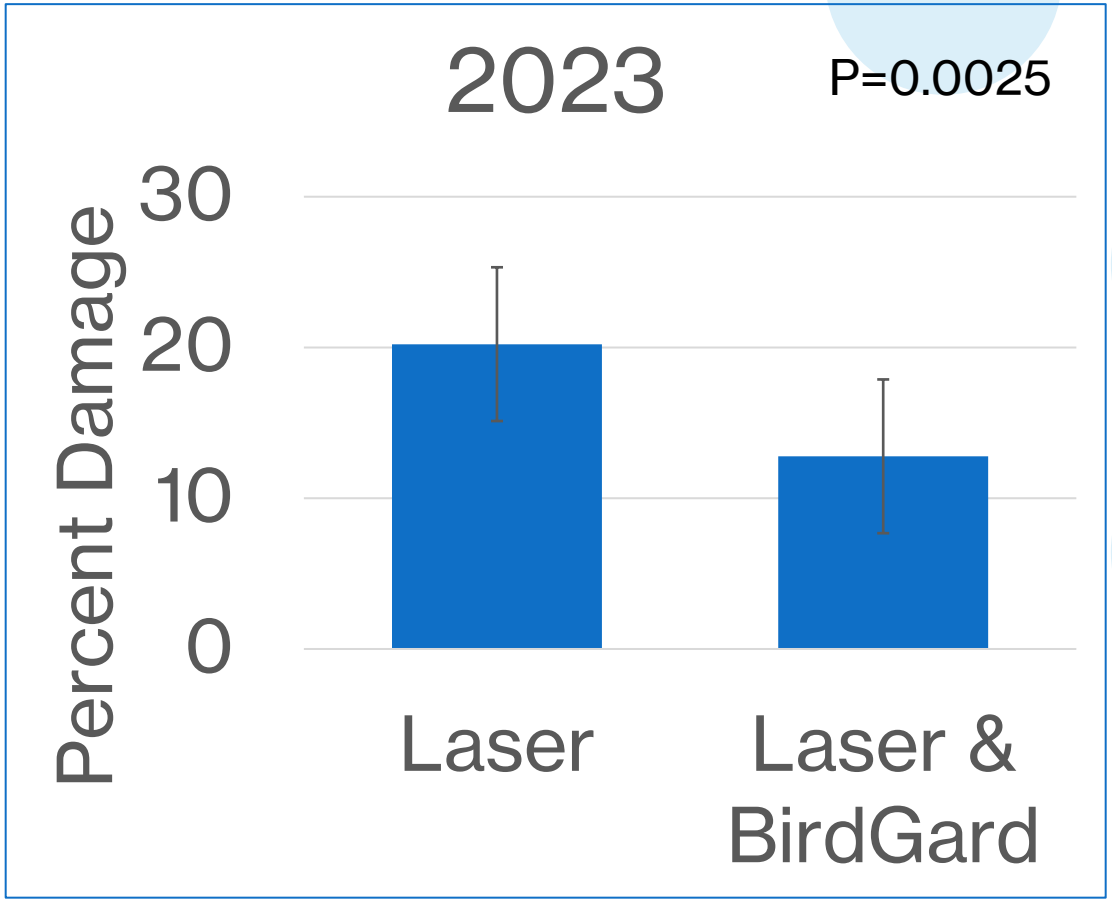
Does combining recorded distress calls with lasers further decrease damage?

Methods

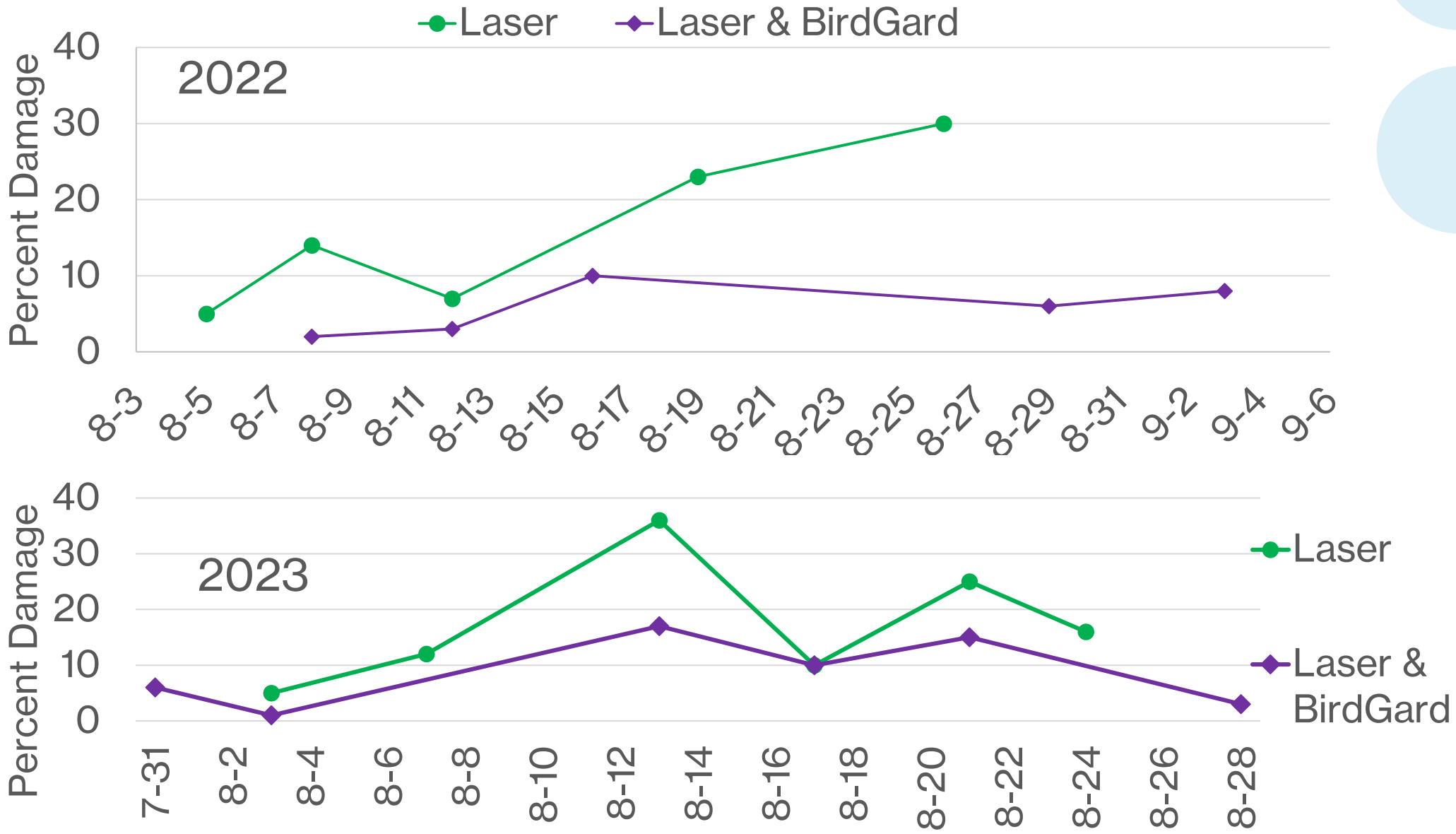
- Two fields, ~ 2,000 ft apart
- 5 or 6 planting blocks per field – maturing over 4 to 5 weeks
- Both fields equipped with URI Laser Scarecrow and BirdGard Super Pro distress call system (optimized for starlings and red-winged blackbirds) running dawn to dusk
- Laser scarecrow ran continuously beginning 1 week before first ears matured
- Status of BirdGard toggled on/off after each data collection
- Damaged ears counted on two dates for each planting block – at prime harvest and 3 to 5 days after prime
- Study repeated for 2 years

Results


2022
P<0.0001
Percent Damage
30
20
10
0
Laser
Laser & BirdGard


2023
P=0.0025
Percent Damage
30
20
10
0
Laser
Laser & BirdGard

Results


Laser
Laser & BirdGard
2022
Percent Damage
40
30
20
10
0
8-3
8-5
8-7
8-9
8-11
8-13
8-15
8-17
8-19
8-21
8-23
8-25
8-27
8-29
8-31
9-2
9-4
9-6
2023
Percent Damage
40
30
20
10
0
7-31
8-2
8-4
8-6
8-8
8-10
8-12
8-14
8-16
8-18
8-20
8-22
8-24
8-26
8-28
Laser
Laser & BirdGard

Conclusions

- Laser Scarecrows can significantly reduce bird damage to sweet corn
- Habituation is unlikely unless birds are strongly motivated
- Adding auditory deterrent further reduces damage

Acknowledgements

- David Brown for designing and building laser scarecrows
- Sean Manz, Katie Sieving and Bryan Kluever for flight pen trials
- Jasper Romero, Gabrielle Torphy, Jack Conway, Fari Gheshm and Emma Fernandes for help with data collection
- John Jackson and Tyler Young for hosting experiments on their farms
- Gabrielle Torphy and Tim Sherman for assistance with field work at URI
- Jim Lawson of RI Division of Agriculture Wildlife Management for initiating and championing the project
- This work was supported by the USDA AMS Specialty Crop Marketing Program, Northeast SARE, and the Rhode Island Agriculture Experiment Station
- BirdGard Super Pro units were donated by BirdGard
- More information at www.laserscarecrow.info