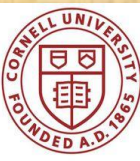


Seed Corn Maggot in the Northeast US

**Elson Shields
Entomology-Retired-2022
Cornell University
Ithaca, NY**



E. Shields

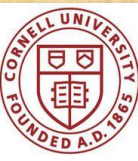
Extension: Research – Cornell Entomology – Ithaca

36 years (1986 – 2022)

Responsibility – Field Crops Entomology

(alfalfa, corn, soybeans, wheat, grass pastures)

Retired as a Full Professor in September 2022





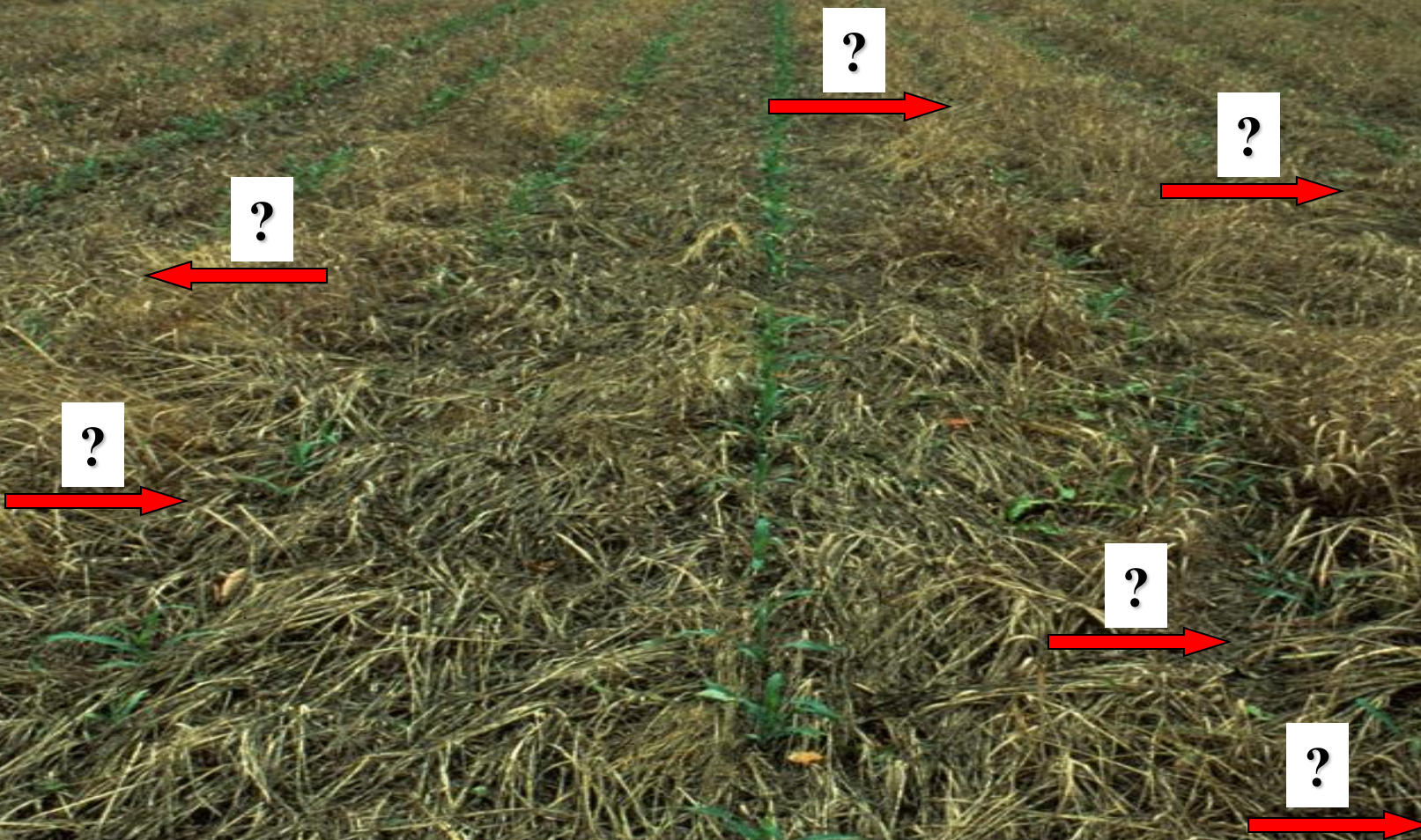
Seed Corn Maggot

Insect attracted to the environment, not the crop

- 1) Overwinter outside the field**
- 2) Attracted to high organic matter (love your compost pile)**
- 3) Multiple generations over the growing season**
- 4) Only the first 2 generations important to field crops (or most of agriculture).**



1990s

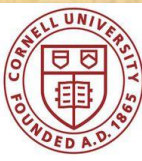


Pre-Neonic Cover Crop Stand Losses

Is IPM an option to seed treatment?

Is Scouting viable before planting?

- 1) What happens if SCM adults appear shortly after planting?
- 2) Corn 30-7 days window of vulnerability (soil temp)
- 3) No Insecticide rescue treatment
- 4) Replanting not a viable option (growing season too short, yield reduction, extra expense)
- 5) If less than 50% stand loss, less money is lost if the stand is retained than the expense of a replant.



Is IPM an option to seed treatment?

Is an IPM Threshold for SCM feasible?

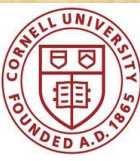
1) SCM adults can appear before planting or after planting

(overwinter outside the field, attracted to the organic matter in the field)

2) Planting delays = Yield Reduction due to short growing season

3) Corn 7-30 days window of vulnerability

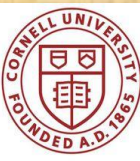
4) No Insecticide Rescue Treatment



Are Insecticide Seed Treatments really needed?

- 1) Continuous corn**
- 2) Corn following cover crops**

**If Neonic seed treatments are
banned in NY, what are the
alternatives?**



SCM- Corn plot design

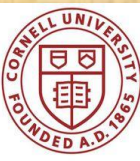
Single row plots using a 4-row corn planter

Treatments: Single row of

- 1) non-Bt-RW without neonic seed treatment**
- 2) non-Bt-RW with neonic seed treatment**
- 3) Bt-RW without neonic seed treatment**
- 4) Bt-RW with neonic seed treatment**

Continuous corn (7 years)

Corn following a cover crop (red clover)



Continuous Corn – Plot Design

Single row for each treatment

Single Planter pass, 4 reps

6 weekly planting dates



Non-Bt-RW
No Insecticide



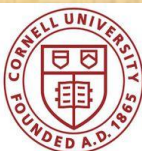
Non-Bt-RW
+ Insecticide



Bt-RW
No Insecticide



Bt-RW
+ Insecticide



SCM in Continuous corn

Assume: Target corn stand = 32,000/plants/acre

10% Stand loss & greater: 9/24 planting pairs = 38% ←

(Some agronomists feel Yield Loss starts at this level)

14% Stand loss & greater: 8/24 planting pairs = 33% ←

(Most agronomists feel Yield Loss starts at this level)

20% Stand loss & greater: 6/24 planting pairs = 25% ←

(All agronomists feel Yield Loss occurs at this level)

Assume

20-ton yield & \$40/ton value =>

1% yield loss = 0.2 tons = \$8 loss/ac

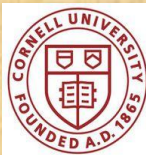
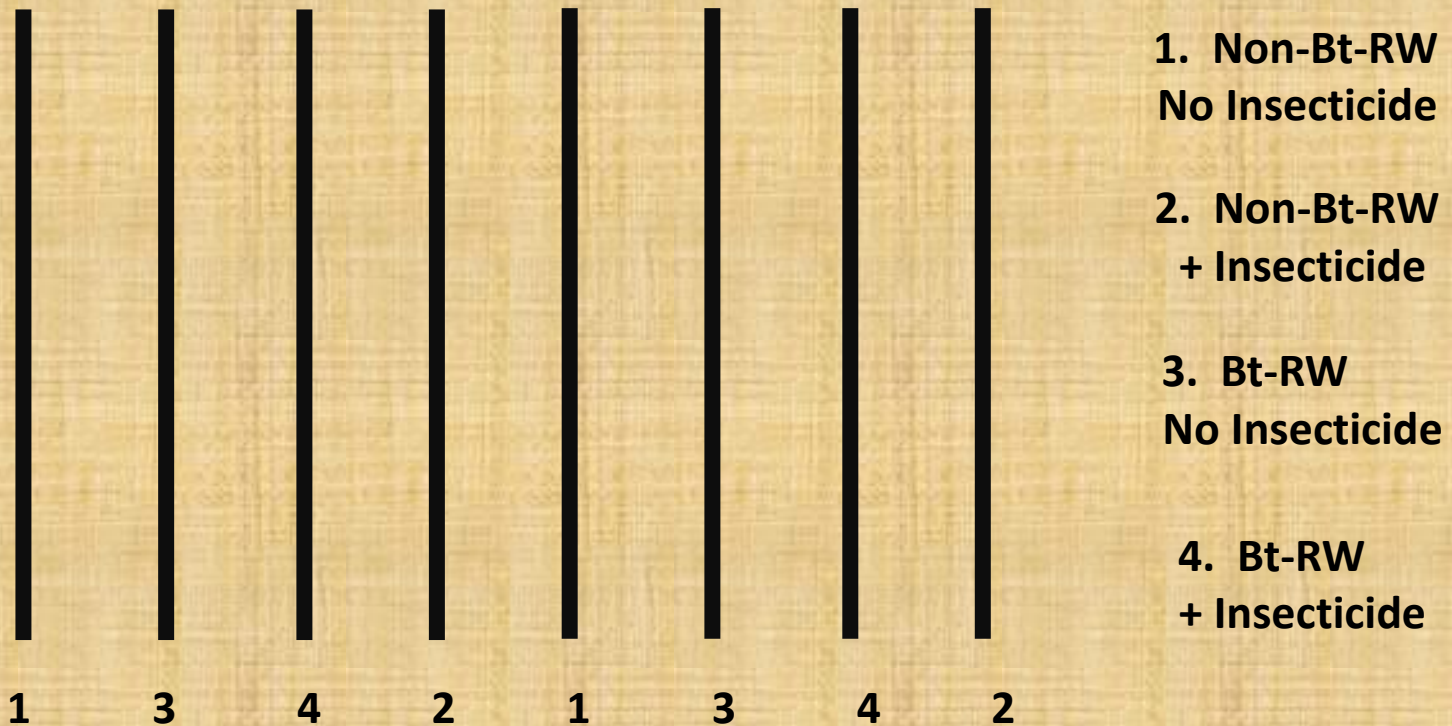
5% yield loss = 1 ton = \$40 loss/ac

Cost of the SCM seed treatment = \$5/ac



Corn following Cover Crop + Manure Plot Design

Single row for each treatment
2 Planter passes, 4 Reps
6 weekly planting dates



SCM in Corn following Cover Crop + Dairy Manure

10% Stand loss & greater: 13/24 planting pairs = 54% ←

(Some agronomists feel Yield Loss starts at this level)

14% Stand loss & greater: 9/24 planting pairs = 38% ←

(Most agronomists feel Yield Loss starts at this level)

20% Stand loss & greater: 7/24 planting pairs = 29% ←

(All agronomists feel Yield Loss starts at this level)

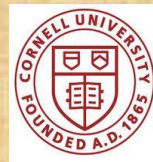
Assume:

20-ton yield and \$40/ton value =>

1% yield loss = 0.2 tons = \$8 loss/ac

5% yield loss = 1 ton = \$40 loss/ac

Cost of the SCM seed treatment = \$5/ac



Summary

Continuous corn (7 years):

10% and greater stand loss = 38%

14% and greater stand loss = 33%

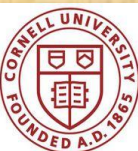
20% and greater stand loss = 25%

Corn after cover crop + manure:

10% and greater stand loss = 54%

14% and greater stand loss = 38%

20% and greater stand loss = 29%



Alternatives to Neonic Seed treatments

- **Do nothing and suffer losses**
(25% - 54% of the fields)
- **Diamides as a seed treatment**
(Currently 3x the costs of Neonics)
- **Liquid insecticide with the popup fertilizer at planting**
- **In-Furrow Soil Insecticide (Force, etc).**

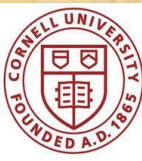


Table 1. Mean (\pm SEM) percentage of snap bean plants, cv ‘Huntington’, damaged by seedcorn maggot, *Delia platura*, near Geneva, NY in 2021. (B. A. Nault)

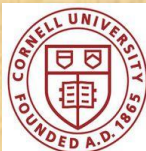
Trt# ^b	Treatments	Active ingredient	Rate	% plants damaged (above-ground plant stand only) ^a	% plants damaged (above- and below-ground based on a sample of 25 plants/germinated seeds) ^a
1	Untreated	-----	-----	17.6 \pm 2.2 a	43.3 \pm 5.2 a
2	Cruiser 5 FS (2X corn rate)	Thiamethoxam (Neonic)	1.28 fl oz/cwt of seed	3.7 \pm 1.2 b	5.3 \pm 1.7 c 88% control
3	Fortenza	Cyantraniliprole (Diamide)	0.25 mg a.i./seed	3.5 \pm 0.9 b	18.7 \pm 3.0 b 57% control
4	Fortenza	Cyantraniliprole (Diamide)	0.5 mg a.i./seed	2.3 \pm 0.6 b	21.3 \pm 4.1 b 51% control

SCM Control on Snap Beans

B.A. Nault & R. S. Harding 2019

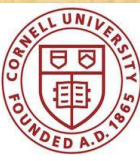
Product	AI	Rate	% plants SCM damaged
Untreated	---	----	20.8 ± 1.8 a
Capture LFR	bifenthrin	4 fl oz	10.3 ± 2.7 b

50% reduction
In damage



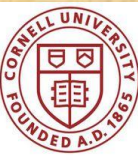
Mitigate Risks

- 1) Neonic dust from planters coating flowering plants during planting**
(only vacuum air planters, dust reduction)
(planter modification, dust reduction additive)
- 2) Neonic residues in water from tile lines**
(present but extremely low levels)
- 3) Neonic residues in plant nectar**
(no conclusive scientific studies to date)



Cornell Report

- 1) Very little research data from the Northeastern US**
- 2) Many cited sources are statistically inappropriate for the analysis utilized**
- 3) My own research was misrepresented in the report (authors refused to correct it)**



Questions?



Pre-Neonic Cover Crop Stand Losses