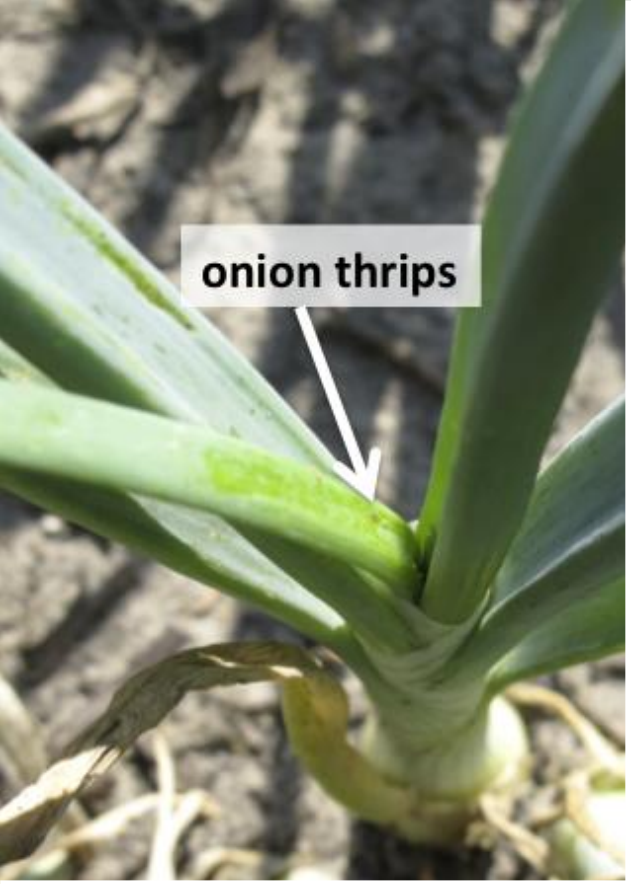


Venturing into organic thrips control

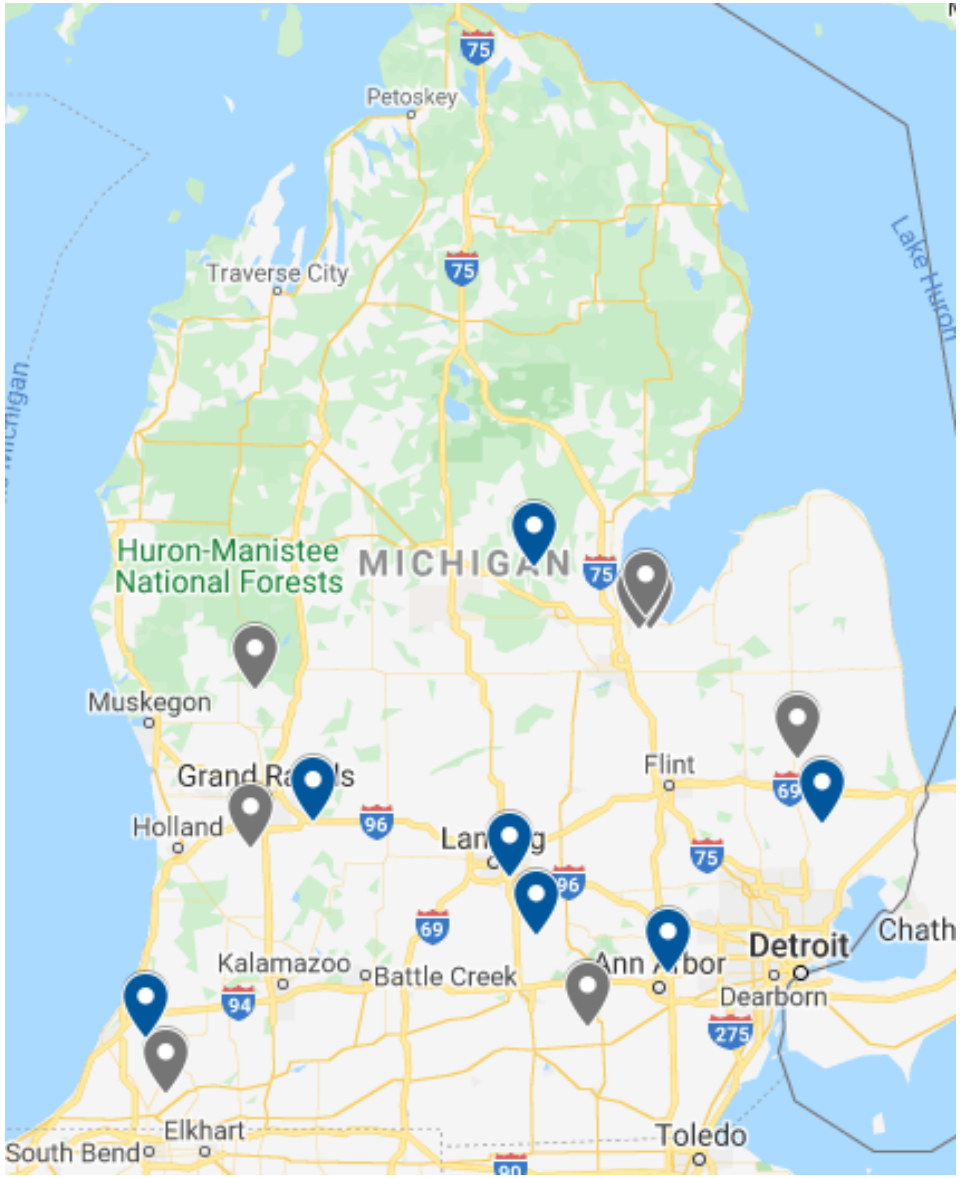
Zsofia Szendrei & Natalie Constancio, Vegetable Entomology, Michigan State University

Goals

- Compare thrips and disease pressure in conventional vs. organic onion fields
- Test organic pesticides for control of onion thrips and pathogens

Field surveys

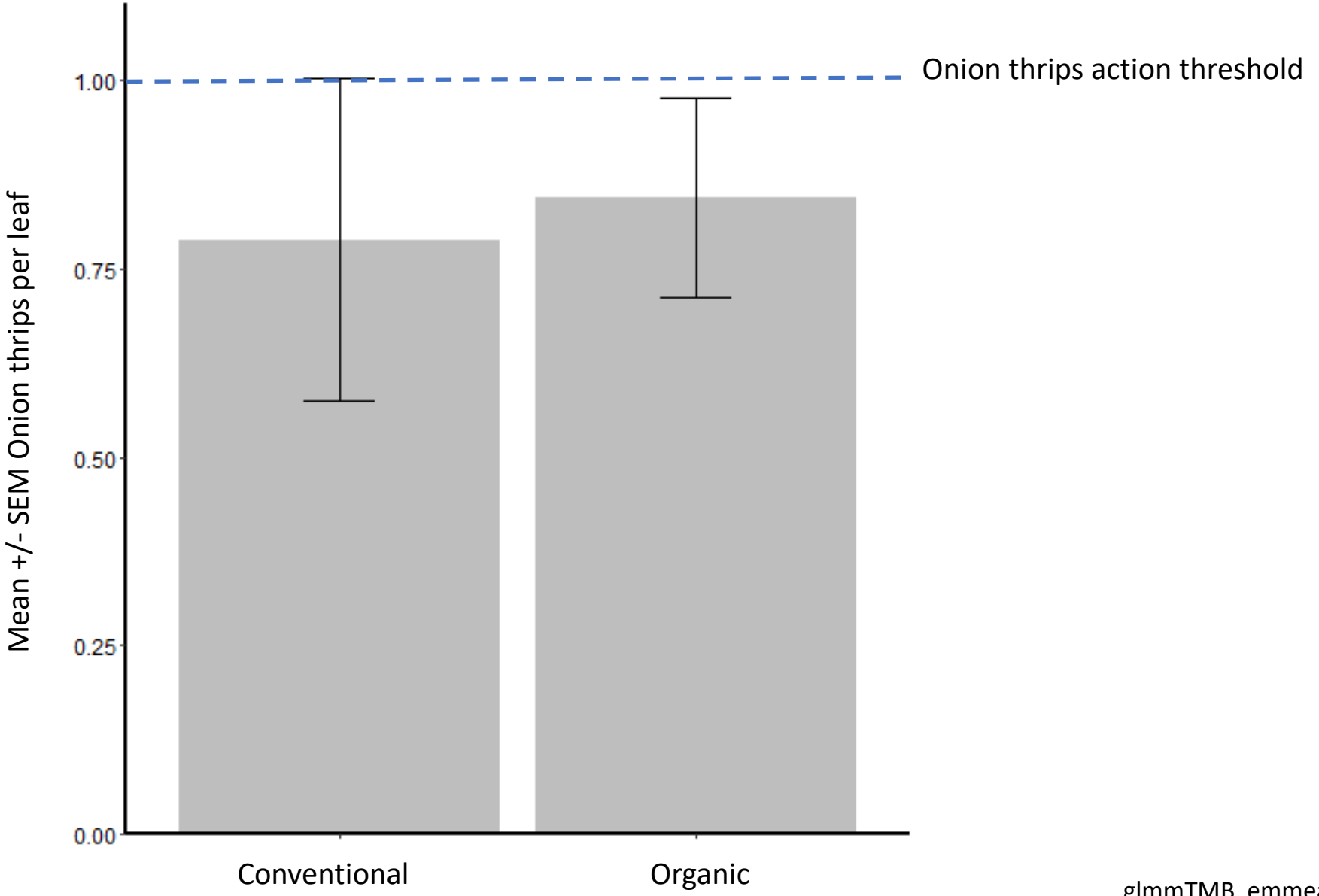
- 15 fields total
  - 7 organic (blue)
  - 8 conventional (grey)



Counted thrips and disease

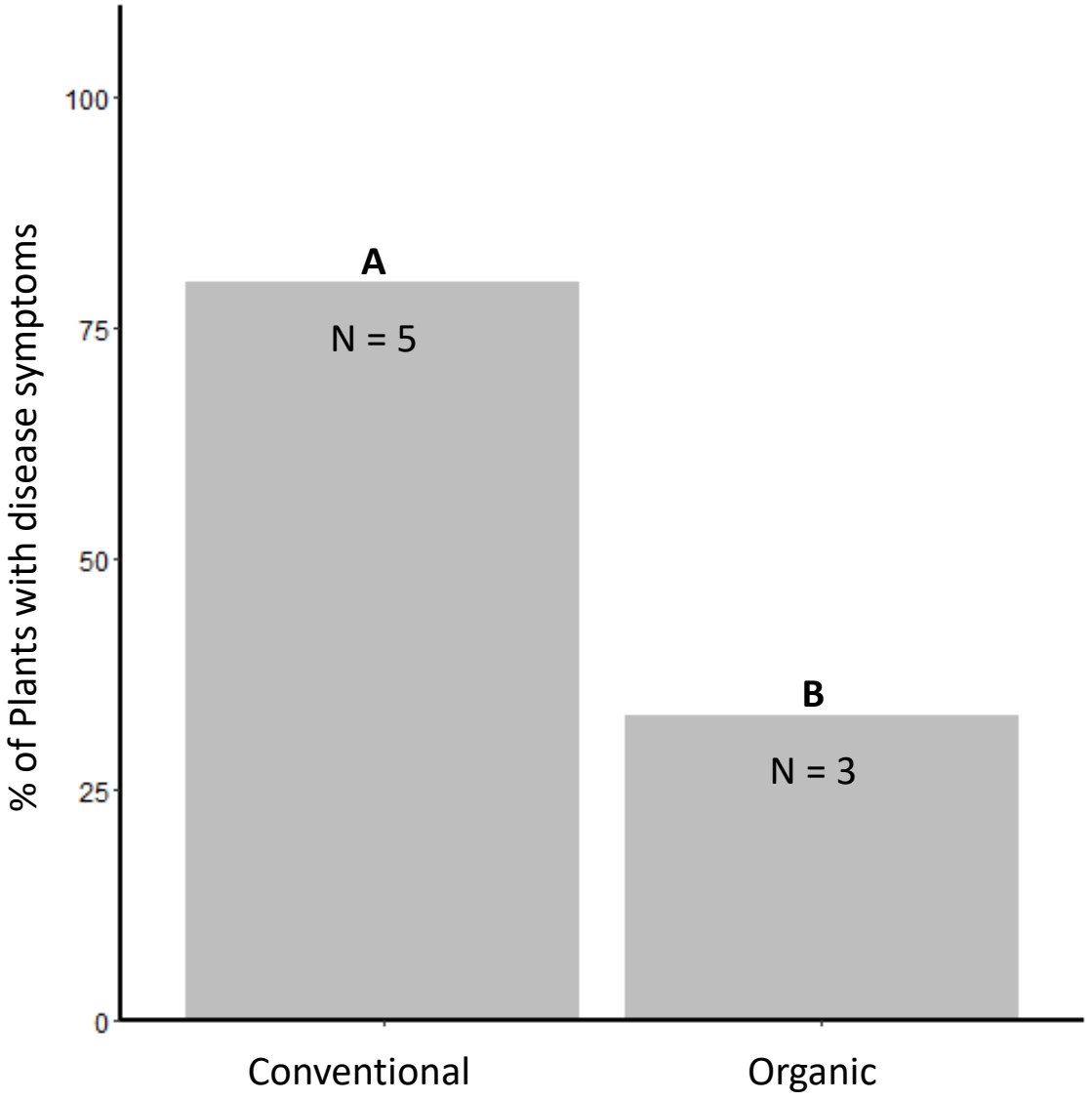
- July and August 2020

No difference in onion thrips per leaf by farming systems



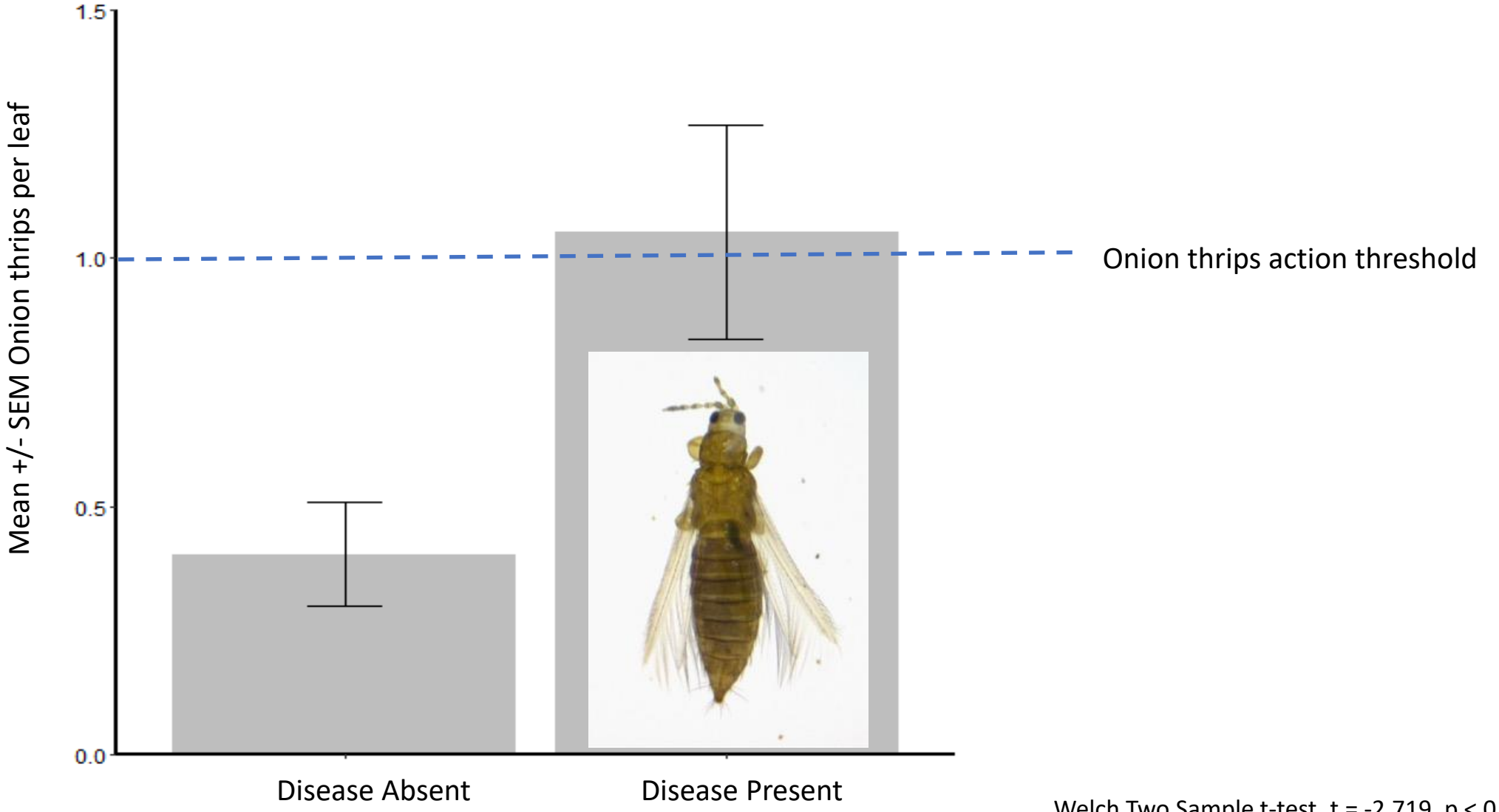
glmmTMB, emmeans, p = 0.087

Conventional fields had more disease than organic



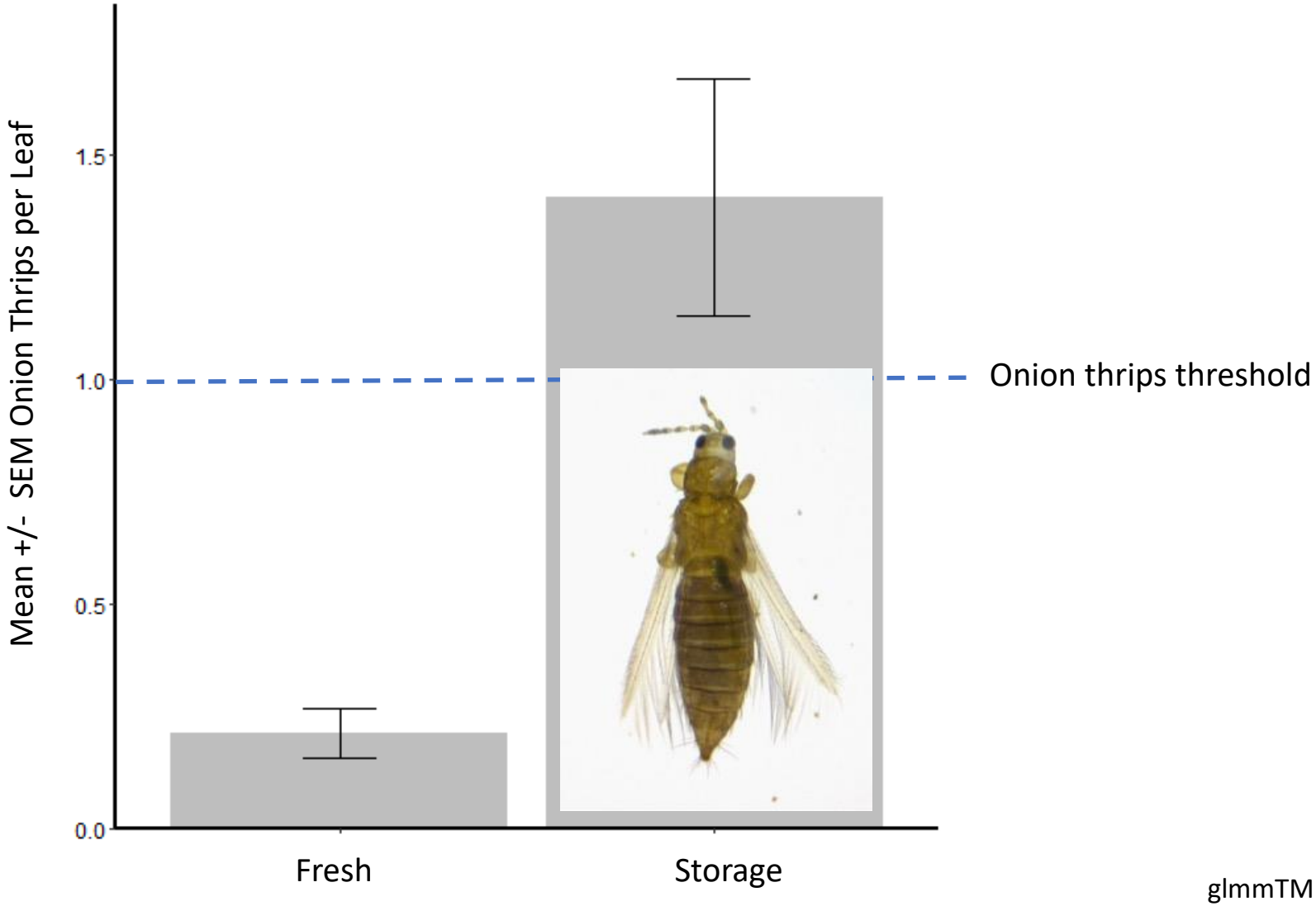
Chi-squared test, X-squared = 32.88, $p < 0.01$

More onion thrips per leaf when disease was present



Welch Two Sample t-test, t = -2.719, p < 0.01

More onion thrips in storage onions than fresh onions



glmmTMB, emmeans, $p < 0.01$

Organic spray trial 2020 and 2021

Neem

Azadirachta indica –
ornamental shade tree

Neemix® 4.5

INSECT GROWTH REGULATOR

BIOLOGICAL INSECTICIDE

An Insecticide for Use on Vegetables, Fruits, Turf (Including Commercial Lawns), and other Crops Grown in the Field or Mushroom Houses. Kills/repels a variety of insect pests including whiteflies, loopers, caterpillars, leafminers, psyllids, mealybugs, and larvae of diamondback moths.

CAN BE USED IN ORGANIC PRODUCTION

ACTIVE INGREDIENT:	
Azadirachtin	4.5%
OTHER INGREDIENTS:	95.5%
TOTAL:	100.0%

This product contains 0.39 lb. (175 g) of azadirachtin per US gallon

OMRI LISTED
For Organic Use

- Larvae need to ingest or come in contact with it
- Interferes with molting
- Repels / deters from feeding
- Apply when pests first appear and are in their early larval stages
- Repeat applications every 7 days or as needed
- 4-16 fl oz / acre
- 5 apps at low rate or 1 app at high rate per season

Spinosad

- Bacterial fermentation
- Suppression
- 4-8 fl oz / acre
- Max. 29 fl oz / season
- Max. 5 apps / year
- Adjuvant is encouraged
- 1 day PHI

Specimen Label

SPINOSAD	GROUP	5	INSECTI

CORTEVA™ agriscience

Entrust® SC

NATURALYTE® INSECT CONTROL

® ™ Trademarks of Dow AgroSciences, DuPont or Pioneer and thei affiliated companies or respective owners

A Naturalyte® insect control product formulated for con of lepidopterous larvae (worms or caterpillars), leafmine thrips, and red imported fire ants.

Active Ingredient:
spinosad (a mixture of spinosyn A and spinosyn D) .....
Other Ingredients.....
Total.....
Contains 2 lb of active ingredient per gallon.

OMRI™ Listed

Listed by the Organic Materials Review Institute (OMRI) for use in organic production.

Kocide® 3000-O

FUNGICIDE/BACTERICIDE

Dry Flowable

FOR ORGANIC PRODUCTION

OMRI LISTED For Organic Use

Active Ingredients:	**By Weight**
Copper Hydroxide* (CAS No. 20427-59-2)	46.1%
Inert Ingredients:	53.9%
TOTAL:	100.0%

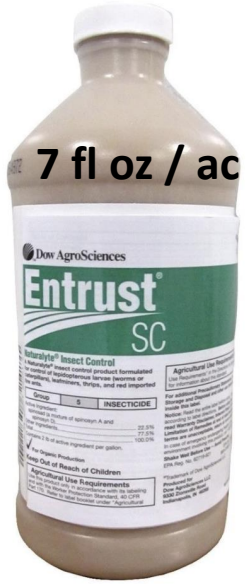
(*Metallic Copper Equivalent 30%)

Onion, Garlic, Leek	Bacterial Blight, Downy Mildew, Purple Blotch	0.75 - 1.5 lb.	20 lb.	Begin when plants are 4 to 6 inches high and repeat at 7- to 10-day intervals if needed depending on disease severity. Can cause phytotoxicity to leaves.

2020 experiment – weekly application

ORGANIC SPRAY PROGRAM

1 fl oz / ac



7 fl oz / ac

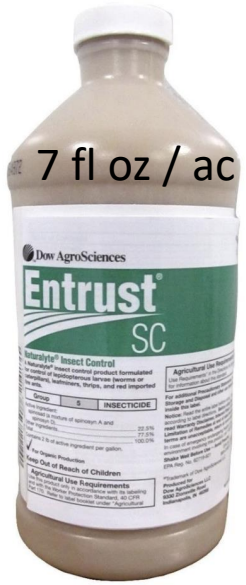
1.5 lb / ac

Organic pesticides did not control onion thrips populations

ORGANIC SPRAY PROGRAM

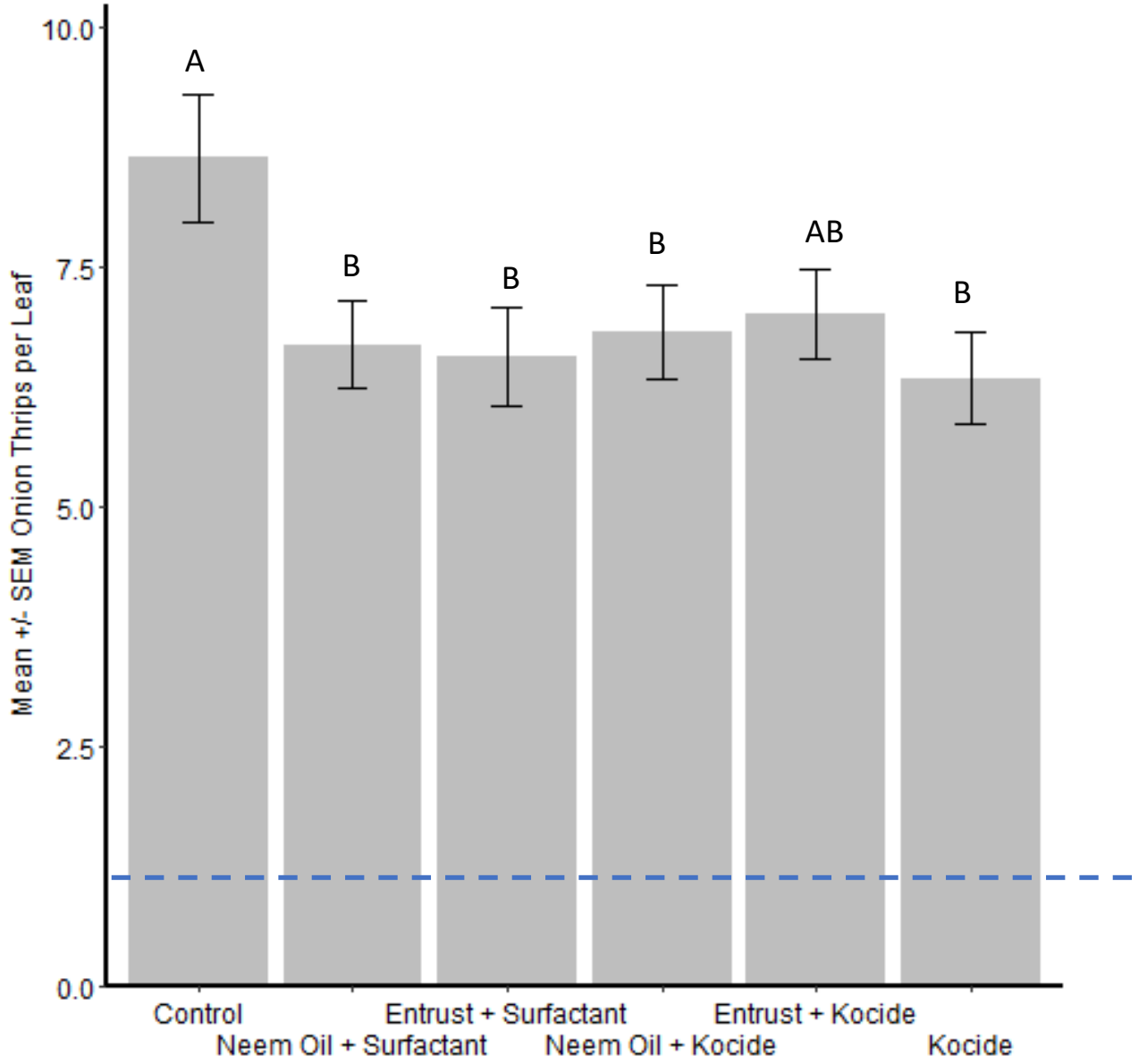
Weekly applications

1 fl oz/ ac



7 fl oz / ac

1.5 lb / ac

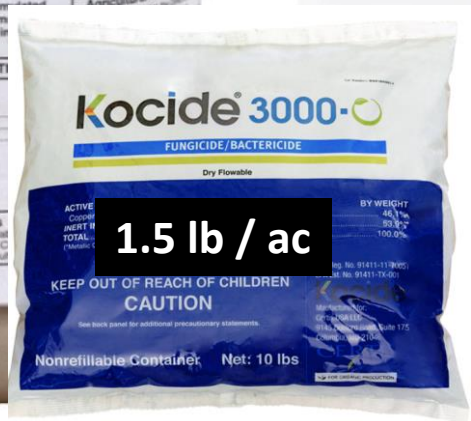


2021 experiment – weekly applications

ORGANIC SPRAY PROGRAM

7 fl oz / ac

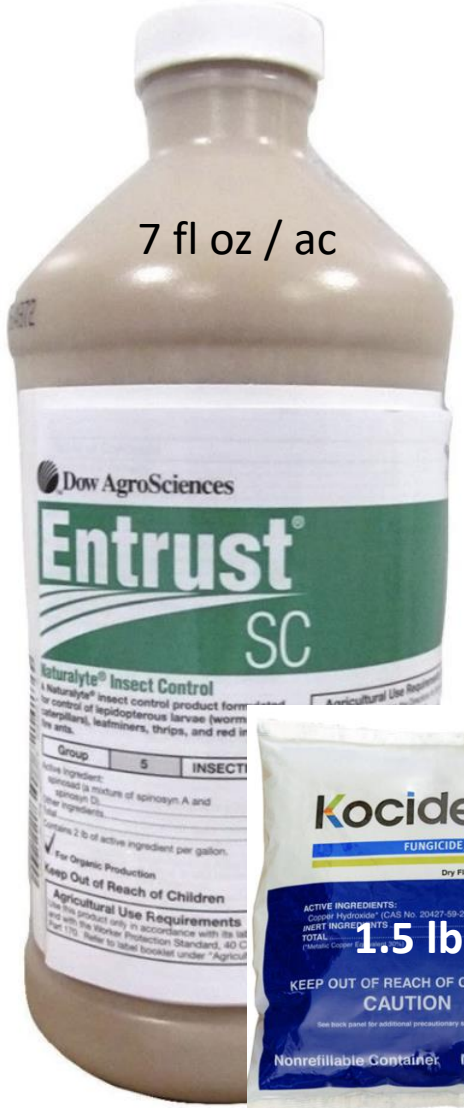
16 fl oz / ac



1.5 lb / ac

2021 experiment – weekly applications

ORGANIC SPRAY PROGRAM



7 fl oz / ac

16 fl oz / ac

1.5 lb / ac

CONVENTIONAL SPRAY PROGRAM

Week 1-2

BAYER
MOVENTO®

Week 3-4

Minecto® Pro

Week 5-6

Radiant® SC
INSECTICIDE

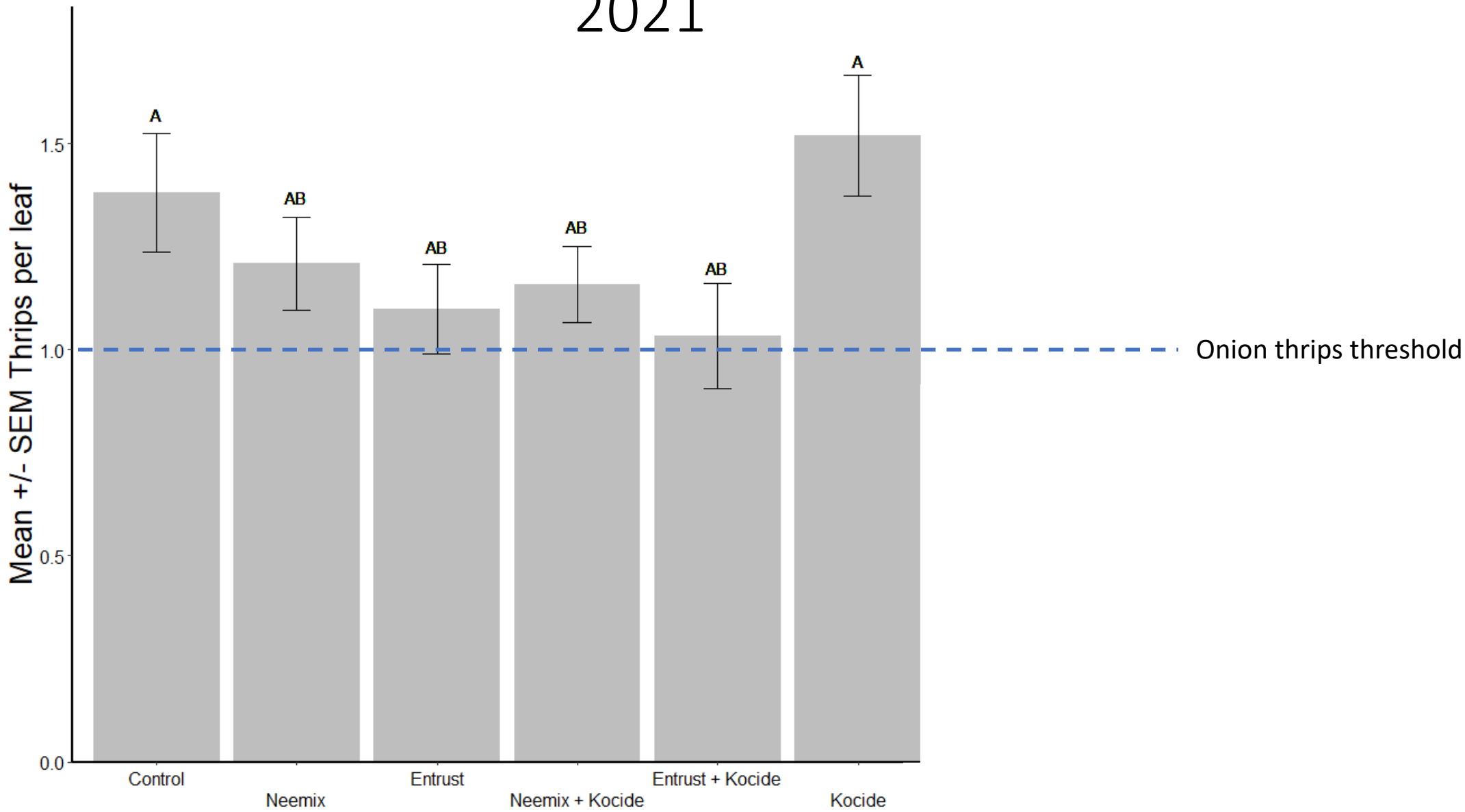
Week 7-8

DANGEROUS POISON
KEEP OUT OF REACH OF CHILDREN
READ SAFETY DIRECTIONS BEFORE OPENING OR USING
LANNATE® L
INSECTICIDE
ACTIVE CONSTITUENT:
225g/L METHOMYL (an anticholinesterase compound)
SOLVENT: 472g/L METHANOL
GROUP 1A INSECTICIDE

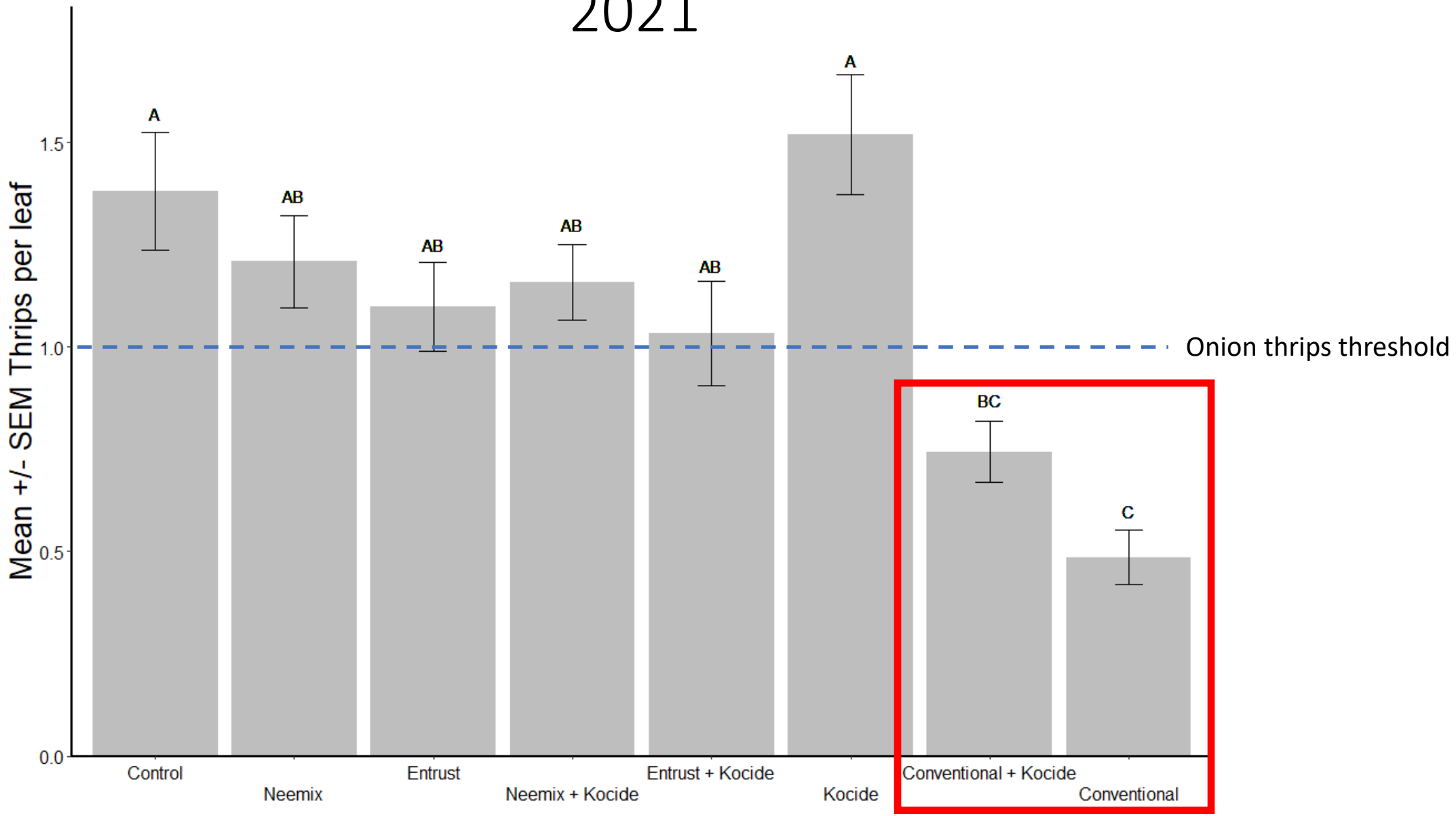
Warrior II
with Zeon Technology®

Nufarm

Organic pesticides did not control onion thrips populations 2021



Organic pesticides did not control onion thrips populations 2021

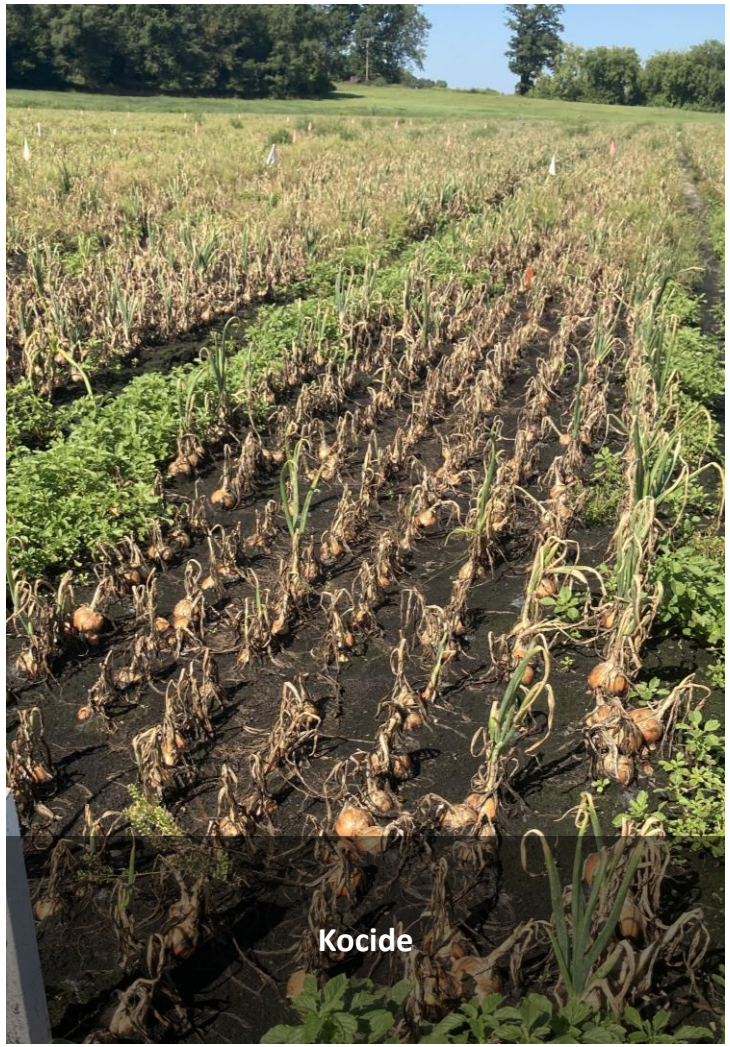


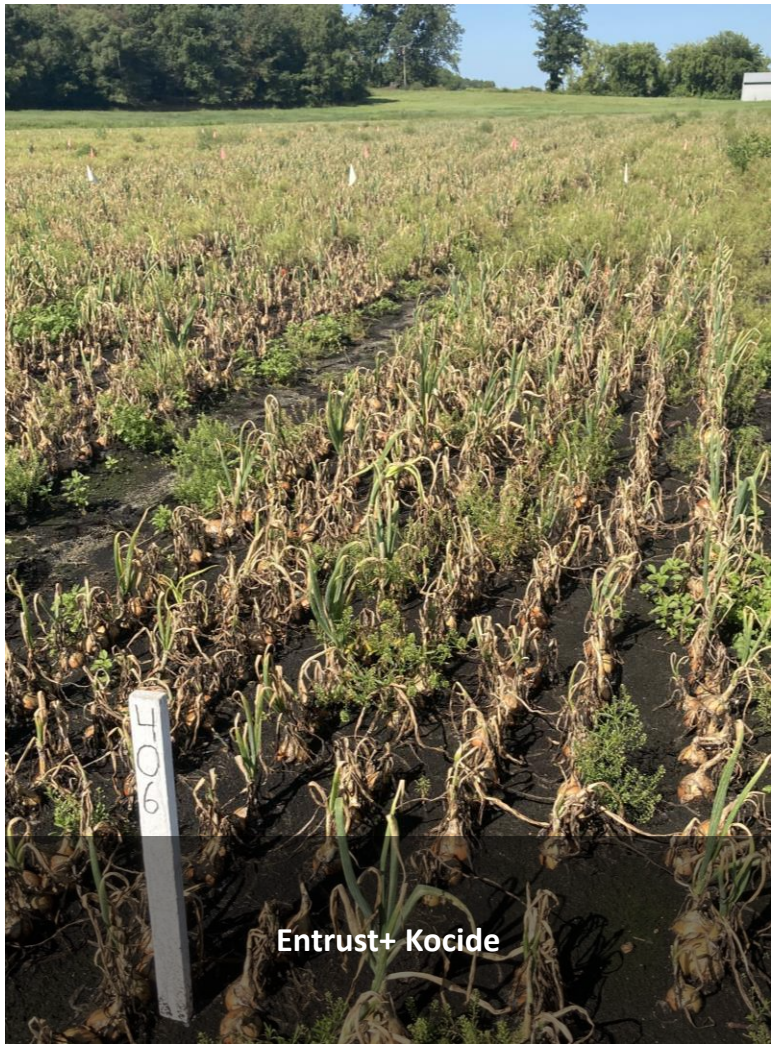
Untreated

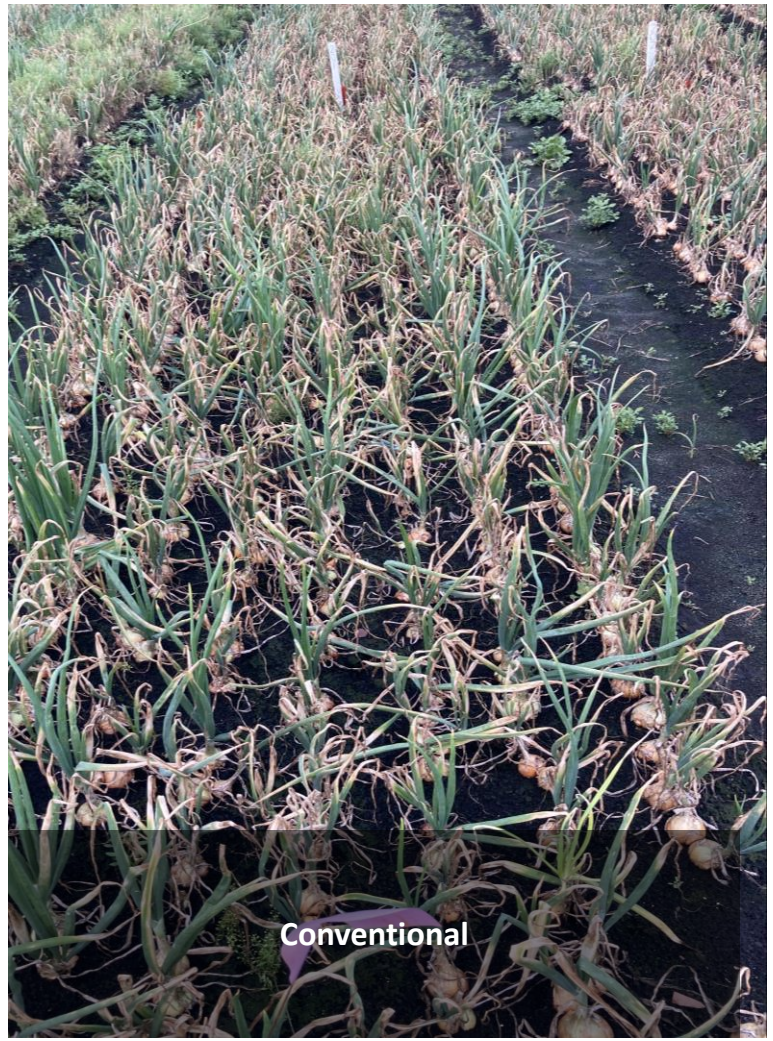
Neemix

Entrust

Conventional


Kocide


Entrust+ Kocide


Conventional

Thrips and diseases interact!

- Pantoea
- Stemphylium
- Anthracnose

Key takeaways

- Organic and conventional onion fields had similar # onion thrips per leaf
- Conventional fields had more necrosis than organic
- Fields with disease had more onion thrips than without disease
- Storage variety onion fields had more onion thrips than fresh variety
- Organic pesticides did not control onion thrips population

Department of Entomology
MICHIGAN STATE UNIVERSITY

Acknowledgements

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- Drs. Mary Hausbeck and Doug Higgins from MSU Vegetable Pathology
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USDA NIFA

Start early with your strongest fungicides to protect onions against Stemphylium leaf blight

Doug Higgins, PhD and Mary Hausbeck, PhD

Spots and blights on the leaves can get in the way of good onion growth. In Michigan and other eastern production regions, producers wage a yearly battle to protect onions from various foliar diseases. Purple blotch used to be a common disease of onion leaves in the northeast U.S. but Stemphylium leaf blight has now become the most formidable opponent for many onion producers. Stemphylium leaf blight is caused by a fungal pathogen of the same name (*Stemphylium vesicarium*).

Early symptoms of Stemphylium leaf blight can be difficult to diagnose. Tip burn may be associated with herbicide damage but can also be a first symptom of disease. The brown spots of Stemphylium leaf blight are small at first but increase in size, extending down the leaf. These elongated lesions can appear similar to symptoms of bacterial stalk and leaf blight. An accurate diagnosis can be obtained by sending plant samples with symptoms to a University diagnostic lab. In healthy onions the oldest onion leaves die first. However, premature leaf death resulting in a mid-season loss of green leaf tissue is typical of Stemphylium leaf blight. Without healthy foliage, bulb size is reduced and so is total yield.

Many of the fungicides that were historically used to manage purple blotch do not adequately protect against Stemphylium leaf blight. Field research from Michigan State University has shown that the Stemphylium leaf blight pathogen is resistant to fungicides classified as strobilurins such as azoxystrobin, picoxystrobin, pyraclostrobin, and trifloxystrobin. On the other hand, Omega SC, Luna Tranquility SC, Miravis Prime SC, Tilt SL, and Luna Experience SC effectively limit Stemphylium leaf blight. Our research has also shown that fungicide programs to protect the onion's foliage from Stemphylium leaf blight should begin when plant are young (by the 5- to 7-leaf stage) and include highly effective products at the front end of the season to prevent the pathogen from becoming too well established (**Figure 1**). Protecting the onion leaves early in the season helps to ensure that the plants have a fighting chance to reach maturity and achieve their full yield potential.

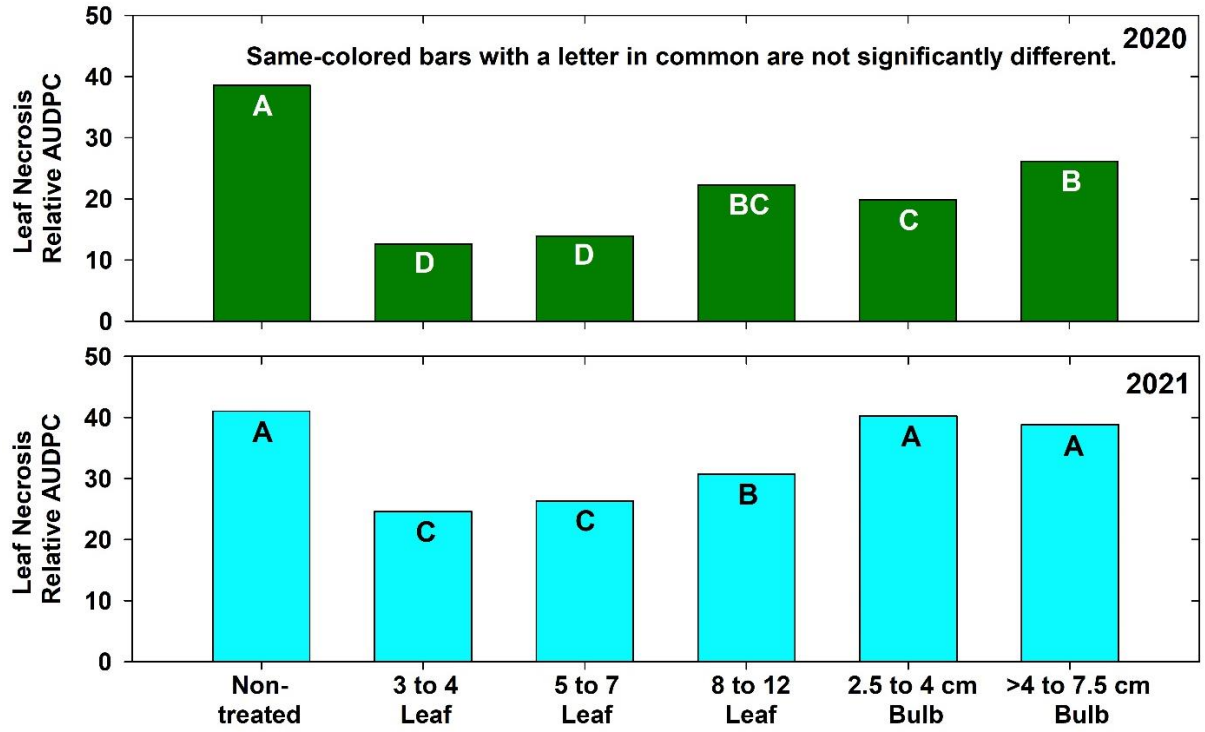

Figure 1. Stemphylium leaf blight fungicides applied by onion growth stage in 2020 (top) and 2021 (bottom). Fungicides were initiated according to five growth stages and then applied as part of a rotational program every 7-days. The non-treated plots received no fungicide.