Diamide Seed Treatments as an Alternative to "Neonic" Insecticides: Seed Corn Maggot Control in Sweet Corn and Snap Beans

MFVGA Expo!

January 2023

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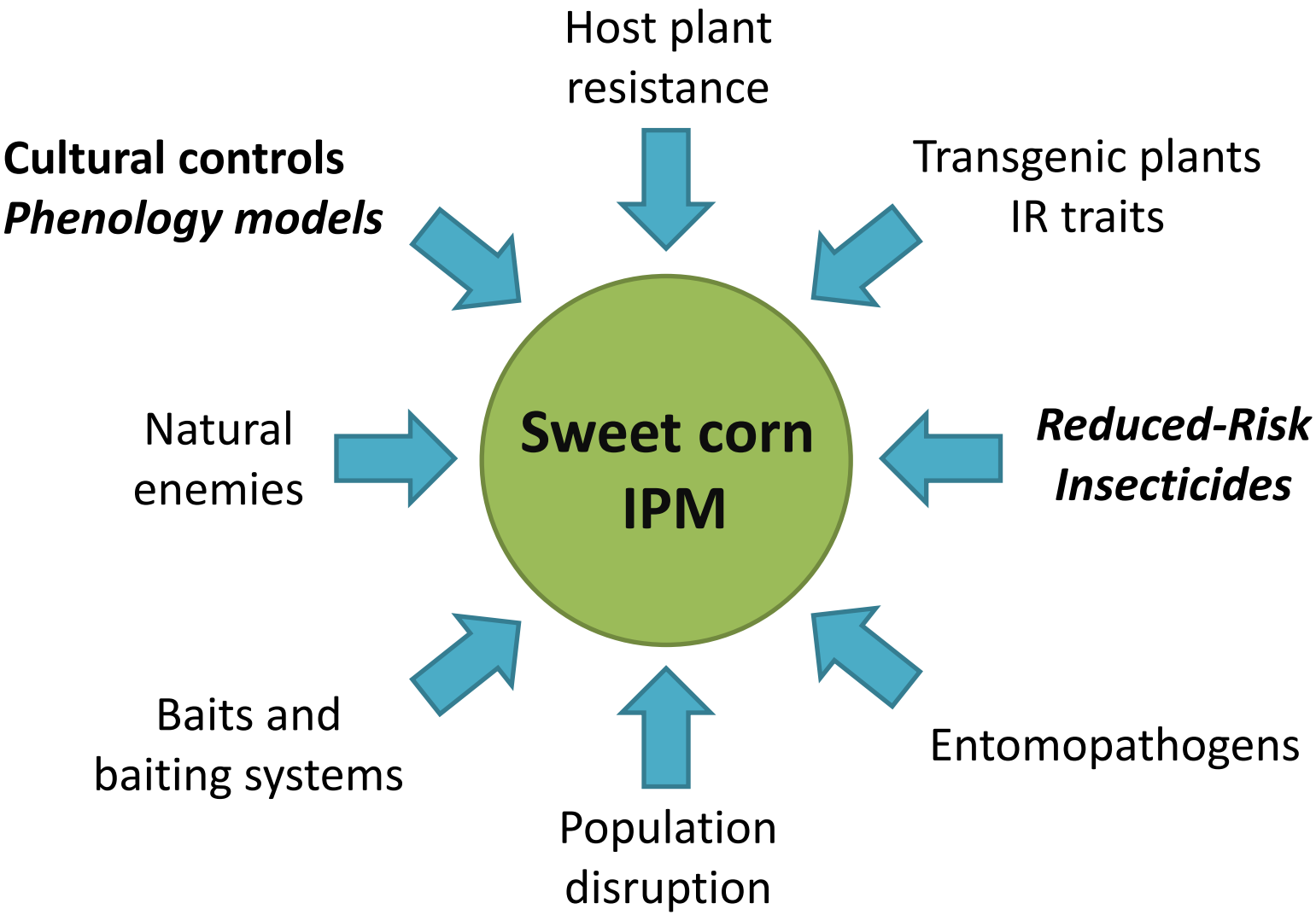
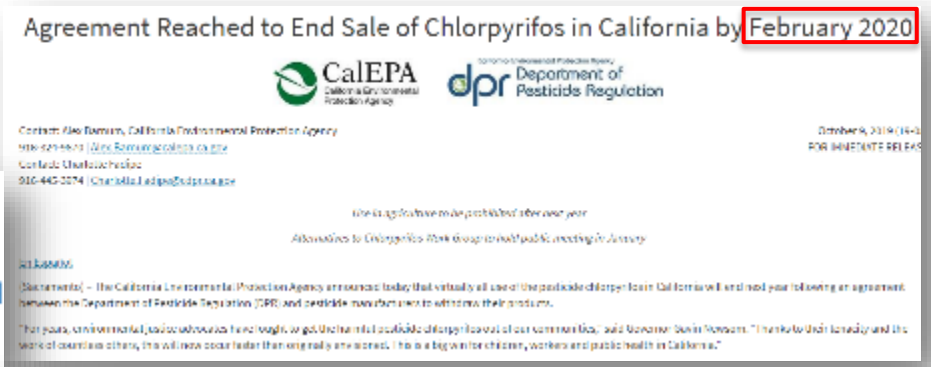
Key Pest: Seedcorn Maggot, *Delia platura*

- Found in northern temperate regions worldwide (35-60° N)
- Saprophagous, but also feeds on plants (polyphagous)
- Life cycle is 18 – 60 d (temp dependent)
- Three-four generations/year
- Overwinters as puparium in soil
- Time of emergence and risk is predictable (Degree-day model)

Integrated Pest Management & Seed Treatments?



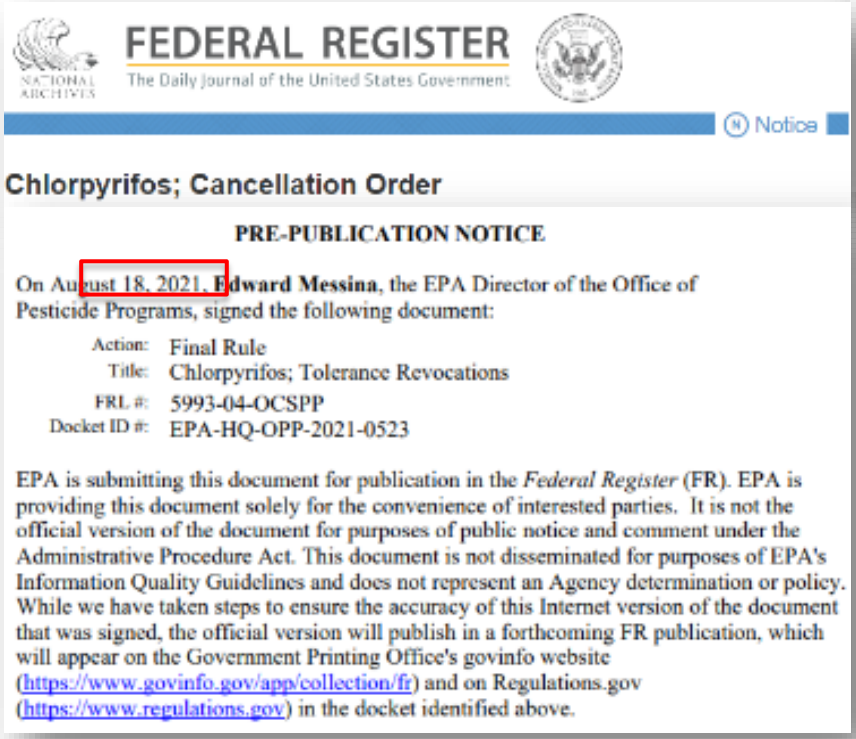
EPA Cancellation – Lorsban (chlorpyrifos): 2021



Agreement Reached to End Sale of Chlorpyrifos in California by February 2020

CalEPA

dpr Department of Pesticide Regulation



FEDERAL REGISTER

The Daily Journal of the United States Government

Notice

Chlorpyrifos; Cancellation Order

PRE-PUBLICATION NOTICE

On August 18, 2021, **Edward Messina**, the EPA Director of the Office of Pesticide Programs, signed the following document:

Action: Final Rule
Title: Chlorpyrifos; Tolerance Revocations
FRL #: 5993-04-OCSPP
Docket ID #: EPA-HQ-OPP-2021-0523

EPA is submitting this document for publication in the *Federal Register* (FR). EPA is providing this document solely for the convenience of interested parties. It is not the official version of the document for purposes of public notice and comment under the Administrative Procedure Act. This document is not disseminated for purposes of EPA's Information Quality Guidelines and does not represent an Agency determination or policy. While we have taken steps to ensure the accuracy of this Internet version of the document that was signed, the official version will publish in a forthcoming FR publication, which will appear on the Government Printing Office's govinfo website (https://www.govinfo.gov/app/collection/fr) and on Regulations.gov (https://www.regulations.gov) in the docket identified above.

Corteva Announces It Will Discontinue Making Insecticide Chlorpyrifos

February 9, 2020

CORTEVA agriscience

Corteva AgriScience says it will stop making chlorpyrifos (klor-peer-ih-foss) insecticide by years end. In a statement given to Brownfield, Corteva calls it a "strategic business decision" because of falling sales of the chemical. The state of California stopped sales of chlorpyrifos this week.

Corteva says its customers "will have access to enough chlorpyrifos supply to cover current demand through the end of the year, while they transition to other products or other providers." Corteva is the top maker of the insecticide. Environmental groups claim it causes neurological problems and are suing the EPA for denying a petition to ban it.

Corteva Statement: *Corteva Agriscience has one of the largest and most diverse product pipelines in the industry with multiple exciting, upcoming brand launches. Demand for one of our long-standing products, chlorpyrifos, has declined significantly over the last two decades, particularly in the U.S.*

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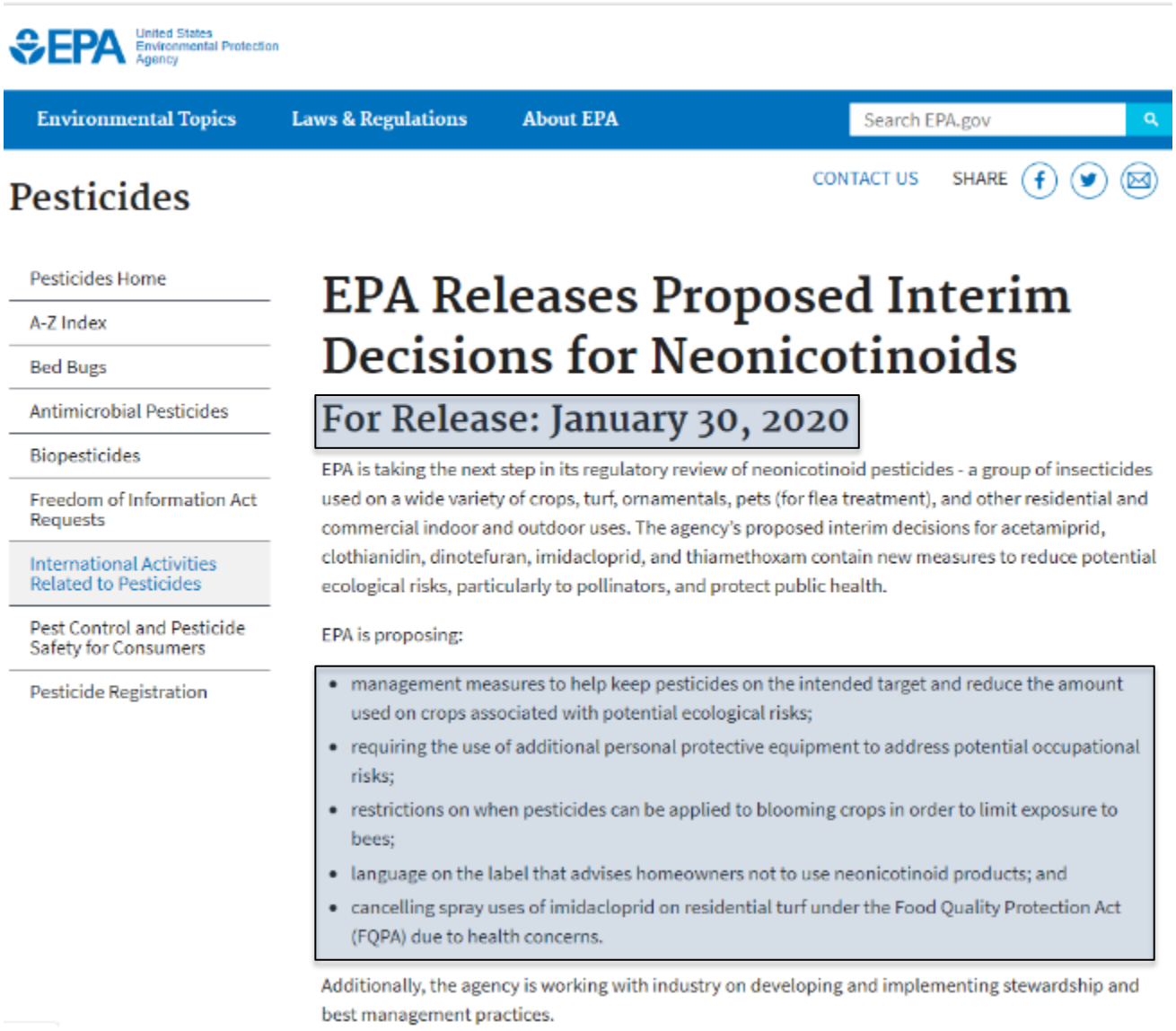
Re-registration decisions (Jan 30)



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EPA Releases Proposed Interim Decisions for Neonicotinoids

For Release: January 30, 2020

EPA is taking the next step in its regulatory review of neonicotinoid pesticides - a group of insecticides used on a wide variety of crops, turf, ornamentals, pets (for flea treatment), and other residential and commercial indoor and outdoor uses. The agency's proposed interim decisions for acetamiprid, clothianidin, dinotefuran, imidacloprid, and thiamethoxam contain new measures to reduce potential ecological risks, particularly to pollinators, and protect public health.

EPA is proposing:

- management measures to help keep pesticides on the intended target and reduce the amount used on crops associated with potential ecological risks;
- requiring the use of additional personal protective equipment to address potential occupational risks;
- restrictions on when pesticides can be applied to blooming crops in order to limit exposure to bees;
- language on the label that advises homeowners not to use neonicotinoid products; and
- cancelling spray uses of imidacloprid on residential turf under the Food Quality Protection Act (FQPA) due to health concerns.

Additionally, the agency is working with industry on developing and implementing stewardship and best management practices.

https://www.epa.gov/pesticides/epa-releases-proposed-interim-decisions-neonicotinoids

Opportunity & Time to:
Evaluate New seed treatments (novel MoA)

– Fortenza (cyantraniliprole) – MoA Group 28 (diamide)

Protection against early-season damage caused by cutworms, grubs, wireworms, fall armyworm and seedcorn maggot on sweet corn (https://www.syngenta-us.com/seed-treatment/fortenza).

– Entrust (spinosad) – MoA Group 5. (*S. spinosa* bacterium, organic, Corteva)

Commercial seed treatment, Regard™ SC offers protection for dry bulb onions against seedcorn maggot and onion maggot (https://www.syngenta-us.com/seed-treatment/regard-sc)

- Reatis 480 FS (tetraniliprole) – MoA Group 28 (diamide)

Designed as commercial seed treatment against rootworm, wireworm, v d seedcorn maggot (https://www3.epa.gov/pesticides/chem_search/ppls/000264-01192-20210310.pdf)

- PLINAZOLIN (isocycloseram) – *New MoA ("meta-diamide"), Syngenta

Compare to Neonic Standards:

- Poncho 600 (clothianidin) – MoA Group 4A (Neonic)

- Cruiser 5FS (thiamethoxam) – MoA Group 4A (Neonic)

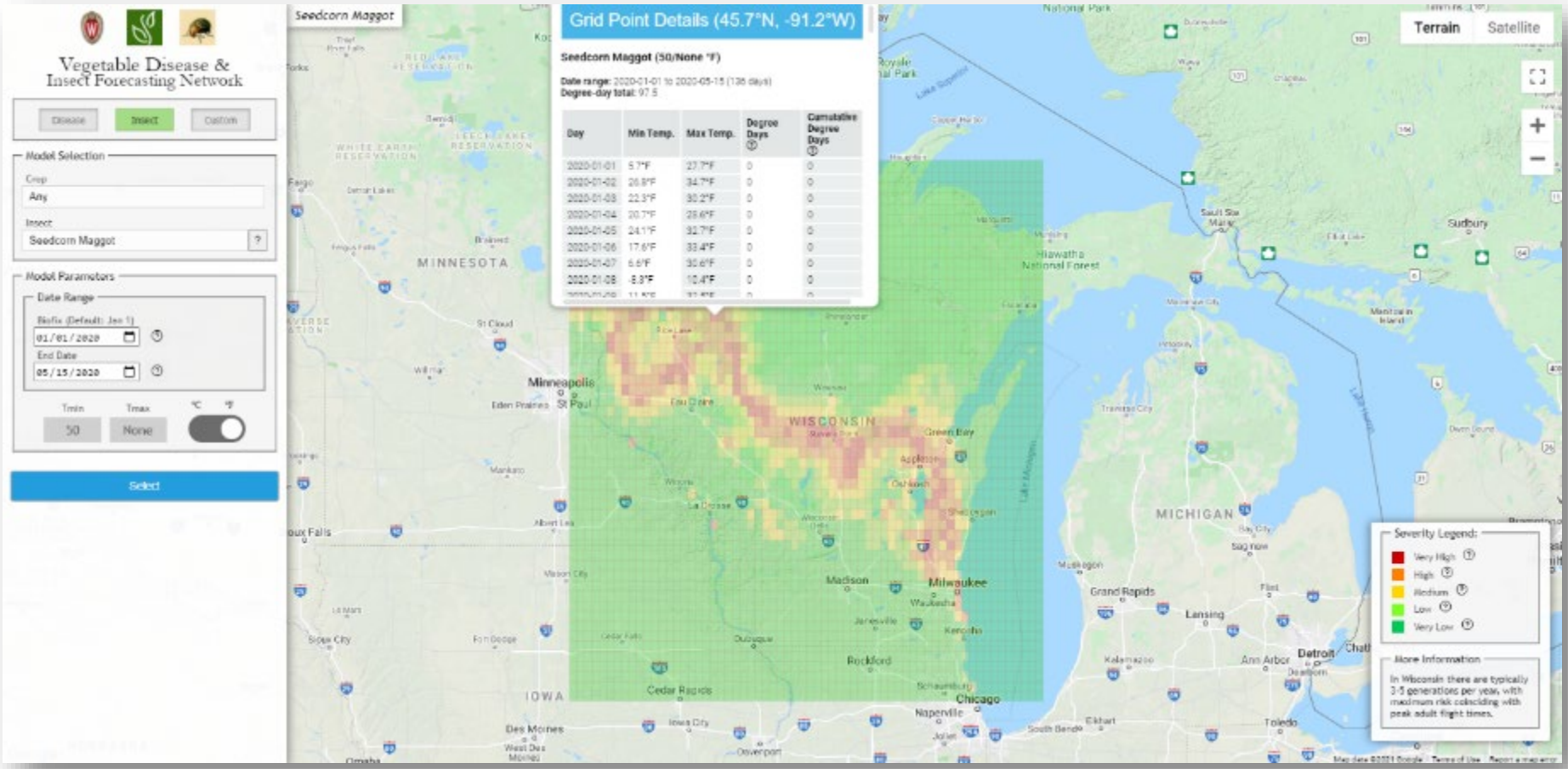
Experimental Approach:

- **Arlington Agric. Exp. Station, WI + Rosemount ROC, MN**
- Two planting dates/yr (*target: 1st and 2nd generation SCM*)
- Syngenta/Seminis processing varieties (‘21)
- Bone/blood meal attractants
- 4-6 experimental replicates / treatment
- 5 seed treatment active ingredients/crop
- 4-row plots (30” rows); 30ft long; data from 2 middle rows; Randomized complete block design (RCBD)

https://www.syngenta-us.com/seeds/vegetables/processor-sweet-corn

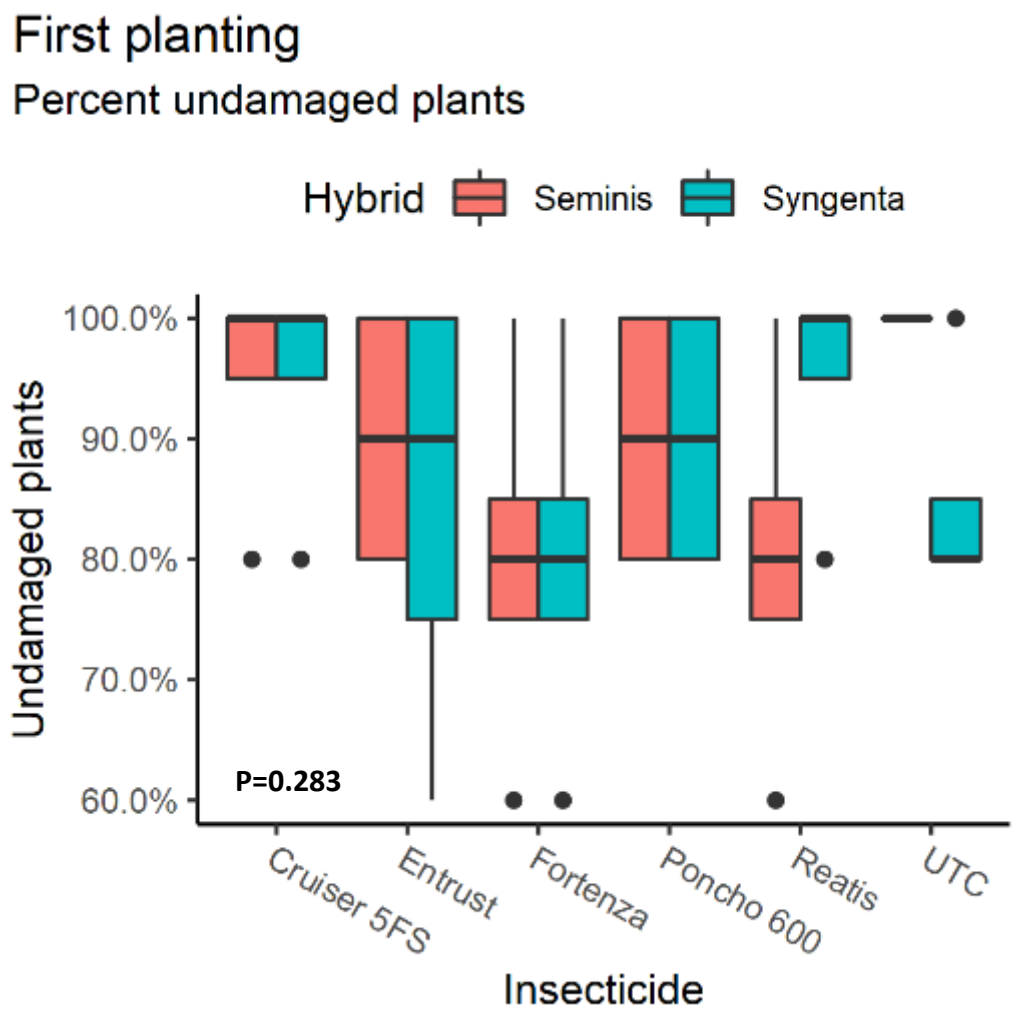
https://www.vegetables.bayer.com/us/en-us/products/sweet-corn.html

Vegetable Disease & Insect Forecasting Network:
Methods: *Seed Corn Maggot emergence, time planting dates*



https://agweather.cals.wisc.edu/vdifn

WI: 2021 1st planting – % Healthy Plants-NS



https://extension.entm.purdue.edu/fieldcropsipm/insects/corn-seedcorn-maggot.php

RESULTS:

- **No significant (NS) differences** among seed treatments
- No differences between hybrids
- **High variability** (Coefficient variation, CV)

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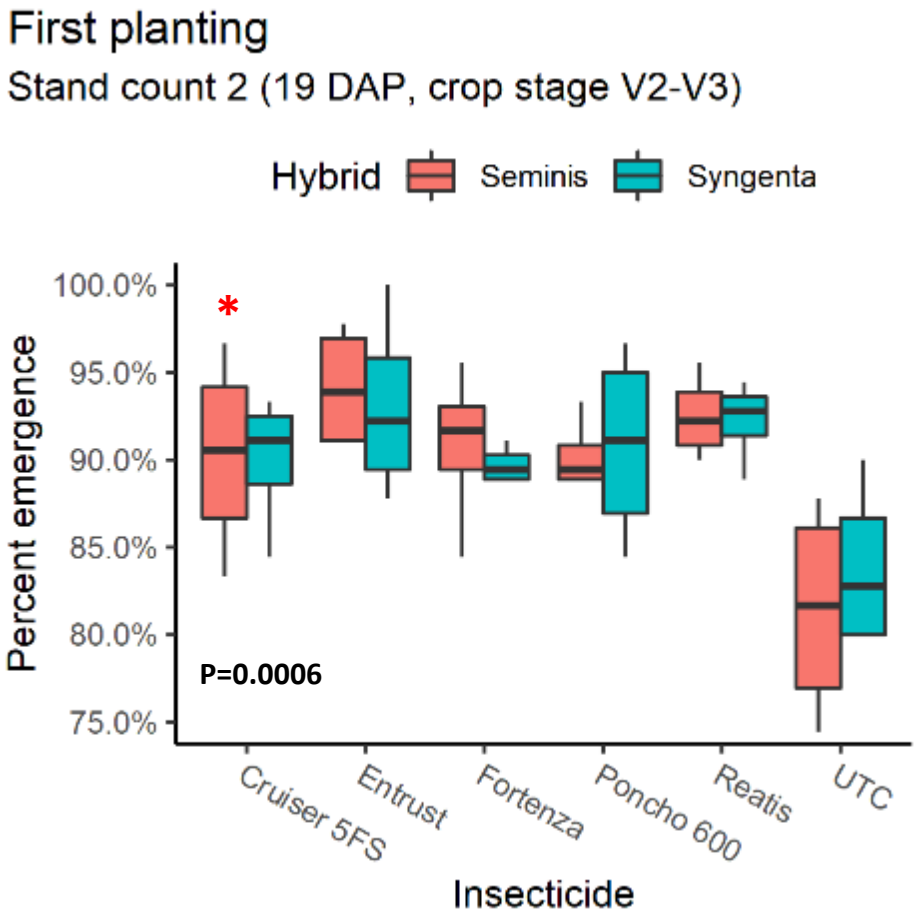
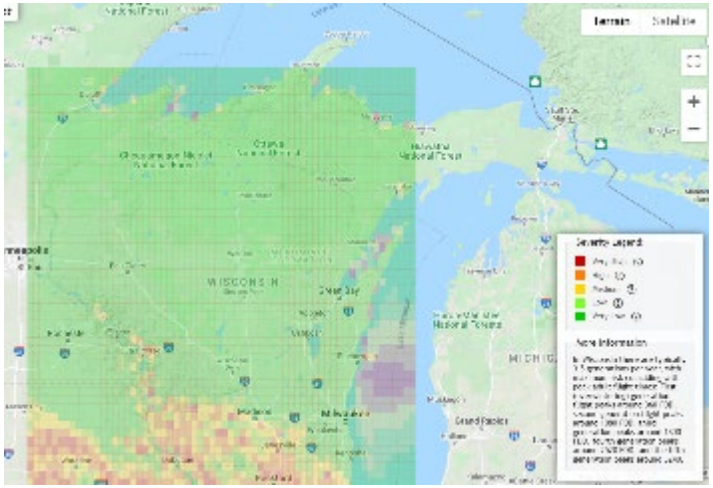
WI: 2021 1st planting – Stand Count (bottom line)*





https://agweather.cals.wisc.edu/vdifn?panel=insect&model=seedcorn-maggot

(May 26, colonized by second gen SCM)

RESULTS:

- All treatments statistically significant* vs. Untreated check (UTC)
- Approx. 9.0-12.8% increase over UTC: **Cruiser, Entrust, Reatis, Fortenza**
- No consistent differences between hybrids

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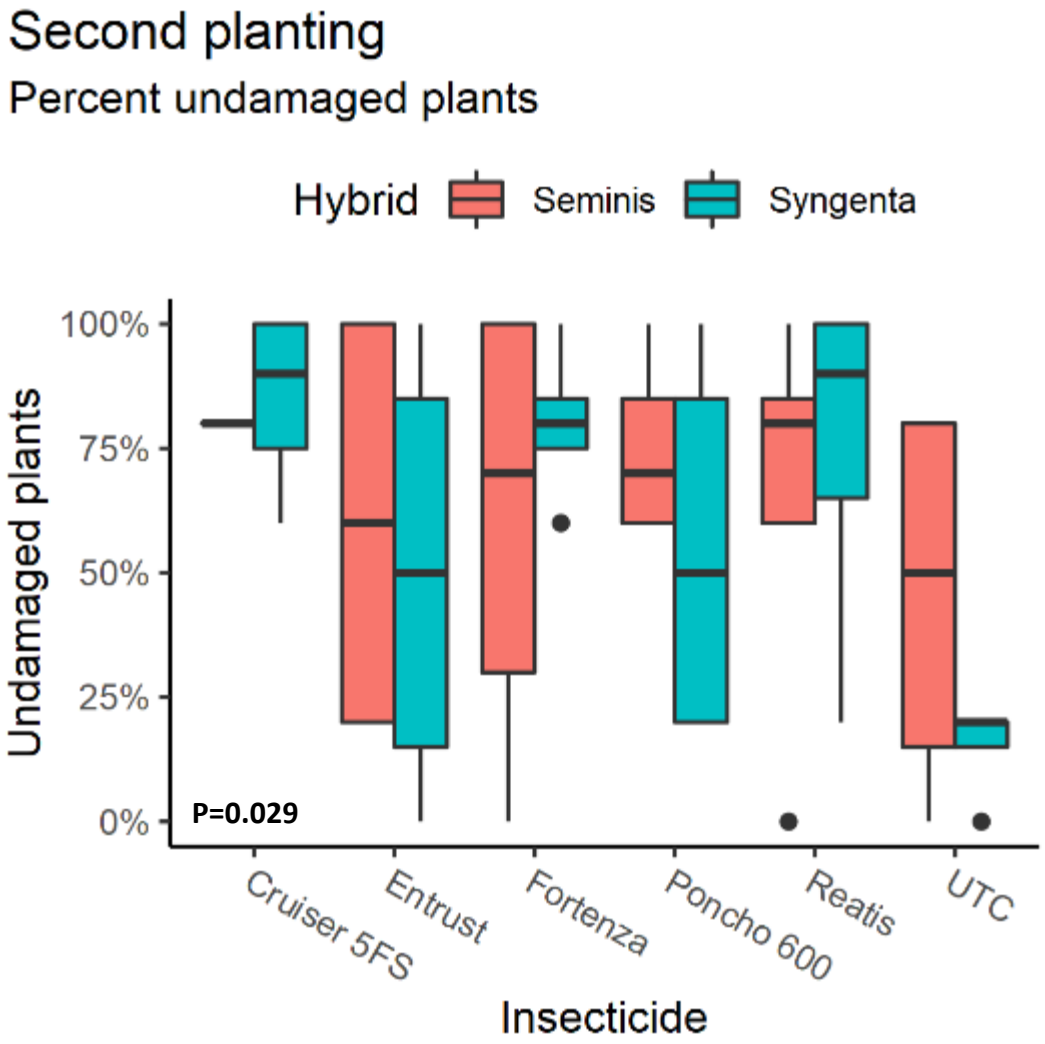
WI: 2021 2nd planting – % Healthy Plants*



https://extension.entm.purdue.edu/fieldcropsipm/insects/corn-seedcorn-maggot.php

RESULTS:

- Some significant differences among treatments*
- Cruiser, Poncho = Higher % Healthy plants
- Some hybrid x trt interactions (but NS)
- Slight improvement with Seminis hybrid

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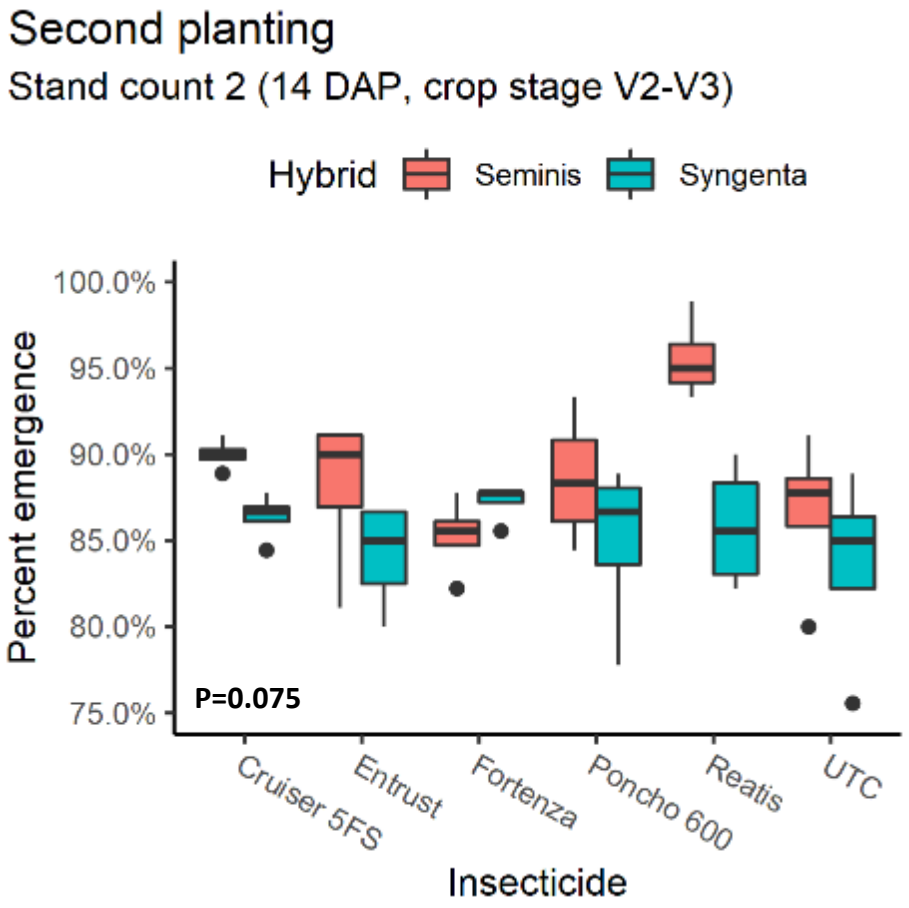
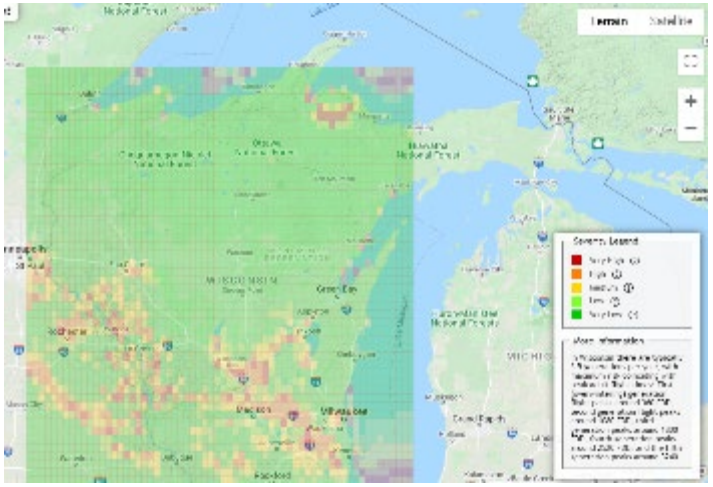
WI: 2021 2nd planting – Stand Count*





https://agweather.cals.wisc.edu/vdifn?panel=insect&model=seedcorn-maggot

(June 23, colonized by third gen SCM)

RESULTS:

- Some differences among treatments
- *Reatis, Cruiser, Poncho = significant higher Stand Counts
- Slight improvement with Syngenta hybrid

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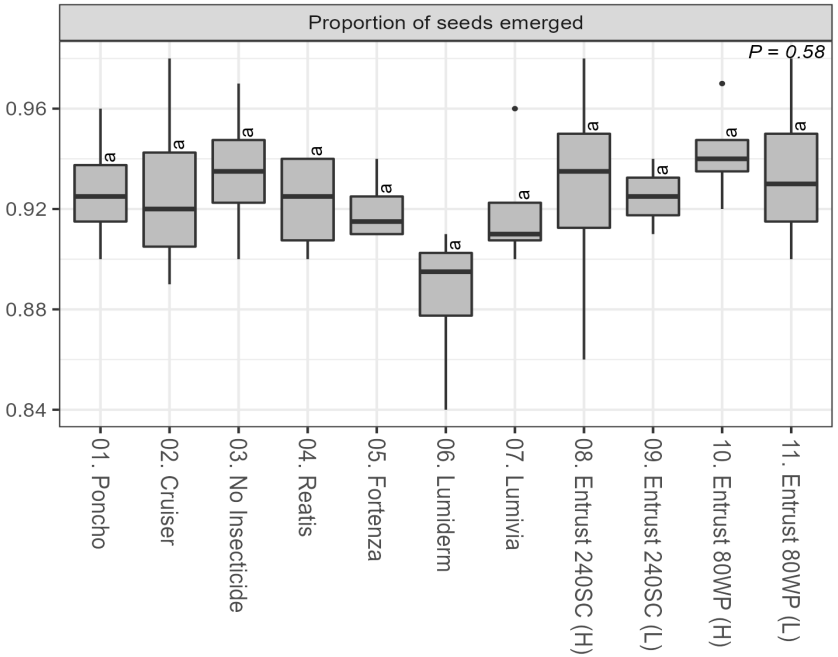
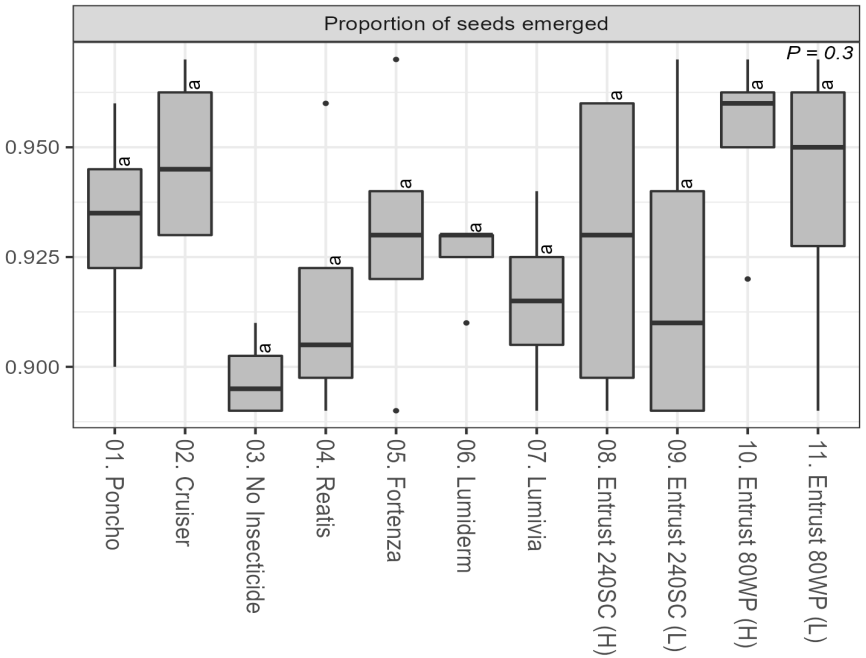
MN-2022: 1st and 2nd planting, Rosemount-NS

Sweet Corn

UMN Sweet Corn SCM - 1st planting



UMN Sweet Corn SCM - 2nd planting

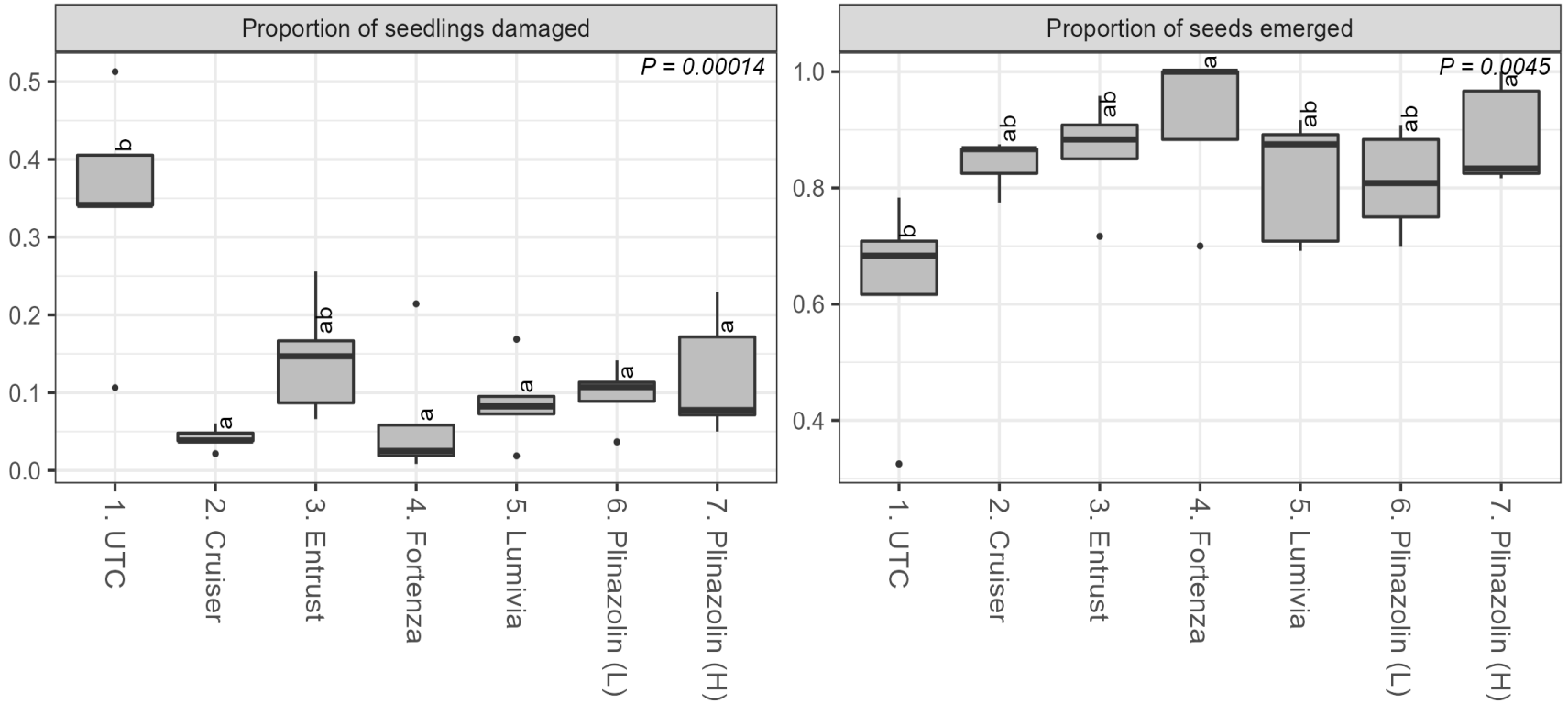


For Stand Count:
***No consistent significant differences among treatments, 2022**
NS, ALSO TRUE FOR Snap Beans as well

WI-2022: 2nd planting, Snap bean*

Snap Bean

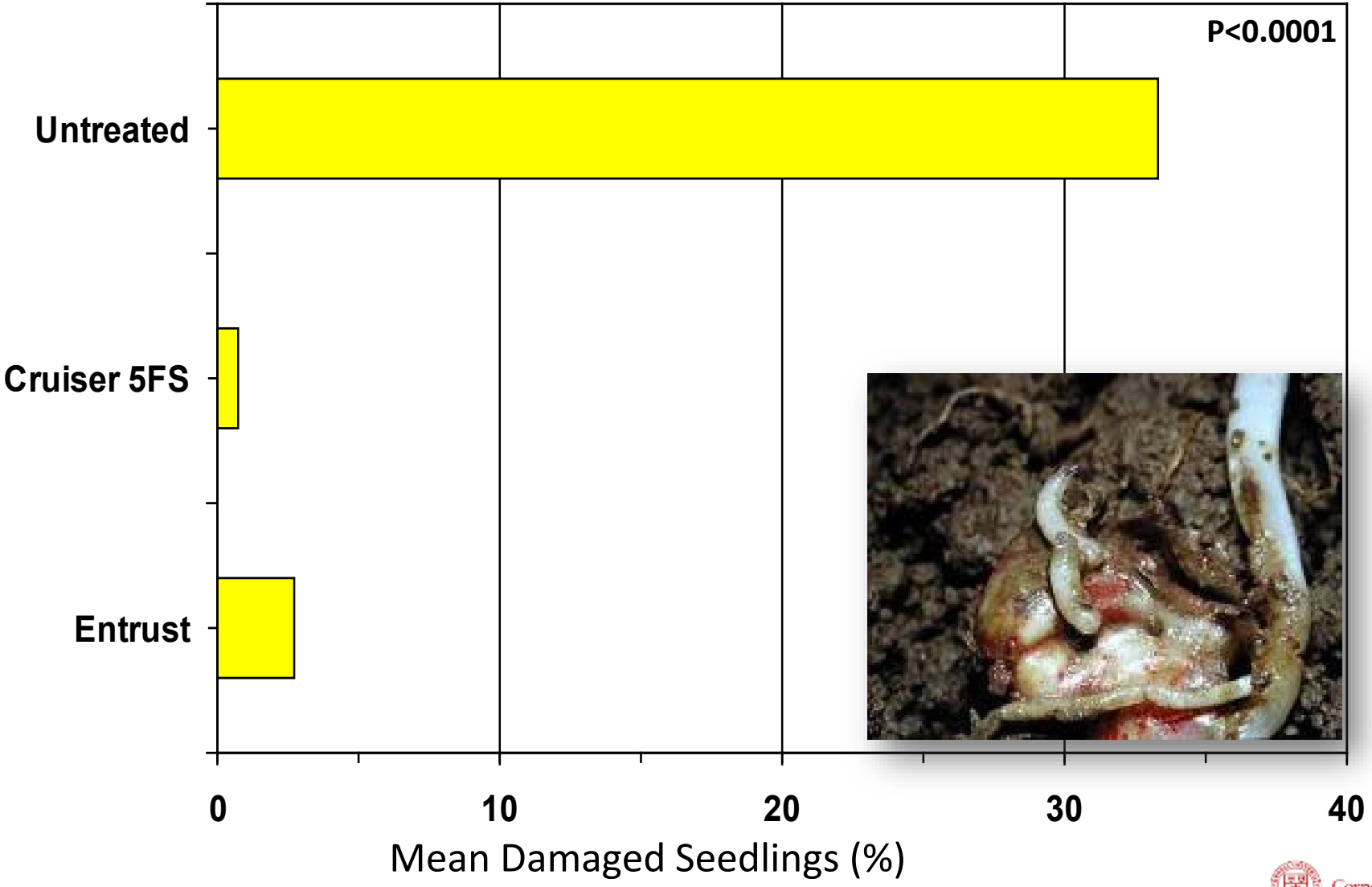
AARS Syngenta Green Bean SCM Trial (2nd planting)



For both seed damage, stand count,
*Cruiser, Fortenza, Plinazolin showed statistical significance to UTC

Seed Maggot Control in Sweet Corn (**high pressure, preferred**)

'Incredible SE' planted 17 May 2011; Data 13 dap; Cornell, Elba, NY



Conclusions: Focus on Seed Corn Maggot, Stand counts (Sweet corn & Snap beans)

- Due to SCM (and/or other stressors), a **benefit in Stand Count** is often observed, for several Seed Treatment insecticides:
  - *** 10-15% increase, MN**
  - *** 10-30% increase, WI**

* Several new Active ingredients (AI) look promising (viable alternatives to Neonics)
- * Reatis (sweet corn)—**now labelled**
- * Entrust (sweet corn, snap bean)
- * Fortenza (sweet corn, snap bean)—**now labelled**
- * Lumivia (snap bean)
- * Plinazolin – High Rate (snap bean)

- Some of the Stand Count benefit is likely due to the suite of fungicides used (4-5/crop), disease protection
- More Data needed under high SCM pressure, wider range of environmental conditions **(Try Turkey manure)**
- **Note:** We are not yet aware of $/ac cost of new Seed Treatments; will include in future analyses once more efficacy data are available

Thank you, Plans for 2023: Questions?

MWFPA
Midwest Food Products Association, Inc.

http://labs.russell.wisc.edu/vegento/

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