At-plant, seed treatment options for the control of seed corn maggot in processing sweet corn

ophis@comcast.net

Wisconsin Agribusiness Classic

January 12, 2022

William Hutchison[1], Eric Burkness[1], Bryan Jensen[2], Scott Chapman[2] & Russell L. Groves[2]

[1]Department of Entomology, University of Minnesota, St. Paul, MN 55108
[2]Department of Entomology, University of Wisconsin, Madison, WI 53706

rgroves@wisc.edu

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Funding Acknowledgements and Co-authors

Midwest Food Products Association
Raw Products Committee
Year 1 Project

Dr. Bill Hutchison and Mr. Eric Burkness
Department of Entomology
University of Minnesota
https://vegedge.umn.edu/

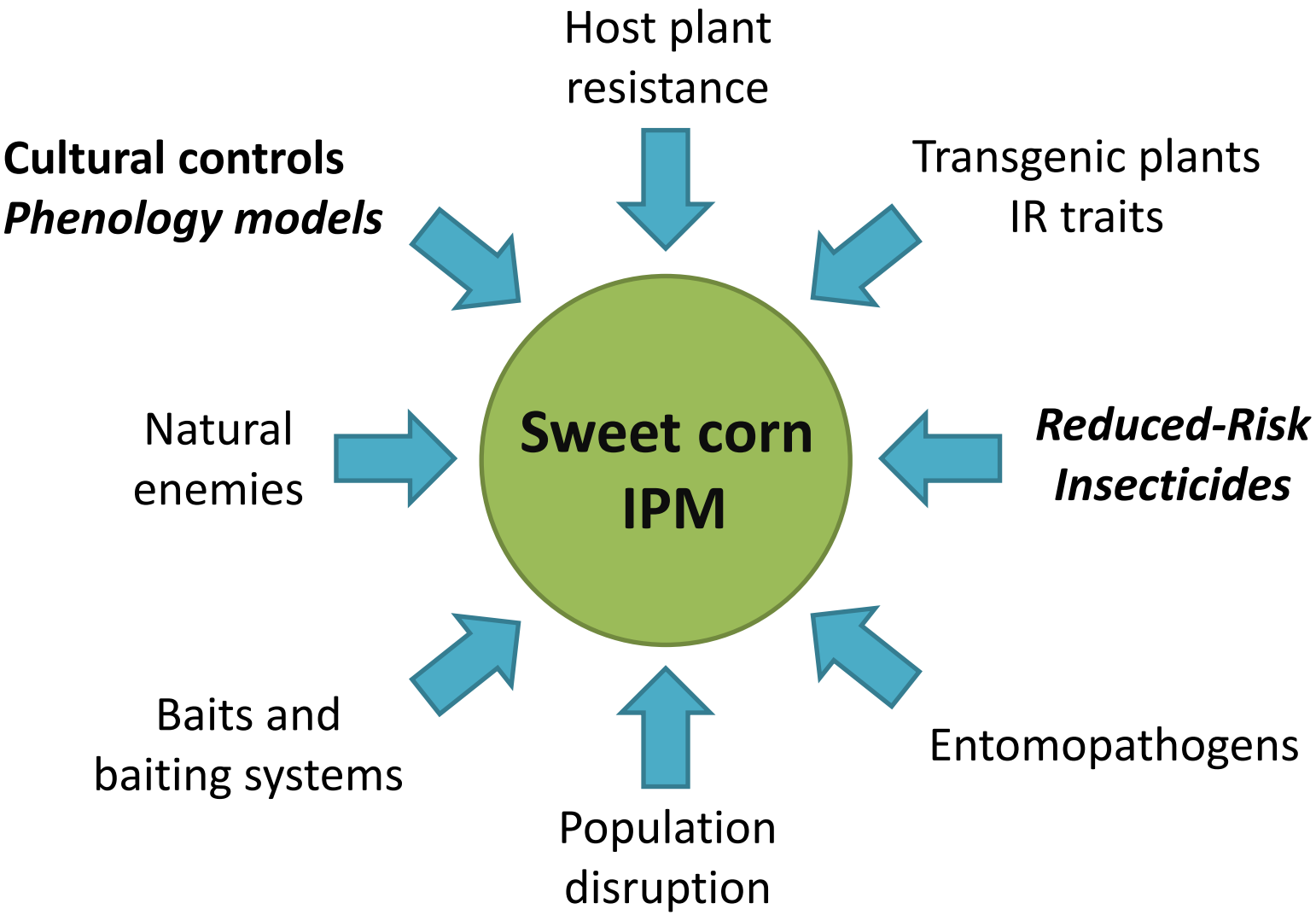
The first official mascot illustration, 1940s

https://twin-cities.umn.edu/gopher-athletics/goldy-gopher

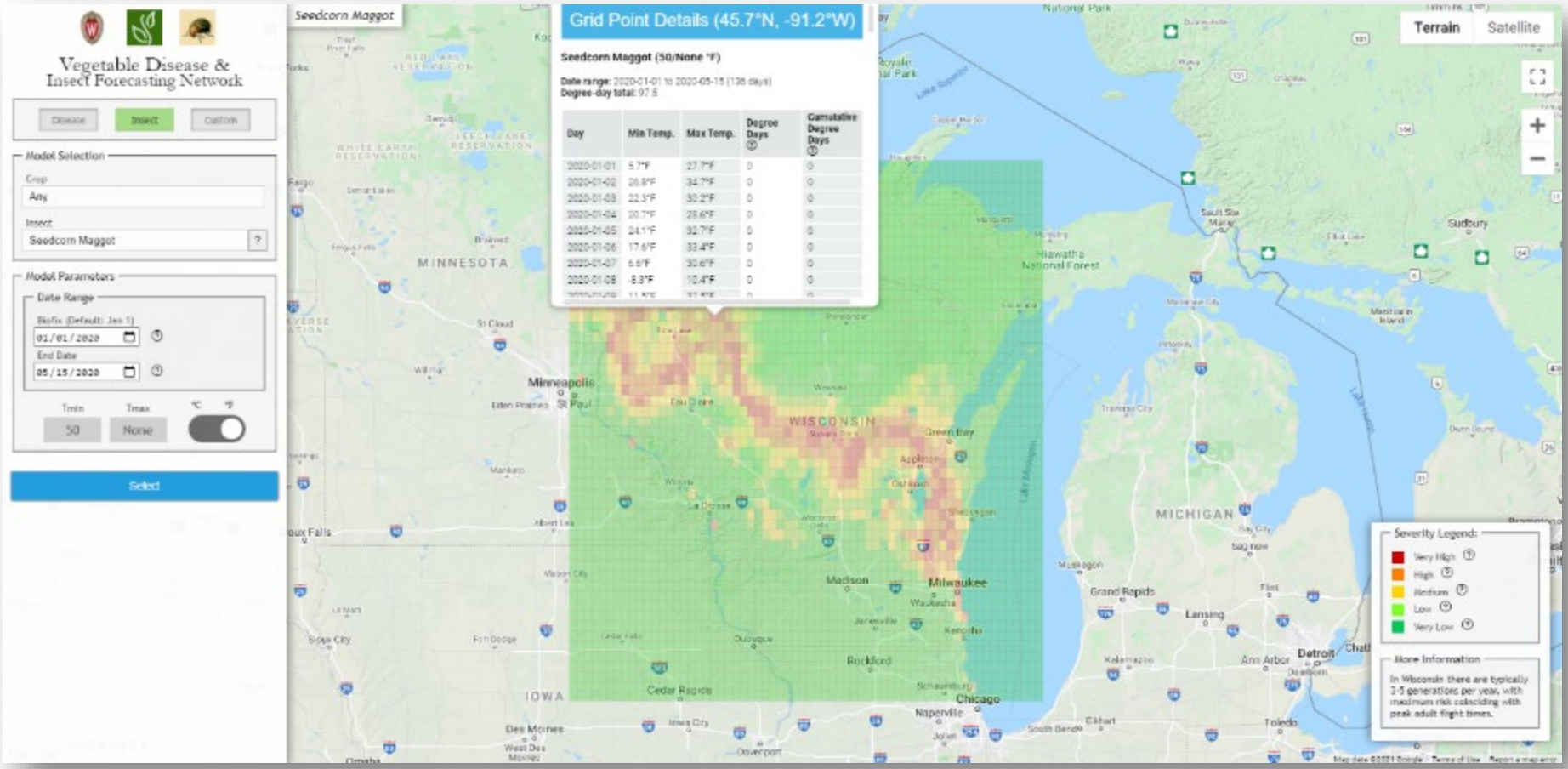
Seedcorn Maggot, *Delia platura* (Meigen)

- 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

Integrated pest management



Vegetable Disease and Insect Forecasting Network



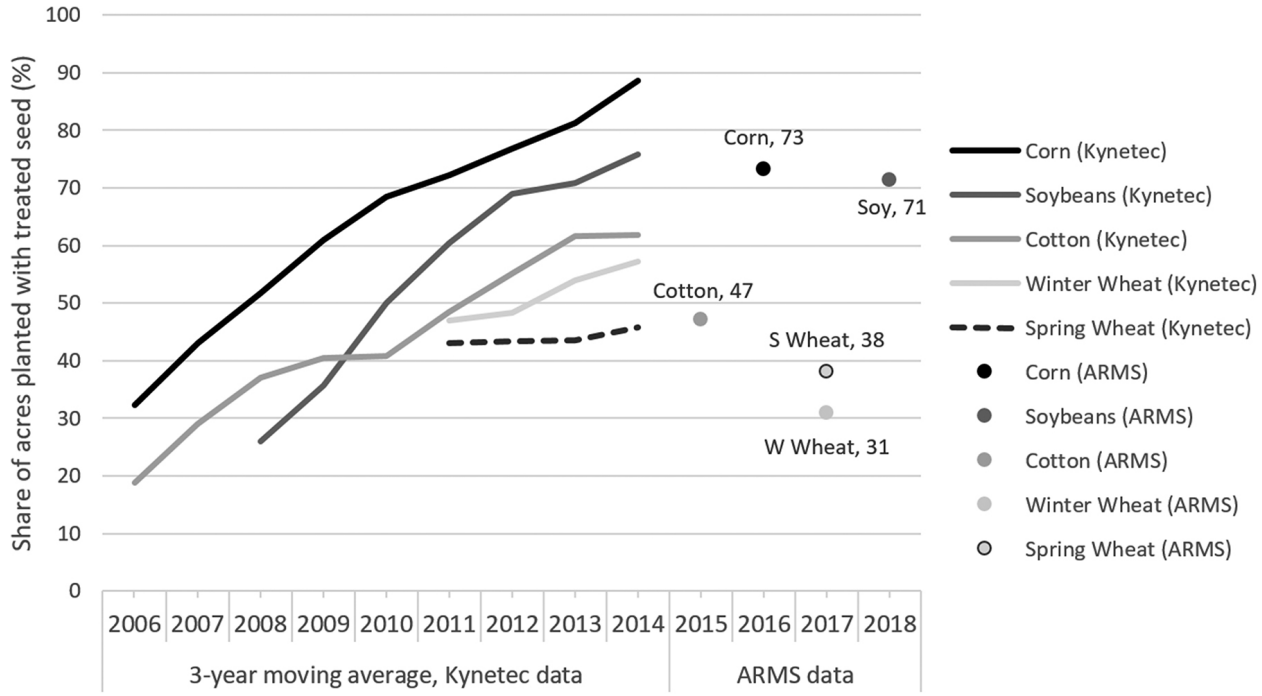
https://agweather.cals.wisc.edu/vdifn

Global Insecticide Seed Treatment Use is Increasing

“The global insecticide seed treatment market is projected to reach nearly $1.6 billion by 2016, growing at a CAGR of 11.4%.”

(Source: marketsandmarkets.com. January 2012).

Insecticide Seed Treatment Use Continues to be a Standard Agricultural Practice



BioScience, 2020, https://doi.org/10.1093/biosci/biaa019

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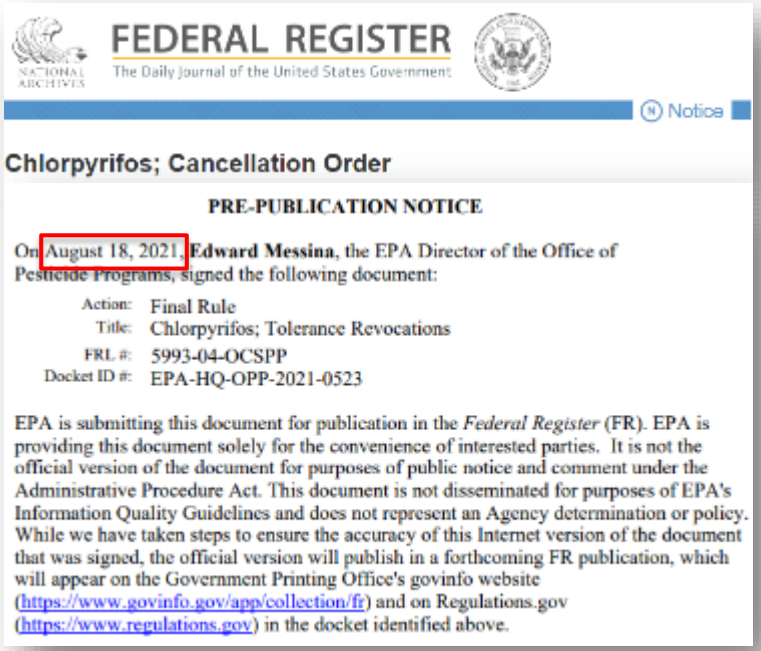
Factors Influencing Insect Pest Management
‘Food Safety and Residues’

– Major food retailers are setting acceptable residue levels below those set by government regulatory agencies.

“No detectable residues” will be a competitive advantage for food retailers.

– Older insecticides that do not meet these requirements are not being re-registered, resulting in increased use of novel insecticides (bio-pesticides & reduced-risk).

EPA Cancellation - chlorpyrifos



FEDERAL REGISTER
The Daily Journal of the United States Government

Notice

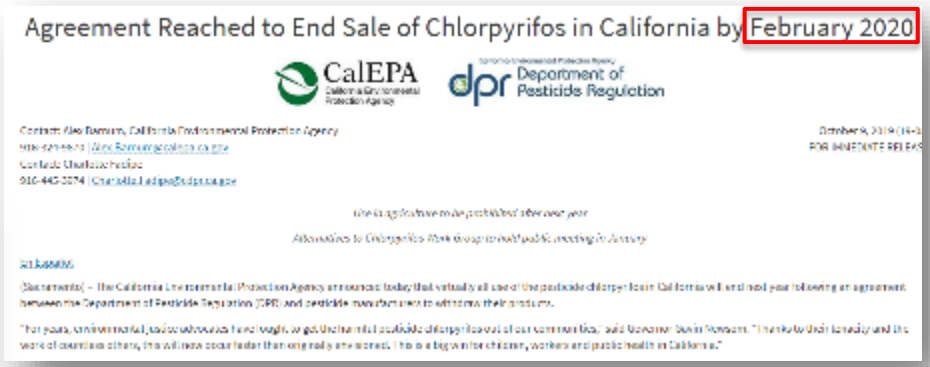
Chlorpyrifos; Cancellation Order

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.



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

CalEPA
dpr Department of Pesticides Regulation

(Sacramento) – The California Environmental Protection Agency announced today that virtually all uses of the pesticide chlorpyrifos in California will end next year following an agreement between the Department of Pesticide Regulation (DPR) and pesticide manufacturers to eliminate their products.

"For years, environmental and social advocates have fought to get the harmful pesticide chlorpyrifos out of our communities," said Governor Gavin Newsom. "I thank the DPR scientists and the work of countless others, this will move faster than originally anticipated. This is a big win for children, workers and public health in California."

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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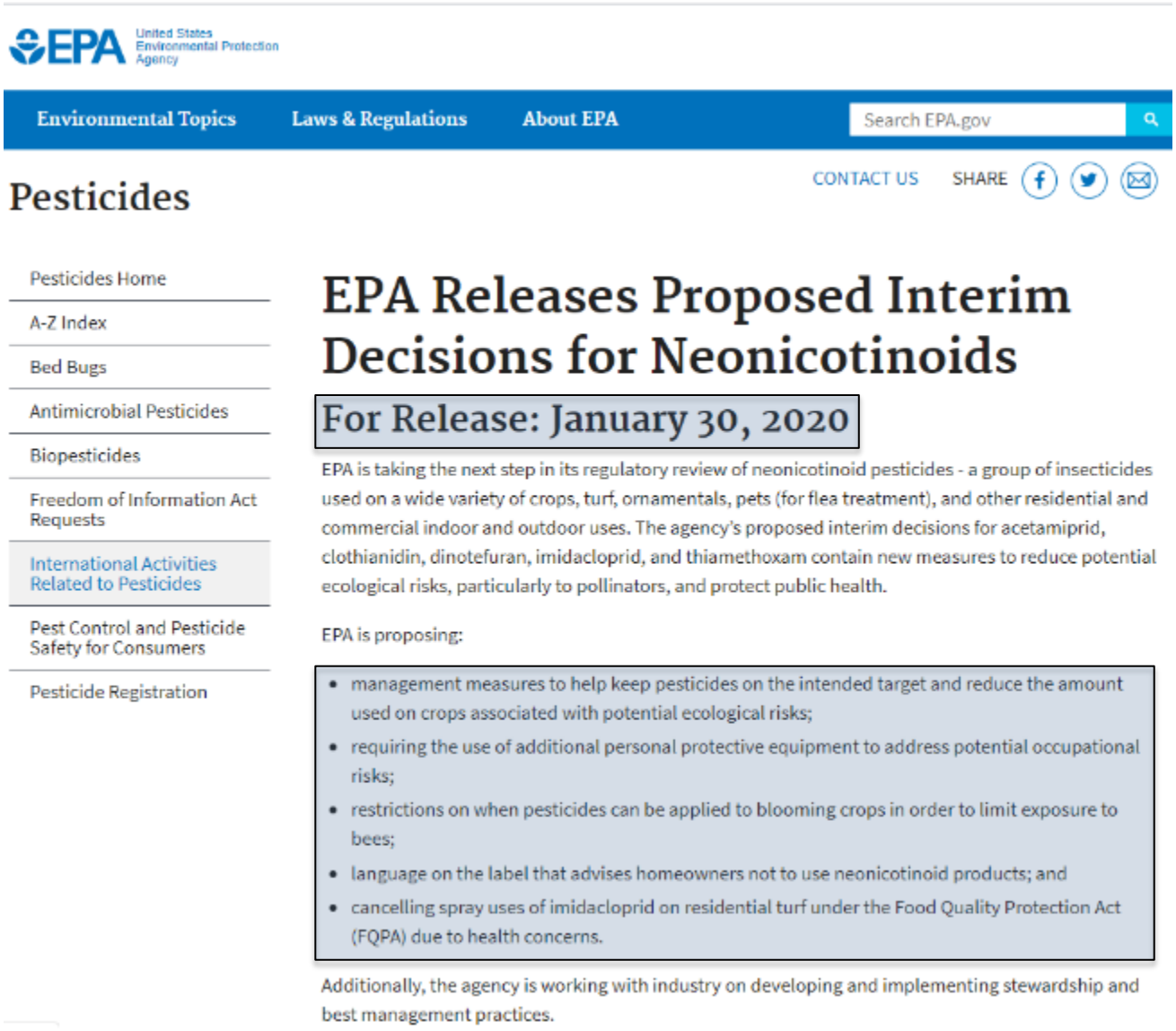
Re-registration decisions (Jan 30)



EPA United States Environmental Protection Agency

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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

EPA (1973)- Endangered Species Act

https://www.epa.gov/endangered-species

EPA (1973)- Endangered Species Act

EPA United States Environmental Protection Agency

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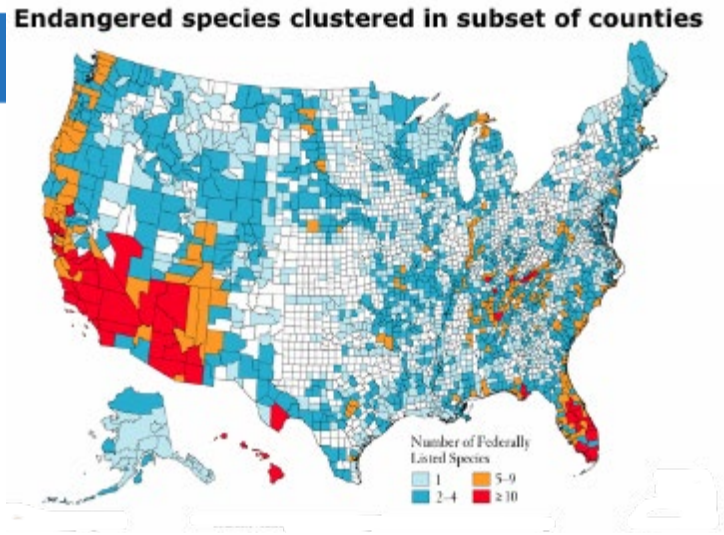
Endangered Species

EPA Releases Revised Method

Since the release of the NAS report, EPA, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Department of Agriculture (referred to as "the agencies") have been working together to develop and improve methods for assessing risks to listed species. In March 2020, EPA released the Revised Method for National Level Listed Species Biological Evaluations of Conventional Pesticides. The Revised Method updates the Interim Method developed in 2015.



- Biological investigations have been litigated over the last 30 years
- Revised NAS method suggests, "*to be delivered over next 3 years*"
- Investigations will ask if, "*continued use could affect >1 member*"
- Rudimentary range maps currently exist – need refinement

Insecticide Seed Treatments for Vegetable Crops in the U.S.

Crop Group	Major Pests	Products
Carrot	aster leafhopper	Sepresto 75WS, Cruiser 5FS
Bulb crops	onion maggot, seedcorn maggot	Trigard 75WP, CAPS, FarMore FI500
Legumes	seedcorn maggot, potato leafhopper, aphids, etc.	Cruiser 5FS, Lorsban 30F
Cucurbits	seedcorn maggot, cucumber beetles, aphids, etc.	FarMore FI400
Sweet corn	seedcorn maggot, corn flea beetle, corn rootworms, etc.	Poncho 600, Poncho 1250, Poncho VOTiVo, Cruiser 5FS, Lorsban 30F, Fortenza

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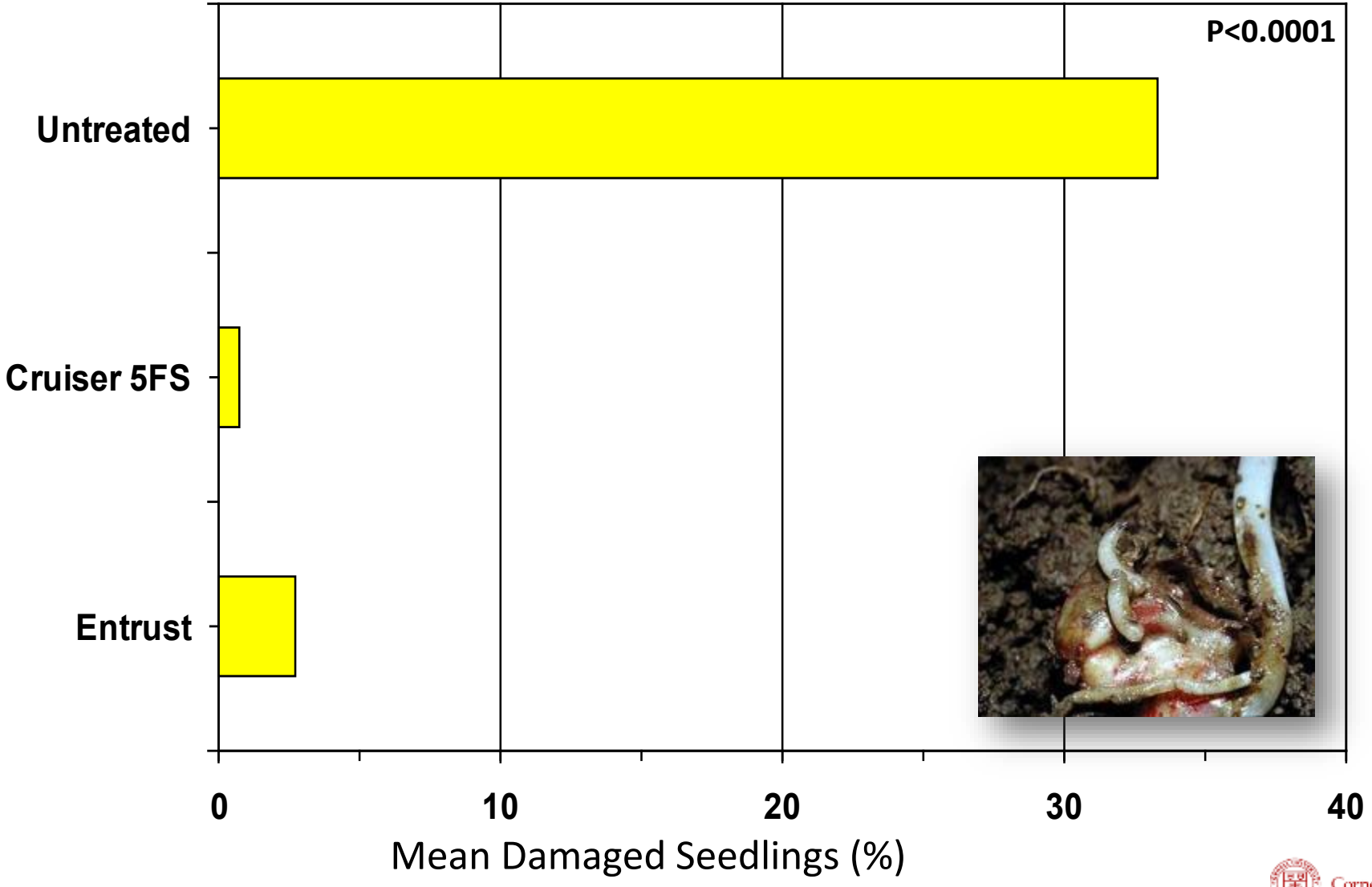
Insecticides Evaluated as Seed Treatments for Seed Maggot Control in Sweet Corn (2011), Elba,NY

Product	Active Ingredient	Rate	Class
Cruiser 5FS	thiamethoxam	0.25 mg ai/seed	Neonicotinoid
Poncho 600	clothianidin	0.25 mg ai/seed	Neonicotinoid
*Entrust	spinosad	0.25 mg ai/seed	Spinosyn

* Product NOT currently labeled as seed treatment on sweet corn; Registered now as Regard SC by Syngenta for seed treatment in onion (OMRI approved).

Seed Maggot Control in Sweet Corn

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



Evaluating new seed treatments (novel MoA)

– Fortenza (cyantraniliprole) – MoA Group 28

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).

– Regard SC (spinosad) – MoA Group 5.

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

Bayer CropScience

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

- Poncho 600(clothianidin) – MoA Group 4A

Poncho 600
Seed Treatment

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

Cruiser 5FS

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Insect targets

- Seed corn maggot (*Delia platura*)

- Corn flea beetle (*Chaetocnema hortensis*)

- Black cutworm (*Agrotis ipsilon*)

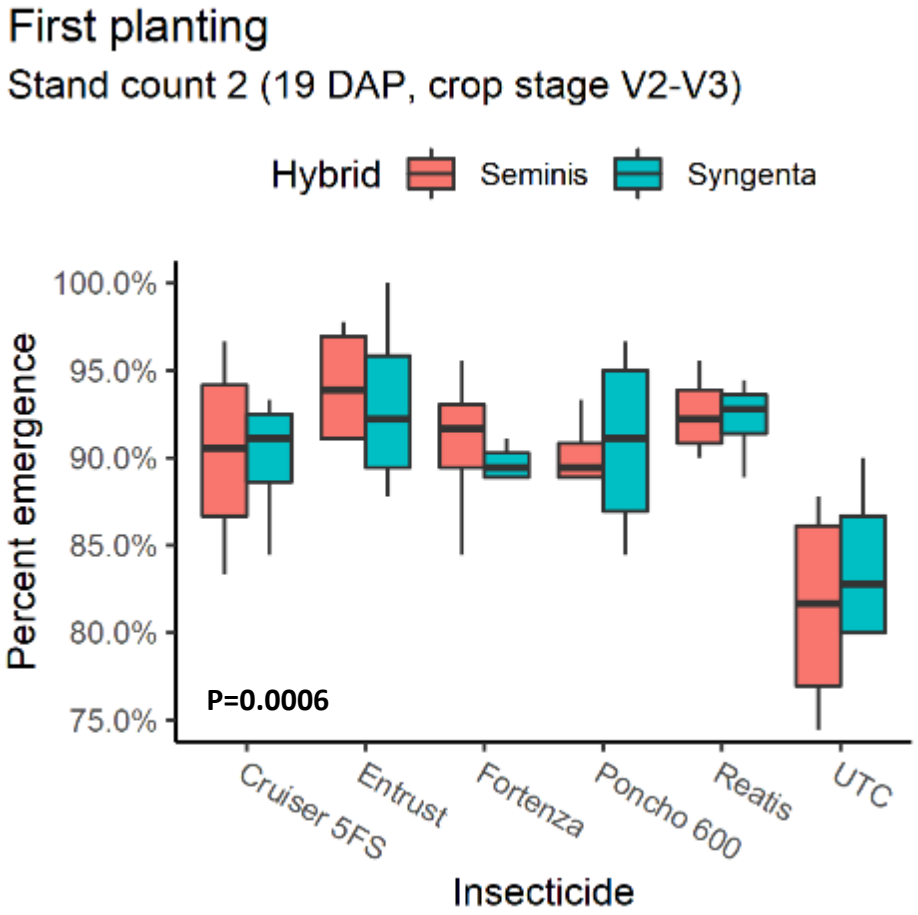
Experimental Approach

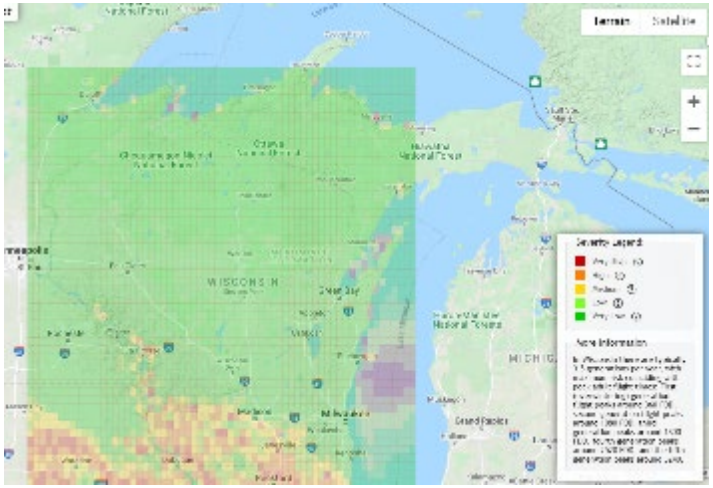
- Arlington Agricultural Experiment Station
- Two planting dates (1st and 2nd generation SCM)
- Syngenta/Seminis processing varieties
- Bone/blood meal attractants
- 6 experimental replicates / treatment
- 5 seed treatment active ingredients
- Potential for new experimental treatments (2022 & 2023)

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

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

First planting – Stand Counts

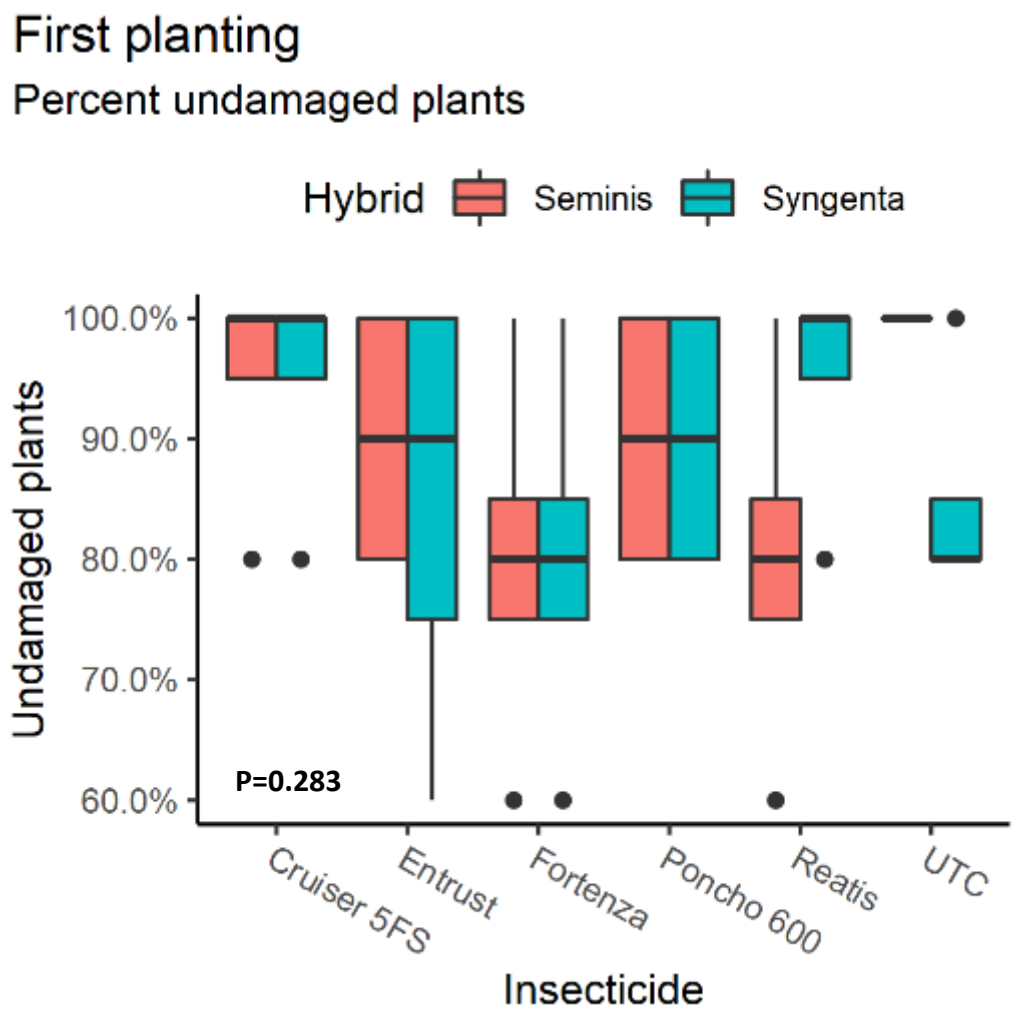




https://agweather.cals.wisc.edu/vdifn?panel=insect&model=seedcorn-maggot

(May 26, colonized by second gen SCM)

First planting – Percent Undamaged Plants



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

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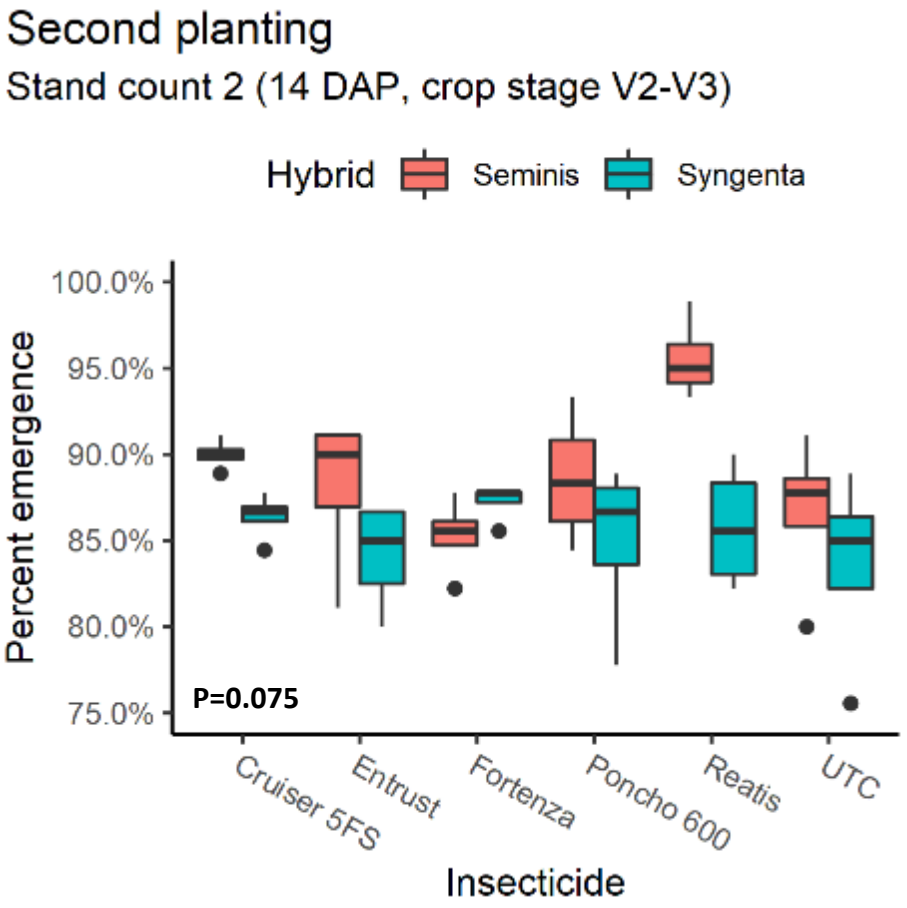
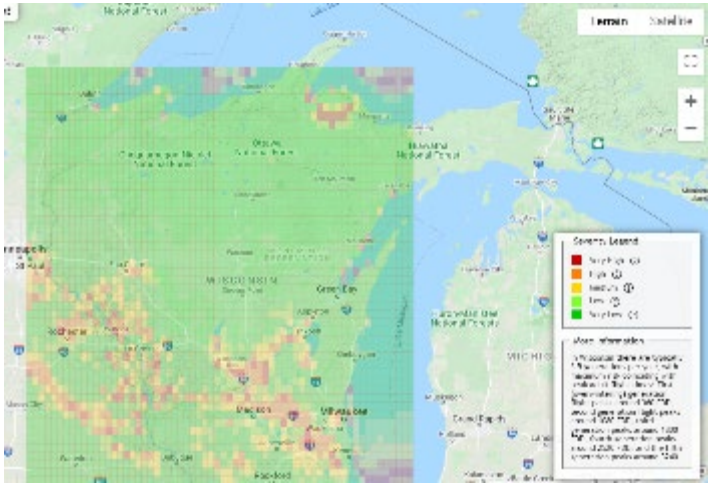
Second planting – Stand Counts

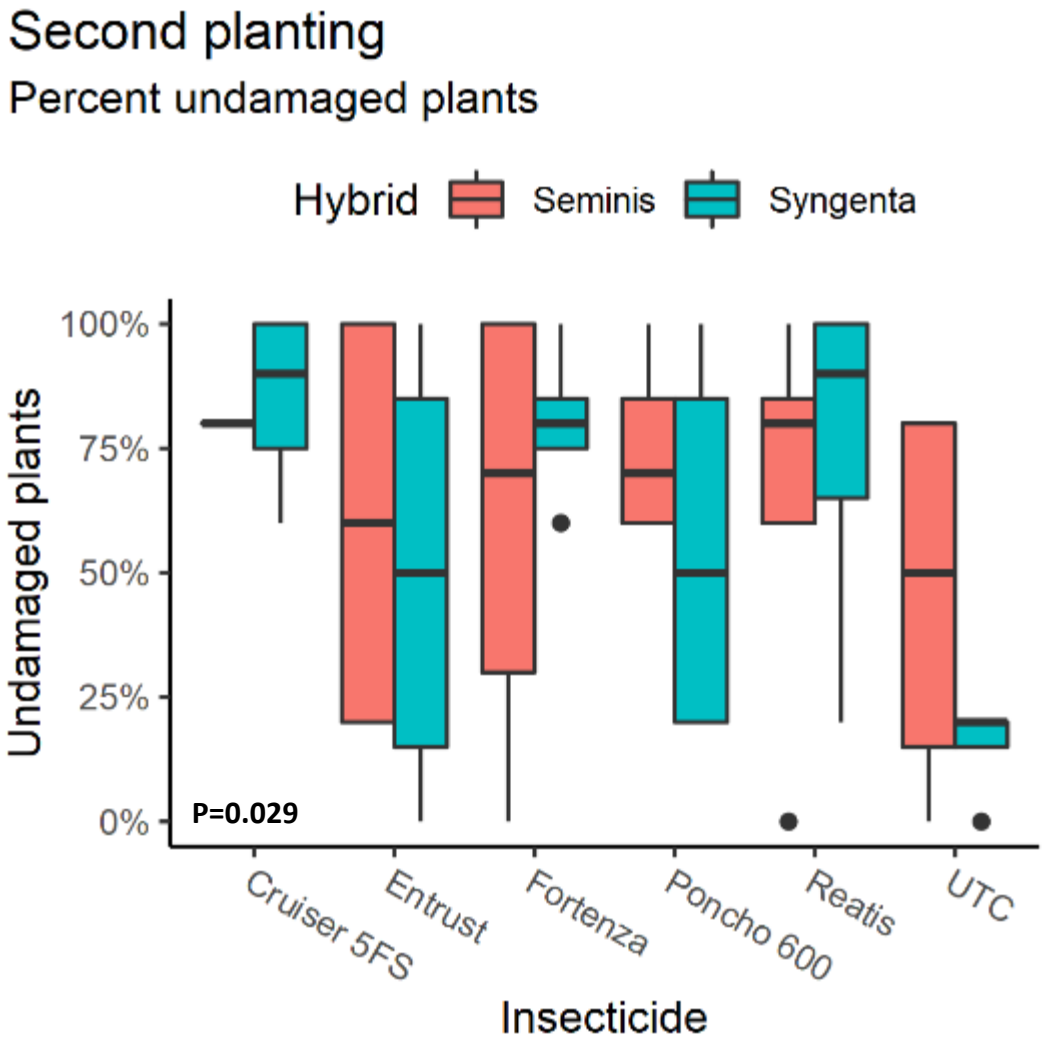




https://agweather.cals.wisc.edu/vdifn?panel=insect&model=seedcorn-maggot

(June 23, colonized by third gen SCM)

Second planting – Percent Undamaged Plants



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Acknowledgements and Thanks

MWFPA
Midwest Food Products Association, Inc.

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

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