UNIVERSITY OF MINNESOTA EXTENSION

2026 Minnesota Neonic Forum

Thursday, January 15, 2026

8:30 a.m. - 3 p.m.

Location: University of Minnesota Southern Research and Outreach Center

(35838 120th St, Waseca, MN)

Forum summary in 10 slides

On January 15, 2026, the University of Minnesota Regional Sustainable Development Partnerships hosted an educational forum on neonicotinoid insecticides, where leading researchers, farmers, and seed industry representatives discussed the benefits and harms of widespread neonic use.

You can find videos of the forum on YouTube here. (Total time: approximately 4 hours).

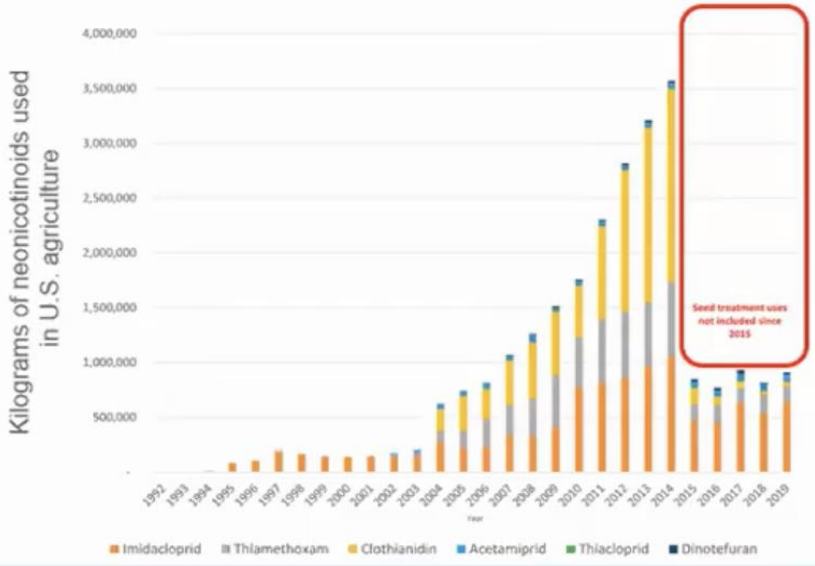
If you'd like to see a summary of the forum in 10 key slides prepared by the Campaign for Cleaner Seed, read on!

Pervasiveness of neonics in the environment

Dr. Scott McArt, Associate Professor, Dept. of Entomology, Cornell Univ.

Most neonic usage in USA is via corn & soybean seed treatments

You can see this very clearly when USGS stopped monitoring neonic seed treatment usage in 2015



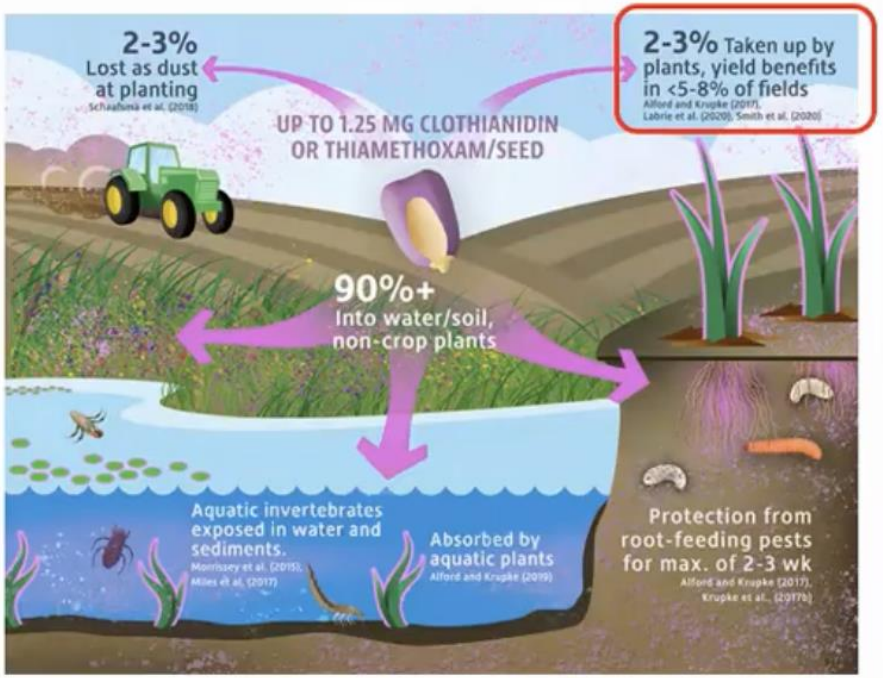
CornellCALS College of Agriculture and Life Sciences

Sass et al. 2024 *Frontiers in Toxicology*

27

"Our country does not currently monitor the major use of the most toxic insecticide used in the USA, and it's mostly coming from seed treatments."

Only 2-3% of the neonic actually goes to the crop



Purple represents fate of neonicotinoid in crop plants and the environment

Krupke & Tooker 2020 *Front. Sust. Food Syst.*
https://doi.org/10.3389/fsufs.2020.595855

Dr. Bill Arnold, Professor, Dept. of Civil, Environmental, and Geo-Engineering at the Univ. of Minnesota

Detections in lakes and rivers

(500+ surface water samples from Minnesota taken between 2019-2022)

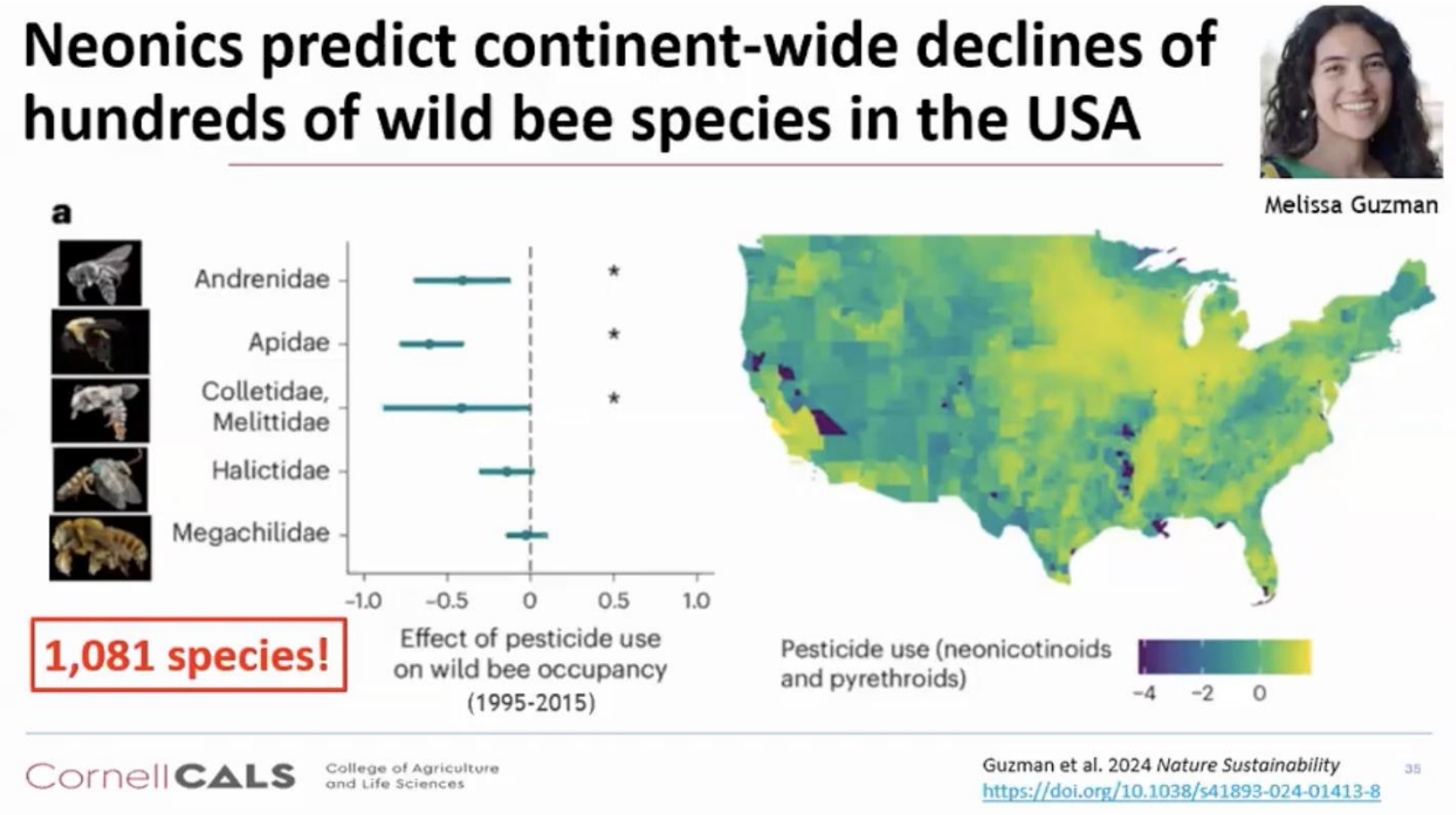
	Lakes			Rivers			
Analyte	Detection Proportion	Range (ng/L)	Mean (ng/L)	Detection Proportion	Median (ng/L)	Range (ng/L)	Mean (ng/L)
Acetamiprid	0.29	0 - 1.4	0.043	0.35	0.0075	0 – 91	1.0
Acetamiprid-N-Desmethyl	0.03	0 - 3.4	0.022	0.03	<LOQ	0 – 86	0.98
Clothianidin	0.31	0 - 9.2	0.26	0.60	0.14	0 – 210	5.7
Desnitro-Imidacloprid	0.26	0 - 11000	500	0.27	<LOQ	0 – 11000	340
Fipronil	**0.32**	**0 – 66**	**1.3**	**0.30**	**<LOQ**	**0 – 310**	**4.5**
Fipronil Desulfinyl	0.27	0 – 25	0.39	0.11	<LOQ	0 – 160	1.8
Fipronil Sulfide	0.11	0 – 40	0.23	0.08	<LOQ	0 – 190	1.8
Fipronil Sulfone	0.24	0 - 5.2	0.16	0.20	<LOQ	0 – 250	2.4
Imidacloprid	**0.65**	**0 – 120**	**2.5**	**0.85**	**1.6**	**0 – 220**	**8.7**
Imidacloprid-Olefin	0.05	0 – 91	0.36	0.04	<LOQ	0 – 220	1.5
Imidacloprid-Urea	0.35	0 - 8.9	0.59	0.29	<LOQ	0 – 210	2.9
Thiacloprid	0.15	0 - 1.2	0.015	0.13	<LOQ	0 – 170	1.7
Thiacloprid-Amide	0.21	0 - 7.6	0.49	0.17	<LOQ	0 – 510	7.6
Thiamethoxam	0.19	0 - 2.2	0.041	0.44	<LOQ	0 – 51	1.1

“We’ve been repeating this cycle since the 40s. DDT, PCBs, Glycol Ethers, PFAS…We make new chemicals that are useful in some way, and don’t fully understand the environmental and toxicological impacts until after the fact.”

Note: the chronic toxicity benchmark is 10 ng/l for Imidacloprid and 11 ng/l for Fipronil

Effect on animals and humans

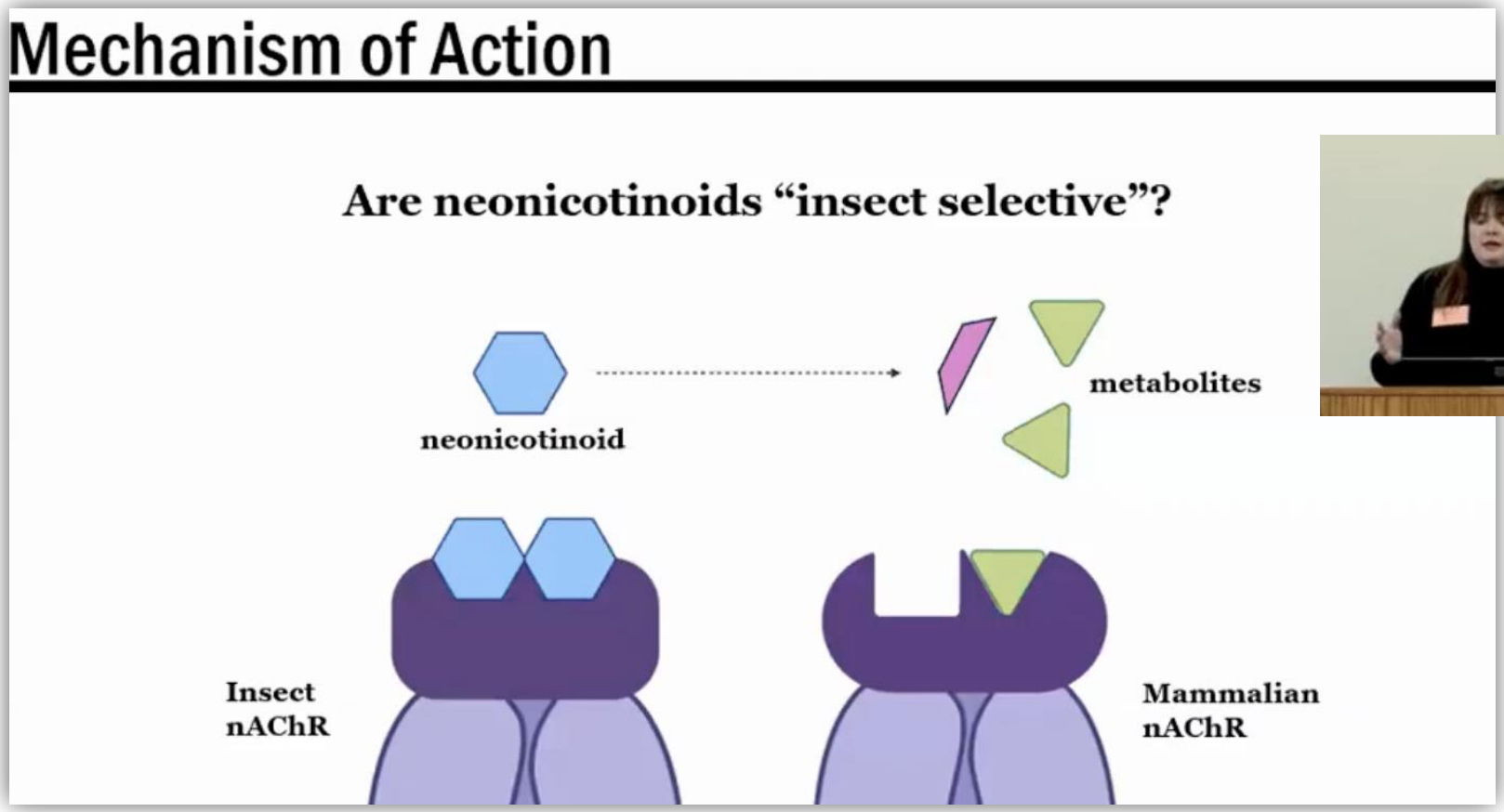
Dr. Scott McArt, Associate Professor, Dept. of Entomology, Cornell Univ.



Melissa Guzman is a data scientist who looked at the entire iNaturalist database to document a decline in pollinators. She then looked at some of the drivers that are causing the changes.

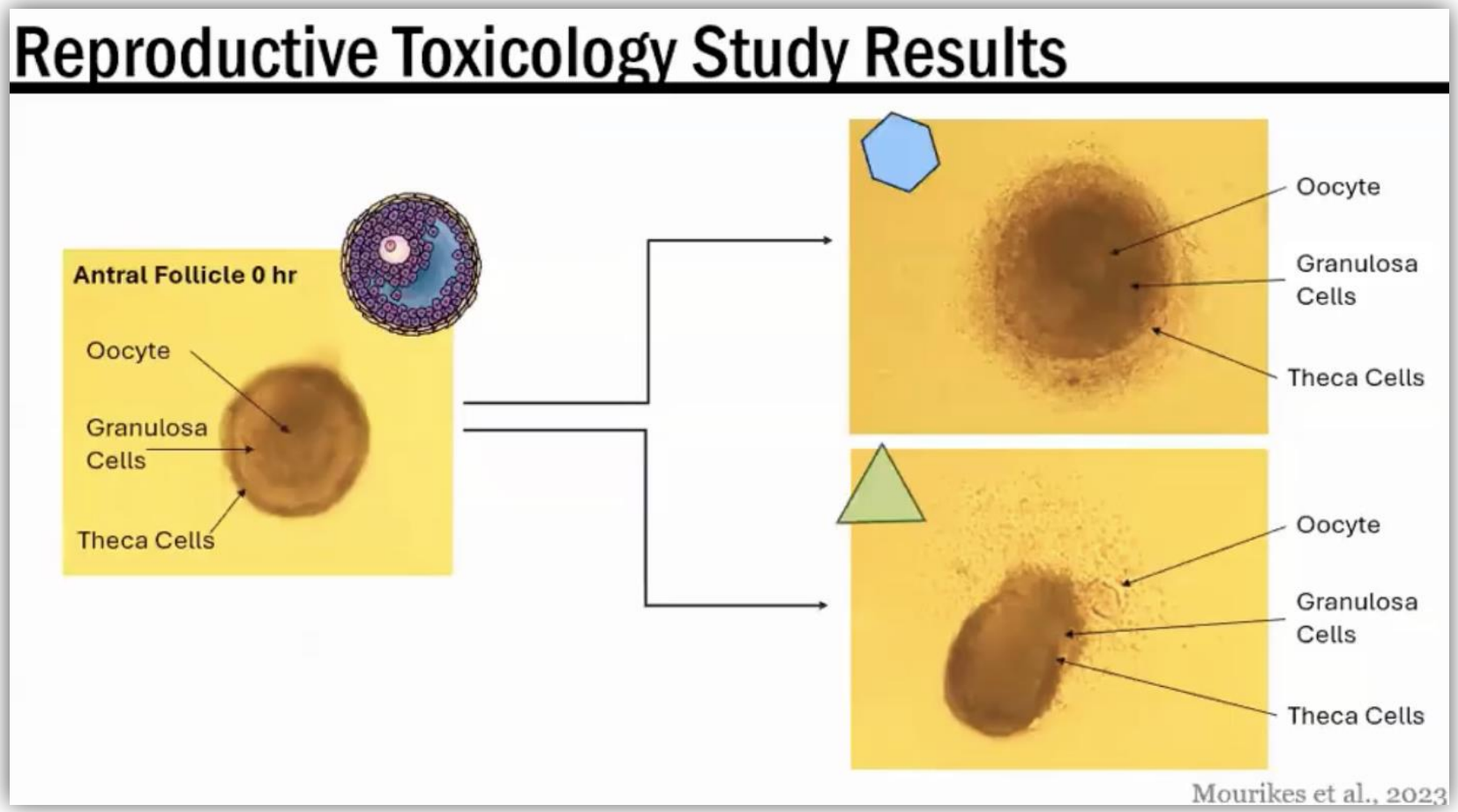
"The single most important factor for driving declines in those 1081 species of pollinators? Neonicotinoids and pyrethroids."

Dr. Vasiliki Mourikes, Reproductive Toxicologist and DVM, Northwestern Univ.

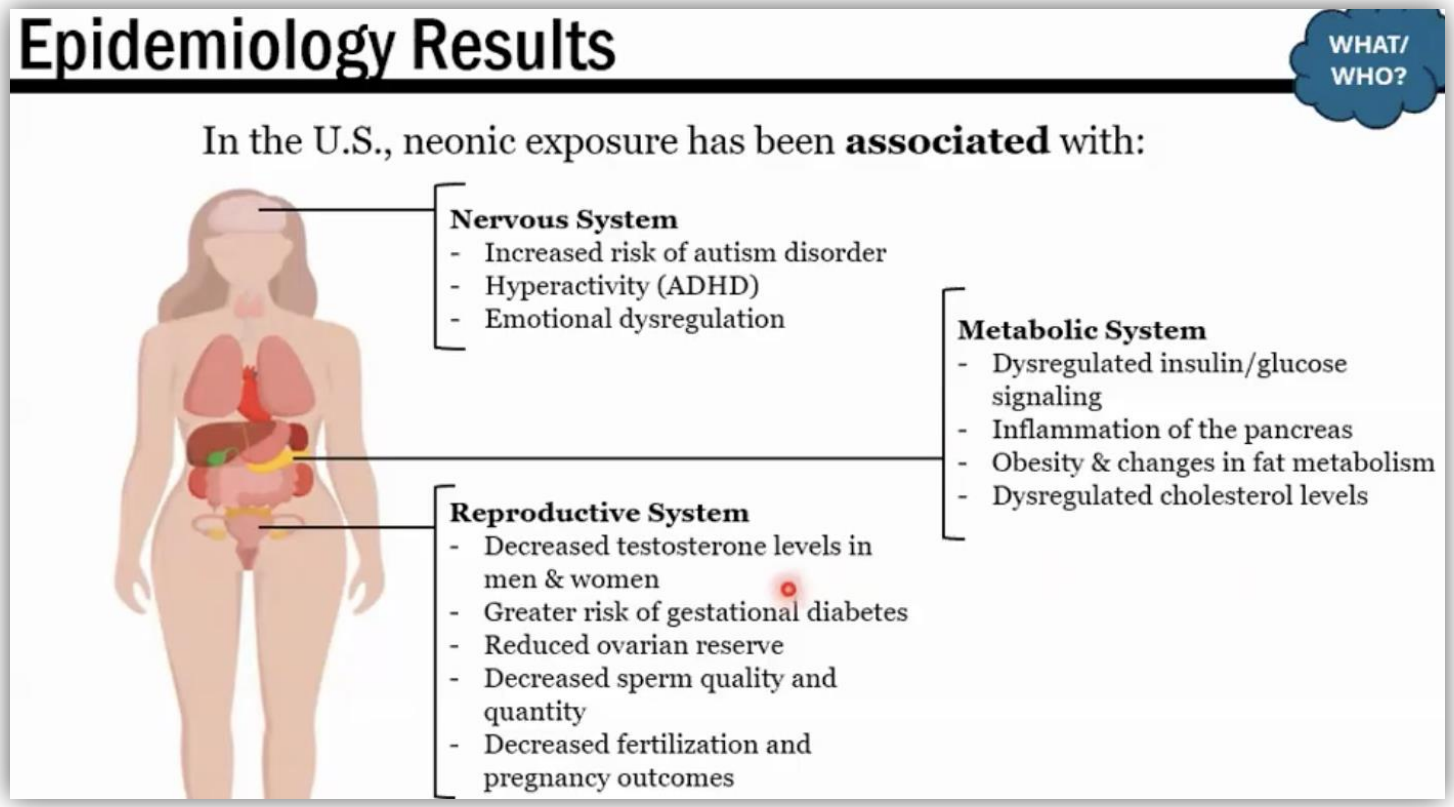


Neonics are metabolized in the liver into molecules that disrupt the mammalian nervous system.

"Is it true that neonics are insect-selective? Not really."



"This here (upper right) is an example of a healthy follicle, a follicle that grew and is happy in culture. And I know that this follicle is healthy because the Oocyte is in the middle, it's round, and these support cells have multiplied and spread out.
In contrast (lower right) this is an example of follicle that came from the group that was exposed to the metabolite…The Oocyte is extruded from the follicle, so it is no longer inside. It is misshapen, it doesn't have a nice round shape, and the support cells are not happy and growing. They're actually quite miserable."



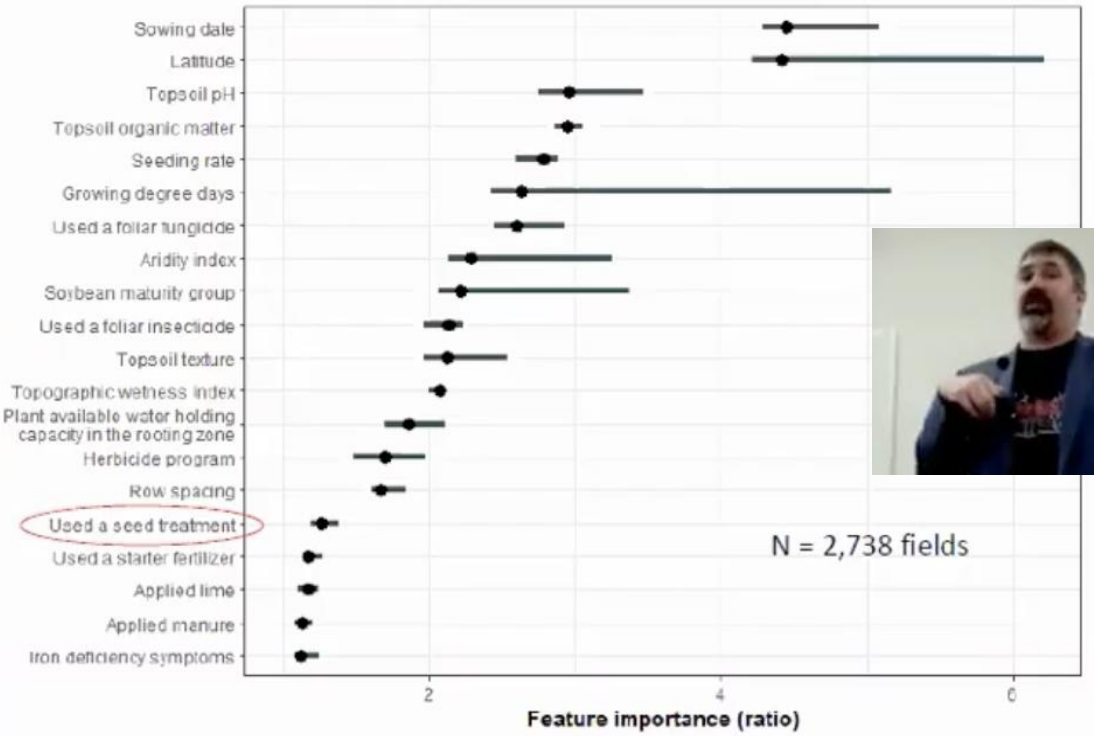
"I hope you've all recognized by this point that humans are definitely being exposed, and we are detecting neonicotinoids in all sorts of places in our bodies.
As it turns out, in these controlled animal studies, the results perfectly mirror the correlation between neonics and the adverse health outcomes that we see in the human population.
This is a situation where the more of something you are exposed to the worse the outcome…But these chronic effects, and these are really the effects we are seeing in the metabolic system and reproductive system, they are as a result of chronic exposure, but not just chronic exposure; chronic exposure at fairly low doses that are well within and below the detection levels that we are finding in our environment."

Effect on farm yields and profitability

Dr. Shawn Conley, Professor of Agronomy, Univ. of Wisconsin, Madison

Importance of management-based variables in a random forest model predicting soybean yield.

Shah, A.D., T. R. Butts, S. Mourtzinis, J. I. Rattalino Edreira, P. Grassini, S. P. Conley and P. D. Esker. 2021. An interpretable machine learning assessment of foliar fungicide contribution to soybean yield in the north-central United States. Scientific Reports 11:18769. https://doi.org/10.1038/s41598-021-98230-2.



COOL BEAN
University of Wisconsin-Madison | UW Extension

"I was initially one of the biggest proponents of using neonicotinoids in soybeans. Around 2018, I started hearing from Christian Krupke at Indiana and other entomologists across the country that we're not seeing a yield response.

We were able to collect data from 194 trials across the Midwest…Did we see a yield response? Yes, about half a bushel (per acre). So if you think, what's the average cost of a neonic (treatment)…we're really not seeing that return on investment…At best, farmers just broke even."

Hunter Ness, Master's Student, Department of Entomology, Univ. of Minnesota

Discussion

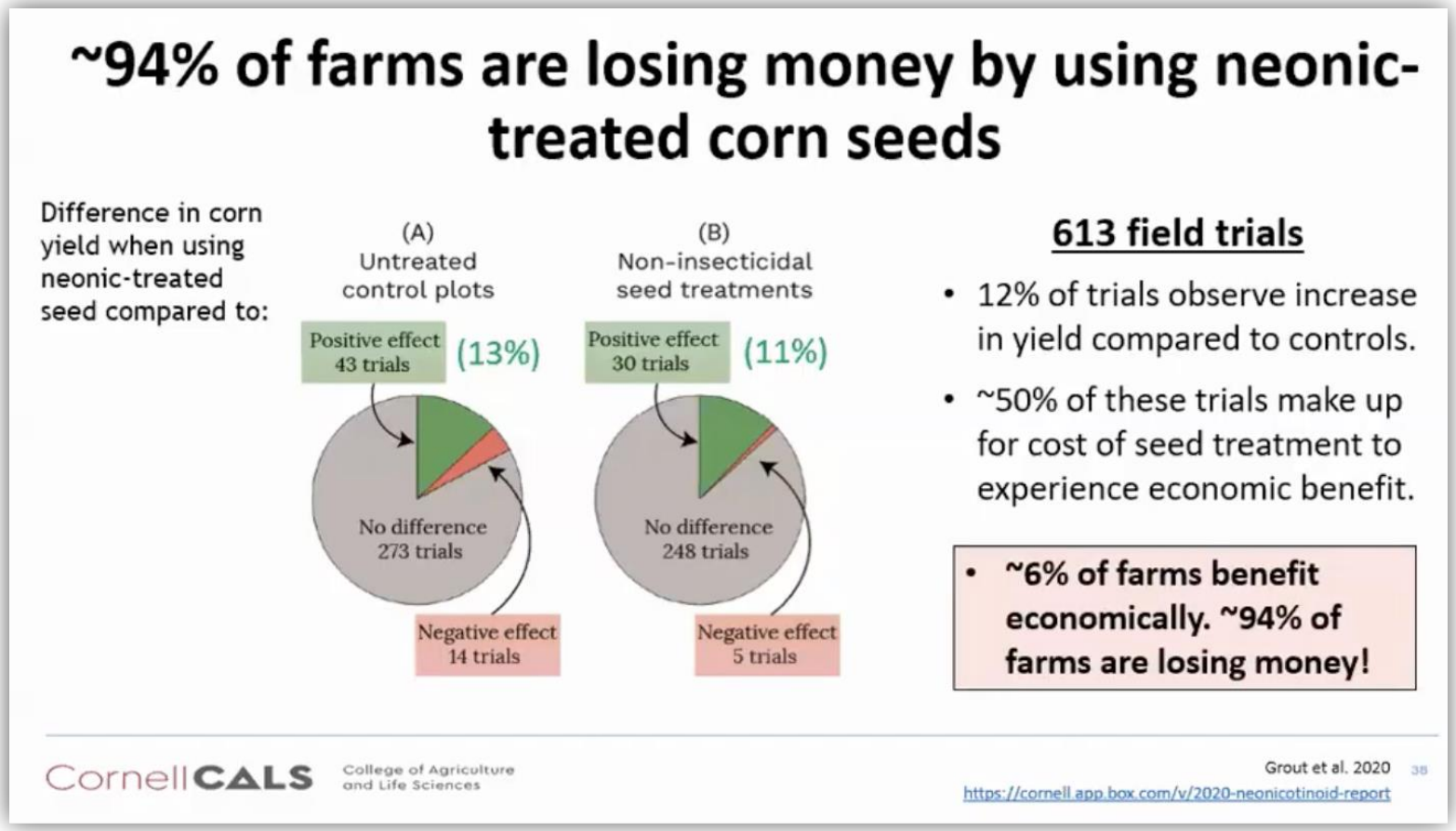
Takeaways

- IST usage remains high – primarily prophylactic
- Early season soil insect pest pressure appears to be low
- ISTs have limited effectivity against major corn and soybean pests, provide limited yield benefits
- ISTs provide no additional benefit to Bt-corn in susceptible CRW populations

Hunter did a field study of corn and soy pest populations.
He then tested the efficacy of neonic-based insecticide seed treatments in Southern Minnesota.
His key takeaways are show above.

*CRW is corn rootworm, the most economically significant corn pest. Bt-corn is a genetically modified crop that contains genes from the soil bacterium Bacillus thuringiensis

Dr. Scott McArt, Associate Professor, Dept. of Entomology, Cornell Univ.



"In all application contexts other than field crops, there actually is really clear evidence for benefits, economic benefits, to users of neonicotinoid insecticides. Are there other things that they could use? Sure. In almost every application context, there are alternatives. ***But for field crops, the answer is completely different."***