Variation in Biological and Molecular Response of *Meloidogyne* spp. to Post-Plant Nematicides

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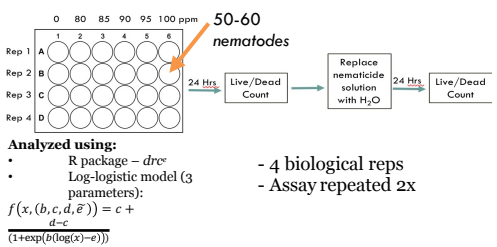
Location: Corvallis, OR, USA
Time Zone: Pacific Daylight Time

Introduction: Nematicides primary control for PPN. 48% of the total nematicide market used to control RKN. **Few new nematicides on the market to use – proper stewardship key to longevity of limited controls.** Many basic biology questions about new to the market nematicides remain unanswered.

Does the 24-hr ED_{50} of fluazadiozine remain constant across PPN genera and species from different geographical locations?

Methods



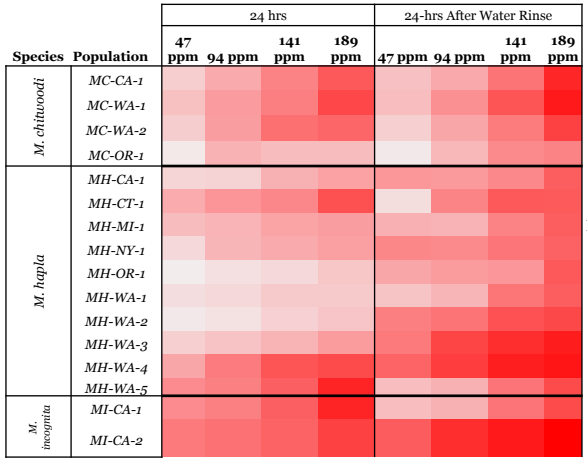
Analyzed using:
- R package – *drc*
- Log-logistic model (3 parameters):

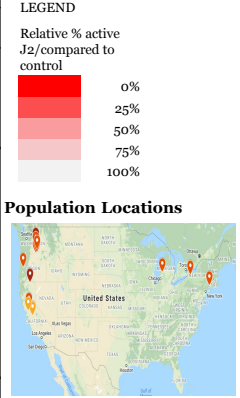
$$f(x,(b,c,d,e)) = c + \frac{d-c}{(1+\exp(b(\log(x)-e)))}$$

- 4 biological reps
- Assay repeated 2x

Results

https://doi.org/10.1094/PHYTO-05-20-0189-R





Species	Population	State	Original Host
M. chitwoodi	MC-CA-1	CA	Potato
	MC-WA-1	WA	Potato
	MC-WA-2	WA	Potato
	MC-WA-3	WA	Potato
M. hapla	MH-CA-1	CA	Tomato
	MH-CT-1	CT	Ornamentals
	MH-MI-1	MI	Vegetables
	MH-NY-1	NY	Tomato
	MH-OR-1	OR	Grape
	MH-WA-1	WA	Concord Grape
	MH-WA-2	WA	Grape
	MH-WA-3	WA	Grape
	MH-WA-4	WA	Grape
	MH-WA-5	WA	Grape
M. incognita	MI-CA-1	CA	Grape
	MI-CA-2	CA	Row Crops

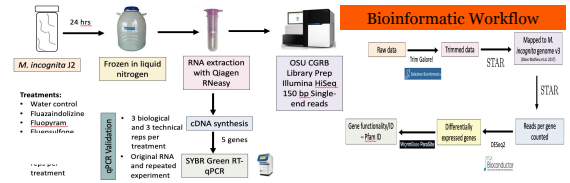
Conclusions

>10-fold variation in *Meloidogyne* spp. and populations within spp. fluazaindolizine ED_{50}

A single-labeled rate of fluazaindolizine may not be effective in suppressing PPN of agricultural significance

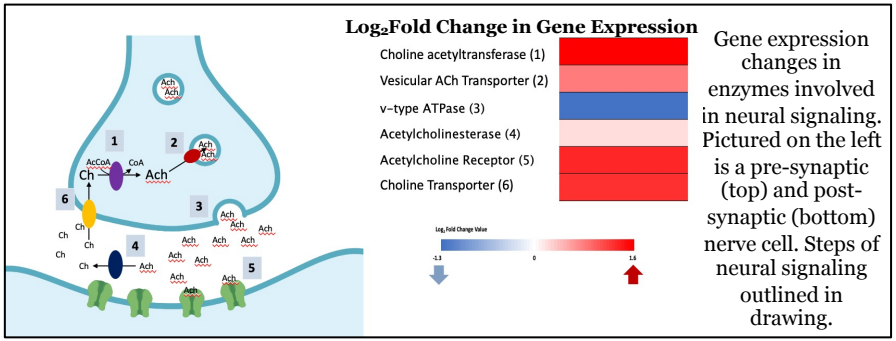
Do gene expression changes in *M. incognita* after a the 24-hr ED_{90} of fluazadiozine give insight into fluazaindolizine mode-of-action?

Methods



Results

Wram et al. 2022, *Scientific Reports*, In-press



Gene expression changes in enzymes involved in neural signaling. Pictured on the left is a pre-synaptic (top) and post-synaptic (bottom) nerve cell. Steps of neural signaling outlined in drawing.

Conclusions

Strong ↑ in acetylcholine neuron enzymes. Suggesting fluazaindolizine may be impacting release of acetylcholine. This corroborates abnormal movement observed by Thoden and Wiles (2019) in *M. incognita* exposed to fluazaindolizine.