



Nematode management in row crops

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Row Crop Short Course Meeting

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Zane Grabau Introduction

- Started June 2016
- 70% research, 30% extension
- North Florida agronomic & horticulture crops
- Based in Gainesville
- Plant-parasitic nematode management
- Soil ecology: free-living (beneficial) nematodes



Outline

- Nematodes in row crops
- Nematode management
 - Resistance
 - Crop rotation
 - Nematicides

Nematodes in row crop production: root-knot nematodes

- Wide host range; varies by RKN species
- Damaging and common, often late-season symptoms
- Worse in sandy soil
- Causes root galling
 - Size varies by crop





Root damage by
root-knot
nematode to
soybeans, cotton,
and peanuts



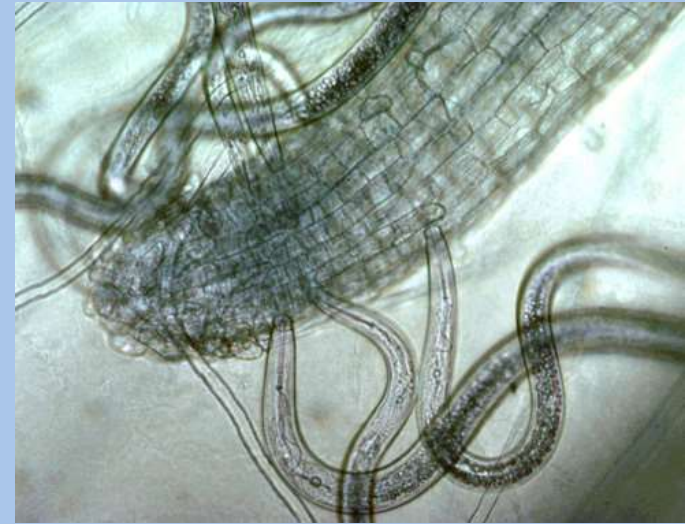
Foliar damage by
root-knot
nematode to
soybeans, cotton,
and peanuts



Nematodes in row crop production:

Sting nematode

- Most crops are hosts (may vary by population)
- Very damaging; no galling
- Only in very sandy soil (90%)
- Often early-season problem



Nematodes in row crop production:

Reniform nematode

- Affects cotton & soybean
- Subtle symptoms
- Heavier soil optimal (80% sand)
- Many other nematodes also infect row crops!



Outline

- Nematodes in row crops
- Nematode management
 - **Resistance**
 - **Crop rotation**
 - Nematicides

Nematode management: resistant cultivars

- Nematode reproduction reduced/eliminated
- Reduces damage, lowers nematode populations
- Pest-specific: mainly root-knot resistance available



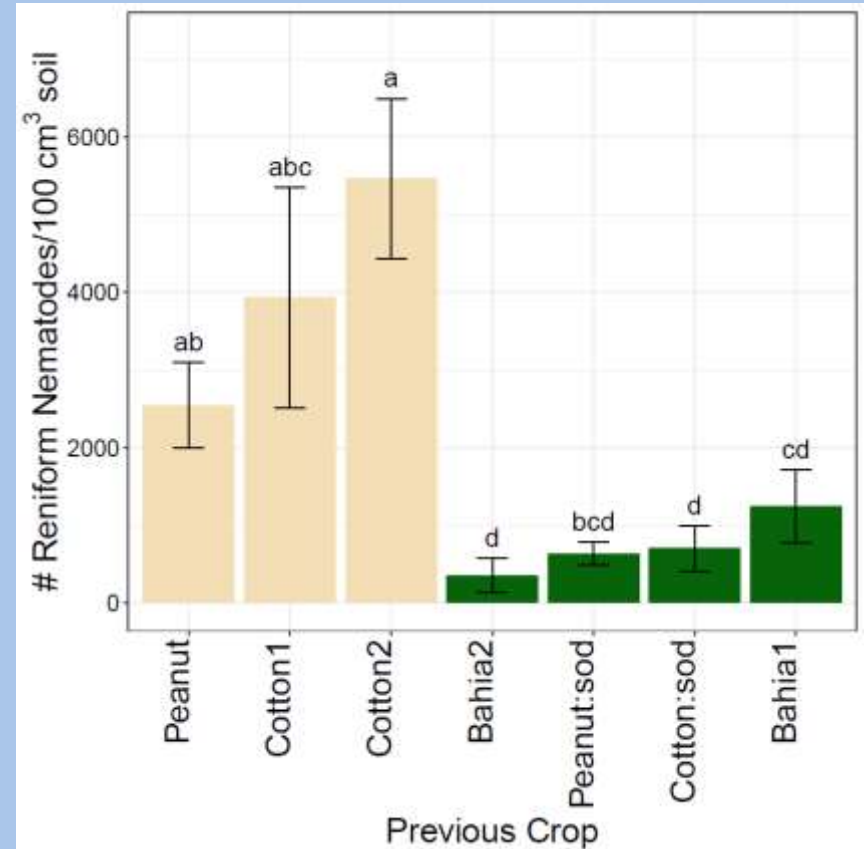
Resistant cultivars by crop

- Peanut (highly resistant)
 - Tifguard (available)
 - Georgia 14N (available)
 - Tif Envy H/L (increase)
- Cotton (moderate-high)
 - Variety of root-knot resistant cultivars
- Soybean
 - Susceptible to all root-knot species
 - Some cultivars resistant; mainly cotton root-knot



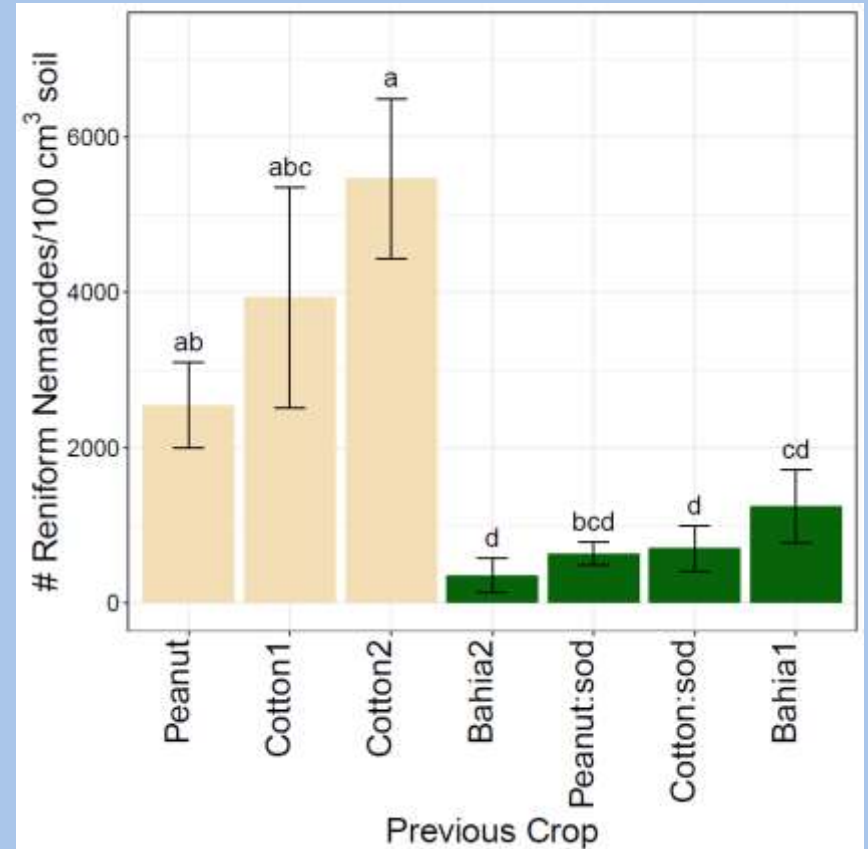
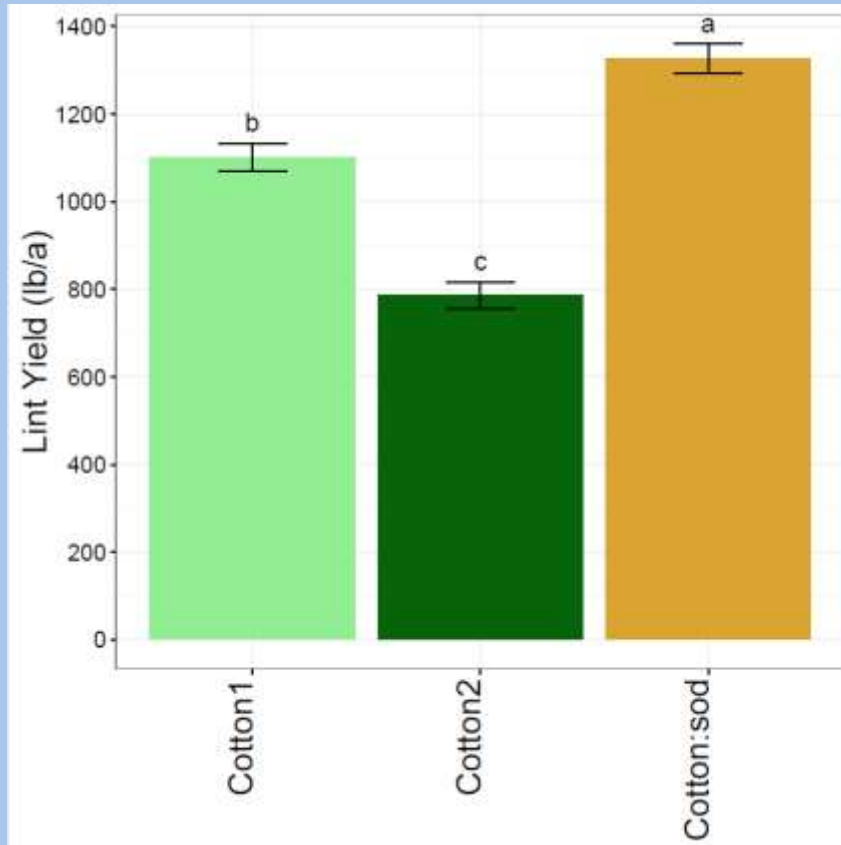
Nematode management: rotation

- Grow non-host, nematodes decline, yields increase
- Sod-based rotation as example



Preplant nematode counts from
Quincy research site

Nematode management: rotation



Preplant nematode counts from
Quincy research site

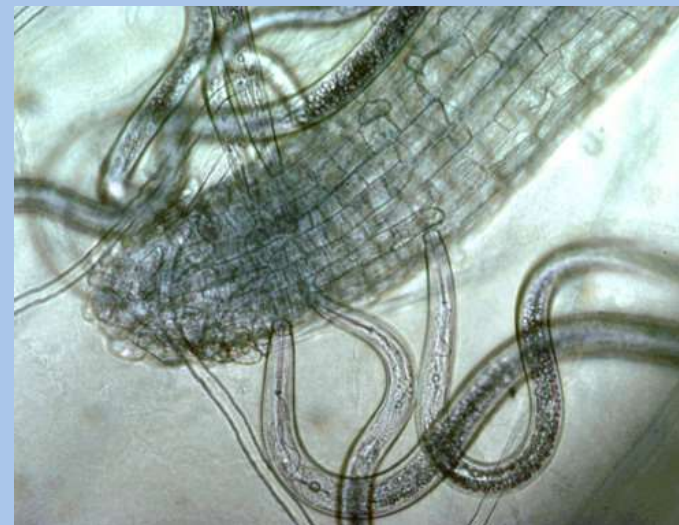
Crop rotation strategies for root-knot nematodes

- Cotton root-knot nematode
 - Avoid cotton, susceptible soybean, veggies
 - Better: peanut, some grasses (infects corn), resistant soybean
- Peanut root-knot nematode
 - Avoid peanut, susceptible soybean, veggies
 - Better: cotton, some grasses



Crop rotation strategies for other nematodes

- Reniform nematode
 - Avoid cotton, soybean, veggies
 - Most others non-hosts
- Sting
 - Wide host range
 - Avoid grasses



Outline

- Nematodes in row crops
- Nematode management
 - Resistance
 - Crop rotation
 - **Nematicides**

Nematode management: fumigant nematicides



- Telone
 - Availability?
- Vapam/Kpam, etc.
 - At lower rates, not consistent for nematodes
- Labelled for most crops

Nematode management: non-fumigant nematicides

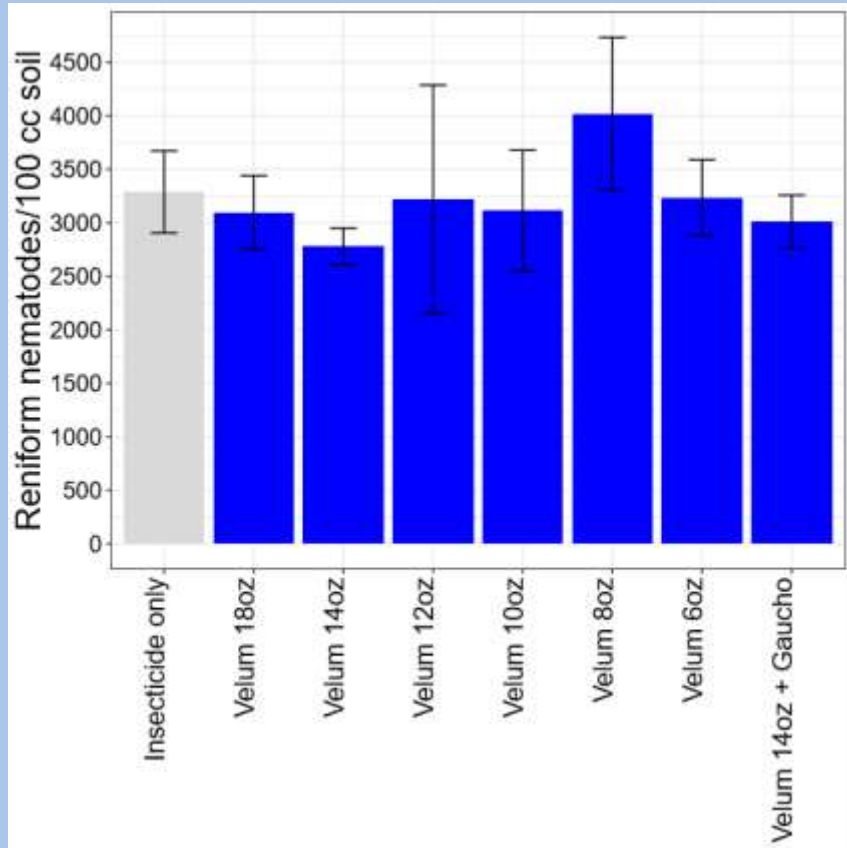
Trade Name/ active ingredient	Labelled row crops (FL)	Maximum Rate	Timing	Application method
Velum Total (fluopyram)	Cotton, peanut	18 oz/A	At plant	In furrow spray
Propulse (fluopyram)	Peanut (as fungicide)	13.7 oz/A per application	At pegging	Foliar spray
AgLogic 15GG (aldicarb)	Peanut	7 lb/A preplant 10 lb/A pegging	1. In furrow at plant 2. Before pegging	In furrow granular
	Cotton	7 lb/A preplant 5 lb/A postplant	1. In furrow at plant 2. 3 weeks after planting to squaring	In furrow granular
Vydate/Return (oxamyl)	Cotton, peanut	136 oz/A per year (5 apps)	1. At-planting 2. Post-emerge spray	Ground/foliar spray
Counter 15G (terbufos)	Corn	8.7 lb/A	At plant	In furrow granular

NFREC-Quincy cotton nematode trials

- Velum Total at different rates
 - With and without seed treatment
- Heavy reniform nematode pressure
- Yields affected by hurricane

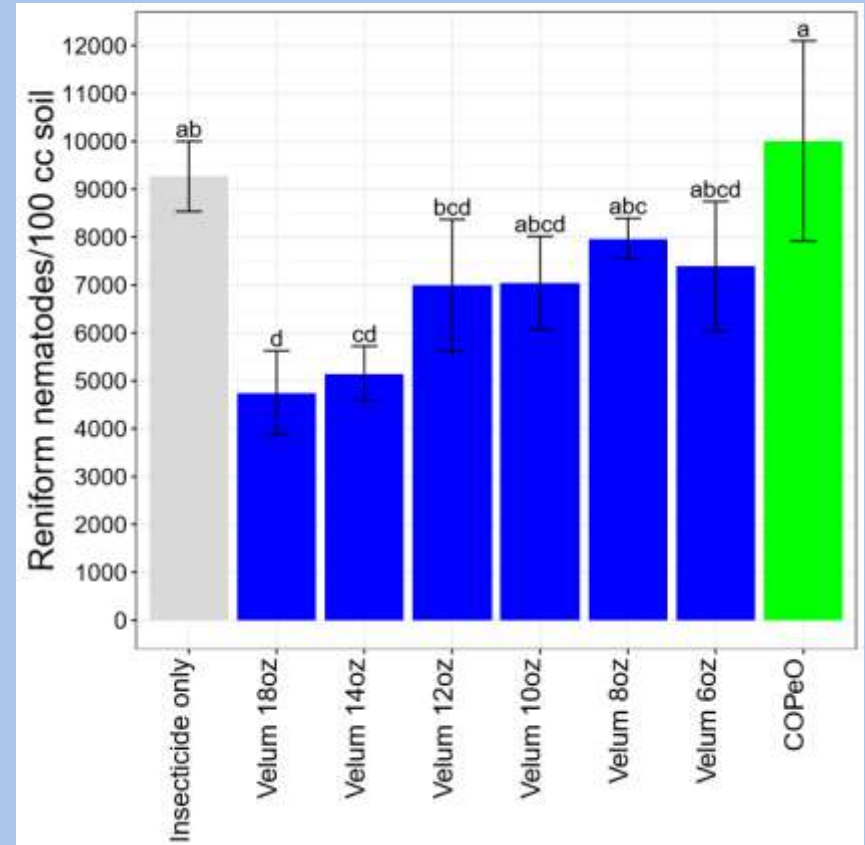


2017 trials results at 46 days after planting



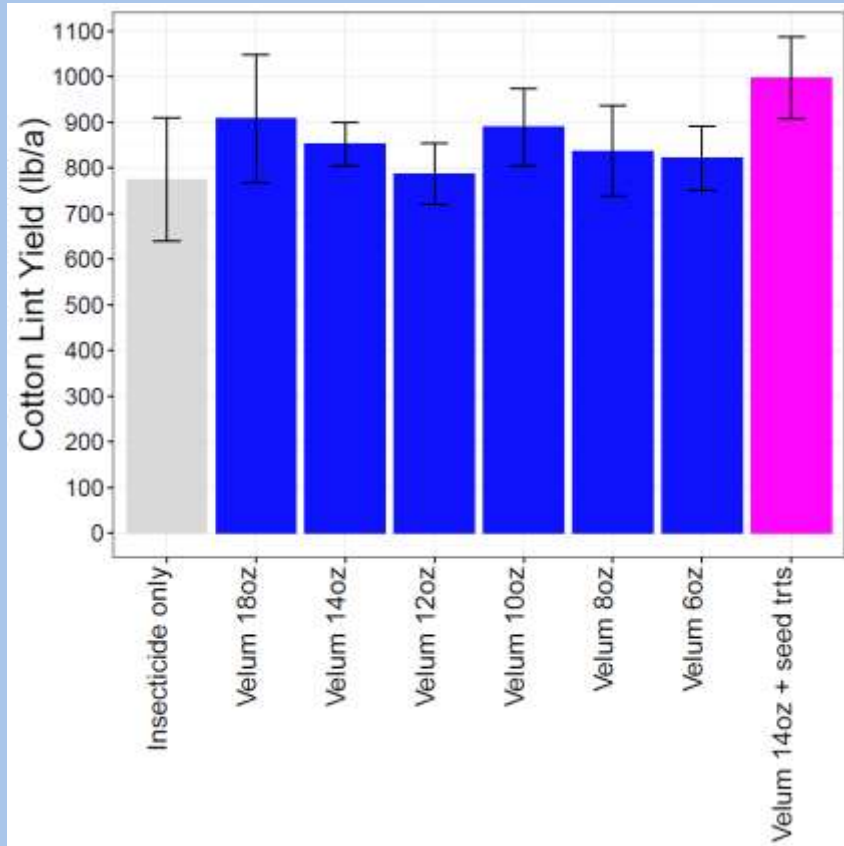
2017 Trial 1

(COPeO+Aeris in all treatments)



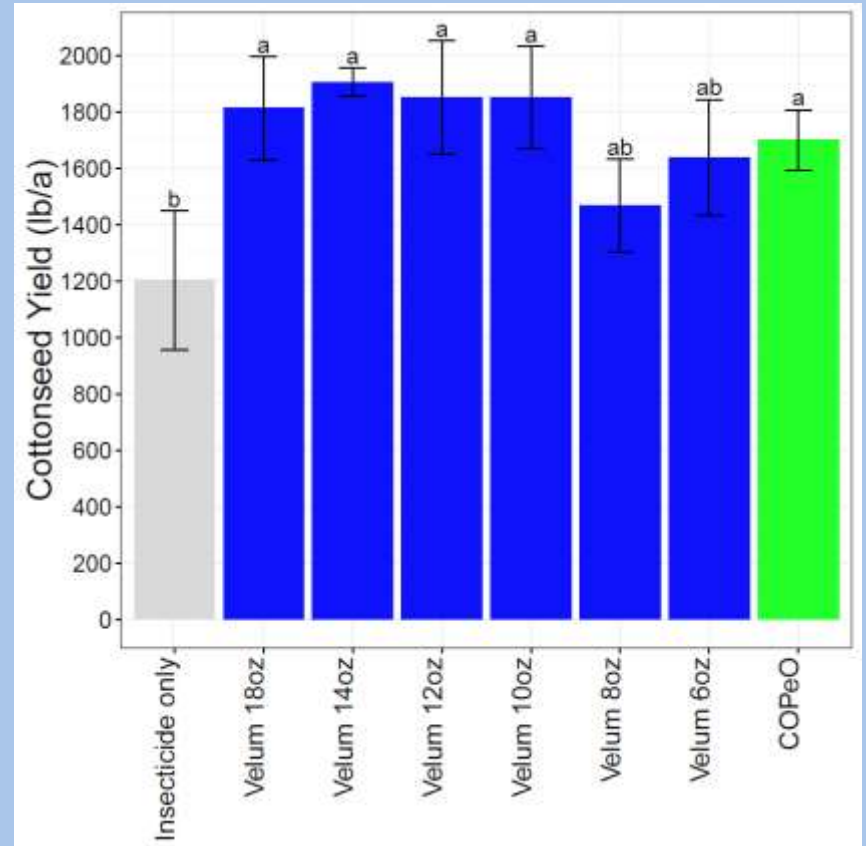
2017 Trial 2

Cotton Yield



2017 Trial 1

(COPeO+Aeris in all treatments)



2017 Trial 2

Peanut and cotton on-farm nematicide trials



Jackson County, irrigated, sandy soils



On-farm peanut nematocide trial 2017

Length of field about 1/2 mile (about 1 acre per strip)

Strip	Treatment	Replicate
Strip 1	No nematicide	Rep 1
Strip 2	Velum Total in-furrow (18 oz/acre)	
Strip 3	Telone II (3.5 lb/acre; rip it in)	
Strip 4	AgLogic aldicarb in-furrow (7 lb/acre)	
Strip 5	No nematicide	Replicate 2
Strip 6	Telone II (3.5 lb/acre; rip it in)	
Strip 7	AgLogic aldicarb in-furrow (7 lb/acre)	
Strip 8	Velum Total in-furrow (18 oz/acre)	
Strip 9	Telone II (3.5 lb/acre; rip it in)	Replicate 3
Strip 10	AgLogic aldicarb in-furrow (7 lb/acre)	
Strip 11	Velum Total in-furrow (18 oz/acre)	
Strip 12	No nematicide	
Strip 13	AgLogic aldicarb in-furrow (7 lb/acre)	Replicate 4
Strip 14	No nematicide	
Strip 15	Velum Total in-furrow (18 oz/acre)	
Strip 16	Telone II (3.5 lb/acre; rip it in)	

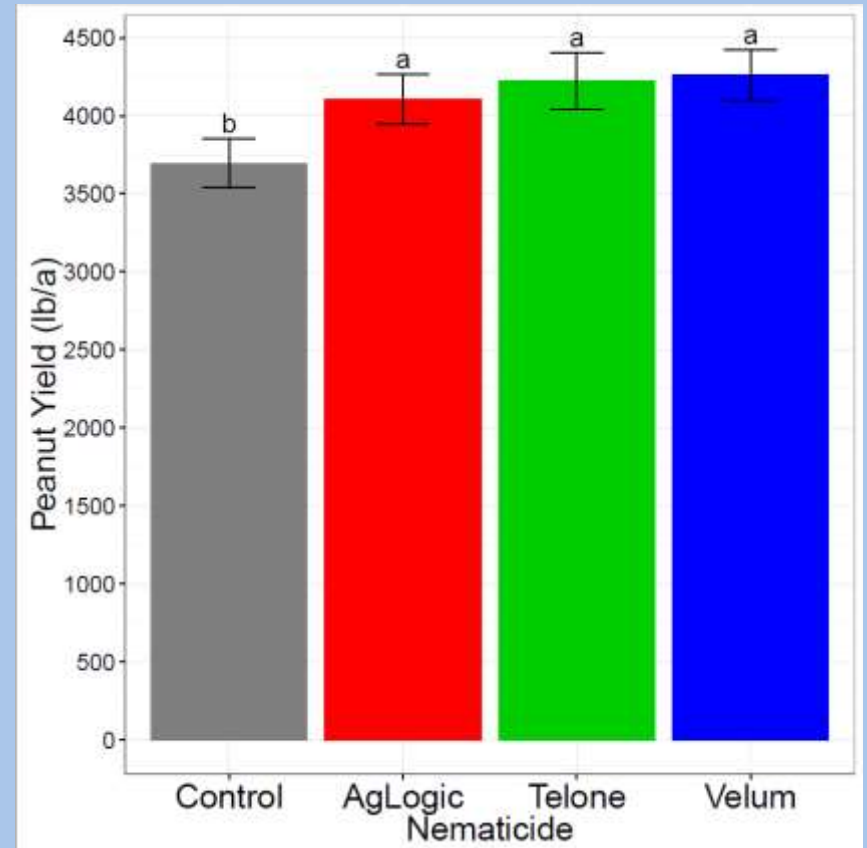
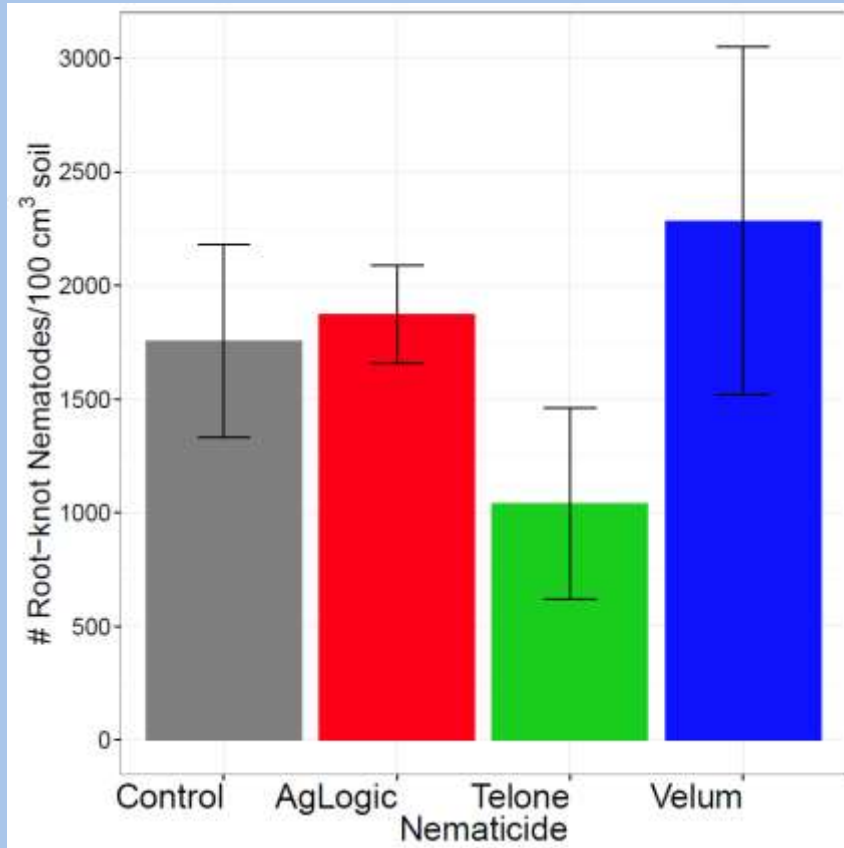
50' section used for nematode counts

Strips are 6 rows wide at 36" rows, 18' per strip. Twin rows

On-farm trial: moderate root-knot nematode pressure



Nematode counts and yield



September 2017

On-farm peanut nematocide trial return on investment

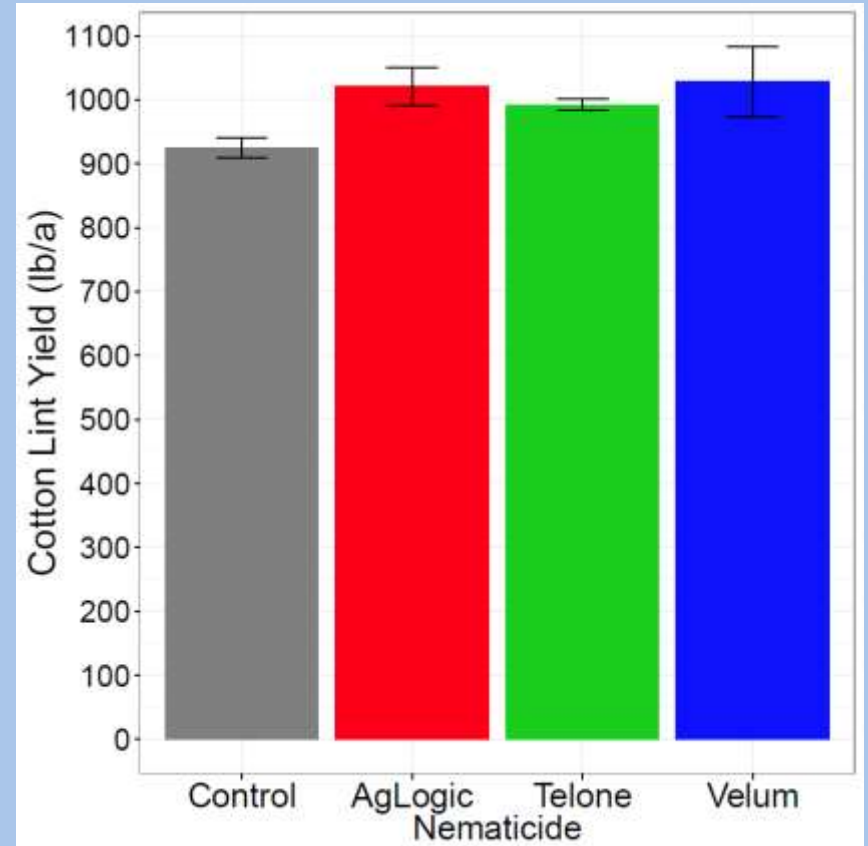
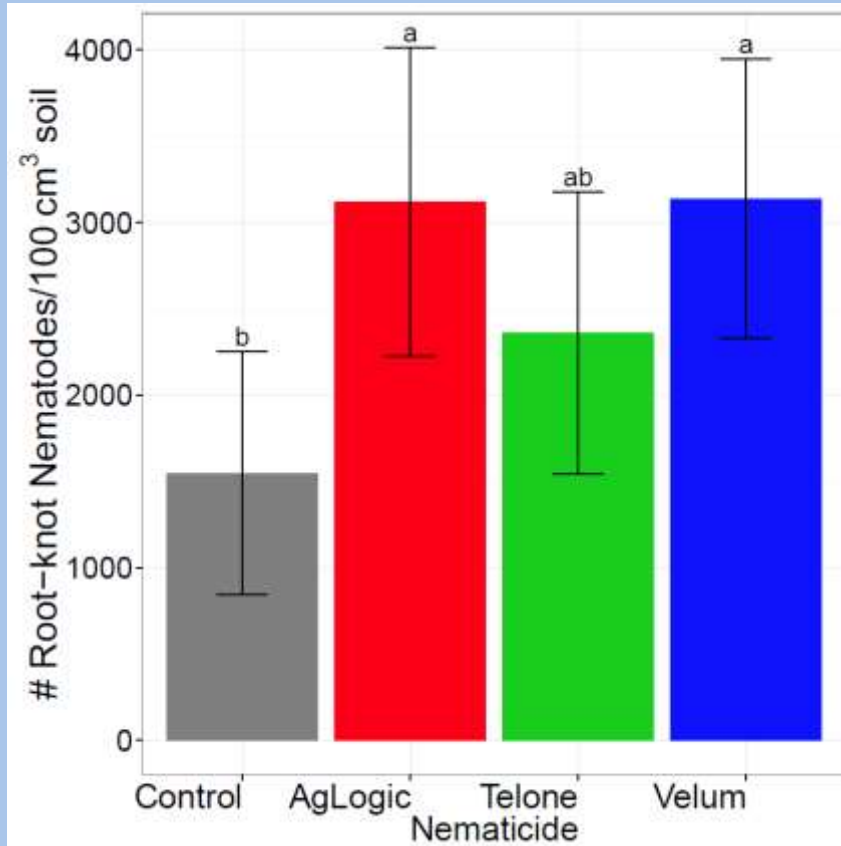
Table 1. Nematicide application economics based on 2017 on-farm nematocide trial. All values are on a per-acre basis

Treatment (rate)	Peanut yield (lb/a)	Yield increase vs. untreated	Revenue increase[†]	Product cost[§]	Income increase
Velum Total (18 oz/a)	4262	566	\$120	\$34	\$86
Telone (3.5 gal/a)	4224	528	\$112	\$70	\$42
AgLogic 15GG (7 lb/a)	4109	413	\$88	\$42	\$46
Untreated	3696	-	-	-	-

[†]Revenue increase is based on \$0.212/lb or \$424/ton for runner peanuts

[§] Assumes Telone costs of \$20/gallon, AgLogic at \$6/lb, and Velum at \$1.89/oz

On-farm cotton nematocide trial



September 2017

On-farm cotton nematicide trial return on investment

Table 1. Nematicide application economics based on 2017 on-farm nematicide trial. All values are on a per-acre basis

Treatment (rate)	Seed cotton yield (lb/a)	Yield increase vs untreated	Total Revenue increase	Product cost§	Income increase
Velum Total (18 oz/a)	2706	272	\$90	\$34	\$56
Telone (3.5 gal/a)	2611	177	\$59	\$70	-\$11
AgLogic 15GG (7 lb/a)	2686	252	\$83	\$42	\$41
Untreated	2434	-	-	-	-

[†]Revenue increase is based on \$0.70/lb for lint and \$0.10/lb for seed.

§ Assumes Telone costs of \$20/gallon, AgLogic at \$6/lb, and Velum at \$1.89/oz

Acknowledgements

- Extension Agents Ethan Carter & Mark Mauldin
- NFREC-Live Oak farm crew
- Lesley Schumacher & Eddie Shuker
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Questions?

- Find the Grabau Lab on Twitter & Facebook: **@UFcropnematodes**
- zgrabau@ufl.edu



2017 Live Oak Peanut Nematicide trial

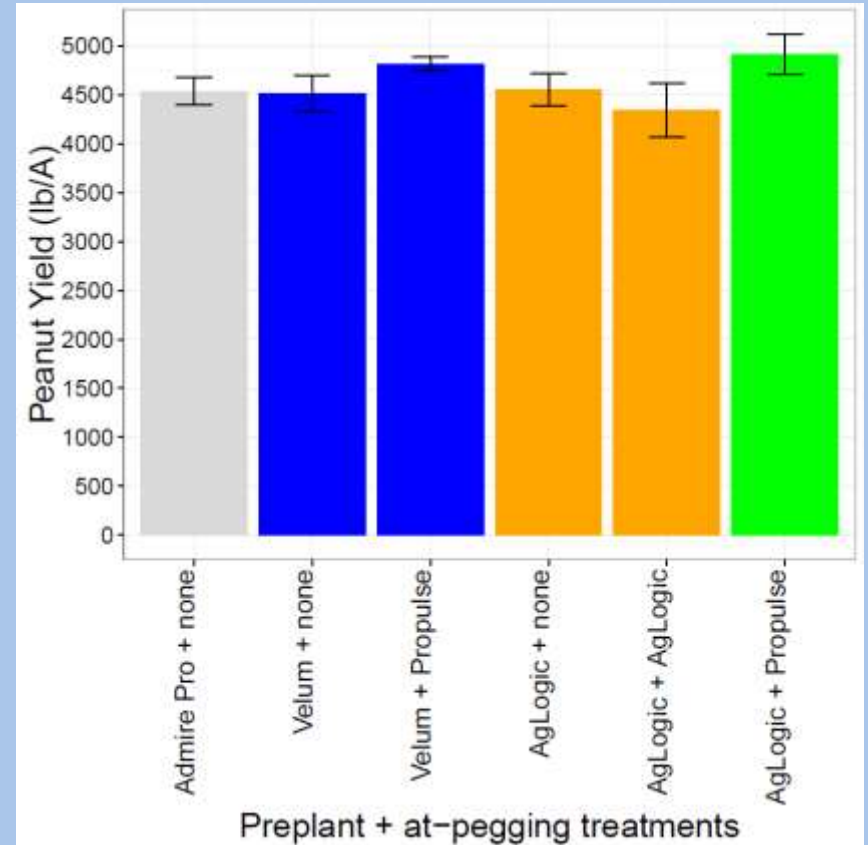
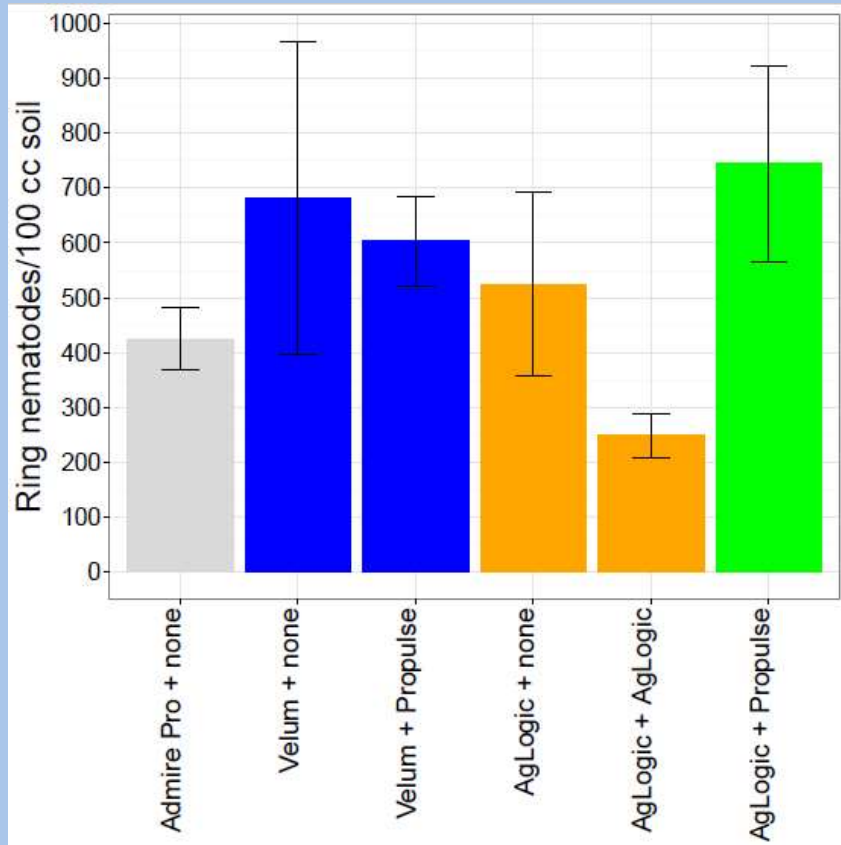
Treatments

1. Untreated control
2. Velum Total (fluopyram) in-furrow at planting
3. Velum in-furrow + Propulse (fluopyram) spray at pegging
4. AgLogic (aldicarb) in-furrow
5. AgLogic in-furrow+AgLogic at pegging
6. AgLogic in-furrow + Propulse (fluop. + prothio.) at pegging
 - Light RKN pressure, ring nematode

Live Oak trial on July 18



Nematicide impacts on ring nematodes and yield



Nematode counts at 68 days after planting