Nematode management in cotton

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Juvenile root-knot nematode

Galling on cotton roots (diagnostic symptom of root-knot nematode infestation)

Patchy stunting from southern root-knot nematode

Female reniform nematodes and egg masses

Stunting from reniform nematode (center 2 rows, untreated) vs healthy outer rows treated with Telone

Root-knot nematode resistant cotton cultivars for Southeast (not comprehensive)

Brand	Cultivar	Type of resistance	Maturity
Phytogen	400	Partial	Mid
Phytogen	500	High (double-gene)	Mid-full
Phytogen	580	High (double-gene)	Full
Deltapine	1747	“NR” (1 strong gene)	Full
Stoneville	4946	Partial	Early-mid
Stoneville	5600	1 strong gene?	Mid-full

Cotton performance by resistance group in Texas variety trials. Each group includes a number of varieties. Adapted from Wheeler et al. (2020)

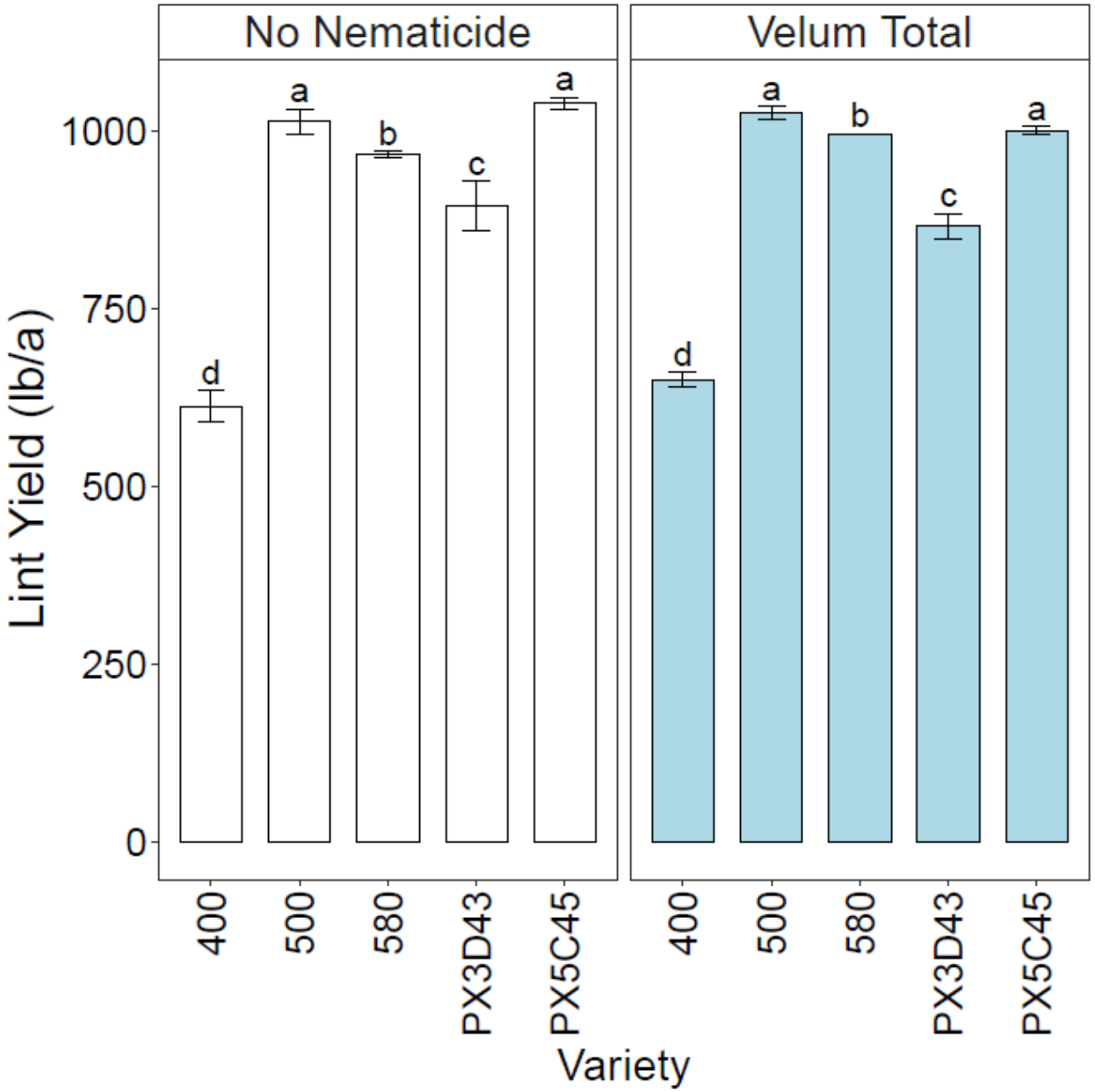
Resistance group	Lint yield (lb/a)	Root-knot eggs/500 cc soil at harvest	Root-knot juveniles/200 cc soil at harvest
High-Phytogen	1300 a	340 d	27 b
Partial-Phytogen	1184 ab	2193 c	32 b
“NR”-Deltapine	1092 b	1880 bc	37 b
Partial-Fibermax/Stoneville	1242 a	3283 b	73 b
Susceptible	1107 b	7867 a	168 a

Means with the same letter are not significantly different (within column, 95% confidence level)

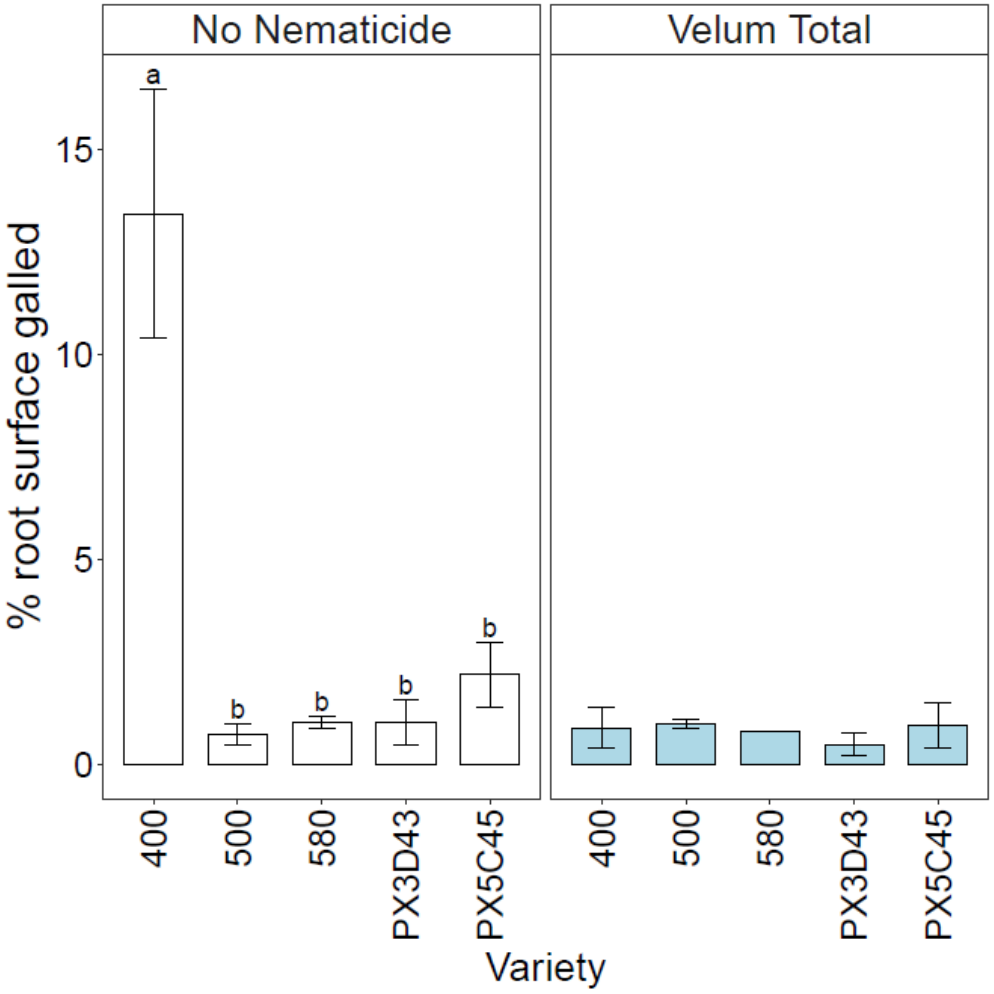
On-farm Jackson County Phytogen variety trial with and without Velum Total nematicide

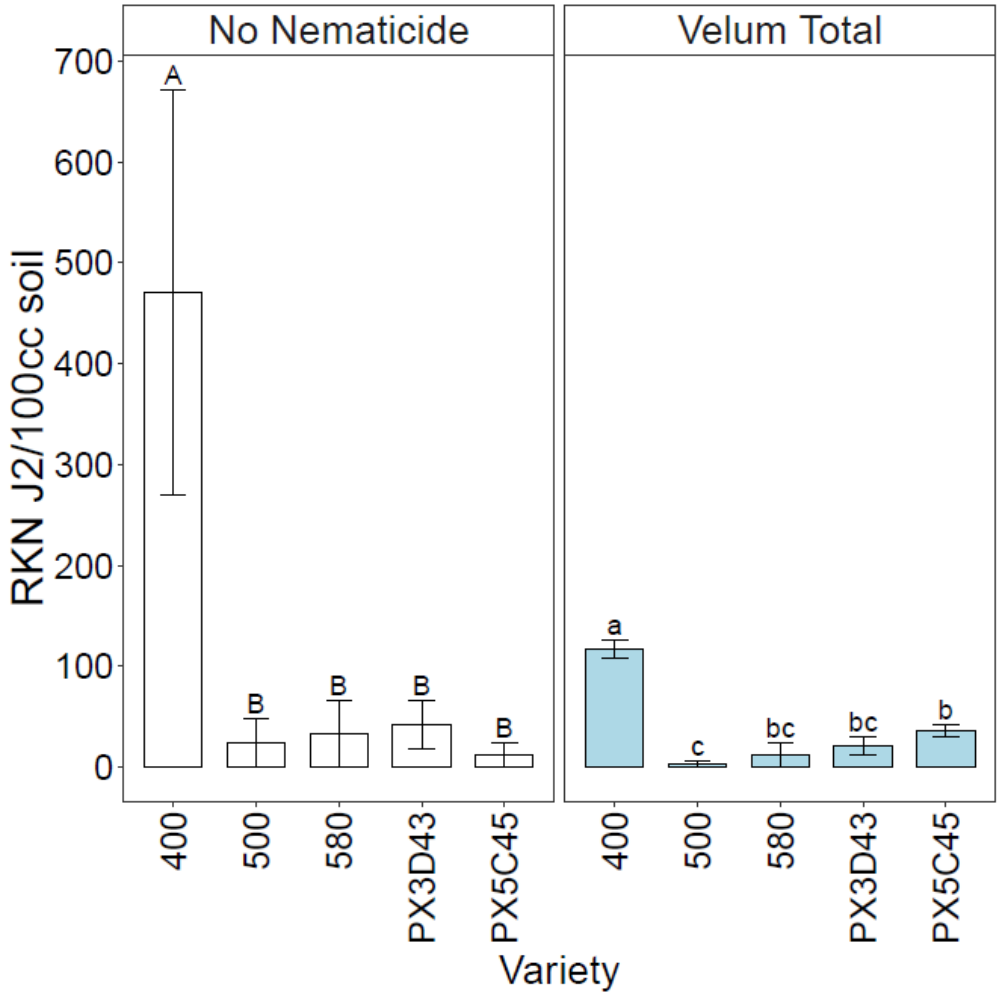
Varieties

- 400 (partial resistance)
- 500 (high)
- 580 (high)
- PX3D43 experimental (high+reniform nematode resistance)
- PX5C45 experimental (high+reniform)



Variety and nematicide affected nematode counts and symptoms in variety trial at harvest





Means with the same letter are not significantly different (within nematicide treatment, 95% confidence level)

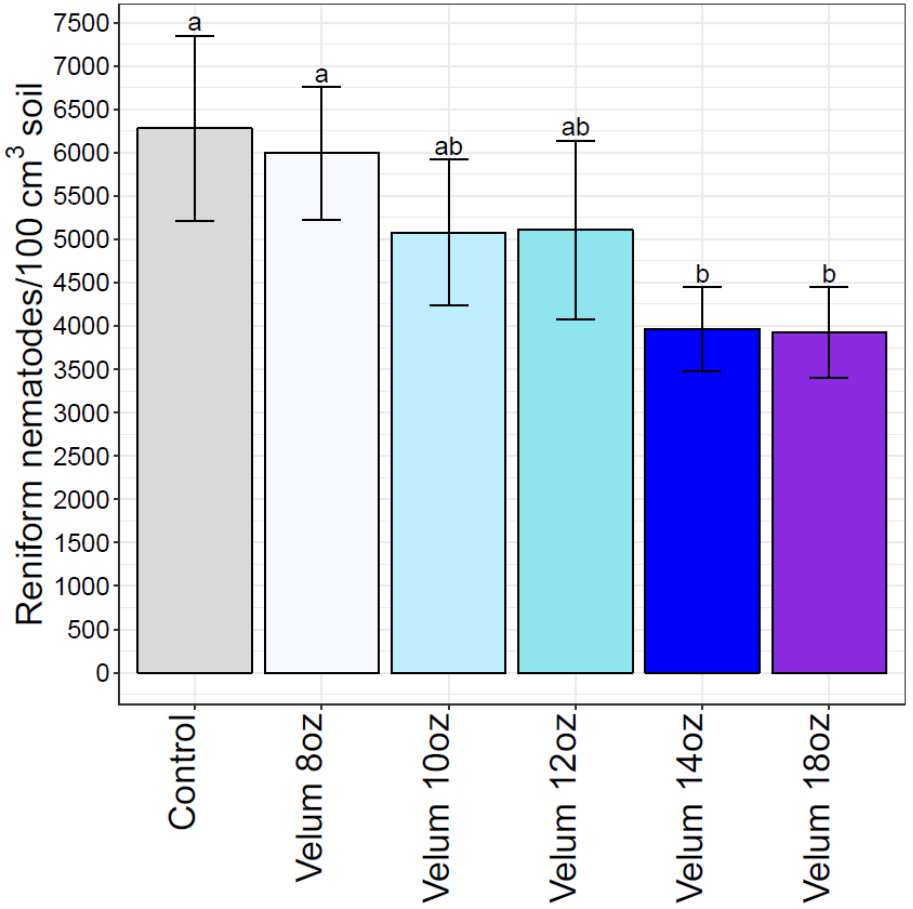
Nematicides available for cotton

Trade Name/ active ingredient	Maximum Rate	Timing	Application method
Telone (1,3-D)	12 gal (3-6 typical)	Preplant	Fumigant
Velum Total (fluopyram)*	18 oz/A	At plant	In-furrow spray
AgLogic 15GG (aldicarb)	7 lb/A preplant	At plant	In-furrow granular
Vydate/Return (oxamyl)	17 oz/A	Post-emerge spray (up to 2)	Foliar spray (supplement)

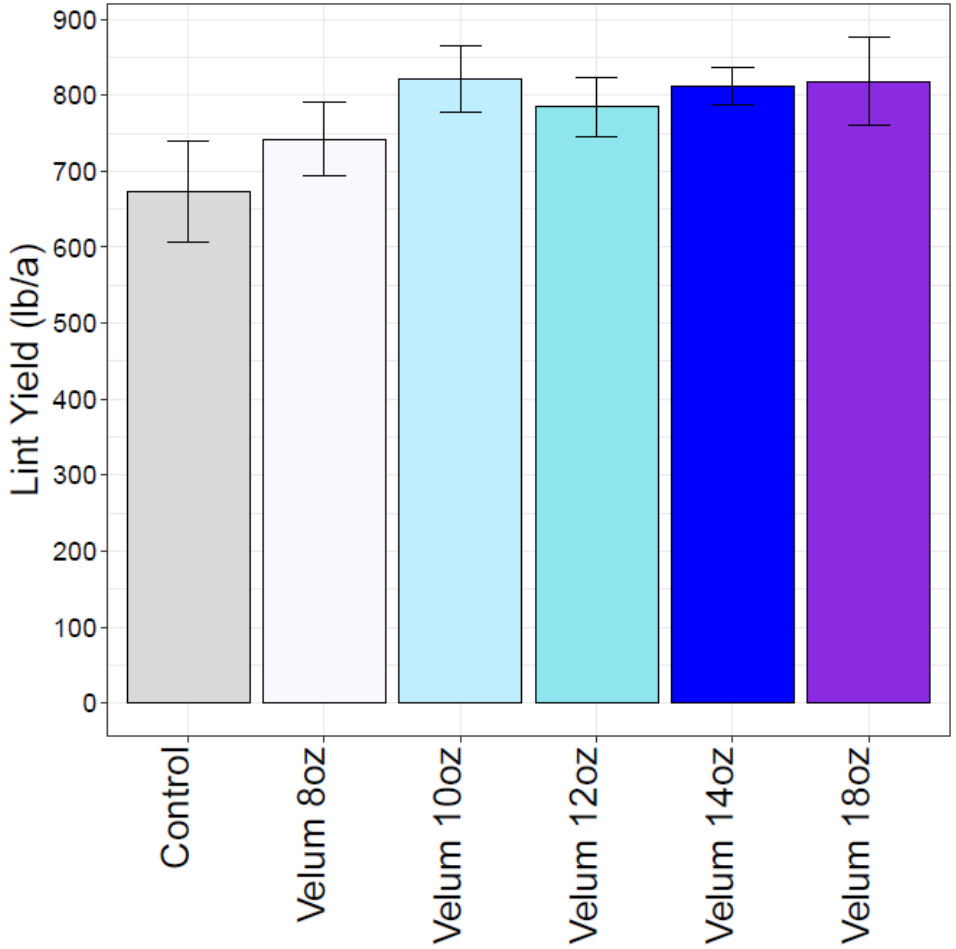
*In 2021 in-furrow fluopyram will have a new name and formulation (no imidacloprid)
*Velum Total also contains imidacloprid insecticide

Cost? About $40/acre for most in-furrow nematicides at full retail

Nematicide responses are somewhat inconsistent by year/trial: Good response from Velum Total in 2016/17 trials.

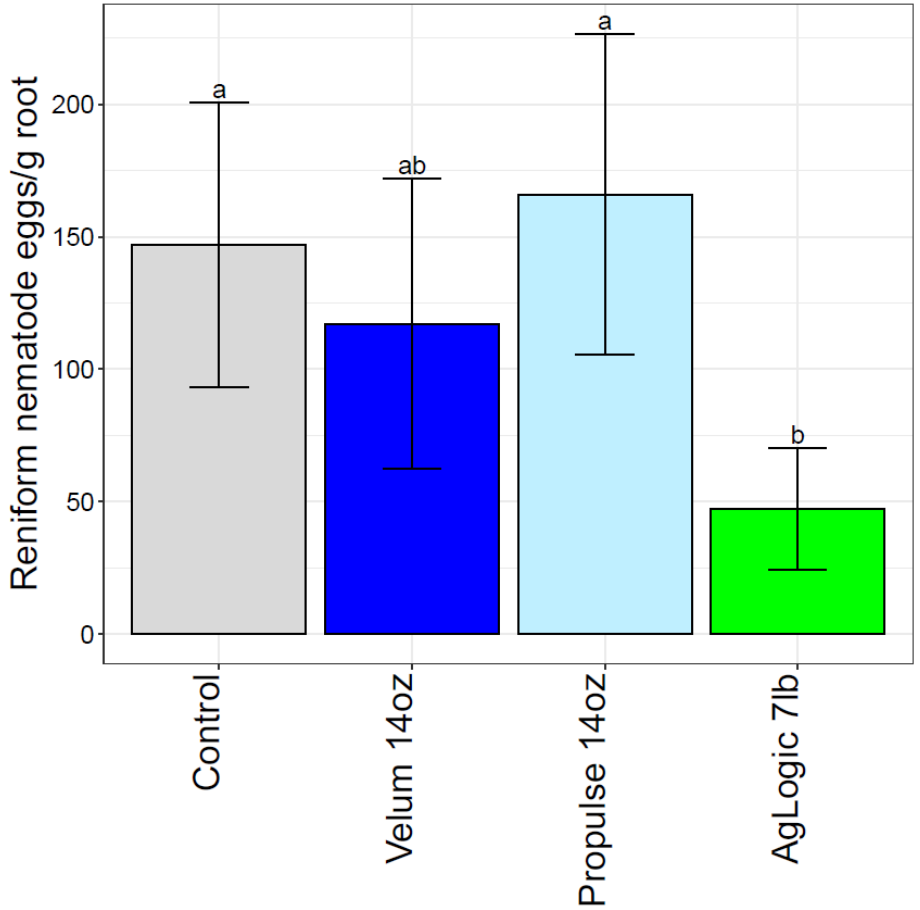


Midseason 2 trials combined

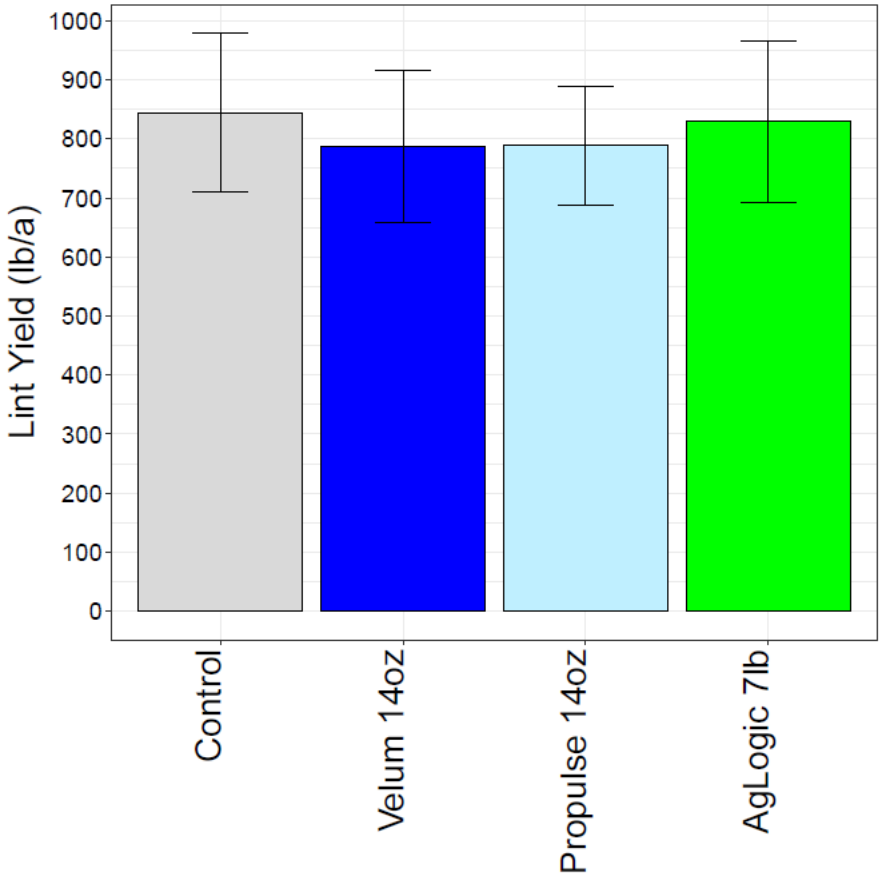


Meaningful yield response (3 trials combined)

Reniform nematode control from AgLogic but no yield response in 2018/19 trials. No velum total response.

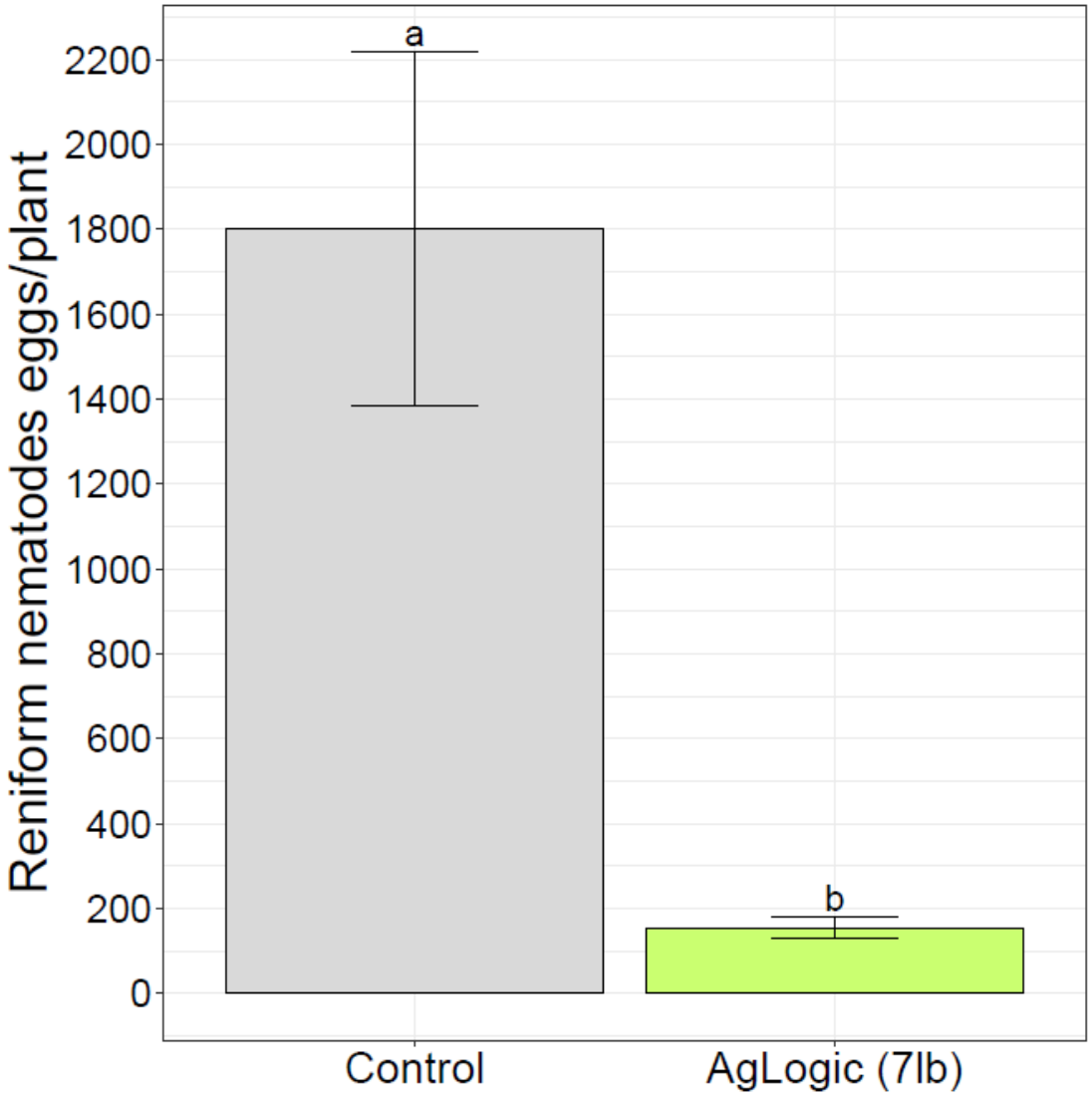


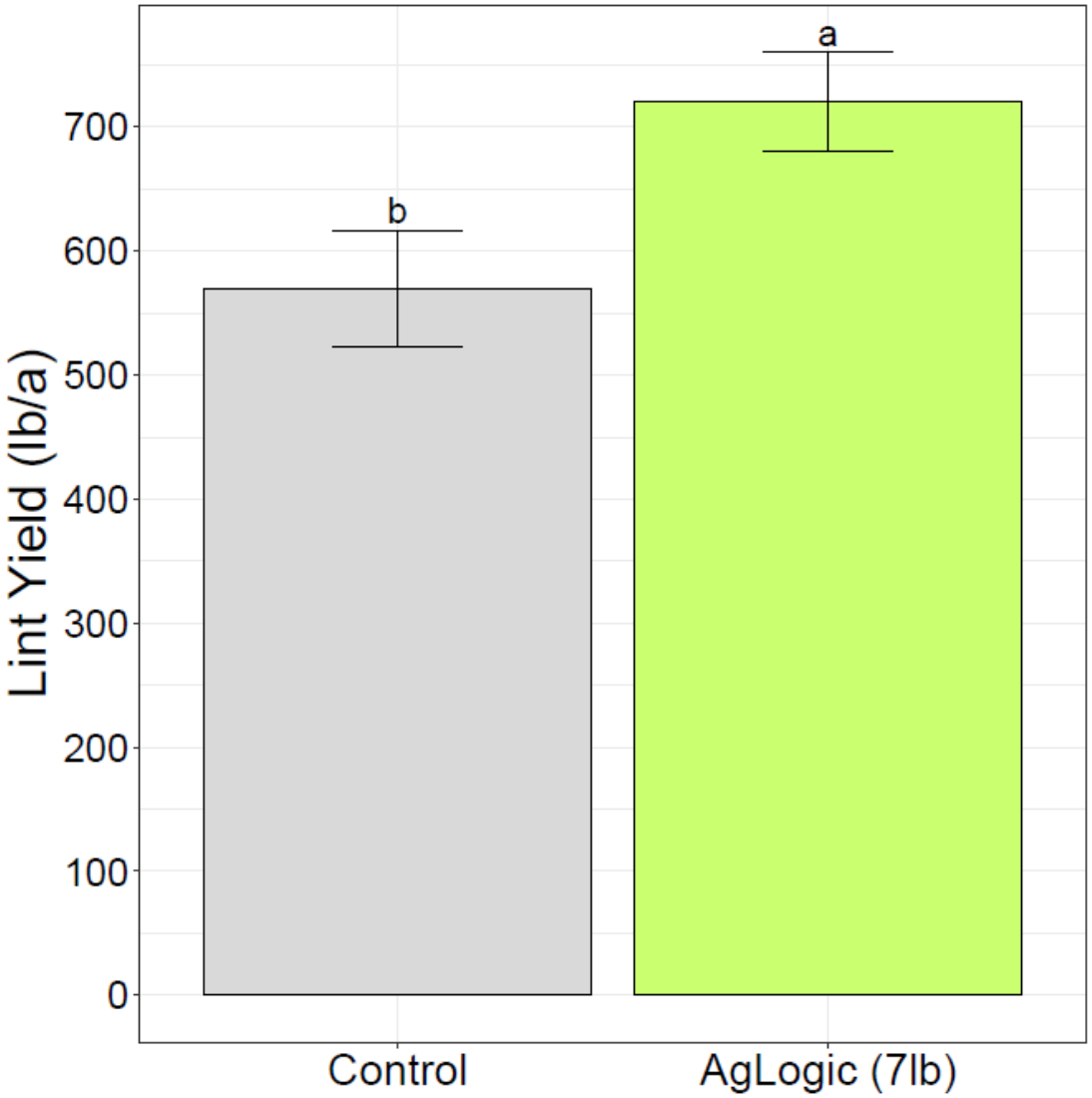
Midseason nematode counts combined 2018-2019



Lint yield combined across 2018-19

Good reniform nematode control and yield response from AgLogic in 2020 trial.



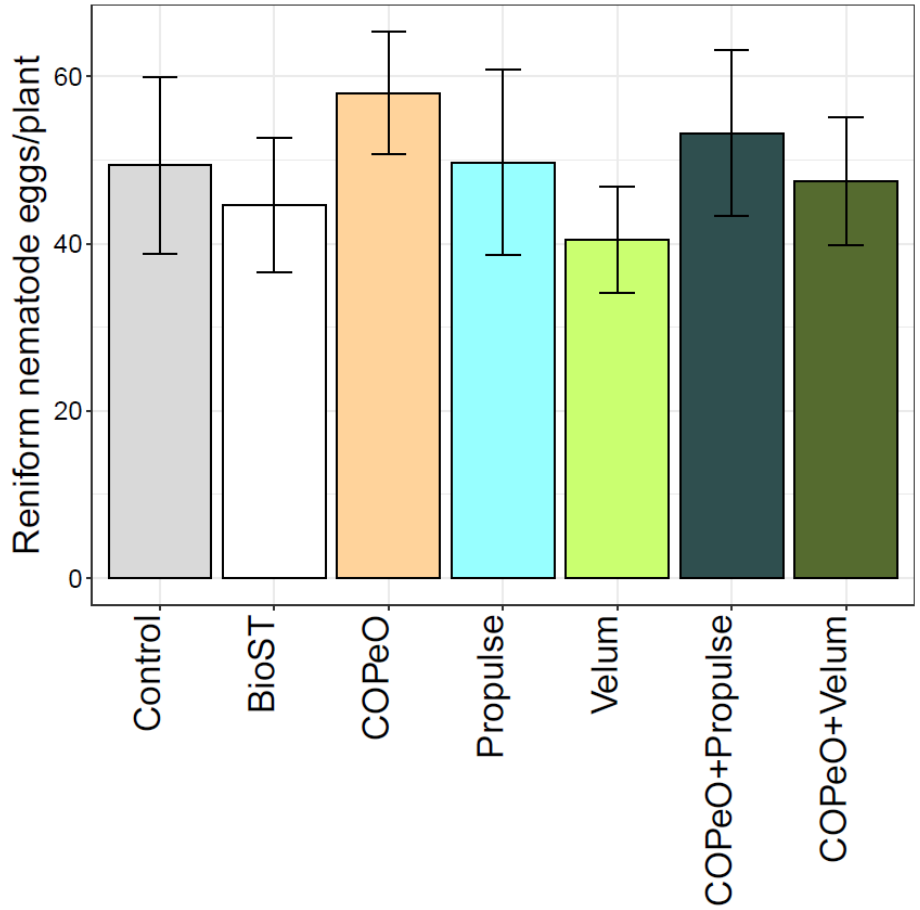


Nematicidal seed treatments for cotton

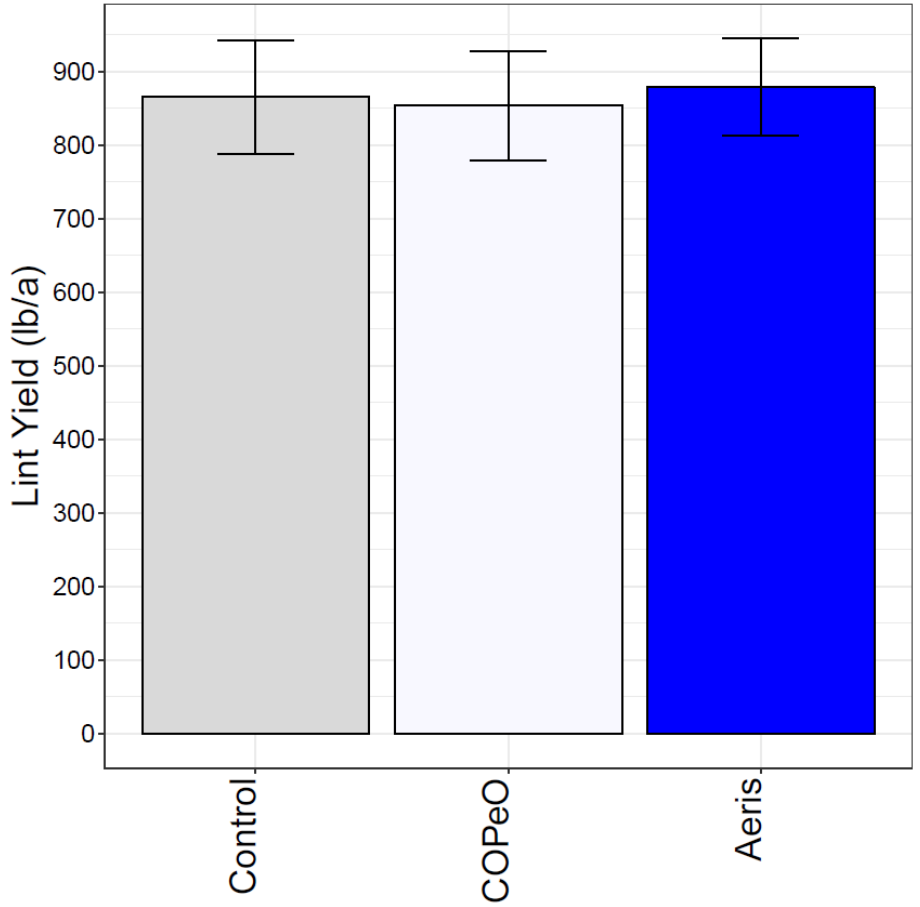
Trade Name	Active ingredient	First launch
Aeris	Thiodicarb Imidicloprid	2008
VOTiVO	Live *Bacillus firmus*	2010
Avicta	Abamectin	2011
COPeO/ILeVO	Fluopyram	2014
BioST Nematicide 100	Dead *Burkholderia*	2017

Cost often rolled into in seed price.
BioST can be added downstream.

Typically minimal response to seed treatments in Florida research trials



Midseason 2020 trial



Flat yield response to seed treatments. 4 trials combined

Nematode management: Rotation

- Grow non-host, nematodes decline, yields increase
  - Varies by nematode species

Crop	Cotton root-knot	Sting*	Reniform
Cotton	Bad	Bad	Bad
Peanut	Good	Bad	Good
Corn	Bad	Bad	Good
Soybean	Bad	Bad	Bad

* Grasses are worst for sting, avoid them. Host range varies by sting nematode population.