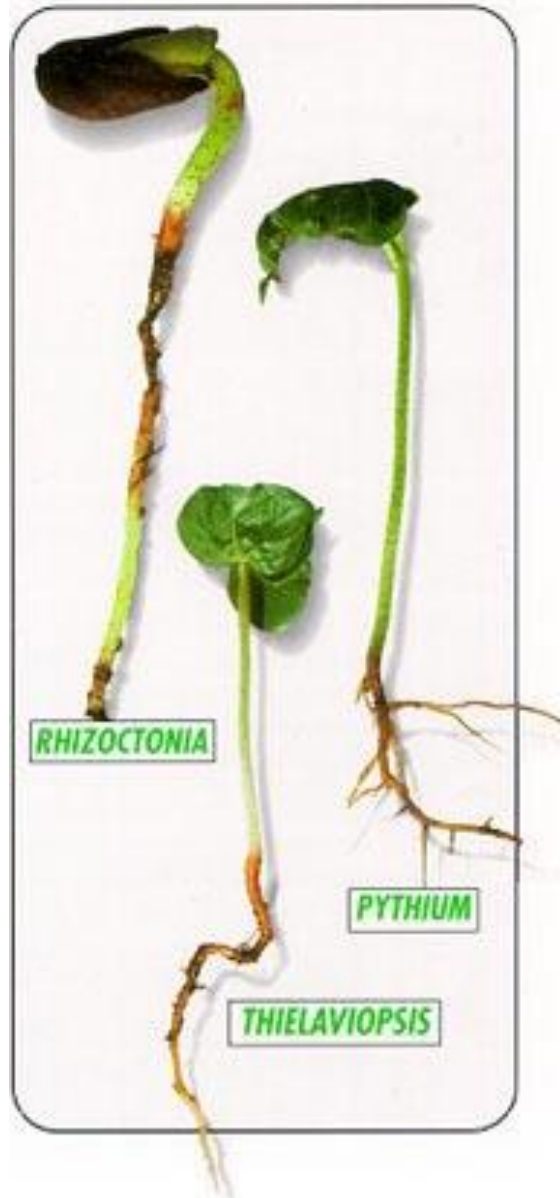


Managing Diseases in Cotton

Trey Price 318-235-9805

Cotton Seedling Diseases

SEEDLING DISEASE



- Fungicide seed treatments very effective
- Most beneficial under stressful conditions...
 - Poorly-drained soils
 - Cool weather
 - Poor seed quality
- Proper planting date
- Appropriate soil temperature
- Long range forecast calling for warm temperatures

Cotton Seed Treatments

- **Don't plant naked seed!**
- Even the best seed treatments can fail under high disease pressure
- **In most situations a base fungicide treatment offered by the seed company will be adequate**
- Some companies are flexible with options
 - This may be an opportunity to save \$\$\$\$\$
- Do your homework! Figure out what is on the seed before making a decision to over-treat
 - There are some redundancies with available options!
- Contact **your** agent or state specialist...things could be different in your area!

Company Fungicide Seed Treatment Options

Company (Brand)	Option Names	Modes-of-action (MOAs)
Americot (NexGen)	Cottolyst Base	3,4,12
	Cottolyst Enhanced	3,4,7,12
	Cottolyst Premier	3,4,11,12
Armor	Acceleron Basic	3,4,7,11
	Acceleron Standard	3,4,7,11
	Acceleron Elite	3,4,7,11
Bayer (Deltapine)	Acceleron Basic	3,4,7,11
	Acceleron Standard	3,4,7,11
	Acceleron Elite	3,4,7,11
BASF (Stoneville/Fibermax)	Base	3,4,7
	Core	3,4,7,11
	Premium	3,3,4,7,11
	Prime	3,4,7,11
Dyna-Gro	“Prem”	M3,3,4,7
	“Prof”	P01,4,11
	“Pltm”	3,4,4,7,11
Phytogen	Base M	3,4,12
	Trio	3,4,7,11,12



Cotton Incorporated Seedling Disease Committee

- 1993-2004 (Rothrock, et al. 2012)
- Fungicides increased stands compared to non-treated in 119 of 211 trials.
- metalaxyl (*Pythium* spp.) increased stands in 40 of 119 trials.
- PCNB (*Rhizoctonia solani*) increased stands in 44 of 119 trials.
- “newer chemistries” azoxystrobin and triazoles were comparable to carboxin+PCNB+metalaxyl

Cotton Incorporated Seedling Disease Committee

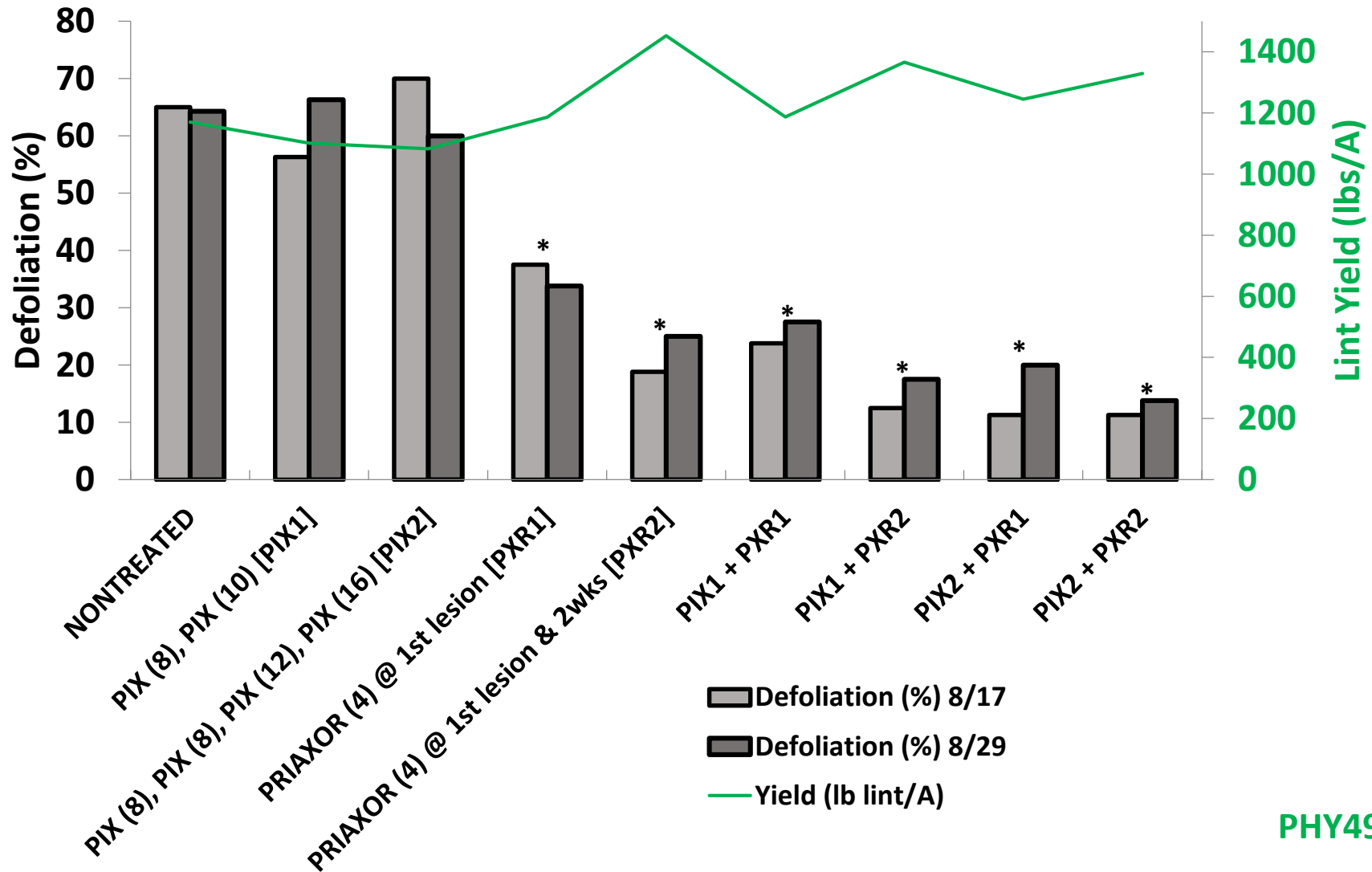
- 1993-2004 (Rothrock, et al. 2012)
- Little to no benefit if soil temps were >25C for 3 days after planting
- As temperatures decreased to 12C and soil moisture increased, losses increased dramatically
- *R. solani* not significantly affected by temperature and soil moisture

Target spot

- *Corynespora cassiicola*
- Starts low in canopy after closure
- Defoliates from bottom to top
- Frequent rainfall events drive disease
- High N rates may exacerbate
- Poor PGR management may exacerbate
- Fungicides are effective
- Best timing is canopy closure
- ROFI if disease starts in July and defoliation exceeds 40-50%



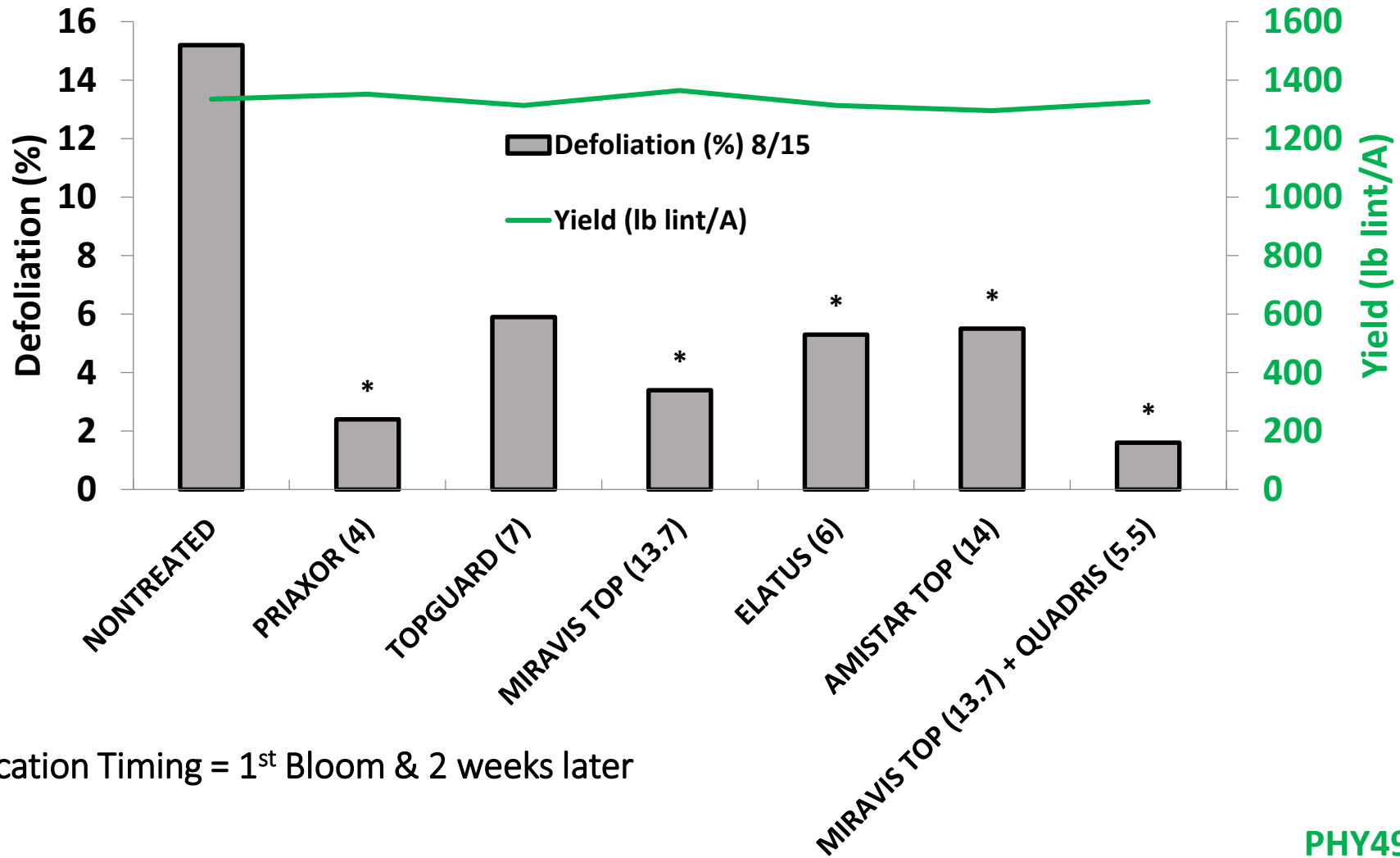
Regional Trial (Target Spot II) St. Joseph, LA – 2017



PHY490

NECT1701

Syngenta Programs for Target Spot Winnsboro, LA – 2018



PHY490
MRCT1807

Performance of fungicides on target spot in Louisiana across 19 trials conducted during 2016-2021.

Trade Name (number of observations) ^z	Active Ingredient (%)	Severity Reduction (low-high) ^y	Yield Preservation (lb seedcotton/A) ^x
Headline (n=12)	pyraclostrobin (23.6)	37.4 (12.2-76.7)	209 (-100-509)
Miravis Top (n=10)	pydiflumetofen (6.9) + difenoconazole (11.5)	37.3 (19.3-76.9)	104 (-59-392)
Priaxor (n=44)	fluxapyroxad (14.3) + pyraclostrobin (28.6)	62.2 (0-92.3)	191 (-196-708)
Quadris (n=13)	azoxystrobin (22.9)	19.1 (0-39.6)	103 (-106-391)
Topguard (n=14)	flutriafol (11.8)	26.4 (0-49.7)	108 (-99-318)

^zFungicide trade name and the number of times (n) it was compared to a non-treated control in a replicated field trial.

^yMean disease severity reduction calculated as a percentage of the non-treated control.

^xMean yield preservation calculated as the difference from the non-treated control.

Average yield preservation, value added, and return on fungicide investment (ROFI) for target spot applications.

Trade Name	Average Seedcotton Yield Preservation ^z	Value Added Range/A (\$) ^y	ROFI range/A 1 application ^x	ROFI range/A 2 applications ^x
Headline	209 (-100-509)	\$50.16 - \$96.14	\$30.16 - \$76.14	\$10.16 - \$56.14
Miravis Top	104 (-59-392)	\$24.96 - \$47.84	\$4.96 - \$27.84	-\$15.04 - \$7.84
Priaxor	191 (-196-708)	\$45.84 - \$87.86	\$25.84 - \$67.86	\$5.84 - \$47.86
Quadris	103 (-106-391)	\$24.72 - \$47.38	\$4.72 - \$27.38	-\$15.28 - \$7.38
Topguard	108 (-99-318)	\$25.92 - \$49.68	\$5.92 - \$29.68	-\$14.08 - \$9.68

^zAverage seedcotton yield preservation across 19 foliar fungicide trials with target spot conducted from 2016-2021 in Louisiana.

^yValue added based on 40% turnout and cotton price range of \$0.60 to \$1.15 from 2015-2021.

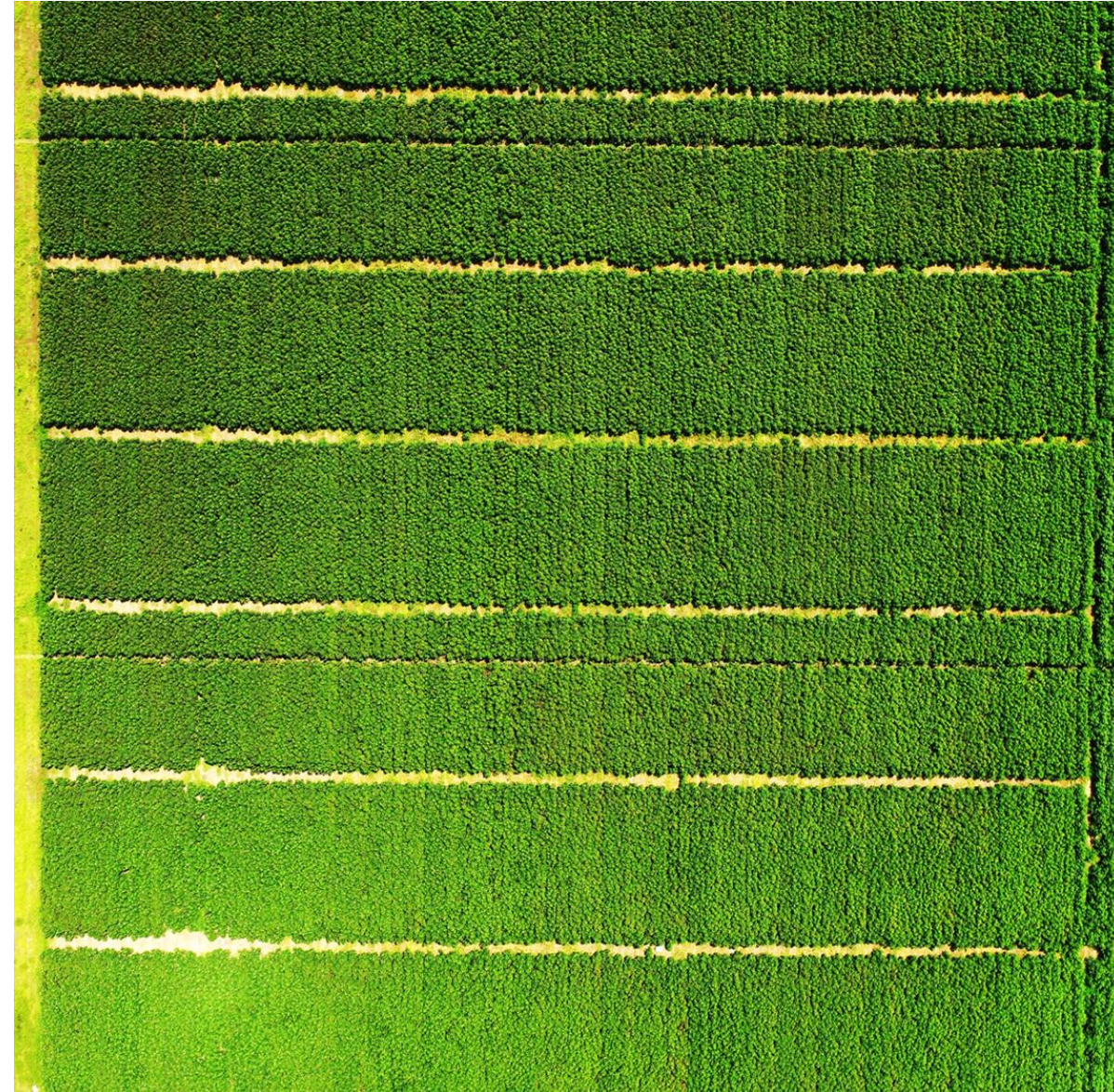
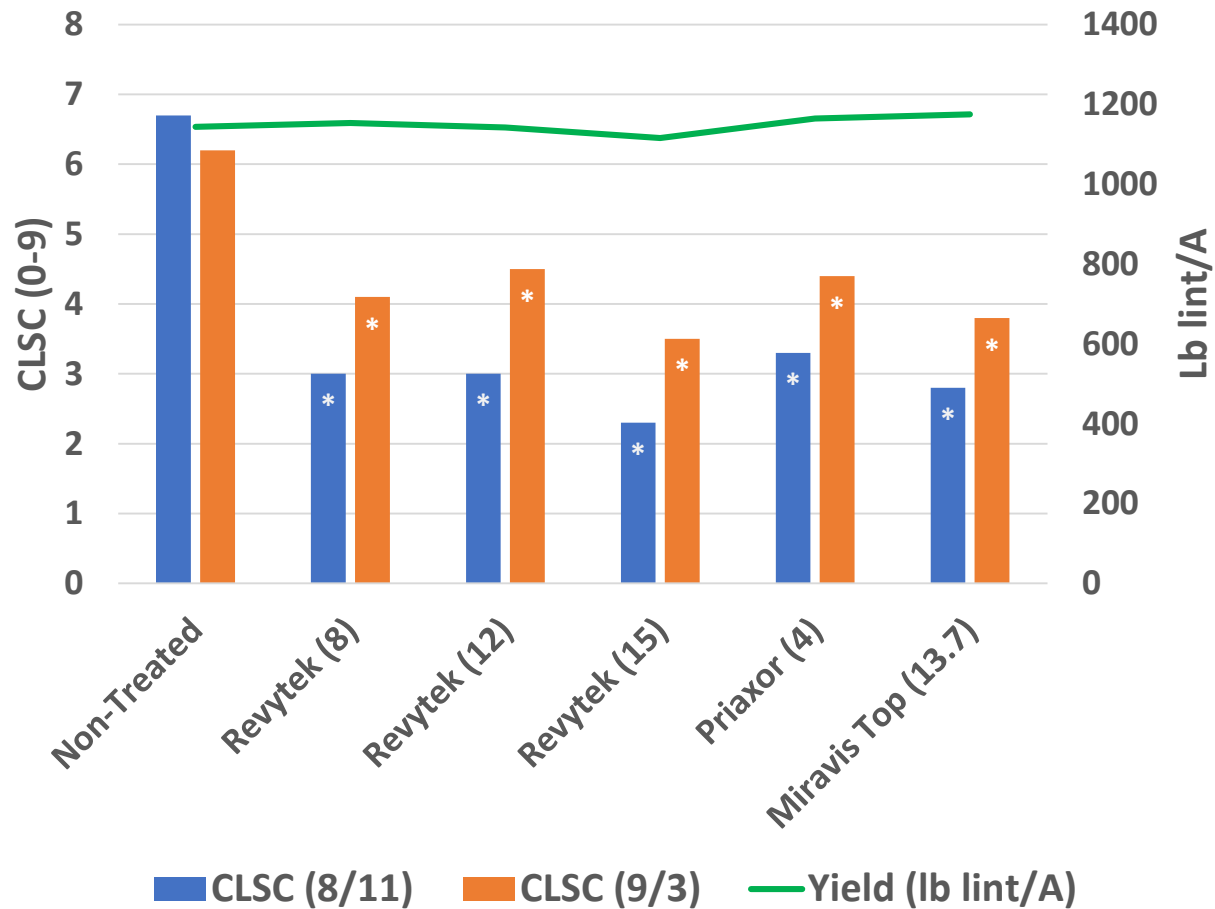
^xReturn on fungicide investment based on value added minus the cost of application (\$20/A).

Cotton Leaf Spot Complex

- *Cercospora*, *Stemphylium*, and *Alternaria* spp.
- Underlying K deficiency/drought stress almost always
- Herbicide injury can exacerbate
- Fungicides are effective
- ROFI is rare



Effect of fungicides on the cotton leaf spot complex (CLSC)



Performance of fungicides on cotton leaf spot complex in Louisiana across nine trials conducted during 2015 and 2020.

Trade Name (number of observations) ^z	Active Ingredient (%)	Severity Reduction (low-high) ^y	Yield Preservation (lb seedcotton/A) ^x
Headline (n=7)	pyraclostrobin (23.6)	19.7 (3.8-33.8)	-21 (-140-169)
Miravis Top (n=6)	pydiflumetofen (6.9) + difenoconazole (11.5)	38.7 (18.2-58.2)	93 (77-114)
Priaxor (n=14)	fluxapyroxad (14.3) + pyraclostrobin (28.6)	23.4 (5.5-50.7)	88 (-84-271)
Quadris (n=8)	azoxystrobin (22.9)	8.7 (0-21.7)	-59 (-250-96)
Topguard (n=6)	flutriafol (11.8)	12.4 (3.8-19.2)	-3 (-56-128)

^zA=Fungicide trade name and the number of times it was compared to a non-treated control in a replicated field trial.

^yMean percent disease control calculated as a percentage of the non-treated control.

^xMean yield preservation calculated by the difference from the non-treated control.

Average yield preservation, value added, and return on fungicide investment (ROFI) for cotton leaf spot complex applications.

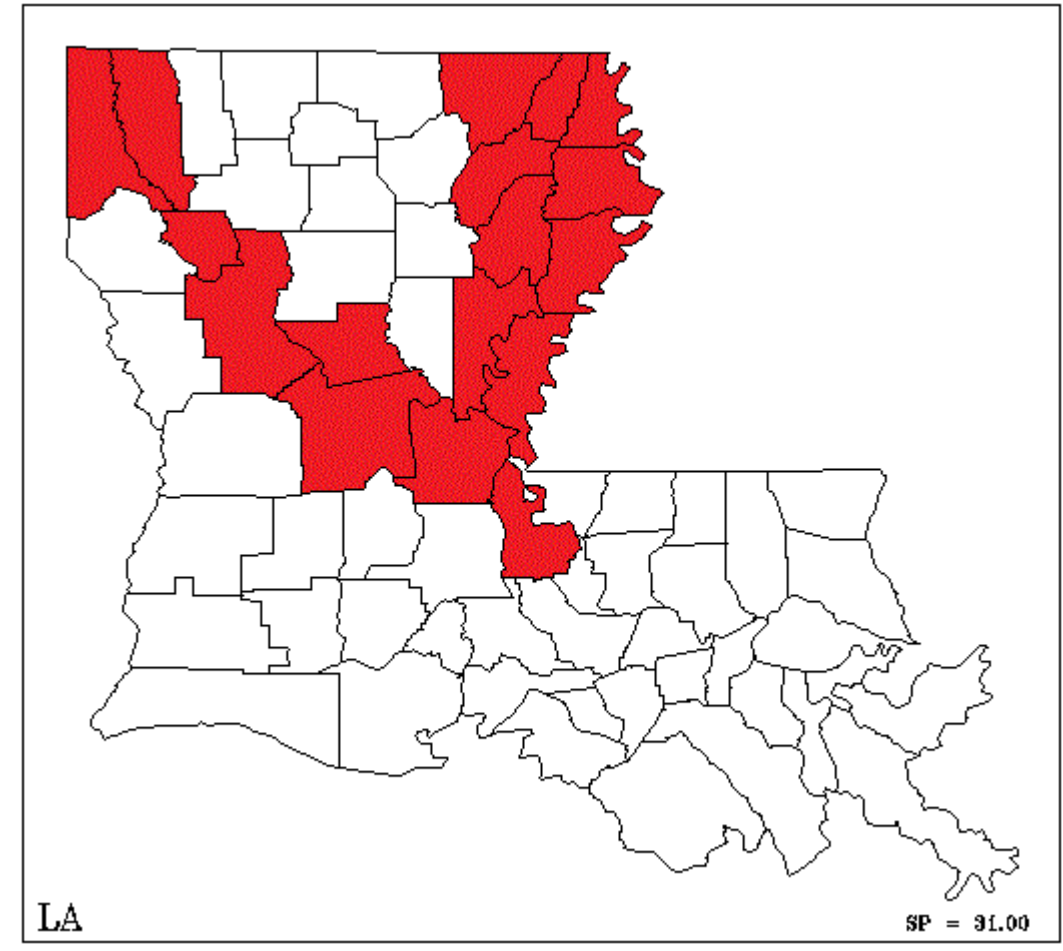
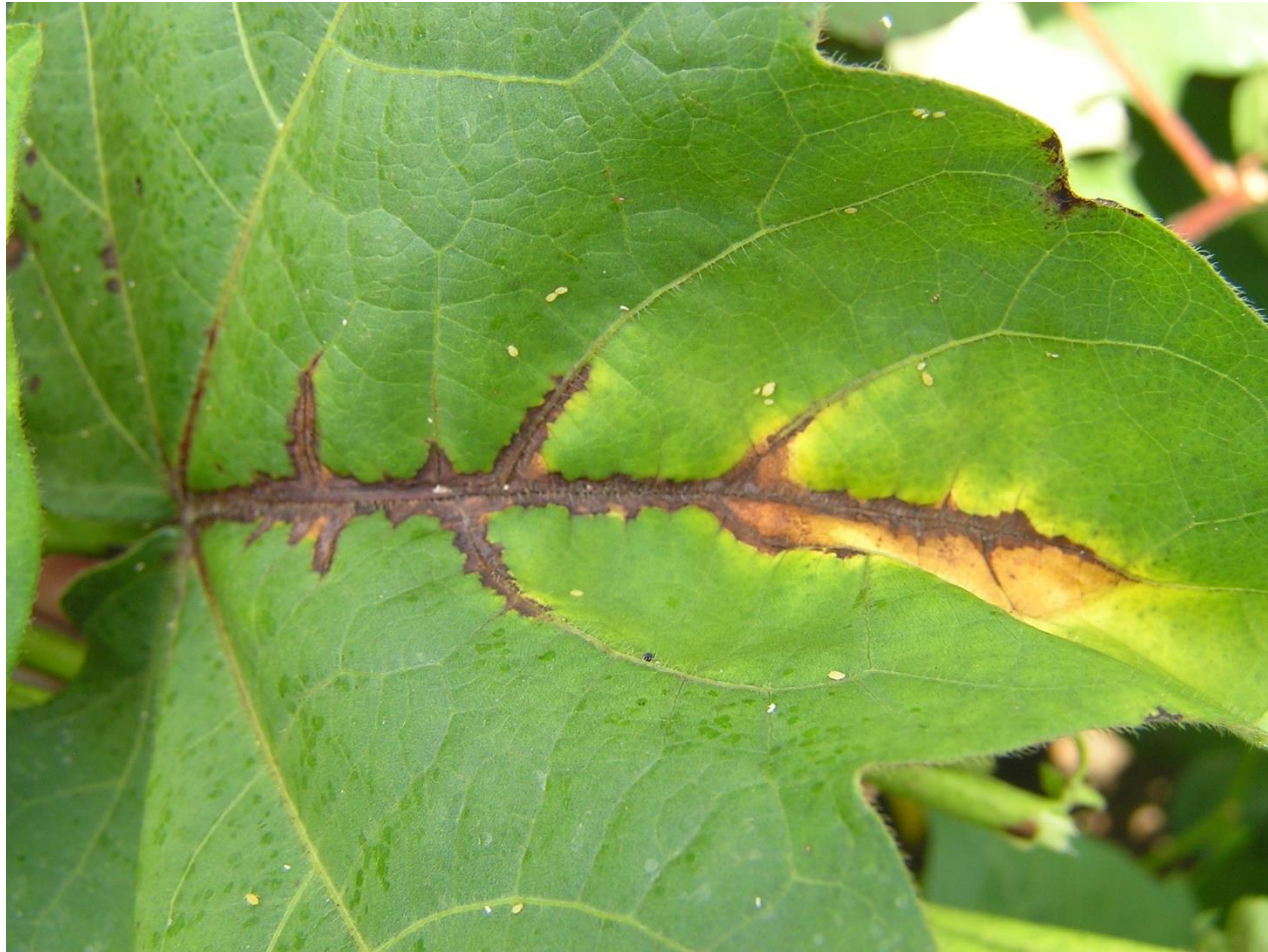
Trade Name	Average Seedcotton Yield Preservation ^z	Value Added Range/A (\$) ^y	ROFI range/A 1 application ^x	ROFI range/A 2 applications ^x
Headline	-21 (-140-169)	--	--	--
Miravis Top	93 (77-114)	\$22.32 - \$42.78	\$2.32 - \$22.78	-\$17.68 - \$2.78
Priaxor	88 (-84-271)	\$21.12 - \$40.78	\$1.12 - \$20.48	-\$18.88 - \$0.48
Quadris	-59 (-250-96)	--	--	--
Topguard	-3 (-56-128)	--	--	--

^zAverage seedcotton yield preservation across 19 foliar fungicide trials with the cotton leaf spot complex conducted from 2016-2021 in Louisiana.

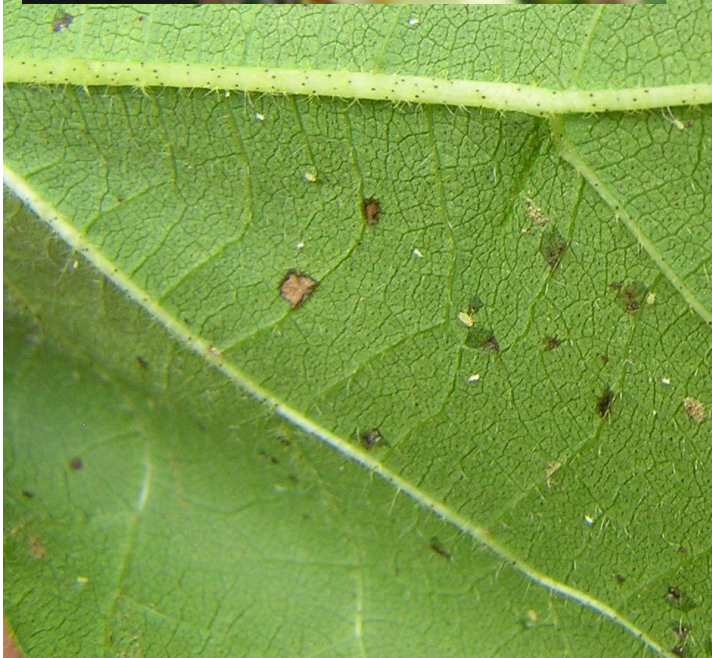
^yValue added based on 40% turnout and cotton price range of \$0.60 to \$1.15 from 2015-2021.

^xReturn on fungicide investment based on value added minus the cost of application (\$20/A).

Bacterial Blight



Bacterial Blight



Best Management Option? Resistant Varieties

- <https://www.cottoninc.com/>
- <https://www.mississippi-crops.com/>

Other Management Options?

- Tillage
- Rotation
- Canopy Management
- Avoid Excessive N
- No overhead irrigation/don't over-irrigate
- Limited data on bactericides

Nematode Problems in LA

Reniform Nematode (*Rotylenchulus reniformis*)

- Dominant nematode pest of cotton in LA
 - 74% of samples in NAS diagnostic lab (2020)
- Sedentary semi-endoparasitic nematode
- Causes stunting, yellowing, and reduced yields



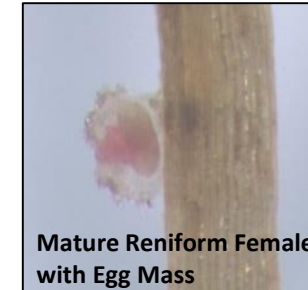
Reniform Infective Juvenile



Mature Reniform Female



REN damage



Mature Reniform Female with Egg Mass

Southern Root-Knot Nematode (*Meloidogyne incognita*)

- Sedentary endoparasitic nematode
 - 22% of samples in NAS diagnostic lab (2020)
- Galling on roots = reduced yields



Root-Knot Infective Juvenile



Mature Root-Knot Female



SRKN damage



Severe Root-Knot Galling Symptoms

Nematode Management

Host Resistance

- Best tool for nematode management when available
- 2021 release of stacked resistance to **Reniform** and **Root-Knot Nematode**:
 - Deltapine 2141NR
 - Phytogen PHY 332 W3FE
 - Phytogen PHY 411 W3FE
 - Phytogen PHY 443 W3FE



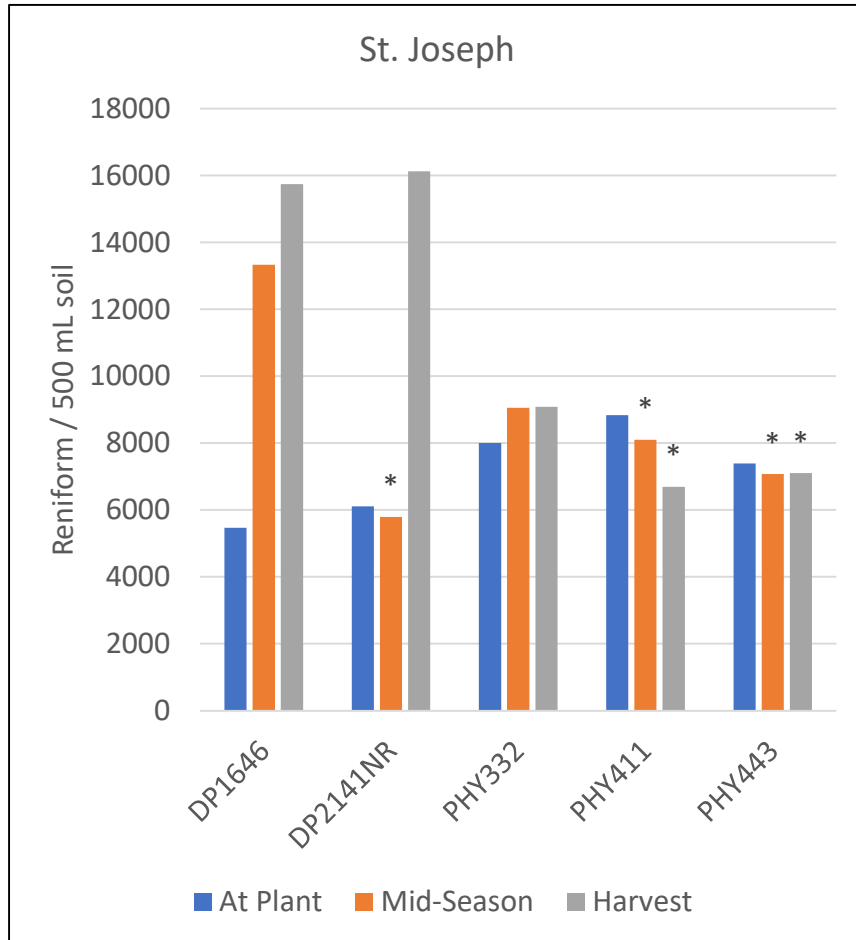
Nematicides

- Provide additional suppression of nematodes
- Maintains viability of host resistance through suppression of resistance breaking nematode populations
- Example:
 - BioST (a.i. heat-killed bacteria) = Biological seed coat nematicide
 - Velum (a.i. fluopyram) = Synthetic liquid in-furrow nematicide

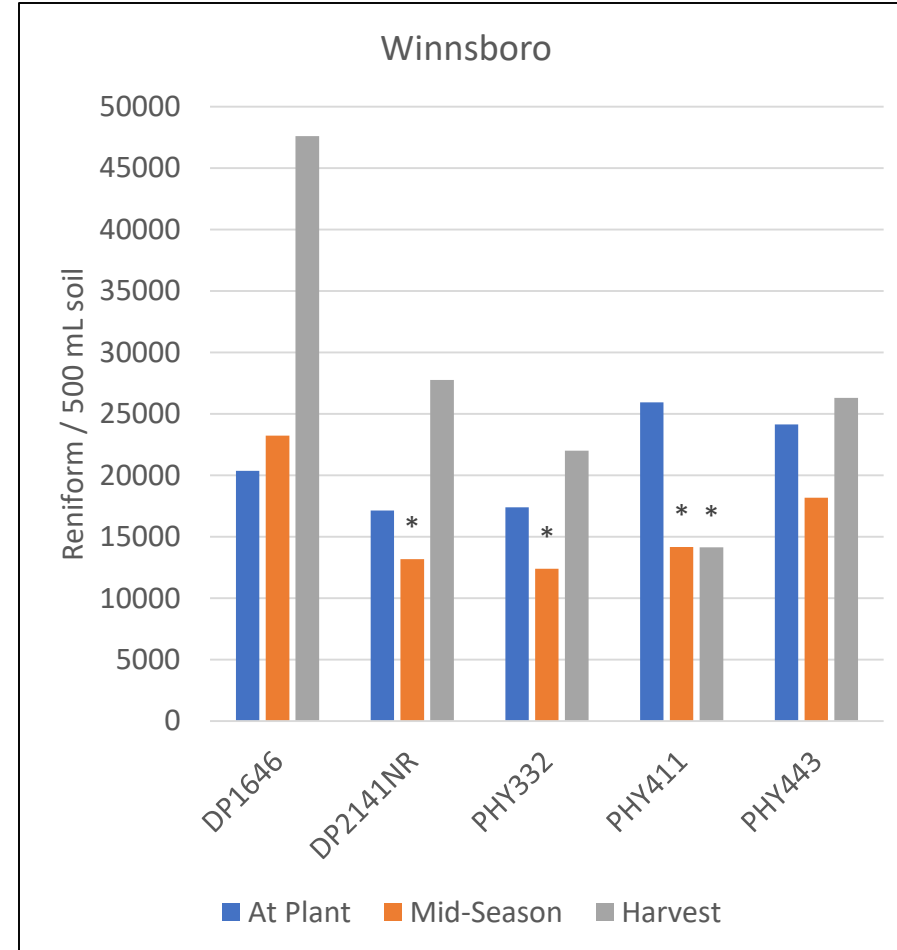




Reniform Nematode Population Dynamics



* Differs from DP1646

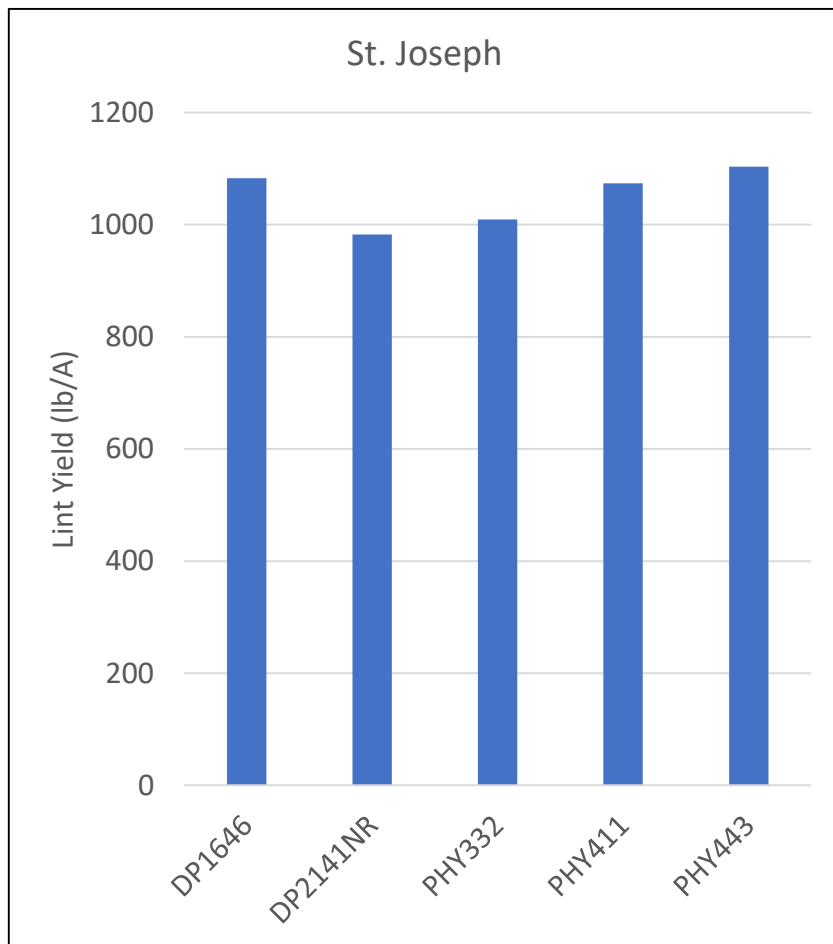


* Differs from DP1646

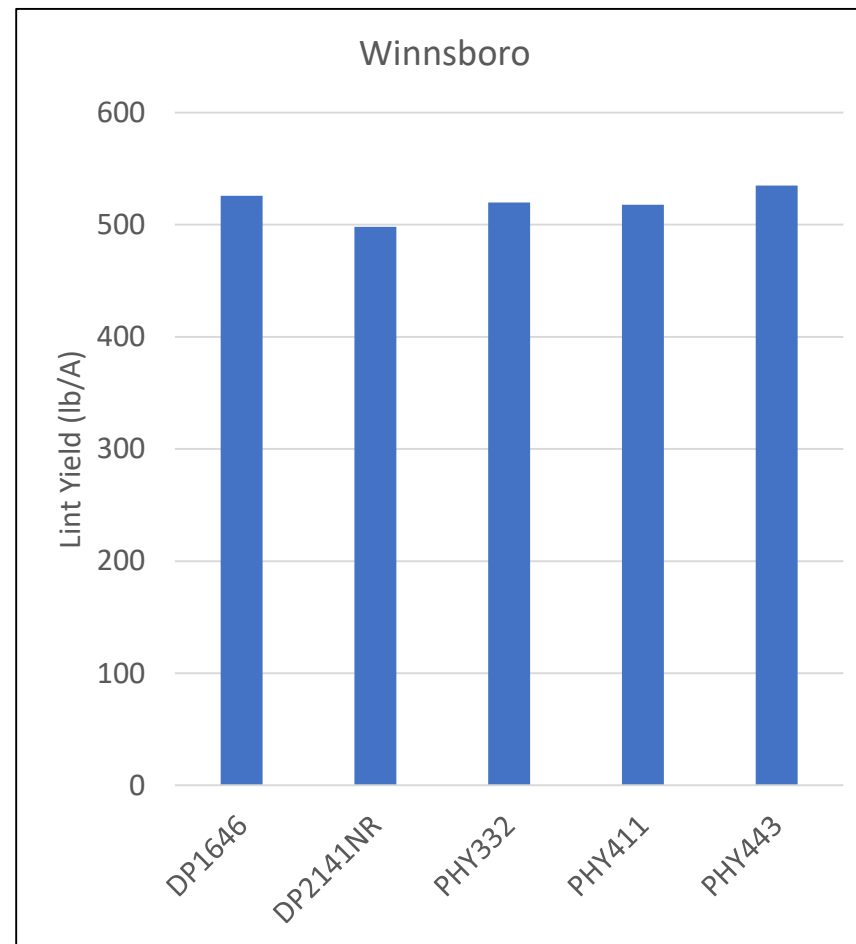
PHY411 plots had consistently fewer reniform nematodes in soil relative to that of DP1646 plots throughout the growing season



Yield



No significant difference; $P = 0.861$



No significant difference; $P = 0.993$

Yield did not differ among cultivars

Experiment #2: Incorporation of Nematicides

2 Locations:

- St. Joseph, LA (*Reniform and Root-Knot Nematode*)
- Winnsboro, LA (*Reniform nematode*)

Plot Size:

4 rows wide
35 feet long
7-foot alley

Whole Plots = Cultivar

- Deltapine 1646 (susceptible control)
- Deltapine 2141NR

Measurements:

- Nematode populations
 - At Plant
 - Mid-season
 - Harvest
- Yield

Split Plots = Nematicide

- Untreated
- BioST (seed coat at 7 oz/CWT)
- Velum (liquid in-furrow at 6 fl oz/A)
- BioST+Velum

Replicates = 5

2022 Growing Season

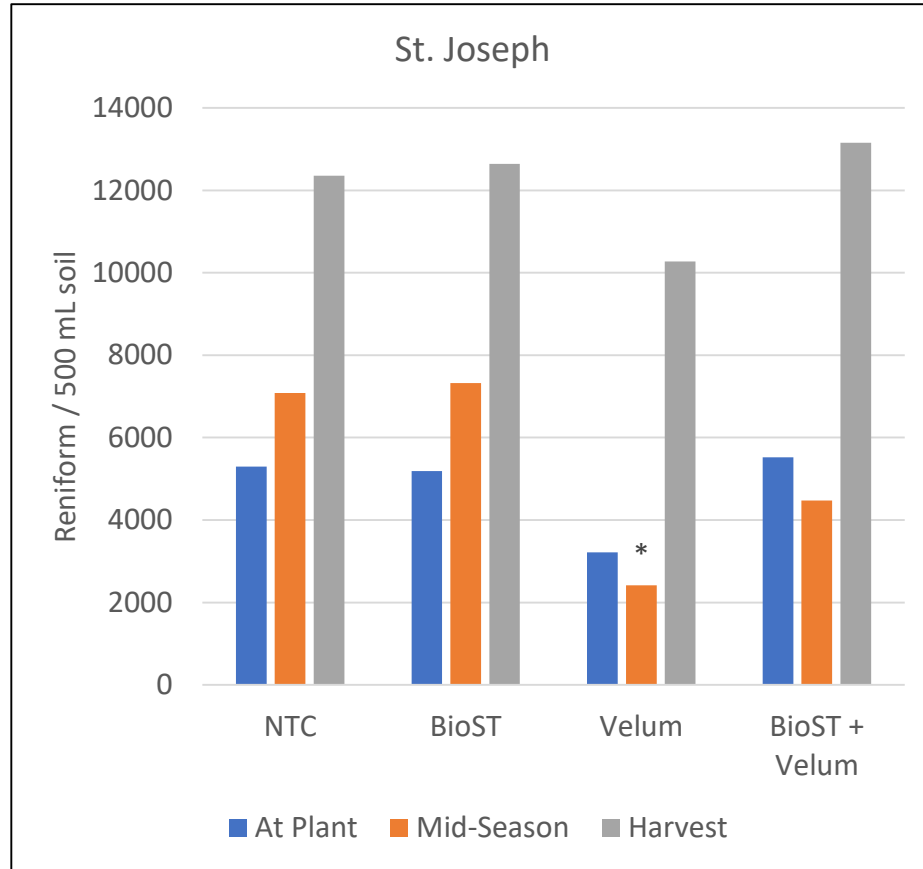
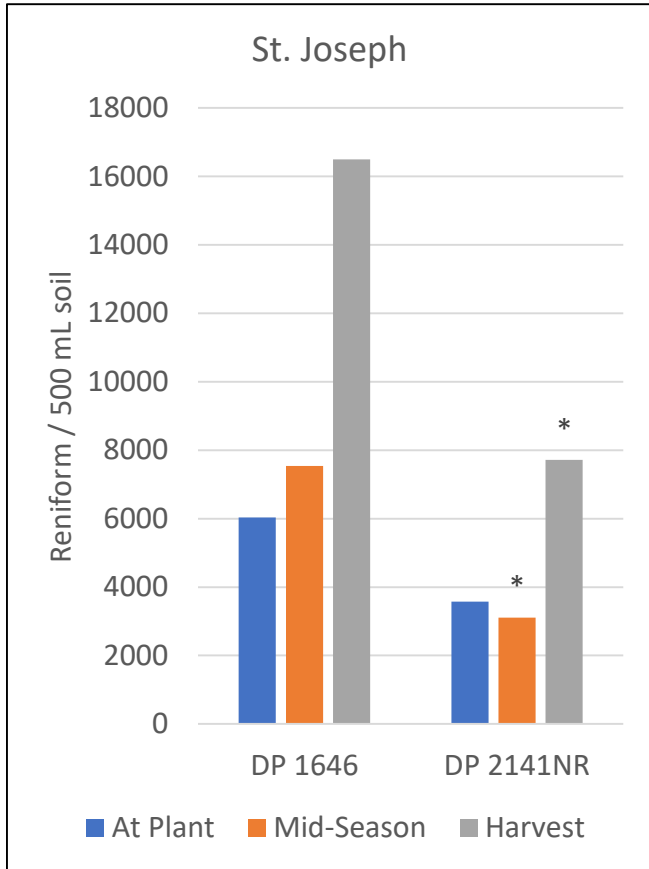
Dr. Tristan Watson





Reniform Nematode Population Dynamics St. Joseph

No Interaction Effect (P>0.10)



* Differs from DP1646

* Differs from NTC

Dr. Tristan Watson

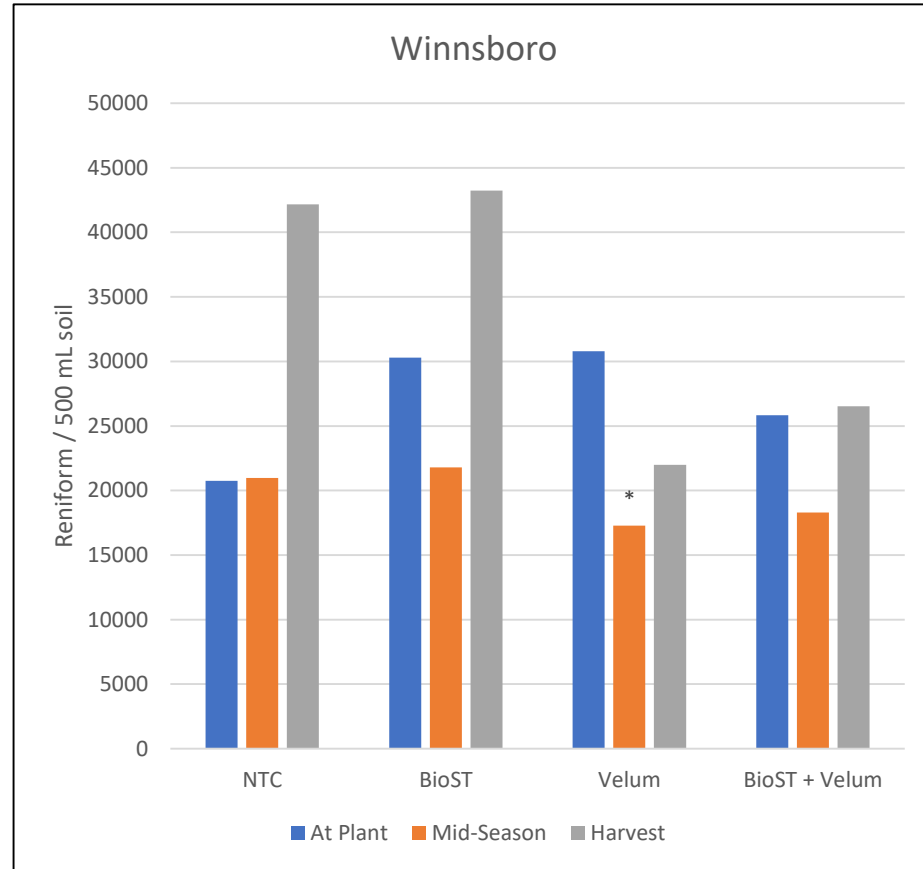
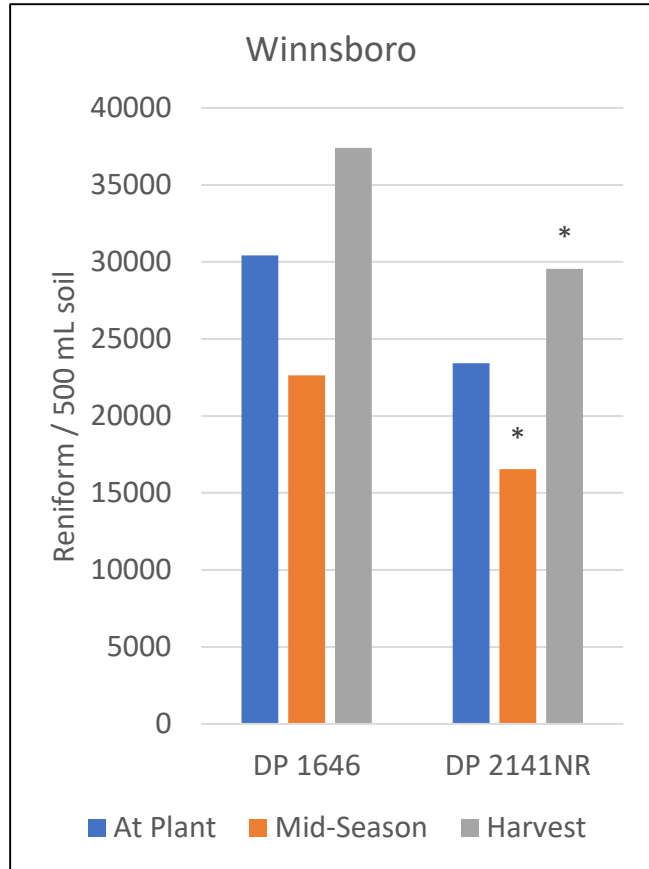
DP 2141NR reduced reniform abundance relative to DP1646

Velum reduced mid-season reniform nematode abundance



Reniform Nematode Population Dynamics Winnsboro

No Interaction Effect (P>0.10)



* Differs from DP1646

* Differs from NTC

DP 2141NR reduced reniform abundance relative to DP1646

Velum reduced mid-season reniform nematode abundance

Thanks to many!

