2001 - 2013

Table 1. Yield of corn, cotton, and peanut total water during the cropping cycle in dryland production versus sub-surface drip irrigation (SDI) from 2001 to 2013 in North Carolina.*

	Crop yield		Total water	
Crop and year	Rain only	Rain plus SDI	Rain only	Rain plus SDI
Corn	*bushels/acre*		*inches*	
2008	96	146*	11.3	21.9
2009	62	148*	12.9	27.6
2010	64	155*	3.6	16.8
2011	64	101*	13.6	20.7
2013	137	131	19.8	21.8
Cotton	*lbs lint/acre*			
2001	800	1020*	8.6	13.8
2002	460	900*	13.0	18.5
2003	840	850	18.9	24.4
2004	920	1010	24.9	31.8
2005	850	1300*	12.2	18.3
2006	810	860	19.5	27.8
2007	470	1020*	11.5	21.3
2008	390	840*	13.8	25.2
2011	480	800*	19.9	39.1
2012	1370	1450	18.1	26.6
2013	1430	1490	19.8	21.8
Peanut	*lbs/acre*			
2001	2350	3400*	8.6	13.8
2002	2020	2960*	13.0	18.5
2003	3020	3210	19.6	24.8
2004	2660	2830	20.0	25.0
2010	2540	3880*	9.3	21.9
2011	3440	4040*	19.9	39.1
2012	5100	4910	18.1	26.6

*Indicates significance at $p \leq 0.05$.

CORN - yield greater with drip irrigation in 4 of 5 years

COTTON - yield greater with drip irrigation in 6 of 11 years

PEANUT - yield greater with drip irrigation in 4 of 7 years

Table 2. F-statistic, P>F, yield, and estimated financial return for corn, cotton, and peanut without irrigation versus sub-surface drip irrigation (SDI) from 2001 to 2013 in North Carolina.

		Estimated financial return		
		Pricing structure†		
SDI irrigation‡	Yield	Low	Medium	High
		$/acre		
Corn	*bushels/acre*			
No	85	-199	-30	139
Yes	136	-217	-55	327
F statistic	8.5	0.1	0.9	2.3
P>F	0.0435	0.7491	0.3913	0.2035
No. of years	5	56	5	5
Cotton	*lbs lint/acre*			
No	800	-133	27	187
Yes	1050	-158	52	261
F statistic	16.8	0.5	0.3	16.8
P>F	0.0022	0.5119	0.6186	0.2468
No. of years	11	11	11	11
Peanut	*lbs/acre*			
No	3010	-216	-116	-19
Yes	3600	-252	-133	-18
F statistic	7.8	0.5	0.1	0.1
P>F	0.0317	0.4895	0.7728	0.9789
No. of years	7	7	7	7
All crops and all years	-			
No	-	-173	-29	113
Yes	-	-200	-4	191
F statistic		1.2	0.6	3.1
P>F		0.2865	0.4627	0.0934
No. of crop-years	-	23	23	23

†Low, medium, and high price for corn was $3/bushel, $5/bushel, and $7/bushel, respectively. Low, medium, and high price for cotton was $0.6/lb lint, $0.8/lb lint, and $1/lb lint, respectively. Low, medium, and high price for peanut was $0.24/lb, $0.27/lb, and $0.3/lb, respectively.

‡Total cost of SDI was set at $174/acre. Total cost, included fixed and variable costs for corn, cotton, and peanut were set at $453/acre, $613/acre, and $925/acre, respectively.

Although yields were greater for all 3 crops when pooled over years, economic returns did not differ unless price of all crops was high. If you look at the economics over the long term (~13 years in this case), there was no difference or added value from drip irrigation. BUT, in over half of the years for all 3 crops irrigation may have "saved" the farm.

System Overhaul. 2014 - Present

Table 10. Influence of subsurface drip irrigation (SDI), planting date, and cultivar on final lint yield from 2014 to 2016.

	2014	2015	2016
	---------- Lint Yield (kg ha^{-1}) ----------		
SDI			
Irrigated	1236	892 a†	1029 a
Non-Irrigated	1299	330 b	459 b
LSD	ns	138	61

T. Spivey

Peanut in 2017

	Peanut yield (lbs/acre)
SDI	5072 *
Dryland	3673

2018 - 2021

Table 4. F-statistic, P>F, yield, and estimated financial return for corn without irrigation versus sub-surface drip irrigation (SSDI) from 2018 to 2021 in North Carolina.†

			Estimated financial return		
			Corn price ($/bu)		
Year	SSDI irrigation	Yield	4.00	6:00	8:00
		bushels/acre	--------- $/acre ---------		
2018	Dry	130	67	327	587
	Drip	157	17	331	644
	F statistic	1.6	1.6	1.6	1.6
	P>F	0.3216	0.3198	0.3198	0.3199
2019	Dry	54	-237	-129	-21
	Drip	179	106	464	822
	F statistic	2.5	2.5	2.5	2.5
	P>F	0.0534	0.0536	0.0536	0.0536
2020	Dry	107	-27	185	398
	Drip	147	-23	270	563
	F statistic	3.2	3.2	3.2	3.2
	P>F	0.0164	0.0163	0.0163	0.0163
2021	Dry	158	176	491	806
	Drip	149	-13	284	582
	F statistic	1.1	1.1	1.1	1.1
	P>F	0.8097	0.8106	0.8107	0.8108
Pooled	Dry	112	-4	219	443
	Drip	158	21	337	653
	F statistic	2.3	2.3	2.3	2.3
	P>F	0.0003	0.0003	0.0003	0.0003
	No. of years	4	4	4	4

†Total cost of SSDI was set at $157/acre. Total cost, included fixed and variable costs for corn was set at $405/acre, respectively. Data are pooled over levels of planting pattern.

Scott Tilley

Corn yield was greater in 2 of 4 years with irrigation.

Total 2001 - 2021

CORN - yields greater in 6 of 9 years for SSDI

COTTON - yields greater in 8 of 14 years for SSDI

PEANUT - yields greater in 5 of 8 years for SSDI

While these results are for drip irrigation, they reflect response with sprinkler irrigation. In trials where dryland has been compared to overhead sprinkler irrigation and SSDI, yields for all 3 crops have almost always been similar for both irrigation systems.

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Contact and Residual Herbicides

Gramoxone (3.0 lb) 8 oz plus Basagran (8 oz)

Storm (16 oz) plus Gramoxone (8 oz)

Dual Magnum 16 oz

Warrant 48 oz

Outlook 13 oz

Zidua 2.5 oz

Anthem Flex 2.7

Nonionic surfactant (1 pint/100 gallons)

*Clethodim at 16 oz applied across all plots in early August

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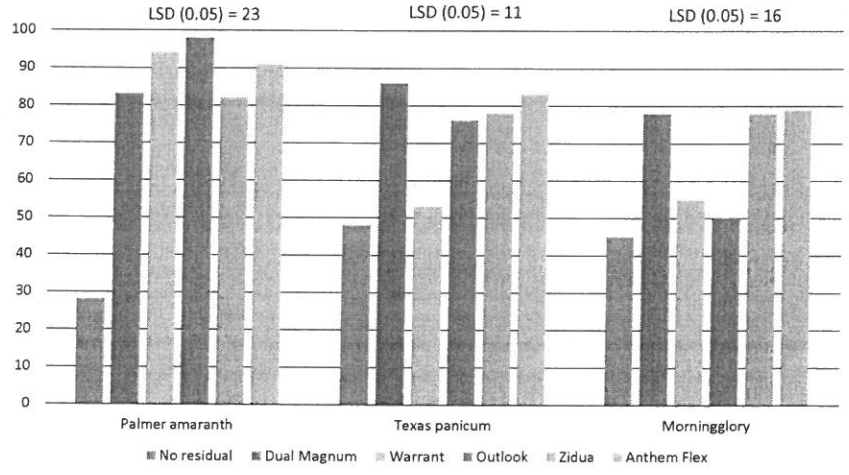
Palmer amaranth control - Rocky Mount
Texas panicum and Morningglory control - Lewiston-Woodville
Gramoxone plus Basagran plus NIS alone or with residual herbicides



Disease Management Trials

We will go into more detail at the plot tour on September 21 at Lewiston and September 28 at Rocky Mount. Differences in treatments will be more obvious at that time. The plot tour will begin at 12:30 and end no later than 2:30 pm on both days. Yes, this is the hottest time of the day. But my schedule is really full.

Today's focus is on variety response to fungicides in a leaf spot setting. One key goal is to determine relative resistance to leaf spot for these varieties. I second goal is to determine how sulfur compares to chlorothalonil in case chlorothalonil is no longer an option.

A summary of research designed to determine the length of time Miravis plus Elatus remains effective is also provided.

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Miravis plus Elatus or Convoy Applied at Spray 2

- Non-treated
- No follow up after spray 2
- Follow up 3 weeks after spray 2
- Follow up 4 weeks after spray 2
- Follow up 5 weeks after spray 2

*Spray 1 was chlorothalonil

**Follow up was chlorothalonil plus azoxystrobin or tebuconazole (through August) then chlorothalonil (through mid September)

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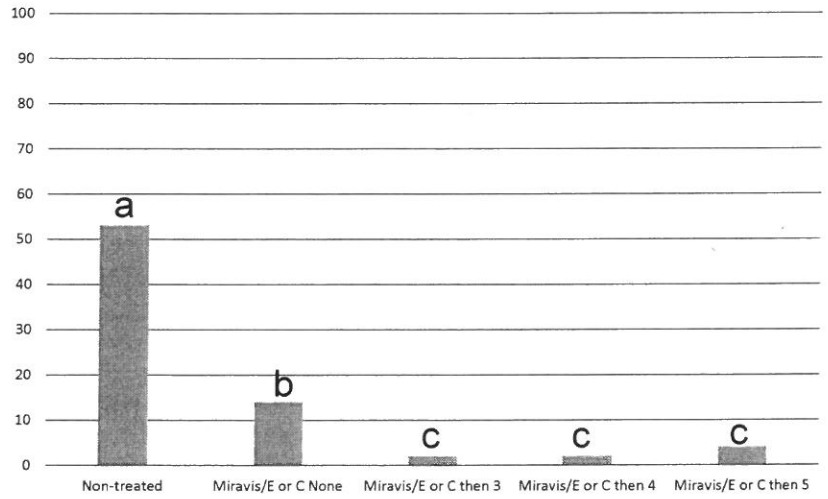
Canopy Defoliation at Digging with Bailey or Bailey II
Follow up after Miravis plus Elatus or Convoy
Study 1 - Pooled over 10 site-years (2019-2021)



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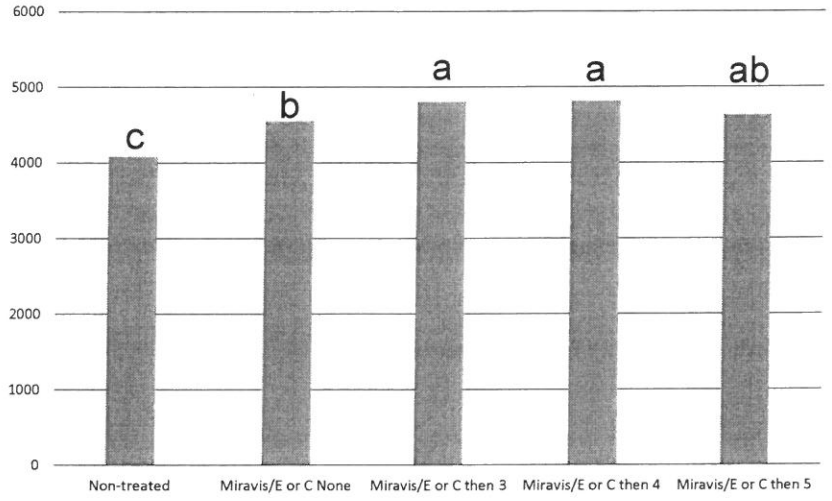
Peanut Yield (lbs/acre) with Bailey or Bailey II
Follow up after Miravis plus Elatus or Convoy
Study 1 - Pooled over 10 site-years (2019-2021)



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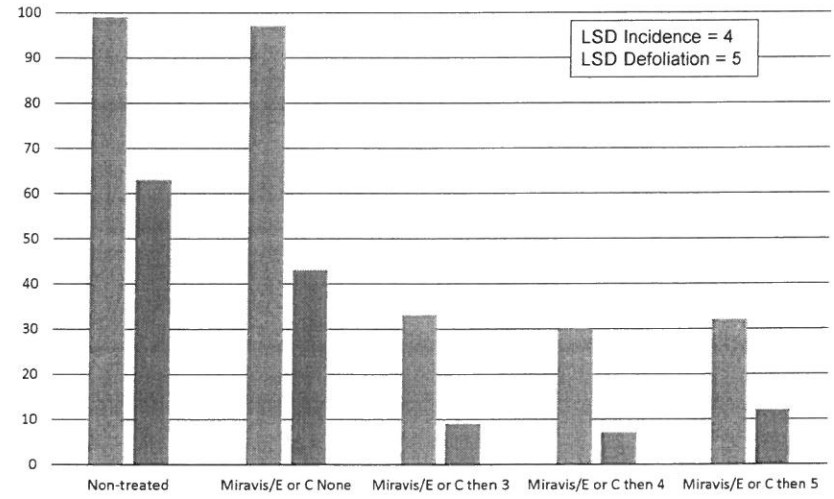
Leaf Spot Incidence (Blue Bar) and Canopy Defoliation (Red Bar)
Interval of Follow up after Miravis plus Elatus or Convoy
Study 2 - Pooled over three cultivars and three locations (2021)



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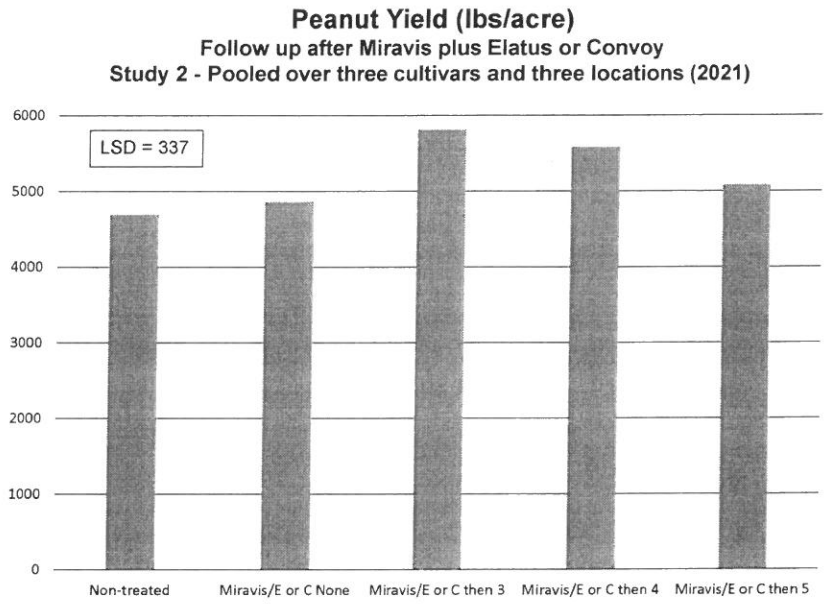

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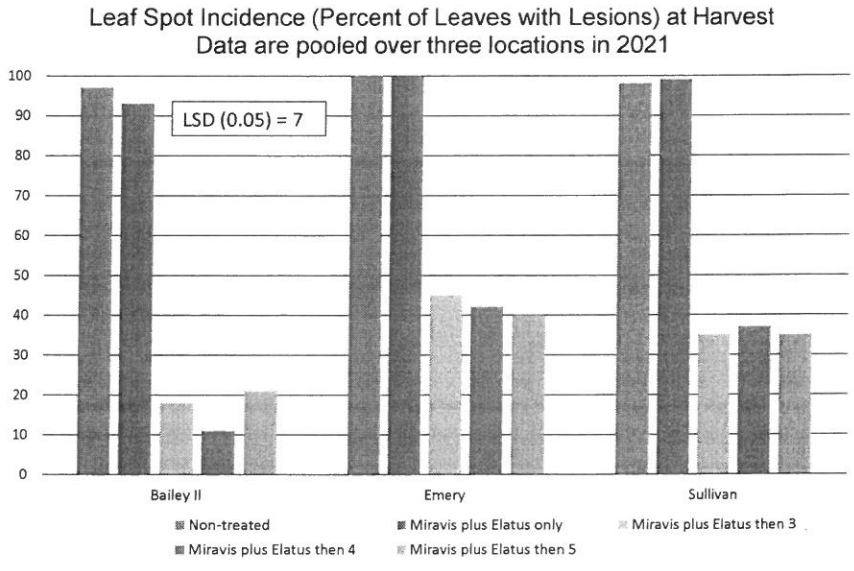

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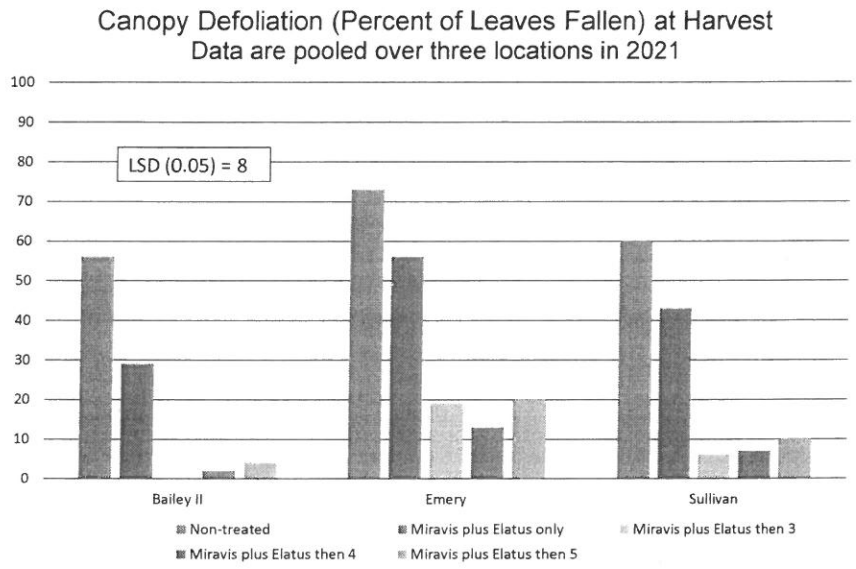

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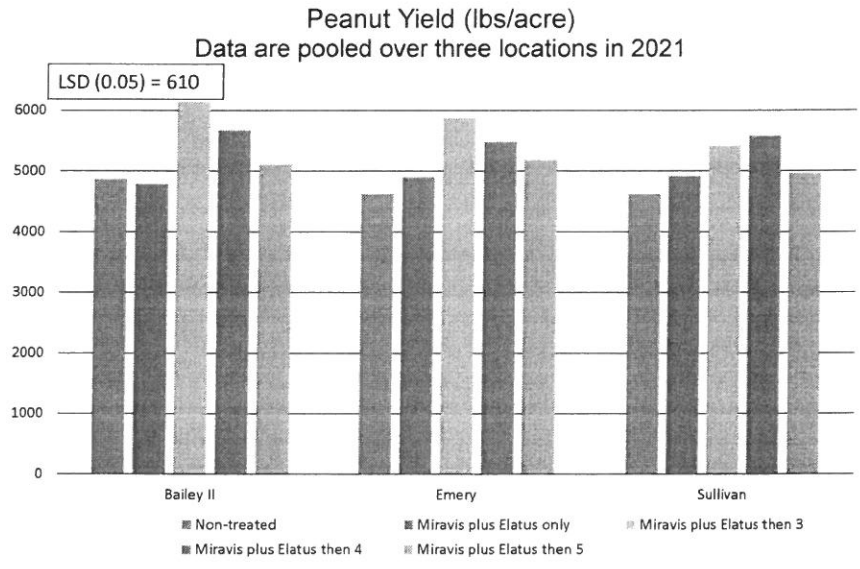

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Summary

- Follow up at 3 and 4 weeks after Spray 2 (Miravis plus Elatus/Convoy) more effective than no follow up or follow up 5 weeks (generally)
- Assume Elatus or Convoy was adequate on stem rot during critical time in NC (gaps based on timing of follow up with tebuconazole or azoxystrobin likely not a contributing factor to yield)
- Recommendations on follow up timing (generally and for these varieties)?
- Concern over lesions at end of the season
- Financial competitiveness if follow up interval needs to be 3 weeks
- *Miravis/Elatus contributions to Sclerotinia blight control*