Cotton Leaf Spot Complex - Management Considerations

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Alternaria/Stemphylium/Cercospora Leaf Spots – Background Information

- Found throughout cotton belt
- Associated with drought conditions and potassium deficiency
- Potassium deficiency
- Crop injury (hail, pesticide damage, etc…) may exacerbate
- Disease usually evident throughout entire canopy
- Differences in varietal susceptibility
- Losses may be significant in some cases
- Most cases are a cosmetic issue
- Fungicide efficacy trial results inconsistent and hard to find

Alternaria/Stemphylium STV5288 – Caldwell Parish - 2013

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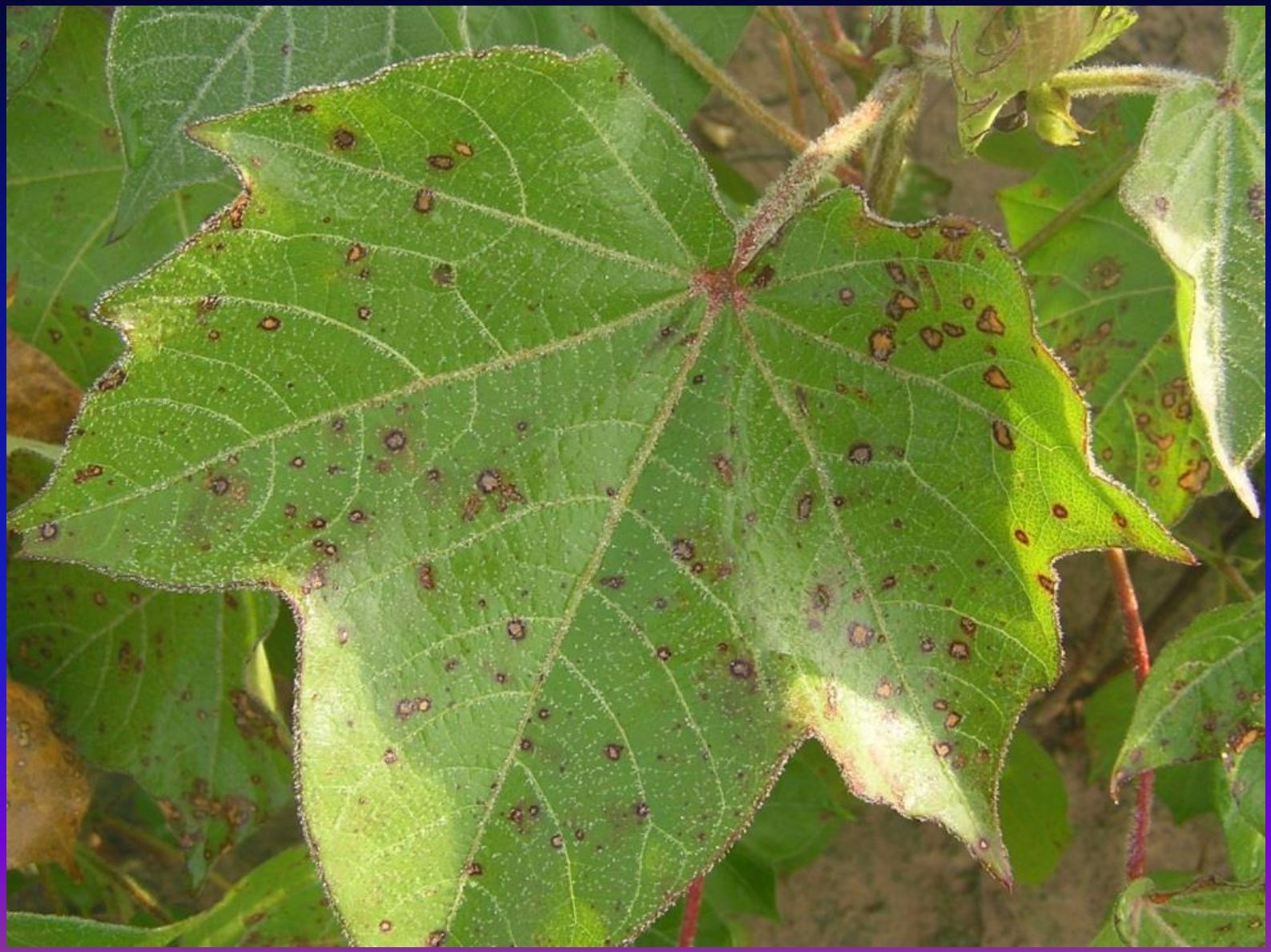
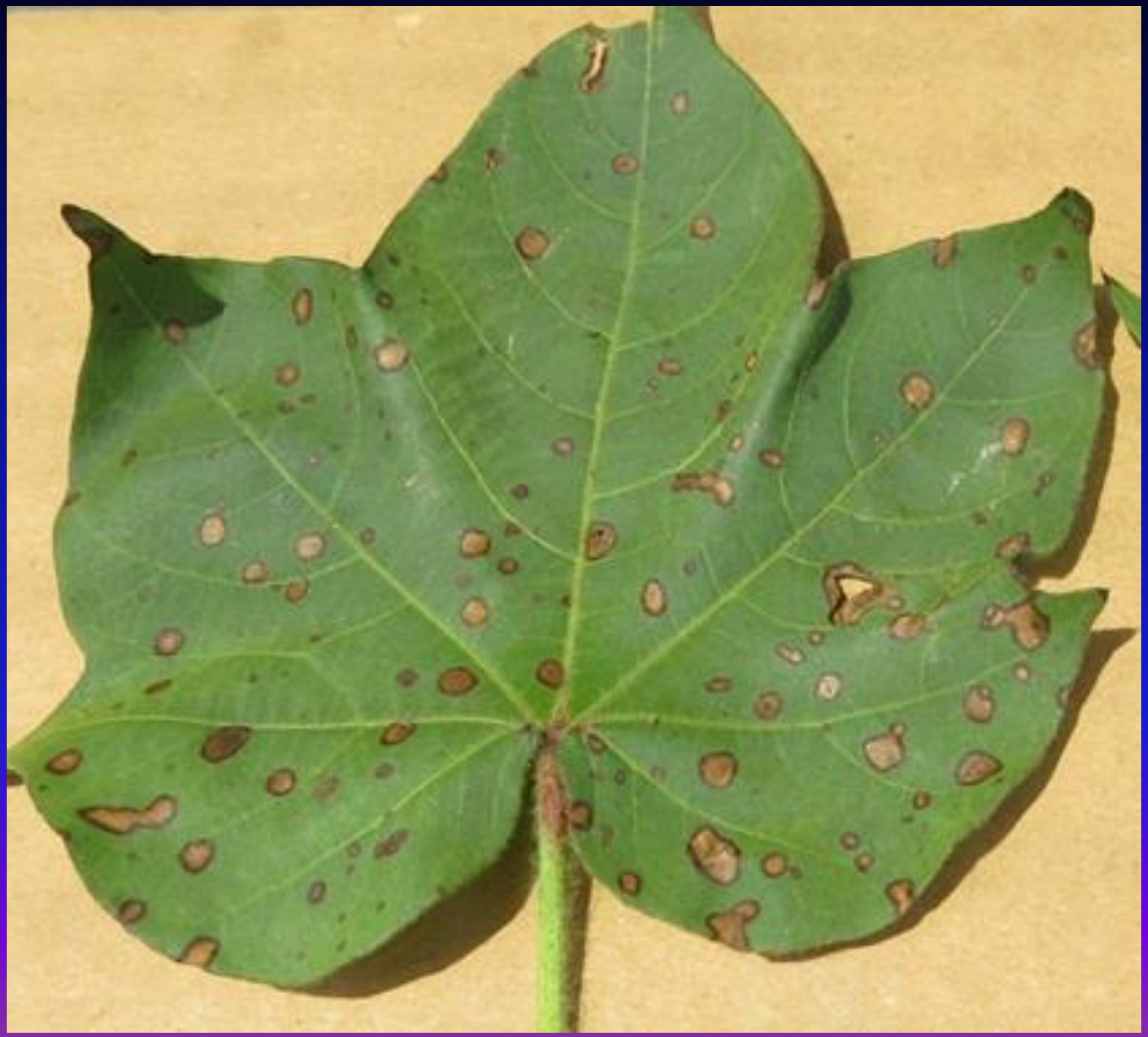


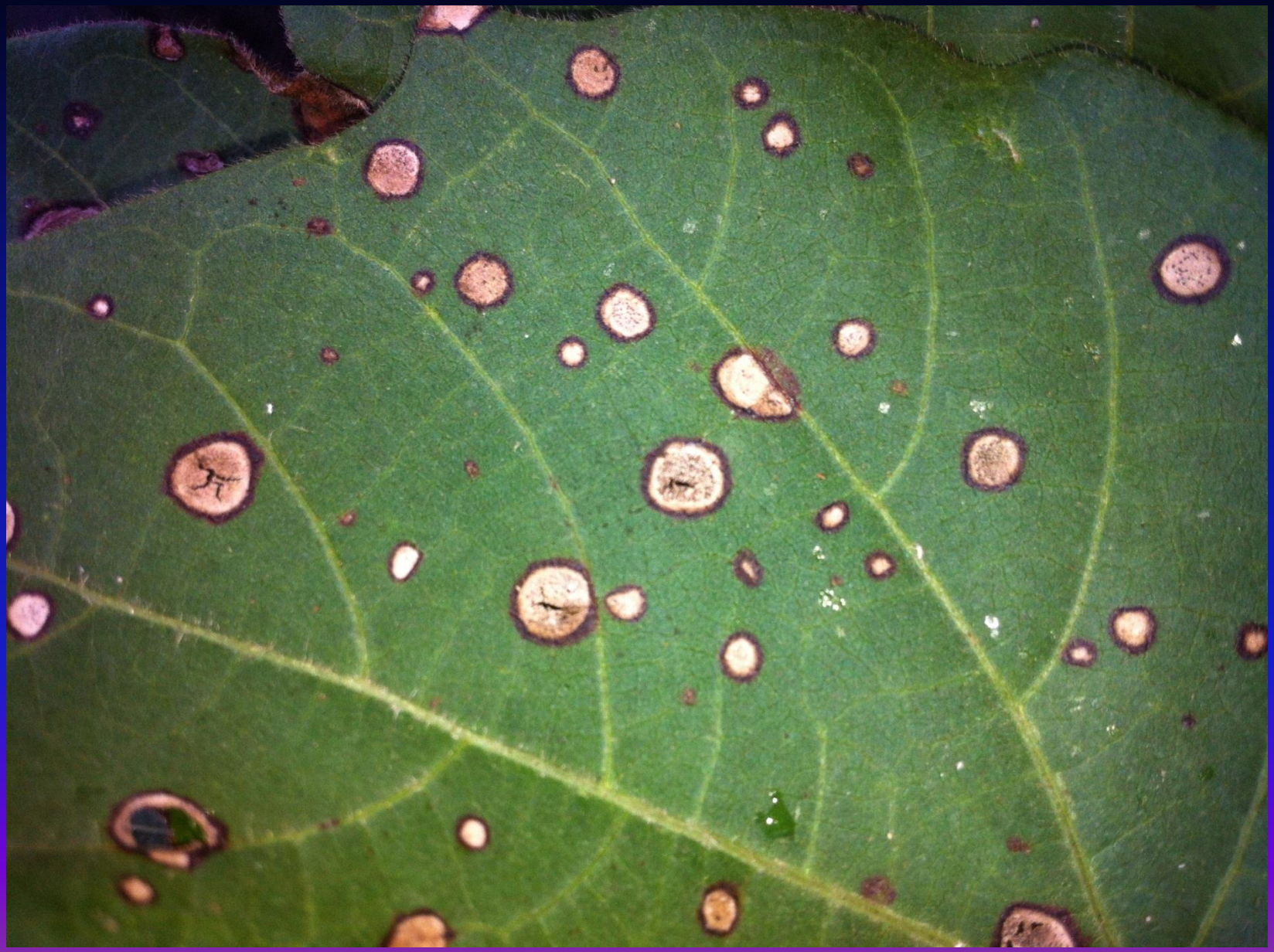
Alternaria/Stemphylium STV5288 – Caldwell Parish - 2013

Alternaria leaf spot NERS - 2013

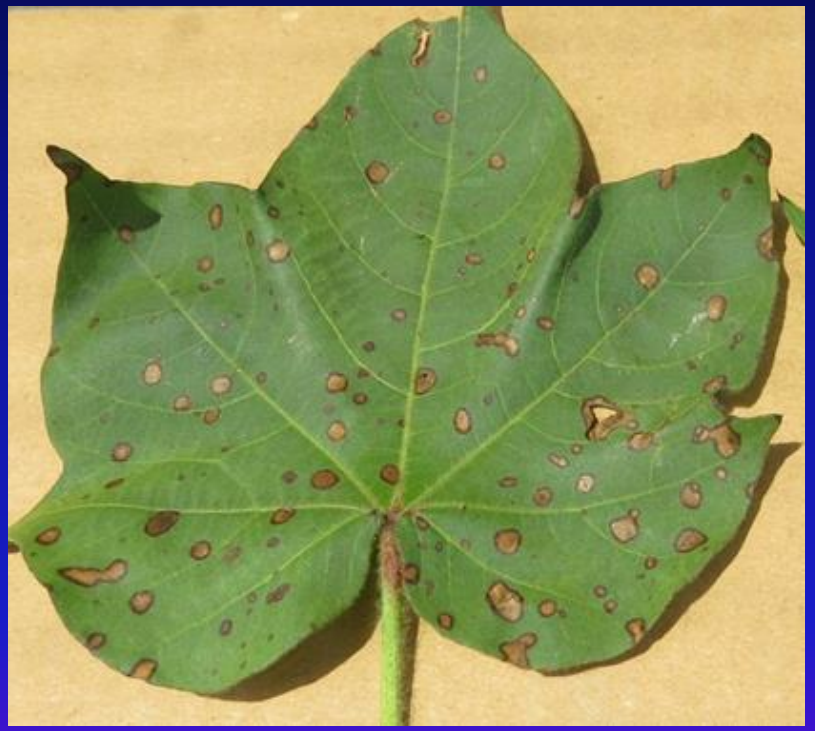


Alternaria leaf spot NERS - 2013

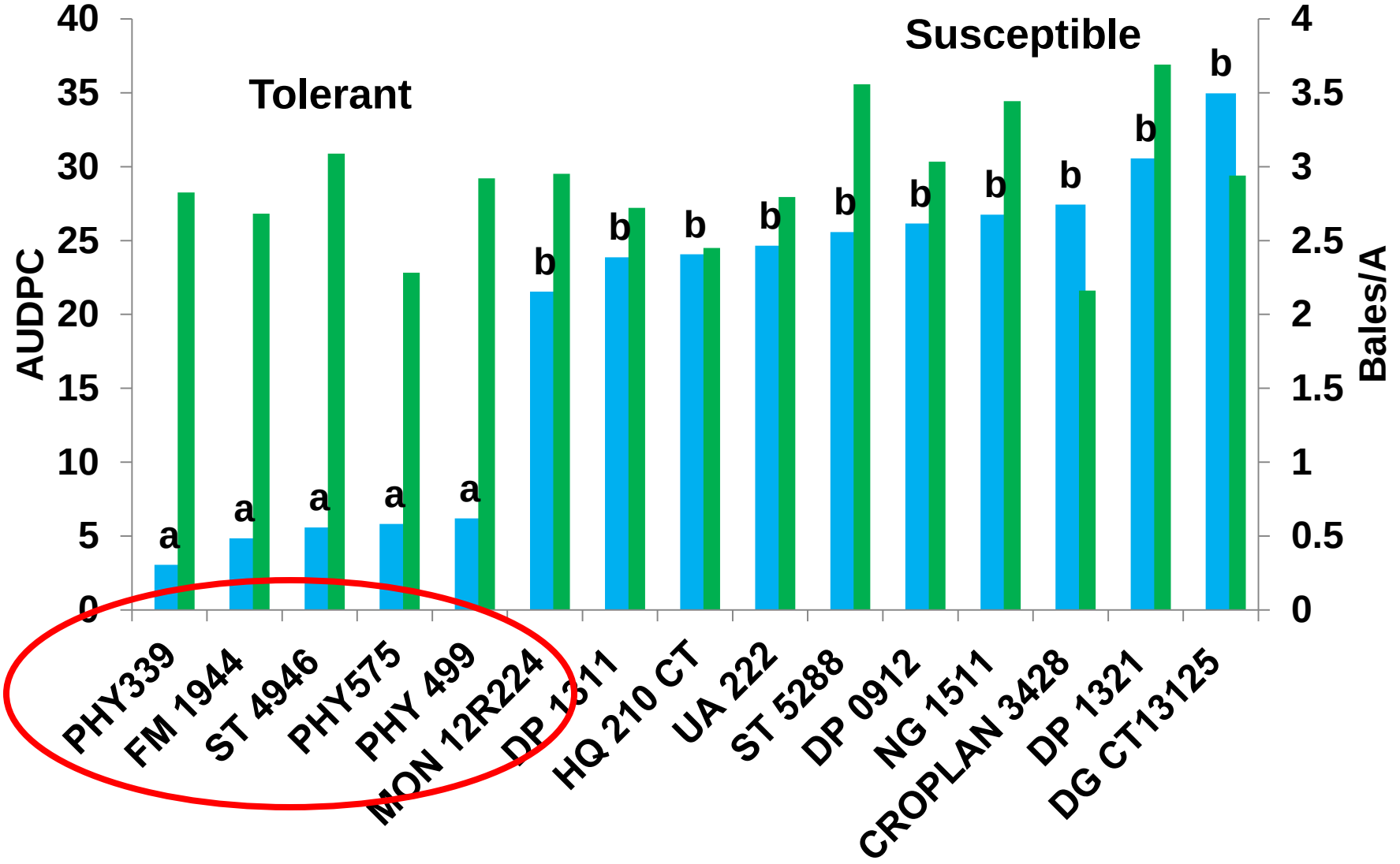
Alternaria leaf spot – NERS - 2013



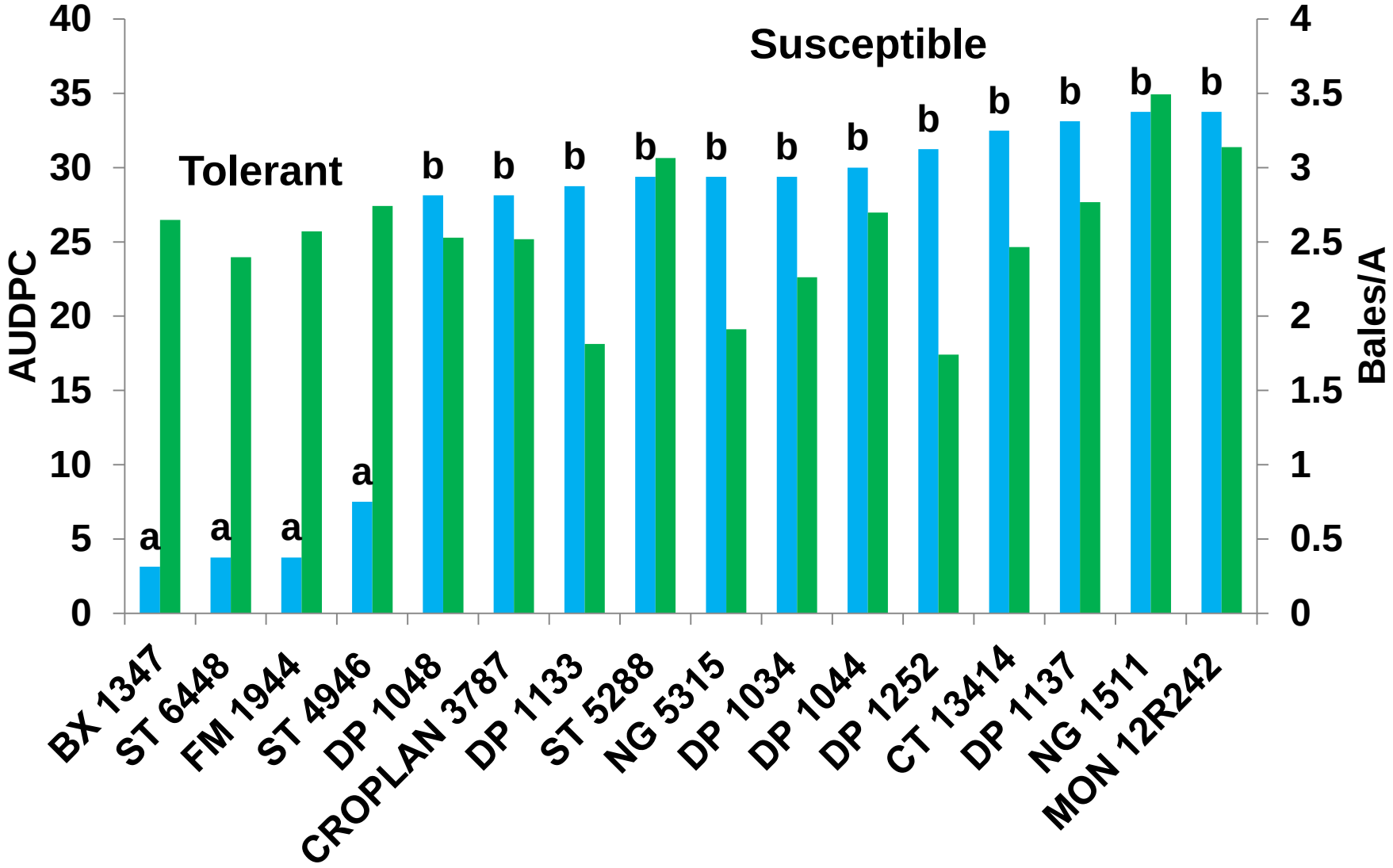
Alternaria leaf spot – Variety Trials – NERS - 2013



Alternaria leaf spot – NERS – 2013
Dry Land Variety Trial - Early



Alternaria leaf spot – NERS – 2013
Dry Land Variety Trial - Medium



Efficacy of Fungicides on Alternaria Leaf Spot 2013 – Late Application (5NAWF)

Treatment	AUDPC No. lesions/lf	Seedcotton (lb/a)
Quadris (6.0)	95.7 ab	2498 a
Quadris (15.5)	125.7 ab	2638 a
Headline (6.0)	88.9 b	2442 a
Headline (12.0)	126.3 ab	2383 a
Twinline (8.5)	121.1 ab	2416 a
Stratego (4.7)	103.8 ab	2400 a
Topguard (14.0)	86.4 b	2406 a
Nontreated	160.2 a	2311 a

NERS

Efficacy of Fungicides on Alternaria Leaf Spot 2013 – Late Application (5NAWF)

Treatment and rate	AUDPC	Seedcotton lb/A
Quadris 6 fl oz	28.1 ab	2343 a
Quadris 15.5 fl oz	18.6 b	2216 a
Headline 6 fl oz	23.7 b	2096 a
Headline 12 fl oz	24.0 b	2289 a
TwinLine 8.5 fl oz	20.1 b	2234 a
Stratego YLD 4.7 fl oz	19.7 b	1946 a
Topguard 14 fl oz	25.8 b	1933 a
Non-treated check	70.5 a	1897 a

MRRS

Alternaria leaf spot – Woodward et al - Texas

Table 2. Assessment of fungicides for management of Alternaria leaf spot in Texas, Trial 1, 2010.

Treatment	Rate (fl oz/A)	Timing*	Lint yield (lb/A)
Untreated	--	--	937.8
Headline	12.0	A	956.8
Headline	6.0 and 6.0	AB	985.5
Headline	6.0 and 12.0	AB	974.1
Quadris	12.0	A	929.8
Quadris	6.0 and 6.0	AB	917.9
Quadris	6.0 and 12.0	AB	922.8
LSD≤0.05			NS

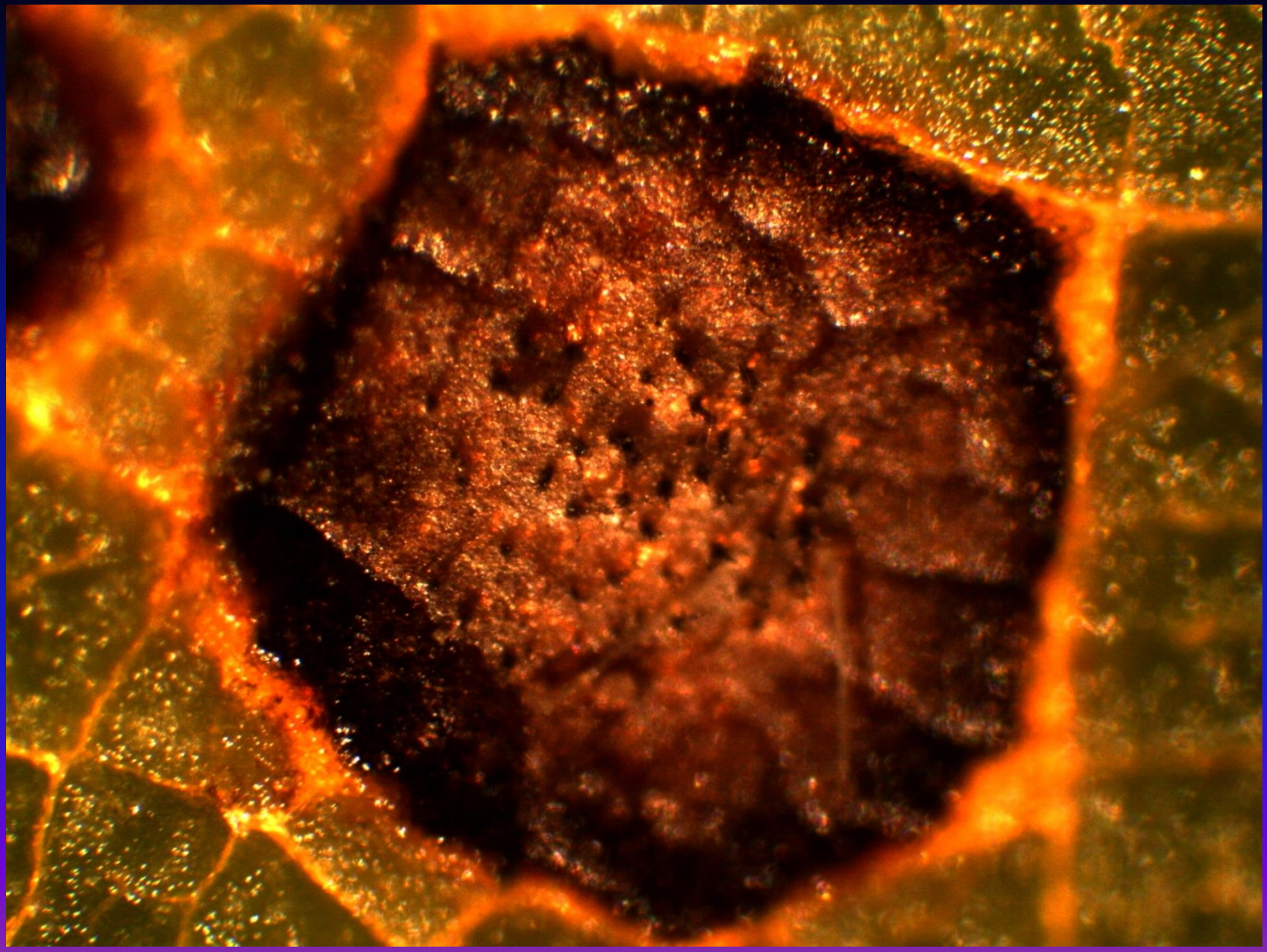
* Fungicide applications were initiated soon after first bloom (A) and repeated as noted on a two-week interval.

Table 3. Assessment of fungicides for management of Alternaria leaf spot in Texas, Trial 2, 2010.

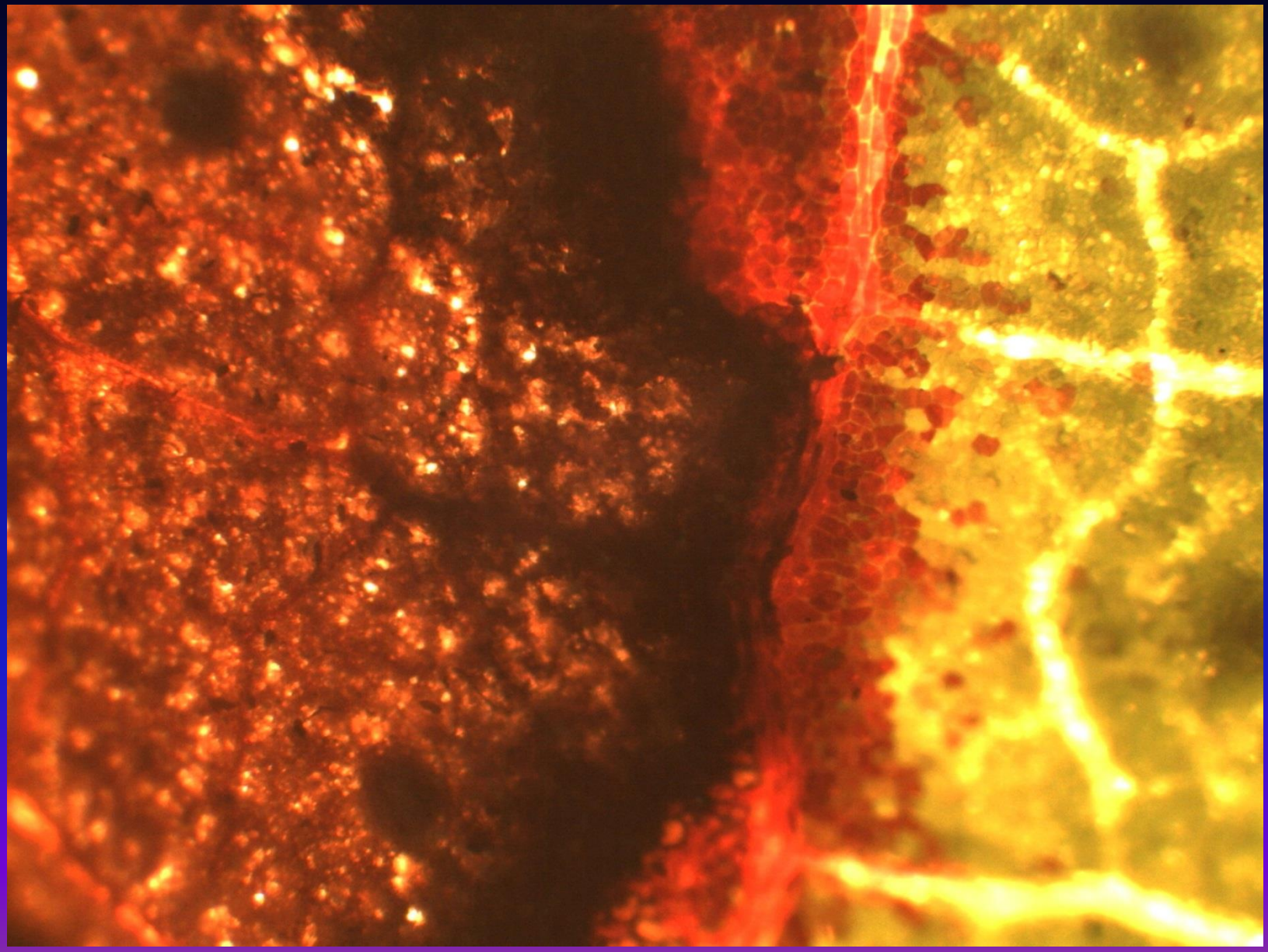
Treatment	Rate (fl oz/A)	Lint yield (lb/A)
Untreated	--	297.4
Mepiquat	8.0	273.0
Mepiquat + Evito	8.0 + 0.5	305.2
Mepiquat + Evito	8.0 + 1.0	312.5
Mepiquat	16.0	274.9
Mepiquat + Evito	16.0 + 0.5	281.4
Mepiquat + Evito	16.0 and 1.0	256.0
Evito	0.5	274.0
Evito	1.0	302.9
LSD≤0.05		**NS**

Cercospora leaf spot – Pioneer, LA

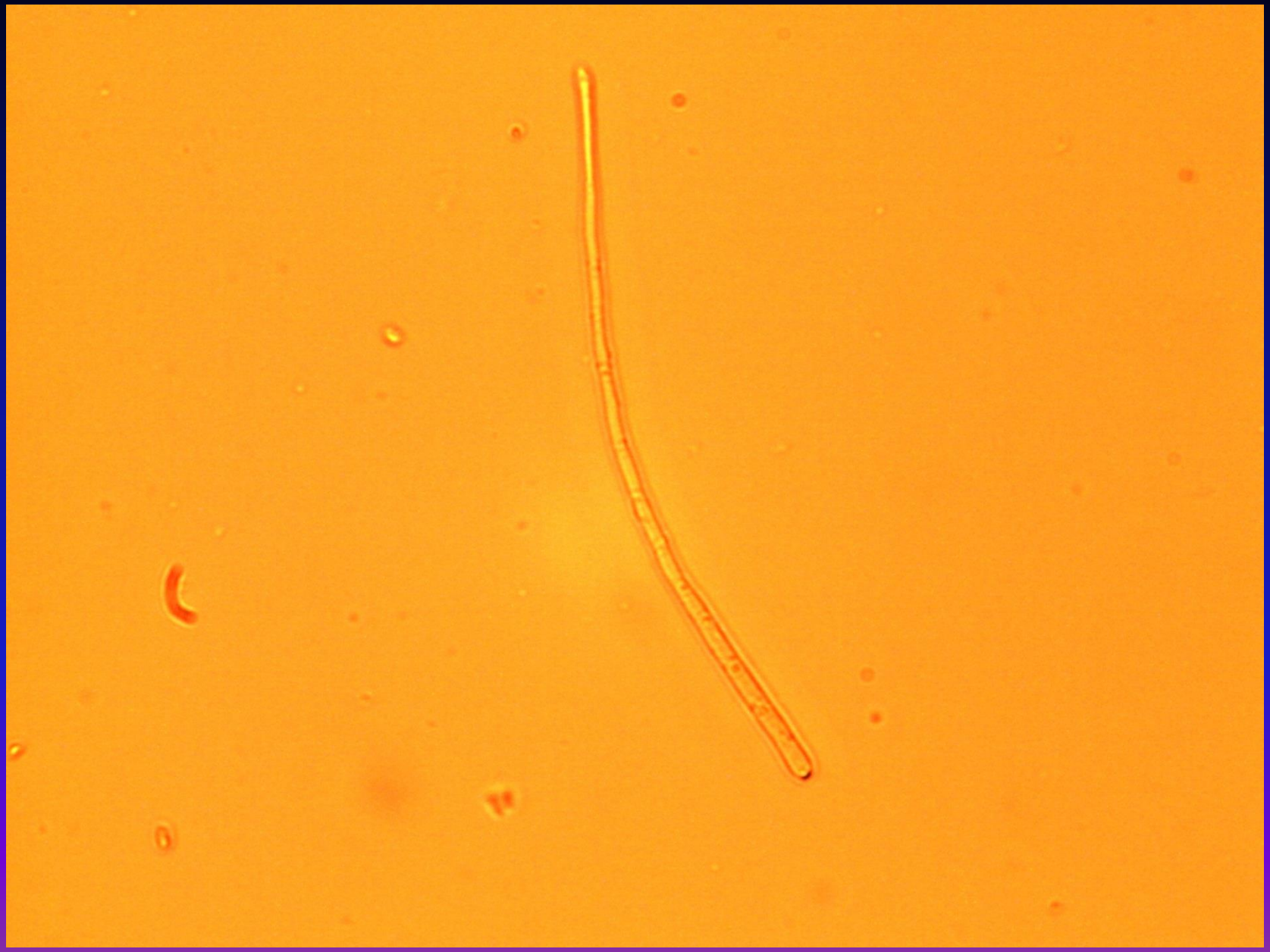
Cercospora leaf spot – Pioneer, LA



Cercospora leaf spot – Pioneer, LA



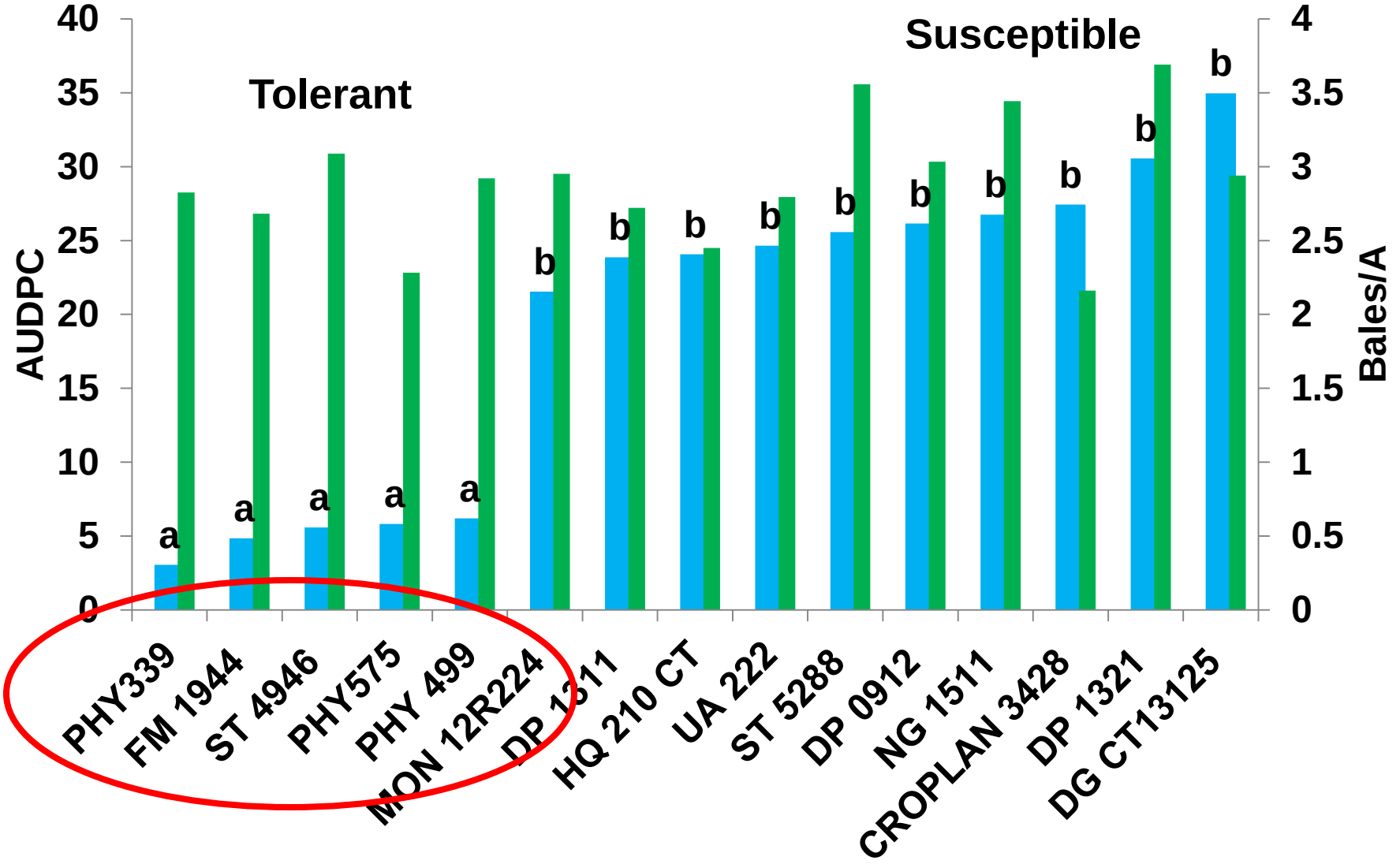
Cercospora leaf spot – Pioneer, LA



Varietal susceptibility – Cercospora Pioneer, LA, West Carroll Parish 2013

Variety Source	Disease Severity
Stoneville (8)	Light to Moderate
DynaGro (7)	Light to Moderate
Phytogen (2)	Heavy
D&PL (9)	Light to Moderate

Alternaria leaf spot – NERS – 2013
Dry Land Variety Trial - Early



Stemphylium/Cercospora – Kemerait et al - Georgia

Table 1. 2010 Stemphylium/Cercospora fungicide study, Attapulgus REC Decatur County, Georgia.[z]

Treatment	Rate (fl oz/A)	Timing[y]	Disease Severity[x] (% leaf area affect)	Seed Cotton (lb/A)
Untreated	--	--	9.0	3842
Headline	6.0	A	13.8	3456
Headline	6.0	AB	2.5	3328
Headline	6.0	ABCD	6.1	3786
Quadris	6.0	A	2.0	3340
Quadris	6.0	AB	7.9	3527
Quadris	6.0	ABCD	1.7	3848
Folicur	6.0	A	1.5	3795
Folicur	6.0	AB	12.0	3660
Folicur	6.0	ABCD	1.2	3580
Topsin M	16.0	A	6.7	3731
Topsin M	16.0	AB	8.8	3824
Topsin M	16.0	ABCD	12.9	3754
LSD≤0.05			**9.2**	**414**

[z]Trial was irrigated and planted to DPL 0949B2RF; primary diseases were Stemphylium and Cercospora leaf spots.
[y]Fungicide applications were initiated approximately two weeks after first bloom (A) and repeated as noted on a two-week interval.
[x]Rating of % leaf area affected of symptomatic leaves from a sample of 10 leaves collected on 16 August.

Stemphylium/Cercospora – Kemerait et al - Georgia

Table 4. Commercial field trial, Bay, Colquitt County, Georgia, 2010.[z]

Treatment	Rate	Timing[y]	Disease Severity[x] (% leaf area affect)	Seed Cotton (lb/A)
At-plant application of potassium				
None	0 lb/A K_2O	--	31.4	262
Low	60lb/A K_2O	Near planting	5.4	790
Middle	120 lb/A K_2O	Near planting	4.9	876
High	180 lb/A K_20	Near planting	4.3	915
LSD≤0.05			**8.5**	**206**
Fungicide Program				
Untreated	--	--	10.8	699
Headline	6.0	A	15.1	705
Headline	6.0	AB	9.3	718
Foliar Potassium	6.0	AB	11.2	721
LSD≤0.05			**8.5**	**NS**

[z]Trial was non-irrigated and planted to DPL 0949B2RF; diseases were Stemphylium and Cercospora leaf spots.
[y]Fungicide applications were initiated approximately two weeks after first bloom (A) and repeated as noted on a two-week interval.
[x]Rating of % leaf area affected from a sample of 10 leaves collected on near end of season.

Target Spot – *Corynespora cassiicola* Background Information

- NOT related to K deficiency
- Southwest Georgia 2003, Observed in most SE States
- Irrigated fields with frequent rain
- Dry weather slows disease development
- Disease develops in the lower canopy and progresses upward
- Losses may be significant (early infection and optimal environment)
- Differences in varietal susceptibility
- Fungicide efficacy trials inconsistent
- Hosts include: cotton, cucumber, sweet potato, soybean, and tomato

Target Spot

Faske, University of Arkansas

Target Spot

Target Spot

Other Leaf Spots

Faske, University of Arkansas

Target Spot

Faske, University of Arkansas

Target Spot

Liu, University of Florida

Target Spot – Hagan et al – Auburn Variety Trials

Cotton variety	Target spot intensity[z]	Turnout (%)[y]	Lint yield lb/A
All-Tex Nitro 44 B2RF	5.8 c-g[x]	0.42 g	1907 c-f
Americot 1511 B2RF	6.7 abc	0.46 a	2340 a
Americot NG 0012 B2RF	5.1 h	0.44 de	1623 f
Croplan Genetics 3787 B2RF	5.1 h	0.44 d	2001 a-e
Deltapine 1044 B2RF	6.7 ab	0.42 g	1809 def
Deltapine 1048 B2RF	5.4 e-h	0.44 d	2139 a-d
Deltapine 1050 B2RF	6.0 b-f	0.45 bc	2174 abc
Deltapine 1137 B2RF	5.5 d-h	0.44 d	2180 abc
Deltapine 1252 B2RF	5.3 fgh	0.45 ab	2199 abc
Deltapine MON 11R136 B2RF	6.1 a-e	0.42 g	2060 a-d
Deltapine MON 11R159 B2RF	5.7 d-h	0.44 cd	2064 a-d
DynaGro 2610 B2RF	5.5 c-f	0.43 ef	2120 a-d
FiberMax 1944 GLB2	5.5 d-h	0.41 h	1968 b-f
Phytogen 375 WRF	5.1 h	0.41 h	1709 ef
Phytogen 499 WRF	7.4 a	0.45 ab	2093 a-d
Phytogen 565 WRF	5.9 b-f	0.42 g	2157 abc

- **6 published trials from 2011 & 2012, PHY 499 most susceptible in all**
- **Scout in the lower canopy in PHY 499 for this disease!**

Target Spot – Hagan et al – Auburn Fungicide Efficacy Trials

- 3 published trials from 2012, fungicides suppressed target spot
- Applications beginning at 1st bloom, then 2wk interval
- No significant yield increase compared to non-treated in 2 of 3 trials
- Significant yield increase 1/3 (3 Headline Applications)
- Preventative applications more efficacious than “on-demand” apps
- Losses up to 200 lb (PHY 499), 120 lb (DP 1050) lint
- Defoliation >75% (PHY 499), up to 50% (DP 1050)
- No completely resistant varieties
- COVERAGE IS A BIG PROBLEM

Allen et al – Mississippi State Fungicide Efficacy Trials

- 3 published trials from 2012, No effect on disease severity
- No significant effects on yield in 1 of 3 trials
- Negative effects on yield in 2 of 3 trials

Kemerait et al – Georgia
Factors Increasing Risk to Target Spot

- Fungicides effective at reducing disease symptoms
- Recommend application timing before canopy closure
- Recommend preventative applications
- Recommend use of PGRs to avoid rank growth
- Best timing for management is an application at 1st bloom followed by an application at 3rd week of blooming
- Estimate yield preservation of 200-700 lbs seed cotton under heavy disease pressure

Kemerait et al – Georgia
Factors Increasing Risk to Target Spot

- Past history of target spot and severe outbreaks
- Rank cotton with a dense canopy
- Irrigated cotton, extending dew periods, overhead irrigation
- Frequent periods of rainfall and cloudy conditions
- Reduced tillage
- Cotton following cotton
- Susceptible variety

Summary

- Fungicide apps can suppress cotton leaf spot diseases
- Fungicide apps do not result in increased yields for Alternaria/Stemphylium/Cercospora
- Fungicide apps MAY result in increased yields for target spot
- There may be varieties resistant to Alternaria/Stemphylium/Cercospora leaf spot pathogens
- There do not appear to be any varieties resistant to target spot
- Coverage and timing are issues

Future Plans

- NERS, DLRS, and MRRS
- Continue work with labeled fungicides
- Try other products (i.e. successful products on other hosts)
- Application timings, rates, coverage issues
- Continue to identify resistant varieties
- Collaborate with agronomists to address nutrient issues

Questions?

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