

Management Strategies for Bacterial Blight in Cotton

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Bacterial blight

- *Xanthomonas citri* subsp. *malvacearum* (*Xcm*)
- Pathogen has been reported in almost every country where cotton is grown
 - Bacterium is known to be seedborne (internal and external)
 - Capable of surviving in the soil on crop debris
 - Plants are susceptible throughout the growing season
 - Infections can take place on foliage and bolls
- Yield loss of 34% following inoculation
 - 35-59% in field epidemics (1950) pre acid delinting
 - Currently, negligible losses have occurred; however, sporadic outbreaks do occur

Bacterial blight

- **Pathogen can survive fairly well under arid conditions**
- **Disease development is highly dependent on environmental conditions**
 - **High humidity is required for infections to take place**
 - **In Texas, we see the disease during the middle to later part of the season: dense canopy, rainfall events or high irrigation capacity**
 - **Abrasion from blowing sand increases disease incidence early in the season**

Bacterial blight or Angular leaf spot



Bacterial blight

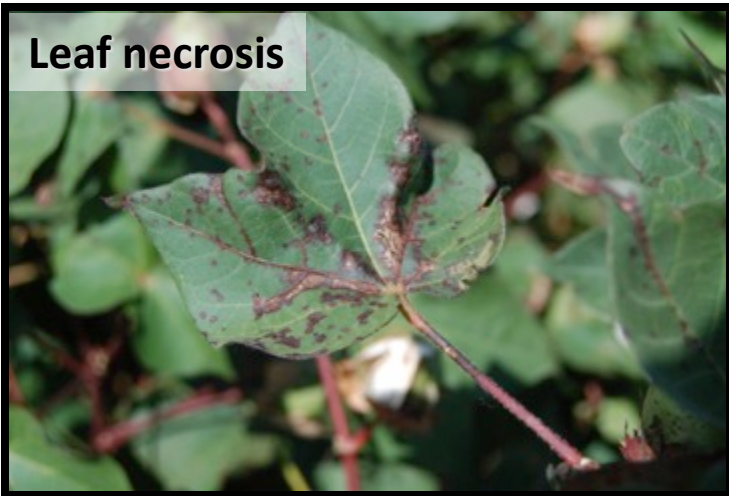
Angular leaf spot



Vein necrosis



Leaf necrosis



Blackarm



Bacterial blight on cotton bolls



More recent and common symptoms



More recent and common symptoms



Bacterial blight

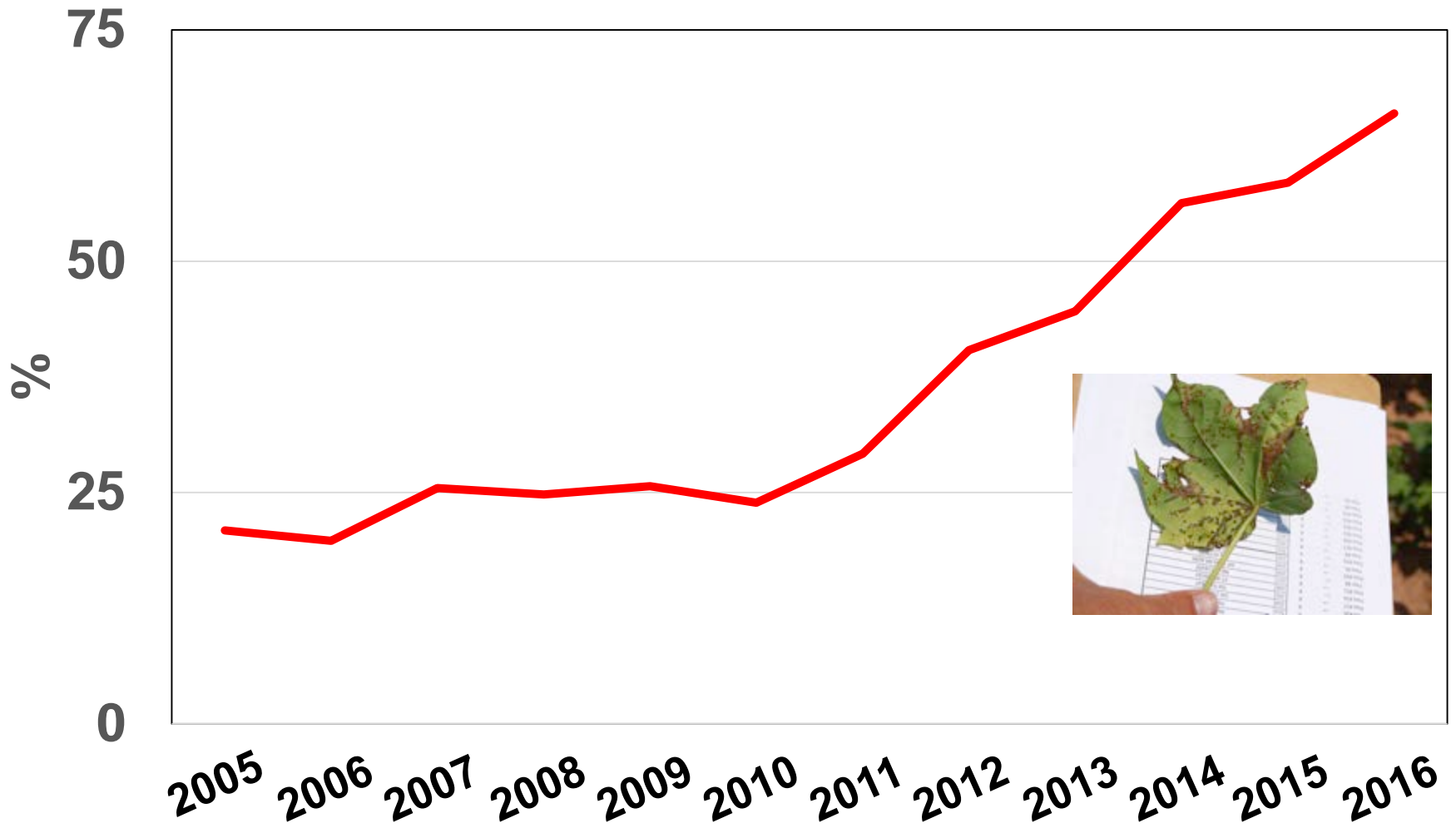


Bacterial blight management options

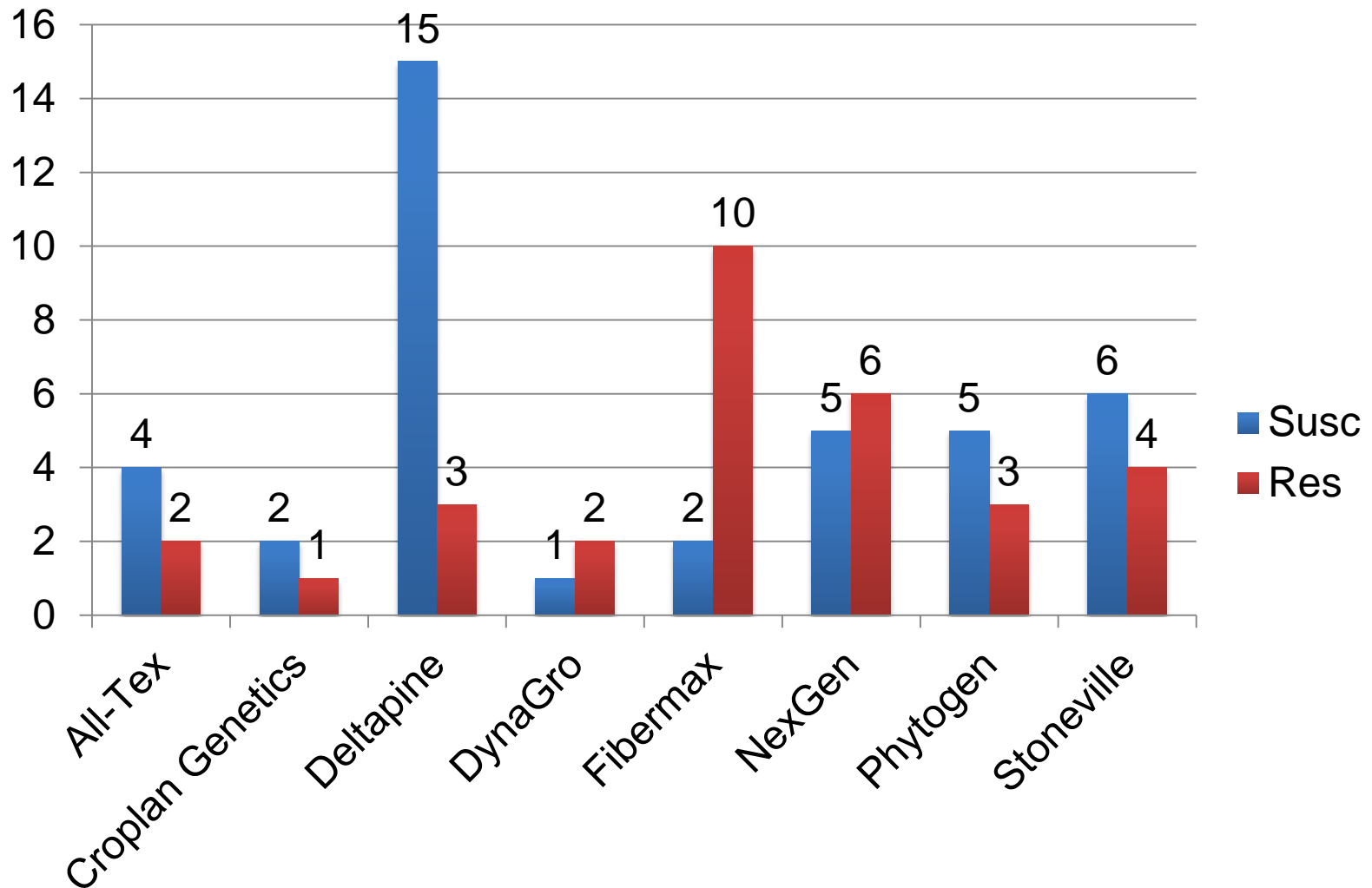
- **How do I manage Bacterial blight**
 - **Variety selection**
 - **Diversification: DO NOT plant the entire farm to a single variety**
 - **Crop rotation**
 - **Residue management**
 - **Irrigation type**

 - **There are no corrective measure**
 - **Fungicide applications are ineffective**
 - **Antibiotics are not labeled and cost prohibitive**

Breakdown of cotton varieties susceptible to Bacterial blight Texas



Variety reaction Bacterial blight by brand name for Texas



Recent varieties with at least partial resistance to Bacterial blight

- DP 1518B2XF, DP 1639B2XF, DP 1646B2XF**
- FM 1830GLT, FM 2334GLT, FM 1900GLT, FM 2007GLT, FM 1888GL, FM 1953GLTP**
- NG 3500XF, NG 3640XF, NG 3699B2XF, NG 4545B2XF, NG 4689B2XF**
- PHY 223WRF, PHY 490W3FE, PHY 300W3FE, and PHY 243WRF**

Effect of crop rotation on Bacterial blight

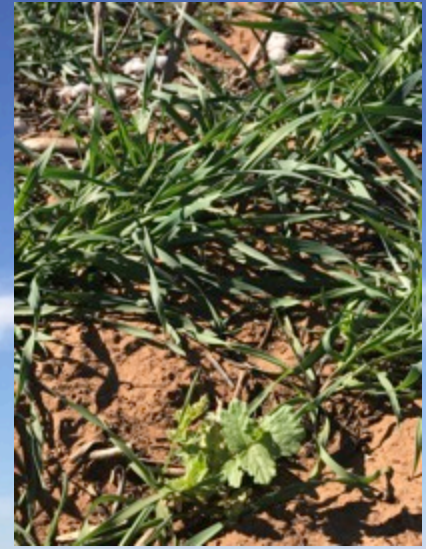
- **Crop rotation – non-host crops that fit existing production systems**
 - **Resistant cotton varieties**
 - **Corn**
 - **Sorghum**
 - **Soybean**
 - **Peanut**

Effect of tillage on Bacterial blight

Tillage method	Severity (% leaf area affected)
Conventional	33.0 a
No-till (mixed spp.)	24.0 a
No-till (rye)	11.5 b

- **No differences in disease incidence were observed**
- **Incidence was somewhat correlated with stand (biomass)**
 - Rye has a higher C:N ratio and persisted longer

50% rye
33% winter pea
10% vetch
7% radish



Rye Cover

Mixed Cover

Bacterial blight management options

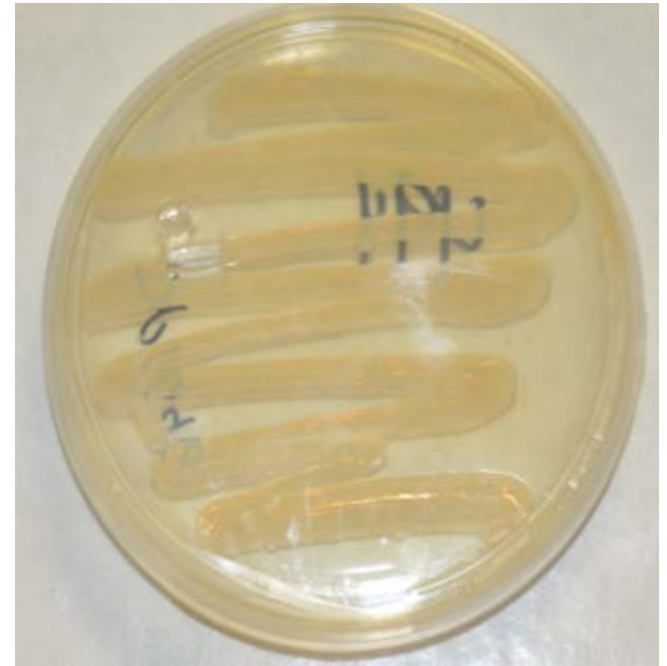
- **Irrigation management**
 - Limit use of overhead irrigation, reduce splash
 - Use of LEPA (low elevation precision application) systems are more efficient in delivering irrigation water







A new player? “The game is afoot”









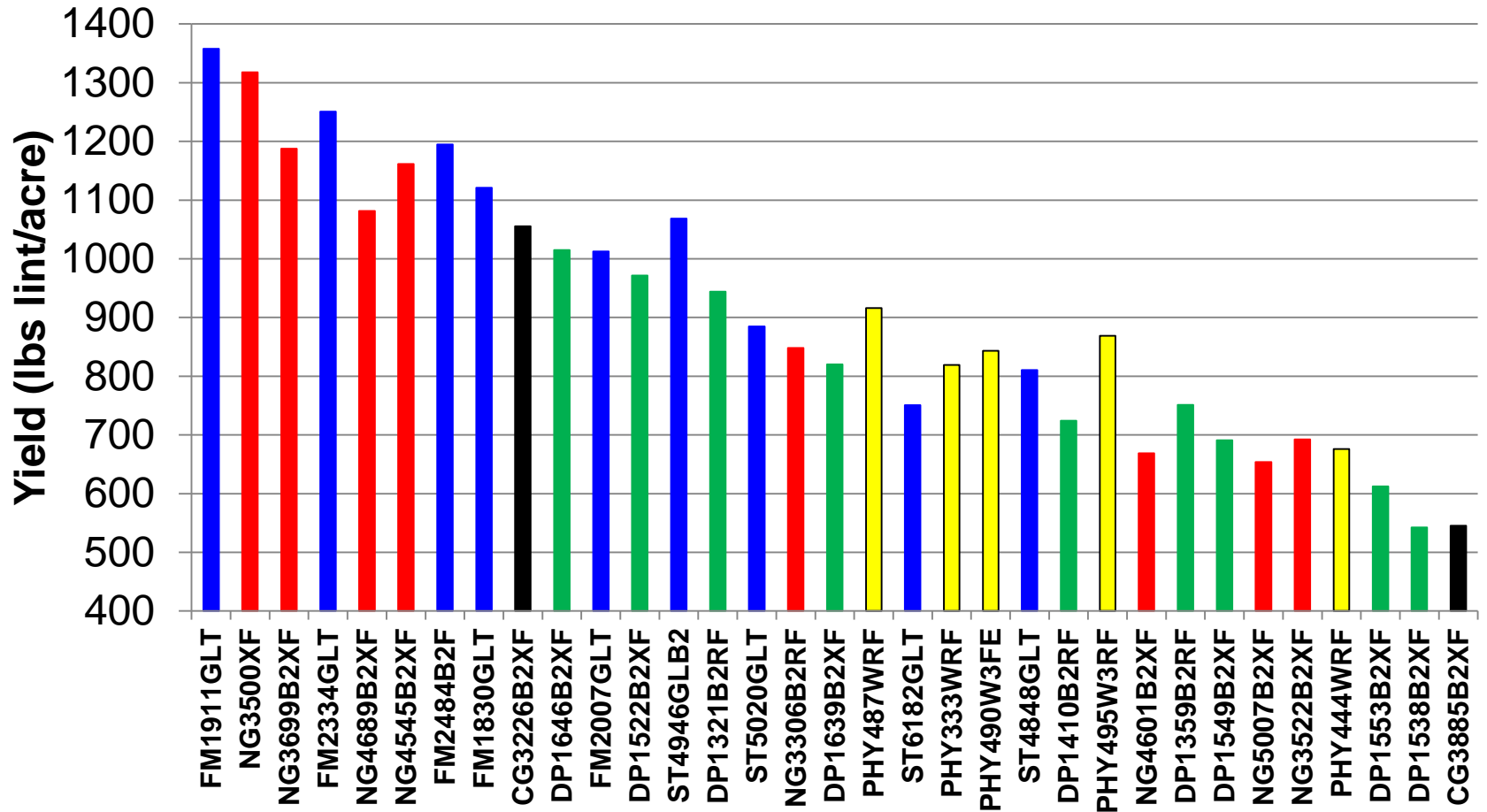
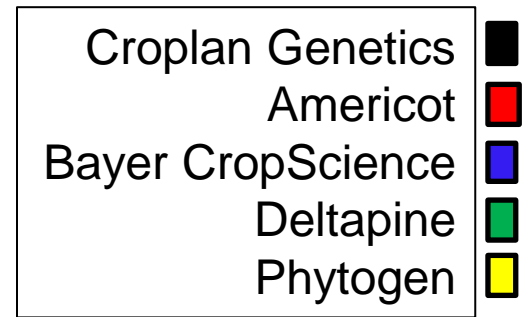
Symptoms expression is first observed during flowering, intensifying during boll fill

Increased water demand

Coincides with time when temperatures increase and rainfall is limited



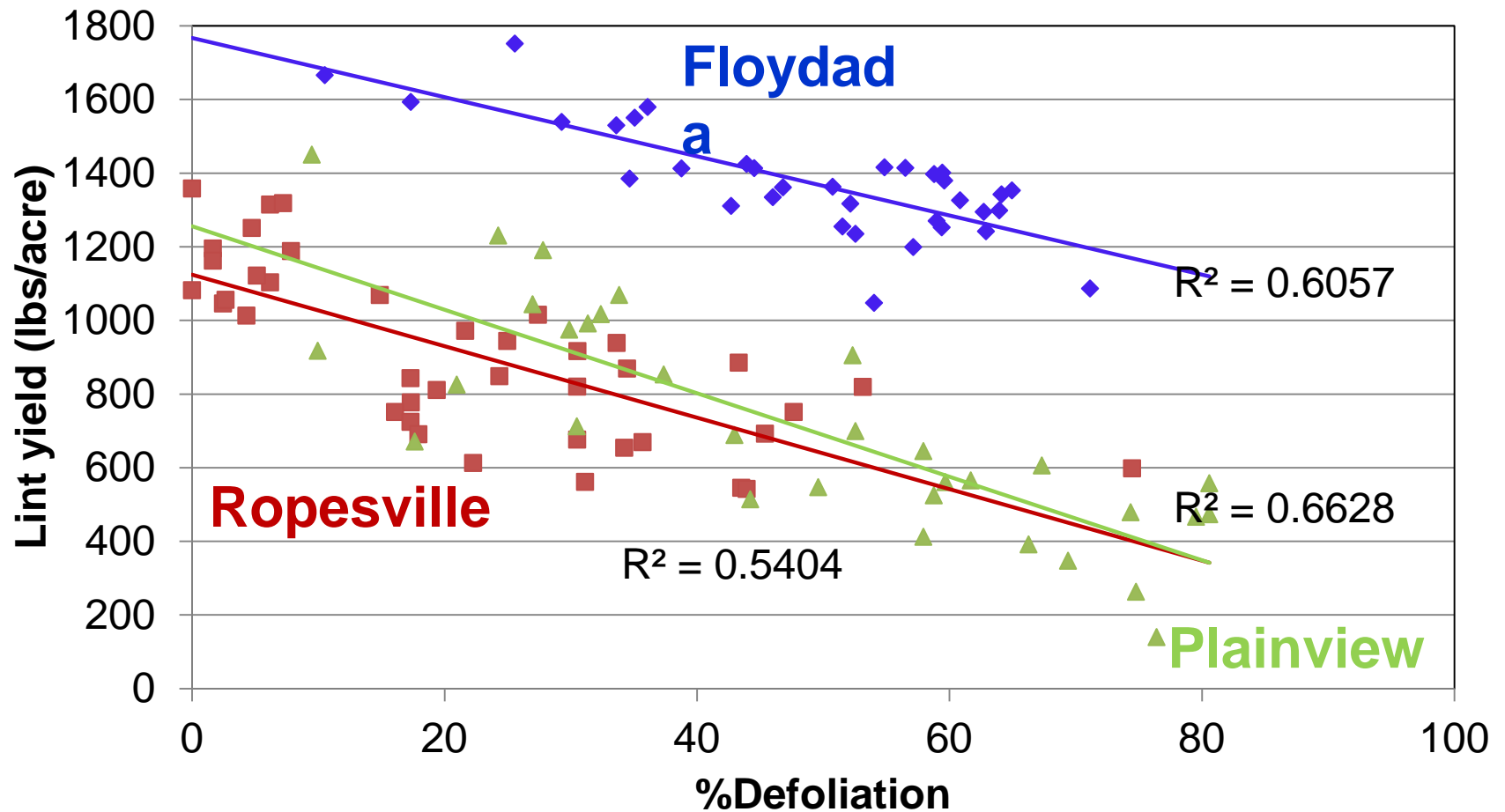
Verticillium Wilt Ropesville: Yield



8.0 lbs of lint were lost for every 1% defoliation at Floydada

9.7 lbs of lint were lost for every 1% defoliation at Ropesville

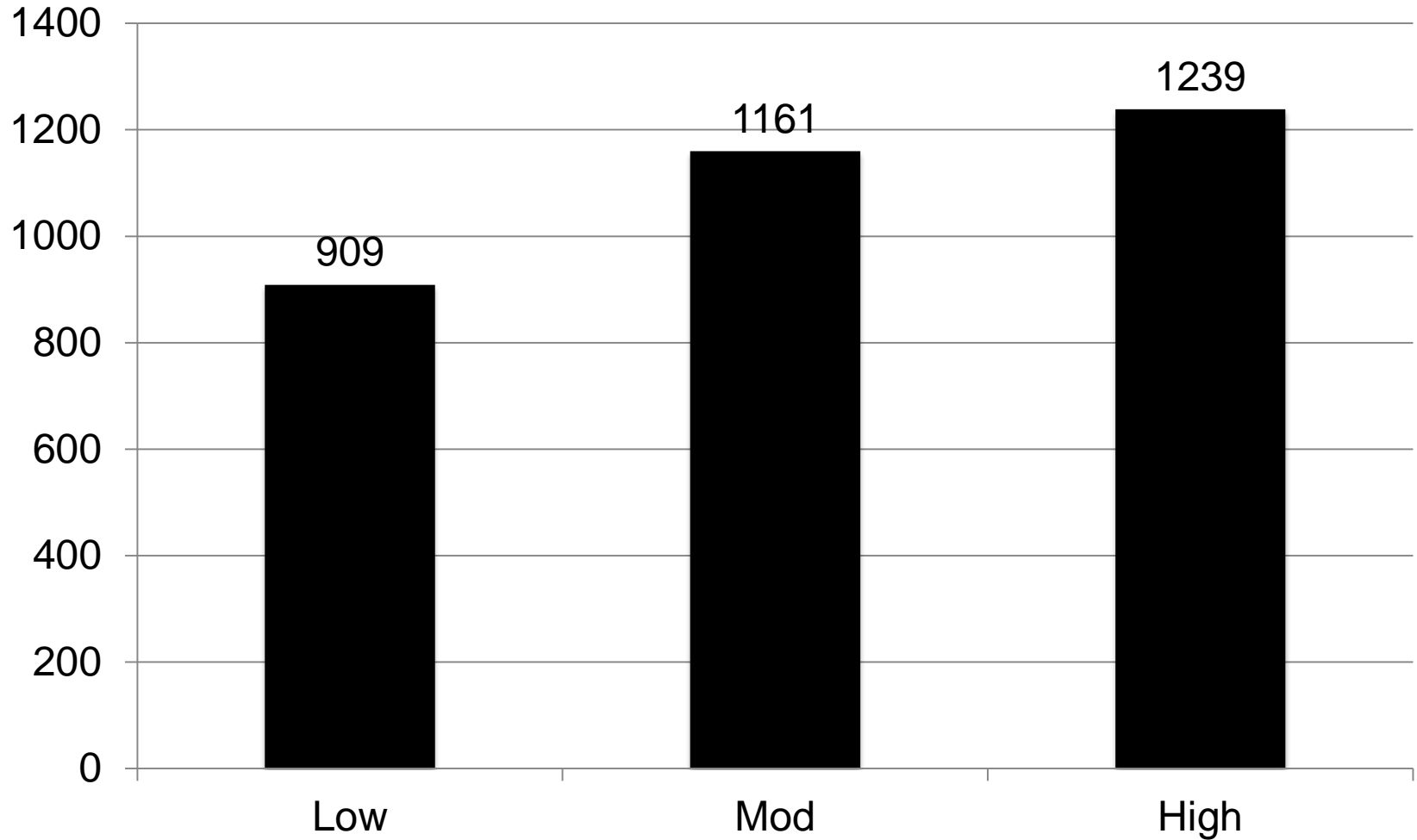
11.3 lbs of lint were lost for every 1% defoliation at Plainview



Verticillium Wilt Recommended Varieties

- **All these varieties have good combinations of high yield, low wilt, and low defoliation**
- **NG 3500XF and NG 4545B2XF**
- **PHY 243WRF**
- **Possibly (want more testing): NG 3640XF and NG 3699B2XF**
- **Older varieties: FM 2484B2F, ST 4747GLB2, and FM 2322GL**

RKN Variety Performance (irrigation effect across varieties)



Lint yield in response to irrigation in a field infested with root-knot nematodes

Variety	Low (5.1")	Base (6.6")	High (8.2")	Variety mean
----- (lb acre ⁻¹) -----				
ST 4946	1,151 a	1,453 a	1,579 a	1,394
FM 2011	1,079 ab	1,332 b	1,567 a	1,326
NG 1511	971 bcde	1,358 ab	1,384 abc	1,238
FM 1911	900 cdef	1,257 b	1,448 ab	1,202
DP 1747	1,019 abcd	1,297 b	1,243 bcd	1,186
DP 1558	1,038 abc	1,277 b	1,239 cd	1,185
DP EXP 1	1,033 abcd	1,116 c	1,179 cd	1,109
PHY 417	870 def	1,084 cd	1,207 cd	1,054
PHY 427	910 cde	1,126 c	1,098 d	1,045
PHY 499	905 cde	1,050 cde	1,086 d	1,014
FM EXP 2	740 f	991 de	1,108 d	946
FM EXP 1	809 ef	693 e	1,042 d	848
Trial mean	934	1144	1236	--
LSD_(0.05)	163	114	206	--

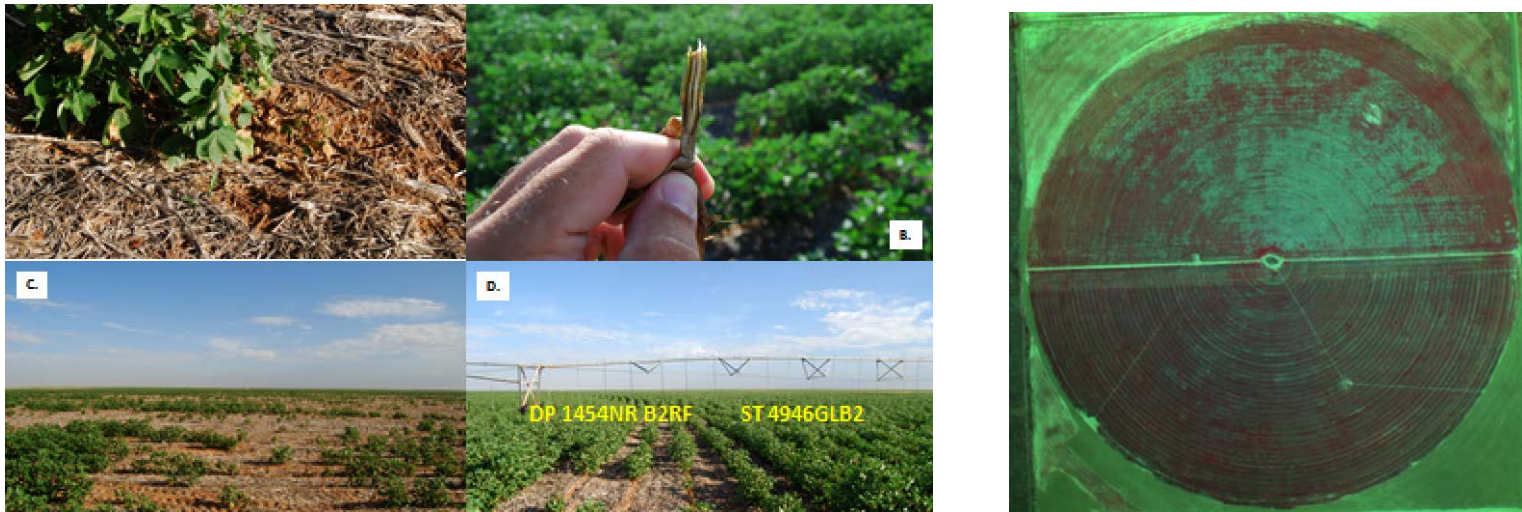
Fusarium wilt



Fusarium wilt

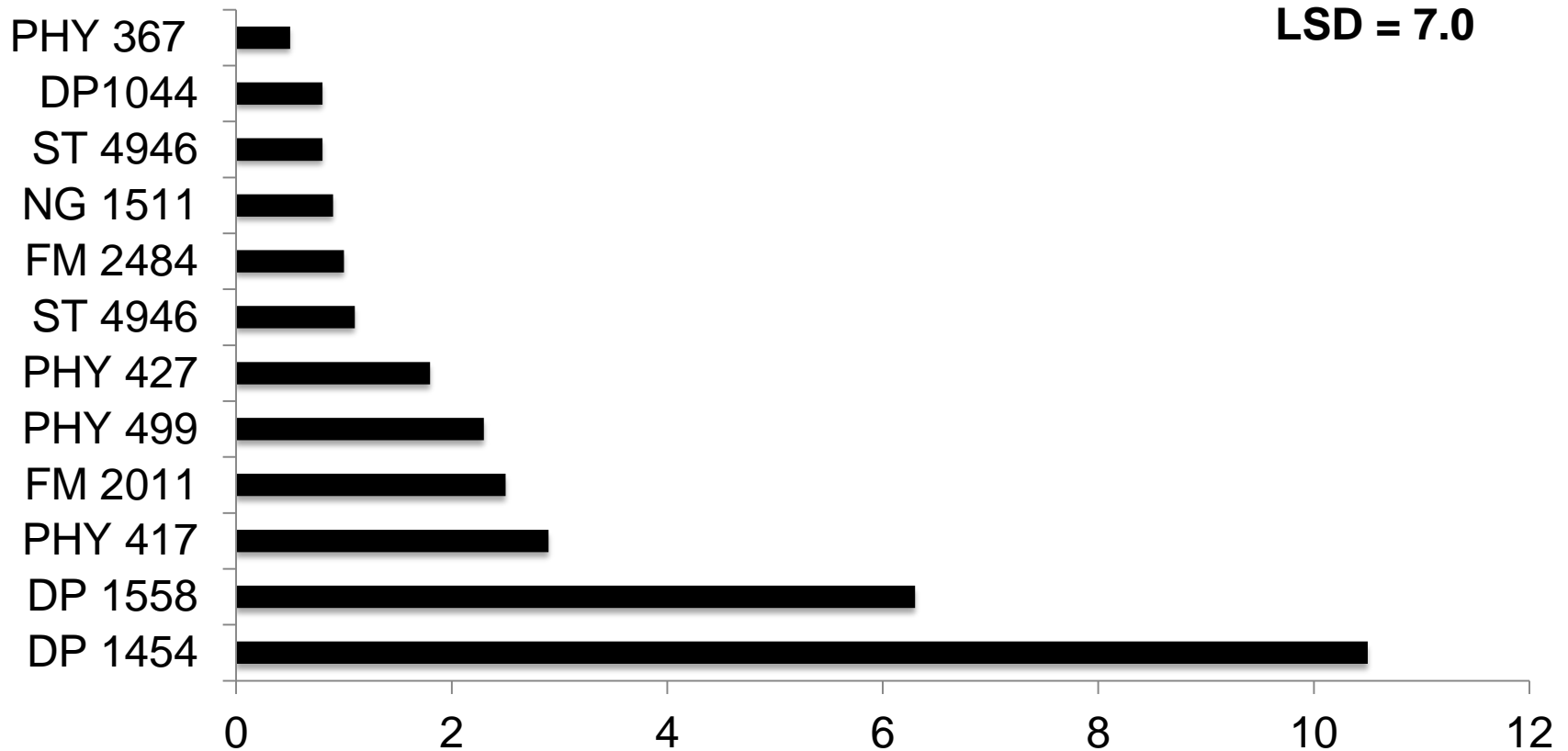
❖ Previous studies

- Emphasis on nematode resistant varieties
 - DP 174RF, ST 5458B2F, PHY 367WRF,
 - ST 4946GLB2, FM 2011GT,
 - PHY 417WRF, **DP 1454 NRB2RF...**



Fusarium wilt variety response

Fusarium wilt incidence (%)



Fusarium wilt Race 4 (El Paso)





Texas
is Cotton
Country

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