

CORN/SORGHUM BOARD PROPOSAL—Year End Report, November 2010.

Title: Assessment of the Importance of Nematodes and Foliar Disease in Corn in Arkansas

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Objectives:

- 1) Determine the yield loss associated with root-knot nematodes and foliar diseases in field corn.
- 2) Evaluate new and current corn hybrids for resistance to root-knot nematodes and foliar diseases.

There were a total of 4 Disease Management Plots planted from May to late June for foliar disease evaluation at select locations throughout the state: 1.) Hempstead County (SWREC Station), 2.) Jefferson County, 3.) Jackson County (Newport Research Center), and 4.) Desha County (Rowher Vegetable Substation). 34 hybrids were planted and will be evaluated for the disease resistance to southern rust, and other important diseases. Plots at each location were evaluated for incidence of diseases in Mid-August. Individual plots of each hybrid or line (four replicates) were assessed for disease severity in both a fungicide treated and untreated situation. Fungicide trials were conducted to evaluate all commercially available and experimental fungicides for control of southern rust and other economically important foliar disease in corn. A greenhouse screening was initiated in June for hybrids submitted to corn variety test in 2010. 94 hybrids that were entered into the 2010 Arkansas Corn Variety Test were evaluated for root-knot resistance and/or tolerance in greenhouse tests.

Disease pressure was relatively light due to the hot and dry conditions through most of the growing season. Southern rust and northern corn leaf blight were the only two economical important diseases observed in three of the four locations. Southern rust severity ranged from 0 to 12% and northern corn leaf blight severity ranged from 0 % to 3% at the Hempstead County (SWREC Station) and Desha County (Rowher Substation) (Table 1). Little to no Disease was observed at the Newport Research Sub-Station. All data have yet to be analyzed. The greenhouse nematode screening on the varieties submitted in the 2010 corn variety test was completed in late July. All of the hybrids were susceptible with nematode reproduction ranging from (64561 to 4,707,205 eggs/gram of dry root) (Table 2). Although no hybrids were found to be resistant, several hybrids had significantly lower levels of reproduction.

Fungicide trials were also conducted to evaluate all commercially available and experimental fungicides for control of southern rust. Disease pressure was light at all research locations and no measurable differences among fungicides were observed (Table 3). This also continues to support our recommendation not to use a fungicide in the absence of disease.

Thanks to the Arkansas Corn and Sorghum Promotion Board and the Corn growers of Arkansas for continuing to make this program possible.

Table 1

Field evaluation of corn hybrids for resistance to corn rust and leaf blight, SWREC, Hope, AR, 2010.

Variety	Treated		Untreated	
	Corn Rust ¹	Leaf Blight ¹	Corn Rust ¹	Leaf Blight ¹
Stine 9806	2.8 a-e ²	1.3 cd	2.3 b-f	1.3 cd
M-Pride UT3117VP	1 f	1.3 cd	1 f	1 d
M-Pride BC02670PF1	3.3 abc	1 d	1.8 c-f	1 d
Stine 9803VT3	2 b-f	1.3 cd	1.3 ef	1 d
Stine 9725	2.5 b-f	1 d	1.3 ef	1 d
Stine 9728	2.5 b-f	1 d	1.8 c-f	1.3 cd
Cropolan 8505	2.5 b-f	1 d	2.3 b-f	1 d
Croplan 7131	2.5 b-f	1.3 cd	1 f	1.3 cd
DeKalb 66-96	3.5 ab	1.4 cd	1.3 ef	1.5 cd
DeKalb 61-05	1.5 def	1.3 cd	2 b-f	1 d
DKC 67-88	2 b-f	1.5 cd	1.3 ef	1 d
DKC 64-83	2 b-f	1.3 cd	1.5 def	1.3 cd
DKC 68-05	2.8 a-e	1.3 cd	1 f	1.3 cd
EXP 8126				
EXP 747F	2 b-f	1.3 cd	1.5 def	1.3 cd
Dyna-Gro 5759	4.3 a	1 d	4.3 a	1.3 cd
Dyna-Gro 58VP99	3.7 ab	1 d	2.8 a-e	1.3 cd
Dyna-Gro V5373	1.5 def	1 d	1.3 ef	1 d
Pioneer P2023HR	2.3 b-f	1.8 bcd	1.8 c-f	1.3 cd
Pioneer 32B34	1.3 ef	1 d	1 f	1.5 cd
REV 26HR50	2.5 b-f	1.5 cd	1 f	3 a
REV 28HR30	2 b-f	1.5 cd	1.3 ef	1.5 cd
REV 25HR39	2.3 b-f	1.5 cd	2.3 b-f	1.8 bcd
Pioneer 32D79	2 b-f	1.3 cd	2.3 b-f	1.3 cd
Pioneer 31D59	2.5 b-f	1.5 cd	1 f	1.8 bcd
Pioneer P1615 AR	1.8 c-f	1 d	1 f	1.5 cd
Pioneer 33M57	2.3 b-f	1.5 cd	1 f	2 bc
Pioneer 31P42	1.5 def	1.8 bcd	1.3 ef	1.5 cd
Pioneer 33N58	2.8 a-e	1.5 cd	1.5 def	2.5 ab
Pioneer 31G71	1.5 def	1.3 cd	1 f	1.3 cd
Belle 1545 Pro	1.5 def	1.3 cd	1.5 def	1 d
Belle 1655 Pro	3 a-d	1 d	1.5 def	1.3 cd
REV 28HR20	1 f	2 bc	1.8 c-f	1.3 cd
REV 28HR29	1.5 def	1.3 cd	1.3 ef	1.8 bcd
LSD (P=.05)	1.75	0.86	1.75	0.86

¹Disease ratings made on 8-9-10 based on Horsfall-Barrett scale where: 1 = 0, 2 = 0-3, 3 = 3-6, 4 = 6-12, 5 = 12-25, 6 = 25-50, 7 = 50-75, 8 = 75-87, 9 = 87-94, 10 = 94-97, 11 = 97-100

²Means followed by same letter do not significantly differ (P=.05, LSD)

Table 2.

Greenhouse evaluation of corn hybrids for root-knot nematode resistance, SWREC, Hope, AR, 2010.

Variety	Root-knot Nematode Eggs/g Dry Root Wt.	Variety	Root-knot Nematode Eggs/g Dry Root Wt.	Variety	Root-knot Nematode Eggs/g Dry Root Wt.
AgriGold A6479VT3	480,135 d-g ¹	Dyna-Gro CX10015	196,509 g	Delta Grow 2888	145,989 g
AgriGold A6489VT3	1,164,748 b-g	Dyna-Gro D56VP24	311,459 efg	Dyna-Gro 58V69	363,416 d-g
AgriGold A6533VT3	816,431 b-g	Dyna-Gro V5373VT3	876,117 b-g	Dyna-Gro CX10617	353,740 d-g
AgriGold A6553VT3	271,990 fg	Golden Acres 26V21	803,811 b-g	Dyna-Gro D58VP99	214,714 g
AgriGold A6632VT3Pro	2,482,768 a-f	Golden Acres 26V31	273,372 fg	Golden Acres 27V01	777,110 b-g
AgriGold A6633VT3	620,583 c-g	Masters Choice MCT-812	351,210 d-g	Golden Acres 28V81	285,999 efg
Belle 1161PRO	253,923 fg	M-Pride 0114X	88,397 g	REV28HR20	163,068 g
Belle 1363PRO	1,403,645 b-g	M-Pride MP3110GT	467,767 d-g	REV28HR29	542,876 d-g
Belle 1457VT3	459,619 d-g	M-Pride MP3139RR	4,707,225 a	REV28HR30	160,806 g
Belle 1511C	64,561 g	M-Pride MP3150	166,970 g	REV28R10	99,023 g
Belle 1545PRO	395,175 d-g	M-Pride MP3151	222,061 fg	Triumph 1802V	408,343 d-g
Belle 1655PRO	1,438,323 b-g	M-Pride MP3194VT3	561,456 d-g	Pioneer 31D62	158,186 g
Belle BX909PRO	394,598 d-g	REV25HR39	4,632,064 a	Pioneer P1745HR	2,590,841 a-d
Belle BX915PRO	987,873 b-g	REV25HR49	300,078 efg	Pioneer P2023HR	182,279 g
Belle BXC028VT3	461,590 d-g	REV25R19	230,040 fg		
Belle BXC039PRO	351,307 d-g	REV25R29	211,379 g		
Belle BXC062PRO	1,243,686 b-g	REV26HR50	184,090 g		
Belle BXG078GT	2,899,030 ab	REV26HR70	202,883 g		
Belle BXT069GT	167,007 g	REV26R60	102,647 g		
BH 8928VTTP	843,413 b-g	Schillinger SXP114	87,381 g		
BH X10064VTTP	295,660 efg	Syngenta N68B-3000GT	470,090 d-g		
BH X9085VT3	650,523 b-g	Syngenta N72K-GT/CB/LL	303,966 efg		
BH X9150G	707,049 b-g	Syngenta N77P-3000GT	1,895,461 b-g		
Croplan Genetics 6286VT3Pro	358,852 d-g	Syngenta N78N-3000GT	396,175 d-g		
Croplan Genetics 6425VT3Pro	282,313 fg	Syngenta N78S-CB/LL	219,792 fg		
Croplan Genetics 6725VT3Pro	440,458 d-g	Triumph 7514S	889,163 b-g		
Croplan Genetics 7131VT3	201,689 g	Pioneer 32D79	2,876,807 abc		
DEKALB DKC61-05 (GENVT3P)	403,879 d-g	Pioneer 33D49	290,408 efg		
DEKALB DKC63-84 (VT3)	2,549,226 a-e	Pioneer P1184HR	497,619 d-g		
DEKALB DKC64-69 (GENVT3P)	408,218 d-g	Pioneer P1420HR	326,324 d-g		
DEKALB DKC64-83 (GENVT3P)	640,681 b-g	Pioneer P1615HR	367,879 d-g		
DEKALB DKC65-63 (VT3)	178,506 g	REV28R30	266,987 fg		
DEKALB DKC66-96 (GENVT3P)	714,187 b-g	AgriGold A6839	350,374 d-g		
Delta Grow 2827	514,451 d-g	Belle 1868PRO	436,971 d-g		
Delta Grow 3788	208,079 g	Belle BXG080GT	238,245 fg		
Delta Grow 3988	85,480 g	BH 8895VTTP	349,430 d-g		
Dyna-Gro 57V21	211,521 g	Croplan Genetics 8505VT3Prc	239,858 fg		
Dyna-Gro 57V40	438,882 d-g	Croplan Genetics 8756VT3	550,225 d-g		
Dyna-Gro 57V59	437,705 d-g	DEKALB DKC67-88 (GENVT3P)	779,827 b-g		
Dyna-Gro 58V72	246,494 fg	DEKALB DKC68-05 (GENVT3P)	534,436 d-g		

¹Means followed by same letter do not significantly differ (P=.05, LSD)

Table 3. 2010 Fungicide Trials in Corn for Management of NCLB and Southern Rust at Jefferson County, AR

Trt No.	Treatment Name	Form Conc	Form Unit	Form Rate	Other Rate	Other Unit	Southern Rust 1	NCLB 2	Yield bu/ac 3
1	Headline EC NIS	2.09	LB/GAL	EC	6 fl oz/a 0.25 % v/v		3.3 b	3.3 a	180.248 a
2	Headline SC NIS	2.09	LB/GAL	SC	6 fl oz/a 0.25 % v/v		3.3 b	4.5 a	176.355 a
3	Headline AMP NIS	1.67	LB/GAL	SC	10 fl oz/a 0.25 % v/v		7 b	3.3 a	164.815 b
4	Quilt NIS	1.66	LB/GAL	SC	14 fl oz/a 0.25 % v/v		4.5 b	3.3 a	174.283 ab
5	Stratego NIS	2.08	LB/GAL	EC	10 fl oz/a 0.25 % v/v		3.3 b	3.3 a	170.78 ab
6	Quilt Excel NIS			EC	10.5 fl oz/a 0.25 % v/v		5.8 b	3.3 a	169.873 ab
7	Untreated Check						12.3 a	3.7 a	181.2 a
	LSD (P=.10)						3.29	2.75	6.9935
	Standard Deviation						2.68	2.24	5.6841
	CV						47.64	64.15	3.27