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Evaluation of Commercial Varieties in the Northern United States–Soybean Sudden Death Syndrome Commercial Variety Test

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Abstract
Soybean sudden death syndrome (SDS) is a fungal disease causing foliar necrosis and early leaf drop. SDS can be a significant factor in soybean yield loss and has been found in fields across Iowa. The fungus is a good saprophyte and can grow well on plant debris in the field. The disease often is worse following corn. Although there is no complete resistance to SDS available in soybean, disease resistance is an important part of SDS disease management.

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Introduction

Soybean sudden death syndrome (SDS) is a fungal disease causing foliar necrosis and early leaf drop. SDS can be a significant factor in soybean yield loss and has been found in fields across Iowa. The fungus is a good saprophyte and can grow well on plant debris in the field. The disease often is worse following corn. Although there is no complete resistance to SDS available in soybean, disease resistance is an important part of SDS disease management.

Weather conditions significantly affect SDS disease expression on soybean. Early planting can increase disease infection and later symptoms. Moisture at the beginning of the season, plus during flowering and seed fill, increases infection and symptom expression.

The Northern Research Farm is an ideal location for early maturity SDS trials because of its location, access to irrigation, and on-farm staff to assist with irrigation and plot maintenance. Although this was the first year of USB-funded commercial variety evaluations for SDS in Iowa, our project has had SDS trials at Kanawha since 2007.

Materials and Methods

The 107 varieties from maturity groups O through early II were evaluated for SDS at Kanawha and Ames. Lines were planted in groups by maturity (O, I early, I Late, and II early). Two checks, one resistant and one susceptible, of the same maturity were included with each set of lines. For the MG O and MG I Early tests, there were no standard checks and evaluation consistency will improve as checks can be identified.

Lines were evaluated in three replications of 2-row 5-ft long plots, planted at 10 seed/ft. Tests were planted on May 7. Although the field on the research farm was known to have SDS, fungal inoculum was added in each plot to increase disease pressure and minimize plot-to-plot inoculum variation.

Supplemental overhead irrigation insured at least one in. of moisture/week starting before flowering. Irrigation continued until the end of August when all experiments were past pod fill.

Plots were evaluated when each experiment was at R6.2, seed fill before the leaves, and pods started yellowing. Plots were evaluated for percent of plants with SDS symptoms and the average severity of disease symptoms on diseased plants in each plot. Severity was based on a scale of 1 to 9 with 1 being healthy and 9 being dead. A disease index later was calculated for each plot based on the equation = Incidence × Severity/9.

Results and Discussion

Although there were disease symptoms in all tests, the susceptible checks did not allow significant differentiation in MG O, IE, and IL. Disease index for MG IIE ranged from 0 to 37 percent, with the susceptible check averaging 17.4 percent (Table 1).

The Kanawha location was one of two locations where the Early SDS Commercial Trials were grown. The complete 2014 SDS Commercial Trial report is available online at http://web.extension.illinois.edu/nwiardc/downloads/55828.pdf. Only tests with susceptible checks scoring 15 percent or more were included because lower scores do not provide good differentiation between resistant and susceptible lines.

Table 1. Disease averages by entry for MG IIE trial.[a]

Name	Incidence	Severity	Disease index
K-233+ (res)	8.7	1.3	1.9
H-2494 (sus)	45.0	3.7	17.4
Dyna-Gro S20RY45	12.0	2.7	3.6
Dyna-Gro S20RY94	56.7	2.3	14.1
K2-2002	0.0	0.0	0.0
Latham L2058R2	83.3	4.0	37.0
Latham L2084R2	0.0	0.0	0.0
Latham L2083L	20.3	2.7	6.7
C2020R2	3.3	1.0	1.1
Navaho 1220RR2Y	2.0	1.7	0.5
Munsee 1520LL	10.7	3.0	3.6
AG2035	2.3	2.7	0.7
PB-2033R2	0.3	0.7	0.1
PB-2024R2	2.0	1.3	0.4
PB-2099NRR2	17.0	2.7	4.0
PB-2188R2	56.7	3.0	18.9
E2062	10.7	3.3	2.5
K2-2103	3.7	2.7	1.0
Latham L2128R2	3.7	1.7	0.9
Latham L21B53R2	27.0	2.3	8.6
Latham L2183R2	23.3	2.7	7.4
Kruger K2-2103	5.3	2.3	1.6
Channel 2108R2	28.3	2.3	6.5
PB-2119R2	65.0	3.0	21.7
PB-2198R2	28.3	2.0	9.4
PB-2230R2	31.7	3.0	10.6
E2162	26.7	3.0	8.9
Dyna-Gro S22RY64	26.7	2.7	6.7
Dyna-Gro S22LL65	66.7	3.0	24.6
HS 22A21	10.0	2.0	3.3
K2-2201	30.0	2.0	10.0
Latham L2253R2	13.7	3.0	4.6
Latham L2258L	40.0	3.0	15.4
C2222R2	30.0	3.3	10.4
C2259LL	58.3	3.0	19.4
Mohegan 1422RR2	18.7	2.7	6.2
E2282	15.0	2.3	4.4
Beck 238L4	41.7	2.7	11.1
Beck XL 233R4	0.0	0.0	0.0
Dyna-Gro SX14823R	0.3	1.0	0.1
HS 23A42	3.7	2.0	0.8
Latham L2384R2	26.7	2.3	7.8
Latham L2358L	51.7	2.7	16.9
C2333R2	2.3	2.7	0.6
Chippewa 1523LL	53.3	3.0	17.8
PB-2319R2	83.3	4.0	37.0
PB-2484R2	16.7	1.7	5.4

Table 1. Disease averages by entry for MG IIE trial (continued).[a]

235.T	38.3	3.3	12.6
Beck 241NR	3.3	2.0	1.1
Dyna-Gro S24RY65	18.3	2.7	5.9
HS 24A44	38.3	3.3	15.7
HS 24A42	65.0	3.3	25.4
K2-2402	23.3	1.7	7.4
Latham L2448R2	23.3	2.0	7.8
C2465R2	53.3	3.0	17.8
C2441R2	2.0	1.3	0.4
Sauk 1524RR2	28.3	1.7	6.7
Stone 2R2415	7.0	2.7	2.0
Kruger K2-2402	25.3	2.3	8.0
Channel 2408R2	63.3	3.3	23.1
Total	**25.7**	**2.4**	**8.6**

[a]Values presented in this table are means. The first two varieties are a resistant and susceptible check. Disease index had an LSD (.05) of 14.5.