

MISSISSIPPI SOYBEAN PROMOTION BOARD
PROJECT 19-2019
2019 Soybean Stem Canker Inoculated Variety Trial Evaluations
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BACKGROUND

The 2019 Mississippi State University Official Soybean Variety Trial (OVT) entries were evaluated for their reaction to the stem canker fungus. In addition, a few varieties (n=10) were added to supplement the trials and obtain information on those particular varieties that were not entered by the seed respective companies in the 2019 MSU-OVT. Trials consisted of single rows of each cultivar planted in 10 foot plot lengths and replicated 4 times. Within each row, a total of 10 plants were inoculated with a single toothpick that contained the fungus that causes stem canker (four isolates of the fungus were used for a fungal cocktail on toothpicks). Plants were inoculated approximately 8 weeks post-planting. Evaluations of stem canker severity were conducted between R6 and R6.5 by observing the stem of each inoculated plant for the presence of a canker. Observations of each variety were conducted using a modified 0-9 scale. Information contained within each table contain the analyzed stem canker rating as an average of all inoculated plants within the four replicate plots. In addition, each cultivar includes a stem canker designation: R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible. In field situations where stem canker has been observed plant cultivars that have been observed to contain resistance to stem canker. In addition, keep in mind that observations of stem canker tend to be more obvious when the environment is conducive for disease development. Therefore, over time, and in years when the environment may not be conducive for the development of stem canker, it is possible that stem canker designations change between years. Moreover, as additional fungal isolates are added to the collection it is possible that the rating as well as cultivar designation can change accordingly.

Response of Maturity Group IV conventional soybean cultivars to stem canker, 2019.

Company/Cultivar	Stem canker rating^{1,2}	Cultivar designation³
J77-339 (check)	2.1	R
Go Soy 48C17S	1.0	R
Univ. of Missouri S13-10590C	0.7	R
Univ. of Missouri S13-10590C	0.2	R
Univ. of Missouri S13-10592C	0.2	R
Univ. of Missouri S13-1955C	1.2	R
Univ. of Missouri S13-2743C	0.3	R
Univ. of Missouri S13-3851C	1.3	R
Univ. of Missouri S16-14379C	0.1	R
Univ. of Missouri S16-14730C	0.3	R
Virtue V4520S	0.8	R
Virtue V4720S	1.5	R
Virtue V4920S	0.6	R
LSD (0.05)	1.4	
CV (%)	129.9	
<i>P</i> -value for F-statistic	0.1992	

¹Stem canker reaction-10 plants per plot were inoculated with infested toothpicks. Ratings were given by individual plant reaction using a modified 0-9 scale based on lesion severity and are presented as the average for the eight plants. Where a lesion did not appear, a rating of 0 (Resistant) was assessed. Ratings were assessed based on the presence of a lesion whereby a reaction that produced a visible lesion that did not expand up the length of the stem was assessed as a 1. Dead plants with lesions that extended up most of the plant's length received a score of 9.

²Means followed by the same letter(s) within a column are not significantly different according to Fisher's Protected LSD ($\alpha=0.05$).

³By using the Mean Disease Rating, a standardized designation system is as follows: 1 = Resistant, 3 = Moderately Resistant, 5 = Moderately Susceptible and 7 = Susceptible.

Response of Maturity Group IV early Xtend soybean cultivars to stem canker, 2019.

Company/Cultivar¹	Stem canker rating^{2,3}	Cultivar designation⁴
AgriGold G4440RX (check)	4.5 c	MR
USG 7447XTS (2018 check)	5.9 ab	MS
AgriGold G4579RX	0.1 d	R
AgriGold G4605RX	0.4 d	R
Armor 42-D27	0.1 d	R
Armor 44-D92	0.5 d	R
Armor X45D51	0.5 d	R
Asgrow AG43X0	0.0 d	R
Asgrow AG43X8	0.2 d	R
Asgrow AG45X8	0.2 d	R
Asgrow AG46X0	0.0 d	R
Asgrow AG46X6	0.4 d	R
Delta Grow 46X25	0.4 d	R
Delta Grow 46X65	0.0 d	R
*Dyna-Gro S43XS70	0.1 d	R
Dyna-Gro S45XS37	0.2 d	R
Dyna-Gro S45XS66	0.3 d	R
Dyna-Gro S46XS60	0.0 d	R
Great Heart GT-4255XS	0.2 d	R
Great Heart GT-4616X	0.0 d	R
Great Heart GT-4677XS	0.0 d	R
LG Seeds LGS4420RX	0.2 d	R
Local Seed LS3976X	0.8 d	R
Local Seed LS4487XS	0.1 d	R
Local Seed LS4565XS	0.0 d	R
Local Seed LS4583X	0.1 d	R
Local Seed LS4677X	0.7 d	R
Local Seed LSX4301XS	0.4 d	R
Local Seed LSX4501X	0.9 d	R
Local Seed LSX4601XS	0.0 d	R
Mission Seed A4448X	0.0 d	R
Mission Seed A4618X (MEX4618)	0.1 d	R
Mission Seed Solutions A4447NS	5.4 bc	MS
MorSoy MS 4616	0.2 d	R
NK S39-G2X	0.2 d	R
NK S44-C7X	0.1 d	R
Pioneer P42A96X	0.3 d	R
Pioneer P44A72BX	0.1 d	R
Pioneer P46A57BX	0.2 d	R
Progeny Ag P4255RX	7.0 a	S
Progeny Ag P4265RXS	0.5 d	R
Progeny Ag P4444RXS	0.6 d	R
Progeny Ag P4620RXS	0.2 d	R
Terral REV 4679X	0.0 d	R
LSD (0.05)	1.3	
CV (%)	129.5	
P-value for F-statistic	<0.0001	

¹An asterisk (*) denotes a variety that was supplemented for the purposes of gaining additional information on varieties that may be planted in the MS soybean production system but were not a part of the 2019 MSU OVT program.

²Stem canker reaction-10 plants per plot were inoculated with infested toothpicks. Ratings were given by individual plant reaction using a modified 0-9 scale based on lesion severity and are presented as the average for the eight plants. Where a lesion did not appear, a rating of 0 (Resistant) was assessed. Ratings were assessed based on the presence of a lesion whereby a reaction that produced a visible lesion that did not expand up the length of the stem was assessed as a 1. Dead plants with lesions that extended up most of the plant's length received a score of 9.

³Means followed by the same letter(s) within a column are not significantly different according to Fisher's Protected LSD ($P=0.05$).

⁴By using the Mean Disease Rating, a standardized designation system is as follows: 1 = Resistant, 3 = Moderately Resistant, 5 = Moderately Susceptible and 7 = Susceptible.

Response of Maturity Group IV late Xtend soybean cultivars to stem canker, 2019.

Company/Cultivar¹	Stem canker rating^{2,3}	Cultivar designation⁴
AgriGold G4990RX (check)	0.0	R
Petrus Seed 4916 GT (2018 check)	2.7	MR
AgriGold G4815RX	0.1	R
AGS GS47X19	1.4	R
*AGS GS48X19	0.1	R
AGS GS49X19	0.1	R
*Armor 49-D66	0.0	R
Armor X47D18	0.0	R
Armor X47D85	0.9	R
Armor X48D25	0.5	R
Armor X49D67	0.0	R
Asgrow AG47X9	0.1	R
Asgrow AG48X9	0.0	R
Asgrow AG49X9	0.0	R
Credenz CZ 4869X	0.3	R
Credenz CZ 4979X	0.2	R
Delta Grow 47X95	0.0	R
Delta Grow 48X05	1.2	R
Delta Grow 48X45	0.5	R
Delta Grow 48X95	0.2	R
Delta Grow 49X15	0.0	R
Don Mario 47X01	0.0	R
Don Mario 49J3X	0.2	R
Dyna-Gro S47XT20	0.7	R
Dyna-Gro S48XT56	0.2	R
Dyna-Gro S49XT39	0.5	R
Dyna-Gro S49XT70	0.0	R
Great Heart Seed GT-4764XS	0.0	R
Great Heart Seed GT-4802X	0.4	R
Great Heart Seed GT-4833XS	0.3	R
Great Heart Seed GT-4979X	0.0	R
LG Seeds C4845RX	0.0	R
LG Seeds LGS4899RX	0.2	R
LG Seeds LGS4931RX	2.2	R
*Local Seed LS4798X	0.0	R
Local Seed LS4889XS	0.5	R
Local Seed LSX4798X	0.0	R
Local Seed LSX4801XS	0.5	R
Local Seed LSX4901X	0.0	R
Mission Seed A4950X (MEX 4908)	0.5	R
MorSoy MS 4846	0.0	R
NK S47-Y9X	0.5	R
NK S49-F5X	0.0	R
Pioneer P48A60X	0.0	R
Progeny Ag P4799RXS	0.0	R
Progeny Ag P4816RX	0.9	R
Progeny Ag P4821RX	0.1	R
Progeny Ag P4851RX	0.3	R
Progeny Ag P4999RX	0.2	R
Terral REV 4927X	0.2	R
Terral REV 4940X	0.0	R
USG 7470XTS	0.0	R
USG 7489XTS	0.2	R
USG 7496XTS	0.2	R
LSD (0.05)	1.4	
CV (%)	327.2	
P-value for F-statistic	0.4803	

¹An asterisk (*) denotes a variety that was supplemented for the purposes of gaining additional information on varieties that may be planted in the MS soybean production system but were not a part of the 2019 MSU OVT program.

²Stem canker reaction-10 plants per plot were inoculated with infested toothpicks. Ratings were given by individual plant reaction using a modified 0-9 scale based on lesion severity and are presented as the average for the eight plants. Where a lesion did not appear, a rating of 0 (Resistant) was assessed. Ratings were assessed based on the presence of a lesion whereby a reaction that produced a visible lesion that did not expand up the length of the stem was assessed as a 1. Dead plants with lesions that extended up most of the plant's length received a score of 9.

³Means followed by the same letter(s) within a column are not significantly different according to Fisher's Protected LSD ($P=0.05$).

⁴By using the Mean Disease Rating, a standardized designation system is as follows: 1 = Resistant, 3 = Moderately Resistant, 5 = Moderately Susceptible and 7 = Susceptible.

Response of Maturity Group IV LibertyLink soybean cultivars to stem canker, 2019.

Company/Cultivar	Stem canker rating^{1,2}	Cultivar designation³
Dyna-Gro 4567LL (check)	0.2	R
Credenz CZ 3601 LL (2018 check)	1.6	R
Credenz CZ 3929GTLL	0.5	R
Credenz CZ 4539GTLL	0.7	R
Credenz CZ 4649LL	0.2	R
Delta Grow 4977 LL/STS	0.2	R
Go Soy 44GL18	1.1	R
Go Soy 46GL18	1.8	R
LSD (0.05)	1.6	
CV (%)	141.7	
<i>P</i> -value for F-statistic	0.2787	

¹Stem canker reaction-Eight plants per plot were inoculated with infested toothpicks. Ratings were given by individual plant reaction using a modified 0-9 scale based on lesion severity and are presented as the average for the eight plants. Where a lesion did not appear, a rating of 0 (Resistant) was assessed. Ratings were assessed based on the presence of a lesion whereby a reaction that produced a visible lesion that did not expand up the length of the stem was assessed as a 1. Dead plants with lesions that extended up most of the plant's length received a score of 9.

²Means followed by the same letter(s) within a column are not significantly different according to Fisher's Protected LSD ($P=0.05$).

³By using the Mean Disease Rating, a standardized designation system is as follows: 1 = Resistant, 3 = Moderately Resistant, 5 = Moderately Susceptible and 7 = Susceptible.

Response of Maturity Group IV RoundUp Ready and Enlist soybean cultivars to stem canker, 2019.

Company/Cultivar¹	Stem canker rating^{2,3}	Cultivar designation⁴
USG 7447XTS (check)	5.5 a	MS
Mission Seed Solutions A4447NS (2018 check)	5.3 a	MS
Delta Grow 45E23	0.3 c	R
Delta Grow 46E29	1.2 c	R
Delta Grow 46E29	0.2 c	R
Delta Grow 47E19	0.6 c	R
Delta Grow 47E25	0.0 c	R
Delta Grow 48E10	0.2 c	R
Delta Grow 48E28	0.7 c	R
Delta Grow 48E39	0.7 c	R
Delta Grow 48E49	1.6 bc	R
Delta Grow 49E29	0.8 c	R
Don Mario 48D3E	0.3 c	R
Go Soy 463E19	0.1 c	R
*Go Soy 481E19	0.1 c	R
Go Soy 482E18	0.7 c	R
Local Seed LSX4503GLS	1.1 c	R
Local Seed LSX4602ES	0.8 c	R
Local Seed LSX4701E	0.5 c	R
Petrus Seed 4916 GT	3.3 b	MR
*Terral REV 4990E	0.5 c	R
Univ. of Missouri S14-15138R	0.0 c	R
Univ. of Missouri S14-15146R	0.3 c	R
USG 7480ET	0.7 c	R
LSD (0.05)	1.8	
CV (%)	121.5	
P-value for F-statistic	<0.0001	

¹An asterisk (*) denotes a variety that was supplemented for the purposes of gaining additional information on varieties that may be planted in the MS soybean production system but were not a part of the 2019 MSU OVT program.

²Stem canker reaction-10 plants per plot were inoculated with infested toothpicks. Ratings were given by individual plant reaction using a modified 0-9 scale based on lesion severity and are presented as the average for the eight plants. Where a lesion did not appear, a rating of 0 (Resistant) was assessed. Ratings were assessed based on the presence of a lesion whereby a reaction that produced a visible lesion that did not expand up the length of the stem was assessed as a 1. Dead plants with lesions that extended up most of the plant's length received a score of 9.

³Means followed by the same letter(s) within a column are not significantly different according to Fisher's Protected LSD ($P=0.05$).

⁴By using the Mean Disease Rating, a standardized designation system is as follows: 1 = Resistant, 3 = Moderately Resistant, 5 = Moderately Susceptible and 7 = Susceptible.

Response of Maturity Group V conventional soybean cultivars to stem canker, 2019.

Company/Cultivar	Stem canker rating^{1,2}	Cultivar designation³
J77-339 (check)	1.9 bc	R
Univ. of Missouri MO5201D Conv	0.5 c	R
Univ. of Missouri S11-17025	0.2 c	R
Univ. of Missouri S11-20242C	4.4 a	MS
Univ. of Missouri S13-1955C	0.9 c	R
Univ. of Missouri S15-10434C	3.5 ab	MR
LSD (0.05)	2.5	
CV (%)	87.7	
<i>P</i> -value for F-statistic	0.0135	

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²Means followed by the same letter(s) within a column are not significantly different according to Fisher's Protected LSD ($P=0.05$).

³By using the Mean Disease Rating, a standardized designation system is as follows: 1 = Resistant, 3 = Moderately Resistant, 5 = Moderately Susceptible and 7 = Susceptible.

Response of Maturity Group V early Xtend soybean cultivars to stem canker, 2019.

Company/Cultivar¹	Stem canker rating^{2,3}	Cultivar designation⁴
Go Soy 54G16 (check)	0.5	R
Progeny P5688RX (check)	0.4	R
AgriGold G5000RX	0.0	R
*AGS GS52X19S	0.3	R
Armor 51-D77	1.3	R
Armor 52-D71	0.3	R
Asgrow AG52X9	0.5	R
Asgrow AG53X0	0.3	R
Asgrow AG53X9	0.0	R
Asgrow AG55X7	0.0	R
Credenz CZ 5299X	1.5	R
Delta Grow 52X05	1.6	R
Delta Grow 54X25	1.9	R
Dyna-Gro S52XS39 (SX18652XS)	0.3	R
Dyna-Gro S52XT08	0.2	R
Dyna-Gro S54XT17	0.4	R
Dyna-Gro S56XT99	0.7	R
Great Heart Seed GT-5528X	0.0	R
Local Seed LS5087X	0.0	R
Local Seed LS5386X	0.3	R
Local Seed LS5588X	0.7	R
NK S51-R3XS	0.3	R
NK S53-F7X	0.2	R
Pioneer P54A54X	0.7	R
Pioneer P55A49X	0.7	R
*Pioneer P55A59X	1.0	R
Progeny Ag P5016RXS	0.5	R
Progeny Ag P5170RX	0.9	R
Progeny Ag P5252RX	0.0	R
Progeny Ag P5554RX	0.2	R
Progeny Ag P5688RX	2.7	MR
Terral REV 5659X	0.0	R
LSD (0.05)	1.5	
CV (%)	187.2	
P-value for F-statistic	0.1273	

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³Means followed by the same letter(s) within a column are not significantly different according to Fisher's Protected LSD ($P=0.05$).

⁴By using the Mean Disease Rating, a standardized designation system is as follows: 1 = Resistant, 3 = Moderately Resistant, 5 = Moderately Susceptible and 7 = Susceptible.

Response of Maturity Group V RoundUp Ready and Enlist cultivars to stem canker, 2019.

Company/Cultivar¹	Stem canker rating^{2,3}	Cultivar designation⁴
Progeny P5688RX (check)	0.5	R
Go Soy 54G16 (check)	0.1	R
Delta Grow 52E22	0.9	R
Delta Grow 5585 RR2/STS	0.4	R
Go Soy 50G17	0.0	R
Go Soy 512E18	0.2	R
*Terral REV 5190E	1.4	R
Univ. of Missouri S14-9017R	0.0	R
Univ. of Missouri S16-3747RY	0.2	R
LSD (0.05)	1.3	
CV (%)	229.2	
<i>P</i> -value for F-statistic	0.4468	

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⁴By using the Mean Disease Rating, a standardized designation system is as follows: 1 = Resistant, 3 = Moderately Resistant, 5 = Moderately Susceptible and 7 = Susceptible.