

Experimental sugar beet cultivars evaluated for resistance to bacterial root rot in Idaho, 2008.

Thirty-six experimental sugar beet cultivars were grown in a commercial sprinkler-irrigated sugar beet field near American Falls, ID where potatoes were grown in 2007. The plots were planted on 21 Apr 08 and managed according to standard cultural practices. Plants were free of foliar and root disease symptoms. Four roots representative of each cultivar were hand topped and harvested on 1 Oct. The roots were then placed in a cold room at 3°C and 90% relative humidity until they were assayed on 7 Jan 09. The roots were washed, dipped in 0.6% sodium hypochlorite solution for 1 min, rinsed in sterile reverse osmosis water, and then air dried in a laminar hood. A cross section of the root 8-10 mm thick and 45-70 mm in diameter was cut just below the widest portion of root and placed in a Petri dish on sterile filter paper moistened with sterile tap water. A 2-mm diameter and 3-mm deep hole was created with a sterile tooth pick in the center of the root slice. A sterile tooth pick was then dipped in a 48-hr old culture of *Leuconostoc mesenteroides* subsp. *dextranicum* B322 grown on MRS media at 30°C and placed in the hole along with a drop of sterile tap water. Four additional root slices served as the non-inoculated check (no bacteria inoculated). The root slice/Petri dish combination was placed in a plastic bag and incubated at 30°C. The experiment was a randomized complete block design with four replications (1 root slice = 1 replication for each cultivar). The diameter of rotted root area was recorded after 72, 96, and 120 hr. Bacteria from the lesions in each replication were re-isolated by streaking onto MRS to prove only *L. mesenteroides* was present. Data were analyzed using the general linear models procedure (Proc GLM-SAS), and Fisher's protected least significant difference was used for mean comparisons.

The plants from which the roots were collected were healthy in appearance (no signs or symptoms for any disease problem). The root slices in the non-inoculated check treatment developed no rot. On the inoculated slices, only *L. mesenteroides* was isolated from the bacterial rot lesions. After 120 hr, bacterial rot ranged from a high of 18.3 mm on cultivar HM080011 to a low of 2.8 mm on cultivar B-40. These data should provide a starting point in the search to identify resistance to *L. mesenteroides* in sugar beet. Given the range of responses, improving sugar beet cultivars for resistance to bacterial rot should be possible.

Cultivar ^z	Bacterial root rot diameter (mm) ^y		
	72 hr rating	96 hr rating	120 hr rating
HM080011.....	12.5 a	15.8 a	18.3 a
HM080013.....	10.5 a-c	14.2 ab	14.8 ab
C-19.....	10.0 a-c	12.8 a-c	13.5 a-c
SV002.....	11.2 ab	12.2 a-d	13.5 a-c
SX011.....	8.2 a-g	11.2 a-f	13.2 a-c
C-4.....	9.5 a-d	11.5 a-e	12.8 a-d
HM080009.....	10.0 a-c	12.0 a-e	12.5 a-d
C-29.....	9.0 a-e	10.2 b-g	12.5 a-d
HM080008.....	7.8 b-h	10.0 b-h	10.5 b-e
B-38.....	7.2 b-j	9.5 b-i	10.0 b-f
HM070006.....	8.2 a-g	9.2 b-j	10.0 b-f
HM080007.....	8.2 a-g	9.5 b-i	10.0 b-f
C-26.....	7.8 b-h	8.5 c-l	9.8 b-g
B-39.....	8.8 a-e	9.2 b-j	9.5 b-g
HM080004.....	8.5 a-f	8.8 c-k	9.2 b-h
SX012.....	8.2 a-g	9.0 c-k	9.2 b-h
B-37.....	7.5 b-i	8.5 c-l	9.2 b-h

B-41	6.2 c-l	7.5 c-m	8.2 c-i
SX013.....	7.0 c-k	7.5 c-m	8.2 c-i
SV004.....	7.0 c-k	7.8 c-m	8.0 c-i
HM080006.....	6.2 c-l	7.0 d-m	7.8 c-i
C-28.....	6.8 c-k	7.5 c-m	7.8 c-i
C-24.....	6.2 c-l	6.8 e-m	7.2 d-i
C-27.....	5.0 d-m	5.8 g-m	6.5 e-i
SV003.....	4.5 e-n	6.0 f-m	6.2 e-i
HM080010.....	3.2 h-n	5.0 g-n	6.0 e-i
HM080001.....	4.0 f-n	4.5 i-n	5.0 e-j
HM080002.....	3.8 g-n	4.0 j-n	5.0 e-j
SV005.....	2.0 l-n	4.8 h-n	4.8 e-j
SV001.....	3.8 g-n	3.8 k-n	4.5 f-j
HM070022.....	4.0 f-n	4.2 i-n	4.5 f-j
HM080003.....	2.8 j-n	4.0 j-n	4.0 g-i
B-7.....	3.0 j-n	3.2 l-n	3.5 h-j
HM080005.....	1.5 mn	3.2 l-n	3.2 ij
C-11.....	2.8 j-n	2.8 mn	3.0 ij
B-40.....	2.5 k-n	2.5 mn	2.8 ij
Noninoculated check	0.0 n	0.0 n	0.0 j
$P > F^x$	<0.0001	<0.0001	<0.0001
LSD ($P \leq 0.05$)	4.7	5.3	5.8

^z For more information on coded cultivars contact the respective companies: B = Betaseed, Inc., C = ACH Seeds, Inc., HH = Holly Hybrids, HM = Hilleshog, and SX = Seedex, Inc.

^y Bacterial root rot created by inoculating with *Leuconostoc mesenteroides* subsp. *dextranicum* B322.

^x $P > F$ was the probability associated with the F value. LSD = Fisher's protected least significant difference value. Within each column, means followed by the same letter did not differ significantly based on Fisher's protected least significant difference.