SUGAR BEET (*Beta vulgaris*)
Bacterial root rot; *Leuconostoc mesenteroides*

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Transgenic sugar beet cultivars evaluated for resistance to bacterial root rot in Idaho, 2007.

Thirty-three transgenic (glyphosate resistant) sugar beet cultivars were grown in a commercial sprinkler-irrigated sugar beet field near American Falls, ID where potatoes were grown in 2006. The plots were planted on 30 Apr to a density of 352,272 seeds/ha, and thinned to 88,068 plants/ha on 12 Jun. Plots were four rows (0.56-m row spacing) and 10.5 m long. The experimental design was a randomized complete block design with eight replications. The crop was managed according to standard cultural practices. The field trial was free of foliar and root disease symptoms. Four roots from one plot for each cultivar from the same replication 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 3 Feb 08. 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 from the middle of the root 8-10 mm thick and 45 to 70 mm in diameter was cut from each root and placed in a Petri dish on sterile filter paper moistened with sterile well 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 well water. Four additional root slices from HM090026 served as the uninoculated 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 4 replications (1 root slice = 1 replication for each cultivar). The diameter of rotted root area was recorded after 72 and 96 hr. Bacteria from the 10 largest lesions in each replication were streaked 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 plant tops and roots used for the assay had no signs or symptoms for any disease problem when harvested. The root slices in the uninoculated check treatment developed no rot. On the inoculated slices, the 10 largest bacterial rot lesions in each replication contained only *L. mesenteroides* in reisolations. After 96 hr, bacterial rot ranged from a high of 27 mm on cultivar C10 to a low of 9 mm on cultivar C4. These data should provide a starting point in the search to identify resistance to *L. mesenteroides* in sugar beet. Given the range of responses it may be possible to improve sugar beet cultivars for their resistance to bacterial rot.

Cultivar [z]	Bacterial rot diameter (mm)[y]	
	72 hr rating	96 hr rating
C10	21 ab	27 a
B7	22 a	25 ab
B22	20 a-c	24 a-c
HM070022	16 b-g	24 a-d
HH016	17 a-e	22 a-e
HM070013	19 a-d	21 a-f
HM070008	16 c-h	20 b-g
B25	17 b-f	19 b-h
B35	14 d-i	18 c-h
HM070017	14 d-i	18 d-i
B14	14 d-i	18 d-i
C19	13 e-k	17 e-j
HM070016	11 h-k	16 e-j
B23	12 f-k	16 e-k
HM090025	12 e-k	16 e-k
HM070019	13 e-k	16 f-l
C11	13 e-k	15 f-m
C9	12 e-k	15 f-m
HM070010	14 e-j	14 g-m
HM090026	10 i-k	14 g-m
B5	12 f-k	14 g-m
HM070023	12 f-k	14 g-m
C12	10 i-k	14 g-m
HH015	12 g-k	13 h-m
HM070006	10 i-k	12 i-m
HM070020	11 g-k	12 i-m
HH017	10 i-k	12 i-m
HM070009	10 i-k	12 i-m
B11	10 i-k	10 j-m
B13	9 jk	10 k-m
B34	9 jk	9 lm
B21	8 k	9 lm
C4	9 jk	9 m
Uninoculated check	0 l	0 n
$P > F$	<0.0001	<0.0001
LSD ($P \leq 0.05$)	5	6

[z] For more information on coded cultivars contact the respective companies: B = Betaseed, C = ACH Seeds Inc., HH = Holly Hybrids, and HM = Hilleshog. $P > F$ was the probability associated with the F value. LSD = Fisher's protected least significant difference value. Within each parameter, means followed by the same letter did not differ significantly based on Fisher's protected least significant difference.

[y] Bacterial rot created by inoculating with *Leuconostoc mesenteroides* subsp. *dextranicum* B322.