SUGAR BEET (*Beta vulgaris* ssp. *vulgaris*)
Beet curly top; *Beet curly top virus*

C. A. Strausbaugh, USDA-ARS NWISRL, Kimberly, ID 83341 and L. Panella, USDA-ARS, Sugar Beet Res. Unit, Crops Res. Lab, Ft. Collins, CO 80526

Beet curly top resistance in USDA-ARS Plant Introduction Lines, 2016.

Twenty-nine sugar beet Plant Introduction (PI) Lines from the USDA-ARS National Plant Germplasm System (NPGS) and two commercial check cultivars [SV2012RR (susceptible) and HM PM90 (resistant)] were screened for resistance to *Beet curly top virus* (BCTV). The curly top evaluation was conducted at the USDA-ARS North Farm in Kimberly, ID which has Portneuf silt loam soil and had been in barley in 2015. The field was plowed in the fall and in the spring, it was fertilized with 90 lb of N and 110 lb of P_2O_5 per acre and roller harrowed on 4 Apr. The germplasm was planted at the rate of 142,560 seeds/A on 16 May. The plots were two rows 10 ft long with 22-in row spacing and arranged in a randomized complete block design with four replications. The field was sprinkler irrigated, cultivated, and hand weeded as necessary. Plant populations were thinned to about 47,500 plants/A on 16 Jun. Plants were inoculated at the four- to six-leaf growth stage on 20 Jun with approximately six viruliferous (contained at least the following BCTV strains: CA/Logan, CO, Svr, and Wor) beet leafhoppers per plant. The beet leafhoppers were redistributed three times a day during the first two days and then twice a day for five more days by dragging a tarp through the field. The plants were sprayed with Lorsban 4E (1.5 pints/A) on 30 Jun to kill the beet leafhoppers. Plots were rated for foliar symptom development on 13 Jul using a scale of 0 to 9 (0 = healthy and 9 = dead), with the scale treated as a continuous variable (Plant Dis. 90:1539-1544). Data were analyzed in SAS using the general linear models procedure (Proc GLM), and Fisher's protected least significant difference (LSD; $\alpha = 0.05$) was used for mean comparisons.

Curly top symptom development was uniform and no other disease problems were evident in the plot area. The resistant and susceptible checks performed as expected for the visual ratings. Based on the visual rating, there were three PI accessions (entries 10, 13, and 17) that were not significantly different from the resistant check. These germplasms all originated in the breeding program of R. T. Lewellen (USDA-ARS, Salinas, CA) and have been incorporated into currently released germplasm. These results and germplasm will be accessible to interested parties through the USDA-ARS, NPGS GRIN database (http://www.ars-grin.gov/npgs/index.html).

Entry[z]	Description[y]	Curly top rating[x]
13	PI 560130, C762-17	3.1 l
17	PI 564758, C790-15	3.4 l
HM PM90	Resistant check	3.4 l
10	PI 515965, C796	3.6 l
14	PI 560338, C47R	4.6 k
3	PI 285593, CRASSA UDYCKI ZOLTY WALCOWATY	4.9 jk
16	PI 560340, C94	4.9 i-k
23	PI 165013, HAYVAN PAUCARI	5.0 i-k
2	PI 266102, TETRA-MONO IHAR 2N=36	5.2 h-k
9	PI 470091, IDBBNR 5522	5.4 g-k
8	PI 470089, IDBBNR 5520	5.4 g-j
11	PI 518167, Ch-11	5.6 f-j
18	PI 583780, y322	5.7 e-j
15	PI 560339, C93	5.8 e-j
19	PI 583781, y387	5.8 d-i
26	PI 169025, IDBBNR 5270	6.0 c-h
29	PI 179174, IDBBNR 5346	6.1 b-g
25	PI 169018, PANCAR	6.2 b-g
20	PI 355962, TALTUSKOVSKAJA ODNOSEMIAN 2	6.2 b-g
1	PI 355958, V 19	6.2 b-g
7	PI 266104, POLY MONO IHAR /2X-3X-4X/	6.2 a-g
22	PI 117117, IDBBNR 5172	6.2 a-g
21	Ames 3047, IDBBNR 4819	6.2 a-g
SV2012RR	Susceptible check	6.4 a-f
5	PI 357367, Sveklo	6.5 a-e
30	PI 222769, CHAGHONDAR	6.6 a-e
28	PI 177269, KOCABAS	6.6 a-d
4	PI 266103, TETRA PCR NR 6IHAR 2N=36	6.8 a-c
27	PI 175601, PAZI	6.9 ab
24	PI 169016, PAZI	7.0 ab
6	PI 411128, O type N1	7.1 a
$P > F$[w]		<0.0001
LSD ($\alpha = 0.05$)		0.9

[z] Two entries were commercial check cultivars: SV2012RR (susceptible) and HM PM90 (resistant).
[y] All lines were *Beta vulgaris* subsp. *vulgaris*.
[x] Curly top ratings = curly top was rated using a scale of 0 to 9 (0 = healthy and 9 = dead), with the scale treated as a continuous variable.
[w] $P > F$ was the probability associated with the F value. Within a column, means followed by the same letter did not differ significantly based on Fisher's protected least significant difference (LSD; $\alpha = 0.05$) value.