WILD BEET (*Beta vulgaris* ssp. *maritima*)
Beet curly top; *Beet severe curly top virus*

L. Panella and C. A. Strausbaugh; USDA, Agricultural Research Service (ARS), Sugar Beet Research Unit, Crops Research Lab, 1701 Centre Ave., Fort Collins, CO 80526-2083 and USDA-ARS NWISRL, 3793 N. 3600 E., Kimberly, ID 83341

Beet curly top resistance of USDA-ARS National Plant Germplasm System Plant Introductions, 2009.

Thirty wild beet (*Beta vulgaris* subsp. *maritima* (L.) Arcang) accessions from the *Beta* Collection of the USDA-ARS National Plant Germplasm System were screened for resistance to *Beet severe curly top virus* (BSCTV) in 2009. The curly top evaluation was conducted at the USDA-ARS North Farm in Kimberly, ID which had been in beans in 2008. The field was plowed in the fall, fertilized (75 lb N/A and 75 lb P_2O_5/A) on 22 Apr 09, sprayed with Ethotron (2 pt/A), and roller harrowed. The germplasm was planted (density of about 143,000 seeds/A) on 18 May. The plots were two rows 10 ft long with 22-in row spacing and arranged in a randomized complete block design with three replications. A resistant breeding line from Betaseed, Inc., G6040, was included as a resistant check. The fields were sprinkler irrigated and hand weeded as necessary. Plant populations were thinned to about 47,500 plants/A on 19 Jun. Plants were inoculated at the four to six leaf growth stage on 23 Jun with six viruliferous beet leafhoppers per plant. The beet leafhoppers were moved twice a day (right after sunrise and just before sunset) for one week by dragging a tarp through the field. The plants were sprayed with Lorsban 4E (1.5 pints/A) on 7 Jul to kill the beet leafhoppers. The plots were rated for foliar symptom development using a scale of 0-9 where 0 = healthy and 9 = dead (Mumford, D.L. 1974. Procedure for inducing curly top epidemics in field plots. J. Am. Soc. Sugar Beet Technol. 18:20-23), with disease index (DI) treated as a continuous variable. Data were analyzed using the general linear models procedure (Proc GLM-SAS), and least significant difference was used for mean comparisons.

Disease development was uniform and severe. Other disease problems were not evident in the plot area. The PIs were a combination of annual and biennial plant types. The resistant check was significantly more resistant than any of the tested germplasms. None of the lines tested appeared to be resistant to BSCTV. The two best germplasm were *Beta vulgaris* subspecies *maritima* lines, both of which contained biennial plants. However their scores were much higher than the resistant check and do not seem to contain resistance to BSCTV.

ID[z]	Alternate ID	subspecies	Country	Region	Mean
Beta G6040	1996A008	*vulgaris*	***Resistant Check***		5.00 a
PI 518401	IDBBNR 5895	*maritima*	Ireland		6.75 b
PI 540679	WB 933	*maritima*	Denmark		6.75 b
PI 518423	IDBBNR 5917	*Maritima*	United Kingdom	England	7.00 bc
PI 518312	IDBBNR 5806	*maritima*	United Kingdom	England	7.25 b-d
PI 540628	WB 882	*maritima*	United Kingdom		7.25 b-d
PI 604508	IDBBNR 2193	*maritima*	Greece	Peloponnese	7.25 b-d
PI 540639	WB 893	*maritima*	France		7.50 b-d
PI 562599	IDBBNR 9794	*maritima*	Egypt	Matruh	7.50 b-d
PI 599349	N499	*maritima*	United States	California	7.50 b-d
PI 604509	IDBBNR 2207	*maritima*	Italy	Sicily	7.50 b-d
PI 540583	WB 837	*maritima*	France		7.75 b-e
PI 540671	WB 925	*maritima*	Denmark		7.75 b-e
PI 540678	WB 932	*maritima*	Denmark		7.75 b-e
PI 540691	WB 945	*maritima*	France		7.75 b-e
PI 562597	IDBBNR 9747	*maritima*	Egypt	Matruh	7.75 b-e
PI 518310	IDBBNR 5804	*maritima*	United Kingdom	England	8.00 b-e
PI 518417	IDBBNR 5911	*maritima*	Ireland		8.00 b-e
PI 540682	WB 936	*maritima*	Denmark		8.00 b-e
PI 546423	IDBBNR 5616	*maritima*	Greece		8.00 b-e
PI 604507	IDBBNR 1469	*maritima*	United Kingdom		8.00 b-e
FC709-2	20021011H	*vulgaris*	***Susceptible Check***		8.00 b-e
PI 198348	IDBBNR 5662	*maritima*	Spain		8.25 c-e
PI 504268	Wild beet	*maritima*	France		8.25 c-e
PI 518403	IDBBNR 5897	*maritima*	Ireland		8.25 c-e
PI 518419	IDBBNR 5913	*maritima*	Ireland		8.25 c-e
PI 550718	IDBBNR 5636	*maritima*	Ireland		8.25 c-e
PI 562594	IDBBNR 9793	*maritima*	Egypt	Matruh	8.25 c-e
PI 562581	IDBBNR 9733	*maritima*	Egypt	Matruh	8.50 de
PI 562593	IDBBNR 9744	*maritima*	Egypt	Matruh	8.50 de
PI 562596	IDBBNR 9746	*maritima*	Egypt	Matruh	8.50 de
PI 546434	IDBBNR 5648	*maritima*	Greece		9.00 e
Overall mean					7.75
$P > F$[x]					0.006
Coefficient of variation					8.33
LSD ($P \leq 0.05$)					1.32

[z] PI = Plant introduction line.

[y] All accessions were *Beta vulgaris*, either subspecies *vulgaris* (domesticated) or *maritima* (wild beet).

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