

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

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### **Beet curly top resistance of USDA-ARS National Plant Germplasm System Plant Introductions, 2010.**

Twenty-six 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) and other closely related *Curtovirus* species in 2010. The curly top evaluation was conducted at the USDA-ARS North Farm in Kimberly, ID which had been in beans in 2009. The field was disked in the spring, fertilized (160 lb P<sub>2</sub>O<sub>5</sub>/A) on 7 Apr 09, sprayed with Ethotron (2 pt/A), and roller harrowed. The germplasm was planted (density of 142,560 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 two 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 on 15 Jul using a scale of 0-9 (0 = healthy with no sign of disease and 9 = leaves necrotic and plant 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 Fisher's protected least significant difference was used for mean comparisons.

Curly top development was uniform and 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 not significantly more resistant than any of the 19 lowest rated lines (i.e. most resistant), which ranged from having a DI of 5.0 to having a DI of 6.0. The resistant germplasm were from a number of European countries. With the narrow range of scores (4.95 to 7.25), it will be necessary to evaluate these germplasm once more at a future date.

<b>ID<sup>z</sup></b>	<b>Alternate ID</b>	<b>subspecies<sup>y</sup></b>	<b>Country</b>	<b>Mean DI</b>
Beta G6040.....	1996A008.....	<i>vulgaris</i> .....	<b>Resistant Check</b> .....	4.95 d
PI 518400.....	IDBBNR 5894.....	<i>maritima</i> .....	Ireland.....	5.00 d
PI 540648.....	WB 902.....	<i>maritima</i> .....	France.....	5.25 d
PI 540696.....	WB 950.....	<i>maritima</i> .....	France.....	5.25 d
PI 540579.....	WB 833.....	<i>maritima</i> .....	France.....	5.50 c-d
PI 540593.....	WB 847.....	<i>maritima</i> .....	France.....	5.50 c-d
PI 540634.....	WB 888.....	<i>maritima</i> .....	U. K. ....	5.50 c-d
PI 540659.....	WB 913.....	<i>maritima</i> .....	France.....	5.50 c-d
PI 540672.....	WB 926.....	<i>maritima</i> .....	Denmark.....	5.50 c-d
PI 599350.....	R423.....	<i>maritima</i> .....	U. S. ....	5.50 c-d
PI 540674.....	WB 928.....	<i>maritima</i> .....	Denmark.....	5.75 c-d
PI 540586.....	WB 840.....	<i>maritima</i> .....	France.....	6.00 b-d
PI 540587.....	WB 841.....	<i>maritima</i> .....	France.....	6.00 b-d
PI 540621.....	WB 875.....	<i>maritima</i> .....	France.....	6.00 b-d
PI 540622.....	WB 876.....	<i>maritima</i> .....	France.....	6.00 b-d
PI 540624.....	WB 878.....	<i>maritima</i> .....	France.....	6.00 b-d
PI 540673.....	WB 927.....	<i>maritima</i> .....	Denmark.....	6.00 b-d
PI 540677.....	WB 931.....	<i>maritima</i> .....	Denmark.....	6.00 b-d
PI 540687.....	WB 941.....	<i>maritima</i> .....	Belgium.....	6.00 b-d
PI 540693.....	WB 947.....	<i>maritima</i> .....	France.....	6.00 b-d
PI 540601.....	WB 855.....	<i>maritima</i> .....	France.....	6.50 a-c
PI 540607.....	WB 861.....	<i>maritima</i> .....	France.....	6.50 a-c
PI 540688.....	WB 942.....	<i>maritima</i> .....	Belgium.....	6.50 a-c
PI 540694.....	WB 948.....	<i>maritima</i> .....	France.....	6.50 a-c
PI 540655.....	WB 909.....	<i>maritima</i> .....	France.....	7.00 a-b
PI 540685.....	WB 939.....	<i>maritima</i> .....	Denmark.....	7.25 a
Overall mean.....				5.90
$P > F^x$ .....				0.05
Coefficient of variation.....				9.79
LSD ( $P \leq 0.05$ ).....				1.19

<sup>z</sup> PI = Plant introduction line.

<sup>y</sup> All accessions were *Beta vulgaris*, either subspecies *vulgaris* (domesticated) or *maritima* (wild beet).

<sup>x</sup>  $P > F$  was the probability associated with the F value. LSD = Fisher's protected least significant difference value. Means followed by the same letter did not differ significantly based on Fisher's protected LSD.