

RHIZOCTONIA ROOT ROT RESISTANCE OF *BETA* PIs FROM THE USDA-ARS NPGS, 2000: Twenty-eight Plant Introductions (PIs) from the USDA-ARS National Plant Germplasm System (NPGS) (Garden Beet, Sugar Beet, Leaf Beet, Fodder Beet, and wild beet) were evaluated for resistance to Rhizoctonia root rot. The trial was a randomized, complete-block design. One-row plots, replicated five times were planted in Windsor, CO, on 16 May. Plots were 4.5 m long with 56 cm between rows and 20 to 25 cm within-row spacing. Inoculation with dry, ground, barley-grain inoculum of *Rhizoctonia solani* AG 2-2 isolate R-9 was performed on 12 Jul; immediately after inoculation, a cultivation was performed to throw soil into the beet crowns. The field was thinned by hand and irrigated as necessary. Beets were harvested 31 Jul through 2 Aug. Each root was rated for rot on a scale of 0 (no damage) to 7 (dead). Analyses of variance (PROC ANOVA - SAS) were performed on disease indices (DIs), percent healthy roots (undamaged classes 0 and 1 combined), and percentage of roots in classes 0 thru 3 (those most likely to be harvested and taken to the factory). Percentages were transformed using arcsin-square root to normalize the data for analyses ("AP 0-1" and "AP 0-3" in the accompanying table). Both percentages and transformations are given in the table.

We had unusually high temperatures in the summer of 2000 which, combined with a high inoculum load, contributed to a severe root rot epidemic. The *Rhizoctonia* epidemic progressed very quickly, becoming severe by the end of July. Differences in DIs among entries were highly significant ($P < 0.001$). Mean DIs across all tests in the 2000 nursery for highly resistant FC705-1, resistant FC703, and highly susceptible FC901/C817 controls were 2.5, 2.7, and 4.4 respectively. Percentages of healthy roots were 16.0, 16.3, and 3.9% for these controls. Percentages of roots in disease classes 0 thru 3 were 79.9, 67.1, and 28.7, respectively. The highest and lowest DIs for the evaluated lines were 6.4 and 1.7, respectively. A few PI accessions had DIs not significantly different from the resistant checks, and one performed extremely well (PI 590766). These data, and more information on these accessions, are available through the USDA-ARS GRIN database at <http://www.ars-grin.gov/npgs>.

Entry	Seed Source	subspecies	Donor's ID	DI	% 0-1 ¹	% 0-3 ¹	AP 0-1 ¹	AP 0-3 ¹
221	Ames 19166	<i>vulgaris</i>	SD Ramonskaja 931	4.7	0	7	0.0	11.6
222	Ames 19167	<i>vulgaris</i>	SD Jaltuskovskaja Od	4.2	0	13	0.0	11.0
223	PI 198431	<i>vulgaris</i>	SD WB 171	5.2	0	4	0.0	5.3
224	PI 476322	<i>vulgaris</i>	SD Belocerkovskaja o	4.3	0	3	0.0	4.2
225	PI 518780	<i>vulgaris</i>	SD IDBBNR 9607	4.8	0	0	0.0	0.0
226	PI 531254	<i>vulgaris</i>	SD KAWEMAJA	4.4	0	16	0.0	15.5
227	PI 590767	<i>vulgaris</i>	SD IDBBNR 5102	4.8	0	13	0.0	16.3
228	PI 612767	<i>vulgaris</i>	SD AT3986A	4.5	0	8	0.0	12.8
229	PI 612770	<i>vulgaris</i>	SD EL40 Breeding Lin	4.6	0	1	0.0	3.1
230	PI 504185	<i>maritima</i>	SD Wild beet	6.1	0	3	0.0	4.6
231	PI 504205	<i>maritima</i>	SD Wild beet	5.0	0	13	0.0	13.4
232	PI 504262	<i>maritima</i>	SD Wild beet	5.1	5	18	8.2	16.4
233	PI 518306	<i>maritima</i>	SD IDBBNR 5800	5.8	0	0	0.0	0.0
234	PI 540676	<i>maritima</i>	SD WB 930	6.2	0	0	0.0	0.0
235	PI 546413	<i>maritima</i>	SD IDBBNR 5639	5.8	0	2	0.0	3.9
236	PI 546422	<i>maritima</i>	SD IDBBNR 5640	4.9	0	20	0.0	18.0
237	NSL 141994	<i>vulgaris</i>	SD 043	3.9	0	21	0.0	27.1
238	NSL 141995	<i>vulgaris</i>	SD 1502HO/NB1 (CMS)	4.3	0	5	0.0	8.4
239	PI 590766	<i>vulgaris</i>	SD IDBBNR 4591	2.5	10	84	11.6	66.9
240	PI 590837	<i>vulgaris</i>	SD IDBBNR 4337	4.6	0	7	0.0	9.5
241	PI 590838	<i>vulgaris</i>	SD IDBBNR 4338	4.7	0	0	0.0	0.0
242	PI 590843	<i>vulgaris</i>	SD IDBBNR 4363	4.8	0	2	0.0	3.9
243	PI 590844	<i>vulgaris</i>	SD IDBBNR 4362	4.5	0	2	0.0	3.9
244	PI 608798	<i>vulgaris</i>	SD A77-50	4.3	0	7	0.0	9.3
245	PI 608799	<i>vulgaris</i>	SD A78-30	4.9	0	2	0.0	3.9
246	PI 608803	<i>vulgaris</i>	SD A80-17	4.1	0	7	0.0	11.6
247	PI 608804	<i>vulgaris</i>	SD 0405	4.8	0	2	0.0	3.3
248	PI 601766	<i>vulgaris</i>	SD AT3985A	4.6	3	3	4.9	4.9
249	931017	<i>vulgaris</i>	Susceptible Check - FC901/C817	4.7	0	3	0.0	6.4
250	831083	<i>vulgaris</i>	FC705/1 - 'Highly Resistant Check	4.3	2	12	3.5	15.7
251	751080H	<i>vulgaris</i>	FC703 - 'Resistant Check	3.2	9	56	11.0	49.7
				LSD _{p=0.05}	0.9		6.5	16.9
Trial Mean				4.7	1	11	1.3	12.0

¹ DI = Disease Index on a scale of 0 (no damage) to 7 (plant death), % 0-1 = percent healthy roots, % 0-3 those roots most likely to be harvested and taken to the factory. AP is the arcsin-square root transformation of percentages to normalize the data for analyses.