

Harveson R.M., G.L. Hein, J.A. Smith, R.G. Wilson, and C.D. Yonts. University of Nebraska, Panhandle Research and Extension Center, 4502 Ave. I, Scottsbluff, NE 69361. **Response of sugar beet cultivars to diseases in the Central High Plains.**

During the 1999 growing season, sugar beet cultivars trials were conducted at eight locations in three states, including Nebraska (5), Wyoming (1), and Colorado (2). One of the Nebraska sites was located at the Panhandle Research and Extension Center in Scottsbluff, while the remaining seven locations were conducted in cooperating grower's fields. Experimental design was a randomized complete block, utilizing thirty-eight entries with six replications. Each plot consisted of three 15m rows on 55cm centers. University of Nebraska personnel were involved with planting and harvest operations at all sites; growers conducted all other farm operations during the season including irrigation and cultivation.

Each site was evaluated at least once during the season for root diseases, and two sites (Greeley and Torrington) were rated for *Cercospora* leaf spot severity. Four of the five Nebraska sites were severely infested with root diseases, including *Aphanomyces* root rot, *Rhizoctonia* root and crown rot, and *Fusarium* yellows. The two Colorado locations had low root disease levels, and the Wyoming site had moderate levels of *Rhizoctonia* root and crown rot and sugar beet cyst nematodes. At harvest, all three rows were mechanically dug, and a root disease rating (0-4) was made at all eight locations. The rating was accomplished utilizing ten roots randomly selected from each plot. Standard yield components were additionally determined, including sucrose percentage, root and sucrose yields, and sucrose loss to molasses.

At seven of the eight sites, yields of all combined entries averaged 24m tons and 9,000kg sucrose/ha with 15% sucrose. Significant differences were observed between entries regarding disease ratings and yield, illustrating the differences in disease pressure and cultivar response among sites. This is well illustrated with a comparison of the Dalton and Scottsbluff sites. The Dalton site was infested almost exclusively with *Aphanomyces cochlioides*, and the Scottsbluff site had high levels of both *A. cochlioides* and *Rhizoctonia solani*. The *Rhizoctonia*-resistant cultivar Betaseed 4546 produced over 1100 kg/ha of sucrose more at the Scottsbluff site than it did at the Dalton location. This shows both the value of the *Rhizoctonia* resistance in the cultivar, and its susceptibility to *Aphanomyces* root rot. Nevertheless, several entries performed well overall, regardless of site or pest or pathogen pressure, including Novartis 9155 and 1639, Seedex Ranger, and Betaseed 4038, 4006, and 4546. This study has also discovered that growers should not have to sacrifice yields by using rhizomania resistant cultivars. No sites were severely infested with this disease during 1999, yet the rhizomania resistant cultivars Novartis 1639, and Betaseed 4038 and 4006 were among the top performers.