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Under severe rhizomania, *Rz* (Holly factor) provides only intermediate levels of resistance. Higher levels of resistance appear to be available from an enhanced sugarbeet x *Beta vulgaris* spp. *maritima* population developed at Salinas. This population called R22 was originally released as C50 and subsequently released as C51 after multiple cycles of selection for resistance to rhizomania. Backcross derived sugarbeet breeding lines in multigerm and monogerm backgrounds also were released as C79-8 and C890-8. In ongoing breeding work these C51 type lines have given high levels of protection against severe rhizomania and associated root rots. Tests were run in overwintered trials in Imperial Valley to compare resistance conditioned by *Rz* and C51 factors. Three hybrids were compared in May (moderate temperature) and July (high temperature) harvests grown with and without rhizomania. The hybrids were (i) a susceptible commercial, (ii) *Rz* experimental, and (iii) C51 experimental (25% *B. v. m.* germplasm). Without rhizomania, the susceptible commercial had the highest sugar yield and C51 hybrid the lowest. With rhizomania the opposite occurred. The *Rz* hybrid was intermediate in both situations. The C51 hybrid had the least root rot and plant loss. For the three hybrids harvested in May, the sugar yield losses were 43, 34, and 12%, respectively. In July under extremely high temperatures, the sugar yield losses were 70, 44, and 28% and root rot killed 40, 13, and 4% of plants. These results suggest that these resistance sources did not fully protect against rhizomania, but that resistance from C51 was stronger than from *Rz* factor. However, in these hybrids the resistance factors at best were heterozygous and fewer than 100% of the plants carried resistance. In addition, some losses across all hybrids may have been caused by other soil-borne problems (e.g., cyst nematode) that increase when rhizomania infested test areas are established.