GALLIAN, JOHN J., and CHARLES E. STANGER. Department of Plant, Soil and Entomological Sciences, University of Idaho, P.O. Box 1827, Twin Falls, Idaho 83303-1827, and Oregon State University, Malheur Experiment Station, Ontario, Oregon 97914. - Relationship of curly top virus disease ratings to yield loss under conditions of natural field infection. ABSTRACT.

A high level of curly top virus resistance in sugarbeet varieties is necessary in order to grow an economical crop in Idaho and eastern Oregon. In 1992, the Amalgamated Sugar Company growing area experienced the worst infection from curly top virus in about 20 years, with an estimated loss of 400,000 tons valued at about \$14 million. Curly top disease ratings and yield were taken on a severely infected variety test near Ontario, Oregon. Root yield for commercial varieties ranged from 41.08 to 14.60 tons/acre, with the highest yielding varieties having the lowest disease ratings. The relationship between root yield and curly top rating was highly significant; R=0.89 and R²=0.79. The regression coefficient was -5.78 tons/acre for each curly top unit of increasing susceptibility. Response of experimental varieties was similar with a yield range of 40.30 tons/acre; R=0.89 and R²=0.80. Regression coefficient was -7.00 tons/acre. No differences were observed in % sucrose or % extraction. suasses. Tresuments were established in plots (1 row x 12 liest) 2 weeks after plant arregence as follows: 3. wrelitarous black bean sphiles (yellows virus 4 aphild injury), and 4.) untreated check. Aphiles were interest beneath floating row cover material to maintain the integrity of the treatments. Black been applied levels preised at - 1200 per 2 leaves in the infested treatments and the virus incidence was 100% in the BYV troopingent. Photosynthetic rates everaged 19.0, 12.2, and 22.1 umolimits on 29 May, 3 June, and 5 July. photogynthetic rate was reduced in the full season ephid treatment by 33.5% and in the aphid + virus treatment by 42.2%. Sugar best yield was 18.3 tons/A in the uninfeated treatment livering trabids and virus) and the yelfs was 88.6, 71.6, and 31.7% of that in the uninfested maximum in the aphld-partial season, aphid full season, and aghid - best yellows virus treatments, respectively. Percentage sugar was not affected by the treatments and averaged 13.1% for the four treatments