

JONES, DAVID C.*, FEKEDE WORKNEH and CHARLIE M. RUSH, Texas Agricultural Experiment Station, Bushland, TX 79012. **Incidence and spatial distribution of rhizomania in fields planted to rhizomania resistant cultivars.**

ABSTRACT

Beet necrotic yellow vein virus (BNYVV) causes rhizomania in sugar beets, and resistant cultivars are the best available control method. However, during the growing season of 2003 in the California Imperial Valley (CIV), severe rhizomania symptoms were observed in resistant varieties. These appeared as chlorotic strips that ran the length of the field. Subsequent studies have indicated that a fundamental difference exists between the CIV and wild type isolates. In Minnesota, rhizomania symptoms have also begun to appear in fields planted to resistant cultivars. Initially, individual plants exhibiting rhizomania symptoms (blinkers) were observed in several fields. Some suggest that this was due to a mix of susceptible and resistant seeds at planting or a result of pollen drift. However, symptomatic plants now often appear in clusters, which are inconsistent with distributions resulting from seed mixtures. Therefore, spatial distribution and spatial dependence were measured using aerial photography and geostatistical analysis to determine the randomness of the blinkers. In 2005 and 2006, rhizomania resistant fields with typical rhizomania symptoms were selected for this study. Digital images were acquired using a standard digital camera from a fixed wing aircraft. The pixels in each image were classified into three categories (soil, healthy, blinker) using unsupervised classification. Geostatistical analysis was conducted on data classes to determine the randomness of the blinker pixels within an image. Preliminary results indicate some degree of aggregation and appear to be directionally related to soil movement, suggesting that blinkers are not due to random seed mixture or pollen drift, but rather to variation in soil edaphic factors, virus density, virus genotype, or other unrecognized factors causing resistance breakdown in rhizomania resistant varieties.