McCLELEN, C.E., and J.S. GERIK, Holly Sugar Co., Plant Pathology Laboratory, Tracy CA 95378. Comparison of Methods to Expedite Soil Analyses for Beet Necrotic Yellow Vein Virus (BNYVV).

Soil infestations of BNYVV, the causal agent of rhizomania, are routinely detected using an assay procedure developed in 1985 by the USDA. This procedure requires planting sugarbeet seed in the soil to be tested, and cultivating the seedlings in a greenhouse in a manner to optimize the infection potential of the virus. After 8 weeks, the roots of the seedlings are removed from the soil and assayed for BNYVV by ELISA. Several problems persist with this method: the time required for completion is rather lengthy, greenhouse space may become limiting, and greenhouse environmental conditions may become difficult to maintain during the warm summer months. Because of the lengthy time requirement, fields to be tested must be sampled well in advance of planting so the results will be available when needed. A more rapid technique using bait plants has been shown in previous research to be able to detect BNYVV infested soil in less than one week. This study addresses the reliability of the baiting technique and the sensitivity to sample dilution.

Field soil infested with BNYVV was diluted (1:12.5, 1:25, 1:50, 1:100, or undiluted) with autoclaved field soil and potted in replicates. The soils were seeded with sugarbeet and maintained in the greenhouse at 20-30 C. Roots were removed from the soil and assayed weekly for BNYVV at weeks 3 through 7. In another experiment, soil slurries (100 ml soil + 100 ml water) produced with the same dilution series as above were baited with 4 week old sugarbeet seedlings. The seedling baits were produced in sterilized sand. These slurries were maintained at 27 C in an incubator. The roots of the baits were assayed after 1 and 2 weeks. One week long baiting experiments were also conducted in greenhouse conditions, and with or without the addition of two rates of fungicides (Hymexazol, PCNB, and Metalaxyl) to the slurries.

Results of the experiments indicate that BNYVV can be detected in the seedlings grown in pots with undiluted soil at 3 weeks, and down to a dilution of 1:25 by week 7. BNYVV was detected in the bait plants in the soil slurries after 1 week, even at 1:100 dilution. Higher ELISA values were obtained after 2 weeks. The ELISA values for the seedlings in the slurries were less than for the seedlings grown in pots for 7 weeks. The seedlings in the slurries had a high mortality rate, due to infection by seedling disease fungi. The majority of replicates failed to live until the two week assay. Negative controls using seedlings in water or sterilized soil all survived 2 week tests. The percentage of positives was significantly lower in baits treated with fungicides at either level, and in baitings done under the greenhouse conditions.