

G.C. WISLER, R.T. LEWELLEN, H.-Y. LIU, J. SEARS, and W.M. WINTERMANTEL, USDA-ARS, Salinas, CA 93905. **Interactions between BNYVV and BSBMV in rhizomania resistant and susceptible sugarbeet varieties and effects on beet development.**

Beet necrotic yellow vein virus (BNYVV), the cause of Rhizomania, produces striking root and sometimes foliar symptoms, and results in considerable sugar content and yield reductions. This virus was introduced from Europe and has since spread throughout many beet growing regions in the U.S. In contrast, *Beet soil-borne mosaic virus* (BSBMV) appears to have originated and evolved in the U.S. Although this virus does not produce the severe losses that result with BNYVV infection, it does appear to have some effect on yield. Compared with BNYVV, little is known about the effects and importance of other *P. betae* vectored viruses in the rhizomania syndrome. Knowledge that has been generated on BNYVV can be often be applied to the study of BSBMV.

Recent studies have demonstrated that although these viruses are closely related, Rz gene-resistance to BNYVV does not confer resistance to BSBMV. Both viruses are transmitted by *Polymyxa betae* and are being found together in increasing numbers of beet fields in the western United States. As a result, we are not only attempting to ascertain the existence of resistance to BSBMV, but also to determine whether the presence of both viruses together substantially affects beet yield, sugar content and virus concentration. To determine the effect of single and mixed infections of BNYVV, BSBMV, as well as virus-free *P. betae* on susceptible and rhizomania resistant sugarbeet, sterile soils were inoculated with viruliferous beet roots containing *P. betae*, or *P. betae* and one or both viruses. These soils were used in greenhouse tests to explore the effects of mixed infection. Results demonstrated that concentrations of both viruses increased for 3-4 weeks in all combinations, then virus levels began to decline. BNYVV accumulated more quickly, and concentrations of BNYVV were declining by the time BSBMV concentrations reached their maximum level. In addition, BSBMV levels were suppressed in mixed infections with BNYVV, and BNYVV levels appeared to increase substantially in the presence of BSBMV, suggesting a possible synergism between these viruses. These results suggest that BSBMV may be a factor in severity of rhizomania, and that varietal development should include development of resistance to BSBMV as well as BNYVV.