

WINTERMANTEL, WILLIAM M.* and LAURA L. HLADKY, USDA-ARS, 1636 East Alisal Street, Salinas, CA 93905. **Resistance to curly top viruses through virus induced gene silencing.**

Curly top disease, caused by viruses of the genus Curtovirus, and transmitted by the beet leafhopper (*Circulifer tenellus*), has resulted in losses for western U.S. agriculture for over a century. No control methods have been developed that economically, effectively and reliably prevent losses in tomato, sugarbeet and many other crops, and sources of host resistance are incomplete and difficult to transfer among cultivars. In order to provide more reliable control in a wider array of hosts, we are developing methods to engender resistance to the two primary curtovirus species in the United States. Partial replication gene (C1) sequences of *Beet severe curly top virus* (BSCTV) and *Beet mild curly top virus* (BMCTV) were inserted into a *Tobacco rattle virus* (TRV)-based vector to test the effectiveness of the sequences in suppressing infection of BSCTV and BMCTV through virus-induced gene silencing (VIGS). TRV containing curtovirus VIGS-inducer constructs were agroinoculated into *Nicotiana benthamiana* seedlings. BSCTV and BMCTV were inoculated separately at various time points following treatment with TRV/VIGS inducers. Test plants were monitored for the development of curly top symptoms over time and scored for disease severity, plant weight and virus concentration. Results with two silencing constructs delayed and reduced curly top symptom development in infected plants and decreased virus concentration compared to plants not treated with silencing constructs. Confirmation of control is in progress through plant transformation with optimized constructs. Continuing studies are examining application of these constructs for large-scale induction of resistance to curtoviruses in the absence of plant transformation.