BARGABUS-LARSON, REBECCA L*[1], JOHN J. WEILAND[2], [1] USDA-ARS, Sugarbeet Research Unit, Crops Research Laboratory, 1701 Centre Ave, Fort Collins, CO 80526, [2] USDA-ARS, Sugarbeet and Potato Research Unit, Northern Crop Science Laboratory, 1307 N 18th St, Fargo, ND 58105. **RNA silencing for the control of *Beet necrotic yellow vein virus* infection of sugarbeet.**

Beet necrotic yellow vein virus (BNYVV), a multipartite single-stranded RNA benyvirus causing Rhizomania in sugarbeet, is a serious threat worldwide. Tolerant cultivars currently available succumb to Rhizomania under severe disease pressure. The lack of complete control with tolerance prompted investigation into novel means of preventing infection. RNA silencing, a naturally occurring phenomenon, results in the post-transcriptional degradation of aberrant double-stranded RNAs, including mRNAs, preventing protein synthesis. This process has been induced under laboratory conditions for preventing virus infections in numerous plant and animal host-virus systems and may operate in currently deployed genetically enhanced sugarbeets exhibiting BNYVV resistance. In the current study, guide sequences used for eliciting silencing were designed to target blocks of untranslated and coding regions of the RNA1 of BNYVV that encodes for viral replication machinery. The sequences were amplified by reverse transcriptase polymerase chain reaction (RT-PCR), or in the case of small hairpin (hp) RNA, created by direct synthesis of deoxyoligonucleotides with 60 base pair "arm lengths". Silencing constructs were developed by cloning these fragments into a *Barley stripe mosaic virus* (BSMV) vector. When using either the RT-PCR generated or small hpRNA constructs, a higher degree of silencing was achieved using targets for the untranslated regions of RNA1 when compared to constructs containing RNA1 coding region guide sequences, as determined by disease reduction and ELISA assays.