BORNEMANN, KATHRIN[1,2], NAZLI DIDE KUTLUK YILMAZ[3], MOHAMED F. R. KHAN[2] and MELVIN D. BOLTON[1]*, [1]USDA-ARS, Northern Crop Science Laboratory, Fargo, North Dakota, USA and [2]North Dakota State University, Department of Plant Pathology, Fargo, ND, USA and [3]University of Ondokuz Mayis, Agriculture Faculty, Department of Plant Protection, Samsun, Turkey. **Sequence analysis of the *Beet necrotic yellow vein virus* P25 pathogenicity factor in Turkey and the Red River Valley of MN and ND.**

ABSTRACT

Rhizomania is a devastating disease of sugar beet caused by *Beet necrotic yellow vein virus* (BNYVV) and is widely present in Turkey and in the Minnesota/North Dakota growing regions. In the past, disease management was obtained by using hybrids with resistance genes *Rz1* or *Rz2*. Recently, BNYVV strains were identified that were able to overcome *Rz1*-mediated resistance. Most *Rz1*-resistant strains described so far possess an A67V amino acid exchange within the RNA3-encoded P25 pathogenicity factor.

To identify the extent that the A67V mutation or other mutations occur in P25, 635 and 595 soil samples were collected throughout Turkey and Minnesota/North Dakota, respectively, and analyzed for the presence of the virus. Positive samples were taken for a resistance test with *Rz1*, *Rz2*, and *Rz1+Rz2* resistant sugarbeet cultivars and virus titer was measured with ELISA. Samples were also analyzed for the composition of P25. In both growing regions, susceptible genotypes tended to be a mixture of two or more virus strains evidenced by analysis of sequence electropherograms. PCR products from such samples were sub-cloned to obtain sequence from individual strains. In Turkey, at least 13 different P25 tetrad signatures were identified while in Minnesota/North Dakota, six tetrad types were identified. In the *Rz2* background, five tetrad types were identified in Turkey. In the *Rz1+Rz2* background, three tetrad types were identified in Turkey. Sequence analysis of P25 is on-going for Minnesota/North Dakota samples. However, preliminary analysis from both locations suggests no clear association between any tetrad and the ability to grow to high titer in any genetic background. For example, wild-type tetrad types (e.g. ACHG) were commonly found in *Rz1*, *Rz2*, and *Rz1+Rz2* backgrounds. These results suggest that additional components besides the P25 tetrad play a role in overcoming genetic resistance in Rhizomania-resistant cultivars.