DIFFERENTIATING *Rz-1* AND *Rz-2* RESISTANCE REACTIONS TO *BEET NECROTIC YELLOW VEIN VIRUS* THROUGH PROTEOME ANALYSIS IN SUGARBEET

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Rhizomania, caused by *Beet necrotic yellow vein virus* (BNYVV), is one of the most economically important diseases affecting sugarbeet, and is widely distributed in most sugarbeet growing areas of the world. Control is achieved almost exclusively through planting of resistant varieties. Following the introduction of *Rz*1 varieties in the 1990s, new pathotypes that break resistance have appeared. Previous studies demonstrated that a relatively small number of differences in sugarbeet protein expression were associated with BNYVV infection as well as for resistance. Current studies are examining protein differences among resistant (*Rz1* and Rz2) and susceptible sugarbeet, when infected with both traditional (pathotype A) and *Rz1* resistance-breaking BNYVV (pathotype IV, from California's Imperial Valley). Near isogenic lines differing only for Rhizomania resistance were provided by KWS, and raised in virus-specific soils under standardized growth chamber conditions. Protein was extracted from sugarbeet seedlings three weeks after planting to represent a time point early in the infection cycle. Total protein extracts were processed through SCX fractionation, followed by reverse phase liquid chromatography and mass spectrometry (LC-MS-MS). Peptide Spectra were examined for identity using the NCBI 'all plant' and *Beta vulgaris* genome initiative (BvGI) databases. Subtractive analysis was performed to identify differences among treatments, and indicate variation in protein content among treatments. These studies build on the knowledge generated through previous research, which identified protein interactions responsible for infection of sugarbeet by BNYVV pathotype A (the predominant BNYVV pathotype in the US) in susceptible and resistant (*Rz1)* interactions, and how these interactions differ with another source of resistance *(Rz2)*. Ultimately, this may lead to methods to prolong the longevity of *Rz* resistance sources by understanding the fundamental mechanisms that cause resistance to break down.