FUGATE, KAREN KLOTZ[1*], JOCLEITA P. FERRAREZE[2] and MELVIN D. BOLTON[1], [1]USDA-ARS, Northern Crop Science Laboratory, 1605 Albrecht Blvd. N., Fargo, ND 58102-2765 and [2]Federal University of Viçosa, Viçosa, MG, Brazil 36571-000. **Jasmonic acid and salicylic acid inhibit growth of three sugarbeet storage rot pathogens.**

## ABSTRACT

Storage rots contribute to postharvest losses by consuming sucrose and increasing carbohydrate impurities that increase sugar loss to molasses during processing. They also increase root respiration rate, which causes additional sucrose loss and contributes to pile warming. Currently, storage rots are controlled by cooling piles and removing pile 'hotspots' as they develop, since low temperatures reduce the growth rate of many rot-causing organisms. Such control methods, however, require favorable weather conditions and continuous monitoring of piles, and are limitedly effective in controlling those rot-causing fungi that are capable of growth at low temperatures. Jasmonic acid and salicylic acid are endogenous plant hormones that have been shown to induce plant defense responses and reduce storage diseases in several crops when applied exogenously. The ability of these compounds to reduce the incidence and severity of storage diseases of sugarbeet, however, has not been previously reported. Pretreatment of sugarbeet roots with jasmonic acid or salicylic acid reduced the severity of disease symptoms after inoculation with *Botrytis cinerea*, *Penicillium claviforme*, and *Phoma betae*, three common storage rot-causing organisms. Jasmonic acid, when applied at concentrations of 0.1 to 100 μM, significantly reduced rot due to *B. cinerea* by 36 to 62%, significantly reduced rot due to *P. claviforme* by 32 to 65%, and significantly reduced rot due to *P. betae* by 58 to 81%. Salicylic acid significantly reduced rot due to *B. cinerea* by 82 to 84% when applied at concentrations of 0.01 to 1 mM, significantly reduced rot due to *P. claviforme* by 41% when applied at a concentration of 1 mM, and significantly reduced rot due to *P. betae* by 81 to 94% when applied at a concentration of 1 to 10 mM. Investigation of the effect of jasmonic acid and salicylic acid on the expression of defense-related genes, the activity of defense-related enzymes, and the sugarbeet root transcriptome has been initiated. Preliminary data indicates that the activity of several common defense-related enzymes including β-glucanase, catalase, and phenylalanine ammonia lyase are altered by salicylic acid. Jasmonic acid had no effect on the activities of these enzymes, suggesting that jasmonic and salicylic acids induce different defense mechanisms in sugarbeet roots.