

FUGATE, KAREN KLOTZ^{1*}, ABBAS M. LAFTA², JOHN D. EIDE¹, GUOLONG LI³, AND MOHAMED F.R. KHAN², ¹USDA-ARS, Northern Crop Science Laboratory, Fargo, ND 58102, ²Department of Plant Pathology, North Dakota State University, Fargo, ND 58108, and ³College of Agriculture, Inner Mongolia Agriculture University, Hohhot, China 010018. **Effect of methyl jasmonate on seedling tolerance to drought and cold temperature stress.**

Environmental conditions are rarely optimal for plant growth, and nearly all plants experience some degree of abiotic stress during production. Commonly caused by inadequate water availability or unfavorably low or high temperatures, environmental stresses cause growth to slow or cease, reduce net photosynthesis, generate reactive oxygen species that can alter metabolism and damage cells, and reduce crop stands if sufficiently severe. Environmental stress can occur at any time during production, but is most common during early development when plants are most sensitive to cold and have small root systems with a limited ability to extract water from all but the upper soil profile. In other plant species, exogenous application of methyl jasmonate has been found to mitigate the negative effects of abiotic stresses. Methyl jasmonate responses, however, vary between plant species and have not been tested in sugarbeets. The ability of exogenous methyl jasmonate to alleviate the negative effects of drought stress or cold temperature stress in sugarbeet seedlings was determined. Seedlings were treated with 0, 0.01, 0.1, 1, or 10 μ M methyl jasmonate, and stressed by a cessation of watering or exposure to 4 °C for up to seven days. The effects of these stresses on fresh weight accumulation, dry weight accumulation, photosynthetic parameters, and cellular membrane damage, in treated and untreated sugarbeet seedlings were quantified at multiple times after the initiation of the stress which allowed methyl jasmonate's ability to mitigate the negative effects of water stress or cold stress to be evaluated under mild, moderate, and severe stress conditions.