DE LOS REYES, BENILDO G.*, and J. MITCHELL M^CGRATH, USDA-ARS, Sugar Beet and Bean Research Unit, 494 PSSB, Michigan State University, East Lansing MI 48824-1325. Stress and germination: A molecular basis of seed vigor in *Beta vulgaris*.

Poor emergence or low seed vigor in sugar beet is related to stress tolerance. This problem is a manifestation of abiotic stresses during the first several days after planting when the germinating seeds are most vulnerable to changes in moisture condition. Field emergence counts and laboratory germination in solutions that mimic environmental stress conditions (salt-150mM NaCl; osmotic -200mM mannitol; excess moisture/water soaking) indicated genetic differences in seed vigor among commercial cultivars. We used the cultivars USH20 (good stress-emerger) and ACH185 (poor stress-emerger) and the solution germination method to dissect the molecular basis of seed vigor in *Beta vulgaris*, through the discovery of differential gene action in response Gene expression analyses by differential display, northern to stress during germination. hybridization and RT-PCR showed that stress induced the expression of germin or oxalate oxidase in USH20 but not in ACH185. Germin expression was down-regulated to developmental levels by 88mM H₂O₂, which also caused cultivar-independent enhancement of germination under stress. In USH20, the stress-mediated increase and H₂O₂-mediated decrease in germin transcripts were paralleled by corresponding changes in oxalate oxidase activity. Since H₂O₂ is a product of oxalate metabolism by oxalate oxidase, the results from this study imply that the stress-induced germin expression is a mechanism of H_2O_2 production during germination, which may be required for the expression of stress tolerance. A collection of Expressed Sequence Tags (EST) from subtracted cDNA libraries is currently being used for semi-global analysis of stress- and H₂O₂-regulated gene activity in order to identify the genetic and biochemical determinants of seed vigor.

introduction of the Cervan-vers of game, for tools export gene, into might best will soon be traved as a potential effective control of leadipot. The off game is currently being transformed into sugar boot in us lib using *Pointohum* (formerly *Agrobicaterium*-) modiated transformation which produces only single gamenic intermine.

Reprintation of the second sec

Plant molecular biologists have long environed the control of pinut/mon shal intervations which are discusses using bioexpansered planta. Progress in score crop plants can been rach into augur breets are difficult to transform. Denoise this difficulty, considere genes, which could theore cally incruese disease molecunce and annahis for flasing with plant promoters, have been introduced et a sugar heets. Thus for these genes include these specifying entire compile (from tants), throoins sugar heets. Thus for these genes include these specifying entire compile (from tants), throoins incruese disease related proteins (both fram other plants). Sayder et al., (1999) reported er profilogenesis related proteins (both fram other plants). Sayder et al., (1999) reported provide transformation of chinactic constructs of these genes into august beet genotype Rel-1, obtrated from transformation of chinactic constructs of these genes into august beet genotype Rel-1, obtrated from transformation of chinactic constructs of these generative calous master on 0.1 modern at 30° C in we dark to generate al., 1997, trai reported that atoms if quard cells are evaluative to tappetent. Dra Samders, Ann (1936) and frave been to ing to device a simple single-step procedure assist for obtaining efficient regenerations following 10% uptake, for example. A paper on that work appears elsewhere in this solution (Samiders et al., 2001).

Two years use, after specifing scene counts trying to determine whether shoot cultures of the signer heat transitenics attendy available in the lab had as) anti-Correspond activity or view (log-lemdal, 1960; Kuyloudal and Smericki 1969), I decided to test plants in growth chambers for leafipor susceptibility from spores. The two gravitytes ovaluated wave QOT and Courty???