KNOLLE, JUERGEN C. SUET Saat- und Erntetechnik GmbH, Industriehof, D-3440 Eschwege, FRG. - Studies and expectations of sugar beet seed pretreatments.
Pretreatments of sugar (and fodder) beet seeds are claimed to improve germination rate and velocity, the emergence and population, as well as the yield of the crop. SUET has tested a broad range of varieties by steeping in water, in addition with the fungicide thiram, and by damp storage, also followed by pelleting exclusively for the field tests. Results obtained in the laboratory show highest increase of germination velocity with raw seed pretreated, also after pelleting. Previously processed seeds (polishing, cleaning, grading) already develop high quality level so that further increase from pretreatment is minimized. After pelleting, the effects of pretreatment are marginal and cannot be saved in the field tests. The loss can be a result from multiple wetting and drying while pelleting. But from leaching tests of pre- and nontreated seeds, the cation concentrations (Na, K, Ca, Mg) do not correlate with respective germination rate or velocity or emergence results. Addition of thiram infused by steeping does not influence the fungal diseases, as analyzed active ingredient on/in the seeds is only in ppm range, compared to protection by several grams per kg of seed from standard application.

SAUNDERS, JOSEPH W.*, STEPHEN E. HART, and DONALD PENNER. USDA, Agricultural Research Service, Crop and Soil Science Dept., Michigan State University, East Lansing, MI 48824. - Physiological and genetic basis of sulfonylurea herbicide resistance obtained from somatic cell selection.
Publically released clone CR1-B is a direct selection via somatic cell culture for resistance to the sulfonylurea herbicide chlorsulfuron. CR1-B was found to be 300- to 1000-fold more resistant to chlorsulfuron than source clone REL-1 in in vitro shoot culture tests. Greenhouse tests found CR1-B resistant as well to the other sulfonylurea herbicides primisulfuron and thifensulfuron, but not to imidazolinone herbicides. Both CR1-B and REL-1 exhibited similar low (10%) rates of metabolism of primisulfuron. CR1-B had acetolactate synthase (ALS) activity at least eight-fold less sensitive to inhibition by chlorsulfuron than REL-1. CR1-B is heterozygous for the resistance factor, which has been transmitted and expressed in a 1:1 fashion for four successive outcrosses in a stable manner. These results indicate that this sulfonylurea resistance is encoded by a dominant allele (designated *Sur*) that conditions an altered ALS enzyme, which is less sensitive to inhibition by the sulfonylurea herbicides.

TERRY, NORMAN*, A. R. ARULANANTHAM, and I. M. RAO. Dept. of Plant Biology, University of California, Berkeley, CA 94720. - Photochemical capacity limits photosynthesis of sugar beets under field conditions by decreasing the CO_2-acceptor, ribulose bisphosphate.
Research from this laboratory has shown that the rate of photosynthesis of sugar beets is limited by the capacity of the leaf to do photochemistry. Photochemical capacity limits photosynthesis at high or low levels of ambient CO_2 concentration (e.g., field levels). In this paper, I present data showing that photochemical capacity limits photosynthesis through a reduction in the amount of the CO_2-acceptor, ribulose 1,5-bisphosphate (RuBP), rather than through the activity of the CO_2-fixing enzyme, rubisco. The reduction in photochemical capacity of leaves was obtained experimentally by using iron deficiency, which has been shown to specifically diminish the thylakoid content of chloroplasts. The reduction in RuBP regeneration in iron deficient leaves was not due to a decrease in the formation of the photochemical products, ATP and NADPH. This view is based on measurements of ATP and NADPH, and on triose phosphate/3-phosphoglycerate ratios, which were high in iron deficient leaves. RuBP regeneration may have been limited by the modulation of the enzyme that forms RuBP, ribulose-5-phosphate kinase.