

## ABSTRACT

In response to concerns over sugarbeet irrigation efficiency, trials were conducted in 1985 and 1986 at Ontario, Oregon. The objectives were to determine what yield and sugar losses might result if irrigation was discontinued approximately 6 or 10 weeks prior to the normal full September termination date and to compare production under full season furrow versus full season sprinkler irrigation. The following irrigation strategies were tested: 1) furrow, full season; 2) furrow, full season with partial termination; 3) furrow, full season with partial termination and 4) sprinkler, full season.

**SNYDER, GORDON W., JOHN C. INGERSOLL, and LOWELL D. OWENS, USDA/ARS, PMBL, 10300 Baltimore Ave., Beltsville, MD 20705. - Agrobacterium-mediated and biolistic enhanced transformation of sugarbeet.**

Molecular improvement of the sugarbeet is dependent on an efficient, reproducible method of direct gene transfer, therefore, our objective was to develop a simple method of genetic transformation. Seeds of Rel-1 were germinated in the dark at 27°C for 3 weeks on medium containing 1.0 mg/l 6-benzylaminopurine (BA) and 0.5 mg/l 2,3,5-triiodobenzoic acid. The seedlings were then transferred to 4°C for cold treatment and storage. After 2 months, the shoots were isolated, the leaves trimmed close to the stem, then incubated for 10 days in the dark at 27°C on a high-auxin containing medium. Following the incubation, the shoots were cut through the longitudinal axis, placed cut-side-up on medium containing osmotica, 0.3 mg/l BA, and 0.1 mg/l naphthaleneacetic acid. The tissue was bombarded with gold particles coated with a plasmid containing one of four pathogen-response genes. Half of the explants were then incubated in an *Agrobacterium* culture for 20 min. After a two-day cocultivation on the same medium supplemented with 100 µM acetosyringone, the explants were washed, placed on medium containing either 1.0 or 2.0 mg/l BA, 100 mg/l kanamycin and 300 mg/l cefotaxime and incubated in the light at 25°C. After 4 weeks green organogenic calli appeared on the explant tissue. Only the tissue inoculated with *Agrobacterium* showed regeneration, and from 10 explants 0-5 calli were produced. Generally, regeneration was better on the medium supplemented with 2.0 mg/l BA, with the controls producing only nonorganogenic green calli.