

# TREATMENT OF SOIL WITH BRIGHT SUN SOIL BOOSTER<sup>1</sup> AND POLYACRYLAMIDE<sup>1</sup> AS SOIL CONDITIONERS FOR IMPROVED SEEDLING EMERGENCE

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## Introduction

Surface crusting of soil after planting can result in poor emergence and reduced stands. The use of polysaccharides and polyelectrolytes for soil conditioning has been found to improve seedling emergence. This trial evaluated the use of a molasses and nutrient based soil conditioner (Bright Sun Soil Booster<sup>1</sup>, Cargill Inc., Minneapolis, MN) and a polyacrylamide soil conditioner (P.A.M.<sup>1</sup>, Complete Green Co., El Segundo, CA) applied in the planting row for improvement of seedling emergence.

## Procedures

The trial was conducted in two fields, a Nyssa silt loam and an Owyhee silt loam, using identical procedures. Both fields had been planted to spring wheat during 1992. Wheat stubble was disked and plowed. The soil was bedded into 22 inch rows. Planting depth was 1.0 inch. Soil conditioner treatments were the main plots and each was replicated five times in each field ([Table 1](#)). Four crop species were planted as split plots in each of the main plots. The crops used were broccoli cultivar "Packman", onion cultivar "Great Scott", sugar beet cultivar "HM PM 9" and tomato cultivar "Nema 512". One hundred seeds of each of the four crops were planted in 25 foot by four row plots on September 2 and 3 using an Almaco cone seeder on a John Deere flexi-planter. The soil conditioner applicator was mounted on the planter.

The soil conditioner treatments were diluted in water and applied in the planting row on the soil above the seed just after seed drop. The total liquid application rate was 80 gal/acre. Rhodamine B red dye was mixed with all treatments at the rate of 750 g/ac in order to locate, measure, and photograph the soil conditioner distribution pattern. Both fields were irrigated the day after planting with two lines of solid set sprinklers on each side of the field. Each field was irrigated for six hours at a rate of one inch of water per hour to intentionally crust the soil. Emergence counts were taken on September 11, 14, 17, 21, and 24. Ten soil strength readings (pocket penetrometer CL-700, Soiltest Inc., Chicago, IL) were taken in the planting row in the unplanted but treated area of each plot on September 15 for the Nyssa silt loam and September 21 for the Owyhee silt loam.

<sup>1</sup>The use of certain products does not constitute an endorsement by Oregon State University.

## Results and Discussion

The average maximum and minimum soil temperature at four inch depth between September 4 and September 14 was 76.4 and 65.1°F respectively. The application of the soil conditioners to the soil resulted in a V shape distribution of the water, dye, and soil conditioner in the top of the soil averaging 0.65 inches wide at the top and 0.87 inches deep for the Nyssa silt loam and a U shape distribution in the Owyhee silt loam averaging 0.53 inches wide by 0.77 inches deep.

Emergence was higher on the Owyhee silt loam than on the Nyssa silt loam (data not shown). Soil type did not alter the treatment effect on emergence. Soil treatment with either the Bright Sun or P.A.M. resulted in a significant improvement of sugar beet seedling emergence ([Table 1](#)). The other crops did not show a response to the soil conditioners. Broccoli emerged very quickly before the soil dried. Tomatoes and onions emerged slowly and irregularly due to cool soil temperatures and soil drying. The average strength of the soil crust was reduced by both soil conditioners ([Table 1](#)).

Table 1. Emergence of sugar beet seedlings and average soil strength readings in response to low rates of soil conditioners applied in the planting row. Malheur Experiment Station, Oregon State University, Ontario, OR, 1992.

Treatment	Emergence by days after planting			Maximum Penetrometer reading g/cm <sup>2</sup>
	8	11	14	
	----- % -----			

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Water	28.2	46.6	43.3	47.5	1.89
Bright Sun 0.96 gal/ac	32.2	51.2	51	55.2	1.89
Bright Sun 1.91 gal/ac	33.2	53.7	54.6	56.4	1.78
Bright Sun 3.82 gal/ac	26.2	41.5	43.8	45.7	1.44
P.A.M. 0.36 g/ac	23.3	37.5	42.9	45.6	1.93
P.A.M. 3.62 g/ac	38	55.4	55.9	57.6	1.53
P.A.M. 36.2 g/ac	35.4	53.9	51.3	54.8	1.36
LSD(0.05)	9.1	10.5	9.6	9.7	0.36

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