ALABAMA SOYBEAN PRODUCERS
Soybean Project Report, 2008

TITLE: New Soybean Inoculants for Alabama

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Effective infection of soybean roots by rhizobia bacteria (*Bradyrhizobium japonicum)* is critical for nitrogen fixation, and high yields of soybeans without the addition of expensive nitrogen fertilizer. Several new rhizobia inoculants have been introduced in recent years, with claims that they are more effective than existing strains or native soil rhizobia. The objective of this study was to evaluate several new commercial formulations of rhizobia inoculants under Alabama growing conditions.

Experiments were conducted in 2008 at three Experiment Stations locations with and without a recent history of soybean production. Fields at EV Smith Field Crops Unit (EVS) and Sand Mountain REC (SMS) did not have soybeans planted in the last 5 years, while the field at Plant Breeding Unit (PBU) was planted in soybeans in 2007. A Randomized Complete Block Design was used, with 4 replications and 4 rows of 30 to 36-inch rows * 20-25 ft. long. Experiments at EVS and PBU were irrigated as needed to prevent extreme stress from dry weather. Soybean seed were inoculated less than 24 hours before planting with inoculants according to manufacturers' recommendations. Formulations included peat-based, sterile-peat based and liquids. Planters were sterilized between treatments with 95% ethyl alcohol and allowed to dry before the next treatment was planted. The number of viable rhizobia in each inoculant was determined by plate counts using Mannitol-Yeast extract-Congo red agar media (Table 1). The numbers of viable rhizobia in inoculants were similar to labeled values with the exception of Vault LVL and Rhizo-Stick, which were approximately 2 orders of magnitude (100X) lower. Roots of five plants from each of the outside rows (10 per plot) were dug approximately 6 weeks post-plant for nodule counts (Table 1). There were no differences in height, color or other growth parameters noted.

There were no significant differences for nodule count between any of the treatments, even at locations where there was not a recent history of soybean production in the trial fields (EVS and SMS). Nodule counts averaged across inoculated treatments were numerically higher at PBU and SMS (35.8 and 44.6, respectively) than for Untreated Checks, but were highly variable and did not result in higher yields. There were some statistical yield differences at PBU, however, no inoculant treatments yielded higher than the Untreated Check.

Table 1. Nodule Counts and Yield for Soybeans Inoculated with *Bradyrhizobium japonicum* at Planting at Three Locations in Alabama, 2008

		Nodules / plant			Yield (bu/A)		
Treatment	**Type**	**EVS**	**PBU**	**SMS**	**EVS**	**PBU**	**SMS**
Untreated Check	-------	55.6 a	31.2 a	40.5 a	67.5 a	70.8 abc	29.8 a
Optimize with LCO	Liquid	55.4 a	41.5 a	52.4 a	63.2 a	67.6 a-d	27.7 a
Cell-Tech	Liquid	56.3 a	38.5 a	41.3 a	66.8 a	72.2 ab	30.5 a
Nitra-Stick-S	Sterile peat	46.4 a	34.3 a	43.4 a	69.4 a	71.2 ab	30.9 a
Vault NP	Liquid	46.7 a	25.0 a	45.2 a	66.7 a	74.1 a	29.5 a
Vault LVL	Liquid	49.5 a	45.9 a	46.1 a	63.3 a	65.1 bcd	27.6 a
Vault SP	Sterile peat	55.2 a	30.3 a	41.3 a	66.7 a	61.6 d	29.5 a
Rhizo-Stick	Peat	58.8 a	35.6 a	42.4 a	65.5 a	64.1 cd	28.5 a
	LSD(P=0.10)	14.6	13.8	17.2	4.1	6.6	5.8
	CV (%)	22.7	32.2	32.0	5.1	7.9	16.3

Means followed by same letter do not significantly differ *(P=.10, Duncan's New MRT)*