

COTTON (*Gossypium hirsutum* 'Paymaster 1218 BG/RR')
 Seedling disease complex; *Rhizoctonia solani*
Pythium spp.
Fusarium spp.

N.W. Greer, A.J. Palmateer, K.S. McLean,
 M.S. Reddy, and J.W. Kloepper
 Department of Entomology & Plant Pathology
 Auburn University, Auburn, AL 36849

Evaluation of plant growth-promoting rhizobacteria for control of *Pythium* and *Rhizoctonia* in North Alabama, 2001.

A cotton test was planted 11 Apr at the Tennessee Valley Research Center of the Alabama Agricultural Experiment Station near Belle Mina, Alabama. The field site was a Decatur silty loam with a natural infestation of *Rhizoctonia solani*, *Pythium* spp. and *Fusarium* spp. Each plot was also infested with millet seed inoculated with *Pythium* spp. and *Rhizoctonia solani*. There were six plant growth-promoting rhizobacteria PGPR treatments and a non-treated control. Among these PGPR strains, GBO3 was produced as industrially formulated endospores, GBO3 + IN937a was produced similarly and formulated with a chitosan powder, and *Azospirillum brasilense* was in a liquid formulation supplied by Ecosoil Inc. PGPR strains C4-7-12, OCR7-8-38, and 89B61 were produced under laboratory conditions. All PGPR treatments were mixed with tap water to yield 1.7×10^7 cfu/ml. PGPR were applied as in-furrow sprays at time of seeding with an 8002E nozzle mounted on the cotton planter and calibrated to deliver 6 gpa at 18 psi. Plots consisted of 4 rows, 25 ft long with 40 -in. row spacing and were arranged in a randomized complete-block design with six replications. A 20-ft alley separated blocks. Temik 15G (5 lb/a) was applied in-furrow at planting as a nematocide,. Plots were maintained with standard herbicide, insecticide and fertility production practices as recommended by the Alabama Cooperative Extension Service. Healthy stand was recorded at 2, 4, and 7 wk after planting and a skip index was recorded at 7 wk after planting to determine the percent seedling loss and stand density due to cotton seedling diseases. Plots were harvested to determine yield on 27 Sep. Data were analyzed using ANOVA and means were compared using Fischer's protected LSD.

Cotton seedling disease incidence was high in 2001 due to cold, wet conditions. Seedling emergence at 2 wk after planting ranged from 34% to 23% for the non-treated control and *A. brasilense*, respectively. By 7 wk after planting cotton stand ranged from a high of 17% to a low of 10% in the *Azospirillum brasilense* + *Pseudomonas putida* (89B61) and *A. brasilense*, respectively. There was no effect however, by any of the PGPR used on healthy stand of cotton at 2, 4, and 7 wk after planting compared to the non-treated control. PGPR also did not have any effect on skip index rated at 7 wk after planting. No treatment effects were observed on yield of cotton under the conditions tested, although seed cotton yields ranged from 2241.8 to 1837.0 lb/a for the non-treated control and *C. acidovorans* (C4-7-12), respectively.

Treatment/concentration	Healthy stand ^a (plants/25ft)			Skip index ^b	Seed cotton (lb/a ^c)
	26 Apr	9 May	30 May	30 May	27 Sep
Non-treated Control	42.0	28.7	21.5	13.8	2241.8
<i>Bacillus subtilis</i> (GBO3) 1.7×10^7 cfu/ml	29.5	18.7	14.7	16.0	1861.2
<i>B. subtilis</i> (GBO3) 1.7×10^7 cfu /ml + <i>B. amyloliquifaciens</i> (IN937a) 1.7×10^7 cfu /ml.....	33.3	22.8	14.7	14.5	1955.8
<i>Azospirillum brasilense</i> 1.7×10^7 cfu /ml	29.0	16.7	12.7	15.8	1929.4
<i>A. brasilense</i> 1.7×10^7 cfu /ml + <i>Pseudomonas putida</i> (89B61) 1.7×10^7 cfu /ml.....	36.3	30.3	21.8	13.2	1929.4
<i>Comamonas acidovorans</i> (C4-7-12) 1.7×10^7 cfu /ml	38.5	25.2	16.5	15.8	1837.0
<i>C. acidovorans</i> (OCR7-8-38) 1.7×10^7 cfu /ml	37.2	20.2	18.0	14.8	2140.6
LSD ($P = 0.05$)	12.0	12.5	9.0	4.6	373.6

^aMean from six replications with 125 seed per row.

^bMean skip index per 25 ft of row from six replications based on the rating scale: 1 = 1 ft gap; 2 = 2 ft gap; 3 = 3ft gap;... 25 = no plants.

^cMean seed cotton yield from six replications.