

**SOIL/WATER RESEARCH**  
***South Dakota State University***  
**2009 Progress Report**  
Agricultural Experiment Station  
Plant Science Department  
South Dakota State University, Brookings, SD 57007

---

**Biological inoculants and other products for soybeans during 2009.  
(44309 and 44409)**

**A. Bly, H. Woodard, and R. Gelderman**

**Introduction**

Many products other than fertilizers, herbicides and insecticides are available for use on soybeans. They all have one thing in common and that is claims for increasing yield. Most claims for increasing yield are for less than 5 bu/a. The costs for these products are usually small and relative to the promoted yield return, it seems to make sense to use them. However, how do we decide which one to use? Replicated, unbiased research needs to be provided to growers for use in their decision making. Therefore, a research project was initiated to evaluate several biological inoculants and other products for use on soybeans.

## Materials and Methods

Item	Description
Locations	SE Research Farm near Beresford Brookings
Treatments / Products tested	Check – no treatment applied Jumpstart, seed applied (57 g in 3500 ml water on 2500 lbs seed) TAG Team, seed applied (1.26 ml solution on 1 lb seed) TJ Quick Roots, seed applied (7.8 g on 150,000 seeds) Bin Buster XP, seed placed (5 oz/a in 5 gpa water) Bin buster XP, foliar at V3 growth stage (9 oz/a in 15 gpa water) Rootastic, seed applied (1.44 g on 1 lb seed) Vault, seed applied (0.92 ml on 1 lb seed) SoyScience, foliar at V3 growth stage (2 qts/a in 15 gpa water)
Varieties	All products (treatments) applied. SE Research Farm (Asgrow 2108 RR) Brookings (Asgrow 1403 RR)
Product components/contents	See Table 1
Row Spacing / planting rate	30 inch (150,000 seeds/a)
Planting date	Beresford (May 26) Brookings (May 19)
Plot size	5 ft x 40 ft
Crop Rotation	Corn/Soybean
V4 plant samples	Plant and root dry weight, and nodule count of 8 plants/plot. From the check, Jumpstart, TJ Quick Roots and Bin BusterXP foliar treatment plots.
Harvest date	SE Research Farm (October 19) Brookings (September 30)
Plot design and statistics	RCBD, 6 replications, ANOVA

## Results and Discussion

The source and components / contents of the products tested are given in table 1. No significant differences were found at the V4 growth stage for plant dry weight, root dry weight or nodules at either site for the products that were sampled (Table 2). Grain yield was not significantly influenced by any of the products tested (Table 3). In addition, any additive effect of using all the products together was not significantly different from the check.

## Acknowledgments

This project partially supported by the South Dakota Soybean Research and Promotion Council, the SD Ag. Experiment Station, and the SDSU Soil and Plant Testing Laboratory. Thank you to Kelsey Seed and Ag. Service for providing the SoyScience. Thank you to Olbertson's Quad State Soil Service for providing the Bin Buster XP.

Table 1. Product list for soybean studies at SE Research farm (Beresford) and Brookings SD in 2009. (44309 and 44409)

Product	Company	Components / contents
Bin Buster XP	No-Till Farms, Kalispell MT	Agricultural surfactant
Jumpstart	Novozymes, Saskatoon SK	$7.2 \times 10^8$ cfu/g Penicillium bilaii
TAG TEAM	Novozymes, Saskatoon SK	$7.2 \times 10^8$ cfu/g Penicillium bilaii
TJ Quick Roots (soybean)	TJ Technologies, Brookings SD	$2.0 \times 10^9$ cfu/g Bradyrhizobium japonicum
Vault LVL	Becker Underwood, Ames IA	$2.5 \times 10^9$ cfu/g Bacillus amyloliquefaciens
Rootastic	Agronomy Sciences, advertised by AgPhd, Hefty seed company	$5 \times 10^8$ cfu/g Trichoderma virens
SoyScience	AgExplore Int., Cape Girardeau MO	$5.9 \times 10^9$ cfu/g Bradyrhizobium japonicum
		Integral biological fungicide – Bacillus Subtilis
		$4 \times 10^9$ Brady rhizobium japonicum
		4-0-18-0.5B-2.5Mn

Table 2. Influence of several biological inoculants and other products for soybeans on soybean V4 plant dry weight, root weight and nodule count at SE Research Farm and Brookings in 2009. (44309 and 44409)

Treatment	Mean Plant dry wt. <sup>A</sup>		Mean Root dry wt. <sup>B</sup>		Mean Nodules / plant <sup>C</sup>	
	SE Farm	Brookings	SE Farm	Brookings	SE Farm	Brookings
	g / plant		g / plant		# / plant	
1 - check	1.3	1.3	0.13	0.34	10.7	18.9
2 – Jumpstart <sup>D</sup>	1.4	1.3	0.21	0.35	10.3	19.6
4 – TJ Quick Roots <sup>E</sup>	1.2	1.1	0.17	0.31	10.1	18.5
5 – Bin Buster XP (9 oz/a foliar) <sup>F</sup>	1.0	0.9	0.14	0.29	10.6	20.1
Pr>F	0.65	0.12	0.21	0.17	0.96	0.77
CV (%)	42	25	44	16	21	15
LSD	NS	NS	NS	NS	NS	NS

<sup>A,B and C</sup> Mean of 8 plants at V4 growth stage extracted from plot row, plant shoots and roots (washed), dried, weighed and nodules counted.

<sup>D</sup> applied to seed prior to planting at: 57 g Jumpstart in 3,500 ml H<sub>2</sub>O on 2500 lbs seed

<sup>E</sup> applied to seed prior to planting at: 1 enclosed scoop (7.8g) on 150,000 seeds

<sup>F</sup> applied in 15 gpa H<sub>2</sub>O at V3 growth stage

SE farm planted 5-26-09, Asgrow 2108RR (150,000 seeds/a)

Brookings planted 5-19-09, Asgrow 1403RR (150,000 seeds/a)

Conventional tillage both sites.

RCBD (6 replications)

Table 3. Influence of several biological inoculants and other products for soybeans on soybean grain yield at SE Research farm and Brookings in 2009. (44309 and 44409)

Treatment	Mean Grain Yield (13 % moisture)	
	SE Farm	Brookings
	----- bu/a -----	
1 - check	61.4	46.1
2 – Jumpstart <sup>A</sup>	58.7	46.6
3 – TAG Team <sup>B</sup>	59.1	44.1
4 – TJ Quick Roots <sup>C</sup>	59.6	45.4
5 – Bin Buster XP (9 oz/a foliar) <sup>D</sup>	58.1	42.8
6 – Rootastic <sup>E</sup>	59.8	45.9
7 – Vault <sup>F</sup>	58.5	44.8
8 – SoyScience (2 qts/a foliar) <sup>G</sup>	56.9	43.8
9 – All products <sup>H</sup>	58.0	44.0
10 – Bin Buster XP (5 oz/a seed) <sup>I</sup>	57.0	not used
Pr>F	0.39	0.12
CV (%)	5.4	5.2
LSD	NS	NS

<sup>A</sup> applied to seed prior to planting at: 57 g Jumpstart in 3,500 ml H<sub>2</sub>O on 2500 lbs seed

<sup>B</sup> Premix liquid applied to seed prior to planting at: 1.26 ml solution per 1 lb seed

<sup>C</sup> applied to seed prior to planting at: 1 enclosed scoop (7.8 g) on 150,000 seeds

<sup>D</sup> applied in 15 gpa H<sub>2</sub>O at V3 growth stage.

<sup>E</sup> applied to seed prior to planting at: (1.44 g per 1 lb seed)

<sup>F</sup> Premix liquid applied to seed at: (0.92 ml per 1 lb seed)

<sup>G</sup> applied in 15 gpa H<sub>2</sub>O at V3 growth stage.

<sup>H</sup> all products applied to treatment plots including trts 5 and 10 at SE farm.

<sup>I</sup> applied in 5 gpa H<sub>2</sub>O in seed furrow at planting.

SE farm planted 5-26-09, Asgrow 2108RR (150,000 seeds/a)

Brookings planted 5-19-09, Asgrow 1403RR (150,000 seeds/a)

Conventional tillage both sites.

RCBD (6 replications)