

**SOIL/WATER RESEARCH**  
**South Dakota State University**  
**2008 Progress Report**

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**Biological seed inoculant influence on winter wheat growth, yield, and quality, Stanley, Co. SD, 2008.**

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Numerous biological inoculants are available to crop producers. Claims include increased plant growth and nutrient uptake. JumpStart is produced by Novozyme and is a seed inoculant containing the fungus *Penicillium belaii*. The company indicates the fungi releases organic acids that reduce pH near the root zone, releasing soil P for additional plant uptake.

A strip trial was used to test this product in Stanley Co. South Dakota. on the D. Neuharth farm approximately 25 mi. west of Pierre SD. The test crop was Expedition winter wheat planted on September 21, 2007. The inoculant was applied to the seed at the recommended rate.

Two trials were completed with the following treatments:

Trial one: Normal Practice

1) P<sub>2</sub>O<sub>5</sub> (30 lb/a) N (70 lb/a) applied at seeding (1/3 with the seed; 2/3 sideband) , no JumpStart.

2) P<sub>2</sub>O<sub>5</sub> (30 lb/a) N (70 lb/a) applied at seeding (1/3 with the seed; 2/3 sideband) JumpStart on the seed.

Trial two: No P fertilizer used

1) No P at seeding, N (70 lb/a) surface stripped in spring, no JumpStart.

2) No P at seeding, N (70 lb/a) surface stripped in spring, with JumpStart on the seed.

Four replications were used with strip length 576 to 1155 ft. and width 80 ft. Harvest width was 80 ft. and completed on July 28. A weigh wagon was used to measure grain weight.

Spring soil tests indicated high nitrate-N (160-220 lb/a in 2ft., very low Olsen P tests (3-4 ppm), very high potassium levels and pH of 7.8 – 7.9.

## **Results**

Table 1. Influence of JumpStart on winter wheat, Stanley Co., SD, 2008

Fertilizer Treatment	JumpStart	Early growth <sup>1</sup>			yield	protein	test wt.
		dry weight	P conc.	P uptake			
		grams	%	mg	bu/a	%	lb/bu
<b>Normal Practice</b>							
P at seeding <sup>2</sup>	no	22.7	0.30	68.5	46.4	12.1	59.6
P at seeding	yes	27.9	0.26	75.3	47.2	11.9	59.9
Statistics Pr>F		0.24 (NS)	0.21(NS)	0.73(NS)	0.81(NS)	0.13(NS)	0.36(NS)
<b>No P Trial</b>							
No P at seeding <sup>3</sup>	no	18.6	0.29	55.6	40.2	12.1	58.2
No P at seeding	yes	15.8	0.29	45.4	43.8	12.2	57.2
Statistics Pr>F		0.61(NS)	0.98(NS)	0.51(NS)	0.44(NS)	0.13(NS)	0.39(NS)

<sup>1</sup> one meter of row cut at jointing on May 21, 2008

<sup>2</sup> 70-30-0 applied at seeding

<sup>3</sup> 70-0-0 stripped in spring

The addition of JumpStart produced no significant differences in any of the parameters measured including early growth and grain yield (Table 1). There was an increase of 3.6 bu/a for the inoculant addition in trial two. However, this difference was not significant nor was there any trend for increased early growth or uptake of P with the inoculant. There was a trend for increased early growth and yield for the normal practice treatments

presumably because of the added P and/or the N timing/placement method.

This field has been in continuous, low-disturbance no-till and good rotations for many years. The reason that there was little or no response to inoculation with *Penicillium belaii* indicates that there may already be a robust population of these or similar organisms. There are probably populations of VAM as well.