

Seed Treatments

Doug Alert and **Margaret Smith** (Hampton) grow soybeans once in their five-year rotation. They wondered whether under those conditions there is a significant benefit to inoculating soybean seed with a fresh dose of the Rhizobia bacteria that fix nitrogen for the crop. But the term "significant" can mean different things. In research, statistical significance means a result that would be unlikely to occur by chance. In PFI trials, "unlikely to occur by chance" typically means an outcome that would occur less than 5 percent of the time



Margaret Smith braving the sun at a PFI field day.

even if the treatments had no effect. By that definition of "significant," soybean inoculant didn't quite improve yield. There is roughly a 7 percent chance that the 0.6-bushel yield difference was a random occurrence given our assumptions ([Table 4, click to view](#)). Most agricultural researchers would say this yield difference is at least great enough to merit another trial. But if you define significant as "meaningful or important," six-tenths of a bushel doesn't make it for Doug. He probably will not take the trouble to inoculate soybeans in the future.

Seed treatments of another kind have been getting much attention from organic farmers lately. Organic farmers use seed that has not been treated with synthetic fungicides. As a result, they usually plant later in the spring,

when warmer soil gives the seed an advantage over organisms that would attack it. These organic farmers have to choose between a shorter growing season and the risk that cold stress or mechanical damage will allow seed pathogens to devastate the crop. Wouldn't it be nice if there were a natural product that would protect the seed?

Researchers have sought an organically acceptable seed treatments for years. A recent entry is a product called Natural II, from Agricoat Industries. The **Neely-Kinyon Research Farm** (Greenfield) and ISU organics specialist Kathleen Delate have evaluated Natural II, a product many organic growers have received on corn from Blue River Hybrids in recent years.

As [Table 4 \(click to view\)](#) shows, results were very different in three years of trials at Neely-Kinyon. In 2005 the Natural II treatment yielded 10.6 bushels more than the untreated control. In 2006 and 2007, although organic corn yields were excellent, the seed treatment made no significant difference in yield. Were conditions in the spring of 2005 different? Figure 2 shows that precipitation during the 2005 planting season falls right between the precipitation for 2006 and 2007, so 2005 was not extreme in that sense.

More years of evaluation will be needed to really define the benefit of this product, but snafus led to Natural II being unavailable in parts of Iowa in 2007. Meanwhile, PFI and ISU assistant professor of seed science Susana Goggi have secured support from the Environmental Protection Agency to evaluate non-toxic seed treatments based on plant essential oils in 2008.

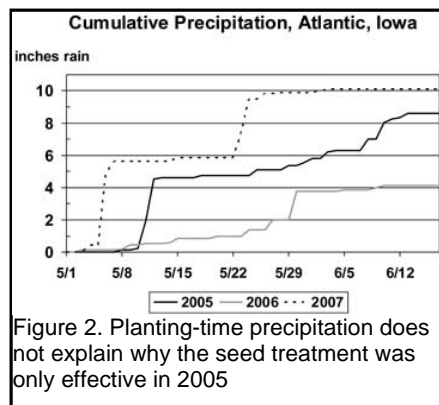


Figure 2. Planting-time precipitation does not explain why the seed treatment was only effective in 2005

Table 4. Seed Treatment Trials

Seed Treatment Trials

COOPERATOR	CROP	TREATMENT "A"			TREATMENT "B"			DIFFERENCE				COMMENT
		DESCRIPTION	YIELD (bu.)	TREATMENT COST	DESCRIPTION	YIELD (bu.)	TREATMENT COST	YIELD DIFF.	YLD LSD (bu.)	YLD SIG.	\$ BENEFIT OF TRT "A"	
ALERT (2006)	SOYBEAN	INOCULATED SEED	51.0	\$1.62	NO INOCULANT	50.3	\$0.00	0.6	0.7	N.S.	(\$1.62)	JUST SHORT OF 95% CONFIDENCE. IF REAL DIFF, THEN INOCULANT PROFITABLE
NEELY-KINYON (2005)	CORN	NATURAL II SEED TRT	183.4	\$48.64	CONTROL	172.8	\$44.80	10.6	8.2	*	\$51.80	SIGNIFICANT POSITIVE EFFECT ONE YEAR OUT OF THE THREE.
NEELY-KINYON (2006)	CORN	TREATED SEED, NATURAL II	194.5	\$4.80	UNTREATED CONTROL	196.5	\$0.00	-2.0	6.6	N.S.	(\$4.80)	
NEELY-KINYON (2007)	CORN	NATURAL II SEED TRT	183.5	\$4.80	UNTREATED	179.4	\$0.00	4.1	11.4	N.S.	(\$4.80)	