



BioGuard Seed Treatment for Organic Corn

In a Nutshell:

- While there are many biological products on the market, few are organic certified.
- BioGuard is an OMRI-listed biological that is advertised to reduce insect feeding and fungal disease damage and improve emergence, plant stand uniformity, and plant nutrient uptake.
- Organic farmers Doug Alert & Margaret Smith, Matthew Fitzgerald, Eric Madsen and Scott Shriver decided to trial BioGuard on their farms and determine whether it had any effect on corn population or yield.

Key Findings:

- Neither Alert & Smith nor Shriver found any differences in corn population or corn yield with BioGuard, even in a very wet year.
- Fitzgerald's and Madsen's replicated trials were both flooded and abandoned. However, they replanted single-strip observation trials where they observed no differences in corn growth or yield.
- All farmers concluded that they will not continue to use BioGuard.

BACKGROUND

Organic row crop farmers have few product options for pest and disease management. BioGuard is a relatively new biological seed coating that is OMRI-listed and advertised as reducing insect feeding and fungal disease damage as well as supporting plant growth throughout the corn life cycle. Intrigued by these promises but also leery of the product's price tag, PFI farmers Doug Alert & Margaret Smith, Matthew Fitzgerald, Eric Madsen and Scott Shriver decided to test BioGuard's effects on corn planting population, yield and return-in-investment through rigorous research trials on their farms. At the outset, Shriver said that "This trial will help me decide if using the BioGuard seed treatment will be something I want to use (or not use) in future."

It is important to note that while BioGuard is OMRI-listed, the farmers had to get permission from their organic certifier before using the product.

METHODS

Design

Fitzgerald and Madsen were unable to plant replicated trials due to seed availability and time constraints while planting/replanting in a very wet season. Alert & Smith and Shriver each planted corn in two treatments, BioGuard (applied as seed coating with 1r) and control (only 1r), in spring of 2025. 1r is also a biologically-derived seed coating that is advertised as protecting seeds from pathogens and improve nutrient uptake. Seed treated only with BioGuard was not available. Planting

and management details on each farm are presented in **Table 1**. Seed came pre-treated to the manufacturer's specifications. Cooperators established treatments in randomized, paired strips: 2 treatments × 6 replications = 12 strips total (**Figure A1**).

TABLE 1: Corn management practices at Alert & Smith's and Shriver's in 2025.

	ALERT & SMITH	SHRIVER
Previous crop	Soybeans	Soybeans
Cover crop planting	Winter rye and hairy vetch	None
Cover crop termination	Apr. 16: Rotavator	None
Strip size	2,350 ft x 40 ft	
Pre-plant tillage	May 14	May 7
Corn planting date	May 15	May 8 35,000 plants per acre on 30 in. rows
Fertilizer	Apr. 16 2 tons/ac chicken litter	Apr. 1 5,700 gal/ac liquid hog manure
Weed management	May 17 and 25: rotary hoe June 8: Flame Weeder June 22 and 29: cultivate	May 12 and 28: rotary hoe Jun. 2, 11 and 21: cultivate
Corn harvest	Nov. 7	Oct. 8

Cooperators

Doug Alert and Margaret Smith – Hampton, IA

Matthew Fitzgerald – Glencoe, MN

Eric Madsen – Audubon, IA

Scott Shriver – Jefferson, IA

Funding

Builders Vision Philanthropy

Measurements

To measure plant population, farmers counted number of plants in two, 17-foot and 5-inch row sections in each replicate. At harvest, farmers recorded grain yield and moisture using a yield monitor or weigh wagon. Reported corn yields are corrected to 15.5% moisture. Farmers also documented costs of equipment passes and applied products.

Data Analysis

We used an ANOVA (Analysis of Variance) at a 95% confidence level to determine if there were significant differences in plant population and yield between BioGuard and control treatments. This means that any treatments we declare statistically different would be expected to occur 95 times out of 100 under the same conditions. We can perform this analysis because the cooperators had completely randomized and replicated experimental designs (Figure A1).

RESULTS AND DISCUSSION

Neither Alert & Smith nor Shriver saw any differences in plant population or corn yield between BioGuard and control treatments (Table 2). BioGuard seed treatment cost \$17.50/ac in 2025, meaning that there was a relative net loss of \$17.50/ac from the treatment. Anecdotally, Fitzgerald and Madsen also did not observe any differences in corn growth or yield between BioGuard and the control in their unreplicated check strips on the product, which were replanted after their full trials flooded.

Farmers were unsurprised to find no difference in yield between the two treatments, though they were somewhat surprised that there were no differences in plant population in any of the trials. Fitzgerald summed up the conclusions of the group succinctly. “There was no impact observed from seed treatment. We’re unlikely to change our management practices (i.e., adopt BioGuard broadly).”

TABLE 2: Corn plant population and yield in BioGuard and Control treatments at Doug Alert & Margaret Smith’s and Scott Shriver’s in 2025. Statistical analysis revealed no significant differences in plant population or yield between treatments at either farm at the 95% confidence level.

	ALERT & SMITH		SHRIVER	
	Plant population (no./ac)	Yield (bu/ac)	Plant population (no./ac)	Yield (bu/ac)
BioGuard	29,500	179	29,333	169
Control	30,667	178	31,083	167

CONCLUSIONS AND NEXT STEPS

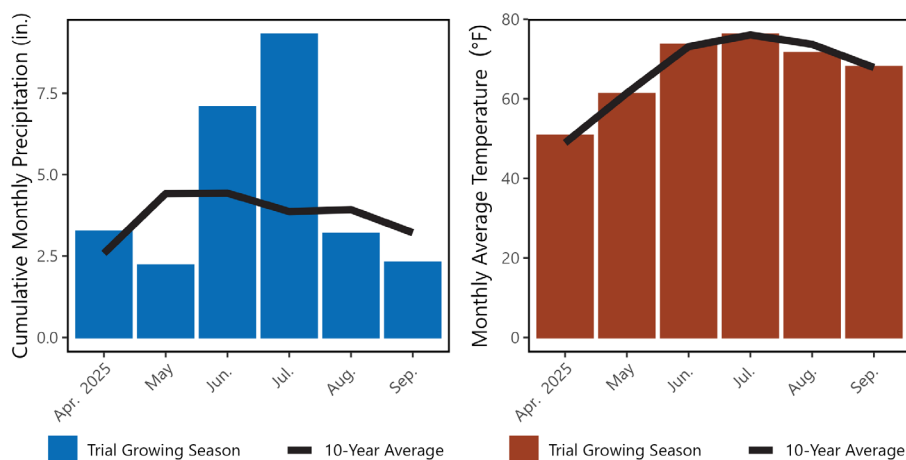
BioGuard did not provide any plant population increase or yield increase, and reduced financial returns at both Alert & Smith or Shriver’s. Past PFI research on other biological and biostimulant products in organic and conventional corn and soybean production have generally reached similar conclusions [1], [2], [3]. Participating farmers report that they will not continue to use BioGuard in the future. PFI will continue to support farmers in testing the effects of biological and biostimulant treatments as new products come on the market.

APPENDIX – TRIAL DESIGN AND WEATHER CONDITIONS

	Control	BioGuard	BioGuard	Control	Control	BioGuard	BioGuard	Control	BioGuard	Control	Control	BioGuard
STRIP	1	2	3	4	5	6	7	8	9	10	11	12
REP	1		2		3		4		5		6	

FIGURE A1. Example 6-replicate experimental design used by trial participants.

Shriver



Smith, Alert

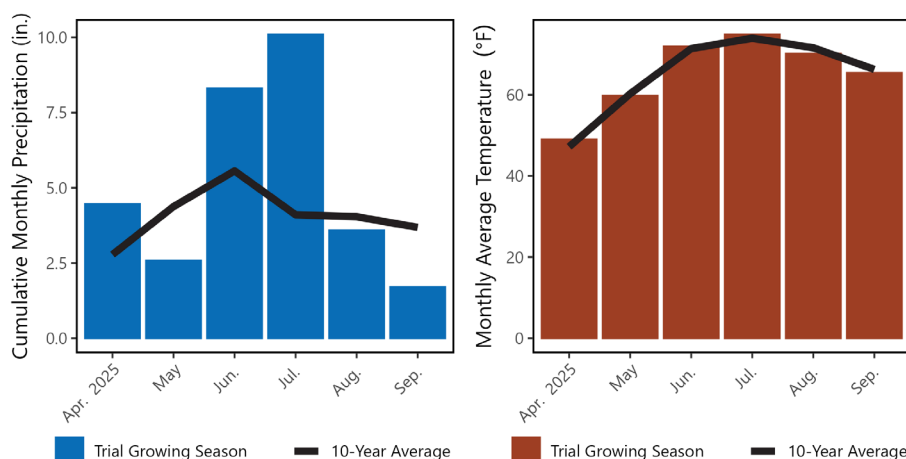


FIGURE A2. Modelled mean monthly temperature and rainfall at each trial site during the study period and the ten-year historic averages. Data is from the NasaPOWER climate dataset. [4], [5]

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PFI COOPERATORS' PROGRAM

PFI's Cooperators' Program helps farmers find practical answers and make informed decisions through on-farm research projects.

The Cooperators' Program began in 1987 with farmers looking to save money through more judicious use of inputs.

If you are interested in conducting an on-farm trial contact Stefan Gailans @ 515-232-5661 or stefan@practicalfarmers.org.