

Biological Seed Coatings Influence on Soil and Plant Health

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Introduction

Seed treatments have been applied since the 17th century, and since the 1990s have been revamped and exponentially increasing in use. Biological seed treatments have gained the most spotlight due to their connection with soil health, mainly in terms of potential beneficial relationships within soil biota and increasing soil health in general. BASF has developed a biological seed treatment called Poncho® Votivo® 2.0 (PV2.0), which is marketed to improve yields by improving soil health, making nutrients more plant available. Other potential benefits include protecting roots from harmful nematodes and stimulating root growth at earlier stages to increase plant vigor.

The goal was to evaluate both chemical and biological seed treatment effectiveness across four site years (two sites and two years) and four common maize (*Zea mays* L.) hybrids.

The major research questions are:

- 1) How do chemical and biological seed treatments impact maize growth and quality?
- 2) Do hybrid and environment influence the effectiveness of seed treatments?

Materials and Methods

This experiment is located in central and northwest Iowa in a randomized block design. Only the northwest Iowa location is presented here. The corn seeds used have five predefined concentrations and combinations of the PV 2.0 product, a non-coated seed with base fungicide treatment and a complete control seed with no treatments (Table 1). In addition to the treatments, there are two different hybrids per location. In northwest Iowa, the following hybrids were used—M104SSTX1 (hybrid Y) and M103SSTX (hybrid Z). This planting followed soybean and was planted in 30-in. rows with a seeding rate of 35,000 seeds/acre. Furthermore, 150 lb of N/acre was applied pre-planting.

Results and Discussion

Both hybrids showed significant treatment differences in grain yield (Figure 1) compared with the control of untreated seed (P-value 0.049), and marginal effects when comparing with base fungicide control (P-value 0.1185).

The yield for hybrid Y ranged from 217 to 260 bushels/acre with an average yield of 237 bushels/acre. For hybrid Z, yields ranged from 204 to 255 bushel/acre with an average of 228 bushels/acre.

Acknowledgements

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Table 1. Seed treatment descriptions. ^a	
Category	Treatments
Control	Untreated Seed
	Base Fungicide (BF)
Chemical	BF + Poncho at .25mg/seed
	BF + Poncho at .5mg/seed
Biological	BF + Poncho at .5 mg/seed + Votivo
	BF + Poncho at .5mg/seed + Votivo + 2.0

^aSeed treatments descriptions: Untreated, Base, P25, P5, P5V, P5V2, respectively.

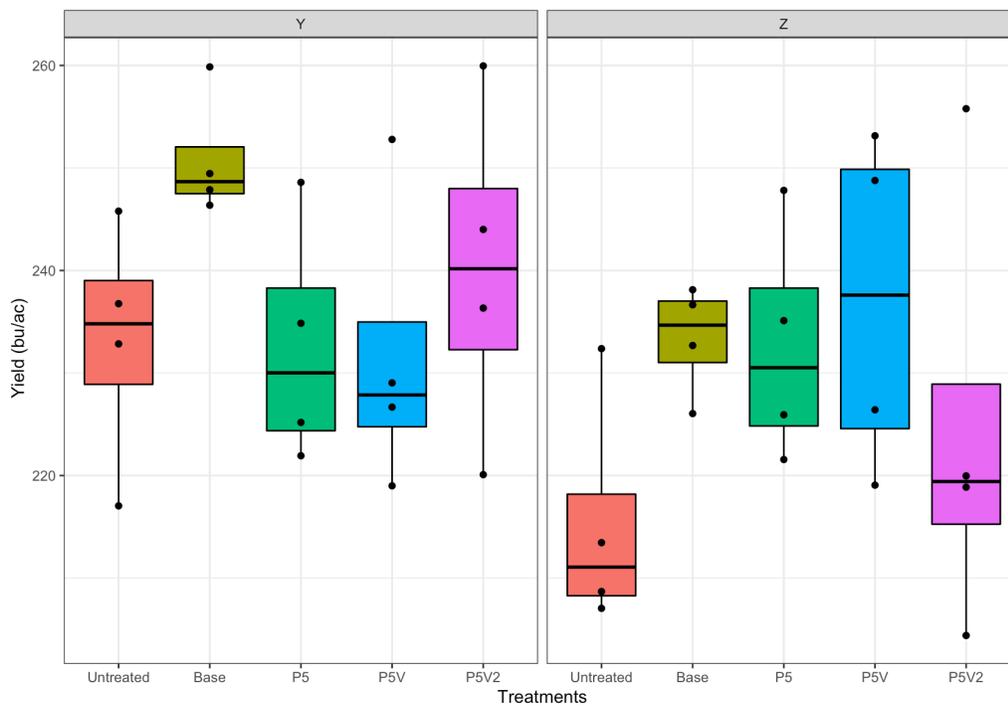


Figure 1. Corn grain yield response with chemical and biological seed treatments as compared with no seed treatment (untreated) and base fungicide (BF) seed treatment controls at Sutherland, Iowa, 2020.

