Use of Biological Seed Treatments for Improved Seedling Establishment and Disease Control in Sweet Corn

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Introduction

This project focuses on the use of organic/biological seed treatments for optimum stand establishment of sweet corn. Traditional seed treatments, due to their composition, cannot be used in organic production systems. Use of untreated seed often reduces seed germination and field stands. Organic/biological treatments may be useful to organic and transitional farmers when direct-seeding crops such as sweet corn. This project assessed establishment when sown under lab and field conditions.

Materials and Methods

Sweet corn 'Obsession' seed (sh_2) was treated with various biological treatments: (Green Guard™, Actinovate®, Delaw1 strain) as well as Thiram, an untreated control and a water control. Seeds were tested in the lab using standard germination (25°C for seven days) and cold tests (seven days at 10°C, then four days at 25°C). Field plots were established on a Rimer loamy fine sand at the OSU/OARDC North Central Ag Research Station (NCARS), Fremont, OH. Fifty seeds per plot were planted 6 inches apart with 30 inches spacing between rows. All treatments were replicated four times. Seed treatments were applied on June 16 and plots were seeded on June 18. Soil temperature (2-inch depth) at planting was 61.3°F (16.3°C). Stand counts were taken on July 15.

Results

There were no significant differences due to seed treatment in standard germination or laboratory cold tests. Field stand counts showed a significantly higher percent germination/stand (92-93%) for seeds treated with Actinovate®, the untreated control, and the water control (Table 1). Delaw1 (90%) and Green Guard (85%) presented intermediate levels of seedling establishment. Thiram-treated seed had the lowest percent stand (Table 1). Soil temperature stress was minimal for the 2008 field studies, and lower seedling establishment levels are typically observed when planting untreated sweet corn seed. Future studies in Ohio with a wider range of sweet corn germplasm and biological seed treatments under cooler soil conditions (50-60°F) are needed.

Conclusion

Growers looking to grow produce in a more sustainable and reliable manner can benefit from effective seed treatments for uniform seedling establishment and disease control. This would especially be important to those looking to transition to organic production

where traditional seed treatments are not labeled for organic production. Additional work is needed to provide more data on these and other treatments.

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Table 1. Effect of various seed treatments on standard laboratory germination and cold test results, and seedling establishment (4 WAS) in the field of an *sh*$_2$ sweet corn cultivar ('Obsession'), Fremont, OH – 2008.

Seed Treatment	Active Ingredient/Beneficial Microorganism	Std. germ (%)	Cold test (%) germ	Field stand count (%)
Control		99	99	93
Water Control		99	95	92
Thiram	*Tetramethylthiuram disulfide*	100	96	77
Green Guard™	*Metarhizium anisopliae*	100	99	85
Actinovate®	*Streptomyces lydicus*	99	95	92
Delaw1	*Pseudomonas fluorescens*	100	96	90
LSD (0.05)		NS	NS	2.01
p value		0.701	0.29	
CV		1.3	3.6	9.5