

# Organic/Transitional Edamame (Vegetable Soybean) and Sweet Corn Seedling Establishment — 2007

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## Introduction

This project focuses on the use of organic/biological seed treatments for optimum stand establishment of sweet corn and edamame. 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 and edamame. This project assessed establishment when sown under lab, greenhouse conditions, and field seedling establishment to maximize agronomic and horticultural usefulness.

## Materials and Methods

Sweet corn ('Xtra-tender 272A') and edamame ('Envy') seed were treated with various biological treatments: Champion, PlantShield<sup>®</sup> HC, and *Pseudomonas fluorescens* strain Delaw 1 (*Pfl*) in three formulations (A, C, D) which differed only in the age and moisture content of the inoculum. All three formulations of *P. fluorescens* are suitable for organic production. Laboratory standard germination tests and cold tests (five replications of 50 seeds) were performed on treated seeds and an untreated control. Seeds were also planted in plug trays in four replications of 50 seeds. Trays were put into a germinator at 60°F for 4 days (8 hours light, 16 hours dark). Trays were then transferred to a greenhouse bench and grown for an additional 7 days. Stand counts were recorded and 10 plants from each replication were sampled for dry weight accumulation. Field plots were also established at an organic grower site near Fremont, Ohio. Plots were mechanically seeded using five replications on June 11. Edamame seeds were planted in 30-inch rows at a population of 120 seeds per plot. Sweet corn was planted in 30-inch rows at a population of 60 seeds per plot. Stand counts were recorded on July 20. Statistical analysis was performed for data sets with missing data. Due to a planter malfunction, some treatments (in the field study only) are averaged over two to four reps.

## Results

Sweet corn showed significant differences for standard germination, cold tests, and plug tray emergence but not for seedling dry weights among the seed treatments (Table 1). *Pfl* formulations A and C were promising treatments in the sweet corn cold test and plug tray assessments. There were significant treatment differences for edamame ('Envy') plug tray emergence and seedling dry weights, but no differences among seed treatments for laboratory cold tests (Table 1).

Field results show no significant differences among seed treatments for either the sweet corn or edamame, although the three *Pfl* formulations tended to perform best in field data comparisons for sweet corn emergence and seedling growth (Table 1). Percent field emergence was lower in general for edamame than for sweet corn, with the exception of the PlantShield HC treatment. Field emergence for sweet corn ‘Xtra-tender 272A’ ranged from 45-72%, and for edamame ‘Envy’ from 30-52%. Future studies should also look at seed treatment effects on final yield.

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**Table 1.** *Organic/transitional edamame (vegetable soybean) and sweet corn seedling establishment — 2007*

**Sweet Corn ‘Xtra-tender 272A’**

Treatment	Standard Germ. %	Cold Test (% germ)	Plug Tray Study		Percent Field Emergence
			Emergence (% germ)	Seedling Dry Wt. (gm)	
Untreated	98	68	97	0.32	58
PlantShield HC	95	63	88	0.29	51
Champion	92	82	84	0.29	45
P. fluorescens strain Delaw1-A	96	94	95	0.35	64
P. fluorescens strain Delaw1-C	96	95	95	0.39	69
P. fluorescens strain Delaw1-D	96	88	90	0.35	72
LSD (0.05)	3.2	6.7	3.8	NS	NS
pvalue	0.024	0.016	0.016	0.08	0.770
CV	3.0	16.5	6.4	16.3	

**Edamame ‘Envy’**

Treatment	Standard Germ. %	Cold Test (% germ)	Plug Tray Study		Percent Field Emergence
			Emergence (% germ)	Seedling Dry Wt. (gm)	
Untreated	97	90	86	1.39	34
PlantShield HC	92	90	85	1.47	52
Champion	92	90	84	1.29	37
P. fluorescens strain Delaw1-A	88	92	78	1.48	30
P. fluorescens strain Delaw1-C	98	90	92	1.37	38
P. fluorescens strain Delaw1-D	94	82	72	1.34	45
LSD (0.05)	NS	NS	10.2	0.12	NS
p value	0.061	0.165	0.015	0.025	0.350
CV	5.8	6.8	10.4	7.0	