MANAGEMENT OF SEED CORN MAGGOT FOR ORGANIC SNAP BEAN PRODUCTION

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INTRODUCTION

Organic snap bean production for processing currently meets only one-third of current demand. In spite of price incentives, it is difficult for processors to contract sufficient acres to meet demand due to the higher risk associated with plant disease and insect pests in large-scale organic production.

Currently, most organic vegetable producers tend to be small entrepreneurs who spread the risk of disease, pests, weeds, and weather patterns among many different crops and cultivars. The crops are intensively managed on small plots. In contrast, large-scale production of processing vegetables cannot spread risk among crops; it is a contractual agreement with a grower, often for a specified cultivar to be harvested and delivered on a specific date. Irrigation, fertilizer, and pesticides have, in conventional agriculture, been applied when necessary to reduce risk to the grower on a large acreage monoculture. To achieve large-scale production that is compatible with organic standards, technology must be developed to reduce the risk and costs associated with organic production.

An important insect pest of snap bean is seed corn maggot (*Delia platura*). Entrust organic seed treatments have previously been demonstrated as effective means of controlling seed corn maggot in snap beans and is currently under review with the Inter-Regional Research Project 4 (IR-4) (http://ir4.rutgers.edu/FoodUse/PerformanceDMP1.cfm?Prnum=X0251) and approval could be anticipated in 2010-2011.

RESEARCH OBJECTIVE

The objective of this research was to determine the efficacy of varying spinosad (Entrust: an OMRI approved formulation) seed treatment rates for management of seed corn maggot in snap beans.

MATERIALS AND METHODS

A trial consisting of the snap bean cultivar 'Hystyle' with six seed treatment rates was planted on June 4, 2008 to coincide seedling emergence and development with 2nd generation adult seed corn maggot (*Delia platura*) emergence at 600 DD_{50}. The trial was planted at Hancock Agricultural Research Station (ARS), Hancock, WI using a randomized complete block, factorial design including 4 replications of each seed treatment. Plots consisted of 2-rows, each 20 ft in length. Rows were spaced 36" apart and seeded with a single row cone planter at a rate of 8 seeds/ft for a total of 320 seeds/2-row plot. Seed treatments (performed by Dr. Alan Taylor, Cornell University) included three levels of Entrust (low, 0.25 mg ai/seed; medium, 0.50 mg ai/seed; high 0.75 mg ai/seed), Captan 400 fungicide (3.0 fl oz/cwt), Cruiser insecticide (0.136 mg ai/seed) as an insecticide standard, and no seed treatment as an untreated control. Immediately after planting, a narrow band of blood meal (12-0-0) was applied over each row at a rate of 320 g per 2-row plot. The trial was machine harvested and graded for sieve size on July 30.

RESULTS AND CONCLUSIONS

The data suggests that there were no significant differences among the Captan fungicide treatment, the Cruiser insecticide treatment, and all three rates of Entrust for percent stand loss. All treatments were equally effective in terms of preventing stand reductions compared to the no seed treatment. The effectiveness of Captan suggests that fungal pathogens may have contributed to reductions in yield more so than seed corn maggot. No significant differences were observed in maturity of Hystyle (percent of 5 sieves) regardless of treatment. Entrust rates, when graphed, appear to have a quadratic increase in both stand and yield (Fig. 1 and 2). The highest yield was achieved with the lowest rate (0.25 mg ai/seed) of Entrust. Preliminary yield data suggest that the medium (0.5 mg ai/seed) and high (0.75 mg ai/seed) rates of Entrust may have negatively influenced yield, however, this phenomenon will need to be investigated further.

Source		**Seed germination**		**Yield (ton/acre)**		**Pct 5's**	
	df	**Mean square**	**Prob>F**				
Block	3	351.15	0.043	1.831	0.183	6.62	0.599
Treatment	5	696.24	0.001	3.020	0.043	18.11	0.923
Error	15	45.08		0.099		4.25	

Means by Treatment

	Pct. stand		**Yield (tons/A)**		**Pct. 5's**	
Cruiser 5F (50g)	A	62.4	3.72	AB	48.33	A
fungicide only	A	62.4	4.19	A	49.41	A
Entrust Low rate	A	61.6	4.12	A	49.72	A
Entrust High rate	A	59.1	3.64	AB	48.56	A
Entrust Medium rate	A	57.7	3.58	B	51.01	A
no seed trtmt	B	49.5	2.98	B	49.42	A

Means with the same letter are not significantly different (Students t test).

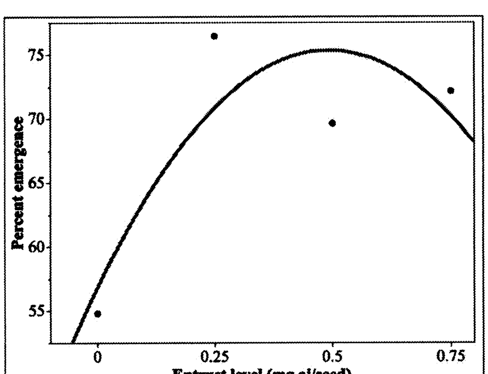

Fig. 1. Quadratic increase in percent emergence with increased level of Entrust.

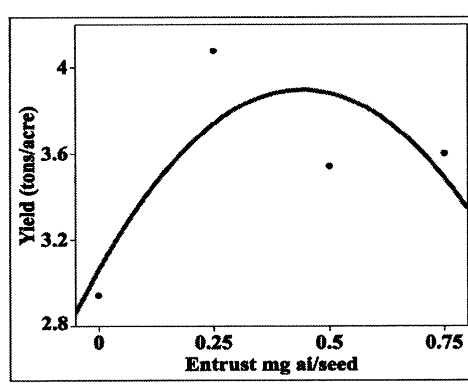

Fig. 2. Quadratic increase in yield with increased levels of Entrust.

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