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INTEGRATED PEST MANAGEMENT IN ORGANIC VEGETABLE SOYBEAN PRODUCTION

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INTRODUCTION

- Vegetable soybean is an important crop in East and Southeast Asia
- Source of dietary protein; also improves soil fertility
- Damaged by a plethora of insect pests and diseases
- Crop loss could be as high as 100%
- Chemical pesticides mainly used to control insect pests; not sustainable
- An IPM strategy was developed for organic production

MATERIALS and METHODS

- Insect pests on vegetable soybean monitored under organic production systems in a field trial during Spring 2006
- An IPM strategy based on sex pheromones, yellow sticky paper traps, biopesticides with neem, *Bacillus thuringiensis* (Bt), and nucleopolyhedrovirus (NPV) was validated. The IPM strategy was compared with an untreated control during Autumn 2006 and Spring & Autumn 2008, with an untreated control as well as farmers' practice during Spring & Autumn 2007

RESULTS

Insect pests on vegetable soybean

Spodoptera litura

Spodoptera exigua

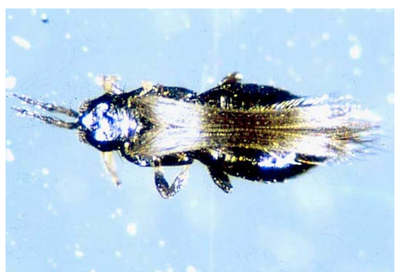
Helicoverpa armigera

Omiodes indicata

Porthesia taiwana

Bemisia tabaci

Edwardsiana flavescens



Megalurothrips usitatus

Nezara viridula

Maruca vitrata

Etiella zinckenella

Effects of IPM strategy on pests and vegetable soybean yield

Table 1. Effects of various management practices on the incidence of secondary phytophagous insect pests on vegetable soybean

Pest species	No. of insects/plant			F value	P value
	Organic IPM	Farmers' practice	Check		
Lepidoptera					
Cabbage looper (*Trichoplusia ni*)	0.06 a	0.00 b	0.07 a	11.94	0.0003
Soybean webworm (*Omiodes indicata*)	0.03	0.01	0.02	2.49	0.11
Common armyworm (*Spodoptera litura*)	0.02	0.01	0.03	1.11	0.35
Beet armyworm (*Spodoptera exigua*)	0.01	0.01	0.004	0.69	0.51
Tomato fruitworm (*Helicoverpa armigera*)	0.01	0.02	0.02	0.63	0.54
Taiwan tussock moth (*Porthesia taiwana*)	0.04 b	0.00 b	0.11 a	11.14	0.0005
Hemiptera					
Green stink bug (*Nezara viridula*)	0.02	0.02	0.01	0.40	0.67
Smaller green leafhopper (*Edwardsiana flavescens*)	0.49 a	0.00 b	0.61 a	40.40	<0.0001

Figures followed by same letter(s) in a row are not significantly different at p=0.05

Table 2. Effects of various management practices on the pod damage of vegetable soybean due to pod borers

Treatments	Pod damage (%)			
	2007		2008	
	Spring	Autumn	Spring	Autumn
Check	10.70 a	10.10 a	17.90 a	2.45 a
Organic IPM	4.00 b	11.20 a	6.93 b	1.32 b
Farmers' practice	1.80 c	0.92 b	---	---

Figures followed by same letter(s) in a row are not significantly different at p=0.05

Table 3. Effects of various management practices on the total and graded pod yield in vegetable soybean

Treatment	Pod yield (t/ha)									
	Autumn 2006		Spring 2007		Autumn 2007		Spring 2008		Autumn 2008	
	Tot	Grad	Tot	Grad	Tot	Grad	Tot	Grad	Tot	Grad
Check	6.00 b	3.20 b	9.00 c	4.20 c	5.08 b	1.66 b	12.06 a	5.00	6.20 a	2.06 b
Organic IPM	9.90 a	7.10 a	9.90 b	4.90 b	6.31 a	3.80 a	11.49 b	5.69	5.69 b	2.83 a
Farmers' practice	---	---	13.80 a	8.90 a	4.53 b	2.00 b	---	---	---	---

Figures followed by same letter(s) in a row are not significantly different at p=0.05

CONCLUSION

- Pod borers (*E. zinckenella* and *M. vitrata*) emerged as major pests. Secondary phytophagous insects did not cause significant damage
- Damage due to pod borers was significantly reduced by the IPM strategy
- Graded pod yield is always higher in IPM plots than in control plots

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