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Suppression of European Corn Borer in Peppers by a Corn Trap Crop

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Introduction: European corn borer is the key insect pest of peppers in Ohio. Even with an intensive insecticide program, many growers have been unable to keep corn borer damage at acceptable levels. Corn borer infests peppers when silking corn is not present in the area. It is possible that a planting of corn close to peppers could lessen the intensity of the corn borer's attack on peppers to the point that the standard insecticide program would provide acceptable control. The objective of this trial was to evaluate trap cropping as a possible cultural control component of an integrated pest management program for peppers.

Materials & Methods: 'North Star' red bell peppers were transplanted on 21 June at the OARDC Veg Crops Branch at Fremont. Plots were set up in a split-plot design with three blocked replicates. Main plot treatments were: 1) peppers with an adjacent planting of sweet corn and 2) peppers with no adjacent corn. Each main plot with corn was at least 100 yards from its corresponding main plot without corn. Sub-plot treatments were: 1) with a standard insecticide program, and 2) no insecticides. Each sub-plot was four twin-row beds wide and 20 feet long. The trap crop was planted on 22 June as a seed mix of four varieties of sweet corn with varying maturity times: Seneca Horizon (60 days), Seneca Daybreak (63 days), Lancelot (80 days), and Merlin (84 days). Four rows of corn 50 feet long were planted next to peppers in each replicate of corn main-plots. Corn in trap crop plantings started tasselling on 31 July. Orthene 75SP (1.33 lb/A) was applied to insecticide sub-plots six times: on 2, 9, 15, 23, and 30 August and on 6 September. All fully red peppers were harvested from a 10-foot long section in the middle two twin-row beds in each sub-plot on 19 September, 1 October, and 11 October. Peppers were counted, weighed, and cut open to evaluate for presence of corn borer larvae or damage. Data were subjected to analysis of variance (ANOVA). Percentage data were transformed by arcsine square root before analysis.

Results & Conclusion: The European corn borer population was large in northern Ohio in 1996. Trapping determined that moths of the second generation became active on 18 July and peaked between 7 and 11 August. Yield and quality of peppers in main plots next to corn did not differ significantly ($P > 0.05$) from main plots not next to corn, on any of three harvest dates (Table 1). The percentage of peppers that were clean of European corn borer (ECB) was significantly better ($P < 0.05$) in sub-plots treated with insecticide than in untreated plots on all three harvest dates, and yield of peppers was significantly better in insecticide sub-plots than in untreated plots on the second and third harvest dates (Table 1). More specific trends were seen when yield and quality in the four individual combinations of main-plots and sub-plots were examined (Table 2). We had hoped to see higher yield and a higher percentage of clean peppers in plots that were sprayed with insecticide and next to corn than in plots sprayed but not next to corn, but this trend was seen only slightly in quality of the first harvest and in yield of the third harvest (Table 2). Although the results may have been more promising if corn was planted earlier or if the insecticide program was started a week earlier, the conclusion from this trial is that trap cropping with corn does not appear to offer improvement in control of European corn borer under conditions of heavy pressure from the corn borer population.

Table 1. Yield and quality of peppers on three harvest dates, overall means of three replicate main plots and sub-plots, Fremont, Ohio, 1996.

Harvest date	Level	Treatment	Yield per plot (kg)	% Clean of ECB
19 September	main plot	with corn	5.8	49
	main plot	no corn	6.3	44
		P value from ANOVA	0.74	0.53
	sub-plot	with insecticide	6.0	82 a
	sub-plot	no insecticide	6.1	11 b
		P value from ANOVA	0.93	0.0005*
1 October	main plot	with corn	5.6	62
	main plot	no corn	6.2	64
		P value from ANOVA	0.46	0.78
	sub-plot	with insecticide	8.4 a	97 a
	sub-plot	no insecticide	3.4 b	29 b
		P value from ANOVA	0.02*	0.001*
11 October	main plot	with corn	2.9	69
	main plot	no corn	2.6	67
		P value from ANOVA	0.46	0.63
	sub-plot	with insecticide	4.2 a	97 a
	sub-plot	no insecticide	1.3 b	39 b
		P value from ANOVA	0.02*	0.007*

Table 2. Yield and quality of peppers on three harvest dates in individual main plot/sub-plot combinations (mean of three blocked replicates), Fremont, Ohio, 1996.

Harvest date	Treatment		Yield per plot (kg)	% Clean of ECB
	Main plot	Sub-plot		
19 September	with corn	with insecticide	6.7	84
	with corn	no insecticide	5.0	14
	no corn	with insecticide	5.4	80
	no corn	no insecticide	7.1	8
1 October	with corn	with insecticide	8.4	97
	with corn	no insecticide	2.8	27
	no corn	with insecticide	8.4	97
	no corn	no insecticide	4.0	31
11 October	with corn	with insecticide	4.4	97
	with corn	no insecticide	1.5	42
	no corn	with insecticide	4.1	97
	no corn	no insecticide	1.1	37