

## EVALUATION OF SOIL-APPLIED INSECTICIDES FOR CONTROL OF SWEET POTATO PESTS IN BOLIVAR CO., MS. 2004

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**ABSTRACT:** Plots of sweet potato, variety Beauregard, were planted at the demonstration farm of the Alcorn State University near Mound Bayou, MS, to evaluate efficacy and benefit of insecticides applied as preplant and/or lay-by incorporated soil applications. Preplant/lay-by treatments were as follows: Untreated/untreated; Lorsban (chlorpyrifos)/untreated; Lorsban/Capture (bifenthrin); Regent/Regent (fipronil); Regent/untreated; Capture/untreated; Capture/Capture; MoCap (ethoprop)/Capture. Insect populations were extremely light with few pests during the season. Insects sampled were flea beetles (*Chaetocnema* spp.; *Systema* spp.), cucumber beetles (primarily *Diabrotica undecimpunctata howardi* Barber [12 spotted cucumber beetle]), and various click beetles and lepidoptera larvae. Sugar cane beetle, *Euetheola humilis rugicieps* (LeConte) and whitefringed beetle (*Graphognathus* spp.), were not found in any of the vacuum or other samples at the Mound Bayou location, however, some potatoes had damage identified as that from both insect pests. There were no statistically significant differences among treatments for insects counted in vacuum samples. Harvested samples of potatoes in each plot demonstrated very little damage and no significant differences in insect damage among treatments were documented.

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**KEY WORDS:** Sweet potato, insecticides, pre-plant, lay-by, wireworm, whitefringed beetle, flea beetle, grub.

**MATERIALS AND METHODS:** Slips, variety Beauregard, obtained from CC farms in Calhoun Co. were planted on 6/3/04, with a 2 row planter, in 8, 40-inch rows per plot. Plots were 40 feet long. The statistical design was randomized complete block. Insecticide treatments were broadcast on 5/24/04, at the volumetric application rate of 10 gal per acre with a spray tractor equipped with Spray Systems 8001 hollow cone nozzles spaced at 20 inches on an 8 row boom. The lay-by application was similarly applied on 7/7/04. Incorporation was done by hipping the rows immediately following insecticide application, and incorporation of the lay-by treatment was with partly raised hippers in order to incorporate the insecticide and not damage the plants. Pre-plant/lay-by treatments were as follows: Untreated/untreated; Lorsban/untreated; Lorsban/Capture Regent/Regent; Regent/untreated; Capture/untreated; Capture/Capture; MoCap/Capture. Rates are listed in Table 1. No foliar insecticides were applied to the plots during the season. The test was scouted approximately once a week with a motorized vacuum

device by vacuuming 40 row feet of one of the 2 center rows. Plots at the Mound Bayou location were harvested by hand by digging a minimum of 25 potatoes from several hills in one of the center rows of each plot. Potatoes were then washed and evaluated for insect damage by examining each potato. This research was funded by a grant from USDA/ARS (USDA/ARS 58-6402-2-0068).

**RESULTS AND DISCUSSION:** Because of the low insect populations and minimal damage indices, none of the data for this trial met the assumption of homogeneity of variance required for analysis of variance (means were correlated with the variance). The problem could not be corrected by use of transformation of data, thus there were no statistically significant differences among treatments for means for insects counted in vacuum samples (Table 2), or for damage evaluated on potatoes after harvest (Tables 3 and 4). Results of the vacuum samples are presented in Figure 1. Sweet potato flea beetles were the most numerous insects captured in 2004, with distinct peaks on 6/30/04, 8/3/04, and 9/2/01. Other flea beetles also demonstrated 3 peaks, but were much lower in number and at different intervals. The major peak for sweetpotato flea beetle was the peak in June; for the other flea beetles the major peak was on 8/10/04. Other insect species were collected in very low numbers (<0.5 per sample).

Table 1. List of insecticide treatments applied soil-incorporated, Mound Bayou, 2004.

Treatment Number	Treatment	Formulation	Lbs. AI / Acre	Application Timing
1	Untreated			Pre-Plant Incorporated
	Untreated			Lay-By
2	Lorsban	4E	2	Pre-Plant Incorporated
	Untreated			Lay-By
3	Lorsban	4E	2	Pre-Plant Incorporated
	Capture	2E	0.1	Lay-By
4	Regent	4SC	0.1	Pre-Plant Incorporated
	Regent	4FS	0.1	Lay-By
5	Regent	4SC	0.1	Pre-Plant Incorporated
	Untreated			Lay-By
6	Capture	2E	0.1	Pre-Plant Incorporated
	Untreated			Lay-By
7	Capture	2E	0.1	Pre-Plant Incorporated
	Capture	2E	0.1	Lay-By
8	MoCap	6EC	8	Pre-Plant Incorporated
	Capture	2E	0.1	Lay-By

Table 2. Mean insects per vacuum sample averaged across sample dates at Mound Bayou, MS 2004.

Treatment	Sweet Potato	Total Flea	Spotted	Tortoise	Click Beetles	Lepidoptera
	Flea Beetle	Beetles	Cucumber Beetle	Beetle Adult		Larvae
Capture / Untreated	1.05	1.59	0.32	0.11	0.07	0.45
Regent / Regent	0.91	1.27	0.20	0.16	0.02	0.55
Lorsban / Capture	1.14	1.61	0.20	0.11	0.00	0.18
Regent / Untreated	0.93	1.43	0.20	0.16	0.02	0.39
Lorsban / Untreated	1.11	1.50	0.30	0.36	0.02	0.23
MoCap / Capture	1.30	2.20	0.18	0.16	0.02	0.25
Capture / Capture	0.80	1.32	0.11	0.20	0.02	0.18
Untreated / Untreated	1.43	1.80	0.27	0.18	0.00	0.23
Probability of F*	---	---	---	---	---	---

\* Data did not meet assumptions for ANOVA.

Table 3. Mean number of insect scars per sample, Mound Bayou, MS 2004.

Treatment	Scars			Ratings				
	Diabrotica Holes	Wire Worm Holes	Systema Holes	Sweet Potato Flea Beetle	White Fringed Beetle	Southern Corn Borer	White Grub	Lepidoptera
MoCap / Capture	0.42	0.25	0.81	0.03	0.06	0.06	0.28	0.03
Lorsban / Capture	1.08	0.04	1.60	0.28	0.00	0.00	0.56	0.00
Capture / Untreated	0.82	0.00	1.18	0.09	0.18	0.00	0.18	0.00
Regent / Regent	0.43	0.04	1.14	0.11	0.04	0.04	0.29	0.00
Lorsban / Untreated	0.82	0.04	1.18	0.00	0.07	0.00	0.07	0.07
Capture / Capture	0.40	0.12	1.64	0.00	0.20	0.00	0.16	0.00
Untreated / Untreated	0.27	0.00	0.73	0.09	0.05	0.00	0.41	0.05
Regent / Untreated	0.38	0.00	0.38	0.00	0.25	0.00	1.00	0.00
Probability of F*	---	---	---	---	---	---	---	---

\* Data did not meet assumptions for ANOVA.

Table 4. Mean percent of potatoes damaged by insect species and all insects collectively.

<b>Treatment</b>	<b>Cucumber beetles</b>	<b>Wire worm</b>	<b>Flea beetles*</b>	<b>Sweet potato flea beetle</b>	<b>White fringed beetle</b>	<b>Sugarcane beetle</b>	<b>White grub</b>	<b>Lepidoptera larvae</b>	<b>All insects</b>
Capture / Capture	2.4	6.0	7.5	0.0	1.5	0.0	1.2	0.0	18.6
Capture / Untreated	6.7	0.0	6.2	1.5	1.0	0.0	10.0	0.0	25.5
Lorsban / Capture	7.8	0.3	6.5	1.5	0.0	0.0	4.3	0.0	19.9
Lorsban / Untreated	8.8	0.2	7.8	0.0	0.3	0.0	0.8	0.7	26.4
MoCap / Capture	3.2	1.6	4.8	0.1	0.0	0.1	3.0	0.1	17.3
Regent / Regent	2.4	0.2	5.9	0.9	0.4	0.4	5.0	0.0	14.7
Regent / Untreated	3.3	0.0	2.7	0.0	1.6	0.0	6.7	0.0	20.5
Untreated / Untreated	3.0	0.0	5.5	1.7	0.5	0.0	6.4	0.9	15.7
Probability of F**	---	---	---	---	---	---	---	---	---

\*Flea beetles other than sweet potato flea beetle \*\*Data did not meet assumptions for ANOVA.

**Figure 1. Mean insect numbers per vacuum sample averaged across treatments.**

