

WHITE PAPER: Organic Insecticide Cabbage Webworm Trial with Daikon
Waimanalo Research Station 2016
Final Summary
December 12, 2016
Report submitted to Robin Shimabuku by Jari Sugano and Steve Fukuda

A collaborative team from UH CTAHR under the lead of Robin Shimabuku, conducted a replicated field trial comparing physical barriers to organic pesticides for controlling the imported cabbage web worm, *Hellula rogatalis* (Hulst) on daikon, variety "Alpine". Team members included, Steve Fukuda, Jari Sugano, Jensen Uyeda, Kylie Wong, Josh Silva, Fred Reppun, Shelby Ching and Drs. Ronald Mau and Koon Hui Wang. The field was established at the Waimanalo Research Station on September 27, 2016. Final field data was collected on November 25, 2016 (day 57).

The imported cabbage webworm is an economically important pest on brassica crops such as white stem cabbage (pak choy), mustard cabbage (kai choy), napa cabbage (won bok), radishes, broccoli, cabbage, and other crucifers. The insect causes primary damage by feeding on the growing terminals (apical meristem) and cause plants to develop multiple shoots or even death. Other symptoms include webbing, folding of young leaves, feeding damage on developing leaves and frass.

The objective of the field trial was to 1) control the cabbage webworm (*Hellula rogatalis*) on radish using organic insecticides and physical barriers and 2) determine efficacy of organic insecticides on webworm control, as compared to a non-organic insecticide (Coragen). Organic insecticides selected included: Neemix 4.5 (azadirachtin), Crymax WDG (*Bt kurstaki* and *aizawai*), Entrust 5C (spinosad), Pyganic 5% (pyrethins). Physical barriers selected included a Mesh 17 screen (CPS Hawaii) and a Biothrips floating row cover from Johnny's Seed Company. Coragen was selected as a non organic insecticide for comparison purposes. The trial also included a non treated control.

The trial consisted of eight treatments, replicated three times. The non-treated control was replicated four times. A physical barrier was install before germination to all plots to ensure successful and uniform germination. The barrier was removed after germination. Physical barriers were then re-installed over the screen treatments using hoops to provide structure. Floating row covers were placed loosely over the top of the beds secures by rocks and soil around the perimeter.

Two weeks after seeding, organic insecticides were treated weekly at the highest labeled rate using a CO2 sprayer with a boom attachment. Spray volume yielded 70-100 gallons per acre. The non-organic insecticide, Coragen, was sprayed every other week at the lowest labeled rate. Final webworm damage ratings were taken from 10 random plants/plot. Damage were rated based on a modified Kemerait et. al. scale of 0=none, 1=trace to 5%, 2=6-15%, 3=16-35%, 4=36-67%, 5=68-100%.

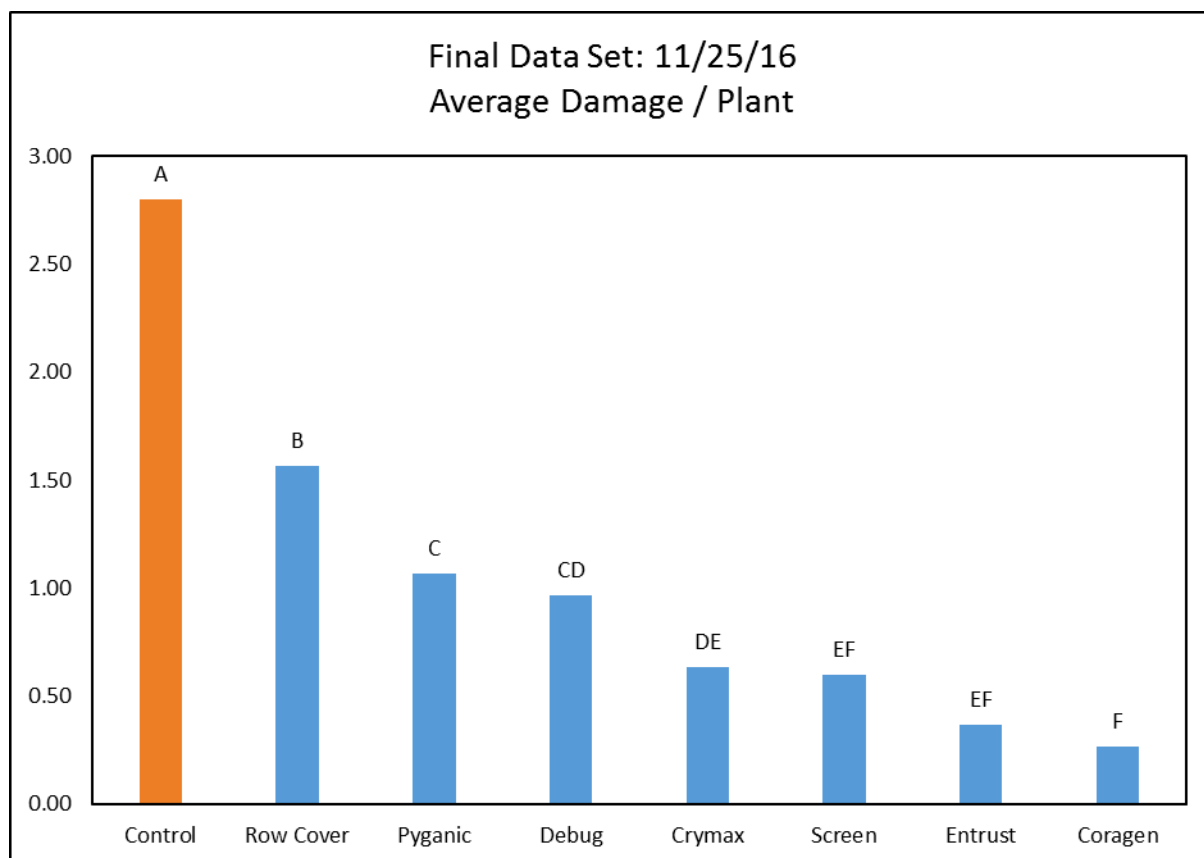


Figure 1: Average Damage /Plant

Based on a modified Kemerait et. al. scale of 0=none, 1=trace to 5%, 2=6-15%, 3=16-35%, 4=36-67%, 5=68-100%.

Data showed there were significant differences between the control and select organic insecticides and physical barriers. Coragen, Entrust (o), and the 17 mesh screen out performed products such as Debug Turbo (o), Pyganic (o) and the floating row cover. Crymax was comparable to Entrust (o), the 17 mesh screen and Debug Turbo (o).

The results from this trial may help producers develop a resistance management program against *Lepidoptera* pests which includes the rotation of less effective pesticides with products with higher efficacy in order to combat webworm in organic, brassica cropping systems. Results showed the 17 mesh screen out performed the floating row cover. The physical screen system was included as a pest exclusion barrier and may serve as an additional organic option for producers. Observational data indicates that targeted and non target pests which enter the screened units may get trapped inside and create additional problems.

Cabbage Webworm Organic Insecticide Trial
Field Layout

Screen	Control	Neemix 4.5	Coragen	Entrust 5C
Crymax WDG	Coragen	Pyganic 5%	Row Cover	Crymax WDG
Row Cover	Entrust 5C	Screen	Pyganic 5%	Control
Neemix 4.5	Pyganic 5%	Control	Entrust 5C	Neemix 4.5
Coragen	Crymax WDG	Row Cover	Control	Screen

Active Ingredient

	1 Control	
	2 Screen	
	3 Row Cover	
	4 Coragen	Chlorantranilipro
	5 Crymax WDG (o)	<i>Bt kurstaki</i>
	6 Neemix 4.5(o)	Azadirachtin
	7 Entrust 5C (o)	Spinosad
	8 Pyganic 5% (o)	Pyrethrin

(o) OMRI approved

A follow up trial will be conducted using pak choy in 2017.