

CRITERIA FOR RANKING EVALUATIONS OF IR-4 ADVANCED STAGE BIOPESTICIDE PROPOSALS-2014

Proposal number/Title/PI: **9A, Spotted Wing Drosophila Control in Organic Berries, Schreiber**

The following criteria were established to assist the reviewers in selecting biopesticide projects for funding that: (1) are either in a more advanced stage of development (as opposed to exploratory or early stage of development) or involve expansion of the label; (2) have a high probability of being registered/marketed in a reasonable period of time; and (3) will be useful in meeting pest control needs involving minor crops (uses), including minor uses on major crops.

Criteria	Score (0 to 10 or 20)
1. Adequacy of investigators and facilities.	_____ of 10
2. Experimental design, work plan and preliminary research.	_____ of 10
3. Does experimental design allow to determine performance relative to conventional control practices and how the biopesticide might fit into IPM programs.	_____ of 10
4. Evaluation of Budget	_____ of 10
5. Relevance of the proposal toward the development of data for registration or label expansion of the biopesticide.	_____ of 10
6. Evidence of Efficacy. Positive supporting data provided.	_____ of 20
7. Probability of biopesticide being used by growers (factors such as effectiveness and economics of use rates should be considered).	_____ of 10
8. Other control measures currently available to control target pest.	_____ of 10
9. Probability of biopesticide being registered, time to registration, and if label expansion, time to market.	_____ of 10
	TOTAL* _____ of 100
Funding Recommendation	YES _____
(Check appropriate line)	NO _____
	MAYBE _____

Note: Attach a comment page, should you have specific comments related to the proposal not covered in the above criteria.

* There is a possibility of 10 points per criteria (except efficacy=20) for a total of 100 points. A rating of 0 means that the proposal does not meet the criteria at all, while a rating of 10 means it is ideal.

Reviewer's Initials _____

Proposal Number:	Principal Investigator: Alan Schreiber
Proposal Title: Spotted Wing Drosophila Control in Organic Berries	
Institution: Washington Blueberry Commission	
Total dollars Requested (Year 2 only) \$15,315	

No.	Biopesticide and/or Conventional Product TRADE Name	Active Ingredient	Crop	Pest
1	Entrust	Spinosad	Blueberry/blackberry	SWD
2	Pyganic	Pyrethrin	Blueberry/blackberry	SWD
3	Grandevo	Chromobacterium	Blueberry/blackberry	SWD
4	Neemazad	Azadiractin	Blueberry/blackberry	SWD
5	Aza-Direct	Azadiractin	Blueberry/blackberry	SWD
6	Des-X	Potassium Salts of	Blueberry/blackberry	SWD
7	Jet Ag	Hydrogen peroxide/	Blueberry/blackberry	SWD
7	"	Peroxyacetic acid		
8				
9				

Biopesticide Grants Contact Information Form

<i>Proposal Title:</i> Spotted Wing Drosophila Control in Organic Berries	Address				
Name	Street	City/State	Zip+4	Phone Number & Fax	E-mail Address
Project Director (Principal Investigator): Alan Schreiber	2621 Ringold Road	Eltopia, WA	99330	509 266 4300 509 266 4317	aschreib@centurytel.net
Administrative Contact: Alan Schreiber	Same			Same	Same
Financial Grant Officer: Stacey Hill	Same			Same	shill@centurytel.net
Authorized Grant Official: Alan Schreiber	Same			Same	Same
Individual Responsible for Invoicing: Stacey Hill	Same			Same	Same

I. Grant Stage

X Advanced. This project will look at least seven products, all of which have blueberries on the label, none of which have spotted wing drosophila. Aza-Direct lists flies with examples of flies that it controls, but none are closely related to SWD; Entrust, Jet Ag, Des-X and Grandevo does not list SWD or any kind of flies for control of berries; Neemazad lists fruit flies, which belong to the family Tephritidae, which is a family different to which SWD belongs; and Pyganic lists vinegar flies which is the family to which SWD belongs. Since the products do not have SWD on the label, it would appear the proposal is most appropriately placed in the Advanced category.

II. Introduction

Eight years ago, there was an estimated 600 acres of organic blueberries in the United States. By the end of 2013, Washington will have in excess of 2,500 acres of organic blueberries and is a leading source of this category of crop in the world. Acreage of this crop is expanding due to the favorable prices received and the relatively lack of insect and disease pressure the industry has enjoyed. Approximately 90% of organic blueberries are located in eastern Washington. Prior to 2012, virtually no insecticides or fungicides had been applied to blueberries grown in eastern Washington. [Blueberries produced in western Washington have significant disease and insect pressure.]

Spotted wing drosophila (SWD) was detected in eastern Washington in 2010 but was not sufficiently widespread, present in sufficient numbers or was not noticed prior to 2012. This year, 2012, was different from previous years. Several growers deployed significant SWD programs, other growers less aware of the pest or less sophisticated in the SWD control programs suffered significant losses due to the insect.

For fresh blueberries, detection of a single larva per pallet results in rejection. Processed blueberries have lower standards, but that are still impossible to meet without a competent SWD control program. Several shipments of blueberries from eastern and western Washington were rejected due to the presence of SWD. The administrator of the Washington Blueberry Commission is under significant pressure to respond to this situation. For conventional growers, there are a number of insecticidal options available and WSU's Lynell Tanigoshi has done a good job of evaluating these products. Unfortunately to date, only a single organically approved insecticide (Entrust, spinosad, Dow AgroSciences) has been demonstrated to have sufficient efficacy against SWD in Washington, although Pyganic is used in California. Organic blueberry growers rely very heavily on Entrust and the Washington (and California and Oregon) organic blueberry industry are dependent on this product. One of the challenges growers have is the limit on the amount of the product that can be applied during the course of the season resulting in growers using lower rates in order to extend coverage through the season.

There is data available that shows SWD has developed resistance to Entrust in blueberries in the Watsonville area of California. Washington organic blueberry growers know two things: 1) Entrust is not working as well as it once did against SWD in the areas where it has been used the longest and 2) such heavy reliance on a single mode of action year after a year in a pest known to develop resistance is a risky situation. The manufacturer of Entrust has expressed significant concerns that SWD will develop resistance with the way the product is currently being used. Other insect species have developed resistance to Entrust in the same area that organic blueberries are grown in Washington in the tree fruit industry. The same

growers who have Entrust resistance issues in leafrollers in organic apples also grow organic blueberries.

The Washington blueberry industry is desperate to develop new organic products for SWD. In a late season 2012 SWD blackberry trial, Schreiber developed successful, but limited, data on a second organic product (Grandevo) demonstrating that 1) he can complete a SWD trial and 2) there are biopesticide products potentially available for control of SWD.

See the attached final report, but in 2013, the PI generated significant data that showed Entrust is the most effective product for control of SWD and that other products have some efficacy against SWD. The application patterns in which the products were used did not provide commercially acceptable levels of control. It is believed that by modifying the use patterns that commercially acceptable levels of control can be obtained. SWD pressure was lighter than expected in blueberries so no useful data was obtained. SWD pressure was heavier than expected in blackberries and treatment intervals were not short enough. The same products used in 2013 are expected to provide significantly improved control when applied in 5 to 7 day intervals as opposed to the 10 day intervals used this year.

Objective 1. Identify new organic insecticides for SWD control in blueberry. **Objective 2.** Develop integrated control programs using multiple products and baits. **Objective 3.** Develop resistance management strategies for Entrust and for biopesticide/organic insecticides in general.

III. Experimental Plan

1. Provide a numerical list of all treatments including the products.

The following treatments are being proposed based on input from agchem companies, growers and berry consultants. It is expected that the use patterns will be further refined based on additional input from the industry.

1. Untreated check
2. Entrust (spinosad), 4 ounces
3. Entrust (spinosad), 6 ounces
4. Grandevo (Chromobacterium), 1 pound product
5. Grandevo (Chromobacterium), 2 pound product
6. Entrust (spinosad), 4 ounces, plus bait
7. Grandevo (Chromobacterium), 1 pound, plus bait
8. Pyganic (pyrethrin), 64 fluid ounces
9. Neemazad (azadiractin), 16 ounces
10. Azadirect (azadiractin), 3.5 pints
11. Pyganic+Neemazad, 64 fluid ounces +16 ounces

12. Pyganic+Azadirect, 64 fluid ounces + 3.5 pints
13. Entrust, 6 ounces rotated with Pyganic+Neemazad, 64 fluid ounces + 16 ounces
14. Entrust, 6 ounces rotated with Grandevo at 2 pounds.
15. Des-X (potassium salt of fatty acids), 2 gallons in 100 gallons of water

Pyganic and Neemix/Neemazad have demonstrated efficacy against a wide array of other insect pests in organic systems. Research on other pests (e.g. European asparagus aphid) on asparagus, tank mixes of Pyganic and azadiractin products demonstrated significantly better efficacy than either product alone (enclosed). Based on these results, it is thought that tank mixing products might provide better efficacy against SWD. WSU's Elizabeth Beer has shown a significant improvement of efficacy in Entrust when it was mixed with a commercially available fruit fly bait.

Applications would be made at approximately 5 to 7 day intervals. The applications would be made using the same equipment as a grower would use, a tractor pulled air blast applicator. We would use 50 to 75 gallons of water per acre as a carrier. Fruit would be sampled at weekly from the day of first application through final harvest. Each treatment would be applied 6 to 8 times. The blueberry harvest starts around June 20-June 25th. Applications would start about two weeks before first harvest, possibly earlier and would continue through the end of harvest in early to mid August. Blackberry harvest starts in early August and continues until mid October. Applications would start about two weeks prior to first harvest, possibly earlier.

The above set of treatments would be made to the blueberry crop. Results would be collected, entered into database on a real time basis, so all results are available by the end of each week. By the time the last blueberry application is made and the last sample is collected, we will have the data analyzed and conclusions drawn. It is expected that we will have a good understanding of what treatments made to blueberry were successful, which are not and which are marginally successful.

The results from the blueberry trial will be used to reformat the blackberry treatments. A similar number of treatments would be included in the blackberry planting; however, we would put in new treatments, drop ineffective or refine treatments based on the results of the blueberry trial. By having two crops that are almost perfectly sequential to each other, we can achieve two seasons worth of trial data in one year.

Results from this project would be applicable to raspberry, blackberry and possibly to strawberries

2. What crops or sites will this study be conducted on?

The first set of trials will be on blueberries, the second set of trials will be on blackberries.

3. What experimental design will be utilized?

We propose to conduct a 4 replication, randomized complete block design airblast applied trial in

certified organic blueberries and on conventional blackberries at the WBC's eastern Washington research site.

4. How many locations (field or greenhouse)? How many replications?

The field trial will be at two locations on the same research site, one for blueberries, a second location for blackberries. Each treatment will be replicated four times.

5. Describe how this proposal is designed to provide information on how it fits into an integrated pest management program.

Currently growers are relying on a single product, Entrust, for all season. Because this is an organic system, we have to rely on organically approved products preventing our use of conventional products.

There are no other significant control tactics for control of SWD other than insecticides at this time. Growers monitor for the pest, but once it is detected, the only recourse is to spray and keep spraying. Growers try to remove alternate hosts, but that is practically impossible in the Pacific Northwest due to the ubiquitous distribution of suitable wild hosts for SWD. Two proposed treatments involved lacing insecticides with fruit fly bait. (It has shown promise against SWD in cherries according to by WSU's Elizabeth Beers.) We hope to find new organically acceptable products for control of SWD; develop integrated programs that use multiple products and come up with tank mixes and insecticide laced baits to improve control and integrated modes of action into pest management programs.

6. Data collection:

We will collect 20 fruit from each plot, each week for all treatments for both trials. The fruit will be immersed in a sugar solution that has become the standard means for sampling SWD in berries. We follow the accepted methodologies for SWD evaluations that have been agreed to by berry entomologists in Oregon and Washington. We use the standard apple cider and the yeast methods for monitoring adults at the trial locations.

7. Describe the pests to be controlled, the degree to which they are a problem in your state or region and the frequency that they occur (season long problem, every year, every few years).

This project focuses on spotted wing drosophila. As of 2012, SWD had spread to every blueberry growing region of Washington, the Pacific Northwest and most of the U.S. The pest seems to be reduced in abundance over the winter but due to its ability to have multiple generations per year, it builds in number as the season progresses. It does not attack green fruit but will start ovipositing on fruit that is started ripen and becomes a progressively worse problem as the season progresses.

This is an annual pest of berries. This is still a developing pest problem but we have sufficient experience to know that if control programs are not deployed fruit will not be marketable. Large amounts of fruit of blueberry, blackberry, raspberry, strawberry and elderberry were rejected by fresh handlers and processors in 2012 and 2013 in Washington and Oregon. Loads of fruit that did not have SWD were rejected by foreign trade partners (Taiwan, Japan) due to residues over there MRLs based on efforts to control SWD. Other countries (South Korea, etc) have increased sampling of blueberries due to this issue. Control of SWD and the fallout from our efforts to control SWD is reaching a crisis level. Organic growers, while not having to deal with MRL issues, have serious problems with availability and use restrictions on the products they are currently using for SWD.

8. Will the crop be inoculated with the target pest or otherwise be brought into the test system to ensure that it will be available for evaluation? If not, describe the frequency of occurrence.

There is no need to inoculate for this pest.

9. What is the proposed start date and completion date? Also describe this in chronological order in the context of the experimental plan.

Treatment use patterns would be finalized by April 1, 2013. Blueberry plots would be marked out by May 1. Applications would start in early June to mid June and would continue weekly through early to mid August. By August 1, blackberry plots would be marked out and applications would begin. Applications would be made on a weekly basis through early to mid October. Final results with a written report would be completed by mid November.

10. Describe the test facilities where these studies will be conducted.

The trial would be conducted on a research site that has been created by the Washington Blueberry Commission just for projects such as this. It is located on the research facility operated by Alan Schreiber. The research site has access to all field and research equipment and support personnel necessary to conduct SWD efficacy trials. There is a one acre of certified organic blueberries on which to conduct the trial. There is a 0.9 acre of blackberries which will serve as the site for the second trial. These locations are commercially managed but are available for research trials.

11. Budget:

See the attached budget (below).

12. Describe why this product is needed and why growers are likely to use this product. (Also list alternative conventional and alternative biopesticide treatments)

Growers are desperate for additional products. The current organic SWD program is based largely

on the use of Entrust. Growers are using the product a number of times, at lower rates in order to have enough product to make it through the season. The current use pattern is very likely to result in resistance unless more products are found and are used in a resistance management program. Growers are eager to have access to additional products but are reluctant to experiment in their fields.

In the most recent report released by the Washington Agricultural Statistics Service (WASS), blueberries were ranked as the most valuable crop in Washington with the per acre value in 2011 being \$17,500. WASS does not keep statistics on the crop, but blackberries have a similar value to blueberries. Organic berries are substantially higher in value than that reported by WASS. While organic and some biopesticide products are expensive and we propose to use them at higher rates, growers will willingly use the products regardless of the cost due to the necessity to produce such a very high value product and the losses that they have seen so far.

Note: See appendix for attachment of additional information.

Appendix 1

PCR Forms. Per a conversation with Braverman, PCR forms are not needed since all products involved are already registered on the crops involved.

Appendix 2

Labels. Labels for all seven products involved are included.

Appendix 3

Supporting preliminary data. (See the final reports that are attached).

Appendix 4

Resume enclosed.

Appendix 5

Final reports for a blueberry SWD trial and a blackberry SWD trial are enclosed.

Appendix 6

Registrant support. Letters of support are enclosed from the registrants and the Washington Blueberry Commission.

On a separate sheet provide the following information: Project title, PI name and one paragraph statement of work

Spotted Wing Drosophila Control in Organic Berries

Alan Schreiber, Washington Blueberry Commission

Washington (and the West Coast) has greatly increased the acreage of organic blueberries. Almost all organic blueberries come from this region, with the largest area of production concentrated in eastern Washington. SWD made its first appearance three years ago in California and in 2012 made its way to organic blueberry fields in eastern Washington. Growers are currently relying mostly on Entrust, with some use of Pyganic, although there is data showing the pest has developed resistance to both products in California. Organic growers need access to new products for control of the insect and more information on how to use a mix of products, and/or how to use products differently in order to control this pest without fomenting resistance. We propose to conduct a mid season trial on blueberries and based on those result conduct a second late season trial on blackberries. Results on SWD in blueberries is expected to be directly applicable in blackberries. Although this project is targeting organic control, conventional growers are interested in the results as a way to manage late season SWD without resulting in insecticide residues over the limits established by our Pacific Rim trading partners.

Budget Notes

Proposal Title: Spotted Wing Drosophila Control in Organic Berries

Principal Investigator: Alan Schreiber

There are two primary costs for this trial; the salary and benefits for the individuals working in the trial and the cost of growing, managing and harvesting the crops in the trial. Working in berries is expensive. Part of the cost of operating the berry crops is paid for by sales from the berries until we started SWD research and the berries are no longer saleable. \$6,000 is requested for managing and working with the blackberry crop. This is half the cost of this expense. The Washington Blueberry Commission is providing the \$14,200 for the rest of the blackberry and all of the blueberry crop expenses.

Applications would start in early June and would continue through July/early August for blueberries. Applications to blackberries would begin mid August and would continue through early October. Total time interval for applications covers about 4.5 months. Sampling would begin about two weeks before applications and would continue for two weeks after applications end. This set of trials would require 20% of a field researcher, 20% of our agronomist and 20% of the time of for two interns to sample fruit, over the course of the trial. Some farmworker time will necessary to work on the trial.

The materials supplies covers trapping supplies, cost of products (yes, some will be provided, but some will not be (e.g. Pyganic), sugar (the trial will consume about 200 pounds of sugar) and maintenance supplies for the crop agronomy, such as herbicides, fertilizer and land rent.

BIOPESTICIDE PROJECT BUDGET

Project Period: From:

To:

	Funds Requested	Totals (\$)	
		Funds Requested	Matching Funds
A. Senior/Key Person		\$ 1500	\$
B. Other Personnel		\$ 5000	\$ 16500
Total Number, Other Personnel	5000.**		
C. Fringe Benefits		\$ 1815	\$ 4125
Total Salary, Wages and Fringe Benefits		\$ 8315	\$ 20625
D. Equipment		NOT ALLOWED	\$
E. Travel		\$	\$
1. Domestic	\$		\$
2. Foreign	NOT ALLOWED		\$
F. Participant Support Costs		\$	\$
1. Travel	\$		\$
2. Other	\$		\$
G. All Other Direct Costs			
1. Materials and Supplies	\$ 1000		\$ 1875
2. Publication Costs	\$		\$
3. Consultant Services	\$		\$
4. Computer Services	\$		\$
5. Subawards/Consortium/Contractual Costs	\$		\$
6. Equipment or Facility Rental/User Fees	\$		\$
7. Alterations and Renovations	NOT ALLOWED		\$
8. Other 1 <i>Crop Mgmt</i>	\$ 68,000		\$ 14200
9. Other 2	\$		\$
10. Other 3	\$		\$
Total Direct Costs		\$ 15315	\$ 39,500

****Each budget item requires documentation****

****IMPORTANT****

Identify each budget item individually - provide cost and a written description and/or purpose for the cost.

For rentals and fees: identify type of rental or fee and provide rental rate & purpose for the cost

Any contractual work will require a separate budget and statement of work including rate and purpose

The Other category **MAY NOT** include construction or indirect overhead. These costs are not permitted, under any circumstances, under this grant.

*Indicate in a footnote if the matching funds are monetary or in kind and their source. Please enter all values to the nearest hundred dollars.

Appendix 1. (PCR Forms)

Appendix 1—Registrant Questionnaire

Please fill out the first page of this form for each crop/biopesticide combination and send to the registrant.

Registrant please return to IR-4 Project Headquarters, Michael Braverman, Biopesticide and Organic Support Program Manager, 500 College Road East; Suite 201 W; Princeton, NJ 08540-6635, Tel: (732) 932-9575 ext. 4610, Fax: (609) 514-2612, braverman@aesop.rutgers.edu

Principal Investigator: Alan Schreiber

Address: 2621 Ringold Road
Eltopia, WA 99330

Telephone: 509 266 4300

Proposal Title: Spotted Wing Drosophila Control in Organic Berries

Registrant name and address: Certis USA
9145 Guilford Rd # 175
Columbia, MD 21046-1952
(301) 604-7340

Product Name: Neemazad 1% EC Active Ingredient: azadirachtin

Trade Name: Neemazad 1% EC

The following section is to be completed by the Biopesticide Registrant. The PCR form is to be completed by the researcher for Early and Advanced Stage Proposals (Due Nov. 12)

1) Is this product EPA registered through BPPD? Yes X No _____

Is this use covered by your current label? Yes _____ No X

If this product is not yet registered with EPA, describe where you are at in collecting the toxicology data or Stage of the registration process. If this project was previously funded, describe how the registration status has changed since last year.

Is label and toxicology work currently limiting product only to non-food uses? **No**

2) Assuming the efficacy data are favorable, what is the likelihood that this use will be added to your label? **High**

3) Considering the use rate(s), what is considered to be the farm-level cost for the treatment in \$/acre? **\$63- \$96**

4) How would you rank the importance of the proposed use compared to other potential uses? **High**

5) If you are only considered a potential registrant (do not currently own rights to the product), rank your degree of interest in this product. **Not Applicable**

6) Were you involved or consulted in the development of the treatments or proposal?
Yes

7) What financial support are you planning on providing, if any? Certis will provide product and technical support.

Scott C. Ockey
Name of Registrant representative

12/05/2013
Date

Field Development Manager-Western US
Title

Appendix 1—Registrant Questionnaire

Please fill out the first page of this form for each crop/biopesticide combination and send to the registrant.

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Principal Investigator: Alan Schreiber

Address: 2621 Ringold Road
Eltopia, WA 99330

Telephone: 509 266 4300

Proposal Title: Spotted Wing Drosophila Control in Organic Berries

Registrant name and address: Certis USA
9145 Guilford Rd # 175
Columbia, MD 21046-1952
(301) 604-7340

Product Name: Des-X Active Ingredient: Potassium Salts of Fatty Acids

Trade Name: Des-X

The following section is to be completed by the Biopesticide Registrant. The PCR form is to be completed by the researcher for Early and Advanced Stage Proposals (Due Nov. 12)

1) Is this product EPA registered through BPPD? Yes X No _____

Is this use covered by your current label? Yes _____ No X

If this product is not yet registered with EPA, describe where you are at in collecting the toxicology data or Stage of the registration process. If this project was previously funded, describe how the registration status has changed since last year.

Is label and toxicology work currently limiting product only to non-food uses? **No**

- 2) Assuming the efficacy data are favorable, what is the likelihood that this use will be added to your label? **High**
- 3) Considering the use rate(s), what is considered to be the farm-level cost for the treatment in \$/acre? **\$9- \$13**
- 4) How would you rank the importance of the proposed use compared to other potential uses? **High**
- 5) If you are only considered a potential registrant (do not currently own rights to the product), rank your degree of interest in this product. **Not Applicable**
- 6) Were you involved or consulted in the development of the treatments or proposal?
Yes
- 7) What financial support are you planning on providing, if any? **Certis will provide product and technical support.**

Scott C. Ockey
Name of Registrant representative

12/05/2013
Date

Field Development Manager-Western US
Title

Appendix 1—Registrant Questionnaire

Please fill out the first page of this form for each crop/biopesticide combination and send to the registrant.

Registrant please return to IR-4 Project Headquarters, Michael Braverman, Biopesticide and Organic Support Program Manager, 500 College Road East; Suite 201 W; Princeton, NJ 08540-6635, Tel: (732) 932-9575 ext. 4610, Fax: (609) 514-2612, braverman@aesop.rutgers.edu

Principal Investigator: Alan Schreiber

Address: 2621 Ringold Rd
Eltopia, Washington. 99330

Telephone: 509-266-4348

Proposal Title: Spotted Wing Drosophila Control in Organic Berries

Registrant name and address: Dow AgroSciences
9330 Zionsville Road
Indianapolis, IN 46268

Product Name: Entrust SC Active Ingredient: Spinosad

Trade Name: _____

The following section is to be completed by the Biopesticide Registrant. The PCR form is to be completed by the researcher for Early and Advanced Stage Proposals (Due Oct. 21, 2013)

1) Is this product EPA registered through BPPD? Yes _____ No X _____

Is this use covered by your current label? Yes X _____ No _____

If this product is not yet registered with EPA, describe where you are at in collecting the toxicology data or Stage of the registration process. If this project was previously funded, describe how the registration status has changed since last year.

Is label and toxicology work currently limiting product only to non-food uses? No, registered for food use.

2) Assuming the efficacy data are favorable, what is the likelihood that this use will be added to your label? Currently registered on “Bushberries” subgroup 13B

3) Considering the use rate(s), what is considered to be the farm-level cost for the treatment in \$/acre? Approximately \$60.00/acre

4) How would you rank the importance of the proposed use compared to other potential uses?
Very high. Entrust SC is the only effective insecticide for spotted wing drosophila control in organic systems. Finding effective rotational partners to minimize the occurrence of resistance development is very critical.

5) If you are only considered a potential registrant (do not currently own rights to the product), rank your degree of interest in this product.

6) Were you involved or consulted in the development of the treatments or proposal?
Yes

7) What financial support are you planning on providing, if any?

Final support decisions will likely be made in March 2014, but an estimate would be \$2,000.

Harvey A. Yoshida, Ph.D.

December 3, 2013

Name of Registrant representative

Date

Senior Scientist

Title

Appendix 2. (Product Labels)



Aza-Direct®

Botanical Insecticide

AZADIRACHTIN-BASED BOTANICAL, ANTIFEEDANT, REPELLANT AND INSECT GROWTH REGULATOR

**FOR USE ON GREENHOUSE AND OUTDOOR FOOD CROPS,
ORNAMENTAL FLOWERS, TREES, SHRUBS AND PLANTS**

FOR ORGANIC PRODUCTION

ACTIVE INGREDIENT:	% By Wt.
Azadirachtin	1.2%
OTHER INGREDIENTS	98.8%
TOTAL	100.00%

Contains 0.0987 lb. (44.8 g) azadirachtin per gallon.

KEEP OUT OF REACH OF CHILDREN
CAUTION

FIRST AID	
If inhaled	Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call poison control center or doctor for further treatment advice.
If on skin or clothing	Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
If in eyes	Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing eyes. Call a poison control center or doctor for treatment advice.
If swallowed	Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor.
Have the product container or label with you when calling a poison control center or doctor or going for treatment. FOR MEDICAL EMERGENCIES INVOLVING THIS PRODUCT, CALL TOLL FREE 1-888-478-0798	

READ ALL DIRECTIONS BEFORE USING THIS PRODUCT

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail).

**PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS**

Caution: Harmful if swallowed, absorbed through skin or if inhaled. Causes moderate eye irritation. Avoid breathing vapor. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove contaminated clothing and wash before reuse. Wear chemical resistant gloves.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Applicators and other handlers must wear:

- Long sleeved shirt and long pants
- Chemical resistant gloves
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish and aquatic invertebrates. For Terrestrial Uses: Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment washwater or rinsate.

USER SAFETY RECOMMENDATIONS

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.
READ ENTIRE LABEL. USE STRICTLY IN ACCORDANCE WITH PRECAUTIONARY STATEMENTS AND DIRECTIONS, AND WITH APPLICABLE STATE AND FEDERAL REGULATIONS. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the state or tribal agency responsible for pesticide regulation.

NET CONTENTS _____ GALLONS

EPA Reg. No. 71908-1-10163
EPA Est. No. 67545-AZ-1

Gowan®

Produced For:
Gowan Company
P.O. Box 5569
Yuma, AZ 85366

hand move) irrigation systems. Do not apply this product through any other type of irrigation system.
 Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from non-uniform distribution of treated water.
 Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system unless the pesticide label-prescribed safety devices for public water systems are in place.
 If you have questions about calibration, you should contact State Extension Service specialists, equipment manufacturers, or other experts. A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.

Dilute AZA-DIRECT with water before introduction into the system. Use the diluted mixture within 8 hours. Do not apply in irrigation water if the pH exceeds 7.0. The optimum pH range for application is 5.5-6.5. If needed, the pH of the irrigation water can be adjusted by use of a suitable buffering agent. Agitation is necessary. Apply at the rate indicated in APPLICATION INSTRUCTIONS using sufficient water to achieve an even distribution

For Chemigation Systems

Connected to Public Water Systems

- The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection.
- The pesticide injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
- Systems must use a metering pump, such as a positive displacement injection pump (e.g. diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
- Do not apply when wind speed favors drift beyond the area intended for treatment.

In addition, all directions and requirements specified for Sprinkler Irrigation Systems must be followed.

Sprinkler Irrigation Systems

The system must contain a functional check valve and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow.

The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump. The pesticide injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.

The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops. The irrigation line or water pump must include a functional pressure switch that will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.

Systems must use a metering pump, such as a positive displacement injection pump (e.g. diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.

Do not apply when wind speed favors drift beyond the area intended for treatment.

Center pivot, motorized lateral move, or traveling gun types of equipment: Inject into the system for one revolution or run. Shut off injection equipment after one revolution or run, but continue to operate irrigation system until AZA-DIRECT has been cleared from the last sprinkler head. Do not use end guns. The system should be run at maximum speed for a foliar application.

Wheel move, side roll, end tow, solid set, or hand move types of equipment: Adjust equipment to inject AZA-DIRECT over a 30-60 minute period. Shut off injection equipment. Continue to operate irrigation system until AZA-DIRECT has been cleared from the last sprinkler head. AZA-DIRECT can be injected at the end of the irrigation cycle or as a separate application. Do not use end guns. AZA-DIRECT must be premixed in a supply tank with water and other appropriate tank-mix chemicals. Agitation is necessary at all times.

Attention must be exercised in irrigation waters with a pH greater than 7. If the irrigation cycle will last longer than 8 hours and the AZA-DIRECT is premixed in the supply tank, the tank mix must be buffered to a pH of 6 or lower. Please contact your Gowan sales representative should this situation apply. Application is to be in sufficient water and of sufficient duration to apply the appropriate rate evenly over the entire treated area.

No field runoff can be permitted during chemigation.

USE SITES

AGRICULTURAL USE SITES – Use AZA-DIRECT on agricultural use sites including, but not limited to, the following:

BERRIES GROUP, such as: Blackberry, Blueberry, Currant, Elderberry, Gooseberry, Huckleberry, Loganberry, Raspberry (black and red), Note: For Strawberries – see miscellaneous.

BULB VEGETABLES, such as: Garlic, Leek, Onion (dry bulb, green and Welsh), Shallot

CEREAL GRAINS and GRAINS GROUP, such as: Barley, Buckwheat, Corn, Millet (pearl and Proso), Oats, Popcorn, Rice, Rye, Sorghum (milo), Teosinte, Triticale, Wheat, Wild rice

CITRUS FRUITS, such as: Calamondin, Citrus citron, Citrus hybrids, Grapefruit, Kumquat, Lemon, Lime, Mandarin (tangerine), Orange (sour and sweet), Pummelo, Satsuma mandarin, White Sapote, Uniq Fruit

COTTON AND TOBACCO

CUCURBIT VEGETABLES, such as: Chayote, Chinese waxgourd, Citron melon, Cucumber, Gherkin, Gourd (edible), Muskmelon, Pumpkin, Squash (summer and winter), Watermelon

FORAGE CROPS, including but not limited to: Alfalfa, Clover, Trefoil or Vetch.

FRUITING VEGETABLES, such as: Eggplant, Groundcherry, Pepino, Pepper (including bell pepper, chili pepper, cooking pepper, pimento, sweet pepper), Tomatillo, Tomato

HERBS AND SPICES GROUP, such as: Allspice, Angelica, Anise (anise seed and star), Annatto (seed), Balm (lemon balm), Basil, Borage, Burnet, Camomile, Caper buds, Caraway, Caraway (black), Cardamom, Cassia bark, Cassia buds, Catnip, Celery seed, Chervil (dried), Chive, Chinese Chive, Cinnamon, Clary, Clove buds, Coriander (cilantro or Chinese parsley – leaf), Coriander (cilantro-seed), Costmary, Culantro (leaf and seed), Cumin, Curry (leaf), Dill (dillweed and seed), Fennel (common, Florence), Fenugreek, Grains of paradise, Horehound, Hyssop, Juniper berry, Lavender, Lemongrass, Lovage (leaf and seed), Mace, Marigold, Marjoram, Mustard (seed), Nasturtium, Nutmeg, Parsley (dried), Pennyroyal, Pepper (black and white), Poppy (seed), Rosemary, Rue, Saffron, Sage, Savory (summer and winter), Sweet bay (bay leaf), Tansy, Tarragon, Thyme, Vanilla, Wintergreen, Woodruff, Wormwood

DES-X™

INSECTICIDAL SOAP CONCENTRATE

May be used up to day of harvest

FOR ORGANIC PRODUCTION

ACTIVE INGREDIENT	By Wt.
Potassium Salts of Fatty Acids	47%
OTHER INGREDIENTS	53%
TOTAL	100%
Contains 4.07 lb. Technical per Gallon	

KEEP OUT OF REACH OF CHILDREN WARNING AVISO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail).

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS WARNING

Causes substantial but temporary eye injury. Causes skin irritation. Do not get in eyes, on skin or on clothing. Wear protective eye gear (goggles, face shield, or safety glasses). Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse.

FIRST AID

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor or going for treatment.

For emergency information regarding this product, call toll free hotline number: 1-800-255-3924

Personal Protective Equipment (PPE) Requirements:
Handlers who may be exposed to the concentrate through mixing, loading, application, and other tasks must wear:

- Protective eyewear
- Coveralls worn over short-sleeved shirt and short pants
- Chemical-resistant footwear and socks

OMRI™
Listed
Organic Materials Review Institute

- Net Contents: 2.5 Gallons
 Net Contents: 30 Gallons

EPA Reg. No. 67702-22-70051
EPA Est. No. 48408-CA-1

Manufactured for
Certis USA, LLC
8145 Guilford Rd, Suite 175
Columbia, MD 21046

CERTIS



Sold under a license of
W. Neudorff GmbH KG
An der Mühle 331680 Emmertal – Germany

- Chemical-resistant gloves, such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, polyvinyl chloride, and viton
- Chemical-resistant headgear for overhead exposure
- Chemical-resistant apron when cleaning equipment, mixing, or loading

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. When mixing and loading wear a chemical-resistant apron. When cleaning equipment add a chemical-resistant apron. Follow the manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

Users Should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This product may be hazardous to aquatic invertebrates. Do not apply directly to water, areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water by cleaning of equipment or disposal of equipment wash waters.

GENERAL INFORMATION

- DES-X™ INSECTICIDAL SOAP CONCENTRATE can be used to treat plants prior to biological control agent release and to treat "hot spots" for pest control in greenhouses with subsequent release of beneficial mites and insects.
- Compatible with biological control agents, beneficial insects, and mites.

Mode of Action

- DES-X™ INSECTICIDAL SOAP CONCENTRATE is a contact killer for both insect and mite pests. It penetrates the body of pests and results in rapid death. DES-X™ INSECTICIDAL SOAP CONCENTRATE kills pests by disrupting membrane and cellular function.
- DES-X™ INSECTICIDAL SOAP CONCENTRATE contains specially selected fatty acid salts (soaps) chosen for effective pest control.
- DES-X™ INSECTICIDAL SOAP CONCENTRATE has been formulated to provide optimum spreading.
- DES-X™ INSECTICIDAL SOAP CONCENTRATE is effective against the adult, larval, and nymph stages of pests. Pupal stages of some pests (e.g. whitefly) may also be affected.
- Can be used as part of an Integrated Pest Management System.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. Read all directions for use before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), restricted-entry interval, and notification to workers. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated area during the restricted-entry interval of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- Coveralls over short-sleeved shirt and short pants
- Chemical-resistant gloves, such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, polyvinyl chloride, and vitron
- Chemical-resistant footwear and socks
- Protective eyewear
- Chemical-resistant headgear for overhead exposure

NON-AGRICULTURAL USE REQUIREMENT

The requirements of this box apply to uses of this product that are not within the scope of the Worker Protection Standard for agricultural workers (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

DIRECTIONS FOR MIXING

For 2% formulation, mix 2 gal of product/100 gal of water (4.07 lb Tech/gal). Add sufficient water to the mixing tank to allow proper agitation by pump or paddles. Continue stirring while adding first the DES-X™ INSECTICIDAL SOAP CONCENTRATE then the remaining water. Hard water in excess of 300 ppm should be conditioned to reduce its hardness prior to mixing with DES-X™ INSECTICIDAL SOAP CONCENTRATE.

TANK MIXING

DES-X™ INSECTICIDAL SOAP CONCENTRATE may be combined with other pesticides to broaden the target spectrum, improve the level of kill, provide residual kill and enhance coverage. When used as a tank-mix, observe all directions for use, crops, use rates, dilution ratios, precautions, and limitations which appear on the tank mix product label. Follow the label directions for the most restrictive of label precautions and limitations. This product should not be mixed with any product which prohibits such mixing. Tank mixtures are permitted only in those states where the tank mix partner is registered. For tank mixing with companion pesticides, use DES-X™ INSECTICIDAL SOAP CONCENTRATE at a rate of 1% formulation (1 gallon of concentrate to 100 gallons of water). For example, certain caterpillars and leaf-feeding beetles (e.g. Elm leaf beetle) can be controlled with tank mixes of 1 gallon of DES-X™ INSECTICIDAL SOAP CONCENTRATE per 100 gallons of water plus a standard pesticide.

Order of Tank Mixing:

- Water
- Water conditioner (if needed)
- Conventional pesticide

Add other products in the following order:

- Water soluble bags
- Wettable powders
- Dry flowables
- Liquid flowables
- ECs
- Soluble materials such as fertilizers
- DES-X™ INSECTICIDAL SOAP CONCENTRATE

Also, if appropriate, give a Tank Mix Compatibility Test: Using a 2 quart jar, add the proportionate amounts of the products (in the order recommended above) to 1 qt water. After thorough mixing, let it stand for 5 minutes. If the combination remains mixed or can be re-mixed readily, it is compatible. Once compatibility is proven, use the same procedure for adding required products to the spray tank.

Manzate and dithane products are incompatible with DES-X™ INSECTICIDAL SOAP CONCENTRATE.

Combining this product with sulfur or applying this product within 3 days of sulfur application may increase the plant damage caused by sulfur on sensitive plants (e.g. grape). Do not tank mix DES-X™ INSECTICIDAL SOAP CONCENTRATE with sulfur when temperatures are higher than 90°F.

Do not allow tank mixes to sit for longer than 24 hours. Mix and spray as soon as possible.

DES-X™ INSECTICIDAL SOAP CONCENTRATE alone only requires stirring prior to use. Continue to stir tank mixes of DES-X™ INSECTICIDAL SOAP CONCENTRATE with other pesticides throughout use. If using equipment without pump or paddle, shake often during use. Flush fluid in sprayer hose lines back into the tank if stirring is interrupted.

APPLICATION INSTRUCTIONS

For field applications, apply 2% formulation, 2 gal of product/100 gal of water (4.07 lb Tech/gal), at a rate of 75 to 200 gal/acre (5.10 to 16.26 lbs ai/acre) using ground spray equipment. For best results, commence treatment when infestation is first noticed. Thoroughly spray insect pests on plants with diluted product to wetting. Minimize run-off to reduce plant injury on sensitive plants. DES-XSM INSECTICIDAL SOAP CONCENTRATE is a contact spray and is effective in its liquid state. Pests need to be contacted with spray solution to be effective. Efforts should be made to thoroughly reach all plant parts including undersides of leaves.

Repeat treatment every one to two weeks as needed. Apply to a maximum of three consecutive applications to ensure plant injury does not occur. Additional applications may be possible if previous experience with repeat applications of the product under the same conditions have not produced plant injury. May be used on edible crops up to and including day of harvest after a minimum spray interval of 12 hours.

PESTS/SITES

DES-XSM INSECTICIDAL SOAP CONCENTRATE will control listed insect pests such as: adelgids (woolly aphids), aphids, lacebugs, mealybugs, mites, leafhoppers, scale insects, plant bugs, sawfly larvae (e.g. pear and rose slugs), psyllids, tent caterpillars, spider mites, earwigs and whitefly.

CROP	PEST
Fruit trees such as: apples pears apricots prunes cherries nectarines peaches Nut trees such as: pecans almonds	aphids psyllids mites sawfly larvae plant bugs (pear slugs) leafhoppers scale insects earwigs spider mites mealybugs tent caterpillars
citrus	aphids mealybugs mites scale insects
olives	aphids scale insects spider mites

Additional restrictions for this use:

- For tent caterpillars, apply at a rate of 3% formulation (3 gal of product/100 gal of water) directly on larvae.
- Do not exceed a maximum spray volume of 400 gal/acre on apples.
- Use with care on pears after delayed dormant stage due to potential for fruit marking.
- Do not exceed a maximum rate of 100 gal/acre on smooth-skinned stone fruit up to fruit formation.
- Do not exceed a maximum rate of 175 gal/acre on peaches.
- Do not use on yellow-skinned nectarines.
- If sooty mold is present on citrus, application of product may result in fruit marking.

CROP	PEST
Small fruits: grapes raspberry strawberry cranberry blueberry	aphids scale insects mealybugs leafhoppers mites plant bugs

Additional recommendations for this use:

- Do not use on table grapes once they become 6-7 mm in diameter (removes waxy bloom) or use at lowest recommended rate (75 gal/acre).

Specimen Label

 Dow AgroSciences



Naturalyte[®] Insect Control

[®]Trademark of Dow AgroSciences LLC

A Naturalyte[®] insect control product formulated for control of lepidopterous larvae (worms or caterpillars), leafminers, thrips, and red imported fire ants.

Group	5	INSECTICIDE
Active ingredient:		
spinosad		
(a mixture of spinosyn A and spinosyn B)		80%
Other Ingredients		20%
Total		100%

Contains 80% active ingredient on a weight basis.

EPA Reg. No. 62719-282



Listed by the Organic Materials Review Institute (OMRI) for use in organic production.

Keep Out of Reach of Children

CAUTION

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. Refer to the label booklet under "Agricultural Use Requirements" in the Directions for Use section for information about this standard.

Refer to inside of label booklet for additional precautionary information including Directions for Use.

Notice: Read the entire label. Use only according to label directions. Before using this product, read Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies at end of label booklet. If terms are unacceptable, return at once unopened.

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

Precautionary Statements

Hazard to Humans and Domestic Animals

CAUTION

Causes Moderate Eye Irritation

Avoid contact with eyes or clothing.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks

Mixers/loaders must wear:

- An approved dust/mist filtering respirator (NSHA/NIOSH approval number prefix TC-21C), or NIOSH approved respirator with any N, R, P or HE filter.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

Environmental Hazards

This product is toxic to bees exposed to treatment for 3 hours following treatment. Do not apply this pesticide to blooming, pollen-shedding or nectar-producing parts of plants if bees may forage on the plants during this time period. This product is toxic to aquatic invertebrates. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from treated areas. Drift and runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. Apply this product only as specified on the label.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Waterproof gloves
- Shoes plus socks

Non-Agricultural Use Requirements

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Do not enter or allow others to enter the treated area until sprays have dried.

Storage and Disposal

Do not contaminate water, food or feed by storage and disposal.

Pesticide Storage: Store in original container only.

Pesticide Disposal: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Nonrefillable rigid containers 5 gallons or less:
Container Handling: Nonrefillable container. Do not reuse or refill this container.
 Triple rinse or pressure rinse container (or equivalent) promptly after emptying. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Nonrefillable nonrigid containers:
Container Handling: Nonrefillable container. Do not reuse or refill this container. Completely empty bag into application equipment. Then offer for recycling if available, or dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Refillable rigid containers larger than 5 gal:
Container Handling: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water and, if possible, spray all sides while adding water. If practical, agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinse into application equipment or rinse into collection system. Repeat this rinsing procedure two more times. Then offer for recycling if available, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Nonrefillable rigid containers larger than 5 gal:
Container Handling: Nonrefillable container. Do not reuse or refill this container.
 Triple rinse or pressure rinse container (or equivalent) promptly after emptying. Then offer for recycling if available, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

General Information

Entrust® is a Naturalyte® insect control product for control of many foliage feeding pests including lepidopteran larvae (worms or caterpillars), Colorado potato beetles, leafminers and thrips infesting labeled crops. This product's active ingredient, spinosad, is biologically derived from the fermentation of *Saccharopolyspora spinosa*, a naturally occurring soil organism. Mix Entrust (wetable powder) with water and apply as a foliar spray with aerial or ground equipment equipped for conventional insecticide spraying.

General Use Precautions

Integrated Pest Management (IPM) Programs

Entrust is recommended for IPM programs in labeled crops. Apply Entrust when field scouting indicates target pest densities have reached the economic threshold, i.e., the point at which the insect population must be reduced to avoid economic losses beyond the cost of control. Other than reducing the target pest species as a food source, Entrust does not have a significant impact on certain parasitic insects or the natural predaceous arthropod complex in treated crops, including big-eyed bugs, ladybird beetles, flower bugs, lacewings, minute pirate bugs, damsel bugs, assassin bugs, predatory mites or spiders. The feeding activities of these beneficials will aid in natural control of other insects and reduce the likelihood of secondary pest outbreaks. If Entrust is tank mixed with any insecticide that reduces its selectivity in preserving beneficial predatory insects, the full benefit of Entrust in an IPM program may be reduced.

Insecticide Resistance Management (IRM)

Entrust contains spinosad, a Group 5 insecticide. Insect/mite biotypes with acquired resistance to Group 5 insecticides may eventually dominate the insect/mite population if Group 5 insecticides are used repeatedly in the same field or area, or in successive years as the primary method of control for targeted species. This may result in partial or total loss of control of those species by Entrust or other Group 5 insecticides. Currently, only spinetoram and spinosad active ingredients are classified as Group 5 insecticides. These two insecticide active ingredients share a common mode of action and must not be rotated with each other for control of pests listed on this label. Spinetoram and spinosad may be rotated with all other labeled insecticide active ingredients.

To delay development of insecticide resistance, the following practices are recommended:

- Carefully follow the specific label guidelines within the use directions sections of this label, especially in regard to IRM recommendations.
- Avoid use of the same active ingredient or mode of action (same insecticide group) on consecutive generations of insects. However, multiple applications to reduce a single generation are acceptable. Treat the next generation with a different active ingredient that has a different mode of action or use no treatment for the next generation.
- Avoid using less than labeled rates of any insecticide when applied alone or in tank mixtures.
- Applications should be targeted against early insect developmental stages whenever possible.
- Base insecticide use upon comprehensive IPM programs including crop rotations.
- Monitor treated insect populations in the field for loss of effectiveness.
- Contact your local extension specialist, certified crop advisor, and/or manufacturer for insecticide resistance management and/or IPM recommendations for the specific site and resistant pest problems.
- For further information or to report suspected resistance, you may contact your local Dow AgroSciences representative or by calling 800-258-3033.

Requirements for Use of Entrust in Greenhouses¹ and for Commercial Production of Herbaceous (Non-Woody) Ornamentals in Nurseries¹

- ¹A greenhouse is defined as a structure or space enclosed with a nonporous covering inside which plants are produced. A nursery is defined as a facility engaged in the outdoor production of plants.
- Regardless of the crop or pest being treated (excluding thrips, leafminers, spider mites and/or diamondback moths), do not apply Entrust more than 10 times in a 12-month period inside a greenhouse or a structure that can be altered to be closed or open. If Entrust is used for thrips, leafminer, spider mite and/or diamondback moth control, do not apply Entrust more than six times in a 12-month period inside a greenhouse or a structure that can be altered to be closed or open regardless if other insect pests are also being treated. It is a violation of federal law to use this product in a manner inconsistent with its labeling.
 - For areas of commercial production of herbaceous (non-woody) ornamentals in nurseries (including plant propagation beds), do not apply Entrust more than 10 times in a 12-month period per crop regardless of the pest being treated (excluding thrips, leafminers, spider mites and/or diamondback moths). If Entrust is used in areas of commercial production of herbaceous (non-woody) ornamentals in nurseries (including plant propagation beds) for leafminer, spider mite and/or diamondback moth control, do not apply Entrust more than six times in a 12-month period per crop regardless if other insect pests are also being treated.
 - Because generations of a specific pest may overlap, rotate insecticides and miticides and never apply more than three consecutive applications of Entrust or products containing the same active ingredient or with the same mode of action (same insecticide group). Use only specified label rates.
 - Make localized area treatments of ornamental plants where pest problems are anticipated or occur rather than general area-wide broadcast treatments.

Mixing Directions

Application Rate Reference Table

Application Rate of Entrust (oz/acre)	Active Ingredient Equivalent (lb ai/acre)	Acres per Pound of Entrust
0.5	0.025	32
0.75	0.0375	21.2
1	0.05	16
1.25	0.0625	12.8
1.5	0.075	10.5
2	0.1	8
2.5	0.125	6.4
3	0.15	5.3

Entrust - Alone: Fill the spray tank with water to about 1/2 of the required spray volume. Start agitation and add the required amount of Entrust. Continue agitation while mixing and filling the spray tank to the required spray volume. Maintain sufficient agitation during application to ensure uniformity of the spray mix. Do not allow water or spray mixture to back-siphon into the water source.

Spray Volume: Dilute sprays are sprayed to the point of runoff. The application rate range for dilute sprays in the table is based upon a spray volume of 300 gallons per acre. Gallonage of dilute sprays will vary depending upon tree size, density of canopy, stage of seasonal growth, and spacing in the orchard.

Resistance Management: Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

Restrictions:

- **Preharvest Interval:** Do not apply within 8 weeks of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 7 days apart.
- Do not apply more than a total of 9 oz of Entrust (0.45 lb ai spinosad) per acre per crop
- **Maximum Number of Applications:** Do not make more than four applications per crop or apply more than six times per calendar year.

Brassica (Cole) Leafy Vegetables (Crop Group 5)¹

¹Brassica (cole) leafy vegetables (crop group 5) including broccoli, broccol raab, Brussels sprouts, cabbage, cauliflower, cavalo, Chinese broccoli, Chinese cabbage (bok choy), Chinese cabbage (napa), Chinese mustard cabbage (gai choy), collards, kale, kohlrabi, mizuna, mustard greens, mustard spinach, rape greens

In the state of Georgia, do not apply Entrust to: broccol raab, Chinese cabbage (bok choy), collards, kale, mizuna, mustard greens, mustard spinach, rape greens

Pests and Application Rates:

Pests	Entrust (oz/acre)
diamondback moth	0.5 – 1.25
cabbage looper imported cabbageworm	1 – 2
armyworms (including beet armyworm) leafminers ¹ thrips ²	1.25 – 3
fla beetle (suppression)	1.25 – 2.5

¹Control of leafminers and thrips may be improved with the addition of an adjuvant to the spray mixture. See Use of Adjuvants section under Mixing Directions.

Application Timing: Treat when pests appear, targeting eggs at hatch or small larvae. Heavy infestations may require repeat applications, but follow resistance management guidelines. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

Application Rate: Apply as a foliar spray at the rate specified to control target pest. Use a higher rate in the rate range for heavy infestations or advanced growth stages of target pests.

Resistance Management: Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. For diamondback moth, if additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least two applications. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area. Make treatment decisions for the entire farm and consider area wide programs if other growers are in close proximity. Do not make more than six applications of Entrust per calendar year for diamondback moth over an entire farm (an area of abutting or nearby fields).

Restrictions:

- **Preharvest Interval:** Do not apply within 1 day of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 4 days apart.
- Do not apply more than a total of 9 oz of Entrust (0.45 lb ai spinosad) per acre per crop.
- **Maximum Number of Applications:** Do not make more than six applications per calendar year.
- Do not apply to seedling cole crops grown for transplant within a greenhouse, shade house, or field plot.

Bulb Vegetables (Crop Group 3)¹

¹Bulb vegetables (crop group 3) including dry bulb onion, garlic, great-headed (elephant) garlic, green onion, leek, shallot, welch onion

Pests and Application Rates:

Pests	Entrust (oz/acre)
armyworms dipteran leafminers European corn borer fleabeetle loopers	1 – 2
thrips (suppression) ¹	1.25 – 2.5

¹Control of thrips may be improved with the addition of an adjuvant to the spray mixture. See Use of Adjuvants section under Mixing Directions. If thorough coverage is desired, then high pressure (>70 psi) directed sprays with dual directed nozzles can assist leaf penetration of onion.

Application Timing: For determining when to treat, scout with enough regularity to monitor the population size of each of the labeled pests. Treat when pests appear, targeting eggs at hatch or small larvae. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

Application Rate: Apply as a foliar spray at the rate specified to control target pest. Use a higher rate in the rate range for larger larvae or heavier infestations.

Resistance Management: Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

Restrictions:

- **Preharvest Interval:** Do not apply within 1 day of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 4 days apart.
- Do not apply more than a total of 9 oz of Entrust (0.45 lb ai spinosad) per acre per crop (includes foliar plus soil plus seed)
- **Maximum Number of Applications:** Do not make more than five foliar applications per calendar year.

Bushberries (Subgroup 13B)¹

(Insect Suppression)

¹Bushberries (subgroup 13B) including blueberry, currant, elderberry, gooseberry, huckleberry, juneberry, lingonberry, salal

Pests and Application Rates:

Pests	Entrust (oz/acre)
armyworms cherry fruitworm cranberry fruitworm currant fruitfly European grapevine moth fireworms leafrollers light brown apple moth loopers thrips ²	1.25 – 2

²Control of thrips may be improved with the addition of an adjuvant to the spray mixture. See Use of Adjuvants section under Mixing Directions.

Application Timing: Treat when pests appear, targeting eggs at hatch or small larvae. Heavy infestations may require repeat applications, but follow resistance management guidelines. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

Application Rate: The amount of Entrust applied per acre will depend upon plant size and volume of foliage present and pest pressure. Use a lower rate in the rate range for light infestations and/or small plants and a higher rate in the rate range for heavy infestations and/or larger plants.

Resistance Management: Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications

of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

Restrictions:

- **Preharvest Interval:** Do not apply within 3 days of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 6 days apart.
- **Do not apply more than a total of 9 oz of Entrust (0.45 lb ai spinosad) per acre per crop.**
- **Maximum Number of Applications:** Do not make more than six applications per calendar year or more than three applications per crop.

Caneberries (Subgroup 13A)¹

¹Caneberries (subgroup 13A) including blackberry, loganberry, red and black raspberry, cultivars and/or hybrids of these

Pests and Application Rates:

Pests	Entrust (oz/acre)
beet armyworm bertha armyworm European grapevine moth green fruitworm leafrollers light brown apple moth looper sawfly western raspberry fruitworm	1.25 - 2

Application Timing: Treat when pests appear, targeting eggs at hatch or small larvae. Heavy infestations may require repeat applications, but follow resistance management guidelines. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

Application Rate: The amount of Entrust applied per acre will depend upon plant size and volume of foliage present and pest pressure. Use a higher rate in the rate range for larger larvae or moderate to severe infestations and/or larger plant volume.

Resistance Management: Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

Restrictions:

- **Preharvest Interval:** Do not apply within 1 day of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 5 days apart.
- **Do not apply more than a total of 9 oz of Entrust (0.45 lb ai spinosad) per acre per crop.**
- **Maximum Number of Applications:** Do not make more than six applications per calendar year.

Citrus (Crop Group 10)¹

¹Citrus (crop group 10) including grapefruit, lemons, limes, oranges, tangerines

Pests and Application Rates:

Pests	Entrust (oz/acre)
citrus leafminer citrus orangedog citrus peelminer citrus thrips ¹	1.25 - 3

¹Control of thrips may be improved with the addition of an adjuvant to the spray mixture. See Use of Adjuvants section under Mixing Directions.

Application Timing: Treat when pests appear or in accordance with local economic thresholds. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

Application Rate: The amount of Entrust applied per acre will depend upon tree size and pest pressure. Use a lower rate in the rate range for light infestations and/or small trees and a higher rate in the rate range for heavy infestations and/or large trees.

Resistance Management: Citrus thrips are present most of the time on the crop during the growing season and have demonstrated a high potential to develop resistance to insect control products. Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. For citrus thrips, rotate to another class of effective products for the next two applications after using two applications of Entrust within a season. Consult your Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

Restrictions:

- **Preharvest Interval:** Do not apply within 1 day of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 6 days apart.
- **Do not apply more than a total of 9 oz of Entrust (0.45 lb ai spinosad) per acre per crop.**
- **Maximum Number of Applications:** Do not make more than three applications per calendar year.
- **Do not apply to citrus nurseries or citrus in greenhouses.**

Corn (Field, Sweet, Popcorn, Seed Corn) and Teosinte

Pests and Application Rates:

Pests	Entrust (oz/acre)
armyworms European corn borer	0.5 - 2
beet armyworm corn earworm southwestern corn borer western bean cutworm	1 - 2

Application Timing: Scout for European corn borer and armyworms with enough regularity to monitor egg laying and egg hatch. Time applications of Entrust to coincide with peak egg hatch of each generation. Frequent treatments may be necessary when the crop is growing rapidly, during silking or under heavy pest pressure. For corn earworm control, a 1- to 2-day re-treatment schedule may be necessary at silking. For control of all other pests, a 5- to 7-day re-treatment schedule may be necessary if the crop is growing rapidly or if there is heavy pest pressure.

Application Rate: Apply as a foliar spray at the rate specified to control target pests. Use a higher rate in the rate range for heavy infestations or advanced growth stages of target pests.

Spray Delivery: For control of first generation European corn borer and armyworms, apply broadcast or as a directed spray into the leaf whorls. For control of corn earworm, apply broadcast or direct spray to ear zone. Use sufficient spray volume and nozzle pressure to ensure thorough wetting of the silks.

Chemigation: Entrust may be applied to corn by chemigation at labeled rates. Refer to the Chemigation Application section.

Resistance Management: Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

Restrictions:

- **Sweet Corn, Popcorn, Seed Corn**
Preharvest Interval: Do not apply within 28 days of fodder harvest, 1 day of grains harvest or 7 days of forage harvest.
Do not apply more than a total of 9 oz of Entrust (0.45 lb ai spinosad) per acre per year.
Maximum Number of Applications: Do not make more than six applications per calendar year.
- **Field Corn and Teosinte**
Preharvest Interval: Do not apply within 28 days of grain or fodder harvest or 7 days of forage harvest.
Do not apply more than a total of 3.75 oz of Entrust (0.188 lb ai spinosad) per acre per year.
Maximum Number of Applications: Do not make more than three applications per calendar year.

GRANDEVO®

Active Ingredient: <i>Chromobacterium subsugae</i> strain PRAA4-1 ^T and spent fermentation media*.....	30.0%
Other ingredients:	70.0%
Total:.....	100.0%

*Contains not less than 1000 Cabbage Looper Killing Units (CLKU)/mg. **Note:** The percent active ingredient does not indicate product performance and potency measurements are not federally standardized.

EPA Reg. No.: 84059-17

EPA Est. No.: 39578-TX-1

EPA Est. No.: 84059-MI-001

KEEP OUT OF REACH OF CHILDREN

CAUTION

FIRST AID	
IF IN EYES:	<ul style="list-style-type: none"> Hold eye open and rinse slowly and gently with water for 15 – 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
IF INHALED:	<ul style="list-style-type: none"> Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.
IF SWALLOWED:	<ul style="list-style-type: none"> Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.
IF ON SKIN OR CLOTHING:	<ul style="list-style-type: none"> Take off contaminated clothing. Rinse skin immediately with plenty of water for 15 – 20 minutes. Call a poison control center or doctor for treatment advice.
HOT LINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-222-1222 for emergency medical treatment information.	

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION: Causes moderate eye irritation. Harmful if inhaled, swallowed or absorbed through the skin. Avoid contact with skin, eyes or clothing. Avoid breathing dust or spray mist. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet. Remove and wash contaminated clothing before reuse.


PERSONAL PROTECTIVE EQUIPMENT (PPE)

Applicators and other handlers must wear:

- long-sleeved shirt and long pants
- waterproof gloves
- shoes plus socks
- protective eyewear

Mixer/loaders and applicators must wear a dust/mist filtering respirator meeting NIOSH standards of at least N-95, R-95, or P-95. Repeated exposure to high concentrations of microbial proteins can cause allergic sensitization. Follow the manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables are available, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Controls: When handlers use closed systems, enclosed cabs or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

 CAN BE USED IN ORGANIC PRODUCTION
NET WEIGHT: 5 lb, 30 lb, _____



GRA-13-03

Lot #:



 **Marrone**
Bio Innovations
2121 Second St., Ste. B-107
Davis, CA 95618 USA
info@marronebio.com

IMPORTANT: When reduced PPE is worn because a closed system is being used, handlers must be provided all PPE specified above for "applicators and other handlers" and have such PPE immediately available for use in an emergency, such as a spill or equipment breakdown.

USER SAFETY RECOMMENDATIONS

Users should:

- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This product is toxic to aquatic invertebrates. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas.

This product is toxic to certain nontarget terrestrial arthropods. Minimize spray drift away from target area to reduce effects to nontarget insects.

For terrestrial uses: Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. For any requirements specific to your State or Tribe, consult the State or Tribal agency responsible for pesticide regulation. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 4 hours.

PPE required for early entry to treated areas (that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil or water) is:

- Coveralls
- Waterproof gloves
- Shoes plus socks
- Protective eyewear

EXCEPTION: If the product is soil incorporated or soil injected, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are not within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries or greenhouses.

Keep unprotected persons out of treated areas until sprays have dried.

PRODUCT INFORMATION

GRANDEVO® is a biological insecticide/miticide containing fermentation solids of *Chromobacterium subsugae* strain PRAA4-1^T for use on edible crops against the pests listed in the Directions for Use section. GRANDEVO® functions primarily as a stomach poison for use in the control or suppression of many foliar-feeding pests, including caterpillars, and certain coleopteran. GRANDEVO® has multiple effects, including reducing fecundity and oviposition, deterring feeding and acting as a stomach poison on Homoptera and Hemiptera, such as aphids, psyllids, whiteflies, *Lygus* and mealybugs, and on thrips and phytophagous mites infesting labeled crops or use sites. GRANDEVO® must be mixed with water and applied as a foliar spray with ground or aerial equipment equipped for conventional insecticide spraying or by chemigation.

GRANDEVO® can be used in the field or greenhouse for the control of any labeled pest.

USE INSTRUCTIONS

GRANDEVO® is a biological insecticide/miticide for use against listed insects and mites. Close scouting and early attention to infestations is highly recommended. For insects and mites, proper timing of application targeting new populations or recently hatched larvae and nymphs is important for optimal results. Applying GRANDEVO® when pest populations are low is recommended.

Bananas**2 – 3 pounds of GRANDEVO® per acre**

Banana skipper

Brassica (Cole) Leafy Vegetables**Broccoli, Broccoli Raab, Brussels Sprouts, Cabbage, Cauliflower, Cavalo Broccolo, Chinese Broccoli, Chinese Cabbage (Bok Choy), Chinese Cabbage (Napa), Chinese Mustard Cabbage (Gai Choy), Collards, Kale, Kohlrabi, Mizuna, Mustard Greens, Mustard Spinach, and Rape Greens****1 – 3 pounds of GRANDEVO® per acre**

Armyworms, beet armyworm, cabbage looper, cabbage webworm, cross-striped cabbageworm, cutworms, diamondback moth, imported cabbageworm, light brown apple moth

2 – 3 pounds of GRANDEVO® per acre

Aphids, billbugs, leafhoppers, mites, plant bugs, thrips, whiteflies, yellow margined leaf beetle larvae

Yellow margined leaf beetle larvae – apply to newly hatched to 2nd instar. If adult beetles are also present, tank mix with a knockdown insecticide.**Bulb Vegetables****Leek, Garlic, Onion (Bulb and Green), and Shallot****1 – 3 pounds of GRANDEVO® per acre**Armyworms, cross-striped cabbageworm, cutworms, diamondback moth, European corn borer, green cloyerworm, *Heliothis*, hornworm, imported cabbageworm, leek moth, loopers, omnivorous leafroller, saltmarsh caterpillar, webworms**2 – 3 pounds of GRANDEVO® per acre**

Aphids, thrips

Bushberries**Blueberry, Currant, Elderberry, Gooseberry, Huckleberry, Juneberry, Lingonberry, and Salal****1 – 3 pounds of GRANDEVO® per acre**

Armyworms, cherry fruitworm, cranberry fruitworm, fireworms, leafrollers, loopers

2 – 3 pounds of GRANDEVO® per acre

Aphids, thrips

Caneberries**Blackberry, Black and Red Raspberry, Loganberry, and Cultivars, Varieties and/or Hybrids of these****1 – 3 pounds of GRANDEVO® per acre**

Armyworms, beet armyworm, bertha armyworm, green fruitworm, leafrollers, loopers, western raspberry fruitworm

2 – 3 pounds of GRANDEVO® per acre

Aphids, thrips

Cereal Grains**Barley, Buckwheat, Oats, Pearl Millet, Proso Millet, Rye, Sorghum (Milo), Triticale, and Wheat****1 – 3 pounds of GRANDEVO® per acre**

Armyworms, corn earworm (headworm), southwestern corn borer, web worms

2 – 3 pounds of GRANDEVO® per acre

Aphids (including greenbug), chinch bugs, mites, thrips

Citrus Fruit**Grapefruit, Lemons, Limes, Oranges, and Tangerines****1 – 3 pounds of GRANDEVO® per acre**

Citrus cutworm, citrus leafminer, fruitree leafroller, orangedog

2 – 3 pounds of GRANDEVO® per acre

Asian citrus psyllid, aphids, citrus blackfly, citrus red mite, citrus rust mite, citrus thrips, citrus whitefly, cloudy-winged whitefly, glassy-winged sharpshooter, mealybugs, six-spotted spider mite, Texas citrus mite, two-spotted spider mite

Jet-Ag™

Jet-Ag™ – A Fungicide, Bactericide, Algacide
for Agricultural Uses

Active Ingredients:

Hydrogen Peroxide.....26.5%

Peroxyacetic Acid.....4.9%

Other Ingredients:..... 68.6%

Total:..... 100.0%

ANGER - PELIGRO
STRONG OXIDIZING AGENT

KEEP OUT OF REACH OF CHILDREN

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

See side panel for additional precautionary statements and first aid.



Jet Harvest Solutions
P.O. Box 915139
Longwood, FL 32791
1-407-523-7842

EPA Registration No. 81803-6
EPA Est. No. 70547-IL-001

Net Contents: 53 gallons/5 gallons/30gallons/265 gallons

Batch No:

FIRST AID

If in eyes	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15 – 20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If on skin or clothing	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15 – 20 minutes. • Call a poison control center or doctor for treatment advice.
If swallowed	<ul style="list-style-type: none"> • Call poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give anything by mouth to an unconscious person.
If inhaled	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. • Call a poison control center or doctor for treatment advice.
HOTLINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact Jet Harvest Solutions 24 hours at, 1-877-866-5773 for emergency medical treatment information.	
NOTE TO PHYSICIAN	
Probable mucosal damage may contraindicate the use of gastric lavage.	

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

DANGER

Corrosive. Causes irreversible eye damage. May be fatal if swallowed or absorbed through skin. Causes skin burns or temporary discoloration on exposed skin. Do not breathe vapor. Do not get in eyes, on skin or on clothing. Wear protective eyewear such as goggles or face shield. Wash thoroughly with soap and water after handling. Remove and wash contaminated clothing before reuse.

Personal Protective Equipment (PPE): Applicators and handlers must wear coveralls over long-sleeved shirt, long pants,

and chemical resistant footwear plus socks. When mixing and loading wear a chemical resistant apron. For overhead exposure wear chemical-resistant headgear. Wear protective eyewear (goggles, face shield, or safety glasses), and chemical resistant gloves. When cleaning equipment wear a chemical resistant apron. Follow manufacturer's instructions for cleaning / maintaining PPE. If no such instruction exists for washables, use detergent and hot water.

User Safety Recommendations:

User should wash hands thoroughly with soap and water before eating, drinking or using tobacco or using the toilet. Users should remove clothing immediately if contaminated by pesticide. Wash thoroughly and put on clean clothing. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Environmental Hazards - This pesticide is toxic to birds and fish. Do not contaminate water when disposing of equipment washwaters or rinsate. Exposed treated seed may be hazardous to birds and other wildlife. Dispose of all excess treated seed and seed packaging by burial away from bodies of water.

This product is highly toxic to bees and other beneficial insects exposed to direct contact on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds while bees are actively visiting the treatment area. Do not apply this product or allow it to drift to crops where beneficials are part of an Integrated Pest Management strategy.

Physical or Chemical Hazards

Corrosive.

Strong oxidizing agent. Do not use in concentrated form. Mix only with water in accordance with label instructions. Never bring concentrate in contact with other oxidative agents.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This standard contains the requirements for the protection of agricultural workers on farms, forests, nurseries and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about Personal Protective Equipment (PPE) and Restricted-Entry Interval (REI).

Agricultural Use Requirements (continued)

The requirements in this box apply to the uses of this product that are covered by the Worker Protection Standard.

For enclosed environments:

There is a restricted entry of one (1) hour for this product when applied via fogging or spraying to growing plants, surfaces, equipment, structures and non-porous surfaces in enclosed environments such as glasshouses and greenhouses. PPE requirement for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil or water, is coveralls worn over long-sleeved shirt and pants, waterproof gloves and shoes plus socks.

There is a restricted entry of zero (0) hours for pre-plant dip, seed treatment, soil drench, mop, sponge, dip, soak, rinse or other non-spraying or non-fogging application methods when used in enclosed environments such as glasshouses and greenhouses.

For field applications:

Keep unprotected persons out of treated areas until sprays have dried.

For fruit and vegetable storage systems:

Keep unprotected persons out of treated area for two (2) hours after the system has been purged with fresh air.

Non-Agricultural Use Requirements

The requirements in this box apply to uses of this product that are not within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries or greenhouses.

Keep unprotected persons out of treated areas until sprays have dried.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for the pesticide regulation.

To prevent, suppress, or eliminate fungi, bacteria and algae – *Alternaria* – *Anthraxnose* – *Aphanomyces* – Black Spot – *Botrytis* (grey mold) – Downy Mildew – *Erwinia* – *Fusarium* (root rot) – Leaf Spot – *Phytophthora* (blights, rots) – *Plasmopara* – Powdery Mildew *Pseudomonas* *Pythium* *Rhizoctonia* Rust – Scab – Smut – *Thielaviopsis* – *Uncinula* (powdery mildew) – Wilts and Blights – Red, Blue Green, Black and Brown - Algae

Do not apply this product through any irrigation system unless directed by the label. Refer to Chemigation Directions for Use.

Jet-Ag can be applied to the following growing crops to control fungi. **Crops:** root vegetables, potatoes, berries, strawberries, citrus fruit, pome fruit, stone fruit, herbs, spices, peppers, tomatoes, sweet potatoes, onions, cucurbits, tropical fruits, avocados, bananas, mangoes, grapes, brassicas, peas, beans, soybeans, cereal crops, peanuts, cotton, and coffee.

Initial Curative Application:

1. Use 3.9 to 7.8 fluid ounces of Jet-Ag per 5 gallons of clean water.
2. Do not reuse already mixed solution; make fresh daily. Spray or mist plants and trees including application through irrigation or chemigation systems. **If application is to be made through irrigation or chemigation systems, refer to the Chemigation Directions for Use section of this label for further requirements and instructions.**
3. Thoroughly wet all surfaces of plant, upper and lower foliage, including stems, branches and stalks to ensure full contact with plant tissue.
4. Based on disease severity, apply for one to three consecutive days and then follow directions for preventative treatment after the initial application.

Weekly Preventative Treatment:

1. Use 0.75 to 1.3 fluid ounces of Jet-Ag per 5 gallons of clean water.
2. Spray or mist plants and trees. **If application is to be made through irrigation or chemigation systems, refer to the Chemigation Directions for Use section of this label for further requirements and instructions.**
3. Thoroughly wet all surfaces of plant, upper and lower foliage, including stems, branches and stalks.
4. Based on disease pressure, spray every five to seven days as a preventative treatment.
5. At the first sign of disease, spray daily with 3.6 to 7.8 fluid ounces of Jet-Ag per 5 gallons of water for three consecutive days and then resume weekly preventative treatment.

CHEMIGATION DIRECTIONS FOR USE

General Requirements

1. Apply this product through one of the following types of irrigation systems: center pivot, lateral move, end tow, side wheel roll, traveler, solid set, and hand move, flood basin or drip trickle irrigation system. Do not apply this product through any other type of irrigation system.
2. Crop injury or lack of effectiveness can result from non-uniform distribution of treated water.
3. Ensure that the irrigation system is properly calibrated. If you have questions about calibration, contact the State Extension Service specialist, the equipment manufacturer, or other experts.
4. Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a

public water system unless proper safety devices for public water systems are in place. Read specific requirements provided below.

5. A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make any necessary adjustments should the need arise.

Specific Requirements for all Irrigation Systems:

1. Public water system means a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days throughout the year.
2. Chemigation systems connected to public water systems must contain a functional, reduced-pressure zone (RPZ), backflow preventer or the functional equivalent in the water supply line upstream from the point of pesticide introduction. As an option to the RPZ, the water from the public water system should be discharged into a reservoir tank prior to pesticide introduction. There shall be a complete physical break (air gap) between the outlet end of the fill pipe and the top or overflow rim of the reservoir tank of at least the inside diameter of the fill pipe.
3. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of liquid back towards the injection pump.
4. The pesticide injection pipeline must contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being drawn from the supply tank when the irrigation system is either automatically or manually shut down.
5. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops or in cases where there is no water pump, when the water pressure decreases to the point where pesticide distribution is adversely affected.
6. Systems must use a metering pump, such as a positive displacement injection pump or equivalent, effectively designed and constructed of materials that are compatible with pesticide and capable of being filled with a system interlock.
7. Do not apply outdoors when wind speed favors drift beyond the area intended for treatment.

Application Instructions

1. Remove scale, pesticide residues and other foreign matter from the chemical supply tank and entire injector system. Flush with clean water. Failure to provide a clean tank, void of scale or residue may cause product to lose effectiveness of strength.
2. Determine the treatment rates as indicated in the directions for use and make proper dilutions.
3. Prepare a solution by filling the tank with the required volume of water and then adding product as required. The product will immediately go into solution without any required agitation.

Neemazad[®] 1% EC

INSECT GROWTH REGULATOR

Kills/repels a variety of insect pests including whiteflies, caterpillars, leafminers, aphids, and diamondback moths.

FOR ORGANIC PRODUCTION

ACTIVE INGREDIENT:	
Azadirachtin.....	1.0%
OTHER INGREDIENTS:	99.0%
TOTAL:	100.0%

This product contains 0.082 lb. of azadirachtin per U.S. gallon.

KEEP OUT OF REACH OF CHILDREN CAUTION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.
(If you do not understand the label, find someone to explain it to you in detail).

SEE SIDE/BACK PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS AND FIRST AID

Net Contents: 2.5 Gallons
EPA Reg. No. 70051-104
EPA Est. No. 44616-MO-01
Lot Number:

Manufactured by
Certis USA, L.L.C.
9145 Guilford Road
Suite 175
Columbia, MD 21046

CERTIS

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS CAUTION

Harmful if absorbed through the skin. Causes moderate eye irritation. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Remove and wash contaminated clothing before reuse.

FIRST AID

If in eyes: Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.

If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes.

Call a poison control center or doctor immediately for treatment advice. Have the product container or label with you when calling a poison control center or doctor, or going for treatment. Hot Line Number: 1-800-255-3924.

Personal Protective Equipment:

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category C on an EPA chemical-resistance category selection chart.

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants.
- Chemical-resistant gloves, such as barrier laminate or butyl rubber or nitrile rubber or neoprene rubber or polyvinylchloride (PVC) or Viton.
- Shoes plus socks.
- Protective Eyewear

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not re-use them.

USER SAFETY RECOMMENDATIONS

Users Should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This product is hazardous to fish and aquatic invertebrates. For terrestrial uses: Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters or rinsate.

DIRECTIONS FOR USE

IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT IN A MANNER INCONSISTENT WITH ITS LABELING.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and

with the Worker Protection Standard, 40 CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 4 hours.

For early entry into treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, wear:

- Coveralls.
- Chemical-resistant gloves, such as barrier laminate or butyl rubber or nitrile rubber or neoprene rubber or polyvinylchloride (PVC) or Viton.
- Shoes plus socks.
- Protective Eyewear

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses. Keep unprotected persons out of treated areas until sprays have dried.

GENERAL

- Botanical Insecticide Concentrate.
- Kills larval stages of insects only.
- Not for use in food-handling establishments.
- Shake well before using.
- Spraying directly onto the pest and a longer duration of leaf wetting increases effectiveness. Apply in early to mid-morning or late afternoon.
- The pH of spray solution containing Neemazad® 1.0% EC must be kept between 3 and 8. Use spray solutions within several hours of preparation for maximum effectiveness. Do not store diluted solution for later use.
- Do not apply to wilted or otherwise stressed plants, or to newly transplanted material prior to root establishment. Do not apply to known spray sensitive plants without testing.
- Neemazad® 1.0% EC has been found to be compatible when used in conjunction with most beneficial insects. Conduct a small trial to assure compatibility before using on a large scale.
- For indoor and outdoor use.

TANK MIXING

Neemazad® 1.0% EC Botanical Agricultural Insecticide has been found to be compatible with most commonly used fungicides, insecticides, and fertilizers. Check physical compatibility first by using the correct proportion of products in a small jar test. Then, test tank-mix combinations for phytotoxicity on a sample of plants prior to use. This must be done with combinations used before as environmental conditions can alter the interaction between compounds.
Due to the wide variation in climatic conditions, cultural

practices, and other factors, the user assumes full responsibility for any crop damage or other liability resulting from the use of Neemazad® 1.0% EC in a tank mix combination. Do not mix Neemazad® 1.0% EC with oxidizing agents such as bleach, or strong acids and bases as they will destabilize the product.

DIRECTIONS FOR FOOD CROP APPLICATION

General Directions

- Use care when applying near streams, ponds, lakes or other bodies of water.
- Do not apply Neemazad® 1.0% EC when weather conditions favor drift or when the likelihood of runoff is high.

GREENHOUSE

- For use to control whiteflies, thrips, mealybugs, leafminers, and aphids in and around greenhouses and commercial nurseries.
- Neemazad® 1.0% EC may be used on all fruits, vegetables, vegetable transplants, and herbs both inside and outside of the greenhouse.
- Dilute Neemazad® 1.0% EC at 1 to 2.25 pints (16 - 36 fluid oz.) per 100 gallons of water (1 1/8 to 2 1/4 teaspoon of Neemazad® 1.0% EC per gallon of water). Mix thoroughly. Apply at 25-40 psi with hand sprayer or 100-200 psi with power sprayer as a fine spray to both leaf surfaces to runoff. Use 1-2 gallons of spray solution/1,000 sq. feet. Avoid excessive application.
- For low volume application, apply 2.25 pint of Neemazad® 1.0% EC per acre in sufficient water to provide adequate coverage.
- Apply sprays on a preventative 7-day schedule or at the first sign of insect presence. This schedule is effective under low insect pressure. Under high insect pressure, apply every 3-4 days.
- For drench applications in greenhouse or nursery plantings, use 10 fluid ounces per 100 gallons and apply at the rate of 4.5 quarts of diluted solution per square foot of growing media surface. Repeat at 14-day intervals during the growing season.

Specific Crop Directions

Application Rate: Apply 1 1/8 - 4 1/2 pints (18.0-72.0 fluid oz.) of Neemazad® 1.0% EC per acre using suitable ground or aerial application equipment, in a manner to obtain uniform and complete plant coverage. For agronomic crops apply using conventional ground application equipment in a minimum of 30 gallons of water and aerial application equipment in a minimum of 3 gallons of water. Avoid over-spraying to the point of excessive runoff. Refer to table for application rates. Use the low rate as a preventative when pest pressure is low, or if used in conjunction with adulticide products. Otherwise, use the high rate. The maximum application rate is 20 grams active ingredient or less per acre according to the tolerance exemption (40 CFR 180.1119).

Mode of Action

This product controls targeted insect larvae when ingested or come in contact with it, by interfering with the insects' ability to molt. It is effective on all larval stages and pupae. It also reduces damage by repelling and deterring feeding of all stages of insect.

Application Rate for Whiteflies, Aphids, Leafminers, Armyworms, and Other Pests			
Pest	Rate Neemazad® 1.0% EC Per Acre*(fluid ounces)	Frequency	Remarks
Sweetpotato Whitefly			
Low Pressure	18.0 – 31.5 fluid oz.	4 – 10 days	Foliar application to larvae and nymphs
High pressure	36.0 – 72.0 fluid oz.	3 – 7 days	
Aphids	22.5 – 31.5 fluid oz.	7 – 10 days	Suppression and adult feeding deterrence
Leafminer	18.0 – 31.5 fluid oz.	14 – 21 days	Foliar application to larvae and nymphs
Leafhoppers	31.5 – 72.0 fluid oz.	7 – 10 days	Foliar application to nymphs

*apply in sufficient water to obtain adequate plant coverage.

CITRUS, POME AND STONE FRUITS

Crops (including, but not limited to)

Apples	Jujubes	Peaches
Apricots	Kumquats	Pears
Avocado	Lemons	Plums
Cherries	Limes	Prunes
Crabapples	Nectarines	Quinces
Grapefruits	Oranges	

CUCURBITS

Crops (including, but not limited to)

Balsam pears	Gherkins	Pumpkins
Cantaloupes	Gourds	Squashes
Chinese waxgourds	Honeydew melons	Watermelons
Cucumbers	Mangoes	

BULB, COLE AND LEAFY VEGETABLES

Crops (including, but not limited to)

Asparagus	Collards	Mustard greens
Arugula	Cress	Onions
Broccoli	Endive	Parsley
Bok choy	Fennel	Rhubarb
Brussels sprouts	Garlic	Shallots
Cabbage	Kale	Spinach
Cauliflower	Kohlrabi	Swiss chard
Celery	Leek	Turnip tops
Chinese spinach	Lettuce	Watercress

LEGUME AND FRUITING VEGETABLES

Crops (including, but not limited to)

Beans	Lentils	Soybeans
Chick peas	Peanuts	Tomatoes
Eggplants	Peas	
Ground cherries	Peppers	

ROOT AND TUBER VEGETABLES

Crops (including, but not limited to)

Artichokes	Horseradish	Turmeric
Beets	Parsnips	Turnips
Carrots	Potatoes	Yam beans
Cassava	Radishes	Yams
Ginger	Rutabaga	
Ginseng	Sweet potatoes	

SMALL FRUITS AND BERRIES

Crops (including, but not limited to)

Blackberries	Dewberries	Loganberries
Blueberries	Elderberries	Raspberries
Boysenberries	Gooseberries	Strawberries
Cranberries	Grapes	Youngberries
Currants	Huckleberries	

HERBS AND SPICES

Crops (including, but not limited to)

Anise	Cumin	Rosemary
Balm	Curry leaf	Rue
Basil	Dandelion	Sage
Borage	Dill	Savory
Camomile	Fennel	Spearmint
Caraway	Marigold	Sweet bay
Catnip	Majoram	Tarragon
Celery	Mint	Thyme
Chives	Pennyroyal	Wintergreen
Coriander	Peppermint	

NUTS

Crops (including, but not limited to)

Almonds	Cashews	Macadamias
Beech nuts	Chestnuts	Pecans
Brazil nuts	Filberts	Pistachios
Butternuts	Hickory nuts	Walnuts

MISCELLANEOUS

Crops (including, but not limited to)

Cotton	Corn
Sweet Corn	Other crops grown for seed
Alfalfa	

PyGanic

Crop Protection EC 1.4_{II}



Specimen Label

- Contains pyrethrum—a botanical insecticide derived from chrysanthemums
- Provides rapid knockdown and kill of plant pests
- For use on growing crops and ornamentals
- Can be used on day of harvest
- Controls key livestock pests
- Controls more than 100 insects

For Organic Production

OMRI

ACTIVE INGREDIENT:	
Pyrethrins	1.40%
OTHER INGREDIENTS	98.60%
	100.00%

KEEP OUT OF REACH OF CHILDREN CAUTION PRECAUCIÓN

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.
(If you do not understand the label, find someone to explain it to you in detail)

FIRST AID

IF SWALLOWED:

- Call poison control center or doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow.
- Do not induce vomiting unless told to do so by the poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

IF IN EYES:

- Hold eye open and rinse slowly and gently with water for 15-20 minutes.
- Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
- Call a poison control center or doctor for treatment advice.

IF ON SKIN OR CLOTHING:

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor for treatment advice.

IF INHALED:

- Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible.
- Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. For information regarding medical emergencies or pesticide incidents, call 1-888-740-8712.

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS CAUTION

Harmful if swallowed or absorbed through skin. Avoid contact with skin, eyes or clothing. Avoid breathing vapors or spray mist. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Remove and wash contaminated clothing before reuse. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category E on an EPA chemical resistance category selection chart.

Applicators and other handlers must wear: Long-sleeved shirt and long pants; Chemical-resistant gloves, such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber, or Viton; Shoes plus socks.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

When handlers use aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides 40 CFR 170.240 (g) (4-G), the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations: Users should: Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This pesticide is highly toxic to fish. For terrestrial uses, do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Drift from treated areas may be hazardous to organisms in adjacent aquatic sites. Do not contaminate water when disposing of equipment washwaters.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR, Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls;
- Chemical-resistant gloves, such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber, or Viton;
- Shoes plus socks.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirement specific to your State or Tribe, consult the agency responsible for pesticide regulation.

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR, Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Keep unprotected persons out of treated areas until sprays have dried.

Wear protective clothing when using or handling this product to help avoid exposure to eyes and skin. Eye protection, gloves, a long-sleeved shirt and long-pants are recommended.

Allow spray to dry before allowing adults, children or pets on treated areas.

For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

For the control of insects, including, but not limited to:

Ants	Eastern Tent Caterpillars	Leafrollers
Aphids	Elm Leaf Beetles	Leafhoppers
Apple Maggots	European Corn Borers	Lice
Armyworms	European Pine Tip Moths	Looper
Artichoke Plume Moths	Face Flies	Lygus
Asparagus Beetles	Fall Webworms	Mealy Bugs
Beet Armyworms	Fire Ants	Mediterranean Flour Moths
Bagworms	Firebrats	Midges
Bean Beetles	Fireworms	Mexican Bean Beetles
Beetles	Flux Beetles	Millipedes
Blight Beetles	Flies	Mosquitoes
Blow Flies	Forest Tent Caterpillars	Mushroom Flies
Biting Flies	Fungus Gnats	Naval Orangeworms
Bolt Weevils	Fruit Flies	Onion Maggots
Cabbage Loopers	Fruitree Leafrollers	Pear Psylla
Cankerworms	Glassy Winged Sharpshooters	Potato Leafhoppers
Carrot Weevils	Grape Leafhoppers	Psyllids
Caterpillars	Grape Leaf Skeletonizers	Rice Weevils
Clover Mites	Green Fruit Worms	Saw-toothed Grain Beetles
Clover Weevils	Green Peach Aphids	Scales
Cockroaches	Greenhouse Thrips	Silverfish
Codling Moths	Gypsy Moths (adults and larvae)	Skippers
Colorado Potato Beetles	Harlequin Bugs	Sowbugs
Crane Flies	Homets	Spiders
Crickets	Horn Flies	Stable Flies
Cross-striped Cabbageworms	Homworms	Stink Bugs
12-spotted Cucumber Beetles	Horse Flies	Tabanidae
Cucumber Beetles	House Flies	Tarnished Plant Bugs
Darling Beetles (lesser meal worm)	Imported Cabbageworms	Thrips
Deer Flies	Indian Meal Moths	Tomato Hornworms
Deer Ticks	Japanese Beetles	Vinegar Flies
Earwigs	Katydid	Wasps
Diamondback Larvae	Lace Bugs	Webworms
	Leafhoppers	Whiteflies
		Yellow Jackets

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

USED ALONE: Apply 16 ounces (1 pint) to 64 ounces (2 quarts) per acre by ground in sufficient water for thorough coverage. This product may be applied by air at the rate of 16 to 64 ounces per acre in a minimum of 5 gallons of water. Mix only enough for immediate use. Spraying should begin when the insects first appear. Do not wait until the plants are heavily infested. Repeat as required to maintain effective control.

It is recommended that the final spray mix be buffered to a pH of 5.5-7.0.

To avoid possible harm to honey bees, it is advisable to apply in the early morning or late evening hours.

USED AS A TANK MIX: This product may be tank mixed with other insecticides, acaricides, fungicides, adjuvants and wetting agents. This application should conform to accepted use precautions and directions for both products. Tank mix applications must be made in accordance with the more restrictive of label limitations and precautions. No label application rates may be exceeded. This product cannot be mixed with any product with label prohibitions against such mixing.

Prior to tank-mixing, a compatibility test should be conducted using the proper proportions of products and water to ensure the physical compatibility of the mixture.

IMPORTANT NOTE: Plant safety is an important consideration when using insecticides in a greenhouse. However, it is not possible to evaluate the phytotoxicity of PyGanic® Crop Protection EC 1.4i on numerous plant varieties that may react differently to insecticides in different growth stages or under varying environmental conditions. Before making widespread applications of PyGanic® Crop Protection EC 1.4i, or tank mix combinations, treat a limited number of plants and observe for phytotoxicity over a 10 day period.

USE THROUGH IRRIGATION SYSTEMS (CHEMIGATION): Refer to supplemental labeling entitled "DIRECTIONS FOR APPLICATION THROUGH IRRIGATION SYSTEMS" (available through your distributor) for use directions for chemigation. Do not apply this product through any irrigation system unless the supplemental labeling on the chemigation is followed.

PyGanic® Crop Protection EC 1.4i may be used on most crops because its active ingredient is exempt from tolerances when applied to growing crops. The crop grouping scheme used on this label was devised by the Environmental Protection Agency to expedite minor use pesticide registration. Each crop grouping on this label contains the phrase "including, but not limited to," and then lists a number of crops in each group. This wording allows the use of PyGanic® Crop Protection EC 1.4i on crops that may not be specifically listed on this label (providing that the crop to which the crop belongs is listed).

GROWING CROPS (OUTDOORS AND IN GREENHOUSES):

ROOT AND TUBER VEGETABLES: Including, but not limited to: Arracacha, Arrowroot, Purple Arrowroot, Japanese Artichoke, Jerusalem Artichoke, Garden Beets, Sugar Beets, Edible Burdock, Edible Canna, Carrots, Cassava (bitter or sweet), Celeriac (celery root), Chayote (root), Chervil (turnip rooted), Chicory, Chufa, Dashen, Ginger, Ginseng, Horseradish, Leren, Parsley (turnip rooted), Parsnip, Potato, Radish, Japanese Radish (daikon), Rutabaga, Salsify, Black Salsify, Spanish Salsify, Sweet Potato, Tansy, Turmeric, Turnip, Yam (true), Yam Bean.

LEAVES OF ROOT AND TUBER VEGETABLES: Including, but not limited to: Garden Beet, Sugar Beet, Edible Burdock, Carrot, Cassava (bitter or sweet), Celeriac (celery root), Chervil (turnip rooted), Chicory, Dashen (faro), Parsnip, Radish, Japanese Radish (daikon), Rutabaga, Black Salsify, Sweet Potato, Tansy, Turnip, Yam (true).

BULB VEGETABLES: Including, but not limited to: Garlic, Great-headed Garlic, Leek, Onion (bulb and green), Welch, Shallot.

LEAFY VEGETABLES: Including, but not limited to: Amaranth (leafy amaranth, Chinese spinach, tampala), Arugula, Cardoon, Celery, Chinese Celery, Celtuce, Chervil, Cilantro, Corn Salad, Chrysanthemum (edible-leaved), Chrysanthemum (garden), Cress (garden, water), Upland Cress (yellow rocket, winter cress), Dandelion, Dock (some), Endive (escarole), Fennel (Florence), Lettuce (head and leafy), Orach, Parsley, Purslane (garden and winter), Radicchio, Rhubarb, Spinach, Fine Spinach (Malabar, Ceylon), Spinach (New Zealand), Swiss Chard.

BRASSICA (COLE) LEAFY VEGETABLES: Including, but not limited to: Broccoli, Chinese Broccoli (Gai Lon), Broccoli Raab (rapini), Brussels Sprouts, Cabbage, Chinese Cabbage (Bok Choy), Chinese Cabbage (Napa), Chinese Mustard Cabbage (Gai Choy), Cauliflower, Cavolo Broccolo, Collards, Kale, Kohlrabi, Mizuna, Mustard Greens, Mustard Spinach, Rape Greens.

LEGUME VEGETABLES (SUCCULENT OR DRIED): Including, but not limited to: Aduki Beans, Field Beans, Kidney Beans, Lima Beans, Mott Beans, Mung Beans, Navy Beans, Pinto Beans, Rice Beans, Runner Beans, Snap Beans, Tepary Beans, Urd Beans, Wax Beans, Asparagus Beans, Black-eyed Peas, Catjang, Chinese Longbeans, Cowpeas, Chowder Peas, Southern Peas, Yard-longbeans, Broad Beans (fava beans), Chick Peas (garbanzo beans), Guar, Jackbean (sword bean), Lablab Bean (hyacinth bean), Lentils, Peas (garden peas, field peas, sugar snap peas, English pea, snow pea), Pigeon Peas, Soybeans, Sweet Lupin Beans, White Lupin Beans, White Sweet Lupin, Sword Bean.

FOLIAGE OF LEGUME VEGETABLES: Including, but not limited to: Plant part of any legume vegetable included in the legume vegetable group that will be used as animal feed including any variety of Beans, Field Peas, Soybeans.

FRUITING VEGETABLES: Including, but not limited to: Eggplant, Ground Cherry, Okra, Peppers, Pepper (bell pepper, chili pepper, cooking peppers, pimientos, sweet peppers), Tomatillo, Tomatoes.

CUCURBIT VEGETABLES: Including, but not limited to: Balsam Apple, Balsam Pear (bitter melon), Chayote (fruit), Chinese Wargourd (Chinese preserving melon), Chinese Cucumber, Citron Melon, Cucumber, Gherkin, Edible Gourds, Melons (including hybrids, cantaloupe, casaba, crenshaw, golden pershaw melon, honeydew melons, honey balls, mango melon, muskmelon, Persian melon, pineapple melon, Santa Claus melon, snake melon), Pumpkin, Squash (summer and winter), Watermelon (including hybrids).

CITRUS FRUITS: Including, but not limited to: Calamondin, Citrus Citron, Citrus Hybrids, Grapefruit, Kumquats, Lemons, Limes, Mandarin (tangerine), Orange (sweet and sour), Pummelo, Satsuma Mandarin, (Citrus spp. includes chironja, tangelos, tangors).

POME FRUITS: Including, but not limited to: Apple, Crabapple, Loquat, Pear, Mayhaw, Oriental Pear, Quince.

STONE FRUITS: Including, but not limited to: Apricot, Cherry (sweet and sour), Nectarine, Peach, Plum, Prune, Chickasaw Plum, Damson Plum, Japanese Plum, Plumcot.

SMALL FRUITS AND BERRIES: Including, but not limited to: Blackberry, Blueberry, Cranberry, Currant, Dewberry, Elderberry, Gooseberry, Grape, Huckleberry, Loganberry, Oatleaf Berry, Raspberry (black and red), Strawberry, Youngberry.

TREE NUTS: Including, but not limited to: Almond, Beech Nut, Brazil Nut, Butternut, Cashew, Chestnut, Chinquapin, Filbert (hazelnut), Hickory Nut, Macadamia Nut (push nut), Pecan, Pistachio, Walnut, Black and English (Persian).

ORIENTAL VEGETABLES: Including, but not limited to: Acerola, Atemoya, Balsam Pear (bitter melon), Carambola, Japanese Artichoke, Chinese Broccoli (Gai Lan), Chinese Cabbage (Bok Choy, Napa), Chinese Mustard Cabbage (Gai Choy), Dasheen, Ginger, Ginseng, Chinese Longbeans, Mung Beans, Citron Melon, Japanese Radish (daikon), Chinese Spinach, Chinese Watercress, Cilantro, Citron Melon, Rambutan, Water Chestnut.

SUBTROPICAL FRUITS: Including, but not limited to: Avocado, Banana, Carob, Barbados Cherry, Cherimoya, Dates, Durian (jackfruit), Feijoa, Figs, Guava, Kiwifruit, Lychee, Mango, Papaya, Passion Fruit, Persimmon, Pineapple, Pomegranate.

CEREAL GRAINS: Including, but not limited to: Barley, Buckwheat, Corn (sweet and field), Millet, Proso, Oats, Pearl Millet, Popcorn, Rice, Rye, Sorghum (milo), Teosine, Triticale, Wheat, Wild Rice.

FORAGE, FODDER AND STRAW OF CEREAL GRAINS: Including, but not limited to: Barley, Buckwheat, Corn (sweet and field), Millet, Proso, Oats, Pearl, Popcorn, Rice, Rye, Sorghum (milo), Teosine, Triticale, Wheat, Wild Rice.

GRASSES FOR SEED, FORAGE, FODDER AND HAY Including, but not limited to: any Grass (Gramineal family, green or cured, except sugarcane and those listed in the cereal grains group), that will be fed to or grazed by livestock, all Pasture and Range Grasses and Grasses grown for hay and silage, Bermuda Grass, Bluegrass, Bromegrass, Fescue.

NON-GRASS ANIMAL FEEDS: Including, but not limited to: Alfalfa, Velvet Bean, Clover, Kudzue, Lespedeza, Lupine, Sainfoin, Trelot, Crown Vetch, Milk Vetch.

HERBS AND SPICES: Including, but not limited to: Allepice, Angelica, Anise (anise seed), Anise (star), Annatto (seed), Balm (lemon balm), Basil, Borage, Burnet, Camomile, Caper buds, Caraway, Caraway (black), Cardamom, Cassia bark, Cassia buds, Catnip, Celery seed, Chervil (dried), Chikory, Chive, Chive (Chinese), Cinnamon, Clary, Clove buds, Coriander (cilantro or Chinese parsley) (leaf), Coriander (cilantro) (seed), Costmary, Culantro (leaf), Culantro (seed), Cumin, Curry (leaf), Dill (dillweed), Dill (seed), Fennel (common), Fennel (Florence) (seed), Fenugreek, Grains of Paradise, Horehound, Hyssop, Juniper Berry, Lavender, Lemongrass, Lovage (leaf), Lovage (seed), Mace, Mangold, Marjoram (includes sweet or annual marjoram, wild marjoram or oregano and pot marjoram), Mustard (seed), Nasturtium, Nutmeg, Oregano, Mint, Paprika, Parsley (dried), Pennyroyal, Pepper (black), Pepper (white), Poppy (seed), Rosemary, Rue, Saffron, Sage, Savory (summer and winter), Sweet bay (bay leaf), Tansy, Tarragon, Thyme, Vanilla, Wintergreen, Woodruff, Wormwood.

ADDITIONAL CROPS: Including, but not limited to: Artichoke, Asparagus, Avocado, Coffee, Cotton, Hops, Jobba, Mushroom, Okra, Olives, Peanuts, Pineapple, Rice, Safflowers, Sesame, Sugar Cane, Sunflower, Tea.

ORNAMENTALS: Including, but not limited to: African Violet, Ageratum, Aster, Azalea, Begonia, Calceolaria, Calendula, Calla, Camellia, Carnation, Ceanothus, Cineraria, Chrysanthemum, Coleus, Cyclamen, Cypress, Daffodil, Dahlia, Delphinium, Dogwood, Elm, Eucalyptus, Fern, Ficus, Foliage Plants, Fuchsia, Gardenia, Geranium, Gladiolus, Gloxinia, Gypsophila, Holly, Hyacinth, Hydrangea, Iris, Lily, Maidenhair Fern, Marigold, Narcissus, Palm, Pansy, Peony, Pelargonium, Petunia, Philodendron, Philox, Pine, Pyracantha, Rhododendron, Roses, Rubber Plant, Snapdragon, Sweet Pea, Tulips, Viburnum, Wandering Jew, Yew, Zinnia and Andromeda, Arborvitae, Ash, Beech, Birch, Boxwood, Colonnaster, Crabapple, Euonymus, Fir, Firethorn, Forsythia, Hawthorn, Hemlock, Hickory, Honey Locust, Horse Chestnut, Juniper, Larch, Laurel, Lilac, Linden, Mimosa, Myrtle, Oak, Pine, Privet, Tulip Tree, Viburnum, Willow.

FOR CONTROL OF ANTS ON ORCHARD FLOORS: Apply as a broadcast spray to the entire orchard floor using ground spray equipment at 5 to 18 fl. oz. per acre in 25 or more gallons of water. For best results use the high rate for heavy infestations and the lower rate for light infestations.

Do not apply where weed growth or other obstructions would impede uniform coverage of the orchard floor. Mow or chemically control weeds before the application. Foliar applications of PyGanic® Crop Protection EC 1.4u may be made in addition to the orchard floor treatment.

USE ON GREENHOUSE FRUIT, VEGETABLE, FLOWER AND FOLIAGE PLANTS:
USED ALONE: Combine 16 ounces (1 pint) to 32 ounces (1 quart) with 30 gallons of water for applications with conventional hydraulic sprayers or 1 to 2 ounces per gallon of water for applications with compressed sprayers.

FOR USE OUTDOORS ON TREES, SHRUBS, FLOWERS AND FOLIAGE PLANTS:
USED ALONE: Combine 3.5 to 7 pints of PyGanic® Crop Protection EC 1.4u with 100 gallons of water for applications with conventional hydraulic and airblast sprayers or 3.5 to 7 pints of PyGanic® Crop Protection EC 1.4u with 10 gallons of water for applications with low volume mist blowers or 1 to 2 fl. oz. per gallon water for applications with compressed air sprayers.

FOR USE AROUND THE EXTERIOR OF HOMES AND OTHER BUILDINGS: To control insects on turf, ornamental plants, gardens, landscaping foundation walls and perimeters mix 1 to 2 fl. oz. of PyGanic® Crop Protection EC 1.4u per gallon of water for applications with compressed air sprayers or pump driven sprayers.

USE INDOORS ON TREES, SHRUBS, FLOWERS AND FOLIAGE PLANTS:
USED ALONE: Combine 3.5 to 7 pints of PyGanic® Crop Protection EC 1.4u with 100 gallons of water for applications with conventional hydraulic sprayers or 1 to 2 fl. oz. of PyGanic® Crop Protection EC 1.4u per gallon of water for applications with compressed air sprayers.

USE WITH HYDROPONICALLY GROWN VEGETABLES AND ORNAMENTALS
AS A WATER SYSTEM TREATMENT: To control aquatic diptera larvae, apply PyGanic® Crop Protection EC 1.4u to the water at the rates outlined in the following table:

Pyrethrins concentration	mL of PyGanic® Crop Protection EC 1.4u	Gallons of water
0.1 ppm	286	10,000
0.01 ppm	28.6	10,000
0.001 ppm	2.86	10,000

FOR USE AS A LIVESTOCK AND POULTRY SPRAY:

- 1) To kill and repel Horn Flies, House Flies, Mosquitoes and Gnats, dilute at the rate of 5 to 10 fluid ounces per gallon of water and apply to wet the hair thoroughly with particular attention to topline, underline, flanks, withers and other infested areas. Repeat treatment at intervals of 5 to 12 days for small insect populations or as needed when flies are emerging in large numbers.
- 2) To kill and repel Stable Flies, Horse Flies and Deer Flies, dilute at the rate of 9 to 14 fluid ounces per gallon of water and apply at a quart per adult animal to wet the hair thoroughly with particular attention to the legs, flanks, barrel, topline and other body areas commonly attacked by these flies. Repeat treatment each week as needed.
- 3) To kill and repel Face Flies dilute at the rate of 9 fluid ounces per gallon of water and apply using spray which produces large wetting droplets. Apply to the face of the animal in the morning before releasing to pasture. Apply sufficiently to wet the face but not more than 1 1/2 ounces of diluted solution per animal. Repeat daily as needed.
- 4) For effective control of Biting and Sucking Lice on cattle, horses, sheep, goats and hogs, dilute at the rate of 1 quart with 16 gallons of water (3 fluid ounces with 1 gallon) and spray to thoroughly wet the hair of the animal including the head and brush of the tail. Repeat treatment in 10 days to kill newly hatched Lice.
- 5) To control Poultry Lice, using a dilution of 9 to 14 ounces of concentrate per gallon of water spray roosts, walls and nests or cages thoroughly. It is not necessary to remove poultry from the housing unit during treatment. This should be followed by spraying over the birds with a fine mist.
- 6) For control of Bed Bugs and Mites on poultry and in poultry houses, dilute at the rate of 9 to 14 fluid ounces per gallon of water and spray crevices of roost poles, cracks in walls and cracks in nests where the Bed Bugs and Mites hide. This should be followed by spraying over the birds with a fine mist.
- 7) To control Sheep "Tick" or Ked, dilute at the rate of 5 to 10 fluid ounces per 4 gallons of water and thoroughly wet all portions of the body by dipping or by spraying with sufficient pressure and with a nozzle adjustment to give penetration of the wool. Treat at a rate sufficient to wet the animal.
- 8) To kill Fleas and Ticks on livestock and to obtain protection against reinfestation, dilute at the rate of 9 fluid ounces per gallon of water and wet the animal by dipping or spraying. This product may also be used for livestock/pet quarters. Do not spray pets. For best results against fleas and ticks on dogs and cats the kennels and/or animal quarters and bedding should be treated. Remove and destroy pet's old bedding. To reduce infestation, thoroughly spray the animal's bedding and sleeping quarters. Also spray the entire inside surface of doghouses. Put fresh bedding in pet's quarters after spray has dried. Also treat dogs and cats with a registered flea and tick control product before allowing them to reenter treated area.

Appendix 3. (Supporting preliminary data)

** See appendix #5

Appendix 4. (Resume)

Alan Schreiber

President, Agriculture Development Group, Inc.

2621 Ringold Road, Eltopia, Washington 99330

Phone: 509 266 4348; Fax: 509 266 4317

aschreib@centurytel.net

Education:

B.S. Biology, M.S. Entomology and Ph.D. Entomology/Pesticide Toxicology

Experience:

Private Research and Consulting. President, Agriculture Development Group, Inc., Pasco Washington. Conduct research on agricultural and conventional and organic pest management issues. Consulting on environmental, pesticide, pest management and Food Quality Protection Act issues for grower groups, governmental organizations and agribusiness's, including National Potato Council, Oregon Seed Council, Washington Red Raspberry Commission, Washington State Potato Commission, PNW dill growers. Research is conducted on more than 30 crops on a 100 acre research farm. (1/98 to present.)

Schreiber has conducted extensive work on biopesticides and organic pesticides on asparagus, blueberries, potatoes and other crops. He has 27 acres of certified organic ground and conducts much of his biopesticide research in organic conditions. He has five years' experience working on organic and biopesticides on berries.

Administrator - Washington State Commission on Pesticide Registration. Provide administrative services for the WSCPR, a state governmental entity dedicated to support of activities related to pesticide registration and pest management. Manages a \$0.5 million budget. Interact with all commodity and pest management groups, pest management researcher and extension specialist in Washington. The WSCPR is the largest or second largest source of organic research funds in the Pacific Northwest. (7/95 to present.)

Executive Director – Washington Asparagus Commission. Responsible for management of all aspects of the Washington Asparagus Commission. (1/2002 to present).

Executive Director – Washington Blueberry Commission. Responsible for management of all aspects of the Washington Blueberry Commission. (7/2007 to present).

Assistant Professor. Washington State University Department of Entomology/Food and Environmental Quality Laboratory. Responsibilities: Educate commodity groups, environmental groups, agencies, and faculty in pest control and food safety. Support pesticide registration, re-registration and develop new pest management tools. Serve as Washington pesticide coordinator, IR-4 liaison and PIAP representative. University liaison with commodity groups, private companies, state and federal agencies, environmental organization, and others on agrichemical issues. (5/93 to 12/97)

Entomologist: USEPA/Office of Pesticide Programs/Biological and Economic Analysis Division. Responsibilities: Analyze issues in support of registration and re-registration of insecticides. Review emergency exemption requests (onion thrips, Russian wheat aphid, aphids and mites on hops and tracheal and varroa mites on honeybees). Assess pesticide benefits on turf. Develop policy statements, briefings and reports on IPM and pesticide resistance. Respond to environmental groups regarding pesticide resistance and transgenic plants. Co-lead Division on cosmetic standards and food safety issues. Support the National IPM Forum and follow-up actions. (5/91 to 5/93)

Extension Associate: University of Missouri, Integrated Pest Management Specialist. Responsibilities: Conduct IPM programs (alfalfa, corn, soybeans, grain sorghum, wheat and pecans). Direct agricultural pest survey and detection program. Develop educational materials for pesticide related issues. Support other IPM programs, assist with biological control of musk thistle, alfalfa weevil and euouymus scale. (4/87 to 5/91)

Honors and Awards:

Entomological Society of America's Distinguished Service in Regulatory Entomology, 2007

Outstanding Service Award to U.S. Potato Industry, National Potato Council, 2002

Entomological Society of America, Excellence in Extension nominee, 1997

WSU Outstanding Extension Scientist, Department of Entomology nominee,

1997 Oregon/Washington Asparagus Growers Assn. "Friend of the Industry Award,"

1996 Columbia Basin Vegetable Seed Association Outstanding Service Award, 1995

EPA Bronze Medal for work on IPM programs, 1993

University of Missouri, Department of Entomology, Outstanding Grad Student, 1991

Appendix 5. (Final reports for berry SWD trials)

10-8-13 (BlackB.SWD.Rotating.2013)

Agriculture Development Group, Inc.

SWD Trial in Blackberries

Trial ID: SWD-BLK1 Protocol ID: SWD-BLK1
 Location: Eltopia, WA Study Director: Andy Nagy
 Project ID: Investigator: Alan Schreiber
 Sponsor Contact: Several

General Trial Information

Study Director: Andy Nagy **Title:** Agricultural Researcher
Investigator: Alan Schreiber **Title:** President

Discipline: I insecticide
Trial Status: I one-year/interim **Trial Reliability:** GOOD
Initiation Date: 7-29-13 **Planned Completion Date:** 9-16-13

Trial Location

City: Eltopia **Latitude of LL Corner °:** 46.490851 N
State/Prov.: WA **Longitude of LL Corner °:** -119.186621 E
Postal Code: 99330 **Altitude of LL Corner, Unit:** 908.00 FT
Country: USA
Directions:

ADG Research Farm located at the corner of Ringold Rd and Bellevue Rd, near Eltopia , Washington.

Objectives:

Objective 1: Develop new organic insecticides for spotted wing Drosophila.

Objective 2: Develop resistance management strategies for entrust and for organic insecticides in general.

Personnel

Study Director: Andy Nagy **Title:** Agricultural Researcher
Affiliation: Agriculture Development Group, Inc.
Address: 2621 Ringold Rd
Location: Eltopia Washington
Postal Code: 99330 **E-mail:** anagy@centurytel.net
Phone No.: 509-266-4348
Investigator: Alan Schreiber **Title:** President
Affiliation: Agriculture Development Group, Inc.
Address: 2621 Ringold Road Eltopia, Wa
Postal Code: 99330 **E-mail:** aschreib@centurytel.net
Phone No.: 509-266-4348 **Mobile No.:** 509-539-4537

10-8-13 (BlackB.SWD.Rotating.2013)

Agriculture Development Group, Inc.

Crop Description	
Crop 1: RUBFR Rubus fruticosus	European Blackberry
BBCH Scale:	BPER

Pest Description	
Pest 1 Type: I	Code: DROSSU Drosophila suzukii
Common Name:	Spotted wing drosophila

Site and Design	
Plot Width, Unit: 10 FT	Site Type: FIELD field
Plot Length, Unit: 20 FT	Experimental Unit: 1 PLOT plot
Plot Area, Unit: 200 FT ²	Tillage Type: CONTIL conventional-till
Replications: 4	Study Design: RACOB L Randomized Complete Block (RCB)
Untreated Arrangement: INCLUDED single control	
randomized in each block	

Soil Description	
Description Name: Tauntum Sandy Loam	
% Sand: 66.9	% OM: 1.4
% Silt: 26.7	pH: 7.5
% Clay: 6.4	CEC: 11.7
Texture: SL sandy loam	Soil Name: Tauntum Sandy Loam

Moisture and Weather Conditions	
Overall Moisture Conditions: NORMAL normal	
Closest Weather Station:	WSU Ringold Rd
.5	MI
	Distance, Unit:

Application Description					
	A	B	C	D	E
Application Date:	7-31-13	8-9-13	8-20-13	8-30-13	9-10-13
Time of Day:	9:00am	9:00am	7:30am	9:00am	9:00am
Application Method:	AIRBLAST2	AIRBLAST2	AIRBLAST2	AIRBLAST2	AIRBLAST2
Application Timing:	ACTIVI	ACTIVI	ACTIVI	ACTIVI	ACTIVI
Application Placement:	PLOT-2	PLOT-2	PLOT-2	PLOT-2	PLOT-2
Applied By:	Ryan	Tom	Tom	Andy N	Andy N
Air Temperature, Unit:	75 F	90 F	78 F	80 F	82 F
% Relative Humidity:	60	30	40	69	45
Wind Velocity, Unit:	3 MPH	1 MPH	2 MPH	2 MPH	4 MPH
Wind Direction:	ESE	W	N	NE	S
Dew Presence (Y/N):	N no	N no	N no	N no	N no
Soil Moisture:	GOOD	GOOD	NORMAL	NORMAL	NORMAL
% Cloud Cover:	20	15	10	25	15

10-8-13 (BlackB.SWD.Rotating.2013)

Agriculture Development Group, Inc.

Crop Stage At Each Application	
	A
Crop 1 Code, BBCH Scale:	VACMY BPER

Pest Stage At Each Application	
	A
Pest 1 Code, Type, Scale:	DROSSU I

Application Equipment				
	A	B	C	D
Appl. Equipment:	AIRBLAST	AIRBLAST	AIRBLAST	AIRBLAST
Operation Pressure, Unit:	200 PSI	200 PSI	200 PSI	200 PSI
Nozzle Type:	CONEJET	CONEJET	CONEJET	CONEJET
Nozzle Size:	TXVK-8	TXVK-8	TXVK-8	TXVK-8
Nozzle Spacing, Unit:	7 IN	7 IN	7 IN	7 IN
Nozzles/Row:	3	3	3	3
Ground Speed, Unit:	2.5 MPH	2.5 MPH	2.5 MPH	2.5 MPH
Carrier:	WATER	WATER	WATER	WATER
Spray Volume, Unit:	50 GPA	50 GPA	50 GPA	50 GPA
Mix Size, Unit:	2.5 GALLONS	2.5 GALLONS	2.5 GALLONS	2.5 GALLONS
Propellant:	PUMP	PUMP	PUMP	PUMP
Tank Mix (Y/N):	N no	N no	N no	N no

10-8-13 (BlackB.SWD.Rotating.2013)

Agriculture Development Group, Inc.

SWD Trial in Blackberries			
Trial ID:	SWD-BLK1	Protocol ID:	SWD-BLK1
Location:	Etopia, WA	Study Director:	Andy Nagy
Project ID:		Investigator:	Alan Schreiber
		Sponsor Contact:	Several

Reps: 4

Plots: 10 by 20 feet

Spray vol: 50 gal/ac

Mix size: 6.5 liters (min 4.1713)

Trt No.	Treatment Type Name	Form Conc	Form Type	Rate Rate Unit	Appl Code	Amt Product to Measure	Rep 1	Rep 2	Rep 3	Rep 4
1	CHK UTC						101	204	308	402
2	INSE ENTRUST	80	WP	4 oz/a	ABC	2.083 g/4 pl	102	212	317	405
3	INSE ENTRUST	80	WP	6 oz/a	ABC	3.124 g/4 pl	103	205	316	404
4	INSE ENTRUST	80	WP	4 oz/a	ABC	2.083 g/4 pl	104	202	315	410
	INSE GRANDEVO	30	DF	1 lb/a	ABC	8.33 g/4 pl				
5	INSE GRANDEVO	30	DF	2 lb/a	ABC	16.66 g/4 pl	105	206	303	409
6	INSE ENTRUST + BAIT	80	WP	4 oz/a	ABC	2.083 g/4 pl	106	214	313	403
7	INSE GRANDEVO +BAIT	30	DF	1 oz/a	ABC	0.5207 g/4 pl	107	209	307	413
8	INSE PYGANIC	1.409	EC	64 fl oz/a	ABC	34.76 ml/4 pl	108	211	306	416
9	INSE NEEMAZAD	.082	EC	16 oz/a	ABC	8.69 ml/4 pl	109	215	302	414
10	INSE AZA-DIRECT	.0987	EC	3.5 pt/a	ABC	30.41 ml/4 pl	110	217	310	406
11	INSE PYGANIC	1.409	EC	64 fl oz/a	ABC	34.76 ml/4 pl	111	203	311	415
	INSE NEEMAZAD	.082	EC	16 oz/a	ABC	8.69 ml/4 pl				
12	INSE PYGANIC	1.409	EC	64 fl oz/a	ABC	34.76 ml/4 pl	112	208	305	411
	INSE AZA-DIRECT	.0987	EC	3.5 pt/a	ABC	30.41 ml/4 pl				
13	INSE ENTRUST	80	WP	6 oz/a	ABC	3.124 g/4 pl	113	210	312	401
	INSE PYGANIC	1.409	EC	64 fl oz/a	A	34.76 ml/4 pl				
	INSE NEEMAZAD	.082	EC	16 oz/a	A	8.69 ml/4 pl				
14	INSE ENTRUST	80	WP	6 oz/a	ABC	3.124 g/4 pl	114	207	314	417
	INSE GRANDEVO	30	DF	2 lb/a	A	16.66 g/4 pl				
15	INSE DES-X	4.07	SL	2 gal/100 gal	ABC	130.0 ml/mx	115	201	309	408
16	INSE ENTRUST	80	WP	4 oz/a	ABC	2.083 g/4 pl	116	213	304	412
	INSE AZA-DIRECT	.0987	EC	3.5 pt/a	ABC	30.41 ml/4 pl				
17	INSE JET AG		L	1 % v/v	ABC	64.99 ml/mx	117	216	301	407

Sort Order: Replicate 1

10-8-13 (BlackB.SWD.Rotating.2013)

Agriculture Development Group, Inc.**SWD Trial in Blackberries**

Trial ID: SWD-BLK1 Protocol ID: SWD-BLK1
 Location: Eltopia, WA Study Director: Andy Nagy
 Project ID: Investigator: Alan Schreiber
 Sponsor Contact: Several

Product quantities required for listed treatments and applications of trials included in this table:

Amount*	Unit	Treatment Name	Form Conc	Form Type	Lot Code
46.859	G	ENTRUST	80	WP	
91.634	G	GRANDEVO	30	DF	
6.248	G	ENTRUST + BAIT	80	WP	
1.562	G	GRANDEVO +BAIT	30	DF	
347.604	Ml	PYGANIC	1.4096	EC	
60.831	Ml	NEEMAZAD	.082	EC	
273.709	Ml	AZA-DIRECT	.0987	EC	
389.958	Ml	DES-X	4.07	SL	
194.979	Ml	JET AG		L	

* 'Per area' calculations based on 4 replicates of 10 by 20 feet 'Plot' experimental units (area of one treatment).

* 'Per area' calculations based on spray volume= 50 gal/ac, mix size= 6.5 liters (mix size basis).

* 'Per volume' calculations use spray volume= 50 gal/ac, mix size= 6.5 liters.

* Adjusted for multiple applications in treatment list.

10-8-13 (BlackB.SWD.Rotating.2013)

Agriculture Development Group, Inc.

SWD Trial in Blackberries			
Trial ID: SWD-BLK1		Protocol ID: SWD-BLK1	
Location: Eltopia, WA		Study Director: Andy Nagy	
Project ID:		Investigator: Alan Schreiber	
Sponsor Contact: Several			
Pest Name		Spotted wing drosophila	Spotted wing drosophila
Crop Name		Blackberry	Blackberry
Description		20 Berries	20 Berries
Rating Date		8-8-13	8-19-13
Part Rated		LARVA P	LARVA P
Rating Type		DUNK COUNTS	DUNK COUNTS
Rating Unit		NUMBER	NUMBER
Rating Timing		8 DAFA	19 DAFA
Trt No.	Treatment Type Name	Rate	Appl Code
1	CHK UTC		
		53.8 b-e	75.8 abc
2	INSE ENTRUST	4 oz/a ABC	
		22.0 def	54.0 b-f
3	INSE ENTRUST	6 oz/a ABC	
		13.0 f	46.3 def
4	INSE ENTRUST	4 oz/a ABC	
	INSE GRANDEVO	1 lb/a ABC	
		50.8 b-e	69.3 a-d
5	INSE GRANDEVO	2 lb/a ABC	
		37.8 b-f	89.3 a
6	INSE ENTRUST + BAIT	4 oz/a ABC	
		28.5 c-f	60.8 a-f
7	INSE GRANDEVO +BAIT	1 oz/a ABC	
		59.3 bc	82.5 ab
8	INSE PYGANIC	64 fl oz/a ABC	
		90.0 a	79.3 abc
9	INSE NEEMAZAD	16 oz/a ABC	
		67.8 ab	89.8 a
10	INSE AZA-DIRECT	3.5 pt/a ABC	
		29.0 c-f	73.8 a-d
			57.5 abc

Means followed by same letter do not significantly differ (P=.10, Duncan's New MRT)

10-8-13 (BlackB.SWD.Rotating.2013)

Agriculture Development Group, Inc.

Pest Name	Spotted wing drosophila			Spotted wing drosophila			Spotted wing drosophila		
Crop Name	Blackberry			Blackberry			Blackberry		
Description	20 Berries			20 Berries			20 Berries		
Rating Date	8-8-13			8-19-13			8-29-13		
Part Rated	LARVA P			LARVA P			LARVA P		
Rating Type	DUNK COUNTS			DUNK COUNTS			DUNK COUNTS		
Rating Unit	NUMBER			NUMBER			NUMBER		
Rating Timing	8 DAFA			19 DAFA			29 DAFA		
Trt No.	Treatment Type	Rate	Unit	Appl Code	1	2	3		
11	INSE PYGANIC	64 fl oz/a	ABC	ABC	54.5 bcd	88.5 a	65.5 ab		
	INSE NEEMAZAD	16 oz/a	ABC	ABC					
12	INSE PYGANIC	64 fl oz/a	ABC	ABC	50.5 b-e	78.3 abc	67.5 ab		
	INSE AZA-DIRECT	3.5 pt/a	ABC	ABC					
13	INSE ENTRUST	6 oz/a	ABC	ABC	50.0 b-e	33.0 f	57.5 abc		
	INSE PYGANIC	64 fl oz/a	A	A					
	INSE NEEMAZAD	16 oz/a	A	A					
14	INSE ENTRUST	6 oz/a	ABC	ABC	29.3 c-f	39.0 ef	56.0 abc		
	INSE GRANDEVO	2 lb/a	A	A					
15	INSE DES-X	2 gal/100 gal	ABC	ABC	53.0 b-e	65.5 a-e	53.8 abc		
16	INSE ENTRUST	4 oz/a	ABC	ABC	21.3 ef	50.5 c-f	37.8 c		
	INSE AZA-DIRECT	3.5 pt/a	ABC	ABC					
17	INSE JET AG	1 % v/v	ABC	ABC	33.8 c-f	83.5 ab	46.8 bc		
LSD (P=.10)					27.30	25.35	22.41		
Standard Deviation					22.93	21.29	18.82		
CV					52.39	31.24	31.55		
Replicate F					4.278	6.842	4.051		
Replicate Prob(F)					0.0094	0.0006	0.0120		
Treatment F					2.906	2.880	1.151		
Treatment Prob(F)					0.0022	0.0024	0.3397		

10-8-13 (BlackB.SWD.Rotating.2013)

Agriculture Development Group, Inc.

Pest Name				Spotted wing drosophila	Spotted wing drosophila
Crop Name				Blackberry	Blackberry
Description				20 Berries	Total # of Larvae
Rating Date				9-9-13	
Part Rated				LARVA P	LARVA P
Rating Type				DUNK COUNTS	COUNT TOTAL
Rating Unit				NUMBER	NUMBER
Rating Timing				40 DAFA	
Trt No.	Treatment Type Name	Rate Rate Unit	Appl Code	4	5
1	CHK UTC			118.5 a	324.8 ab
2	INSE ENTRUST	4 oz/a	ABC	52.0 e	180.0 ef
3	INSE ENTRUST	6 oz/a	ABC	50.5 e	166.8 f
4	INSE ENTRUST INSE GRANDEVO	4 oz/a 1 lb/a	ABC ABC	45.5 e	214.0 def
5	INSE GRANDEVO	2 lb/a	ABC	81.8 bcd	273.0 a-d
6	INSE ENTRUST + BAIT	4 oz/a	ABC	63.0 de	219.5 def
7	INSE GRANDEVO +BAIT	1 oz/a	ABC	91.5 a-d	299.5 abc
8	INSE PYGANIC	64 fl oz/a	ABC	92.5 a-d	334.5 a
9	INSE NEEMAZAD	16 oz/a	ABC	95.5 abc	320.0 ab
10	INSE AZA-DIRECT	3.5 pt/a	ABC	93.0 a-d	253.3 b-e

10-8-13 (BlackB.SWD.Rotating.2013)

Agriculture Development Group, Inc.

Pest Name				Spotted wing drosophila	Spotted wing drosophila
Crop Name				Blackberry	Blackberry
Description				20 Berries	Total # of Larvae
Rating Date				9-9-13	
Part Rated				LARVA P	LARVA P
Rating Type				DUNK COUNTS	COUNT TOTAL
Rating Unit				NUMBER	NUMBER
Rating Timing					
Trt No.	Treatment Type	Rate	Appl Code		
		Rate Unit		4	5
11	INSE PYGANIC	64 fl oz/a	ABC	96.5 abc	305.0 abc
	INSE NEEMAZAD	16 oz/a	ABC		
12	INSE PYGANIC	64 fl oz/a	ABC	114.5 a	310.8 abc
	INSE AZA-DIRECT	3.5 pt/a	ABC		
13	INSE ENTRUST	6 oz/a	ABC	99.0 ab	239.5 c-f
	INSE PYGANIC	64 fl oz/a	A		
	INSE NEEMAZAD	16 oz/a	A		
14	INSE ENTRUST	6 oz/a	ABC	89.0 a-d	213.3 def
	INSE GRANDEVO	2 lb/a	A		
15	INSE DES-X	2 gal/100 gal	ABC	89.3 a-d	261.5 a-d
16	INSE ENTRUST	4 oz/a	ABC	65.3 cde	174.8 f
	INSE AZA-DIRECT	3.5 pt/a	ABC		
17	INSE JET AG	1 % v/v	ABC	72.8 b-e	236.8 c-f
LSD (P=.10)				26.62	64.41
Standard Deviation				22.35	54.09
CV				26.95	21.25
Replicate F				2.103	2.724
Replicate Prob(F)				0.1122	0.0544
Treatment F				3.718	4.142
Treatment Prob(F)				0.0002	0.0001

10-8-13 (BlackB.SWD.Rotating.2013)

Agriculture Development Group, Inc.

SWD Trial in Blackberries

Trial ID: SWD-BLK1	Protocol ID: SWD-BLK1
Location: Eltopia, WA	Study Director: Andy Nagy
Project ID:	Investigator: Alan Schreiber
	Sponsor Contact: Several

Trial Comments

Preliminary Trial Notes:

A - F: Apply when SWD populations are detected and flies are present, based on trap counts

A-Three weeks before first harvest (first harvest is around June 20th-25th) B-F: 7-10 day intervals.

Six applications at 7 days is a 42 spread, 10 days is 60 days, if the first application is made on June 1 then the ending interval would be July 12 to August 1.

- If 7 day intervals are made, it will require additional applications beyond six. 6-10 day intervals will probably be adequate. However, that decision will be made during the trial. SWD pressure is expected to be lower during the time that Duke is being harvested and if so, then 10 day intervals may suffice.

SWD data will be collected within 24 hours before the next application, so if it is a 7 day interval, sampling will be weekly. If applications are made at 10 day intervals, the sampling will be every 10 days. Sampling will continue for two intervals after the last application, assuming berries and conditions permit each week and recorded for availability. X number of berries will be collected from each plot. The berries will be gently crushed and put in a sugar solution and the number of SWD larvae will be counted at 24 hours post sampling. Adult trap counts will be collected during the course of the trial for a general measure of adult pressure in the area (data will not be collected for adults in each plot, but rather in general for the trial area)

July 28th - the spray interval for this trial will be every 10 days.

July 30th - Trt 6 & 7 Monterey Insect Bait will be applied at a rate of 6 pints per acre

AUG 22, - (modification) 4 oz rate of Entrust was added to (aka to be mixed with) the 1 lb/acre rate of Grandevo (Trt 4)

AUG 30. - It was determined the creator/transcriber of the protocol for this trial used an incorrect rate for Treatment 7. The correct rate was One Pound per acre, w/ bait, and not One Ounce per acre w/bait.

10-8-13 (BlackB.SWD.Rotating.2013)

Agriculture Development Group, Inc.

SWD Trial in Blackberries

Trial ID: SWD-BLK1	Protocol ID: SWD-BLK1
Location: Eltopia, WA	Study Director: Andy Nagy
Project ID:	Investigator: Alan Schreiber
	Sponsor Contact: Several

During the summer of 2013, the staff at the Agriculture Development Group, Inc. conducted a research trial investigating the efficacy of different organic insecticides on populations of spotted wing drosophila (SWD), *Drosophila suzukii*, within established rows of common blackberries. The treatments for this study were applied using a Rear's plot airblast sprayer outfitted with a drift reducing "spray wall". Several of the airblast's nozzles were turned off to facilitate one direction of spraying, and the sprayer was calibrated to apply solutions at a rate of 50 gallons per acre. Applications were applied to each side of the blackberry row and each plot was 20ft in length. Preliminary monitoring for SWD populations were conducted using vinegar trap cups placed within the blackberry rows earlier in the season. Routine examination of these vinegar cup suggested a large population of SWD existed within these particular blackberry rows. The first application of these organic insecticides was applied on July 31st, and an interval of 10 days between subsequent applications was used for this study. Preceding each application, 20 ripe blackberries were collected from each plot and subjected to "salt dunking" to determine the approximate numbers of SWD larvae present. These larvae counts provided a basis for rating the efficacy of these organic insecticides. Five spray applications were made over the next 50 days.

Efficacy results varied between treatments in this study, although no treatment could be considered a "silver bullet" for organic producers. 40 days after the first application (DAFA), the range in reduction of SWD larvae numbers varied from 62% to 4% when compared to the untreated check. The treatments that provided the largest reduction of SWD larvae were treatments that applied *Entrust* at 6 oz per acre (i.e. Trt#3) and 4 oz per acre (Trt#2). *Entrust* treatments were most effective when used alone, as opposed to tank mixing with others (e.g. Trt#14, *Entrust* @ 6oz/a + *Grandevo* @ 2 lb/a). The inclusion of *Monterey Insect bait* @ 6pt/A, did not enhance the overall effectiveness of *Entrust* when applied @ 4 oz/A rate (i.e. Trt#6). Stand alone treatments of *Pyganic* @ 64 oz/A, *Neemazad* @ 16 oz/A, and *Aza-Direct* @ 3.5 pt/A were not effective, and produced no statistical difference from the larvae counts taken from the untreated checks. Tank mixing treatments of *Pyganic* @ 64 oz/A, *Neemazad* @ 16 oz/A, and *Aza-Direct* @ 3.5 pt/A, also produced only a limited amount of control (i.e. Trt #11 and #12) and no statistical differences from the untreated checks. *Jet-Ag* (peroxyacetic acid, Trt#17) is a broad spectrum certified organic sanitizer registered as a fungicide, bactericide, and algacide for agricultural usage. It apparently also has some potential as an organic insecticide, as it showed a significant reduction of SWD larvae at 40 DAFA when compared to the untreated check (i.e. 39% less larvae). *Grandevo* @ 2 lb/A also showed a statistically significant reduction of SWD larvae 40 DAFA when compared to the untreated check (i.e. 31% less larvae).

Comments from Alan Schreiber. When the blueberry trial failed to have *any* SWD pressure we were unprepared and surprised at the intensity of pressure of insect pressure in the blackberry trial which started immediately after the blueberry trial. In hindsight, our 10 day interval was too long and we should have been on a 7 or even a 5 day interval. Having made this observation post trial, I am drawing the following conclusions:

- Entrust at 6 oz appears to be the most efficacious product available to organic growers for SWD control in berries.
 - Tank mix of Entrust with Aza-Direct provides a comparable level of control as Entrust alone, but may have value for resistance management.
 - Entrust at 4 oz tank mixed with Grandevo could provide a comparable level of control as Entrust at the high rate.
 - Entrust at 4 oz tank mixed with Aza-Direct at 3.5 pints could provide a comparable level of control as Entrust at 6 oz.
 - Pyganic at the high rate of 64 oz applied alone at this interval has no value for SWD control. Use of this product alone in SWD control programs may be of questionable value.
 - This is the first trial to suggest that Jet Ag has some value for control of SWD.
-

9-24-13 (BlueB.SWD.Rotating)

Agriculture Development Group, Inc.**SWD Trial In Organic Blueberries**

Trial ID: Protocol ID:
 Location: Eltopia, WA Study Director: Andy Nagy
 Project ID: Investigator: Alan Schreiber
 Sponsor Contact: Several

General Trial Information

Study Director: Andy Nagy **Title:** Agricultural Researcher
Investigator: Alan Schreiber **Title:** President

Discipline: I insecticide
Trial Status: I one-year/interim **Trial Reliability:** GOOD
Initiation Date: 6-13-13 **Planned Completion Date:** 7-31-13

Trial Location

City: Eltopia **Latitude of LL Corner °:** 46.490851 N
State/Prov.: WA **Longitude of LL Corner °:** -119.186621 E
Postal Code: 99330 **Altitude of LL Corner, Unit:** 908.00 FT
Country: USA
Directions:

ADG Research Farm located at the corner of Ringold Rd and Belleview Rd, near Eltopia, Washington.

Objectives:

Objective 1: Develop new organic insecticides for SWD control in blueberry.

Objective 2: Develop resistance management strategies for Entrust and for organic insecticides in general

Personnel

Study Director: Andy Nagy **Title:** Agricultural Researcher
Affiliation: Agriculture Development Group, Inc.
Address: 2621 Ringold Rd
Location: Eltopia Washington
Postal Code: 99330 **E-mail:** anagy@centurytel.net
Phone No.: 509-266-4348
Investigator: Alan Schreiber **Title:** President
Affiliation: Agriculture Development Group, Inc.
Address: 2621 Ringold Road Eltopia, Wa
Postal Code: 99330 **E-mail:** aschreib@centurytel.net
Phone No.: 509-266-4348 **Mobile No.:** 509-539-4537

9-24-13 (BlueB.SWD.Rotating)

Agriculture Development Group, Inc.**Crop Description**

Crop 1: VACCO Vaccinium corymbosum Highbush blueberry
Variety: Duke **Description:** Description
BBCH Scale: BDIC
Planting Method: ESTABL established

Pest Description

Pest 1 Type: I **Code:** DROSSU Drosophila suzukii
Common Name: Spotted wing drosophila

Site and Design

Plot Width, Unit: 10 FT **Site Type:** FIELD field
Plot Length, Unit: 20 FT **Experimental Unit:** 1 PLOT plot
Plot Area, Unit: 200 FT2 **Tillage Type:** CONTIL conventional-till
Replications: 4 **Study Design:** RACOB� Randomized Complete Block (RCB)
Untreated Arrangement: INCLUDED single control
 randomized in each block

Soil Description

Description Name: Tantum Sandy Loam
% Sand: 66.9 **% OM:** 1.4 **Texture:** SL sandy loam
% Silt: 26.7 **pH:** 7.5 **Soil Name:** Tantum Sandy Loam
% Clay: 6.4 **Fert. Level:** G good
Soil Drainage: G good

Moisture and Weather Conditions

Overall Moisture Conditions: NORMAL normal
Closest Weather Station: Ringold Rd Station **Distance,**
Unit: .5 MI

9-24-13 (BlueB.SWD.Rotating)

Agriculture Development Group, Inc.

Application Description				
	A	B	C	D
Application Date:	6-21-13	7-3-13	7-12-13	7-23-13
Time of Day:	7:30pm	9:00am	6:00pm	10:00am
Application Method:	AIRBLAST	AIRBLAST	AIRBLAST	AIRBLAST
Application Timing:	ACTIVI	ACTIVI	ACTIVI	ACTIVI
Application Placement:	FOLIAR	FOLIAR	FOLIAR	FOLIAR
Applied By:	Andy-Casey	Andy-Casey	Andy-Ryan	Andy-Ryan
Air Temperature, Unit:	65 F	90 F	80 F	87 F
% Relative Humidity:	65	30	45	35
Wind Velocity, Unit:	3 MPH	2 MPH	4 MPH	0 MPH
Wind Direction:	SE	W	SE	calm
Dew Presence (Y/N):	N no	N no	N no	N no
Soil Moisture:	SLIWET	GOOD	NORMAL	NORMAL
% Cloud Cover:	75	10	25	5

Crop Stage At Each Application	
	A
Crop 1 Code, BBCH Scale:	VACCO BDIC

Pest Stage At Each Application	
	A
Pest 1 Code, Type, Scale:	DROSSU I

9-24-13 (BlueB.SWD.Rotating)

Agriculture Development Group, Inc.

Application Equipment				
	A	B	C	D
Appl. Equipment:	AIRBLAST	AIRBLAST	AIRBLAST	AIRBLAST
Operation Pressure, Unit:	200 PSI	200 PSI	200 PSI	200 PSI
Nozzle Type:	CONEJET	CONEJET	CONEJET	CONEJET
Nozzle Size:	TXVK-8	TXVK-8	TXVK-8	TXVK-8
Nozzle Spacing, Unit:	7 IN	7 IN	7 IN	7 IN
Nozzles/Row:	3	3	3	3
Ground Speed, Unit:	2.5 MPH	2.5 MPH	2.5 MPH	2.5 MPH
Carrier:	WATER	WATER	WATER	WATER
Spray Volume, Unit:	50 GPA	50 GPA	50 GPA	50 GPA
Mix Size, Unit:	2 GALLONS	2 GALLONS	2 GALLONS	2 GALLONS
Propellant:	PUMP	PUMP	PUMP	PUMP
Tank Mix (Y/N):	N no	N no	N no	N no

SWD Trial In Organic Blueberries

Reps: 4

Plots: 10 by 20 feet

Spray vol: 50 gal/ac

Mix size: 6.5 liters (min 4.1713)

Trt No.	Treatment Type Name	Form Conc	Form Unit	Form Type	Rate Rate Unit	Appl Code	Amt Product to Measure	Rep 1	Rep 2	Rep 3	Rep 4
1	CHK UTC							101	204	308	402
2	INSE ENTRUST	80 %W/W	WP		4 oz/a	ABCDF	2.083 g/4 pl	102	212	317	405
3	INSE ENTRUST	80 %W/W	WP		6 oz/a	ABCDF	3.124 g/4 pl	103	205	316	404
4	INSE ENTRUST	80 %W/W	WP		4 oz/a	ABCDF	2.083 g/4 pl	104	202	315	410
	INSE GRANDEVO	30 %W/W	DF		1 lb/a	ABCDF	8.33 g/4 pl				
5	INSE GRANDEVO	30 %W/W	DF		2 lb/a	ABCDF	16.66 g/4 pl	105	206	303	409
6	INSE ENTRUST + BAIT	80 %W/W	WP		4 oz/a	ABCDF	2.083 g/4 pl	106	214	313	403
7	INSE GRANDEVO +BAIT	30 %w/w	DF		1 oz/a	ABCDF	0.5207 g/4 pl	107	209	307	413
8	INSE PYGANIC	1.409 LB/GAL	EC		64 fl oz/a	ABCDF	34.76 ml/4 pl	108	211	306	416
9	INSE NEEMAZAD	.082 LB/GAL	EC		16 oz/a	ABCDF	8.69 ml/4 pl	109	215	302	414
10	INSE AZA-DIRECT	.0987 LB/GAL	EC		3.5 pt/a	ABCDF	30.41 ml/4 pl	110	217	310	406
11	INSE PYGANIC	1.409 LB/GAL	EC		64 fl oz/a	ABCDF	34.76 ml/4 pl	111	203	311	415
	INSE NEEMAZAD	.082 LB/GAL	EC		16 oz/a	ABCDF	8.69 ml/4 pl				
12	INSE PYGANIC	1.409 LB/GAL	EC		64 fl oz/a	ABCDF	34.76 ml/4 pl	112	208	305	411
	INSE AZA-DIRECT	.0987 LB/GAL	EC		3.5 pt/a	ABCDF	30.41 ml/4 pl				
13	INSE ENTRUST	80 %W/W	WP		6 oz/a	ABF	3.124 g/4 pl	113	210	312	401
	INSE PYGANIC	1.409 LB/GAL	EC		64 fl oz/a	CD	34.76 ml/4 pl				
	INSE NEEMAZAD	.082 LB/GAL	EC		16 oz/a	CD	8.69 ml/4 pl				
14	INSE ENTRUST	80 %W/W	WP		6 oz/a	ABF	3.124 g/4 pl	114	207	314	417
	INSE GRANDEVO	30 %W/W	DF		2 lb/a	CD	16.66 g/4 pl				
15	INSE DES-X	4.07 LB/GAL	SL		2 gal/100 gal	ABCDF	130.0 ml/mx	115	201	309	408
16	INSE ENTRUST	80 %W/W	WP		4 oz/a	ABCDF	2.083 g/4 pl	116	213	304	412
	INSE AZA-DIRECT	.0987 LB/GAL	EC		3.5 pt/a	ABCDF	30.41 ml/4 pl				
17	INSE JET AG			L	1 % v/v	ABCDF	64.99 ml/mx	117	216	301	407

Sort Order: Replicate 1

9-24-13 (BlueB.SWD.Rotating)

Agriculture Development Group, Inc.**SWD Trial In Organic Blueberries**

Trial ID:	Protocol ID:
Location: Eltopia, WA	Study Director: Andy Nagy
Project ID:	Investigator: Alan Schreiber
	Sponsor Contact: Several

Product quantities required for listed treatments and applications of trials included in this table:

Amount*	Unit	Treatment Name	Form Conc	Form Type	Lot Code
65.602	g	ENTRUST	80	WP	
158.278	g	GRANDEVO	30	DF	
10.413	g	ENTRUST + BAIT	80	WP	
2.603	g	GRANDEVO +BAIT	30	DF	
590.927	ml	PYGANIC	1.4096	EC	
104.281	ml	NEEMAZAD	.082	EC	
456.181	ml	AZA-DIRECT	.0987	EC	
649.929	ml	DES-X	4.07	SL	
324.965	ml	JET AG		L	

* 'Per area' calculations based on 4 replicates of 10 by 20 feet 'Plot' experimental units (area of one treatment).

* 'Per area' calculations based on spray volume= 50 gal/ac, mix size= 6.5 liters (mix size basis).

* 'Per volume' calculations use spray volume= 50 gal/ac, mix size= 6.5 liters.

* Adjusted for multiple applications in treatment list.

9-24-13 (BlueB.SWD.Rotating)

Agriculture Development Group, Inc.

SWD Trial In Organic Blueberries			
Trial ID:		Protocol ID:	
Location: Eltopia, WA		Study Director: Andy Nagy	
Project ID:		Investigator: Alan Schreiber	
		Sponsor Contact: Several	
Pest Scientific Name	Drosophila suzukii	Drosophila suzukii	Drosophila suzukii
Crop Name	Highbush blueberry	Highbush blueberry	Highbush blueberry
Rating Type	DUNK COUNTS	DUNK COUNTS	DUNK COUNTS
Part Rated	LARVA P	LARVA P	LARVA P
Description	20 Berries	20 Berries	20 Berries
Sample Size, Unit	berry	berry	berry
Rating Date	6-21-13	7-2-13	7-11-13
Days After First/Last Applic.	0 0	11 11	20 8
Trt Treatment Rate			
No. Type Name Rate Unit			
1 CHK UTC	0.0 a	0.0 a	0.0 a
2 INSE ENTRUST 4 oz/a	0.0 a	0.0 a	0.0 a
3 INSE ENTRUST 6 oz/a	0.0 a	0.0 a	0.0 a
4 INSE ENTRUST 4 oz/a INSE GRANDEVO 1 lb/a	0.0 a	0.0 a	0.0 a
5 INSE GRANDEVO 2 lb/a	0.0 a	0.0 a	0.0 a
6 INSE ENTRUST + BAIT 4 oz/a	0.0 a	0.0 a	0.0 a
7 INSE GRANDEVO +BAIT 1 oz/a	0.0 a	0.0 a	0.0 a
8 INSE PYGANIC 64 fl oz/a	0.0 a	0.0 a	0.0 a

Means followed by same letter do not significantly differ (P=.10, Duncan's New MRT)

9-24-13 (BlueB.SWD.Rotating)

Agriculture Development Group, Inc.

Pest Scientific Name	Drosophila suzukii	Drosophila suzukii	Drosophila suzukii
Crop Name	Highbush blueberry	Highbush blueberry	Highbush blueberry
Rating Type	DUNK COUNTS	DUNK COUNTS	DUNK COUNTS
Part Rated	LARVA P	LARVA P	LARVA P
Description	20 Berries	20 Berries	20 Berries
Sample Size, Unit	berry	berry	berry
Rating Date	6-21-13	7-2-13	7-11-13
Days After First/Last Applic.	0 0	11 11	20 8
Trt Treatment Rate			
No. Type Name Rate Unit			
9 INSE NEEMAZAD 16 oz/a	0.0 a	0.0 a	0.0 a
10 INSE AZA-DIRECT 3.5 pt/a	0.0 a	0.0 a	0.0 a
11 INSE PYGANIC 64 fl oz/a INSE NEEMAZAD 16 oz/a	0.0 a	0.0 a	0.0 a
12 INSE PYGANIC 64 fl oz/a INSE AZA-DIRECT 3.5 pt/a	0.0 a	0.0 a	0.0 a
13 INSE ENTRUST 6 oz/a INSE PYGANIC 64 fl oz/a INSE NEEMAZAD 16 oz/a	0.0 a	0.0 a	0.0 a
14 INSE ENTRUST 6 oz/a INSE GRANDEVO 2 lb/a	0.0 a	0.0 a	0.0 a
15 INSE DES-X 2 gal/100 gal	0.0 a	0.0 a	0.0 a
16 INSE ENTRUST 4 oz/a INSE AZA-DIRECT 3.5 pt/a	0.0 a	0.0 a	0.0 a
17 INSE JET AG 1 % v/v	0.0 a	0.0 a	0.0 a
LSD (P=.10)	0.00	0.00	0.00
Standard Deviation	0.00	0.00	0.00
CV	0.0	0.0	0.0
Replicate F	0.000	0.000	0.000
Replicate Prob(F)	1.0000	1.0000	1.0000
Treatment F	0.000	0.000	0.000
Treatment Prob(F)	1.0000	1.0000	1.0000

9-24-13 (BlueB.SWD.Rotating)

Agriculture Development Group, Inc.

Pest Scientific Name	Drosophila suzukii	Drosophila suzukii
Crop Name	Highbush blueberry	Highbush blueberry
Rating Type	DUNK COUNTS	TOTAL COUNT
Part Rated	LARVA P	LARVA P
Description	20 Berries	Total # of Larvae
Sample Size, Unit	berry	
Rating Date	7-22-13	7-23-13
Days After First/Last Applic.	31 10	32 11
Trt Treatment Rate		
No. Type Name Rate Unit		
1 CHK UTC	0.0 a	0.0 a
2 INSE ENTRUST 4 oz/a	0.0 a	0.0 a
3 INSE ENTRUST 6 oz/a	0.0 a	0.0 a
4 INSE ENTRUST 4 oz/a INSE GRANDEVO 1 lb/a	0.0 a	0.0 a
5 INSE GRANDEVO 2 lb/a	0.0 a	0.0 a
6 INSE ENTRUST + BAIT 4 oz/a	0.0 a	0.0 a
7 INSE GRANDEVO +BAIT 1 oz/a	0.0 a	0.0 a
8 INSE PYGANIC 64 fl oz/a	0.0 a	0.0 a

9-24-13 (BlueB.SWD.Rotating)

Agriculture Development Group, Inc.

Pest Scientific Name	Drosophila suzukii	Drosophila suzukii
Crop Name	Highbush blueberry	Highbush blueberry
Rating Type	DUNK COUNTS	TOTAL COUNT
Part Rated	LARVA P	LARVA P
Description	20 Berries	Total # of Larvae
Sample Size, Unit	berry	
Rating Date	7-22-13	7-23-13
Days After First/Last Applic.	31 10	32 11
Trt Treatment Rate		
No. Type Name Rate Unit		
9 INSE NEEMAZAD 16 oz/a	0.0 a	0.0 a
10 INSE AZA-DIRECT 3.5 pt/a	0.0 a	0.0 a
11 INSE PYGANIC 64 fl oz/a INSE NEEMAZAD 16 oz/a	0.0 a	0.0 a
12 INSE PYGANIC 64 fl oz/a INSE AZA-DIRECT 3.5 pt/a	0.0 a	0.0 a
13 INSE ENTRUST 6 oz/a INSE PYGANIC 64 fl oz/a INSE NEEMAZAD 16 oz/a	0.0 a	0.0 a
14 INSE ENTRUST 6 oz/a INSE GRANDEVO 2 lb/a	0.0 a	0.0 a
15 INSE DES-X 2 gal/100 gal	0.0 a	0.0 a
16 INSE ENTRUST 4 oz/a INSE AZA-DIRECT 3.5 pt/a	0.0 a	0.0 a
17 INSE JET AG 1 % v/v	0.0 a	0.0 a
LSD (P=.10)	0.00	0.00
Standard Deviation	0.00	0.00
CV	0.0	0.0
Replicate F	0.000	0.000
Replicate Prob(F)	1.0000	1.0000
Treatment F	0.000	0.000
Treatment Prob(F)	1.0000	1.0000

9-24-13 (BlueB.SWD.Rotating)

Agriculture Development Group, Inc.

SWD Trial In Organic Blueberries

Trial ID:	Protocol ID:	
Location: Eltopia, WA	Study Director: Andy Nagy	
Project ID:	Investigator: Alan Schreiber	
	Sponsor Contact: Several	

Trial Comments

A - F: Apply when SWD populations are detected and flies are present, based on trap counts

A-Three weeks before first harvest (first harvest is around June 20th-25th)

B-F: 7-10 day intervals.

Six applications at 7 days is a 42 spread, 10 days is 60 days, if the first application is made on June 1 then the ending interval would be July 12 to August 1.

- If 7 day intervals are made, it will require additional applications beyond six. 6-10 day intervals will probably be adequate. However, that decision will be made during the trial. SWD pressure is expected to be lower during the time that Duke is being harvested and if so, then 10 day intervals may suffice.

SWD data will be collected within 24 hours before the next application, so if it is a 7 day interval, sampling will be weekly. If applications are made at 10 day intervals, the sampling will be every 10 days. Sampling will continue for two intervals after the last application, assuming berries and conditions permit. each week and recorded for availability. X number of berries will be collected from each plot. The berries will be gently crushed and put in a sugar solution and the number of SWD larvae will be counted at 24 hours post sampling. Adult trap counts will be collected during the course of the trial for a general measure of adult pressure in the area (data will not be collected for adults in each plot, but rather in general for the trial area)

June 21st - Trt 6 & 7 Monterey Insect Bait was applied at a rate of 6 pints per acre

- also the spray interval for this trial will be every 10 days
- The "Spray wall" attachment to the Air blast sprayer will be used during all applications, to prevent excessive spray drift between plots.

July 28th - It was determined the creator/transcriber of the protocol for this trial used an incorrect rate for Treatment 7. The correct rate was One Pound per acre, w/ bait, and not One Ounce per acre w/bait as was written.

9-24-13 (BlueB.SWD.Rotating)

Agriculture Development Group, Inc.**SWD Trial In Organic Blueberries**

Trial ID:	Protocol ID:
Location: Eltopia, WA	Study Director: Andy Nagy
Project ID:	Investigator: Alan Schreiber
	Sponsor Contact: Several

401 13	402 1	403 6	404 3	405 2	406 10	407 17	408 15	409 5	410 4	411 12	412 16	413 7	414 9	415 11	416 8	417 14
301 17	302 9	303 5	304 16	305 12	306 8	307 7	308 1	309 15	310 10	311 11	312 13	313 6	314 14	315 4	316 3	317 2
201 15	202 4	203 11	204 1	205 3	206 5	207 14	208 12	209 7	210 13	211 8	212 2	213 16	214 6	215 9	216 17	217 10
101 1	102 2	103 3	104 4	105 5	106 6	107 7	108 8	109 9	110 10	111 11	112 12	113 13	114 14	115 15	116 16	117 17

9-24-13 (BlueB.SWD.Rotating)

Agriculture Development Group, Inc.**SWD Trial In Organic Blueberries**

Trial ID:	Protocol ID:
Location: Eltopia, WA	Study Director: Andy Nagy
Project ID:	Investigator: Alan Schreiber
	Sponsor Contact: Several

During the summer of 2013, the staff at the Agriculture Development Group, Inc., conducted a research trial investigating the efficacy of different organic insecticides on populations of spotted wing drosophila (SWD), *Drosophila suzukii*, within established rows of highbush blueberry, *Vaccinium corymbosum L.* The treatments for this study were applied using an airblast sprayer outfitted with a drift reducing “spray wall”, and the sprayer was calibrated to apply solutions at a rate of 50 gallons per acre. Applications were applied to each side of the blueberry row and each plot was 20ft in length.

Preliminary monitoring for SWD populations were conducted using vinegar trap cups placed within the study site earlier in the season. Seven days before the first application was applied, two SWD were identified within one of the vinegar cups. A decision was made to begin making treatment applications using 10 day intervals between sprays. Preceding each application, 20 ripe blueberries were collected from each plot and subjected to “salt dunking” to determine the approximate numbers of SWD larvae present. These larvae counts provided a basis for rating the efficacy of these organic insecticides, and therefore pivotal to the success of this study. Unfortunately, no SWD larvae were present within the salt dunking tests preceding each of the four spray applications, so no scientific determination could be made to the potency of any of the treatments within blueberries.

Appendix 6. (Registrant letters of support)



Harvey A. Yoshida, Ph.D.
Crop Protection Research & Development
Dow AgroSciences, LLC
432 Aimee Drive
Richland, WA 99352

November 23, 2013

Dr. Michael Braverman, Manager, Biopesticide and Organic Support Program

Dear Dr. Braverman:

Spotted wing drosophila (SWD), *Drosophila suzukii*, continues to be a serious pest of blueberries and other soft fruit in the Pacific Northwest. Management of SWD is especially challenging in organic systems due to the lack of effective insecticides. Entrust® insecticide (active ingredient, spinosad) continues to be the linchpin for SWD management in organic production.

Due to the propensity of *Drosophila* species to undergo genetic mutations and coupled with its multiple reproductive generations per year, a shift in lack of susceptibility to spinosad by SWD is likely to occur. A sound resistance management program which also provides effective control of SWD is needed in organic blueberry production. Effective alternative insecticides used in a rotation program would alleviate the selection pressure off any one compound and thereby extend the life of all insecticides. The proposed testing of alternative insecticides and their integration into an overall SWD management program by Dr. Schreiber is very much needed for organic blueberry production.

I will make a formal recommendation that Dow AgroSciences provide support to Dr. Schreiber's research in 2014; a final decision regarding funding will be made around next March.

Please do not hesitate to contact me if you require additional information.

Sincerely,

A handwritten signature in black ink that reads "Harvey A. Yoshida".

Harvey A. Yoshida, Ph.D.
Senior Research Scientist



Certis USA

9145 Guilford Road

Suite 175

Columbia, MD 21046

(301) 604-7340

Dr. Michael Braverman

IR-4 Biopesticide Program Manager

500 College Road East, Suite 201W

Princeton, New Jersey 08540

December 5, 2013

Dear Dr. Braverman:

This letter is to express the support of Certis USA, L.L.C. for the proposal by Dr. Alan Schreiber entitled "Spotted Wing Drosophila Control in Organic Berries". Certis USA has registrations on blueberries for both Neemazad 1%EC (azadirachtin) and Des-X (Potassium Salts of Fatty Acids), two materials included in Dr. Schreiber's proposal.

Both products are currently registered with EPA for use in controlling various insects in berry crops and show that it can be an effective tool in management of insects in berry crops. Being an industry leader in biorational products, Certis has been encouraged to pursue a pest and crop expansions of our labels for the agriculture markets. Dr. Schreiber has a long history of grower-focused field research efforts toward increasing adoption of biopesticides. Having collaborated with him for biopesticide field trials on many occasions, Certis has utmost confidence in his ability to achieve the objectives of this program.

Sincerely,

A handwritten signature in black ink that reads "Scott C. Ockey". The signature is written in a cursive style and is placed on a light gray rectangular background.

Scott C. Ockey

Field Development Manager, Western US

Cc: Dr. Alan Schreiber

To: Dr. Michael Braverman, Biopesticide and Organic Support Program
Manager

From: Patrick Gibbons, Technical Sales Manager
Jet Harvest Solutions. Yakima WA.

Date: 12/10/2013

Re: Proposal: Spotted Wing Drosophila Control in Organic Berries

Spotted wing drosophila (SWD) is a serious pest of blueberries and other soft fruit in the Pacific North. It arrived in Washington in 2010 and has spread throughout the state.

- With over \$40 million in organic berry sales from Washington State, the industry is seeing tremendous growth driven by health conscious consumers. Buyers of organic products expect their purchases to be free of pest and diseases. The SWD has no known predator to control it and there is huge need to produce marketable berries.
- Jet Harvest's peracetic acid solution has been reported by growers to offer some control of the SWD when being applied as a fungicide. We would like to explore this potential and support the growers efforts in their quest to control this costly pest.
- Jet Harvest is reviewing the cost/benefit for applying PAA on berries to suppress the SWF in organic production. Once completed, we will propose to offer our financial support to the Biopesticide research project.

If you require more information about our product or company, please contact me at: Patrick Gibbons, Patrick@agprodint.com, 509-949-7242