

Sponsor: Nature-Cide
Study: Product Development
Sponsor Code: N/A

REPORT TITLE

Efficacy of the 012813-3-A-SNE Formulation when applied as Direct Spray Applications against Various Pests Species

STUDY

Product Development

TRIALS

CIMXLE / LEPISA / ARANSP / RHIPSA / CTECFE / UROPSP / PERIAM / BLTTGE / BLTTOR / PERIFU / TRIBCO / BOISTR / MYZUPE / BEMJAR / HALYHA / MONOPH / SOLEIN / LINEHU / CALIVO / MUSCDO / ANPHQM / CULXFA / AEDSAE / PLUTXY / SPODEX / DOLIMA / VESPSP / PSORCU / TINEBI / FORFAU / LASDSE / HARNAX / LEPTDE

SPONSOR CODE

N/A

EXPERIMENTAL START DATE

January 28, 2013

EXPERIMENTAL COMPLETION DATE

TBD

REPORT DATE

February 2014

TABLE OF CONTENTS

[Table of Contents](#)2
[Study Objective\(s\)](#)3
[Test Substance Information](#)3
[Test System Information](#)4
[Materials and Methods](#)6
[Results/Discussion](#)10
[Conclusion](#)11
[Tables](#)12
[Appendix A: Photographs](#)17

Sponsor: Nature-Cide
Study: Product Development
Sponsor Code: N/A

STUDY OBJECTIVE(S):

To determine the efficacy of the 012813-3-A-SNE formulation when applied as direct spray applications against various pest species.

TEST SUBSTANCE INFORMATION:**Test Substance(s):**

1. Controls - Untreated
2. 012813-3-A-SNE

Competitive Products:

3. Garden Safe Houseplant & Garden Insect Killer (0.02% Pyrethrin, 0.20% Piperonyl Butoxide, Technical), EPA Reg. No. 478-125-39609, (Snell Code: 102412-4-B-SPE).
4. EcoSmart Organic Home Pest Control (2.0% 2-Phenethyl Propionate, 1.0% Clove Oil, 1.0% Rosemary Oil, 1.0% Peppermint Oil, 0.5% Thyme Oil, 050712-13-B-SNE.
5. 3oz/gal rate essentria™ IC3 Insecticide (10.00% Rosemary Oil, 5.00% Geraniol, 2.00% Peppermint Oil), Lot-56481, 103012-4-A-SNE – diluted 3ml/128ml water.

TEST SYSTEM INFORMATION:

Trial	Test System	Strain	Stage/Age	Source
Household Pests				
CIMXLE	Bed Bug (<i>Cimex lectularius</i>)	"Cooper 2" Wild	Late Stage Nymphs / Adults	Reared
LEPISA	Silverfish (<i>Lepisma saccharina</i>)	Lab	Late Stage Nymphs / Adults	Collected/Reared
ARANSP	House Spider (<i>Aranea spp</i>)	Field	Adults	Collected
FORFAU	European Earwig (<i>Forficula auricularia</i>)	Lab	Late Stage Nymphs / Adults	Collected/Reared
TINEBI	Clothes Moth (<i>Tineola bisselliella</i>)	Lab	Adults	Reared
Flea/Tick/Mites				
RHIPSA	Brown Dog Tick (<i>Rhipicephalus sanguineus</i>)	Lab	Nymphs	Purchased
CTECFE	Cat Flea (<i>Ctenocephalides felis</i>)	Lab	Adults	Purchased
CTECFE	Cat Flea (<i>Ctenocephalides felis</i>)	Lab	Larvae	Purchased
UROPS	Poultry Litter Mite (<i>Uropodid spp.</i>)	Field	Mixed Stage Nymphs / Adults	Collected
PSORCU	Rabbit Ear Mite (<i>Psoroptes cuniculi</i>)	Field	Mixed Stage Nymphs / Adults	Infested Test Subject
Cockroaches				
PERIAM	American Cockroach (<i>Periplaneta americana</i>)	Lab	80% Nymphs, 10% Adult Males, 10% Adult Non-Gravid Females	Purchased/Reared
BLTTGE	German Cockroach (<i>Blattella germanica</i>)	Lab	80% Nymphs, 10% Adult Males, 10% Adult Non-Gravid Females	Purchased/Reared
BLTTOR	Oriental Cockroach (<i>Blattella orientalis</i>)	Lab	80% Nymphs, 10% Adult Males, 10% Adult Non-Gravid Females	Purchased/Reared
PERIFU	Smokey Brown Cockroach (<i>Periplaneta fuliginosa</i>)	Lab	80% Nymphs, 10% Adult Males, 10% Adult Non-Gravid Females	Purchased/Reared
Stored Product Pests				
TRIBCO	Confused Flour Beetle (<i>Tribolium confusium</i>)	Lab	Adults	Reared
	Cigarette Beetle (<i>Lasioderma serricorne</i>)	Lab	Adults	Reared
Plant Pests/Home Invaders				
BOISTR	Boxelder Bug (<i>Boisea trivittatus</i>)	Field	Mixed Stage Nymphs / Adults	Collected
MYZUPE	Green Peach Aphid (<i>Myzus persicae</i>)	Field	Mixed Stage Nymphs / Adults	Collected
BEMJAR	Silverleaf Whitefly (<i>Bemisia argentifolii</i>)	Field	Adults	Collected
HALYHA	Brown Marmorated Stink Bug (<i>Halyomorpha halys</i>)	Field	Adults	Collected
LEPTDE	Colorado Potato Beetle (<i>Leptinotarsa decemlineata</i>)	Lab	Adults	Purchased
HARNAX	Asian Lady Beetle (<i>Harmonia axyridis</i>)	Field	Adults	Collected

Sponsor: Nature-Cide
 Study: Product Development
 Sponsor Code: N/A

Trial	Test System	Strain	Stage/Age	Source
Ants				
MONOPH	Pharaoh's Ant (<i>Monomorium pharaonis</i>)	Field	Workers	Collected
SOLEIN	Red Imported Fire Ant (<i>Solenopsis invicta</i>)	Field	Workers	Collected
LINEHU	Argentine Ant (<i>Linepithema humile</i>)	Field	Workers	Collected/Reared
Flies				
CALIVO	Blue Bottle Fly (<i>Calliphora vomitoria</i>)	Lab	Adults	Purchased
MUSCDO	House Fly (<i>Musca domestica</i>)	Lab	Adults	Purchased
Mosquitoes				
ANPHQM	Common Malaria Mosquito (<i>Anopheles quadrimaculatus</i>)	Lab	Adult Females	Purchased
CULXFA	Southern House Mosquito (<i>Culex quinquefasciatus</i>)	Lab	Adult Females	Purchased
AEDSAE	Yellow Fever Mosquito (<i>Aedes aegypti</i>)	Lab	Adult Females	Purchased
Caterpillars				
PLUTXY	Diamondback Moth (<i>Plutella xylostella</i>)	Lab	Larvae	Purchased
SPODEX	Beet Armyworm (<i>Spodoptera exigua</i>)	Lab	Larvae	Purchased
Wasps/Hornets				
DOLIMA	Bald Faced Hornet (<i>Dolichovespula maculata</i>)	Field	Adults	Collected
VESPPSP	Yellow Jacket (<i>Vespula</i> spp.)	Field	Adults	Collected

MATERIALS AND METHODS:

The following is the Testing Method for evaluating the efficacy of pesticides when applied as direct spray applications against various arthropod species. Further details related to this specific study are described following the test method summary. Select action items and illustrations have been removed from this standardized test method in an effort to make the report more precise and accurate to the study conducted. Any details removed from this test method were deemed irrelevant to the study conducted in this report.

Direct Spray Study**311.1 Materials:***Test Arena Information:*

- 311.1.1 Treatment Arenas: CPVC Cartridges with BioQuip 7250NSW or 7250C mesh. The Test Arenas were used to contain the test systems during the test substance applications.
- 311.1.2 Post-Treatment Arenas: Various containers were used per species. The Post-Treatment arenas were used to contain the test systems in a clean environment after exposure to the test substance(s).
- 311.1.3 Food/Moisture: Various food and moisture items were used per species.

Test Equipment:

- 311.1.4 Volumetric Measuring Equipment: Graduated cylinders and/or beakers were used as needed in preparing and/or measuring the flow rates of the test substance(s).
- 311.1.5 Digital Balance(s): Balances were used as needed in preparing and/or weighing the test substance canisters before and after applications.
- 311.1.6 CO₂ and Regulator: A standard 20 pound CO₂ cylinder with regulator was used to anesthetize the test systems and sort them into the test arenas (prior to exposure to the test substances). The test systems were allowed to adequately recover from anesthetizing before being exposed to the test substance(s), and they were not anesthetized at any point following exposure to the test substance(s). Any additional transfers required after exposure to the test substances was conducted using methods that did not involve anesthetizing.
- 311.1.7 Intermediate Sorting/Transfer Containers: Additional sorting and transfer containers were used to aid in moving the test systems from the primary rearing/collection containers and into the treatment and/or post-treatment arenas.
- 311.1.8 Metronome/Timing Equipment: A metronome and/or other timing equipment were used as needed to assist in the timing when conducting the applications and/or when collecting the observations.

Application Equipment:

311.1.9 Application Equipment: Disposable Trigger Sprayer.

311.2 Methods:*Test Design:*

- 311.2.1 The evaluations of this study followed the photographs in the Appendix A: Photograph section of the report.
- 311.2.2 Each Treatment and/or Post-Treatment Arena was labeled with a test substance code and a replicate number. The arenas were positioned on a clean tray and grouped together per test substance type. The tray(s) with the Treatment and Post-Treatment Arenas were also labeled using the study name, trial name, and the study initiation date (as a duplicate means of ensuring accurate data collection).
- 311.2.3 The test systems were sorted into the Treatment Arenas using the appropriate methods based on the species type.
- 311.2.4 All of the test systems were confirmed to be of “good vigor” (alive) prior to exposure to the test substance(s).
- 311.2.4.1 Only live test systems were selected for use in the study.
- 311.2.4.2 After all test systems were transferred into the test arenas, they were confirmed to be alive and exhibiting normal behavior before continuing with the study.
- 311.2.5 The number of replicates conducted per test substance and the number of test systems evaluated per replicate were conducted using 3 replicates of 10 specimens per replicate (30 specimens per test substance) with most trials. The total number of specimens used per trial was dependent on the availability of the test systems, and therefore for certain trials, the replicates and number per replicate may have been slightly more or less than 30 per test substance.

Test Substance Preparation & Applications:

- 311.2.6 The test substance container(s) were clearly labeled with the test substance name.
- 311.2.7 The test substance(s) were adequately shaken prior to applications.
- 311.2.8 The applications were conducted using an application rate of 2 trigger pulls per replicate.
- 311.2.9 The applications were conducted by treating each replicate from a 12 inch distance away and by applying 2 trigger pull(s) (approximately 2 mL) per replicate using a mist setting.

Sponsor: Nature-Cide
Study: Product Development
Sponsor Code: N/A

Observation Methods:

- 311.2.10 The number of “Alive”, “Knocked Down (KD)”, and “Dead” test systems per arena was recorded prior to applications (Pre-trt), and at 30 min, 1 hr, 2 hrs, 4 hrs, 24 hrs, and then daily as needed after applications (DAT).
- 311.2.11 The observations were collected by raising the test arenas and gently blowing air on the test systems to provoke movement, lightly prodding the test systems, or the test arenas were shaken/agitated to provoke test system movement.
- 311.2.12 The test systems were transferred from the Treatment Arenas into the clean Post-treatment Arenas after the 1 hr observation interval.
- 311.2.13 Definitions of “Alive”, “Knock Down (KD)”, and “Dead”:
- 311.2.13.1 Alive – Test System exhibited normal forward motion and/or the ability to fly.
 - 311.2.13.2 Knock Down (KD) – Test System exhibited some movement, but could not crawl and/or fly.
 - 311.2.13.3 Dead - Test System exhibited no movement, even when stimulated.

Environmental Conditions:

- 311.2.14 The test systems were tested under ambient laboratory conditions.

Rabbit Ear Mite Study**Materials***Test Arena Information:*

- Treatment Arenas: Infested Rabbit Ears

Application Equipment:

- Application Equipment: Disposable Trigger Sprayer.

Methods:*Test Design:*

- The evaluations of this study followed the photographs in the Appendix A: Photograph section of the report.
- Naturally existing infestations of rabbit ear mites, *Psoroptes cuniculi*, in San Juan rabbits were used for this study.
- Each infested ear was treated as one replicate.
- Ear mites and ear crusts were confirmed prior to exposure to the test substance(s).

Test Substance Preparation & Applications:

- The test substance container(s) were clearly labeled with the test substance name.
- The test substance(s) were adequately shaken prior to applications.
- The applications were conducted by treating each replicate evenly with 2 trigger pull(s) (approximately 2 mL) per replicate using a mist setting.
- Treatments were re-applied at 2 and 4 days after treatment.

Observation Methods:

- The presence of ear mites and the presence of ear crusts were recorded prior to applications (Pre-trt), and then at 2, 4, and 7 days after treatment (DAT).
- The observations were collected by visual inspection.

RESULTS / DISCUSSION:***Direct Spray Study***

The results for the direct spray study are shown in Tables 1-10. The tables are separated based on species similarity, and each table illustrates the average percent mortality of the evaluated species (test system) at each observation interval for the un-treated controls and the evaluated test substance. In addition to the percent mortality that is shown in the tables, the mortality rates for each trial (test system) were statistically analyzed using a t test for independent samples. The analysis was conducted using a one-tailed distribution and probability value of $p < 0.05$ to evaluate if any significant differences in mortality were recorded between the un-treated controls and the test substance. For any trials that had competitive formulations tested, a second analysis was conducted using a two-tailed distribution and probability value of $p < 0.05$ to evaluate if any significant differences in mortality were recorded between the test substances.

Of the 33 completed trials, 26 of the species recorded 100% mortality with the 012813-3-A-SNE treatment, while 5 more recorded $\geq 90\%$ mortality, and 2 species recorded 80% mortality rates. Significant differences in the mortality rates between the test specimens treated with the 012813-3-A-SNE formulation and the un-treated controls were recorded with all 32 of the evaluated species, with most species proving statistically different within 30 minutes after the applications. The 012813-3-A-SNE formulation also outperformed EcoSmart Organic Home Pest Control (2.0% 2-Phenethyl Propionate, 1.0% Clove Oil, 1.0% Rosemary Oil, 1.0% Peppermint Oil, 0.5% Thyme Oil) and the 3oz/gal rate of essentria™ IC3 Insecticide (10.00% Rosemary Oil, 5.00% Geraniol, 2.00% Peppermint Oil) during the 30 minute observation interval with the brown dog tick evaluation (Table 2), and outperformed EcoSmart Organic Home Pest Control during the 1 hour observation with the diamondback moth evaluation (Table 9).

Rabbit Ear Mite Study

The results for the rabbit ear mite study are shown in Table 11, which illustrates the average number of days taken for the ear mite population to be eradicated (controlled) from the ear and the average number of days for significant ear crust reduction.

When treated with 012813-3-A-SNE, the ear mites were completely eradicated by 7 DAT. Significant ear crust reduction was also observed by 7 DAT. Ear crust reduction was considered significant when all of the large slivers of crust had fallen from the ear. Photograph 7 shows a fully infested ear, while photograph 8 shows an ear 7 days after treatment. Photograph 8 illustrates what was considered to be significant crust reduction.

CONCLUSION:***Direct Spray Study***

It is evident from the results of the study that the 012813-3-A-SNE formulation provides adequate mortality against a wide range of pest species following direct spray application methods. The results show that the formulation is effective against household pest species (bed bugs, silverfish, house spiders, European earwigs, and clothes moths), fleas, ticks, and mites (brown dog ticks, cat fleas adults, cat flea larvae, and poultry mites), cockroaches (American, German, Oriental, and smoky brown cockroaches), stored product pests (confused flour beetles and cigarette beetles), plant pests/home invaders (boxelder bugs, green peach aphids, silverleaf whiteflies, brown marmorated stink bugs, Colorado potato beetles, and Asian lady beetles), ants (pharaoh, red imported, and Argentine ants), flies (blue bottle and house flies), mosquitoes (common malaria, southern house, and yellow fever mosquitoes), caterpillars (diamondback moths and beet armyworms), and wasp/hornets (bald faced hornet and yellow jackets).

Rabbit Ear Mite Study

It is evident from the results of the study that the 012813-3-A-SNE formulation controls rabbit ear mites and resolves the ear crusts associated with rabbit ear mite infestations. Although ear mites are not a widespread problem with equines, *Psoroptes cuniculi* is a primary mite species that can infest equine ears, and therefore it could be inferred that the 012813-3-A-SNE formulation would control ear mites in equines.

TABLES:

Table 1.

Household Pests - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Bed Bug	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	77%	87%	87%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Silverfish	Controls	0%	0%	0%	0%	0%	3%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
House Spider	Controls	0%	0%	0%	0%	5%	15%
	012813-3-A-SNE	0%	90%	90%	90%	90%	95%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Clothes Moth	Controls	0%	0%	0%	0%	0%	7%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
European Earwig	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%

Table 2.

Flea/Tick/Mites - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Brown Dog Tick	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
	Garden Safe Houseplant & Garden	0%	100%	100%	100%	100%	100%
	EcoSmart Home Pest	0%	70%	100%	93%	100%	100%
	essentria™ IC3 Insecticide	0%	73%	93%	100%	100%	91%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Cat Flea Adults	Controls	0%	0%	0%	0%	0%	3%
	012813-3-A-SNE	0%	90%	90%	90%	90%	100%
Test System:	Test Sub.	Pre-trt	4 hr	24 hr	2 DAT	3 DAT	4 DAT
Cat Flea Larvae	Controls	0%	0%	0%	0%	0%	7%
	012813-3-A-SNE	0%	90%	90%	90%	90%	90%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Poultry Mite	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%

Table 3.

Cockroaches - Average % Mortality							
Test System:	Test Sub.	Pre-trt	1 hr	24 hr	2 DAT	3 DAT	4 DAT
American Cockroach	Controls	0%	0%	0%	0%	0%	3%
	012813-3-A-SNE	0%	60%	63%	67%	77%	90%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	2 DAT
German Cockroach	Controls	0%	0%	0%	0%	0%	13%
	012813-3-A-SNE	0%	87%	83%	87%	90%	90%
Test System:	Test Sub.	Pre-trt	30 min	1hr	2 hr	4 DAT	5 DAT
Oriental Cockroach	Controls	0%	0%	0%	0%	3%	13%
	012813-3-A-SNE	0%	80%	90%	93%	97%	100%
Test System:	Test Sub.	Pre-trt	30 min	2hr	2 DAT	3 DAT	4 DAT
Smokey Brown Cockroach	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	63%	87%	90%	93%	97%

Table 4.

Stored Product Pests - Average % Mortality							
Test System:	Test Sub.	Pre-trt	24 hr	2 DAT	5 DAT	8 DAT	9 DAT
Confused Flour Beetle	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	50%	60%	70%	77%	80%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Cigarette Beetles	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%

Table 5.

Plant Pests/Home Invaders - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Boxelder Bug	Controls	0%	0%	0%	0%	0%	3%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Green Peach Aphid	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Silverleaf Whitefly	Controls	0%	0%	0%	0%	0%	23%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	2 DAT
Brown Mar Stink Bug	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	53%	60%	60%	73%	80%
Test System:	Test Sub.	Pre-trt	1 hr	2 hr	24 hr	4 DAT	5 DAT
Colorado Potato Beetle	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	4%	88%	92%	96%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Asian Lady Beetle	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	23%	93%	100%	100%	100%

Table 6.

Ants - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Pharaoh Ant	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	1 hr	2 hr	24 hr	2 DAT	3 DAT
Red Imported Fire Ant	Controls	0%	0%	0%	7%	10%	13%
	012813-3-A-SNE	0%	67%	67%	80%	93%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Argentine Ant	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%

Table 7.

Flies - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Blue Bottle Fly	Controls	0%	0%	0%	0%	7%	17%
	012813-3-A-SNE	0%	83%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
House Fly	Controls	0%	0%	0%	0%	3%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%

Table 8.

Mosquitoes - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Common Malaria Mosquito	Controls	0%	0%	0%	0%	10%	40%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Southern House Mosquito	Controls	0%	0%	0%	10%	13%	40%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Yellow Fever Mosquito	Controls	0%	0%	0%	0%	0%	10%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%

Table 9.

Caterpillars - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Diamondback Moth	Controls	0%	0%	0%	0%	0%	0%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
	Garden Safe Houseplant & Garden	0%	100%	80%	80%	97%	100%
	EcoSmart Home Pest	0%	100%	83%	90%	100%	100%
	essentria™ IC3 Insecticide	0%	100%	93%	93%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Beet Armyworm	Controls	0%	0%	0%	0%	0%	20%
	012813-3-A-SNE	0%	97%	100%	100%	100%	100%
	Garden Safe Houseplant & Garden	0%	97%	100%	100%	100%	100%
	EcoSmart Home Pest	0%	93%	97%	97%	100%	100%
	essentria™ IC3 Insecticide	0%	93%	93%	93%	100%	100%

Table 10.

Wasp/Hornet - Average % Mortality							
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Bald Faced Hornet	Controls	0%	0%	0%	0%	0%	7%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%
Test System:	Test Sub.	Pre-trt	30 min	1 hr	2 hr	4 hr	24 hr
Yellow Jacket	Controls	0%	0%	0%	0%	0%	13%
	012813-3-A-SNE	0%	100%	100%	100%	100%	100%

Table 11.

Rabbit Ear Mites - AVG # Days for Mite Control		
Test System:	Test Sub.	Avg Days for Mite Control
Rabbit Ear Mite	Controls	NA-Control Not Achieved
	012813-3-A-SNE	7
Rabbit Ear Mites - Average # Days for Significant Crust Reduction		
Test System:	Test Sub.	Avg Days for Significant Crust Reduction
Rabbit Ear Mite	Controls	NA-Reduction Not Achieved
	012813-3-A-SNE	7

APPENDIX A: PHOTOGRAPHS

Photograph 1. Example of Trigger Sprayer used for Applications



Photograph 2. Example of Bed Bugs in Post-Treatment Arenas



Photograph 3. Example of CPVC Mesh Cartridge w/ German Cockroaches



Photograph 4. Brown Dog Ticks during Sorting



Photograph 5. Blue Bottle Flies in Rearing Container



Photograph 6. Example of Mosquitoes in Post-Treatment Arena



Photograph 7. Example of an Infested Rabbit's Ear with Ear Crusts



Photograph 8. Example of a Rabbits Ear 7 Days after Treatment with 012813-3-A-SNE

