COMPLETED AND ONGOING RESEARCH FOR THE CALENDAR YEAR 2008-2009

INSECT CONTROL

EFFICACY OF COMMERCIAL MITICIDES IN THE CURATIVE CONTROL OF ALOE MITE (*Eriophyes aloinis* KEIFER)

Background

Among the 500 or so varieties of Aloe plants worldwide many are grown in production nurseries as an attractive ornamental plant that is in ever-increasing demand due to its low maintenance and drought tolerance. Aloes are tolerant of most insect pests, but mealybugs, scale insects and aphid species are occasionally observed. The Aloe mite, *Eriophyes aloinis* (Keifer), however, affects a wide array of ornamental Aloe species and causes severe damage. The Aloe mite causes tumor-like growths on Aloe and is commonly referred to as Aloe cancer. The development of this deformed tissue makes Aloe plants aesthetically unappealing and non-saleable, and unfortunately, the damage is irreversible. The only curative solution is the removal of the infected plant parts, which is also necessary to prevent further spread of the mite. Although there is a wide array of chemicals available for mite control, there is no information on the efficacy of any of the commercially available chemicals on the control of *E. aloinis*. At present, management practices lead to significant losses and to a wait and see approach to control. It is critical to know which miticides are most effective against the pest and whether curative or preventative approaches will be the best practice. The knowledge in this area will be useful to growers of Aloe species as ornamental plants, to landscapers and indirectly, to the consumer and public in general.

Objective:

- Evaluate the number of live adults of Aloe mite (*Eriophyes aloinis* Keifer) after treatment with selected commercial miticides.

Materials and Methods

Host Plants and Mites: Infected plants of *Aloe reitzii* Reynolds were obtained from a local grower. Plants were growing in one-gallon containers. Plants were placed outdoors under full sun, watered manually as needed and fertilized with 200ppm N of 15-5-15 every two weeks.

Experimental Design and Sampling:

A completely randomized design with 5 replicates per treatment was used in this study. The presence of mites was verified by detaching a leaf with recent signs of mite attack from 9 plants and counting the number of adults and eggs present in an area of 17.72 mm^2. The number of live and dead adults was counted again two weeks after treatment application. Plants were categorized according to the degree of damage caused by the mite in a scale of 1, slight damage to 5, severe damage with galls (Figure 1).

Pesticide Treatment Applications and Rates:

Table 1 shows the chemicals studied. Treatment applications were made using a Flowmaster Model 1101HD 1 gallon sprayer with an adjustable spray pattern nozzle. Plants were sprayed until runoff. Control plants were sprayed with water. Capsil at 6 oz/100 gallons was applied with all treatments.

Table 1. Registered miticides to be used in trials.

Common name	Trade Name	Formulation	Rate	Eriophyid Efficacy
Bifenthrin	Talstar	NF	43.5fl.oz./100 gallons	Spider and Broad mites
Spirotetramat	Kontos	SC	3.4fl.oz./100 gallons	yes
Milbemectin	Ultiflora	EC	16fl.oz./100 gallons	yes
Fenthropathrin	Tame	2.4EC	16fl.oz./100 gallons	Spider mites only
Hexythiazox	Hexygon	DF	2fl.oz./100 gallons	Spider mites only

Pyridaben	Sanmite	75%	4fl.oz./100 gallons	Spider mites only
Chlofenapyr	Pylon	21.40%	5.2fl.oz./100 gallons	yes
Acequinocil	Shuttle	15SC	0.46liters/500 liters	Spider mites only
Etoxazole	TetraSan	5WDG	16fl.oz./100 gallons	Spider mites only
Spiromesifen	Judo	45.20%SC	4 fl.oz./100 gallons	yes
GH=Greenhouse, SH=Shadehouse, N=Nursery				

Statistical Analysis: A logarithmic transformation was applied to all variables prior to analysis to satisfy the assumptions of analysis of variance. Data was analyzed using JMP version 8.0 and Student's t-test (p=0.05) was used to separate means.

Preliminary Results

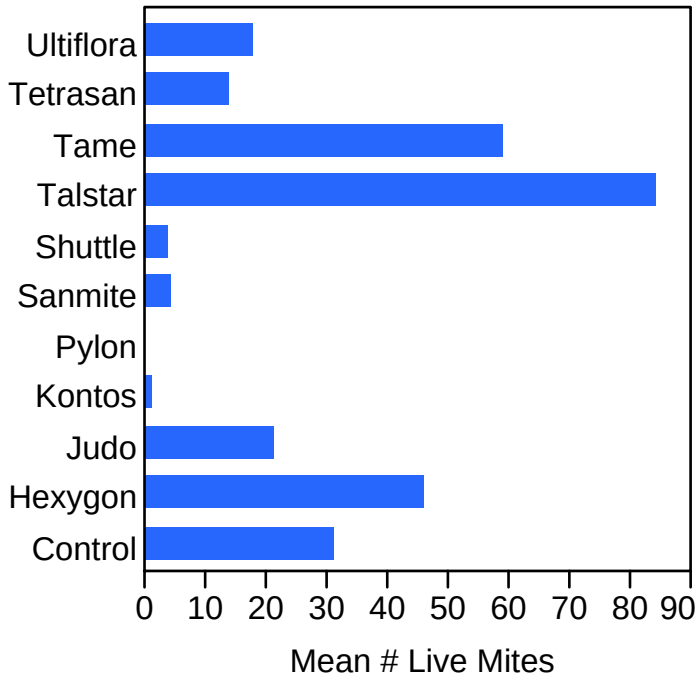
No significant differences were found among treatments due to the high variability among samples treated alike. However, two products, Kontos and Judo, reduced the number of live mites counted on leaves two weeks after treatment (Figure 2).

Future Research

- Continued studies on miticide efficacy
- Preventative control of Aloe mite
    - Application of chemicals before infection to determine efficacy and length of protection.

Figure 1. *Aloe reitzii* with Aloe mite damage on a scale from 1 (slight damage) to 5 (severe damage, galls present).

Figure 2. Mean number of live adult mites in a 17.72 mm^2 area in young leaves of *Aloe reitzii* two weeks after treatment application



EFFICACY OF AN EXPERIMENTAL INSECTICIDEAGAINST THE SWEETPOTATO WHITEFLY, *Bemisia tabaci*, ON GERBERA DAISY (*Gerbera jamesonii* L.) UNDER GREENHOUSE CONDITIONS

Bryan Vander Mey, Staff Research Associate
James A. Bethke, Floriculture and Nursery Farm Advisor, San Diego County
University of California Cooperative Extension

Objective:

- Determine the efficacy of various pesticides against the sweetpotato whitefly, *Bemisia tabaci*.

Materials and Methods

Host Plant and Insects: Gerberas 'Revolution Salmon', were obtained from a local grower. Plants were placed on raised slat benches in a climate controlled greenhouse at ambient relative humidity and light. The plants were fertilized using a liquid 20-20-20 mix and irrigated every other day. Sweetpotato whitefly were collected from a colony maintained on Poinsettia at the Center for Applied Horticultural Research.

Experimental Design and Sampling: On day (0), 10-15 whiteflies were clip-caged on the underside of a leaf. A circle was drawn around the cage (2.5 cm diameter) with a permanent marker to mark the spot of exposure. Following egg eclosion (9-10 days) the number of instar nymphs was recorded. A randomized complete block design with three single replicate blocks per treatment was used in this study. Efficacy was assessed 15 days after treatment, following complete adult emergence from all plants.

Statistical Analysis:

Data for percent mortality were transformed Arcsine√x prior to analysis to satisfy the assumptions of analysis of variance. Analysis of variance was performed on the data using Proc GLM (SAS version 9.1). Following a significant treatment effect, means were separated by Fisher's least significant difference (α = 0.05).

Pesticide Treatment Applications and Rates:

Gowan-1708 T&O was compared to Sanmite for white fly control. The selected grower standard was Avid and controls were treated with water only. Treatment applications were made using a Flowmaster Model 1101HD 1 gallon sprayer with an adjustable spray pattern nozzle. Plants were sprayed until runoff. Treatments were:

- GWN-1708 T&O @ 12 oz/100
- GWN-1708 T&O @ 18 oz/100
- GWN-1708 T&O @ 24 oz/100
- Sanmite @ 4 oz/100
- Sanmite @ 6 oz/100
- Avid (Grower Standard)
- Untreated Check

Results

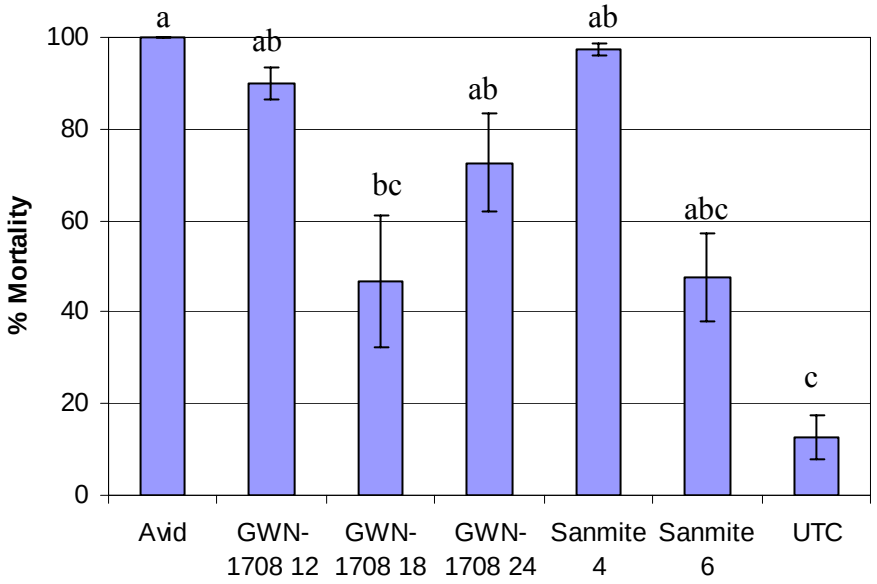
All treatments were evaluated for residue, Sanmite at 6 fl oz left a slight, powdery residue on the leaves of all plants treated, the rest of the treatments left no residue.

GWN-1708 at all levels caused similar nymph mortality (Figure 1). Sanmite at all levels studied provided similar nymph mortality. Avid, Sanmite at 4fl oz and GWN-1708 at 12 and 24 fl oz and Sanmite at 4 fl oz caused significantly higher nymph mortality than that observed in the untreated control. However, nymph mortality in plants treated with GWN-1708 at 18 fl oz and Sanmite at 6 fl oz was similar to that seen in the untreated control (Figure 1). Sanmite at 4 fl. oz. and Avid at 15.5 fl. oz. resulted in 97.5% and 100% mortality respectively, Gowan 17-08 at 12 fl oz resulted in 90% mortality. Avid was significantly better than the control and GWN-1708 at 18 fl. oz. but as effective as GWN 1708 at 12 and 24 fl oz (Figure 1). The high variation observed between samples treated alike makes it difficult to establish significant

differences among the treatments; Gerbera plants were leafy and coverage might have been an issue in areas of the plants where leaves overlapped. Based on this data, Chemicals can be ranked based on the mortality of nymphs caused as follows:

- Avid, Sanmite at 4 fl oz and GWN-1708 at 12 fl oz. Good control
- GNW-1708 at 24 fl oz, less effective than the previous group but not statistically different
- GNW-1708 at 18 fl oz, Sanmite at 6 fl oz and untreated control. No statistical difference and no effective control.

Figure 1. Mean (± SE) nymph mortality in Gerbera daisies treated with selected insecticides. Bars followed by different letters are significantly different (p=0.05). Treatments (x-axis) were Avid, GWN-1708 at 12, 18 and 24 fl oz, Sanmite at 4 and 6 fl oz and Untreated Control (UTC).



Conclusions

- Avid, Sanmite at 4 fl oz and GWN-1708 provided excellent control of whitefly nymphs. GWN-1708 at 24 fl oz although not statistically different from the most effective treatments, was less effective in killing white fly nymphs.
- GWN-1708 and Sanmite at 6 fl oz were not effective controlling white fly nymphs.

EFFICACY OF SELECTED CHEMICALS AGAINST THE SWEETPOTATO WHITEFLY, *Bemisia tabaci,* ON GERBERA UNDER GREENHOUSE CONDITIONS

Bryan Vander Mey, Staff Research Associate
James A. Bethke, Floriculture and Nursery Farm Advisor, San Diego County
University of California Cooperative Extension

Objective:

- Determine the efficacy of various pesticides against the sweetpotato whitefly, *Bemisia tabaci*, from the Mediterranean region.

MATERIALS AND METHODS

Host Plant and Insects: Gerberas cv. 'Revolution Salmon' obtained from Altman Plants in Vista, were used for this trial. Plants were placed on raised slat benches in a greenhouse, ambient relative humidity and light. The plants were fertilized using a liquid 20-20-20 mix and irrigated every other day. The sweetpotato whitefly was collected from a colony maintained at the Center for Applied Horticultural Research.

Experimental Design and Sampling: On day (0), 10-15 whiteflies were clip-caged on the underside of a leaf. A circle was drawn around the cage (2.5 cm diameter) with a permanent marker to mark the spot of exposure. Following egg eclosion (6 days) the number of instar nymphs was recorded on 10-14-09. A randomized complete block design with three single replicate blocks per treatment was used in this study. Efficacy was assessed on 10-25-09 (8 days after application) following complete adult emergence from all plants.

Statistical Analysis: An ANOVA (SAS, GLM procedure) was used to analyze the data. Following a significant treatment effect, means were separated by Fisher's least significant difference ($\alpha = 0.05$).

Pesticide Treatment Applications and Rates:

Foliar Applications	Common Name	Rate per 100 gallons
F7954	Bifenthrin 8.7% + Abamectin 1.3%	21 ozs.
Talstar Pro	Bifenhrin 7.9%	23.85 ozs.
Sanmite	paridaben 75%	4 ozs.
Sanmite	paridaben 75%	6 ozs.
Avid	Abamectin 2.0%	15.5 ozs.
UTC	***	***

Controls were treated with water only. The application occurred on September 17, 2009. Half gallon tank mixes were used. Treatment applications were made using a Flowmaster Model 1101HD 1 gallon sprayer with an adjustable spray pattern nozzle. Plants were sprayed until runoff.

RESULTS

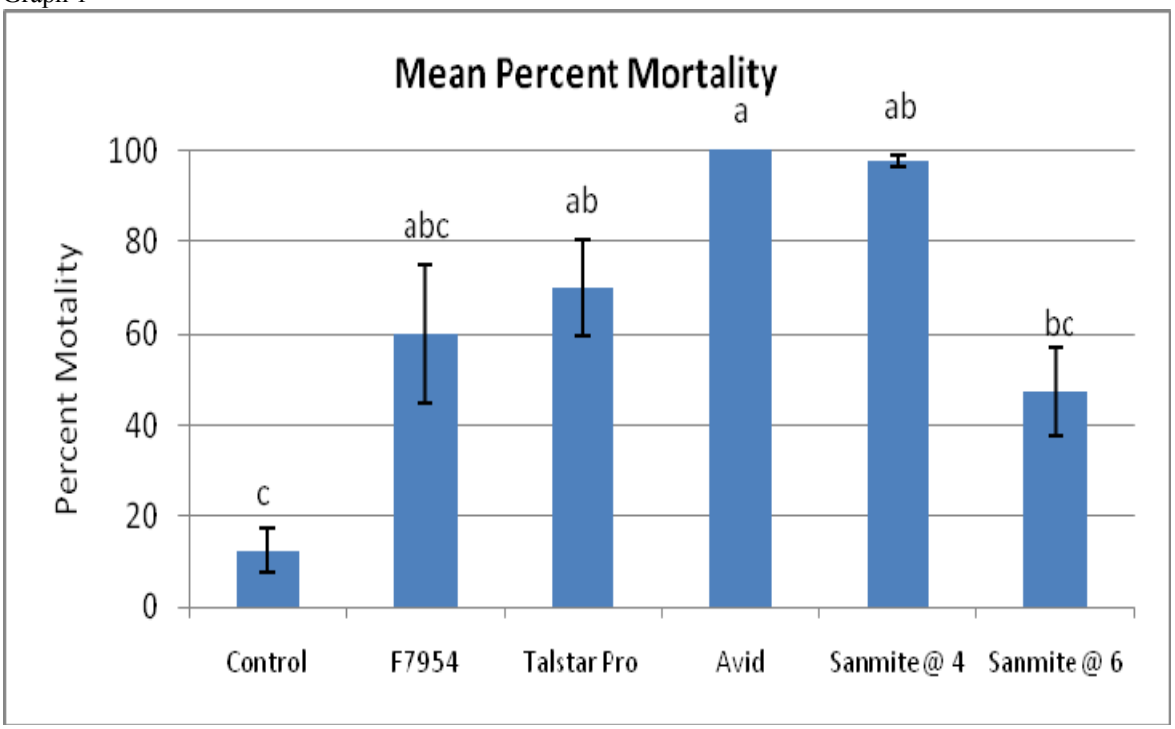
Sanmite at 4 fluid ounces and Avid at 15.5 fluid ounces resulted in 97.5% and 100% mortality respectively. Avid was significantly better than the control. Data is shown in Table 1 and shown in Graph 1.

Table 1

Treatment	Mean number of live nymphs Pre-treatment	Mean percent mortality Post- treatment
Control	21.8 a	12.5 ± 9.5 c
Avid	26.3 a	100.0 ± 0.0 a
Sanmite @ 4	16.5 a	97.5 ± 2.5 ab
Sanmite @ 6	19.5 a	47.5 ± 19.3 abc
F7954	24.0 a	60.0 ± 30.0 abc
Talstar Pro	30.3 a	70.0 ± 20.8 ab

pre-treatment (F = 0.54; df = 8,19; P = 0.8107
post-treatment (F = 3.39; df = 8,19; P = 0.0137
Data for percent mortality were transformed Arcsine√x prior to analysis to satisfy the assumptions of ANOVA.

Graph 1



EFFICACY OF DIFFERENT CHEMICALS AGAINST THE CITRUS MEALYBUG, (*Planococcus citri*), ON MARANTA UNDER GREENHOUSE CONDITIONS

Bryan Vander Mey, Staff Research Associate
James A. Bethke, Floriculture and Nursery Farm Advisor, San Diego County
University of California Cooperative Extension

Host Plant: Maranta cv. unknown
Target Pest: Citrus Mealybug, *Planococcus citri* (Risso)

Objective:

- Determine the efficacy of various pesticides against the Citrus Mealybug, an invasive pest that affects growth.

Materials and Methods

Host Plant and Insects: Maranta plants were obtained in 4-inch pots from an unknown source. Plants were placed on raised slat benches in a greenhouse, ambient relative humidity and light. The plants were irrigated every other day.

Experimental Design and Sampling: Mealybugs were allowed to infest the Maranta. Once a suitable population was established, a pre-application assessment was done. Populations were measured by selecting one leaf and counting the number of adults and instars on both sides of the leaf. The individual leaves were marked using a twist tie. The pre-application evaluation took place on November 4, 2009. A randomized complete block design with four single replicate blocks per treatment was used in this study. Post application evaluations occurred on November 6 & 10, 2009.

Statistical Analysis: An ANOVA (SAS, GLM procedure) was used to analyze the data. Following a significant treatment effect, means were separated by Fisher's least significant difference ($\alpha = 0.05$). Data was transformed using the log function.

Pesticide Treatment Applications and Rates:
The application took place on November 4, 2009. Controls were treated with water only. Treatment applications were made using a Flowmaster Model 1101HD 1 gallon sprayer with an adjustable spray pattern nozzle. Plants were sprayed until runoff.

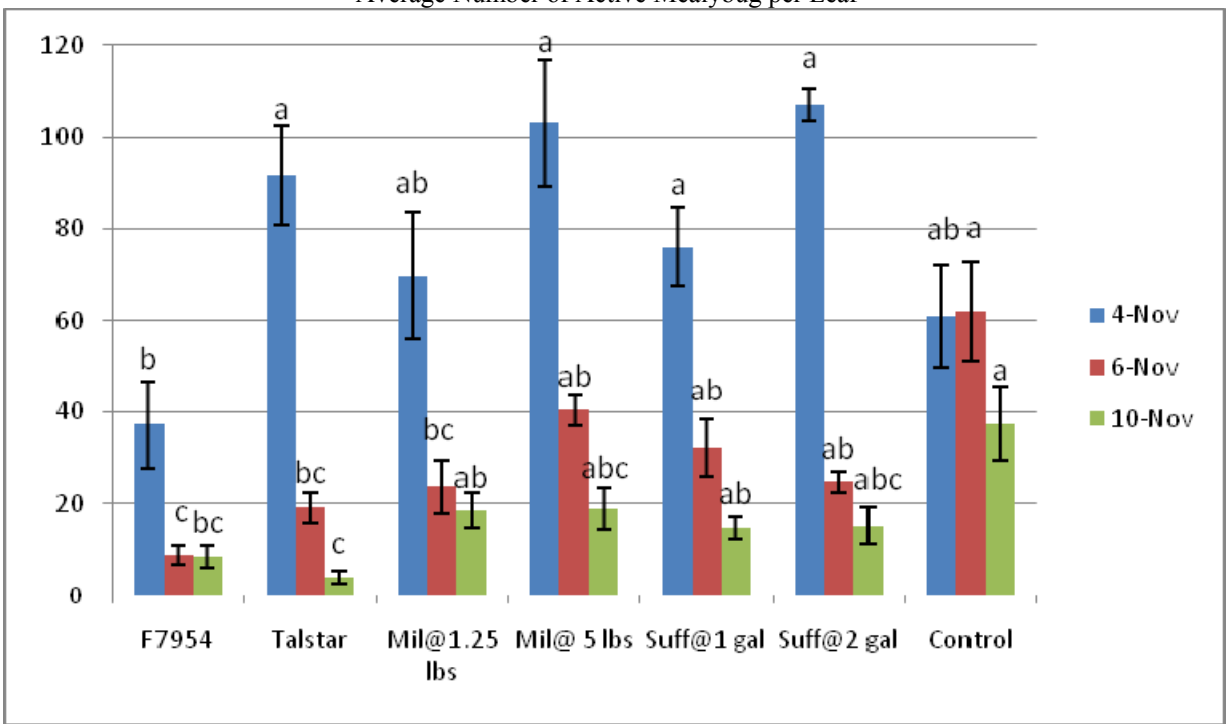
Foliar Applications	Common Name	Rate per 100 gallons
FMC F7954	Bifenthrin 8.7% + Abamectin 1.3%	21 ozs.
Talstar Pro	Bifenthrin 7.9%	23.85 ozs.
Milstop	Potassium Bicarbonate 85%	1.25 lbs.
Milstop	Potassium Bicarbonate 85%	5.0 lbs.
SuffOil-X	Petroleum Oil 80%	1 gal.
SuffOil-X	Petroleum Oil 80%	2 gal.
Control	***	***

Results

FMC products F7954 and Talstar Pro statistically reduced the number of mealybug below that of the control. All other products did lower the numbers but not to the degree that F7954 and Talstar did. See Graph 1 for results.

Graph 1

Average Number of Active Mealybug per Leaf



Staistical Analysis

Evaluation Date	F-value	DF	P
November 4	2.33	6,18	0.0227
November 6	3.30	6,18	0.0765
November 10	2.68	6,18	0.0488

EFFICACY OF AZAHAR™ INSECTICIDE TO CONTROL FUNGUS GNAT (*Bradysia coprophila* Lintner) ON CELOSIA (*Celosia plumosa* L.) UNDER GREENHOUSE CONDITIONS

Objective:

- Determine the efficacy of Azahar™ on the control of fungus gnat adults and larvae.

Materials and Methods

Host Plant and Insects:

Celosia 'Kimono Mix' plugs were obtained from a local grower. Plugs were planted in containers 14 cm in diameter and 1.34 quarts (1268.11 cm3) capacity. The medium used was Sunshine Mix # 1 (78% peat 22% perlite, Sun Gro Horticulture, Bellevue, WA) with 5 lbs per cubic yard of slow release fertilizer. Plants were placed on raised slat benches in a climate controlled greenhouse at ambient relative humidity and light. The fungus gnats were collected from infested Poinsettia plants by placing squares of potato tubers approximately 2x2x0.3 cm in the medium for a week and then placing one square in each one of the 32 pots planted with Celosia plants.

Experimental Design and Sampling:

A completely randomized design with 8 replicates per treatment was used in this study. The fungus gnats were allowed to establish for 4 weeks, an initial count of larvae was done by placing potato tuber pieces of approximately 2x2x0.3 cm in each pot. Five days after placing the tubers, they were removed and taken to the laboratory, fungus gnat larvae present on both sides of the tuber square were counted with a Bausch & Lomb stereoscope. An initial count of fungus gnat adults was assessed by placing 3x10cm yellow sticky card strips on the surface of each pot and then placing each plant in a brown bag. Five days after bagging, the plants were removed from the bags and the sticky cards removed; the number of fungus gnat adults in each sticky card was counted by using a stereoscope. Insecticide efficacy was assessed 7 days after the last treatment application by counting the number of larvae in squares of potato tubers as previously described. The plants aspect was rated in a scale of 1, plants with no damage, to 5, severely affected plants. The shoots of the plants were severed at the soil surface and a dry weight taken by placing them in an oven at 58 ºC for 2 days. The number of fungus gnat adults was assessed as previously described 14 days after bagging. Roots were washed 14 days after bagging and rated on a scale of 1 (completely dead) to 8 (roots with no damage), root dry weight was recorded as previously described. A group of Celosia plants was kept in a separate area of the greenhouse, these plants were not infested with fungus gnats and were used as a healthy control group, dry weight of roots and shoots and root rating was also measured in these plants.

Pesticide Treatment Applications and Rates:

Azahar was compared to Safari (grower standard). Control plants were treated with water only. Treatment applications were made using a Flowmaster Model 1101HD 1 gallon sprayer with an adjustable spray pattern nozzle. Plants were sprayed until runoff. Azahar was applied three times at 10 days intervals. Safari was applied once.

Treatments were:

- Azahar at 0.2%
- Azahar at 0.4%
- Safari at 16fl. oz. per 100 gallons (Grower standard)
- Untreated Check

Statistical Analysis:

A logarithmic transformation was applied to all variables prior to analysis to satisfy the assumptions of analysis of variance. Data was analyzed using SAS version 9.1 (SAS Systems) Proc GLM and was used to do the analysis of variance. The Kruskal-Wallis chi-square test was used to test for significance of the plant and root rating values. Following a significant treatment effect, means were separated using Student's t-test ($\alpha = 0.05$ and 0.1).

Results

Azahar at 0.2 and 0.4% was not effective to control adult fungus gnats, Safari at 16 fl. oz. provided the best control of adults and larvae (Figure 1). Azahar at 0.2% was not effective to control fungus gnat larvae, the counts of larvae were similar to the counts in the control group. Azahar at 0.4% provided better control of fungus gnat larvae than at 0.2% and it was significantly better than the control group, but not as effective as Safari (Figure 1). Fungus gnat attack severity based on plant aspect was assessed on a scale of 1 to 5 seven days after the last treatment application (Figure 2). There were no significant differences between the treatments (Figure 3), plants with no fungus gnats scored significantly lower degree of damage (aspect) than infested plants. Shoot dry weight was, as expected, highest in the group with no fungus gnats (Figure 4). Plants treated with Azahar at 0.4% has heavier shoots than plants treated with Safari but none of the treatments were significantly different to the control (no chemical application) group. Root dry weight was highest in plants with no fungus gnats, but it was the same in the rest of the treatments; indicating that all plants had been equally affected by fungus gnats (Figure 4). The degree of root damage was rated in a scale of 1 (dead roots) to 8 (no damage) and it was the same among insecticide treated plants; which had significantly less damage than the control group. Healthy plants had well developed root systems that were significantly better than the roots of the fungus gnat infested plants (Figure 5). The scale used for root rating can be seen in figure 6, while Figure 7 shows a sample of the roots of treated plants.

Conclusions

- Safari provided the best adult and larvae fungus gnat control
- Azahar did not provide effective control of adult fungus gnats at any of the rates applied
- Azahar at 0.4% provided moderate control of fungus gnats larvae
- Plant and root growth was severely affected by fungus gnats. Insecticide treated plants had roots that were less affected by gnats than the control but still had considerable damage from the infection.
- Since Azahar at 0.4% had significantly lower fungus gnat larvae counts than the control, Azahar at higher application rates might provide better control of fungus gnats than observed in this study.

Figure 1. Mean (± SE) number of fungus gnat adults and larvae in Celosia plants treated with selected insecticides. Bars followed by different letters are significantly different (p=0.05).

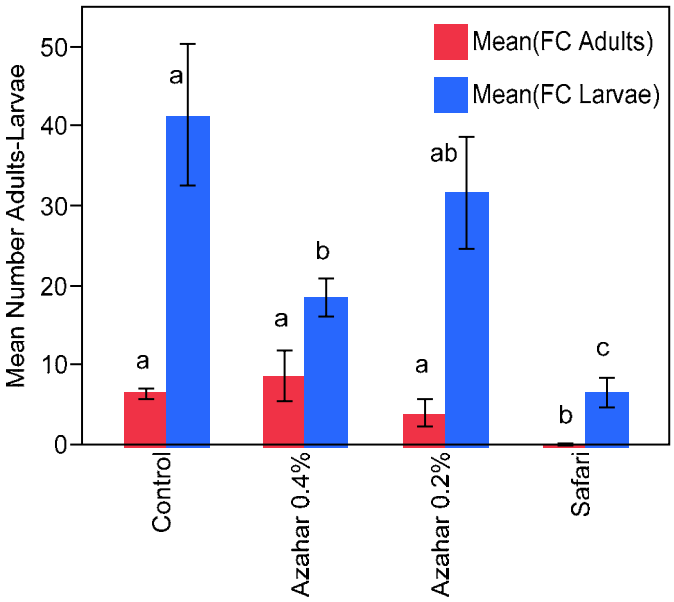


Figure 2. Plant aspect 7 days after the last treatment application. The plants are representative of the scale used to quantify damage ranging from 1, no symptoms of attack, to 5, plant severely affected.

Figure 3. Mean (± SE) aspect ratings of Celosia plants treated with selected insecticides, water (control) and with no gnat infection (no gnats). The scale (y-axis) used varied from 1, plants with no damage, to 5, severely affected plants. Bars followed by different letters are significantly different (p=0.1).

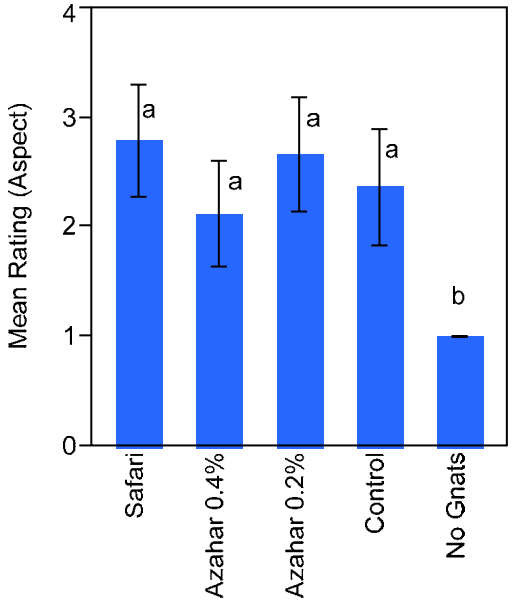


Figure 4. Mean (± SE) shoot (SDW) and root (RDW) dry weight of Celosia plants treated with selected insecticides, water (control) and with no gnat infection (no gnats). Bars followed by different letters are significantly different (p=0.05).

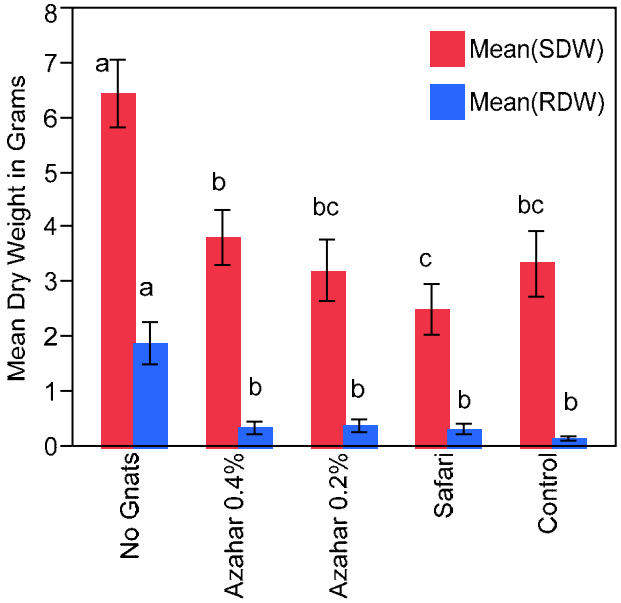


Figure 5. Mean (± SE) root ratings of Celosia plants treated with selected insecticides, water (control) and with no gnat infection (no gnats). The scale (y-axis) used varied from 1, root severely affected to 8, no symptoms of attack. Bars followed by different letters are significantly different (p=0.05).

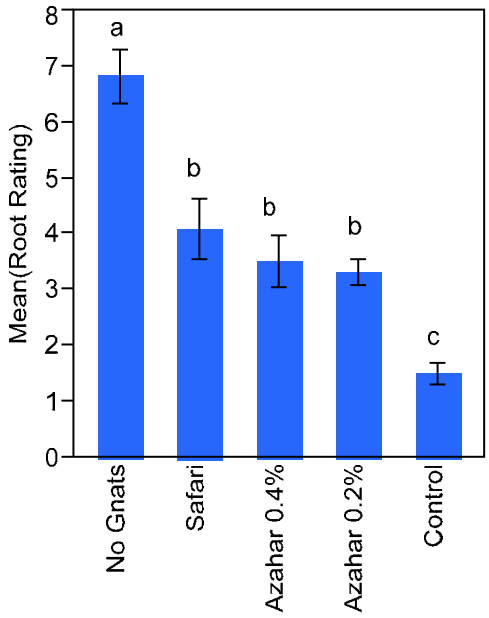
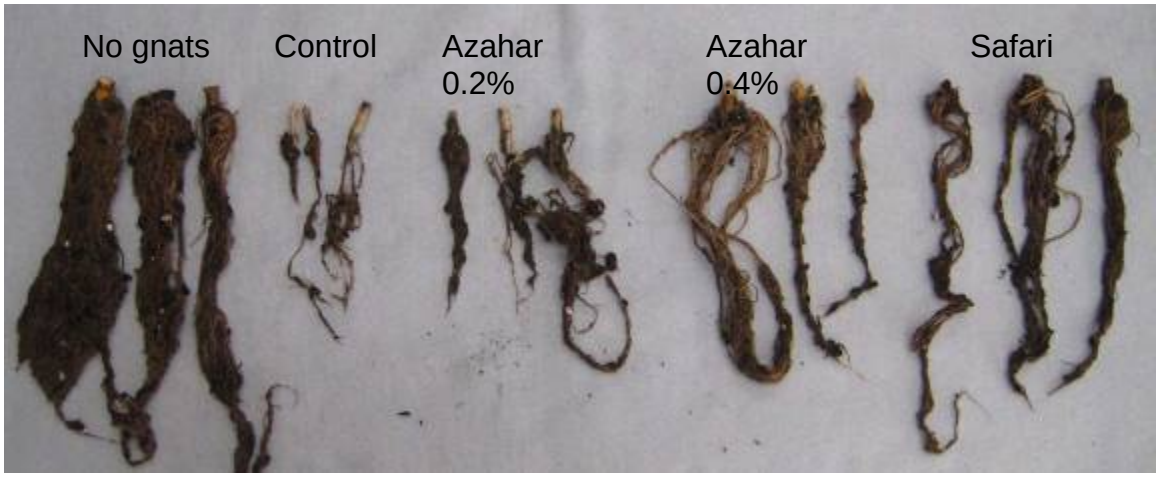


Figure 6. Root rating scale used to quantify damage; the values represent ranking from 1, root severely affected to 8, no symptoms of attack.

Figure 7. Sample of plant roots 7 days after last treatment application.



EFFECTS OF SILICON BASED MEDIA ADDITIVES ON THE UPTAKE AND ASSIMILATION OF SILICON IN HOST PLANT TISSUE

Bryan Vander Mey, Staff Research Associate
James A. Bethke, Floriculture and Nursery Farm Advisor, San Diego County
University of California Cooperative Extension

Host Plant: *Verbena peruviana* cv. Tem Patio Rose

Target Pest: Sweet Potato Whitefly *Bemisia tabaci* Gennadius

Objectives:

- Implement demonstration sites at four locations in California incorporating silicon into the fertilizer mix to increase bedding plant resistance to arthropod and disease pests, thus increasing the tolerance of plants to pest damage and to reduce overall pest population development. This should result in fewer pesticide applications.

- B. Extend project results and information concerning proper IPM practices to growers of bedding plants and propagation materials to increase their implementation of project findings and other IPM practices.

Materials & Methods

Treatment List

Treatment	Formulation	Rate
100 SGN	Granular	2.8 grams/pot
Baghouse Dust	Granular	2.8 grams/pot
Pro-Tekt	Liquid	300 ppm/ irrigation
UTC	---	---

Irrigation Set-up- Coming off the water supply, a Tee was connected. One route delivered clean water to three treatments. The other route was connected to a Dosatron chemical injector which delivered the liquid product. Each treatment contained of 50 pots each. Treatment 1 was a solid formulation of silicon (the product was labeled 100 SGN). This product is a grey granular material much like sand. Treatment 2 was also a solid labeled Baghouse Dust. This product is also grey but finer in texture and has a distinctive odor. Both these products were measured at 2.8 grams per pot. Treatment 3 was the liquid product Pro-Tekt which was applied at 300ppm per watering event. Treatment 4 was an untreated control that received only untreated water.

The irrigation system was calibrated on Friday, February 20, 2009. Lead weight emitters were connected to each pot. Twelve points (3 per line) were used to collect water. Amount was measured using a 500 ml graduated cylinder. These emitters put out 135 ml per minute. Pro-Tekt was calculated to use 2 ml per irrigation per 50 plants. The Dosatron was calibrated to deliver 8 ml per irrigation. A solution of 1 part Pro-Tekt and 3 parts water was made in a gallon container to deliver the required 2 ml per irrigation. Irrigations were programmed to occur once every 3 days for one minute.

Granular soil incorporation- Granular silicon was weighed using an Ohaus scale measured to the thousandth. Accuracy was within plus or minus 0.01. Dry potting soil (SunGro Horticultural Compressed Peet Moss; 60/40 mix) was added to 6-inch pots at a pre-determined level. This soil was then poured into a Ziploc bag. The contents of the granular silicon was added to the bag and shaken to mix the soil and silicon. The soil was then poured back into the pots. The same procedure (minus the silicon incorporation) was used for the control and Pro-Tekt treatments. All treatments were then watered to dampen the soil. One plug was then planted in each pot. Planting occurred on February 24, 2009. Greenhouse temperatures were programmed to be between 65^{o}F and 80^{o}F. Photos were taken to document the procedure.

Sampling Procedure

Starting with the control, plants were chosen at random in three groups of five. The stems were cut at soil level and the leaves were pulled from the stems and placed into a brown paper bag (one bag each

for the stems and leaves). Each bag contained the plant parts of five plants. The soil and roots were first loosened over a trash can. Then they were placed in a bucket of water and massaged to remove a majority of the soil from the root mass. A hose was then used to rinse the remaining debris away. The root masses were then submerged in a bucket of distilled water and were allowed to soak at least 15 minutes. From there, they were put on drying racks. All samples were allowed to air dry in the greenhouse for 48 hours. Sample order was: Control, Baghouse Dust, 100 SGN and Pro-TeKt. The rinsing bucket, distilled water and latex gloves were changed between each treatment. After 48 hours, the root samples were placed in paper bags and all samples were taped shut. Paper bags were labeled with a Sharpie with the sample number and sample date. The paper bags were put in a box and shipping to ANR Analytical Lab at UC Davis for silicon analysis. The first samples were taken on March 24, 2009. The two month samples were taken on April 27 and the three month samples taken on May 27, 2009.

The five remaining plants from each treatment were subject to sweet potato whitefly (*Bemisia Tabaci*) for 32 days. After that period, the number of instars was counted on 10 leaves. The first count took place on July 1 and the second on July 14, 2009.

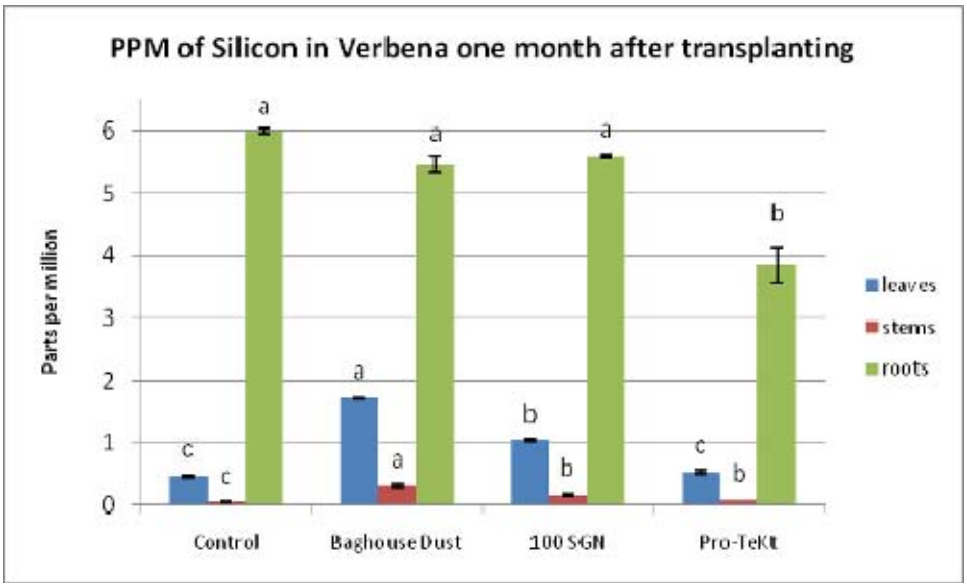
Discussion

Results from the one month sampling (3/24/09) are as follows as received from the lab in. Averages of parts per million of silicon presented in Table 1 and shown in Graph 1.

Table 1

Treatment	Leaves	Stems	Roots
Control	0.46	0.05	6.00
Baghouse Dust	1.72	0.32	5.44
100 SGN	1.04	0.16	5.58
Pro-TeKt	0.54	0.08	3.84

Graph 1



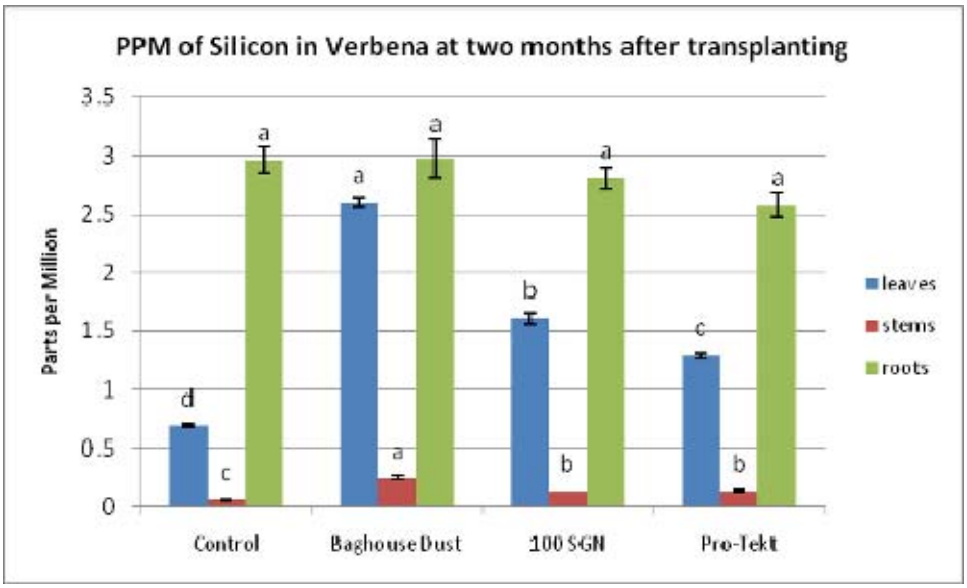
Bars of the same color followed by different letters are significantly different, P=0.05

Results from two month sample (4/27/09) in Table 2 and shown in Graph 2.

Table 2

	Leaves	Stems	Roots
Control	0.69	0.06	2.96
Baghouse Dust	2.60	0.24	2.97
100 SGN	1.61	0.13	2.80
Pro-Tekt	1.29	0.13	2.58

Graph 2



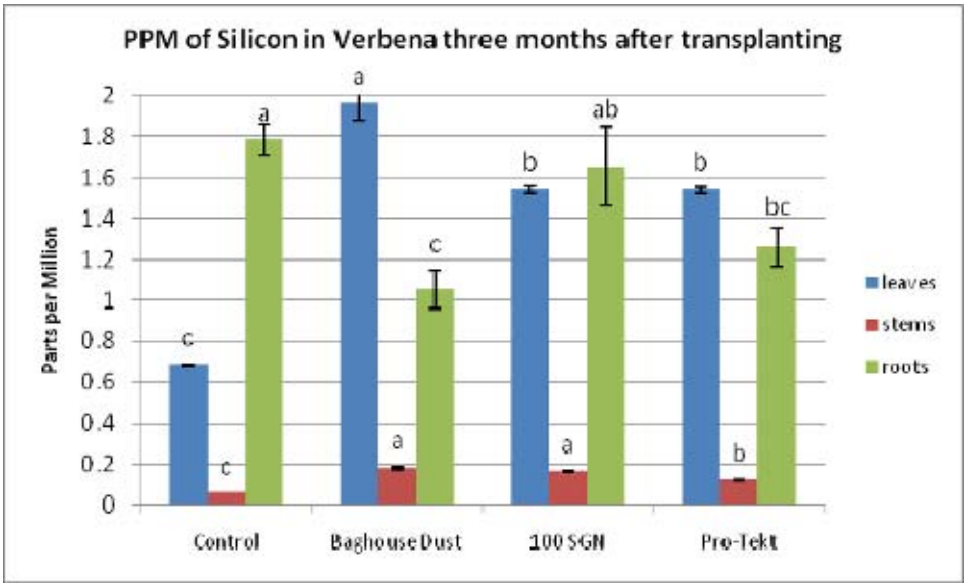
Bars of the same color followed by different letters are significantly different, P=0.05

Results from three month sample (5/27/09) in Table 3 shown in Graph 3.

Table 3

	Leaves	Stems	Roots
Control	0.68	0.06	1.78
Baghouse Dust	1.96	0.18	1.05
100 SGN	1.54	0.16	1.65
Pro-Tekt	1.54	0.12	1.26

Graph 3



Bars of the same color followed by different letters are significantly different, P=0.05

Statistical Analysis

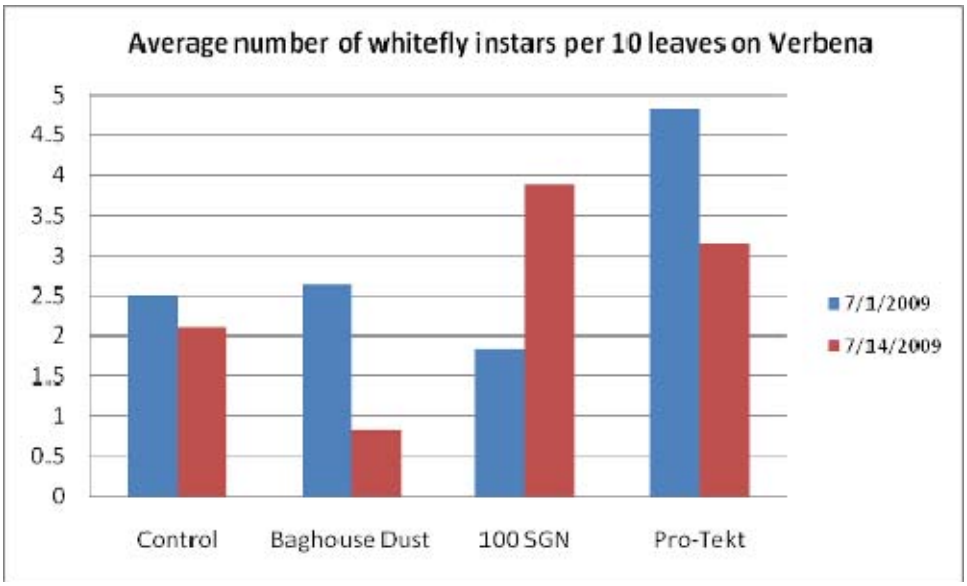
		F Value	df	P
	Leaves	168.24	3,6	< .0001
1 month	Stems	18.38	3,6	0.002
	Roots	12.38	3,6	0.006
	Leaves	184.87	3,6	< .0001
2 months	Stems	23.85	3,6	0.001
	Roots	0.46	3,6	.7201
	Leaves	35.63	3,6	0.0003
3 months	Stems	39.44	3,6	0.0002
	Roots	5.08	3,6	0.0437

Results

Results from tissue analysis show that silicon is translocated to the stems and leaves. Root concentrations deminish over time while leaf concentrations gradually climb. Stem concentrations seemed to peak and level out at the two month sampling. Baghouse Dust seems to be more readily absorbed than the other products. That may be due to it's fine powdery composition.

When these plants were exposed to sweet potato whitefly, the products showed little to no effect in repelling the insect from laying eggs and developing on the plants. The following graph (4) shows the average number of whitefly nymphs per 10 leaves. Baghouse Dust showed a little activity as compared to the control.

Graph 4



BIOLOGY AND GALL FORMATION OF *Klambothrips myopori, Myoporum* THRIPS ON *Myoporum laetum*

I. *Myoporum* THRIPS DAMAGE ASSESSMENT ON *Myoporum* 'PACIFICUM'

Bryan Vander Mey, Staff Research Associate
James A. Bethke, Floriculture and Nursery Farm Advisor, San Diego County
University of California Cooperative Extension

Host Plant: *Myoporum 'Pacificum'*, (Myoporaceae)

Target Pest: *Klambothrips myopori*, (Mound and Morris) Myoporum thrips

Objective:

- Assess length of time and amount of damage for varying numbers of adult thrips to do damage to terminal tip of Myoporum "Pacificum" as well as how long the plant takes to recover from feeding damage.

Materials and Methods

Host Plant and Insects: Myoporum "Pacificum" tip cuttings, obtained from landscape plantings in Rancho Bernardo and San Marcos were placed in cages constructed from 40 dram vials (Onlinesciencemall, Birmingham, AL) with fabric netting providing air (Mono 13562, McLogan Supply Co, Inc. Anaheim, CA). One vial was used as a base for water; plastic lids were stapled together and a hole punched for the stems. The stems were wrapped in cotton gauze for stability. The cuttings were treated with a rooting hormone at a rate of .50 grams per 750 ml water (Schultz Take Root, Spectrum Brands,). Lighting is ambient, and heat approximately 80-95 degrees F. The cuttings were watered as needed by hand. The cuttings were replaced if they died. After eight weeks the cuttings were planted in soil and placed in a rooting chamber to grow new terminal ends. Insects were collected from galls found in *Myoporum laetum* and Myoporum "Pacificum" growing locally in Rancho Bernardo and San Marcos landscape and roadside plantings.

Experimental Design and Sampling: Ten cuttings were used for each treatment of thrips. On day (0), Myoporum thrips were placed on the terminal end of the Myoporum cuttings at the following rates: control: 0, 1, 2, 4, and 8 thrips per cutting. If the thrips expired, more were added to the plant. Every week for eight weeks the cuttings were rated for damage to the tip of the cutting at a number from 1 to 10, with 1 rated as no damage, and 10 being visible gall formation.

Treatment Rates:

Treatment	Number of Thrips
Control:	**0**
1-1 thru 1-10	**1**
2-1 thru 2-10	**2**
4-1 thru 4-10	**4**
8-1 thru 8-10	**8**

Results

All surviving cuttings showed some level of damage after five weeks, with the most visible and greatest damage on the samples with eight thrips. However, the samples with one thrips showed an equal level of damage to the ones with eight in four weeks. The worst had a thrips/cutting survival of nine weeks, with the typical galling beginning to form. Further, eggs and larvae were observed on thrips samples after seven weeks.