for the duration of the experiment, but poor control was obtained with the low rate of pendimethalin at Fort Lonesome as contrasted with the excellent control experienced at Bradenton. This difference in pendimethalin performance was probably due to the higher surface soil moisture at Bradenton, as soil moisture can greatly effect efficacy of preemergence surface-applied herbicides (3, 4). Prodiamine (all rates), and the high rate of diclofop also provided good to excellent control of sprangletop at Fort Lonesome unlike Bradenton where they performed poorly. This difference in results is probably related to the soil moisture differences and the related lower germination of sprangletop seed at Fort Lonesome which produced less "weed pressure" in the test.

Runner development was slower at Fort Lonesome than Bradenton and no differences among treatments were observed at Fort Lonesome (Table 4). Differences in runner development were minor at Bradenton. However it was important to note that those herbicides which controlled sprangletop. metolachlor, napropamide, and pendimethalin; did not reduce sod growth as indicated by runner development ratings. There was a trend for runner development to reduce as prodiamine rate increased, but this reduction was not significant when compared with the untreated control.

This research demonstrates good control of bearded sprangletop can be obtained with metolachlor (2 or 4 lb.a.i./acre), 4 lb.a.i./acre napropamide, or pendimethalin (1 or 2 lb.a.i./acre) without seriously affecting vigor and growth of 'Floratam' St. Augustine grass under commercial sod production conditions.

Table 4. Effect of preemergence herbicides on runner development in 'Floratam' St. Augustine grass 40, 60, and 81 days after application at two locations. Spring 1989.

Herbicide	Rate (lb./acre	Rating[z] Days after application: Bradenton 40	Bradenton 60	Bradenton 81	Ft. Lonesome 40	Ft. Lonesome 60
Untreated	0.0	1.3bc[y]	2.4bcd	2.2bc	1.0a	1.6a
Metolachlor	2.0	1.4b	2.9a	2.6abc	1.0a	1.5a
Metolachlor	4.0	1.2bc	2.6ab	2.4abc	1.0a	1.2a
Napropamide	4.0	1.5b	2.9a	2.7ab	0.5a	1.2a
Prodiamine	1.0	1.2bc	2.6ab	2.6abc	1.0a	1.5a
Prodiamine	2.0	1.5b	2.3bcd	2.5abc	0.8a	1.1a
Prodiamine	4.0	1.2bc	2.2cd	2.2bc	0.8a	1.4a
Pendimethalin	1.0	1.1c	2.4bcd	2.8a	1.0a	1.6a
Pendimethalin	2.0	1.2bc	2.7ab	2.2bc	1.0a	1.4a
Atrazine	2.0	1.4b	2.6ab	2.1c	1.0a	1.5a
Simazine	2.0	1.9a	2.5abc	2.1c	0.5a	1.2a
Diclofop	1.0	1.5b	2.1d	2.4abc	1.0a	1.5a
Diclofop	2.0	1.5b	2.5abcd	2.7ab	0.8a	1.4a

[z]Runner development was evaluated using a visual rating scale where 0 = runners not forming, 1 = runners just beginning to develop, 2 = runners one-half the distance between ribbons, 3 = runners have grown from one ribbon to the next.

[y]Mean separation within columns by Duncan's multiple range test, 5% level.

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Proc. Fla. State Hort. Soc. 102:293-295. 1989.

INSECTICIDAL CONTROL OF MAGNOLIA WHITE SCALE AND LONG-TAILED MEALYBUG ON SAGO-PALMS[1]

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Abstract. **(Populations of magnolia white scale (=false oleander scale), *Pseudaulacaspis cockerelli* (Cooley), infesting sago-palm, *Cycas revoluta* Thunberg, were reduced > 96% with a single application of dimethoate and two applications two weeks apart of methidathion, each at 0.6 g AI/l H_2O. Populations of long-tailed mealybugs, *Pseudococcus longispinus* (Targioni-Tozzetti) were eliminated from sago-palms, by single foliar applications of methidathion and chlorpyrifos and nearly eliminated by a single application of dimethoate, all applied at 0.6 g AI/l H_2O.**

The magnolia white scale, also known as the false oleander scale, *Pseudaulacaspis cockerelli* (Cooley) (Homoptera: Diaspididae), was considered by Dekle (1) to be the most serious insect pest of ornamental plants grown in Florida. This species and the longtailed mealybug, *Pseudococcus longispinus* (Targioni-Tozzetti) (Homoptera: Pseudococcidae), are common pests of cycads (Cycadaceae), a few species of which are important in the Florida nursery and landscaping industries. Reinert (2) reported that acephate, dimethoate, monocrotophos and oxydemetonmethyl were effective against the magnolia white scale infesting *Bischoffia javanica* Blume (Euphorbiaceae). Thompson et al. (4)

[1]This paper reports the results of research only. Mention of a product or trademark name in this paper does not constitute a recommendation or endorsement by the University of Florida, nor does it imply registration of a pesticide under FIFRA. The following companies supplied materials for testing: American Cyanamid Co., Ciba-Geigy Corp., Dow Chemical Co., Mobay Corp., and E.I. de Pont de Nemours & Co. I thank Drs. Robin Giblin-Davis and Stephen Verkade for critically reading the manuscript. This work was partially funded by a contract with the California Department of Food and Agriculture and is published as Florida Agricultural Experiment Station Journal Series No. N-00055.

reported that ethion, malathion and Supracide (methidathion) were active against "oleander scale" (undoubtedly *P. cockerelli*) on mango, with Supracide giving the best control.

This paper reports results of tests of nine treatments against the magnolia white scale, and five treatments against the longtailed mealybug infesting sago-palms, *Cycas revoluta* Thunberg.

Materials and Methods

Containerized sago-palms each ca. 30 cm tall were kept in a walk-in cage with sides of fiberglass mesh with 0.9 mm openings to prevent entry of larger predators such as coccinellid beetles. The cycads were watered daily and a 16-4-8 fertilizer applied every two months, since in general high nitrogen levels are conducive to the establishment of scale insect populations. Weekly from June-September 1987, leaves of *B. javanica* infested with mature females of magnolia white scale were placed on the cycads so that as eggs hatched the crawlers would infest the plants. This resulted in dense, fairly uniform populations of magnolia white scale on the cycads.

Cycads were selected at random for each treatment, with five plants per treatment. Counts of live and dead scale insect females, crawlers, and eggs were made a day before and one month following initial treatments. Several infested pinnae per plant were excised and examined under a stereoscopic microscope. Twenty mature female scales/plant were selected at random, the scales removed, and and the insect determined by the appearance of the mature female whether it was alive (turgid and glossy yellow) or dead (shriveled and darkened). Live and dead eggs and crawlers were distinguished on the basis of appearance and color as with the adult females. Eggs of armored scale insects occur in masses beneath the female scales. Since egg masses with one or more live eggs may initiate an infestation, such egg masses were recorded as live. Usually there were few, if any, dead eggs in a "live egg mass". Masses in which 100% of the eggs were dead were recorded as "dead egg masses". Pinnae were examined under a stereoscopic microscope and the first 20 crawlers seen were observed for mortality.

Insecticides were sprayed using a hand-held compressed air sprayer. Upper and lower leaf surfaces were thoroughly covered. Dosages and numbers of applications of the different treatments are shown in Table 1.

The sago-palms that remained infested with magnolia white scale after this test were sprayed with methidathion and then kept in the walk-in cage under the water and fertilizer regime described above. After 18 months, the cycads had become infested with dense populations of longtailed mealybugs. Prior to treatment, 20 mealybugs per plant were selected at random and examined under a stereoscopic microscope for mortality. Treatments were applied as above. The materials were applied at a rate of 0.6 g AI/l, except for oxamyl, which was spread on the soil surface at a rate of 0.45 g per containerized plant and drenched in with 1 l of water/container. Twenty days after treatment, the plants were examined for results. The foliage of many of the treated plants was now largely free of mealybugs and there were large numbers of dead mealybugs on the ground beneath many of the treated plants. Thus treatments could not be compared on the basis of live and dead insects. The treatments were compared on the basis of the number of live insects per plant. A maximum of 20 mealybugs per plant were counted. Results were analyzed with the Analysis of Variance and the Waller-Duncan Bayesian K-ratio t-test (3).

Results and Discussion

The most effective treatments against magnolia white scale mature females were two applications two weeks apart of methidathion or dimethoate, or single applications of dimethoate or a methidathion, chlorpyrifos and oil mixture (Table 1). A single application of methidathion + oil + chlorpyrifos or of dimethoate was highly effective against the crawler stage (Table 2) Single and double applications of methidathion and dimethoate were highly effective against eggs (Table 3). In tests against magnolia white scale on several other host plant species (Author, unpublished), single applications of either dimethoate or methidathion virtually eliminated the scales. Reinert (2) also reported that dimethoate was effective against magnolia white scale. These results differ from those of Reinert (2) in that oxydemetonmethyl was not highly effective. A lower rate was used to avoid phytotoxicity as reported by that author.

Table 1. Evaluation of treatments against magnolia white scale on sago-palm. Percent alive of 20 mature female scales per plant prior to and 1 month following insecticide applications. Five replications/treatment.

Insecticide treatment[1]	Dosage AI (g/l)	Pretreatment mean % live scales	Posttreatment mean % live scales	Standard Deviation
control		96.0a	86.3a[2]	11.8
oil (Oil-i-cide, Swift & Co.)	10.0	93.0a	84.3a	11.4
oxydemetonmethyl	0.6	95.0a	38.0b	24.7
methidathion	0.6	95.4a	22.0c	12.0
methidathion + oil	0.6 + 10.0	97.0a	10.0cd	6.1
dimethoate (2 applications)	1.2	93.0a	8.0d	4.5
dimethoate	1.2	94.0a	4.0d	6.5
methidathion + oil + chlorpyrifos	0.6 + 10.0 + 1.2	97.0a	3.0d	6.7
methidathion (2 applications)	0.6	95.4a	2.0d	2.7

[1]Single applciations, or, if noted, two applications two weeks apart.
[2]Means in a column not followed by the same letter are significantly different ($P<0.05$, Waller-Duncan Multiple Range Test).

Table 2. Evaluation of insecticides against magnolia white scale on sago-palm. Treatments and percent alive of 20 crawlers per plant 1 month following treatments. Five replications/treatment.

Insecticide treatment[1]	mean % live crawlers	Standard Deviation
control	71.3a[2]	6.3
oil	72.9a	15.3
oxydemetonmethyl	63.0a	30.5
methidathion	19.0b	4.1
methidathion (2 applications)	8.0bc	6.7
dimethoate (2 applications)	5.0bc	5.0
methidathion + oil	5.0bc	5.0
dimethoate	1.0c	2.2
methidathion + oil + chlorpyrifos	1.0c	2.2

[1]Single applications, or if indicated, 2 applications 2 weeks apart.
[2]Means in a column not followed by the same letter are significantly different ($P < 0.05$, Waller-Duncan Multiple Range Test).

Table 3. Evaluation of insecticides against magnolia white scale on sago-palm. Treatments and numbers of female scales per sample (n = 20/plant) harboring live egg masses. Five plants per treatment.

Insecticide Treatment[1]	mean number scales with live egg masses	Standard Deviation
control	14.5a[2]	1.7
oxydemetonmethyl	5.8b	4.8
methidathion	0.8c	1.1
dimethoate	0.4c	0.9
methidathiom + oil	0.4c	0.6
methidathion (2 applications)	0.2c	0.5
dimethoate (2 applications)	0.0c	0.0

[1]Single application, or where indicated, 2 applications 2 weeks apart.
[2]Means in a column not followed by the same letter are significantly different ($P < 0.05$), Waller-Duncan Multiple Range Test).

There was a high degree of mortality of mealybugs in the controls. This cannot be explained, but it may have been related to the extremely high population densities at the beginning of the experiment. Single applications of either chlorpyrifos, methidathion, dimethoate, oxamyl, or oxydemetonmethyl effectively reduced the numbers of live longtailed mealybug on the cycads (Table 4). In fact, each of these treatments eliminated or nearly eliminated the mealybugs from the sago-palms. Possible repellent effects of insecticides were not determined, but since there were large numbers of dead mealybugs beneath the plants and the plants did not become reinfested with mealybugs, most of this reduction was probably due to toxicity of the insecticides. No symptoms of phytotoxicity due to any of the insecticide treatments were noted.

Table 4. Evaluation of insecticides against longtailed mealybug on sago-palm. Treatments and numbers of live mealybugs per sample (n = 20/plant).

Insecticide	Mean live mealybugs/plant	*Standard* Deviation
Control	8.2a[1]	7.5
oxydemetonmethyl	2.4b	1.7
oxamyl	0.8b	0.8
dimethoate	0.2b	0.5
methidathion	0.0b	0.0
chlorpyrifos	0.0b	0.0

[1]Means in a column not followed by the same letter are significantly different ($P < 0.5$, Waller-Duncan).

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Proc. Fla. State Hort. Soc. 102:295-296. 1989.

RESIDENT INSTRUCTION IN HORTICULTURE FOR PLACE-BOUND STUDENTS

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Additional index words. Agricultural education.

Abstract. **Horticultural educators have encountered declining enrollments at a time when most of Florida's horticultural industries are expanding. This presents the challenge of identifying new groups of potential students and meeting their educational needs.**

An innovative program has been developed by the University of Florida's IFAS which provides courses leading to a Bachelor of Science degree and assists an emerging group of students which previously had been geographically excluded from advanced undergraduate educational opportunities. These students typically are older than average undergraduates and have long-established ties to their families, professions and communities and are removed from the main campus of Florida's land-grant university. A profile of these students is provided.

Florida Agricultural Experiment Station Journal Series No. N-00140.

National declining enrollment trends in agriculture during the late 1970's and 1980's indicate a potential shortage of highly trained workers in agribusiness (1). Agricultural employers in Florida also have noted this shortage. In many instances these job opportunities are being filled by older individuals, who only recently considered agriculture as a career option.