Table 6 Speed Sprayer—Number of Live Females.

Treatment	PreSpray −2	Weeks After Second Application 8	16	26
Control	26a	19a	39a	4ab
Aldicarb/Dicofol	20a	20a	41a	10a
Dicofol/Dicofol	27a	21a	69a	4ab
Probability		0.0001	0.0001	0.0001
c.v. (%)		66	68	400
N		32	32	32

Ryan-Einot-Gabriel-Welsch Multiple F test for log (count).
Means within columns with the same letter are not significantly different.

Table 7 Speed Sprayer—Number of Live Males

Treatment	PreSpray −2	Weeks After Second Application 8	16	26
Control	51a	26a	68a	14a
Aldicarb/Dicofol	67a	24a	51a	19a
Dicofol/Dicofol	89a	18a	82a	14a
Probability		0.0001	0.0001	0.0001
c.v.(%)		50	59	104
N		32	32	32

Ryan-Einot-Gabriel-Welsch Multiple F test for log (count).
Means within columns with the same letter are not significantly different.

Table 8. Speed Sprayer—Number of Crawlers.

Treatment	PreSpray −2	Weeks After Second Application 8	16	26
Control	29ab	63a	258a	109a
Aldicarb/Dicofol	27ab	21 b	161a	89a
Dicofol/Dicofol	33a	47ab	321a	165a
Probability		0.0001	0.0001	0.0001
c.v. (%)		68	48	54
N		32	32	32

Ryan-Einot-Gabriel-Welsch Multiple F test for log (count).
Means within columns with the same letter are not significantly different.

Table 9. Speed Sprayer—Ratio of Live Males to Live Females.

Treatment	Weeks After Second Application 8	16	26
Control	3.2	6.1	4.9ac
Aldicarb/Dicofol	1.9	8.1	8.7a
Dicofol/Dicofol	1.4	2.6	4.6ab
Probability	.6505 ns	.2050 ns	.0044
c.v. (%)	55	97	76
N	32	32	32

Ryan-Einot-Gabriel-Welsch Multiple F test for log (count).
Means within columns with the same letter are not significantly different.

The results of this trial demonstrates that typical speed sprayer applications to a citrus grove in good condition does not result in significant increases in the snow scale population. Snow scale population increases did result from through wetting of the scaffold branches with a hand gun spray, which indicates that more thorough coverage of the inside branches is required to induce the population increases than is achieved with the typical speed sprayer application.

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ENHANCEMENT OF CITRUS RED MITE *PANONYCHUS CITRI* (MCGREGOR) CONTROL THROUGH THE USE OF TRITON CS-7

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Abstract. **Several miticides were applied to 'Washington' navel orange (*Citrus sinensis* (L.) Osb.) trees for the control of citrus red mites *Panonychus citri* (McGregor) during 1987 and 1988 at the Citrus Research Station, Port Sulphur, Louisiana. Miticides were applied alone and as a tank mix with the spreader binder Triton CS-7. Citrus red mite control was significantly enhanced with the addition of Triton CS-7 to the various miticide applications.**

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The major pest of the Louisiana citrus industry is that of periodic infestations of the citrus red mite. Previous work (1-6) has identified several miticides and experimental pesticides that are effective in the control of the citrus red mite. In recent years there has been a decrease in effectiveness of some of these recommended miticides. Therefore, this study was undertaken to determine the effectiveness of Triton CS-7, a spreader binder added to the miticide spray on the control of citrus red mites in 'Washington' navel orange trees.

Materials and Methods

Various miticides alone and as a tank mix with Triton CS-7 were applied to 'Washington' navel orange trees with the use of a Solo backpack sprayer (Model 425). Miticide treatments consisted of single tree plots replicated four times in a randomized complete block design. Miticide treatments were applied to the tree foliage with complete

tree coverage or until runoff occurred. Approximately 0.5-1.0 gallon of spray solution was applied per tree.

Mite populations were determined one week after treatment and again one month later after treatment in 1987 by randomly pulling ten leaves per miticide treatment per replication. The leaf samples were then examined under a stero-microscope and the number of mites per leaf was counted. During the 1988 test, mite populations were determined two weeks after treatment and again one month after treatment using the technique described above.

Upon completion of the mite counts, the two means of each treatment were contrasted using single degree of freedom analysis of variance to show the effectiveness of Triton CS-7 on mite control.

Results and Discussion

Triton CS-7 at 1 qt/100 gal significantly reduced the average number of mites per leaf one week after treatment in 1987 on 'Washington' navel orange trees (Table 1). Fenbutatin, fluvalinate and avermectin had significantly fewer mites per leaf when Triton CS-7 applied as a tank mix was compared with the treatments without CS-7. All other miticides show no significant difference in the number of mites per leaf when CS-7 was applied as a tank mix.

The effect of miticides with and without Triton CS-7 on the control of citrus red mites on 'Washington' navel orange trees one month after treatment is shown in Table 2. The addition of Triton CS-7 to the miticides: fenbutatin, fluvalinate, avermectin, dimethoate, and carbosulfan significantly reduced the number of mites per leaf when compared to the application of miticide alone. The use of Triton CS-7 as a tank mix with dicofol and amitraz did not enhance the effectiveness of these miticides to control citrus red mites.

Table 3 indicates the effect of the addition of Triton CS-7 (1 pt/100 gal) to several miticides on the control of citrus red mites on 'Washington' navel orange trees 15 days after treatment during the 1988 test. Mite populations in 1988 were considerably lower than the previous year. The addition of Triton CS-7 at the rate of 1 pt/100 gal. to several miticides did not significantly reduce the number of mites per leaf. All proparigate treatments showed excellent control of citrus red mites with less than one mite per leaf.

Table 1. Effect of miticides with and without Triton CS-7 (1 qt/100 gal) on the control of citrus red mites on 'Washington' navel oranges - 1987

		Mean[z] No. Mite/Leaf 7 days after treatment			
Treatment	Rate/Acre	Without CS-7	With CS-7	F	P
Fenbutatin	.5 lb	61.4	5.7	14.8	0.0004
Fluvalinate	.1 lb	55.8	8.8	10.5	0.0023
Avermectin	.25 lb	49.5	12.2	6.6	0.0136
Dimethoate	.75 lb	24.7	10.8	0.9	0.3417
Dicofol	.4 lb	18.0	11.9	0.2	0.6751
Carbosulfan	.5 lb	31.9	8.1	2.7	0.1077
Amitraz	.75 lb	7.0	8.1	2.7	0.8627
Control	—	37.7			

[z]Means represents 4 replications/treatment with 10 leaves/replication.

Table 2. Effect of miticides with and without Triton CS-7 (1 qt/100 gal) on the control of citrus red mites on 'Washington' navel oranges - 1987

		Mean[z] No. Mite/Leaf 30 days after treatment			
Treatment	Rate/Acre	Without CS-7	With CS-7	F	P
Fenbutatin	.5 lb	43.8	1.3	16.8	0.0002
Fluvalinate	.1 lb	36.3	4.8	9.2	0.0004
Avermectin	.25 lb	30.7	4.7	6.3	0.0161
Dimethoate	.75 lb	27.7	3.8	5.3	0.0257
Dicofol	.4 lb	21.6	2.5	3.4	0.0733
Carbosulfan	.5 lb	33.4	2.5	8.9	0.0046
Amitraz	.75 lb	6.9	1.1	0.3	0.5723
Control	—	57.2			

[z]Means represents 4 replications/treatment with 10 leaves/replication.

Table 3. Effect of miticides with and without Triton CS-7 (1 qt/100 gal) on the control of citrus red mites on 'Washington' navel oranges - 1988

		Mean[z] No. Mite/Leaf 15 days after treatment			
Treatment	Rate/Acre	Without CS-7	With CS-7	F	P
Fenbutatin	.5 lb	5.58	3.70	0.81	0.3727
Amitraz	.75 lb	1.68	.98	0.11	0.7383
Dicofol	.4 lb	1.35	.70	0.10	0.7564
Avermectin	.25 lb	1.88	.30	0.57	0.4534
Proparigate	6.0 lb	.95	.53	0.40	0.8392
Proparigate	7.5 lb	.20	.20	0.00	1.0000
Proparigate	9.0 lb	.23	.50	0.02	0.8955
Control	—	2.98			

[z]Means represents 4 replications/treatment with 10 leaves/replication.

The results of the mite counts 30 days after treatment in 1988 are shown in Table 4. No significant differences existed with any miticide in the number of mites per leaf when the miticides tank mixed with CS-7 were compared to the miticides which were applied alone. Again the proparigate treatments had excellent control of citrus red mites with less than 1 mite per leaf.

The higher rates of the proparigate treatments had a tendency to clog the trigger valve of the Solo sprayer, and it was necessary to take it apart and clean thoroughly before continued use. Therefore, use of this product will require spray equipment with continuous agitation in order to avoid this potential problem.

Table 4. Effect of miticides with and without Triton CS-7 (1 qt/100 gal) on the control of citrus red mites on 'Washington' navel oranges - 1988

		Mean[z] No. Mite/Leaf 15 days after treatment			
Treatment	Rate/Acre	Without CS-7	With CS-7	F	P
Fenbutatin	.5 lb	0.78	8.56	2.99	0.0908
Amitraz	.75 lb	2.98	4.13	0.06	0.8000
Dicofol	.4 lb	4.03	0.38	0.65	0.4229
Avermectin	.25 lb	5.68	0.13	1.51	0.2251
Proparigate	6.0 lb	0.23	0.18	0.00	0.9736
Proparigate	7.5 lb	0.08	0.23	0.00	0.9736
Proparigate	9.0 lb	0.18	0.15	0.00	0.9956
Control	—	8.70			

[z]Means represents 4 replications/treatments with 10 leaves/replication.

The reduction of the recommended rate of Triton CS-7 *from 1 quart* per 100 gallons of water to 1 pint per 100 gallons of water did not show the definite enhancement of mite reduction as shown in the 1987 test. However, based on previous results, the addition of CS-7 at its recommended rate of 1 quart per 100 gallons of water could be beneficial in the reduction of citrus red mite populations and an enhancement of the effectiveness of various miticides.

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COMPARISON OF TWO METHODS OF ESTIMATING POTENTIAL CITRUS EVAPOTRANSPIRATION

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Abstract. **Chronic periods of dry weather have lead to irrigation water shortages in southwest Florida. Proper irrigation scheduling of citrus groves, which are major water-users in the region, can decrease water consumption and may delay any mandatory cut-backs in use by regulatory agencies. A major input into water-budget methods of irrigation scheduling is an estimate of potential crop evapotranspiration (ET_p). A comparison of ET_p estimates from weather data using the Penman equation and evaporation pan measurements was made in this study. Linear correlation analysis of average daily, weekly, and monthly ET_p values between the two methods gave correlation coefficients of 0.74, 0.89, and 0.96, respectively, even with the point of weather data acquisition and the evaporation pan separated by approximately 12 km. Daily ET_p calculated from pan evaporation was about 1 mm day^{-1} higher than that calculated with the Penman equation. Either method of estimating ET_p would be suitable for use in current irrigation scheduling models, giving growers a choice in the type of apparatus they might acquire.**

The expansion of irrigated citrus acreage in southwest Florida in combination with chronic periods of dry weather have led to recent irrigation water shortages. This situation is not expected to improve, and will probably worsen with time as competition for limited water resources increases. Current irrigation research and educational programs promote the use of quantitative, water-budget irrigation scheduling techniques as opposed to the more qualitative methods traditionally used by growers. Proper scheduling of irrigations can decrease water consumption and may delay any mandatory cut-backs in use by regulatory agencies.

A major input into water-budget methods of irrigation scheduling is the estimate of daily crop potential evapotranspiration (ET_p). An accurate value for this parameter is not easily obtainable. The Penman method uses a predictive equation (3, 4) to obtain ET_p. This equation requires the input of daily meteorological parameters usually obtained from electronic weather stations. The Penman method has proven to be accurate under a wide variety of climatic conditions worldwide, however, it requires a substantial initial investment for specialized equipment. Another option to estimate daily ET_p involves the measurement of pan evaporation (3, 6). This usually requires a National Weather Service standard evaporation pan and water level measuring equipment.

Past research has shown good agreement between monthly ET_p values estimated using these two methods in a citrus grove on Florida's east coast (5). The current study was undertaken to: 1) compare daily, weekly, monthly, and annual ET_p values calculated using the Penman equation and pan evaporation in southwest Florida; 2) determine which form of the Penman equation gave ET_p values which correlated best with those calculated using pan evaporation; and 3) compare 1 yr of ET data from southwest Florida to an 8-yr average measured in a developing citrus grove at Ft. Pierce on the east coast of Florida.

Materials and Methods

This study covered a period of 12 months from April 1988 through March 1989 in which climatic conditions were much drier than normal. Meteorological data were obtained from an electronic weather station of a LaBelle, FL citrus grower located approximately 12 km north of the Southwest Florida Research and Education Center (SWFREC) at Immokalee. The weather station was situated

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