A few feet in elevation might make a difference in the microclimate and the adaptability of the plant to survive winters in a specific location. Two to 5°F difference in the mean minimum temperature can make a considerable difference in which plants can be grown in a given location.

There are many tropical fruits that may be grown in tropical Florida. The fruits recommended in the Master Gardener program have all been known to fruit in Florida, can be grown without a great deal of cold protection and serious horticultural problems, and are generally available in nurseries or from plant sales of local chapters of the Rare Fruit Council (Table 1).

Species of *Citrus* fruits for sub-tropical areas are similar to the ones grown in more temperate areas. However, there are some cultivar differences and different rootstocks are often required. See Fruit Crops Fact Sheet #13 (4) and Fruit Crops Fact Sheet #23 (7) for specific recommendations. Mango and avocados have many cultivars recommended for specific areas and conditions and these are detailed in Fruit Crops Fact Sheet #2 (2) and Fruit Crops Fact Sheet #3 (5).

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REACTION OF NEMATODE-INFECTED CENTIPEDEGRASS TURF TO PESTICIDAL AND NON-PESTICIDAL TREATMENTS[1,2]

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Abstract. **Treatments were applied to centipedegrass infected with plant-parasitic nematodes, primarily** Hemicycliophora parvana **Tarjan, 1952 (sheath nematodes) and** Macroposthonia sphaerocephala **(Taylor, 1936) (ring nematodes) at the University of Florida Horticultural Unit in Gainesville. Materials used were Ekol Leaf Mold, Cytex cytokinins, bendiocarb, Seaborn kelp-extract, phenamiphos-fensulfothion mixture, phenamiphos, ethoprop and ethylene dibromide. Fresh weight of grass clippings from each plot was obtained six times during a ten-month period after treatment. Leaf Mold, phenamiphos-fensulfothion, and ethoprop consistently gave the three highest grass yields. Soil and root samples were obtained four times; nematode control varied with the chemical treatment, type of parasitic nematode, and time of year sampled.**

New pesticides for control of plant-parasitic nematodes on turfgrass have been unavailable for the past few years. With the withdrawal of DBCP (dibromochloropropane) from the market, only chemicals such as ethoprop (Mocap), phenamiphos (Nemacur), fensulfothion (Dasanit) and diazinon (Sarolex) are available for commercial application to nematode-infected turf. These chemicals have been available for more than a decade. At least two other novel materials under test as turf nematicides, bendiocarb and UC 21865, were withdrawn from further testing. The homeowner, or "do-it-yourselfer," has fared worse since there are no materials available to him which can be applied to nematode-infected turf.

The purpose of this test was to investigate the following non-pesticidal and novel pesticidal materials using currently available turf nematicides as standards. Kelp (seaweed) extracts have been reported to be mildly nematicidal and to improve yield when applied to citrus nematode-infested orange trees (2). Such materials also have provided beneficial results when applied to centipedegrass (1). Cytokinins (Cytex) are also derived from kelp and have been used on blight-infected citrus trees and as growth promoters on various other crops. Ekol leaf mold is a relatively new organic material prepared from waste cotton plants and supposedly without pesticidal properties, but with decided growth-stimulating properties. Bendiocarb (Ficam) is a commercial insecticide; ethylene dibromide (Soilbrom 90) is 93% active and a nematicidal fumigant. The three other materials used in this test—phenamiphos (Nemacur), fensulfothion (Dasanit) and ethoprop (Mocap)—are known turf nematicides.

Materials and Methods

Nematode-infected centipedegrass turf (*Eremochloa ophiuroides* [Munro] Hack.) at the University of Florida Horticultural Unit in Gainesville was found to contain mainly *Hemicycliophora parvana* Tarjan, 1952 (sheath nematodes) and *Macroposthonia sphaerocephala* (Taylor, 1936) (ring nematodes). Sting nematodes *Belonolaimus longicaudatus* Rau, 1958, and stubby root nematodes (*Trichodorus* sp.) were also present but in lower numbers. The test area was divided into 60 0.9 x 3.4 m (3 x 11 ft) plots with 0.6 m (2 ft) between each test plot. Each of 10 treatments were replicated six times in a randomized complete block design. Treatments were: 1. leaf mold (Ekol leaf Mold) at 4.9 kg/sq m (1 lb/sq ft); 2. Cytokinins (Cytex) at 562 l/ha (50 gal/acre); 3. & 4. Bendiocarb WP at 4.5 and 6.7 kg (ai)/ha (4 & 6 lbs/acre) respectively; 5. kelp extract (Seaborn) at 34 l/ha (3 gal/acre); 6. phenamiphos-fensulfothion (Nemacur-Dasanit) mixture 10 G - 5 G at 11.2 kg (ai)/ha (10 lbs/acre); 7. phenamiphos (Nemacur) 15 G at 11.2 kg (ai)/ha (10 lbs/acre); 8. ethoprop (Mocap) 10 G at 22.4 kg (ai)/ha (20 lbs/acre); 9. ethylene dibromide (Soilbrom 90) at 67 l (ai)/ha (6 gal/acre); and 10. untreated control. Each treatment material was applied initially at

[1]Florida Agricultural Experiment Stations Journal Series No. 3367.
[2]Mention of a trademark or proprietary product does not constitute a guarantee or warranty of the product and does not imply its approval to the exclusion of other products that may also be accepted.

½ the above rates with the remaining half-dosage applied four weeks later. The entire test area was irrigated with ¾ inch of water immediately prior to each application date.

Leaf Mold (Treatment 1) was distributed evenly by hand over each treatment area. Materials applied in water (Treatments 2-5, 9) were sprinkled on each plot in two gallons of water while solid granular materials (Treatments 6-8) were spread with a shaker jar. Directly after application, each of the plots under test received an additional 4-5 gallons of water. At the end of the first applications, the entire test area was irrigated with another ¾ inch of water (an additional ½ inch of rain fell that evening). After the second application four weeks later, an additional ½ inch of post-treatment irrigation was applied. Supplemental irrigation and herbicide (atrazine) were applied when necessary for a year following final treatment.

Soil and root samples (4 plugs/plot) were obtained from each plot four times during the year. The soil from the plugs was thoroughly mixed and a 10 cm^3 aliquant processed for nematodes by a standard sugar elutriation technique. Plant parasitic nematodes were identified and counted. Grass clippings were obtained six times during the course of the test using a Jacobsen reel-type mower with attached grass catcher.

Data on nematode populations and fresh weights of grass from the plots were submitted to an analysis of variance, followed by Duncan's multiple range test. The test was terminated after one year.

Results and Discussion

Data are presented as total populations of plant parasitic nematodes because populations of the two predominant genera, *Hemicycliophora* and *Macroposthonia*, reflected the trend shown by the total populations (Table 1). One month after treatment, significantly fewer nematodes (P = 0.05) were present in plots treated with cytokinin, bendiocarb @ 4.5 kg/ha,phenamiphos-fensulfothion mixture, and ethoprop treatments than in untreated control plots. It should be noted, however, that the nematode populations in the controls were higher than in all other plots except those treated with Seaborn kelp extract. Nematode populations for three additional sampling periods (Table 1) were not significantly different. When the mean total plant-parasitic nematode populations for each treatment were compared to controls and the percent increase or decrease calculated, it was shown that phenamiphos-fensulfothion mixture and ethoprop treatments resulted in the greatest reduction of plant-parasitic nematodes, while bendiocarb @ 4.5 kg/ha and cytokinins were the next best treatments.

The grass weight analysis (Table 2) showed the Ekol leaf mold treatment to be statistically better (P = 0.05) than controls in providing a greater growth of grass for three of the six sampling dates. Grass clipping weights were consistently greater for the leaf mold treatment than all other treatments except for ethoprop and phenamiphos-fensulfothion mixture (April and May harvests). These three treatments resulted in increased grass clipping weights of 61, 45, and 39% respectively, in comparison to controls (Table 2).

There are three points of view to consider when evaluating results of turf treatments. Does one want only nematode control, only turf improvement, or both? If nematode control is desired, then phenamiphos-fensulfothion mixture and ethoprop treatment were the most effective, resulting in about a 70% reduction of nematodes one month after treatment and an overall mean reduction of 50% for the year

Table 1. Total plant parasitic nematodes/100 cc of soil.

Treatment	Sampling date				Avg.[z]	% Reduction (−) or Increase (+)[z]
	Sept 1980	Oct 1980	May 1981	Aug 1981		
1. Leaf Mold	582ab[y]	1318ab	2193a	1107ab	1300	+81
2. Cytokinins	220 b	872abc	348 b	307 c	437	−39
3. Bendiocarb @ 4.5 kg/ha	250 b	488 bc	578 b	372 c	422	−41
4. Bendiocarb @ 6.7 kg/ha	425ab	1143abc	1545ab	720abc	958	+34
5. Seaborn Kelp Extract	912a	1507a	1490ab	1130ab	1260	+76
6. Phenamiphos-fensulfothion	267 b	397 c	332 b	433 bc	357	−50
7. Phenamiphos	558ab	642 bc	892 b	710abc	703	−02
8. Ethoprop	247 b	477 bc	405 b	338 c	367	−49
9. Ethylene dibromide	673ab	1093abc	1373ab	1210 a	936	+31
10. Controls	912a	652 bc	805 b	500abc	717	—

[z]Test was initiated in August, 1980; AVG. = Average count including all sampling dates; % Reduction or increase = as compared to controls.
[y]Each figure represents the mean of 6 replicates; data in columns followed by the same letter are not significantly different (P = 0.05).

Table 2. Weight of grass clippings in grams.

Treatment	Harvest date						Avg.[z]	% Reduction (−) or Increase (+)[z]
	Oct 1980	April 1981	May 1981	June 1981	July 1981	Aug 1981		
1. Leaf Mold	56a[y]	192ab	108a	83a	143a	56a	106	+61
2. Cytokinins	37ab	173ab	89a	52 b	75 b	47abc	79	+20
3. Bendiocarb @ 4.5 kg/ha	26 b	118 b	72a	46 b	94 b	46abc	67	+02
4. Bendiocarb @ 6.7 kg/ha	35ab	130 b	89a	47 b	65 b	45 bc	69	+05
5. Seaborn Kelp Extract	33 b	120 b	76a	44 b	73 b	46abc	65	−02
6. Phenamiphos-fensulfothion	43ab	192ab	114a	57 b	98 b	45 bc	92	+39
7. Phenamiphos	28 b	126 b	95a	46 b	85 b	39 c	70	+06
8. Ethoprop	44ab	217a	108a	60 b	95 b	51ab	96	+45
9. Ethylene dibromide	33 b	102 b	79a	48 b	74 b	40 c	78	+18
10. Controls	31 b	119 b	71a	48 b	81 b	46abc	66	—

[z]Test was initiated in August, 1980; Avg. = Average count including all harvest dates; % Reduction or increase = as compared to controls.
[y]Each figure represents the mean of 6 replicates; data in columns followed by the same letter are not significantly different (P = 0.05).

following treatment. These two treatments also gave an average 42% increase in grass yield for the year following treatment but were inferior to leaf mold, an organic soil amendment, which had a 61% increase in grass yield for the year. Leaf mold stimulated grass growth but, as can be expected, resulted in an 81% increase in nematodes due to increased root production. Unfortunately, the increase in nematode population can prove detrimental to grass growth during the next growing season. The possibility becomes implicit, and worthy of further test, that annual nematicide treatment and an annual treatment with an organic soil amendment applied six months apart could yield the best results.

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Proc. Fla. State Hort. Soc. 94:227-229. 1981.

EFFECTIVENESS OF SLOW-RELEASE N FERTILIZERS IN MAINTAINING TURFGRASS QUALITY AND GROWTH[1]

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Additional index words. 'Derby' ryegrass, 'Tifway' bermudagrass, Sulfur-coated Urea, IBDU, Oxamide, Ureaform.

Abstract. **A number of synthetic slow-release N sources were compared with $(NH_4)_2SO_4$ at two N rates (7.5 and 15.0 g N/m^2/90 days) relative to their influence on the growth and quality of 'Derby' ryegrass and 'Tifway' bermudagrass over a three year period. In general, CIL SCU IBDU and $(NH_4)_2SO_4$ produced the highest yields and visual rating on the ryegrass. A mottled appearance was observed in the turfgrass for the first 4 to 6 weeks after application where TVA SCU was used. In contrast, the TVA SCU, Ag Ind. SCU ,CIL SCU and Oxamide produced the highest yield and visual rating on the bermudagrass. Acceptable turfgrass growth and quality can be maintained throughout a 12-week period by the use of 7.5 g N/m^2 from most of the slow-release materials which were tested.**

Turfgrasses require large quantities of N fertilizers to remain a desirable dark green color. In Florida where the soils are sandy and of low exchange capacity and rainfall is high, the movement of soluble N is rapid. Frequent applications of N are common. Nitrogen materials which solublize less rapidly or release their N to the grass according to the uptake pattern of the grass would tend to limit the quantity of N lost through leaching and increase the efficiency of the applied N. Synthetic slow-release N materials have been produced in the recent past which have the capacity to resist immediate dissolution and release their N over a longer period of time.

Urea formaldehyde (UF) has been a more controversial product with about one-third of its N in a form having negligible controlled-release characteristics, and another third in a form with very slow availability (2). Reports on IBDU show that it has characteristics markedly different from UF. Availability rate of N depends on granular size and the presence of water (1). The primary characteristics reported for IBDU are a slow initial release of N and an abrupt response curve once the material begins releasing N. Sulfur-coated urea (SCU) has been shown to have a relatively low dissolution and to be a good product on warm season turfgrasses (3).

[1]Florida Agricultural Experiment Station Journal Series No. 3658.

Research was initiated at the Horticultural Unit near Gainesville with the following objectives: (1) To determine the effectiveness of synthetic slow-release N materials in supplying N to 'Tifway' bermudagrass and 'Derby' ryegrass, (2) To evaluate the effect of climatic conditions on the release properties of the N materials, and (3) To evaluate the effect of application rate on the effectiveness of the N sources.

Materials and Methods

Several different synthetic slow-release N materials were evaluated relative to their influence on the visual appearance, yield and N uptake of bermudagrass (*Cynodon dactylon* (L.) PERS X *Cynodon transvaalinsis* BURTT DAVY) and perennial ryegrass (*Lolium perenne* L.). During the fall 'Derby' ryegrass was seeded over 'Tifway' bermudagrass growing on a loamy fine sand (Typic Quartzipsamment). Nitrogen treatments were applied in a split-plot arrangement on plots 1.83 x 2.73 m and replicated three times. Whole plot treatments were composed of two N rates (7.5 and 15.0 g N/m^2). Sub-plot treatments were different sources of slow-release N with $(NH_4)_2SO_4$ as a standard water soluble N material. All N sources were applied at 90-day intervals.

This investigation extended over a three year period and the N sources under study changed as information on the materials was acquired and as new synthetic slow-release N sources became available. Clippings were collected for yield and total N analysis at 45-day intervals. Visual ratings were made on a weekly basis in 1978 and on a biweekly basis in 1979 and 1980. The range of the rating scale was 1 to 9 with 5.5 representing the minimum acceptable turfgrass. Mowing heights were maintained at 1.9 and 2.5 cm for bermudagrass and ryegrass, respectively.

Results and Discussion

1978. The average yield, N uptake and visual rating for 'Derby' ryegrass and 'Tifway' bermudagrass grown in 1978 as influenced by selected slow-release N sources are given in Table 1. Small differences in yield and N uptake by the ryegrass were noted in response to the N source, except in the case of TVA SCU (5% dissolution). This material is heavily coated and the N is released very slowly during the cool season. A number of statistical classes were noted among the means for visual rating across N sources; however, all sources, except the TVA SCU (5% diss.) produced an average visual rating higher than the minimum acceptable level of 5.5. Both sources of Canadian Industries