



Cooperative Extension Service
Institute of Food and Agricultural Sciences

Evaluation of Slow-release Fertilizers in Florida¹

Dewayne L. Ingram and Thomas H. Yeager²

NATURE OF WORK

Slow-release fertilizers are frequently used in container production of woody plants (1,3,4,5,6) because of reduced application frequency and waste from leaching compared to other fertilizer systems (2). New formulations and types of slow-release fertilizers have been introduced in recent years and these should be evaluated at several rates and with different application methods in various locations and environmental conditions.

An experimental fertilizer formulation, Escote 22-4-11 was applied at three rates (2.5, 3.2 and 4.0 g N/container) as a surface, incorporation or dibble application. Escote 21-4-10 was surface applied or incorporated at the same rates. Osmocote 18-6-12 at the medium recommended rate (2.52 g N/container; 14 g of product/container) was also applied to the surface, incorporated or dibbled under the liner root ball. Osmocote and Escote fertilizers were reapplied as a surface application after 6 months. These treatments were compared to insertion of three Woodace briquettes 14-3-3 into the surface of the container medium with 1 lb. nitrogen per cubic yard from Estech 18-5-10. Treatments were replicated eight times in a randomized complete block design.

Rhododendron sp. 'Mrs. G. G. Gerbing' liners were transplanted (June, 1986) into No. 1 containers (3 quarts) with a 3 pine bark: 1 Canadian peat: 1 sand medium amended with 5 lbs. of dolomitic limestone and 1.5 lbs. of Perk per cubic yard. Three lbs. of Perk per cubic yard were used with the Osmocote treatment. Plants were placed in a shade house with 47% light exculsion and irrigated with 0.5 inches as needed via Dramm drip rings.

Leachates were collected 7, 100, 150 and 200 days after fertilizer application using the pour-through method (7). One year after experiment initiation, shoots were severed at the soil line and placed in a forced-air oven for 48 hrs at 150° F before dry weights were recorded.

RESULTS AND DISCUSSION

Shoot dry weight was significantly affected by fertilizer (Table 1), but fertilizer placement and rate did not alter shoot growth (data not shown). Osmocote 18-6-12 and Escote 22-4-11 resulted in greater shoot dry weight than the Escote 21-4-10, and the effect of the Woodace briquettes was intermediate.

Leachate pH on day 7 ranged from 4.8 for the Osmocote treatment to 5.2 for the Escote 22-4-11 and the Woodace briquettes. By day 200, the leachate pH for the Osmocote treatment had increased to 6.2 while the mean

1. This document is ENH 136, one of a series of the Department of Environmental Horticulture, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. First published November 1987. Reviewed February 1999. Please visit the FAIRS Web site at <http://hammock.ifas.ufl.edu>.
2. Dewayne L. Ingram, Former Professor, and Thomas H. Yeager, Associate Professor, Environmental Horticulture Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

The use of trade names in this publication is solely for the purpose of providing specific information. It is not a guarantee or warranty of the products named, and does not signify that they are approved to the exclusion of others of suitable composition.

The Institute of Food and Agricultural Sciences is an equal opportunity/affirmative action employer authorized to provide research, educational information and other services only to individuals and institutions that function without regard to race, color, sex, age, handicap, or national origin. For information on obtaining other extension publications, contact your county Cooperative Extension Service office. Florida Cooperative Extension Service / Institute of Food and Agricultural Sciences / University of Florida / Christine Taylor Waddill, Dean

pH for Escote fertilizers and the Woodace briquette treatment was 5.5 to 5.7 on day 200.

Leachate NO_3 on day 7 was more than six times greater from plants fertilized with Osmocote compared to other treatments (Table 2). On day 100, leachate NO_3 from the Osmocote treatments had decreased to 20 ppm,

Table 1. Effect of fertilizers on shoot dry weights of 'Mrs. G. G. Gerbing' azaleas

Fertilizer	Shoot dry weight
Osmocote 18-6-12	131a ^z
Escote 22-4-11	127a
Escote 21-4-10	111b
Woodace briquette 14-3-3	119ab
^z Means with the same letter are not statistically different, 5% level	

Table 2. Effect of fertilizer on leachate NO_3 and NH_4 concentration.

Fertilizers	Days after application			
	7	100	150	200
NO_3 (ppm)				
Osmocote 18-6-12	72	20	2	3
Escote 22-4-11	11	11	3	2
Escote 21-4-10	14	14	3	6
Woodace briquette 14-3-3	12	36	45	14
NH_4 (ppm)				
Osmocote 18-6-12	47	5	1	1
Escote 22-4-11	48	2	1	2
Escote 21-4-10	69	1	1	2
Woodace briquette 14-3-3	89	2	2	1

while leachate NO_3 for Escote treatments remained at 11 to 14 ppm. By day 150, leachate NO_3 concentrations were 3 ppm or less for the Osmocote and Escote treatments. Leachate NO_3 concentrations from the Woodace briquette treatment were greatest on days 100 and 150 and were significantly greater than the levels from other treatments on these dates. Leachate NH_4 concentrations on day 7 ranged from 47 to 89 ppm, but by day 100 leachate NH_4 concentrations were 5 ppm or less in all treatments. These leachate nitrogen concentrations after day 100 were most likely below those needed to stimulate optimal growth.

LITERATURE CITED

- Fuller, D. L. and W. A. Meadows. 1986. *Effect of Osmocote rate and placement on the production of three gallon woody ornamentals*. Proc. SNA Res. Conf. 31:90-92.
- Hershey, D. C. and J. L. Paul. 1982. Leaching-losses of nitrogen from pot chrysanthemums with controlled release or liquid fertilization. *Scientia Hort.* 17:145-152.
- Knox, G. W. 1986. *Nutrient availability from a liquid and two slow-release fertilizers on 'Pink Ruffles' azalea and 'Shore' juniper*. Proc. SNA Res. Conf. 31:58-62.
- Laiche, A. J., Jr. 1986. *Growth of selected container-grown woody ornamentals fertilized with Woodace briquettes*. Proc. SNA Res. Conf. 31:51-55.
- Meadows, W. A. and D. L. Fuller. 1986. *Effect of Osmocote placement on release patterns of nitrogen and potassium in a pine bark medium*. Proc. SNA Res. Conf. 31:85-89.
- Yeager, T. H. and D. L. Ingram. 1986. *Nitrogen release from Woodace briquettes*. Proc. SNA Res. Conf. 31:56-57.
- Yeager, T. H., R. D. Wright, and S. J. Donohue. 1983. Comparison of pour-through and saturated pine bark extract N, P, K and pH levels. *J. Amer. Soc. Hort. Sci.* 108 (1): 112-114.