CONTROLLED-RELEASE FERTILIZER AND PLANT GROWTH OF GLOXINIA AND TUBEROUS BEGONIA

Experiments were conducted at Antonelli Brothers Nursery, Santa Cruz, in 1968 to evaluate different types of controlled-release fertilizer products. The trial was designed to answer several questions.

(1) Is controlled-release fertilizer valuable for short term nursery crops?
(2) What nitrogen rate should be applied?
(3) How effective are the different slow-release products?
(4) Can slow-release be combined with a periodic liquid feed program?

Three varieties of tuberous begonias and three varieties of gloxinia were studied. Uniform sized seedlings were potted in 4" pots May 13, 1968. Growth was recorded at two intervals after planting. All growth data is reported as a plant growth index. The index was obtained by multiplying the height of the plant by its diameter and dividing the product by two.

Controlled-release materials tested were: Isobutylidene diurea (IBDU), urea-formaldehyde (UF), MagAmp and Osmocote (18-9-9). Each was evaluated at two rates of preplant incorporation -- one-half pound and one pound of actual nitrogen per cubic yard of mix. Treble super-phosphate and potassium levels to be equal to the Osmocote treatment. Potassium sulfate also was added to the MagAmp treatment to adjust the potassium level to that of the other plots. The phosphorus in the MagAmp treatment was much higher than in the other treatments because of the analysis of the product used (7-40-6). Calcium carbonate limestone also was added to all treatments at the rate of seven and one-half pounds per cubic yard.

The soil mix consisted of 7 parts redwood sawdust, 2 parts peat moss and 1 part sandy loam soil. Laboratory analyses showed this mix to have excellent chemical and physical properties. (Table 1)

Table 1 - Physical and chemical properties of soil mix

Cation exchange capacity	- 23.0 me/100g
Bulk density	- 0.33 gram/cc
Hydraulic conductivity	- 33 centimeters per hour

All plants were initially placed in a greenhouse, but the begonia seedlings were moved to a cool lathhouse one month after planting. The initial irrigation consisted of a solution of Dexon at the rate of 70 parts per million. The second application of Dexon at 85 ppm and Terrachlor at 55 ppm were applied to the gloxinia plants five weeks after planting.

All treatments received identical irrigation and periodic liquid fertilizer treatments.

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Plant growth was influenced by the fertilizer material and the rate of application. The varieties responded somewhat differently. Use of controlled-release nitrogen fertilizer resulted in better growth of all plants. The check treatments received only periodic liquid fertilization. The differencesin plant growth due to different products were initially large. The growth of urea-formaldehyde and IBDU treated plants was larger than that obtained with either MagAmp or Osmocote. The differences were much more apparent with begonias than with gloxinias. The differences 10 weeks after planting were somewhat less than were found earlier at five weeks. However, plants receiving urea-formaldehyde or IBDU were larger than those receiving MagAmp or Osmocote.

CONTROLLED-RELEASE FERTILIZER AND PLANT GROWTH OF GLOXINIA AND TUBEROUS BEGONIA (continued)

The 1/2-pound rate of nitrogen incorporation was superior to the 1-pound rate in all cases. The application of one pound of nitrogen per cubic yard resulted in overfertilization symptoms for all plants and all varieties. The initial overfertilization was overcome when urea-formaldehyde or, in some cases, IBDU, was used. Overfertilization with the other two materials often resulted in a continued suppression of growth. Again, varieties and plants responded differently.

The results are summarized in table 2.

These results suggest the following conclusions:

(a) With these short-term crops, use of controlled-release nitrogen had advantages over periodic liquid feed alone.

(b) The optimum rate of nitrogen incorporation varied somewhat with plant species and variety, but a rate of one-half pound of actual nitrogen per cubic yard was safe for the plants tested.

(c) Some difference in plant growth was found due to fertilizer material.

"Controlled-Release Fertilizer and Plant Growth of Gloxinia and Tuberous Begonia" was prepared by D. S. Farnham, farm advisor, Santa Cruz County, John M. Rible, extension technologist, Riverside, and Dr. Tokuji Furuta, extension ornamental horticulturist, Riverside.

For further information, refer to the April 10, 1969, issue of "Florists Review".

Table 2 - Growth of Begonia and Gloxinia Receiving Different Amounts and Types of Controlled-Release Fertilizer

Begonia - Rose Form Picotee

Fert. 1/	Rate 2/	Red		Pink		Apricot	
		5 wk	10 wk	5 wk	10 wk	5 wk	10 wk
UF	1/2	103.5	149.9	102.2	154.6	64.6	108.5
	1	73.6	129.0	57.0	101.5	84.8	129.1
MagAmp	1/2	84.8	138.5	87.7	132.8	55.9	104.7
	1	79.8	132.3	51.9	85.2	53.2	92.5
Osmocote	1/2	56.6	57.6	95.6	150.9	108.4	153.9
	1	37.0	28.8	48.5	30.4	39.8	27.2
IBDU	1/2	93.4	156.5	112.0	169.9	88.5	137.9
	1	54.4	77.6	51.9	60.8	43.4	54.4
Control	0	23.7	28.3	28.0	27.9	19.3	22.9

Gloxinia

Fert. 1/	Rate 2/	Kiss of Fire 5 wk	Kiss of Fire 9 wk	Fred G 5 wk	Fred G 9 wk	Diane 5 wk	Diane 9 wk
UF	1/2	42.7	119.9	28.3	81.9	31.2	99.5
	1	43.2	92.7	25.8	58.6	32.1	104.8
MagAmp	1/2	38.8	107.8	24.6	74.4	23.2	81.6
	1	35.4	95.8	29.2	75.6	30.9	97.0
Osmocote	1/2	44.0	109.7	31.7	78.8	28.4	92.0
	1	29.9	56.5	26.9	46.1	13.9	27.8
IBDU	1/2	29.0	90.5	27.5	76.1	29.9	85.4
	1	27.5	75.8	24.2	51.2	28.4	60.6
Control	0	9.5	34.7	20.3	41.8	17.5	39.4

1/ UF - Urea-formaldehyde; MagAmp - (7-40-6); Osmocote - (18-9-9); IBDU - Isobutylidene diurea.

2/ Pounds N/cubic yard preplant incorporation.