

**Poinsettia Growth in Five Root Media with
Continual Or Pulse Fertilization**

Jay S. Koths, Extension Floriculturist
Robert Adzima, Greenhouse Manager

Poinsettias may be grown successfully in a wide range of root media and fertilizer regimes. In these experiments, even the worst plants were commercially acceptable although the best plants might have commanded a higher price.

Experimental Procedures: Experiment #1. On August 25, 1985 twenty seven 'Annette Hegg Dark Red' poinsettias were planted in 6" plastic azalea pots in each of five media: UConn 1:1:1 (compost:peat:perlite), Reddi-Earth, Metro-Mix 350, Fafard #3 and Pro-Mix BX. The media were watered with 20-10-20 at 300 ppm N prior to planting and at each irrigation. Since many plants died in Reddi-Earth and Metro-Mix 350 due to improper watering, they were replaced by plants originally planted for Experiment #2. They were pinched September 9 but some of the cuttings were so spindly that not all of them had five good nodes. Cycocel (1:60) was applied on 9/23, 10/7 and 10/21. Temperatures were held at 60°F nights (heat to 65° day, vent at 80° with CO₂), raised to 65° 10/24, dropped to 60° 11/15, 55° 11/21 and 50° 11/25. Tissue samples were taken 10/25 and soil samples on 10/25 and 11/28. Data was taken 11/28. Horizontal air flow (HAF) was provided by a 16" duct fan in this 28 x 33' greenhouse section and CO₂ was supplied at ca 1000 ppm during the day except when vents were open more than 6".

Experiment #2. Since the Exp. #2 plants from the 8/25 planting (no initial fertilization) were used to replace those which died in Exp. #1, a second planting (13 per medium) was made on 9/5 in the same media as Exp. #1, but without fertilization, using callused cuttings which had been rooted in Jiffy 7's. They were fertilized weekly with 19-5-24 (6 parts KNO₃, 2 Ca(NO₃)₂, 2 Urea and 1 NH₄H₂PO₄) at 450 ppm N until 10/17, then 15-0-18 (3 parts Ca(NO₃)₂, 2 KNO₃) at 450 ppm N through 11/21.* All other procedures were as in Experiment #1.

* Analyses of these solutions by W. R. Grace indicate that actual levels of all fertilizers used in this experiment were lower than calculated.

We thank W. R. Grace, Inc. for supplying plants, media, fertilizer and testing service, Paul Ecke Poinsettias for plants, Conrad Fafard, Inc. for media and Premier Brands, Inc. for media.

In both experiments, the pots were placed randomly on the bench in three blocks. One block was used for the 10/25 tissue and soil tests and no further data was taken on these plants. The random placement was unfortunate since differential water requirements placed the 1:1:1 medium at a severe disadvantage which was not noted until irreversible damage had occurred due to overwatering, especially in Experiment #1.

Table 1: Poinsettia 'Annette Hegg Dark Red' growth in five root media with two fertility programs.

Fertilizer	Medium	Pollen Date (Nov.)	Plant Height (cm)	Plant Width (cm)	Plant Height + Width (cm)	No Bracts	Largest Bract (cm)	Fresh weight (g)	Dry weight (g)
**20-10-20	Reddi-Earth	24.4	37.1	37.7	74.8	4.8	28.0	92.2	15.9
ø 300 ppm	*UConn 1:1:1	24.9	33.9	32.0	65.9	4.6	25.0	60.3	10.2
N continu-	Fafard #3	25.0	40.1	43.5	83.5	5.1	28.8	107.3	19.4
ous	Metro-Mix 350	24.6	36.7	39.5	76.2	4.2	29.2	107.1	19.6
	Pro-Mix BX	24.2	35.9	34.4	70.3	4.7	26.2	72.2	12.5
**19/5/24	Reddi-Earth	23.8	36.6	39.5	76.1	5.8	29.6	107.8	19.1
15-0-18	*UConn 1:1:1	23.9	36.6	40.0	76.6	5.8	29.8	95.2	18.2
ø 450 ppm	Fafard #3	23.0	36.0	38.4	74.4	6.1	28.6	102.7	19.0
weekly	Metro-Mix 350	23.6	36.6	41.1	77.7	5.9	30.5	115.1	20.4
	Pro-Mix BX	23.4	37.6	39.6	77.2	6.0	29.0	110.8	20.2

*UConn 1:1:1 mix, containing soil, was overwatered in early stages of growth.
 **Direct comparisons of data due to fertilization cannot be made since the cuttings were not from the same supplier.

Discussion: For statistical veracity, the five media in this experiment were randomly distributed on the bench. It was impossible for the grower to adequately ascertain which pots required differential watering. As a consequence, the 1:1:1 medium containing soil was grossly overwatered and growth was reduced.

This overwatering of a medium containing soil reinforces the observation of growers who find that such media require less frequent watering than soilless media. In this experiment, it would seem that 1/4 to 1/3 less water would have been appropriate in early stages of growth.

Many researchers have found that up to 300 ppm nitrogen from a fertilizer such as 20-10-20 applied at every watering will produce good poinsettias. This has been considered excessive in Connecticut where 200 ppm N has been recommended. In these trials, 300 ppm N was found to be excessive even though an injector malfunction actually applied less than 300 ppm N for some time.

Randomly mixing the pots containing different media on the bench caused another problem. The poinsettias were rooted in Oasis blocks. These have been reported to require excessive watering to establish plants in the pot. But this

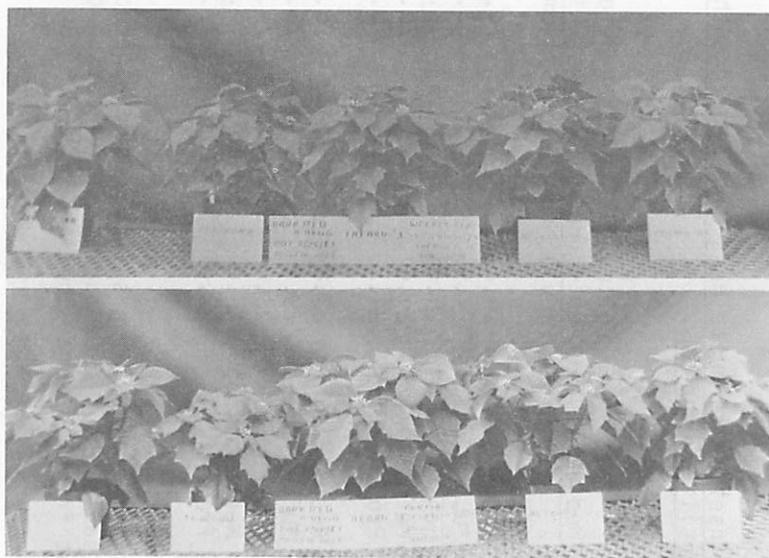


Figure 1. Poinsettia growth with continual fertilization (top row) at 300 ppm N or weekly (bottom row) at 450 ppm N in Reddi-Earth (left pots), UConn 1:1:1, Fafard #3, Metro-Mix 350 and Pro-Mix BX (right pots).

varies with the medium. In Fafard #3 and Pro-Mix BX, all 27 plants in each treatment did not wilt in Exp. #1 in spite of the extremely high temperatures which occurred following planting on August 25. In Metro-Mix 350, 16 were severely wilted after four days while 17 wilted in Reddi-Earth and 3 in 1:1:1. These were replaced by plants originally planned for Exp. #2 where no fertilizer was initially applied.

Since some of the plants for Exp. #2 (weekly fertilization) were used to replace those which died in Exp. #1, a new set of plants was potted for Exp. #2 on September 6. These had been received as callused cuttings from Paul Ecke, Inc. and rooted in Jiffy 7's. No loss occurred in any medium. The plants were of better quality.

A significant observation in this research is the effect on pH. The weekly 450 ppm N UConn fertilizer schedule of 19-5-24 until Oct. 17 followed by 15-0-18 through Nov. 21 resulted in much higher pH levels than 20-10-20 at 300 ppm N at each irrigation. This is summarized in Table 2.

On inspection, these results indicate that 20-10-20 will depress the pH an average of about 0.8 units for these five root media. but, averaging the results from two testing laboratories, the pH depression through the use of

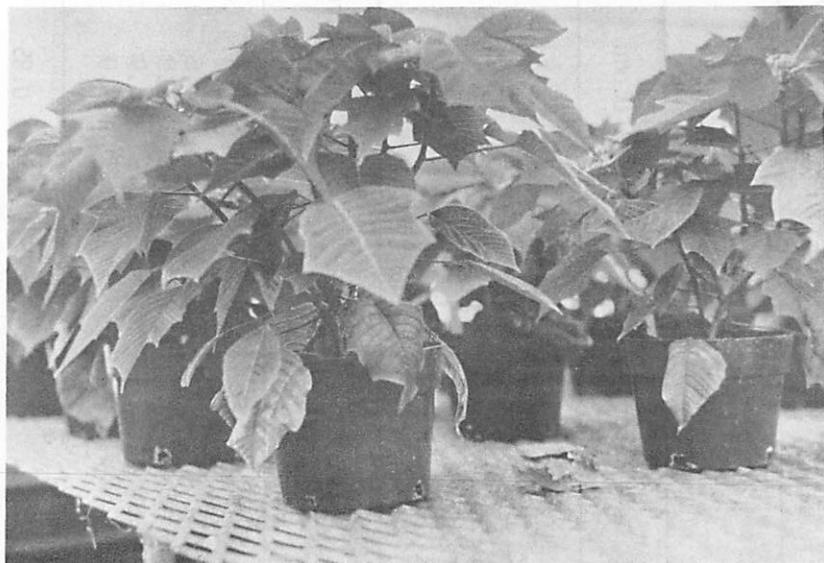


Figure 2. Lower leaf burn and abscission on poinsettias fertilized with 20-10-20 at 300 ppm N at each irrigation.

Summary:

1. Reddi-Earth and Metro-Mix 350 require more water to establish Oasis-propagated poinsettias than do Pro-Mix 8X, Fafard #3 or 1:1:1.
2. Continual fertilization with 20-10-20 at 300 ppm N is an excessive rate; weekly fertilization at 450 ppm N (19-5-24 and 15-0-18) produced plants with equally good foliage color even though soil tests showed relatively low values (plants from the two experiments cannot be directly compared due to the different cutting source).
Assuming about four irrigations per week, the ratio of fertilizer N used was 3 (cont.):3(pulse). The cost is about 5:1. At 300 ppm N, 20-10-20 costs a bit less than \$0.01/gal. A 6" poinsettia should use a bit less than 5 gals. water. The comparative fertilizer costs are \$0.05 vs. \$0.01, so low that a very small difference in growth will overshadow fertilizer costs.
3. The excessive fertilization rate (20-10-20 @ 300 ppm N continuously) caused lower leaf burn and abscission. This detracted little from the appearance of the plant but is a significant warning.
4. Three applications of Cycocel at 1:60 is more than recommended for Connecticut; the plants were quite compact.
5. In greenhouse experiments, environmental conditions (especially with Horizontal Air Flow) do not vary enough to warrant random placement of plants. They should be grown in replicated blocks large enough so that cultural variations such as differential watering can be better noted and corrective measures taken.
6. With continual fertilization at 300 ppm N, Fafard #3 produced the largest plants although fresh and dry weights did not differ from Metro-Mix 350.
7. Under weekly fertilization at 450 ppm N, no significant differences in plant growth occurred although the dry weight of those grown in 1:1:1 was less due to overwatering in the early stages of growth.
8. With relatively pure water for irrigation, the pH of greenhouse soils tends to drop, especially with acidic fertilizer use, as shown in these experiments.

**1984 New England Greenhouse Conference
Sheraton Sturbridge Resort and Conference Center
October 22-23-24, 1984**

The 1984 New England Greenhouse Conference has a new look! It will differ in many ways from past conferences. It has moved to the Sheraton in Sturbridge, Massachusetts to increase the facilities available for you. Here are some of the details.

The official sponsor is the Connecticut Florists Association. It is co-sponsored by the Northeast Regional Agricultural Engineering Service so you may expect a few more engineering subjects.

It is now THREE DAYS. The Trade Fair opens on Monday afternoon and there is an evening program.

Extra Attractions include Old Sturbridge Village along with motels for overflow attendees and a variety of restaurants.

The Sheraton Sturbridge is located on Route 20 across from Old Sturbridge Village and is just minutes from I-86 and the Mass. Pike.

You should have received registration materials by now. If not, you can call Dr. Everett Emimo, Registration Chairman, on 203-486-2924.

Hope to see you in Sturbridge!