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Fertilization of 'Angelika Red' Poinsettia using Commercially Prepared Formulations

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Nitrogen deficiency has been seen on 'Gutbier V-17 Angelika Red' poinsettias *(Euphorbia pulcherrima* Willd. ex Kl.) portions of the midwestern United States. Poinsettia growth is inferior under an NH_4-rich regime in comparison to a NO_3-program (Lawton et al., 1989). The objective of this study was to determine appropriate production and finishing fertilization programs using commercially available fertilizers to produce quality 'Angelika Red' poinsettias.

Rooted cuttings of 'Angelika Red' were potted on 31 Aug. and grown in 1.7-liter azalea pots filled with either a soilless growing medium (Metro-Mix 510, Grace-Sierra, Milpitas, Calif.) or a soil-based medium [1 soil : 3 sphagnum peat : 3 perlite (v/v) amended with dolomitic lime at 3 $kg \cdot m^{-3}$]. Plants were divided into three groups to receive 300 mg N/liter at each irrigation from three production fertilizers (PROD): 15N-7P-14K (53% NO_3-N, 22% NH_4-N, 25% urea-N) or 20N-4P-17K (60% NO_3-N, 40% NH_4-N) Peter's Peat-Lite Specials, or 20N-9P-17K (28% NO_3-N, 20% NH_4-N, 52% urea-N) Peter's General Purpose (Grace-Sierra, Fogelsville, Pa.).

The finishing program was initiated on 20 Nov. while the inflorescences were completing bract expansion. Half of the plants grown in each medium and under each PROD program were either irrigated with tap water only or with Peter's Poinsettia Finisher 15N-9P-21K (47% NO_3-N, 27% NH_4-N, 26% urea-N) at 300 mg N/liter at each irrigation.

Commercial poinsettia production procedures were followed with regard to pinching and pest control (Ecke and Matkin, 1976). Plants were grown at 26/18C (day/night) under natural daylengths until 3 Oct., then short days were maintained using black cloth. Night temperature was reduced to 16C. No growth-regulating chemicals were used.

The experiment was arranged as a 2 x 3 x 2 factorial in a completely randomized design using three replications per factor combination with three single plants per replication. Data were collected when the plants were marketable. Inflorescence diameter was measured across the widest part of the bract display of the upper two lateral branches. Plant parts were separated for drying at 65C. Foliar N was determined by micro-Kjeldahl (Soil and Plant Tissue Laboratory, Dept. of Agronomy, Kansas State Univ.). The 20N-9P-17K/water program was considered the control; it was under these conditions that N-deficiency symptoms occurred.

Growing medium had no effect on the attributes measured. Data in Table 1 are means pooled over medium.

Plants produced with 20N-9P-17K had reduced stem dry weight in comparison with plants on the 20N-4P-17K PROD (6.7 g, 7.3 g,and 5.8 g for 15N-7P-14K, 20N-4P-17K, and 20N-9P-17K PROD programs, respectively, $LSD_{0.01}$ = 1.1 g).

All programs produced plants that had acceptable foliar-N levels (Cox and Seeley, 1983, 1984), and none produced visual symptoms of N deficiency. Under the 15N-7P-14K/water program, plants had reduced dry weights, yet bract size and total foliar N were not affected in comparison to other programs. Bract dry weight was highest for plants in the 20N-4P-17K/water program. The plants under the 15N-7P-14K/15N-9P-21K program had the lowest foliar-N levels and the highest total plant dry weight. Inflorescence diameter was smallest for plants in the 20N-9P-17K/water program, yet bract size for plants in the 20N-9P-17K/15N-9P-21K program did not differ from other PROD programs. The proportion of NO_3-N (47%) in 15N-9P-21K may have aided final bract enlargement. This effect was not seen with the other two PROD programs, possibly due to adequate NO_3-N levels available throughout crop development. This contrasts with Lawton et al. (1989) who produced poinsettias using only 15N-7P-14K, which has slightly more available N in the NO_3-form than 15N-9P-21K.

Because 1) there were no visual N-deficiency symptoms, 2) inflorescences were of desirable size, 3) total plant dry weight was satisfactory, and 4) foliar-N levels were within acceptable levels, the 15N-7P-14K/15N-9P-21K and the 20N-4P-17K/water programs or similar fertilizers are recommended for 'Angelika Red' poinsettias.

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Table 1. Dry weights, inflorescence diameters, and total foliar N as influenced by production fertilizer and finishing program for 'Angelika Red' poinsettia.

Growth measurement	Finishing program	Production fertilizer 15N–7P–14K	20N–4P–17K	20N–9P–17K
Dry wt (g)				
Stem	Water	6.2	7.7	6.0
	15N–9P–21K	7.1	6.9	5.5
	LSD NS			
Leaves	Water	6.3	7.3	7.9
	15N–9P–21K	9.3	6.5	6.5
	$LSD_{0.05}$ 2.8			
Bracts	Water	8.2	10.3	8.4
	15N–9P–21K	9.4	8.9	9.1
	$LSD_{0.01}$ 1.6			
Total	Water	20.7	25.2	22.3
	15N–9P–21K	25.9	22.2	21.1
	$LSD_{0.05}$ 3.8			
Inflorescence diam (cm)				
First	Water	34.3	34.5	32.3
	15N–9P–21K	34.3	34.9	34.8
	$LSD_{0.05}$ 1.5			
Second	Water	34.1	34.5	31.4
	15N–9P–21K	34.5	34.3	35.1
	$LSD_{0.05}$ 2.2			
Total foliar N	Water	4.01	3.61	4.01
(%)	15N–9P–21K	3.48	3.81	4.08
	$LSD_{0.01}$ 0.46			

[NS]Production fertilizer × finishing treatment interaction not significant for this measurement.

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