Sequential nutrient pulsing: pot mums

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Purpose

To study if the proposed concept of sequential nutrient pulsing is as effective as a constant fertilizing schedule on the growth and development of Chrysanthemum morifolium cultivar Twilight.

Procedure

Fifty-one rooted cuttings of the cultivar Twilight, supplied courtesy of Stafford Conservatories, Stafford Springs, CT. were planted on Feb. 4, 1986, one per 4 1/2 inch plastic square pot, using a pasteurized soil mixture of equal parts of composted soil, sphagnum peat and perlite. The root medium was amended with 14 lb. 12 oz. dolomitic limestone, 4 lb. 2 oz. 0-20-0, 1 lb. 13 oz. (5-10-3) Electra and 6 lb. 11 oz. (14-14-14) Osmocote per cubic yard. The potted cuttings were placed on a capillary mat and provided short night conditions. All plants were misted periodically for the first several days to prevent excessive wilting.

Watering of the plants followed established practices and schedules during short day treatments. Fertilization schedules utilized a sequential four-part pulsing scheme using the equivalent of a 15-0-18 fertilizer composed of potassium chloride 0-0-60 and calcium nitrate is 15.5-0-0 and based on a nutrient equivalent of 600 ppm N. A one gallon stock of each component was made as follows: 0-0-60 (2.56 oz./gal.) and 15.5-0-0 (8.32 oz./gal.). For specific dilutions of the stocks and specific sequence of application refer to treatments below.

The plants were pinched at the onset of long nights on Feb. 14. The pinch was made to allow 7 leaves to remain on each plant. In conjunction with pinching, the plants were divided into three groups of 17 plants each and spaced on 8 1/4 inch centers, allowing for 6 pots per row across a 4 ft. expanded metal topped bench.

For height control, daminozide (B-Nine) was applied at 0.25%, when the lateral shoots were approximately one inch long as a spray to the point of run-off.

Treatments

Each pot was filled to the rim at each irrigation. Plants in each treatment were irrigated at the same time when they were dry enough to require watering.

1. Continual (C): the plants in this treatment received the equivalent of 150 ppm N and 180 ppm K_2O with each irrigation using 2 oz. of each stock solution per gallon of irrigation water.

2. Nutrient Pulse (NP): 8 oz each of the 0-0-60 stock and 15.5-0-0 stock solutions per gallon of irrigation solution. Use the following sequence of irrigation and repeat.

    1. fertilize 600 ppm N plus 720 ppm K_2O
    2. water
    3. water
    4. water

3. Sequential Nutrient Pulse (SNP): 8 oz. of the 0-0-60 stock to make a gal. of solution and 8 oz. of the 15.5-0-0 stock to make a gal. of solution. Use the following sequence for irrigation and repeat.

    1. 0-0-60 (720 ppm K_2O)
    2. water
    3. 15.5-0-0 (600 ppm N)
    4. water

Data Obtained

1. Date of anthesis was 4/14 to 4/17
2. Diameter of flowers
3. Number of flowers and buds showing color per plant
4. Plant height (measured from pot rim)
5. Plant weight (fresh)

Table 1. The effect of plant height and flower diameter of various nutrient pulsing schemes on Chrysanthemum morifolium cultivar Twilight.

	Treatments		
	C	NP	SNP
Plant Ht. (cm)	14.56	14.06	14.08
Flower Dia. (cm)	7.35	7.20	7.37

means analyzed using analysis of variance at the 0.05 level of significance. No significance was found.

Table 2. The effect on plant fresh weight of various nutrient pulsing schemes on Chrysanthemum morifolium cultivar Twilight.

	Treatments		
	C	NP	SNP
Fresh wt. (gm)	59.31a	55.19b	52.33 b

means analyzed using analysis of variance at the 0.05 level of significance LSD = 3.51.

Table 3. The effect on number of flowers per plant of various nutrient pulsing schemes on Chrysanthemum moriofolium cultivar Twilight.

	Treatments		
	C	NP	SNP
No. flowers	5.59a	5.69a	6.24b

means analyzed using analysis of variance at the 0.05 level of significance LSD = .235. SNP resulted in a significantly higher number of flowers.

Conclusion

The greater number of flowers produced with the sequential nutrient pulse (SNP) would indicate that increased amounts of nutrients applied separately have a significant influence on flower bud development. If the number of flowers is multiplied by the flower area, the flower display with SNP was 12% greater than C, 15% greater than NP. If a rating system has been employed SNP might have ranked higher.

Statistically, there was a significant increase in fresh weight of plants under the continual (C) fertilization schedule shows itself to be the most effective application method of crop nutrition for overall growth, since plant weight denotes the amount of overall growth.

The authors recognize that there may be an indication that SNP has merit but do not believe that this study provides conclusive evidence.