Colorado Flower Growers Association

IN COOPERATION WITH COLORADO A & M

Secretary, Ray App, 4434 Colorado Blvd., Denver, Colorado

Bulletin 46 August 1953

College Day to be September 16

Organized tours of the Research Greenhouses on West Lake Street from 10 a.m. to 12 noon. New laboratory and propagation facilities will be of special interest.

Luncheon on your own at the Student Union Cafeteria.

The afternoon session is scheduled in the Student Union. During this session reports will be made by the staff on work completed the past year. Some work in progress may get additional attention at this session. A detailed program will be included in the September Bulletin. Reserve the 16th on your calendar.

Carnation Mother Stock Must Have Ample Nitrogen

by R. E. Odom

Nitrogen nutrition of carnation mother stock affects the number and size of cuttings produced and especially the performance of the plants resulting from these cuttings. Nitrogen deficient stock produce fewer side breaks and are slower to clear these breaks than plants from stock which has had sufficient nitrogen. The effects of potassium and phosphorus on the cuttings or resulting plants are not as striking or as easily measured as the nitrogen effects.

All possible combinations of 3 levels of nitrogen, 2 levels of phosphorus, and 3 levels of potassium were tested on White Sim carnation stock plants. Eighteen plots of 21 plants each were planted Sept. 13, 1952, to study the effects of these nutrients in combination on the production of cuttings and the rooting and growth responses of the resulting plants. Ammonium nitrate applied at the rate of $\frac{1}{2}$ pound per 100 square feet of bench area was used as the source of nitrogen. The nitrogen levels were maintained from normal to deficient by varying the number of applications in a ratio of 3:2:1. Phosphorus levels were maintained at high and normal by incorporation of treble superphosphate, at the rate of 5 pounds per 100 square feet, in the soil of the high plots before planting. Potassium chloride applied at 1 pound per 100 square feet regulated the potassium levels from high to low by varying the number of

Carnations Are Tolerant to a Wide Range of Soil Moistures

by W. D. Holley

Carnations can be grown drier without detriment to production or quality. Considerable saving in labor may be accomplished by less frequent irrigation.

The plants should be adapted to drier soils by watering them each time at approximately the same moisture tension. Carnation plants adapted to moist soils may be severely checked by sudden drought.

Work done at Colorado A & M from 1949 to 1951 established the fact that carnations are not sensitive to soil moistures in the higher range, i.e., when watered at moisture tensions from 3 to 9 inches of mercury. No differences in total production resulted from the different moisture levels, however watering when the soil moisture tension reached 9 inches improved the quality of carnations over those from soils kept more moist. This work was published in detail in Colo. Flw. Gro. Buls. 26 and 27.

To explore the possibilities of growing carnations in still drier soils, 3 levels of soil moisture were tested during the 1952-53 season. The 3 moisture levels used were 9, 15 and 21 inches of mercury, the plots being watered thoroughly when moisture tensions reached these levels. The treatments were randomized within a bench and repeated 3 times. There were 21 White Sim plants in each plot spaced 6 x 8 inches. All plants were pinched, handled and fed in exactly the same manner. The production from September 1, 1952 to May 9, 1953 was graded by taking into consideration weight plus length. Providing the stems met Colorado length standards, they were graded into the following weight categories:

Short--10 to 14 grams
Standard--15 to 24 grams
Fancy--25 grams and up.

The average total production and production within each grade for each soil moisture is shown in Table 1. Variation of the separate plots in each moisture level was small. Although 15 inches of tension produced slightly more flowers the difference is not significant. In fact, through statistical analysis, none of the differences are significant.

Table 1. Average[a] production and quality of White Sim carnations produced by 3 soil moisture levels.

Moisture tension inches of mercury	Grade				Total production
	Split	Short	Standard	Fancy	
9	1.3	16.6	108.3	80.3	206.6
15	4.3	25.6	103.6	81.0	214.6
21	1.6	21.6	104.6	72.3	200.3

a/ Average for 3 plots of 21 plants each.

It should be emphasized that the different moistures were maintained from the beginning of the experiment. In this way plants became adapted to the drier soils. The total salt content of the soil was low. The specific conductance of the soil, as measured by a Solubridge at a 1 to 5 dilution, never exceeded 80.

The plants growing at a moisture tension of 21 inches occasionally showed visible signs of wilting just prior to watering. This moisture level also produced visibly shorter plants and harder foliage. The production or development of the flowers was not retarded, however, and the overall quality was approximately the same.

Table 2 shows the average number of waterings required to maintain each moisture level from Aug. 1 to April 30. These figures point out a real potential for saving labor.

Table 2. Average number of waterings per month required to maintain 3 levels of soil moisture.

Moisture tension inches of Mercury	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	Total
9	6.6	8.3	5.3	3.3	3.6	5.0	4.0	5.3	5.3	47
15	5.6	6.3	5.0	3.3	3.0	3.3	3.0	4.3	4.0	38
21	4.0	5.0	3.0	2.0	2.0	1.6	2.0	3.3	2.6	25.6

Bul. 46

applications in a ratio of 3:2:1.

Cuttings from these nutrient plots on Dec. 19, Jan. 13, and April 1 were rooted to observe rooting response. When removed from the rooting medium, the extent of rooting was arbitrarily divided into 4 catagories (Table 1).

Table 1. Rooting index of cuttings taken from the nutrient plots on December 19, January 13 and April 1.

		Rooting index a/			Rooting index a/			Rooting index a/
	High	3.40		High	3.24		High	3.39
Nitrogen	Medium	3.40	Potassium	Medium	3.32	Phosphorus		
	Low	3.20		Low	3.44		Low	3.28

a/ 1. No rooting
2. Slightly rooted
3. Medium rooted
4. Well rooted

When the cuttings were removed from the rooting medium, only slight differences were observed in rooting. Cuttings from the high nitrogen plots produced a slightly larger root system than those from the medium or low plots. There were no apparent differences due to potassium or phosphorus levels.

Cuttings taken April 1 were rooted and planted in a nursery bed and fed nitrogen by liquid feeding each time they were watered. The first pinch was made when the side breaks were plainly visible. Plants from the high nitrogen plots were ready for the first pinch 4 weeks after transplanting. Plants from the low and medium plots were pinched 1 to 2 weeks later. Some of the plants from the low nitrogen plots had cleared no side breaks after 6 weeks in the nursery bed.

Plants originating from high, medium and low nitrogen plots were separated and benched at normal spacing for further observations of growth and production. When all breaks had elongated, the number of breaks per plant was counted. The average number of breaks per plant was found to be 3.49 for plants from the high nitrogen plots, 3.18 from the medium and 2.87 from low. These were distinct differences.

Additional records were kept on the total number and average weight of cuttings from each nutrient plot. High nitrogen produced more and larger cuttings than either medium or low (Table 2). Potassium or phosphorus levels did not materially affect the number or size of the cuttings.

Table 2. Total number and average weight of cuttings taken from the nutrient plots.

		Total number of cuttings	Average weight per cutting in grams
	High	1836	5.70
Nitrogen	Medium	1374	5.30
	Low	929	4.81
	High	1400	5.07
Potassium	Medium	1360	5.38
	Low	1379	5.37
Phosphorus	High	2110	5.32
	Low	2029	5.23

Fig. 1 pictures the typical growth of carnation plants originating from stock plants grown at different levels of nitrogen. Numbers 1, 2, and 3 were from the low, medium and high nitrogen plots. Number 4 is representative of cuttings from stock plants maintained at an even higher nitrogen level than that for number 3. The plants were photographed 47 days after they were removed from the propagating medium, during which time they were all fed adequate nitrogen.

Fig. 1. Carnation transplants propagated from mother stock which was grown (1) nitrogen deficient, (2) at medium, (3) high and (4) still higher soil nitrate levels.

From Edco News Letter - H. W. Ridgeway, Editor.

THERMOMETERS

Temperature control is one of the most important keys to greenhouse success. No one will question this, but how many growers are sure that their thermometers are reasonably accurate and place them in such a way that they are not effected by sun, heat pipes, or drafts?

A grower recently told us of going to purchase a new thermometer and finding that all of those in the store gave different readings even while they were lying side by side on the counter. Not only do new thermometers vary, but they tend to get out of order. Therefore, we will pass along a very simple method which anyone can use to check on the accuracy of your thermometers and we would suggest that all those in use be checked at least once a year so as to catch any breakage or changes.

Since melting ice, provided it is made from reasonably pure water, is always at approximately a temperature of 32°, simply place the thermometers to be tested in ice water containing ice, or in crushed ice. Allow them to remain one, marking on it the variation from 32°, if any. If you know how many degrees to add or subtract it is perfectly possible to use a thermometer which reads 5° high or 5° low and still keep your house where you want it. If your water is hard or contains much chlorine or any other chemical the freezing point will be lowered, and a more accurate reading may be obtained by using rain water.

We suggest that all greenhouse thermometers be placed in a three sided wooden box in such a way that the sun does not ever shine on them, and that they be placed in a part of the house which is average for that house. Because there is often considerable variation between different parts of a greenhouse it may be necessary to try several locations before finally placing each thermometer.

Unrecognized variations of greenhouse temperatures must cause many tens of thousands of dollars of losses every year. Accurate thermometers properly placed would largely eliminate this waste.

Your editor,

W D Holley

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FIRST CLASS