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Effect of Watering Treatment on the Growth of Carnations -- A Progress Report

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The purpose of this study is to 1) determine the general effect of three irrigation regimes on the growth and flowering of carnations, 2) what variations in response may be encountered during different seasons of the year and 3) when a particular watering level might have its greatest effect on growth.

Methods and Materials

Two east-west oriented greenhouse benches were divided into 18 soil plots (27 X 37 inches). The soil plots were further divided into three treatments consisting of 5 plots each. Twenty rooted White Pike's Peak cuttings were planted in each plot November 25, 1965. All treatments were watered similarly for the first two weeks with a Chapin system that distributes water uniformly over the surface of the plot.

Beginning the third week, 5 plots were watered when tensiometers placed in the plots reached 40 cm water (wet); 5 were watered when the readings reached 600 cm (medium) and 5 when a Bouyoucos resistance meter, attached to a gypsum block, reached a maximum reading of 15 kilohms (dry). All plots are read once daily between 8 and 9 am, and watered at that time if the values have reached or exceeded the above.

Mounted underneath each soil plot is a tank which serves as a collection reservoir for the water that drains through the soil. The amount of water applied at each irrigation, the amount drained and the amount retained in each plot is measured.

Preliminary Results

As light increases, and the plant becomes larger, more water is required. This change in water requirement is reflected in Figure 1 and Table 1. The amount of water applied per square foot per month increased in all treatments and the time between watering in any treatment decreased. The irrigation intervals between treatments decreased.

In December, the dry plots went an average of 24 days longer than the wet plots before watering, whereas, in March the interval was only 5 days. This suggests that growth was less affected by the treatment in March as compared to December and January. Long intervals between waterings during early stages of growth in carnations is more likely to visibly reduce potential growth.

It is apparent that considerable delay occurred when the soil was allowed to dry. This delay is reflected in the mean growth rate (Fig. 2) and the number of breaks produced under the three irrigation levels (Figs. 3 and 4). The wet treatment initially averaged 1.5 breaks more per square foot than the dry treatment and 1.2 breaks more per square foot than the medium treatment. When the potential secondary breaks are considered, the differences are markedly greater (Fig. 4).

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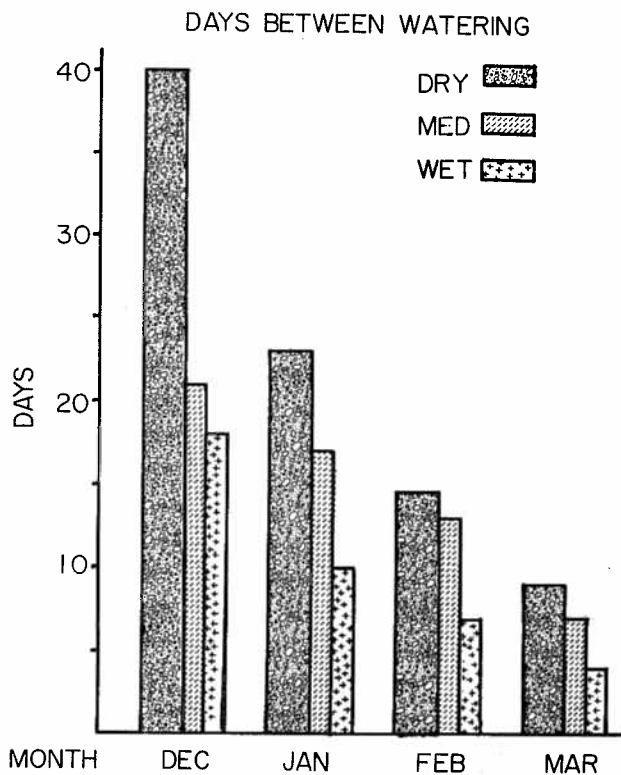


Figure 1: The average number of days required for three watering treatments to reach predetermined suction levels from December, 1965, through March, 1966.

Table 1: Gallons of water applied per square foot from December, 1965, to March, 1966.

Month	Treatment		
	Dry	Medium	Wet
December	0.04	0.70	0.72
January	1.26	1.28	1.72
February	1.75	1.87	2.92
March	3.62	4.10	5.26

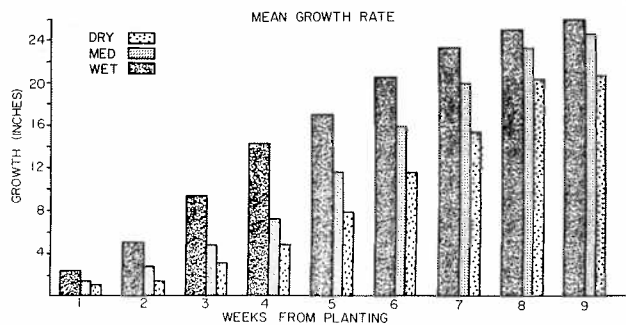


Figure 2: The effect of three levels of irrigation on the elongation of the first breaks (cumulative inches).

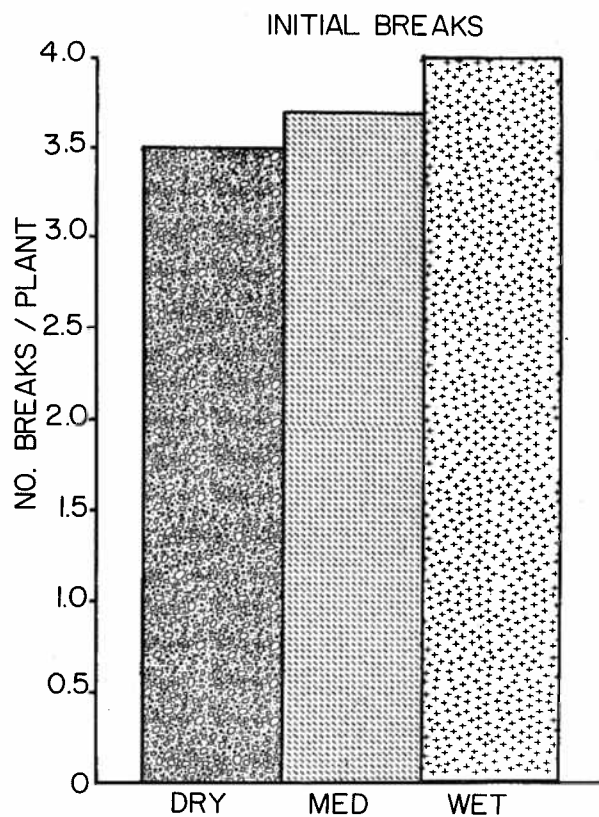


Figure 3: The mean number of breaks produced per plant from the first pinch under three watering levels.

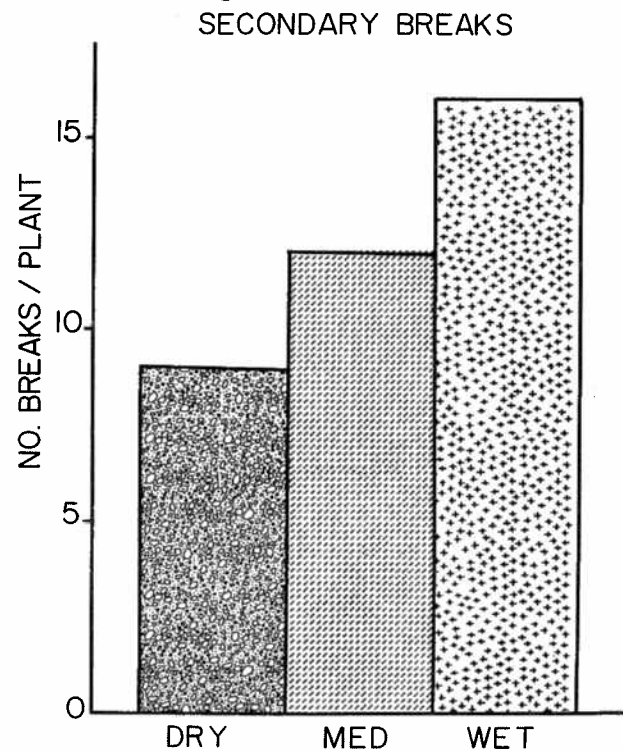


Figure 4: The mean number of secondary breaks produced per plant under three watering levels.



Figure 5: Effect of 3 irrigation intervals on growth of carnations. Benched Nov. 25, 1965, picture taken April 11, 1966.

It appears that the longer the interval between irrigations, the more likely is carnation growth to be reduced, lowering potential yield. On the basis of these preliminary results, the more water a carnation plant can receive, the higher the potential production. However, frequent irrigations may result in root damage, particularly in the early stages of growth when water requirements are low. Plants in the wettest treatments, during December, did show signs of slight yellowing, indicating root damage. Fortunately, this was not sufficient to markedly

reduce growth.

As shown in Table 1, the difference in the actual amount of water applied between wet and dry treatments was quite small (0.68 gallons in December and 0.46 gallons in January). The difference of 2.64 gallons in March can be attributed to smaller plants in the dry treatments.

It is too early to assess the effects of these treatments on flower quality, or to make definite statements. However, those who may be planting should look critically at their initial watering practices.