

Nitrate Levels, Light Intensity, Growing Temperatures and Keeping Qualities of Flowers Held at 31° F

By
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Soil nitrate had no effect on the keeping of carnations, chrysanthemums, and snapdragons whether or not they were held several days at low temperature. Low light intensity for short periods previous to cutting pompon chrysanthemums reduced the quality, reduced the possible holding period, and decreased the room temperature life. The keeping time at room temperature was reduced much more when flowers finished in poor light were held for a time at 31° F than when immediately placed at room temperature. High growing temperatures previous to cutting gave extremely poor quality and short-lived carnations.

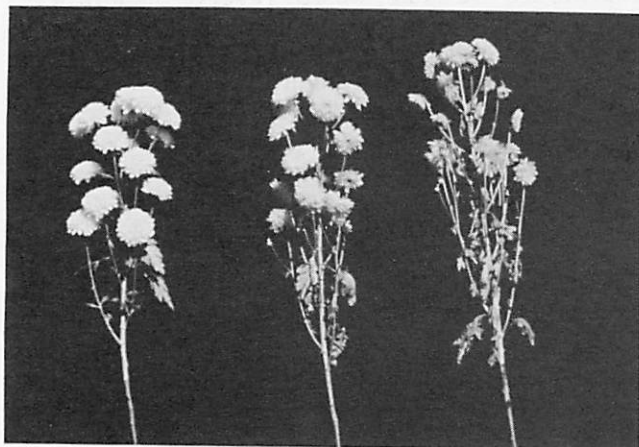
Nitrate Levels

Carnations, pompon chrysanthemums, and snapdragons were grown in benches of sterilized soil. The nitrates were adjusted with ammonium sulfate according to frequent soil tests (Spurway). Three levels of soil nitrates were maintained: low 2-14 ppm, medium 5-51 ppm, and high 20-82 ppm. Foliage color of the various crops indicated that nitrogen was low or deficient in the low plots, and in abundant supply in the high nitrate plots.

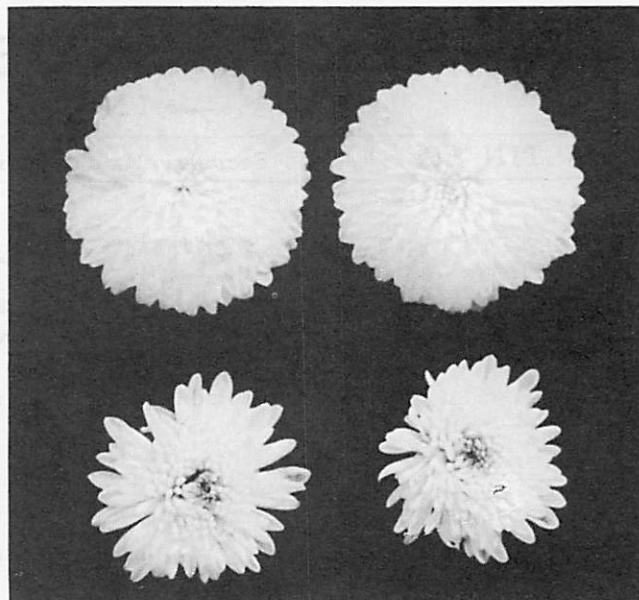
The flowers were cut at the proper stage of maturity and placed immediately in "Leverpak" drums. They were held at 31° F for varying lengths of time. On removal from low temperature, the stems were cut, and placed in 100° F water. The cans of hot water were placed in a 40° F refrigerator to cool for 24 hours. After hardening, the flowers were placed in the laboratory to determine their life and quality at room temperature.

While low nitrate levels reduced production as measured by weight and stem length for chrysanthemums and snapdragons, and by numbers and weight for carnations, flowers kept equally well grown with high or low nitrate.

Obviously, the grower should maintain recom-



Normal Light 1/2 Light No Light
 14 days 3 days
 before cutting before cutting
Gold Coast after 37 days at 31° F



Black centers (bottom) result if flowers are held too long. This develops earlier on flowers finished in low light intensity.

mended levels of nitrogen for quality production when flowers are to be held at 31° F.

Light Intensity

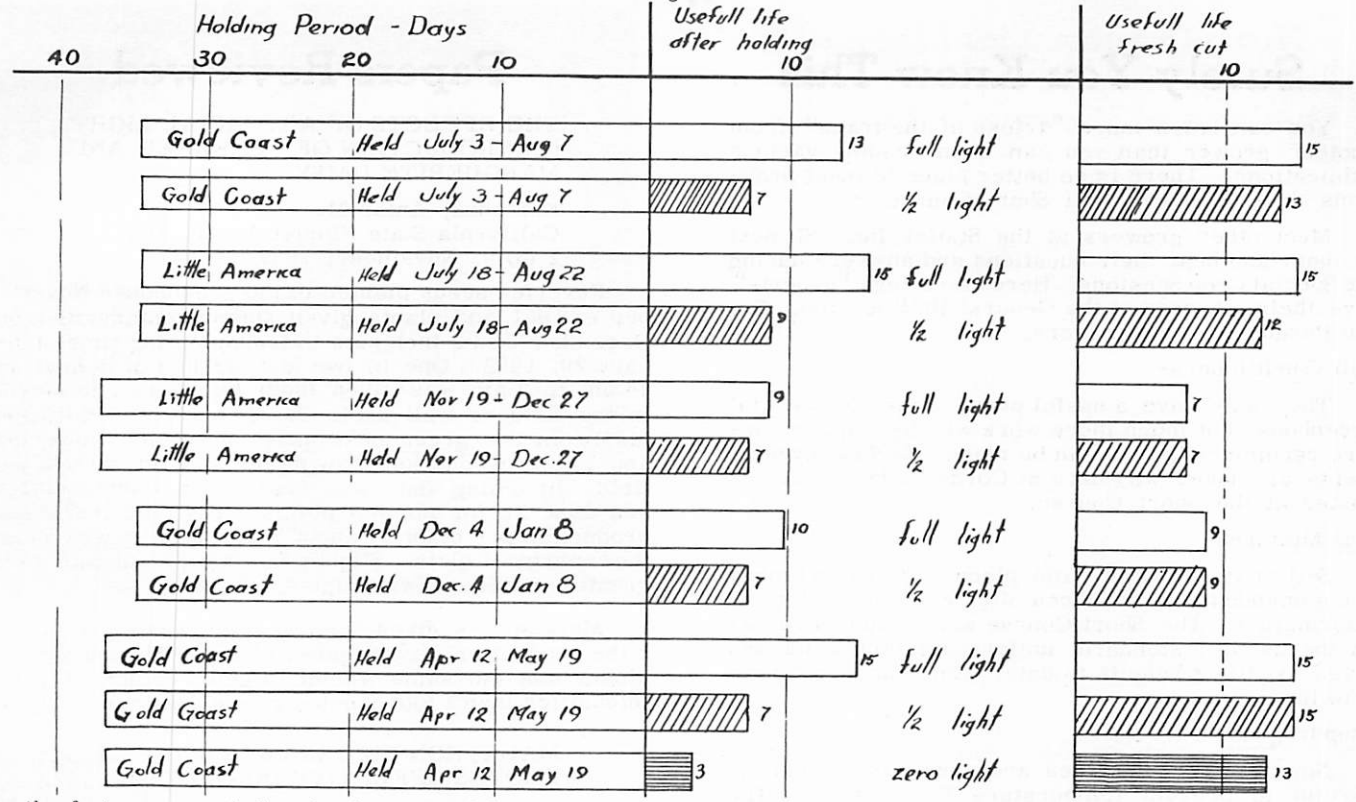
It is generally recognized that the higher the light intensity, the greater the production of any floricultural crop. Post and Howland (1946) found that the number of roses produced was directly related to the prevailing light intensity. Howland (1944) demonstrated that roses cut in the afternoon kept 7-11% longer than flowers cut in the morning. The longer life was attributed to more sugars in the flower resulting from photosynthesis during the daylight hours; while the shorter life of flowers cut in the morning was attributed to a low carbohydrate content resulting from respiration and translocation of food to other parts of the plant during the night.

Pompon chrysanthemums (varieties Gold Coast and Little America) were grown under normal light intensities at three different seasons of the year. The first crop matured during the high light intensity and temperatures of July; the second was cut during the low light intensity of December; while the third crop flowered during the period of increasing light intensity of March and April, but at a time of year when temperature control is possible.

For periods of 14 to 25 days previous to cutting, the plants were covered with two layers of cheese cloth to reduce the prevailing light intensity one-half. Other groups were covered with black sateen cloth for three to five days (24 hours a day) previous to cutting to reduce the levels of carbohydrates in the plant tissues. After cutting, the flowers were handled as outlined in the previous paragraph on soil nitrate levels.

Reduced Light Intensity

Whenever the prevailing light intensity was reduced, the keeping time after holding at low temperature was significantly shortened. The data for chrysanthemums is presented graphically. With normal light, Gold Coast chrysanthemums held at 31° F for 35 days kept 12 to 14 days after the holding period. They kept only 7 or 8 days if the light intensity was reduced one-half before cutting. Freshly cut Gold Coast grown with normal light kept 14-15 days at room temperature, while with one-half light, they kept one day less.



Length of storage period and subsequent life of pompon chrysanthemums as related to light intensity before storage.

room temperature, while with one-half light, they kept one day less.

Flowers grown with normal light and held beyond 30-35 days, kept inversely as the length of the holding period. With low light intensity prior to cutting, the life was shortened in extreme cases to zero days.

Season of the Year

The effect of reduced light intensity on the life of chrysanthemums was also influenced by the season of the year. Reducing the light intensity previous to cutting chrysanthemums in April or July reduced the post-holding keeping 5 or 6 days; while in the winter months, keeping was shortened only 2 days by reducing the light before cutting. The keeping time of flowers cut during the winter months was not affected by a reduction in light intensity previous to cutting if they were immediately placed at room temperature. The normal room temperature life of pompon chrysanthemums was also shorter than in the months of higher light intensities.

Appearance of Flowers

In addition to the effect on keeping, reducing the light intensity previous to cutting also affected the appearance of the flowers at the time they were removed from low temperature. Shorter periods of holding gave a less striking effect, but these differences appear within two days at room temperature with flowers that received reduced light.

The flowers have no sales value, and the incidence of "brown centers" is greatly increased. "Brown centers" appeared on all pompons held for more than 28 days at 31°F, and the crop should be grown with the highest light intensity prevailing previous to cutting.

Age of the Flower

Age of the flower is also important in the low temperature conditioning of chrysanthemums and other cut flowers. Flowers should be cut at a stage just

before their fullest development to keep best. In these experiments, pompon chrysanthemums were cut when the central florets had not fully expanded, while some of the crop was cut one week later. Little America, cut on 7/18/52 and held 35 days, kept 15 days at room temperature, while the same crop cut on 7/25/52 (1 week older) kept 10 days after 35 days at low temperature.

Growing Temperatures

Red Sim carnation plants were grown in 7-inch pots at 50° to 60°F. One week before flowers were to be cut, plants were moved to 40°F and 80°F. The flowers were cut after one week of treatment and held in Cellophane for four weeks at 31°F.

The high temperature of 80°F for one week before cutting resulted in flowers which kept only 3 days. Flowers from plants at 40°F for one week, kept 8 days while flowers grown at 50°F kept seven days. This shows the need for careful control of temperatures, whether or not the grower expects to hold carnations.



Grown at 50°F

80°F 1 week before cutting