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Temperature Classification of Chrysanthemum

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Flowering time of chrysanthemums was controlled by the interaction of daylength and temperature. Some varieties can be flowered only at certain times of the year; other varieties can be flowered successfully throughout the year. The ability of a variety to be flowered for a specific date entails an understanding of what the temperature range will be. Combining a temperature response variety and the time of year will make timing of crops possible. This study was made to determine the effect of a wide range of temperatures on the flowering of chrysanthemums.

The varieties were selected after consultation with Cloy Miller and others from Yoder Brothers, Barberton Ohio.

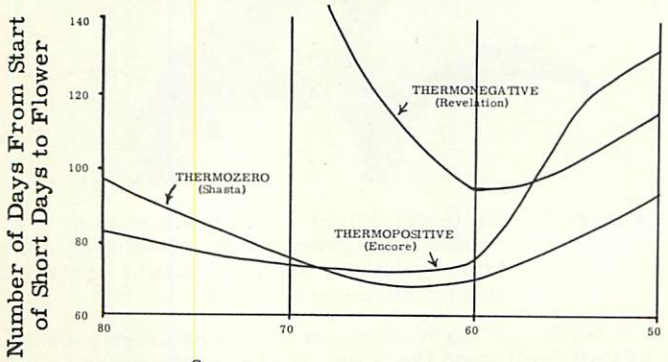
Variety	Weeks to Flower
Encore	10
Cameo	13
Dreamboat	10
Shasta	10
Revelation	14
Defiance	13

The cuttings obtained were used as stock plants. Stock was grown at 50, 60, and 80°F and long photoperiods (interruption of dark period from 10 p. m. to 2 a. m.). At the time of potting, start of short photoperiods, and when the buds were first visible ten plants were moved from the stock temperature to 50, 55, 60, 70, 80°F. The experiments were started December 28, 1951 and January 5, 1953.

The data included: (a) the date that short photoperiods were started, (b) the date that buds could be seen in the expanding growing point, (c) the date the bud showed color, (d) the date the flowers were open. The period of time from (a) to (b) is referred to as bud initiation. The period of time from (b) to (d) is referred to as bud development. The period of time from (a) to (d) is referred to as flowering time.

CHART I

Temperature Classification of Chrysanthemum Varieties



From 60°F stock--Above temperature (°F) at which plants were grown.

The results (Chart I) showed that the varieties used could be classified in their response to temperature as three types. Sixty degrees was used as the base temperature.

I Thermozero: Inhibition of flowering did not result in the temperature range from 50 to 80°F. Temperatures of 50° or 80°F continually gave a slight delay but 50°F through vegetation and bud initiation followed by 80°F during bud development delayed flowering by thirty-two days. The variety Shasta responded in such a manner.

II Thermopositive: Temperature of 60°F or above was necessary for initiation of flower buds. High temperature (60°F or above) during the stock plant, vegetative, and bud initiation and a medium temperature of 60°F during the bud development resulted in flowering in the minimum time. Continuous high temperature (70 and 80°F) during bud development retarded but did not prevent them from flowering. Low temperature (50 and 55°F) inhibited the initiation of complete flower buds. The varieties Encore, Dreamboat, and Cameo responded in this manner.

III Thermonegative: Temperature of 60°F or below was necessary for bud development. Medium temperature (60°F) during the entire growth cycle caused flowering in the minimum time. If the plants were grown at high temperature (70 and 80°F), buds initiated but did not develop. Continuous low temperature (50 and 55°F) retarded flowering but flowers were eventually produced. Defiance and Revelation responded in this manner.

From these experiments it may be postulated that temperature controlled flowering when plants were exposed to short photoperiods. In this discussion, the presence of a flower was used as a criterium of flowering. There was no consideration given to quality of the flowers. Thermozero varieties would be satisfactory for flowering throughout the year if the temperature was maintained at a 60°F minimum. Growing these varieties at a temperature below 60°F would result in large compound sprays which would flower over a long period of time. Thermonegative varieties can be flowered successfully only when the temperature in the greenhouse can be controlled at a maximum temperature of 60°F. Growing these varieties at temperatures above 60°F will result in complete inhibition of the development of the flower buds.

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