Chapter 5

Discussion

Experiment 1 of Part 1 was conducted on variety Delaware, some pots of which were subjected to extended days (8+0, 8+2, 8+4 hours) by artificial light under low and normal light intensity during flower bud initiation stage for 6 weeks. The flower bud initiation took place at the same rate in all cases. Then the plants were subjected to extended days (8+0, 8+2, 8+4 hours) by natural light under low and natural light intensity for 10 weeks. There were observed differences in flowering time, thought to be caused by the length of time necessary for their development from the flower initiation stage under varying conditions.

Experiment 2 was conducted also on var. Delaware. Here the plants were subjected to extended days (8+0, 8+2 8+4 hours) by natural light under both low and normal light intensity conditions during the flower bud initiation stage for 8 weeks. The flower bud initiation stage was earlier in all cases under normal light intensity conditions, but the buds appeared in the following order- 8+4-hour extended day, 8+2-hour extended day, 8+0-hour extended day. The plants were then subjected to extended days (8+0 8+2, 8+4 hours) by artificial light under both low and normal light intensity conditions for 8 weeks. Flower

bud development appeared to be the same under both low and normal light intensities.

In experiment 3, performed on var. Bon Deluxe, the plants were subjected to extended days (8+0, 8+2, 8+4 hours) by artificial light under low and normal light intensities for a period of 10 weeks during the flower bud initiation and development stages. Overall, normal light intensity conditions appeared to give better results.

Concerning flower quality, i.e. diameter of inflorescence and percentage of ray florets, no conclusive statement can be made in any case as the results varied.

Concerning shoot length, Delaware plants held under normal light intensity conditions showed shorter shoot lengths. No conclusive statement can be made about Bon Deluxe variety, although it appears that under low light intensity conditions the shoots were shorter (Perhaps this was due to the particular time the experiment was held, i.e. autumn, because of lower prevailing temperatures and lower light intensity).

The number of leaves on all plants did not differ significantly, although, in Delaware that held under low light intensity conditions it averaged 1-4 more leaves per plant, whereas in Bon Deluxe it averaged 1-3 leaves more per plant under normal light intensity conditions.

Generally, plants held under normal light intensity conditions exhibited better qualities over those held under low light intensity conditions, Smaller leaf number, shorter plants, shorter photoperiods, larger diameter of inflorescences were observed in those under normal light intensity. On the other hand, those under low light intensity showed a somewhat greater percentage of ray florets.

In the next experiment, numbered 4, discussed in Part 2, the object was to find how growth and flowering was affected by the age of the plant at the time of the beginning of the short day treatment. The potted Chrysanthemum morifolium var. Americana was used here. The short day treatment (8 hours) was given starting from 0 to 5 weeks after pinching. The plants were all held under normal light intensity conditions. The best flower production in terms of quality and time resulting from the short day treatment was found in those whose SDT was started five weeks after pinching.

As discussed fully in Part 3, the next experiment was carried out upon Bon Deluxe to further investigate the effects of varying photoperiods. For 12 weeks, plants were subjected to varying conditions involving natural and short days extended by artificial light, but all plants were subjected to normal light intensity.

Plants in 2 groups were subjected to a short photoperiod for 5 weeks followed by 7 weeks of exposure to natural conditions by removing them from the vinyl house. The plants in the other three groups were exposed to continuous short day periods extended by artificial light (8+0, 8+2, 8+4 hours) throughout both periods (5, 7 weeks), or through the entire 12 weeks of the experiment.

In evaluating the results of those under continuous treatment, that is, 8-hour, 10-hour, and 12-hour, no great differences were found among the three groups in number of leaves, photoperiods or flower quality, except in shoot length, although the continuous 8-hour plants could perhaps be designated as the best in all categories.

In the two groups with non-continuous treatments, those plants subjected to 8-hour short days followed by natural conditions exhibited slightly better qualities in all aspects except in the percentage of ray florets.

Considering all 5 groups, in the opinion of the writer, those plants held under continuous 8-hour day, exhibited the most desirable commercial qualities, followed by those under continuous 10-hour day. In all cases, there were no significant differences in the photoperiod for flowering, the number of leaves and in flower quality, except that in the latter case, the plants under continuous 10-hour day had the largest average flower diameters

and the plants receiving 10-hour days followed by natural conditions had the largest average percentage of ray florets (98.3%).

The last series of experiments was carried out upon 54 newly bred varieties of potted chrysanthemums. The cuttings of these varieties were subjected to constant short day conditions (8 hours) in different seasons in order to determine the optimum conditions under which they might develop. They were thus allowed to grow with only a commercial fertilizer, an insecticide and fungicide applied when necessary, and their various dates of cutting, planting, pinching, starting of short day treatment and flowering were recorded. Almost 54 varieties were subjected to 4 different periods from May 2, 1966 to September 13, 1966; June 8, 1966 to November 20, 1966; August 1, 1966 to December 30, 1966; August 10, 1966 to January 11, 1967. Under constant short day conditions differences in dates of flowering among the varieties were due to differences in the date of bud initiation and in the length of time required for development of the inflorescences due to varietal differences. In the same variety, differences in photoperiod requirements for flowering during different season are due to differences in temperatures.

The different ages of vegetating stem had no effect

on the time taken to flower after short days were started with either single stem or pinched plants (Cathey, 1953). In the present experiments, it was found that there is a definite correlation, in pinched plants, between the age of the plant after pinching and the starting of the short day treatment and the number of photoperiods required for flowering. As the plants grew older after pinching and the starting of the short day treatment, they became more sensitive to photoperiodic treatment and a shorter critical photoperiod was required for their flowering.