

Chapter 3

Materials and Methods

Six series of experiments were carried out in a vinyl house on an open field of the Department of Olericulture and Floriculture, Faculty of Agriculture, Kyoto University, Japan.

The first three series of experiments concerned photoperiods and light intensities; Chrysanthemum morifolium var. Delaware and Bon Deluxe were used. In the next series, experiment 4 involving age, Chrysanthemum morifolium var. Americana were used. In the fifth series, concerning the effects of varying photoperiods, Chrysanthemum morifolium var. Bon Deluxe were used. The last series involved 54 newly bred varieties.

Cuttings were made about 2½ - 3 inches in length just below the node with sharp knife, and the lower leaves were removed. Cuttings were dipped immediately into a rooting hormone (α -naphthyl acetoamido 0.40%, mineral 99.60%, marketed by Ishihara Co. under the tradename of 'Ruton') before insertion in the sand. The rooted cuttings were potted into 5-inch pots containing soil and compost (2:3), 3 plants per pot were used, except in experiment 4 wherein Americana were planted one plant per pot, and in experiment 5 where one plant per pot was used. Light pinches (2-3 mm.) were made a week later leaving three

stems per plant.

The plants were fed with a nutrient solution called 'Sumitomo Liquid Fertilizer'. 'Daizen' was used when necessary as a fungicide and 'Endorin' as an insecticide.

Day-length treatment.

Day-length treatments employed and referred to in all experiments were:

1. "8-hour day" comprising 8 hours of natural light from 9 a.m. to 5 p.m.
2. "10-hour day" comprising 10 hours of natural light from 9 a.m. to 7 p.m.
3. "12-hour day" comprising 12 hours of natural light from 7 a.m. to 7 p.m.
4. "8-hour + 2-hour extended day" comprising 8 hours of natural light from 9 a.m. to 5 p.m. extended by 2 hours of supplementary illumination from 7 a.m. to 9 a.m. before the natural light periods to give a 10-hour day.
5. "8-hour + 4-hour extended day" comprising 8 hours of natural light from 9 a.m. to 5 p.m. extended by 4 hours of supplementary illumination from 5 a.m. to 9 a.m. before the natural light periods to give a 12-hour day.

Supplementary Light.

Supplementary light was supplied by 110V 100W

Toshiba incandescent bulbs spaced 65x65 cm. apart at about 70 cm. above the pots averaging 4 bulbs per 5 potted plants. Thus, as the plants increased in height, they were subjected to increasing intensities of supplementary illumination varying from about 120 to 145 lux as measured by a luxmeter.

Light shading.

The shading used in experiment 1, 2, 3 in order to obtain low light intensity conditions was by the use of a black screen of chemical fiber (1/20 in. x 1/15 in.) marketed by Teijin Co. under the tradename of 'Kanreisha'. Each groups of five pots was completely surrounded on all four sides and on top by screens made from the above mentioned in 75x90x100 cm. Thus the light cut off by this shading amounted to about 60-75%.

Silver Polito, a thin silver coated sheet was used to cut the light to obtain short-day condition.

Data collection.

The data collected were:

1. The shoot length measured every ten days, after the start of short photoperiods until anthesis.
2. The number of days to budding (macroscopically visible inflorescence bud), until the color was visible and a few ray florets opened, and until anthesis (flower

fully open) after the start of short photoperiods.

3. The diameter of inflorescences.

4. The number of ray and disc florets in the inflorescences.

5. The number of leaves (including bracts) on the shoot.