EFFECT OF PRE-TRANSPLANTING LIGHT TREATMENTS ON THE LEAF NUMBER AND CURD YIELD OF SUMMER CAULIFLOWER

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Two summer cauliflower varieties, namely 'All the year round' and 'Pioneer', were subjected to different light durations and intensities at pre-transplanting stage. Increasing the duration of natural daylight from 8 to 12 hours suppressed both the leaf number and the dry matter yield of the curd in each variety. However, higher light intensities increased the leaf number as well as the curd dry matter yield in the variety all the year round, while no such increments were obtained in the variety Pioneer.

INTRODUCTION

Curd yield in cauliflower has been shown to be correlated with leaf number (Aamlid, 1952; Salter, 1959). Prevailing light intensity and its duration at stages during plant development is recognized to effect the growth and development of vegetable crops (Gregory, 1926; Pritchett and Nelson, 1951). Hence, it was contemplated in this study to investigate the effect of light intensity and its duration at pre-transplanting stage on the subsequent leaf number and yield of summer cauliflower curds.

MATERIALS AND METHODS

This study was carried out in the Department of Agronomy, University of Leeds, U.K. from 1965 to 1967. Seedlings of two summer cauliflower varieties namely 'All the year round' and 'Pioneer' were grown in early December in 9-inch black polythene pots, filled with John Innes potting compost No. 1. The seedlings were kept at 30°F. in a glasshouse and at two-leaf stage were subjected to the following day lengths and radiation intensities till March 1st : 1.8 hours of light (Natural daylight); 2.8 hours of high intensity light (Natural daylight supplemented with light from 400 watts mercury lamps during the same period), 3.12 hours of light (equivalent to natural light) (8 hours of natural daylight followed by 4 hours of light from 150 watts mercury lamps); 4. 12 hours of high intensity light. (From 400 watts of mercury lamps.)

Thereafter, the seedlings were gradually hardened off before they were transplanted in the field on 1st Apirl to avoid any killing due to sudden tem-

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perature change from the glasshouse to the outdoors. The planting was done in 2×2×2 factorial design. Leaf number was recorded by counting the total number of leaves formed at curd initiation. The crop was harvested on July 12 and the curds were dried at 80°C. for 12 hours in an oven. Dry matter yield of the curd per plant was taken and the data were subjected to the analysis of variance method.

RESULTS AND DISCUSSION

Effects of pre-transplanting light duration and its intensity on the leaf number and the dry matter yield of curd per plant in cauliflower plants are shown in Table 1 and 2, respectively. The response of both the varieties to light

TABLE 1. *Effect of pre-transplanting light duration and its intensity on leaf number in cauliflower* (3 *years' average results*).

Treatment	Average leaf number per plant[1]		± increase over the natural daylight	
	All the year round	Pioneer	All the year round	Pioneer
8 hours of natural daylight ..	16.7	20.1	..	..
8 hours of high intensity light ..	18.3	21.1	+1.6	+1.0
12 hours of light (equivalent to natural light) ..	16.3	17.1	−0.4	−3.0
12 hours high intensity light ..	20.1	16.7	+3.4	−3.4

1. Average of 64 plants.

TABLE 2. *Effect of pre-transplanting light duration and its intensity on the dry matter yield of curd per plant in cauliflower* (3 *years' average results*).

Treatment	Average dry matter yield of curd per plant (gms.)[1]		Increase over the natural daylight.	
	All the year round	Pioneer	All the year round	Pioneer
8 hours of natural daylight ..	96.1	125.1		
8 hours of high intensity light ..	97.0	109.7	+0.9	−15.4
12 hours of light (equivalent to natural light) ..	69.4	94.6	−26.7	−30.5
12 hours high intensity light ..	145.2	99.9	+49.1	−25.2

1. Average of 64 plants.

duration was similar. Increasing natural daylight from 8 to 12 hours suppressed the leaf number as well as the dry matter yield of the curd per plant in each variety. However, the reaction of both the varieties to light intensity was remarkably different. In general, higher light intensity increased the leaf number as well as the dry matter yield of the curd per plant in the variety 'All the year round', while it decreased both the leaf number and yield in the variety 'Pioneer'. This difference in behaviour of these varieties to the light intensity may be attributed to their inherent genetic variability. This view is supported by the work of Calvert (1959). He observed similar differences in leaf and flower number within various tomato varieties as a result of variation in light intensity.

It is interesting to note that the curd dry matter yield pattern generally parallels the leaf number. The greater leaf area on account of higher leaf number in variety 'All the year round' possibly resulted in more photosynthesis and consequent higher dry matter yield. This observation is strengthened by the findings of Blackman *et al.* (1955) and Black (1955). They stated that the rate of dry matter increment was determined by the efficiency of photosynthetic process and the extent of leaf surface.

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