

STUDIES ON THE
GROWTH AND DEVELOPMENT OF CAULIFLOWER
(Brassica oleracea var. botrytis)

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ABSTRACT

Three experiments were carried out to provide information on the effects of certain environmental factors on the growth and development of the cauliflower crop.

The effects of nutrition, moisture and light were selected in the first experiment as they are factors which can be controlled to some extent by grower practice. Four treatments were applied, control, low nutrition, low moisture and shading.

The variety Flore Blanca was sown in early May and the plants were grown in a glasshouse. The dry matter percentage of the leaves decreased under shading and increased with low nutrition. These two treatments also reduced plant growth more than low moisture and it was suggested that this may indicate that these factors are more important in plant competition than soil moisture. No effect of the treatments were found on leaf number and once 22 leaves were formed curds were initiated. The spread of curd initiation was not affected and it was suggested that nutrients, moisture and light were unlikely to effect the spread of curd initiation in a cauliflower crop providing they were evenly applied.

The second experiment was designed to study the cold requirements for curd and flower initiation with a range of cauliflower varieties. The plants were grown in a glasshouse during the summer months, where the minimum temperature was maintained at 16°C. Control plants did not leave the glasshouse whereas cold treated plants were removed at varying ages for varying treatment periods to cold rooms, where the temperature was maintained at 5.6°C. With the two summer varieties grown, AYR and Snowball M, curd initiation took place without a cold treatment, but was necessary for flower

initiation. Of the two autumn varieties used Flora Blanca did not require cold for curd initiation but Strain 230 did. Flora Blanca produced weak flowering with some control plants, but cold was required for satisfactory flowering of all plants. Strain 230 had not flowered by the end of the experiment. The two winter varieties, Y-5 and White Acre, required cold for curd initiation and like Strain 230 they had not flowered by the end of the experiment. It was assumed that with these later varieties cold was required for flowering. Effects of the cold treatments on reducing the spread of curd initiation were also noted.

The final experiment consisted of a December sowing of a summer (Snowball M) and a winter (Y-6) variety. Weekly harvests were made until after curd maturity to collect data on partitioning of dry matter in the cauliflower crop. For a month from emergence leaf growth dominated resulting in a high percentage of total plant dry weight in the leaves. At curd initiation the percentage in the leaves fell rapidly. The percentage of total plant dry weight in the roots fell from emergence until the 28th day when it remained fairly constant till the end of the experiment. An allometric relationship was shown to exist between curd and leaf growth from curd initiation till curd maturity. With both varieties competition for assimilates occurred between the leaves and curds.

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INTRODUCTION

Recent research work reported by a number of workers (Salter and Pradgley, 1969a and 1969b) has shown that economically important plant characteristics of the cauliflower crop can be influenced by growing techniques. Other work (Salter, 1969; Salter and Ward, 1972) has demonstrated that the cold treatment of transplants can effect crop maturity characteristics. These studies, while demonstrating the possibilities of such techniques have also emphasized our lack of knowledge of many aspects of the growth and development of the cauliflower and how growing conditions can effect crop performance.

The present study consisted of three experiments. The first examined the effects of 3 major environmental factors on the growth and development of the cauliflower crop. The environmental factors selected are all under grower control to some extent. The second experiment was designed to gain further knowledge on the cold requirements of cauliflower varieties for curd initiation, as Salter and Wards' (1972) work had demonstrated a lack of data on this subject. The third experiment studied the pattern of distribution of dry matter between plant organs from seed sowing till after curd maturity for both a summer and winter variety. This last project was carried out as there is no published information of this nature available.