EFFECT OF SOME CULTURE AND LIGHT TREATMENTS ON GROWTH AND FLOWERING OF SOME ANNUALS PLANTS

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INTRODUCTION

There are many essential factors affecting the growth and flowering of plants, among these factors, that limit the time of flowering is the light which is of a prime importance of many plants. Many experiments in "electrohorticulture" by Baily and other pioneer researchers showed that the flowring of several plants could be accelerated by extending the natural day light. At the time, this faster flowering was ascribed to a general acceleration of growth by additional light which causes alteration in flowering time. Earlier in the last century, Kelbs in Germany, came tantalizingly close to realizing the significance of daylength when he made plants of *Sempervivum* flower by exposing them to several days of continuous light. Many plants which flower naturally in the autumn were found to require exposure to days shorter than certain critical length before they would flower. These they called short day plants (SDP). The critical daylength varied considerably between species from about sixteen hours to less than twelve hours. Some plants had on absolute requirment for short day, like Mamoth tabacco, but others merely flowered much faster in short days and have come to be refreed to as quantitative short day plants. For both kinds, however, the shorter the daylength, down to about eight hours, this faster the flowering.

On the other hand, many spring and summer flowering plants such as radish, lettuce and Hibiscus proved to be either absolute or quantitative long day plants (LDP), flowering faster the longer the daylength up to sixteen hours or so.

Exposing plants to additional light can be used to produce flowering at the desirable time of the year to cover the local and exporting demands, by hastening or delaying it. This method would be of great economic benefits and would increase the value of many cut flowers.

The present work for the effect of different dates and periods of light treatments was carried out on some important cut flower plants namely *Callistephus chinensis*, Nees and *Antirrhinum majus*, L. , due to their importance as popular cut flowers for home use. Their normal flowering supply the demands during spring season, so any elongation of earliness of flowering would be concedered of economic benefits.

The obtained results would be of great importance especially for export purposes during the months of Dec. untile March to European markets.

REVIEW OF LITERATURE

1- Effect of supplementary light on the growth and flowering of *Antirrhinum majus* :

Mclaughlin, (1953) reported that under condition of low light intensity in January snapdragon plants kept continuosuly at 40 or 50°F. produced few "skipes" (Flower bud with normal exteriors and disintegrated interiors), but injury occurred when the temperature was lowered from 50°F. to 40°F. or less on 2 or more nights. Similar temperature variation under conditions of stronger light in April did not result in any blasted buds. When plants were shaded in April the spike stems were flattened, hollow and weak.

Kpistgffren, (1956) tested 9 varieties of snapdragon by growing well in artificial light (from germination to planting out) but the benefit was not striking. Where illumination is contemplated strip lighting at the rate of 150 watts/sq.m should be applied in conjunction with a temperature of 12-13°C.

Thayer, *et al*. (1956) mentioned that snapdragons plants receiving a 16 hours day flowered 17 days earlier than those in normal day length.

Petersen, (1957) exposed three varieties of snapdragon, Golden spike, Jack Pot and Margaret to several supplementary light treatment with the possibility of using such light economically in growing antirrhinums.

Flint, (1958) discused the effects of applying supplementary light to snapdragons at different times of the year and with different types of lamps. From results obtained so far a table is presented which shows times of sowing and types of lighting to get flowering from mid-December to mid-March, and the probable reduction in grade which will result. Lighting crops to flower later than March can not be recommended lighting potted snapdragons plants is not recommended for longer than 30 days and in bright weather 20 days is adequate. Lighting the plants every other night for 20 nights has given results similar to lighting every night fortnight .

Miller, (1959) studied on the response to night temperature have been abstracted previously. Further work showed that adjusting night temperature upwards during the growing period after bright winter days resulted in earlier flowering but also in decreased plants size as compared with plants grown at normal temperatures. Reducing night temperatures after dull days throughout the growing period did not result in increasing size or higher quality.

Flint, (1959), found that snapdragon seedlings (varieties Jack Pot and Margaret), were illuminated at night by incandescent or mercury vapour lamps. He used various methods, before benching in the greenhouse. The use of incandescent lamps resulted in the earliest flowering but caused a considerable reduction in plant size. Mercury lamps resulted in less rapid flowering but less reduction in size. The percentage dry weight was not affected by lighting but was greatly affected by the time of year. Light of very low intensity (produced by a 60 watt incadescent lamp 40 ( ) inches above the seedlings) was in some cases very effective in hastening flowering, but this effect was quite erratic. The maximum advance of flowering obtained was about 7 weeks. This was achieved with plants raised from seed sown in late August. Progressively less advance of flowering occurred with later sowings. Pinched plants responded less to supplementary illumination than single stemmed plants. The effect of illumination was never so great as were the effects of seasonal changes in light and temperature.

Hiller and Scheuase, (1961) found that the only snapdragon varieties to benefit from supplementary illumination are those that have a short growing period and can be spaeed closely (e.g. Hellen and Ball's hybrids). The cost of treatment up to the time of transplanting was not more than 0.03 D.M per plant. Treated plants were ready for sale a fortnight earlier than the controls and they were of a better quality.

There was no advantage in providing artificial lighting for plants sown after January.

Flint, (1961) studied the effect of light duration and intensity on dry matter production in snapdragon seedlings and on growth and flowering of older plants in light and temperature controlled chamber. He used warm-white fluorescent lamps and light intensity of 200,400,800 and 1.600 f.c. were maintained for durations of 6,12 and 24 hours. Then he grew the seedling in 12 combination of these duration and intensity treatments. He took samples of plants for dry weight measurements at the end of 3,6 and 10 days. Some plants were grown under certain of these treatments untile maturity. He found that a given amount of light applied overlong daily duration produced more dry matter than when applied over shorter duration. Also he reported that light saluration of photosynthesis was not a limiting factor, longer duration at all total light levels also resulted in greater leaf area and stem elongation. Plants grown under the 6 hr. duration had not formed visible flower buds after 5 month.

Chan (1961), reported that flowering of snapdragon seedlings was advanced by 3 weeks of supplementary lighting (with incandescent, fluorescent and mercury-vapour lamps at 10 watts/sq.ft.) during the seedling stage, but flower quality was relatively poor with incandescent lighting.

Link, and Shanks (1963), grew varieties of winter and summer flowering snapdragon during September to April. They found that it flowered earlier with continuous light at 60°F, but their flower spikes were smaller than those of plants grown at lower temperatures and with interrupted light. In a temperature study; flowering was earlier with plants grown at 60°F. for 3 or 6 weeks after pinching and then at 50°F, than with plants grown at 60°F for 9 or 12 weeks. They also found that plants grown at 60°F earlier flowering occurred where long days were given for the first 3 or 6 weeks after pinching than where long days were given for 9 or 12 weeks.

Maginnes, (1965) found that the differentiated leaves regarded to the variated seeds with the Antirrhinum majus, variety Jock Pot. He added that the light sensitive stage started sometime after germination, being regulated by temperature. He recognized two phases, viz. the onest of light responsiveness and the onest of maximum light responsiveness. He observed photoperiodically and temperature controlled growth responses to start before and continue after the light sensitive stage. He found that flower bud initiation were controlled by photoperiod and modified by temperature. He used leaf number, onset of maximum response to light and days from germination to maturity to short snapdragon varieties into several commercial response.

Carpenter, (1965) used alluminium foil reflectors to increase light intensities in mid-winter. It increased stem lengths and fresh and dry weight of snapdragon. Also snapdragons flowered earlier.

Kurkl, (1966), forced nine F_1 hybrids without additional light in S.W.Fin-Land during May, July, September and December. He found that the first 3 forcing periods were succenfull in producing commercially acceptable flowers. He reported that the use of supplementary lighting produced earlier, better quality blooms of the c.v. Tampico forced during May as did higher light intensities with normal day lengthed.

Sanderson,(1966),grew snapdragon seedlings under various temperature photoperiod condition. He used 70°, 62° and 52°F in 2 experiments. A third experiment was conducted under the prevailing summer temperature. He found that the opening of the first floret occurred significantly earlier when the plants were grown at 70°F than at 62° or 52°F. Winter green opened its first floret significantly earlier than Florida. He also found that the fresh weight, height, number of florets and number of leaves of the snapdragon were significantly greater when the plants which were grown at 52°F than when grown at 70°F. Supplementing the natural day reduced the plants fresh weight, height, number of leaves and weight the flower heads. Florida produced significantly more fresh weight, height, floretts, leaves and flower heads weight than Wintergreen. There was an indication than both temperature and photoperiod influence changes in the leaf arrangement. The quality of the flowers was reduced when the plants were grown at 70°F, the greatest number of high grade flowers being produced at 52°F. Stem strength as measured by stem divergence from a horizontal plane, the weight of the stem in relation to length and the force required to shear the stem, was significantly increased when the plants were grown at 52°F. Stems were significantly stronger in plants grown in 9 hour days than in plants grown with other photoperiods. Florida produced significantly stronger stems than Wintergreen.

Whetmhn (1966), demonstrated that the supplementary illumination during the winter can hasten flowering, but it must be given after pricking out and before the plants enter a photo sensitive stage.

Maginnes, and Langhans, (1967) raised the seedling of snapdragon variety Jack Pot at constant temperatures of 40, 50,60 and 70°F, and under day length of 9 and 18 hours. They