PHOTOHORMONAL STUDIES ON ASTER PLANT

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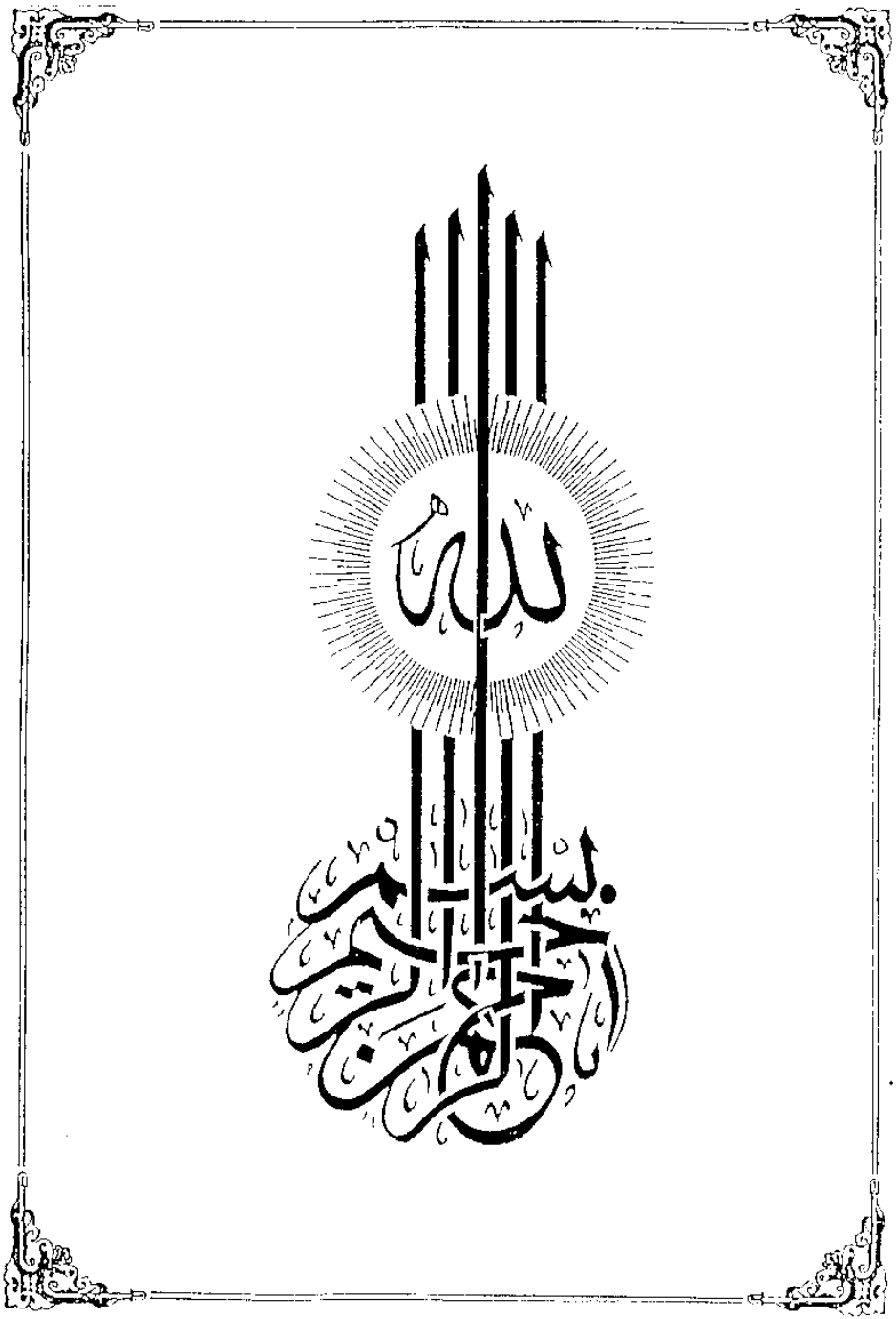

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ABSTRACT

China aster are annual plants. They are grown in most parts of the world for a attractive cut flowers, besides, they are of best keeping quality for home use. The main goal of this investigation is to study the effect of light treatments for different hours and periods and some growth regulators, i.e. gibberellic acid and kinetin on the growth and flowering of aster plants. Two experiments were carried out to reach the aim of this work.

First Experiment :

The experiment was designed to study the effect of light treatments for different hours and periods on the growth and flowering of the plant. The results indicate that there was earlier flowering, significant increase in plant height, number of branches and flowers, fresh and dry weight of flowers and the length and thickness of the flower stalk. In addition, there was an increase in the NPK percent, total carbohydrates, and DNA, RNA, while, decrease in the plant content of total phenols.

Second Experiment :

This experiment disclosed the effect of growth regulators GA_3 at the concentration; 0, 100, 150, and 200 ppm and kinetin at the concentrations, 0, 10, 50, and 100 ppm. The results indicated that there was earlier flowering with gibberellin and significant increase in plant height number of branches and flowers, length of the flower stalk and its thickness, dry and fresh weights, and NPK percent, total carbohydrate, RNA and DNA content. On the other hand, gibberellin treatments decreased the plant content of total phenols.

CONTENTS

Cont. Page

Cont. Page

LIST OF TABLES

LIST OF TABLES

Cont.

LIST OF FIGURES

INTRODUCTION

China asters are annual plants native to China and Japan. They are grown in most parts of the world for cut flowers. It is considered an important cut and garden flower. The flowers have one of the best keeping quality for home use. There are big and small flowers with a great diversity of colour.

There are many essential factors affecting the growth and flowering of plants, one of these factors which controls flowering of plants is the photoperiod.

Many experiments in "electro horticulture" by Baily and others pioneer researchers showed that the flowering of several plants could be accelerated by lengthening the natural day light. At the sametime, this faster flowering was ascribed to a general acceleration of growth by additional light which causes alteration in flowering time as mentioned by many researal workers. Earlier in the last century Kelbs in Germany, came tanlizingly close to realizing the significance of day length when he made plants of Sempervivum flower by exposing them to several days of continuous light. Many plants which flower naturally in the autum were found to require exposure to days shorter than certain critical days length before they would flower. These are so called short day plants (SDP). The critical day length varied considerably between species from about sixteen hours to less

than twelve hours. Some plants had an absolute requirement for short day; as the Mamouth tabacco, but others merelly flowered much faster in short days and have come to be referred to as quantitative short day plants. For both kinds, however, the shorter the day length, down to about eight hours, this faster the flowering as emphathised by many authors.

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 day length up to sixteen hours or so.

Exposing plants to additional light or reducing the normal day light can be used to produce flowering at the desirable time of the year to cover the local and exporting demands. This method would be of great economic benefits and would increase the value of such treated cut flowers.

Besides the light treatments used, the work herein aimed to study the effect of some growth regulators as gibberellic acid (GA_3) and kinetin of different concentrations on the growth and time of flowering of aster plants.

REVIEW OF LITERATURE

I. Effect of supplementary light on the growth and flowering of Callistephus chinensis :

Line and Waston (1951), studied the influence of day length and temperature on the growth and flowering of Callistephus chinensis. They kept the young aster plants from December 6th to March 31st at 50°F and 65°F with ordinary light and ordinary light plus 5 hours of artificial light per day. They found that at 65°F long day treatment hastened flower bud initiation and bud appearance by 15 days and at 50°F. long day treatment hastened flower bud initiation by 30 days and bud appearance by 25 days.

Kofrank (1953), stated that several aster varieties were made to flower 3 months earlier than normal by planting seeds December, 27th or February 14th and giving 4 hours of supplementary light out-of-doors in California. First flower were cut March 13th, on the early planted lot, whereas normal flowering was at June 30th.

Tsukamoto et al. (1954), studied the effect of intermittent additional light in delaying flowering in short day plants and in forcing long day plants. Aster and Shasta daisies received 5 different light treatments, with Aster results were indefinite. With Shasta daisy the length of the period of illumination rather than the exact time at which light was given was all important.