

PHYSIOLOGICAL STUDIES ON SNAP BEAN

By

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M.Sc. Thesis

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ABSTRACT

Two field experiments were carried out during the summer seasons of ٢٠٠٤ and ٢٠٠٥ at Barrage Hort., Research Station. The field experiments were conducted to study the response of two snap bean cultivars i.e., Paulista and Tema planted at three sowing dates on ١٥th June , ١st July , and ١٥th July to spraying with Ascopen (Ascorbic plus Citric acid ٢٨%) , Delfan (١١% free amino acids) and shading with maize to protect of snap bean against higher temperature adverse effects toward maximizing its growth and productivity. The results showed plant growth and green pod yield per Fadden were increased with sowing on ١٥th June compared with sowing on ١st July and ١٥th July, during both seasons of study, In this respect Tema cv. had more significant effect on total yield and exportable yield percent, green Pods quality, Photosynthetic pigment in leaves and Chemical composition of pods. In addition, the results of sprayed with Delfan or Ascopen during heat stress conditions recorded higher values of pigments content in leaves, total protein and carbohydrate content in pods. The resulted showed that the combination of sowing seeds on the ١٥th of June with foliar spray of Delfan diminished the bad effect of sowing.

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INTRODUCTION

Snap bean *Phaseolus vulgaris* L. is one of the most important member of leguminous crops grown in Egypt for local market and exportation, as well as, plays an important role for human nutrient as a cheap source of protein, carbohydrate, vitamins and minerals.

In Egypt, the cultivated area of this crop in ٢٠٠٥ was estimated at ٥٢٠٢٨ Feddan, which produced about ٢٤٥٩٠٥ tons of green pods with an average yield of ٤,٧٣ tons per feddan, according to Department of Agricultural statistics, Ministry of Agricultural and land Reclamation. The exported quantity of snap bean were ٢٧,٨٣٦ ton / feddan and dry bean were ٣٧,٧١٠ ton/feddan in ٢٠٠٥. according to Agricultural Exportable Unoin.

In Egypt, climatic conditions are suitable for Snap bean growth except in critical periods, i.e. June, July, and August. In such periods, plants are subjected to relatively high temperature. Green bean is a heat - sensitive crop decreased at high temperatures (Dickson and Boettger, ١٩٨٤).

High temperatures during the reproductive growth stage result in a reduction in pod and seed set in green bean due to enhanced abscission of flower buds, flowers, and pods (Monterroso and Wien, ١٩٩٠). The most favorable environment for pod set and retention consisted of high humidity, low night temperature, and high soil moisture (Fisher and Weaver, ١٩٧٤).

A highly positive correlation was observed between pod set and pollen stability in flowers that were affected by heat stress about ١٠ days before anthesis (Suzuki *et al.*, ٢٠٠١).

The aim of the present work was study the effect of some protective techniques and sowing date on growth, yield and quality of Snap bean cultivars.

REVIEW OF LITERATURE

The effect of sowing dates, cultivars, shading of maize, Ascopen, Delfan, and on growth, yield and chemical composition of snap bean crop will be reviewed under the following heading.

1. Vegetative growth characteristics

a. Effect of sowing date

In India, Sharma (1969) compared three sowing dates of black gram (*phaseolus mungo*) i.e., 15th of June, 30th of June and 15th of July, found that stem length and number of branches were increased in the second date. In U.S.A., Williams and Marshall (1976) indicated that soybean was sown on 20 April, 20 May or 20 June, they found that highest plant height was obtained with sowing on 20 May. In India, Sharma *et al.* (1989) studied the effect of four sowing date i.e., 13th July, 23rd July, 2nd August, and 12th August on snap bean. They noticed that the highest plant height, and branches number, was recorded with sowing date (13th July) compared with other sowing dates. Khalil (1990) studied the influences of three planting dates (July 1st, July 15th and August 1st) on cowpea. Found that the maximum values of growth rate under the conditions of later planting date (August 1st). El-Attar (1993) working on soybean studied the effect of six dates of planting, i.e., early- April, mid- April, early- May, mid-May, early June and mid- June found that later sowing date on half June significantly decreased plant height, branches number per plant. Hassan (1998) compared between of six sowing dates (1st of March, 21st of March, 10th of April, 10th of May, 20th of May and 10th of June), the tallest plants were noticed when cowpea seeds were sown on

11th of June. In India, Sanini and Negi (1998) on *phaseolus vulgaris* pointed that plant height and branches number/ plant were significantly lower in 30 May over than the 10 April, 30 April, and 10 May. Tolba *et al.* (2002) studied the effect of three planting dates started on 10 May with 20 days intervals on cowpea. They found that planting date 30 May significantly increased plant height, dry weight per plant but significant increase in branches number per plant were observed in first season only compared with 11 May, and 30 June. In Egypt, Mahmoud and shahin (1991) studied the influence of five planting dates (started monthly at the first of April up to the first of August) on the vegetative growth of cowpea, they mentioned that sowing seeds in July, significantly increased plant height, number of branches followed by those of April and June respectively. Abd-Allah (2006) on snap bean indicated that early sowing on 1st of March reflected the highest values for plant length, branches per plant as well as fresh weight of plant compared with mid (1st of April) and late (1st of May) sowing dates.

b. Effect of cultivars

Mohamed (1997) found no significant difference in plant height among the studies bean cultivars, i.e., Bronco, Conteder, Giza3, Dialana, Tema, Morgan and Giza6 while, such cultivars showed difference number of the developed primary branches on their plants. El-Tohamy (2000) tested five bean cultivars namely cvs. Giza3, Giza6, Bronco, Felxo and Tema. It was found that cvs. Giza3 and Felxo were best in growth rate compared with other tested cultivars. Ewais (2003) indicated that significant difference among the tested cultivars (S1, Diacol and Nebraska) in the plant height and number of branches per