BIOLOGICAL STUDIES ON SOYBEAN PODS DURING RIPINING AND STORAGE WITH REFERENCE TO CHEMICAL WEED CONTROL

By

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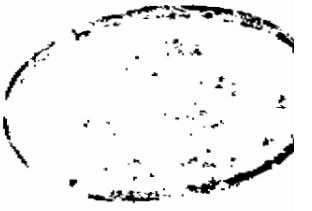

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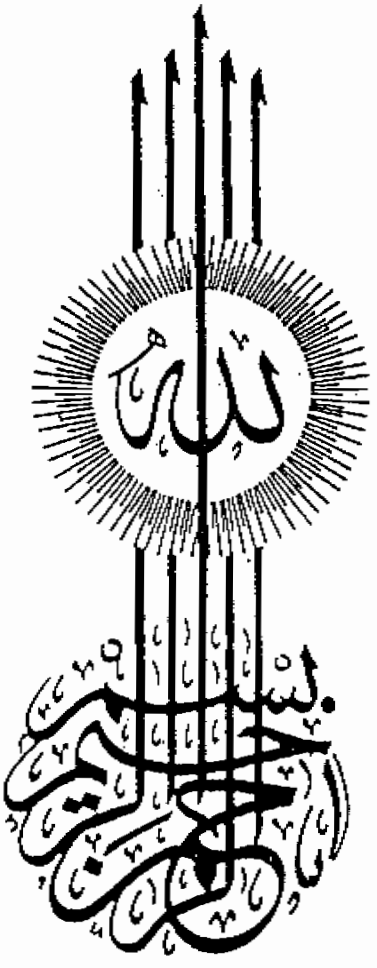

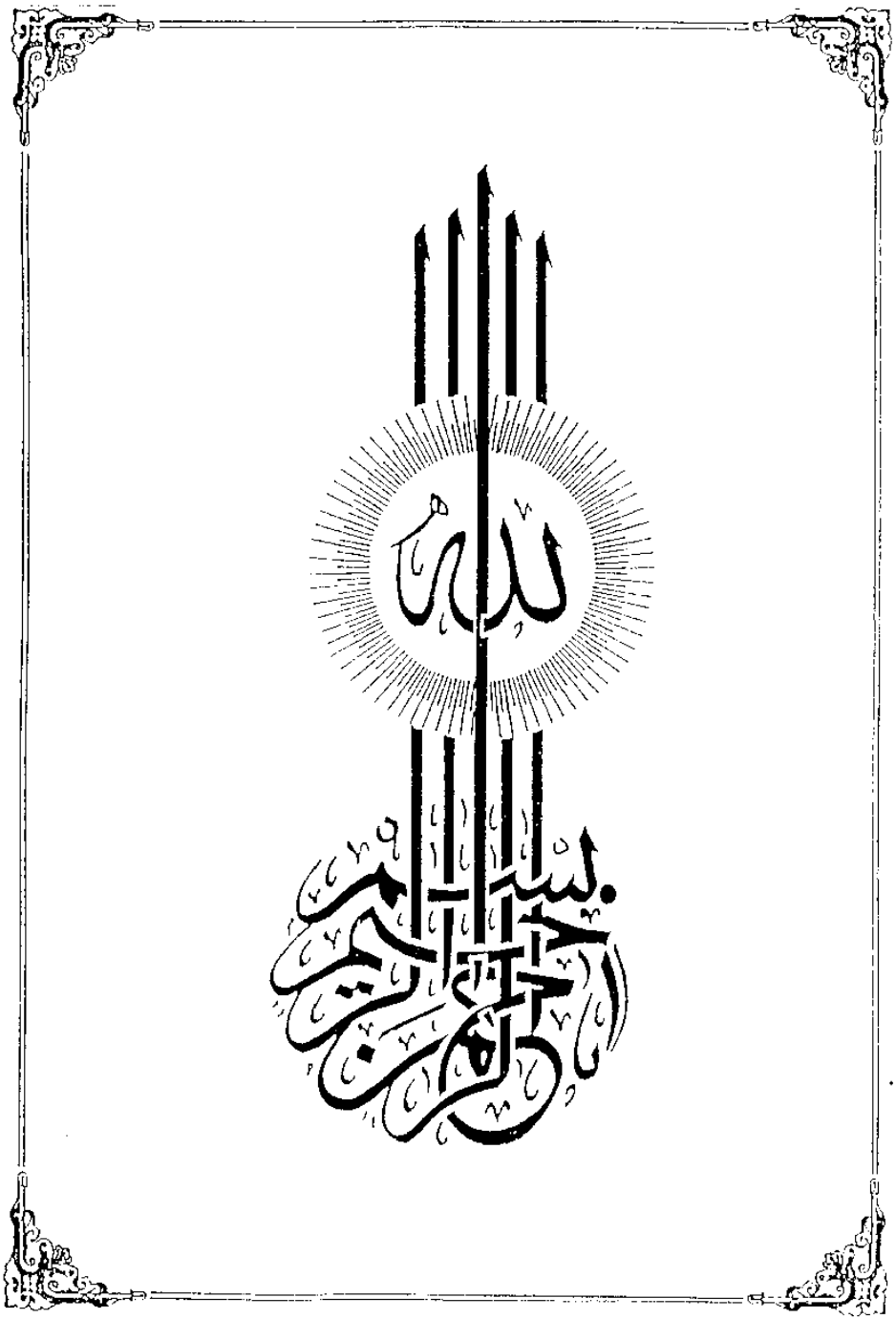

APPROVAL SHEET

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To My Husband Prof. Dr. Mahmoud Tawfiek

Sons, Amr and Emad

and

My beloved daughter

Nahla

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INTRODUCTION

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Soybean is considered as an important Leguminous summer crop which has shown extended success along different provinces in Egypt.

The importance of this crop is raised for its highly nutritional valuable. For instance, it consists about 20 % oil, 40 % of good quality protein and high amounts of essential amino acids especially lysine (Norman, 1963). Therefore, it is an excellent source for human and animal nutrition. Thus, along the last decade, soybean has attracted the attention of growers who want to increase the national income. The acreage had been increased to be 140,000 Feddans in 1983 with an average yield of one Ton/feddan*.

The infestation of soybean with different species of weeds has created a hard competition between them. This in turn, reflects unfavourably effect on the obtained seed and straw yields of soybean plants.

The total losses in yield, in this respect, reach occasionally to 40 - 50 % depending upon the intensity of weed infestation (Bhan, et al., 1972). The potential losses have been estimated as 1 Kg of soybean yield for each Kg of weeds (Herzallah, 1980). The high sensitivity of the soybean plants to mechanical control of weeds, whilst, the rapid increase in the labour loans had obviously brought

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* From Agric. Economics Res. Institute, Agric. Res. Centre Egypt.

the application of herbicides to fore front. Chemical weed control with either pre or post-emergence herbicides into the soil either is accompanied with different proplems, such as the accumulation of these herbicides in the soil and their inhibitory effect on the beneficial activities of soil microorganisms.

The ability of soybean plant to gain its own nitrogen by N-fixing bacteria, Rhizobium japonicum and subsequently to leave a generous amounts of nitrogen to the successive plant in the rotation, saves a great deal of money equal to the disaster rising in fertilizer prices.

The aim of the present investigation was to study the effect of some weed control treatments and inoculation with Rhizobium japonicum on growth, nodulation, nitrogenase activity and yield of soybean plant and its components during growth and at harvest, consideration was also given to the study of the previous factors on the quality of soybean seeds throughout 10 months of storage.

Review of Literature

REVIEW OF LITERATURE

I. Effect of weeds infestation on soybean Plants :

Many investigators studied the effect of the competition between weeds and soybean plants which are grown in the same field. They assured that soybean plant height was decreased as weed growth increased (Moomaw and Robinson, 1972). Soybean plant became unable to compete with the weeds during the initial 60 days of the growth period (Muniyappa et al. 1982). Therefore, seed yield and straw yield in the unweeded check treatments were significantly lower compared to weed control treatments (Harvey and Mc Nevein, 1980; Moshtohry, 1983). Sajjapongse and Roan (1981) found that weed interferance caused seed yield losses up to 63 % as a result of smaller seeds, fewer seeds per pod and fewer pods per plant. Seed yields from plots kept weed free for 45 - 60 days were as high as yields from plots kept free throughout the growing season. Stepkin and Rafal'skii (1982) found that weed infestation was lowest in soybean grown after annual herbage spp. or red clover in 5- and 6- course rotations; seed yields increased by 22.2 % compared with soybean grown after wheat in a 2-course rotation. Cultivation of soybean in monoculture increased weed infestation and decreased yields.

Mutch and Meggitt (1984) showed that grass densities of 14, 28, 56 and 503 plants per square meter reduced soybean yields by 35, 24, 38 and 36 %, respectively compared with weed free plots.

2. Effect of weed control treatments:

A. On weeds :

a. Linuron (Afalon) :

It is proved that linuron was the most effective herbicide for weed control as pre-emergence treatment (Lipscomb, 1963).

Anderson (1964) concluded that linuron at 1.5 Lb/acre applied 1 - 2 days after sowing was the best treatment in conjunction with the so-called "stale seed bed" technique for soybean.

Investigations indicated that application of linuron at the rate of 2 - 4 Kg/ha gave 12 - 60 % weed control under the low rain fall conditions (Voevodin, 1969). While, Pak (1980) found that linuron at 1 - 3 Kg/ha. gave 84 - 92 % control of weeds.

On the other side, different concentrations of linuron has specific characteristics on control weeds. Using linuron at 0.5 Lb/acre + 0.5 % surfactant as post-emergence controlled weeds up to 2 inches high in a crop 12 inches high (Overton et al. 1971). Linuron at 1.2 Kg/ha. gave statisfactory control of Cyperus esculentus and about 100 % control of Xanthium pensyvanicum and Desmodium tortuesum (Hauser et al. 1972). While, its using as pre-emergence by the rate of 1.68 or 3.36 Kg/ha gave good control of Sesbania exaltata for at least 6 weeks (Eastin, 1973). Lower rate of linuron (1 kg/ha) failed to control Datura ferox and Xanthium cavanillesii (Mitidieri, 1976) but controlled broad leaved and grassy weeds by 60 and 62 % from the control, respectively (El-Deek, 1977).