EFFECT OF SOME HERBICIDES ON GROWTH, YIELD AND QUALITY OF BROAD BEANS (VICIA FABA, L.).

By

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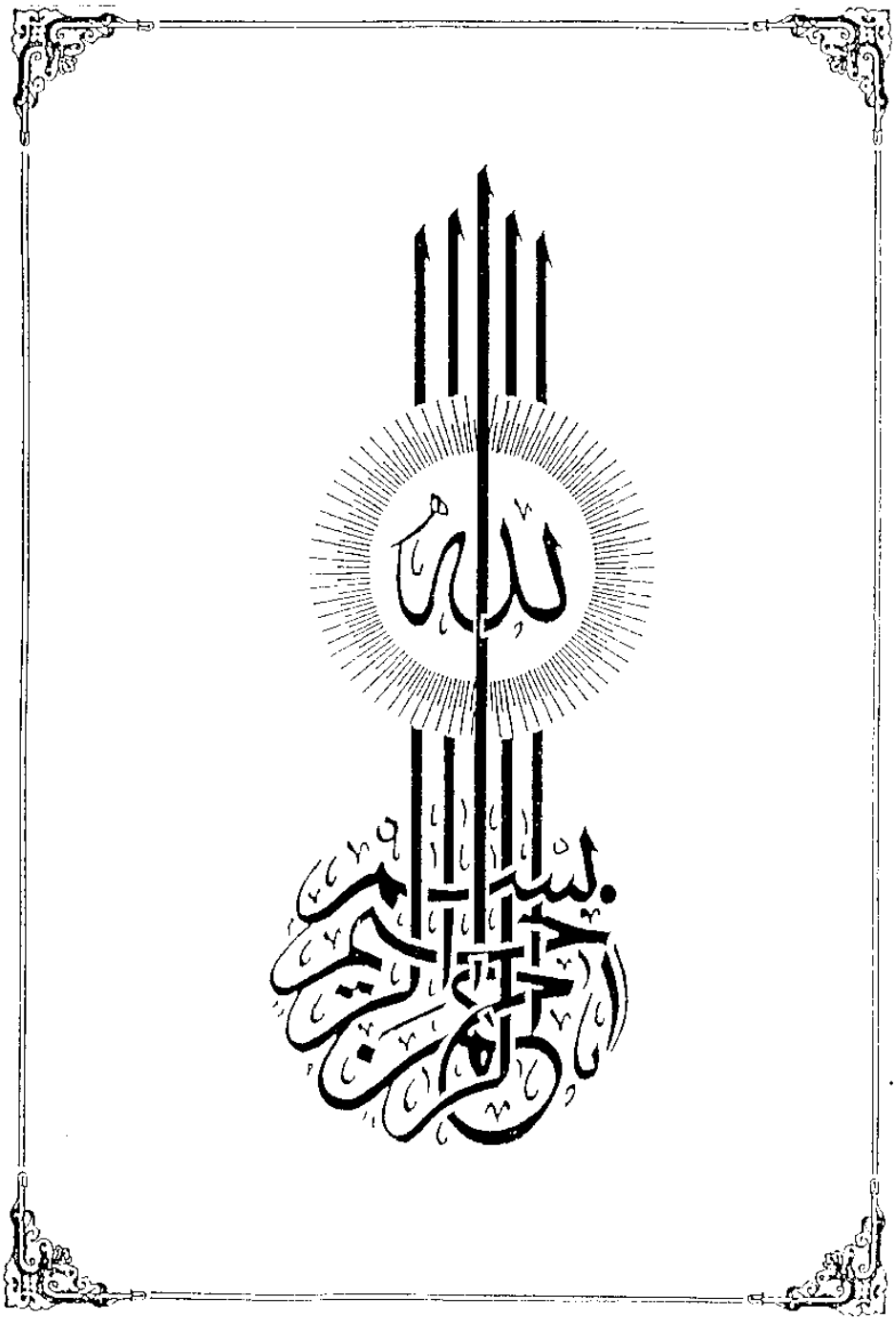

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ABSTRACT

The investigation was classified into two classes : Firstly, field experiments: which were conducted to investigate the effect of some herbicides on growth, yield and quality of broad bean plants and associated weeds. The residual effect of broad bean weeded treatments on the succeeding crops maize and summer squash was also studied during the two successive growing seasons of 1985/1986 and 1986/1987. The two seasons were carried out in the Agricultural Experimental station of the Faculty of Agriculture, Ain Shams University at Shalakan. Secondly, pots experiments were conducted at the netted greenhouse of Botany Laboratory National Research Centre to ivnestigate the effectiveness of Alpha aminooxy acetic acid (AOA) on the protection of broad bean seedlings from phytotoxic symptoms of acifluorfen and bifenox herbicides. The results could be summarized as follows :

1. There was a significant increase in growth of broad bean plants (plant height, number of branches, leaves, marketable green pods and unmarketable green

pods per plant, fresh weight of leaves, stems, marketable green pods and unmarkdtable green pods per plant and their dry weights compared to unweeded.

2. Yield of seeds and straw was significantly increased than in unweeded treatment.

3. The percentage of protein, phosphorus and potassium were not affected by different weed control treatments.

4. There was a reduction in number, fresh and dry weight of weeds due to weed control treatments compared to unweeded treatment.

5. Weeded broad bean plots had a significant effect on the following crops (maize and summer squash), increased their growth, yield and their components in both crops.

6. There was a reduction in fresh weight of weeds associated with the following crops due to weed control treatments applied in broad bean field.

7. Potted broad bean seedlings at 3-leaf sprayed with acifluorfen and bifenox at 0.125 (a.i.) and 0.5 (a.i.) Lb/feddan respectively caused phytotoxic symptoms and increased ehtylene production within 24 hours after application.

8. Foliar application of ethylene inhibitor AOA, suppressed leaf damage and ethylene production after application of the previous two herbicides.

9. These observations suggested that ethylene appeared to be involved in the development of the phytotoxic symptoms of acifluorfen and bifenox in broad bean seedlings and AOA could protect broad bean seedlings early.

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INTRODUCTION

Field bean (Vicia faba) is an important leguminous crop raised for seed production in Egypt. The Egyptian government is devoting much effort to increase productivity for unit area for most of the field crops grown in Egypt, particularly the legumes. Field bean (Vicia faba, L.) is considered as the most important crop among legumes since the seeds provide a rich source of protein, for public as well as for animal feeding. The government encourages the cultivation of field bean through the production of new improved cultivars and best cultivation methods for high productivity.

A great number of weeds when found in field bean fields might cause great losses in seed yield because weeds compete directly with field bean plants for light, moisture, carbon dioxide and soil nutrients. Farmers usually control weeds in field bean by using mechanical devices.

Nowadays, there is a shortage in farm labour and therefore, chemical control of weeds should be put into consideration. Elimination of weeds by herbicides may cause a deleterious effect on growth, yield, yield components and chemical composition of broad bean plants. On the other hand, the phytotoxic after effects of these herbicides may prove injurious to succeeding crops. This

type of work is of particular importance in Egypt where two or three crops are grown rotationly in one year.

In recent years the new technique of herbicide safeners has been used increasingly in chemical weed control field. Herbicide safeners are chemical substances that selectively protect crop plants against herbicide injury (Hatzios, 1989).

The present investigation aims to study the effect of numerous chemical and mechanical weed control treatments on weeds as well as growth, yield, yield components and chemical composition of broad bean plants. The work was extended to study the residual effect of the applied herbicides on squash and maize as a summer succeeding crops.

Special consideration was also given to evaluate the uses of ∝ aminooxy acetic acid (AOA) as a safener substance in pot experiment to protect broad bean seedlings against the toxicity symptoms of both acifluorfen and bifenox herbicides.

REVIEW OF LITERATURE

1. Effect of weed control treatments on faba bean weeds:

Konstantinov (1968) mentioned that linuron at 1.5 - 3.0 kg/ha. applied as pre-emergence gave satisfactory weed control in field bean. Similar results were recorded by Lindegaard and Christensen (1970), Lindegaard and Christensen (1971), and Sedov and Losev (1976).

Verlaat (1968) reproted that pre-emergence application of linuron at 1-2 kg/ha. gave satisfactory control of young broad-leaved but not grass weeds in broad bean. Walczak and Turowski (1971) recorded that linuron at 2 kg/ha. after sowing Vicia faba, when plants were about 10 cm. in height, gave moderate weed control. Similar data were observed by Zahran (1982).

Gummesson (1975) noticed that application of bentazone at 1.44 kg/ha. applied when field bean plants were 8 - 10 cm. high, gave better weed control than dinoseb. Betts and Morrison (1979) mentioned that in field bean, metribuzin at 0.4 - 0.8 kg/ha. controlled Brassica kaber var. pinnatifida and Sinapis arvensis.

Costa et al., (1979) in trials with field bean recorded that application of methabenzthiazuron at 2.1 kg/ha. and linuron at 0.75 kg/ha. controlled a mixed