ESPONSE OF SESAME (Sesamum indicum L.) TO SOME HERBICIDES UNDER DIFFERENT CULTURAL TREATMENTS

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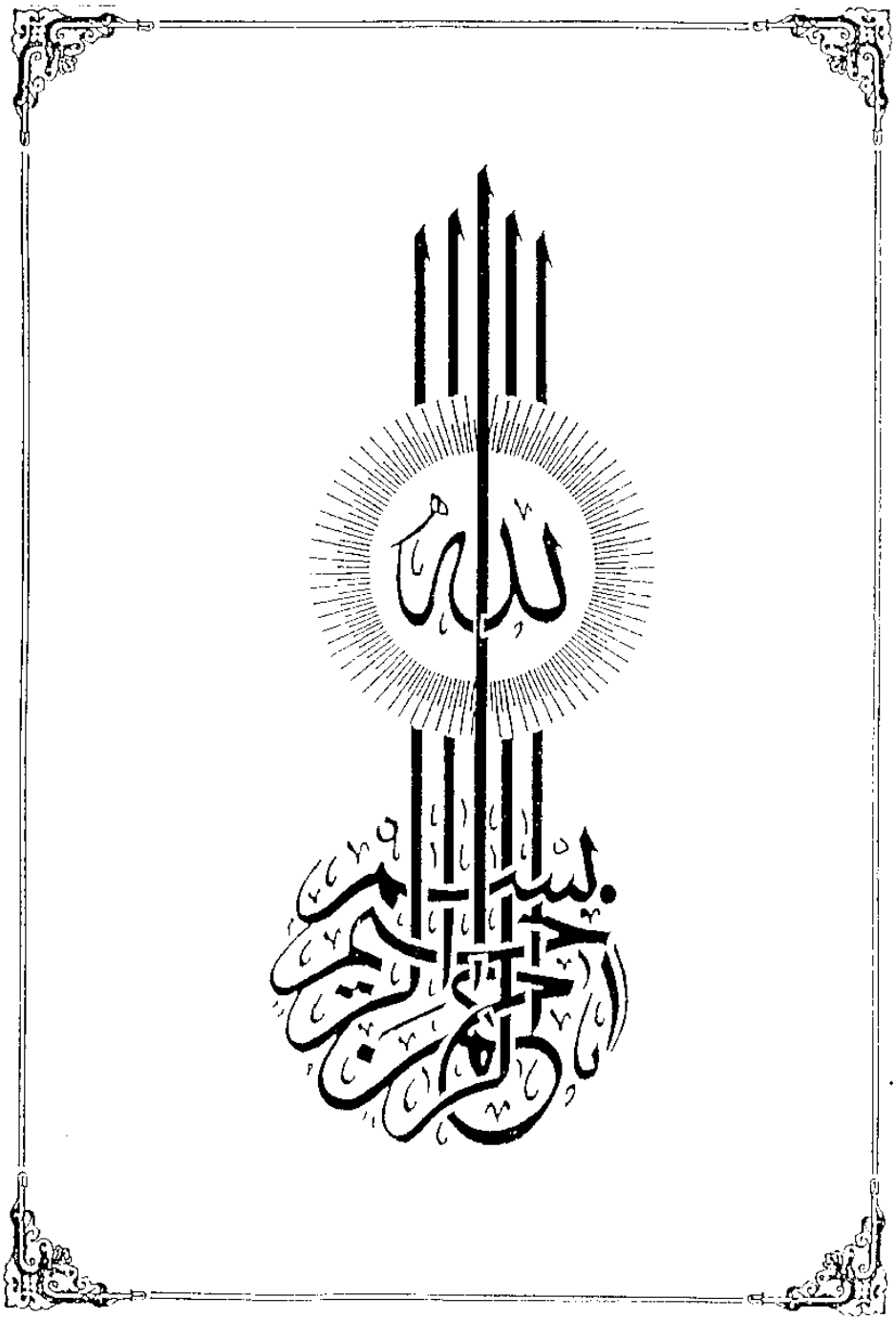

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INTRODUCTION

Production of vegetable oils in Egypt is fall below requirement for local consumption. Due to the increase in the demand of oils and the shortage of our local production to cover the country needs, the expansion in sesame cultivation for oil extraction will be helpful. Sesame (Sesamum indicum, L.) is an excellent source of edible oil. It is of great importance to improve the total production and quality of oil by increasing growing area and/or raising the yield per unit area. This could be achieved by agronomic practices such as weed control, nitrogen fertilization and optimum plant population.

The total annual production of sesame seeds in Egypt in 1984 amounts to 13.5 thousand tons yielded from 26 thousand faddan (Statistical Yearbook, A.R.E., 1984).

The major problem which effects sesame growth and decreases plant population is weeds. Weed removal in sesame field during the first 2 weeks led to an increase in seed yield by about 278 % (Gurnah, 1974). When sesame is young, the crop is very sensitive to weed competition (Siriwardana, 1982). Sesame usually makes

very rapid growth after it reaches a height of 10 cm and then compete most weeds (Culp and McWhorter, 1965).

In Egypt, during summer season, the available agricultural labour are not so easy for hand-hoeing such crop due to various practices needed for different crops in the same period. Moreover, hand-hoeing in sesame during seedling stage is impracticable and might damage seedlings. Therefore, a real need for an selective and effective pre-emergence herbicide is necessary for keeping up the plant population as good as possible, which reflects the total seed yield.

In the second order, optimum nitrogen supply and plant population are considered among the main factors influencing the yield and its components of sesame.

The present study was undertaken to find a promising selective pre-emergence herbicide for weed control in sesame and to study the effect of nitrogen fertilization and plant density on sesame yield.

REVIEW OF LITERATURE

The literature cited below are dealing with the effect of some weed control treatments, plant distances and nitrogen fertilization on weeds; growth, yield and yield components of sesame.

I. Effect of weed control treatments on :

1. Weeds :

A- Single Herbicide :

a) Alachlor (Lasso) :

Lyubenov and Kostadinov (1970 and 1972) reported that Lasso (alachlor 48 %) at 4.0 kg/ha. as pre-emergence application in sesame was effective in controlling weeds. Alachlor controlled a wide range of annual grassy and broad-leaved weeds. Similar results were obtained by Fischer (1971) and Moore (1974).

Dean and Parker (1971) showed that incorporating alachlor at 1.0 kg/ha. as pre-sowing in sesame controlled both Amaranthus retroflexus (as an indicator to broad-leaves) and Eleusine indica (as an indicator to grasses).

Sancho and Garcia (1971) found that applying alachlor in sesame as pre-emergence at 3.0 kg/ha. gave weed control ranged from 80 - 98 %.

The Ethiopian Institute of Agricultural Research (Anonymous, 1973 a and b) reported that in irrigated sesame where herbicides were applied as pre-emergence, alachlor at 1.6 kg/ha. gave good weed control hardly adequate at 3 weeks after sowing, but the higher rate applied (2.73 kg) gave excellent control for 5-6 weeks. Alachlor was more effective in controlling grass weeds than broad-leaves. On the other hand, weed control % obtained with alachlor in rainfall sesame were 58.3 and 69.4 % with 1.9 and 2.9 kg/ha. of alachlor, respectively. Similar trends in controlling weeds by alachlor were obtained in sesame by Rao (1983) and in sunflower by Woon et al. (1984).

Riley (1974) concluded that alachlor at 3.0 lb/ac. did not control Chenopodium album in soybean.

Gaur and Tomar (1978) showed a significant reduction in weed population associated with sesame plants due to application of Lasso at 1.5 - 4.5 kg/ha. as pre-emergence.

Buchholz et al. (1981) noticed that alachlor at 1.4 - 4.5 kg/ha. gave complete control of Echinochloa crussgalli seeded immediately after treating. They added that longevity of control was less than 4 weeks on sandy loam and silty loam soils.

Subramanian and Sankaran (1981) indicated that alachlor at 1.75 kg/ha. as pre-emergence application in sesame gave good weed control of purslane and nut-sedge.

Chairman (1983) mentioned that alachlor could be used for control of annual grass, yellow nutsedge and certain broad-leaved weeds in soybean, groundnut and cotton crops.

Choudhary (1983) found that pre-emergence application of alachlor at 1.5 kg/ha. significantly lowered weight of Cyperus esculentus in groundnuts. He added that by the time of groundnuts harvest, alachlor did not show any appreciable difference in weed cover than the untreated control.

b) Linuron (Afalon) :

Santelmann et al. (1963) noticed that pre-emergence application of linuron at 1.0 lb/ac. controlled 80 and

60 % of broad-leaved and grass weeds in sesame, respectively, while at 2.0 lb/ac. gave 90 % control for each group of weeds. These results are in harmony with those obtained by Lyubenov and Kostadinov (1970 and 1972).

Kasasian (1971) concluded that application of monuron or diuron as pre-emergence was found to be effective for controlling weeds in sesame. He added that urea herbicides controlled broad-leaved and grass weeds in sesame effectively.

Weiss (1971) showed that both monuron at 0.18 and 0.40 kg or diuron at 0.6 and 0.8 kg/ha. as pre-emergence application controlled a wide range of weeds in sesame fields.

Freydier (1975) found in soybean trials that when grass weeds were present, good weed control was obtained by pre-emergence application of linuron at 1.0 kg/ha.

El-Deek (1977) reported that pre-emergence application of linuron at 1.0 kg/fad. in soybean controlled about 60 and 62 % of broad-leaved and grass weeds, respectively. On the other hand, Abd El-Raouf and Fayed (1978) demonstrated that there was no significant

difference between linuron at 1.0 kg/fad.as pre-emergence application and untreated treatment on the fresh weight of weeds in soybean.

Moursi et al. (1980) concluded that pre-emergence application of linuron had low efficiency in controlling grass weeds in soybean comparing with its efficiency on broad-leaved weeds. Linuron at a rate of 1.0 kg/fed. controlled 57.0, 61.3 and 8.4 % after 45 days and 19.6, 33.0 and 15.9 % after 75 days from sowing of total,broad-leaved and grass weeds, respectively.

Chairman (1983) mentioned that linuron could be used for controlling germinating and newly established broad-leaved and grass weeds in soybean and cotton crops.

Fayed et al. (1983) showed that pre-emergence application of linuron at 1.0 kg/fed. significantly decreased the fresh weight of broad-leaved by 50.6 and 62.2 %,grasses by 65.1 and 68.5 % and total weeds by about 53.7 and 64.5 % after 6 and 12 weeks from soybean sowing than the untreated treatment, respectively. Similar trends were obtained by El-Bagoury et al. (1983).

Hussein et al. (1983) applied linuron as pre-emergence in sesame at 1.8 kg/ha. and obtained 55.5 and 72.8 % control of broad-leaved and 45.1 and 75.3 % of total weeds at one and two months after sowing, respectively, while controlled 50.6 and 71.2 % of grass weeds over the untreated control.

Mostafa and Hassanien (1983) observed a depression in fresh weight of total weeds associated with sunflower by about 70 % of the untreated treatment by the application of linuron at 1.0 kg/fed. as pre-emergence.

c) Prometryn (Gesagard) :

The Ethiopian Institute of Agricultural Research (Anonymous 1973 a and b) reported that pre-emergence application of prometryn at 1.0 kg/ha. in irrigated sesame controlled 66.7 and 38.9 % of weeds after 54 and 105 days from sowing, respectively. Meanwhile, at a rate of 1.85 kg controlled 77.8 and 66.7 % of weeds at the previous periods. Cyperus weed was not affected. On the other hand, prometryn at 1.1 and 2.2 kg in rainfall sesame gave 55.6 and 72.2 % control of weeds at 75 days after sowing, respectively. The same Institute (Anonymous 1976) found good weed control by applying prometryn at 1.0 and 1.2 kg/ha. in irrigated sesame.

Moore (1974) noticed that in irrigated sesame prometryn gave consistent and better weed control than alachlor.

Gaur and Tomar (1978) stated that weed population in sesame was significantly reduced due to the pre-emergence application of prometryn at 0.5 - 1.5 kg/ha. than untreated.

Chairman (1983) indicated the use of prometryn for controlling broad-leaved and grass weeds in cotton crop.

Hassan (1984) showed that prometryn application as pre-emergence at 0.75 kg/fed. are considered effective for reducing number of weeds/m^2 and fresh weight of weeds in lentils and chick pea crops.

d) Oxyfluorfen (Goal) :

Lange and Schlesselman (1979) reported that oxyfluorfen applied in tomatoes as pre-emergence at 2.0 lb/ac. controlled 95 % of weeds.

Biroli et al. (1980) mentioned that pre-emergence application of oxyfluorfen at 0.45 kg/ha. in soybean

gave 91 and 93 % control of Chenopodium album and Portulaca oleracea, respectively.

Jha and Sen (1981) noticed that post-emergence application of oxyfluorfen in sesame was very effective against Cyperus rotundus, but after a month it attained its normal growth.

Chairman (1983) recommended the use of oxyfluorfen for the control of annual broad-leaved and grass weeds in soybean and groundnut crops.

Woon et al. (1984) obtained good weed control in sunflower by pre-emergence application of oxyfluorfen at 1.0 lb/ac.

e) Oxadiazon (Ronstar) :

Zhelev et al. (1979) reported that Ronstar (oxadiazon) at 4 kg/ha. as pre-emergence application in sunflower was effective against grass weeds.

Bhan et al. (1983) stated that pre-emergence application of oxadiazon at 1.0 and 2.0 kg/ha. in groundnuts controlled 67.0 and 81.6 % of weeds, respectively, after 45 days from sowing.