INFLUENCE OF SEEDBED PREPARATION PRACTICES ON THE EFFICIENCY OF SOIL-ACTING HERBICIDES IN COTTON

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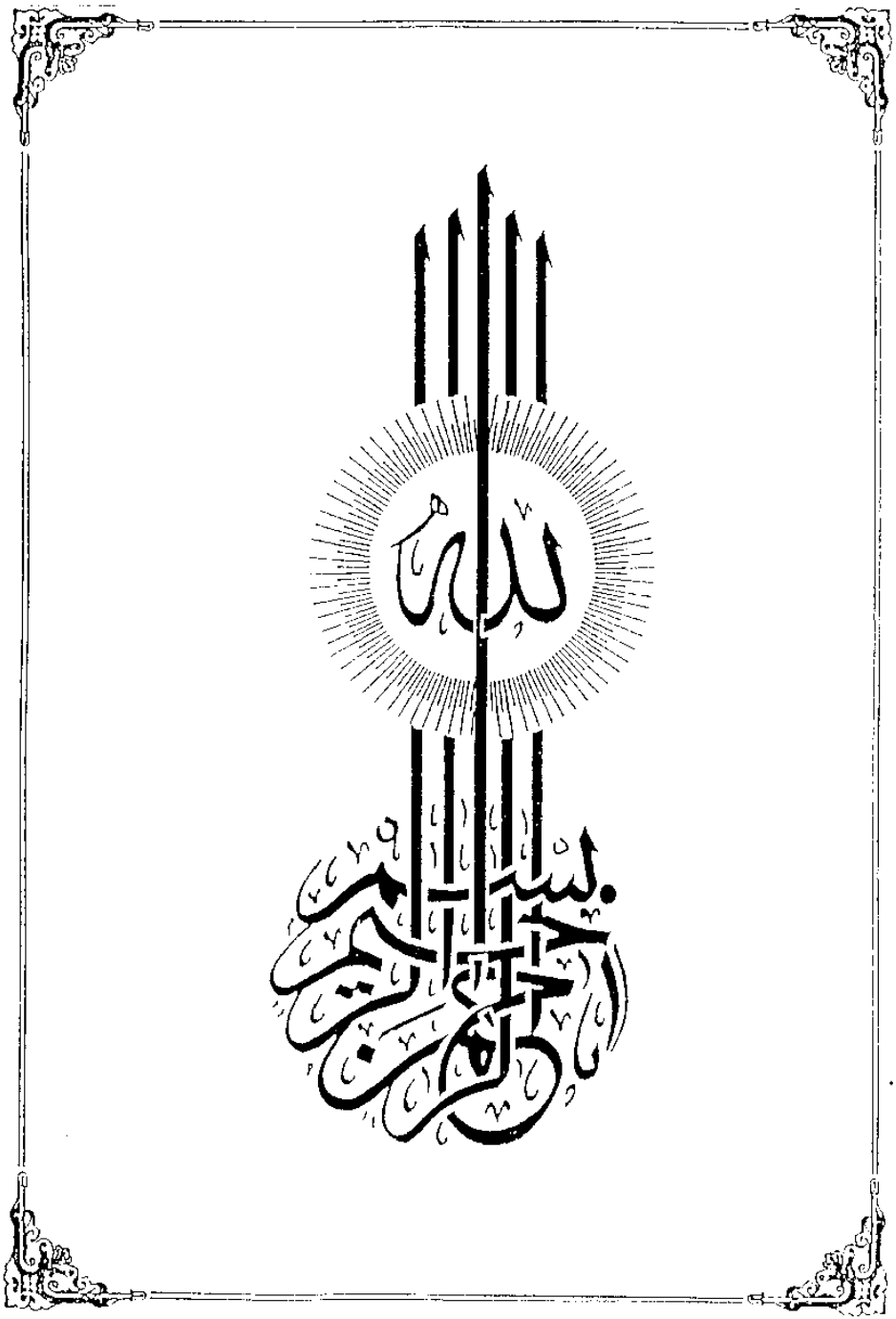

ABSTRACT

Reda Abdel - Whab Said . On Influence Of Seedbed Preparation Practices On The Efficiency Of Soil - Acting Herbicides In Cotton . Unpubilshed Master of science in Agriculture , University of Ain - Shams , 1995 .

The effect of seedbed preparation practices, weed control treatments and their interaction on cotton weeds, cotton plant growth, cotton yield and its components was studied .

Seedbed preparation practices treatments increased significantly number and fresh weights of broad-leaved, grassy and total weeds comparing with no or minimum tillage. Three to four-plowing treatments increased number of leaves, LAI, and number of bolls per plant. Whereas, two and three-plowing treatments gave the highest seed cotton yield per plant. The highest values of seed cotton yield per fed. were achieved from no tillage one plowing, and two-plowing treatments whom not deviate significantly with each other .

All weed control treatments decreased significantly number and fresh weight of broad-leaved weeds grasses and total weeds $/m^2$ after 4,8 and 16 weeks from sowing as comparing with the unweeded treatment. Hand hoeing (3 times) and fluometuron 1.0 kg + pendimthalin 1.7 l/fed. treatment gave the highest number of bolls per plant, weight of seed cotton per boll, seed cotton yield per plant and seed cotton yield per fed. comparing with other weed control treatments.

The potent treatments in controlling cotton weeds three hand hoeings, and mixture of fluometuron +

pendimethalin treatment under no tillage farming system. Zero and minimum tillage (one plowing) plots weeded with hand hoeing exhibited the higher seed cotton yield per fed. Yield of these potent treatment was superiored those of similar seedbed preparation treatments under unweeded conditions by 97.3 and 96.3%, respectively .

Key words :-

Seedbed preparation practices - plowing - tillage - zero and minimum tillage - farming system. - fluometuron - pendimethalin - mixture of herbicides - efficiency - weed control - weed spectrum - cotton growth and yield .

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INTRODUCTION

Cotton (Gossypium barbadense L.) is the most important fiber crop in Egypt . The relative long growing season for cotton plants was associated with many winter and summer weed species whom consequently reduce both quantity and quality of cotton yield.

Hand hoeing remains responsible for most weed control programs in cotton and other row field crops in Egypt, but the expensive and scarce of farming hand labour presents a continuos increase in using herbicides .

Suitable seedbed preparation is another important factor prerequisites for successful stand, establishment, healthy growth and desirable yield for cotton plants.

Plowing has been the primary process in the creation of a seedbed . This practice plays an important role, not only in seedbed preparation, trash incorporation, and hand fitting for irrigation and planting, but also in weed distribution as well, Otherwise, plowing disturbs soil surface and consequently affect the dynamic relations between soil and agrochemicals applied .

Soil acting herbicides, i.e. fluometuron and pendimethalin are the most common and effective herbicides
used in cotton fields in Egypt in the past 20 years. Independent of method of application , activity and persistence of these herbicides will seriously affected with soil properties achieved by seedbed preparation practices .

This work was designed to throw some lights the role of seedbed preparation practices, weed control treatments and their interaction on weed infestation and growth, yield and yield components of cotton plant .

REVIEW OF LITERATURE

Establishment, growth and yield of cotton plants as well as associated weeds are directly affected by seedbed preparation practices, weed control treatments and their interaction. In order to fulfill the objective of this study, the literature is reviewed under the following broad categories;

A- Effect of seed bed preparation practices .

B- Effect of weed control treatments .

C- Effect of the interaction between seedbed preparation practices and weed control treatment .

Subdivisions of each category are covered with results obtained on either weeds or cotton plants .

D- Effect of weed infestation on cotton plants.

A- Effect of seedbed preparation practices :

1- On weeds :-

Plowing is the primary process in seedbed preparations. Plowing controls weeds by burying them, separating shoots from roots and stimulating germination of dormant weed seeds and buds .

Wickes and somerhalder, (1993) showed that the Nebraska till-plant system is an accepted minimum tillage methods for corn . Fewer redroot pigweed (Amaranthus retroflexus L.) and grass weeds in the row under the Nebraska till-plant system than under a coventional system for seedbed preparation . Fewer weeds in the row suggested that weed seeds were being moved from the row by the Nebraska till- system.

Tillage operations markedly reduced weed yields . Average of weed yields for tilled and untilled plots were 80 and 390 lb / A, respectively. Tillage treatments reduced weed yield by 76% in plot receiving no other weed control treatment . However, during rainy periods

timely tillage operations may not be possible, as they were in this study - under wet conditions. The use of a selective herbicide would certainly be advantageous to prevent excessive weed growth (Burnside et al., 1964).

Three tillage intensities designated excessive, moderate, and minimum depending on the number and kind of tillage operations performed prior to planting, were used three different tillage tools used as the primary implement in preparing the seedbed were sweep machine, one way and moldboard plow . Excessive, moderate, and minimum tillage plots averaged 72, 73, and 63 1b / A of weeds, respectively(Fenster and Robinson, 1968) .

Tillage may influence the management of weed seeds in a number of ways. A reduction of weed seeds in the row reduces the number of weed emerging with the corn . In contrast, the conventional disking and plowing system of seedbed preparation did not remove weed seed from row(Wieks and somerhalder, 1971) .

Roberts and Feast, (1972) observed that with the moldboard plowing more weed seeds were buried and either decomposed or remains in a dormant state . With little or no tillage , weed seed stay near the soil surface where germination and emergence is possible if the soil condition are favorable, which may also be influenced by tillage (Harper, 1977). Therefore,no tillage and minimum tillage gave better weed than conventional cultivation (Robinson and langdale , 1983) .

In no tillage planting systems, initial weed control for planting is accomplished by a broadcast application of a non-selective herbicides such as paraquat or glyphosate (siemenes and Oschwola, 1978) . Reduced tillage on dry land areas in Nebraska did not affect weed control , but increased annual grasses weeds and perennial species in other states (williams and wieks, 1978), and may increase the population of biennial and perennial broad leaf and grasses weeds and consequently may increase the population of weeds (williams et al., 1983).

Tillage had a marked effect on the weed population, and some of the most numerous dicotyledonous species such as Sinapis aviculare L., Raphanus raphanistrum L., and Polygonum aviculare L. It increases levels of cultivation (Pollard and Cussans, 1981) .

With minimum tillage or no tillage, many weed seeds did not germinated (Ghadiri et al., 1984). With moldboard plow system, more weed seeds are incorporated into soil aggregates than reduced tillage, where it is less likely to germinate (pareja et al., 1985 and pareja and staniforth , 1985) .

Wilson et al ., (1986) suggested that control of some weed species was excellent with conventional tillage and no tillage plus non- selective herbicides but was significantly less with no tillage without non-selective herbicides and with minimum tillage .

Schweizer et al ., (1989) showed that annual weeds were controlled in disced, bedded and strip rotary till plant systems with a moderate or intensive level of herbicides .

Acomparison between moldboard and chisel plowing indicated that weed seeds were more prevalent near soil surface after chisel plowing. The density of certain annual weed seeds increased more rapidly in the seed bank after chisel plowing compared to moldboard . The soil seed bank is the major source of weed infestation on most tilled agricultural sites. Tillage directly affects the seed bank by physical mixing of the soil . Tillage and herbicides application indirectly affect the seed bank by reducing the number of seed producing plants (Ball and Miller, 1990) .

2- On cotton plants :-

The advantages of no and minimum tillage plowing systems on growth and yield of crop plants were recognized and reviewed by many investigators (Beale and Langdale, 1967) on corn and small grains;fester and Robinson , 1968 on safflower; Sandford et al., 1973 and webber et al., 1987 on soybean; Nodon and Harveing, 1981 and Ciha, 1982 on sweet corn; and Erie and Harris, 1957, Scott and Bord, 1974,Robinson and