

A P P R O V A L S H E E T

Title : Sensitivity of onion (Allium cepa, L.) plants to mechanical and chemical weed control.

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Date : / / 1986

ACKNOWLEDGEMENT

It is a great honour to express my indifinite gratitude and may immense appreciation to my major supervisor, Dr. Tawakol, Y. Rizk, Professor of Agronomy and Vice Dean, Faculty of Agriculture, Ain Shams University for his kind guidance, encouragement, and sincere help.

I would also like to express my sincere gratitude to Dr. M.T. Fayed, Professor of Agronomy, Faculty of Agric., Ain Shams University for his generous effort, meticulous supervision and invaluable help which he gave during the course of this study.

Particular thanks to Dr. S.M. El-Naggar Associate Professor, Botany Laboratory National Research Centre for his generous help, guidance and support as regards.

I am also greatly indebted to the Head and Staff members of the Botany Laboratory at the National Research Centre for all facilities given to me.



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INTRODUCTION

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I N T R O D U C T I O N

The population of Egypt has been increased at the rate of 2.3% per annum during the past decade.

At the present time, it is estimated to 49 million and approximately 70% of this population is concentrated in the Delta area.

In other words, all of the nation's population is concentrated in only 4.6% of the country's land area.

The national strategy aiming to redistribute population over new areas. Numerous studies have been carried out to find the proper locations for the new settlements. Results obtained ensured that the High Dam Lake Areas are the most proper and important locations.

Onion is one of the most important field crop in Egypt, where it is either locally used or exported.

Unlike most crops, onions grow slowly and do not form a leaf canopy because of their upright habit of growth. This characteristic of onion makes competition with weeds a very important factor which affects yield.(Paller et al 1971). Onion yield is mainly influenced by weed competition for nutrient, water, light,.....etc, than any other factors.

For the successful growing of onions, weed control is essential especially during their early development.(Hewson,

and Roberts, 1971). At present time there is a great shortage in hand labour and rise in wage scale, this make the uses of chemical weed control very necessary to decrease the cost and increase the production of onions. This problem is one of the major factor effecting the productivity especially in the new reclaimed areas.

Nowadays, there is a tendency to use close plant spacing for reducing weed competition (Williams et al 1973) and increasing yield production in onions (Brewster and Salter, 1980).

The objective of the present investigation is to study the sensitivity of onion plants to mechanical and chemical weed control under different levels of onion plant densities.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

The literature cited below are dealing with the effect of some herbicides and plant density on weeds, growth and yield of onions.

To fulfill the objectives of this study, the review of literature was divided into different parts. Each part concerned with one of the main factors of the study. The subdivisions concerned with the results obtained on either weeds or onion plants.

A). Effect of weed control treatments :

1. On weeds :

(a). Afalon S (Linuron/Monolinuron) :

Castro and Calvar (1973), concluded that afalon at 2.0 Kg/ha applied to transplanted onions gave good results in weed control.

Kiss (1973), reported that two applications of linuron (afalon), (the first after planting the sets at 1.3 - 1.4 Kg/ha and the second when the onions reached 8 - 12 cm at 1.7 - 2.0 kg/ha), controlled dicotyledonous weeds.

Velev (1973), found that linuron (afalon) at 1.0 kg/ha gave good control of dicotyledonous weeds when applied at the 2-to 3- leaf stage, but it is not advised to be used on light soils.

Godinho et al (1977), demonstrated that linuron/monolinuron (1:1) at 0.75 kg/ha was selective in transplanted onions and controlled Portulaca oleracea.

Hajón and Kiss (1978 & 1979), found that afalon was effective against dicotyledonous weeds in onion grown from sets.

Richards et al (1980), confirmed that afalon at 1.5 kg/ha applied 18 days after transplanting substantially reduced the amount of hand-weeding necessary.

Dall'Armellina (1981), noticed that afalon at 0.75 kg/ha gave adequate control for 12 weeks from the time of application.

(b). Stomp (Penoxalin . Pendimethalin):

Roa et al (1975), showed that penoxalin at rates ranged from 1.555 to 1.320 kg/ha, applied after transplanting onion sets controlled a broad spectrum of weeds although some cruciferae and compositae weeds were resistant.

Medramo et al (1976), demonstrated that penoxalin at 4.0 Lit/ha applied one week after transplanting gave good weed control in onions.

Godinho et al (1977), reported that penoxalin at 1.32 and 2.64 kg/ha was selective in transplanted onions and controlled Portulaca oleracea.

Aston (1978), confirmed that penoxalin at rates of 1-2 kg/ha controlled a broad spectrum of annual weeds with good selectivity in trasplanted onions.

Hajdu and Kiss (1978 & 1979), found that penoxalin applied as pre-emergence was effective against monocotyledonous weeds in onion grown from sets.

Fayed et al (1981), found complete mortality for Portulaca oleracea, L. ; Medicago hispida, Gaerten; Rumex dentatus, L. and Beta vulgaris, L. was obtained by the pre-planting application of penoxalin. They added that the application of penoxalin gave 74.4% control of onion total weeds..

Aita et al (1982) found that 1.25 kg/ha penoxalin applied 21 days after transplanting and before weed emergence gave the best control of both dicotyledonous weeds and Echinochloa spp.

Singh et al (1982), found that penoxalin gave effective control of weeds in onion crops.

Malik et al (1982), reported that penoxalin gave the best effect on the dry matter production of weeds in onion fields.

(c). Galex (Metolachlor/chlorobromuron):

Clarkson and Geluwe (1975), stated that metolachlor has been shown to be effective as either pre-sowing (incorporated) or pre-emergence herbicide on a wide variety of grassy and broad-leaved weeds. Hajdu and Kiss (1978), reported that metolachlor as pre-emergence gave season-long control of weeds in planted onions. In (1978 & 1979), they found that metolachlor applied as pre-emergence was effective against monocotyledonous weeds in onion grown from sets.

(d). Preforan (Fluorodifen):

Green (1972), found that fluorodifen at 3.0 kg/ha gave good and safe weed control in transplanted onions. Similar results were obtained by Hammerton (1972). On the contrary, Silva et al (1979), showed that fluorodifen (3.0 kg/ha) gave slightly poorer weed control in onion crops.

Ferreira et al (1978), reported that fluorodifen at 3.0 kg/ha applied after transplanting onion gave good weed control.

Richards (1979), confirmed that fluorodifen 36% at 14.0 lit./ha applied as pre-emergence in transplanted onions substantially reduced the amount of hand weeding-necessary.

Fayed et al (1981), found that moderate mortality for Chenopodium album, L. was obtained by fluorodifen herbicide. Complete mortality for Portulaca oleracea, L.; Medicago hispida, Gaerten; Rumex dentatus, L. and Beta vulgaris, L. was obtained by the post-planting application of fluorodifen herbicide. They added that fluorodifen gave 75% control of onion total weeds.

Orkwor et al (1982), found that fluorodifen and oxadiazon reduced weed weight from 6.40 - 14.50 t/ha to 3.22 - 3.66 t.

Kasim (1984), noticed that weed competition affected onion growth to a great extent 3 months after transplanting. He also found that fluorodifen significantly reduced the number of annual weeds, but the herbicide showed insignificant effect on the perennial weeds in onion crops.

(e). Ronstar (Oxadiazon) :

Wilson (1973), found that oxadiazon applied at 1.0, 1.5 and 3.0 kg/ha gave good control of Oxalis latifolia.

Deuber and Forster (1975), found that oxadiazon controlled Oxalis oxypetala most effectively and led to a greater reduction in the fresh weight of weeds.

Sanok and Weber (1975), showed that oxadiazon at 1-4 lb/acre applied as pre-emergence to weeds in transplanted

onions gave excellent weed control. They added that the higher rates of oxadiazon gave longer control at the weeds present.

Randhawa and Bhalla (1976), found that oxadiazon at 1.0 kg/ha in transplanted onion decreased the weed density to 12.0%. They found significant reduction in the fresh and dry matter accumulated of the weeds due to the use of oxadiazon herbicide.

Randhawa (1977), found that oxadiazon at 1.0 and 1.5 kg/ha applied as pre-emergence gave excellent weed control in onions.

Ferreira et al (1978), reported that oxadiazon at 1.0 kg/ha applied after transplanting onion gave good weed control.

Ishiy et al (1978), reported that oxadiazon gave good selective weed control in onion crops.

Richards et al (1978), confirmed that oxadiazon at 5.0 lit/ha applied after 18 days from transplanting substantially reduced the amount of hand-weeding necessary.

Selleck and Sanok (1978), found that oxadiazon at 0.5 - 1.0 lb/acre applied to onions at the 3-leaf stage resulted in good to excellent control of barnyard grass, pineapple weed, purslane and crab grass.

Bokhari and Khalil (1979) ~~showed~~ that oxadiazon controlled narrow leaf weeds more effectively than broad-leaf weeds. They also found that oxadiazon significantly affected the total weight of both broad and narrow leaf weeds in onion crops.

Fayed et al (1981), found that complete mortality for Portulaca oleracea, L.; Medicago hispida, Gaerten, Rumex dentatus, L. and Beta vulgaris, L. was obtained by the pre-planting application of oxadiazon. They added that the application of oxadiazon gave 72.7% control of total weeds in onion crops.

Hassannien et al (1981), reported that most of onion weeds i.e. wild beet, bur clover, dock weed, pig weed and cocklebur weed were susceptible to oxadiazon herbicide more than penoxalin herbicide. They found that the highest controlling effect for onion weeds was obtained by post-planting application of oxadiazon at 2.5 lit/faddan which controlled about 91.3 and 99.8% of onion total weeds in 1980 and 1981 experiments, respectively.

Menges and Tamez (1981), reported that oxadiazon at 2.2 kg/ha controlled Sisymbrium irio, Parthenium hysterophorus and Sonchus oleraceus in onion but can not control Helianthus annus.

Singh et al (1982), found that oxadiazon gave effective control of weeds in onion crops.