EFFECT OF TILLAGE SYSTEMS SEQUENCE AND SOME WEED CONTROL TREATMENTS ON SOME FIELD CROPS

MEKKY, M.S., A.N.M. NASSAR AND M.R.R. MOSHTOHRY

Cent. Lab. for Weed Res., ARC, Giza Egypt

(Manuscript received 24 December 2006)

Abstract

Two field experiments were conducted in clay soil at Sids Agricultural Research Station, to assess the role of tillage and weed control treatments on weed management through 2-year crop rotation in the period from 2003 to 2006. The first experiment was conducted to study the effect of three tillage systems i.e. to use mouldboard followed by rotary plow, chisel plow three passes followed by rotary plow and chisel plow two passes where these treatments were applied repeatedly every season through four summer and winter seasons in the same plot of every treatment three sub plots weed control treatments (pendimethalin, hand-hoeing and weedy check) were distributed to study their effects on weeds and productivity of the different in the rotation. Results showed that increasing tillage by combining mouldboard or chisel plowing with rotary plowing decreased the total weeds biomass/m^2 by 29.2 and 38.5% and increased seed yield of faba bean by 12.7and 10.3% than chisel plowing only in 2003/04 season and the respective values during 2004/05 season were 38.2 and 32.8% for weed biomass reduction and 25.8 and 3.2% for seed yield. Similar trends were obtained with the effect of tillage systems on weeds and yield of both maize and soybean. On the other hand, repeating tillage operations seasonally in faba bean decreased total weed biomass/m^2 by 34.0, 17.6 and 24.5% in the third season compared to the first season with mouldboard rotary, chisel with rotary and chisel only in the same respective order. Pendimethalin or hand hoeing resulted in a significant decrease in the total weeds of all studied crops accompanied with significant increases in their yields.

The second experiment was conducted to evaluate the effect of tillage systems on the control of orobanche management in faba bean. Similar trends were obtained emphasizing that increasing tillage operation by combining mouldboard rotary plowing or chisel plowing with rotary plowing succeeded in reducing orobanche biomass/m^2 by 23.3 and 18.2% in 2003/04 season and by 41.4 and 33.4% in second season compared to chisel plowing only and causing increases ranged from the 4.0 to 20.2% of faba bean yield. Imazapic or hand weeding show also significant control of orobanche accompanied with significant increases in faba bean yield productivity. The role of tillage on controlling weeds may be attributed to the role of rotary or mould plowing in burying great proportion of weed seeds including orobanche to depths preventing germination of such seeds. The effect of various possible integration between both tillage and weed control methods were discussed emphasizing the importance of this integration on weed management tactics in studied crops. Other effects of studied factors on weeds or yield components were also recorded.

INTRODUCTION

Both tillage systems and herbicides are considered essential keys for weed management in most field crops. Increasing tillage from no tillage to conventional tillage cause weed shift towards decreasing weed densities or prevalent of certain species as reported by many researchers i.e. Schreiber (1992) and Ball and Miller (1993), they evaluated the effect of primary tillage (mouldboard and chisel plowing), and found that weed density increased dramatically after 3 years from chisel plowing. Buhler and Mester (1991) reported that at least 40% of the giant and green foxtail plants emerged from the upper 1cm in no till compared to 25% in chisel plots and less than 15% in conventional tillage. Yenish *et al.* (1992) indicated that mouldboard plowing had uniform distribution of weed seed in 19 cm of soil. Teasdale *et al* (1991) showed that weeds density increased after one year of no tillage and after two years of conventional tillage in a four years experiment with repeated assignment of the same treatment to the same plot. Ball (1992) indicated that weed seed of predominant annual weeds and number of weeds over the three-year period increased more rapidly in the seed bank after chisel plowing compared to mouldboard. Buhler, (1995) mentioned that the trend toward reducing tillage in corn and soybean production changes the environment where weeds are managed, survive and reproduce. The shift from tillage systems that include extensive annual soil disturbance to systems that minimize soil disturbance will cause major changes in weed population dynamics. These changes often reduce the effectiveness of weed control practices. Concerning the effect of tillage on yield, Abdou (1996) found that the use of disc harrow or rotary tiller after chisel plowing gave higher yield of grain and straw compared to chisel plowing two passes for wheat crop. Concerning the effect of weed control treatments, El- Badawi (1987) found that Stomp (pendimethalin) was the most promising for weed control in faba bean. In experiments carried out by Hassanein *et al* (2000) from 1985/86 to 1989/90 showed that weed control treatments which included the use of pendimethalin, oxyfluorfen, butralin, linuron/monolinuron, imazaquin and some possible mixtures of these herbicides, hand hoeing and unweeded treatment used alone or in combination with bentazon were effective and comparable to hand hoeing on weed control, yield and quality of soybean. Mekky *et al* (2002) reported that butralin at rate of 1.2 kg a.i/fed. either used alone or supplementary with one hand hoeing at 30 days from planting increased the corn grain yield/fed. by 41.1 and 48.9% and the percent control of broad-leaved and grassy weeds by 85.6 and 93.1% in 1999 season and 45.7 and 46.3% increase in crop yield/fed. and percent control of broad-leaved and grassy weeds by 83.1 and 96.5% in 2000 season as compared to the unweeded check. Yehia

and Mekky (2002) found that imazapic (herbicide) at the rate of 200 cm^3/fed applied two or three times significantly reduced the number of *Orobanche* spikes and their dry weight compared to the untreated check and increased significantly plant height, plant weight, number of branches, number and weight of pods/plant as well as seed yield.

The objective of the present work is to study the long-term effect of tillage systems and weed control treatments on orobanche management and crop productivity of some field crops in 2-years rotation.

MATERIALS AND METHODS

Two field experiments were conducted during 2003/04 to 2005/06 winter and summer seasons in clay soil (table 1) at Sids Agricultural Research Station, Agric. Res. Center (ARC) where the first experiment was conducted in fields naturally infested with weeds and the other one in fields naturally infested with orobanche as follow:-

Table 1. Particle size distribution and soil textural class of the soil.

Particle size distribution						
Clay %	Silt %	Clay + Silt %	Fine sand %	Coarse sand %	Real density (g/cm^3)	Soil textural class
51.22	28.73	79.95	18.25	1.70	2.65	Clay

Experiment I

This experiment was carried out to study the effect of long-term tillage systems through experiment summer and winter seasons integrated with weed control methods on weeds and crop productivity of some summer and winter crops during the period from 2003 to 2005 seasons. Also, to compare increasing tillage operations under weed control treatments 1 and 2 than 3 where chisel plow did not cause soil inversion. An area of 2100 m^2 in the mentioned above clay soil was chosen and divided into four replicates where every replicate was divided into three plots, the plot area was 60 meter length and 3 meter width during October, 2003 to apply three tillage systems randomly and the treatments assigned seasonally in the same plots during the period of study until the summer season 2005 as follows:-

1- Mouldboard plow followed by rotary plow (MP + RP),

2- Chisel plow three passes followed by rotary plow (CP3p +RP)

3- Chisel plow two passes only (CP2p).

The average depth of plough was 15 -20 cm. for chisel plough.20 cm. for mouldboard plough and 10 cm. for rotary plow. Weed control treatments were

arranged in sub plots in four replications of the tillage systems treatments in all crops as follows:-

1.Pendimethalin (N- (1-ethylpropyl) -3,4- dimethyl -2,6- nitrobenzene-amine), known commercially as Stomp 50 % EC sprayed pre – emergence at the rate of 1.75 L./fed. for the control of broad – leaved and grassy weeds.

2. Hand-hoeing (twice) the first applied before the first irrigation and the second before the second irrigation.

3.Untreated (weedy check).

Crops and weed control treatments were distributed inside every tillage system and seasons as presented in Table (2).

All cultural practices of growing all crops were conducted according to recommendations.

Faba bean seeds variety Yousef El-Sdeek were planted on both sides of the ridge in double seeds / hill spaced 20 cm apart. Harvest was carried out after 160 days from sowing. in 2003/04 and 2004/05 seasons. Faba bean planted after soybean summer crop in first season.

Maize seeds variety Giza 2 were hand planted on one side of the ridge in double kernels / hill spaced 25 cm apart. Harvest was carried out after 100 days from sowing.

Soybean seeds variety Giza 21 were hand planted drilling on both sides of the ridge. Harvest was carried out after 150 days from sowing.

The sub plot area of 10.5 m^2 consisted of five ridges 3.5 m long and 60 cm apart .in faba bean and five ridges 3.0 m long and 70 cm apart in maize.

Weed control treatments were applied for all crops with a sprayer equipped with one nozzle boom and water volume of 200 L / fed.

The recorded data:-

A1- Weed

Weeds were hand pulled from 1 m^2 in each plot at 60 days from sowing for each crop and were classified to three groups (broad – leaved, grassy and total weeds) and determined the fresh weight of all section as (g/m^2).

A2- Yield and its components: -

A2-1- Faba bean crop

1- Plant height. (cm) at 90 days after sowing.

2 -Dry weight of plant (g) at 90 days after sowing.

3- Number of pods / plant at harvest

4-Weight of 100 seeds (g) at harvest.

5- Seed yield (ardab / fed.) at harvest.

Table (2)

Crops sequences	Tillage systems frequencies				Weed control treatments
	Winter 2003/04	Summer 2004	Winter 2004/05	Summer 2005	
2003/04 winter season (Faba bean)	Mouldboard plow + rotary plow (MP + RP)				Stomp 50% EC (1.75 L/fed.) Hand hoeing (twice) Untreated (weedy check).
	Chisel plow three passes+ rotary plow (CP3p + RP)				Stomp 50% EC (1.75 L/fed.) Hand hoeing (twice) Untreated (weedy check).
	Chisel plow two passes only (CP2p)				Stomp 50% EC (1.75 L/fed.) Hand hoeing (twice) Untreated (weedy check).
2004 summer season (Maize)	Mouldboard plow + rotary plow (MP + RP)	MP + RP			Stomp 50% EC (1.75 L/fed.) Hand hoeing (twice) Untreated (weedy check).
	Chisel plow three passes+ rotary plow (CP3p + RP)	CP3p + RP			Stomp 50% EC (1.75 L/fed.) Hand hoeing (twice) Untreated (weedy check).
	Chisel plow two passes only (CP2p)	CP2p			Stomp 50% EC (1.75 L/fed.) Hand hoeing (twice) Untreated (weedy check).
2004/05 winter season (Faba bean)	Mouldboard plow + rotary plow (MP + RP)	MP + RP	MP + RP		Stomp 50% EC (1.75 L/fed.) Hand hoeing (twice) Untreated (weedy check).
	Chisel plow three passes+ rotary plow (CP3p + RP)	CP3p + RP	CP3p + RP		Stomp 50% EC (1.75 L/fed.) Hand hoeing (twice) Untreated (weedy check).
	Chisel plow two passes only (CP2p)	CP2p	CP2p		Stomp 50% EC (1.75 L/fed.) Hand hoeing (twice) Untreated (weedy check).
2005 summer season (Soybean)	Mouldboard plow + rotary plow (MP + RP)	MP + RP	MP + RP	MP + RP	Stomp 50% EC (1.75 L/fed.) Hand hoeing (twice) Untreated (weedy check).
	Chisel plow three passes+ rotary plow (CP3p + RP)	CP3p + RP	CP3p + RP	CP3p + RP	Stomp 50% EC (1.75 L/fed.) Hand hoeing (twice) Untreated (weedy check).
	Chisel plow two passes only (CP2p)	CP2p	CP2p	CP2p	Stomp 50% EC (1.75 L/fed.) Hand hoeing (twice) Untreated (weedy check).

A2.2. Maize crop

1- Plant height. (cm) at 90 days after sowing

2 -Dry weight of plant (g) at 90 days after sowing.

3 -Grain yield (ardab / fed.) at harvest.

A2.3. Soybean crop -

1 - Dry weight of plant (g) at 90 days after sowing.

2 – Number of pods / plant at harvest

3 – Seed yield (ton / fed.) at harvest.

Experiment II

During 2004/05 and 2005/06 winter seasons, this field experiment was carried in the above mentioned clay soil naturally infested with orobanche to study the effect of tillage systems and weed control treatments on orobanche control and crop productivity of faba bean. The treatments were arranged in a split plot design with four replications where main plots (tillage system) had three different seedbed preparation systems as that used in experiment I

Weed control treatments were arranged in sub plots as follows:-

1.Imazapic [(±) -2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1*H*-imidazol-2-yl]-5-methyl-3-pyridinecarboxylic acid.] known commercially as Oroban 10 % EC sprayed as post sowing after 45 to 50 days from sowing at the rate of 0.2 ./fed.

2. Hand pulling (twice) of orobanche spikes after 90 and 110 days from sowing.

3.Untreated (weedy check).

Faba bean seeds variety Yousef El - Sdeek were hand planted on both sides of the ridge in double seeds/hill spaced 20 cm. apart. Harvest was carried out after 160 days from sowing. All cultural practice of growing faba bean were conducted according to recommendations. Herbicide was applied with a knapsack sprayer equipped with one nozzle boom and water volume used was 200 L/fed.

The recorded data:-

B – Weeds:-

At harvest, broomrape was hand pulled from each plot and the number (plant / m^2) and dry weight of broomrape (g / m^2) was recorded.

B2 – Yield and its components

At harvest, last week of April samples of ten plants were chosen at random from each plot to study the following traits: -

1- Plant height. (cm).

2 -Dry weight of plant (g).

3- Number of pods / plant

4- Number of branches / plant.

5-Weight of 100 seeds (g).

6- Biological yield.

7- Seed yield (ardab / fed.) was calculated from the weight of seeds obtained from each plot.

Statistical analysis: -

Treatments were arranged in complete randomized blocks design with four replicates. All data were statistically analyzed according to the procedures outlined by

Snedecor and Cochran (1980) and the treatments means were compared by the least significant differences (L.S.D).

RESULTS AND DISCUSSION

Experiment 1

A-Effect of tillage systems on weeds, yield and yield components of studied crops.

The predominated recorded weed species in check plots at the experimental sites during the winter seasons were sea beet (*Beta vulgaris* L.), water cress (*Coronopus squamatus* (Forsk) Ascers), dentated dock (*Rumex dentatus* L.), primpenel (*Anagallis arvensis* L.), sun spurge (*Euphorbia helioscopia* L.) as broad - leaved weeds and canary grass (*Phalaris paradoxa* L.) as well as (*Phalaris minor* Retz) as grassy weeds and during the summer seasons purslane (*Portulaca oleracea* L.), cockleber (*Xanthium strumarium*), Sida alba (*Hibiscus trionum* L.), Mexican fire plant (*Euphorbia geniculata* Ortega), Malta jute (*Corchorus olitorius* L.) as broad leaved weeds and jungle rice (*Echinochloa colonum* L.Link.) as grassy weeds.

A I – Faba bean.

Data in Table (3) showed that tillage systems reduced significantly the fresh weight of broad-leaved, grassy and total weeds and increased significantly yield and yield components of faba bean compared to conventional tillage (chisel plow two passes only). Comparing of 2003/04 and 2004/05 winter seasons results showed that repeating tillage systems (winter + summer + winter) in 2004/05 than 2003/04 seasons decreased the fresh weight of total weeds from 535.4 to 353.1 g/m^2 with mouldboard / rotary plowing (MP + RP) tillage system, 465.5 to 383.7 g/m^2 with (CP3p + RP) tillage system and 756.4 to 571.1 g/m^2 with conventional tillage (CP2p) tillage system or 34.0, 17.6 and 24.5%, respectively. Also increasing tillage by using (CP3p + RP) or with (MP + RP) than conventional tillage (CP2p). These results were true in both season. For yield and yield components, in 2003/04 winter season, using (MP + RP) increased significantly plant height, dry weight per plant (g), 100-seeds weight and seeds yield ardab/fed. by 3.1, 20.3, 3.7 and 12.7%, respectively ,compared to (CP2p).. In 2004/05 winter season, tillage system (MP + RP) repeated seasonally three times increased significantly the dry weight per plant (g), number of pods per plant, 100-seeds weight and seeds yield ardab/fed. by 6.5, 51.7, 3.1 and 25.8%, respectively ,compared to conventional tillage.

Table 3. Effect of tillage systems frequencies on fresh weight of weeds (g/m^2), yield and yield components on some crops from 2003 to 2005 seasons.

Tillage systems frequencies					Fresh weight of weeds (g/m^2)						Yield and its components of faba bean				
					Broad – leaved weeds				Grassy						
Crops	Winter 2003/04	Summer 2004	Winter 2004/05	Summer 2005	1	2	3	Total	1	Total weed (g/m^2)	Plant height (cm)	Dry weight /plant (g)	No. of pods / plant	100 seeds weight	Seeds or grains yield *ardab or **ton/fed
2003/04 winter season (Faba bean)	MP + RP				157.5	80.9	16.6	255.00	280.4	535.4	123.9	27.8	9.1	61.8	3.82
	CP3p + RP				84.9	71.8	6.0	162.7	302.8	465.5	122.6	24.7	8.2	61.4	3.74
	CP2p				162.4	113.6	56.6	332.6	423.8	756.4	120.2	23.1	8.1	59.6	3.39
LSD at level 5%					26.4	16.6	11.9	37.1	73.0	78.6	2.52	3.4	N.S	1.23	0.39
2004 summer season (Maize)	MP + RP	MP + RP			116.2	9.9	2.5	128.6	63.5	192.1	233.2	239.4	-	-	19.6
	CP3p + RP	CP3p + RP			105.3	10.5	4.3	120.1	53.2	173.3	220.6	228.8	-	-	18.2
	CP2p	CP2p			179.1	24.1	15.4	218.6	97.3	315.9	217.7	227.4	-	-	17.4
LSD at level 5%					25.8	12.3	7.7	33.1	17.1	42.7	10.5	14.2	-	-	1.15
2004/05 winter season (Faba bean)	MP + RP	MP + RP	MP + RP		88.9	85.8	27.6	202.3	150.8	353.1	122.0	32.8	8.8	59.9	3.9
	CP3p + RP	CP3p + RP	CP3p + RP		93.3	79.1	28.2	200.6	183.1	383.7	118.2	32.4	7.8	58.3	3.2
	CP2p	CP2p	CP2p		165.6	95.2	53.5	314.3	256.8	571.1	118.1	30.8	5.8	58.1	3.1
LSD at level 5%					44.5	40.7	9.9	43.4	32.3	64.9	N.S	1.5	1.62	1.78	0.09
2005 summer season (Soybean)	MP + RP	MP + RP	MP + RP	MP + RP	138.9	0.8	2.3	142.0	16.5	158.5	-	22.33	14.06	-	0.90
	CP3p + RP	CP3p + RP	CP3p + RP	CP3p + RP	125.1	15.6	0.0	140.7	21.4	162.0	-	22.22	13.78	-	0.85
	CP2p	CP2p	CP2p	CP2p	176.3	27.5	14.0	217.8	24.3	242.1	-	20.09	13.17	-	0.71
LSD at level 5%					NS	NS	7.4	66.8	NS	81.8	-	N.S	N.S	-	0.05

Mouldboard plow + rotary plow (MP + RP) & Chisel plow three passes+ rotary plow (CP3p + RP) & Chisel plow two passes only (CP2p

Broad – leaved weeds for faba bean {*Beta vulgaris* (1) - *Coronopus squmantus* (2) - other weed (3)) and grassy weeds *Phalaris sp.* (1)}

Broad – leaved weeds for maize and soybean {*Portulaca oleracea* (1) *Xanthium strumar ium* (2) other weed (3) and grassy weeds *Echinochloa colonum* (1)}

* Ardab for faba bean and maize

**Ton for soybean

We concluded that repeating tillage system or increasing tillage operations cause weed seed bank exhausting and consequently decrease weed population. These results are similar in those obtained by Yenish, *et al* (1992), Teasdale, *et al* (1991) and Ball, (1992).

A2 – Maize

Data in Table (3) revealed that tillage systems reduced significantly the fresh weight of broad- leaved, grassy, total weeds and increased significantly yield and yield components of maize. In 2004 summer season, the highest reduction percentage of broad- leaved, grassy and total weeds were obtained by using chisel/rotary plowing repeated seasonally two times which were 45.1, 45.3 and 45.2% ,respectively, compared to conventional tillage. For yield and yield components, using mouldboard / rotary plowing repeated seasonally two times increased significantly plant height, dry weight per plant (g) and grain yield ardab /fed. by 7.1, 5.3 and 12.6%, respectively ,compared to conventional tillage. These results are in agreement with those reported by Ball (1992), Ball and Miller (1993), Schreiber (1992) and Buhler (1995).

A 3 – Soybean

Data in Table (3) revealed that all tillage systems reduced significantly the fresh weight of broad- leaved, grassy, total weeds and increased significantly yield and yield components of soybean. In 2005 summer season, the highest reduction percentage of broad- leaved weeds (i.e. 35.4%) was obtained by using chisel/rotary plowing repeated seasonally four times compared to conventional tillage. The highest reduction percentage of grassy and total weeds were obtained by using mouldboard / rotary plowing repeated seasonally four times which were 32.1 and 34.5%, respectively, compared to conventional tillage. For yield and yield components, using mouldboard / rotary plowing repeated seasonally four times increased significantly seeds yield ardab/fed. by 26.8% compared to conventional tillage.

It is clear from the pervious results in Table (3) and Figure (1) that increasing tillage by combining mouldboard / rotary plowing, or chisel/rotary plowing as compared to chisel plowing only or by repeating these systems seasonally in the same plots tented to decrease consistently weed biomass. For example, repeating tillage operations seasonally in faba bean decreased total weed biomass/m^2 by 34.0, 17.6 and 24.5% in the third season compared to the first season with mouldboard rotary, chisel with rotary and chisel only in the same respective. These results are in agreement with those obtained by Schreiber (1992), Ball and Miller (1993) and Teasdale *et al* (1991) who showed that weeds density increased after year with no tillage and delayed to four year with conventional tillage. Ball (1992) who indicated that weed seed of predominant species were one more prevalent near the soil surface after chisel plow, seed bank also declined rapidly after mouldboard plowing. Concerning the increases in crop yields of different studied crops under mouldboard or rotary and chisel plowing may be attributed to the improving soil porosity and consequently improving nutrient uptake and decreasing weed biomass and consequently weeds competition.

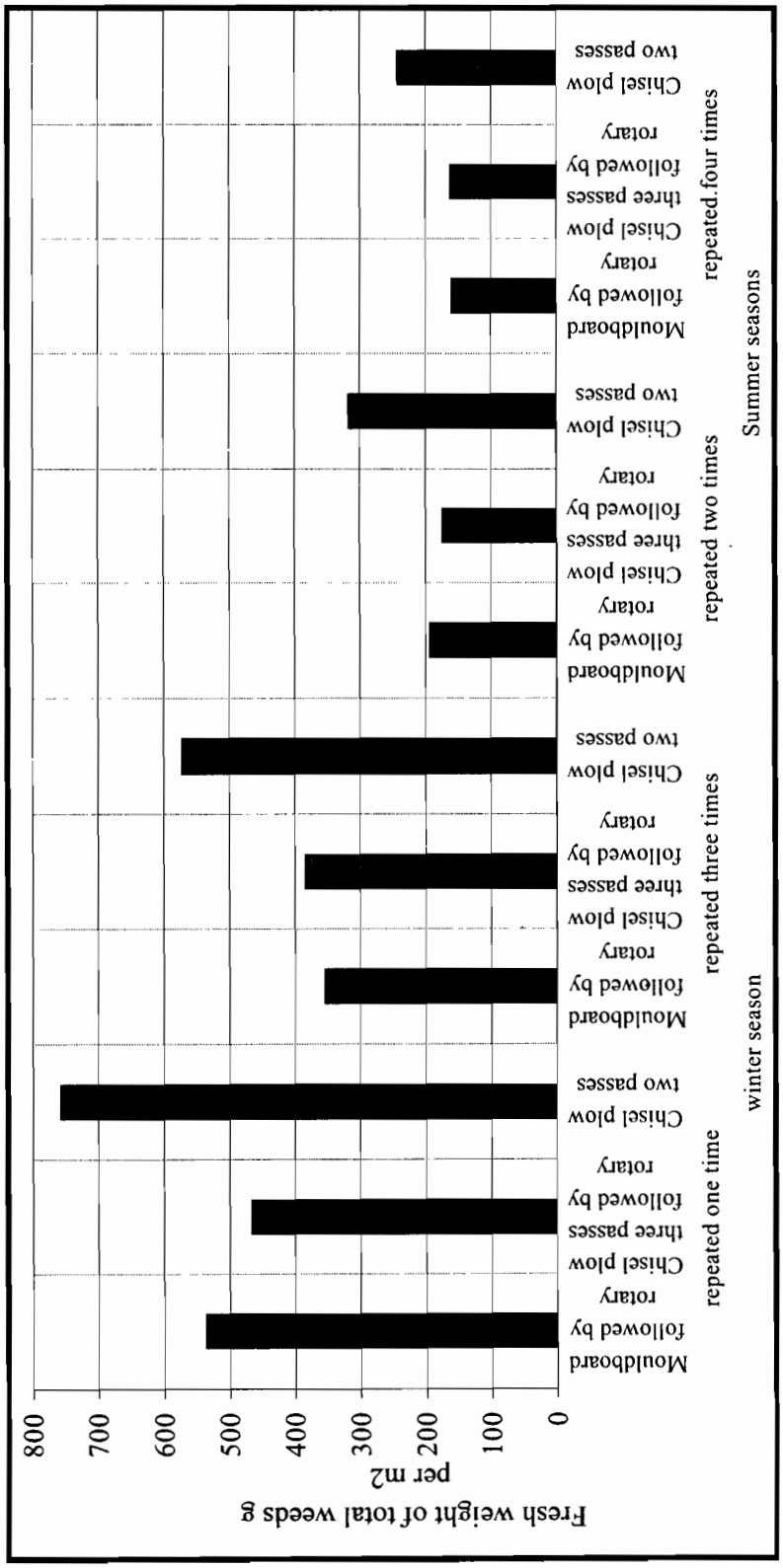

Fig 1. Effect of tillage sequence on fresh weight of total weeds (g/m^2)

Effect of weed control treatments on weeds, yield and yield components:-

Data in Table (4) showed that all weed control treatments reduced significantly the fresh weight of broad- leaved, grassy, total weeds and increased significantly plant height, dry weight per plant (g), number of pods per plant, 100-seeds weight and seed yield (ardab /fed). in all crops

B1– Faba bean

Data in Table (4) showed that hand hoeing twice reduced significantly the fresh weight of broad- leaved, grassy and total weeds by 61.5, 77.8 and 72.9%, respectively, in 2003/04 winter season and in 2004/05 winter season by 80.5 and 79.1%, respectively, for broad- leaved and total weeds compared to weedy check Applying Stomp in 2004/05 winter season reduced significantly the fresh weight of grassy weeds by 92.1% compared to weedy check. For yield and yield components, in first season, applying the herbicide pendimethalin significantly increased plant height and dry weight per plant (g) by 14.8 and 147.7%, respectively, compared to weedy check. Hand hoeing twice increased significantly number of pods per plant, 100-seeds weight and seeds yield ardab /fed. by 107.4, 5.2 and 150% ,respectively, compared to weedy check. In 2004/05 winter season, applying pendimethalin significantly increased plant height dry weight per plant (g), number of pods per plant, 100-seeds weight and seeds yield ardab /fed. by 9.6%, 79.8, 123.8, 7.6 and 220% ,respectively, compared to weedy check. We concluded that the contribution of both pendimethalin or hand hoeing in weed control minimized weed crop metabolism competition which in turn improved crop productivities of faba bean, maize and soybean as comparing with unweeded check in studied crops. Similar were obtained by El-Badawi, 1987.

B2 – Maize

Data in Table (4) showed that weed control treatments reduced significantly the fresh weight of broad- leaved, grassy and total weeds. In 2004 summer season, the highest reduction percentage of broad- leaved, grassy and total weeds were obtained by using pendimethalin were 93.7, 96.1 and 94.4%, respectively, compared to weedy check. Hand hoeing twice or pendimethalin treatment gave the same results and increased significantly dry weight per plant (g) and grain yield ardab /fed. by (18.2 &18.3%) and (44.4 & 43.7%), respectively, compared to weedy check. Hand hoeing twice increased significantly the plant height by 4.5% compared to weedy check. These results are in agreement with those reported by Mekky *et al* (2002).

B.3 – Soybean

Data in Table (4) showed that weed control treatments reduced significantly the fresh weight of broad- leaved, grassy and total weeds. In 2005 summer season, the highest reduction percentage of broad- leaved and total weeds were obtained by hand hoeing twice which gave 97.9 and 95.4% control, respectively, compared to weedy check. Applying pendimethalin treatment reduced significantly the fresh weight of grassy weeds by 85.9% compared to weedy check and increased significantly number of pods per plant by 115.1% compared to weedy check. Hand hoeing twice treatment increased significantly dry weight per plant (g) and seeds yield ardab/fed. by 195.8 and 246%,respectively, compared to weedy check. These results are in agreement with those indicated by Yenish, *et al.* (1992).

Table 4. Effect of weed control treatments on fresh weight of weeds (g/m^2), yield and yield components on some crops from 2003 to 2005 seasons.

Crops	Weed control treatments	Fresh weight of weeds (g/m^2)						Yield and its components of faba bean				
		Broad – leaved weeds				Grassy	Total weed (g/m^2)	Plant height (cm)	Dry weight /plant (g)	No. of pods / plant	100 seeds weight	Seeds or grains yield •ardab or ••ton /fed
		1	2	3	Total	1						
2003/04 winter season (Faba bean)	Stomp 50% EC (1.75 L/fed.)	175.2	119.2	51.3	345.7	167.5	513.2	132.0	31.7	8.8	61.3	3.9
	Hand hoeing (twice)	40.9	62.5	9.1	112.5	152.6	265.1	124.1	31.0	11.2	62.3	5.0
	Untreated (weedy check).	188.6	84.6	18.9	292.1	686.9	979.0	116.0	12.8	5.4	59.2	2.0
LSD at level 5%		26.7	14.8	13.5	35.1	83.7	65.6	4.8	1.8	1.2	0.8	0.3
2004 summer season (Maize)	Stomp 50% EC (1.75 L/fed.)	16.0	7.1	2.8	25.9	6.8	32.3	227.7	244.6	-	-	20.4
	Hand hoeing (twice)	30.0	3.3	0.0	33.3	33.5	66.8	226.0	244.3	-	-	20.5
	Untreated (weedy check).	354.5	34.1	19.4	408.0	173.5	581.5	217.8	206.7	-	-	14.2
LSD at level 5%		55.8	9.1	8.4	63.4	20.2	71.4	4.9	9.8	-	-	1.2
2004/05 winter season (Faba bean)	Stomp 50% EC (1.75 L/fed.)	93.0	109.2	97.4	299.6	36.0	335.6	123.6	38.3	9.4	60.7	4.8
	Hand hoeing (twice)	32.6	32.5	3.0	68.1	99.8	167.9	121.8	36.4	8.8	59.2	3.9
	Untreated (weedy check).	222.1	118.4	8.9	349.4	455.1	804.5	112.8	21.3	4.2	56.4	1.5
LSD at level 5%		19.9	18.8	17.0	35.5	211.2	210.5	4.0	1.2	1.3	2.0	0.3
2005 summer season (Soybean)	Stomp 50% EC (1.75 L/fed.)	18.7	0.0	0.0	18.7	6.0	24.7	-	27.1	16.78	-	*1.14
	Hand hoeing (twice)	6.5	1.5	2.1	10.1	13.7	23.8	-	28.1	16.43	-	*1.28
	Untreated (weedy check).	415.1	42.3	14.1	471.5	42.5	514.0	-	9.5	7.80	-	*0.05
LSD at level 5%		65.9	37.2	9.0	87.2	19.7	41.9	-	2.0	1.20	-	0.06

Broad – leaved weeds for faba bean {*Beta vulgaris* (1), *Coronopus squmantus* (2), other weed (3)} and grassy weeds {*Phalaris sp.*}
Broad – leaved weeds for maize and soybean {*Portulaca oleracea* (1), *Xanthium strumar ium* (2) other weed (3)} and grassy weeds {*Echinochloa colonum*}.

• Ardab for faba bean and maize

•• Ton for soybean

C – Effect of the interaction between tillage systems and weed control treatments on weeds, yield and yield components.

C1 – Faba bean

Results in Table (5) showed that the effect of interaction between tillage systems and weed control treatments on weeds and yield components were statistically significant at 5% level. This mean that the effect of weed control treatments did not behave in a similar manner under different tillage treatments. In 2003/04 winter season, applying (CP3p + RP) with hand hoeing twice reduced significantly the fresh weight of broad- leaved and total weeds by 71.2 and 75.3%, respectively, compared to (CP2p) and weedy check Applying (MP + RP) with pendimethalin treatment reduced significantly the fresh weight of grassy weeds by 77.9% compared to (CP2p) and weedy check. In 2004/05 winter season, (CP2p) repeated seasonally three times with hand hoeing twice reduced significantly the fresh weight of broad- leaved by 87.2% compared to (CP2p) and weedy check. For grassy and total weeds applying (MP + RP) repeated seasonally three times with pendimethalin and hand hoeing twice reduced significantly these weeds by 97.4 and 81.8%, respectively, compared to (CP2p) and weedy check. The fresh weight of total broad – leaved weeds tented to increase with pendimethalin under (CP2p) check than the weed control treatments due the role of pendimethalin in controlling grassy weeds and give the chance of broad leaved weeds healthy to grow without competition. For seed yield, the interaction between tillage system and weed control treatments increased significantly seed yield ardab/fed. Applying (CP3p + RP) with hand hoeing twice increased significantly seed yield by 228.4% compared to (CP2p) and weedy check. In 2004/05 winter season, the use of (MP + RP) with hand hoeing treatment increased significantly seed yield ardab/fed by 202.3 compared to (CP2p) and weedy check.

C2 – Maize

Data in Table (5) showed that the interaction between tillage system and weed control treatments reduced significantly the fresh weight of broad- leaved, grassy and total weeds and increased significantly grain yield ardab/fed. In 2004 summer season, applying chisel/rotary plowing repeated seasonally two times with pendimethalin reduced significantly the fresh weight of broad- leaved, grassy and total weeds by 93.9, 98.7 and 95.3%, respectively, compared to conventional tillage and weedy check. Applying mouldboard/rotary plowing repeated for two season times with hand hoeing twice increased significantly grain yield ardab/fed. by 32.5% compared to conventional tillage and weedy check.

C3 – Soybean

Results in Table (5) showed that the interaction between tillage system and weed control treatments reduced significantly the fresh weight of broad- leaved, grassy and total weeds and increased significantly seed yield ardab/fed. In 2005 summer season, applying chisel/rotary plowing repeated seasonally four times with pendimethalin treatment reduced significantly the fresh weight of broad- leaved, grassy and total

weeds by 99.7, 100 and 99.6%, respectively, compared to conventional tillage and weedy check.

Applying mouldboard/rotary plowing repeated seasonally four times with hand hoeing twice increased significantly seed yield ardab /fed. by 2600 compared to conventional tillage and weedy check

Table 5. Effect of interaction between tillage system frequencies and weed control treatments on fresh weight of weeds (g/m^2) and yield on some crops from 2003 to 2005 seasons.

Crops sequences	Tillage systems frequencies				Weed control treatments	Fresh weight of weeds (g/m2)						Seeds or grains yield •ardab or ••ton /fed
						Broad – leaved weeds				Grassy	Total weed (g/m^2)	
	Winter 2003/04	Summer 2004	Winter 2004/05	Summer 2005		1	2	3	Total	1		
2003/04 winter season (Faba bean)	MP + RP				Stomp 50%	175.4	94.9	5.3	275.6	119.4	395.0	3.70
					Hand hoeing	60.3	62.5	11.5	134.3	180.4	314.7	4.93
					Weedy check.	236.8	85.3	32.9	355.0	541.6	896.6	2.82
	CP3p + RP				Stomp 50%	140.4	90.9	4.5	235.8	192.9	428.7	3.99
					Hand hoeing	15.5	37.1	3.8	56.4	135.0	191.4	5.55
					Weedy check.	98.8	87.4	9.8	196.0	580.5	776.5	1.69
	CP2p				Stomp 50%	209.9	171.9	144.0	525.8	190.3	716.1	4.12
					Hand hoeing	47.0	88.0	11.9	146.9	142.4	289.3	4.49
					Weedy check.	230.3	81.0	13.9	325.2	938.6	1263.8	1.57
LSD at level 5%						62.8	33.0	19.3	75.2	95.9	141.8	0.51
2004 summer season (Maize)	MP + RP	MP + RP			Stomp 50%	10.4	7.0	4.8	22.1	17.3	39.4	20.7
					Hand hoeing	34.3	2.5	0.0	36.8	28.8	65.5	22.8
					Weedy check.	303.9	20.1	2.8	326.8	144.4	471.1	15.4
	CP3p + RP	CP3p + RP			Stomp 50%	9.1	6.9	3.5	19.5	1.7	21.2	20.9
					Hand hoeing	22.3	0.0	0.0	22.3	22.0	44.3	20.3
					Weedy check.	284.3	24.6	9.3	318.1	135.8	453.9	13.3
	CP2p	CP2p			Stomp 50%	28.5	7.5	0.0	36.0	1.5	37.5	19.8
					Hand hoeing	33.4	7.5	0.0	40.9	49.9	90.8	18.6
					Weedy check.	475.5	57.3	46.1	578.9	240.5	819.4	13.8
LSD at level 5%						37.9	10.6	12.2	38.2	35.6	59.8	2.14
2004/05 winter season (Faba bean)	MP + RP	MP + RP	MP + RP		Stomp 50%	118.1	92.6	73.4	284.1	10.6	294.8	4.44
					Hand hoeing	27.5	49.1	0.0	76.6	41.0	117.6	5.35
					Weedy check.	121.0	115.5	9.5	246.0	400.9	646.9	1.77
	CP3p + RP	CP3p + RP	CP3p + RP		Stomp 50%	26.0	80.8	75.8	182.5	42.8	225.3	3.67
					Hand hoeing	21.4	48.3	0.4	70.0	118.0	188.0	4.68
					Weedy check.	232.6	108.3	8.4	349.3	388.6	737.9	1.33
	CP2p	CP2p	CP2p		Stomp 50%	135.0	154.1	143.0	432.1	54.6	486.8	3.44
					Hand hoeing	49.0	0.0	8.8	57.8	140.3	198.0	4.52
					Weedy check.	312.8	131.4	8.9	453.0	575.6	1028.6	1.33
LSD at level 5%						44.6	53.3	16.7	50.9	72.3	79.2	N.S
2005 summer season (Soybean)	MP + RP	MP + RP	MP + RP	MP + RP	Stomp 50%	9.9	0.0	0.1	10.0	4.3	14.3	1.31
					Hand hoeing	11.8	0.0	3.0	14.8	9.0	23.8	1.35
					Weedy check.	395.1	2.3	3.6	401.0	36.4	437.4	0.05
	CP3p + RP	CP3p + RP	CP3p + RP	CP3p + RP	Stomp 50%	1.9	0.0	0.0	1.0	0.0	1.9	1.15
					Hand hoeing	7.8	4.5	0.0	12.3	22.5	34.8	1.35
					Weedy check.	365.7	42.2	0.0	407.8	41.6	449.5	0.06
	CP2p	CP2p	CP2p	CP2p	Stomp 50%	44.3	0.0	0.0	44.3	13.8	58.0	0.96
					Hand hoeing	0.0	0.0	3.3	3.3	9.5	12.8	1.14
					Weedy check.	484.5	82.5	38.8	605.8	49.5	655.3	0.04
LSD at level 5%						97.3	N.S	12.0	99.0	30.5	119.2	0.15

Mouldboard plow + rotary plow (MP + RP)
Chisel plow three passes+ rotary plow (CP3p + RP)
Chisel plow two passes only (CP2p)
Broad – leaved weeds for faba bean {*Beta vulgaris* (1), *Coronopus squmantus* (2), other weed (3)} and grassy weeds {*Phalaris sp.*}
Broad – leaved weeds for maize and soybean {*Portulaca oleracea* (1), *Xanthium strumar ium* (2) other weed (3)} and grassy weeds *Echinochloa colonum}*.

• Ardab for faba bean and maize

•• Ton for soybean

Experiment II

I – Effect of tillage systems on orobanche, yield and yield components of faba bean.

Data in Table (6) revealed that all tillage systems did not significantly effect the number and dry weight of orobanche weed in first season but significantly increased yield and yield components in the first and second seasons. In 2004/05 winter season, tillage system reduced significantly the dry weight of orobanche by 41.1% when mouldboard/rotary plowing was use compared to conventional tillage. In 2003/04 season, applying mouldboard with rotary plowing significantly increased dry weight per plant (g), number of pods per plant, biological yield, 100-seeds weight and seed yield ardab /fed by 16.7, 29.3,16.8, 5.4 and 20.2%, respectively, compared to chisel plow only. Chisel plow three passes followed by rotary plow significantly increased number of branches per plant and also 100-seeds weight by 14.6 and 5.4%, respectively, compared to chisel plow only. In 2004/05 winter season, the highest increases in plant height, dry weight per plant (g), number of pods per plant, number of branches per plant, biological yield, 100-seeds weight and seed yield ardab/fed. were obtained by using mouldboard/rotary plowing were 2.2, 31.5, 5.5, 9.5, 35.7,2.9 and 6.6%, respectively, compared to conventional tillage. According to use mouldboard rotary or chisel with plowing invert soil which help in burying orobanche seeds to depths below 10 cm. and preventing the germination of orobanche seeds. Similar results were obtained by Zahran (1982) He found that sowing faba bean to 8:9 cm decrease orobanche infestation by 34 - 41% than surface planting 2:3 cm depth. Also, he found in another pot experiment that burying orobanche seeds at 5, 35 and 65 cm from sowing surface and then planting faba bean seeds as normal, he found that 35 cm depth of burying decreased number of orobanche spike appeared in soil surface by 91%.

2–Effect of weed control treatments on orobanche, yield and yield components of faba bean.

Data in Table (7) showed that tillage system reduced significantly the number and dry weight of orobanche plants as well as increased significantly yield and yield components of faba bean in 2003/04 and 2004/05 winter seasons. The use of imazapic reduced significantly the number and dry weight of orobanche plants by (94.5 & 99.6%) and (95.1 & 98.2 %), respectively, in the first and second seasons compared to (CP2p). Data in Table (7) showed that the weed control treatments increased significantly yield and yield components of faba bean In 2003/04 winter season, the highest values for plant height, number of branches per plant, number of pods per plant, biological yield, 100-seeds weight and seeds yield ardab/fed. were obtained by using imazapic were 1.4, 16.5, 53.7, 83.4, 6.2 and 114.2% ,respectively, compared to weedy check. Hand hoeing increased significantly the dry weight per plant (g) by 81.1% compared to weedy check

In 2004/05 winter season, the highest values for plant height, number of branches per plant, number of pods per plant, biological yield and seeds yield

ardab/fed. were obtained by using imazapic were 6.0, 22.9, 151.3, 76.9 and 80.7%, respectively, compared to weedy check Hand hoeing increased significantly the dry weight per plant (g) and 100-seeds weight by 73.6 and 2.15%, respectively, compared to weedy check .These results are in agreement with those reported by Yehia and Mekky (2002).

3 – Effect of interaction between tillage system and weed control treatments on orobanche, yield and yield components of faba bean.

Data in Table (8) showed that the effect of interaction between tillage systems and weed control treatments on orobanche weeds and yield components were statistically significant at 5% level. This mean that the effect of orobanche control treatments did not behave in a similar manner under different tillage treatments. The interaction between tillage systems and weed control treatments reduced significantly the number, dry weight of orobanche and yield and yield components of faba bean In 2003/04 winter season, the interaction between tillage system (MP + RP) and imazapic or chisel/rotary plowing with imazapic or hand hoeing twice gave 100% reduction for number and dry weight of orobanche compared to conventional tillage and weedy check. In 2004/05 winter season, the interaction between tillage system (MP + RP) and hand hoeing twice reduced significantly the number and dry weight of orobanche by 94.7 and 99.6%, respectively, conventional tillage and weedy check. Data in Table (8) showed that the interaction between tillage systems and weed control treatments increased significantly plant height, dry weight per plant (g), number of pods per plant, number of branches per plant, biological yield, 100-seeds weight and seed yield ardab /fed.

In 2003/04 winter season, the use of mouldboard/rotary plowing and imazapic treatment increased significantly plant height, biological yield, 100-seeds weight and seeds yield ardab /fed. by 13.0, 65.1, 4.5 and 106.2% ,respectively, compared to conventional tillage and weedy check. Applying mouldboard/rotary plowing with hand hoeing twice increased significantly number of branches per plant by 31.1% compared to conventional tillage and weedy check. Tillage system chisel/rotary plowing with hand hoeing twice increased significantly dry weight per plant (g) and number of pods per plant by 167.9 and 98.0%, respectively, compared to conventional tillage and weedy check. In 2004/05 winter season, applying (MP + RP) and imazapic treatment increased significantly dry weight per plant (g), number of pods per plant, biological yield and seed yield ardab /fed. by 64.3, 178.6, 55.0 and 81.9% ,respectively, compared to conventional tillage and weedy check. The use of tillage system chisel/rotary plowing with imazapic treatment increased significantly plant height and number of branches per plant by 12.6 and 54.3%,respectively, compared to conventional tillage and weedy check. Similarly tillage system chisel/rotary plowing with hand hoeing twice increased significantly biological yield by 6.0% compared to conventional tillage and weedy check

Table 6. Effect of tillage systems frequencies on number, dry weight of orobanche / m^2, yield and its components of faba bean in 2003/04 and 2004/05 seasons.

Winter seasons	Tillage systems frequencies	Orobanche (g/m^2)		Yield and its components of faba bean						
		No. of orobanche	Dry weight of orobanche	Plant height (cm)	Dry weight /plant (g)	No. of pods / plant	No. of branches / plant	Biological yield	100 seeds weight	Seeds yield ardab /fed.
2003/04	Mouldboard plow + rotary plow (MP + RP)	3.08	62.25	112.2	37.08	1.85	8.52	2.43	62.08	4.90
	Chisel plow three passes+ rotary plow (CP3p + RP)	2.08	66.50	111.7	40.50	2.12	8.10	2.10	62.08	4.86
	Chisel plow two passes only(CP2p)	3.08	81.25	111.3	40.33	1.65	6.59	2.08	58.92	4.61
	LSD at level 5%	N.S	N.S	N.S	1.66	0.20	0.72	0.25	1.65	0.28
2004/05	Mouldboard plow + rotary plow (MP + RP)	8.75	120.42	120.6	40.86	2.11	7.70	1.56	59.17	4.20
	Chisel plow three passes+ rotary plow (CP3p + RP)	10.25	137.00	119.5	35.60	2.34	7.42	1.36	59.08	4.15
	Chisel plow two passes only(CP2p)	13.50	205.58	118.0	31.08	2.00	7.03	1.15	57.50	3.94
	LSD at level 5%	N.S	69.70	3.7	4.60	0.72	N.S	0.12	2.46	0.27

Table 7. Effect of orobanche control treatments on number, dry weight of orobanche / m^2, yield and its components of faba bean in 2003/04 and 2004/05 seasons.

Winter seasons	Orobanche control treatments	Orobanche (g/m^2)		Yield and its components of faba bean						
		No. of orobanche	Dry weight of orobanche	Plant Height (cm)	Dry weight /plant (g)	No. of pods / plant	No. of branches / plant	Biological yield	100 seeds weight	Seeds yield ardab/fed.
2003/04	Oroban at the rate of 0.2 L/fed.	0.42	0.83	113.3	49.67	1.98	8.76	2.66	62.50	5.83
	Hand polling (twice)	0.25	0.25	110.3	50.83	1.95	8.74	2.49	61.75	5.24
	Untreated (weedy check).	7.58	208.92	111.7	27.42	1.70	5.70	1.45	58.83	2.72
	LSD at level 5%	2.38	67.33	N.S	1.92	0.21	0.60	0.16	1.89	0.40
2004/05	Oroban at the rate of 0.2 L/fed.	1.42	7.67	122.6	41.18	2.36	9.50	1.61	58.67	4.86
	Hand polling (twice)	2.33	21.08	119.8	42.10	2.17	8.86	1.55	59.17	4.74
	Untreated (weedy check).	28.75	434.25	115.7	24.25	1.92	3.78	0.91	57.92	2.69
	LSD at level 5%	8.48	107.90	3.4	3.47	0.59	1.12	0.15	3.55	0.30

Table 8. Effect of the interaction between tillage system frequencies and orobanche control treatments on number, dry weight of orobanche/ m^2, yield and its components of faba bean in 2003/04 and 2004/05 seasons

Winter seasons	Tillage systems frequencies	Orobanche control treatments	Orobanche (g/m^2)		Yield and its components of faba bean						
			No.	Dry weight	Plant height (cm)	Dry weight /plant (g)	No. of branches / plant	No. of pods / plant	Biological yield	100 seeds weight	Seeds yield ardab/fed
2003/04	MP + RP	Oroban	0.50	1.3	119.3	51.00	1.95	9.80	2.89	63.75	6.07
		Hand polling	0.00	0.0	111.8	51.25	1.80	9.15	2.65	61.50	5.84
		Weedy check.	8.75	185.5	105.5	39.00	1.80	6.60	1.75	61.00	3.06
	CP3p + RP	Oroban	0.00	0.0	105.0	49.75	2.23	8.25	2.44	63.00	5.92
		Hand polling	0.00	0.0	117.0	50.00	2.35	10.65	2.43	64.25	5.13
		Weedy check.	6.25	199.5	112.5	21.75	1.79	5.38	1.42	59.00	2.92
	CP2p	Oroban	0.75	1.3	115.0	48.25	1.75	8.23	2.66	60.75	5.51
		Hand polling	0.75	0.8	102.0	51.25	1.70	6.43	2.39	59.50	4.76
		Weedy check.	7.75	241.8	117.0	21.50	1.50	5.13	1.20	56.50	2.19
	LSD at level 5%		4.68	158.5	5.58	3.75	0.45	1.14	0.29	2.29	0.793
2004/05	MP + RP	Oroban	1.50	6.8	125.5	49.78	2.00	10.00	1.86	60.25	5.02
		Hand polling	1.25	1.5	117.5	42.51	2.42	9.50	1.64	58.75	4.82
		Weedy check.	23.50	353.0	118.8	30.30	1.92	3.59	1.20	58.50	2.76
	CP3p + RP	Oroban	1.00	5.3	125.3	33.47	2.84	9.42	1.60	56.75	4.84
		Hand polling	5.00	53.8	121.7	49.50	2.34	8.58	1.66	62.00	4.73
		Weedy check.	24.75	352.0	111.5	23.83	1.84	4.25	0.82	58.50	2.89
	CP2p	Oroban	1.75	11.0	117.0	40.31	2.25	9.08	1.38	59.00	4.73
		Hand polling	0.75	8.0	120.3	34.30	1.75	8.50	1.36	56.75	4.69
		Weedy check.	38.00	597.8	116.8	18.63	2.00	3.50	0.73	56.75	2.41
	LSD at level 5%		16.17	117.4	6.05	6.66	0.77	2.26	0.03	3.52	0.46

Mouldboard plow + rotary plow (MP + RP)

Chisel plow three passes+ rotary plow (CP3p + RP)

Chisel plow two passes only (CP2p)

REFERENCES

1. Abdou, F. M. E. 1996. Effect of some seed bed preparation systems and mechanical planting on wheat production. Misr J. Agric. Eng. 13 (1): 44-58.
2. Ball, D.A. 1992. Weed seed bank response to tillage, herbicides and crop rotation sequence. Weed Sci. Soci. of America ,Weed Sci. 40(4):654 – 659.
3. Ball, D.A. and S.D. Miller. 1993. Cropping history, tillage and herbage effects on weed flora composition in irrigated corn. Agron., J., .85 (4): 817-821.
4. Buhler, D.D. 1995. Influence of tillage systems on weed population dynamics and management in corn and soybean in the central USA. Crop Sci. (USA). 35 (5): 247-1258.

5. Buhler, D.D. and T.C. Mester. 1991. Effect of tillage systems on the emergence depth of giant foxtail (*Setaria faberi*) and green foxtail (*Setaria viridis* L.). Weed Sci.39 (2):200-203.

6. El Badawi, E.O. 1987. Weed control in the traditional areas, Sudan. In ICARD/IFAD Nile Valley Project on Faba bean, Ann. Report. Eighth Ann. Coordination Meet., 13 - 17 Sept., Cairo, Egypt.

7. Hassanein, E.E. , M.H. Fayed, N.F. Dawla and S.E. EL-Sehly. 2000. Effect of some weed control treatments on soybean and associated weeds. Egypt. J. Agric. Res.,78(5): 1979-1993

8. Mekky, M.S., A.N.M. Nassar and S.L. Attalla. 2002. Effect of weed control treatments on weeds, growth, chlorophylls, crude protein and yield of maize (*Zea mays* L.). Egypt, J. Appl. Sci. : 17 (6):219-240.

9. Schreiber, M.M. 1992. Influence of tillage, crop rotation and weed management on giant foxtail (*Setaria faberi*) population dynamics and corn yield.. Weed Sci. 40(4): 645-653.

10. Snedecor, D.W. and W. Cochran. 1980. Statistical methods. Seventh Ed., Iowa State University Press, Iowa, USA.

11. Teasdale, J.R., C.E. Besteand and W.E. Potts. 1991. Response of weed to tillage and cover crop residue. Weed Sci. 39 (2):195-199.

12. Yehia, Z.R. and M.S. Mekky. 2002. A comparative study on some post – emergence herbicides for the control of broomrape in faba bean fields. Assiut J.. of Agric.. Sci., 33:(5) 65-96.

13. Yenish, J.P., J.D. Doll and D.D. Buhler. 1992. Effect of tillage on vertical distribution and viability of weed seed in soil. Weed Sci., 40 (3): 429-433.

14. Zahran, M.K. 1982. Control of parasitic plants (broomrape and dodder) in different crops in Egypt. Final Rept. Agric. Res. Prog, edit Broomrape book. P 38 (1998).

تأثير تعاقب نظم الخدمة وبعض معاملات مكافحة الحشائش في بعض المحاصيل الحقلية

محمد شمس مكي , "أكرم نصار" محمد نصار , محمد رضا مشتهري

المعمل المركزي لبحوث الحشائش - مركز البحوث الزراعية – الجيزة.

تم إقامة تجربتين حقليتين فى تربة طينية بمحطة البحوث الزراعية بسدس لتقدير دور الخدمة وطرق مكافحة الحشائش على المحاصيل المتعاقبة فى دورة زراعية لمدة عامين فى الفترة من ٢٠٠٣ إلى ٢٠٠٦ . وقد إحتوت التجربة الأولى على ثلاث طرق خدمة هى (١) إستخدام محراث قلاب متبوعا بإستخدام عزاقة دورانية (٢) محراث حفار ثلاث سكات متبوعا بعزاقة دورانية (٣) محراث حفار وجهين فقط (الكنترول) وكررت المعاملات الثلاث فى نفس القطعة التجريبية لمدة أربعة مواسم من شتوية إلى صيفية. وقسمت كل معاملة بداخلها إلى ثلاث قطع تحتوى على ثلاث معاملات لمكافحة الحشائش (البندمثالين بمعدل ١,٧٥ لتر/فدان – العزيق مرتين – معاملة المقارنة) لدراسة تأثير ذلك على الحشائش والمحصول فى كل موسم. أوضحت نتائج التجربة أن زيادة عمليات الخدمة بإستخدام توليفة مابين المحراث القلاب متبوعا بعزاقة دورانية والمحراث الحفار ثلاث سكات متبوعا بعزاقة دورانية إلى نقص فى الوزن الكلى للحشائش /م٢ بمقدار ٢٩,٢و٣٨,٥% وزيادة الحاصل بمقدار ١٢,٧و١٠,٣% عن معاملة إستخدام المحراث الحفار وجهين فقط (الكنترول) فى الموسم الشتوى ٢٠٠٣/٢٠٠٤ بحقول الفول البلدى وكانت القيم هى ٣٨,٢و٣٢,٨% للخفض فى وزن الحشائش وزيادة الحاصل بمقدار ٢٥,٨و٣,٢% فى الموسم الشتوى الثانى ٢٠٠٤/٢٠٠٥ وكانت هذه الإتجاهات ملاحظة مع معاملات الخدمة فى محصول الذرة وفول الصويا فى الموسمين الصيفين التاليين ومن ناحية أخرى فإن تكرار معاملات الخدمة موسميا فى نفس القطع فى محصول الفول أنقصت وزن الحشائش بمقدار ٣٤,٠ و ١٧,٦ و ٢٤,٥% فى هذه المعاملات على التوالى فى الموسم الثالث مقارنة بالموسم الأول ، كما إتجهت معاملتى العزيق أو البندمثالين إلى خفض معنوى فى أوزان الحشائش وزيادة فى محصول الفول البلدى أو الذرة أو فول الصويا فى جميع مواسم الدراسة.

وفى التجربة الثانية التى أجريت لمعرفة تأثير معاملات الخدمة السابقة ومعاملات مكافحة الهالوك أعطت معاملات الخدمة المزدوجة بالمحراث القلاب متبوعا بعزاقة دورانية والمحراث الحفار ثلاث سكات متبوعا بعزاقة دورانية خفضا من وزن الهالوك بمقدار ٢٣,٣و١٨,٢% فى موسم ٢٠٠٣/٢٠٠٤ و ٤١,٤ و ٣٣,٤% فى موسم ٢٠٠٤/٢٠٠٥ عن معاملة إستخدام المحراث الحفار وجهين فقط (الكنترول) وصاحب ذلك زيادة فى إنتاجية الفول بمقدار يتراوح مابين ٤,٠ و ٢٠,٢ % كما كانت معاملتى أمازيك والعزيق ناجحة فى خفض الإصابة بالهالوك وزيادة الحاصل معنويا فى كلا موسمى الدراسة مقارنة بمعاملة المقارنة بدون معاملة ربما يعزى دور المحاريث القلابة أو القرصى إلى إعادة دفن نسب كبيرة من مخزون البذور فى التربة لأعماق بعيدة ممايجعلها غير قادرة على الأنبات أو الإتصال بالعائل عماهو الحال مع المحراث الحفار , كما كانت التفاعلات بين عاملى الدراسة معنوية فى معظم الحالات فى صالح زيادة تأثيرها فى مكافحة الحشائش وزيادة الأنتاجية للمحاصيل تحت الدراسة مما يشير إلى أهمية التكامل بين معاملات الخدمة وطرق المكافحة فى رسم سياسات المكافحة المتكاملة للحشائش فى هذه المحاصيل, كما شملت الدراسة أيضا تأثير العوامل تحت الدراسة على مكونات المحصول لهذه المحاصيل كما هو واضح فى النتائج.