J. Agric. Sci. Mansoura Univ., 32 (3): 2253 - 2264, 2007

EFFECT OF SOME ISOPROTURON FORMULATIONS ON WHEAT CROP AND ITS ASSOCIATED WEEDS.

El-Kholy, R.M.A. and A. E. Abdelmonem
Department of plant protection, Fac. of Agric., Al-Azhar Univ. Cairo

ABSTRACT

Two field trials were conducted in Itay El-Baroud, Beherah Governorate, to evaluate the effect of some isoproturon formulations (Arelon, Turnix, Isoflon and Swat) as well as hand weeding on annual weeds and their effects on wheat yield during 2004 – 2005 and 2005 – 2006 seasons. Five broad-leaved weeds *(Beta vulgaris* L., *Chicorium pumpilum* Jacq., *Medicago intertexta* (L.) Mill., *Melilotus indica* L. and *Rumex dentatus* L). and three narrow-leaved weeds *(Avena fatua*, L. *Phalaris minor* L.Retz. and *Polypogon monspeliensis* (L.) Desf.) were predominant in both seasons. Broad-leaved weeds had higher density (17 and 19 plant m^{-2}) and biomass (75.75 and 137.02 $g.m^{-2}$) compared with grassy weeds (5 and 6 plant m^{-2}) and (22.25 and 56.69 $g.m^{-2}$) in both seasons, respectively. Also, the weed biomass was significantly reduced in all herbicidal treatments comparing with hand weeding treatment. Isoflon and Arelon treatments resulted in higher weed biomass reduction and higher wheat grain or straw yield than Turnix and Swat in both seasons. However, hand weeding treatment was the less effective one in this respect.

Generally, wheat fields infested with annual weeds should be treated with herbicides at 30 DAS to control these weeds and to reduce weed competition with wheat plants and consequently increased wheat yield.

INTRODUCTION

Wheat (*Triticum aestivum* L.) provides one of the major sources of human food (grains) and animal feed (straw) in Egypt. The demand for wheat crop is ever increasing because of rapid increase in human population making it imperative to raise wheat productivity. Cultural practices are considered one of the most important factors required to increase the wheat productivity.

Wheat and annual weeds are direct competitors for nutrients, water, sunlight and space. Weed competition with wheat may affect all stages of development either during the early wheat development stages (Hassal, 1990 and Galal, 2003) or during the late ripeness stages (Dallas and John, 1992; Omar *et al.*, 1997; Khan and Haq, 2002; Saxena *et al.*, 2003 and Hassanien *et al.*, 2005).

In wheat field, getting rid of weeds is achieved through direct method such as herbicide application or by hand weeding as well as indirect method such as land preparation, sowing method and seeding rate (Abd El-Samie, 2001). Recently, herbicides have been increasingly accepted by farmers as an efficient, economic and timesaving method for controlling weeds growing in wheat (Helalia, 1993). Previous reports demonstrated that isoproturon herbicide effectively controlled annual weeds in wheat fields (Ahujar and Yaduraju, 1991; Malike *et al.*, 1992; Arun Jaggi and Yadav, 2000; Saini and Singh, 2001; Mahajan and Virender Sardana, 2003 and Salama, 2004).

This research aimed to study the efficiency of different isoproturon formulations and hand weeding on annual weeds (broad-leaved and grasses) and their effects on grain and straw yield of wheat.

MATERIALS AND METHODS

Two field experiments were conducted at Itay El-Baroud, Beherah Governorate during the two seasons (2004 – 2005 and 2005 – 2006) to study the effect of some isoproturon formulations and hand weeding on annual weeds (broad- leaved and grasses), and their effects on wheat grain and straw yield. Wheat seeds (Sakha 93cv.), which supplied by Central Administration of Seeds, ARC, Ministry of Agriculture and Land Reclamation, were dressed in 28 and 30 November in the first and second seasons, respectively at the rate of 60 kg feddan^{-1} by broadcast method. The preceding summer crop was rice in both seasons. The experimental design was randomized complete blocks with four replicates treatment^{-1}. The area of each plot (replicate) was 175m^2 (10.0 m. in wide and 17.5 m. in long). The recommended agricultural practices were carried out throughout the two seasons.

The efficiency of isoproturon [3-(4-isopropylphenyl)-1,1-dimethyl urea] formulations (Table 1) in controlling annual weeds in wheat field was evaluated. Herbicidal treatments were applied 30 days after sowing (DAS) using knapsack sprayer (CP3) at 200 L feddan^{-1}. Hand weeding treatment was applied twice (20 and 40 DAS). After 2 months from sowing, the growing annual weeds in area of 1m^2 (using woody frame 1 x 1 m.) in each plot were gathered randomlly four times, sorted, identified (Hassanein *et al.*, 2000), counted and weighed. In the unweed plots, the following parameters were assessed at 60 DAS.

1- Weed density = average number of each weed m^{-2}.

2- Percent of weed density = $\frac{\text{average number of one weed}}{\text{average number of total weeds}} \times 100$

Table (1):Some characteristics of the examined isoprturon formulations.

Trade name, concentration and formulation	Common name	Rate/ feddan*	Source of herbicide sample
Arelon 50% Fl.	Isoproturon	1.25 L.	Wadi El-Nil Co. for Agricultural development
Isoflon 50% w.p	Isoproturon	1.35 kg	Kafr El-Zayat Pesticides and Chemicals Co.
Swat 50 % SC	Isoproturon	1.25L.	Consukorra Co.
Turnix 50% SC	Isoproturon	1.50 L.	International Co. for Chemicals and Trade Agencies (ICCTA)

According to the recommendation of Ministry of Agriculture and Land Reclamation.

3- Weed biomass =average fresh weight of each weeds ($g.m^{-2}$).

4- Percent of weed biomass = $\frac{\text{average fresh weight of one weed}}{\text{average fresh weight of total weeds}}$ x100

The efficiency of weed control treatments were recorded as follows:

5- Weeds biomass= average fresh weight of weeds in each treatment ($g.m^{-2}$).

6- Weed control efficiency % (% reduction in weed biomass)

$$= \frac{C - T}{C} \times 100$$

Where:

C = Weed biomass in the unweeded control.

T = Weed biomass in the treatment.

At harvest, the wheat plants were air dried in the field for 3 days, then, grain and straw yield were calculated as kg $plot^{-1}$. Percent increase in wheat grain and straw yield was recorded by the following formula.

$$\% \text{ increase in grain and/or straw yield } = \frac{T - C}{T} \times 100.$$

Where :

T = wheat grain and/or straw yield in the treatment.

C = wheat grain and/or straw yield in the unweeded check

Data were statistical analyzed using ANOVA-test and the mean values were tested after Duncan's (1955) Multiple Range Test at *P= 0.05* and *0.01*.

RESULTS AND DISCUSSION

A- Weed type.

Five broad-leaved (*Beta vulgaris* L., *Chicorium pumplium* Jacq., *Medicago intertexa* (L.) Mill., *Melilotus indica* L. and *Rumex dentatus* L. and three narrow-leaved (*Avena fatua* L., *Phalaris minor* L.Retz. and *Polypogon monospeliensis* (L.) Desf) annual weeds were prevailed in both seasons and identified as shown in Table (2).

B- Weed density:

The weed density (average number of each weed m^{-2}), and % of weed density from broad, narrow and total weeds through 2004 and 2005 and 2005 -2006 seasons were shown in Table (3), respectively. The results in Table (3) showed that, in the first seasons, broad – leaved weeds gave the higher weed density (17 weed plants m^{-2}) than grassy weeds(5weeds plants m^{-2}). Therefore, % of weed density from total weeds (22 weeds m^{-2}) was higher in broad-leaved (77.28%) than grassy weeds (22.72%). Medic and Sweet clover gave the higher weed density rate from broad-leaved weeds (29.42%) followed by Chicory (17.64%) followed by dentated dock or Seabeet (11.76%). The corresponding wheat density rates from total weeds were 22.73, 22.73, 13.64, 9.09 and 9.09%, respectively. From narrow-leaved

weeds, little seed canary grass followed by beard grass or spring wild oat gave weed density of 3 and 1 weed plants m^{-2}, respectively.

The corresponding weed density rates from grassy weeds were 60, 20 and 20% and from total weeds were 13.64, 4.54 and 4.54%, respectively.

The results in Table (3), in the second seasons, indicated that broad-leaved weeds gave the higher weed density (19 weed plants m^{-2}) than grassy weeds (6 weed plants m^{-2}), which gave weed density rates from total weeds of 76% and 24% respectively. Medic gave the higher weed density of weeds m^{-2} (7 m^{-2}) followed by Seabeet (4 m^{-2}), dentated dock or Sweet clover (3m^{-2}) and chicory (2 weed plant m^{-2}). The mentioned values of weed density represent 36.84, 21.05, 15.79, 15.79 and 10.53% from broad-leaved weeds, and represent 28, 16, 12,12 and 8 % from total weeds, respectively.

Table (2): Prevailed annual (broad and narrow-leaved) weeds species in the experimental wheat (Sakha 93 cv.) field during the two seasons of study (2004 – 2005 and 2005 – 2006).

Weed type	Vernacular name	English name	Scientific name	Family name
broad-leaved	Salq.	Seabeet, wild beet	*Beta vulgaris* L.	Chenopodiaceae
	Shikoria, Sirees	Chicory	*Chicorium pumpilum* Jacq.	Compositae
			Medicago intertexta (L) Mill.	
	Nafal	Medic	*Melilotus indica* L.	Leguminosae
	Handaqooq	Sweet clover, Indian melilot	*Rumex dentatus* L.	Leguminosae
	Hommeid	Dentated dock		Polygonaceae
narrow-leaved or grasses	Zommeyr	Spring wild oat	*Avena fatua* L.	Gramineae
	Shaeer elfaar	little seed canary, Lesser canary grass	*phalaris minor* L. Retz	Gramineae
	Diel el-qott	Beard grass	*Polypogen monspeliensis* (L) Desf.	Gramineae

From grassy weeds, little seed canary grass gave weed density of 3 weed m^{-2} followed by beard grass (2 m^{-2}) and wild oat (1 m^{-2}), which represent 50, 33.33 and 16.64% weed density from grassy weeds or 12, 8 and 4% from total weeds, respectively.

C- Weed biomass:

The weed biomass (average fresh weight of weed m^{-2}) and % of weed biomass from weed type or from total weeds during both seasons were recorded in Table (3), in the first seasons respectively. The results in Table (3) showed that broad-leaved weeds gave the higher weed biomass (75.75 gm^{-2}) compared to grassy weeds (22.25 g. m^{-2}), which represent 77.29% and 22.71% from weed biomass of total weeds, respectively. Medic weed gave the higher biomass of 20.41 g. m^{-2} followed by Sweet clover (18.83 m^{-2}),dentated dock (15.38g.m^{-2}), Sea beet (11.63 m^{-2}) and Chicory (9.50 g.m^{-2}). These values represent 26.95, 24.86, 20.30, 15.35 and 12.54% from biomass of broad-leaved weeds and represent 20.83, 19.21, 15.69, 11.87 and 09.69% from biomass of total weeds, respectively. For grassy weeds, little seed canary grass gave the higher weed biomass (13.42 g.m^{-2}) followed by beard grass (06.59 g.m^{-2}) and spring wild oat (02.24 g.m^{-2}) which

represent 60.31, 29.62 and 10.07% from grassy weed biomass and represent 13.69, 06.73 and 02.29% from biomass of total weeds, respectively. The result in Table (3), in the second seasons also indicated that broad-leaved weeds gave the higher weed biomass (137.02 $g.m^{-2}$) than grassy weeds (19.67 $g.m^{-2}$), which represent 87.45% and 12.55% from biomass of total weeds, respectively. Medic gave 60.06 g. m^{-2} followed by Seabeet (28.19 $g.m^{-2}$), Sweet clover (26.28 $g.m^{-2}$), dentated dock (15.19 $g.m^{-2}$), and Chicory (07.00 $g.m^{-2}$). The abovementioned biomass values represent 43.83, 20.57, 19.42, 11.08 and 05.10% from weed biomass of broad-leaved weeds and represent 38.33, 17.99, 16.97, 09.69 and 04.47% from biomass of total weeds, respectively. For grassy weeds, beard grass followed by little seed canary grass and spring wild oat gave weed biomass of 7.60, 7.54 and 4.53 $g.m^{-2}$, respectively, which represent 38.64, 38.33 and 23.03% from biomass of grassy weeds and 04.85, 04.81 and 02.89% from biomass of total weeds, respectively. From Table (3), the results indicated that weed density and biomass of broad-leaved weeds were higher than those of grassy weeds in both seasons. These results are in accordance with Singh *et al.*, (2000) they found that dicotyledonus weeds were the more dominant (76%) comparted to monocotyledonus (22%). Similar findings were found by Harker and Blackshow (1991) and Hassanien *et al.*, (2005). They concluded that the abovementioned annual weeds were common in the wheat fields.

2- Effect of weed control treatments on weed biomass:

The results in Table (4) showed the effect of weed control treatments on weed biomass (average fresh weight of broad-leaved, narrow-leaved and total weeds [$g.m^{-2}$]) during 2004-2005 and 2005-2006 seasons, respectively. General speaking, at P= 5% with unweeded treatment, all treatments including hand weeding significantly reduced fresh weight of broad-leaved, narrow-leaved and total weeds compared with unweeded check in both season. Also, at 5% without unweeded control, the results indicated that all the herbicidal treatments significantly reduced the fresh weight of broad-leaved and total weeds compared to hand weeding treatment in both seasons. The data obtained indicated that Isoflon gave the higher reduction rates to broad-leaved weeds and followed by Arelon, Turnix and Swat in the first seasons or followed by Arelon, Swat and Turnix in the second season with significant differences between the efficiency of the first three treatments and that of the last one. On the other hand, the results obtained through both seasons showed that Isoflon was more effective in reducing the mean fresh weight of grassy weeds comparing with the other treatments (Tables 4 and 5) with no significant differences between their efficiencies (Tables 4 and 5). From the data in Tables (4 and 5) it was found that herbicide application significantly reduced weed population and weed biomass at 60 DAS compared to the unweeded control. Generally, Isoflon and Arelon were relatively the most effective treatments compared to the other tested herbicides.

The results in Tables (4 and 5) showed the weed control efficiency % (% reduction in fresh weight) of the weed control treatments for broad-leaved, grassy and total weeds in both seasons.

Table (3): Density and biomass of the annual weeds prevailed in the experimental wheat (Sakha 93 cv.) field during 2004-2005 and 2005-2006 seasons.

Weed type	Weed name	Weed density						Weed biomass					
		Number m^{-2}		% from weed type		% from total weeds		Fresh weight ($g.m^{-2}$)		% from weed type		% from total weeds	
		1st season	2nd season	1st season	2nd season	1st season	2nd season	1st season	2nd season	1st season	2nd season	1st season	2nd season
Broad leaved	Chicory	03.00	02.00	17.64	10.53	13.64	08.00	09.50	07.00	12.54	05.10	09.69	04.47
	Dentated dock	02.00	03.00	11.76	15.79	09.09	12.00	15.38	15.19	20.30	11.08	15.69	09.69
	Medic	05.00	07.00	29.42	36.84	22.73	28.00	20.41	60.06	26.95	43.83	20.83	38.33
	Sea beet	02.00	04.00	11.76	21.05	09.09	16.00	11.63	28.19	15.35	20.57	11.87	17.99
	Sweet clover	05.00	03.00	29.42	15.79	22.73	12.00	18.83	26.58	24.86	19.42	19.21	16.97
	Total	17.00	19.00	100.00	100.00	77.28	76.00	75.75	137.02	100.00	100.00	77.29	87.45
Narrow leaves or grasses	Beard grass	01.00	02.00	20.00	33.33	04.54	08.00	06.59	07.60	29.62	38.64	06.73	04.85
	Little seed canary grass	03.00	03.00	60.00	50.00	13.64	12.00	13.42	07.54	60.31	38.33	13.69	04.81
	Spring wildoat	01.00	01.00	20.00	16.67	04.54	04.00	02.24	04.53	10.07	23.03	02.29	02.89
	Total	05.00	06.00	100.00	100.00	22.72	24.00	22.25	19.67	100.00	100.00	22.71	12.55
Total weeds		22.00	25.00	-	-	100.00	100.00	98.00	56.69	-	-	100.00	100.00

Table (4): Effect of some post-emergence herbicides and hand weeding on weed biomass [mean fresh weight of weeds ($g.m^{-2}$)] in wheat (Sakha 93 cv.) fields during 2004-2005 season.

Treatments	Rate/feddan	Mean fresh weight of annual weeds (g. m^{-2})														
		Broad-leaved					Narrow leaved					Total weeds				
		A *	B	C	D	WCE**	A	B	C	D	WCE**	A	B	C	D	WCE**
Arelon 50% Fl.	1.25 L.	07.18c	07.18c	07.18b	07.18b	90.52	05.72a	05.72a	05.72b	05.72b	74.29	12.90cd	12.90c	12.90c	12.90b	86.84
Isoflon 50% W.P.	1.35 kg	04.99c	04.99c	04.99b	04.99b	93.41	04.05a	04.05a	04.05b	04.05b	81.79	09.04d	09.04c	09.04c	09.04b	90.77
Swat 50% SC	1.25 L.	17.25b	17.25b	17.25b	17.25b	77.23	06.25a	06.25a	06.25b	06.25b	71.99	23.50b	23.50b	23.50bc	23.50b	76.02
Tumix 50% SC	1.50 L.	07.77c	09.77 c	09.77b	09.77 b	87.10	06.49a	06.49a	06.49b	06.49b	70.84	16.26c	16.26c	16.26bc	16.26b	83.41
Hand weeding	2 times	24.85a	24.85a	24.85b	24.85b	67.19	06.85a	06.85a	06.85b	06.85b	60.67	33.60a	33.60a	33.60b	33.60b	65.71
Untreated check	-	-	-	75.75a	75.75a	-	-	-	22.25a	22.25a	-	-	-	98.0a	98.0a	-

A = *p.* at 5% of treatments without untreated control. B = *p.* at 1% of treatments without untreated control.
C = *p.* at 5% of treatments including untreated control. D = *p.* at 1% of treatments including untreated control.
WCE** = Weed Control Efficiency.
Values with the same litter(s) within the columns are not significantly different [*p= 0.05* and *0.01*], Duncan's Multiple Range Test.

The results showed that Isoflon was the most effective followed by Arelon, Turnix, Swat and hand weeding in the first season for controlling broad-leaved and total weeds, but in the case of grassy weeds Isoflon followed by Arelon, Swat, Turnix and hand weeding were the most effective. The results in the second season indicated that Swat was more effective than Turnix against broad-leaved, grassy and total weeds. The highest effect of Swat on grassy weeds compared with Turnix may be due to their sensitivity to Swat more than Turnix. Also, differences between isoproturon formulations in controlling annual weeds may be attributed to differences in formulation type and susceptibility of these weeds. The high efficiency of Isoflon, Arelon or Swat may be due to their formulation type and to accessory substances in these formulations. This indicated that chemical weed control treatments were most effective than hand weeding in controlling annual weeds in wheat fields. This finding are in agreement with Abou-Donia *et al.*, (1994) as they found that Arelon at 1.25 L feddan^{-1} gave 83.14 to 85.03% reduction in fresh weight of weeds, while hand weeding gave 65.66 to 65.36 % in Giza 155 and Sakha 69 cvs, respectively. Similar trend was also found by Salama (2004) who found that Arelon at 1.25L feddan^{-1} reduced fresh weight of weeds than hand weeding.

The effect of isoproturon on weeds was reported by several authors. Ahujar and Yadaraju (1991) and Malike *et al.*, (1992) concluded that application of Arelon 50% at the rate of 2.98 L.ha^{-1} was found to be effective against *Anagalis arvensis* L. *Chenopodium album* L., *Melilotus* spp. and *Phalaris* spp. Saini and Singh (2001) showed that, application of Arelon at 1.50 kg ha^{-1} on weeds, significantly reduced weed population and dry weight of weeds. Mahajan and Virender Sardana (2003) reported that application of isoproturon at 0.94 kg ha^{-1} reduced the nutrient removal by the *Phalaris minor* leading to an increased in nutrient uptake by the wheat crop. Similar trend was found by Arun Jaggi and Yadav (2000). Kanoja and Nepalia (2004) found that isoproturon at 750 g.ha^{-1} significantly reduced the density and dry weight of *P. minor* and broad-leaved weeds. Similar trend of results was also reported by Abd El-Samie (2001) and Salama (2004).

3- Effect of weed control treatments on yield:

The results in Table (6) showed the effect of weed control treatments on wheat grain yield (kg plot^{-1}) during 2004-2005 and 2005-2006 seasons. The results indicated that, all herbicidal treatments markedly gave higher grain yield compared with hand weeding and unweeded check in both seaons. Generally, Isoflon was the most effective in increasing the grain yield in first season which it gave 13.52% increase in wheat yield comparison with unweeded check, followed by Arelon (10.87%), Turnix (10.51%), Swat (07.93%) and hand weeding (6.03%). In the second season, however, Isoflon gave 09.73% increase in grain yield followed by Arelon (08.76%), Swat (07.91%), Turnix (05.81%) and hand weeding (04.70%).

The results in Table (7) showed the effect of weed control treatments on wheat straw yield (kg plot^{-1}) during the two season . From this Table, the results generally indicated that, the same trend of increasing grain yield was observed with straw yield.

Table (5): Effect of some post-emergence herbicides and hand weeding on weed biomass [mean fresh weight of weeds ($g.m^{-2}$)] in wheat (Sakha 93 cv.) fields during 2005-2006 season.

Treatments	Rate/ feddan	Mean fresh weight of annual weeds ($g.m^{-2}$)														
		Broad-leaved					Narrow leaved					Total weeds				
		A*	B	C	D	WCE**	A	B	C	D	WCE**	A	B	C	D	WCE*
Arelon 50% Fl.	1.25 L.	12.46c	12.46b	12.46b	12.46b	90.91	03.93a	03.93a	03.93b	03.93b	80.02	16.39bc	16.39bc	16.39b	16.39b	89.54
Isoflon 50% W.P.	1.35 kg	11.28c	11.28b	11.28b	11.28b	91.77	03.51a	03.51a	03.51b	03.51b	82.15	14.79c	14.79b	14.79b	14.79b	90.68
Swat 50% SC	1.25 L.	14.57bc	14.57b	14.57b	14.57b	89.37	04.13a	04.13a	04.13b	04.13b	79.09	18.70bc	18.70b	18.70b	18.70b	88.06
Tumix 50% SC	1.50 L.	16.55b	16.55b	16.55b	16.55b	87.92	04.31a	04.31a	04.31b	04.31b	78.09	20.87b	20.87b	20.87b	20.87b	86.69
Hand weeding	2 times	32.40a	32.40a	32.40b	32.40b	76.35	05.02a	05.02a	05.02b	05.02b	74.48	37.42a	37.42a	37.42b	37.42b	76.12
Untreated check	-	-	-	137.02a	137.02a		-	-	19.67a	19.67a		-	-	156.69a	156.69a	

A = *p.* at 5% of treatments without untreated control. B = *p.* at 1% of treatments without untreated control.
C = *p.* at 5% of treatments including untreated control. D = *p.* at 1% of treatments including untreated control.
WCE** : Weed Control Efficiency.
Values with the same litter(s) within the columns are not significantly different [*p= 0.05* and *0.01*], Duncan's Multiple Range Test.

Table (6): Effect of some post-emergence herbicides and hand weeding on wheat (Sakha 93 cv.) grain yield (kg $plot^{-1}$) under field conditions during the both seasons (2004 – 2005 and 2005-2006).

Treatments	Rate/feddan	First Season					Second Season				
		Wheat grain yield [kg/plot ($175m^2$)]				% increase	Wheat grain yield [kg/plot ($175m^2$)]				% increase
		A*	B	C	D		A*	B	C	D	
Arelon 50% Fl.	1.25 L.	138.37 ab	10.15	138.37 ab	138.37 ab	10.15	140.97 ab	140.97 a	140.97 ab	140.97 ab	08.76
Isoflon 50% W.P	1.35 kg	142.62 a	12.83	142.62 a	142.62 a	12.83	142.49 a	142.49 a	142.49 a	142.49 a	09.73
Swat 50% SC	1.25 L.	133.96 bc	07.19	133.96 bc	133.96 ab	07.19	136.55 abc	136.55 a	136.55 abc	136.55 ab	07.91
Tumix 50% SC	1.50 L.	137.81 abc	09.78	137.81 abc	137.81 ab	09.78	134.95 bc	134.95 a	134.95 bc	134.95ab	05.81
Hand weeding	2 times	132.65 c	06.27	132.65 c	132.65 bc	06.27	132.65 c	132.65 a	132.65 c	132.65 bc	04.70
Untreated check	-	-	-	124.33 d	124.33 c	-	-	-	128.62 d	128.62 c	-

A = *p.* at 5% of treatments without untreated control. B = *p.* at 1% of treatments without untreated control.
C = *p.* at 5% of treatments including untreated control. D = *p.* at 1% of treatments including untreated control.
Values with the same litter(s) within the columns are not significantly different [*p= 0.05* and *0.01*], Duncan's Multiple Range Test.

Table (7): Effect of some post-emergence herbicides and hand weeding on wheat (Sakha 93 cv.) straw yield (kg plot^{-1}) under field conditions during the both seasons (2004 – 2005 and 2005-2006).

Treatments	Rate/ feddan	First Season					Second Season				
		Wheat grain yield [kg/plot (175m^2)				% increase	Wheat grain yield [kg/plot (175m^2)				% increase
		A*	B	C	D		A*	B	C	D	
Arelon50% Fl.	1.25 L.	461.23 ab	461.23 ab	461.23 ab	461.23 ab	11.30	469.89 ab	469.89 a	469.89 ab	469.89 ab	10.89
Isoflon 50% W.P.	1.35 kg	475.38 a	475.38 a	475.38 a	475.38 a	13.94	474.98 a	474.98 a	474.98 a	474.98 a	11.85
Swat 50% SC	1.25 L.	446.93 bc	446.93 ab	446.93 bc	446.93 ab	08.39	465.52 abc	465.52 a	465.52 abc	465.52 ab	10.05
Turnix 50% SC	1.50 L.	459.38 abc	459.38 ab	459.38 abc	459.38 ab	10.95	455.15 bc	455.15 a	455.15 bc	455.15 ab	08.01
Hand weeding	2 times	438.50 c	438.50 b	438.50 c	438.50 bc	06.70	449.83 c	449.83 a	449.83 c	449.83 bc	06.92
Untreated check	-	-	-	409.11 d	409.11c	-	-	-	418.83 d	418.73 c	-

A = *p.* at 5% of treatments without untreated control. B = *p.* at 1% of treatments without untreated control.
C = *p.* at 5% of treatments including untreated control. D = *p.* at 1% of treatments including untreated control.
Values with the same litter(s) within the columns are not significantly different [*p= 0.05* and *0.01*], Duncan's Multiple Range Test.

Isoflon was the most effective treatment as it gave 13.94, 11.85% increase in straw yield in both seasons, respectively, while hand weeding gave the lowest increasing as it gave only 06.49% and 06.92% in the first and the second seasons, respectively.

The differences between weed control treatments in increasing wheat grain and straw yield may be due to differences between herbicide formulations and their efficiency in controlling annual weeds in wheat fields.

The effect of isoproturon on wheat yield was recorded by several authors. Ghanem and El-Khawaga (1991) reported that post-emergence herbicides sprayed on wheat plants had a significant increase in yield and its components as compared with the unweeded control. Similar trend of results on isoproturon was also observed by Saini and Singh (2001) and Kanoja and Nepalia (2004) who reported that application of isoproturon at 750 $g.ha^{-1}$ led to significant increase in wheat growth and yield

Increasing the wheat grain and straw yield may be due to application of herbicides increased nutrients uptake by plants by keeping wheat free from weeds. Similar trend was found by Arun Jaggi and Yadav (2000) and Mahajan and Virender Sardana (2003). The wheat yield losses in the untreated check indicating that both weeds types (broad-leaved and grasses) effectively competed with wheat plants by limiting growth factors (Saxena *et al.*, 2003) and consequently these weeds caused reduction in wheat yield (Omar *et al.*, 1997; Khan and Haq, 2002; Galal, 2003 and Hassanein *et al.*, 2005). Also, these weeds reduced plant growth, tiller development and plant height, final grain yield (Omar *et al.*, 1997). On the other hand, all weed control treatments in this study reduced weed competition, increased plant growth of wheat then, more nutrients uptake, water, sunlight and space were available to wheat plants and these factors improved wheat yield. Similar trend was observed by Salama (2004).

Therefore, our findings support the view that wheat field infested with annual weeds should be treated with herbicides for controlling these weeds at 30 DAS to reduce the weed competition with wheat plants and consequently increased wheat yield.

REFERENCES

Abd El-Samie, F.S.(2001). Integrated weed management in wheat. Minufiya J. Agric. Res., Vol. 26(3): 619-633.

Abou-Donia, S.A.; Helalia, A.R. and Abdel-Lateef, M.F. (1994). Evaluation of certain pre and post-emergence herbicides in two wheat varietris under field conditions. Al-Azhar J. Agric. Res. Vol. 19: 185-194.

Ahujar, K.N. and Yaduraju, N.T. (1991). Optimizing isoproturon application in relation to first irrigation in wheat (*Triticum aestivum L.*). Indian, J. Agron. 36:492-495.

Arun Jaggi, and Yadav, S.K. (2000). Nutrients saving in wheat through herbicides. Crop Research (Hisar) 20(1): 154-157. (C.F.Weed Abstract. 2001 Vol. 50(2) No. 500).

Dallas, E.P. and John, D.W. (1992). Green foxtail (*Setaria viridis*) competition with spring wheat. Weed Technology 6: 291-296.

Duncan, D.B. (1955). Multiple Range and Multiple F. tests, Biometrics, 11:1-42.

Galal, Anaam H. (2003). Response of wheat and its associated weeds to sowing methods, seeding rates and weed control treatments. Assiut J. of Agric. Sci.; Vol. (34) (5): 77-97.

Ghanem, S.A.I. and El-Khawaga, A.A.H. (1991). Growth, yield and its attributes of wheat as influenced by seeding rate and chemical weed control. Zagazig J. of Agric. Res. 18(5): 1403-1416.

Harker, K.N. and Blackshow, R.E. (1991). Influence of growth stage and broad leaf herbicides on tralkoxydim activity. Weed Sci. 39: 550-559.

Hassal, K.A. (1990). The Biochemistry and Uses of Pesticides, Structure, Metabolism, Mode of Action and Uses in Crop Protection, 2nd Edition. English Language Book Society/Macmillan.

Hassanein, E.E.; Ibrahim, H.M.; Kholosy, A.S.; Al-Marsafy, H.T. and Abo Elenien, R.A. (2000). Manual of weed identification and control in wheat, ARC, Field Crop Research Institute, Weed Control Research Section in collaboration with the European Union/ the International Center for Agricultural Research in the Dry Areas (ICARDA)m Second edition.

Hassanien, E.E.; Ibrahim, H.M.; Kholosy, A.S.; Yehia, Z.R.; Abo Elenien, R.A.; Tewfik, M.S.; El-Wekil, H.R. and Al-Marsafy, H.T. (2005). IPM Egyptian Experience in weed management in winter cereals and legumes. Weed Research Central Laboratory, Agricultural Research Center, Ministry of Agriculture and Land Reclamation.

Helalia, A.A.R. (1993). Efficacy of some herbicides for weed control in wheat Al-Azhar J. Agric. Res., Vol., (18): 279-288.

Kanoja, Y. and Nepalia, V. (2004). Influence of herbicidal weed control on wheat *(Triticum aestivum)* productivity. Research on Crops 5(1): 138-142.

Khan, M. and Haq, N. (2002). Wheat crop yield loss assessment due to weeds. Sarhad J. of Agric. 18(4): 449-453.

Mahajan, G. and Virender Sardana (2003). Nutrient uptake by wheat and *Phalaris minor* as influenced by weed management practices. Agricultural Science Digest 23(3): 195-198. (C.F. Weed Abstract 2004 Vol. 53(11) No. 4172).

Malike, R.K.; Ponwar, R.S. and Malik, R.S. (1992). Chemical control of broad leaf and grassy weeds in wheat (*Triticum aestivum* L.). Indian J. of Agron. 37:324-326.

Omar, A.M.; Galelah, A.A.M. and Mady, A.A. (1997). Effect of some weed control treatments on wheat crop under nitrogen fertilization levels. J. Agric. Res. Tanta Univ. 23(4): 345-358.

Saini, J.P. and Singh, K.P. (2001). Efficacy of new herbicides against grass weeds in wheat *(Tritcum aestivum* L.) under mid-hill conditions of Himachal Pradesh. Indian J. of Agron. 46(2): 233-238.

Salama, S.M. (2004). Effects of hand weeding and some herbicides on wheat plant and its associated weeds. J. Agric. Sci. Mansoura Univ., 29(4): 1801 – 1812.

Saxena, S.; Sharma, K.; Surendra Kumar; Sand, N.K. and Rao, P.B. (2003). Effect of weed extracts on uptake of P and Zn in wheat varieties. Allelopathy Journal 11(2): 201-216. (C.F. Weed Abstract. 2003 Vol. 52(9) No. 3472).

Singh, S.J.; Singha, K.K.; Pandy I.B. and Mishra, S.S. (2000). Cultural and chemical weed control in late sown wheat J. of Research, , Birsa Agric. Univ. 12(2): 249-251.

تأثير بعض مستحضرات الأيزوبروتيرون على محصول القمح والحشائش الحولية المصاحبة له

رمضان مصطفى عبد ه الخولي و عبد الله الحسين عبد المنعم
قسم وقاية النبات – كلية الزراعة بالقاهرة – جامعة الأزهر

تم إجراء تجارب حقلية لدراسة تأثير بعض مستحضرات الايزوبروتيرون والنقاوة اليدوية على كل من الحشائش الحولية (عريضة وضيقة الأوراق) المصاحبة لمحصول القمح (سخا ٩٣) بمنطقة إيتاى البارود بالبحيرة وكذلك دراسة تأثير تلك المعاملات على محصول القمح والتبن الناتج وذلك خلال موسمي ٢٠٠٤-٢٠٠٥ و٢٠٠٥ – ٢٠٠٦م. وقد أوضحت النتائج أن الحشائش الحولية عريضة الأوراق هي الاكثر في العدد/م٢ وهى الأعلى فى الوزن الغض (جرام/م٢) مقارنة بالحشائش ضيقة الأوراق وذلك خلال موسمي الدراسة. وقد تم تعريف الحشائش العريضة الأوراق كالآتي: سلق (بيتافولجاريس) سريس أو شيكوريا (شيكوريوم بومبيليوم) ، نفل (ميديكاجو انترتكستا) ، حندقوق (ميليلوتس انديكا) ، حميض (روميكس دينتاتس). كما تم تعريف الحشائش ضيقة الأوراق كالاتي:- زمير (أفينافاتوا) ، شعير الفأر- فلاريس (فلارس مينور) ديل القط (وبولي بوجون مونسبيلينسيس). وكذلك أوضحت النتائج أن جميع التجهيزات المختبرة (أيزوفلون ، تيورنكس، سوات، أريلون) قد أنقصت وزن الحشائش الغض معنويا مقارنة بالنقاوة اليدوية ، ففي الموسم الأول كان مستحضر الايزوفلون هو الأكثر فاعلية متبوعا بالأريلون ، تيورنكس ثم السوات بينما في الموسم الثاني تميز الأيزوفلون يليه اريلون ثم سوات ثم تيورنكس.

من ناحية أخرى فقد بينت النتائج المتحصل عليها أن المستحضرات المختبرة قد أدت إلى زيادة محصول الحبوب والقش (التبن) الناتج وكان ترتيب فاعليتها فى الموسم الأول هو ايزوفلون ثم الاريلون ثم تيورنكس ثم سوات بينما في الموسم الثاني كان الترتيب كالآتي:- ايزوفلون ثم اريلون ثم سوات ثم تيورنكس. وفى الموسمين جاءت معاملة النقاوة اليدوية فى المرتبة الأخيرة فى هذا الصدد ، وعموما فإن الدراسة أوضحت أن حقول القمح المصابة بالحشائش الحولية لابد من معاملتها بمبيدات الحشائش بعد ٣٠ يوم من الزراعة لمكافحة هذه الحشائش ومن ثم تقليل تنافسها مع نباتات القمح مما يؤدي إلى زيادة محصول القمح والتبن.