EFFECT OF SEEDING RATES AND WEED CONTROL ON ASSOCIATED WEEDS OF BROADCAST SEEDED RICE

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ABSTRACT

Two field experiments were carried out at the Demonstration fields of Kafer Saad, Domietta Governorate in 1989 and 1990 seasons to investigate the effect of seeding rates (30,40,50,60 and 70 kg/fed.) and some weed control treatments (un-weeded hand-weeded, thiobenzyl bentazon and thiobenzyl + bentazon) on weed density in broadcast seeded rice. Dominant weeds were : Echinochloa Crus galli (L.) Link and Cyperus difformis, L., whereas Echinochloa colonum L. was also present in small numbers and not repeatable in all replications as well as at different growth stages. Increasing seeding rates significantly reduced number and, fresh and dry weights of weeds. Increasing seeding rate from 30 to 70 kg/fed. caused a significant reductions in number of total weeds by 85 and 15% in the first season and by 57 and 41% in second season, at 90 and 120 days from sowing respectively. Echinochloa crus galli was controlled significantly by thiobenzyl (2.0 l/fed), however bentazon (1.5 l/fed.) was not effective in controlling this weed at different growth stages, i.e., 30,60,90 and 120 days from sowing in the both seasons Whereas, C difformis and E. colonum were controlled significantly by both herbicides Moreover, hand-weeding three times after 30 60 and 90 days from sowing, as well as thiobenzyl were the best treatments, whereas bentazon gave poor control of weeds compared with the two previous treatments

INTRODUCTION

Weeds compete with rice plants for light nutrients, space and water, they also adversely affect the microclimate around the plant, and harbour diseases and pests Hassan and Mahrous (1989) concluded that the most prevalent weeds occurring in rice fields are E crus galli (L.) Link (barnyard grass) E colonum L (Jungle rice) C difformis L (small-flower umbrella plant Ammania spp (red stem) and Eclipta alba (L.) hassk (tago weed)

In Egypt, it is expected that in the coming years, hand-transplanting of rice will be increasingly replaced by direct-seed broadcast method, drilling of mechanical trans-planting. For instance, the direct seeded rice area was negligible in the past, but gradually increased and reached more than 20% of the total rice area in 1989 (Badawi et al., 1991) and consequently weed control c problems were increased.

Thus, high importance will be given to chemical weed control to totally replace the promotive hand-weeding which is a common current method of controlling rice weeds in Egypt (Aly, 1984; Aly et al., 1984; Aly and Shaalan, 1984; Mohamed, 1985; Shrief et al., 1987; hassan and Mahrous, 1989 and Gielah et al., 1991). However, hand-weeding method has become undesirable because of the high labour requirements for hand-weeding, high wages, particularly during peak peri-ods of farming operations, and unfavorable weather condi-tions at weeding time. In addition, increasing seeding rate per unit area may affect weeds growth. The closer rice is planted the more competitive rice plants are against weeds (Kim and Moody, 1980; Moody and De Datta, 1980, and 1982; Hassan et al., 1990). But the increase in cost due to increased seeding rates should be compared with that of lower seed rates combined with other weed control practices, including the use of selective herbicides to assess profita-bility. The present investigation aimed to study the effect of seeding rates and weed control treatments on associated weeds of rice plants.

MATERIALS AND METHODS

Two field experiments were conducted at the Demonstra-tion fields of kafer Saad, Domietta Governorate in 1989 and 1990 seasons. The soil in which the experiments were under-taken is clay loamy textured with pH value of 7.65 and its organic matter content was 2.05%. Each experiment included 25 treatments which were the combination of five seeding rates and five weed control treatments. The treatments of this experiment were as follows:

A. Seeding rates:

a- 30 kg/fed. b- 40 kg/fed. c- 50 kg/fed d- 60 kg/fed e- 70 kg/fed.

B. Weed control treatments:

1- Un-weeded (control)

2- Hand-weedings after 30, 60 and 90 days from sowing

3- Bentazon (Basagran 50%, 3-isopropyl-1H-2 1 3 benzothiadiazin (4) 3H-one 2 2 dioxide at 1 5 1 (commercial) per feddan applied after 14 days from sowing.
4- Thiobenzyl (Saturn 50% EC) S- (4-Chlorobenzyl) N,N-diethyl-thiolcarbamate at 2 0 1 (commercial) per feddan, 7 days after sowing
5- Thiobenzyl (Saturn 50% EC)at 2 0 1 7 days after sowing followed with bentazon (Basagran 50% EC) at 1.5 1./feddan after 14 days from sowing Herbicides were sprayed with a knapsac sprayer with a spray volume of 400 lit/feddan

The experimental design was randomized complete block with four replications The area of experimental plot was 3x3.5 m (1/400 fed) Rice grains variety Giza 172 were sown (broadcasted)on June 4th and May 31th in the first and second seasons, respectively The preceding winter crop was clover. Plots were fertilized at rates of 16 kg P_2O_5 and 60 kg N/fed. Phosphorus was applied at sowing date in the form of calcium superphosphate (16% P_2O_2). while N was applied at 30 days from sowing date in the form of ammonium sulfate (20.5% N) The normal cultural treatments of growing rice were practiced. Weeds were handpulled at random from one sequare meter of each plot after 30,60,90 days as well as at harvesting time (120 days after sowing) Weeds were identified and the number, fresh and dry weights of each weed species and total weeds were estimated All data were statistically analysed according to procedyrs outlined by Sendecor and Cochran (1967) L S.D test was used to compare the treatment means (Steel and Torrie 1980)

RESULTS AND DISCUSSION

It is clear that the most dominant weeds were, small flower umbrellaplant (Cyperus difformis L) and barnyardgrass (Echinochloa crus galli (L) Link Jungle rice (Echinochloa colonum (L) Link was also presented but the number of these latter weed however was and not repentable in all replications.

1 Effect of seeding rates on density of rice weeds:

1.1. Number of weeds/m²:

Data present in Table (1) indicate clearly that seeding rates had no significant effect on number of weeds/m² at early growth stages of rice plants namely 30 and 60 days from sowing On the other hand number of weeds/m at 90 and

Table 1 : Effect of seeding rates on number of weeds/m² at different growth stages of rice plants in 1989 and 1990 seasons

Seeding rate kg/fed.	1989 Season				1990 Season			
	E. crus-galli	C. difformis	E. colonum	Total	E. crus-galli	C. difformis	E. colonum	Total
(a) 30 days from sowing								
30	5.20	32.40	0.00	37.60	0.80	71.40	0.00	72.20
40	5.60	38.20	0.00	43.80	0.60	67.00	0.00	67.60
50	3.40	27.00	0.00	30.40	0.40	18.20	0.00	18.20
60	4.40	20.40	0.00	24.80	0.80	78.00	0.00	78.80
70	2.80	34.00	0.00	36.80	0.40	5.60	0.00	6.00
L.S.D. 5 %	N.S.	N.S.		N.S.	N.S.	N.S.		N.S.
1 %	N.S.	N.S.		N.S.	N.S.	N.S.		N.S.
(b) 60 days from sowing								
30	4.80	297.20	0.60	302.60	1.00	244.60	0.00	245.60
40	5.00	263.40	0.60	269.00	0.80	181.60	1.20	183.60
50	3.60	218.60	0.40	222.60	0.80	168.40	0.80	170.00
60	2.60	296.00	0.40	299.00	0.80	240.00	0.60	241.40
70	2.60	272.20	0.60	387.80	1.20	201.60	0.00	202.80
L.S.D. 5 %	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
1 %	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
(c) 90 days from sowing								
30	2.80	146.40	0.60	285.50	0.60	228.00	0.40	229.00
40	4.60	52.80	0.40	57.80	0.40	231.20	1.00	232.60
50	3.80	85.20	0.00	89.00	0.40	146.00	0.40	146.80
60	2.60	66.40	0.20	69.20	0.60	134.00	0.00	134.60
70	3.00	41.20	0.20	44.40	0.80	96.60	0.00	97.40
L.S.D. 5 %	N.S.	19.60	0.07	38.21	N.S.	33.43	N.S.	50.42
1 %	N.S.	31.36	0.13	60.05	N.S.	63.58	N.S.	75.60
(d) 120 days from sowing (at harvest)								
30	90.60	74.00	0.00	164.60	38.20	89.00	0.20	127.40
40	82.20	81.20	0.00	163.40	20.60	96.80	0.20	117.60
50	69.00	97.60	0.00	166.60	31.20	79.20	0.80	111.20
60	54.40	71.20	0.00	125.60	30.80	67.00	0.20	98.00
70	49.40	91.00	0.00	140.40	15.20	60.60	0.00	75.80
L.S.D. 5 %	20.74	N.S.		22.82	10.08	20.00	N.S.	26.4
1 %	N.S.	N.S.		N.S.	N.S.	N.S.	N.S.	42.24

120 days from sowing were significantly decreased as rice seeding rates were increased These results were true in the two successive seasons. Increasing seeding rates from 30 to 70 kg/fed. decreased the total number of weeds/m² by 85 and 15% in the first season, and by 57 and 41% in the second at 90 and 120 days from sowing. respectively.

The depressing effect of dense planting on number of weeds/m² was more pronounced with C. difformis at 90 days from sowing and E. crus-galli at 120 days from sowing of rice plants. These results are expected since increasing rate was strongly inhibited the growth of weeds by rice plant competition. These results were agreed with those obtained by Kim and Moody (1980), Hassan et al. (1987) and Hassan et al. (1990).

1.2. Fresh and dry weights of weeds/m²:

Data presented in Tables (2 and 3) indicate clearly that seeding rate showed seasonal variation effect on fresh and dry weights of weeds/m² at different growth stages of rice plants. In the first season, seeding rate had a significant effect at 5% level of significance on fresh weight of weeds/m² at 60 days from sowing rice plants only. Fresh and dry weights of E. crus-galli as well as total weeds/m² significantly decreased with increasing seeding rate. On the other hand, C. difformis and E. colonum were not significantly affected by increasing seeding rate. Whereas, in the second season, seeding rate showed significant effect on fresh and dry wights of weeds, namely, E crus galli C. difformis and E. colonum as well as fresh weight of total weeds/m² at latter stages of growth (90 and 120 days from sowing). Increasing seeding rate from 30 to 70 kg/fed. Significantly decreased fresh weight of E. crus-galli, C. difformis as well as total weeds/m² by 69,62 and 62% at 90 days from sowing and by 72, 52 and 65% at harvesting stage of rice plants, (120 days from sowing), respectively.

It could be concluded that weights of weeds decreased as the seeding rate was increased from 30 to 70 kg/fed. This reduction was more clearly with E. crus- galli than C. difformis in the latter stage of rice growth

Generally, it was evident that rice density affect the competitive equilibrium between weeds and crop Therefore, the increased competition produced by the having seeding of rice had a suppressive effect on growth of their associated weeds Similar results were obtained by Kim and Moody

Table 2 : Effect of seeding rateson fresh weight of weeds in (g./m²) at different growth stages of rice plants in 1989 and 1990.

Seeding rate kg/fed.	1989 Season				1990 Season			
	E. crus-galli	C. difformis	E. colonum	Total	E. crus-galli	C. difformis	E. colonum	Total
				(a) 30 days from sowing				
30	10.88	10.60	0.00	21.48	1.38	15.32	0.00	16.70
40	15.36	15.06	0.00	30.42	1.28	29.46	0.00	30.74
50	8.26	8.89	0.00	17.15	1.51	19.24	0.00	20.75
60	9.67	6.58	0.00	16.25	2.32	17.58	0.00	19.90
70	8.70	11.96	0.00	20.66	5.24	14.86	0.00	20.10
L.S.D. 5 %	N.S.	N.S.		N.S.	N.S.	N.S.		N.S.
1 %	N.S.	N.S.		N.S.	N.S.	N.S.		N.S.
				(b) 60 days from sowing				
30	1024.20	1508.40	3.80	2536.40	250.00	1094.00	3.00	1347.00
40	2185.80	1587.00	2.80	3775.60	106.00	946.20	1.50	1157.00
50	910.40	1146.40	3.20	2060.00	141.00	726.00	1.50	868.50
60	838.60	1700.00	0.60	2539.20	82.00	788.00	0.00	870.00
70	666.00	1486.00	5.00	2157.00	188.00	752.60	0.00	940.60
L.S.D. 5 %	650.00	N.S.	N.S.	1017.15	N.S.	N.S.	N.S.	N.S.
1 %	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
				(c) 90 days from sowing				
30	1855.00	1222.20	7.40	3084.60	623.00	1670.60	6.80	2299.80
40	2476.60	406.30	5.20	2888.10	390.00	1623.80	3.40	2017.20
50	1956.80	774.20	0.00	2731.00	236.40	1061.00	1.60	1299.00
60	1373.00	614.40	0.70	1988.10	266.40	1012.00	0.00	1278.40
70	1642.00	332.50	0.10	1974.60	198.40	628.00	0.00	821.40
L.S.D. 5 %	N.S.	N.S.	N.S.	N.S.	319.07	710.20	2.00	1056.57
1 %	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
				(d) 120 days from sowing at harvest				
30	473.40	65.00	0.00	538.40	184.00	107.00	4.30	295.30
40	517.00	48.00	0.00	565.00	96.40	103.00	1.00	200.40
50	389.00	88.20	0.00	477.20	135.00	73.00	1.40	209.40
60	374.00	55.20	0.00	429.20	130.40	50.60	1.40	182.44
70	376.00	86.20	0.00	462.20	51.00	51.00	0.00	102.00
L.S.D. 5 %	N.S.	N.S.		N.S	88.20	49.33	1.55	144.94
1 %	N.S.	N.S.		N.S.	N.S.	N.S.	N.S.	N.S.

Table 3 : Effect of seeding rateson dry weight of weeds/m² at different growth stages of rice plants in 1989 and 1990 seasons.

Seeding rate kg/fed.	1989 Season				1990 Season			
	E. crus-galli	C. difformis	E. colonum	Total	E. crus-galli	C. difformis	E. colonum	Total
				(a) 30 days from sowing				
30	1.59	0.83	0.00	2.42	0.14	1.37	0.00	1.51
40	2.25	1.10	0.00	3.35	0.13	2.63	0.00	2.76
50	1.66	0.65	0.00	2.31	0.13	1.72	0.00	1.85
60	1.41	0.48	0.00	1.89	0.24	1.57	0.00	1.81
70	1.27	0.88	0.00	2.15	0.49	1.33	0.00	1.82
L.S.D. 5 %	N.S.	N.S.		N.S.	N.S.	N.S.		N.S.
1 %	N.S.	N.S.		N.S.	N.S.	N.S.		N.S.
				(b) 60 days from sowing				
30	438.80	141.60	0.38	580.78	47.60	128.20	0.00	175.80
40	306.06	143.00	0.48	449.54	20.20	86.00	0.24	282.24
50	127.60	103.40	0.32	231.32	26.80	93.20	0.12	120.12
60	118.20	153.00	0.06	271.26	15.60	111.80	0.13	127.53
70	22.20	133.80	0.30	256.30	35.80	89.00	0.00	124.80
L.S.D. 5 %	68.76	N.S.	N.S.	114.60	N.S.	N.S.	N.S.	N.S.
1 %	99.01	N.S.	N.S.	165.02	N.S.	N.S.	N.S.	N.S.
				(c) 90 days from sowing				
30	491.80	110.10	0.78	602.68	194.20	297.92	0.18	492.30
40	662.80	36.56	0.55	699.91	57.10	282.56	0.76	340.42
50	498.60	70.02	0.00	568.62	47.80	189.20	0.38	237.38
60	364.00	55.30	0.07	419.37	64.40	180.40	0.00	244.80
70	435.20	29.99	0.01	465.20	50.40	111.95	0.00	162.35
L.S.D. 5 %	N.S.	N.S	N.S	N.S.	64.00	160.60	N.S.	228.60
1 %	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
				(d) 120 days from sowing (at harvest)				
30	286.20	42.66	0.00	328.86	141.90	80.46	1.88	224.24
40	312.40	37.00	0.00	349.40	74.40	77.00	0.67	152.07
50	236.80	61.45	0.00	298.25	104.00	54.60	0.66	160.66
60	226.40	38.45	0.00	264.85	100.60	37.80	0.67	139.07
70	227.20	60.05	0.00	287.25	39.40	38.60	0.00	78.00
L.S.D. 5 %	N.S.	N.S.		N.S.	66.93	35.38	0.49	111.55
1 %	N.S.	N.S.		N.S.	N.S.	N.S.	N.S.	N.S.

(1980), Moody and De Datta (1980), Moody and De Datta (1982), Hassan et al. (1987), Hassan and Mahrous (1989) and Hassan et al.(1990).

2. Effect of weed control on density of rice weeds:

2.1. Number of weeds/m²:

Data presented in Table (4) indicate that number of weeds was decreased at different growth stages by experimental treatments of weed control in the two successive seasons.

Echinochloa crus -galli was controlled significantly by thiobenzyl however, bentazon was not effective in controlling this significantly at 60,90 and 120 days from sowing in the first season and at 120 days in the second season. Whereas, C. difformis and E. colonum were controlled significantly by both herbicides, i.e., thiobenzyl and bentazon at different growth stages. Hand-weeding three times (after 30, 60 and 90 days from sowing rice) also gave a very good result in controlling weeds in general and E. crus-galli in particular. It could be concluded that hand-weeding as well as thiobenzyl were the best treatment for the control of rice weeds at different growth stages. On the other hand, bentazon gave poor control of weeds compared with the two previous treatments. Similar results were obtained by Mahapatra et al. (1989).

2.2. Fresh and dry weights of weeds/m²:

The effect of control treatments on fresh and dry weights of individual weed as well as total weights of weeds/m² was similar (Tables 5 and 6).

It is noticed that most of the herbicidal treatments as well as hand-weeding treatment, were highly effective in decreasing the total weights of weeds/m² at different growth stages in the two successive seasons.

In 1989 season, the most effective treatments in controlling weeds at 120 days from sowing could be arranged in the following order: hand-weeding, bentazon + thiabenzyl and single application of thiobenzyl. The reduction in fresh and dry weights of weeds attributed to previous treatments were 100,100 and 99.7%, as compared with the unweeded treatment, respectively. On the other hand, application of bentazon as single was not effective for controlling weeds in rice fields.

Table 4 : Effect of weed control on number of weeds/m² at different growth stages of rice plants in 1989

Table 4 : Effect of weed control on number of weeds/m² at different growth stages of rice plants in 1989 and 1990 seasons.

Weed control	1989 Season					1990 Season				
	E. crus-galli	C. difformis	E. colonum	Total	Controlling effect	C. crus-galli	C. difformis	E. colonum	Total	Controlling effect %
(a) 30 days from sowing										
Unweeded	6.40	60.40	0.00	66.80	-	0.60	58.80	0.00	59.40	
Hand-weeding	7.60	91.60	0.00	99.20	-	0.40	32.80	0.00	33.20	
Bentazon	7.40	00.00	0.00	7.40	88.9	0.40	52.80	0.00	53.20	10.4
Thiobenzyl	0.00	00.00	0.00	00.00	100	0.80	43.80	0.00	44.60	24.9
Bentazon+Thiobenzyl	0.00	00.00	0.00	00.00	100	0.80	52.00	0.00	52.80	11.1
L.S.D. 5 %	N.S.	4.56		52.02		N.S.	N.S.		N.S.	
1 %	N.S.	6.57		78.03		N.S.	N.S.		N.S.	
(b) 60 days from sowing										
Unweeded	7.80	937.00	1.60	946.40	-	1.40	649.20	2.60	653.20	-
Hand-weeding	2.80	357.80	0.80	361.40	61.8	0.20	373.00	0.00	373.20	42.9
Bentazon	7.20	51.00	0.20	58.40	93.8	3.00	14.00	0.00	17.00	97.4
Thiobenzyl	0.20	1.40	0.00	1.60	99.8	0.00	0.00	0.00	0.00	100
Bentazon+Thiobenzyl	0.60	0.00	0.00	0.60	99.9	0.00	0.00	0.00	0.00	100
L.S.D. 5 %	0.74	40.39	N.S.	60.8		N.S.	31.09	N.S.	35.29	
1 %	1.07	68.16	N.S.	85.5		N.S.	44.88	N.S.	62.58	
(c) 90 days from sowing										
Unweeded	7.40	367.00	1.20	376.60	-	1.60	801.80	1.20	804.60	-
Hand-weeding	0.00	4.80	0.00	4.80	98.7	0.00	5.60	0.60	6.20	99.2
Bentazon	8.80	19.40	0.00	28.20	92.5	1.20	11.40	0.00	12.60	98.4
Thiobenzyl	0.40	0.80	0.20	1.40	99.6	0.00	17.00	0.00	17.00	97.9
Bentazon+Thiobenzyl	0.20	0.00	0.00	0.20	99.9	0.00	0.00	0.00	0.00	100
L.S.D. 5 %	0.50	19.60	0.07	38.21		N.S.	33.43	N.S.	50.42	
1 %	0.72	31.36	0.13	60.05		N.S.	63.58	N.S.	75.60	
(d) 120 days from sowing at harvest										
Unweeded	165.00	402.40	0.00	567.40	-	51.40	392.60	1.40	445.40	-
Hand-weeding	0.00	0.00	0.00	0.00	100	00.00	0.00	0.00	0.00	100
Bentazon	180.40	9.20	0.00	189.60	66.6	81.60	0.00	0.00	81.60	81.7
Thiobenzyl	0.00	3.40	0.00	3.40	99.4	00.00	0.00	0.00	0.00	100
Bentazon+Thiobenzyl	0.00	0.00	0.00	0.00	100	3.00	0.00	0.00	3.00	99.3
L.S.D. 5 %	20.74	12.45		22.82		10.08	20.00	N.S.	26.40	
1 %	29.87	17.93		55.68		15.08	28.8	N.S.	42.20	

Table 5 : Effect of weed control on fresh weight of weed/m² (g) at different growth stages of rice plants in 1989 and 1990 seasons.

Weed control	1989 Season					1990 Season				
	E. crus-galli	C. difformis	E. colonum	Total	Controlling effect %	E. crus-galli	C. difformis	E. colonum	Total	Controlling effect %
					(a) 30 days from sowing					
Unweeded	17.15	17.00	0.00	34.15	-	6.22	59.04	0.00	65.26	-
Hand-weeding	16.10	35.79	0.00	51.89	-	1.95	37.12	0.00	39.07	-
Bentazon	19.43	0.10	0.00	19.53	42.8	3.36	0.10	0.00	3.46	94.7
Thiobenzyl	0.10	0.10	0.00	0.20	99.4	0.10	0.10	0.00	0.20	99.7
Bentazon+Thiobenzyl	0.10	0.10	0.00	0.20	99.4	0.10	0.10	0.00	0.20	99.7
L.S.D. 5 %	8.09	8.26		16.51		2.73	22.86		24.79	
1 %	11.65	11.88		23.77		N.S.	31.77		36.69	
					(b) 60 days from sowing					
Unweeded	2503.40	5442.60	6.80	7952.80	-	197.00	2673.00	6.20	2876.20	-
Hand-weeding	440.60	1494.60	5.60	1940.80	75.6	4.40	1457.60	0.00	1462.00	49.2
Bentazon	2525.60	287.00	3.00	2815.60	64.6	524.20	176.20	0.00	700.40	75.6
Thiobenzyl	61.00	3.60	0.00	64.60	99.2	0.00	0.00	0.00	0.00	100
Bentazon+Thiobenzyl	94.40	0.00	0.00	94.40	98.8	0.00	0.00	0.00	0.00	100
L.S.D. 5 %	650.00	869.52	N.S.	1017.15		93.08	564.40	N.S.	664.85	
1 %	938.60	1220.10	N.S.	1464.48		134.03	812.74	N.S.	957.38	
					(c) 90 days from sowing					
Unweeded	3126.00	3162.60	11.60	6300.20	-	678.40	5841.00	10.80	6530.20	-
Hand-weeding	0.00	17.00	0.00	17.00	99.7	0.00	31.60	1.00	32.60	99.5
Bentazon	5788.40	166.00	0.00	5954.40	5.4	1035.40	59.80	0.00	1095.20	83.2
Thiobenzyl	302.00	4.00	1.80	307.80	95.1	0.00	63.00	0.00	63.00	99.0
Bentazon+Thiobenzyl	87.00	0.00	0.00	87.00	98.6	0.00	0.00	0.00	0.00	100
L.S.D. 5 %	1039.52	370	N.S.	1424.33		319.07	710.20	2.00	1056.57	
1 %	1496.91	533.15	N.S.	2051.03		459.46	1022.69	2.88	1521.50	
					(d) 120 days from sowing at harvest					
Unweeded	987.00	324.80	0.00	1311.80	-	273.40	366.60	8.10	648.10	-
Hand-weeding	0.00	0.00	0.00	0.00	100	0.00	0.00	0.00	0.00	100
Bentazon	1142.80	14.00	0.00	1156.80	11.8	312.40	18.00	0.00	330.40	49
Thiobenzyl	0.00	3.80	0.00	3.80	99.7	0.00	0.00	0.00	0.00	100
Bentazon+Thiobenzyl	0.00	0.00	0.00	0.00	100	11.00	0.00	0.00	11.00	98.3
L.S.D. 5 %	346.46	50.40		402.86		88.20	49.33	1.55	144.94	
1 %	498.90	88.22		580.12		127.01	71.04	2.23	208.71	

Table 6 : Effect of weed control on dry weight of weeds/in² at different growth stages of rice plants in 1989 and 1990 seasons.

Weed control	1989 Season					1990 Season				
	E. crus-galli	C. difformis	E. colonum	Total	Controlling effect %	E. crus-galli	C. difformis	E. colonum	Total	Controlling effect %
				(a) 30 days from sowing						
Unweeded	2.51	1.24	0.00	3.75	-	0.59	5.26	0.00	5.85	
Hand-weeding	2.36	2.62	0.00	4.98	-	0.18	3.31	0.00	3.49	
Bentazon	2.85	0.01	0.00	2.86	23.7	0.35	0.01	0.00	0.36	93.8
Thiobenzyl	0.01	0.01	0.00	0.02	99.5	0.01	0.01	0.00	0.02	99.6
Bentazon+Thiobenzyl	0.01	0.01	0.00	0.02	99.5	0.01	0.01	0.00	0.02	99.6
L.S.D. 5 %	1.33	0.68		1.84		0.40	1.95		2.22	
1 %	N.S.	N.S.		N.S.		N.S.	2.81		3.20	
				(b) 60 days from sowing						
Unweeded	476.80	490.00	0.88	967.68	-	37.60	305.80	0.50	343.90	
Hand-weeding	63.40	158.40	0.36	222.16	77.0	8.40	172.40	0.00	180.80	47.4
Bentazon	551.80	26.00	0.30	578.10	40.3	100.00	30.00	0.00	130.00	62.2
Thiobenzyl	8.60	0.40	0.00	9.00	99.1	0.00	0.00	0.00	0.00	100
Bentazon+Thiobenzyl	13.26	0.00	0.00	13.26	98.6	0.00	0.00	0.00	0.00	100
L.S.D. 5 %	68.76	43.04	0.57	114.60		19.58	68.54	0.09	89.01	
1 %	99.01	61.98	0.83	165.02		28.20	103.60	0.17	128.17	
				(c) 90 days from sowing						
Unweeded	835.20	284.80	1.22	1121.22	-	163.70	1041.40	1.20	1206.30	
Hand-weeding	0.00	1.72	0.00	1.72	99.8	0.00	5.66	0.11	5.77	99.5
Bentazon	1514.20	15.10	0.00	1529.30	36.4	250.20	10.71	0.00	2609.91	16.4
Thiobenzyl	80.00	0.36	0.19	80.55	92.8	0.00	11.20	0.00	11.20	99.1
Bentazon+Thiobenzyl	23.00	0.00	0.00	23.00	97.9	0.00	0.00	0.00	0.00	100
L.S.D. 5 %	323.80	40.47	N.S.	367.95		64.00	160.60	N.S.	228.60	
1 %	466.27	58.28	N.S.	528.48		92.16	231.26	N.S.	329.18	
				(d) 120 days from sowing at harvest						
Unweeded	597.20	227.20	0.00	824.40	-	210.80	274.60	3.89	489.29	
Hand-weeding	0.00	0.00	0.00	0.00	100	0.00	0.00	0.00	0.00	100
Bentazon	691.30	9.76	0.00	701.56	14.9	241.00	13.86	0.00	254.86	47.9
Thiobenzyl	0.00	2.65	0.00	2.65	99.8	0.00	0.00	0.00	0.00	100
Bentazon+Thiobenzyl	0.00	0.00	0.00	0.00	100	8.50	0.00	0.00	8.50	98.3
L.S.D. 5 %	120.12	20.02		143.22		66.93	35.38	0.49	111.55	
1 %	172.00	28.82		206.24		96.38	50.94	0.71	160.63	

In 1990 season, the results of tge weights of total weeds/m² showed that the most effective treatments at later stage of growth could be arranged in a descending order: hand-weeding, thiobenzyl bentazon + thiobenzyl and bentazon, where the reduction in fresh weight of weeds were 100,100, 98.3 and 49%, respectively compared with the unweeded (control) treatment.

Single application of thiobenzyl (2.1/fed.) or with bentazon (1.5 l./fed.) were superior in controlling E. crus-galli, C. difformis and E. colonum. On the other hand, the poorest treatment in controlling weeds in general and E. crus-galli in particular was bentazon (1.5 l./fed.) as a single application. Hand-weeding (three times) was approximately similar to thiobenzyl or application of bentazon + thiobenzyl in controlling rice weeds, namely, E. crus-galli, C. difformis and E. colonum at different growth stages in the two successive seasons.

3. Effect of the interaction:

The effect of interactions between seeding rates and weed control treatments on weeds density (number, fresh and dry weights/m² in rice plants at different growth stages of rice plant (after 30.60, 90, and 120 days from sowing) were not significant. Such result indicates that each experimental factor acted separately in affecting the number, fresh weight and dry weights of weeds/m².

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تأثير معدلات التقاوى ومقاومة
العشائش على العشائش المصاحبة للارز البـــــــــــــــدار

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أقيمت تجربتان حقليتان خلال موسمى ١٩٨٩و ١٩٩٠ بالحقول الارشادية التابعة لوزارة الزراعة بمركز كفر سعد بمحافظة دمياط . ودلك لدراسة تأثير بعض معدلات التقاوى ومقاومة العشائش على كثافة العشائش المنتشرة فى محصول الارز. وتضمنت التجربة ٢٥ معاملة عبارة عن خمسه معدلات تقاوى (٣٠ ، ٤٠ ، ٥٠ ، ٦٠ ، ٧٠كليو جرام/ للفدان) وخمسه معاملات لمقاومة العشائش هى: (١) بدون مقاومة (كنترول) ، (٢) نقاوة يدوية ثلاث مرات. (٣) ساتيرن ٥٠٪ بمعدل ٢ لتر/ف . (٤) بازجران٥٠٪ بمعدل ٥ر١ لتر/ف . (٥) ساتيرن ٥٠٪ + بازجران ٥٠٪ بمعدل ٢ لتر + ٥ر١ لتر/ف.

استخدم تصميم القطاعات كاملة العشوائية فى أربعة مكررات وكانت مساحة القطعة التجريبية ٥ر١٠م٢ ($\frac{1}{400}$ من الفدان) والصنف المنزرع من الارز هو جيزة ١٧٢ .

وتشير أهم النتائج المتحصل عليها من الدراسة فى الاتـــى:-

١) تظهر النتائج أن حشيشتى الدنيبة والعجيرة السائدان تحت ظروف التجربة ، أمـــا حشيشة أبوركبة فوجدت بأعداد قليلة وليست بدرجة واحدة فى مكررات التجربـــة وفى مراحل النمو المختلفة .

٢) لم يكن لمعدلات التقاوى المستخدمة تأثير معنوى على أعداد العشائش المنتشرة فـــى الارز فى المراحل الاولى من عمر النبات (٣٠و ٦٠ يوما من الزراعة) فى حين كـــان التأثير معنوى على هذه الاعداد فى المراحل الاخيرة من عمر النبات (٩٠ و ١٢٠يوما من الزراعـــة) حيث وجد أنه بزيادة معدل التقاوى من ٣٠ الى ٧٠ كجـــم/ف انخفضت الاعداد الكلية للعشائش بنسبة ٨٥ ،١٥٪ فى الموسم الاول ، ٤١،٥٧٪ فـــى الموسم الثانى عند اعمار ٩٠ و ١٢٠ من الزراعة على الترتيب كما انخفضت معدلات التقاوى المرتفعة اعداد حشيشة العجيرة عند عمر ٩٠ يوما من الزراعة وأعـــداد حشيشة الدنيبة عند عمر ١٢٠ يوما من الزراعة

٣) كان تأثير معدلات التقاوى على الوزن الجاف للعشائش فى المتر المربع فى مراحل النمو المختلفة مشابها للتأثير على الوزن الغض للعشائش ففى الموسم الاول نقص الوزن الجاف للعشيشة الدنيبة وكذلك الوزن الكلى للعشائش فى المتر المربع معنويا بزيادة معدلات التقاوى وذلك بعد ١ يوما من الزراعة فقط. أما فى الموسم الثانى ادت زيادة معدلات التقاوى الى انخفاض اوزان العشائش كل على حده وكذلك الوزن الكلى لمجموع العشائش بعد ٩٠ و ١٢٠ يوما من الزراعة ولكن تأثير معدلات التقاوى كان اكثر وضوحا على عشيشة الدنيبة بالمقارنة بعشيشة العجيرة.

٤) أظهر الساتيرن مقاومة فعالة لعشيشة الدنيبة بينما لم يكن للبازجران أى تأثير على هذه العشيشة فى مراحل النمو المختلفة (بعد ٣٠، ٦٠، ٩٠، ١٢٠ يوما من الزراعة) خلال موسمى التجربة بينما أمكن مقاومة العجيرة والبوركبة بكلا المبيدين معنويا.

٥) بالنسبة لنتائج الوزن الغض والجاف للعشائش أظهرت النتائج أن المعاملات الفعالة فى مقاومة العشائش يمكن ترتيبها تنازليا كما يلى النقاوة اليدوية، ساتيرن، بازجران+ ساتيرن بازجران حيث ادت الى تقليل أوزان العشائش فى المتر المربع مقارنة بمعاملة المقارنة (بدون مقاومة) فى موسمى التجربة.

٦) لم يكن للتفاعل بين معدلات التقاوى ومعاملات مقاومة العشائش المستخدمة فى التجربة أى تأثير معنوى على أعداد وأوزان العشائش فى كلا موسمى التجربة.