

		2008		2007			
		6	4	2	0	100	200
		/K 400 300 200 100 0 K ₂ SO ₄					
27.85	28.8)						
						(%50.11	%41.68)
		(/	76.7	80.39)		(	26.7 23.8)
308.4	295.95				(12.2	12.63)	300 (/
			(143.8	104.9)			55.25 49.45)
	/ 400		(² /	493.73	410.42)		Co ₂
54.81)	(	92.81	88.31)		(28.75	24.69)	(33.44
286.06	258.94)	(	167.50	115.39)	(13.44	13.22)	300 (
			(² /	580.12	461.62)		(%55.91
							%44.01)

The Iraqi Journal of Agricultural Sciences 41 (3):

Hussien & Wuhaib.

THE RELATIONSHIP BETWEEN ROOT GROWTH AND YIELD IN SAFFLOWER INFLUENCED BY IRRIGATION INTERVAL AND POTASSIUM LEVELS

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Kareema M. Wuhaib

Coll. Of Agric.Univ. of Baghdad

ABSTRACT

The study was conducted at experimental field of Field Crops sciences Department – College of Agriculture – University of Baghdad during two seasons (2007-2008). The objective of the study was to investigate the influence of irrigation interval and potassium levels on root growth of safflower variation. Almass, and the relationship with yield and yield component characters. The study was carried out according to Split Plot arrangements by using Randomized Complete Block Design including four replicates. Irrigation treatments were 2, 4 and 6 week intervals in addition to control (un-irrigated). These treatments occupied the main plots, while the subplots were occupied by potassium (K₂SO₄) levels (0, 100, 200, 300 and 400) kg/ha. Results showed superiority of irrigated over un-irrigated. Four – weeks interval irrigation was superior in giving the highest root length (28.8 and 27.85) cm and harvest index (41.68 and 50.11)% for two years respectively. Furthermore, the same treatment was superior in head number (80.39 and 76.7) heads/plant and 300 seeds-weight (12.36 and 55.25) gm for two years respectively. Dry matter weight increased from 295.95 to 308.4 gm/plant that confirmed the improvement of System Capacity Constant since it gave the highest plant yield (104.9 and 143.8) gm for two years respectively. Plants of this treatment were characterized by their efficiency in light and Co₂ assimilation as it gave the highest efficiency (410.42 and 493.73) gm/cm². Fertilization with 400 kg/ha gave the highest root weight (28.75 and 140.19) cm, seed number per head (54.81 and 61.13), 300 seeds-weight (13.22 and 13.44) gm, plant yield (115.91 and 167.50) gm/plant, dry matter yield (258.94 and 286.06) gm/plant, Harvest Index (44.01 and 55.91%) and yield efficiency (461.62 and 580.12) gm/cm².

.(19)

(6)
. (27)

(25)

(8)

(30)

.(17)

(22)

mRNA

(21)

()

.(28)

./K (400 300
 %50) K₂SO₄
 .(K%42 K₂O -
 30) (2008 2007)
 (1) .(

200 100 0) K₂SO₄

2008 2007 .1

2009-2008	2008-2007		
7.6	7.8		pH
3.8	4.1	1-	EC
63	78	1-	N
13	15	1-	P
117	120	1-	K
380	362	1-	
423	448	1-	
197	190	1-	

()
 (%4 %8) (%0.7 %2)
 () . (P 19% P₂O₅ 46%)
 / P₂O₅ 100
 () /N 120 (N 46%)
 6 4
 5
 (3)
 (4) 75 (5×3)
 25
 (15 4)
 ()
 . (12) 5
 :
 400 :
 34.31 /K 25 70
 33.44 50
 %70 %56 . 2
 21.87 ()
 (7) 19.62 300
 .(14) ()
 %
 .(11) . .
 .%5
 400 4
 36.75 37.50 /K ()
 17 20 2
 27.85 28.80
 . (12) 6
 %10

2008 2007

()

. 2

2008							2007						
/							/						
400	300	200	100	0			400	300	200	100	0		
25.35	33.00	27.50	25.00	24.25	17.00	2	26.60	33.55	28.00	27.75	20.50	20.00	2
27.85	36.75	32.00	25.00	25.00	20.50	4	28.80	37.50	34.25	25.75	24.75	21.75	4
26.25	32.75	29.50	25.00	25.00	20.50	6	28.30	34.75	31.75	27.75	23.00	24.25	6
25.15	31.25	25.75	25.00	23.25	20.50		26.05	31.75	26.50	26.50	24.00	21.50	
1.44	2.53					. . %5	1.13	2.42					. . %5
	33.44	28.69	25.00	23.62	19.62			34.31	30.12	26.94	23.06	21.87	
	1.22					. . %5		1.24					. . %5

%85 %62

()

(15.50 15.19)

3

26.70 23.80

%60 %52

.(12)

(%8 %18) (%44 %41)

(10)

30.75 /K 400

35.25

10.50

.(16)

13.00

.(12)

(12)

/K 400

28.75 24.69

2008 2007

()

.3

2008						2007							
/						/							
400	300	200	100	0		400	300	200	100	0			
26.70	35.25	30.50	26.25	22.75	18.75	2	23.80	30.75	26.25	23.50	20.00	18.50	2
24.00	33.75	26.00	22.75	20.50	17.00	4	22.05	24.50	24.75	22.50	19.00	19.50	4
19.75	25.25	22.50	20.00	17.75	13.25	6	18.46	23.25	23.00	21.50	12.00	12.55	6
16.65	20.75	20.50	14.75	14.25	13.00		15.60	20.25	19.75	13.50	14.00	10.50	
1.25	1.79					· · · %5	1.90	2.52					· · · %5
	28.75	24.87	20.49	18.81	15.50			24.69	23.44	20.25	16.44	15.19	
	0.77					· · · %5		1.02					· · · %5

4

400

92.81 88.31

/K

4

/

%152 %167

33.00

/ 76.70 80.39

/ 36.69

%97 %106

(14)

(7)

()

(%75 %63)

(%66 %41)

(29) Qayyum

124

/K 400

/ 118.75

(10)

23.25

/ 22.25

2008						2007							
/						/							
400	300	200	100	0		400	300	200	100	0			
76.70	118.75	84.75	81.00	60.00	46.50	2	80.39	124.00	98.25	84.25	56.25	39.00	2
68.15	102.25	80.00	62.25	52.00	43.50	4	63.50	92.25	72.00	62.75	52.00	38.50	4
64.75	101.75	78.75	58.00	50.75	34.50	6	55.00	82.00	68.75	52.00	41.25	31.00	6
38.85	56.50	43.75	40.75	33.00	22.25		39.00	55.00	45.00	40.00	31.50	23.50	
5.05	6.51					.. %5	5.68	7.51					.. %5
	92.81	72.00	60.50	48.44	36.69			88.31	71.00	59.75	45.25	33.00	
	2.57					.. %5		3.05					.. %5

5

/K 400
/ 61.13 54.81
%168
55.25 49.45
%115 %150 %116
28.31 20.44)
%100) ((%93 %51) (%131
(23) Kolsarici (26) Memon
. (1)

71.75 /K 400
/ 80.00
15.75 16.50
64.25 55.25 . (18)

2008 2007

.5

2008						فترات الري بالاسابيع	2007					فترات الري بالاسابيع	
المعدل	مستويات التسميد البوتاسي كغم/هـ						المعدل	مستويات التسميد البوتاسي كغم/هـ					
	400	300	200	100	0			400	300	200	100		0
55.25	80.00	59.00	53.25	45.00	39.00	2	49.45	71.75	57.75	49.00	44.25	24.50	2
50.59	73.75	55.50	49.50	45.25	30.75	4	45.60	63.25	53.75	49.25	39.50	22.25	4
42.75	59.25	46.75	41.50	38.50	27.75	6	34.45	52.25	40.75	32.75	28.00	18.50	6
22.05	31.50	25.00	20.75	17.25	15.75	بدون ري	22.80	32.00	25.75	21.75	18.00	16.50	بدون ري
3.92	6.65					أفم %5	2.27	3.78					أفم %5
	61.13	46.56	41.25	36.50	28.31	المعدل		54.81	44.50	38.19	32.44	20.44	المعدل
	3.17					أفم %5		1.79					أفم %5

13.44 5.56 13.22 () 300
%57 %46 300 6

12.20 12.63 300
%24 %25
)

(
(%16 %4) (%20 %12)

.(13)

Qayyum

300

(29)

300

/K 400

15

7.75 8.50

(10)

/K (400 0)

9

300

2008 2007 () 300 .6

2008						فترات الري بالاسابيع	2007					فترات الري بالاسابيع	
المعدل	مستويات التسميد اليوتاسي كغم/هـ						المعدل	مستويات التسميد اليوتاسي كغم/هـ					
	400	300	200	100	0			400	300	200	100		0
12.20	15.00	13.00	12.00	12.00	9.00	2	12.63	15.00	13.00	12.50	12.63	10.00	2
11.80	14.00	12.50	12.00	12.00	8.50	4	11.33	13.13	12.00	11.75	10.75	9.00	4
11.40	12.75	12.00	12.00	11.25	9.00	6	10.60	12.00	12.00	10.50	10.00	8.50	6
9.80	12.00	12.00	9.25	8.00	7.75	بدون ري	10.10	12.75	11.50	10.00	7.75	8.50	بدون ري
0.32	0.72					أ.ف.م %5	0.40	0.74					أ.ف.م %5
	13.44	12.38	11.31	10.81	8.56	المعدل		13.22	12.13	11.19	10.28	9.00	المعدل
	0.37					أ.ف.م %5		0.36					أ.ف.م %5

()

7

400 / 308.4 295.95
 258.94 /K
 286.06 %95 %93
 %84 %83 (76.70 80.39)
 88.31 300 55.25 49.45
 61.13 54.81 92.81 (6 5 4) (12.20 12.63)
 13.44 13.22 300
 (3) 28.75 24.69
 4 3 2) 33.44 34.31
 (6 5 (%49 %54)
 (%11 %4)
 (3) (2)
 141.12
 155.5
 .(9)
 .(24)

ATP

/K 400

/ 407 381.5

107 104.5

2008 2007

()

.7

2008						فترات الري بالاسابيع	2007						فترات الري بالاسابيع
المعدل	مستويات التسميد البوتاسي كغم/هـ						المعدل	مستويات التسميد البوتاسي كغم/هـ					
	400	300	200	100	0			400	300	200	100	0	
308.40	407.75	327.50	294.50	282.25	230.00	2	295.95	381.50	309.50	288.25	277.50	223.00	2
235.70	314.50	250.00	229.75	210.75	173.50	4	189.85	243.75	226.25	197.25	157.25	124.75	4
175.80	227.75	212.75	185.00	142.00	111.50	6	159.20	193.25	194.25	161.00	135.25	112.25	6
158.50	194.25	193.75	161.75	135.75	107.00	بدون ري	153.15	207.25	189.25	136.00	118.75	104.50	بدون ري
9.99	12.86					أ.ف.م %5	4.49	7.57					أ.ف.م %5
	286.06	246.00	217.75	192.69	155.50	المعدل		258.94	229.81	195.62	172.19	141.12	المعدل
	5.06					أ.ف.م %5		3.60					أ.ف.م %5

()

()

(%149 %62) (%295 %160)

(30) Uslu (29) Qayyum

(.8)

109.80)

%347 %246

(143.28

/ 26.7 23.8

49.45

/ 76.7 80.39

(.20)

12.63 300

/ 55.25

(6 5 4 3) 12.20

400

(308.4 295.95)

115.39

/K

%443 %335 167.50

30.8 26.48

ATP

33.44 34.31

28.75 24.59

54.81 92.81 88.31

13.44 13.22 300 61.13

(286.06 258.94)

(7 6 5 4 3 2)

(31)

/K 400

246.9 186.75

8.40 8.92

2008 2007

()

.8

2008						فترات الري بالاسابيع	2007					فترات الري بالاسابيع	
المعدل	مستويات التسميد اليوتاسي كغم/هـ						المعدل	مستويات التسميد اليوتاسي كغم/هـ					
	400	300	200	100	0	400		300	200	100	0		
143.28	246.90	191.00	144.10	88.00	46.40	2	109.80	186.75	137.00	114.25	70.00	41.00	2
126.54	229.30	173.80	116.00	76.70	36.90	4	82.50	118.37	109.75	90.37	59.00	35.00	4
79.90	124.00	105.10	82.50	56.70	31.30	6	51.42	88.12	70.50	44.75	32.75	21.00	6
32.00	69.50	45.70	22.80	13.40	8.40	بدون ري	31.65	68.32	43.50	23.56	13.95	8.92	بدون ري
12.38	16.57					أ.ف.م %5	6.31	8.68					أ.ف.م %5
	167.50	128.90	91.40	58.70	30.80	المعدل		115.39	90.19	68.23	43.92	26.48	المعدل
	6.80					أ.ف.م %5		3.66					أ.ف.م %5

9

%41.68

/K 400

%50.11

%55.91 %44.01

%174 %121

%183 %139

%117.5 115.39

(9 8 7) 286.06 258.94

.(13)

/K 300

%48.95

/K 400 300

. %72.9

%7.85 % 8.53

(5)

)

(

%87)

(%138 %62) (%140

(3)

2008 2007

% 9

2008						فترات الري بالاسابيع	2007						فترات الري بالاسابيع
المعدل	مستويات التسميد البوتاسي كغم/هـ						المعدل	مستويات التسميد البوتاسي كغم/هـ					
	400	300	200	100	0			400	300	200	100	0	
43.83	60.55	58.32	48.93	31.18	20.17	2	35.29	48.95	44.26	39.63	25.22	18.38	2
50.11	72.90	69.52	50.48	36.39	21.26	4	41.68	48.56	48.51	45.81	37.51	528.0	4
43.49	54.44	49.40	44.59	39.92	29.10	6	30.52	45.59	36.29	27.79	24.21	18.70	6
18.23	35.77	23.58	14.09	9.87	7.85	بدون ري	18.80	32.96	22.98	17.32	11.74	8.53	بدون ري
3.16	4.94					أفم %5	2.25	3.59					أفم %5
	55.91	50.20	39.52	29.34	19.59	المعدل		44.01	38.01	32.64	24.67	18.41	المعدل
	2.27					أفم %5		1.67					أفم %5

(/)

² / (158.02 140.32)

10

410.42

² / 493.73

%149 %108

(8) 143.28 109.8

/K 400

(%69 %23) (%138 %82)

² / 612.29

(15)

/K 400

² / 776.23

² / 74.80 79.28

10

400

580.12 461.62

/K

² /

%267 %228

(8) (167.5 115.39)

2008 2007

2 /

.10

2008						فترات الري بالاسابيع	2007						فترات الري بالاسابيع
المعدل	مستويات التسميد اليوتاسي كغم/هـ						المعدل	مستويات التسميد اليوتاسي كغم/هـ					
	400	300	200	100	0			400	300	200	100	0	
493.73	717.52	642.23	539.90	363.94	205.03	2	410.42	612.29	501.28	454.82	295.60	187.21	2
471.70	776.23	617.40	458.13	329.46	177.32	4	359.69	468.79	462.68	408.91	282.83	175.26	4
334.58	445.08	428.62	365.69	258.55	174.95	6	243.67	389.56	322.95	218.82	167.51	119.52	6
197.76	381.65	274.80	157.24	100.15	74.80	بدون ري	196.71	375.83	261.89	162.48	104.10	79.28	بدون ري
39.33	52.80					أ.ف.م %5	17.80	35.38					أ.ف.م %5
	580.12	490.76	380.24	263.03	158.02	المعدل		461.62	387.20	311.26	212.51	140.32	المعدل
	21.74					أ.ف.م %5		17.80					أ.ف.م %5

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.273	.	-			.1988
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	.2005 .			.2005 .	.2
.179-171:(1)5 .					
	.1999.		.10	.99	-
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		92.			
	.2004.		.11		.164
				.1985 .	.4
.245:	.	-		-	
	.1990.		.12		
				.71	-
.92	.	-		.2005 .	.5
	.1990.		.13		
	()				
		.496			
.2006.			.14		
					.115
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	.90			.2000 .	
.1989 .			.15		
				.15-25:(31)	
				.1999.	.7
	.310-279:(1)20.				
.1999.			.16		
				.102	
				.2007 .	.8
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