Efficacy of Irrigation Intervals and Some Weed Control Treatments on Weeds and Sugar Beet (*Beta vulgaris* L) Productivity

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ABSTRACT

Two field experiments were conducted at El-Serw Agricultural Research Station, Damietta Governorat Agricultural Research Center, Egypt in 2011/12 and 2012/13 growing winter seasons. The effects of the water i intervals were allocated rates in the main plots. The irrigation intervals every 2,3 and 4 weeks, while the effect of herbicidal treatments were determined in the sub- plots. The herbicides used were Harness (acetochlor 84% EC faddan, Goltix70%SC (metamitron) at 2L / faddan, Goltix plus 50%SC (metamitron35% and ethofumesate15%) / faddan ,hand hoeing twice and un treated check. The results showed that, irrigation intervals each at every three weeks caused the same significant increasing percentage on fresh weight of total annual weeds approximately by 63.7%, respectively, in first season and by 33.9 and 63.6%, respectively, in second season compared to irrigation at every two weeks. That may be due to the irrigation intervals at every two weeks increased the efficacy of the he used on controlling weeds more than the irrigation intervals at every three and four weeks. Irrigation interval at ev weeks gave the highest percentage of sucrose and sodium by 17.4 and 2.8%, respectively, in first season, and 2.9%, respectively, in second season.

Hand hoeing twice, Harness at 840g/faddan, Goltix at 1400g/faddan as two soil-applied herbicides and Golti 750g/faddan as early post-emergence herbicide gave reduction in fresh weight of total weeds recorded to 87, 58 respectively, in first season and 89, 38, 42 and 47%, respectively, in second season, compared to untreated ch interaction between, irrigation intervals at every three weeks and Goltix, interaction between, irrigation intervals two weeks and both Harness and Goltix plus and the interaction between, irrigation intervals at every four weeks hand hoeing twice and Harness gave the highest values of root yield by 29.2, 29.0, 26.8, 26.9 and 26.5 ton/ respectively.

The interaction between, irrigation intervals at every two, three and four weeks and Harness, interaction l irrigation intervals at every four weeks and Goltix and at every two and three weeks and Goltix plus caused the for benefit / cost ratio to 1.93, 1.93, 1.76, 1.70, 1.66 and 1.66, respectively.

That mean, reduction the irrigation intervals increased the efficacy of soil-applied and early post-en herbicides for controlling weeds which competing the sugar beet plants.

Key words: Irrigation intervals – Economic analysis - Sugar beet - Soil–applied and earl emergence herbicides.

INTRODUCTION

Water has economic, cultural and socio–economic values. Limited water resources in the Arab region appear as one of the main limiting factors for irrigated agriculture area expansion. In the Arab region, water is the most critical natural resource. The complex dimensions of fresh water in the Arab world, its fragility and its scarcity have received considerable attention as a primary priority issue politically, technically and scientifically, (Abu-zeid and Hamdy, 2003). Many seed quality characteristics are determined, primarily by the genetic makeup of the variety. However, unfavorably growing conditions including plant water straw may modify the genetic potential of certain seed characteristics (Bruan, 1989). Sugar beet is one of the highest water consuming plants due to long growth period, with an annual consumption of 350 to 1150 mm in different regions of world (Allen et *al.*, Water requirement of sugar beet is st dependent on weather conditions, irri management, growth stage, plant density, ge and nitrogen application (Kuchaki and S 1995). For many crops and growing conditi relationship between evapotranspired (ET) for the growing season by centimeters and y linear up to ET values that result in ma productivity aboveground biomass represent (Bruan,1989). Due to increase water co decrease available water, water stress has be center of much attention (Winter, 1980). The of water deficiency stress on sugar beet dry partitioning is unclear, though it seems that beet has a great capacity to recover lea following drought and subsequent irri (Abdollahian-Noghabi and Froud– Wi 1998). The greatest reduction in dry

accumulation following drought stress usually occurs in the sugar beet storage root. Hostile environmental pressures such as predation, pathogen attack, chill injury and drought can also lead to chlorophyll degradation (Hendry et *al.* 1987).

Sugar beet is one of the most productive crops in temperate climates, but at the same time one of the poorest competitions to weeds. The poor competitiveness is a combination of rather slow early growth and an extremely low seed rate (about 100,000 seeds/ ha.).There is a critical period of about six to eight weeks when sugar beet is a poor competitor, and weeds have to be controlled(Bruan 1989). Broadleaf weeds in sugar beet are a major limitation for profitable sugar production and herbicides considred an important tool for their control. The total losses from weeds ranged from, 26 to 100% of the potential sugar beet yield (Schweizer and Dexter, 1987 and May, 2000). Annual broad-leaved weeds are usually more competitive than annual grasses. They often grow to a height two to three times that of sugar beet by mid- season (Deveikyte and Seibutis, 2006). Therefore, their control is an essential component of sugar beet production. (Winter, 1980)

Post emergence herbicides applied fields in sugar beet are effective only when applied to weeds less than 2cm in height, and repeat applications are usually needed because weeds continue to emerge in flushes until the end of growing crop season. Strategies that reduce weed emergence early in the season would be beneficial to growers that must manage weeds in noncompetitive crops, such as sugar beet. Gabibullaev (1996), showed that Betanal Progress AM (containing phenmedipham, desmedipham and ethofumesate) at 1.5 l/ha was an average 93.3% effective against weeds in sugar beet fields. El-Zouky(1998),found that chemical weed control by metamitron + phenmedipham + ethofumesate (post-emergence) and chloridazon + ethofumesate (pre-emergence) was insufficient to control all weed species during the whole crop cycle, but chemical weed control + hand-weeding at 100 days after sugar beet sowing resulted in the effectiveness for weed control and increased sugar beet yields.

So, the aim of the presented study was to investigate the effects of irrigation intervals and herbicide treatments on weeds, top & root yield and yield components of sugar beet to choose the best irrigation intervals and effective weed treatments in integration.

MATERIALS AND METHODS

During 2011/12 and 2012/13 growing winter seasons, two experiments were conducted at El-Serw Agricultural Research Station, Agricultural Research Center, Damietta Governorate, Egypt, to study irrigation intervals and weed control integration effects on sugar beet (*Beta vulgar* cawemeira) productivity.

The soil texture in this study was heav and low permeable soil and the mai characteristics were presented in Table (1).

In each experiment, the treatments arranged in split-plots design with four repli follows:

A- The main plots: included three ir intervals:

1- Every two weeks interval (equal 12 irrigat

2- Every three weeks interval (equal 9 irrigat four weeks interval (equal 7 irrigation).

3- Every

B- The sub – plots: included five weed treatments namely:

1- Harness 84%EC (acetochlor) at the rate faddan pre- sowing.

2- Goltix70% SC [metamitron] at the rate faddan pre- sowing.

3- Goltix plus 50% SC [metamitron 3 ethofumesate 15%] at the rate of 1.5 L. after 30 days from sowing.

4- Hand hoeing twice after thirty and six from planting.

5 -Untreated check.

The sub-plot area was 21m^2 (3mx7m) .S rates was 3-4 seeds in each hill. Sowing dat 1st November in 2011/12 season, and 10 No in the second season. Harvesting dates were 10 May in both seasons, respectivel recommended agricultural practices of sug production for the region were followed.

For determining weeds survey associated with sugar beet plants; the sample randomly taken using by one square meter qu plot them and weeds were separated and cla according to their species, and accordi Tackhőlm, 1974.

A random 10 sugar beet plant sampl taken from each plot to measure, root leng root diameter in both seasons.

At harvest, plants harvested from the plot area to measure sugar beet yields as follo

1 - Top yield/ faddan (ton/ faddan)

2 - Root yield/ faddan (ton/ faddan)

3- Total yield/ faddan (ton / faddan)

Samples of ten roots from each plot were at random and sent to the Belqas sugar comp determine the different of root quality att using the official methods as follows:

1-Sucrose % was determined using sucarom a lead acetate basis according to the described by Carruthers and Oldfield, 19

2-Alpha amino nitrogen per (Milliequaivalents /100 g beet) dete using hydrogenation method according method of Carruthers et *al*. (1962).

Table 2: Common names, chemical names, chemical families, trade name and mode of action of herbicides (William, 1994).

Common Name	Chemical name	Chemical family	Trade Name	Mode of action
Acetochlor	2-chloro-N-(ethoxymethyl)-N-(2-ethyl-6-methylphenyl) acetamide	Acetamide	Harness	Inhibition of cell Division
Metamitron	4-amino-3-methyl-6-phenyl-1,2,4-triazin-5(4H)-one	Triazinone	Goltix	Inhibition of photosynthesis at photosystem II
Metamitron 35% & ethofumesate15%	4-amino-3-methyl-6-phenyl-1,2,4-triazin-5(4H)-one& (.+)-2-ethyl-2,3-dihydro-3,3-dimethyl-5 Benzofuranyl methanesulfonate	Triazinone & Benzofuranyl alkenesulfonate	Goltix plus	Inhibition of photosynthesis at photosystem II

3-Sodium percentage (Milliequaivalents / 100 g beet).

4-Total soluble solids percentage (TSS %) in root was determined by using digital refractometer, Model PRI (ATAGO).

5-Purity percentage: It was estimated to the following formula:

$$Purity,\% = \frac{Sucrose,\%}{TSS\%} x100$$

According to Dunan et *al*. (1995), the economic evaluation for root of sugar beet yield (ton/ faddan), total variable cost ,gross income (GI), profitability and benefit/cost ratio (B/C) were calculated according to Heady and Dillon (1961), as follows:

Gross income (GI) = 400 L.E x Root yield (ton / faddan).

Net income (NI) = Gross income – Total costs.

Profitability (P) = (Net income/Total costs) x 100.

Benefit/Costs Ratio (B/C) = Gross income/Total costs.

All data were subjected to the statistical analyses according to the technique of analysis of variance (ANOVA). Comparison between means of all traits studied was carried out using Least Significant Differences(LSD) at 0.05 level of probability method as mentioned by Duncan (1955) and Steel and Torrie (1980).

RESULTS AND DISCUSSION

The existed weed species in this study during both seasons were *(Melilotus indica* L.) All.(sour clover), *Chenopodium album*, L.(white goosefoot, lambsquarter), *Rumex dentatus*, L,(dentated dock) as annual broad-leaved weeds and the fresh weight of their infestations were estimated by 11.0 and 11.5 ton/faddan in first and second seasons, respectively (untreated check in table 6). Meanwhile, *Polypogon monspelienses*,L. Desf. (annual bard grass) as the only annual grassy weeds with very low infestation, which was estimated by 0.18 and 0.45 ton fresh w faddan in both seasons, respectively.

I- Effect of irrigation intervals:

I- 1- On weeds:

Results in Table(3) indicated that, irri intervals each (every three and four weeks) the same significant increasing percentage in weight of total annual weeds approximate 36.6 and 63.7%, respectively in the first and, 33.9 and 63.6%, respectively, in the s season compared to irrigation intervals at two weeks. That may be due to that the irri intervals at every two weeks increased the ef of the herbicides used for controlling weeds than three and four weeks intervals.

Furthermore, the interaction between irri intervals and weed control treatments sure- e these results (Table 12).

I-2- on sugar beet plant characteristics yield:

On other hand in Table(4), there wa significant effect of all irrigation interva characteristics of sugar beet plants, i.e., root (cm), root diameter (cm) and yields of the t roots ton/ faddan in both seasons except wit yield/ faddan which increased by, 14 percen two weeks in the first season.

I-3- on sugar beet quality:

Data in Table (5) illustrate that ther significant effect of the irrigation interva sugar beet quality through two seasons. Irri interval at every four weeks gave h percentage of sucrose and sodium by 17. 2.8%, respectively, in first the season, and 17 2.9%, respectively, in the second season. W the irrigation interval at every three weeks highest percentages of alpha amino nitro T.S.S. by 4.3 and 31.8%, in the first s respectively, and 4.4 and 31.7%, in the s season, respectively.

Table 3: Effect of irrigation intervals treatments on fresh weight of weeds during 2011/12 and 2 seasons.

Irrigation intervals	The fresh weight of the annual weeds(g/m2)				The fresh weight of total weeds (g/m2)	The fresh weight of the annual weeds(g/m2)				The fresh weight of total weeds (g/m2)
	Broad- leaves weeds			Grassy weed		Broad- leaves weeds			Grassy weed	
	Melilotus indica	*Chenopodium album*	*Rumex dentatus*			*Melilotus indica*	*Chenopodium album*	*Rumex dentatus*		
	2011/12 season					2012/13 season				
Two weeks	888b	124	130	33	1137c	877b	207 b	139 b	23b	1209 c
Three weeks	706c	529	224	59	1539b	674 c	548 a	280 ab	57ab	1593 b
Four weeks	1398a	531	243	1.3	1914a	1443 a	261 ab	290 a	21b	1994 a

Means followed by the same letter within each column are not significantly different according to Waller- Duncan t test, 0.05level.

Table 4: Effect of irrigation intervals treatments on sugar beet characteristics during 2011/ 2012/13 seasons.(over all means)

irrigation intervals	Sugar beet plant characteristics and yields									
	Root length (cm)	Root diameter (cm)	Top ton/ faddan	Root yield ton/ faddan	Total yield ton / faddan	Root length (cm)	Root diameter (cm)	Top ton/ faddan	Root yield ton/ faddan	Total yield ton / faddan
	2011/12 season					2012/13 season				
Two weeks	30.7	9.2	4.45	21.59	26.04 b	30.3 b	9.5	4.71	23.66	28.37
Three weeks	29.8	8.9	4.98	24.69	29.67 a	31.0 b	9.1	5.09	22.97	28.06
Four weeks	31.6	8.9	4.48	22.61	27.09ab	32.3 a	9.9	4.83	23.91	28.74

Means followed by the same letter within each column are not significantly different according to Waller-Duncan t test, 0.05 level.

Table 5: Effect of irrigation intervals treatments on some quality parameter of sugar beet produ during 2011/12 and 2012/13 seasons.

irrigation intervals	Sugar beet quality									
	Sucrose %	Sodium %	alpha amino nitrogen%	T.S.S. %	purity %	Sucrose %	Sodium %	alpha amino nitrogen%	T.S.S. %	purity %
	2011/12 season					2012/13 season				
Two weeks	16.9 c	2.42 c	3.74 c	30.2 b	55.8 a	16.9	2.49 c	3.80 c	30.4 c	55.6 a
Three weeks	17.3 b	2.65 b	4.34 a	31.8 a	54.4 b	17.2	2.72 b	4.41 b	31.7 b	54.3 c
Four weeks	17.4 a	2.79 a	4.17 b	31.3 a	55.9 c	17.4	2.86 a	4.24 a	31.8 a	54.9 b

Means followed by the same letter within each column are not significantly different according to Waller-Duncan t test, 0.05level.

However, there were fluctuated results of irrigation intervals on purity%, the highest purity percentages obtained by, irrigation intervals at every four and two weeks by 55.9 and 55.8,in the first season, respectively, and 55.6% by irrigation interval at two weeks in the second season.

II- Effect of weed control treatments:

II-1- On weeds:

Data presented in Table (6) revealed that all weed control treatments decreased the fresh weight of two categories of weeds (broadleaf and grassy weeds) with significant effect compar untreated check treatment during two se Efficacy of weed control treatments on weight reduction of total two categories could be arranged in descending order as fc hand hoeing at twice (87-81%), Harn 840g/faddan (57-95%) and Goltix at 1400g/ (50-0.0%), compared to untreated check in tl season. Meanwhile, there were little differer arrangement of the efficacy weed control tre on controlling weeds in the second seasons.

Hand hoeing at twice, Harness at 840g/faddan, Goltix at 1400g/faddan and Goltix plus at 750g/faddan were gave reduction on the fresh weight of total weeds up to, 87, 58, 29, 33 and 89, 38, 42 and 47 %, respectively, Also, the hand hoeing twice was superior to the herbicides used on controlling weeds and confirmed with the recommended herbicides in Egypt which it need to supply or add of hand hoeing at once to give weed control in sugar beet. On the other hand data in Table (6), showed that, *Melilotus indica* and *Chenopodium Album* as annual broadleaf weeds were tolerant to all herbicidal treatments used (less than 60% of controlling percentage). There is true in both seasons except with Harness at 1 L /faddan and Goltix plus at 1.5 L/f daddan, which gave controlling percentage with *M. indica* by, 63.9 and 61%, in first season, respectively. *Rumex* dentatus as annual broadleaf weed was susceptible to Harness at 1 L /faddan which gave controlling percentage by, 37 and zero%, in 2011/12 season, respectively; meanwhile it was moderate susceptible and moderate tolerant to Harness at 1 L /faddan and Goltix at 2 L/ faddan by, 85 and 68% of controlling percentage, respectively, and it was tolerant to Goltix plus at 1.5 L/f addan by, 40% of controlling percentage in 2012/13 season. Whilst, *Polypogon monspelienses* as annual grassy weed was susceptible to Harness at 1 L /faddan by 95% of controlling percentage; and it was moderate tolerant to Goltix plus at 1.5 L/faddan and Goltix faddan by, 70 and zero%, of controlling perc in the first season, respectively. In the season, *P. monspelienses* was susceptible tc at 2 L/faddan by, 100% controlling percenta was moderate tolerant to Harness at 1 L /fad Goltix plus at 1.5 L/f daddan by, 88 and controlling percentage, compared to u check, respectively, (Frans and Talbert,1977)

Acetochlor is used pre-emergence or pr to untreated check certain annual broad- weeds and yellow nutsedge (at 3kg/ha = faddan), Longden, 1989, Kolbe (1984), fou the pre-emergence application of Goltix at t of 5 kg/ha, provided the highest level of control, compared with unweeded or v mechanically. Goltix is used a pre- and ear emergent herbicide active on many broad- and grasses weeds in sugar and fodder (William, 1994). El-Zouky (1998), foun chemical weed control by, metamitr phenmedipham + ethofumesate (post-emer and chloridazon + ethofumesate (pre-emer were insufficient to control all weed species the whole crop cycle, but chemical weed con hand-weeding at 100 days after sugar emergence resulted in the effectiveness for control and increased sugar beet yields**.**

Table 6: Effect of herbicides treatments on weeds associated with sugar beet during 2011-201 2012-2013 seasons.

Weed control Treatments	The fresh weight of the annual weeds(g/m2)									
	Broad- leaves weeds							Grassy weed		Total Weeds (g/m2)
	Melilotus indica	Controlling (%)	*Chenopodium Album*	Controlling (%)	*Rumex dentatus*	Controlling (%)	Total	*Polypogon monspeliense*	Controlling (%)	
2011/12 season										
Harness	776c	63	324	0	34 b	90	1127c	2	95	1129c
Goltix	1082b	50	370	0	348 a	0	1801b	90	0	1891b
Goltix plus	837c	61	708	0	210 ab	37	1767b	13	70	1780 b
H. h. t.◦	142d	----	536	----	100 b	-----	338 d	8	----	347 d
Untreated check	2147a	----	36	----	335 a	-------	2618a	43	----	2661a
2012/13 season										
Harness	1146 b	33	339 ab	16	74c	85	1564 b	12.0 b	88	1576 b
Goltix	1057 b	38	391 a	3	161 bc	68	1654 b	0.0 b	100	1654 b
Goltix plus	977 b	43	519 a	0	301 b	40	1763 b	34.4 b	68	1797 b
H. h. t.◦	99 c	----	40 b	----	142 c	----	281c	15.5 b	----	297 c
Untreated check	1711 a	----	405 ab	-----	504 a	-----	2731 a	106.7 a	----	2838 a

Means followed by the same letter within each column are not significantly different according to Waller-Du ratio t test, 0.05level. H. h. t.◦ = hand hoeing twice.

III- In dry soils, root growth is much less depressed than shoot growth and there is typically an increase in the root to shoot dry weight ratio in response to drought stress(Marschner, 1995). Deveikyte (1997b), revealed that Betanal Tandem [ethofumesate plus phenmedipham], compared to other Betanal compounds reduced weed infestation and increased yield. Goltix [metamitron] gave better weed control than Nortron [ethofumesate], but when mixed with 3 L/ha. Betanal their efficiencies became more effective on weeds and increased yields of sugar beet. Dararas (2001), showed that root yield and total nitrogen uptake were significantly decreased by weed competition period, which gave reduction percentage of 44 and 43%, respectively, in unweeded treatments compared to weed control treatments. In sugar beet *(B. vulgaris ssp. vulgaris*) crops, weed beet leads to sugar yield decreases [approximately 10% sugar yield loss per weed beet plant /m^2).

II-2- On sugar beet plant characteristics and yield:

Weed control treatments gave significant increasing effect on, top, root yield and their total in both seasons, and no significant on, root diameter during two seasons. Applying hand hoeing twice, Harness at 1L /faddan, and Goltix at 2 L /faddan, increased top yield (ton / faddan), with increase percentage in top yield by, 50, 106 and 78%, respectively, in the first season, but, Harness at 1L /faddan, Goltix at 2L /faddan, and Goltix plus at 1.5 l / faddan, increased top yield by, 128,99 and 84%,in the second season, respectively. Harness 84% EC and Goltix plus at 1.5 l / faddan increased root yield percentages up to, 69 and in the first season, respectively, but, in the season, Harness 84% EC, Goltix at 2L /fadda Goltix plus at 1.5 l / faddan cause increase yield up to, 90, 73 and 67%, compared untreated check treatment. Harness 84% Goltix, Goltix plus at 1.5 l /faddan and hoeing increased fresh weight of total y sugar beet (ton/ faddan) up to, 61, 56, 60, and 86%, during two seasons, respectively.

II-3- On sugar beet quality:

Results in Table (8) indicated that, clear of weed control treatments on sucrose percer sodium%, alpha amino nitrogen%, total solid% and purity% were significantly dur seasons. Untreated check, Harness at 1L/fad hand hoeing twice treatments recorded the sucrose % during two seasons. The weed treatments caused high significant effect on percentage through two seasons. Goltix /faddan, and hand hoeing twice were r increasing in sodium% by, 7 and 0.4% in season, and Goltix at 2L/faddan, by 7% second season, compared to untreated Harness at 1L/faddan and Goltix plus L/faddan increased alpha amino nitrogen% and 11% through two seasons, respe compared with untreated check. Untreatec treatment recorded increasing in total solubl percentage in root of sugar beet by, 32.2 and during two seasons, respectively more tha weed control treatments in this study. U check and hand hoeing twice recorded in value of purity percentage by, 56.9 and56.6 first season and, 56.1 and 55.8% in the seasons, respectively.

Table 7: Effect of herbicides treatments on sugar beet plant characteristics and yield during 2012 and 2012-2013 seasons.

Weed control treatments	Sugar beet plant characteristics and yields									
	Root length (cm)	Root diameter (cm)	Top ton / faddan	Root yield ton/ faddan	Total yield ton / faddan	Root length (cm)	Root diameter (cm)	Top ton/ faddan	Root yield ton/ faddan	Total yield ton/ faddan
	2011/12 season					2012/13 season				
Harness	30.8	9.2	6.03 a	26.87 a	32.90 a	31.4 ab	9.9	6.33 a	29.06 a	35.39 a
Goltix	31.0	8.9	5.19 b	23.58 a	28.77 ab	28.8 b	9.8	5.52 b	26.37 ab	31.89 b
Goltix plus	31.0	8.7	4.65 bc	24.95 a	29.60 ab	30.2 b	9.2	5.13 b	25.48 b	30.61 b
H. h. t.◦	30.5	9.1	4.39 c	23.47 a	27.86 b	33.7 a	9.3	4.63 c	21.40 c	26.04 c
Untreated check	30.1	9.1	2.92 d	15.94 b	18.86 c	31.9 ab	9.2	2.78 d	15.26 d	18.04 d

Means followed by the same letter within each column are not significantly different according to Waller-Du ratio t test, 0.05level. H. h. t.◦ = hand hoeing twice.

Table 8: Effect of herbicides treatments on sugar beet plant and yield during 2011-2012 and 2012 seasons.

Weed control treatments	Sugar beet quality									
	Sucrose %	Sodium %	alpha amino nitrogen%	TS.S.%	purity %	Sucrose %	Sodium %	alpha amino nitrogen%	TS.S.%	purity %
	2011/12 season					2012/13 season				
Harness	17.4 b	2.50 c	4.50 a	31.4 b	55.4 b	17.1 b	2.57 c	4.57 a	31.3b-d	54.7 b
Goltix	17.0 d	2.78 a	3.86 c	30.5 c	55.8 b	17.1 b	2.85 a	3.92 c	30.8 de	55.9 a
Goltix plus	15.9 e	2.60 b	4.53 a	30.9 c	52.0 c	16.0 c	2.67 b	4.60 a	30.6 de	52.1 c
H. h. t.◦	17.2 c	2.61 b	3.44 d	30.4 bc	56.6 a	17.3 b	2.67 b	3.51 d	31.0 c-e	55.8 a
Untreated check	18.3 a	2.60 b	4.08 b	32.2 a	56.9 a	18.4 a	2.67 b	4.15 b	32.8 a	56.1 a

Means followed by the same letter within each column are not significantly different according to Waller-Du ratio t test, 0.05level. H. h. t.◦ = hand hoeing twice.

significantly affect during two seasons. Untreated check, Harness at 1L/faddan and hand hoeing twice treatments recoded, the highest of sucrose percentage in two seasons. The weed control treatments were caused high significant effect on sodium percentage trough two seasons. Goltix at 2L /faddan, and hand hoeing twice recorded increasing in sodium% by (7 and 0.4%) in the first season, and Goltix at 2L/faddan, by 7% in the second season, compared to untreated check. Harness at 1L/faddan and Goltix plus at 1.5 L/faddan increased alpha amino nitrogen% to 10 and 11% through two seasons, respectively, compared with untreated check. Untreated check treatment was recorded increase in total soluble solids percentage in root of sugar beet to (32.2 and 32.8%) during two seasons, respectively more than other weed control treatments in this study. Untreated check and hand hoeing twice recorded increasing value of purity percentage to by,56.9, 56.6 in the first season, and, 56.1 and 55.8% in the second seasons, respectively.

III- Effect of interaction:

III-1- On weeds:

Results in Table 9 show that, both fresh weight of broadleaf and grassy weeds were significantly reduced with all interaction between, different irrigation intervals and weed control treatments during 2011/12 and 2012/13 seasons. The results discussed two categories together because the only grassy weed was presented in very low infestation.

Firstly, the highest reduction of fresh weight of total weeds was achieved with the interaction between, irrigation intervals at every three weeks and hand hoeing twice compared to overall interaction**,** in both seasons. The interaction between, irrigation intervals at every two, three and four weeks and hand hoeing twice gave the highest reduction percentage on total weeds by, 98.7, 81.5 and 79.6%, respectively, in the first season and 96.2, 91.8 and 75.9%, respectively, in the second season. These results compared to the interaction b irrigation intervals at every four weeks and u check in both seasons. Also, the results may to irrigation intervals can encourage weeds emergence and permit hand hoeing twice to it efficacy with a high percentage. Secon interaction between, irrigation intervals at ev weeks and the Goltix plus, Harness and Gol reduction percentage by, 75.6, 55.6 and 53 the first season, respectively, and with Golt Goltix and Harness by, 77.2; 61.2 and 37.9% second season, respectively. These results co with the interaction between, irrigation inte every four weeks with untreated check. A interaction between, irrigation intervals a three weeks and Harness, Goltix plus and gave reduction percentage by, 49.7; 45.7 and in the first season, respectively, and, 39.9; 2 27.0%, in the second season, respe Meanwhile, the interaction between, ir intervals at every four weeks and Harness and Goltix plus gave, reduction percentage b 12.3 and 0.0%, in the first season, respectiv 30.5; 10.7 and 0%, in the second respectively. These results compared w interaction between, irrigation intervals at ev weeks and untreated check.

From the previous results, it was noticed that the herbicidal treatments efficacy increas irrigation intervals at every two weeks, follo three weeks compared to every four weeks seasons.

III-2- On sugar beet characteristics and yi

From Table (10) it is clear that, the int between, different irrigation intervals an control treatments, had significant effect length (cm/plant) and didn't reach to signifi root diameter (cm) in both seasons. In t season, the interaction between, irrigation i at every two weeks and Goltix plus gave the value of root length by, 36cm,

Table 9: Effect of interaction between, irrigation intervals and herbicides treatments on v during2011/12and2012/13seasons.

Irrigation Intervals	Weed control treatments	The fresh weight of the annual weeds(g/m2)					
		Total broad-leaves weeds	Grassy weed	Total Weeds (g/m2)	Total broad-leaves weeds	Grassy weed	Total Weeds (g/m2)
		2011/12 season			2012/13 season		
Two weeks	Harness	1148 ef	0.0	1148 ef	1502 fg	29 b	1531 e
	Goltix	1195 ef	0.0	1195 ef	958 h	0.0 b	958 d
	Goltix plus	593 g	38	631 g	545 i	17 b	562 e
	H. h. t.◦	26 h	7	33 h	87 j	7 b	94 f
	Untreated check	2724 b	120	2844 b	2953 ab	63 b	3016 a
Three weeks	Harness	1300 e	0.0	1300 e	1483 g	0.0 b	1483 c
	Goltix	1937 d	270	2207 d	1801 e	0.0 b	1801 c
	Goltix plus	1404 e	0.0	1404 e	1714 e	20 b	1734 c
	H. h. t.◦	511 g	18	529 g	163 j	40 b	203 f
	Untreated check	2544 b	8	2552 c	2807 b	223 a	3030 a
Four weeks	Harness	933 f	7	940 f	1708 ef	7b	1715 c
	Goltix	2296 c	0.0	2296 d	2205 d	0.0 b	2205 b
	Goltix plus	3304 a	0.0	3304 a	3030 a	67 b	3097 a
	H. h. t.◦	479 g	0.0	479 bc	594 i	0.0 b	594 e
	Untreated check	2587 b	0.0	2587 bc	2434 c	33 b	2467 b

Means followed by the same letter within each column are not significantly different according to Waller-Duncan t test, 0.05level. H. h. twice◦ = Hand hoeing twice.

followed by the interaction between, irrigation intervals at every four weeks and both Harness and Goltix by, 35 and 33cm, respectively. Whilst, the other interaction, gave values between 27cm from the interaction of irrigation intervals at every two weeks and Harness to 31cm by each of interaction of irrigation intervals at two weeks and both Goltix and hand hoeing twice; interaction between, irrigation intervals at four weeks and both hand hoeing twice and untreated check and the interaction between, irrigation intervals at every three weeks and Harness in the second season. The interaction between, irrigation intervals at both every two and four weeks and hand hoeing twice; interaction between, irrigation intervals at both every three and four weeks and Harness, each gave the same highest value of root length/ plant by 35cm. Meanwhile, the rest interaction gave values between 33 cm by the interaction of irrigation intervals at every four weeks and untreated check to 24 cm by the interaction of, irrigation intervals at every two weeks and Harness.

The interaction between, irrigation intervals at every two weeks, three weeks and Harness gave the highest value of top yield by, 6.1; 6.4 and 5.7 ton/ faddan, respectively, followed by the interaction between, irrigation intervals at both at every two and three weeks and Goltix which gave values, 5.2 and 5.3 ton/ faddan, respectively. Whilst, the rest interaction gave, values between 2.4 ton /faddan by the interaction between irrigation intervals at every three weeks and untreated check to 5.0 ton/ faddan by the interaction between, irrigation inte every four weeks and Goltix plus in first se the second, the interaction between, ir intervals at every two, three and four we Harness gave the highest values of top yield 6.5 and 6.1 ton/ faddan, respectively, follo interaction between, irrigation intervals a three weeks and both Goltix and Goltix pl gave the same value at 5.7 ton/ faddan. Wh rest interaction, gave values between 2.8 faddan by, interaction of irrigation intervals both three and four weeks and untreated chec ton/ faddan by the interaction between, ir intervals at every two weeks and Goltix in season.

The interaction between, irrigation inte every three weeks and Goltix, interaction b irrigation intervals at every two weeks a Harness and Goltix plus and the interaction l irrigation intervals at every four weeks a hand hoeing twice and Harness gave the values of root yield by, 29.2, 29.0, 26.8, 2 26.5 ton/ faddan, respectively. Meanwhile, interactions gave values between 13.3 ton/ from interaction of irrigation intervals at ev weeks and untreated check to 25.0 ton / fadd irrigation intervals at every three weeks a Harness and hand hoeing twice and int between, irrigation intervals four weeks an plus in first season.

The interaction between, irrigation intervals both Harness and Goltix plus, irrigation intervals at every three weeks and Goltix and irrigation intervals at every four weeks and both Harness and Goltix by, 32.9; 28.6; 29.3; 29.1 and 28.3 ton/ faddan, respectively. Meanwhile, the rest interactions were gave values between 14.2 ton/ faddan from interactions of irrigation intervals at every three weeks and untreated check to 25.0 ton/ faddan from interaction of irrigation intervals at every three weeks and Harness in second season.

III-3- On sugar beet quality:

Results in Table (11) indicate that, clearly interaction effect between, irrigation intervals and weed control treatments high significantly on sucrose percentage%, sodium%, alpha amino nitrogen%, total soluble solid% and purity% through two seasons was high significant during two seasons. The sucrose percentage (19.37, 18.90, 18.54, 19.44, 18.96, 17.86 and 17.86%) recorded from untreated check with irrigation intervals at every two weeks, Goltix at 2L/faddan, with irrigation intervals at every three weeks, Harness at 1L /faddan, with three weeks, Harness at 1L/faddan, with two weeks irrigation intervals, untreated check with irrigation intervals at every two weeks, Goltix plus at 1.5 L/faddan with irrigation intervals at every three weeks, Harness at 1L /faddan, with irrigation intervals at every four weeks, Goltix at 2L/faddan, with irrigation intervals at every three weeks, hand hoeing with irrigation intervals at every two weel untreated check with irrigation intervals at four weeks in 2011/12 and 2012/13se respectively. The sodium percentage, ob from effects of interaction between, irri intervals and herbicides treatments on s percentage in roots (83.10, 3.06, 3.02, 2.84 3.13, 3.09 and 2.91%) were recorded from at 2L/faddan, with irrigation intervals at ever weeks, Harness at 1L/faddan, with irri intervals at every four weeks, hand hoeing with irrigation intervals at every two weeks, plus with irrigation intervals at every three Goltix at 2L/faddan with irrigation interv every four weeks, Harness at 1L /faddan irrigation intervals at every four weeks, hoeing twice with irrigation intervals at eve weeks and Goltix plus at 1.5L/faddan irrigation intervals at every three weeks con with untreated check with irrigation interv every two weeks in 2011/12 and 2012/13 se respectively.

The alpha amino nitrogen% (5.05, 4.99 4.72, 5.12, 5.06, 4.88 and 4.79%) recorded Harness at 1L /faddan, untreated check irrigation intervals at every three weeks at, plus at 1.5 L/faddan with four weeks irri intervals, Goltix plus at 1.5 L/faddan with in irrigation at every two weeks,

Table 11: Effect of interaction between, irrigation intervals and herbicides treatments on some q parameter of sugar beet plant during 2011/12 and 2012/13 seasons

Irrigation Intervals	Weed control Treatments	Rates g/ faddan	Sugar beet quality									
			Sucrose %	Sodium %	Alpha amino nitrogen%	Total Soluble solids%	Purity %	Sucrose %	Sodium %	Alpha amino nitrogen%	Total Soluble solids%	Purity %
			2011-2012 season					2012-2013 season				
Two weeks	Harness	840	16.00 i	2.12 g	3.95 g	29.49 h		54.26c-h	16.07 f	2.19 h	4.03 g	29.77 f	53.97 e
	Goltix	1400	14.65 j	2.46 e	2.80 k	26.66 i		54.95 fg	14.74 e	2.53 e	2.85 k	26.96 h	54.68 d
	Goltix plus	750	16.55 h	2.15 g	4.72 c	30.85df		53.64 h	16.72 b	2.22 h	4.79 c	31.01 cd	53.59 ef
	H. h. t.◦	-----	17.79 d	3.02 a	3.55 i	31.53b-d		56.42 cd	17.86 a	3.09 a	3.62 i	31.80 c	56.16 bc
	Untreated check	------	19.37 a	2.35 ef	3.66 h	32.45 b		59.69 a	19.44b-d	2.42 ef	3.73 h	32.73 b	59.39 a
Three weeks	Harness	840	18.54 c	2.32 f	5.05 a	32.16 bc		57.65 b	17.61 a	2.39 fg	5.12 a	31.44 cd	56.02 bc
	Goltix	1400	18.90 b	2.79 bc	4.38 e	33.71 a		56.07 c-e	18.96 f	2.86 bc	4.45 e	33.99 a	55.79 c
	Goltix plus	750	14.16 k	2.84 b	4.06 f	30.48eg		46.46 i	14.23c-e	2.91 b	4.13 f	29.09 g	48.92 g
	H. h. t.◦	-----	17.06 f	2.60 d	3.21 j	30.08 fh		56.71 cd	17.13 b	2.67 d	3.28 j	30.33 ef	56.48 b
	Untreated check	------	17.84 d	2.70 cd	4.99 a	32.35 bc		55.14 c-g	17.91 bc	2.77 d	5.06 a	33.70 a	53.15 f
Four weeks	Harness	840	17.65 e	3.06 a	4.5 d	32.45 b		54.38 gh	17.72 bc	3.13 cd	4.57 d	32.74 b	54.12 e
	Goltix	1400	17.55 e	3.10 a	4.39 e	31.11 de		56.41 cd	17.62b-d	3.17 a	4.46 e	31.40 cd	56.10 bc
	Goltix plus	750	16.94 g	2.82 bc	4.81 b	31.42 c-e		55.85 d-f	17.04 de	2.89 a	4.88 b	31.73 c	53.71 ef
	H. h. t.◦	-----	16.86 g	2.20 g	3.57 i	29.67 gh		56.83 bc	16.93 e	2.27 gh	3.64 i	30.95 de	54.70 d
	Untreated check	------	17.79 d	2.75 bc	3.59 hi	31.78 b-d		55.98c-e	17.86 b	2.82 bc	.66 hi	32.06 c	55.71 c

Means followed by the same letter within each column are not significantly different according to Waller-Du ratio t test, 0.05level. H. h. t.◦ = Hand hoeing twice.

Harness at 1L/faddan, with intervals irrigation at every three weeks, untreated check with irrigation intervals at every three weeks, Goltix plus at 1.5 L/faddan with irrigation intervals at every four weeks and Goltix plus with irrigation intervals at every two weeks, compared with other treatments in 2011/12 and 2012/13 seasons, respectively. The interaction effect between, irrigation intervals and herbicides treatments on total soluble solids% gave (33.77, 32.45, 32.45, 32.35, 33.99, 33.70 and 32.74%) recorded from Goltix at 2L/faddan, with irrigation intervals at every three weeks, untreated check with irrigation intervals at every two weeks, Harness at 1L/faddan, with irrigation intervals at every four weeks, untreated check with irrigation intervals at every three weeks, Goltix at 2L/faddan, with irrigation intervals at every three weeks, untreated check with irrigation intervals at every three weeks and Harness at 1L/faddan, with irrigation intervals at every four weeks in 2011/12 and 2012/13seasons, respectively.

The high purity percentage (59.87, 57.65, 56.83, 56.71, 59.39, 56.79, 56.48 and 56.16%) recorded from, untreated check with irrigation intervals at every two weeks, Harness at 1L/faddan, with irrigation intervals at every three weeks, hand hoeing twice with irrigation intervals at every four weeks, hand hoeing twice with irrigation intervals at every three weeks, untreated check with irrigation intervals at every two weeks, Goltix at 2L/faddan with irrigation intervals at every three weeks, hand hoeing twice with irrigation intervals at every three weeks and hand hoeing twice with irrigation intervals at every two weeks, compared with all other this interaction treatments in 2011/12 and 2012/13seasons, respectively. Kuchaki and Soltani (1995) related the reason of increasing sugar percentage in stress to the lower size of roots (Tubers). The results are similar to Taleghani et *al.* (1998) and Allen et *al*.. (1998). Esmaeili, (2011) showed that, utilizing water stress increased water use efficiency. In continuous stress treatment could produce 6.7 tuber and 0.863 Kg sugar per M^3 while initial water stress treatment showed increasing of 6 Kg tuber and 0.675 Kg sugar and in without water stress it was observed 5 Kg for tuber and 0.544 for sugar per M^3 used water. The reason of WUE increase in driest conditions may be this fact that in case of water deficit, the stomatal will become more closed. The stomatal closure affects the exit of water from plant to the atmosphere and the Co2 entrance and the association of dry maters, but its effects are not the same and the exit of water from the plant will be affected more. This causes the denominator of the WUE equation to decrease than its numerator and consequently the amount of WUE will increase. But, there was no difference between water stress levels (Initial and continuous) and initial water stress and without stress statistically.

The interaction between, irrigation inter every two, three and four weeks and Harne interaction between, irrigation interval at three weeks and at every four weeks anc hoeing twice and interaction between irri intervals at every two weeks and Goltix plu the highest values of total yield by, 35.1, 32.2, 34.5, 31.5 and 31.4 ton/ faddan, respec Whist the rest interactions were gave between 15.8 ton /faddan from irrigation in at every two and four weeks and untreated ch 29.8 from at every three weeks and hand twice in the first season. The interaction be irrigation intervals at every two weeks an Harness and Goltix plus at every three wee Goltix and interaction between, irrigation in at every four weeks, interaction between, irri intervals and both Harness and Goltix gave h values of top yield by, 32.9, 28.6, 29.3, 29 28.3 ton / faddan, respectively. As soon as, t interactions range between 15.6 ton / fadda the interaction of irrigation intervals at eve weeks and untreated check to 25.1 ton / from at every three weeks and Harness second season.

IIII- On Economic Analysis:

Data in table (12) show that, diffe between all economic studied criteria to det the economic feasibility of sugar beet grow affected by either intervals, weed treatments or their interactions arrived to th of significant in 2011/12 and 2012/13 seasons. The total cost, which calculat 5900LE Egyptian pound in 2011/12 seasc 6400 LE in 2012/13 season included fixe (land preparation, price of seeds planting sowing activities, fertilization, irrigation, harvesting and rental costs per faddan) increase in total costs were obtained with in of irrigation at two weeks (6412 and 6912 the first and in the second seasons, respec but, the reduction in total costs were caus interval irrigation at four weeks (6212 anc LE)**.** The total costs increased with hand twice, Goltix plus at 1.5L/faddan and Goltix faddan by, 13, 5, 4, 12, 4 and 4% durin seasons, respectively, as compared with un check.

Gross income significantly increase different of herbicidal treatments. These inc in gross income due to increasing top yie root yield/ faddan by decreasing weed interf with sugar beet crop. Grosse income of sug root yields (LE/ faddan) increased signif with the use of herbicides than hand hoeing than untreated check under various irri intervals.

The highest net income per faddan was obtained from hand hoeing or Goltix plus treatments under various irrigation intervals.

Concerning, the effect of various treatments on net income (LE/ faddan) each weed control treatments exhibited significant increases in net income except with untreated check which exhibited significant reduction in net income due to the weed competition to sugar beet plants which reduced root yields per faddan by, 50% than herbicides treatments in untreated check under irrigation intervals every two and four weeks), and clearly that, the highest net income (6368, 6368, 5033, 4671 and 4547 LE.) recorded from interaction between, irrigation intervals every two weeks x Harness, irrigation intervals every three weeks x Harness, irrigation intervals every four weeks x Harness, irrigation intervals every four weeks x Goltix and irrigation intervals every two weeks x Goltix plus, respectively, in 2012/13 season.

Marketable benefit/cost ratio grades were obtained with Harness at 1L / faddan, Goltix plus at 1.5L/ faddan and Goltix at 2L/faddan (1.73, 1.59, 1.5, 1.73, 1.5 and 1.56), respectively, through two seasons. Total costs(LE /faddan) of weed control treatments tended to increase significantly either with herbicidal or hand hoeing twice treatments than untreated check under all irrigation intervals and slightly with shortening irrigation intervals due the increase in irrigation costs (fuels and lalours), or the costs of applying herbicides or hand hoeing. In another hand, in general hand hoeing is more costable than herbicides.

Either profitability or benefit / cost ratio showed that each weed control treatments were more profitable and exceeded untreated check which were lose and each Egyptian pounds losses under untreated check, respectively.

Thus, sugar beet growers farmers showed taken in consideration weed control management in sugar beet fields by herbicides as a main component of integrated weed management (IWM) or hand hoeing during its life is very crucial in sugar beet crop management(CM) These results agreed with Heady and Dillon (1961). Advice that reduction the irrigation intervals to increase the efficacy of soil-applied and early post-emergence herbicides for controlling weeds which competing the sugar beet plants.

1- Yield/ vine:

Data in Table (1) clearly show that spraying clusters of Early sweet grapevines with GA_3 at 10 to 40 ppm or Sitofex at 2.5 to 10 ppm was significantly effective in improving the yield relative to the check treatment. The promotion on the yield was accompanied with increasing concentrations of each plant growth regulator. Using GA_3 at 10 to 40 was significantly preferable than using Sitofex at 2.5 to 10 ppm in improving the yield. A slig unsignificant promotion on the yield was at to increasing concentrations of GA_3 from 2 ppm and Sitofex from 5 to 10 ppm. The m yield was produced on the vines that recei spray of GA_3 at 40 ppm but the best treatme economical point of view was the applic GA_3 at 20 ppm (since no measurable prome the yield was recorded between 20 and 40 GA_3). Under such promised treatment, yie reached 13.6 and 14.0 kg during both respectively. The control vines produced 9.1 kg during 2013 and 2014 seasons, respectiv percentage of increase on the yield application of GA_3 at 20 ppm over the treatment reached 49.5 and 45.8 % duri seasons, respectively. The beneficial effects on the yield might be attributed to their action on increasing cluster weight. The pr effects of GA_3 on the yield was supported results of Dimovska *et al*., (2011) and Abu and Salameh (2012) on different grapevine c The results regarding the beneficial ef Sitofex on enhancing the yield are in harmo those obtained by Juan *et al*. (2009); Abdel *et al*., (2010) and Al- Obeed (2011).

2- Harvesting date:

It is clear from the data in Table (1) that and Sitofex treatments had significantly del the harvesting date of Early Sweet grapevine than the control treatment. The degree of d on harvesting date was correlated to the inc the concentrations of both GA_3 and Sitofex GA_3 significantly delayed harvesting comparing with using Sitofex. In concentrations of GA_3 from 20 to 40 p Sitofex form 5 to 10 ppm failed to show sig delay on harvesting date. A cons advancement on harvesting date was obse untreated vines the great delay on harvesti was observed on the vines that received G ppm during both seasons. GA_3 and Sitof shown by many authors to retard the rel ethylene and the disappearance of pigments chlorophylls and carotenoids and onest of start. Also they were responsible for prolong maturity stages Nickell (1985). These regarding the delaying effect of GA_3 and Sit harvesting date were in harmony with obtained by Wassel *et al*., (2007), Kasser (2011), Abu- Zahra and Salameh (2012) and *et al*. (2012).

3- Cluster weight and dimensions:

It is evident from the data in Table treating clusters with GA_3 at 10 to 40 Sitofex at 2.5 to 10 ppm was signi accompanied with enhancing weight, leng width of cluster relative to the control treatm

The promotion was significantly associated with increasing concentrations of GA_3 and Sitofex. Using GA_3 was significantly favourable than using Sitofex in this respect. The maximum values were recorded on the vines that received one spray of GA_3 at 40 ppm. Meaningless promotion was detected with increasing concentrations of GA_3 from 20 to 40 ppm and Sitofex from 5 to 10 ppm. The untreated vines produced the minimum values during both seasons. The positive action of GA_3 on cluster weight and dimensions might be attributed to its essential role on stimulating cell division and enlargement of cells, the water absorption and the biosynthesis of proteins which will lead to increase berry weight. Dimovska *et al*., (2011); Abu Zahra and Salameh, (2012) and Dimovska *et al*., (2014).

The previous essential role of CPPU on cluster weight was attributed to its higher content of cytokinin when applied to plants (Nickell, 1985).

4- Shot berries %:

Data in Table (2) obviously reveal that percentage of shot berries in the clusters of Early Sweet grapevines was significantly controlled with spraying GA_3 at 10 to 40 ppm or Sitofex at 2.5 to 10 ppm relative to the check treatment. Using GA_3 was preferable than using Sitofex in reducing the percentages of shot berries. There was a gradual reduction on the percentage of shot berries with increasing concentrations of GA_3 and Sitofex. There was a slight reduction on such unfavourable phenomenon with increasing concentrations of GA_3 form 20 to 40 ppm and Sitofex from 5 to 10 ppm. The minimum values of shot berries (7.3 and 6.9 % during both seasons, respectively) were recorded on the clusters harvested from vines treated with GA_3 at 40 ppm. The maximum values of shot berries (12.0 & 12.5 %) during both seasons were recorded on the untreated vines during both seasons. The reducing effect of GA_3 on shot berries might be attributed to its important role on enhancing cell division and the biosynthesis of proteins Nickell, (1985). These results were supported by the results of wassel *et al*. (2007) and Abu Zahra and Salameh (2012).

5- Fruit quality:

Data in Tables (2, 3 & 4) clearly show that spraying clusters with GA3 at 10 to 40 ppm or Sitofex at 2.5 to 10 ppm significantly was accompanied with enhancing weight, longitudinal and equatorial of berry, total acidity%, proteins % and percentages of P, K and Mg and T.S.S. %, reducing sugars %, T.S.S. / acid and total carotenoids relative to the check treatment. The effect either increase or decrease was associated with increasing concentrations of each auxin. Using GA_3 significantly changed these parameters than using Sitofex. A slight effect was recorded on these quality parameters with increasing concentrations of GA_3 from 20 to 40 ppm and Sitofex from 5 to 10 ppm. From economical point of view, t results with regard to fruit quality were o due to treating clusters with GA_3 at 2(Untreated vines produced unfavourable eff fruit quality. These results were true durir seasons. The effect of GA_3 on increasin weight and dimensions might be attribute effect in promoting cell division and enlarge cells, water uptake and the biosynthesis of Nickell (1985). These results were in conc with those obtained by Williams and Ayars and Dimovska *et al*., (2014).

The higher content of Sitofex from cy surly reflected on enhancing cell division elongation of berries Nickell (1985). These were in agreement with those obtained b Zahra (2013) and Retamales *et al*. (2015).

CONCLUSION

Treating Early Sweet grapevines once w average berries reached 6mm with GA_3 at was responsible for promoting yield an quality.

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الملخص العربى

لتداخل بين فترات الري وبعض معاملات مكافحة الحشائش على الحشائش و محصول بنجر السكر وانتاجيته

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~~رش حامض الجبريليك والسيتوفكس فى تحسين المحصول وجودة حبات العنب الايرلى سويت فى منطقة المنيا – مصر~~

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ت تجربتان حقليتان في موسمي 2012 -2011 و 2012/2013 بمحطة البحوث الزراعية بالسرو – مركز البحوث : – دمياط – مصر وذلك لدراسة تأثير التداخل بين فترات الري وبعض مبيدات الحشائش على بنجر السكر ش المصاحبة له.

هذه الدراسة تم توزيع معاملات الري كل أسبوعان وثلاثة وأربعة أسابيع في القطع الرئيسية في حين استخدمت يدات متخصصة على نبات البنجر وهي، هارنس (84% EC) بمعدل لتر للفدان، جولتكس (70% عدل 2 لتر للفدان يتم استعمالهم برشهم على التربة بعد الزراعة وقبل الري، جولتكس بلس (50% SC) بمعدل ـ للفدان يستعمل بعد الانبات في مرحلة 4-6 ورقة للبنجر بالإضافة الي عزيق مرتين وكنترول في القطع ودراسة اثر ذلك على نمو البنجر ومحصوله والحشائش المصاحبة له ولقد توصلت الدراسة الى النتائج التالية:

أعلى وزن للحشائش الكلية عند الري كل أربعة أسابيع وقد كانت الزيادة معنويه جدا خلال الموسمين بينما ادة في الوزن الكلى للحشائش كانت عند الري كل ثلاثة واربعه اسابيع بنسبه 33.6، 63.7% في الموسم الاول 33.9، 63.6% خلال الموسم الثاني بالمقارنة بالري كل اسبوعان.

ن الدراسة ان الري كل اسبوعان ادى الى زيادة كفائه المبيدات على الحشائش.

ذى الري كل اسبوعان الى زيادة في نسبة السكر والصوديوم بنسبة 17.4، 2.8% فى السنة الاولى و 7.4 2.% خلال السنة الثانية.

معاملات مكافحة الحشائش العزيق مرتين، هارنس، جولتكس وجولتكس بلص الى انخفاض فى الوزن الكلى شائش بنسبة 33، 29، 58 و87% في الموسم الاول و 47، 42، 38 و 89% بالترتيب خلال الموسم الثاني ت الدراسة بالمقارنة بمعاملة الكنترول.

حت النتائج تحت الدراسة أن التفاعل بين استعمال الهارنس والري كل اسبوعان وجولتكس والرى كل ثلاثة اسابيع سجلوا زيادة في وزن الجذور بمعدل 29.0و 29.2خلال الموسم 12/2011 بينما سجلوا زيادة في وزن ذور ل32.9، و 29.3 طن/ الفدان خلال موسم 13/2012.

، النسبة الربحية في هذه الدراسة عند الري كل اسبوعان و ثلاثة اسابيع واربعة اسابيع مع الجولتكس والري كل وعان وثلاثة اسابيع مع جولتكس بلص بمعدل 1.93، 1.93، 1.76، 1.70، 1.66 و 1.66% بالترتيب.

من هذه الدراسة ان الري على فترات متقاربة لنبات البنجر في المراحل الاولى يؤدى الى رفع كفائه المبيدات في ومة الحشائش في البنجر.

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