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YIELD AND QUALITY OF SUGAR BEET AS AFFECTED BY SOME WEED CONTROL TREATMENTES

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ABSTRACT

Two field experiments were carried out during 2003/2004 and 2004/2005 growing seasons at The Experimental Farm of the Faculty of Agriculture, Al-Azhar University, Assuit Governorate to study the effect of some weed control treatments (Pyramin and Goltix herbicides and hand hoeing) on yield and quality of Kawamera and Farida sugar beet varieties (*Beta vulgaris*, L.). A Split-plot design with four replications was used in this study. The obtained results showed that, applying hand hoeing three times and Pyramin or Goltix at the rate of 2 kg/fed as pre-emergence plus hand hoeing twice led to a significant reduction in the dry weight of narrow and broad-leaved weeds compared with other treatments. Hand hoeing three times and any of the two herbicides plus hand hoeing twice attained the highest, total soluble solids, sucrose percentages root and sugar yields/fed. The highest root yield (33.3 and 33.43 tons/fed) and sugar yield (4.189 and 4.078 tons/fed) were obtained by sowing Kawamera and Farida varieties and controlling weeds by hand hoeing three times in the 1st and 2nd seasons, respectively. The interaction between sugar beet varieties and weed control treatments non significant effect on all studied characters in both seasons, except sugar yield ton/fed in both season and TSS and sucrose in the first and second season respectively. Under conditions of Assuit Governorate, sowing Farida sugar beet variety and practicing hand hoeing three times could be recommended.

INTRODUCTION

Sugar beet yield and quality depends mainly on the number of roots harvested per unit area which could be affected by the accompanying weeds grown with the crop throughout the growing season. In addition, sugar beet is characterized with a very weak competition with weeds which may negatively affect the obtained root yield at harvest time. Integrated weed management is of great importance for realizing high yield of field crops. Major weed problems in sugar beet have to address narrow and broad-leaf weeds. Moreover, sugar beet variety plays an important effect throughout the closed relationship between gene expression in terms of variety and environment represented in the agronomical practice and growth condition.

Concerning varietal differences, Hassanin (1991) showed that the sugar beet varieties did not significantly differ in root length, diameter and fresh weight. Abd Alla *et al.* (1995) showed that sugar beet varieties significantly differed in root length, diameter as well as sucrose and purity percentages. El-Hattab *et al.* (1996) reported that total soluble solids percentage (TSS %) ranged from 21.4 to 23.8 in Gitane sugar beet variety and from 19.2 to 22.2% in Pleno variety, while sucrose content ranged from

12.85 to 15.4 % in Gitane and 13.55 to 15.51% in Pleno variety. Shalaby (1998) showed that sugar beet varieties significantly differed in root diameter, fresh weight, top fresh weight, sucrose percentage, root yield and TSS%. On the other hand, El-Taweel and Abo El-Fotouh (1999) found that sugar beet varieties did not differ significantly in top and sugar yields as well as sucrose, TSS and purity percentages. Ramadan (1999) found that variety Eva had the highest sucrose and purity percentage, while Ras Poly variety gave, the highest root weight at harvest. Ramedan and Hassanin (1999); Mahmoud *et al.* (1999) and Abd El-Fatah (2000) concluded that the studied sugar beet varieties differed significantly in root weight, sucrose and purity percentages as well as root and sugar yields. Abou-Salama and El-Syiad (2000) reported that sugar beet varieties varied in root and sugar yields, where cv. Gazella produced higher root yield compared to that obtained by Ras poly, while cv. Oscar poly gave the highest sugar yield. Nassar (2001) showed that Toro variety gave the highest root length and diameter compared with the other varieties. El-Hinnawy *et al.* (2003) mentioned that genotypes significantly differed in TSS%, sucrose and purity percentages.

As for weed control treatments, El-Hattab and Shaban (1982) reported that leaving weeds without removal from sugar beet fields caused losses in yield by about 50% when they used both chemical and mechanical methods to control weeds singly or combined. Zwolinska, *et al.* (1983) mentioned that application of Chloridazon (Pyramin) gave more than 90% weed control in sugar beet. Costa and Zonta (1985) mentioned that application of 3.78 kg Pyrazon (chloridazon) to sugar beet plants of 2-4 leaf stage and Metamitron at 3.5 kg/ha applied pre-emergence attained the most effective weed control. Farag *et al.* (1987) found that application of Eptam (2.5 L/fed) and Pyramin (2.5 kg/fed) significantly incresed root yields/fed. Derylo (1991) found that application of Pyramin at a rate of 5 kg/ha with mechanical weeding controlled weeds grown with sugar beet. Pyramin resulted in the greatest root yields compared with mechanical weeding. Gagro and Dadacek (1996) demonstrated the efficacy of 15 herbicide combinations with hoeing for weed control in sugar beet. They reported that the best results were achieved with post-emergence herbicide + hoeing treatments. Bensellam *et al.* (1997) found that hoeing twice during the growing season of sugar beet was sufficient to provide acceptable crop growth development and yield components, compared to the other chemical control treatments. They added that Phenmedipham + fluazifop-butyl + clopyralid and phenmedipham + fluzifop-butyl resulted in the best root and extractable sugar yields. El-Zouky and Maillet (1998) investigated the effect of 7 weed control methods on weed biomass and sugar beet yield. They mentioned that chemical control + hand-weeding at 100 days after sugar beet emergence resulted in increased weed control and yields. El-Geddawy *et al.* (2001) reported that increasing hoeing number from two to three times attained a relative advantage in the values of root and sugar yields, while hoeing number had no significant effect on root length and diameter as well as quality characters. Ali (2005) indicated that planting Pamela variety at 20 cm between hills and practicing hoeing after 20, 40 and 60 days from planting gave the greatest sugar yield/fed.

The objective of this investigation was to study the effect of some weed control treatments on yield and its components as well as quality traits of two sugar beet varieties grown in Assuit Governorate, Middle Egypt.

MATERIALS AND METHODS

Two field experiments were carried out during 2003/2004 and 2004/2005 growing seasons at The Experimental Farm of the Faculty of Agriculture, Al-Azhar University, Assuit Governorate to study the effect of some weed control treatments (Pyramin, Goltix herbicides and hand hoeing) on yield and quality of Kawamera and Farida sugar beet varieties (*Beta vulgaris*, L.). A Split-plot design with four replications was used in both seasons. The two sugar beet varieties were allocated to the main plots, while weed control treatments were randomly distributed to the sub plots. Each sub-plot consisted 5 rows 3.5 m long and 60 cm apart with an area 10.5 sqm. Sugar beet seeds were manually sown on one side of ridges at 20-cm apart between hills on the 2nd week of November in both seasons, while harvesting was done at age of 180 days. Nitrogen was applied as Urea 80 kg N in two equal portions after thinning and 21 days later from planting. Phosphorus fertilizer was added at land preparation at the rate of 30 kg P_2O_5/fed in the form of calcium super phosphate 15.5% P_2O_5/fed. Potassium was added at the rate of 24 kg K_2O/fed in the form of Potassium sulfate 48% K_2O with the 1st N-portion. Physical and chemical analysis of the soil of the experimental site showed that the soil was clay including 28.5 % silt, 20.5 % sand and 51.0 % clay and containing of 35.0, 910 and 307 ppm for N, P and K, respectively with 8.52 pH. Other agricultural practices were done as recommended in the region.
Studied weed control treatments were as follows:

1. Hand hoeing once times after 28 days from sowing.
2. Hand hoeing twice times after 28 and 42 days from sowing.
3. Hand hoeing three times after 28, 42 and 56 days from sowing.
4. Spraying Pyramin (chloridazon) 80% WP herbicide at a rate of 2.0 kg/fed as pre-emergence.
5. Spraying Goltix (metamitron) 70% WP herbicide at a rate of 2.0 kg/fed as pre-emergence.
6. Spraying Pyramin (chloridazon) 80% WP herbicide at a rate of 2.0 kg/fed as pre-emergence + hand hoeing once after 42 days from sowing
7. Spraying Goltix (metamitron) 70% WP herbicide after a rate of 2.0 kg/fed as pre-emergence + hand hoeing once after 42 days from sowing
8. Spraying Pyramin (chloridazon) 80% WP herbicide after a rate of 2.0 kg/fed as pre-emergence + hand hoeing twice after 42 and 56 days from sowing
9. Spraying Goltix (metamitron) 70% WP herbicide after a rate of 2.0 kg/fed as pre-emergence + hand hoeing twice after 42 and 56 days from sowing
10. Un-weeded (control).

The herbicidal treatment were sprayed uniformity with Knapsack sprayer with spray volume of 200 Liters/fed. after sowing and before the first irrigation.

Data recorded:

I. Sugar beet crop:

At harvest, a random sample of 10 plants was taken from each sub plot to determine the following traits:

1. Root length (cm).
2. Root diameter (cm).
3. Total soluble solids percentage (TSS%) was determined using hand referactometer.
4. Sucrose % was determined as described by Le Docte (1927).
5. Purity % was calculated according to the following equation:
   Purity % = sucrose % x 100 /TSS%
6. Root yield/fed (ton) was estimated on plot basis.
7. Sugar yield/fed (ton) was calculated according to the following equation:
   Sugar yield = root yield x sucrose %

II. Weed survey:

Weeds were hand pulled from 1.0 m^2 each plot after 90 days from sowing. Weeds were identified and classified to broad and narrow-leaved weeds to record the following traits:

1. Dry weight of narrow leaved weeds/m^2 (gm.).
2. Dry weight of broad leaved weeds/m^2 (gm.).
3. Dry weight of total weeds/m^2 (gm.).

Weeds were air-dried for seven days and then were oven-dried at 70 C° for 24 hours until a constant weight was reached. The dominant weed species were counted in the experimental plots in both seasons as shown in Table (1).

Table (1): Family name, scientific name and common name for weeds accompanied sugar beet crop in the experimental site during 2003/2004 and 2004/2005 seasons.

Weeds type	Scientific name	English name	Family name	الاسم العربى
Broad leaved	*Melilatus indica, L*	Sweet clover	Leguminosae	الحندقوق
	Rumex dentatus, L.	Sheep sorell	Polygonaceae	الحميض
	Sonchus oleraceus, L.	Dentated dock	Compositae	الحمحميض
	Chenopodium album, L	Commom lambsquarters	Chenopodiaceae	الزربيح
Narrow leaved	*Avena fatua,* L.	Spring wildoat	Gramineae	الزمير
	PhaLars paradoxa, L.	Hood canary grass	Gramineae	الفلارس

The results were statistically analyzed according to Gomez and Gomez (1984) and least significant differences L.S.D. at 5% levels of significant was used to compare between means.

RESULTS AND DISCUSSION

I. Sugar beet Crop:

1. Root length:

Data in Table (2) showed that the two sugar beet varieties were not significantly different in root length in the 1st and 2nd seasons. This results are in agreement with those obtained by Hassanin (1991).

While, all studied weed control treatments whether chemically and mechanically and their combinations succeeded to attain statistical superiority over those of the un-weeded check which showed the lowest root length in both seasons. The results showed that, using Pyramin + 2 hoeings and/or Goltix + 2 hoeings resulted in the longest roots without significant difference with hand hoeing three times in the 1st and 2nd seasons. This indicates that practicing hand hoeing of weeds accompanying sugar beet more frequently during the season ensures better conditions for beet plants to grow and hence longer roots were obtained at harvest.

The interactions among sugar beet varieties and weed control treatments had no significant influence on root length in both seasons.

Table (2): Root length (cm) of the two sugar beet varieties as affected by weed control treatments and their interactions in 2003/2004 and 2004/2005 seasons.

Treatments	2003/2004 season			2004/2005 season		
	Kawamera	Farida	Mean	Kawamera	Farida	Mean
Hand hoeing once (H1)	24.33	22.76	**23.55**	24.30	23.83	**24.07**
Hand hoeing twice (H2)	23.00	23.67	**23.33**	22.80	23.33	**23.07**
Hand hoeing three times	25.33	24.33	**24.83**	26.00	26.37	**26.18**
Pyramin	24.00	23.00	**23.50**	24.33	24.07	**24.20**
Goltix	23.43	23.00	**23.22**	24.00	25.33	**24.67**
Pyramin + (H1)	23.00	24.00	**23.50**	23.33	24.33	**23.83**
Goltix + (H1)	23.87	23.67	**23.77**	23.67	24.33	**24.00**
Pyramin + (H2)	26.33	24.67	**25.50**	26.00	25.73	**25.87**
Goltix + (H2)	25.57	24.67	**25.12**	26.60	25.67	**26.13**
Un-weeded (control)	22.03	21.70	**21.87**	22.63	22.40	**22.52**
Mean	**24.09**	**23.56**		**24.37**	**24.54**	
L.S.D at 0.05						
Sugar beet varieties (A)		**NS**			**NS**	
Weeding treatments (B)		**1.17**			**0.86**	
(A) x (B)		**NS**			**NS**	

2. Root diameter:

Data in Table (3) showed that the two varieties of sugar beet did not significantly differ in root diameter in both seasons. This results are in agreement with those obtained by Hassanin (1991).

Root diameter significantly responded to the used weed control treatments in the two seasons. The highest values of root dimensions (9.81 and 9.92 cm) were obtained from plots treated with Goltix + 2 hoeing in both seasons, without significant variance compared with Pyramin + 2 hoeing in both seasons. However, leaving weeds without any control resulted in the lowest value of this trait in both seasons due to the competition among weeds and sugar beet plants for water, nutrients and solar radiation. These results my show to what extend hoeing is very important not only for weed control but also to create suitable edaphic environmental condition for sugar beet plant to grow well away from weed competition on the soil space and soil nutrition.

No significant interaction effect of the studied factors on root diameter was detected in both seasons.

Table (3): Root diameter (cm) of the two sugar beet varieties as affected by weed control treatments and their interactions in 2003/2004 and 2004/2005 seasons.

Treatments	2003/2004 season			2004/2005 season		
	Kawamera	Farida	Mean	Kawamera	Farida	Mean
Hand hoeing once (H1)	8.80	8.37	**8.59**	8.62	8.70	**8.66**
Hand hoeing twice (H2)	8.80	8.50	**3.65**	8.83	8.65	**8.74**
Hand hoeing three times	9.57	8.79	**9.18**	9.15	8.84	**8.99**
Pyramin	8.70	8.10	**8.40**	8.84	8.09	**8.46**
Goltix	8.27	8.58	**8.42**	8.51	8.50	**8.51**
Pyramin + (H1)	8.30	7.83	**8.07**	8.32	8.20	**8.26**
Goltix + (H1)	8.47	8.40	**8.43**	9.15	7.87	**8.51**
Pyramin + (H2)	9.93	9.17	**9.55**	10.01	9.16	**8.59**
Goltix + (H2)	9.93	9.68	**9.81**	9.68	9.97	**9.92**
Un-weeded (control)	7.33	7.23	**7.28**	7.50	7.46	**7.48**
Mean	**8.81**	8.47		**8.88**	**8.54**	
L.S.D at $_{0.05}$						
Sugar beet varieties (A)		**NS**			**NS**	
Weeding treatments (B)		**0.57**			**0.49**	
(A) x (B)		**NS**			**NS**	

3. Total soluble solid percentage:

Data in Table (4) showed that the tested sugar beet varieties significantly differed in the total soluble solids percentage (TSS %) in the 1st season only, where the highest TSS % was obtained from Farida variety. This results are in agreement with those reported by El-Hattab *et al* (1996); Shalaby (1998); and El-Hinnawy *et al* (2003).

Table (4): Total soluble solids % of the two sugar beet varieties as affected by weed control treatments and their interactions in 2003/2004 and 2004/2005 seasons.

Treatments	2003/2004 season			2004/2005 season		
	Kawamera	Farida	Mean	Kawamera	Farida	Mean
Hand hoeing once (H1)	17.41	17.58	**17.50**	18.24	19.39	**18.81**
Hand hoeing twice (H2)	18.35	19.43	**18.89**	19.00	19.70	**19.35**
Hand hoeing three times	19.70	19.23	**19.46**	20.62	20.92	**20.77**
Pyramin	17.67	19.39	**18.53**	18.74	19.86	**19.30**
Goltix	17.67	18.13	**17.90**	18.39	19.53	**18.96**
Pyramin + (H1)	17.90	18.50	**18.20**	18.16	18.80	**18.48**
Goltix + (H1)	18.03	18.67	**18.35**	18.59	19.12	**18.85**
Pyramin + (H2)	19.07	18.67	**18.87**	19.65	19.31	**19.48**
Goltix + (H2)	19.00	18.43	**18.72**	20.03	19.79	**19.91**
Un-weeded (control)	16.93	17.07	**17.00**	17.62	17.79	**17.70**
Mean	**18.17**	18.51		**18.90**	**19.42**	
L.S.D at $_{0.05}$						
Sugar beet varieties (A)		**0.20**			**NS**	
Weeding treatments (B)		**0.63**			**0.44**	
(A) x (B)		**0.89**			**NS**	

The results pointed out that the weed control treatments had a significant effect on TSS % in both seasons. The highest TSS % (19.46 and 20.77%) was obtained from beets hoed three times in both seasons.

Meanwhile, leaving weeds without any control caused the greatest reduction in TSS % compared with the other weeding treatments in both seasons.

The interaction between varieties and weed control treatments significantly affected TSS % in the 1st season only. The highest value of TSS % (19.70%) was given by sowing Kawamera variety and controlling weeds with three hoeings, while the lowest TSS % (16.93%) was recorded by the same variety without controlling weeds accompanying sugar beet plants, in the 1st season.

4. Sucrose percentage:

The results show that sugar beet varieties significantly differed in sucrose percentage in both seasons (Table 5). Sugar beet Farida variety recorded higher sucrose percentage than Kawamera. This result could be due to the variation in gene make-up between the two varieties. Similar results were reported by Abd Alla *et al* (1995); El-Hattab *et al* (1996); Shalaby (1998) and El-Hinnawy *et al* (2003).

With regard the effect of weed control treatments on sucrose %, it was significant in both seasons, data presented in Table (5) indicate that using three hoeings treatment was associated with the maximum values which gave 15.51% and 15.65 % in the first and second seasons, respectively, while the un-weeded treatment produced the lowest one (13.19 and 13.27%).

Sucrose percentage was significantly affected by the interaction between varieties and weed control treatments in the second season only. The highest value of this trait (16.03%) was obtained by planting Farida variety and using three hoeings, while the lowest value (13.17%) was recorded under Kawamera variety with un-weeded treatment.

Table (5): Sucrose percentage of the two sugar beet varieties as affected by weed control treatments and their interactions in 2003/2004 and 2004/2005 seasons.

Treatments	2003/2004 season			2004/2005 season		
	Kawamera	Farida	Mean	Kawamera	Farida	Mean
Hand hoeing once (H1)	13.73	13.77	**13.75**	13.87	15.37	**14.62**
Hand hoeing twice (H2)	13.67	14.70	**14.18**	14.67	15.63	**15.15**
Hand hoeing three times	14.50	16.53	**15.51**	15.27	16.03	**15.65**
Pyramin	13.50	14.70	**14.10**	13.97	15.67	**14.82**
Goltix	13.88	14.73	**14.31**	14.02	15.57	**14.79**
Pyramin + (H1)	14.22	15.10	**14.66**	13.97	15.40	**14.68**
Goltix + (H1)	14.29	14.89	**14.59**	14.06	14.57	**14.31**
Pyramin + (H2)	14.43	14.73	**14.58**	14.73	14.83	**14.78**
Goltix + (H2)	14.57	13.97	**14.27**	15.57	15.30	**15.43**
Un-weeded (control)	13.17	13.20	**13.19**	13.17	13.37	**13.27**
Mean	**14.00**	**14.63**		**14.33**	**15.17**	
L.S.D at 0.05						
Sugar beet varieties (A)			**0.35**			**0.50**
Weeding treatments (B)			**0.76**			**0.52**
(A) x (B)			**NS**			**0.73**

5. Juice purity percentage:

Results in Table (6) show that the two sugar beet varieties did not significantly differ in juice purity percentage in both seasons. Similar results were obtained by El-Taweel (1999).

Juice purity percentage was insignificantly affected by the used weed control treatments in both seasons. Similar results were obtained by El-Geddawy *et al* (2001).

No significant effects due to the interactions among the studied factors on this trait were detected in both seasons.

Table (6): Juice purity percentage of the two sugar beet varieties as affected by weed control treatments and their interactions in 2003/2004 and 2004/2005 seasons.

Treatments	2003/2004 season			2004/2005 season		
	Kawamera	Farida	Mean	Kawamera	Farida	Mean
Hand hoeing once (H1)	78.87	78.34	**78.60**	76.05	79.27	**77.66**
Hand hoeing twice (H2)	74.77	75.66	**75.22**	77.35	79.33	**78.34**
Hand hoeing three times	73.69	85.98	**79.84**	74.03	76.68	**75.35**
Pyramin	76.45	75.78	**76.12**	74.53	78.90	**76.71**
Goltix	78.57	81.34	**79.95**	76.25	79.71	**77.98**
Pyramin + (H1)	79.42	81.63	**80.52**	76.92	81.91	**79.41**
Goltix + (H1)	79.29	79.74	**79.52**	75.68	76.27	**75.98**
Pyramin + (H2)	75.71	78.99	**77.35**	74.98	76.86	**75.92**
Goltix + (H2)	76.64	75.80	**76.22**	77.70	77.33	**77.51**
Un-weeded (control)	77.80	77.33	**77.57**	74.72	75.14	**74.93**
Mean	**77.12**	**79.06**		**75.82**	**78.14**	
L.S.D at $_{0.05}$						
Sugar beet varieties (A)			**NS**			**NS**
Weeding treatments (B)			**NS**			**NS**
(A) x (B)			**NS**			**NS**

6. Root yield/fed. (ton):

Data in Table (7) pointed out that the two sugar beet varieties significantly varied in root yield in the 1st season only, where Kawamera variety produced 1.31 tons over that given by Farida variety. These results are in agreement with those reported by Shalaby (1998).

The used weed control treatments had a significant influence on root yield/fed in both seasons. Practicing hand hoeing three times resulted in producing the maximum root yield/fed (32.08 and 32.07 ton/fed.) in the first and second seasons, without significant difference with two hoeings either with Pyramin or Goltix herbicides in the 1st season. Such effect can be attributed to increasing root length and diameter (Tables, 2 and 3). While the lowest root yield/fed (17.48 and 18.13 ton/fed.) was obtained from the un-weeded plots in both seasons. The above mentioned findings sustained that herbicides alone were not the preferable treatment in controlling sugar beet weeds., the additional of two hoeing for plots previously weeded with herbicides increased markedly sugar beet yields. This additional hoeing destroyed survival and lat emerged weeds and minimized weed competition to a greet extent and consequently favored growth of sugar beet plants. These results are in agreement with those obtained by Derylo (1991); Bensellam *et al* (1997) and El-Zouky and Maillet (1998).

The interactions among varieties and weed control treatments insignificantly affected root yield in both seasons.

Table (7): **Root yield/fed. (tons) of the two sugar beet varieties as affected by weed control treatments and their interactions in 2003/2004 and 2004/2005 seasons.**

Treatments	2003/2004 season			2004/2005 season		
	Kawamera	Farida	Mean	Kawamera	Farida	Mean
Hand hoeing once (H1)	21.67	19.27	**20.47**	22.90	20.60	**21.75**
Hand hoeing twice (H2)	28.40	28.10	**28.25**	28.70	28.83	**28.77**
Hand hoeing three times	33.03	31.13	**32.08**	33.43	30.70	**32.07**
Pyramin	21.37	20.73	**21.05**	24.43	21.33	**22.88**
Goltix	21.70	19.67	**20.68**	21.53	20.93	**21.23**
Pyramin + (H1)	28.61	27.97	**28.29**	28.77	27.68	**28.22**
Goltix + (H1)	28.67	27.50	**28.08**	28.10	27.66	**27.88**
Pyramin + (H2)	31.73	30.23	**30.98**	31.43	30.14	**30.79**
Goltix + (H2)	32.03	30.13	**31.08**	31.47	29.33	**30.40**
Un-weeded (control)	17.83	17.13	**17.48**	18.63	17.63	**18.13**
Mean	**26.50**	**25.19**		**26.94**	**25.49**	
L.S.D at 0.05						
Sugar beet varieties (A)		**0.33**			**NS**	
Weeding treatments (B)		**1.21**			**1.12**	
(A) x (B)		**NS**			**NS**	

7. Sugar yield:

Data in Table (8) show that no significant differences between sugar beet varieties for sugar yield/fed. in both seasons.

Sugar yield was significantly affected by the applied weed control treatments. Practicing three hand hoeings was associated with the maximum sugar yield/fed, while the lowest one was obtained from the un-weeded plots in both seasons. These results could be due to the same effect of these weeding treatments on root yield (Table 7) which is considered the main component affecting the obtained sugar yield. These results are in line with those obtained by Derylo (1991) and Bensellam *et al* (1997).

Table (8): **Sugar yield /fed. (tons) of the two sugar beet varieties as affected by weed control treatments and their interactions in 2003/2004 and 2004/2005 seasons.**

Treatments	2003/2004 season			2004/2005 season		
	Kawamera	Farida	Mean	Kawamera	Farida	Mean
Hand hoeing once (H1)	2.311	2.061	**2.186**	2.472	2.533	**2.503**
Hand hoeing twice (H2)	3.008	3.268	**3.138**	3.333	3.619	**3.476**
Hand hoeing three times	3.775	4.189	**3.982**	4.078	3.978	**4.028**
Pyramin	2.228	2.411	**2.320**	2.664	2.686	**2.675**
Goltix	2.343	2.299	**2.321**	2.357	2.615	**2.486**
Pyramin + (H1)	3.195	3.364	**3.280**	3.135	3.412	**3.273**
Goltix + (H1)	3.213	3.255	**3.234**	3.088	3.182	**3.135**
Pyramin + (H2)	3.606	3.506	**3.556**	3.664	3.543	**3.604**
Goltix + (H2)	3.675	3.289	**3.482**	3.932	3.588	**3.760**
Un-weeded (control)	1.801	1.736	**1.768**	1.882	1.815	**1.848**
Mean	**2.916**	**2.938**		**3.060**	**3.097**	
L.S.D at 0.05						
Sugar beet varieties (A)		NS			NS	
Weeding treatments (B)		**0.22**			**0.19**	
(A) x (B)		**0.31**			**0.27**	

The interactions among varieties and weed control treatments significantly affected sugar yield in both seasons. Data in Table (8) suggested that sowing Farida and/or Kawamera variety combined with three hand hoeings are recommended to obtain the highest sugar yield/fed.

Survey of weeds at 90 days after sowing:

1. Dry weight of narrow-leaved weeds/m^2 (gm):

Data in Table (9) show that dry weight of narrow-leaved weeds accompanied to the two sugar beet varieties was insignificantly in both seasons.

The results show that the used weed control treatments had a significant influence on the dry weight of narrow-leaved weeds grown with sugar beet in both seasons. The results indicated that the highest dry weight of narrow leaved weeds was recorded under the un-weeded plots (control), while the lowest value of this character was obtained by applying Goltix herbicide combined with two hoeings without significant differences with Pyramin + 2 hoeings in both seasons and/or hand hoeing three times in the second season. This result could be attributed to that practicing two hoeings in addition to the application of Goltix or Pyramin herbicides ensured the eradication of weeds continuously emerged and therefore reduced dry weight of weeds.

The interaction between sugar beet varieties and weeding treatments significantly affected the dry weight of narrow-leaved weeds in second season only. The highest dry weight of weeds was recorded under plots sown with Farida sugar beet variety treatment and un-weeded, while the lowest value of this trait was obtained in case of applying Goltix + 2 hoeings with Kawamera variety.

Table (9): Effect of varieties, weed control treatments and their interactions on dry weight of narrow-leaved weeds/m^2 (gm) after 90 days from sowing of sugar beet in 2003/2004 and 2004/2005 seasons.

Treatments	2003/2004 season			2004/2005 season		
	Kawamera	Farida	Mean	Kawamera	Farida	Mean
Hand hoeing once (H1)	246.67	253.33	**250.00**	220.00	180.00	**200.00**
Hand hoeing twice (H2)	143.33	110.00	**126.67**	113.33	91.67	**102.50**
Hand hoeing three times	63.33	46.67	**55.00**	23.33	13.33	**18.33**
Pyramin	133.33	163.33	**148.33**	93.33	133.33	**113.33**
Goltix	170.00	190.00	**180.00**	126.67	156.67	**141.67**
Pyramin + (H1)	106.67	126.67	**116.67**	83.33	96.67	**90.00**
Goltix + (H1)	126.67	146.67	**136.67**	103.33	130.00	**116.67**
Pyramin + (H2)	28.33	36.67	**32.50**	11.67	20.00	**15.83**
Goltix + (H2)	25.00	21.67	**23.33**	16.67	13.33	**15.00**
Un-weeded (control)	450.00	453.33	**451.67**	410.00	415.00	**412.50**
Mean	**149.33**	**154.83**		**120.17**	**125.00**	
L.S.D at $_{0.05}$						
Sugar beet varieties (A)		NS			NS	
Weeding treatments (B)		28.02			21.17	
(A) x (B)		NS			29.94	

2. Dry weight of broad-leaved weeds/m^2 (gm):

Data presented in Table (10) show that the effect of two sugar beet varieties had a significant effect in the second season only on dry weight of broad-leaved weeds. Variety of Kawamera attained greater reduction in dry weight of broad-leaved weeds compared with Farida variety in both seasons.

The results showed that the used weed control treatments had a significant effect on dry weight of broad-leaved weeds in both seasons. The results indicated that the highest dry weight of weeds was recorded under the un-weeded plots (control) while the lowest value of this trait was obtained by applying Pyramin herbicide combined with two hoeings in both seasons without significant differences as compared with Goltix + 2 hoeings and/or hand hoeing three times. This result could be attributed to that practicing two hoeings in addition to the application of Goltix or Pyramin herbicides ensured the eradication of weeds continuously emerged and therefore reduced dry weight of weeds.

The interaction between varieties and weed control treatments had a significant effect on the dry weight of broad-leaved weeds in both seasons. The highest dry weight of weeds was recorded under plots sown with Farida sugar beet variety and received zero tillage (un-weeded), while the lowest value of this trait was obtained in case of applying Goltix + 2 hoeings with Farida variety.

Table (10): Effect of varieties, weed control treatments and their interactions on dry weight of broad-leaved weeds m^2 (gm) after 90 days from sowing of sugar beet in 2003/2004 and 2004/2005 seasons.

Treatments	2003/2004 season			2004/2005 season		
	Kawamera	Farida	Mean	Kawamera	Farida	Mean
Hand hoeing once (H1)	183.33	250.00	216.67	153.33	216.67	185.00
Hand hoeing twice (H2)	83.33	160.00	121.67	60.00	136.67	98.33
Hand hoeing three times	56.67	60.00	58.33	30.00	26.67	28.33
Pyramin	140.00	135.00	132.5	110.00	98.33	104.17
Goltix	193.33	196.67	195.00	146.67	153.33	150.00
Pyramin + (H1)	83.33	93.33	88.33	41.67	80.00	60.83
Goltix + (H1)	80.00	66.67	73.33	51.67	60.00	55.83
Pyramin + (H2)	43.33	40.00	41.67	18.33	20.00	19.17
Goltix + (H2)	56.67	33.33	45.00	40.00	16.67	28.33
Un-weeded (control)	371.67	443.33	407.50	355.00	400.00	377.50
Mean	129.17	146.83		100.67	120.83	
L.S.D at 0.05						
Sugar beet varieties (A)			NS			10.88
Weeding treatments (B)			24.24			21.66
(A) x (B)			34.27			30.63

3. Dry weight of total weeds/m^2 (gm):

Data in Table (11) show that dry weight of total weeds accompanied to the two sugar beet varieties in significantly differed in both seasons. . It was clear that, in spite of non-significant effect of varieties on dry weight of total weeds grown with Kawamera variety was lower than that recorded with Farida variety.

The results showed that the used weed control treatments had a significant influence on the dry weight of total weeds grown with sugar beet in

both seasons. The results indicated that the highest dry weight of total weeds was recorded under the un-weeded plots (control) while the lowest value of this trait was obtained by applying Goltix and pyramin herbicides combined with two hoeings in both seasons without significant differences with hand hoeing three times in the second season only. This result could be attributed to that practicing two hoeings in addition to the application of Goltix or Pyramin herbicides ensured the eradication of weeds continuously emerged and therefore reduced dry weight of weeds. These results are in agreement with those obtained by Costa and Zonta (1985).; Gagro and Dadacek (1996); and El-Zouky and Maillet (1998)

The interaction between sugar beet varieties and weeding treatments significantly affected the dry weight of total weeds in both seasons. The highest dry weight of weeds was recorded under plots sown with Farida sugar beet variety and received zero tillage (un-weeded), while the lowest value of this trait was obtained in case of applying Goltix + 2 hoeings, in both seasons.

Table (11): Effect of varieties, weed control treatments and their interactions on dry weight of total weeds m^2 (gm) after 90 days from sowing of sugar beet in 2003/2004 and 2004/2005 seasons.

Treatments	2003/2004 season			2004/2005 season		
	Kawamera	Farida	Mean	Kawamera	Farida	Mean
Hand hoeing once (H1)	430.00	503.33	466.67	373.33	396.67	385.00
Hand hoeing twice (H2)	226.67	270.00	248.33	173.33	228.33	200.83
Hand hoeing three times	120.00	106.67	113.33	53.33	40.00	46.67
Pyramin	273.33	288.33	280.83	203.33	231.67	217.50
Goltix	363.33	386.67	375.00	273.33	310.00	291.67
Pyramin + (H1)	190.00	220.00	205.00	125.00	176.67	150.83
Goltix + (H1)	206.67	231.33	210.00	155.00	190.00	172.50
Pyramin + (H2)	71.67	76.67	74.17	30.00	40.00	35.00
Goltix + (H2)	81.67	55.00	68.33	56.67	30.00	43.33
Un-weeded (control)	821.67	896.67	859.17	765.00	815.00	790.00
Mean	278.50	301.67		220.83	245.83	
L.S.D at 0.05						
Sugar beet varieties (A)		NS			NS	
Weeding treatments (B)		38.68			30.35	
(A) x (B)		NS			NS	

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المحصول والجودة لبنجر السكر وتأثرة باستخدام بعض طرق مقاومة الحشائش .

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مركز البحوث الزراعية – المعمل المركزي لبحوث الحشائش

أقيمت تجربتان حقليتان بمزرعة كلية الزراعة جامعة الأزهر بأسيوط خـــلال موســـمى ٢٠٠٣/٢٠٠٤ و ٢٠٠٤/٢٠٠٥وذلك لدراسة تأثير استخدام بعض طرق مقاومة الحشائش (بارمين وجلوتكس والعزبق) على صنفى بنجر السكر (كاوميرا وفاريدا) على محصول وجـــودة بنجـــر السكر تحت ظروف أسيوط.

وكانت أهم النتائج المتحصل عليها كما يلى:

أدت معاملة مقاومة الحشائش سواء باستخدام البيرامين أو الجولتكس بعد الزراعة وقبل الرية الأولى + العزيق مرتين بعد ٤٢ ، ٥٦ يوما من الزراعة وكذلك معاملة العزيـــق ثـــلاث مرات بعد ٢٨ ، ٤٢ ، ٥٦ يوما من الزراعة إلى نقص معنوى فى الوزن الجاف للحشائش الضيقة والعريضة الأوراق والكلية وذلك مقارنة بالمعاملات الأخرى.

كما حققت نفس المعاملة أعلى القيم بالنسبة لصفات النسبة المئويـــة للمـــواد الصـــلبة الذائبـــة (T.S.S%) والنسبة المئوية للسكروز ومحصول الجذور والسكر للفدان. وقد حصل على أعلـــى محصول من الجذور (٣٣,٠٣ ، ٣٣,٤٣ طن/للفدان) من معاملة العزيق ثلاث مرات مع الصنف كاوميرا مقارنة بالصنف فريدا الذى أعطى ٣١,١٣ ، ٣٠,٧٠ طن/للفدان). وكذلك حصل علـــى أعلى محصول من السكر (٤,١٨٩ و ٤,٠٧٨ طن للفدان) من معاملة العزيق ثلاث مـــرات مـــع الصنف فاريدا مقارنة بالصنف كاوميرا (٣,٧٧٥ و ٣,٩٧٨ طن للفدان).

كان هناك تفاعل معنوى بين الأصناف ومعاملات مقاومة الحشائش ومعظـــم الصـــفات تحت الدراسة ماعدا النسبة المئوية للنقاوة فى كلا الموسمين.

توصى هذه الدراسة باستخدام معاملة العزيق ثلاث مرات مع الصـــنف فاريـــدا تحـــت ظروف محافظة أسيوط وذلك للحصول على افضل نمو ومحصول ونقاوة للعصير وكذلك افضـــل مكافحة للحشائش.