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EVALUATION OF SOME CHEMICAL AND MECHANICAL WEED CONTROL METHODS ON ASSOCIATED WEEDS, GROWTH, YIELD AND QUALITY OF SUGAR BEET UNDER NEWLY RECLAIMED SANDY SOIL AT NUBARIYA

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ABSTRACT

Two field trials were carried out during 1998/99 and 1999/2000 seasons to evaluate the effect of some chemical and mechanical weed control methods on growth, yield and juice quality as well as associated weeds of sugar beet (*Beta vulgaris,* L.) grown in newly reclaimed sandy soil at Nubariya. The most important results obtained could be summarized as follows :

- All weed control treatments reduced significantly fresh weight of sugar beet weeds as compared to the unweeded treatment.
- Metamitron was the most effective herbicide on controlling weeds followed by chloridazon and hand hoeing 3 times, respectively.
- Addition of one hand hoeing improved drastically the efficiency of the two applied herbicides with two concentrations in controlling sugar beet weeds when compared with other treatments.
- The results showed that Metamitron at rate of 2 kg/fed plus one hand hoeing resulted in good control of total weeds after 20 and 24 weeks from sowing.
- Data indicated that the photosynthetic pigments chl.a, chl.b and carotenoids significantly decreased due to all herbicidal treated plots than the plots of hoeing treatment. Hand hoeing treatment raised significantly photosynthetic pigments as compared with the untreated control plants after 18 weeks from sowing.
- All growth criteria i.e., plant height (cm), LAI, leaves number/plant, root/top ratio and root characters responded significantly to 2 kgs Metamitron/fed + one hoeing followed by Chloridazon 2 kg/fed + one hoeing and hand hoeing 3-times, respectively, as compared with the untreated control treatment.
- Concerning the effect of weed control treatments on yield components of sugar beet plants, corresponding data cleared that 2 kgs Metamitron/fed + one hand hoeing gave the highest values of tops, roots, biological and sugar yields.
- Application of 2 kgs Metamitron/fed + one hand hoeing caused significant increases in values of juice quality parameters i.e., T.S.S., sucrose and purity % as compared with the untreated control treatment.
- Generally, it can be concluded that addition of one hand hoeing to 2 kgs Metamitron/fed or 2 kgs Chloridazon/fed were the recommended treatments for obtaining the highest growth, yield and juice quality of sugar beet plants as well as significant reduction in total weeds under newly reclaimed sandy soil at Nubariya.

INTRODUCTION

Sugar beet (*Beta vulgaris*, L.) is considered the second sugar crop. Cultivated area in Egypt is 190 thousand fed (Economic Agriculture Report, 2002-2003).There is a dificiency in local sugar production which is expected to increase as a result of greater consumption by increasing population. Therefore, it is necessary to increase sugar production. Recently, more

attention has been given to grow and development sugar beet crop to overlap the gab between consumption and production, especially it is suitable to grow well in new reclaimed soils in addition its tolerance to stresses and low requirements of water (El-Harriri and Gobarh, 2001). Reduction in sugar beet yield caused by weed competition depends on its characterized by their slow rate of growth during the early stages, i.e. from emergence to singling during which they may be heavily infested with weeds. So, the final stand of beet plants and, hence, their yield are reduced. In Egypt, leaving weeds without removal from sugar beet field caused losses in yield by about 50 % (El-Hattab and Shaban, 1982). Therefore, it could be mentioned that weed control in sugar beet fields is a must to achieve high sugar yield.

Sometimes pre-emergence herbicides are recommended but they may cause temporary yellow spots on the leaves of sugar beet (Hermann, 1994) and deterioration of plant growth or yield components and chemical constituents. Moreover, environmental factors may limit herbicidal effect of controlling weeds as well as pollution (Abdel-Aal, 1995). Therefore, mechanical methods such as hoeing are used to destroy the weed plants which survived and escaped from the herbicides. Moreover, hoeing causes good aeration of the soil which encourages the growth of crop plants Fayed *et al.,* (1983). Wevers, (1995) mentioned that band spraying is sometimes used accompanied by hoeing to decrease the number of herbicide treatments as with herbicides in low dose system.

This work was carried out in newly reclaimed sandy soil at Nubariya to evaluate the effect of some chemical and mechanical weed control treatments on growth, yield and its quality of sugar-beet as well as associated weeds.

MATERIALS AND METHODS

Two field experiments were performed in two successive seasons 1998/99 and 1999/2000 under newly reclaimed soil at Nubariya to investigate the influence of some soil applied pre-emergence herbicides and mechanical weed control methods on associated weeds, growth, yield and its quality of sugar beet (*Beta vulgaris,* L.) variety Williams. The mechanical and chemical analysis of the experimental soil are presented in Table (1).

These analysis were carried out using standard methods described by Piper (1950), Richard (1954) and Jackson (1958).

Every experiment included 10 treatments which were the combination of two recommended herbicides (Metamitron and Chloridazon) at recommended and half recommended doses and one hand hoeing treatment 10 weeks after sowing. Herbicidal treatments, hoeing and unweeded check were randomly arranged in a complete randomized block design with four replications was used in both seasons. Plot area was 21 m^2 containing 6 rows with 50 cm apart and seven meters length. Seeds of sugar beet variety Williams was planted at distance of 20 cm between hills on the 3rd week of November for the two growing seasons. Thinning was carried out one month after planting to one plant/hill. Ammonium sulfate (20.6 %) N at

the rate of 70 kgs N/fed was added in three equal doses before the first, second and third irrigation. Calcium superphosphate (15.5 P_2O_5) was added at the rate of 30 kg/fed during seed bed preparation and 48 K_2O in the form of potassium sulfate was applied as usual in sugar beet farms. The normal cultural practices needed for growing sugar beet plants were performed.

Table (1): Mechanical and chemical analysis of Nubariya soil before executing the experiment.

Components	Value
Mechanical analysis :	
Soil fraction	
Sand %	75.6
Silt %	17.4
Clay %	5.5
Texture class	Sandy
Chemical analysis :	
pH	7.99
E.C.	0.730 mmhos/cm.
CO_2	---
HCO_3	2.5 meq/100 g soil
Cl^-	1.0 meq/100 g soil
Ca^{+2}	2.5 meq/100 g soil
Mg^{+2}	1.0 meq/100 g soil
Na^+	1.3 meq/100 g soil
K^+	0.05 meq/100 g soil
Total nitrogen	350 ppm

m. equivalent /100 g soil.

The following pre-emergence herbicides were used :

1. Metamitron (Goltix 70 % wp): 4-Amino-3-methyl-6-phenyl-1,2,4-triazin (4H)-one, origined by Bayer AG of Germany.
2. Chloridazon or pyrazon (pyramin 80 % WP) : 5-Amino-4-Chloro-2-phenyl-3(2H)-pyridazon one, manufactured by BASF corporation AG of Germany.

The ten treatments used were as follows :

1. Metamitron at 2.0 kg (product) per fed (recommended dose), applied pre-emergence.
2. Metamitron at 1.0 kg/fed, (half recommended dose) applied pre-emergence.
3. Metamitron at 2.0 kg/fed + one hand hoeing after ten weeks from sowing.
4. Metamitron at 1.0 kg/fed + one hand hoeing after ten weeks from sowing.
5. Chloridazon at 2.0 kg (product) per fed (recommended dose), applied pre-emergence.
6. Chloridazon at 1.0 kg/fed, (half recommended dose), applied pre-emergence.
7. Chloridazon at 2.0 kg/fed + one hand hoeing after ten weeks from sowing.
8. Chloridazon at 1.0 kg/fed + one hand hoeing after ten weeks from sowing.
9. Hoeing three times at 8, 12 and 16 weeks from sowing.

10. Unweeded treatment (control).

The herbicidal treatments were sprayed uniformity with a knapsack sprayer with spray volume of 200 liters/fed after sowing and before the first irrigation.

Data recorded :

I. On weeds :

Weeds were hand pulled form 1.0 m^2 of each plot twice after 20 and 24 weeks form sowing. Weeds were identified and classified to annual broad-leaved, annual grasses and total annual weeds. Fresh weight (g/m^2) of each group was estimated.

II. On sugar beet plants :

1. Growth Characters :

The photosynthetic pigments were extracted from representative samples of the fresh leaves after 18 weeks from sowing using 85 % acetone. The concentration of Chl.a, Chl.b and Carotenoids (mg/Dec.^{2}) was determined spectro-photometrically using Wettstein's formula (Wettstein, 1957).

A sample of five plants was taken at random from each plot after 18 weeks from sowing and at harvest 26 weeks after sowing to determine the morphological and chemical traits. The following data was recorded : plant height (cm), number of leaves/plant, leaf area index (L.A.I.) as described by Watson (1958) and root/top percentage.

At harvest stage, i.e. 26 weeks after sowing, a random samples of ten plants were taken then the following data were recorded : root length (cm), root diameter (cm) and root fresh weight kg/plant.

2. Yield and its components of beet plant:

At harvest i.e. 26 weeks after, sowing, plants of four guarded rows for each treatment were uprooted and topped to determine the following parameters : Top yield (ton/fed), root yield (ton/fed), biological yield (ton/fed) and sugar yield (ton/fed).

3. Chemical constituents :

Total soluble solids percentage (T.S.S. %) was determined by using "Hand refractometer", sucrose percentage was determined as described by Le-Docte, (1927), juice purity percentage was calculated according to the following equation : purity % = Sucrose % X 100/T.S.S. %.

The results were statistically analyzed according to Snedecor and Cochran (1980) and the treatment means were compared by using the least significant differences L.S.D. test by Waller and Duncan (1969) at 5 % and 1 % level of probability. Combined analysis of the data of the two growing seasons were undertaken.

RESULTS AND DISCUSSION

The results obtained reveal the influence of some chemical and mechanical weed control methods on the fresh weight of broad-leaved, grassy and total weeds grown with sugar beet plants after 20 and 24 weeks from sowing. The most common weed species accompanied with sugar beet plants in this work were *Rumex dentatus*, L.; *Chenopodium album*, L.; *Brassica nigra*, L.; *Chicorium endivial*, L.; *Phalaris canariensis*, L.; *Medicago hispida*, Gaertn and *Polypogon monspeliensis*, L.

The previous finding indicate that the infestation of sugar beet fields with different species of weeds creates a hard competition between them.

I. Weeds :

Data presented in Table (2) clearly revealed that weed control treatments reduced significantly the fresh weight of broad-leaved, grassy and total weeds. These results were fairly true after both 20 and 24 weeks from sowing. Comparing between the used herbicides, Metamitron and Choridazon, we can deduce that Metamitron was the effective herbicide against both broad-leaved and grassy weeds, followed by Chloridazon at recommended and half recommended doses, respectively.

Sgattoni *et al.* (1990) mentioned that Chloridazon at low rates gave excellent control of almost weeds present. Moreover, Milakovic *et al.* (2000) reported that Chloridazon and Metamitron were used in various combinations and showed good weed control in sugar beet fields. The respective herbicidal treatments decreased fresh weight of total weeds (g/m^2) after 20 weeks from sowing by 64.7, 39.1, 57.4 and 42.9% and after 24 weeks by 84.3, 64.7, 80.8 and 59.6 % for recommended and half recommended doses of the two applied herbicides, respectively. The efficiency of the two used single herbicides by two concentrations on beet weeds can be arranged in descending order as follows : Metamitron 2 kg/fed, Chloridazon 2 kg/fed Metamitron 1 kg/fed and Chloridazon 1 kg/fed, respectively. The same finding was reported by Zwolinska-Sniatalowa *et al.* (1983); Jedruszczak (1990) and Rzozi *et al.* (1990) who indicated that Metamitron pre-emergence provided effective weed control. Taking into account the impact of additional hoeing on weed control performance of the herbicidal treatments under investigation, it is evident that additional of one hand hoeing improved drastically the efficiency of the two applied herbicides with two concentrations.

The one supplementary hoeing increased the efficiency of Metamitron 2 and 1 kg/fed as well as Chloridazon 2 and 1 kg/fed. In controlling total sugar beet weeds after 20 weeks from sowing by 86.5, 61.5, 85.3 and 52.6 % and after 24 weeks by 87.4, 74.7, 85.8 and 68.4 %, respectively then that of unhoed herbicidal treatments. The superiority of herbicide + hoeing integrated weed control treatments was reported by Fayed *et al.* (1983) who stated that the additional of one light hoeing destroys the weed plants which survived and escaped form the herbicides. These results are in agreement with those obtained by Vigoureux (1987); Jedruszczak (1990) and Fayed *et al.*, (1992).

Table (2) : Effect of weed control treatments on fresh weight (g/m²) of annual weeds of sugar beet after 12 and 16 weeks from sowing. Combined analysis of 1998/1999 and 1999/2000 seasons.

Treatments		After 20 weeks			After 24 weeks		
		Broad-leaved	Grasses	Total	Broad-leaved	Grasses	Total
Metamitron	2 kg/fed.	320.00	110.90	430.90	254.16	76.95	331.11
	1 kg/fed.	478.10	264.13	696.15	646.51	96.29	742.80
	2 kg/fed. + one hoeing	92.10	67.43	163.53	210.11	54.60	264.71
	1 kg/fed. + one hoeing	350.10	119.34	469.44	448.76	83.75	532.51
Chloridazon	2 kg/fed.	340.12	179.24	519.36	324.50	79.38	403.88
	1 kg/fed.	486.00	210.15	742.23	692.11	156.80	848.91
	2 kg/fed. + one hoeing	96.12	86.65	178.77	230.10	68.36	298.46
	1 kg/fed. + one hoeing	382.16	196.22	578.38	576.36	88.14	664.50
Hand hoeing 3-times		138.69	70.50	209.19	236.46	70.42	306.88
Unweeded (control)		867.85	351.11	1218.96	1720.50	383.00	2103.50
L.S.D. at 0.05		54.66	19.85	37.92	102.45	15.75	114.66
0.01		74.97	27.23	52.00	140.50	21.60	157.26

Mechanical weed control of beet weeds with three hand hoeing existed high reduction in fresh weight of broad-leaves, grassy and total weeds after 20 weeks from sowing by 84.0, 79.9 and 82.8 % and after 24 weeks by 86.3, 81.6 and 85.4 %, respectively, than the control plants. This favorable effect of hoeing is due to elimination of weeds growth. Superiority of hand hoeing in controlling weeds could be attributed to the continuous destroying effect of frequent hoeing on annual weeds since these weeds are not capable to regrowth from the underground parts (Fayed *et al.*, 1992). In addition Abdel-Raouf and Fayed (1978) suggested that hoeing improves aeration of the soil which may encourage germination of additional weed seeds. Similar findings for the excelsior effect of hoeing were obtained by Wevers (1995).

II. Growth characters :

Competition between weeds and sugar beet plants can be considered to be a negative interference that induces growth reduction of plants because of an insufficient supply of some necessary environmental resources, e.g., water mineral elements and light. In general, growth parameters are considered to be the reflected mirror to the expected yield. Photosynthetic pigments, plant height (cm), L.A.I., root dimensions and root/top ratio are the important growth parameters in sugar beet.

Photosynthetic pigments :

The various physiological and biochemical processes affected by herbicides, among these processes photosynthesis (Rao, 1981). Data presented in Table (3) showed that the three photosynthetic pigments were significantly decreased in all herbicidal treated plots than the plots of hoeing treatments.

Shaban *et al.* (2001) reported that herbicide mixture caused a significant reduction in pigments chlorophyll a,b and carotenoids in sugar beet leaves. From the obtained data, it could be emphasized that Metamitron, Chloridazon at recommended and half recommended doses affected photosynthetic pigments content in sugar beet leaves at 18 weeks after sowing. Generally, the two herbicides decreased chl. a, b and carotenoids in comparison with hand hoeing treatment, the differences between the two herbicides in regard to these traits were significant.

Chlorophyll a,b and carotenoids were improved by adding one hand hoeing to herbicidal treatments. On the other hand, the three pigments increased significantly in sugar beet leaves of hoeded plants (three times). These results agreed with those obtained by Dermott (1981) who showed that Chloridazon at over doses is an inhibitor of photosynthesis with both soil and foliage action. Moreover, Jordan and Jordan (1983) found that pyrazon caused definit chorosis and slight stunting of sugar beet leaves. Results on the hazardous effect of some herbicides on photosynthetic pigments of many crops were in accordance with those obtained by Hermann (1994) who mentioned that some herbicides caused temporary yellow spots on the leaves of sugar beet. On the other side, Deveikyte *et al.* (2000) mentioned that Metamitron did not have any negative influence on photosynthetic pigments and development of sugar beet.

Table (3) : Effect of weed control treatments on photosynthetic pigments and growth characters of sugar beet plants. Combined analysis of 1998/1999 and 1999/2000 seasons.

Treatments		Photosynthetic pigments (mg/dm²) at 18 weeks after sowing			18 weeks after sowing (Sink stage)				26 weeks after sowing (harvest stage)			
		Chl.A	Chl.B	Caro.	Plant height (cm)	L.A.I.	No.of leaves /plant	Root /top	Plant height (cm)	L.A.I.	No.of leaves /plant	Root /top
Metam -itron	2 kg/fed.	3.17	2.00	2.28	38.00	3.62	25.30	1.65	56.50	4.00	30.60	3.25
	1 kg/fed.	2.11	1.36	2.11	31.75	2.41	20.50	1.26	45.50	3.20	26.90	2.30
	2 kg/fed. + one hoeing	3.89	2.48	2.64	41.00	4.01	32.10	1.84	66.80	5.20	43.20	3.86
	1 kg/fed. + one hoeing	2.50	1.82	2.31	34.00	3.56	24.50	1.60	50.00	3.96	30.00	3.20
Chlorid -azon	2 kg/fed.	2.89	1.22	2.10	36.50	2.95	22.90	1.50	53.93	3.75	29.50	2.80
	1 kg/fed.	2.04	1.84	2.46	30.50	2.10	19.70	1.19	42.00	2.99	25.60	2.10
	2 kg/fed. + one hoeing	3.21	1.41	2.71	39.40	3.89	29.10	1.72	62.70	4.83	38.50	3.65
	1 kg/fed. + one hoeing	2.46	1.39	1.86	33.10	2.50	22.00	1.48	48.35	3.70	29.00	2.75
Hand hoeing 3-times		3.96	2.86	2.96	38.75	3.80	28.90	1.70	60.90	4.75	32.40	3.58
Unweeded (control)		2.00	1.10	2.46	29.50	1.95	16.60	1.00	40.75	2.30	23.50	1.50
L.S.D. at 0.05		0.27	0.24	0.28	2.11	0.44	3.74	0.17	4.73	0.73	2.99	0.19
0.01		0.38	0.34	0.39	2.89	0.61	5.13	0.25	6.48	0.01	4.10	0.26

Growth parameters of sugar beet plants :

Growth criteria i.e., plant height (cm), leaves number/plant, L.A.I. and root/top ratio of sugar beet plants were studied at two growth stages, i.e. 18 weeks after sowing (sink stage) as well as 26 weeks after sowing (harvest stage) during 1998/99 and 1999/2000. The results obtained reported in Table (3) indicated that all growth characters responded significantly to all weed control methods. The results showed, also, that there was a marked increase in plant height, L.A.I., leaves number/plant and root/top ratio due to application of herbicides Metamitron at 2 kg/fed + one hand hoeing and Chloridazon at 2 kg/fed + one hand hoeing when compared with unweeded control.

These results suggest that weed control is necessary for sugar beet plants during early and advanced growth stages. The effect of weed control treatments on height of beet plants are illustrated in Table (3). It obviously cleared that elimination of weeds increased height and L.A.I. of sugar beet plants after 18 and 26 weeks from sowing than unweeded plants. The tallest beet plants were achieved after 18 and 26 weeks from sowing by Metamitron at 2 kg/fed + one hand hoeing, Choridazon at 2 kg/fed + one hand hoeing and 3 hand hoeing treatments, respectively. Plant height of these treatments were significantly greater than that of unweeded control by 39.0, 33.5 and 31.4 % after 18 weeks and by 63.9, 53.8 and 49.4 % after 26 weeks, respectively. It can be shown that the greater effect of the weed control treatments the higher L.A.I. values Table (3). This observation could explain the hazardous effect of weed competition on growth of beet plants in the two growth stages, 18 and 26 weeks after sowing. Similar results were obtained concerning leaves number/plant and root/top ratio.

Number of leaves/plant and root/top ratio tended to increase by using Metamitron at 2 kg/fed + one hand hoeing which gave the highest number of leaves/plant and root/top ratio at 18 and 26 weeks followed by Chloridazon at 2 kg/fed + one hand hoeing and hoeing 3 times treatments respectively. The superiority of the above mentioned treatments were significantly greater than that of unweeded control by 93.4, 75.3 and 74.1 % after 18 weeks and by 83.8, 63.8 and 37.9 % after 26 weeks for number of leaves/plant and by 84, 72 and 70 % after 18 weeks and by 157.3, 138.7 and 143.3 % after 26 weeks for root/top ratio, respectively, while the lower value was achieved with unweeded control treatment. The aforementioned results indicated that controlling beet weeds encouraged plant growth of sugar beet, this, in turn, might increased the leaves number/plant and giving more chance to better use of the edaphic and aboveground environmental resources and, consequently, stimulated all growth characters of beet plants. These results were true for both growing seasons. Similar results were obtained by Abdel-Aal (1995) and Milakovic *et al.* (2000).

Root characters :

Sugar beet root characters, i.e. root length(cm), diameter in cm and fresh weight (g/plant) were studied and their response to different weed control methods. Relevant results are presented in Table (4), for 1998/99 and 1999/2000 growing seasons. It could be concluded that all studied weed

control treatments whether chemically or mechanically and their combinations succeeded to attain statistical superiority over those of the unweeded check treatment which showed the lowest root dimensions of beet roots after 18 and 26 weeks from sowing. However, the additional of one hoeing improved significantly root length, root diameter and root fresh weight of beet plants not only over the unweeded treatment but also over those of chemical weed control treatments.

The highest values of root dimensions were obtained by 2 kgs Metamitron + one hoeing, then 2 kgs Chloridazon + one hoeing followed by hoeing 3 times. These results may show to what extend hoeing is very important not only for weed control but also to create suitable edaphic environmental condition i.e., good aeration, high biotic activity and increasing availability of some nutrients for sugar beet plant to grow well away from weed competition on the soil space and soil nutrition. These findings are in line with those obtained by Fayed *et al.* (1983) and El-Zouky and Maillet (1998). All chemical and mechanical weed control treatments increased significantly root fresh weight of beet than the control. Comparative results between herbicidal treatments indicate that using 2 kgs Metamitron per fed + one hoeing attained the heaviest root fresh weight of beet plants at both 18 and 26 weeks from sowing. It could be noticed that additional one hoeing to the used herbicides gave and additional increment in the fresh weight of root. It is also interesting to note that using Metamitron 2 kg/fed with one hoeing attained a superiority advantage in respect to root fresh weight not only over unweeded or even hand hoeing 3-times treatments but also over the other herbicide Chloridazon whether used alone or in combination with hoeing treatment. This observation was fairly true in both growth stages. The advantage effect of Metamitron in relation to root fresh weight of sugar beet over the other herbicide may be due to its effective capability on weed elimination compared with Chloridazon (Table 4). The lower fresh weight of total weeds at harvest the higher the root fresh weight. These results are in agreement with those obtained by El-Zouky and Maillet (1998).

Yield traits (ton/fed) :

Results in Table (4) show that the yield traits of beet plants affected by weed control treatments. Weeds interference in the unweeded plots reduced significantly all yield traits of beet plants. Dollinger and Benz (1994) mentioned that the presence of *Aethusa cynapium*, L. in sugar beet field at 8 plants/m^2 reduced yield by more than 100 dt/ha compared to weed free areas.

Limiting weed infestation by weed control treatments increased significantly sugar beet tops, roots, biological and sugar yields, but significant superiority remained with 2 kgs Metamitron/fed + one hoeing treatment which increased over the unweeded treatment by 272.3, 266.6, 268.6 and 175.4%, respectively. Above mentioned findings sustained that herbicides alone were not the preferable treatment in controlling sugar beet weeds. The additional of one hoeing for plots previously weeded with herbicides increased markedly sugar beet yields. This additional hoeing destroyed survival and late emerged weeds and minimized weed competition to a great extent and consequently

Table (4) : Effect of weed control treatments on root characters, yield traits and juice quality of sugar beet. Combined analysis of 1998/1999 and 1999/2000 seasons.

Treatments		Root characters			Yield traits (ton/fed.)				Root juice quality		
		Len-gth (cm)	Diam -eter (cm)	Fresh wt.(g/ plant)	Tops yield	Roots yield	Biologi-cal yield	Sugar yield	T.S.S. %	Sucrose %	Purity %
Metam itron	2 kg/fed.	19.85	11.85	751.50	11.65	22.10	33.75	4.95	22.85	16.12	70.71
	1 kg/fed.	17.50	9.80	614.0	7.95	18.58	26.53	3.61	21.95	15.00	68.53
	2 kg/fed. + one hoeing	22.13	12.65	986.86	13.70	25.15	38.85	5.81	23.21	16.98	73.19
	1 kg/fed. + one hoeing	18.85	10.50	688.95	9.84	20.65	30.49	3.02	22.35	15.92	71.29
Chlorid azon	2 kg/fed.	19.00	11.00	710.00	10.86	21.56	32.42	4.44	22.75	16.00	70.43
	1 kg/fed.	16.50	9.00	541.96	6.75	17.10	23.85	3.12	21.56	14.99	69.60
	2 kg/fed. + one hoeing	20.09	12.11	910.72	12.10	23.75	35.85	5.58	23.11	16.65	72.03
	1 kg/fed. + one hoeing	18.10	10.00	621.85	8.96	20.01	28.97	4.00	22.00	15.55	71.14
Hand hoeing 3-times		20.00	12.09	889.50	12.01	23.55	35.56	5.03	23.02	16.38	71.15
Unweeded (control)		15.00	7.00	245.95	3.68	06.86	10.54	2.11	21.00	14.62	69.63
L.S.D. at 0.05		2.61	2.64	39.25	0.56	0.94	3.43	0.311	1.41	0.74	5.81
0.01		3.59	3.62	53.83	0.77	1.29	4.71	0.427	1.94	1.01	7.97

favored growth of beet plants. Similar observations were reported by Fayed *et al.* (1992) in peanut, El-Zouky and Maillet (1998) who stated that chemical weed control alone was insuffient to control all weed species during the whole crop cycle. Chemical control + hand weeding resulted in increased sugar beet yields.

Root juice quality :

Data presented in Table (4) showed the values of quality parameters i.e. total soluble solids (T.S.S.%), sucrose % and purity % during 1998/1999 and 1999/2000 seasons. Total Soluble Solids sucrose and purity percentage values responded significantly and a positive relationship was exhibited for these quality parameters. There was a remarkable and significant increase in these tested quality parameters with applying chemical and mechanical weed control methods alone or incombination. These results mean that unweeded control treatment gave the lowest values, while 2 kgs Metamitron/fed + one hoeing gave the higher values.

With regard to T.S.S. and sucrose percentage, the available data in Table (4) revealed that 2 kgs Metamitron/fed or Chloridazon plus one hand hoeing were the most effective treatments followed by hoeing process 3-times which induced the highest values for T.S.S. and sucrose percentage in sugar beet root. The distinct influence of hoeing on T.S.S. and sucrose percentage may be due to the encourage effect of hoeing to root dimensions and weight and to the pronounced increase in assimilation organs (tops). Consequently increasing the assimilation and storage process which, in turn, reflected on the amount of stored sugar in root tissue. These finding are in accordance with those found by Abdel-Aal (1995), Deveikyte (1997) and Milakovic *et al.* (2000). Treatments of Metamitron + one hand hoeing and choridazon + one hand hoeing succeeded to gain superiority over the other treatments. This observation may be considered a good indication to the important of hand hoeing in addition to any weed control application to induce a good soil condition for growth consequently more assimilation and, in turn, increased storage capacity for root sugar which directly increased juice purity percentage.

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تقييم بعض الطرق الكيماوية والميكانيكية لمكافحة الحشائش فى بنجر السكر على الحشائش المصاحبة والنمو والمحصول والجودة فى الاراضى الرملية المستصلحة حديثا بالنوبارية

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تم اقامة تجربتان حقليتان خلال موسمى ٩٩/١٩٩٨ ، ٢٠٠٠/١٩٩٩ فى الاراضى الرملية المستصلحة حديثا بالنوبارية وذلك لتقييم بعض الطرق الكيماوية والميكانيكية المستخدمة لمكافحة الحشائش فى بنجر السكر واثر ذلك على النمو والمحصول وبعض صفات الجودة للعصير وكذلك الحشائش المصاحبة ويمكن تلخيص اهم النتائج المتحصل عليها فيمايلى :

- اظهرت معاملات مكافحة الحشائش نقصا معنويا فى الوزن الغض للحشائش المصاحبة لنباتات بنجر السكر مقارنة بمعاملة الكنترول .وكانت افضل المعاملات هى معاملة مبيد المبتاميترون الذى كان اكثر فاعلية فى مكافحة الحشائش يليه مبيد الكلوريدازون ثم معاملة العزيق اليدوى على التوالى .
- وجد ان اضافة عزقة واحدة قد حسنت بقوة فاعلية المبيدات المستخدمة بالتركيزين المقترحين فى مكافحة حشائش البنجر مقارنة بالمعاملات الاخرى .
- اوضحت النتائج ان مبيد الميتاميترون بمعدل ٢ كجم/فدان + عزقة واحدة اظهر مقاومة جيدة للحشائش الكلية فى البنجر بعد ٢٠ ، ٢٤ اسبوع من الزراعة .
- اظهرت النتائج ان صبغات البناء الضوئى وهى كلوروفيل أ و كلوروفيل ب والكاروتينات قد نقصت معنويا فى كل معاملات المبيدات المستخدمة عن معاملة العزيق اليدوى التى ادت الى زيادة فى تلك الصبغات اذا قورنت بمعاملة المقارنة بعد ١٨ اسبوع من الزراعة .
- لوحظ ان جميع صفات النمو مثل طول النبات ، دليل مساحة الاوراق ، عدد الاوراق/نبات ، نسبة الجذر/العرش وصفات الجذر قد استجابت معنويا لمبيد الميتاميترون بمعدل ٢ كجم/فدان + عزقة واحدة يليه مبيد الكلوريدازون بمعدل ٢ كجم/فدان عزقة واحدة ثم معاملة العزيق اليدوى ٣ مرات على التوالى .
- بالنسبة لتأثير معاملات مكافحة الحشائش على مكونات المحصول لنباتات بنجر السكر اوضحت النتائج ان مبيد الميتاميترون بمعدل ٢ كجم/فدان + عزقة واحدة اعطى اعلى القيم لمحصول العرش والجذور والمحصول البيولوجى ومحصول السكر .
- وجد ان استخدام مبيد الميتاميترون بمعدل ٢ كجم/فدان + عزقة واحدة ادى ايضا على زيادة معنوية فى قيم الجودة للعصير وهى النسبة المئوية للمواد الصلبة الذائبة الكلية والنسبة المئوية للسكروز والنسبة المئوية للنقاوة وذلك اذا ماقورنت بمعاملة المقارنة .
- عموما يمكن استنتاج ان اضافة عزقة واحدة الىكل من مبيدالميتاميترون او الكلوريدازون بمعدل ٢كجم/فدان تعتبر معاملات يمكن التوصية بها للحصول على افضل نمو ومحصول ونقاوة للعصير وكذلك افضل مكافحة للحشائش فى نباتات بنجرالسكر تحت ظروف الاراضى الرملية المستصلحة حديثا بالنوبارية .