EFFECT OF GROWTH REGULATORS AND HERBICIDES ON SUGAR YIELD , QUALITY AND ATTENDANT WEEDS OF SUGARCANE *Saccharum officinarum* L. GROWN IN DHULUIYA REGION.

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ABSTRACT

Field experiments were carried out on sugarcane *Saccharum officinarum* L. in the fields of the general company for industrial crops, Dhuluiya (within the central region of Iraq) to study the effect of some plant growth regulators and herbicides, added at the beginning of tillers stage, in Sugar yield , quality and attendant weeds of sugarcane (Variety: Co196). Split Plot Design was used with four replications, the main plots included herbicides 2, 4-D, bentazone and a control treatment (without herbicide). Plant growth regulators GA3, daminozide, mefluidide and control treatment (without PGR) was included in sub plots . The results indicated that the use of mefluidide with 2,4-D has led to highest decrease in weed density with achieve highest percentage of control (80.61 and 76.60 %) for both years respectively , while use of GA3 alone led to highest increase . it was found that the use of GA3 with 2,4-D has led to highest increase in percentage of sucrose (11.97 and 13.79 %) for both years respectively ,while effect of GA3 alone shows highest increase in Brix(16.83 and 15.98 %) for both years respectively , So that the use of GA3 with 2,4-D led to highest increase in Purity (83.41 and 83.91 %) for both years respectively, while use of daminozide treatment led to highest decrease . The interaction effect of mefluidide with 2,4-D treatment caused highest increase in sugar yield with an increase 34 and 31 % for both years respectively .

Keywords : Agronomy, Sugarcane, Plant growth regulators, Herbicides, Quality, Sugar yield, Weed.

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INTRODUCTION

The effectiveness of growth regulator depends on the ability to raise quality of stems in two measures to produce sugar are purity and Brix (Afzal *et al*.,2005 ; Curtis, 2006; Rai *et al*. ,2011)

Alexander *et al*. (1970) had reported that the yield components was increase when the plants were 10 weeks old, The greatest increases in Brix and percentage of sucrose. The daminozide growth regulator has tested to determine extent of its effect on growth of sugarcane 100 days old added two levels 0.07, 0.30% of a chemical compound commercial Alar - 85 has concluded that it has ability to improve quality of juice more than any other material (Almubarak, 2004; Annual Report, 2011) . Use of Growth regulator mefluidide on sugarcane plants aged 3 months led to an increase in sugar yield by 15%, and improved purity of the juice **(**Bahadar**,**1987 **) .**

The presence of weeds in the sugarcane fields and no control has also led to a decrease in sugar yield (Kanchan, 2009; Patel et al, 2007; Roshan et al., 2006) in proportion of sucrose ,Purity and Brix (Peter, 2000; Bahadar *et al*. ,2004 ; Annual Report, 2012). Bakker (2001) , Durigan (2005) and Curtis (2006) showed that using of herbicides in sugarcane field is one of the efficient and effective methods to weed control growing between the lines and between the plants within the line especially those selective herbicides. Recommended to use Bentazone herbicide in sugarcane fields, dose of 0.96-1.92 kg ai / ha against weeds in stage of 3 -5 leaves . Can also be used to control Nutgrass (*Cyperus rotundus* L.) as it is added when the plant height 10-20 cm before flowering (Anonymous,2001a).

Studies indicated that effect of growth regulator with the herbicide are more than effect of the herbicide or growth regulator alone , worked in killing of a large proportion of weeds in early which helped to increase number of tillers that taken a large area of land, was a contributing factor in competitive weeds on space ,light, food and water, which reflected negatively on the weed density during the later stages (Almubarak et al., 2012a) .AL-Chalabi(1988) and Almubarak (2004) show that use of plant growth regulators may help to increase the sensitivity of weeds to herbicides through convert dormancy buds to effective buds so that effective sinks for herbicide are effective killing.Or newly developing buds may deplete nutrients storage in the terrestrial parts quickly which reduces the plant's ability to restore growth after treatment with herbicide later .Or configure number of aerobic vegetative branches may give large leaf area work to keep herbicide and thus the absorption of large quantities of it by vegetative. Goal of the experiment was to know extent of sugarcane response to growth regulators and herbicides under the conditions of the central region of Iraq.

MATERIALS AND METHODS

Two field experiments were carried out on sugarcane in the fields of the general company for industrial crops, Dhuluiya (within the central region of Iraq) during the years 2001-2002 and 2002-2003. Split Plot Design was used with four replications, the main plots included herbicides 2, 4-D 1.6 Kg a.i/ha , bentazone 1.44 Kg a.i/ ha and a control treatment (without herbicide). Plant growth regulators GA3 400 ppm, daminozide 200 ppm, mefluidide 200 ppm and control treatment (without PGR) was included sub plots. The soil of the first experimental site was clay loam with pH 7.6, organic carbon 0.24% and available N,P,K were 139.2, 15.8 and 180.3 Kg/ha respectively, While the soil of the second experimental site was clay loam with pH 7.2, organic carbon 22% and available N,P,K were 144, 15.9 and 188.7 Kg/ha respectively. The experimental unit area 42 m² and the distance between the experimental unit and others was 1 m while distance between replicate was 4 m. Each experimental unit contains four lines length of 7 m and the distance between lines was 1.5 m. 200 kg N / ha was added to experimental land by application of urea (46% N) in two equal parts. First half before planting and the second half after three months. Triple super phosphate fertilizer (45% P2O5) at the rate of 120 kg P2O5/ ha was applied once before planting. Irrigation was provided upto mid-October in varying periods of 7 – 12 days. Growth regulators were sprayed beginning of the growth stage and after 10 days herbicides were sprayed (Almubarak, 2004) .

Weed density (number/m²) : A quadrant sized 1.0 m X 1.0 m was thrown randomly in each experimental unit three times and green weed plants those were not affected by herbicides were counted and averaged.

Percentage of control : Was calculated according to the following equation (Al-Chalabi, 1988)

$$\text{Percentage of control} = \frac{A - B}{A} \text{ X } 100$$

A = Control treatment
B = Chemical compound treatment

After the implementation of experiment, Seven canes were taken from center lines each experimental unit to extract the juice by juicer habitual then the following tests were conducted (Salih,1988)
- Percentage of total soluble solids : They total dissolved solids in the 100 meters from the juice. Is extracted by a Rafrcktomitr

- Percentage of sucrose in juice: Is the weight of sucrose in the 100 meters from the juice measured by Skrmitr device
- Purity: Is the relative concentration of sucrose compared with other solids dissolved in juice Was calculated according to the following equation :

$$\text{Purity (\%)} = \frac{\text{Sucrose (\%)}}{\text{Brix (\%)}} \text{ X } 100$$

- Sugar yield was calculated according to the following equation

Sugar yield (tonnes/ha) = cane yield (tonnes/ha) x percentage of sucrose (%)

Analyzed the data recorded according to method of statistical analysis for the Split Plot Design. LSD was used to compare treatments at significant level of 0.05 (Steel and Torrie, 1960)

RESULTS AND DISCUSSION

Weed Density and percentage of control: Table (1) showed The weed species present in the sugarcane field. Among these the prominent weed species were the annual grasses weeds occupied 56.6 and 48.1 % share in total weed population. Whereas, the broad leaved perennial weeds in a very few numbers that constitutes 2.5 and 8.3 % of the total weed population. However, the perennial grasses weeds constituted 10.8 and 18 % and the broad leave annual weeds constituted 30.1 and 25.6 % to total weed density for both years respectively. So, The tables (2and 3) shows that there are significant implications of growth regulators and herbicides in weed density and percentage of control .

Addition of mefluidide led to a significant decrease in this character(21.8 and 15.4 plant/m²) while GA3 caused significant increase (65.1 and 50.5 plant/m²) as compared to the control treatment (58.7 and 46.7 plant/m²). for both years respectively.

In case of herbicides, 2,4-D caused significant decrease (39.2 and 29.1 plant/m²) as compared to the control treatment (64.9 and 52.9 plan/m²).

On studying the interaction effect, it was found that the use of mefluidide with 2,4-D has led to highest decrease in this character (15.6 and 11.3 plant/m²) achievement highest percentage of control to 76.6 and 80.61 %, followed use of mefluidide with bentazone (20.1 and 14 plant /m²) achievement percentage of control to 69.89 and 76.04 % , while use of GA3 alone led to highest increase (92.5 and 76.3 plant/m²) as compared to the control treatment (67.0 and 58.3 plant /m²) for both years respectively .

Table 1 : *Weed species and spreading percentage in experimental field.*

Scientific name	Family	Life cycle	Plant species	Percentage
First year				
Cressa cretica L.	Convolvulaceae	Perennial	Broad leave	2.5
Aeluropus littoralis (Gouan pari.).	Gramineae	Perennial	Broad leave	
Lactuca serriola L	Compositae	Annual	Broad leave	30.1
Sonchu soleraceus L	Compositae	Annual	Broad leave	
Cyperus rotundus L.	Cyperaceae	Perennial	Grasses	10.8
Phalaris minor Retz	Gramineae	Annual	Grasses	56.6
Second year				
Cressa cretica L.	Convolvulaceae	Perennial	Broad leave	8.3
Aeluropus littoralis (Gouan pari.).	Gramineae	Perennial	Broad leave	
Lactuca serriola L	Compositae	Annual	Broad leave	25.6
Sonchu soleraceus L.	Compositae	Annual	Broad leave	
Cyperus rotundus L.	Cyperaceae	Perennial	Grasses	18.0
Phalaris minor Retz	Gramineae	Annual	Grasses	48.1

Table 2 : *Effect of Plant Growth Regulators and Herbicides on attendant Weed Density (000/m²) of sugarcane.*

PGRs / Herbicides	Daminozide	GA3	Mefluidide	Control	Mean
First year					
Control	70.5	92.5	29.8	67.0	64.9
Bentazone	45.3	58.9	20.1	57.6	45.4
2,4-D	45.7	44.0	15.6	51.7	39.2
Mean	53.8	65.1	21.8	58.7	
L.S.D. 0.05	PGR 3.1	Herbicides 2.4		PGR x Herbicides 2.9	
Second year					
Control	56.0	76.3	21.0	58.3	52.9
Bentazone	35.6	44.0	14.0	42.6	34.0
2,4-D	34.6	31.3	11.3	39.3	29.1
Mean	42.1	50.5	15.4	46.7	
L.S.D. 0.05	PGR 2.1	Herbicides 1.9		PGR x Herbicides 2.5	

Table 3 : *Effect of Plant Growth Regulators and Herbicides on Percentage of Control (%) for attendant weeds of Sugarcane.*

PGRs / Herbicides	Daminozide	GA3	Mefluidide	Control	Mean
First year					
Control	0.00	0.00	55.59	0.00	13.90
Bentazone	32.35	12.04	69.89	14.08	32.09
2,4-D	31.82	34.35	76.60	22.76	41.38
Mean	21.39	15.46	67.36	12.28	
Second year					
Control	4.21	00.0	63.92	00.0	17.03
Bentazone	38.83	24.49	76.04	26.84	41.55
2,4-D	40.55	45.90	80.61	32.53	49.90
Mean	27.86	23.46	73.52	19.79	

Percentage of Sucrose: Table (4) shows that there is significant implication of plant growth regulators ,herbicides and interaction between two in percentage of sucrose in juice of sugarcane .Percentage of sucrose with treatment of GA3 led to increased value 11.35 and 12.71 % while other treatments did not show effect on this character as compared to control treatment (9.67 and 10.26 %) for both years respectively. Application of 2,4-D and bentazone herbicides made a significant increase in percentage of sucrose (10.44 and 10.18 % respectively) for the first year and (11.98 and 11.06 %) for the second year as compared to control treatment (9.60 and 10.57 %) for both years respectively. On studying the interaction effect, it was found that the use of GA3 with 2,4-D has led to highest increase in percentage of sucrose (11.97 and 13.79 %) and does not different significantly by use of GA3 with bentazone (11.25 and 12.44 %) as compared to the control treatment (9.11 and 9.74 %) for both years respectively.

The increase in percentage of sucrose by using GA3 with 2,4-D herbicide might be due to in decrease of weed density and increase of percentage of control (tables 2 and 3) Which gave the opportunity for plants to grow and to reach a better harvest stage, Or may be due to the effect of the growth regulator to absorption nutrients from the leaves toward the stem of the crop which reflected positively in increasing the proportion of sucrose. (Anonymous, 2001b) .

The decrease by using mefluidide with herbicides might be due to large increase in the number of tillers (Almubarak *et al*. ,2012a) has increased composition those tillers on water , food, space and light for their growth and development, which reflected negatively on the proportion of sucrose .Many studies have shown that there is a negative relationship between the number of tillers of sugarcane and the percentage of sucrose in juice. As the high number of tillers always be accompanied by a decrease in quality of the juice (reziq and abd-ali ,1981; Artasit *et al*., 1994) .

Table 4 : *Effect of Plant Growth Regulators and Herbicides on Sucrose percentage (%) of Sugarcane .*

PGRs / Herbicides	Daminozide	GA3	Mefluidide	Control	Mean
First year					
Control	10.61	11.90	10.03	09.74	10.57
Bentazone	10.97	12.44	10.69	10.15	11.06
2,4-D	12.12	13.79	11.12	10.90	11.98
Mean	11.23	12.71	10.61	10.26	
L.S.D. 0.05	PGR	Herbicides		PGR x Herbicides	
	0.78	0.81		1.58	
Second year					
Control	09.50	10.82	08.96	09.11	9.60
Bentazone	10.14	11.25	09.41	09.90	10.18
2,4-D	10.18	11.97	09.60	10.00	10.44
Mean	9.94	11.35	9.32	9.67	
L.S.D. 0.05	PGR	Herbicides		PGR x Herbicides	
	0.52	0.66		1.04	

Brix: Addition of plant growth regulators with herbicides have affected Brix significantly (table 5).Interaction effect of GA3 without herbicide showed highest increase in Brix (15.98 and 16.83 %) and no different significantly with use daminozide treatment alone (15.12 and 15.66 %) for both years respectively. Also Interaction effect of 2,4-D with mefluidide or without growth regulator shows increase in Brix (15.98 and 15.12 %) for the first year respectively and (16.17 and 14.88 %) for the second year respectively in comparison to the control treatments (13.58 and 13.87 %) for both years

respectively . These findings are consistent with Bakker (2001) and Al-Chalabi (1988) .

Table 5 : *Effect of Plant Growth Regulators and Herbicides on Brix (%) of Sugarcane.*

PGRs / Herbicides	Daminozide	GA3	Mefluidide	Control	Mean
First year					
Control	15.12	15.98	14.33	13.87	14.83
Bentazone	15.43	15.06	13.70	14.25	14.61
2,4-D	14.94	16.42	16.17	14.88	15.60
Mean	15.16		14.73	14.33	
L.S.D. 0.05	PGR	Herbicides		PGR x Herbicides	
	N.S.	N.S.		1.60	
Second year					
Control	15.66	16.83	13.91	13.58	15.00
Bentazone	15.72	14.16	13.26	14.05	14.30
2,4-D	13.01	14.35	15.98	15.12	14.62
Mean	14.80	15.11	14.38	14.25	
L.S.D. 0.05	PGR	Herbicides		PGR x Herbicides	
	N.S.	N.S.		1.37	

Purity: The addition of plant growth regulators and herbicides have significant affect on Purity of juice of sugarcane (table 6). Addition of mefluidide caused increase in this character to 72.31 and 57.73 % follow use of GA3 treatment (80.31 and 75.95 %) while does not affect use of daminozide treatment (68 and 74.07 %) as compared to the control treatment (67.86 and 71.62 %) for both years respectively.

Application of 2,4-D herbicide also achieved a significant increase in this character to 70.42 and 76.74 % follow use of bentazone treatment (69.18 and 75.73 %) as compared to the control treatment (62.56 and 71.26 %) for both years respectively .

Study of interaction effect shows that the use of GA3 with 2,4-D led to highest increase in this character (83.41 and 83.91 %),while use of daminozide treatment without herbicide led to highest decrease (70.19 and 60.92 %) as compared to the control treatment (70.33 and 67.33 %) for both years respectively. These findings are consistent with Al-Chalabi (1988) .

Table 6 : *Effect of Plant Growth Regulators and Herbicides on Purity (%)of Sugarcane.*

PGRs / Herbicides	Daminozide	GA3	Mefluidide	Control	Mean
First year					
Control	70.19	74.47	70.06	70.33	71.26
Bentazone	71.17	82.54	78.07	71.13	75.73
2,4-D	80.84	83.91	68.81	73.39	76.74
Mean	74.07	80.31	72.31	71.62	
L.S.D. 0.05	PGR 1.62	Herbicides 2.02		PGR x Herbicides 1.93	
Second year					
Control	60.92	64.75	57.23	67.33	62.56
Bentazone	64.77	79.69	62.14	70.12	69.18
2,4-D	78.30	83.41	53.82	66.14	70.42
Mean	68.00	75.95	57.73	67.86	
L.S.D. 0.05	PGR 1.76	Herbicides 2.49		PGR x Herbicides 2.36	

Sugar yield: Addition of Plant growth regulators and herbicides significant affected sugar yield of sugarcane (Table 7). Mefluidide caused increase in this character to 6.09 and 5.42 tonns / ha while use of GA3 treatment show significant decrease (5.07 and 4.81 tonns/ha).does not significant affect by use of daminozide treatment (5.74 and 5.38 tonns/ha) as compared to the control treatment (5.31 and 5.02 tons / ha) for both years respectively.

Application of 2,4-D herbicide also achieved a significant increase in this character to 5.88 and 6.16 tonns / ha while does not significant affect by use bentazone treatment (4.77 and 5.20 tonns/ha) as compared to the control treatment (4.84 and 5.30 tonns/ha) for both years respectively

The interaction between plant growth regulators and herbicides Notes that there is a general tendency to increase the sugar yield using growth regulators generally as compared to the use of herbicide alone. The interaction effect of mefluidide with 2,4-D treatment caused highest increase in sugar yield (6.20 and 6.92 tonns/ha) with an increase 34 and 31 % , follow use of 2,4-D treatment alone (5.62 and 5.95 tonns/ha), while other treatment did not show effect on

this character as compared to control treatment (4.75 and 5.18 tonns/ha) for both years respectively.

Table 7 : *Effect of Plant Growth Regulators and Herbicides on Sugar Yield (tonnes/ha) of Sugarcane.*

PGRs / Herbicides	Daminozide	GA3	Mefluidide	Control	Mean
First year					
Control	5.53	4.63	5.85	5.18	5.30
Bentazone	5.57	4.93	5.51	4.80	5.20
2,4-D	6.12	5.64	6.92	5.95	6.16
Mean	5.74	5.07	6.09	5.31	
L.S.D. 0.05	PGR 0.33	Herbicides 0.78		PGR x Herbicides 1.86	
Second year					
Control	5.16	4.22	5.22	4.75	4.84
Bentazone	5.11	4.41	4.84	4.70	4.77
2,4-D	5.88	5.80	6.20	5.62	5.88
Mean	5.38	4.81	5.42	5.02	
L.S.D. 0.05	PGR 0.24	Herbicides 0.72		PGR x Herbicides 1.16	

presence of a competition for weeds had a clear effect on crop growth and development .It has been found that survival of weeds and not control during the early stages of crop growth is a determinant factor in the growth and production of crop in the later stages (Chauhan and Srivastava , 2002 ; Al-Chalabi,2003; Patricia , 2011). Therefore, the absence of weed competition by reducing weed density (table 2) and raise proportion of control for green weeds (table 3) and increase of tillers number of sugarcane (Almubarak *et al.* , 2012a).And thus length of weed control period for the most part of crop growing season by use of herbicide, May have a role in determining the final number of millable cane or number it per unit area .The increase in the number of millable cane means an important contribution to increasing sugar yield (Tejera *et al*., 2007) . It may be decrease weed grow and increase number of tillers by using of herbicide since the early stages until maturity has led to the opportunity of sugar cane plants in better consumption and optimum utilization for main growth requirements they have become capable and competent to

compete with weed plants . these findings are consistent with Mohler (2001); Mishra (2004) and Singh *et al*.(2005) , then good light penetration and increased rates of photosynthesis, And than the effect of growth regulator in increasing the proportion of sucrose in the crop stems (table 4) Which reflected positively on the sugar yield of the crop . These findings are consistent with Anonymous (2001b) and Almubarak et al (2012b) .

REFERENCES

Afzal, M., S.H. Shah, A. Jabbar, and M.S. Nazir. 2005. Cane quality parameters as influenced by single and blended herbicidal weed management. *Pak. Sugar Journal*, Vol. XX (02): 13-20.

Al-Chalabi , F.T.1988 . Biological Interaction Between Growth Regulating Substances and Herbicides in Weed Control. PhD . Thesis. University of Wales . U.K.

Al-Chalabi .F.T.2003. Biological response of wheat to weed control by diclofop - methyl herbicide with 2,4-D herbicide and its effect on the grain yield. *Iraqi Journal of Agricultural Sciences . 34(1):89-100.*

Alexander , A.G , R. montalvo – Zapata and A. Kumar.1970. Gibberellic acid activity in sugarcan as a function of the number and frequency of applications. *Journal of. Agriculture Puerto Rico. 54: 477- 503.*

Almubarak, N.F.2004. Response of Sugarcane *Saccharum officinarum* L. and Companion Weeds To Plant Growth Regulators and Herbicides . Dissertation ,College of Agriculture , Baghdad University. Iraq.

Almubarak, N.F.,F.T.Al.Chalabi and A.Al-Janaby 2012a. Effect of growth regulators and herbicides on growth and yield of sugarcane in central region of Iraq. *Indian Journal of Sugarcane Technology.27(02): 79-82.*

Almubarak, N.F., F.T. Al-Chalabi , Ala Aljanabi and Ishwar Singh. 2012b .Effect of chemical herbicides on growth, yield characters and weeds of sugarcane grown in central region of Iraq. *Indian Journal of Weed Science*.44(4): 259-262.

Annual Report 2011. Indian Institute of Sugarcane Research. Lucknow, 226002, Uttar Pradesh, India.

Annual Report. 2012. Directorate of Weed Science Research. Jabalpur(Madhya Pradesh). India .

Anonymous 1985. Basagran, Registered Trademark BASF.

Anonymous. 2001a . Controlling Weeds in Sugarcane. Baton Rouge, LA. Louisiana State University AgCenter and Louisiana Cooperative Extension Service. Pub.2314 .pp. 2-4.

Anonymous. 2001b. Sugarcane Production Handbook. Baton Rouge, LA. Louisiana State University AgCenter and Louisiana Cooperative Extension Service. Pub.2859 .pp. 1-10.

Artasit , B., P. Prapan , P.Preecha , S. Dhanit , A. Charan , T. Thongchai and C. Ruthapon . 1994 . Foliar application of ripener for increasing sugar

content of 8 sugarcane varieties in the early milling period . Suphan Buri Field Crops Research Center (Thailand) .31 . (c.f. agris online).

Bahadar, Q.1987.Effect of various ripeners (polaris, polado ,cycocel , etherel , ethephon , embark , round up, asulox, gramoxone , dalapon, GA,2,4-D, Mefluidide and recuza) on sugarcane. Peshawar(Pakistan).33. (c.f. agris online).

Bahadar, K., M. Jama, and H. Azim. 2004. Effect of weeds on cane yield and content of sugarcane. *Pak. J. Weed Sci. Res.* 10(1-2): 47-50.

Bakker, H. 2001. Sugarcane cultivation and management. *Sugarcane Production Technology.25:179-191.*

Chauhan, R.S. and T.K. Srivastava. 2002. Influence of weed management practices on weed growth and yield of sugarcane. *Indian Journal of Weed Science*, 34 (3-4): 318-319.

Curtis A. Jones.2006. Red morningglory (*Ipomoea coccinea* L.) biology and management in sugarcane. A dissertation, Faculty of the Louisiana State University and Agricultural and Mechanical College.USA.

Durigan, J.C. 2005. Effects of plant densities and management of purple nutsedge on sugarcane yield and effect of growth stages and main way of herbicides contact and absorption on the control of tubers. *J. Environ. Sci. and Health*. B40:111-117.

Jonathan Siebert. 2003.Sugarcane seed response to 2,4-d and alternative herbicides for red morningglory (ipomoea coccinea l.) control .Thesis, Louisiana State University. p: 67.

Kanchan Nainwal. 2009. Weed Infestation in sugarcane. (c.f. online) WWW.atsdr.cdc.gov

Mishra, J.S.2004. Tillage and Weed Management. National Research Centre for Weed Science. Maharajpur, Jabalpur 482 004 (MP).

Mohler, C.L.2001. Mechanical management of weeds . In Ecological Management of Agricultural weeds (Eds. Matt Liebman, Charles L. Mohler and Charles P. Staver). Cambridge University Press, pp.139-209.

Patel, C.L., D.D. Patel, and M.N., Patel. 2007. Critical period of crop weed competition in sugarcane (Var. Co Lk 8001). *Indian Sugar*, LVI (12): 27-32.

Patricia Andrea. 2011. Selectivity of herbicides in varieties of sugarcane. Bragantia., 70(2): 286-293.

Peter Griffee. 2000. "*Saccharum Officinarum*". Food and Agriculture Organization of the United Nations. http://www.fao.org.

Rai,R K.,P. Sing,A. Chandra andR.L. Yadav .2011. Variation in size of apparent free space and assimilatory apparatus in sugarcane varieties with differential sucrose accumulation in to the stalks affecting source-sink relationship. *Indian Journal of Sugarcane Technology*. 26(1):41-50.

Reziq,Y.T.and H.A.Ali.1981. Oil and Sugar Crops .Second Part. University of Mosel.

Roshan, L., S.N.L. Srivastava, and M. Chand. 2006. Integrated weed management for sugarcane (*Saccharum officinarum*) plant-ratoon cropping system. *Indian journal of Agronomy*, 51 (4): 251-255.

Salih,H.Kh.1988. Effect of the Delay and Supply On Yield and Quality of Sugarcane. MSc . Thesis ,College of Agriculture . University of Baghdad.

Singh, R., D. Sen, V.K. Singh, N.S. Rana and S. Kumar. 2005. Effect of weed- management practices on spring-planted sugarcane. *Indian journal of Agronomy*, 50 (3): 236- 238 (CAB Abstracts, 2005).

Steel,G.D.R. and J.H. Torrie.1960. Principles and Procedures of Statistics. Mc Graw-Hill. New york.

Tejera, N. A.,R. Rosa ,O. Eduardo ,C. Rosario and L. Carmen .2007. Comparative analysis of physiological characteristics and yield components in sugarcane cultivars . *Field Crops Research* (102) : 64–72.

تأثير منظمات النمو النباتية ومبيدات الأدغال في حاصل السكر والنوعية والأدغال المرافقة لقصب السكر ***Saccharum officinarum* L.** النامي في منطقة الضلوعية .

نادر فليح علي آلمبارك* **فائق توفيق الجلبي****

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المستخلص

نفذت تجربتين حقليتين في حقول الشركة العامة للمحاصيل الصناعية / الضلوعية (ضمن ظروف المنطقة الوسطى من العراق) لدراسة تأثير بعض منظمات النمو النباتية ومبيدات الأدغال المضافة في بداية مرحلة التفرعات في حاصل السكر والنوعية والأدغال المرافقة لقصب السكر (صنف Co196) . استعمل تصميم الألواح المنشقة بأربعة مكررات . تضمنت الألواح الرئيسة مبيدات الأدغال : مبيد 2,4-D ومبيد bentazone فضلا عن معاملة المقارنة (بدون استخدام مبيد) ، اما الألواح الثانوية فقد تضمنت منظمات النمو النباتية : GA3 و daminozide و mefluidide اضافة الى معاملة المقارنة (بدون استخدام منظم نمو) . أظهرت النتائج ان استخدام منظم النمو mefluidide مع مبيد الأدغال 2,4-D قد أحدث اعلى انخفاض في كثافة نباتات الأدغال مع تحقيق اعلى نسبة مكافحة (76.60 و 80.61 %) لكلا السنتين على التوالي ، بينما استخدام منظم النمو لوحده قد ادى الى احداث اعلى زيادة . وجد ان استخدام منظم النمو GA3 مع مبيد الأدغال 2,4-D قد احدث اعلى زيادة في نسبة السكروز (13.79 و 11.97 %) لكلا السنتين على التوالي , بينما تأثير منظم النمو GA3 لوحده قد سبب اعلى زيادة في نسبة المواد الصلبة الذائبة الكلية Brix (15.98 و 16.83 %) لكلا السنتين على التوالي . ايضا ادى استخدام GA3 مع 2,4-D الى احداث اعلى زيادة في نقاوة العصير (83.91 و 83.41 %) لكلا السنتين على التوالي ، بينما ادى استخدام منظم النمو daminozide الى احداث اعلى انخفاض . تاثير التداخل بين منظم النمو mefluidide ومبيد الأدغال 2,4-D كان واضحا اذ سبب اعلى زيادة في حاصل السكر وبنسبة زيادة بلغت 34 و 31 % للسنتين على التوالي .

الكلمات المفتاحية : قصب السكر ، منظمات النمو النباتية ، مبيدات الأدغال ، النوعية ، حاصل السكر ، الأدغال .