

## **SOME PARAMETERS AFFECTING ON SOME DISEASES AND YIELD OF SUGAR BEET (*Beta vulgaris*, L.) AT DAKAHLIA GOVERNORATE.**

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### **ABSTRACT**

The field experiments were conducted at two locations, Tag El-Ezz experimental station and Belkas region in Dakajhlia Governorate during agricultural seasons (1997/98 and 1998/99) in clay loam soil to study the effect of some factors (sowing dates 15<sup>th</sup>, 30<sup>th</sup> October and 15<sup>th</sup> November) and some sugar beet varieties (Top, Gloria, Oscar and Pamela) to know the effect of these factors on yield and some diseases. The varieties which were planted at 15<sup>th</sup> of October gave the least percentage of diseases and the highest yield, followed by the 30<sup>th</sup> of October, while those of 15<sup>th</sup> of November gave the highest percentage of infection and the lowest yield. The main results of this study revealed that sugar beet sown at 15<sup>th</sup> October gave the highest yield of root as well as sugar yield. Delaying of sowing date to 15<sup>th</sup> November reduced sucrose contents.

The cultivar Top was the best cultivar when gave the lowest percentages of Damping-off, Cercospora leaf spot and Root-rot diseases and the highest yield followed by Gloria, Oscar while Pamela gave the highest percentage of infections and the lowest yield. The interaction between sowing dates and varieties gave different effect of infection percentage and yield in two agricultural seasons.

### **INTRODUCTION**

Sugar beet (*Beta vulgaris*, L.) is considered one of the most important sugar crops not only in Egypt but also in whole world around. Also, it is a vital crop to man as a source of high energy. Sowing dates and varieties were affecting on the percentage of infection with diseases of pre and post emergence damping-off, cercospora leaf spots and root rot diseases as well as quantity and quality of yield Hanna *et al.* (1988), El-Kassaby and Leilah (1992) and Badawi *et al.* (1995).

This trial was conducted to investigate the effect of sowing dates and type of cultivars on the degree of infection with pre and post emergence damping-off also disease severity of cercospora leaf spot and root rot diseases were taken in consideration.

### **MATERIALS AND METHODS**

This investigation was carried out in Dakahlia governorate during two growing seasons (1997/98 and 1998/99) to study the effect of sowing dates and different cultivars (varieties) on some sugar beet diseases and yield (root and sugar content) of four sugar beet cultivars.

A split-plot design with three replications was used with sowing dates in main plots. (15<sup>th</sup> October, 30<sup>th</sup> October and 15<sup>th</sup> November) and cultivars the sub plots (Top, Gloria, Oscar and Pamela). Each sub-plot consisted of 5

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double-ridge beds one meter width and 6 meter long the sub-plot size was 30 m<sup>2</sup>. Hill spacing within ridges were 20 cm. At 4 leaf stages, plants were thinned to insure one plant/hill. Pre and post emergence damping-off were determined before thinning. Also percentage of cercospora leaf spots and root rot as well as disease severity after five months from sowing were determined.

The experiments were harvested after 210 days from sowing in the first and second seasons. Samples of ten roots were taken randomly from each sub-plot to determine yield and sugar percentages.

**Determination of yield:**

For determining the root yield of the two areas samples of roots were collected and weighted in kgs and converted into tons per feddan.

**Sucrose Determination:**

Purity percentages (sucrose %) were determined according to Carruthers and Oldfield (1960).

**Statistical analysis:**

All data were subjected to statistical analysis according to procedures outlined by Snedecor and Cochran (1967) and treatments means were compared by the least significant differences test (LSD) at the levels of 5 % and 1 % probability according to Waller and Duncan (1969).

## **RESULTS AND DISCUSSION**

Data in Tables (1 and 1a) indicate that the percentage of infection and disease severity with damping-off, cercospora leaf spot and root rot decreased with the early sowing date 15<sup>th</sup> October, while the percentage of infection and disease severity with tested diseases was moderately with 30<sup>th</sup> October. Sowing date on the other hand the highest percentage of infection and disease severity was accompanied by late sowing date at 15<sup>th</sup> November. Similar findings were reported by El-Kassaby and Leilah (1992), Ghandorah and Refay (1994), Lauer (1997), Milford (1976) and Sharma and Pathak (1990).

This effect may be due to the microclimate in early sowing date very suitable to germination and growing sugar beet but unsuitable for growing and spreading pathogenic microorganisms, while on the late sowing date the environmental supported the pathogenic microorganisms for germination and spreading to infect sugar beet, while the environmental conditions were unsuitable form germination and growing sugar beet (Panella and Ruppel, 1995).

Data also indicate that Pamela cultivar had the highest percentage of infection and disease severity followed by Oscar and Gloria cultivars, while, Top cultivar gave the lowest percentage of infection and disease severity (Table 1 and 1a), similar results were obtained by Sharma (1990).

Table (1): Effect of sowing dates and cultivars on the percentages of infection and disease incidence to Damping-off, cercospora leaf spot and Root rot diseases under field conditions during agricultural season, 1997/98.

Sowing dates	Cultivars	Damping-off %		Cercospora leaf spot %		Root rot %	
		* Pre-emergence	** Post-emergence	Perc. %***	D.S.I.****	Perc. %	D.S.I.
15 <sup>th</sup> October	Top	7.0	5.0	3.00	1.0	1.00	1
	Gloria	9.0	8.0	6.33	1.0	2.70	1
	Oscar	9.0	7.0	12.66	2.0	2.80	1
	Pamelo	10.0	8.0	10.33	2.0	3.15	1
<b>LSD at 5%</b>		<b>0.8</b>	<b>0.8</b>	<b>0.30</b>	<b>0.1</b>	<b>0.70</b>	
30 <sup>th</sup> October	Top	11.0	4.0	6.00	1.0	6.00	1
	Gloria	10.0	6.0	9.10	2.0	6.70	1
	Oscar	11.0	8.0	12.25	2.0	8.00	1
	Pamelo	15.0	9.0	12.75	2.0	8.20	1
<b>LSD at 5%</b>		<b>0.3</b>	<b>0.7</b>	<b>0.30</b>	<b>0.0</b>	<b>0.10</b>	
15 <sup>th</sup> November	Top	15.0	9.0	9.00	2.0	11.00	2
	Gloria	17.0	8.0	13.18	2.0	12.00	2
	Oscar	17.0	13.0	20.20	4.0	13.80	2
	Pamelo	22.0	18.0	26.75	4.0	15.00	3
<b>LSD at 5%</b>		<b>0.8</b>	<b>0.4</b>	<b>0.60</b>	<b>0.2</b>	<b>0.60</b>	<b>0.1</b>

\* Pre = pre emergence damping-off %

\*\* Post = post emergence damping-off

\*\*\* Perc = percentage of diseases infection %

\*\*\*\* D.S.I. = Disease severity index %

Table (1-a): Effect of sowing dates and cultivars on the percentage of infection and disease severity to Damping-off, Cercospora leaf spot and Root rot diseases under field conditions during agricultural season, 1998/99.

Sowing dates	Cultivars	Damping-off %		Cercospora leaf spot %		Root rot %	
		* Pre-emergence	** Post-emergence	Perc.%***	D.S.I.****	Perc.%	D.S.I.
15 <sup>th</sup> October	Top	9.0	3.00	6.0	1	3	1
	Gloria	10.0	7.55	8.0	1	2	1
	Oscar	13.0	11.83	7.0	1	6	1
	Pamelo	15.0	12.60	7.0	1	7	1
<b>LSD at 5%</b>		<b>0.6</b>	<b>0.30</b>	<b>0.1</b>		<b>0.1</b>	
30 <sup>th</sup> October	Top	13.0	6.60	11.0	2	6	1
	Gloria	16.0	7.80	13.0	2	7	1
	Oscar	6.0	3.83	17.0	2	7	1
	Pamelo	17.0	7.65	9.0	2	7	1
<b>LSD at 5%</b>		<b>0.8</b>	<b>0.7</b>	<b>0.6</b>		<b>0.1</b>	
15 <sup>th</sup> November	Top	17.0	20.30	12.0	2	7	1
	Gloria	19.0	23.75	13.0	2	8	1
	Oscar	20.0	20.45	15.0	2	8	1
	Pamelo	20.0	20.18	20.0	3	10	1
<b>LSD at 5%</b>		<b>0.3</b>	<b>0.6</b>	<b>0.2</b>	<b>0.1</b>	<b>0.2</b>	

\* Pre = pre emergence damping-off %  
 \*\* Post = post emergence damping-off  
 \*\*\* Perc = percentage of diseases infection %  
 \*\*\*\* D.S.I. = Disease severity index %

These results may be due to difference in genetic structure between different tested cultivars (Panella *et al.*, 1999).

Data in Table (2) indicated that early planting or sowing date 15<sup>th</sup> October was accompanied by substantial increase in root yield specially from Top variety in the two seasons (1997/98 and 1998/99) followed by Gloria, Oscar and Pamela. Hanna *et al.* (1988), El-Kassaby and Leilah (1992) and Badawi *et al.* (1995).

**Table (2): Effect of sowing dates and cultivars on root yield and sugar yield (ton/faddan) under field conditions during two agricultural seasons.**

		Root yield (ton/faddan)		Sugar yield (ton/faddan)	
Sowing dates	Cultivars	1997/98	1998/99	1997/98	1998/99
15 <sup>th</sup> October	Top	27.00	26.18	3.44	3.50
	Gloria	25.30	22.00	3.00	3.40
	Oscar	19.60	20.70	4.80	4.00
	Pamelo	17.00	18.00	2.75	2.60
<b>LSD at 5%</b>		<b>0.55</b>	<b>0.36</b>	<b>0.09</b>	<b>0.05</b>
30 <sup>th</sup> October	Top	22.07	20.30	3.00	3.60
	Gloria	20.36	18.35	2.80	2.12
	Oscar	18.44	17.75	2.00	2.00
	Pamelo	18.00	17.32	2.07	1.95
<b>LSD at 5%</b>		<b>0.27</b>	<b>0.18</b>	<b>0.06</b>	<b>0.03</b>
15 <sup>th</sup> November	Top	20.20	18.30	2.70	2.90
	Gloria	20.75	17.00	2.40	3.00
	Oscar	17.33	15.20	2.00	3.02
	Pamelo	15.33	14.33	1.30	2.40
<b>LSD at 5%</b>		<b>0.24</b>	<b>0.16</b>	<b>0.08</b>	<b>0.04</b>

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### **بعض العوامل التي تؤثر على بعض الأمراض ومحصول بنجر السكر في محافظة الدقهلية.**

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في موسمين زراعيين متتاليين تم دراسة تأثير ثلاثة مواعيد للزراعة (١٥ ، ٣٠ أكتوبر ، ١٥ نوفمبر) على نسبة الإصابة بمرض موت البادرات ومرض تبقع الأوراق السركونبوري وكذلك مرض عفن الجذور كما تم دراسة شدة المرض للمرضيين الأخيرين. وقد استخدم في هذا البحث أربعة أصناف من بنجر السكر وهي (توب ، جلوريا ، أوسكار ثم بامبلا).

وأوضحت الدراسة التي أجريت في منطقتين مختلفتين من محافظة الدقهلية وهما (مزرعة محطة البحوث الزراعية بتاج العز والثانية في بلقاس) في موسمين متتاليين (١٩٩٧ / ١٩٩٨ ، ١٩٩٨ / ١٩٩٩) في تربة طينية طميية ، أن الصنف (توب) كان أفضل الأصناف المنزرعة مقاومة لهذه الأمراض في الثلاث عروات وأعطى أعلى محصول في الدرنات تلاه جلوريا ثم أوسكار ثم بامبلا (انظر جدول ٢) مع العلم بأن الصنف أوسكار قد أعطى أعلى نسبة سكر في العروة الأولى من الموسمين الزراعيين ٤,٨ ، ٤ طن / فدان لكن الصنف جلوريا تفوق عليه في العروتين الثانية والثالثة لكلا الموسمين في نسبة السكر (طن / فدان) ثم عاد أوسكار ليعطي في العروة الثالثة أعلى محصول سكر (٣,٠٢ طن / فدان). هذا وقد تفوق الصنف Top في العروة الوسطى (٣٠ أكتوبر) ليعطي أعلى إنتاج درنات ٢٢,٠٧ ، ٢٠,٣ طن / فدان في الموسمين وفي نفس الوقت يعطي أعلى نسبة سكر (٣ ، ٣,٦ طن / فدان) مما يعطي دلالة واضحة على أهمية زراعة هذا الصنف Top في مثل هذه الأراضي والمواعيد الزراعية لما تميز به من قدرة على مقاومة هذه الأمراض في الأوراق والدرنات ولقدرته على إنتاج سكر بنسبة عالية متطابقة مع كمية المحصول.