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EVALUATION OF SOME SUGAR BEET VARIETIES UNDER DIFFERENT SOWING DATES IN TWO REGIONS OF UPPER EGYPT.

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Key Words: Locations, planting dates, sugar beet varieties.

ABSTRACT

A Field experiments was carried out in three sowing dates at two locations under conditions El-Mattana Research Station (latitude of 25.25°N and longitude of 32.31°E and elevation of 81 m above sea level) Luxor Governorate, And Kom Ombo Agricultural Research Station, (latitude of 24.28°N and longitude of 32.57°E and elevation of 84.5 m above sea level) Aswan Governorate, Egypt, during 2018/2019 and 2019/2020 seasons. To Evaluate of nine sugar beet varieties to bridge the sugar gap between production and consumption by expanding sugar beet cultivation in Upper Egypt.

The present work included nine sugar beet varieties (*Beta Vulgaris, L.*) namely Cleopatra, Tarbelli, Betamax, Sirona, Capel, Saucona, FD17B410, FD18B418, and LP 17B411, to evaluate them And select the best in terms of suitability to environmental conditions and the extent of their superiority in yield and Quality . Sugar beet varieties were sawn in three dates (mid of September, October and November ±3) days between the two sites (El-Mattana and Kom Ombo) in the two planting seasons. The experiment was carried out in randomized strip plot design with three replications.

Results showed that El-Mattana location surpassed in the highest values root fresh weight, root length, root diameter, root yield (t/fed), sucrose %, Extractable sugar, purity, and sugar yield (t/fed) and less content of potassium percentages compared with Kom Ombo location.

The results indicated that time of cultivation significantly affected each of average of root fresh weight, top fresh weight, root length, root diameter, root yield (t/fed), sucrose %, Extractable sugar%, purity%, and sugar yield (t/fed) and less content of impurities in month October.

Examined Sugar beet varieties significantly differed in some studied traits in the two seasons. recorded Capel, Sirona and Beta max varieties recorded the highest values of growth, Quality and yield of Sugar beet compared to the other varieties a spatially sown in October month either El-Mattana or Kom Ombo location

INTRODUTION

Sugar beet seeds sown in Egypt are imported seeds annually from foreign countries, especially from Europe and other ones. Therefore it is evaluate them under Egyptian conditions especially under most of soils

and different locations to select the best suited ones related to maximum yield and quality traits. Hence the importance of this assessment to optimize imported cultivars production by this evaluation and adaptation under Egyptian conditions According to **White *et al* (2011)** adjusting the sowing date is by for the most frequently investigated climate change adaptation option. Yield potential of many crops is highly influenced by sowing date since it determines the length of vegetation period and the amount of captured radiation **(El-Mansoub *et al* 2020)** found that sowing sugar beet on 1st October can be recommended get the highest root, sugar yields/fed as well as fewer components of impurities in the roots. With regard to the sowing date has been found through previous studies that sowing date has an active role on growth, yield and quality characteristics of sugar beet under the environmental conditions of Egypt, in this concern.

Mahdi, *et al*. (2013) indicated that planting sugar beet through October markedly increased weight of roots, sugar content as well as root and sugar yields/fed, compared with beets sown in November. **Gobarah *et al*. (2019)** indicated that different sowing dates have significant effect on all beet characters. Sowing sugar beet plants at 1st October was significantly associated with the highest yields of root and sugar as well as quality traits in terms of sucrose (S%), purity % Sowing sugar beet plants at 1st September associated with maximum total soluble solids (T.S.S%) and impurities content, i.e. Na %, K %, α-amino N % as well as sucrose loss to molasses (SLM %) compared with late sowing date. **Curcic *et al*. (2018).** Important environmental variables that determine the beginning of sugar beet growing season are temperature, light, precipitation and soil moisture. **(Ntwanai** and **Tuwana 2013** and **Hossain, Ferdous *et al.* (2015)** reported that early sown sugar beet matured early and quality development parameters (sucrose% and quality index). Inversely, impurities (K, Na, and alpha amino N) varied attributed to planting dates. Several studies either in Egypt or overseas reported the importance of selected or/and evaluated varieties for increasing sugar productivity as well as showed the differences between sugar beet varieties in yield and quality in many environmental condition, i.e., location and sowing dates.

Ghareeb, Zeinab *et al*., (2013) found that Pleno, Samba, Sultan and Farida sugar beet genotypes had the highest root and sugar yields at early sowing dates in October than that in November **Hozayn, *et al*. (2014)** found that all sugar beet varieties showed behavior with respect to sucrose %, fresh root and sugar yield/fed under the three locations. **Enan, *et al.* (2011)** confirmed that the five tested sugar beet varieties differed significantly in their yield potential capacity. Cleopatra variety recorded the highest sucrose%, while Florima and Heracule varieties produced the

highest root and sugar yields/fed due to the difference in their gene make-up, which plays an important role in plant structure and morphology. **Mohamed and Yasin (2013)** cleared that differences between sugar beet varieties were significantly in root dimension, root, and sugar yields/fad. Sucrose% and α-amino N. **El-Mansoub and Mohamed (2014)** indicated that varieties of sugar beet had a significant effect on root length and fresh weight of sugar beet varieties. Recently, several studies in Egypt mentioned that sugar beet is one the main sugar producing crop in Egypt, and since it has been grown in the wide range of environmental conditions such as differed sowing date and locations, successful management and production of the crop often represent a challenge serve horizontal expansion.

Ntwanai and Tuwana (2013) stated that planting date x location x varieties interactions had a significant effect on sugar and root yields and sugar content as well as impurities of sugar beet cultivars. **Kaloi, *et al.* (2014)** showed that locations x varieties interaction were highly significant in yields and quality parameters. **Osman, *et al.* (2014)** El-Fayoum location recorded the highest root yield compared with in EL-Dakhlia location root yield differed significantly with the examined varieties, Sugar beet varieties Belatos and Betamax attained the highest root yield followed by Meridio, Saucona, Dina, Sarah and Hercule. **Hossain *et al.*, 2015; Aly and Khalil,2017), Mohamed *et al.* (2018)** reported that Ismailia location surpassed the other two locations, producing roots with high content of sucrose% and less content of impurities compared with Faiyum and Alexandria. and that varieties significantly differed in the studied traits except Quality index and impurities%. Pyramid variety exhibited the superiority over the other tested varieties which recorded the highest values of root yield (ton/fed.) **Walter, (1987)** discussed the importance of the selection of locations for the evaluation of quantitative characters Also, he found that wide fluctuations in the rank performance of genotypes at test locations suggest that it may be desirable to develop and/or selection the best genotypes for different locations through independent selection. In this connection, **Kristek *et al.* (1997)** establish that the influence of locations was very high in root yield, sugar content and sugar yield. All sugar beet cultivars sown under Egyptian conditions are imported from global breeding sources. Therefore, evaluation of these varieties is locally required to select the best ones, in terms of suitability to environmental conditions and extent of their superiority in yield and quality traits. With regard to the sowing date has been found through previous studies that sowing date has an active role on growth, yield and quality characteristics of sugar beet under the environmental conditions of Egypt, in this concern. **(Aminzadeh *et al.*, 2014)** clarified that the

environment consists of a series of factors including weather conditions and climatic related phenomena. Weather conditions, is one of the factors determining the type of plants that are cultivated in any region ations. **Aly, *et al.* (2015)** found that sugar beet varieties (Top, Sultan and Kawemira) significantly differed in root length, diameter and root fresh weight g/plant, as well as sucrose%, Quality index % and yields of root and sugar (t/fed) in this concern. **Aly (2006)** cleared that the Kafr El-Sheikh site gave the heaviest roots, higher values of extractable sugar, quality percentages as well as, yields of root and sugar/fed compared to the El-Fayoum site. At the same time, the highest values of sodium and potassium contents were produced from the Al-Fayoum location. Planting dates of sugar beet is considered among most important factors that influenced its growth and productivity. Also, planting date is the great important factor in organizing and securing work schedule of beet factories. Thus, planting sugar beet on suitable date according to environmental conditions of region is best method to maximize sugar beet yield and quality. Therefore, this investigation was established to determine the effect of locations and planting dates in performance and behavior of nine multi germ sugar beet varieties by determine variety× environment interaction under EL-Mattana and Kom Ombo regions condition, in Upper Egypt at mid September, October and November.

MATERIALS AND METHODS

A Field experiments was carried out under conditions El-Mattana Research Station (latitude of 25.25°N and longitude of 32.31°E and elevation of 81 m above sea level) Luxor Governorate, And Kom Ombo Agricultural Research Station, (latitude of 24.28°N and longitude of 32.57°E and elevation of 84.5 m above sea level) Aswan Governorate, Egypt, during 2018/2019 and 2019/2020 seasons To Evaluate nine varieties of sugar beet(*Beta Vulgaris, L.*) namely Cleopatra, Tarbelli, Betamax , Sirona , Capel , Saucona, FD17B410, FD18B418,and LP 17B411,in two locations and Three planting dates to evaluate them to select the best in terms of suitability to environmental Conditions and the extent of their superiority in yield and Quality in Upper Egypt. Seeds sugar beet were sawn in the mid of September. Mid of October and Mid of November ±3 days between the two sites in the two sowing seasons while harvesting was done 7 months later in both seasons. Treatments were arranged in strip plot design with three replications. The vertical plots were occupied with the three sowing dates while the horizontal plots were devoted with the nine sugar beet varieties. Which randomly distributed in Sub plot area was 19.25 m2 including five ridges, 7 m long and 55 cm width with 20-cm hill spacing. Nitrogen fertilizer in the form of ammonium nitrate (33.5% N) was added at the rate of 100 kg N/fed, in two equal doses; after thinning and the second carried out after 30 days

from the first dose. Calcium super phosphate (15.0% P2O5) was Applied during soil preparation at the rate of 200 kg/fed. Potassium sulfate (48% K2O) at rate of 50 kg/fed was applied with the second nitrogen dose and before Canopy becomes closer. All culture practices such as irrigation, weed control, insect control etc. were applied in the same manner, as usually done in the ordinary sugar beet fields to obtain maximum yield. Sugar beet genotypes are presented in **Table (1).**

Table (1): Origin of the examined sugar beet varieties

No.	Sugar beet Varieties	Type of Seeds	Origin	
			Company	Country
1	Cleopatra	Multigerm	DESPREZ	France
2	Tarbelli	Multigerm	Semences	France
3	Betamax	Multigerm	Semences	France
4	Sirona	Multigerm	DESPREZ	France
5	Capel	Multigerm	DESPREZ	France
6	Saucona	Multigerm	DESPREZ	France
7	FD17B4010	Multigerm	DESPREZ	France
8	FD18B4018	Multigerm	DESPREZ	France
9	LP17B4011	Multigerm	Semences	France

Soil physical properties were analyzed using the procedure described **by Black, et al. (1981).** Soil chemical analysis was determined according to the method described **by Jackson (1973).** Physical and chemical analyses of the soil (the upper 30-cm) of the experimental site are given in **Table 2**

Table (2): Chemical and Physical properties of the experimental soils

Location	El-Mattana		Kom Ombo	
Seasons	2018/2019	2019/2020	2018/2019	2019/2020
Soil texture	Clay			
Sand %	12.40	13.90	20.20	19.50
Silt %	31.60	30.60	38.50	37.90
Clay %	56.00	55.50	41.30	42.60
E.C.(dsm)	2.10	1.30	2.00	1.60
Ph(1:2.5)	7.70	7.75	7.80	7.99
O.M. (%)	1.25	0.70	0.97	0.82
Cations (meg/L				
Ca^{**}	3.30	4.00	6.00	4.50
Mg^{**}	2.80	3.70	2.00	2.40
Na^{+}	3.30	5.30	8.00	8.20
K^{+}	1.10	0.35	1.00	0.20
$CaCO_3$ (%)	0.84	0.40	0.10	0.20
Anions (meg/L.)				
HCO_3^{-}	0.36	1.14	0.87	0.40
Cl^{-}	5.15	6.21	13.40	13.00
SO_4^{-}	4.99	6.00	2.73	1.90

Monthly temperature and relative humidity of two locations are presented in **(Table 3).**

Table (3): Monthly temperature and relative humidity* of locations

location	El-Mattana				Kom Ombo			
Month	Max.	Min.	Aver.	RH.	Max.	Min.	Aver.	RH.
Seasons 2018/2019								
Sep.	39.61	25.31	32.46	44.49	41.04	27.39	34.22	46.01
Oct.	35.60	21.00	28.30	48.66	36.26	22.64	29.45	39.32
Nov.	28.34	14.41	21.38	40.70	28.64	16.58	22.61	37.29
Dec.	22.92	9.53	16.23	45.66	22.87	10.67	16.77	43.03
Jan.	20.90	6.73	13.82	43.70	22.22	9.76	15.99	45.70
Feb.	24.37	10.54	17.46	42.33	24.17	12.06	18.12	42.30
Mar.	27.23	12.13	19.68	47.87	27.33	14.20	20.77	45.57
Apr.	33.36	17.73	25.55	43.32	35.22	17.80	26.51	47.28
May.	39.23	22.63	30.93	60.46	39.77	21.90	30.84	48.20
June.	42.62	26.89	34.76	61.76	42.79	25.29	34.04	63.56
Seasons 2019/2020								
Sep.	38.71	24.68	31.70	54.91	39.79	25.75	32.77	55.50
Oct.	37.43	22.67	30.05	49.28	39.40	21.77	30.59	47.75
Nov.	29.19	13.68	21.44	46.88	29.06	12.34	20.70	46.41
Dec.	24.13	8.53	16.33	52.63	24.40	8.33	16.37	54.20
Jan.	20.63	7.20	13.92	59.92	20.43	8.60	14.52	46.63
Feb.	23.81	9.18	16.50	54.12	23.93	11.14	17.54	47.93
Mar.	28.84	13.13	20.99	35.20	30.30	13.80	22.05	34.83
Apr.	32.97	18.08	25.52	38.50	33.22	19.31	26.27	37.47
May.	38.39	23.00	30.69	46.59	38.37	23.87	31.12	36.07
June.	41.37	25.66	33.51	52.82	41.76	26.66	34.21	56.10

***Monthly report, Agro meteorological data ARC, Egypt**
Max. = Maximum. Min. = Minimum. Aver. = Average Rh. = Relative humidity

The recorded data:

At harvest, sample of 20 roots from each plot were taken randomly, to determine the following traits:

A- Vegetative qualities:

1. Root dimensions (length and diameter) (cm).
2. Root fresh weight (g/plant).

B- Quality and chemical constituents:

Samples of the twenty roots were randomly taken sent to Laboratory at Abu Qurqas Sugar Factory Egypt according to the procedures of Sugar Company. By Automated Analyzer, as described by **Brown and Lilliand (1964).** Alpha-amino-N was determined using Hydrogenation method according to **Carruthers, *et al*. (1962)**.

1. Sucrose percentage (Pol %) was estimated in fresh samples of sugar beet roots, using polar metrically according to the method described in **A.O.A.C**, **(2005)**. **Le-Docte (1927).**
2. Impurities of juice, in terms of Sodium (Na) and Potassium (K) concentrations were estimated as meq/100g beet while α-amino N was determined using ninhydrin hydrindantin" method according to the method **Cooke and Scott (1993)**
3. Extracted sugar % was calculated using the following equation according to **Cooke and Scott (1993)** Extracted sugar % = (Pol %-0.29) - 0.343*(K + Na) - α- amino N * (0.0939)
4. Sugar loss to molasses % = (K+Na) *0.343+ (&N*0.094) +0.29.
5. Juice quality index (QI %) was calculated according to **Cooke and Scott (1993)** QI% = Quality index% = extracted sugar % (%)/POL×100. using the following equation:
6. Root yield/fed (ton), which were determined on sub plot weight (kg) and converted to tons/fed.
7. Sugar yield/fed (ton) was calculated according to the following method of **Devillers (1988):** Sugar yield/fed (ton) = root yield/fed (ton) x extracted sugar % / 100

Statistical analysis:

All obtained data were statistically analyzed according to the technique of analysis of variance **(ANOVA)** for the strip-plot design and then combined analysis was used between location experiments as published **by Gomez and Gomez (1984)** by using **(MSTAT-c)** computer software. Least significant differences (LSD) method was used to test the differences between treatment means at 5% level of probability as described by **Snedecor, G. W. and W. G. Cochran (1981).**

RESULTS AND DISCUSSION

I. Single Effect of location, Sowing dates and varieties. On sugar beet characters

I .1. Location:

The obtained results in **Table 4** showed that all characteristics of sugar beet ware significantly affected by locations in 2018/2019 and 2019/2020 Seasons except Top fresh weight (kg/plant) and Na% in the 1st Season and Root length (cm) in the 2nd Season El-Mattana location surpassed Kom Ombo in most characteristics values of sugar beet except impurities traits . Also, quality and sugar yield in the 2nd Season recorded in the highest values Kom Ombo location over El-Mattana location this result may be due to the differences in Cations and inions values in soils **Table (2)** in both seasons in two locations. These results coincide with those obtained by **Walter, (1987), Kristek *et al.* (1997), Aly (2006) Osman *et al.* (2014).**

Table (4): Sugar beet characters affected by location, Sowing date and variety.

Main effects	RFW	TFW	RL	RD	RY	S%	Impurities (meq/100 g beet)			SLM	ES%	QI%	SY
Location(L)	(Kg)	(g)	(cm)	(cm)	(t/fed)		K%	Na%	N%	%			(t/fed)
Season 2018/2019													
El-Mattana	1.250	0.266	29.42	15.06	21.49	15.77	2.72	3.43	2.21	2.57	13.21	82.88	2.916
Kom Ombo	1.171	0.261	28.00	11.73	19.14	12.85	3.28	3.40	2.37	2.80	10.05	78.03	1.950
F test	*	NS	*	*	*	*	*	NS	*	*	*	*	*
Sowing dates(S)													
Sep. 1st	1.212	0.261	28.38	13.28	19.72	14.91	2.83	3.34	2.11	2.54	12.38	82.51	2.453
Oct. 1st	1.281	0.286	31.60	14.80	23.91	16.11	2.84	3.47	2.40	2.68	13.43	82.75	3.269
Nov. 1st	1.139	0.243	26.15	12.12	17.32	11.90	3.32	3.43	2.37	2.83	9.08	76.11	1.577
LSD at 0.05	0.011	0.013	0.575	0.551	0.138	0.175	0.097	NS	0.174	0.072	0.251	0.730	0.049
Varieties (V													
Cleopatra	1.230	0.257	27.42	13.14	19.60	14.17	3.00	3.45	2.33	2.71	12.45	80.04	2.294
Tarbelli	1.221	0.253	28.68	13.69	19.84	14.86	2.95	3.46	2.27	2.69	13.04	81.31	2.470
Betamax	1.261	0.299	30.58	14.56	22.13	14.68	2.94	3.34	2.32	2.64	13.17	81.31	2.737
Sirona	1.273	0.292	30.63	15.01	21.95	14.61	3.09	3.45	2.23	2.68	13.11	80.70	2.700
Capel	1.322	0.295	31.49	15.17	22.35	14.81	2.89	3.37	2.25	2.63	13.66	81.48	2.793
Saucona	1.224	0.269	28.67	13.76	20.64	14.43	2.94	3.37	2.24	2.66	12.79	80.91	2.482
FD17B4010	1.140	0.250	28.39	12.26	19.01	13.44	3.11	3.36	2.32	2.69	11.78	79.13	2.115
FD18B4018	1.131	0.234	26.80	11.89	18.81	13.84	2.98	3.48	2.35	2.73	11.89	79.45	2.164
P17B4011	1.091	0.238	25.71	11.08	18.50	13.93	3.07	3.45	2.33	2.72	11.98	79.77	2.141
LSD at 0.05	0.021	0.017	0.968	0.636	0.320	0.337	0.111	NS	NS	NS	0.351	0.753	0.090
Season 2019/2020													
El-Mattana	1.166	0.200	27.65	13.74	19.15	15.00	4.18	2.98	4.65	3.03	11.97	78.50	2.378
Kom Ombo	1.142	0.246	28.21	12.11	18.75	17.85	4.81	1.62	3.87	2.65	15.20	84.95	2.861
F test	*	*	NS	*	*	*	*	*	*	*	*	*	*
Sowing dates(S)													
Sep. 1st	1.152	0.228	27.40	12.62	18.16	15.81	4.23	2.36	4.43	2.78	13.04	81.64	2.375
Oct. 1st	1.187	0.238	30.55	14.24	21.75	18.24	4.81	1.79	3.71	2.72	15.52	84.76	3.388
Nov. 1st	1.123	0.203	25.95	11.93	16.95	15.21	4.45	2.73	4.65	3.01	12.20	78.79	2.094
LSD at 0.05	0.007	0.010	0.588	0.646	0.348	1.469	0.276	0.247	0.345	0.137	1.489	2.052	0.337
Varieties (V)													
Cleopatra	1.161	0.211	29.37	13.42	19.05	15.92	4.26	2.50	4.40	2.84	13.08	81.08	2.533
Tarbelli	1.149	0.214	27.46	12.27	18.88	15.87	4.43	2.39	4.57	2.86	13.01	80.98	2.508
Betamax	1.174	0.244	28.33	13.02	19.87	18.56	4.67	1.92	3.79	2.73	15.83	84.84	3.158
Sirona	1.191	0.249	28.82	13.58	20.06	17.48	4.63	2.04	3.84	2.77	14.71	83.68	2.986
Capel	1.236	0.237	28.86	13.38	21.00	16.78	4.58	2.09	4.38	2.77	14.01	82.59	3.002
Saucona	1.176	0.217	28.03	12.96	19.48	16.48	4.69	2.30	4.31	2.90	13.58	80.97	2.676
FD17B4010	1.112	0.212	27.53	12.52	17.78	15.70	4.53	2.34	4.22	2.87	12.84	80.53	2.313
FD18B4018	1.099	0.201	27.36	12.46	17.35	15.43	4.41	2.61	4.43	2.94	12.48	80.03	2.202
P17B4011	1.088	0.221	25.93	12.75	17.10	15.58	4.25	2.49	4.44	2.84	12.74	80.86	2.193
LSD at 0.05	0.021	0.017	0.860	0.421	0.283	1.302	0.296	0.387	NS	NS	1.344	2.129	0260

RW: root Fresh weight (Kg.), TW: Top fresh weight (g.), RL: root length (cm), RD: root diameter (cm), RY: Root yield (ton/fed), SY. %sugar yield (ton/fed) K%: potassium Na: sodium, N: nitrogen, S.M.L %: Sugar loss to molasses %, S%: Sucrose, ES %: corrected sugar%, QI % quality index

I.2.Sowing dates.

Results in **Table 4** revealed that Sowing dates significantly affected all traits of sugar beet except N % and Extractable sugar% in the 1st Season It as noticed the Sowing dates October attained the highest values fare all traits of sugar beet except impurities traits and sugar lost of molasses in the 1st and 2nd Season than followed September and November which recorded the lowest values of growth, quality and yield of sugar beet. That result obtained by **Mahdi, *et al.* (2013), Gobarah *et al.* (2019)** and **El-Mansoub *et al* (. 2020).**

I .3. Varieties

Results illustrated in **Table 4** showed that varieties significantly affected all studied traits in both seasons except α amino nitrogen and sugar lost in molasses in both seasons and Na% in the 1st Season at is noticed that Capel, Sirona and Beta max ware superior in values of most traits of sugar beet than other varieties a specially growth and quality traits as well as yield traits in both seasons otherwise, varieties LP17B4011, FD18B4018 and FD17B4010 recorded the lowest values of sugar beet this result may be attributed to the game make up in varieties these results are line ob rained by **Enan, *et al.* (2011)**, **Mohamed and Yasin (2013), Aly, *et al.*(2015)** and **Hozayn, *et al.* (2014).**

II. Significant interaction

II.1. Location x sowing date

These results pointed in **Table (5)** revealed that interaction location with sowing date significantly affected same sugar beet traits in the 1st and 2nd Season under El-Mattana and Kom Ombo or location it is noticed that October sowing date surpassed the other sowing dates in growth, quality and yield of sugar came . Otherwise, impurities traits and sugar lost to molasses ware increased when sowing date (November) was applied in El-Mattana location in both seasons as wall Kom Ombo location in the 2nd Season. These results may be attributed to the environmental condition variable in two locations. These results coincide with those obtained by **Aminzadeh *et al.*(2014), Hossain**, **Ferdous *et al.* (2015), Curcic *et al.* (2018).**

II.2. Location x varieties

These results pointed out in **Table (6)** shown the interaction between location and varieties significantly affected same traits of growth, quality and yield of sugar beet in both seasons' traits of top fresh weight (kg/plant), N a% and Extractable sugar% in the 1st Season and k%, α amino nitrogen in the 2nd Season were in Significantly of feted by interaction location x varieties under El-Mattana location , Capel, Sirona and Beta max varieties recorded the highest value of growth, quality and yield of sugar beet traits competed to the other varieties otherwise LP17B4011, FD18B4018 and FD17B4010 varieties recorded the lowest values for the same traits in both seasons. The same trend was not: in Kom Ombo location in general varieties of sugar beet surpassed in El-Mattana over Kom Ombo location in respect of these traits. These results

may be due to the differences in climatic condition between two locations and the gene make up t these of sugar beet in both seasons. Those results are in harmony with those obtained by **White *et al.* (2011), Ntwanai** and **Tuwana (2013)**, **Kaloi, *et al.* (2014)**, **Mohamed *et al.* (2018).**

II.3. Sowing dates x Varieties

Results presented in **Table (7a)** and **Table (7b)** indicted those sugar beet traits except quality impurities traits significantly affected by interaction between sowing dates and varieties in the 1st Season. Under September sowing dates Capel, Sirona and Betamax varieties in the 1st Season. Recorded in the highest value of growth and yield of sugar beet while LP17B4011, FD18B4018 and FD17B4010 varieties obtained the lowest value for the same traits. The same trend was recorded in October and November sowing dates for these varieties but the values in November were less these results may be attar butted to high temperature in September and October months which in arouse growth and yield traits. This results in line with that obtained by **El-Mansoub and Mohamed (2014) Hozayn, *et al.* (2014) Hossain**, ***et al.* (2015), Aly and Khalil, 2017)**

In the 1st and 2nd Season most traits were significantly affected by interaction between sowing dates and variety except root and top fresh weight traits. The same trend was recorded when sowing dates October, September and November with Capel, Sirona and Betamax varieties were applied for the highest value of growth, quality and yield of sugar beet. The variable in values of traits of sugar beet may be due to climate conditions which increase in September, November and he gone make up for varieties. These results coincide the obtained with **White *et al.* (2011) Mahdi, *et al.* (2013) Aminzadeh *et al.* (2014)**

II.4. Location x Sowing dates x Varieties:-

Results obtained in **Table (8a)** and **Table (8b)** showed that interaction among three factors significantly affected all the studied traits except Top fresh weight (kg/plant), K% and Na% in the 1st and 2nd Season and as well as Extractable sugar % in the 1st Season only. Under El-Mattana location It is noticed that Capel, Sirona and Betamax varieties Recorded the highest value of Sugar beet traits in October sowing date followed September and November compared to the LP17B4011, FD18B4018 and FD17B4010 varieties which recorded the lowest value in both seasons for Kom Ombo location the same trend for results of interaction among the three factors in both seasons generally the value in sugar beet traits were higher in El-Mattana location over Kom Ombo in both seasons.

These results may be due to Heir soil properties (cations and anions) and climatic conditions in these locations **(table 2 and 3)** Also these results may be due to the difference of attributed be the genetic structures of sugar beet varieties which plays an important role in plant structure .These results ore in harmony with those obtained by **Enan, *et al.* (2011) Ghareeb, *et al.* (2013) Ntwanai** and **Tuwana (2013) Curcic *et al.* (2018).**

Table (5): Sugar beet characters as affected by Effected by significant interaction between Location and sowing date

Season 2018/2019											
Location (L)	Sowing Date(SD)	RD (cm)	RY (t/fed)	S%	K%.	Na %	Alfa amino -N%	S.L.M %	ES%	QI %	SY (t/fed)
El-Mattana	Sep.	15.33	19.82	16.77	2.48	3.44	2.02	2.39	14.38	85.69	2.869
	Oct.	16.54	25.95	18.48	2.44	3.34	2.15	2.47	16.01	86.59	4.153
	Nov.	13.33	18.70	12.06	3.23	3.51	2.47	2.83	9.22	76.36	1.726
Kom Ombo	Sep.	11.23	19.61	13.05	3.18	3.24	2.20	2.70	10.37	79.33	2.037
	Oct.	13.06	21.88	13.74	3.23	3.60	2.65	2.88	10.86	78.90	2.385
	Nov.	10.91	15.93	11.75	3.41	3.36	2.27	2.83	8.93	75.85	1.428
LSD at 0.05		0506	0.350	0.235	0.146	0.068	0.238	0103	0.245	0.602	0.069
Season 2019/2020											
Location (L)	Sowing Date (SD)	RD (cm)	RY (t/fed)	RFW (Kg)	TFW (g)	Na %	Alfa amino -N %	S.LM %	RL (cm)	QI %	SY (t/fed)
El-Mattana	Sep.	13.09	18.19	1.157	0.217	2.99	5.26	2.94	26.91	78.20	2.027
	Oct.	16.25	23.10	1.222	0.201	2.25	3.99	2.79	31.67	83.69	3.473
	Nov.	11.89	16.17	1.118	0.182	3.69	4.72	3.35	24.37	73.63	1.632
Kom Ombo	Sep.	12.14	18.13	1.146	0.240	1.74	3.60	2.61	27.89	85.08	2.723
	Oct.	12.22	20.40	1.151	0.275	1.33	3.44	2.65	29.20	85.83	3.303
	Nov.	11.97	17.73	1.127	0.223	1.78	4.58	2.68	27.52	83.95	2.555
LSD at 0.05		1.004	0.373	0.014	0.014	0.339	0.419	0.177	1.353	3.145	0.365

RW: root Fresh weight (Kg.), TW: Top fresh weight (g.), RL: root length (cm), RD: root diameter (cm), RY: Root yield (ton/fed), SY. %sugar yield (ton/fed) K%: potassium Na: sodium, N: nitrogen, S.M.L %: Sugar loss to molasses %, S%: Sucrose, ES %: corrected sugar%, QI % quality index

Table (6): Sugar beet characters as affected by Effected by significant interaction between Location and varieties

Season 2018/2019												
Location (L)	Variety (V)	RFW (Kg)	RL (cm)	RD (cm)	RY (t/fed)	S%	K %	Alfa amino-N %	S.L.M %	ES %	QI %	SY (t/fed)
El-Mattana	Cleopatra	1.259	27.28	14.44	20.63	15.70	2.63	2.34	2.59	13.11	82.64	2.743
	Tarbelli	1.256	29.46	15.77	21.24	16.23	2.65	2.27	2.62	13.62	83.29	2.955
	Betamax	1.297	30.93	17.02	23.84	15.97	2.75	2.19	2.56	13.41	83.26	3.284
	Sirona	1.328	31.97	16.91	23.35	16.57	2.86	1.86	2.52	14.05	83.95	3.362
	Capel	1.388	31.70	17.12	22.99	15.93	2.58	1.90	2.44	13.49	83.34	3.175
	Saucona	1.258	30.00	16.01	21.08	16.04	2.59	2.22	2.55	13.50	83.57	2.892
	FD17B4010	1.173	28.88	13.24	20.42	14.88	2.96	2.40	2.59	12.29	81.63	2.605
	FD18B4018	1.159	28.69	12.81	20.16	15.26	2.62	2.46	2.62	12.64	81.88	2.638
	LP17B4011	1.131	25.90	12.23	19.70	15.34	2.83	2.27	2.60	12.74	82.37	2.589
Kom Ombo	Cleopatra	1.202	27.56	11.84	18.57	12.64	3.38	2.32	2.83	9.82	77.45	1.846
	Tarbelli	1.187	27.91	11.62	18.43	13.48	3.26	2.26	2.77	10.68	79.34	1.985
	Betamax	1.226	30.23	12.10	20.41	13.40	3.13	2.45	2.72	10.57	79.36	2.190
	Sirona	1.218	29.30	13.11	20.54	12.66	3.32	2.59	2.84	9.81	77.45	2.039
	Capel	1.257	31.29	13.21	21.72	13.70	3.21	2.60	2.83	11.04	79.61	2.410
	Saucona	1.191	27.34	11.51	20.20	12.81	3.28	2.26	2.77	10.07	78.24	2.071
	FD17B4010	1.107	27.90	11.27	17.60	11.99	3.27	2.24	2.79	9.20	76.63	1.626
	FD18B4018	1.103	24.91	10.97	17.47	12.42	3.33	2.25	2.83	9.58	77.03	1.691
	LP17B4011	1.051	25.52	9.93	17.30	12.51	3.30	2.39	2.84	9.68	77.16	1.692
LSD at 5% level		0.030	1.370	0.899	0.452	0.477	0.157	0.229	0.100	0.496	1.056	0.128

Table (6): Count.

Season 2019/2020												
Location (L)	**Variety (V)**	**RFW (Kg)**	**RL (cm)**	**RD (cm)**	**RY (t/fed)**	**S%**	**TFW (g)**	**Na %**	**S.L.M %**	**ES %**	**QI %**	**SY (t/fed)**
El-Mattana	**Cleopatra**	1.168	29.97	14.58	19.38	14.66	0.181	3.03	2.98	11.69	78.59	2.320
	Tarbelli	1.162	27.54	12.59	19.47	14.53	0.185	2.89	2.99	11.54	78.31	2.334
	Betamax	1.171	27.24	13.56	20.07	18.23	0.202	2.23	2.82	15.41	83.72	3.112
	Sirona	1.183	26.99	14.50	20.35	17.13	0.238	2.43	2.88	14.25	82.46	2.960
	Capel	1.247	26.47	13.90	21.60	16.03	0.196	2.59	2.93	13.11	80.29	2.956
	Saucona	1.198	28.39	13.81	20.46	14.05	0.183	3.32	3.16	10.89	75.97	2.352
	FD17B4010	1.131	28.07	13.23	17.46	13.41	0.198	3.25	3.14	10.27	75.54	1.849
	FD18B4018	1.125	28.27	13.34	16.89	13.55	0.189	3.63	3.26	10.29	75.33	1.791
	LP17B4011	1.110	25.90	14.19	16.68	13.36	0.228	3.42	3.08	10.28	76.33	1.725
Kom Ombo	**Cleopatra**	1.154	28.10	12.26	18.71	17.17	0.242	1.96	2.71	14.46	83.58	2.747
	Tarbelli	1.137	27.37	11.94	18.29	17.20	0.243	1.90	2.72	14.48	83.64	2.682
	Betamax	1.177	29.41	12.48	19.67	18.88	0.286	1.60	2.64	16.24	85.96	3.204
	Sirona	1.198	30.65	12.66	19.78	17.83	0.261	1.65	2.66	15.17	84.90	3.013
	Capel	1.225	31.26	12.86	20.41	17.53	0.278	1.58	2.62	14.91	84.89	3.048
	Saucona	1.154	27.67	12.11	18.49	18.91	0.251	1.27	2.65	16.26	85.96	2.999
	FD17B4010	1.092	26.99	11.80	18.10	17.99	0.225	1.42	2.60	15.40	85.52	2.778
	FD18B4018	1.072	26.45	11.57	17.80	17.31	0.213	1.59	2.63	14.68	84.74	2.614
	LP17B4011	1.066	25.95	11.32	17.52	17.79	0.214	1.56	2.59	15.20	85.39	2.662
LSD at 5% level		0.030	1.216	0.595	0.401	1.841	0.024	0.548	0.202	1.901	3.011	0.367

RW: root Fresh weight (Kg.), TW: Top fresh weight (g.), RL: root length (cm), RD: root diameter (cm), RY: Root yield (ton/fed), SY. %sugar yield (ton/fed) K%: potassium Na: sodium, N: nitrogen, S.M.L %: Sugar loss to molasses %, S%: Sucrose, ES %: corrected sugar%, QI % quality index

Table (7a): Sugar beet characters as affected by Effected by significant interaction between sowing dates and varieties in Season 2018/2019.

Sowing dates(S)	Variety (V)	RFW (Kg)	TFW (g)	RL (cm)	RD (cm)	RY (t/fed)	ES%	SY (t/fed)
Sep.	Cleopatra	1.214	0.267	26.67	12.90	19.77	12.40	2.461
	Tarbelli	1.217	0.255	28.00	13.82	19.76	12.46	2.469
	Betamax	1.246	0.292	28.83	15.17	21.29	12.54	2.700
	Sirona	1.276	0.301	30.00	15.57	21.16	12.92	2.759
	Capel	1.302	0.286	32.25	16.18	21.61	13.35	2.887
	Saucona	1.235	0.260	30.50	13.57	20.86	12.70	2.641
	FD17B4010	1.152	0.225	27.50	11.17	17.92	11.63	2.077
	FD18B4018	1.153	0.214	26.83	11.30	17.70	11.75	2.073
	LP17B4011	1.109	0.251	24.83	9.82	17.37	11.63	2.010
Oct.	Cleopatra	1.288	0.250	30.08	14.87	21.84	13.27	2.918
	Tarbelli	1.283	0.255	32.33	14.73	22.71	14.10	3.254
	Betamax	1.332	0.328	34.58	15.42	26.70	13.92	3.764
	Sirona	1.333	0.310	33.75	15.87	26.13	13.69	3.632
	Capel	1.433	0.311	34.08	15.35	26.19	14.06	3.698
	Saucona	1.266	0.306	30.67	14.75	24.01	13.34	3.200
	FD17B4010	1.213	0.295	31.75	14.75	22.83	12.15	2.892
	FD18B4018	1.206	0.274	29.50	13.72	22.53	13.20	3.060
	LP17B4011	1.176	0.272	27.67	13.72	22.28	13.16	3.006
Nov.	Cleopatra	1.189	0.254	25.50	11.67	17.18	8.72	1.504
	Tarbelli	1.164	0.248	25.72	12.53	17.04	9.90	1.689
	Betamax	1.207	0.278	28.33	13.10	18.39	9.50	1.749
	Sirona	1.211	0.265	28.15	13.60	18.56	9.19	1.710
	Capel	1.232	0.287	28.15	13.97	19.26	9.38	1.793
	Saucona	1.173	0.242	24.85	12.97	17.06	9.31	1.604
	FD17B4010	1.055	0.230	25.92	10.85	16.28	8.46	1.377
	FD18B4018	1.033	0.213	24.07	10.65	16.22	8.38	1.360
	LP17B4011	0.987	0.191	24.63	9.72	15.85	8.84	1.407
LSD at 5% level		0.037	0.030	1.678	1.101	0.553	0.608	0.156

RW: root Fresh weight (Kg.), TW: Top fresh weight (g.), RL: root length (cm), RD: root diameter (cm), RY: Root yield (ton/fed), SY. %sugar yield (ton/fed), ES %: corrected sugar%,

Table (7b): Effect of the significant interaction between sowing dates and varieties on some sugar beet characters in Season 2019/2020

Sowing dates(S)	Variety (V)	RFW (Kg)	RL (cm)	RD (cm)	RY (t/fed)	S%	K %	N a %	N %	S.M.L %	ES %	QI %	SY (t/fed)
Sep.	Cleopatra	0.227	29.02	13.18	18.46	14.06	3.73	3.24	4.95	2.98	11.08	78.10	2.036
	Tarbelli	0.228	29.70	12.32	18.22	15.51	3.89	2.48	4.60	2.71	12.80	82.27	2.329
	Betamax	0.263	27.97	12.10	19.48	18.07	4.55	1.74	3.78	2.61	15.45	85.15	3.010
	Sirona	0.221	28.03	13.47	19.37	16.78	4.41	1.93	4.28	2.65	14.13	83.87	2.736
	Capel	0.258	27.78	13.00	20.27	15.03	3.89	2.41	4.96	2.68	12.35	81.83	2.493
	Saucona	0.211	25.00	12.17	18.94	16.62	4.87	2.07	4.16	2.87	13.76	81.46	2.562
	FD17B4010	0.218	27.47	12.52	16.65	15.45	4.25	2.30	4.24	2.75	12.70	81.65	2.129
	FD18B4018	0.205	26.80	11.37	16.24	15.21	4.36	2.59	4.39	2.92	12.30	79.80	2.027
	LP17B4011	0.223	24.83	13.42	15.83	15.57	4.17	2.52	4.50	2.82	12.75	80.62	2.058
Oct.	Cleopatra	0.218	32.92	14.70	21.68	19.61	5.03	1.61	3.20	2.72	16.90	85.97	3.641
	Tarbelli	0.223	26.42	13.07	21.74	19.14	5.14	1.75	3.48	2.82	16.33	85.07	3.532
	Betamax	0.257	30.25	14.53	21.86	19.93	4.80	1.88	3.70	2.76	17.18	86.09	3.751
	Sirona	0.289	32.58	14.85	23.01	19.51	5.01	1.87	3.73	2.82	16.68	85.42	3.835
	Capel	0.257	31.58	14.70	23.70	19.94	5.19	1.26	3.46	2.62	17.32	86.80	4.140
	Saucona	0.242	32.42	14.73	22.84	17.80	4.60	1.78	3.56	2.65	15.16	85.07	3.466
	FD17B4010	0.217	30.33	13.55	20.80	16.33	4.30	1.96	3.66	2.62	13.71	83.65	2.843
	FD18B4018	0.211	29.67	14.53	20.45	16.36	4.73	1.80	4.09	2.70	13.66	83.30	2.788
	LP17B4011	0.226	28.75	13.48	19.66	15.53	4.46	2.21	4.53	2.79	12.74	81.46	2.498
Nov.	Cleopatra	0.188	26.17	12.37	17.01	14.08	4.02	2.65	5.05	2.83	11.26	79.18	1.922
	Tarbelli	0.190	26.25	11.42	16.69	12.95	4.27	2.95	5.62	3.04	9.91	75.59	1.663
	Betamax	0.212	26.77	12.43	18.28	17.67	4.67	2.14	3.88	2.83	14.85	83.29	2.714
	Sirona	0.237	25.85	12.42	17.82	16.15	4.49	2.32	3.51	2.84	13.31	81.76	2.388
	Capel	0.196	27.22	12.43	19.04	15.38	4.67	2.59	4.71	3.02	12.36	79.15	2.374
	Saucona	0.197	26.67	11.98	16.66	15.02	4.62	3.03	5.21	3.20	11.82	76.36	1.999
	FD17B4010	0.200	24.79	11.48	15.90	15.32	5.05	2.75	4.75	3.23	12.09	76.28	1.969
	FD18B4018	0.187	25.61	11.47	15.35	14.72	4.15	3.45	4.82	3.22	11.50	77.00	1.792
	LP17B4011	0.214	24.19	11.37	15.81	15.63	4.11	2.74	4.28	2.90	12.74	80.50	2.024
LSD at 5% level		0.030	1.489	0.729	0.491	2.255	0.512	0.671	0.988	0247	2.328	3.688	0.450

RW: root Fresh weight (Kg.), RL: root length (cm), RD: root diameter (cm), RY: Root yield (ton/fed), SY. %sugar yield (ton/fed) K%: potassium Na: sodium, N: nitrogen, S.M.L %: Sugar loss to molasses %, S%: Sucrose, ES %: corrected sugar%, QI % quality index

Table (8a): Sugar beet characters as affected by Effected by significant interaction among Location, sowing dates and varieties in Season 2018/2019

Location (L)	sowing dates(SD)	Variety (V)	RFW (Kg)	RL (cm)	RD (cm)	RY (t/fed)	S%	N%	SLM%	ES %	QI%	SY (t/fed)
El-Mattana	Sep.	Cleopatra	1.235	26.00	14.33	20.41	16.63	2.17	2.48	14.15	85.05	2.886
		Tarbelli	1.260	28.00	16.23	20.04	16.90	2.20	2.51	14.39	85.15	2.886
		Betamax	1.267	30.00	17.87	22.42	17.47	1.98	2.35	15.12	86.56	3.390
		Sirona	1.308	31.00	17.37	22.02	18.10	1.43	2.28	15.82	87.40	3.483
		Capel	1.340	32.00	18.43	21.59	17.80	1.64	2.18	15.62	87.76	3.373
		Saucona	1.272	30.00	16.77	20.34	16.83	2.09	2.45	14.38	85.39	2.929
		FD17B4010	1.183	29.00	12.70	17.51	15.17	2.14	2.32	12.85	84.73	2.245
		FD18B4018	1.173	28.67	12.63	17.31	16.23	2.37	2.55	13.68	84.27	2.371
		LP17B4011	1.158	25.00	11.60	16.77	15.83	2.12	2.39	13.44	84.90	2.255
	Oct.	Cleopatra	1.325	30.33	16.67	22.54	18.50	2.17	2.45	16.05	86.73	3.617
		Tarbelli	1.310	33.67	16.83	25.01	18.93	2.29	2.52	16.41	86.66	4.102
		Betamax	1.382	35.00	17.33	29.60	17.97	2.21	2.47	15.50	86.24	4.587
		Sirona	1.418	35.33	18.00	27.98	19.14	1.73	2.44	16.69	87.22	4.670
		Capel	1.543	34.33	16.50	26.87	18.88	1.80	2.29	16.59	87.85	4.456
		Saucona	1.292	33.00	16.50	23.93	18.43	2.16	2.46	15.98	86.70	3.825
		FD17B4010	1.218	31.33	16.33	26.23	18.22	2.32	2.58	15.62	85.70	4.098
		FD18B4018	1.212	32.33	15.17	25.85	18.30	2.42	2.51	15.80	86.31	4.082
		LP17B4011	1.183	29.00	15.50	25.57	17.93	2.25	2.52	15.41	85.92	3.941
	Nov.	Cleopatra	1.217	25.50	12.33	18.93	11.97	2.68	2.84	9.13	76.13	1.726
		Tarbelli	1.197	26.70	14.23	18.68	12.87	2.31	2.82	10.05	78.07	1.877
		Betamax	1.242	27.80	15.87	19.51	12.47	2.37	2.85	9.62	76.96	1.877
		Sirona	1.258	29.57	15.37	20.06	12.47	2.42	2.84	9.63	77.24	1.932
		Capel	1.282	28.77	16.43	20.51	11.10	2.24	2.84	8.26	74.43	1.695
		Saucona	1.210	27.00	14.77	18.99	12.87	2.42	2.75	10.12	78.62	1.922
		FD17B4010	1.118	26.30	10.70	17.51	11.27	2.75	2.87	8.39	74.45	1.471
		FD18B4018	1.092	25.07	10.63	17.31	11.23	2.58	2.79	8.44	75.07	1.461
		LP17B4011	1.050	23.70	9.60	16.77	12.27	2.43	2.90	9.37	76.30	1.573

Table (8a): Count.

Location (L)	sowing dates(SD)	Variety (V)	RFW (Kg)	RL (cm)	RD (cm)	RY (t/fed)	S%	N%	SLM%	ES %	QI%	SY (t/fed)
Kom Ombo	Sep.	Cleopatra	1.193	27.33	11.47	19.13	13.30	2.02	2.66	10.64	80.03	2.036
		Tarbelli	1.173	28.00	11.40	19.48	13.23	2.09	2.64	10.53	79.97	2.051
		Betamax	1.225	27.67	12.47	20.16	12.83	2.09	2.54	9.96	79.70	2.009
		Sirona	1.243	29.00	13.77	20.30	12.90	2.48	2.88	10.02	77.69	2.034
		Capel	1.263	32.50	13.93	21.64	13.37	2.34	2.76	11.09	80.08	2.400
		Saucona	1.198	31.00	10.37	21.38	13.67	2.25	2.73	11.01	80.12	2.353
		FD17B4010	1.122	26.00	9.63	18.34	13.10	2.23	2.69	10.41	79.50	1.909
		FD18B4018	1.133	25.00	9.97	18.08	12.50	2.19	2.68	9.82	78.51	1.775
		LP17B4011	1.060	24.67	8.03	17.97	12.53	2.12	2.71	9.82	78.36	1.765
	Oct.	Cleopatra	1.250	29.83	13.07	21.14	13.43	2.61	2.94	10.50	78.12	2.218
		Tarbelli	1.257	31.00	12.63	20.42	14.67	2.44	2.89	11.78	80.32	2.405
		Betamax	1.282	34.17	13.50	23.81	15.20	2.99	2.85	12.35	81.21	2.940
		Sirona	1.248	32.17	13.73	24.29	13.60	3.15	2.92	10.68	78.48	2.593
		Capel	1.323	33.83	14.20	25.51	14.43	3.19	2.91	11.52	79.79	2.939
		Saucona	1.240	28.33	13.00	24.09	13.47	2.27	2.78	10.69	79.36	2.574
		FD17B4010	1.208	32.17	13.17	19.42	11.50	2.29	2.83	8.68	75.40	1.686
		FD18B4018	1.200	26.67	12.27	19.20	13.48	2.21	2.87	10.61	78.66	2.038
		LP17B4011	1.168	26.33	11.93	19.00	13.83	2.69	2.93	10.90	78.78	2.071
	Nov.	Cleopatra	1.162	25.50	11.00	15.44	11.20	2.32	2.89	8.31	74.19	1.283
		Tarbelli	1.132	24.73	10.83	15.40	12.53	2.26	2.79	9.74	77.72	1.500
		Betamax	1.172	28.87	10.33	17.27	12.17	2.28	2.78	9.39	77.15	1.621
		Sirona	1.163	26.73	11.83	17.05	11.47	2.15	2.73	8.74	76.17	1.489
		Capel	1.183	27.53	11.50	18.01	13.30	2.27	2.80	10.50	78.96	1.892
		Saucona	1.135	22.70	11.17	15.14	11.30	2.27	2.80	8.50	75.23	1.287
		FD17B4010	0.992	25.53	11.00	15.04	11.37	2.20	2.84	8.52	74.99	1.282
		FD18B4018	0.975	23.07	10.67	15.12	11.27	2.34	2.94	8.33	73.90	1.259
		LP17B4011	0.923	25.57	9.83	14.93	11.17	2.35	2.86	8.30	74.34	1.240
LSD at 5% level			0.052	2.372	1.557	0.783	0.826	0.396	0.173	0.860	1.844	0.221

RW: root Fresh weight (Kg.), RL: root length (cm), RD: root diameter (cm), RY: Root yield (ton/fed), SY. %sugar yield (ton/fed), N: nitrogen, S.M.L %: Sugar loss to molasses %, S%: Sucrose, ES %: corrected sugar%, QI % quality index

Table (8b): Sugar beet characters as affected by Effected by significant interaction among Location, sowing dates and varieties in Season 2019/2020

Location (L)	sowing dates(SD)	Variety (V)	RFW (Kg)	RL (cm)	RD (cm)	RY (t/fed)	S%	N %	SLM%	ES %	QI%	SY (t/fed)
El-Mattana	Sep.	Cleopatra	1.162	30.57	13.77	18.93	12.08	3.73	3.20	8.89	73.52	1.682
		Tarbelli	1.158	32.30	12.60	18.62	14.01	2.67	2.76	11.26	80.30	2.096
		Betamax	1.160	26.77	11.70	19.78	18.48	1.91	2.70	15.78	84.62	3.121
		Sirona	1.167	25.63	14.30	19.80	16.23	2.22	2.68	13.55	82.96	2.682
		Capel	1.180	24.40	13.23	20.87	13.34	2.89	2.81	10.52	78.86	2.197
		Saucona	1.175	23.00	12.03	20.03	12.73	3.04	2.98	9.76	76.34	1.953
		FD17B4010	1.150	28.20	13.33	15.87	13.59	3.05	2.98	10.61	77.90	1.683
		FD18B4018	1.140	27.50	11.33	15.24	12.63	3.85	3.30	9.33	73.83	1.423
		LP17B4011	1.125	23.83	15.53	14.58	12.70	3.58	3.04	9.66	75.46	1.411
	Oct.	Cleopatra	1.222	36.67	17.13	22.81	17.95	2.19	2.74	15.22	84.64	3.468
		Tarbelli	1.200	24.00	14.00	23.45	18.14	2.26	2.85	15.29	84.03	3.586
		Betamax	1.212	29.67	16.60	22.82	19.37	2.12	2.77	16.60	85.57	3.791
		Sirona	1.238	33.33	17.03	24.77	19.38	2.22	2.90	16.48	84.95	4.086
		Capel	1.330	31.00	16.50	25.71	21.78	1.58	2.73	19.05	87.47	4.900
		Saucona	1.260	36.33	17.30	25.49	17.92	2.12	2.67	15.25	84.97	3.889
		FD17B4010	1.183	32.67	15.00	21.63	15.29	2.08	2.58	12.72	82.68	2.746
		FD18B4018	1.163	32.33	17.10	21.17	15.47	2.51	2.87	12.59	81.23	2.671
		LP17B4011	1.143	31.00	15.60	20.07	13.54	3.16	2.99	10.55	77.67	2.120
	Nov.	Cleopatra	1.120	24.67	12.83	16.42	13.96	3.18	2.99	10.97	77.61	1.809
		Tarbelli	1.127	26.33	11.17	16.35	11.44	3.73	3.36	8.08	70.61	1.320
		Betamax	1.140	25.30	12.37	17.62	16.83	2.67	2.99	13.85	80.98	2.425
		Sirona	1.145	22.00	12.17	16.47	15.77	2.85	3.05	12.73	79.45	2.112
		Capel	1.180	24.00	11.97	18.22	12.98	3.30	3.24	9.74	74.55	1.772
		Saucona	1.160	25.83	12.10	15.87	11.51	4.79	3.83	7.68	66.60	1.215
		FD17B4010	1.060	23.33	11.37	14.89	11.35	4.62	3.85	7.50	66.04	1.117
		FD18B4018	1.072	24.97	11.60	14.26	12.55	4.53	3.61	8.93	70.92	1.277
		LP17B4011	1.062	22.87	11.43	15.40	13.85	3.51	3.20	10.65	75.87	1.643

Table (8b): Count.

Location (L)	sowing dates(SD)	Variety (V)	RFW (Kg)	RL (cm)	RD (cm)	RY (t/fed)	S%	N %	SLM%	ES %	QI%	SY (t/fed)
Kom Ombo	Sep.	Cleopatra	1.153	27.47	12.60	17.98	16.04	2.75	2.77	13.27	82.68	2.391
		Tarbelli	1.145	27.10	12.03	17.81	17.00	2.29	2.66	14.35	84.24	2.562
		Betamax	1.182	29.17	12.50	19.17	17.65	1.58	2.52	15.12	85.67	2.898
		Sirona	1.208	30.42	12.63	18.93	17.33	1.65	2.62	14.71	84.77	2.790
		Capel	1.257	31.17	12.77	19.67	16.72	1.93	2.54	14.18	84.80	2.789
		Saucona	1.175	27.00	12.30	17.84	20.51	1.11	2.75	17.76	86.58	3.171
		FD17B4010	1.075	26.73	11.70	17.43	17.31	1.54	2.52	14.79	85.40	2.574
		FD18B4018	1.063	26.10	11.40	17.25	17.79	1.33	2.53	15.26	85.76	2.631
		LP17B4011	1.060	25.83	11.30	17.08	18.44	1.47	2.61	15.83	85.78	2.704
	Oct.	Cleopatra	1.155	29.17	12.27	20.54	21.27	1.02	2.70	18.58	87.31	3.814
		Tarbelli	1.133	28.83	12.13	20.03	20.15	1.24	2.79	17.36	86.11	3.477
		Betamax	1.180	30.83	12.47	20.89	20.49	1.63	2.74	17.75	86.60	3.710
		Sirona	1.202	31.83	12.67	21.24	19.63	1.52	2.74	16.89	85.88	3.585
		Capel	1.222	32.17	12.90	21.69	18.10	0.93	2.51	15.59	86.13	3.381
		Saucona	1.145	28.50	12.17	20.19	17.68	1.44	2.62	15.06	85.18	3.042
		FD17B4010	1.125	28.00	12.10	19.98	17.37	1.84	2.66	14.71	84.63	2.939
		FD18B4018	1.100	27.00	11.97	19.73	17.24	1.09	2.52	14.72	85.38	2.905
		LP17B4011	1.102	26.50	11.35	19.25	17.51	1.25	2.58	14.93	85.26	2.876
	Nov.	Cleopatra	1.153	27.67	11.90	17.60	14.21	2.11	2.66	11.55	80.74	2.035
		Tarbelli	1.133	26.17	11.67	17.03	14.46	2.16	2.73	11.74	80.57	2.006
		Betamax	1.170	28.23	12.48	18.95	18.51	1.60	2.66	15.85	85.61	3.002
		Sirona	1.185	29.70	12.67	19.16	16.53	1.78	2.63	13.90	84.06	2.664
		Capel	1.197	30.43	12.90	19.86	17.77	1.89	2.81	14.97	83.75	2.976
		Saucona	1.142	27.50	11.87	17.44	18.53	1.27	2.57	15.96	86.12	2.783
		FD17B4010	1.077	26.25	11.60	16.91	19.29	0.88	2.60	16.69	86.51	2.821
		FD18B4018	1.053	26.25	11.33	16.43	16.89	2.36	2.83	14.06	83.08	2.307
		LP17B4011	1.035	25.52	11.30	16.22	17.41	1.96	2.59	14.82	85.13	2.405
LSD at 5% level			0.051	2.106	1.032	0.694	3.190	0949	0.350	3.293	5.216	0636

RW: root Fresh weight (Kg.), TW: Top fresh weight (g.), RL: root length (cm), RD: root diameter (cm), RY: Root yield (ton/fed), SY. %sugar yield (ton/fed) K%: potassium Na: sodium, N: nitrogen, S.M.L %: Sugar loss to molasses %, S%: Sucrose, ES %: corrected sugar%, QI % quality index

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تقييم بعض أصناف بنجر السكر تحت مواعيد زراعة مختلفة في منطقتين بصعيد مصر

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أقيمت تجربه حقلية في ثلاث مواعيد زراعة (منتصف سبتمبر– أكتوبر – نوفمبر) في منطقتين بصعيد مصر – محطة بحوث المطاعنة محافظة الأقصر (خط عرض 25.25 درجة شمالاً وخط طول 32.31 درجة شرقاً وارتفاع 81 م فوق مستوى سطح البحر) و محطة بحوث كوم أمبو محافظة أسوان (خط عرض 24.28 درجة شمالاً وخط طول 32.57 درجة شرقاً وارتفاع 84.5 م فوق مستوى سطح البحر) مصر خلال موسمي 2019/2018 و

2020/2019 .لتقييم تسعة أصناف من بنجر السكر هم (كليوباترا ، تاربيلي ، بيتاماكس ، سيرونا ، كابيل ، ساكونا ، FD17B410، FD18B418 ، و LP 17B411) واختيار الأفضل من حيث المحصول والجودة بصعيد مصر. وقد استخدم تصميم الشرائح المتعامدة في ثلاثة مكررات حيث وزعت مواعيد الزراعة في القطع الرأسية وأصناف بنجر السكر في القطع العرضية في كلا المنطقتين .

وقد أوضحت النتائج أن الزراعة في :

- محطة بحوث المطاعنة تفوقت على محطة بحوث كوم أمبو في معظم صفات النمو والجودة والمحصول بدرجة متوسطه .
- أن الزراعة في منتصف شهر أكتوبر أعطت قيمآ عالية لمعظم صفات البنجر يليها الزراعة في منتصف شهر سبتمبر ثم الزراعة في منتصف شهر نوفمبر وهو أقل القيم لصفات البنجر.
- اختلفت أصناف بنجر السكر بدرجات متفاوتة في قيم صفات البنجر وأن أفضلهم أصناف كابيل ، سيرونا و بيتاماكس من حيث صفات النمو والجودة والمحصول مقارنة بالأصناف FD17B410، FD18B418 ، و LP 17B411 التي أعطت قيمآ منخفضة لصفات بنجر السكر .
- تحت ظروف البحث يتضح أن منطقة المطاعنة وكوم أمبو يمكن زراعة أصناف كابيل و سيرونا و بيتاماكس في ميعاد منتصف شهر أكتوبر للحصول على أعلى نمو ومحصول وجودة من بنجر السكر بصعيد مصر .