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The Effects of Planting Date and Cutting Time on Teosinte Productivity Under Soil Salinity

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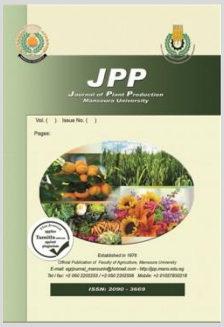

ABSTRACT

During the summers of 2019 and 2020, two field experiments were conducted at El-Serw Agriculture Research Station, in Damietta Governorate. Teosinte seeds were planted on three different dates (15th March, 15th April, and 15th May), and subjected three cutting time of 40, 50, and 60 days in two different salinity soil sites (low and medium salinity depending on dsm-1). The first sowing date and cutting at 60 days in low saline levels led to the heaviest overall fresh and dry weights throughout both seasons. In both seasons, the first sowing date and the first cutting time at the medium salt levels resulted in the lowest mean of total fresh and dry weights. In both seasons, the highest data of fruit instances was observed from the second sowing and cutting time at 60 days under the first level of salinity. The first and second sowing dates under the three managements of cutting under two soil salinity levels showed no significant differences. Under the first soil salinity, the maximum mean of 100 grains weight was reported from the third sowing date and cutting at 60 days. During the first season, the third sowing date and cutting at 50 days under low salinity conditions resulted in the highest seed weight/fed, whereas in the second season, the second sowing date at 50 days under low salinity levels resulted in the highest seed weight/fed. Under medium salinity soil, the lowest seed weight/fed values were reported from the first sowing date and cutting at 40 days.

***Keywords*:** Teosinte, sowing date, cutting, salinity

INTRODUCTION

Salt affects more than 6% of the world's total land area and 20% of irrigated land (FAO, 2008). Most crucially, between 35 percent and 50 percent of the world's population lives in semiarid areas where salinization is a big issue in roughly 80 countries. Egypt is a good example of the issues that such countries face. Clearly, improving genotype salt tolerance has been proposed as the most effective way to reduce the negative effects of salinity on crop production (Pervaiz *et al.,* 2002), because this strategy is still much less expensive for poor farmers in developing countries and more feasible to implement on a large scale than other management practices such as leaching salt from the soil surface. etc. (Qureshi and Barrett-Lennard, 1998).

Teosinte or Rayyana (*Euchlaena maxicana* L.) is generally believed to be the ancestor of modern multi-row corn. It is a neglected forage crop that has not received the attention it deserves, and little work has been done to explore its yield potential. It is an excellent multi-cut fodder which gives a high yield of nutritious green fodder. As a fodder crop, it can be cultivated in any intensive fodder production system on account of its versatile adaptability and biomass production ability. It can be fed safely to animals as green, dry, or conserved fodder in the form of silage or hay even before flowering (Fayed *et al.,* 2020).

Unlike corn kernels, Teosinte survives as a wild plant because the tips of pistylates break open at maturity to disperse grains that are protected by a heavy cellulose lignin structure called shells. The pericarp is composed of the hard part of spikeraki, the outer rice husks of wood, and can be black, black spotted gray, or off-white (Amany Sallam and Hoda Ibrahim, 2014). Among the forage crops cultivated in the summer, Theosinte is one of the most popular high energy, high crude protein grain forage crops (Upreti and Shrestha, 2006; Devkota *et al.* 2015). Since Teosinte has become a popular summer feed in Nepal in recent years, the development of its set of cultivation practices is an urgent need for farmers (Devkota *et al.*, 2017).

With the continued occurrence of green fodder shortages in Egypt during the summer months, boosting the productivity of some promising annual forage varieties is gaining attention (Ziki *et al*., 2019). In comparison to advanced cuttings, Shahin *et al.* (2013) found that the tallest plants of forage pearl millet cultivar Shandaweel 1 were obtained during the initial cut. According to Noor et al. (2016), pearl millet cutting at 55, 65, and 75 DAS resulted in the highest plant height and leaf area per plant. Furthermore, Chaudhari *et al.* (2018) discovered that while 30 DAS had no significant influence on pearl millet plant height, 60 DAS had a significant effect, resulting in increased plant height. Choosing the best pearl millet cutting date is therefore critical for ensuring timely crop recovery following cutting or grazing while also maximizing fodder yield. Farmers and forage producers frequently harvest forage crops depending on market need, ignoring the best cutting date for improved development and production. Plant nutrition components, especially nitrogen, are critical for crop productivity.

Teosinte seeding with locally accessible fodder legumes at appropriate dates could be one of the obvious solutions for low-cost forage/forage production with high forage/forage mass and quality of yield among the various methods for increasing fodder/forage supply (Khanal *et al*., 2020).

Due to climate change and a lack of interest in this crop, output is currently at its pinnacle. As a result, it's become vital to look for different methods or technologies that can increase yield and improve quality, such as examining the ideal planting

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dates, especially with so many kinds and hybrids, and plant breeders developing new varieties (Ajaj *et al.,* 2021). As a result, this study was carried out at the Agricultural Research Center of Egypt's El-Serw Agriculture Research Station in Damietta Governorate (North Delta) to determine the impact of planting and cutting dates on teosinte productivity and quality under salinity soil conditions in this district.

MATERIALS AND METHODS

During the 2019 and 2020 summer seasons, two field experiments were conducted at El-Serw Agriculture Research Station, Damietta Governorate (North Delta), Agricultural Research Center, Egypt, to investigate the effect of planting and cutting dates on teosinte productivity and quality under salinity soil conditions. Teosinte seeds (Gemmiza 4 cultivar) were sown at a rate of 20 kg/fed in two distinct experiments using the dry technique on three different planting dates (15th March, 15th April, and 15th May) (Afir). The experiment was done in a separate location. The planting dates were done (every date) separately sown. In addition, cutting dates, i.e., (cuts were taken after 40, 50, and 60 days for each location) were distributed in a randomized complete block design (RCBD) inside the sowing date plots in every location with three replications: "low salinity soil," "medium salinity soil" (Table 1). During the growing season,Before conducting the experiment, soil samples from 0-30 cm depth were gathered and mixed from the experimental site, air dried, grounded, sieved through a 2 mm sieve, and tested to determine the physical and chemical parameters of the soil. The following were the different determinations made according to Piper (1950).

Table 1. Soil physical and chemical properties of the investigated soils before teosinte cultivation during the 2019 and 2020 seasons.

Locations Characteristics	Low salinity soil (S_1)		Medium salinity soil (S_2)	
	1st season	2nd season	1st eason	2ndseason
Particle size distribution (%)				
Coarse Sand	10.5	10.7	11.2	11.1
Fine Sand	12.5	12.3	14.1	14.6
Silt	20.5	21.5	16.2	16.3
Clay	57.5	58.5	58.5	58.0
Texture Class	Clayey	Clayey	Clayey	Clayey
Chemical properties				
pH (1:2.5)	8.4	8.2	8.3	8.4
EC dSm^{-1}	3.5	3.2	6.0	5.55
OM %	0.98	0.88	0.75	0.72
Soluble Cations (meq 100 g^{-1})				
Ca++	7.11	6.85	9.13	8.69
Mg^{++}	6.79	6.09	8.53	8.03
K^{+}	0.21	0.21	0.28	0.25
Na^{+}	18.5	17.86	38.35	35.08
Soluble Anions (meq 100 g^{-1})				
CO_3^{-}	-	-	-	-
HCO_3^{-}	1.80	1.80	1.60	1.70
Cl^{-}	17.29	19.69	37.67	32.34
SO_4^{-}	13.52	9.52	17.02	18.01
Available Nutrients (mg kg soil $^{-1}$)				
Nitrogen (N)	32	32	33	34
Phosphorus (P)	8.4	8.42	6.60	6.61
Potassium (K)	450	465	450	452

Table 1 shows the physical and chemical parameters of the experimental field samples. According to Table 1, the first and second seasons' average soil salinity levels (low salinity soil "S1") were 3.5 and 3.2 dSm-1, and the first and second seasons' average soil salinity levels (medium salinity soil "S2") were 6.0 and 5.55 dSm^{-1}, respectively. The selected sites for low and medium salinity according to dsm^{-1} were 3.5 and 3.0 (low salinity soil) and 6.0 and 5.55 for 1st and 2nd seasons, respectively.

The experimental plot measured 5.4 m2 (3*1.8 m), with a 3 m length and three 60 cm wide ridges. In both seasons, the previous crop was berseem. Except for the issues under investigation, all other necessary agricultural practices were completed in accordance with the Ministry of Agriculture and Land Reclamation recommendations.

The total fresh (ton/fed) for each cut and its total were determined for each plot and turned to ton/fed. The sum of the total cuts was calculated to get the total cuts.

Dry (kg/plot) for each cut and its total: Then 100g plant representative samples from each plot were dried at 70oC for 24 hr and then to 105°C till constant weight and dry matter percentage (DM %) were estimated. Then dry forage yield was determined for each plot and weighed in kg/plot. The sum of the total cuts was estimated for the total cuts.

Seed case, (fruit cases are composed of hard segments of the rachis of the spike and lignified outer glumes, and may be black, grey with speckles, or ivory white), seed weight/plant, 100-grain (Weight can be determined for 100 grains individually or in at least eight replicates of 100 seeds each). Pure seeds should be counted manually from the entire pure seed) and seed weight/fed: plot seeds were calculated and weighed, then fed at two salinity levels.

Using the "MSTAT-C" computer software package, all obtained data were subjected to ANOVA statistical analysis. Significant difference (LSD) method was used to test the differences among means of treatment at a 5% level of probability as described by Snedecor and Cochran (1980), and Waller and Duncan (1969). Analysis of variance of treatment differences was performed according to Steel and Torrie (1980). The Bartlett test was done to test the homogeneity of error variances. The test was significant for all agronomic studied traits; thus, the data of both years were not combined.

RESULTS AND DISCUSSION

-Total fresh and dry yields:

Data in Tables (2 and 3) revealed that there were significant differences of total fresh and dry yields (ton/fed) in various cutting dates and sowing dates under two salinity soils. The heaviest total fresh and dry weights when planting in the first sowing date under cutting at 60 days from sowing in the first salinity soil levels (25.59 and 31.74 ton/fed and 5.19 and 5.52 ton/fed) in the first and second seasons, respectively.

Whereas, the lowest mean of total fresh and total dry weights can be obtained from first sowing date under first date of cutting in the second level of salinity in the two seasons. Data clear that first sowing date with various cutting dates get five cuts which lead to high yield of total fresh and dry yields. In the third harvest, the yields from later two sowing dates were severely affected by the aplenty decreased precipitation and by the lower maximum and minimum temperatures. The reason may be that the fodder yield was much affected by the shortened day length with altered temperature and precipitation. The temperature and precipitations change the rate of the growth (Yoshida, 1981).

Table 2. The effect of cutting and sowing dates on fresh weight (kg/plot/cut) and total (ton/fed) during the 2019 and 2020 growing seasons in two soil locations.

Treatments		Fresh weight													
		Cuttings													
		1st		2nd		3rd		4th		5th		Total fresh weight (kg/plot/cut)		Total fresh yield Ton/fed	
Seasons		2019	2020	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
Salinity		Cutting dates													
		First sowing date													
S_1	40 days	4.733	4.900	6.600	7.633	6.850	7.020	6.033	7.133	5.833	7.600	30.050	34.287	23.12	26.37
	50 days	4.900	5.633	7.133	8.467	7.433	7.633	6.600	7.500	6.000	7.917	32.067	37.150	24.67	28.57
	60 days	5.000	7.433	7.333	9.500	8.033	8.150	6.733	7.783	6.167	8.400	33.267	41.267	25.59	31.74
	F-test	NS	**	NS	NS	**	NS	*	**	*	**	**	**	**	**
	LSD 0.05	--	1.173	--	----	0.311	----	0.662	0.092	0.322	0.398	1.321	3.605	1.016	2.77
S_2	40 days	2.767	2.750	2.933	2.867	4.967	4.767					10.667	10.383	8.205	7.98
	50 days	2.933	3.767	4.400	4.417	5.300	5.067					12.633	13.250	9.71	10.19
	60 days	3.117	4.367	5.100	4.850	5.133	5.133					13.350	14.350	10.26	11.03
	F-test	NS	*	*	*	NS	NS					**	**	**	**
	LSD 0.05	---	0.560	0.797	0.541	---	----					0.667	0.611	0.513	0.472
		Second sowing date													
S_1	40 days	5.167	5.767	7.400	6.933	8.100	8.000	7.533	7.917			28.200	28.617	21.69	22.01
	50 days	5.633	7.667	7.933	9.267	8.167	7.900	7.533	8.200			29.267	33.033	22.51	25.41
	60 days	5.500	8.033	8.400	10.033	8.283	8.017	7.633	8.117			29.817	34.200	22.92	26.30
	F-test	NS	**	NS	**	NS	NS	NS	NS			*	**	*	**
	LSD 0.05	---	1.131	---	.512	---	----	---				1.240	1.515	0.953	1.165
S_2	40 days	3.233	3.667	3.733	3.867	5.167	5.150					12.133	12.683	9.33	9.75
	50 days	3.467	4.767	5.333	4.667	5.667	5.167					14.467	14.600	11.12	11.23
	60 days	3.400	5.267	5.833	5.067	5.663	5.600					14.867	15.933	11.43	12.25
	F-test	NS	**	*	**	*	*					**	**	**	**
	LSD 0.05	----	0.498	0.594	0.407	0.513	0.614					0.481	0.727	0.370	0.561
		Third sowing date													
S_1	40 days	5.600	6.467	8.967	9.500	8.300	8.067					22.867	23.033	17.59	17.27
	50 days	5.633	8.100	10.233	9.767	8.633	8.000					24.500	25.867	18.84	19.89
	60 days	5.767	8.900	11.200	11.833	8.633	8.217					25.600	28.950	19.69	22.26
	F-test	NS	**	NS	**	**	NS					*	**	*	**
	LSD 0.05	----	0.117	----	1.827	0.311	---					3.016	2.218	2.315	0.929
S_2	40 days	3.500	4.587	4.417	4.733	5.557	5.433					13.473	14.753	10.36	11.34
	50 days	3.467	5.017	5.617	5.333	5.767	5.450					14.850	16.000	11.42	12.30
	60 days	3.567	5.383	6.067	6.333	5.883	5.883					15.517	17.600	11.93	13.53
	F-test	NS	**	*	**	*	**					**	**	**	**
	LSD 0.05	----	0.366	0.408	0.477	0.287	0.357					0.526	0.263	0.066	0.202

Table 3. The effect of cutting and sowing dates on dry weight (kg/plot/cut) and total (ton/fed) during the 2019 and 2020 growing seasons in two soil locations.

Treatments		Dry weight													
		Cuttings													
		1st		2nd		3rd		4th		5th		Total dry weight (kg/plot/cut)		Total dry yield Ton/fed	
Seasons		2019	2020	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
Salinity		Cutting dates													
		First sowing date													
S_1	40 days	0.588	0.588	1.137	1.287	1.190	1.37	1.092	1.501	1.477	1.477	5.484	5.659	4.21	4.35
	50 days	0.714	0.714	1.301	1.132	1.318	1.28	1.226	1.563	1.532	1.532	6.091	6.221	4.68	4.78
	60 days	0.959	0.959	1.507	1.403	1.443	1.349	1.258	1.677	1.581	1.581	6.748	6.922	5.19	5.52
	F-test	NS	**	NS	**	*	**	**	NS	*	*	**	**	**	**
	LSD 0.05	---	0.168	---	0.089	0.266	0.083	0.130	----	0.088	0.087	0.769	0.699	.592	0.538
S_2	40 days	0.341	0.341	0.4048	0.448	0.864	0.864					1.654	1.654	1.27	1.27
	50 days	0.529	0.529	0.0688	0.688	0.946	0.946					2.163	2.163	1.66	1.66
	60 days	0.640	0.640	0.816	0.816	0.950	0.944					2.400	2.400	1.84	1.84
	F-test	NS	*	**	*	*	NS					**	**	**	**
	LSD 0.05	----	0.077	0.079	0.124	0.091	----					0.293	0.293	.225	0.625
		Second sowing date													
S_1	40 days	0.702	12.167	1.059	1.143	1.400	1.406	1.412	1.432			4.573	4.645	3.05	3.57
	50 days	0.986	12.867	1.443	1.434	1.422	1.453	1.422	1.467			5.273	5.391	4.70	4.14
	60 days	1.058	13.167	1.619	1.478	1.475	1.468	1.436	1.510			5.588	5.688	4.29	4.37
	F-test	NS	NS	*	**	NS	**	NS				**	**	**	**
	LSD 0.05	----	---	0.076	0.216	---	0.0250	----				0.191	0.210	.953	0.162
S_2	40 days	0.418	0.418	0.599	0.599	0.920	0.920	1.412				1.938	1.938	1.49	1.49
	50 days	0.639	0.639	0.846	0.846	1.033	1.033					2.518	2.518	1.93	1.93
	60 days	0.724	0.724	0.957	0.957	0.989	0.989					2.670	2.670	2.05	1.05
	F-test	NS	**	**	**	*	NS					**	**	**	**
	LSD 0.05	---	0.062	0.073	20.072	0.141	----					0.210	0.210	.161	0.161
		Third sowing date													
S_1	40 days	0.800	0.800	1.326	1.466	1.441	1.478					3.567	3.567	2.744	2.14
	50 days	1.064	1.064	1.556	1.514	1.474	1.486					4.095	4.128	3..15	3.17
	60 days	1.207	1.207	1.933	1.664	1.559	1.528					4.699	4.699	3.61	3.61
	F-test	NS	**	**	**	NS	**					**	**	**	**
	LSD 0.05	----	0.022	0.341	0.166	----	0.044					0.385	0.378	0.296	0.929
S_2	40 days	0.560	0.560	0.707	0.707	1.004	1.004					2.271	2.271	1.74	1.47
	50 days	0.697	0.697	0.925	0.925	1.033	1.033					2.654	2.654	2.04	2.14
	60 days	0.811	0.811	1.023	1.023	1.110	1.110					2.944	2.944	2.26	2.66
	F-test	NS	**	**	**	*	*					**	**	**	**
	LSD 0.05	---	0.038	0.065	0.064	0.117	0.117					0.072	.072	0.009	.055

The higher temperatures available to the early sown crop resulted in the better growth of the crop in terms of plant height and tiller production, thereby producing more tonnage of fodder (Jehangir *et al.*, 2013; Devkota *et al.*, 2017). The decreased dry fodder yield could be due to the restricted supply of nutrients, perhaps due to disruption of vascular connectivity and utilization in various physiological and metabolic processes. Moreover, the yield in low salinity soil levels surpassed that in moderate salinity levels. This indicates that one of the primary effects of salt stress is that it delays germination and seedling emergence. Delays can be fatal if the emerging seedlings, already weakened by salt stress, encounter additional stresses, such as water stress, extreme temperature fluctuations, and/or soil crusting. Because of evaporation at the soil surface, the salt concentration in the seed bed is often greater than at deeper depths. Consequently, the juvenile roots of emerging seedlings are exposed to a greater degree of stress than indicated by the usual measurements of salinity made on composite soil samples taken from throughout the soil profile. The loss of plants during this crucial phase can reduce the plant population density to suboptimal levels and significantly reduce yields (Maas, 1993).

-Seed characters

Seed character data for the two seasons include fruit cases, seed weight/plant, 100 gm weight, and seed weight/fed (Table 4). Data of fruit cases recorded the highest mean (13.333) going from the second date of sowing and cutting date at 60 days of sowing in the first level of salinity in the first season. The same trend was observed in the second season. whereas the lowest mean was achieved from the first date of sowing in the two seasons under moderate salinity. The reason for the superiority of plants planted on the date of March 15th may be due to the fact that during this date the environmental conditions were suitable for germination, growth and elongation, in addition to its superiority in the length of the growth period from planting to 75% flowering (Ajaj *et al.*, 2021).

Table 4. The effect of cutting and sowing dates on seed characteristics, fruit case, seed weight/plant, 100 grain weight, and seed weight/fed (kg/fed) under two locations of soil during the 2019 and 2020 growing seasons.

Treatments		Seed characters							
		Fruit case		Seed weight/plant		100 grain weight		Seed weight/fed	
Seasons		2019	2020	2019	2020	2019	2020	2019	2020
Salinity		Cutting dates							
		First sowing date							
S_1	40 days	7.000	7.567	120.667	113.333	6.877	6.937	334.289	320.667
	50 days	5.667	6.767	167.333	163.667	9.597	9.537	328.667	335.333
	60 days	9.667	10.000	143.667	161.667	8.887	8.797	355.556	344.000
	F-test	*	**	NS	**	**	**	NS	**
	LSD 0.05	4.23.9	0.8102	---	21.917	0.9568	0.252	---	14.401
S_2	40 days	5.000	5.000	124.667	124.667	8.097	8.097	146.889	146.889
	50 days	6.333	6.333	132.667	132.667	6.970	6.970	228.000	228.000
	60 days	6.000	6.000	130.333	130.333	8.653	8.653	242.444	242.444
	F-test	**	**	NS	NS	*	*	**	**
	LSD 0.05	1.176	1.176	---	---	1.779	1.779	36.371	15.03
		Second sowing date							
S_1	40 days	5.000	5.000	180.33	180.667	10.283	10.167	351.333	360.000
	50 days	7.333	7.667	213.000	205.667	11.623	11.593	340.222	369.662
	60 days	13.333	13.433	195.333	187.000	10.490	10.683	357.556	352.333
	F-test	*	**	NS	NS	NS	**	NS	NS
	LSD 0.05	5.998	3.322	---	-----	---	1.379	---	----
S_2	40 days	6.667	6.667	120.333	120.333	6.517	6.517	247.111	247.111
	50 days	7.000	7.000	164.667	164.667	9.020	9.020	305.333	305.333
	60 days	6.000	6.000	147.000	147.000	9.530	9.530	263.333	263.333
	F-test	NS	NS	NS	NS	**	**	NS	NS
	LSD 0.05	---	----	---	----	1.544	1.544	---	----
		Third sowing date							
S_1	40 days	6.000	6.667	169.333	160.667	11.660	11.340	408.222	251.000
	50 days	6.333	6.000	225.333	194.333	12.023	11.633	425.556	312.000
	60 days	8.333	7.000	218.667	220.667	18.237	17.963	421.778	325.000
	F-test	*	NS	*	**	**	**	NS	**
	LSD 0.05	2.351	----	47.910	30.573	2.125	1.144	---	54.002
S_2	40 days	7.000	7.000	120.667	120.667	4.903	4.903	289.111	289.111
	50 days	6.667	6.667	136.333	136.333	6.113		302.667	
	60 days	6.000	6.000	157.000		5.437		305.333	
	F-test	*	*	*		*		NS	
	LSD 0.05	1.176	1.176	27.926		0.939		---	

Regrading to the seed weight of the plant, the data showed that there were no significant differences in the first and sowing dates of sowing under the three managements of cutting under two soil salinity levels. While the third sowing date under the environment in the study recorded the mean of significance at 0.05. In the first and second seasons, the highest mean of seed weight of plant refers to the third sowing date at 50 days of cutting under low salinity level of soil. These results may be attributed to the difference in the number of florets formed in the inflorescence, and this is due to the genetic factor, and the interaction of genetic and environmental factors may have an effect on the character of the number of grains in the head. This is in agreement with (Abood and Abdul Hameed (2017).

With respect to 100 grains weight, there were significant differences at all sowing dates except at the third one at the first level of salinity in the first season only. The highest means of 100 grains weight recorded from the third sowing dates at 60 days as cutting management under first soil salinity. The highest mean was 18.237 and 19.963 gm in the first and second seasons, respectively. This difference may be attributed to the superiority of the planting date at and consequently the increase in light interception by the leaves, and then an abundance of materials manufactured in the process of photosynthesis, which enabled the plant to improve its performance in the process of photosynthesis. This was reflected in the increase in the number of grains in the head. These results are in agreement with the results of (Yasen and Abed, 2017) who found a significant effect of planting dates on the number of grains per head of sorghum crop.

Data of seed weight/fed (kg/fed) recorded the highest means from the treatment of the third sowing date at 50 days as cutting management under low salinity level of soil in the first season while in the second one the second sowing date at 50 days under low salinity level. The lowest mean of seed weight/fed recorded from the third sowing date at 40 days of cutting at moderate level of salinity which recorded 289.111 kg/fed whereas, the lowest weight of seed weight of fed (146.889 kg/fed) which recorded from the first sowing date i.e. 15th March at 40 days of cutting under the moderate salinity levels. These results may be attributed to the fact that the increase in the grain yield increases with the increase of one or more of its components. This result reinforced what was indicated by (Azrag *et al.*, 2015 and Saini *et al.*, 2018) who found a significant difference between sowing dates of sorghum crop in the character of grain yield.

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تأثير مواعيد الزراعة والحش على إنتاجية الذرة الريانة تحت ظروف ملوحة التربة

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التغير المناخي أحد أكثر القضايا أهمية في الألفية الجديدة ونظرا للتأثير السلبي للتغيرات المناخية على نمو وإنتاجية المحاصيل الحقلية بصفة عامة ونظراً لأهمية محصول نبات الذرة الريانة كأحد محاصيل العلف النجيلية لحل مشكلة نقص العلف الأخضر في مصر. أجريت هذه الدراسة خلال الموسمين الصيفين 2019 و2020 بمحطة البحوث الزراعية بالسرو، محافظة دمياط، مصر بغرض دراسة تأثير ثلاث مواعيد للزرعة وهي (15 مارس، 15 أبريل و15 مايو)، وثلاث مواعيد للحش وهي الحش بعد (40، 50، 60 يومًا) وذلك في موقعين مختلفين من التربة الملحية (منخفضة ومتوسطة الملوحة) على إنتاجية نبات الذرة الريانة صنف جميزة 4. تم توزيع المعاملات تحت الدراسة لكل من الموقعين منفردين وتم زراعة كل ميعاد منفردا وتم توزيع مواعيد الحش في تصميم قطاعات كاملة العشوائية. أظهرت النتائج المتحصل عليها من هذه الدراسة أن زراعة نباتات الذرة الريانة خلال 15 مارس وحش النباتات بعد 60 يوم تحت ظروف التربة منخفضة الملوحة انتجت أعلى القيم لكل من الوزن الطازج والجاف للعف خلال موسمي الزراعة. في حين سجلت أقل القيم لكل من الوزن الطازج والجاف من العلف زراعة النباتات خلال الميعاد الأول 15 مارس وحش النباتات بعد 40 يوم تحت ظروف المنطقة المتوسطة الملوحة في كلا الموسمين. كما أظهرت النتائج المتحصل عليها أن أعلى القيم من عدد فروع النورة المؤنثة عند زراعة النباتات في الميعاد الثاني (15 أبريل) وقطع النباتات بعد 60 يوم وذلك تحت ظروف الموقع الأول (منخفض الملوحة) في كلا مواسم الزراعة. لم يكن هناك تأثير معنوي للعوامل تحت الدراسة على صفة وزن البذور/نبات. أشارت النتائج المتحصل عليها أن أعلى القيم لكل من زن 100 حبة ووزن الحبوب/نبات عند زراعة النباتات تحت ظروف المنطقة الأولى والزراعة خلال 15 مايو وقطع النباتات بعد 60 يوم في كلا موسمي النمو. فيما أدت زراعة النباتات خلال 15 مايو أو 15 أبريل وقطع النباتات بعد 50 يومًا تحت ظروف المنطقة الأولى (الملوحة المنخفضة) أعلى القيم لصفة وزن البذور/ فدان في الموسم الأول والثاني على التوالي. في حين تحت ظروف التربة متوسطة الملوحة، سجلت أقل القيم لصفة وزن الحبوب/فدان والزراعة في الميعاد الأول (15 مارس) قطع النباتات بعد 40 يوم.