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EFFECT OF SOWING DATES AND ZINC FOLIAR ON THE PRODUCTIVITY OF SOME SUNFLOWER CULTIVARS AT NEW VALLEY

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ABSTRACT

Two field experiments were carried out in the Desert Research Center (D.R.C.), Agricultural Experimental Station at El- Kharga, New Valley Governorate, during two summer seasons of 2010 and 2011. These experiments aimed to study yield and its components, oil percent (%), and oil yield at planted three dates, three sunflower varieties as affected by three zinc foliar application treatments. A split – split plot design with four replicates was used, where sowing dates devoted to the main plots, sunflower varieties allocated in the sub plots, and zinc foliar treatments arranged in the sub – sub plots.

The obtained results could be summarized as follows:

Tenth of August planting date gave the highest values for plant height (cm.), head diameter (cm.), number of seed / head, head seed weight (g.), 100- seed weight (g.), seed yield (kg/fad.), Stover yield (kg/fad.), oil content (%) and oil yield (kg/fad.) of sunflower varieties. Sunflower variety Hy sun 333 showed superior its over Sakha 53 and Giza 102 varieties in all studied traits. Zinc foliar treatment of 0.06% as zinc sulphate treatment gave the highest values over the control (tap water) for all studied traits. The first and second order interactions had significant effects on all studied traits.

Keywords: Sowing dates, sunflower varieties, zinc foliar application, yield and its components, oil percentage and oil yield.

INTRODUCTION

There are some promising newly reclaimed lands in Egypt. In this respect, one of the most suitable locations is the New Valley region (Located at the Western Desert of Egypt) with its; Oasis, which represents large land resources and a good hope for agriculture expansion. In this region, weather is hot and dry, and cultivation depends mainly on under ground water from wells, so agriculture expansion in this case needs research of special management for better use of land and water resources.

Moreover, there is a need for increasing the production of plant oils due to over population nowadays, which created a wide gap between production and consumption of vegetable oils reached 90.8%. Great emphasis has been given to sunflower for oil industry due to its adaptability to various environmental conditions in additions to rich seeds of oil (35- 55 %). Additionally, there is no place in the present existing rotation of the old Valley and Delta for sunflower as non-traditional crop to be cultivated. The new lands, and fortunately, research work proved the success of sunflower in these lands.

Sunflower varieties markedly differ in their growth characters and potential yield. Several investigators proved this fact under Egyptian

conditions. The local varieties had the greatest head diameter, number of seed / head and the harvest 100-seed weight which is reflected on the high seed yield. Abd El- Wahab *et al.*, (2005).

Also, the normal concentration of zinc ranges between 150 to 250 ppm in the plant dry matter. Deficiencies occur when the level deep below 20 ppm and toxicities will occur when Zn in leaves exceed 400 ppm. Plant roots absorber zn as a component of synthetic and matural complexes. Soluble zn salts and Zn complexes also enter the plant system through leaves. Zn in not definitely know whether it acts as a functional structural, or regulatory cofactor Hilton, (2000), and Sajjan, (2010).

Therefore, the present investigation aimed to study the productivity of some sunflower varieties under three sowing dates as affected by zinc foliar application.

MATERIALS AND METHODS

Two field experiments were carried out in the Desert Research Center (D.R.C.), Agricultural experimental station at El- Kharga Oasis (30-53 longitude, 25.45 latitude and elevation 78.8), New Valley Governorate, during the two summer growing seasons of 2010 and 2011. The soils texture of the site was sandy clay loam containing 2.04% organic matter, P^H 8.3 and EC 4.4 ds/m. Mechanical and chemical analysis of the experimental soil are shown in Tables (1,2 and 3) respectively. The soil analysis was carried out according to Jackson (1970).

Each experiment included twenty seven treatments, which were the combinations of three planting date (10 July, 25 July and 10 August) as well as three sunflower varieties (Giza 102, Sakha 53 and Hy sun 333) and three Zinc foliar treatments (without (control), 0.04% and 0.06% zinc sulphate).

Table (1): Mechanical properties of the experimental soil.

Depth (cm.)	$Caco_3$ %	Particle size distribution (mm)				Class texture
		Coarse sand (1-0.5)	Fine sand (0.25-0.1)	Silt (0.05-0.02)	Clay (0.002)	
0-60	34.28	48.51	25.88	8.79	16.82	Sandy clay loam

Table (2) :Chemical properties of the experimental soil.

Depth (cm.)	PH	EC (ds/m)	Saturation soluble extract							
			Soluble anions (meq/L)				Soluble cations (meq/L)			
			Co_3^{--}	Hco_3^-	So_4^{--}	Cl^-	Ca^{++}	Mg^{++}	Na^+	K^+
0-60	8.32	2.48	0.00	1.2	5.5	18.0	4.00	3.25	15.79	1.66

Table (3) :Chemical analysis of the irrigation water.

PH	EC (ds/m)	Soluble anions (meq/L)				Soluble cations (meq/L)			
		Co_3^{--}	Hco_3^-	So_4^{--}	Cl^-	Ca^{++}	Mg^{++}	Na^+	K^+
7.00	1.08	0.00	2.50	61.24	36.26	43.89	32.43	1.33	22.35

Each experimental plot contained five ridges, 4 m in long and 6 m wide with hills 20 cm apart. The size of each experimental plot was $12m^2$.

The two outside ridges were lifted to avoid border effects, while the three inner ridges were used for determinations of seed yield and its components, oil content (%) and oil yield (Kg/fad.). Phosphorus fertilizer in the form of calcium super phosphate (15.5% P_2O_5) was applied at the rate of 200 Kg/fad. during land preparation. Nitrogen was added in the form of ammonium nitrate (33.5% N) to the soil at the rate of 60 Kg/fad. in three equal doses. The first dose was added before sowing irrigation, while the second and the third ones were added before the first and the second irrigations, respectively.

Potassium was added as potassium sulphate (48% K_2O) at the rate of 50 Kg/fad before the second irrigation. The biofertilizer was performed by coating the wetted sunflower seeds with N- fixing and phosphate dissolving bacteria (PDB) using a sticking substance (Arabic gum, 5%) just before sowing. Organic manure was applied at the rate of $20m^3$/fad.

before sowing through land preparation. Soil was directly irrigated after planting to provide suitable moisture for the inoculants. Thinning practices were conducted after 21 days from planting to secure one plant per hill. Other practices for growing sunflower were conducted as recommended. At harvest five guarded plants were randomly taken from the three inner ridges of each experimental plot and the following characters were measured; plant height (cm.), head diameter (cm.), number of seeds / head, head seed weight (g.), and seed oil content (%) witch estimated by using Soxhlet apparatus according to A.O.A.C.(1975). Seed yield / fad. (head of the three inner ridges of each sub-sub- plot were harvested and left until fully air- dried by sunshine) and stover yield / fad. were weight. Oil yield (Kg/fad.) was determined by multiplying seed yield(Kg/fad.) by seed oil percentage.

The experiments were laid out in sub- sub- plot design with four replicates. Where, planting dates to the main plots, sunflower varieties allocated to the sub- plots, and zinc foliar treatments arranged in the sub-sub- plots.

The obtained data were subjected to the proper statistical analysis. Homogeneity test were conducted before merging of the two growing seasons. The mean values were compared according to the procedures of analysis of variance (ANOVA) by using (L.S.D.) at the level of 5% of significance according to Snedecor and Cochran (1980). All statistical analysis was performed using analysis of variance technique by means of (IRRISTAT) computer software package. The differences between means were tested by L.S.D. at 5% (Steel and Torrie, 1960).

RESULTS AND DISCUSSION

1 - Effect of planting date:

Available a results in Tables (4,5,6,7 and 8) indicated significant differences due to the effect of planting dates i.e. 10- July, 25- July and 10- August planting produced the greatest values (165.36, 24.23, 922.7, 61.91,

6.61, 1019.5 and 1779.6) for plant height (cm.), head diameter (cm.), number of seed/ head, head seed weight (g.), 100- seed weight (g), seed yield (Kg/fad.) and stover yield (Kg/fad.) and (49.43 and 504.55) oil content (%) and oil yield (Kg/fad.), respectively.

Whereas, the lowest values of sunflower yield and its components, oil content (%) and oil yield (Kg/fad.) were produced at the plant date 10- July. Moreover, these obtained results may be due to the lowest hot temperate level in the flowering plant at 10-August plant date. These results were obtained by Allam *et al.* (2003) cleared that the planting date exerted a highly significant influence on all vegetative growth traits along with yield and its components. The highest value was obtained at May 1st compared with June 1st and July 1st. In addition, Shahbaz *et al.* (2005) found that sowing dates affected all parameters significantly. Early sowing produced heads of large size, gave maximum number of seeds per head and the highest biological yield. Also, Asbagh *et al.* (2009). found that yield and yield components of sunflower increased with early sowing dates. While, Abdou *et al.* (2011) indicated that the sowing dates treatments significantly affected seed yield and yield components in two seasons.

Table (4): Effect of planting dates, varieties and zinc foliar treatments and interactions on sunflower yield and its components (combined analysis of 2010/ 2011 seasons).

		Plant height (cm.)				Head diameter (cm.)			
		Zn_1	Zn_2	Zn_3	Mean	Zn_1	Zn_2	Zn_3	Mean
10 July	V1	144.61	146.22	148.11	146.31	18.27	20.69	23.78	20.91
	V2	146.82	148.23	149.57	148.20	19.85	21.15	24.08	21.69
	V3	148.23	150.33	153.37	150.64	22.14	22.38	24.95	23.15
Mean		146.28	148.26	150.35	148.38	20.08	21.40	24.27	21.91
25 July	V1	147.52	148.83	153.14	149.83	20.25	21.34	24.10	21.89
	V2	154.43	154.29	155.87	154.86	21.68	22.88	25.87	23.47
	V3	158.51	162.19	162.17	160.95	22.17	23.14	26.17	23.82
Mean		153.48	155.10	157.06	155.21	21.36	22.45	25.38	23.06
10 August	V1	154..17	156.28	158.89	156.44	20.56	22.17	24.89	22.54
	V2	160.99	163.86	165.38	163.41	22.48	24.70	26.28	24.48
	V3	174.12	175.89	178.73	176.24	23.17	25.98	27.88	25.67
Mean		163.09	165.34	167.66	165.36	22.07	24.28	26.35	24.23
Varieties	V1	148.76	150.44	153.38	150.86	19.69	21.40	24.25	21.78
	V2	154.08	155.46	156.94	155.49	21.33	22.91	25.41	23.21
	V3	160.28	162.80	164.75	162.61	22.49	23.83	26.33	24.21
Mean		154.37	156.23	158.35		21.17	22.71	25.33	

V1 = Giza 102 V2 = Sakha 53 V3 = Hy sun 333

L.S.D at 5% for	Plant height	Head diameter
Planting dates	4.285	0.895
Varieties	3.512	0.843
Zinc foliar	3.081	0.928
Dates x Varieties	2.714	1.012
Dates x Zinc	3.112	0.993
Varieties x Zinc	3.118	1.118
Dates x Varieties x Zinc	3.411	1.044

Table (5): Effect of planting dates varieties and zinc foliar treatments and interactions on sunflower yield and its components (combined analysis of 2010/ 2011 seasons).

		No. of seed / head				Head seed weight (g.)			
		Zn_1	Zn_2	Zn_3	Mean	Zn_1	Zn_2	Zn_3	Mean
10 July	V1	848.8	857.2	872.2	859.4	47.34	49.78	52.17	49.76
	V2	879.7	900.8	922.6	901.0	52.14	54.28	56.88	54.43
	V3	921.2	938.5	952.7	937.4	54.85	59.78	62.02	58.88
Mean		883.2	898.8	915.8	899.2	51.44	54.61	57.02	54.35
25 July	V1	856.6	874.3	887.7	875.8	51.44	53.24	54.78	53.15
	V2	894.3	911.4	930.3	912.0	54.52	55.73	56.89	55.71
	V3	937.6	947.7	967.9	951.0	57.44	59.88	62.77	60.03
Mean		899.1	911.1	928.6	912.9	54.46	56.28	58.14	56.29
10 August	V1	870.3	878.8	888.6	879.2	55.81	56.81	58.12	56.91
	V2	922.6	932.4	942.7	932.5	60.86	61.44	62.62	61.64
	V3	938.5	952.9	978.1	956.5	64.88	66.71	69.98	67.19
Mean		910.4	921.3	936.4	922.7	60.51	61.65	63.57	61.91
Varieties	V1	858.5	870.1	882.8	870.4	51.53	53.27	55.02	53.27
	V2	898.8	914.8	931.8	915.1	55.84	57.15	58.79	57.26
	V3	932.4	946.3	966.2	948.3	59.05	62.12	64.92	62.03
Mean		896.5	910.4	926.9		55.47	57.51	59.57	

V1 = Giza 102 V2 = Sakha 53 V3 = Hy sun 333

L.S.D at 5% for	No. of seed / head	Head seed weight
Planting dates	8.78	2.02
Varieties	8.87	2.12
Zinc foliar	8.85	2.13
Dates x Varieties	8.77	2.21
Dates x Zinc	9.11	2.21
Varieties x Zinc	9.12	2.29
Dates x Varieties x Zinc	9.23	2.12

Table (6): Effect of planting dates, varieties and zinc foliar treatments and interactions on sunflower yield and its components (combined analysis of 2010/ 2011 seasons).

		100 – seed weight (g.)				Seed yield (Kg / fad.)			
		Zn_1	Zn_2	Zn_3	Mean	Zn_1	Zn_2	Zn_3	Mean
10 July	V1	5.43	5.58	5.78	5.59	868.5	892.1	910.3	890.3
	V2	5.93	6.11	6.23	6.09	923.6	948.4	978.5	950.1
	V3	6.23	6.38	6.49	6.36	983.7	1001.7	1018.6	1001.3
Mean		5.86	6.02	6.16	6.01	925.2	947.4	969.1	947.2
25 July	V1	5.94	6.08	6.12	6.04	842.3	862.5	962.4	889.0
	V2	6.20	6.22	6.24	6.22	964.7	981.1	996.9	980.9
	V3	6.34	6.40	6.58	6.44	1008.6	1043.5	1083.0	1045.0
Mean		6.16	6.23	6.31	6.23	938.5	962.3	1014.1	971.6
10 August	V1	6.39	6.47	6.54	6.46	964.8	983.7	998.3	982.2
	V2	6.57	6.62	6.69	6.62	990.1	1009.2	1029.0	1009.4
	V3	6.64	6.79	6.89	6.77	1024.6	1077.5	1099.2	1067.1
Mean		6.53	6.62	6.70	6.61	993.1	1023.4	1042.1	1019.5
Varieties	V1	6.10	6.04	6.14	6.09	891.8	912.7	957.0	920.5
	V2	6.23	6.31	6.38	6.30	959.4	979.5	1001.4	980.1
	V3	6.40	6.52	6.65	6.52	1005.6	1040.9	1066.9	1037.8
Mean		6.24	6.29	6.39		952.2	977.7	1008.4	

V1 = Giza 102 V2 = Sakha 53 V3 = Hy sun 333

L.S.D at 5% for	100 – seed weight	Seed yield
Planting dates	0.02	12.11
Varieties	0.02	12.86
Zinc foliar	0.03	12.92
Dates x Varieties	0.03	12.99
Dates x Zinc	0.03	13.11
Varieties x Zinc	0.02	13.11
Dates x Varieties x Zinc	0.03	13.45

Table (7):Effect of planting dates varieties and zinc foliar treatments and interactions on sunflower yield and its components (combined analysis of 2010/ 2011 seasons).

		Stover yield (Kg / fad.)			
		Zn_1	Zn_2	Zn_3	Mean
10 July	V1	1502.5	1543.3	1573.3	1539.7
	V2	1613.3	1640.7	1692.9	1648.9
	V3	1719.1	1732.9	1755.2	1735.7
Mean		1611.6	1638.9	1673.7	1641.4
25 July	V1	1483.1	1483.5	1655.4	1540.6
	V2	1696.6	1697.2	1712.4	1702.0
	V3	1762.1	1805.2	1853.1	1806.8
Mean		1647.2	1661.9	1740.3	1683.1
10 August	V1	1689.8	1705.1	1719.7	1704.8
	V2	1720.6	1750.5	1744.3	1738.4
	V3	1857.6	1902.6	1927.7	1895.9
Mean		1756.0	1786.6	1797.2	1779.6
Varieties	V1	1558.4	1577.3	1649.4	1595.0
	V2	1676.8	1696.1	1716.5	1696.4
	V3	1779.6	1813.5	1845.3	1812.8
Mean		1671.6	1695.6	1737.0	

V1 = Giza 102 V2 = Sakha 53 V3 = Hy sun 333

	Stover yield
L.S.D at 5% for	
Planting dates	14.12
Varieties	13.21
Zinc foliar	13.44
Dates x Varieties	13.38
Dates x Zinc	13.01
Varieties x Zinc	13.10
Dates x Varieties x Zinc	12.84

Table (8): Effect of planting dates varieties and zinc foliar treatments and interactions on sunflower oil content and oil yield (combined analysis of 2010/ 2011 seasons).

		Oil %				Oil yield (Kg / fad.)			
		Zn_1	Zn_2	Zn_3	Mean	Zn_1	Zn_2	Zn_3	Mean
10 July	V1	46.48	46.94	47.11	46.84	403.67	418.75	428.84	417.08
	V2	47.38	47.92	48.14	47.81	437.60	454.47	471.04	454.37
	V3	48.82	49.08	49.38	49.09	480.24	491.63	502.98	491.61
Mean		47.56	47.98	48.21	47.91	440.50	454.95	467.62	454.35
25 July	V1	46.87	47.34	48.12	47.44	394.78	408.30	463.10	422.06
	V2	47.82	48.08	48.32	48.07	461.31	471.71	481.70	471.57
	V3	48.93	49.28	50.12	49.44	493.50	514.23	542.79	516.84
Mean		47.87	48.23	48.85	48.31	449.86	464.74	495.86	470.15
10 August	V1	47.93	48.38	49.14	48.48	462.42	475.91	490.56	476.29
	V2	48.72	49.08	49.28	49.02	482.37	495.31	507.09	494.92
	V3	49.85	50.64	51.94	50.81	510.76	545.64	570.92	542.44
Mean		48.83	49.36	50.12	49.43	485.18	505.62	522.85	504.55
Varieties	V1	47.09	47.55	48.12	47.58	420.29	434.32	460.83	438.48
	V2	47.97	48.36	48.58	48.30	460.42	473.83	486.61	473.62
	V3	49.20	49.66	50.48	49.78	494.83	517.16	538.89	516.96
Mean		48.08	48.52	49.06		458.51	475.10	495.44	

V1 = Giza 102 V2 = Sakha 53 V3 = Hy sun 333

	Oil %	Oil yield
L.S.D at 5% for		
Planting dates	0.42	12.11
Varieties	0.46	13.09
Zinc foliar	0.45	13.11
Dates x Varieties	0.47	13.09
Dates x Zinc	0.47	13.11
Varieties x Zinc	0.47	13.12
Dates x Varieties x Zinc	0.48	13.23

The highest averages of plant height, head diameter, head weight, seed weight/head and 100 seed weight in two seasons were obtained from June 1st sowing. Morover, Lawal *et al.* (2011) reported that planting date significantly affected all the growth and yield parameters including oil yield. As planting was delayed, seed and oil yields declined (2,513 kg/ha and 1,077 L/ha, respectively when planted on August 13 as against 1,234 kg/ha and 528 L/ha, seed and oil yields respectively, at September 10 planting) in 2004. Similar trend was observed in 2005. However, Shuaib *et al.* (2011) found that early planting of sunflower during autumn season gave the highest value of yield and yield compounds.

2 - Effect of sunflower varieties:

Data presented in Tables (4,5,6,7 and 8) indicated that sunflower varieties Giza 102, Sakha 53 and Hy sun 333 were differed significantly in yield and its components as well as oil content (%) and oil yield (Kg/fad.). Sunflower Hy sun 333 variety significantly surpassed that of Sakha 53 and Giza 102 varieties, respectively, with all the studied characters, which caused the maximum values Hy sun 333 (162.61, 24.21, 948.3, 62.03, 6.52, 1037.8, 1812.8, 49.78 and 516.96) each for (plant height (cm.), head diameter (cm.), number of seed/ head, head seed weight (g.), 100- seed weight (g.), seed yield (Kg/fad.), stover yield (Kg/fad.), oil content(%) and oil yield (Kg/fad.) respectively. Superiority of Hy sun 333 in all attributes may be due to improvement in translocation of assimilates. Also, Hy sun 333 sunflower variety had a significant increase in oil yield may be due to the increase in seed yield and oil percentage and so the higher ability to translocation of assimilate substances. IN this respect the differences in the productivity betv'een sunflower varieties were reported by Allam *et al.* (2003) indicated that the two varieties of sunflower (Vidoc and Euroflora) differed highly significantly in all studied traits except oil yield/ha. The highest seed yield (3.64 t/ha) was obtained with the varietv Vidoc. Also, Ozer *et al.* (2004) pointed out that there was significant differences in plant height between the genotypes of sunflower. AS-508 produced taller plants than Super 25. While, Balabc *et al.* (2007) cleared that hybrid Rimi of sunflower had the highest mean value for oil yield compared with Miro and Pobednik. However, Khalifa (2009) found that Manchurian variety was the tallest with the thickest stem and a larger head compared with the other three varieties of sunflower (Peredovik, Hungarian-A and Hungarian-B). In addition, Ali *et al.* (2011) showed that hybrid (DK-4040) gave the highest values of plant height, number of leaves plant and head diameter compared with hybrid (19012) and hybrid (Hysun-33).

3 - Effect of Zinc foliar:

The effect of zinc foliar application in different concentrations of zinc are showed in Tables (4,5,6,7, and 8) results indicated that the studied characters were gradually increasing by sunflower zinc foliar in zinc sulphate from zero up to 0.06%. Values of plant height (cm.), head diameter (cm.), number of seed/ head, head seed weight (g.), 100- seed weight (g.), seed yield (Kg/fad.), stover yield (Kg/fad.), oil content(%) and oil yield (Kg/fad.) . reached to (158.35, 25.33, 926.9, 59.57, 6.39, 1008.4, 1737.0, 49.06 and 495.44), respectively, as compared with the control treatment. These results

may be due to zinc is generally involved in the activation of various enzyme systems which in turn encouraged building up the photosynthetic area, reflected on growth stimulation (Tisdale and Nelson, 1978). Similar results were obtained by Ashok and Pawar (2005). found that application of zinc 10 kg/ha recorded higher yield attributes and seed yield compared with 0 and 20 kg/ha. On the other hand, Abbasi and Gandahi (2009) reported that the maximum yield of sunflower response was noted when Zn was applied at the rate of 15 *l* ha. Moreover, Khan *et al.* (2009) mentioned that highest plant height, greater head diameter and highest oil contents were achieved with the application of 10 kg zinc / ha. Also, Baldwin and Wagner (2010). showed that zinc play a major role in increasing seed setting percentage and influence growth and yield of sunflower. In another studied, Ebrahimian *et al.* (2010) showed that the highest seed yield, oil yield, oil percentage, 1000 seed weight, seed weight, and protein percentage of sunflower were obtained from the foliar application of iron + zinc treatments. While, Faizus and Rahman (2012) reported that use of zinc spray had a significant effect on yield and yield components of *Phaseolus vulgaris*.

4 - Effect of the interactions :

It is evident from Tables (4,5,6,7 and 8) that all the studied characters were affected significantly with the interaction each of planting dates x sunflower varieties , planting dates x zinc foliar application , sunflower varieties x zinc foliar application ,and planting dates x sunflower varieties x zinc foliar application. Generally, the highest values of yield and its components were obtained by the interaction treatment, the third plant date (10- August), third sunflower variety (Hy sun 333) and third zinc foliar application (0.06% zinc sulphate). Also, in this respect for oil content (%) and oil yield (Kg/ fad.), the obtained results take the same trend with interactions effect of the three factors. The highest values were (178.73, 27.88, 978.1, 69.78, 6.89, 1099.2, 1927.7, 51.94 and 570.92) each for plant height (cm.), head diameter (cm.), number of seed/ head, head seed weight (g.), 100-seed weight (g.), seed yield (Kg/fad.), stover yield (Kg/fad.), oil content(%) and oil yield (Kg/fad.), respectively, by using the interaction treatment 10 – August plant date x Hy sun 333 sunflower variety x 0.06% zinc sulphate as zinc foliar application. Similar results were obtained by Jose *et al.* (2004) and Balabc *et al.* (2007) who reported that the interactions between varieties and planting dates had significant effect on yield and oil yield of sunflower., On the other hand, Heather (2012). Found that the early season variety '306' had a higher oil yield than '7120' when at the medium and latest (1-June and 7-June) planting dates. The longer season variety '7120' had higher oil yields when planted on the earliest planting date.

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تأثير مواعيد الزراعة والرش بالزنك على إنتاجية بعض أصناف عباد الشمس بالوادي الجديد

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أقيمت تجربتان حقليتان بمحطة التجارب الزراعية بالخارجة التابعة لمركز بحوث الصحراء. محافظة الوادي الجديد. أثناء موسمي الزراعة المتأخرة (يوليو- أغسطس) لموسمي ٢٠١٠- ٢٠١١. نفذت التجارب لدراسة الحاصل ومكوناتة والنسبة المؤية للزيت (%) وحاصل الزيت للفدان وذالك لثلاث مواعيد زراعة هي (١٠ يوليو – ٢٥ يوليو – ١٠ أغسطس) وأيضا لثلاثة أصناف من عباد الشمس وهى (جيزة ١٠٢- سخا ٥٣ – هاى صن ٣٣٣) وذلك تحت تأثير ثلاث مستويات للرش بالزنك (بدون – ٠,٤% كبريتات زنك- ٠,٦% كبريتات زنك). أستخدم تصميم القطع المنشقة مرتين في أربع مكررات حيث خصصت للقطع الرئيسية مواعيد الزراعة ووضعت أصناف عباد الشمس في القطع الشقية الأولى بينما وزعت مستويات الرش بالزنك في القطع الشقية الثانية.

ويمكن تلخيص النتائج فيما يلي:

١- وجدت اختلافات معنوية بين الثلاث مواعيد زراعة للصفات المدروسة. أعطى ميعاد الزراعة ١٠ أغسطس أفضل النتائج لصفات " ارتفاع النبات (سم.)، قطر القرص(سم.)، عدد البذور بالفرص ووزن بذور القرص (جم.) ووزن المائة بذرة(جم.) وحاصل البذور(كجم/فدان)، محصول الحطب(كجم/فدان)، النسبة المؤية للزيت(%) وحاصل الزيت(كجم/فدان).

٢- أشارت النتائج إلى وجود اختلافات معنوية بين الثلاث أصناف لعباد الشمس من حيث الصفات المدروسة. أظهر الصنف هاى صن ٣٣٣ تفوقا واضح على الصنفين الآخرين (سخا ٥٣ ، جيزة ١٠٢) في كل من ارتفاع النبات (سم.) و قطر القرص(سم.) و عدد البذور بالفرص ووزن بذور القرص (جم.) ووزن المائة بذرة(جم.) وحاصل البذور(كجم/فدان) وحاصل الحطب(كجم/فدان) والنسبة المؤية للزيت(%) وحاصل الزيت(كجم/فدان).

٣- تفوقت معاملة الرش ب ٠,٠٦سلفات الزنك على معاملتي الرش الأخرى للصفات المدروسة.

٤- أظهرت النتائج إلى أن جميع التفاعلات الثنائية والتفاعل الثالث لعوامل الدراسة كان لها تأثير معنوي على الصفات المدروسة وأيضا لوحظ أن التفاعلات سواء كانت الثنائية والثلاثية تأخذ نفس إتجاة العوامل منفردة لكل من مواعيد الزراعة ، أصناف عباد الشمس ، الرش بالزنك .

وقد خلصت الدراسة إلى أن زراعة محصول عباد الشمس بالصنف هاى صن ٣٣٣+ الرش بسلفات الزنك بتركيز ٠,٠٦% وذلك في ميعاد الزراعة ١٠ أغسطس قد أعطت أفضل النتائج.

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