Response of Sunflower (*Helianthus annuus* L.) to Different Planting Dates under Suliamani Region Condition

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Abstract

A field experiment was conducted during the spring season 2011 at two locations, the first location was kanipanka, in a research center, which belongs to the Ministry of Agriculture and located about 36Km south-east of Sulaimani city, and the second was conducted at the Qlyasan research center belong to the faculty of Agricultural sciences / university of sulaimani. the aim of the study was to show the effect of different plant date on growth characteristics. Yield, and yield components of Sunflower (Flamme variety). The seeds were planted on 3rd March, 18th March, and 2nd April at Kanipanka, while the dates were 14th March,19th March, and 3rd April at Qlyasan location, the completely Randomized Design (CRBD) was done within three replications in both locations. The results must be shown the existence of significant differences of the effect location of most traits growth characteristics , yield and its components, where the superiority location (kanipanka) in each of the characteristic of stem length, disk diameter, number of seeds / plant, seed weight / plant, seed weight, dry matter yields, seed yields, oil yields and bio-yields location (Qlyasan). However were not significantly affected by different planting date on traits root depth, number of disks / plant and number of leaves / plant.

Keywords: Sunflower, Planting date, Growth characters, Yield component

I. Introduction:

The Sunflower crop (Helianthus annuus L.) one of the important oil crops that follows the (Compositae) family and seeds contain a high percentage of oil between (30 – 50 %) by varieties, sunflower not only rich in oil, but also in vitamins, particularly vitamin (B1) [1]. In general, there are two types of Sunflower which are Sunflower non-oil and Sunflower oil. Sunflower is a second most important source of vegetable oil in the world behind soybeans. [2] Therefore dramatically is used in human nutrition, due to reducing cholesterol in the blood [3 ,4] and Sunflower oil in many industries is used its plants fodder green, and in the industry of Silage in the beginning of the composition flowers., as well as used cake seeds to feed farm animals and especially cattle from them. The seeds are used in human nutrition and birds. Additionally plants are used as a Bumpers

wind in the fields and also can be used medical and decoration plant. Furthermore It keeps bees in its fields to produce the amount of honey and good quality [1, 5, 6, 7, 8, and 9]. It is believed that Mexico and west of the southern region of the (USA) are the first origin of sunflower, were grow wild varieties up to the present time [1, 6, and 10]. Estimated global production (33.421) million tons for the year (2008 – 2009), and (Russia) is one of the largest producing areas of this crop its estimated production is approximately (7.4) million tons, their production cover about (22%) of global production. Either global production for oil Sunflower is 11.674 million tons for the year (2008 - 2009), and (Russia), is one of the largest producing areas estimated production is approximately (2.52) million tons. [10]. Introduced the cultivation of this crop to the (Iraq) by agricultural institutions and departments, and numerous experiments proved the success of this crop deep in mix soils, good drainage and high acidity signals to slash the base (pH) in between(6.5- 8). [1]. That the cost of cultivation, production and the difficulties faced by the relevant departments of the terms of service of the crop processes, lack of education programs, the length of the crop growing season, the lack of adequate research and studies. And all of these variables led planting olive interest in (Iraq) in general and in the province of Kurdistan in particular, which led to the faltering expansion in the cultivation. Maximum productivity to Sunflower in Iraq was about (327.8) kg / acre for the year (1997). [11], but the biggest produce Sunflower in Kurdistan region in Sulaimaniyah city estimated (302.03) kg / acre. For the year (2002) Erbil produced about (282.97)kg / acre Due for the broad range enjoyed by this crop, terms of portability and unsustainable growth in the sandy soils of good drainage and afford to different environments, where grows between latitudes (55) in the north and (40) to the south of the equator. Add to afford temperature (30 - 40) °. The plant Sunflower of tropical crops andeconomically produced in warm areas. [1]. so the different region of (Kurdistan) suitable for cultivation. In addition to the presence of large area suitable for cultivation and the consequent economic benefits in terms of yield and increase the exploitation of agricultural land, but the specialized area of land for cultivation, not the desired economic level. So conducting this study, in order to determine the best time for planting each class, in order to increase productivity and improve the quantity and qualities of oil for the crop**.**

II. Materials and Methods:

The planting dates were as follow:

First date; 3rd March, and 4th March, Second date;18th March, and 19th March, and Third date;2nd April, and 3rd April at Kanipanka and Qlyasan respectively. The agricultural practices normally done by tilling the ground twice, and smoothed then divided into plots, each experiment unit was with an area of 6m2 and contains 6 lines of 2.5m long and 40cm apart. Every 3 seeds were planted in a hole at a depth of 5 cm, which thinned to 1 plant per a hole after emergence, and such a pattern was represented a seeding rate close to 7 Kg/ha. During the growing season , irrigation was done whenever it was required and totally were 12 times at each location of this study, and finally fertilizations also were done as recommended, 80Kg/ha of nitrogen in two

doses, one with 60Kg/ha phosphorus before planting and the second half of nitrogen was applied after the thinning process[1,8,and 13]. Harvesting was done in different dates according to different planting dates at the two locations as follow:

In (Qlyasan): First date: 2011 .07 .10, Second date: 2011 .07 .15, Third date: 2011 .70 .22. In kanipanka: First date: 2011 .07 .12, Second date: 2011 .07 .18 , Third date: 2011.70.27. The datum of each characteristics were generally tested using analysis of variance according to Completely Randomized block Design (CRBD) within three replications, while least significant difference test (LSD0.05) used for testing the significances between the means.

Studied characters:

Growth characters: 10 plants were sampled randomly from each experimental unit for measuring of: A-Plant Height, B-Root Depth, and C-Number of leaves / plant.

Yield components: A- Number of seeds / plant, B. Weight of seeds / plant, C-Weightof (1000) Seed (g), D- Number of disks / plant. E- Disk diameter / cm.

Yield**:**a. dry matter Yields (t / ha), b. seedYields(t / ha), C. Oil percentage, D. oil Yields (t / ha), E. Harvest index: (HI) harvest index was calculated according to the following equation:

(Harvest index = weight of seeds / plant÷ dry weight / plant)

F. Biological yields.

III. Results and Discussion:

A. Planting dates effect on growth characteristics:

Table (I) shown the existence of significant differences between planting dates to trait stem length in both locations and their average. Were given second date of planting largest in the stem length (Kanipanka), where was (189.625) cm. But are no significant differences between the date of the first and the third. Either at the location (Qlyasan) outweigh the right sowing date the first two dates of others. And average signatories were superior first plant dates and second on the date of Agriculture III of this trait was due to the effect of temperature and optical fluctuations. These results are consistent with all of the [17 and 18].And trait the root depth (cm) did not show planting dates effects moral to this trait in the location (kanipanka). But in (the Qlyasan) location there were no significant differences between the first plant dates and second, but the dates first and second margin significantlydate of Agriculture III. And the average of the signatories were given an appointment the second largest agriculture depth reaching (25.777 cm). As for the traitnumber of leaves / plant are no significant differences in both location and their average.

Table.I: Effect of plant date on growth characteristics

Plant date	Number of leaf/ plant	Root depth (cm)	Stem length (cm)
Kanipanka			
First	32.541	22.888	176.687
Second	34.208	25.666	189.625
Third	33.083	22.883	173.687
LSD 0.05	N.S	N.S	5.537
Qlyasan			
First	33.27	27.886	177.354
Second	33.333	25.888	163.923
Third	35.145	21.666	155.52
LSD 0.05	N.S	3.76	7.357
Average			
First	32.906	25.387	177.02
Second	33.77	25.777	176.773
Third	34.114	22.275	146.604
LSD	N.S	3.393	4.31

B. Planting dates effect on yield components:

Table (II) did not show planting dates significant effects for prescription number of disks / plant at the (Kanipanka) location and the average locations. But in (the Qlyasan) location, where agriculture than the date the first two dates of others to the extent increase (0.353) (0.399) respectively disk. And may be due to the fact that this trait is controlled by genetic factors and not planting dates.And the trait of the disk diameter (cm) the existence of significant differences between planting dates for this trait in both locations and average. Were given the first planted date of the agriculture largest value in a (Kanipanka) location, where was (18.05 cm). Either at the (Qlyasan) location were given the first planted date of the agriculture largest value was (14.699 cm). And the average signatories were given the first planted date of the agriculture is also the largest where the value (16.4 cm). The reason for this is the effect of this trait environmental conditions and planting dates. And agree these results with all of the [18 and 19]. As for the trait number of seeds / plant and the presence of significant differences between planting dates for this trait in both locations and their average. Were given the first planted date of the agriculture largest Number of seeds/plant in (Kanipanka) and (Qlyasan) and the average signatories reaching (1709.807), (1537.819) and (1623.813) seed respectively. Has attributed to an increase in disk diameter of first sowing date compared to other plant dates.

These results are consistent with all of the [19and 20]. And to counter the seed weight / plant (g) the existence of significant differences between planting dates for this trait in both locations and their average. Were given the first planted date of the agriculture largest seed weight / plant in my (Kanipanka) and (Qlyasan) and the average locations. And may be due to the fact that changes in environmental conditions during the period of perfect seeds affect yield components sunflowers.The weight (1000) seed (g) did not show planting dates effects to this trait in the location (the Qlyasan). Either were given the first planted date of the agriculture largest weight (1000) seed (g) at the (Kanipanka) location and the average locations where the (69.332) and (55.652) g, respectively. And may be due to the fact that early planting affect the flowering stage and seed development due to differences in temperature and light and the length of the day, And these results agreed with everything you said [19 and 20].

Table.II: The effect of plant date on yield components:

Plant date	Weight of 1000 seeds	Seed weight (gm)	Seed number / plant	Disk diameter (cm)	Disk number / plant
Kanipanka					
First date	69.332	118.666	1709.807	18.051	2.583
Second	66.211	102.055	1511.203	15.304	2.458
Third date	58.923	93.591	1577.5	14.376	3.313
LSD 0.05	5.918	15.712	177.667	3.003	N.S
Qlyasan					
First date	41.973	66.984	1537.819	14.694	2.541
Second	38.054	44.471	1220.556	12.182	2.188
Third date	39.333	37.944	953.503	10.39	2.042
LSD 0.05	N.S	9.092	213.641	1.594	0.272
Average					
First date	55.652	92.825	1623.813	16.4	2.562
Second	52.133	73.263	1365.879	13.743	2.322
Third date	49.128	65.767	1265.501	12.383	2.677
LSD	3.677	8.497	130.074	1.586	N.S

C. Effect of plant date on yield:

Table (III) shown did not show planting dates moral effects trait dry matter yields in (Kanipanka) location. But in (the Qlyasan) location and the average of the signatories, has given the first planted date of the agriculture yields where the dry material (12.702) and (33.145) t / ha, respectively. Fad reason for this is due to outweigh the first planted date of the agriculture in this capacity to increased vegetative growth characteristics (number of leaves, stem length). And thetrait of seed yields (t / ha) and there are significant differences between planting dates for this trait in both locations and their average.

Were given the first planted date of the agriculture largest sum of seeds (t / ha) in my (Kanipanka) and (Qlyasan) and the average locations. Has reason for the discrepancy between the dates of Agriculture and Their average to the difference in the effect of appointments with each other in terms of the weight of the seed / plant, Seed number / plant and weight (1000) seed among the different planting dates, as late in agriculture, the date seed yield at least. Since attributed the cause of the decline in seed yields to high temperatures, especially in the flowering stage resulting in the death of pollen. These results were identical to mention all of the [19, 20and 21]. To counter the percentage of oil did not show planting dates moral effects of this trait in average locations. As agriculture has given the third planted date of agriculture largest percentage of oil at the (Kanipanka) location amounted to(33.665%). In (the Qlyasan) location were given the third planted date of agriculture largest total value (38.674%). Delegation attributed the reason for this superiority to a relative increase in the cortex pulp. Or in other words to increase the seed when the full length of growth. As for all of the oil yields (t / ha) and bio-yields. And there are significant differences between planting dates for these yields in both locations and their average. Were given the first planted date of agriculture largest value in the (Kanipanka), (Qlyasan) and the average locations. This may be due to the reason than the date of the first planted date of agriculture to other dates in the majority of the yield components. You do not planting date's significant effect in the trait harvest index in both locations and their average.

Table.III: The effect of plant date on yields

Plant date	Harvest index	Biological yield (gm)	Oil Yields tons / ha	Oil percentage	Seed Yields tons / ha	dry matter Yields tons / ha
Kanipanka						
First	0.125	1109.499	1.709	31.82	4.81	53.588
Second	0.136	870.166	1.434	33.665	3.981	47.753
Third	0.151	729.453	1.108	27.381	3.888	43.812
LSD	N.S	304.841	0.366	2.151	0.65	N.S
Qlyasan						
First	0.316	278.695	0.977	33.803	2.679	12.702
Second	0.328	205.314	0.664	31.367	2.111	10.316
Third	0.33	151.091	0.6	38.674	1.511	6.785
LSD	N.S	56.436	0.128	3.842	0.293	2.733
Average						
First	0.22	694.097	1.343	32.811	3.744	33.145
Second	0.231	537.74	1.048	32.515	3.045	29.034
Third	0.24	440.272	0.854	33.027	2.699	25.298
LSD	N.S	145.128	0.18	N.S	0.334	4.821

IV. Conclusion:

1. The cultivation of sunflower on first planting date cause to increase on the following things (stem high, all yield component, dry matter yield, seed yield, oil yield and biological yield.
2. Second planting date had a highest root depth.
3. In the kanipanka location the environmental condition is quite suitable compared with Qlyasan location because most of the traits in there gave us the higher value of them.

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