The Effect of a Combination of Organic and Chemical Fertilizers on Maize Yield under Water Stress Conditions

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Abstract

A field experiment was carried out in the field of the College of Agriculture - Wasit University in Wasit Governorate, located within the latitude 30-32 north and longitude 45-49 east, in the autumn season 2021 AD, with the aim of improving the growth performance and yield of maize by a combination of organic and chemical fertilizers and water stress. The experiment was applied according to the RCBD randomized complete block design, in the order of split-plots, and with three replications. The main panels included water stress treatments S1 100%, S2, 75%, S3 50%)) of complete irrigation, while the secondary panels included organic fertilizer combinations (sheep manure) and chemical (NPK) (full recommendation for chemical fertilizer F1, full recommendation For organic fertilizer F2, 50% organic fertilizer +50% chemical fertilizer F3, 75% organic fertilizer +25% chemical fertilizer F4, 25% organic fertilizer +75% chemical fertilizer F5) in addition to the comparison treatment F0. The replicates were divided To secondary experimental units amounted to 18 experimental units for one repeater, The distance between the repeater and the last 2 m for the work of the waterways and the corridors of the crop service, intervals between the experimental units were left within 1 m to ensure that there was no interference between the experiment Treatments, and the data were collected according to the analysis of variance table, then the averages were tested according to the LSD test, the probability level was 0.05, and summed up The most important results are as follows: 1) The F4 fertilizer treatment was significantly superior in leaf area, dry weight, ear length, ear diameter, number of earbuds, number of grains per row, number of rows per ear, weight of 500 grains, biological yield, total grain yield, protein in leaves, protein In cereals, the carbohydrates in cereals amounted to 4675 cm2, 375.9 gm plant-1, 71.54 cm, 5.84 cm, 1.15 cob-1, 27.33 grain cob-1, 15.73 gm plant-1, 43.09 gm plant-1, 20.04 tons ha-1, 5.58 t ha-1, 4.48%, 4.86%, 4.58% sequentially. While the F5 treatment was significantly superior in each of the following traits and gave the highest averages in 50% male flowering, plant height, leaf area index, total leaf content of chlorophyll pigments, harvest index, and carbohydrates in leaves, which amounted to 54.67 days, 160.82 cm, 41.32 SPAD, 28.31%, 5.49%, respectively. 2) The treatment of full irrigation S1 was significantly superior and gave the highest averages in 50% male flowering, plant height, leaf area, leaf area index, ear length, ear diameter, number of earlets, number of grains, number of rows in the ear, total grain yield, harvest index Carbohydrates in leaves and grains, which amounted to 53.61 days, 158.13 cm, 38.44 cm2, 2.07, 68.2 cm, 5.14 cm, 1.12 stem-1, 27.04 ear-corn-1, 16.01 ear-row-1, 5.13 tons ha-1, 26.010%, 5.87%, 4.60% respectively. 3) The interaction treatment F4 + S1 was significantly superior, as it gave the highest averages in each of 50% male flowering, plant height, leaf area index, dry weight, ear diameter, number of stalks, number of grains per row, number of rows, biological yield, grain yield Total, Harvest Guide, Protein in Cereals, Carbohydrates in Cereals which amounted to52.00 days, 2.64, 390.1 gm plant-1, 6.47 cm, 1.26 plant ear-1, 27.96 ear-corn-1, 17.42 row ear-1, 20.81%, 6.31 tons ha-1, 31.62%, 5.78%, 7.02%.

Key Words: Maize Yield, Kernels, Yield, Chemical Fertilizers.

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Introduction

This monocotyledon plant belongs to the Peoce[illegible] family, and it is regarded as one of the most important strategic crops in Iraq and around the world, with the cultivated area and output ranking [illegible] crops. The value of this plant lies in the fact that it contributes significantly to a high level of global food security.

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Yellow maize is significant for a number of reasons, including the fact that it may be used to produce a range of products, such as feed, oil, starch, and sorghum, as well as the fact that it has both medical and industrial purposes (Capehart, Liefert, 2017).

Its high carbohydrate content (65–70%), water content (13–15%), protein content (9–12%), oil content (4%–6%), and vitamin content for human nutrition and animal feed all contribute to its economic importance. Its economic importance is determined by its water content (13–15 percent).In addition to this, it is used in the development of biopharmaceuticals and ethanol, both of which contribute to the reduction of pollution (Mohanna and Hayyad, 2007).

Recent worldwide interest in environmental and agricultural research is based on the role that chemical fertilizers play and their impact on soil and water pollution. This has led to the encouragement of organic production as a safer and safer alternative to meet some of the world's food needs, as (organic fertilizers) have a positive impact on soil fertility and plant growth (Elia and colleagues, 1998).

Organic matter is also a key component in improving the soil's capacity to retain water, ammonium, and other essential nutrients for plant growth and development (Havlin et al., 2005). Despite the positive effects that organic fertilizers have on crop growth, they may not achieve the same high and rapid effectiveness as chemical fertilizers because they are linked to an increase in the activity of microorganisms that decompose organic matter. Therefore, legalizing the use of chemical fertilizers in a way that maintains the ecological balance of nutrients and encourages the activity of microorganisms will result in a higher efficiency of nutrient investment (Satyageet et al., 2007). According to many scientific sources, the ability of soil microorganisms to decompose organic matter is related to the ratio of carbon to nitrogen (C/N ratio) or carbon to phosphorous (C/P ratio) in the soil, which must be small in order for microorganisms to begin their activity in destroying organic matter molecules and liberating the elements from them (Alexander, 1982), so mixing a small batch of mineral fertilizers with organic fertilizers is a good idea.

Despite the growing significance of the yellow maize crop, its planted area has decreased in recent years as a result of the large fall in water levels in the Tigris and Euphrates rivers in Iraq with 1.343 dunums produced on average, a 21.3 percent decrease from the previous season (Central Statistics Organization, 2020). Water shortages are perhaps one of the most visible drought issues, and it has resulted in a drop in the output of Iraq's yellow maize crop. Iraq is currently and, in the future, facing a real water crisis due to its location in the world's arid and semi-arid regions, where drought patterns, soils, and climate have changed dramatically, as has the efficiency of water use and productivity in such conditions (Angus and VanHer, 2001; Monneveux et al., 2006). In addition, there was waste due to a failure to follow current and updated procedures and a lack of enhanced precision in measuring the quantity of water provided or the number of irrigations utilized throughout the season. Agriculture consumes a significant quantity of water. Because of this, it's important to understand how water is scheduled based on how much is needed and how much is used. This will lead to an increase in crop water efficiency, a decrease in the amount of soil waste, and a better use of space (Al-Sahoki and others, 2009).

Materials and Methods

1. Experimentation Location

In the fall of 2021 AD, a field experiment was conducted in the field of the College of Agriculture-Wasit University in the Wasit Governorate with the goal of improving the growth performance and yield of yellow maize through the use of a combination of organic and chemical fertilizers as well as water stress.

The experiment was conducted using the RCBD randomized complete block design, with three replications, and included water stress treatments (100 percent, 75 percent, and 50 percent) in the main panels, as well as fertilizer combinations (the comparison treatment, the full recommendation treatment) in the secondary panels. The entire guideline treatment for organic manure (sheep manure) for NPK chemical fertilizer is 50 percent organic manure + 50 percent chemical fertilizer, 75 percent organic manure + 25 percent chemical fertilizer, and 25 percent organic manure + 75 percent chemical fertilizer. For the work of the rivers and corridors supplying the crop, the duplicates were split into 18 experimental units for one repeater, with a spacing of 1 m between repeaters. To guarantee that there was no overlap between the experiment Treatments, intervals between the experimental units were kept within 1 m, resulting in a total of 3 x 6 x 3 = 54 experimental units. experimental). To determine the chemical and physical qualities of soil, random samples were obtained from field soil at a depth of 0–30 cm in various places and evaluated in the labs of the Directorate of Agriculture in Wasit Governorate, the findings of which are displayed in Table 1.

Table 1. Some chemical and physical properties of field soil

Feature	The value	Unit
The degree of reaction of the soil pH	7. 4	
EC. electrical conductivity	3.35	dCi m - 1
nitrogen	36.4	mg kg -1
phosphorous	12.29	
bulk density	1. 19	Mg. M - 3
Organic matter	81.0	g kg -1
The sand	474	gloom kg - 1
silt	362	gloom kg - 1
mud	164	gloom kg - 1
soil texture	alluvial sand	

The Cornice's Number of Rows (Cornrow-1)

On July 19, 2021, the planting was completed by depositing 2-3 seeds in the hole after determining that the percentage of germination was 95 percent at full maturity. The yield's characteristics were calculated.

The Total Number of Kernels (Kernel-1)

For each experimental unit, the number of kernels from five plants in a random sample was determined, and the mean was chosen.

The Kernel's Number of Rows (Kernel-1 Row)

An average of five kernels per experimental unit was used to compute the number of rows.

The Number of Tablets in a Row (One Row-1)

The number of kernels in each kernel was estimated, and the mean was derived from a random sample of five kernels.

Total Grain Yield (Tonne ha-1)

Total grain yield ton ha and -1 means multiplying one plant's yield (grams) by the plant density per hectare (53333 plants per hectare-1) (Sahoki, 1990).

Biological Output (Ton ha-1)

Five plants were randomly collected from above the soil's surface, then dried aerobically in the sun's rays, then dried in an electric oven at 65 ° C for 72 hours, then dried at 105 ° C for three hours until the weight was stable, and then weighed at stability weight (A.O.A.C, 1975).

Harvest Index: (Percentage)

The harvest index (Atiya and Waheeb, 1989) is the grain yield divided by the biological yield times 100.

Discussion and Conclusions

The Total Number of Kernels (Kernel-1)

Table 2 shows that the fertilization, irrigation, and interference treatments had a substantial impact. There is a big advantage. It should be observed that the f4 treatment had the greatest average for this feature of 1.15 (Kernel-plant-1), whereas the f0 treatment had the lowest average of 1.04 (Kernel-plant-1) (Kernel-plant). 1) The superiority of organic fertilization treatment can be attributed to the fact that it has provided the plant with what it requires in terms of macro and micro nutrients, as well as improved the physical and chemical properties of the soil, which helps to increase root penetration into the soil, allowing the plant to obtain a greater amount of its nutritional needs and, as a result, increasing the plant's substance dry kernels (Al-Alousi, 2005). Table 2 shows that the maximum average number of kernels was reached when the treatment f4s1 was 1.26 (Kernel plant-1) and did not vary significantly from the interaction treatment 5fs1, and the lowest average number of kernels was produced when the interaction treatment F0S3 was 1.01. (Kernel plant-1).

Table 2. Shows the effect of a combination of organic and chemical fertilizers, as well as water stress, on the number of gerans per plant

		Fertilizer levels						Average Water Stress
Treatments		0	1	2	3	4	5	
water stress	full irrigation	1.000	1.333	1.067	1.000	1.267	1.267	1.122
	75%	1.133	1.000	1.000	1.000	1.133	1.133	1.067
	50%	1.000	1.000	1.000	1.000	1.067	1.000	1.011
Fertilizer levels on average		1.044	1.044	1.022	1.000	.1.156	1.133	
a. F. M. (0.05)								
Water Stress				Fertilizer levels		overlap		
0.03				0.07		0.12		

The Kernel's Number of Rows (Row Kernel-1)

Table 2 shows that the fertilization and irrigation treatments, as well as their interactions, have a substantial impact, indicating that there is a considerable superiority. The greatest mean for this feature was 15.73 kernels per row for the f4 treatment, whereas the lowest mean for this trait was 13.42 kernels per row for the f0 treatment, which is related to The reason for organic fertilizer's superiority in the leaf area is that increased leaf area leads to increased dry matter accumulation, improved growth, and a decrease in the rate of abortion in the ovaries, which leads to increased fertilization and pollination rates, and thus an increase in the number of rows in the kernel (Sahoki, 1990). This finding is in line with the findings of Wahib et al., 2009; Sharifi (and others, 2012). Because of the increase in the number of rows in the kernel and the similarity of this result with what was achieved by increasing the levels of organic fertilization, it is noted that there is a significant increase in the number of rows in the kernel with an increase in the levels of organic fertilization (Frioni and Fulchieri, 1994, 1994). Cereals in a row (Bahr and Gomaa I'H 2002), and this is what Reynders and Vlassak (1982) discovered and observed. The irrigation treatment s1 had the greatest mean for this attribute, at 16.01 rows of kernel-1, while the stress treatment, water 3s less dead, had the lowest. The average for this trait was 14.08 kernel rows; this could be due to the effect of water stress on the number of rows in the kernel, as a lack of water during the vegetative growth stage can affect characteristics such as plant height, number of leaves, and kernel diameter, resulting in a reduction in the representation process' outputs. This is reflected in the small number of rows in the kernel, which is owing to the fact that water stress caused during the vegetative development stage induces the creation of tiny female flowers and a small number of grains in the kernel, resulting in a drop in the number of rows in maize kernels (Alusi and Sahoki, 2006). Everyone was in agreement. For these findings, see Al-Obaidi (2014), Hameedi et al. (2015), Al-Roumi (2017), Ardaan (2017), and Al-Qaisi (2017). In terms of interference, Table 2 shows that the treatment f4s1 obtained the greatest average of 17.47 rows of kernel-1, which did not vary substantially from f5s1, and that the interference treatment F0S3 achieved the lowest average of 12.47 rows of kernel-1.

The Cornice's Number of Rows (Corn Row -1)

Table 3 shows that the fertilization and irrigation treatments, as well as their interactions, have a substantial impact, indicating that there is a considerable superiority. The highest average for this trait was 15.73-1 cob row, while the lowest average for this trait was 13.42 cornrow-1 row, and the reason for the superiority of organic fertilizer in leaf area is attributed to the increase in leaf area, which leads to an increase in the accumulation of dry matter, improving growth and reducing the rate of abortion in the ovaries, which leads to an increase in the th This finding is consistent with the findings of Wahib et al., 2009; Sharifi and Others, 2012. (It's worth noting that a rise in organic fertilization levels leads to a considerable increase in the number of rows in the ear; this is due to the increase in the number of rows in the ear and the resemblance of this outcome to what was achieved by. Who was the first to double the number of tablets in a row? and this is what he received and what they saw (Reynders and Vlassak, 1982). And the irrigation treatment s1 had the highest mean for this trait, at 16.01 row-corner-1, while the water stress treatment 3 s had the lowest average for this trait, at 14.08 row-corner-1. This could be due to the effect that water stress has on the number of rows in the ear, as a lack of water in the vegetative growth stage can affect the height of plants, the number of leaves a plant has, and so on. The reason also reappears in the cornea. During the vegetative development phase, water stress stimulates the creation of tiny feminine flowers. And since the number of grains in corn is low, the number of rows in the corn is also low (Al-Alusi and Al-Sahoki, 2006). Al-Obaidi (2014), as well as On these findings, Hameedi et al. (2015), Rumi (2017), Ardaan (2017), and Al-Qaisi (2017) all concurred. In terms of overlap, Table 2 shows that the maximum mean produced by treatment f4 x s1 was 17.47 row-corner-1, which did not vary substantially from f5 x s1, while the interference treatment F0 x S3 achieved the lowest average of 12.47 row-cup-1.

Table 3. Shows the effect of a combination of organic and chemical fertilizers, as well as water stress, on the number of rows in the cornice

Treatments		Fertilizer Levels 0	1	2	3	4	5	normal water stress
water stress	full irrigation	13.47	15.33	16.33	16.07	17.47	17.40	16.01
	75%	14.33	15.67	15.47	14.67	15.13	15.13	15.07
	50%	12.47	13.87	14.13	15.47	13.87	14.67	14.08
Average fertilizer levels		13.42	14.96	15.69	15.11	15.73	15.40	
a. F. M. (0.05)								
water stress			Fertilizer levels			overlap		
0.99			0.80			1.46		

The Quantity of Grains in a Row (Bead Row-1)

Table 4 shows that the fertilization and irrigation treatments, as well as their interactions, have a substantial impact, indicating that there is a considerable superiority. The greatest average for this attribute was 27.33 row-1 grains for the f4 treatment, while the lowest average for this trait was 25.34 row-1 grains for the f0 treatment. One row of grain was due to the amount of phosphorous in the treatment mixture and its interaction with the organic fertilizer added during the flowering stage, as this resulted in an increase in the number of flowers in the row, which was reflected in an increase in the number of grains in the row (Mohammed et al., 2015), and it gave Water stress treatment 3 s had the greatest average of 27.02 grains row-1, whereas irrigation treatment s1 had the lowest average of 27.02 grains row-1. This trait's lowest average was 26.16 rows -1 grain. This is owing to the fact that water stress has a definite influence, which may result in modifications in pollen grains or the emergence of silk, as well as abortion in fertilized ovaries (Khodarahmpour and Hamidi, 2012). Water stress has a detrimental influence on the digestion of all nutrients as well as the activation of key enzymes and hormones inside plants, which is reflected in the fertilization process and the production of fertilized grains by determining the number of grain origins. This was in agreement with what he had stated. Each of these (2007), Al-Obaidi (2014), Al-Roumi (2017), and Ardaan (2017), Al-Qaisi (2017), and Desoky et al (2021) As for the coefficients of overlap, Table 2 shows that the highest average number of acorns was achieved when treatment f4 x s1, which amounted to 27.96 beads row-1, and did not differ significantly from the rest of the treatments, which ranged from 24.96 pills row-1, which was the lowest average.

Table 4. Shows the effect of a mix of organic and chemical fertilizers, as well as water stress, on the number of grains per row and their interaction

Treatments		Fertilizer levels 0	1	2	3	4	5	Normal Water Stress
Water stress	full irrigation	25,633	26.47	27,037	27.300	27.967	27.73	27,024
	75%	25,443	26.37	27.157	27,197	27,283	27.82	26,871
	50%	24.967	26.09	26.420	26,347	26,383	26.40	26.160
Fertilizer levels on average		25,348	26.29	26,871	26,948	27,336	27.31	
a. F. M. (0.05)								
Water Stress			Fertilizer Levels			overlap		
0.42			0.19			0.45		

Total Grain Yield (ton ha-1)

Table 5 shows that the fertilization and irrigation treatments, as well as their interactions, have a substantial impact, indicating that there is a considerable superiority. The highest average for this trait was 5.58 Ton ha-1 for the f4 treatment, which did not differ significantly from the f5 treatment, while the lowest average for this trait was 3.30 Ton ha-1 for the f0 treatment, and y and d for the y and d for the y and d for the y and d for the y and d for the y and d for the y and d for the y and That is, until cereal occurs in the majority of crops, granular target the primary, lest she lose her, and he characterized Quantity Complicated regulation with a large number of parameters ranging from genetics to rat affect environmental factors such as temperature and humidity, among others. Hallauer and Colvin (1985) as that produces the cereal plant He approves of my two steps being necessary. They occurred vaccination and fertilization, as well as the amount of optical in Period what between fertilization and matured the crop to store materials food in Duncan grain), (1978 and attributed that to me. Hallauer and Colvin (1978) as that produces the cereal plant He approves of my two steps being necessary. They occur in vaccination and fertilization, and organic leftovers are perfectly fertilized. Sheep in terms of traits, ingredients, and being a subject of organic composition Whatever effect in readiness elements food in soil to her from properties effect in content metal for soil and then ready absorption and agree this is With help from (Al-Qaisi, 1983 and Osip) et al., (2002) Mtambanengwe and the Mapfumo, (2006 and) Ayed, (2006 and) Al-Baldawi, (2006 and) Hadithi and slave Hamza, (2010 and) Akol, (2011 and Nyiraneza) et al., (2009 and) Alaklawy, 2014 (Whereas irrigation treatment s1 had the greatest mean for this feature, 5.13 tons ha-1, which was not substantially different from s2. While the treatment of water stress 3 s recorded the lowest average for this trait, which amounted to 3.78 tons/hectare, it is clear that the reason for the decrease in yield was the exposure of the plant to water stress in several characteristics of the yield components, such as the decrease in yield percentages, water and height in grades, the heat, and the decline in relative humidity. It is clear that the reason for the decrease in yield was the exposure of the plant to water stress in several characteristics of the yield components, During this time, ovaries' development and conformation were restricted from emergence to 50% blooming (perhaps affecting vegetative growth characteristics, resulting in a lack of process outputs). Creating optical illusions And there isn't enough To create the most vast number of classes possible, The drop in arrival of water and nutrients, particularly during a time of fullness cereal, caused tiny grain size and shrinking, resulting in a reduction in average weight of 500 tablets. These findings corroborated those of (Al-Akidi, 2015) and (2018; Sony Desoky et al., 2021); and (Al Shabr, 2021), who discovered that the spacing of irrigation periods had a substantial impact on grain production per unit area. The interference treatment F0 S3 was found to have the lowest average of 3.22 tons ha-1. In terms of interference, Table 18 shows that during treatment f4 1s, the highest average of 6.31 tons ha-1 was reached.

Table 5. Shows the effect of a combination of organic and chemical fertilizers, as well as water stress, on the character of total grain yield, ton ha-1

		Fertilizer levels						average water stress
Treatments		0	1	2	3	4	5	
water stress	full irrigation	3.400	4.447	4.727	5.703	6.310	6.240	5.138
	75%	3.290	4.267	4.787	5.313	6.160	6.063	4.980
	50%	3.220	3.330	3.420	4.050	4.277	4,397	3.782
Fertilizer levels on average		3.303	4.014	4.311	5.022	5.582	5.567	
a. F. M. (0.05)								
water stress			Fertilizer levels					overlap
0.13			0.22					0.36

Biological Yield (Ton ha-1)

As compared to the fertilization treatments and their interactions, the irrigation treatments had no significant impact, as shown in Table 6. There is a big advantage. The f4 treatment, which recorded the greatest average for this feature, resulted in a value of 20.04. Ton ha -1, Bina recorded a transaction of f0. The lowest average for this characteristic, 17.61 tonne ha-1, is attributable to this subject's dryness for plants. So I can get the best rates. She yielded efficiency in the lid vegan in saw z rays solar and changed from the growth requires presence number or ra s. room and quality paper in the lid vegan that accelerated the development and lengthened his period. Consequently, this represents the rise in subject dry plants. What is the difference between my rate and the total optical rate? Consumption via respiration (Jesus, (1990) correlated this outcome with What is the mechanism suggested? All by Idris) (2003 and) (Al-Baldawi, 2006) The Karani people The hypothalamic, (2011), who reassured me, Role Subject Organic in order to improve soil qualities and increase capacity in water conservation and contain them on me. Food components such as nitrogen, phosphorus, and potassium, as well as other elements, It was the minority that prompted me to equip the plant and its contribution with a bonus. Plants should be kept dry. As indicated in Table 6, interference may be seen. The greatest average yield attained with f4 1 s treatment was 20.81 tons ha-1. The interference treatment F0 S1 had the lowest average yield of 16,74 tons ha-1.

Table 6. Shows the impact of a combination of organic and chemical fertilizers, as well as water stress, on the character of biological yield ton ha-1

		Fertilizer levels						average water stress
Treatments		**0**	**1**	**2**	**3**	**4**	**5**	
water stress	**full irrigation**	**16.74**	**18.86**	**19.48**	**20.72**	**20.81**	**19.95**	**19.43**
	%75	**17.33**	**18.22**	**19.54**	**20.07**	**19.49**	**19.93**	**19.10**
	50%	**18.75**	**18.3**	**18.89**	**18.75**	**19.84**	**19.29**	**18.97**
Fertilizer levels on average		**17.61**	**18.46**	**19.30**	**19.85**	**20.04**	**19.72**	
a. F. M. (0.05)								
water stress			**Fertilizer levels**			**overlap**		
1.14			**1.03**			**1.83**		

Total Grain Yield (Tons per Acre)

Table 7 displays There is a significant effect on the fertilization and irrigation treatments and their interaction, as there is a significant superiority, as observed by the fact that the f5 treatment, which recorded the highest average for this trait, amounted to 28.13 percent and did not differ significantly from f4, while the f0 treatment recorded the lowest average for this trait, 18.85 percent, due to the fact that the increase in resultant cereal yield was attributed to the fertilization and irrigation treatments. It was harder on him in consequence than on me, and that led to a positive trait in my case. harvesting evidence Rate of Evidence Harvesting As the ratio increases, you can see how much subject dry in the economy is happening, and this reveals fragmentation outputs the acting optical fitted to me during flowering) relationship Source downstream. Before and during blooming (this is the expansion), when there is a brief window of time to approach me, my blossoming memory and femininity will expand. From blooming through maturity, the plant undergoes a physiological time of fullness during which the plant's fruit is produced. The likelihood of assembling a subject dry in part vegetative reproductive evil is greater. I that is being seasoned with sufficient "to complete the course life item or type) Issa et al. (1990) and irrigation treatment s1 produced the greatest mean for this attribute, 26.10 percent. Which did not change substantially from s2, whereas the lowest average for this feature was 20.0% in the water stress treatment 3s. The reason may be due to the decrease in the weight of the grain, which is a result of the short period of fullness and the lack of accumulation of dry matter. This is reflected in the decrease in grain yield when the irrigation is reduced by 50 percent, so there is a direct relationship between yield and harvest index. These findings were consistent with Nikju et al. (2015), Kuscu and Demer (2012), and Al-Obaidi (2014). In terms of interference, Table 2 shows that the average for treatment f4 x 1 s was 31.62 percent, while the average for treatment F0 x S3 was 17.23 percent.

Table 7. Shows the effect of a combination of organic and chemical fertilizers, as well as water stress, on the character of total grain yield, ton ha-1

		Fertilizer levels						average water stress
Treatments		0	1	2	3	4	5	
water stress	full irrigation	20.33	23.18	24.24	27.48	31.62	31.02	26.10
	75%	18.98	23.44	24.49	26.50	30.33	30.42	25.91
	50%	17.23	18.33	18.22	21.59	21.70	22.95	20.00
Fertilizer Levels on Average		18.85	21.65	22.32	25.19	27.88	28.13	
A. F. M. (0.05)								
Water Stress			Fertilizer levels			overlap		
0.8			1.35			2.2		

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