



# EFFECT OF ORGANIC FERTILIZER AND COMPOUND IN SOME GROWTH CHARACTERISTICS OF WHEAT CROP *TRITICUM AESTIVUM* L.

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## Abstract

The experiment was carried out in the fields of the Department of Horticulture and Garden Engineering at the college of agriculture/ Al-Qasim Green university, to study the effect of organic fertilizer and compound in some growth characteristics of wheat crop. The results showed that the overlap in the level of organic and compound support had a positive effect in raising the efficiency of the use of fertilizers in the growth of wheat plant, and the overlap between the two fertilizers has given a positive indicator.

**Key words:** organic fertilizer, compound fertilizer, wheat crop, growth

## Introduction

Chemical fertilizer (compost) does not need to confirm the role it plays in the continuity and increase of agricultural production. However, these fertilizers should be used in the appropriate quantities for each crop type and added at the appropriate time. It has already been proven that excessive use of chemical fertilizers due to agricultural policies to support inputs in many countries without accounting for the actual requirement under chemical fertilization, many negative impacts on the environment and health of humans and animals lead to many. Most soils in Iraq tend to alkaline along with their lack of organic matter and biomass, which are a major component of the terrestrial fertility system (physical, chemical and biological (Fares, 1998). Abu Al-Rayyan (2010) pointed to some of the negative effects of excessive use of chemical fertilizers, because of the urgent need for organic agriculture or the use of organic fertilizers as an alternative to chemical fertilizers. These include the addition of large quantities lead to the emergence of symptoms of poisoning, as happens in the case of some Nitrogen compounds, as the accumulation of nitrogen in certain forms is dangerous to human health as happens in the case of nitrates, as 70% of the nitrate in the basket of

human food comes from vegetables, as well as pollution of the heavy elements that can occur in the soil, which adversely affects the Objects Beard. As well as lead to increased soil salinity and ammonia pressure, and may cause a shortage of some elements because of adsorption by the presence of other elements in abundant quantities. (Abu Dahi and the UNESCO, 1988). As it leads to a defect in the stages of the development of different plants, may delay the transition to the stage of flowering or increase the possibility of erosion and then the lack of early flowering and a small number of flowers and fruits and then delayed maturity of the crop, and may lead to the formation of soft plants thin-walled susceptible to disease and insects (Sahaf, 2007). The sound agricultural and economic policy should take into consideration the preservation of the environment and the health of the community and hence the interest in encouraging agricultural producers to follow the proper methods of fertilization that ensure the production of healthy food of good quality. Organic fertilizers from low nutrient fertilizers and nutrient depletion are slow because of the slow transition to the mineral image, but they are of great benefit. They have the ability to retain a large amount of water, increase soil porosity and their biological activity, provide warmth, of phytosanitary nutrients that are gradually released through their gradual degradation, and

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are the cradle of microorganisms that play an important role in soil fertility (National Training Course on the Production and Use of Biological Fertilizers, 1998). Organic wastes contribute to increasing the exchange capacity of positive ions as well as containing active groups of hydroxyl, carboxyl and amine that have the ability to form natural chelating compounds equivalent to seven times the thickness of mineral clay. Nutrients, in particular, protect the minor elements from washing or fixing. These compounds remain readily available in the soil and are easily transported to the sites of absorption by plant roots (Yonbayashi, 1990, Nayak *et al.*, 1990, Sorge *et al.*, 1993; Sanchez *et al.*, 2002). Aruni (2001) As an old and modern method, it is mentioned that Alma Membership is a cornerstone that cannot be dispensed with in maintaining soil fertility and supplying the plant with a need for various nutrients under the prohibition of the use of different chemical fertilizers because of pollution of the environment. Grandy *et al.* (2002) stated that organic fertilizer is a source of essential and minor nutrients necessary for plant growth. Its nutrient content varies depending on its sources. The value of the fertilizer is not estimated by its nutrient content but by the nutrient availability after its degradation, as well as by the different soil characteristics. Al-Janabi (2005) pointed out that the addition of 30 metric tons of water to the soil led to an increase in the amount of phosphorus and potassium available in the soil compared to no addition. Blaise *et al.* (2006) noted that soil organic fertilizer is a good source for phosphorus and potassium and that the soil content of phosphorus and potassium increased significantly in the processes to which organic fertilizer was added compared to non-addition. Triciokaite and Danilcenko (2001) found that the addition of organic and mineral fertilizers led to increased production in most different agricultural crops under study compared with the use of compost alone, as well as an increase in most of the growth traits measured in relation to the use of compost alone. Delolen (2001) in Finland indicate that most crops are more responsive to organic and mineral fertilization than mineral fertilizers alone. Sharif-Hossin *et al.* (2003) reported that the mixing of organic manure with metal resulted in an increase in the number of plant height and the number of branches, and thus on production relative to the comparison treatment, and the treatment of organic fertilization and mineral fertilization alone.

## Materials and methods

### Soil samples

The soil was selected from one of the fields belonging to the Faculty of Agriculture at Al-Qasim Al-Khadra

University, where the soil was dehydrated and tested and mined with a 2 mm diameter sieve and a sample of soil was extracted to estimate the soil characteristics before planting.

### Factors used in the experiment

Three levels of organic fertilizer were used (10, 5, 0) g. (M2, M1, M0), respectively, and three levels of compound fertilizer (20, 10, 10 g) are represented by coefficients (F2, F1, F0).

### Biologic experiment

The experiment was conducted in the fields of the Faculty of Agriculture of the Department of Horticulture and Garden Engineering, at the University of Al-Qasim Al-Khadraa to study the effect of organic and compound fertilizers on some growth characteristics of wheat crop. 7 kg plastic was used and a thin layer of fine gravel was placed in the base. The soil was then added to the soil and seeds were planted with 10 seeds per pot. The plants were then reduced to 6 plants after 14 days of germination.

Plants are irrigated according to the need of the plant for irrigation, where the missing water is compensated by evaporation - weave in the weight wise way, then fertilize according to the recommendations. After that, the measurements of the plant were taken according to the stages of its growth, which will be explained in the analysis of the plant.

### Soil and water analysis

The soil reaction was measured in a saturated paste extract using a pH-meter device as described in page *et al.* (1982). And EC conductivity in a saturated paste extract using an EC-meter and according to the method described in page *et al.* (1982).

### Plant indicators measured

Plant lengths were measured in centimeters and the length of the length of each treatment was measured. The length of the soil was measured from the soil to the spike base (Singh and Stoskopf, 1971)., The proportion of chlorophyll in the leaves was measured by the Spade meter.

Nitrogen: Nitrogen was estimated in the leaves by chloride method using a microdial device Kieldahl- Micro (according to the method cited by Black (1965). Phosphorus was estimated in a plant extract digested by a spectro device at a wavelength of 410 Mm after extraction of absorption values. Potassium was measured by a flame photometer. The paper area of ??the plant was measured by law:

$$(2Cm^2) = \text{paper length (cm)} \times \text{paper width (cm)} \\ \times 0.75 \text{ by } et\ al., \text{ liang (1973)}$$

**Statistical analysis and treatment of results**

The study was applied as a global experiment according to the design of CRD by three replicates and the number of experimental units was 27 experimental units. The results were statistically analyzed according to the ANOVA analysis and were compared with the least significant difference of L.S.D at a significant level 0.05. Jenstat was used in the statistical analysis.

**Table 1:** Some chemical and physical properties of soil used in study

Unite measuring	value	property
ds m <sup>-1</sup>	3.32	Electrical conductivity E <sub>Ce</sub>
	7.4	Soil reaction
Mil L <sup>-1</sup>	10.4	Ca <sup>+2</sup>
Mil L <sup>-1</sup>	2.6	Mg <sup>+2</sup>
Mil L <sup>-1</sup>	15.22	Cl <sup>-1</sup>
Mil L <sup>-1</sup>	6.2	HCO <sub>3</sub>
Mg m <sup>-3</sup>	1.33	Bulk density

**Results and discussion**

The results of the statistical analysis showed that the effect of organic fertilizer and compound and the overlap between them had a significant effect on the ratio of Nitrogen in the plant%. The effect of the compost was significant in the ready nitrogen and was the highest value at the transaction F2, which amounted to 2.438% compared to the treatment of F1, which gave The lowest value of plant-ready nitrogen was 2.07%. On the same table, organic manure had a significant effect on plant-ready nitrogen and its highest value at M1 was 2.486% compared to M 0, which reached 2.083%. The effect of the interaction between organic fertilizer and compound Had a significant effect Also in the value of ready-to-nitrogen plant% and was the highest value in the treatment of overlap M1F0 value of 2.640% and the lowest value when the transaction M0F0 which stood at 1.60%.

It is noted in table 3 that the effect of the composite fertilizer was not significant in the paper area of the wheat plant and the highest value was in the treatment F2, which

**Table 2:** Effect of organic manure and compound and their overlap in the nitrogen ready in the plant%

Averages	organic fertilizer			Compound fertilizers
	M2	M1	M0	
2.180	2.300	2.640	1.600	F0
2.072	1.683	2.463	2.070	F1
2.438	2.380	2.353	2.580	F2
	2.121	2.486	2.083	averages
F	F*M	M		LSD (0.05)
0.3447	0.5970	0.3447		

amounted to 13.79 cm<sup>2</sup> compared to the comparison treatment, which gave the lowest value of paper area of 11.84 cm<sup>2</sup>, and the effect of organic fertilizer in the paper area It was significant and gave the treatment M1 the highest value of the paper area amounted to 16.13 cm<sup>2</sup>. Compared to the comparison treatment of 10.22 cm<sup>2</sup> and an increase of 57.8%. The same table shows that the effect of the interaction between organic fertilizer and compound has a significant effect on the paper area. The F2M1 treatment gave the highest value of the paper surface area of 18.84 cm<sup>2</sup>, Comparison of 9.84 cm

**Table 3:** Effect of organic fertilizer and compound and overlap between them in the paper area cm<sup>2</sup>

Averages	organic fertilizer			Compound fertilizers
	M2	M1	M0	
11.84	10.10	15.57	9.84	F0
12.47	11.95	13.87	11.59	F1
13.79	13.21	18.94	9.23	F2
	11.75	16.13	10.22	average
F	F*M	M		LSD (0.05)
3.606	6.246	3.606		

The results of the statistical analysis showed that the effect of organic fertilizer and compound and the overlap between them had a significant effect on the chlorophyll index. The effect of the compound fertilizer was significant in this effect and the highest value was in the treatment of F1 which reached 42.68 spada unit compared to the comparison of 38.27 spada unit, and from the same table, the organic fertilizer had a significant effect on the chlorophyll index and its highest value was at 44.58 spada unit compared with the treatment of m, which was 38.69 spada unit. The effect of the interaction between organic and compound fertilizer also had a significant effect The value of the chlorophyll index was higher It has a value of 0.47 spada unit with a value of 46.47 spada unit and a lower value at transaction M0F0 of 30.77 spada unit.

The results of the statistical analysis in Table 5 showed that the organic fertilizer and the compound and the interaction between them had a significant effect on the ready phosphorus. The compound fertilizer significantly

**Table 4:** Effect of organic fertilizer and compound and their overlap in the chlorophyll index spade unit

average	organic fertilizer			Compound fertilizer
	M2	M1	M0	
38.27	39.77	44.27	30.77	F0
42.68	40.63	43.00	44.40	F1
41.24	36.37	46.47	40.90	F2
	38.92	44.58	38.69	average
F	F*M	M		LSD (0.05)
2.278	3.945	2.278		

affected the highest value in F2 treatment which was valued at 0.801% compared to the treatment of 0.279 F0. As noted from the table, the organic fertilizer has a significant effect on the ratio of phosphorus ready and the highest value at the treatment of M2, which amounted to 0.64% compared to the comparison treatment, which amounted to 0.463% and the lowest value of ready phosphorus was at the transaction M1, which amounted to 0.295%, as noted from the results Statistical analysis. The correlation coefficients between organic fertilizer and compound had a significant effect on phosphorus and the highest value at treatment was the M2F2 interference which was 1.47% compared to the interference treatment of M0F0, which amounted to 0.177%.

**Table 5:** Effect of level of organic fertilizer and compound and their overlap in the phosphorus-ready plant%

average	organic fertilizer			Compound fertilizer
	M2	M1	M0	
0.279	0.420	0.241	0.177	F0
0.327	0.310	0.280	0.390	F1
0.801	1.217	0.363	0.823	F2
	0.649	0.295	0.463	average
F	F*M	M		LSD (0.05)
0.2285	0.3958	0.2285		

It is noted through the results of statistical analysis in table 6 the effect of organic fertilizer and compound and the overlap between them in the ratio of potassium ready, where it is noted through the results of statistical analysis that the highest value was the addition of compound fertilizer at the transaction F2, which amounted to 76.5% compared to the comparison treatment, which gave the lowest value. The effect of organic fertilizer was significant in giving the highest value of ready-made potassium with a value of 79.4% at the treatment of M1 compared to the comparison treatment which reached 68.6% and an increase of 15.74%. The effect of the interaction between organic and organic fertilizers was significant Potash. The Om ready highest value when the

**Table 6:** Effect of the level of organic fertilizer and compound and the overlap between them in potassium-ready plant%

averages	organic fertilizer			Compound fertilizers
	M2	M1	M0	
73.7	78.4	75.9	66.8	F0
73.4	70.8	83.1	66.3	F1
76.5	77.8	79.3	72.6	F2
	75.7	79.4	68.6	averages
F	F*M	M		LSD (0.05)
6.46	11.18	6.46		

treatment of interference F1M1 which amounted to 83.1% compared to the treatment comparison, which stood at 66.8%, an increase valued at 24.4%.

The results of the statistical analysis show that the effect of organic fertilizer and compound and the overlap between them has had a significant effect on the height of the wheat plant, the effect of the compound fertilizer significantly in the plant height and the highest value at transaction F2, which amounted to 41.2 cm compared to the comparison treatment, The highest value at the treatment M1, which amounted to 40.7 cm and its lowest value was at the treatment of the comparison M0, which amounted to 31.9 cm, an increase of 27.5%. As can be seen from the same table. The interaction coefficients between organic and compound fertilizer had a significant effect on plant height and the highest value was in the treatment of M1F1, which was 40 cm in comparison to the treatment of the comparison of 22.0 cm.

**Table 7:** Effect of level of organic fertilizer and compound and their overlap in plant height (cm).

averages	Organic fertilizer			Compound fertilizer
	M2	M1	M0	
31.4	31.5	40.7	22.0	F0
35.8	36.2	34.8	36.3	F1
41.2	39.3	46.7	37.5	F2
	35.7	40.7	31.9	averages
F	F*M	M		LSD (0.05)
5.70	9.87	5.70		

## Conclusions

1. The overlap between the level of addition of organic fertilizer and compound has a positive effect in raising the efficiency of the use of fertilizers in the growth of wheat plant.
2. There is a positive effect of the interaction between organic fertilizer and compound in all plant indicators.
3. The superiority of organic fertilizer with an increase in levels on the compost in terms of potassium ready in the plant, where the value of 79.4%

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