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Effect Of Adding Compound Fertilizer (N-P-K) And Sheep Manure On Productivity And Some Traits Of Fruits And Leaves Of Date Palm Phoenix Dactylifera L, Cultivar Al-Zahdi.

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Abstract:
This experiment was conducted in one of the orchards of Babylon province- Al-Qasim District - Al-Amadiya Village during the period 2023-2024, To show the effect of adding compound fertilizer (N.P.K at 0, 0.5, 1 kg/tree) and sheep manure (0, 5, 10 kg / tree) on the productivity and some fruit traits of date palm trees of Al-Zuhdi cultivar, Where 27 palm trees were selected, aged 25 years, almost identical in size, and planted on lines and with planting distances of 9 x 9 m. A compound fertilizer of Jordanian origin and decomposed sheep waste was used. The study was conducted with three additions, the first on 1/11/2023, the second addition on 1/2/2024, and the third addition on 1/4/2024. The results of the experiment showed a increase in the total production, fruit weight, average number of bunches, fruits content of sugar, percentage, and the Percentage of each (bunches of nitrogen, phosphorous, potassium, and total carbohydrates, when the study factors were used individually or in combination in the leaves)and the best results obtained were when using a concentration of 1 kg of compound fertilizer and 10 kg of sheep manure for all the mentioned traits.
Keywords: *Chemical Fertilizer, Data Palm Cultivar, Organic Fertilizer, Al-Zahdi ,Phoenix dactylifera L.*

INTRODUCTION :

at palm,(Phoenix dactylifera .L) belong to order Palmae and family Arecaceae. The palm family is considered one of the oldest fruit trees in the world. The order Palmae is considered one of the Palme cultivation spreads in tropical and semi-tropical, Arabian Gulf region is its original homeland it moved to all areas with the appropriate atmosphere for its cultivation greatest (1) and (2)

.From an economic point of view, palm occupies an important place in the agricultural sector in more than forty countries in the world,(3) and in most cases, the lands of palm orchards are used in the cultivation of some types of fruit trees, vegetables, field crops, and ornamental plants. Palm orchards, date pressing operations, and industries derived from the vegetative and fruit parts of the palm also contribute to employing a certain percentage of workers in a number of countries around the world (4).Iraq's production of dates for the 2021 season is estimated to be about 4,735 thousand tons. Baghdad province ranked first, followed by Babylon province in second place, and Diyala province ranked third. The production of the Al-Zahdi variety was estimated at about 396.7 thousand tons, and it is the most common cultivar in Iraq, and it constitutes approximately 54% of the date production in Iraq (5).

.Most of the research focused on studying the components of the main product of the palm tree, which is dates, and the studies dealt with them in terms of their nutritional, medical and economic importance (6).The element's content of leaves and fruits is affected by the characteristics of the soil and the elements it contains, where increasing soil fertility through nitrogen, phosphate and potassium fertilization encourages the absorption of nutrients and increase the content of these elements in palm leaves, which is positively reflected on the quantity and quality of yield (7).

MATERIALS AND METHODS

Twenty-seven trees of Al-Zuhdi cultivar were selected, homogeneous in age and size, approximately planted on lines, and the distance between one tree and another is about 9 m. The experiment was applied by following the design of randomized complete blocks (R.C.B.D) as a factorial experiment (3 × 3).Where the compound fertilizer (N.P.K with 0, 0.5, 1, kg/tree) and sheep manure (0, 5, 10 kg tree) and the averages were compared using the least significant difference (L.S.D) test at the probability level of 0.05 (8).The balanced compound fertilizer N.P.K 20:20:20 in the

form of granules of Jordanian origin was used as a source of the compound fertilizer, as well as decomposed and dry sheep waste.

Studied traits:

1- Average tree yield(kg)

It was calculated by calculate the rate of each treatment after the fruits reached the stage of full maturity

2- Average weight of the fruit (g):-

It was calculated after collecting the fruits and taking 50 fruits from each treatment at random and weighing and then extracting the average

3 - Average number of bunches(bunch/ tree):

The number of tastes was calculated for each treatment and for three replicates, then the average was calculated

4- Percentage of total sugars in fruits %:

Estimated according to the modified Lane and Eynon method (9)

5- Leaves content of nitrogen, phosphorous, and potassium %:-

Nitrogen was estimated using the Kjeldahl (10).and Total phosphorous was estimated using ammonium molybdate and spectrophotometer according to the method mentioned in (11) As for potassium, it was estimated by Flamephotometer according to the method proposed by (12)

6- Carbohydrate content of leaves (bunches) (gm/kg dry weight):

The carbohydrate content of the leaves was estimated according to the method of (13)

The treatments:-

1- control (distilled water only).
2- compound fertilizer 0.5 kg / tree
3- Compound fertilizer 1 kg / tree
4- Sheep manure 5 kg/tree
5- Sheep manure 10 mg/tree
6- Compound fertilizer 0.5 kg / tree + sheep manure 5 kg / tree
7- Compound fertilizer 0.5 kg / tree + sheep manure 10 mg / tree
8- Compound fertilizer 1 kg/tree + sheep manure 5 mg/tree
9- Compound fertilizer 1 kg / tree + sheep manure 10 mg / tree

Table (1) Some chemical properties of sheep manure

Electrical conductivity/DS.M	**31.43**
pH	**6.9**
Organic matter g/kg	**234**
Carbon g/kg	**153**
N/C	**8.3**
nitrogen g/kg	**16.9**
phosphorous g/kg	**17.8**
potassium g/kg	**31**

RESULTS AND DISCUSSION :

1- Average tree yield(kg)

In the table data (2) we see that the addition of the compound fertilizer led to a significant increase in the productivity of the tree, and the highest production rate reached (84.80kg) in trees treated with a concentration of 1 kg/tree compared to the lowest production amount (73.23 kg) in the control treatment .The addition of sheep manure had increasing the productivity of trees, which reached the highest production average when using the concentration of 10 kg/tree, and it was recorded at (81.73 kg) and less production (76.34 kg) in the control trees.As for the interaction between the concentrations of compound fertilizer and sheep manure, it was significant, where the trees treated with the highest concentration of each of them excelled by obtaining the highest yield of (88.85 kg) compared to the lowest averages (70.71 kg) in the control treatment. The increase in the productivity of trees may

be due to the effect of the compound fertilizer in filling the plant's need of the mineral elements necessary for the processes of photosynthesis, respiration, and various metabolic processes because the compound fertilizer contains primary elements,(14).

Table (2) The effect of adding Compound fertilizer and sheep manure and the interaction between them on the rate of tree productivity/kg

Sheep manure concentration kg/tree	Compound fertilizer concentration kg/tree			average
	0	0.5	1	
0	70.71	76.67	81.63	76.34
5	74.03	77.66	83.92	78.54
10	74.96	81.39	88.85	81.73
average	73.23	78.57	84.80	
L.S.D 0.05	Compound fertilizer= 3.297, sheep manure=3.297 , interaction= 5.710			

2- Average weight of the fruit (g):

Of data in Table (3)we find the addition of the compound fertilizer caused increase in the average weight of the fruit, and he reached (10.84 gm) when adding 1 kg/tree. The lowest average and recorded (8.62 g).The addition of sheep manure had a in increasing the fruit weight average, which reached the highest average when using a level of 10 kg/tree, and it was recorded at (10.8 g) compared to the lowest averages (9.24 g) in the control trees. As for the interaction between the concentrations of compound fertilizer and sheep manure, it was significant, as the trees treated with the highest concentration of each of them excelled by obtaining the highest average of fruit weight and recorded (11.22 g) compared to the lowest averages(8.30 g) in the control treatment.

Table (3) The effect of adding Compound fertilizer and sheep manure and the interaction between them on the average weight of the fruit/gm

Sheep manure concentration kg/tree	Compound fertilizer concentration kg/tree			average
	0	0.5	1	
0	8.30	8.90	10.51	9.24
5	8.77	9.02	10.77	9.52
10	8.78	10.24	11.22	10.08
average	8.62	9.39	10.84	
L.S.D 0.05	Compound fertilizer= 0.672, sheep manure= 0.672 , interaction= 1.163			

3 - Average number of bunches(bunch/tree):

In the table data (4) indicate that the addition of the compound fertilizer led to a significant increase in the average number of bunches on the tree, and the highest average reached (7.67 bunches/ tree) in trees treated with a concentration of 1 kg / tree compared to the lowest number of bunches, which is (5.78 bunches / tree) in the control treatment. The addition of sheep manure also had a significant effect in increasing the number of bunches, which reached the highest averages when using the level of 10 kg / tree, and it was recorded at (7.22 bunch / tree) compared to the lowest average (6.33 bunches/ tree) in the control trees. As for the interaction between the concentrations of compound fertilizer and sheep manure, it was significant, where the trees treated with the highest concentration of each of them excelled in obtaining the best results and amounted to (8.67 bunches/tree) compared to the lowest average(5.67 bunch /tree) in the control treatment.

Table (4) Effect of adding Compound fertilizer and sheep manure and the interaction between them on the average number of bunches(bunch/tree)

Sheep manure concentration kg/tree	Compound fertilizer concentration kg/tree			average
	0	0.5	1	
0	5.67	6.33	7.00	6.33
5	5.67	6.67	7.33	6.56
10	6.00	7.0	8.67	7.22
average	5.78	6.67	7.67	
L.S.D 0.05	Compound fertilizer= 0.535, sheep manure= 0.535 , interaction= 0.927			

4- Percentage of total sugars in fruits %:

The results in Table (5) confirm that the using of the compound fertilizer led to a significant in the percentage of total sugars, and the highest average reached (72.93%) in trees treated with a concentration of 1 kg/tree compared to the lowest percentage of total sugars (66.87%) in the control treatment. The addition of sheep manure had a significant effect in increasing the percentage of total sugars, which reached the highest average for this trait when using the concentration of 10 kg/tree, and it was recorded at (71.10%) compared to the lowest average (69.04%) in the control trees. Also, the interaction between the concentrations of compound fertilizer and sheep manure was significant, where the trees treated with the highest concentration of each of them excelled with the highest percentage of total sugars (73.16%) compared to the lowest average (65.47%) in the control treatment.

Table (5) Effect of adding Compound fertilizer and sheep manure and the interaction between them on the average percentage of total sugars in fruits %

Sheep manure concentration kg/tree	**Compound fertilizer concentration kg/tree**			**average**
	0	**0.5**	**1**	
0	65.47	69.05	72.59	69.04
5	67.18	70.73	73.04	70.31
10	67.96	72.18	73.16	71.10
average	66.87	70.65	72.93	
L.S.D 0.05	**Compound fertilizer= 1.039, sheep manure= 1.039 , interaction= 1.799**			

The reason for the increase in the total production average, the weight of the fruit, the average number of bunches, the content of sugars, , as a result of adding the compound fertilizer to the role of nitrogen and phosphorous in the synthesis of nucleic acids such as RNA and DNA and proteins and their role in cell division (15) ,(16) as well as the role of potassium inactivating protein synthesis enzymes and redox enzymes (17).Also, organic fertilizers work on slow processing of the elements for a longer period, in addition to improving the physical and chemical properties of the soil, such as increasing the soil's water retention and the availability of nutrients and then improving plant growth, which is positively reflected in an increase in cell division and an increase in manufactured materials.(18).

5- Leaves (bunches) content of nitrogen %:

The data in Table (6) the use of the compound fertilizer caused a significant increase in the nitrogen content of the leaves, and the highest average of this trait was reached (2.63%) when adding 1 kg/tree compared to the lowest averages of the carbohydrate content in the leaves when the comparison in which the leaf content decreased From Nitrogen to (1.89%) The addition of sheep manure had a significant effect in increasing this trait, and the largest rate when using 10 kg/tree, and it was recorded at (2.42%) compared to the lowest averages (1.67%) in the control trees.As for the interaction between the concentrations of compound fertilizer and sheep manure, it was significant to increase the nitrogen content of the leaves, where the trees treated with the highest concentration of each of them excelled with an average of (2.81%) compared to the lowest averages (1.35%) in the control treatment.

Table (7) The effect of adding compound fertilizer and sheep manure and the interaction between them on the content of leaves (bunches) of total nitrogen %:

Sheep manure concentration kg/tree	**Compound fertilizer concentration kg/tree**			**average**
	0	**0.5**	**1**	
0	1.35	.113	2.53	1.67
5	2.12	2.22	2.55	2.30
10	2.20	2.24	2.81	2.42
average	1.89	1.86	2.63	
L.S.D 0.05	**Compound fertilizer= 0.584, sheep manure= 0.584 , interaction= 1.012**			

6- Leaves (bunches) content of phosphorous %:

The data in Table (7) indicate that the use of the compound fertilizer caused a increase in phosphorous in leaves, and the larger average for this trait was reached (0.2357%) when adding 1 kg/tree compared to the lowest averages of carbohydrate content in leaves when the comparison in which the carbohydrate content decreased Leaves from total phosphorous to (0.1613%) The addition of sheep manure had a increasing, and the highest averages was when using the concentration of 10 kg/tree, and it was recorded at (0.2209%) compared to the lowest averages (0.1666)

in the control trees.As for the interaction between the level of compound fertilizer and sheep manure, it was significant to increase the phosphorous content of leaves, as the trees treated with the highest concentration of each of them excelled with an average of (0.2877%) compared to the lowest average (0.1393%) in the control treatment.

Table (8) Effect of adding compound fertilizer and sheep manure and the interaction between them on the phosphorous content of leaves (bunches) %:

Sheep manure concentration kg/tree	Compound fertilizer concentration kg/tree			average
	0	0.5	1	
0	0.1393	0.1643	0.1960	0.1666
5	0.1763	0.1910	0.2233	0.1969
10	0.1737	0.2013	0.2877	0.2209
average	0.1631	0.1856	0.2357	
L.S.D 0.05	Compound fertilizer= 0.02844, sheep manure= 0.02844 , interaction= 0.04926			

7- The percentage of potassium %:

The data in Table (8) indicate that the use of the compound fertilizer caused increase in the potassium, and the highest average for this trait reached (2.321%) when adding 1 kg/tree compared to the lowest averages of potassium in leaves when compared to the comparison in which the leaf content decreased from potassium to (1.752%).The addition of sheep manure had a significant effect in increasing this trait, and the highest average was when using of 10 kg/tree, and it was recorded at (2.194%) compared to the lowest averages (1,868%) in the control trees. As for the interaction between the concentrations of compound fertilizer and sheep manure, it was significant to increase the potassium content of leaves, where the trees treated with the highest concentration of each of them excelled with an average of (2.523 %) compared to the lowest average (1.520%) in the control.

Table (9) The effect of adding compound fertilizer and sheep manure and the interaction between them on the potassium (g/kg dry weight):

Sheep manure concentration kg/tree	Compound fertilizer concentration kg/tree			average
	0	0.5	1	
0	1.520	2.033	2.050	1.868
5	1.860	2.053	2.390	2.101
10	1.873	2.187	2.523	2.194
average	1.752	2.091	2.321	
L.S.D 0.05	Compound fertilizer= 0.2979, sheep manure= 0.2979 , interaction= 0.5161			

8- Carbohydrate content of leaves (bunches) (g/kg dry weight):

The data in Table (9) use of the compound fertilizer caused a significant increase in the carbohydrate content of the leaves. The highest average of this trait was (4.764 g/kg dry weight) when adding 1 kg/tree compared to the lowest averages of the carbohydrate content of leaves when compared to which the carbohydrate content of leaves decreased to (3.219 g/kg dry weight).The addition of sheep manure had a significant effect in increasing this trait, and the highest rate was of 10 kg/tree, and it was recorded at (4.231 g / kg dry weight) compared to the lowest averages (3.769 g / kg dry weight) in the control trees. As for the interaction between the concentrations of compound fertilizer and sheep manure, it was significant to increase the carbohydrate content of leaves, where the trees treated with the highest concentration of each of them excelled with an average of (4.913 g / kg dry weight) compared to the lowest averages (2.913 g / kg dry weight) in the control treatment.

Table (9) Effect of adding compound fertilizer and sheep manure and the interaction between them on the carbohydrate content of leaves (bunches) (g/kg dry weight):

Sheep manure concentration kg/tree	Compound fertilizer concentration kg/tree			average
	0	0.5	1	
0	2.913	3.763	4.630	3.769
5	3.207	3.970	4.750	3.976
10	3.537	4.243	4.913	4.231
average	3.219	3.992	4.764	
L.S.D 0.05	**Compound fertilizer= 0.1364, sheep manure= 0.1364 , interaction= 0.2363**			

The reason for the increase in the content of leaves (bunches) from the content of leaves (bunches from nitrogen, phosphorous, potassium, and total carbohydrates where a result of adding compound manure and sheep's waste is due to the direct absorption of these added elements, which caused an increase in their concentration in the leaves, and this, in turn, increases the manufactured carbohydrates(19).

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