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The Effect of Planting Distance and Spraying with Different Concentrations of (Micronate15) on Vegetative Growth and Yield Traits of Pea Plant (*Pisum Sativum* L.)

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Abstract: ***The aim of this study was to find the effect of planting distances and spraying with different concentrations of leaf fertilizer with micronate15 on some vegetative growth traits and yield of pea variety Green Canada in non-heated greenhouses, by using three planting distance (factor A) which includes: A1:20, A2: 30, and A3:40 cm and four spray concentrations as foliar application (factor B) which includes: B0: zero, B1: 0.5, b2: 1.5 and b3: 2.5 liter of water). According to the results of this study the highest plant (124.82cm), number of branches (4.58), fresh weight,(95.94 g) and the total yield (142.41 g)were observed in the distance of planting (30 cm), while the highest value of the pod length was observed from the distance planting in 40 cm which is 8.39 cm. The concentration of 1.5 mL / liter of micronate15 gave the highest values of branches 4.53 branches, fresh weight 97.47 g, number of pods 36.73 pods, number of seeds 8.55 oats, length of the pod 8.83 cm and the total yield 150.78 g. The highest values of the number of branches 5.14 branch, fresh weight 105.72 g, the number of seeds 8.90 seed and the total yield 159.78 g were observed from the interaction between the planting distance of 30 cm and 1.5 mL / liter of nutrient micronate15. Also, the interaction between 20 cm distance and foliar application with 2.5 mL l of micronate15 gave the highest value in the number of leaves which is 53.36***.

Keywords: Pea plant, planting distance, Micronate15, Vegetative traits and yield.

1. INTRODUCTION

Pisum sativum L. is an annual plant species of *Pisum* that belongs to the Fabaceae family, native to Central and Southeast Asia [1]. It is rich in nutrients, which makes 27.8% of protein, 42.65% of carbohydrate, vitamins, minerals, dietary fiber and antioxidant compounds [2]. The pea has multiple uses where its green pods and seeds are used as food for humans [3] which are cooked directly, or after they can be frozen [4]. In spite of the importance of this crop, its cultivation is limited to the central region of Iraq, and some limited parts of the northern region, and the area planted with pea in 2015, more than 300 acres in all governorates of Iraq and the average production was 2658.0 kg /acre about 900 tons [5]. It is considered one of the most important vegetable crops in the world and is widespread because of the importance of food processing. It gives good balance in a relatively cold and humid atmosphere while giving a small crop in the hot areas. Pea is planted in spring and autumn seasons, although they bear low temperature of less than zero centigrade [6].

The nutritional elements have an important role in activates plants and increasing the production because it is rich in organic acids and amino acids and is very important to the role of substances in photosynthesis, organic carbohydrates and nutrients found in these paper fertilizers, and their effect in photosynthesis, respiration and protoplasmic synthesis, (RNA and DNA) necessary for cell division [7].

The addition of 1.5 mg Fe / liter with 0.01 mg molybdenum / liter resulted in an increase in the dry weight of the total vegetation of the pea plant it was found by [6] An increase was found in the early yield and the total of the Pea plant at fertilization with 40 kg of phosphate fertilizer P_2O_5 / dunum, [8, 9], and [10] was showed that foliar application increased the vegetative growth characteristics of some vegetable plants. The efficiency of vegetative nutrition in plant varieties are very fast because of the absorption of nutrient elements of the plant parts equally which also reduces the use of large quantities of fertilizer [11].

The soil of central and southern Iraq, which is characterized by its high level of lime ($CaCo_3$) and clay, which makes food elements low-readiness for absorption by the plant, and the dryclimate in summer, which affects the readiness of these elements, leads to lack of quantity and quality [12, 9] noticed significant increase in plant height, number of branches, leaves, fruits / plant, leaf area of plant and plant yield of the plastic house when using spray with a solution nourishing the rivers several times on pepper plant Cordoba, [13]was found that spraying with leaf feeding micronate 25 with a concentration of 0.5 mg / liter gave

the highest number of leaves, fruit size, And the total yield of pepper's California wonder.

As found [14] that the response of the plant Pea plant to the fertilizer of phosphorus and humic acid led to a significant increase in each plant height, number of leaves, number of branches, number of horns, length of Pod, number of seeds, total plant yield.

As found [10] there was also a significant increase in plant length, number of leaves, number of branches, and plant yield of tubers in two varieties of potato plant which sprayed by 25 and 32 g /liter in agro leaf fertilizer.

It was noticed [15] that the addition of potassium sulphate fertilizer 322 kg/ ha achieved a significant increase in plant height, the number of fruits/plant and total plant in cucumber variety Toshka in the glass houses. Concerning distances of planting, both [16] and [17] found that there was an increase in the percentage of small pods with a diameter less than 1 cm for narrow planting distances. It was found [17] that the number of the seeds /pods became less when the distance between plants was reduced. It was noticed [18] that when using (50, 75 and 100) cm between the lines of cowpea and (5, 10, 20) cm between the plants, the distance of 100 cm gave the lowest total crop yield /plant.

Regarding the effect of distances of planting on some quantitative traits and other plants of the legume family, by [19] that the number of pods in bean plants increased by increasing the planting distance between plants, as observed by [20, 21] (Lima green) grown at a distance of 12 cm between plants and 75 cm between the lines of cultivation has given the highest yield in the unit area.

Due to the lack of studies in Iraq on the effect of planting distance, and fertilization of leaf feeding on pea, economic importance and its nutritional value, especially its protein and carbohydrate content, we have conducted this research to determine the most suitable planting distances and levels of micronate15 to evaluate the growth and yield characters in pea plant.

2. METHODS AND MATERIALS

The research was carried out in the non-heated greenhouses of the Department of Protected Planting at the Technical Institute of Bakrajo, Sulaymaniyah Governorate, during the autumn season in 2016 to study the effect of three planting distances (20, 30 and 40 cm) and four levels of leaf feeding with Micronate15 (0.0, 0.5, 1.5) and 2.5 ml/ liter water), Table (1) and their interaction on some vegetative and productive traits of the plant variety Green Canada. This is a common cultured Canadian variety, early with a high contract rate that entered Kurdistan-Iraq in 2010. The number of structural transactions is 12. In this experiment the design of the randomized complete block random sectors R.C.B.D, Means comparisons between characters means was carried out according to Duncan's tests at a significant level of 0.05 [22].

Table 1: Chemical Composition of Micronate15

Iron(Fe) EDTA Citric Acid Chelated	% 4.00
Zinc (Zn) EDTA Citric Acid Chelated	% 4.00
Manganese (Mn) EDTA Citric Acid Chelated	% 3.00
Magnesium (Mg) EDTA Citric Acid Chelated	% 2.00
Boron (B)	% 1.50
Copper (Cu) EDTA Citric Acid Chelated	% 0.50
Molybdenum (Mo) And rich with organic acids , amino acid and vitamins	% 0.05

Production of planting Caravans Company /Zarqa/ Jordan. Indicators of the measured outcome:

At the end of the study the following data were recorded five randomly selected plants and calculated for each experimental unit:

1- **Plant length**: The selected plants were measured starting from the surface of the soil until the developing summit and taking the average length of one plant/cm.
2- **Number of leaves**: The average number of leaves / plant.
3- **Number of branches**: The average number of branches / plant.
4- **Fresh weight**: The average weight gm / plant was calculated.
5- **Number of pods**: The average number of horns was calculated from the beginning of the harvest to the last fairy by dividing the number of the number of plants measured.
6- **Number of seeds**: The average number of seeds / plants was calculated.
7- **Length of pod**: The average length cm per pod.
8- **Yield of one plant :** The average of the product of the plant was calculated / gm.

The dimensions of the plastic house (50 m length, 9 m width and 3.5 m height). Solar Pasteurization of the soil was conducted. The samples of plastic house soil were randomly collected depth 0-30 cm and from several different locations inside the plastic house where the study was carried out. To the terrace's width 75 cm, and the distance between a floor and another 100 cm, leaving 50 cm distance from each. The physical and chemical properties of the soil used in the study is shown in table 2 which defined by [23, 24, 25].

The plastic house was divided into three replicates, each contains 12 combination treatments resulting from the interaction of 4 treatments of spray with the leaf micronate solution 15 (0.0, 0.5, 1.5 and 2.5) ml/ liter sprayed on the plants twice, once when the first flower appeared, and second spray after one month at the first

spray after adding the diffuser material (0.01%) to reduce the surface tension of the water molecules until the full wetness using a 5 liter hand spray in the early morning and three treatments of planting distances (20, 30 and 40 cm) each treatment on the terrace consisted of a length of 45 m and a width of 1 m.

The drip irrigation system was laid along the length of the terrace, and 3-4 seeds were placed in each hole according to the planting distances of the study. The process of thinning was done after two weeks of planting for two plants in the same pit. The usual crop service operations were carried out, as is the case with the service of the crop grown in greenhouses [26].

Table 2: Physicochemical properties of soil.

Parameters	Sample Value
pH	7.5
Electric Conductivity (mmhos/cm)	2.12
Calcium Carbonate (%)	2.49
Organic matter (%)	2.48
Calcium ($mgkg^{-1}$)	4322
Magnesium ($mgkg^{-1}$)	280.78
potassium ($mgkg^{-1}$)	245
phosphorus ($mgkg^{-1}$)	3.47
Zinc ($mgkg^{-1}$)	1.37
Manganic ($mgkg^{-1}$)	35
Soil texture	Clay
Sand (%)	12.17
Silt (%)	45.72
Clay (%)	42.11

3. RESULTS AND DISCUSSIONS

3.1 Plant height (cm): The results obtained from (Table 3) indicate that the best planting distance achieved the longest height of the plant is the cultivation of plants at a distance of 30 cm, which is (124.82 cm) followed by planting plants at a distance of 20 cm (113.73 cm).

The best significant concentration of the feed spray solution is 2.5 ml / liter, 1.5 ml / liter, then 0.5 ml / liter of water and concentration zero (135.74, 127.16, 107.03 and 91.69 cm, respectively). This means that the higher concentration of the feeding spray solution, the higher plant height will increase accordingly. The reason for the increase of leaves is that increasing concentration of nutrients in the spray solution leads to increased vegetative growth, which leads to increase the height of plant and these results are agreed with [14].

Relating the interaction between planting distances and concentration of the spray solution was explained that the best planting distance gave the longest height of the plant when cultivated at a the distance 30 cm, and the use of concentrated spray solution 2.5 and 1.5 ml / liter water (146.15and144.32cm respectively) followed by cultivation at distance 20 cm and concentration 2.5 ml / liter of water (138.73 cm).

3.2 Number of leaves/plant: The results obtained from (Table 4) show that there is (non-significant differences) between the planting distances. The best concentration of the spray solution is 2.5 ml / liter followed by the concentration of 1.5 ml / liter water and the concentration of 0.5 ml / liter water (49.35, 46.73, and 42.28 leaves / plant, respectively). The interaction between plant culture distances and concentration of nutritious spray solution between planting the plants at a distance of 20 cm and the use of concentration of leaf nutrient solution 2.5 ml / liter of water the high number of leaves / plant (53.36 leaves/plant), although only the real leaves were calculated without the modified leaves, and this result contradicts with the finding of [14] because the researchers calculated the real leaves and the modified leaves collected.

3.3 The number of branches / plant: From the data obtained from (Table 5) we note that the best distance to cultivate the plants of pea is 30 cm between plant and another, followed by planting at a distance of 20 cm and planting at a distance of 40 cm (4.58, 4.07, 3.61 branch / plant, respectively). The best concentration of the nutrient spray solution is 1.5 ml / liter of water (4.53 branches / plant) which is superior significantly on the concentration0.5 ml / liter of water and control 4.05and 3.63 branch / plant),and non-significantly the concentration of 2.5 (4.05 branch / plant) These results are consistent with what is indicated by researcher [14] .

It was found in the experiment that the best distance of cultivation was 30 cm to get the largest number of branches was 4.58 and the best paper nutrient concentration of micronate 15 was 1.5 ml / liter to get the largest number of branches was 4.53. The overlap between workers distance 30 cm and nourishing concentration 1.5 ml / liter for the largest number of branches was 5.14. Found that the best distance of planting distance of 30 cm less the number of branches and also the concentration of nutritious concentration the greater or less the concentration of 15 micronate 1.5 ml / liter of the number of branches so you can get the number of branches when using transactions of agriculture 30 cm and concentration 1.5 ml / liter.

Regarding the results of interaction between the planting distances and concentrations of the nutrient spray solution it is obvious that the concentration of 1.5 ml / liter water significantly exceeds other treatments in the number of branches / plants followed by the concentration of 2.5 ml / liter of water (5.14 and 4.92 branch / plant, respectively) when growing the plants on a distance of 30 cm between a plant and another.

3.4 Weight of the total vegetative (gm / plant): Table (6) shows the effect of the distances of planting between plants, when the planting distance is 30 cm significantly higher in the fresh weight of the total vegetative (95.94 gm) followed by planting distance 40 cm (90.94 gm) The distance was relatively highest but no significant to planting by 20 cm between plants (86.23 gm). The most significant concentration of the leaf-spray feeder solution was the concentration of 1.5 ml / liter water, which achieved a wet plant weight of 97.47 g followed by the concentration of 2.5 ml / liter, which achieved (91.50 gm). This concentration significantly exceeded the concentration of zero (85.85 gm) relatively non-significant concentration of 0.5 ml / liter (88.85 gm) this is consistent with the results of [14].

It was explained from the results of interaction between the planting distances and spray concentrations of leaf nutrient , that the planting distance of 30 cm between the plants fulfilled a significant advantage when spraying with a concentration of 1.5 ml / liter of water (105.75 g), followed by planting with the same planting distance and spraying with a concentration of 2.5 ml / liter water (98.33 g) and planting on a distance of 40 cm between the plants and spraying with a concentration of 1.5 ml / liter of water (94.34 g).

3.5 Number of pods / plant: Table (7) shows the effect of planting distances between plants on the average number of pods per plant. Planting on a distance of 40 cm and 30 cm showed the highest number of developed pods (33.38 and 28.44 pod / plant respectively) followed by a significant 20 cm (20.23 pod / plant).

The most significant concentration which obtained the highest number of pods was 1.5 ml / liter (36.73 pods / plant) followed by 2.5 ml / liter (28.94 pods / plant) which had a relatively overwhelming non-significant over concentration of 0.5ml / liter (24.52 pods / plant), and these results are consistent with what the researchers [14,31,32] stated. Interaction between planting distances and nutrient spraying concentrations was clarified that planting plants at a distance of 40 cm between plants and spraying with a concentration of 1.5 ml / liter of water gave the best average number of pods / plant (45.96 pod). It is clear from the experience that the greater the distance of cultivation, the greater number of pots and the best concentration to obtain the highest number of pots is the concentration of 1.5 ml / liter of Micronate15.

3.6 Number of seeds / pod: The results obtained from (Table 8) showed that there were no significant differences between the planting distances treatments. This means that the distances did not affect the number explain it of seeds / pod, but there is a relative superiority not significant of the distance 40 cm followed by distance 30 cm. The best concentrations were 1.5 ml / liter and 2.5 ml / liter (8.55 and 8.13 seed / pod respectively) significantly superior on the concentration of0.5ml / liter of water (7.35 seeds / pod). This is consistent with the results of each [14, 27, 28]. The interaction between the planting distances and the foliar application is that plant cultivation at a distance of 30 cm between the plants and spraying with a concentration of 1.5 ml / liter has given significantly the highest number of seeds / pod (08.9 seeds) as a result of the efficiency of leaf manure in the formation and growth of Inherited seeds.

3.7 Length of Pod (cm): The results obtained in (Table 9) showed non-significant differences between the different planting distances, but there was a slight difference not significant in planting on 40 cm (8.39 cm). The highest significant concentration was the 1.5 ml / liter which obtained the higher length of pods (8.83 cm) compared to the concentration of 0.5 ml / liter (7.75 cm), while the concentration of 2.5 ml / liter (8.28 cm) was relatively non-significant compared to the 0.5 concentration ml / liter of water and this is consistent with the results of [14].

Interaction between the different planting distances and different concentrations of leaf nutrient micronate15 explained that plant cultivation on a distance of 40 cm between the plants and spray with 1.5 ml / liter fulfilled as average the longest pods significantly which is (9.42 cm) followed by 30 cm and spraying with the same concentration of the previous 1.5 ml /liter water where obtained the significant average length of pod (8.93 cm).

3.8 Total yield (gm/plant): From the observation of the results in (Table 10) no significant differences were found in the total yield of the three planting distances, however cultivating the plants on a distance of 30 cm was higher (142.41 gm/plant) if compared to planting on the 40 and 20 cm between the plants. The best concentration of the nutrient spray solution significantly was 1.5 ml / liter, with a total yield of 150.78 gm / plant followed by a concentration of 2.5 ml/liter with a relatively high yield non significantly (142.43 gm/plant) of 0.5 ml/ litter(136.76 gm / plant), and this concentration is relatively higher than the zero concentration (130.52 gm / plant). These results are consistent with [14, 27, 28].

The interaction between the planting distance and the concentration of the spray solution indicated a significant increase of 30 cm of the planting distance and the spraying with ml / liter of leaf nutrient Micronate15 of water (159.78 gm / plant) followed by planting with 20 cm and spraying with the same concentration (149.36 gm / plant).

The reason for the concentration of leaf nutrient Micronate15 (1.5 and 2.5) ml / liter in the most studied traits is due to it was more suitable for the activity and growth of The embryo of the seed, which gave strong and active plants and provided the plant necessary elements, which in turn activates the physiological events within the plant and enzymes that have a role in the processes of vitality within the plant, such as the process of cell division and prolongation and in turn caused the elongation of plants and plant height and an increase in the number of leaves, which lead to increase photosynthesis and eventually increase in production [26].

The increase in the studied traits in the research resulting from the use of spray with the nutritious solution of Micronate 15 may be due to the role of nutrients in the nutrient solution, which led to an increase in the number of branches and leaves, which increased the rate of photosynthesis and the amount of carbohydrates manufactured in the leaves and transfer to branches may have encouraged the opening of a larger number of flower buds and thus increase the number of branches and seeds. Increasing the amount of carbohydrates stimulated the conversion of buds and the formation of flowering principles. The increase in the amount of carbohydrates manufactured in the leaves and their transfer to the fruits increase the weight, either increase the amount of the plant in the back to the role of leave fertilizer in the increase in the number of horns and seeds [10].

The nutrient used in Micronate15 contains good amounts of microelements such as iron, zinc and others, which

provide the plant with the nutrients it needs. Iron has a role in the plant's vital activities and is considered as a catalyst in the formation of chlorophyll. The formation of cytochromates is important in the process of photosynthesis and respiration through its role in the reception and transmission of electrons, which helps increase the content of carbohydrates in leaves [27, 28] causing an increase in processed food, which is transmitted to flowers, which increases the proportion of contract for the pods [29].

Table 3: The effect of planting distances and spraying concentrations of leaf nutrient micronate15 and their interaction on plant height (cm) of green pea plants cultivated in non-heated greenhouses.

A \ B	b_0 zero	b_1 0.5 ml / liter	b_2 1.5ml / liter	b_3 2.5 ml / liter	Average Factor A(cm)
a1 20	93.31	101.63	121.26	138.73	113.73
a2 30	89.41	119.39	144.32	146.15	124.82
a3 40	92.37	99.53	115.91	122.36	110.11
The average factor B mL / liter of water	91.69	107.03	127.16	135.74	

L. S. D 0.05 for planting distances (A) = 8.11
L. S. D 0.05 for leaf nutrient concentrations (B) = 6.47
L. S. D 0.05 for interaction between them (A X B) = 4.27

Table 4: The effect of planting distances and spraying concentrations of leaf nutrient micronate15 and their interactions on the number of leaves / plant of green pea plants cultivated in non-heated houses.

A \ B	b_0 zero	b_1 0.5 ml / liter	b_2 1.5 ml / liter	b_3 2.5 ml / liter	Average Factor A(cm)
a1 20	40.35	42.49	49.72	53.36	46.48
a2 30	41.27	41.93	43.72	47.15	43.52
a3 40	39.83	42.42	46.77	47.55	44.14
The average factor B mL / liter of water	40.48	42.28	46.73	49.35	

L. S. D 0.05 for planting distances (A) = 3.68
L. S. D 0.05 for leaf nutrient concentrations (B) = 3.13
L. S. D 0.05 for interaction between them (A X B) = 2.93

Table 5: The effect of planting distances and spraying concentrations of leaf nutrient micronate15 and their interactions on the number of branches / plants of green pea plants cultivated in non-heated greenhouses.

A \ B	b_0 zero	b_1 0.5 ml / liter	b_2 1.5 ml / liter	b_3 2.5 ml / liter	Average Factor A(cm)
a1 20	3.75	3.93	4.31	4.28	4.07
a2 30	3.93	4.33	5.14	4.92	4.58
a3 40	3.21	3.88	4.14	3.22	3.61
The average factor B mL / liter of water	3.63	4.05	4.53	4.14	

L. S. $D_{0.05}$ For planting distances (A) = 0.44
L. S. $D_{0.05}$ For foliar application (B) = 0.31
L. S. D 0.05 for interaction between them (A X B) = 0.16

Table 6: The effect of planting distances and spraying concentrations of leaf nutrient micronate15 and their interactions on the fresh weight of the vegetative total (gm) of the green pea plants cultivated in non-heated greenhouses.

A \ B	b_0 zero	b_1 0.5 ml / liter	b_2 1.5 ml / liter	b_3 2.5 ml / liter	Average Factor A(cm)
a1 20	81.36	82.47	92.33	88.74	86.23
a2 30	87.41	92.77	105.75	98.33	95.94
a3 40	88.79	91.32	94.34	87.42	90.47
The average factor B mL / liter of water	85.85	88.85	97.47	91.50	

L. S. $D_{0.05}$ for planting distance (A) = 5.42
L. S. $D_{0.05}$ for foliar application(B) = 3.22
L. S. D 0.05 for interaction between them (A X B) = 2.93

Table 7: The effect of planting distances and spraying concentrations of leaf nutrient micronate15 and their interactions on the number of corneas / plants of green pea plants cultivated in non-heated greenhouses.

A \ B	b_0 zero	b_1 0.5 ml / liter	b_2 1.5 ml / liter	b_3 2.5 ml / liter	Average Factor A(cm)
a1 20	17.45	19.30	24.49	19.73	20.23
a2 30	18.91	24.78	39.74	30.31	28.44
a3 40	21.27	29.50	45.96	36.78	33.38
The average factor B mL / liter of water	19.21	24.52	36.73	28.94	

L. S. D $_{0.05}$ or planting distance (A) = 7.18
L. S. D $_{0.05}$ for foliar application (B) = 5.96
L. S. D 0.05 for interaction between them (A X B) = 4.03

Table 8: The effect of planting distances and spraying concentrations of leaf nutrient micronate15 and their interactions on the number of seeds / pod of green pea plants cultivated in non-heated greenhouses.

A \ B	b_0 zero	b_1 0.5 ml / liter	b_2 1.5 ml / liter	b_3 2.5 ml / liter	Average Factor A(cm)
a1 20	6.35	6.62	8.27	8.08	7.33
a2 30	7.23	7.61	8.90	8.13	7.96
a3 40	7.96	7.82	8.47	8.18	8.11
The average factor B mL / liter of water	7.18	7.35	8.55	8.13	

L. S. D $_{0.05}$ for planting distance (A) = 1.25
L. S. D $_{0.05}$ for foliar application (B) =0.78
L. S. D 0.05 for interaction between them (A X B) =0.37

Table 9: The effect of planting distances and spraying concentrations of leaf nutrient micronate15 and the interactions between them aon the length of pods (cm) of green pea plants cultivated in non-heated green houses.

A \ B	b_0 zero	b_1 0.5 ml / liter	b_2 1.5 ml / liter	b_3 2.5 ml / liter	Average Factor A(cm)
a1 20	6.92	7.26	8.13	7.88	7.55
a2 30	7.31	7.79	8.93	8.46	8.12
a3 40	7.45	8.21	9.42	8.50	8.39
The average factor B mL / liter of water	7.23	7.75	8.83	8.28	

L. S. D $_{0.05}$ for planting distance (A) = 1.13
L. S. D $_{0.05}$ for foliar application (B) = 0.77
L. S. D 0.05 for interaction between them (A X B) =0.43

Table 10: The **e**ffect of planting distances and spraying concentrations of leaf nutrient micronate15 and their interactions on the total yieldof plant (gm) of green pea planted in non-heated green houses.

A \ B	b_0 zero	b_1 0.5 ml / liter	b_2 1.5 ml / liter	b_3 2.5 ml / liter	Average Factor A(cm)
a1 20	129.50	134.73	149.36	142.18	138.94
a2 30	130.22	135.94	159.78	143.71	142.41
a3 40	131.76	139.63	143.21	141,39	138.99
The average factor B mL / liter of water	130.52	136.76	150.78	142.43	

L. S. D $_{0.05}$ for planting distance (A) = 9.88
L. S. D $_{0.05}$ for foliar application (B) = 6.54
L. S. D 0.05 for interaction between them (A X B) = 4.21

The results obtained accord with the results of [32] which found that spraying the fermented iron alone or in combination with other fertilizers has given a significant increase in the weight, length, number of pods and total plant yield of the bean plants. Zinc also plays an important role in the formation of pollen grains [8] and affects the formation of the amino acid (tryitophan), which is the basic material of the IAA synthesis, which plays a major role in the flower contract. The result is the increase in the number of corneas pods which is consistent with the researchers [29, 30] in increasing its yield and components (number of pods, number of seeds and biological yield).

4. CONCLUSION

The results of this investigation can be concluded that the most suitable distance for planting among plants significantly is30 cm for most of the studied traits. As far as the concentration of the nutrient micronate15 is concerned, the best concentration of the nutrient micronate15 is that the higher concentration of the nutrient micronate15 the higher values of most traits significantly to the limit 1.5 ml/ liter and in some traits exceed to 2.5 ml/ liter.As a result, in the significant meaning the interaction of studied factors for most of the traits under study was planting on 30cm between plants with using concentration of 1.5 ml/ liter leafmicronate15/ liter of water.

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