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EVALUATION OF PERFORMANCE OF SOME HYBRIDS OF EGGPLANT (*SOLANUM MELONGENA* L.) UNDER THE INFLUENCE OF ADDING TWO TYPES OF NUTRIENTS

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Abstract

This study was conducted in the horticultural research station belonging to the Department of Horticulture and Landscape Gardening, College of Agriculture, Tikrit University during the spring season 2019, with the aim of studying the evaluation of three hybrids of eggplant under the influence of adding two types of foliar nutrients as a factorial experiment, it included two factors: the first factor hybrid which is symbolized by (H):Barcelona (H1), Super Barcelona (H2) and Hauser (H3), The second factor is two types of nutrients: (Fylloton) and (Phosfik), which included three treatments: the first treatment (F1): spraying with a nutrient solution (Fylloton) followed by spraying with nutrient (Phosfik) (four consecutive spraying each one) and the second treatment (F2): spraying with nutrient(Fylloton) and followed in the next week by spraying with nutrient (Phosfik) and the third treatment (F3): spraying with nutrient (Fylloton) and spraying with nutrient (Phosfik) during the growth stages together, In addition to the control treatment, which is symbolized by (F0), which included (8) spraying for the season between each spraying and one week at a concentration of (1.5) $ml.L^{-1}$ for the nutrients (Fylloton) either the nutrients (Phosfik) sprayed with a concentration of (2.5) $ml.L^{-1}$, This experiment was conducted according to Randomized Complete Block Design (RCBD)within the split-plot system with three replicates, the nutrients were placed on the main plot, while the hybrids took the secondary plot, the experiment included 36 experimental units, and the results of the experiment were analyzed using the SAS program and the averages were statistically compared according to a test Duncan Polynomial is under probability level 0.05. The results showed the excelled of the hybrid Barcelona (H1) in most of the studied traits, where the plant height reached (63.62 cm), the number of leaves (103.60 leaves.plant $^{-1}$), the number of main branches in the plant (7.03 branches. plant $^{-1}$) and the leaf area (88.60 $cm^2.Leaf^{-1}$), the number of fruits (18.09 fruit.plants $^{-1}$), the average fruit weight (184.7 $g.fruit^{-1}$) and the plant yield (3,354 kg. $plant^{-1}$) and the total plant yield (118.8 tons. ha^{-1}). As for the effect of the nutrients, the three treatments excelled among between them in giving the best indicators for the studied traits in comparison with the control treatment (spraying with distilled water only), either regarding the interaction between hybrids and nutrients, as there were significant differences as a result of these interaction

Keywords: eggplant, *Solanum melongena L.*, nutrients

Introduction

Solanun melongena L. (Eggplant) is considered to be one of the crops of the Solanaceae family, and it is one of the crops of vegetables of economic importance, especially in hot and moderate regions of the world, where this family includes more than 75 genus and 200 different plant species spread around the world (Abdel- Gawad *et al.*, 2014) Eggplant has been known since ancient times where it was growing wild in both India and China, which are considered its original country (Suganiya, 2012), and then spread in other regions of the world such as the Mediterranean region, Spain and North Africa (Daunay *et al.*, 2001) Europeans entered it to America as it was cultivated White and violet cultivars as ornamental plants (Foster *et al.*, 2003). The importance of eggplant comes from using its fruits as food in most countries of the world, including Iraq, as well as its medical uses In addition to its medical uses, it is useful for treating asthma, diabetes, dysuria or severe diarrhea and decrease cholesterol in the blood (Christaman, 2003),In addition to that the potassium salts present in its fruits help in the fluid secretion from the body, and its multiple uses in food are known (Gopalan *et al.*, 2007). The cultivar or genotype has a major role in the development, growth, and productivity of plants within the cultivated environment and this has a direct impact on the crop yield within the area in which it is grown (Hallard, 1996). Finally, attention has been paid to hybrids With high productivity due to the great importance of the genetic factor in determining production.

Several experiments and studies have indicated that there are significant differences between the genotypes of the cultivated eggplant during one season (Raigon, 2008), Through continuous statistics, it was found that the productivity average per unit area in Iraq is low when compared with the production rate for Arab countries, it is below the ambition rate, as it reached 8.356 thousand hectares, and Arab production of eggplant yield reached about 2116.85 thousand tons, while Iraq's production amounted to 102.452 thousand tons with an average production of 12261.257 kg/ha, while the area cultivated with eggplant in the Arab countries was 99.55 thousand hectares and a yield of 21264.12 kg/ha (Arab Organization for Agricultural Development, 2018) This is due to a number of reasons, the most important of which are the poor quality of the used cultivars and the lack of use of modern methods in agriculture in addition to the deterioration of service operations, and one of the main factors that contribute to increasing production are the cultivation of hybrid cultivars with high productivity and desirable specifications appropriate to the environmental conditions of a particular region (Shafig *et al.*, 2002) In addition to adopting scientific methods in the cultivation and production of this crop. Also, the eggplant plant is one of the plants of the warm seasons, so it is classified in Iraq as a summer crop, where it is cultivated without covering during the spring season to give fruits in the summer and autumn, as it is one of the main crops in protected establishments that can be controlled by temperature. Foliar feeding is considered efficient and

effective in plant nutrition due to the rapid absorption of nutrients for plant parts (Brayan, 1999), in addition to that the hot dry climate in summer affects the readiness of these elements, which leads to a reduced quantity and quality. and given the increasing global demand for vegetable crops, coupled with the increase in population, it has made it of great importance in achieving food security. Therefore, in order to focus efforts on increasing the productivity of the area per unit, this requires removing or reducing the specific factors of production, including the use of poor quality cultivars and hybrids, in addition to the lack of processing of the nutrients according to the need of the plant in quantities and qualities and at the appropriate times, And for the purpose of overcoming the above problems by choosing the cultivar or hybrid that is appropriate for the conditions of the central region of Iraq and which is characterized by high productivity and quality of fruits that are hygienically safe in terms of food in addition to a clean environment free of chemical fertilizer residues through the use of paper nutrients that are considered a necessary and effective aid to increase production (Kostadinov and Kosladinova, 2014). This study aims to determine the best hybrid for the eggplant and to know the best treatment for foliar feeding by spraying, as well as to determine the best combination between hybrids and nutrients in some traits of vegetative growth and yield.

Materials and Methods

This study was conducted during the spring season 2019 in the horticultural research station belonging to the Department of Horticulture and Landscape Gardening, College of Agriculture , Tikrit University - the open field, and the irrigation of the crop was adopted in this experiment using the drip irrigation method, and random samples were taken from different places from the field of the experiment before cultivated with a depth of (0-30) cm well mixed then dried under the sunlight and smoothed and passed through a sieve with openings (2 mm). Table (1) shows the physical and chemical characteristics of the soil.

Table 1 : Shows the physical and chemical characteristics of the field soil before cultivated.

Soil traits	units	values
Soil Texture	-	Sandy loam
Sand	%	58.2
Clay	%	14.3
Silt	%	27.5
PH	-	7.82
EC	$Ds.m^{-1}$	2.1
CaCO3	%	21.5
CaSO4	%	16.2
Organic matter(O.M)	%	0.73
Dissolved ions		
Ca++	Ppm	81.4
Mg++	Ppm	19.7
Na+	Ppm	232
K+	Ppm	73.9
P	Ppm	6.2
N	Ppm	18.3

After selecting the area designated for cultivation, the field land of the horticultural research station was tillage by moldboard plow and was smoothed and leveled, and animal fertilizer (sheep manure) was added in a quantity (0.864 m^3) decomposed to the soil before the transplantation to hybrid the eggplant plant (wanted and others, 1989), The experiment ground was divided into 36 lines, and the experimental unit area (6 m^2) with a length of (4 m) and a width of (1.5 m) and by (12) experimental units per replicate and each experimental unit (20) plants, and the distance between one plant and another (40) cm and at two sides of the line and interchangeably within the same line, After that, urea was added 46% as a source of nitrogen and super triphosphate 21% as a source of phosphorus and potassium sulfate 43% as a source of potassium at a rate of (260, 460 and 220) g. The experimental unit $area^{-1}$ respectively and mixed with the soil, This was followed by the installation of a drip irrigation system at the rate of two drip tubes per line, after which the soil was irrigation before cultivated and then the experimental unit was covered with a black plastic cover (Mulching) to prevent the growth of weeds and bushes as well as maintaining moisture Singh *et al*. (2005) and was closed by fixing its edges to soil. This experiment was conducted according to Randomized Complete Block Design (RCBD) within the split-plot system with three replicates. The experiment included two factors where the nutrients were placed in the main plots (F1, F2, F3), in addition to the control treatment (F0). The Hybrid took the subplot (Barcelona H1), Super Barcelona (H2), and Hauser (H3). The transplanting of the eggplant plants was cultivated interchangeably and randomly on both sides of the line on 7/4/2019 and the first date for the foliar feeding was three weeks after the transplantation plant on 29/4/2019 which included (8) spraying at a concentration of (1.5) ml /L for Fylloton nutritional solution, As for the Phosfik solution at a concentration of (2.5) $ml.L^{-1}$, and that was spraying the two Nutritional solutions on the vegetative growth in the early morning until reaching the full wetness through the use of a backpack sprayer with a capacity of (16) L and the spraying process takes place one day after irrigation to increase the efficiency of the plant absorption process with the material that was sprayed (Al-Jarah, 2014). As for the treatment of nutrient spraying, the experiment included 36 treatments by spraying with solution (Fylloton) by four consecutive spraying (four weeks), followed by spraying with solution (Phosfik) four consecutive spraying (four weeks) and symbolized (F1), and spraying with solution (Fylloton) It is followed in the Next week by spraying with a nutrient solution (Phosfik) at a rate (4 spraying per nutritional solution) and symbolized (F2) and spraying with solution (Fylloton) and (Phosfik) during the growth stages together at a rate of (8 spraying) every 7 days and symbolized (F3), in addition to spraying with distilled water only (control treatment) with each treatment for plants, and it is denoted by the symbol (F0). The agricultural service operations of the crop after the transplantation were carried out symmetrically for all plants, as well as for the prevention of insect, fungal and pathological injuries as they arise and by preventive methods that are suitable for each case at the time. At the end of the experiment, mean traits were recorded and the results were statistically analyzed using a computer according to the SAS program (SAS, 2001). The averages were compared according to the Dunkin Polynomial test at a probability level of 0.05 (Alrawi and Khalaf Allah, 2000).

The vegetative growth traits

Plant height: The plant height was measured from the stem contact site in the soil to the growing top using the metric tape measure and then the average was calculated.

Number of leaves: The number of leaves for the selected plants from each experimental unit was measured at the end of the trial season and then the average was calculated.

Number of main branches: The number of main branches on the stem was calculated at the end of the season for the plants specified for measurement, and then the average was extracted.

The leaf area: The leaf area was measured according to what Morsi and Noureddine mentioned (1970) after the end of the experiment season. (5) leaves were taken from each plant and weighed after the necks were separated from the leaves for the purpose of extracting the average weight of one leaf and then a number of discs with a known area were taken and the mean weight of the disc was extracted, after which the leaf area was calculated according to the equation below:

The leaf area (cm^2)

$$= \frac{\text{Average leaf weight (g)} \times \text{Disk space cut from the leaf } (cm^2)}{\text{Average weight of Disc cut from leaf (g)}}$$

The traits of the yield and its components: This trait is calculated by the following formula:

Single plant yield (kg.plant $^{-1}$) = the average total yield of the experimental unit / number of plants within the experimental unit

The number of fruits: The number of fruits was calculated from the beginning of the harvest season to the last harvest at the end of the season for each experimental unit, and the rate was extracted according to the following formula:

Average fruit weight (g. fruit $^{-1}$) = total fruit weight in the experimental unit / total number of fruits in the experimental unit

Average fruit weight: the total fruit weight of the plants was calculated in one experimental unit, then divided by the total fruits number in order to obtain the average weight of the fruit, as shown below:

plant yield: This trait is calculated by the following formula:

The yield of the experimental unit (kg) = the yield of one plant x number of plants in the experimental unit

Total plant yield : This trait was measured after calculating the total plants yield of grown in the experimental unit and then attributed to the hectare according to the two equations below:

Total yield (ton.ha $^{-1}$)

$$\frac{\text{The yield of the experimental unit}}{\text{Experimental unit space}} \times 10000$$

Results and Discussion

Table (2) shows the effect of hybrids and treatments of types of nutrients solution on the plant height . where there are significant differences between hybrids, as the hybrid Barcelona (H1) compared to others by giving it the highest value of the plant height trait reached (63.62) cm and is not significant for the hybrid Hauser (H3) It reached (62.98) cm, but it differed significantly from the Hybrid Super Barcelona (H2), as it recorded the lowest plant height (60.93) cm. The reason for the significant difference between hybrids in the average of plant height may be due to the dominance of the genetic factors for hybrids to increase their ability to excel and obtain a high average in this traits, which shows us the difference in hybrids in response to the conditions experienced by the experience (Mahmoud, 2014) and (Abdul Rahman, 2011), and it is noted from the results of the same table that the nutrient spraying treatments did not significantly affect the increase in plant height, where treatment (F3) gave the highest plant height reached (66.84) cm compared to the control treatment that gave the lowest height amounted to (56.33) cm, As for the treatment of interaction between hybrids and nutrients, the results indicated the presence of significant differences, where the interaction treatment (F3H1) recorded the highest plant height amounted to (69.93) cm compared to the interaction treatment of (F0H2), which gave the lowest plant height reached (52.20) cm.

Table 2 : Shows the effect of hybrids, nutrient treatments, and their interaction on the plant height (cm.plant $^{-1}$).

The average effect of nutrient solutions	H3	H2	H1	Hybrid / Nutrients
56.33 b	59.07 dc	52.20 e	57.73 d	F0
63.48 a	62.97 bc	63.87 bc	63.60 bc	F1
63.38 a	63.40 bc	63.53 bc	63.20 bc	F2
66.84 a	66.47 ab	64.13 bc	69.93 a	F3
	62.98 ab	60.93 b	63.62 a	The average effect of hybrid

The numbers have similar letters do not differ morally according to Duncan's polynomial test at a probability level (0.05)

It is clear from Table (3) the extent of the effect of hybrids, nutrient treatments and interaction between them in the number of leaves, where we note that there are significant differences between hybrids, where Hybrid Barcelona (H1) gave the highest number of leaves amounted to (103.60) leaf.plant^{-1} and It did not differ significantly from the Hybrid Super Barcelona (H2) by giving it (103.02) leaf.plant^{-1}.While it differed significantly from the hybrid Hauser (H3), which recorded the lowest number of leaves amounted to (95.00) leaf.plant $^{-1}$, and the reason for these differences is due to the genetic variation between hybrids resulting from the difference of the genetic factors that have an important role in the vegetative buds that control the number of leaves formed for every hybrid (Shah and Saadoun, 2012), The same table indicates that there were significant differences between the nutrient spraying treatments in the average number of leaves, where treatment (F3) recorded the highest number of leaves reached (107.80) leaf.plant^{-1}, compared to the control treatment (F0) that Which gave the lowest number of leaves reached (89.16) leaf.plant^{-1}, As for the interaction between hybrids and spraying treatments, we find that there was no significant difference between the majority of the interaction treatments for the average number of leaves that excelled the interaction treatment (F3H1), where it gave the highest number of leaves amounted to (113.00) leaf.plant^{-1}. interaction (F0H3), which amounted to (76.87) leaf.plant^{-1}.

Table 3 : Shows the effect of hybrids, nutrient treatments, and their interaction on the number of leaves (leaf.plant^{-1})

The average effect of nutrient solutions	H3	H2	H1	Hybrid / Nutrients
89.16 b	76.87 d	97.53 bc	93.07 c	F0
102.33 a	98.93 abc	102.00 abc	106.07 abc	F1
102.87 a	101.67 abc	104.67 abc	102.27 abc	F2
107.80 a	102.53 abc	107.87 ab	113.00 a	F3
	95.00 b	103.02 a	103.60 a	The average effect of hybrid

The numbers have similar letters do not differ morally according to Duncan's polynomial test at a probability level (0.05)

The results in Table (4) show Significant differences occurred between the treatments for the average number of main branches in the plant, As the hybrid treatments show the excelled of the hybrid Barcelona (H1) significantly in the trait of the average number of main branches in the plant by giving it the highest number of branches reached (7.03) branch.plant^{-1}. In comparison to the Hybrids Super Barcelona (H2), Hauser (H3) by giving them the lowest number of branches in the plant reached (6.27 and 6.77) branch.plant^{-1} respectively, and the reason for this difference between hybrids may be due to the genetic difference resulting from the difference in the structures and the genetic factors that control Vegetative buds. (Shah and Saadoun, 2012), As for the nutrient treatments, the results of the same table indicate that significant differences occurred between the treatments, where treatment (F3) gave an increase in the average number of main branches in the plant amounted to (7.03) branch.plant^{-1} compared to the number of branches for the measurement treatment (F0) reached (6.09) (branch.plant^{-1}, The reason may be due to the effectiveness of foliar nutrients and their distinguishing with the necessary nutritional elements present in the treatment combination (F3) and their content of nitrogen, phosphorus and potassium, which led to a nutritional balance, which reflected positively on the formation of Lateral buds through the increase in cell division and increased vegetative growth (As-Sahaf, 1989 Saunders, 2001; Torres, 2004), As well as, the reason can be due to the positive effect of foliar nutrients on plant preparation with nutrients, which greatly contributed to the development of the vegetative growth and the increase in the number of stems, which led to an increase in the number of branches in the plant Abd-Elmotty *et al*. (2010), and these results agrees with Youssef (2011) and Azarpour *et al*. (2012), It is clear from the same table that significant differences occurred in the interaction treatments between hybrids and nutrients, where the interaction treatment (F3H1) gave the highest average number of branches amounted to (7.53) branch.plant^{-1}. Whereas, there were no significant differences in most of the interaction treatment, compared to the lowest number of main plant branches (5.47) branch.plant^{-1} for the control treatment (spraying with distilled water only) for the Super Barcelona hybrid (H2).

Table 4 : Shows the effect of hybrids, nutrient treatments, and their interaction on the number of main branches (branch.Plate $^{-1}$)

The average effect of nutrient solutions	H3	H2	H1	Hybrid / Nutrients
6.09 b	6.33 e	5.47 f	6.47 de	F0
6.67 ab	6.60 cde	6.43 ed	6.97 bc	F1
6.97 a	6.93 bc	6.80 bcd	7.17 ab	F2
7.03 a	7.20 ab	6.37 e	7.53 a	F3
	6.77 b	6.27 c	7.03 a	The average effect of hybrid

The numbers have similar letters do not differ morally according to Duncan's polynomial test at a probability level (0.05)

Table (5) shows the extent of the effect of hybrids, nutrient treatments and their interactions on the traits leaf area of the plant, as we note a significant increase between the treatments, as the hybrid Barcelona (H1) gave a significantly excelled by registering the highest leaf area amounted to (88.60) cm^2.leaf^{-1}, compared with the hybrids Super Barcelona (H2), Hauser (H3), which gave (80.43, 78.92) cm^2.leaf^{-1}, respectively, and this difference may be due to factors related to the hybrid itself (Al-Ubaidi *et al.*, 2013). Either when using nutrient treatments, the results of the same table indicated that there was a significant difference between the treatments, as the treatment (F3) gave a significantly excelled by giving it the highest value of the leaf area amounted to (90.65 cm^2.leaf^{-1} compared to the control treatment (F0) (Sprinkle with distilled water only (which amounted to (74.10) cm^2.leaf^{-1} ·Perhaps the reason for the excelled of the treatment (F3) is due to the combination of the nutrient solution used by containing the important nutrients and its effective role in the process of increasing cell division and expansion and thus increasing vegetative growth. Al-Sahaf (1989), and it is also possible that the reason is due to the effect of the hybrid in increasing the number of leaves where the increase in the leaf area in the plant is related to the increase in its number (Hammoud, 2017), and Al-Lami (2015) found significant differences in the leaf area of the Eggplant cultivar Barcelona when using Organic nutrients during growth stages and their role in increasing nutrients and their positive effect in improving and increasing vegetative growth (Taiz and Zeiger, 2010)

This result agrees with Al-Amiri (2011), who explained that spraying tomato plant with foliar nutrients significantly affected the traits of vegetative growth and its negative impact on plant growth when these elements were lacking and in line with what was obtained by Hussein (2017) and Al-Zubaidi (2017) When spraying the vegetable growth of the eggplant plant with foliar feeds, either for the interaction treatment between hybrids and the nutrients, the results of the same table showed the excelled of the interaction treatment (F3H1) significantly by giving it the highest leaf area of (102.09) cm^2.leaf^{-1}, compared to the lowest value of (73.30) cm^2.leaf^{-1}in the interaction treatment (F0H2).

Table 5 : Shows the effect of hybrids, nutrient treatments, and their interaction on the leaf area ($cm^2.leaf^{-1}$)

The average effect of nutrient solutions	H3	H2	H1	Hybrid / Nutrients
74.10 c	73.89 fg	73.30 g	75.11 efg	F0
80.74 b	78.51 defg	78.04 defg	85.67 bcd	F1
85.11 b	81.24 cdef	82.58 cde	91.51 b	F2
90.65 a	82.05 cde	87.81 bc	102.09 a	F3
	78.92 b	80.43 b	88.60 a	The average effect of hybrid

The numbers have similar letters do not differ morally according to Duncan's polynomial test at a probability level (0.05)

Table (6) shows the extent of the effect of hybrids and types of nutrients and their interaction in the number of fruits, where it is clear from the table that there are significant differences between the treatments , as the results indicated the excelled of the hybrid Barcelona (H1) significantly in giving it the highest number of fruits reached (18.09) fruit.plant^{-1} compared to Hybrids Super Barcelona (H2) and Hauser (H3) which gave the lowest number of fruits reached (17.04 and 16.06) fruit.plant^{-1}, respectively, The reason may be due to the difference in the genotype between hybrids because each hybrid is controlled by a number of genes and is responsible for growth and production (Mennella *et al.*, 2010) and (Raigon, 2008), and these results are consistent with its findings (Shah and Saadoun, 2012 and Raigon, 2008 and Ramesh *et al.*, 2012) As for nutrient treatments, we notice from the results obtained in the same table that significant differences occurred between the treatments, where treatment (F3) gave a significant increase in the traits of the number of fruits per plant reached (18.98) fruit.plant^{-1} compared to the lowest value for the number of fruits reached (13.93) fruit.plant^{-1} when treatment is measured (F0). It may be due to the effect of foliar nutrients on increasing the indicators of vegetative growth and fruit set by increasing the results of carbon representation and its positive role in increasing the qualitative traits, especially the number of fruits (Khedr *et al.*, 2004) Al-Lami (2015) in addition to the role of the influencing elements in the physiological and biological processes in the plant (Hatwar *et al.*, 2003), and is consistent with what Al-Zubaidi (2017) mentioned when spraying the vegetative growth of eggplant with foliar feeds, and the same table indicates the presence of significant differences between the interaction treatments between hybrids and nutrients, As the interaction treatment (F3H1) was excelled by giving it the highest number of fruits reached (19.88) fruit.plant^{-1} compared to the lowest number of fruits reached (12.27). fruit.plant^{-1} for the treatment of adding distilled water only (F0) to the hybrid (H3).

Table 6 : Shows the effect of hybrids, nutrient treatments, and their interaction on the number of fruits (fruit.plant^{-1}).

The average effect of nutrient solutions	H3	H2	H1	Hybrid / Nutrients
13.93 c	12.27 g	14.65 f	14.88 ef	F0
17.12 b	15.65 def	17.10 cde	18.60 abc	F1
18.23 ab	16.77 cdef	18.92 abc	19.00 abc	F2
18.98 a	19.57 ab	17.50 bcd	19.88 a	F3
	16.06 b	17.04 ab	18.09 a	The average effect of hybrid

The numbers have similar letters do not differ morally according to Duncan's polynomial test at a probability level (0.05)

The results in Table (7) indicate the effect of Hybrid and nutrient types and their interactions on the average fruit weight, where the results show a significant superiority of the hybrid Barcelona (H1) in giving it a high rate in the fruit weight characteristic of (184.7) g.fruit^{-1} compared to the lowest Average weight of the fruit reached (179.0 and 166.0) g.fruit^{-1} at the two hybrids Super Barcelona (H2) and Hauser (H3) in succession, perhaps due to genetic variations and the extent of the hybrid's suitability to the environmental region conditions (Iqbal *et al.*, 1995 and Hayani, 2000), As for the nutrient spraying treatments, the same table shows that there were significant differences between the treatments, where treatment (F2) was excelled by giving it the highest average fruit weight amounted to (182.6) g.fruit^{-1} compared to the lowest fruit weight, the control treatment (F0) reached (168.9) g.fruit $^{-1}$. Its reason may be due to the nutrient solution and its positive role in the photosynthesis process by increasing the leaf area, which led to the increase of manufactured carbohydrates as well as its role in the transfer of these materials from the places of their manufacture to the places of storage that led to an increase in the fruit weight (Abu Dahi and Al-Younes 1988) Likewise, its role in improving the physical, chemical and biological traits of the soil, which are considered a supplement to ground fertilization, which increased the available elements for absorption (nitrogen, phosphorus, and potassium) and its effective role in increasing the vegetative growth that had a positive impact on the quantitative traits, including increasing the average fruit weight (Abd-Elmotty *et al*., 2011), and these results are consistent with what Azarpour *et al*. (2012), Jaafar (2012), Al-Lami (2015) and Al-Zubaidi (2017) found when spraying the vegetable growth of eggplant with foliar feeds, either with regard to interaction treatments, we notice from the same table significant differences Among the treatments, the interaction treatment (F3H1)was excelled on the rest of the interaction to give it the highest average fruit weight was (192.7) g.fruit^{-1} compared to the interaction treatment (F0H3), which gave the lowest value of the average fruit weight reached (157.7) g.fruit^{-1}.

Table 7 : Shows the effect of hybrids, nutrient treatments, and their interaction on the fruit weight (g.Fruit^{-1})

The average effect of nutrient solutions	H3	H2	H1	Hybrid / Nutrients
168.9 b	157.7 e	173.3 cd	175.7 bc	F0
175.1 ab	160.1 e	178.3 bc	187.0 ab	F1
182.6 a	182.7 abc	181.3 abc	183.9 abc	F2
179.6 ab	163.4 de	183.1 abc	192.4 a	F3
	166.0 c	179.0 b	184.7 a	The average effect of hybrid

The numbers have similar letters do not differ morally according to Duncan's polynomial test at a probability level (0.05)

It is noted from Table (8) the extent of the influence of hybrids and the types of nutrients and their interaction in the trait of plant yield(kg.plant^{-1}), as significant differences in the treatments. In the hybrid treatment, we find the excelled of hybrid Barcelona (H1) significantly by giving it the highest value for the quality of the trait the plant yield reached (3.354) kg.plant^{-1} compared to the hybrids Super Barcelona (H2) and Hauser (H3) which gave the lowest plant yield of (3.060 and 2.658) kg.plant^{-1} respectively. Perhaps it is due to the discrepancy between the genotypes of camels (Mennella *et al.* 2010), These results are consistent with what was confirmed by (Shah and Saadoun, 2012 and Ramesh *et al.*, 2012) in eggplant, either from spraying with nutrients. The same table shows significant differences between treatments, as we note the excelled of treatment (F3) in giving the highest plant yield amounted to (3.410) kg.plant^{-1} compared to the lowest plant yield amounted to (2.365) kg.plant^{-1} for control treatment (F0), Perhaps the reason is due to the increase in the average weight and number of fruits cumulatively in the harvest, which is directly related to the increase in the quantity of the plant yield, and this is what Suge *et al.* (2011) found. In addition to the role of foliar nutrients used in the experiment in improving the physical, chemical and biological traits of the soil and increasing the indicators of vegetative growth through its contribution to increasing the absorption of availability elements during the different stages of plant growth, which was reflected positively in increasing the plant yield (Abd-Elmotty *et al.*, 2011) In addition to the significant increase in the leaf area shown in Table (5), which is considered one of the most prominent things that positively affect the qualitative yield trait of its importance in the process of absorption and carbon representation through the transfer of carbon building products from places of their manufacture to the flower buds and fruits, which led to an increase of the yield plant (Rahemi *et al.*, 2005 and Feleafel *et al.*, 2014),

The results of this study are consistent with the findings of Azarpour *et al*. (2012) and what Ja`far (2012) and Al-Lami (2015) and Pandav *et al*., (2016) and Al-Zubaidi (2017) found when spraying the vegetative group of eggplant plants with foliar nutrients, either for interaction treatments between hybrids and nutrients, the interaction (F3H1) was significantly excelled and the highest values were given in the trait of the plant yield recorded (3.822) kg.plant^{-1} compared to the lowest value of the plant yield reached (1.939) kg.plant^{-1} when treating the interaction between the hybrid Hauser (H3) and add distilled water (F0).

Table 8 : Shows the effect of hybrids, nutrient treatments, and their interaction on the plant yield (kg .plant^{-1})

The average effect of nutrient solutions	H3	H2	H1	Hybrid / Nutrients
2.365 c	1.939 f	2.542 e	2.615 e	F0
3.012 b	2.500 e	3.055 d	3.482 b	F1
3.308 ab	2.991 d	3.436 bc	3.499 b	F2
3.410 a	3.203 cd	3.206 cd	3.822 a	F3
	2.658 c	3.060 b	3.354 a	The average effect of hybrid

The numbers have similar letters do not differ morally according to Duncan's polynomial test at a probability level (0.05)

Through table (9), it is evident that there were significant differences between the treatments in the trait of the total yield, where the results showed a significant excelled of the hybrid Barcelona (H1) in giving it the highest total yield amounted to (118.8) tons.ha^{-1} compared to the lowest production at the super Barcelona hybrids (H2) and Hauser (H3) reached (101.9 and 88.61) tons.ha^{-1}, respectively, and the reason is due to the presence of a variation in the genotypes of hybrids that each hybrid is controlled by a number of genes responsible for the nature of growth and production (Mennella *et al.*, 2010 and Raigon, 2008),These results agree with (Shah and Saadoun, 2012 and Ramesh *et al.*, 2012), and the nutrient treatment showed differences in total plant production as the treatment (F3) excelled it by giving the highest yield to the yield amounted to (113.7) tons.ha^{-1} compared to the control treatment (F0) That gave the lowest production amounted to (78.84) tons.ha^{-1}, The reason may be due to the effectiveness of foliar nutrients in increasing the absorption of nutrients, which increased the amount of hormones in the fruits sets such as Auxin, as well as the prominent role of nutrients in increasing vegetative growth and increasing the percentage of fruits sets that led to an increase and improvement in the quantitative and qualitative traits of the final product (Khedr, 2004; Desouky *et al.,* 2009) emphasized that the formation of nutrients and their presence in a sufficient quantity within the plant increases the qualitative and quantitative yield traits as well as the significant increase in the leaf area shown in Table (5), which has a prominent role in positively influencing the qualitative yield of its importance. In the process of carbon adsorption and construction, which led to an increase in the total yield (Rahemi *et al.*, 2005; Feleafel *et al.*, 2014), these results are consistent with its findings (Al-Tahafi *et al.*, 2012 and Muhammad, 2013) and (Pandav, 2016). When studying on eggplant, either with regard to the interaction treatments between hybrids and nutrients, the

same table shows that there were significant differences between the treatments, where the interaction treatment (F3H1) was significantly excelled by giving the highest values to the total yield traits and recorded (191.1) tons.ha^{-1} compared to the lowest production When treating interaction (F0H3), it reached (96.94) tons.ha^{-1}.

Table 9 : Shows the effect of hybrids, nutrient treatments, and their interaction on the total yield (ton.ha^{-1})

The average effect of nutrient solutions	H3	H2	H1	Hybrid / Nutrients
78.84 b	64.63 f	84.72 e	87.17 de	F0
100.4 a	83.33 e	101.8 bc	116.0 ab	F1
110.3 a	99.70 cd	114.5 abc	116.6 ab	F2
113.7 a	106.8 bc	106.9 bc	127.4 a	F3
	88.61 c	101.9 b	111.8 a	The average effect of hybrid

The numbers have similar letters do not differ morally according to Duncan's polynomial test at a probability level (0.05)

Conclusions and Recommendations

The results of this study showed the excelled of Barcelona Hybrid (H1) in most indicators of vegetative growth and the trait of yield and its components. The treatment of FYLLOTON and PHOSFIK foliar feeder together (F3) was distinguished from the other treatments in most of the studied traits.

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