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Effect of Spraying with some Leaf Nutrients on the Growth and Yield of Two Varieties of Local Green Onion *Allium cepa* L

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ABSTRACT

The field experiment was conducted during the 2015-2016 winter agricultural season in the tomato cultivation project with modern technologies of the Basra Agriculture Directorate in KhorAl-Zubair-Basra Governorate with the aim of studying the effect of some leaf nutrients on the growth and yield of two varieties of green onions, It included two factors which were the interaction between two varieties of local white and red onions and spraying with some leaf nutrients, these nutrients were Algaton at two concentrations 2.5 and 5 ml L^{-1}, Kumulus and Nutri at the concentrations 2.5 and 5 g L^{-1} in addition to the comparison treatment (spraying with distilled water only) and by three sprays every two weeks after completion of the emergence of the cultivated onion sets.

Randomized Complete Block Design (RCBD) was used to factorial experiment with split plot design with three replications; the mean results were analyzed statistically using Genstat, V. 10.3 (2011) application, and the Least Significant Difference test (L.S.D.) was used to compare the means at a probability level of 0.05.

The results showed that there was no significant difference between the two varieties except for the superiority of the local white variety in total chlorophyll and total soluble carbohydrates in the leaves and the local red variety in the percentage of potassium in the leaves, while the plants sprayed with the nutrient solution Nutri 5 g L^{-1} exceeded in most growth indicators, the qualitative and chemical characteristics represented by number of leaves, leaf area, onion neck diameter, fresh and dry weights of the total vegetative, dry weight of roots, number of squamous leaves, fresh (131 g) and dry (15.96 g) weights per bulb, as well as the total weight of the plant (457.17 kg), total productivity (160.92 tons ha^{-1}), total chlorophyll, total soluble carbohydrates and the percentage of nitrogen, phosphorous, potassium and protein in the leaves, both concentrations of 2.5 and 5 g $L^{-1}$of the same nutrient were superior in percentage of sulfur,while the plants that were sprayed with Kumulus at a concentration of 2.5 g L^{-1} and those that were sprayed with Algaton at the concentration of 2.5 ml L^{-1} exceeded in plant height, and those which were sprayed only with Kumulus at a concentration of 2.5 g L^{-1} in bulb diameter, also the plants that were sprayed with the nutrients exceeded the comparison treatment plants in roots fresh weight.

Most of the bilateral interactions between the treatments were significant in the growth indicators and characteristics under study.

Key words

Onion, variety and leaf nutrients

Introduction

Onion belongs to the genus *Allium* of the Alliaceae family, which contains more than 90 genera and about 1,200 species. Many important crops belong to this family, foremost among which is onion that is also classified among the field crops because it is planted on a large scale around the world, especially in Asia and Europe, and it is considered one of the most important vegetable crops after tomato(Griffiths, 2002), and it has medicinal advantages, including that it is an anti-proliferation of bacteria in the gastrointestinal tract, useful in reducing blood sugar concentration, reducing clot formation (Goldman, 1996), and it contains large amounts of antioxidants and flavonoids that contribute to Inhibiting or slowing cell and tissue damage in the body, also quercetin contained in onion contributes to the elimination of free radicals in the body, as well as inhibits the oxidative processes associated with coronary heart disease (Patil *et al.*2008), and in terms of nutritional value, it is characterized by containing a lot of vitamins, some minerals, protein and carbohydrates, as each 100 grams of green onions contains 89.4% moisture, 36 calories, 1.5 g protein, 0.2 g fat, 8.2 g total carbohydrates, 1.0 mg fiber, 0.7 mg ash, 51 mg calcium, 39 mg phosphorous, 1 mg iron, 5 g sodium, 231 g potassium, 2000 IU vitamin A, 0.06 mg thiamine, 0.11 mg riboflavin, 0.5 mg nicotic acid, 29 mg ascorbic acid, 25 micrograms and retinol (Hassan, 2000), the cultivated area of onion in Iraq reached 5813 hectares with a production of 50059 tons and a production rate of nine tons ha^{-1} (FAO, 2019),It is considered one of the bilateral herbaceous plants and completes its life cycle in two seasons, as it grows vegetatively in the first season of planting, during which the plants are active in formation of leaves and roots and then the formation of the bulb at the end of the season, then the bulb remains dormant in the store until the time of planting, so

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it is planted in the second season of cultivation to form leaves and roots and then move to the stage of specialization, fruiting and seed production (Kumar, 1995).

Literature Review

Foliar feeding

Foliar feeding is one of the preferred methods of fertilization because the plants highly benefit from them, as it is added in low concentrations by spraying it on the plant in order to nourish it, accelerate its growth and improve production (Al-Jubouri and Al-Khafaji, 2011),foliar fertilization depends on supplying the plant with the necessary nutrients by spraying the total vegetative and absorbing them through the stomatal apertures spread on the top and bottom surfaces of the leaf, but it is not considered an alternative to ground fertilization, but it is rather useful and necessary with it and it shows a very fast response (Al Sahhaf, 1994),from the studies on this, Ali *et al*. (2017) found that local garlic plants sprayed with Microm foliar fertilizer (0.5, 1 and 1.5 g L^{-1}) were superior to the comparison treatment plants, and the effect increased with increasing concentration, as the spray treatment at a concentration of 1.5 g L^{-1}exceeded in number of leaves, leaf area and head average weight compared to the comparison treatment plants, and the highest and lowest values of the mentioned characteristics were 11.5 ,10.9, 917.5,739.2 cm2, 23.18 and 20.15 ton ha^{-1},Al-Zubaidi (2018) indicated that spraying eggplant plants with nutritional solutions Basfoliar Kelp and Fylloton at concentrations of 0, 2, 3 and 4 g L^{-1}had a significant effect on the studied characteristics, as the plants that were sprayed Fylloton at a concentration of 3 g L^{-1}recorded the highest rate of plant height (101.5 cm), leaf area (3976.4 cm2),number of fruits (29.9),their weight (171.2 g), one plant yield (5.2 kg) and dry weight 167.5 g), while Abboud *et al*. (2020), indicated that spraying watermelon plants with Huzone nutrient solution at concentrations of 0, 2, 4 and 6 cm^3L^{-1} had a significant effect on all growth and yield characteristics.

Materials and methods

The field experiment was conducted in Basra Governorate for the 2015-2016 winter season in the Tomato Development Project with modern technologies of the Basra Agriculture Directorate in Khor Al Zubair, in a mixed sandy soil with a pH of 7.31, an electrical conductivity of 6.48 $Des.m^{-1}$ and an organic matter of 0.62%, maximum and minimum temperatures and relative humidity of the experiment area during the growing season also were recorded, using the data of the Al-Barjisiah Agricultural research station adjacent to the site (table, 1).

Table(1)Maximum and minimum temperatures and relative humidity* during the experiment season

Date	Temperature (◦c)		Relative humidity (%)	
Day-month-year	maximum	minimum	maximum	minimum
20 – 31/ 10/ 2015	32.72	20.02	75.19	29.00
1 – 10/ 11/ 2015	26.68	17.11	83.99	34.81
11 – 20/ 11/ 2015	23.96	11.72	80.76	30.03
21 -30/ 11/ 2015	24.42	10.26	75.71	25.81
1 – 10/ 12/ 2015	18.63	6.77	83.51	28.12
11 – 20/ 12/ 2015	18.49	7.63	88.52	45.83

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21 – 31/ 12/ 2015	15.96	6.23	91.40	50.91
1 – 10/ 1/ 2016	15.29	7.25	94.67	44.70
11 – 20/ /1 2016	19.14	6.57	89.07	35.18
21 – 31/ 1/ 2016	16.51	5.54	74.30	27.01
1 – 10/ 2/ 2016	20.04	5.95	79.34	24.30
11 – 20/ 2/ 2016	21.60	8.86	73.14	20.44
21 – 29/ 2/ 2016	25.16	12.67	85.14	27.44
1 – 10/ 3/ 2016	27.51	13.85	73.09	9.30
11 – 20/3/ 2016	26.87	13.65	67.73	16.26
21 – 31/ 3/ 2016	26.89	14.23	71.26	20.01

The experiment included two factors, which are the interaction between two varieties of onion (local white and red) and spraying with some nutrients, which are Algaton at concentrations of 2.5 and 5 ml L^{-1} and Kumulus and Nutri at concentrations of 2.5 and 5 g L^{-1}in addition to the comparison treatment (Spraying with distilled water only) and by three sprays every two weeks after completion of the emergence of the cultivated onion sets.

Randomized Completely Block Design (RCBD) was used as a split plot design, varieties was considered main plots and spraying with nutrients as Sub- Plots. There are 14 factorial treatmentswith three replicas, with 42 experimental units.Data was statisticallyanalyzed byusing the Genstat, V.10.3 (2011) statistical program, and the test used theleast significant difference (L.S.D.) to compare the averages at 0.05 probabilitylevels (Al Rawi and Khalaf Allah, 1980).

The locally produced onion set of the two varieties, white and red on 22/10/2015, was planted in the field immediately after plowing, smoothing, leveling, and dividing it into six lines (two lines for each replica) of 28 m in length, 50 cm in width and 15 cm in depth, with a distance of 50 cm between one line and another, and 10 cm between the onion set and another, after unifying their suitable weights for cultivation which is equivalent to approximately 1.5 g (Matlab*et al*. 1989), as each line contains 7 experimental units with a length of 4 meters, a width of 0.5 meters and an area of 2 m^2, and by 80 plants in the line for each experimental unit and a plant density of 352000 plants $ha^{-1.}$

The service operations were performed in a similar manner to all treatments as usual in the production of onion, as decomposed organic fertilizer was added by 40 m^3ha^{-1} during the preparation of the field, then the compound fertilizer NPK at a rate of 400 kg ha^{-1}after three weeks of planting and a second batch was added a month after the first batch (Matlab *et al*. 1989), then fertilizing with urea with irrigation water every week and another at a rate of 1g urea L^{-1}water. The drip irrigation system was used to irrigate plants and was uprooted on 28/3/2016.

Field readings were taken from ten plants chosen randomly at the end of the season and included plant height (cm), number of leaves, leaf area (Dm^2) (Liang *et al*. 1973) leaf neck diameter (cm), fresh and dry weights of the vegetative and root total (g), bulb diameter (cm), number of scaly leaves of the bulb, fresh and dry weight of the bulb (g), total plant weight (kg), and total productivity (ton ha^{-1}). Total chlorophyll (mg 100 g^{-1}fresh weight) (Abbas and Abbas, 1992), total soluble carbohydrates (mg g^{-1} dry weight) (Dubois, 1956), percentage of nitrogen and potassium (Page *et al*. 1982) and phosphorous (Murphy and Riley, 1962), sulfur (Patel*et al*.1997), and protein in papers (A.O.A.C. 1970) were also calculated.

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Results

Table (2) results showed the superiority of the plants that were sprayed with kumulus nutrient solution at a concentration of 2.5 g L^{-1} and Algaton at a concentration of 2.5 ml L^{-1} in a significantly in plant height, as they reached 79.83 and 77.83 cm, respectively, compared to the lowest height of the comparison treatment plants, which reached 65.00 cm, while the plants that were sprayed with Nutri nutrient solution at a concentration of 5 g L^{-1}showed significant superiority in number of leaves (21.33 leaves), leaf area (9.80 Dm^2) and diameter of the bulb (2.60 cm)compared to the comparison treatment plants that recorded the lowest values for the aforementioned characteristics as each of them reached12.33 leaves, 5.34 Dm^2, and 1.84 cm respectively. The plants of the local red variety that were sprayed with kumulus at a concentration of 2.5 g L^{-1}exceeded in plant height, as it reached 83.67 cm compared to the comparison treatment plants for the same variety as it reached 64.67 cm when the variety interacted with spraying with nutrients, also the bilateral interaction of the treatments showed the superiority of the of the local white variety plants that were sprayed with Nutri at a concentration of 5 gL^{-1}in leaf area as it reached 10.21 Dm^2 compared to the comparison treatment plants of local red variety, which reached 4.96 Dm^2, while it was noticed that there was no significant difference between the two varieties in the aforementioned characteristics, as well as the bilateral interaction between the variety and sprayingwith nutrients in number of leaves and diameter of the neck of the bulb.

Table (3) results showed the superiority of onion plants that were sprayed with Nutri at a concentration of 5 g L^{-1} significantly in the fresh and dry weights of the total vegetative (290.33 and 24.53g) and the dry weight of the root (1.83g) compared to their lowest weight in the comparison treatment plants, as each of them reached 176.17, 22.71 and 0.87 g respectively,

Table (2) the effect of spraying with leaf nutrients on the growth indicators of two varieties of local green onions

variety	leaf nutrients		Plant height (cm)	Number of leaves	Leaf area (Dm^2)	onion neck diameter (cm)
local white	comparison(Distilled water)	0.0	65.33	12.67	5.73	1.83
	Algaton (ml L^{-1})	2.5	80.67	19.00	8.19	2.39
		5.0	70.00	19.33	8.99	2.36
	Kumulus (g L^{-1})	2.5	76.00	19.33	7.76	2.35
		5.0	70.00	17.67	7.41	2.25
	Nutri(g L^{-1})	2.5	79.00	21.33	9.00	2.53
		5.0	67.00	23.00	10.21	2.79
local red	comparison (Distilled water)	0.0	64.67	12.00	4.96	1.84
	Algaton (ml L^{-1})	2.5	75.00	21.33	9.01	2.44
		5.0	73.67	18.33	7.86	2.25
	Kumulus (g L^{-1})	2.5	83.67	19.33	8.49	2.35
		5.0	76.67	18.33	8.08	2.37
	Nutri(g L^{-1})	2.5	74.67	19.67	7.78	2.30
		5.0	80.00	18.33	9.38	2.41
R.L.S.D 0.05			4.58	NS	0.06	NS
variety average	local white		72.57	18.90	8.18	2.36
	local red		75.48	18.33	7.94	2.28
R.L.S.D 0.05			NS	NS	NS	NS

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nutrients concentrationsaverage	comparison (Distilled water)	0.0	65.00	12.33	5.34	1.84
	Algaton (ml L^{-1})	2.5	77.83	20.17	8.60	2.42
		5.0	71.83	18.83	8.42	2.30
	Kumulus (g L^{-1})	2.5	79.83	19.33	8.13	2.35
		5.0	73.33	18.50	7.75	2.31
	Nutri(g L^{-1})	2.5	76.83	19.83	8.39	2.42
		5.0	73.50	21.33	9.80	2.60
R.L.S.D 0.05			3.37	2.62	0.05	0.22

Table (3) the effect of spraying with leaf nutrients on fresh and dry weights of the vegetative and root groups of two varieties of local green onions

variety	leaf nutrients		fresh weights of the total vegetative (g)	dry weights of the total vegetative (g)	fresh weight of roots (g)	dry weight of roots (g)
local white	)comparison (Distilled water	0.0	172.00	22.70	5.33	0.87
	Algaton (ml L^{-1})	2.5	245.33	23.84	8.00	1.71
		5.0	255.33	24.00	7.83	1.66
	Kumulus (g L^{-1})	2.5	244.67	23.83	8.00	1.35
		5.0	256.33	24.00	8.33	1.28
	Nutri(g L^{-1})	2.5	235.00	23.68	7.50	1.68
		5.0	285.33	24.50	8.83	1.83
local red	)comparison (Distilled water	0.0	180.33	22.72	5.33	0.88
	Algaton (ml L^{-1})	2.5	224.33	23.62	10.00	1.70
		5.0	194.00	23.01	8.67	1.42
	Kumulus (g L^{-1})	2.5	293.67	24.54	8.67	1.64
		5.0	250.67	23.87	8.00	1.75
	Nutri(g L^{-1})	2.5	248.00	23.83	8.67	1.22
		5.0	295.33	24.56	10.00	1.84
R.L.S.D 0.05			15.68	0.24	NS	NS
variety average	local white		242.00	23.79	7.69	1.48
	local red		240.90	23.74	8.48	1.49
R.L.S.D 0.05			NS	NS	NS	NS
nutrients concentrationsave rage	)comparison (Distilled water	0.0	176.17	22.71	5.33	0.87
	Algaton (ml L^{-1})	2.5	234.83	23.73	9.00	1.70
		5.0	224.67	23.51	8.25	1.54
	Kumulus (g L^{-1})	2.5	269.17	24.18	8.33	1.49
		5.0	253.50	23.94	8.17	1.51
	Nutri(g L^{-1})	2.5	241.50	23.76	8.08	1.45
		5.0	290.33	24.53	9.42	1.83
R.L.S.D 0.05			11.54	0.18	1.38	0.28

while the plants that were sprayed with nutrients significantly exceeded the comparison treatment plants in the fresh weight of the root, also the bilateral interaction of local red onion plants and

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spraying with Nutri at a concentration of 5 g L^{-1}achieved significant superiority in both fresh and dry weight of thevegetative total, which reached 295.33 and 24.56 g, compared to the lowest weight of the comparison treatment plants for the local white variety, which reached 172.00 and 22.70 g, respectively. The variety had no significant effect on the mentioned characteristics, as well as the interaction of the variety with spraying with nutrients on the fresh and dry weights of the root.

Table (4) results showed that the variety has no significant effect on yield indicators, while spraying with nutrients showed a significant effect, as the plants that were sprayed with kumulus at a concentration of 2.5 g L^{-1}significantly exceeded in onion diameter, reaching 7.86 cm compared to the lowest diameter of the comparison treatment plants, which reached 5.03 cm, while the plants that were sprayed with Nutri at a concentration of 5 g L^{-1}achieved a significant superiority in number of squamous leaves of the bulb (18.83 $leaf^{-1}$), fresh and dry weight of the bulb (131.00 and 15.69 g), total plant weight (457.17 kg)and total productivity (160.92 ton ha^{-1}) compared to the comparison treatment plants as it reached 12.33 onion $leaf^{-1}$, 75.34 g, 9.36 g, 284.00 kg, and 99.97 ton ha^{-1} for each of the aforementioned characteristics, also the bilateral interaction of local red onion plants that were sprayed with Nutri at a concentration of 5 g L^{-1} significantly exceeded in the aforementioned yield indicators, as diameter of the bulb was 9.17 cm, number of scaly leaves of the bulb was 22.33 leaves of the $bulb^{-1}$ fresh and dry weight of the bulb was 156.00 ,19.20 g, total plant weight was 481.33 kg and total productivity was 169.43 ton ha^{-1} compared to plants the comparison treatment plants which gave the lowest values, as they were 4.92 cm, 12.00, $onion^{-1}$, 70.00 g, 8.78 g, 278.67 kg, and 98.09 $tonha^{-1}$ for each, respectively.

Table (5) results showed that there was a significant difference between the two varieties in total chlorophyll and total soluble carbohydrates in the leaves and the highest values were found in local white onion plants compared to the red variety, while it was noticed that the variety has no significant effect on the percentage of nitrogen, phosphorous, potassium, sulfur and protein as well, also plants that were sprayed with Nutri at a concentration of 5 g L^{-1} significantly exceeded in all the mentioned characteristics the comparison treatment plants which gave the lowest values except for sulfur, as it was noticed that there was no significant difference between the plants that were sprayed at concentrations 2.5 and 5 g L^{-1} for the same nutrient.

The bilateral interaction between local white onion plants and spraying with Nutri at a concentration of 5 g L^{-1} showed a significant superiority in total chlorophyll (2.723 mg 100 g^{-1} fresh weight), total soluble carbohydrates (12.443 mg g^{-1} dry weight) and percentage of sulfur (1.916%) compared to the comparison treatment plants for the local red variety which gave the lowest values for it as it was 1.326 mg 100 g^{-1}fresh weight and 6.071 mg g^{-1} dry weight and 0.663%, respectively,the local red onion plants that were sprayed with the same nutrient and concentration were significant in the percentage of nitrogen, phosphorous, potassium and protein in the leaves (3.962, 1.458, 4.508 and 24.765%) compared to the lowest percentage of the comparison treatment plants for the same variety (2.363, 0.588, 3.406 and 14.767%), respectively.

Table (4) the effect of spraying with leaf nutrients on the yield indicators of two varieties of local green onions

variety	leaf nutrients	bulb diameter (cm)	number of squamous leaves of	fresh weight of the bulb (g)	dry weight of the bulb (g)	total plant weight (kg)	total productivity (ton ha^{-1})

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				the bulb				
local white	)comparison (Distilled water	0.0	4.92	12.00	70.00	8.78	278.67	98.09
	Algaton (ml L^{-1})	2.5	5.33	13.00	85.00	10.18	362.00	127.42
		5.0	6.02	14.67	94.00	11.57	381.00	134.11
	Kumulus (g L^{-1})	2.5	8.60	19.33	129.00	15.12	408.67	143.85
		5.0	6.90	16.33	110.33	13.22	405.00	142.56
	Nutri(g L^{-1})	2.5	5.61	14.00	88.67	10.91	352.00	123.90
		5.0	5.66	15.33	106.00	12.72	433.00	152.42
local red	)comparison (Distilled water	0.0	5.15	12.67	80.67	9.93	289.33	101.85
	Algaton (ml L^{-1})	2.5	8.97	21.33	137.00	16.41	386.67	136.11
		5.0	5.50	13.67	86.33	10.63	318.00	111.94
	Kumulus (g L^{-1})	2.5	7.13	16.67	113.67	13.99	445.33	156.76
		5.0	6.14	16.00	112.00	13.42	394.00	138.69
	Nutri(g L^{-1})	2.5	5.38	14.33	91.33	11.24	378.00	133.06
		5.0	9.17	22.33	156.00	19.20	481.33	169.43
R.L.S.D 0.05			0.94	1.92	13.16	1.59	4.83	1.70
variety average	local white		16.15	14.95	97.57	11.79	374.33	131.77
	local red		6.78	16.71	111.00	13.55	384.67	135.40
R.L.S.D 0.05			NS	NS	NS	NS	NS	NS
nutrients concentrationsaverage	)comparison (Distilled water	0.0	5.03	12.33	75.34	9.36	284.00	99.97
	Algaton (ml L^{-1})	2.5	7.15	17.17	111.00	13.30	374.33	131.77
		5.0	5.76	14.17	90.17	11.10	349.50	123.02
	Kumulus (g L^{-1})	2.5	7.86	18.00	121.34	14.55	427.00	150.30
		5.0	6.52	16.17	90.00	13.32	399.50	140.62
	Nutri(g L^{-1})	2.5	5.50	14.17	90.00	11.08	365.00	128.48
		5.0	7.41	18.83	131.00	15.96	457.17	160.92
R.L.S.D 0.05			0.68	1.33	9.10	1.59	2.77	0.98

Table (5) the effect of spraying with leaf nutrients on the quality of leaves of two varieties of local green onions

variety	leaf nutrients		total chlorophyll (mg 100 g^{-1} fresh weight)	total soluble carbohydrates (mg g^{-1} dry weight)	Nitrogen (%)	Phosphorous (%)	Potassium (%)	Sulfur (%)	protein (%)
local white	Distilled)cmparison (water	0.0	1.524	6.971	2.365	0.731	3.455	0.764	14.781
	Algaton (ml L^{-1})	2.5	2.183	9.982	3.223	1.028	3.629	0.978	20.142
		5.0	2.393	10.955	3.353	1.069	3.847	1.675	20.958
	Kumulus (g L^{-1})	2.5	2.065	9.456	3.193	1.029	4.016	1.652	19.958
		5.0	1.977	9.035	3.406	1.028	3.739	1.777	21.290
	Nutri(g L^{-1})	2.5	2.396	10.965	3.083	1.028	4.071	1.906	19.269
		5.0	2.723	12.443	3.914	1.039	4.187	1.916	24.461
local red	)comparison (Distilled water	0.0	1.326	6.071	2.363	0.588	3.406	0.663	14.767
	Algaton (ml L^{-1})	2.5	2.396	10.975	2.960	1.389	4.116	1.198	18.500
		5.0	2.097	9.584	2.714	1.175	3.793	1.046	16.965
	Kumulus (g L^{-1})	2.5	2.265	10.371	3.912	1.030	4.446	1.133	24.452

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		5.0	2.156	9.865	3.305	1.029	3.849	1.080	21.096
	Nutri(g L^{-1})	2.5	2.084	9.523	3.375	1.174	3.958	1.462	21.096
		5.0	2.507	11.451	3.962	1.458	4.508	1.758	24.765
R.L.S.D 0.05			0.004	0.005	0.007	0.041	0.006	0.260	0.043
variety average	local white		2.180	9.972	3.220	0.993	3.849	1.524	20.123
	local red		2.119	9.691	3.228	1.121	4.011	1.191	20.234
R.L.S.D 0.05			0.001	0.003	NS	NS	0.003	NS	NS
nutrients concentrati onsaverage	)comparison (Distilled water	0.0	1.425	6.521	2.364	0.660	3.431	0.714	14.774
	Algaton (ml L^{-1})	2.5	2.290	10.479	3.091	1.208	3.873	1.088	19.321
		5.0	2.245	10.270	3.034	1.122	3.820	1.361	18.962
	Kumulus (g L^{-1})	2.5	2.165	9.914	3.553	1.030	4.231	1.392	22.205
		5.0	2.066	9.450	3.356	1.029	3.794	1.429	21.193
	Nutri(g L^{-1})	2.5	2.240	10.244	3.229	1.101	4.015	1.684	20.183
		5.0	2.615	11.947	3.938	1.249	4.348	1.837	24.613
R.L.S.D 0.05			0.003	0.003	0.005	0.030	0.005	0.185	0.030

Discussions

The spraying with nutrients treatments superiority when compared to the comparison treatment might be due to the speed of their absorption by the plant and thus their effect on the development of the total vegetative and root and its reflection on increasing the yield, because they contain nutrients necessary for growth such as nitrogen and phosphorus (Table, 1), which is one of the most important requirements for plant development and growth and its effect on productivity and crop quality (Saunders, 2001), or that the increase that appeared on the total vegetative and yield of the varieties, might be due to the balance of the nutrients present in the foliar nutrients (Scialabba, 2002), or it might be due to the harmony between the foliar nutrients used and varieties nutritional status during the different growth stages (Dwelle and Hurley, 1999), or that spraying with nutrients led to an increase in the vegetative and root growth indicators (Tables, 2 and 3), and this was reflected in an increase on yield components and characteristics (Tables, 4 and 5).

The superiority of plants that were sprayed with the foliar nutrient Nutri in most vegetative growth and yield indicators might be due to the role of nitrogen in chlorophyll formation, the increase in the efficiency of photosynthesis and protein building (Al-Sahaf, 1989) in addition to that nitrogen is one of the necessary elements for building the amino acid tryptophan, which is the main substance for indole acetic acid formation (IAA), all this led to an increase in leaf area and fresh and dry weight of the plant and this reflected in the increase and quality of the yield (Abdoul, 1987) in addition to its containment of micro-nutrients (Table, 1) which play an important role in the processes of oxidation, short and building enzymes and several vitamins within the plant (Mahmoud *et al*. 2000) this comes in line with Magdi *et al*. (2009) and Yassen and Khalid (2009) and Ali *et al*. (2017) on garlic.

Conclusions

Local white and red onions grown in the desert areas of southern Iraq can be sprayed with the Nutri foliar feeder at a concentration of 5 g L^{-1} by three sprays every two weeks after the completion of the planting onion sets.

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