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Effect Different Levels of Chelated Iron on the Growth and yield of Wheat (*Triticumaestivum* L.) under Thi- Qar and Al-Muthanaa conditions

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Abstract: ***A field experiment was Conducted in Thi-Qar and Al-Muthanaa cities during the fall Season of 2014 -2015. The experiment aimed to Study the effect of application of levels of chelated iron Fe-EDDHA (0, 50, 100, 150) mg/L by spraying to plant leaves, A randomized complete block design was used with three replications. Means were compared using L.S.D test at 0.05 probability. The results revealed that application of chelated iron led to a significant increasing, The high level of iron application(150) mg/L gave the highest value average: number of branches (6.7-8.88), spikes number in 1m^2(131-122), flag leaf area(37.1-33) cm^2,grains number in the spike(57-58.1), weight of 1000 grain(54-44.6) g, yield of grains(3.19-2.2) ton . ha^{-1} in Thi-Qar and Al-Muthanaa cities- respectively ,no significant in highest of plant. Statistical analytical results showed that a significant differences obtain between Thi-Qar and Al-Muthanaa cities, the application planted Thi-Qar was significantly increased studied properties compared with Al-Muthanaa application planted: in a percentage of highest of plant(11%), spikes number in 1m^2(15%), weight of 1000 grain(21-25%) g, yield of grains(27-44) ton . ha^{-1} compared with Al-Muthanaa city.***

Keywords: Wheat, Fe-EDDHA, Flag leaf, Spike.

1. Introduction

Wheat (*Triticumaestivum* L.) is the most important cerealcrop in the world and is the third major cereal produced in the world, following maize and rice. (FAO, 2013).In Iraq wheat ranked first in terms of planted area, in 2009 amounted to about 1.26 million /ha , Total production reached 1.7 million tons with an average yield reached 1.347 tons/ha (Iraqi Agricultural static, 2010).Economic yield is affected by many factors, including genetic and environmental multiple. The irrigation one of environmental factors that have priority in influencing the qualities of yield, water plays a significant role in increasing the absorption of nutrients, in the cells , divides growth and regularity of the process of photosynthesis (Alsahoeke*et al.,* 2009).Recent evidence in literature indicates that nitrogen nutritional status of plants hasa positive influence on grain accumulation of Fe (Kutman*et al.* 2010). Due to the lack of studies on the use of micro-nutrients claw in ThiQar and Muthanna, the current study aimed to:

1) The effect levels of Fe-EDTA in recipes and holds the growth of wheat.
2) Study class parents 99 response to the circumstances of ThiQar and Muthanna.

2. Methods and Materials

A field experiment was carried out in the Agriculture station in ThiQar and the station Bandar inMuthanna province during the winter growing season (2014-2015). Was plowing the field the soil and settled then divided into blocks with an area of (2.5 × 2 m^2), left spaces between treatments 1.3m Experiment carried out according to the design RCBD) Alsahoeke and Ohab(1994), Add nitrogen fertilizer steady level for all treatments 160 kg H^{-1} on urea N% form 46 two payments equal, first at agriculture and the second in the branches stage, as was added phosphate fertilizer, (triple superphosphate) 160 kg P2O5 e 1 with the first batch of nitrogen. After the passage of 21 days to germination add an Fe-EDTA (% Fe7) spray four levels of Fe-EDTA concentrations (0-50-100-150mg / L) has been serving the crop during the growing season of weeding and removing the jungles whenever the need arises. samples were taken representative of the soil field for some of the chemical and physical characteristics of the soil study, as shown in Table 1 at the flowering stage took random samples representing each treatment of securities It was dried and digested and the extent in which each of the extent in which each of the iron according to (1978, Norvelland Lindsay). At the end of the growing season was calculated plant height and number of spikes and weight of thousand grain and yield Grain. analyzed the traits values statistically using contrast Genstat4 analysis program.

Table 1: some of the physical and chemical characteristics of the soil before planting field

	Location		
	.ThiQar	.Muthanna	
	7.78	7.4	PH
ds/m^2	5.2	4.7	Electrical conductivity
cmmol. Kg $^{-1}$ soil	20	23.8	Exchange capacity of the positive ions
g/kg soil	11.2	14.5	Organic matter
	1.7	1.5	Gypsum
	300.4	285	Lime
	118	110	Sand
	600	560	Silts
	290	330	clay
mg//kg soil	55	63	Ready Nitrogen
	11.6	13.4	Ready Phosphorus
	255	235	Ready Potassium
	3.2	4.3	Ready Iron
	4.5	6.1	Ready Manganese

3. Results and Discussion

The table shows (2) that the levels of Fe-EDTAadded does not have a significant effect on the plant wheat height in the two varieties (ThiQar and Muthanna) while the treatments cultivated excelled in ThiQar province has increased to rise by 10% planted treatments in the province of Muthanna and reached above in 100 in the treatment of ThiQar (86 cm) did not appear between iron levels and my experience any significant effect on plant height.

Table 2: shows the effect of adding Fe-EDTA in plant height (cm)

average	location		Fe-EDTA
	Muthanna	ThiQar	
74.22	72.10	76.33	0
77.56	73.12	82.00	50
81.70	77.40	86.00	100
77.00	73.00	81.00	150
	73.91	81.33	average
Location* Fe	location	Fe-EDTA	L.S.D0.05
ns	4.1	ns	

The effect of Adding Fe-EDTA in the number of the branches

Results showed in a table (3) that there is a significant increase in the branches where the treatment (added 150 mg /L)beats on other treatments in both locations while significant difference was not among the added level of 50-100 mg / L with the comparative treatment and the number of the branches above when the level of 150 mg / L in the province of ThiQar (8.33) branch has been attributed to the iron's role in increasing the efficiency of the process of photosynthesis by increasing the content chlorophyll in the plant in addition to its role in the formation of many important compounds in the process of photosynthesis, such as Alsaitokromat and Elvirodoksenat this result is consistent with Yusuf and Abdul Redha,(1988) and Ali (2006) there appears significant effect between my experience as well as the interaction between the treatments.

Table 3: The effect of adding Fe-EDTA in the number of theBranches:

average	location		Fe-EDTA
	Muthanna	ThiQar	
5.08	4.77	5.33	0
5.27	4.90	5.63	50
6.03	5.55	6.50	100
7.52	6.70	8.33	150
	5.48	6.46	average
Location* Fe	location	Fe-EDTA	L.S.D0.05
ns	ns	2.02	

The effect of adding Fe-EDTA in the number of spikes/m:

The results shown in the table (4) that there is a significant increase in the number of spikes per square meter compared to the comparative treatment of iron added to increase, reaching levels (05/10/10)% of the levels(50. 100-150)mg / L of Fe-EDTA , respectively, compared to the treatment and control in ThiQar province in the province of Muthannasignificant increase in the number of spikes per square meter reached in relation to the treatment of comparative increase the added iron levels as increased by (06.09.10)% of the levels (50-100-150) mg / L of Fe-EDTA , respectively, and compared to the treatment control and for my experience surpassed cultivated treatments in the province of ThiQarsignificantly planted treatments in the province of Muthanna, the increase amounted to 15%, while there were not differences significant in the interaction between the levels of Fe-EDTA and my experience.

Table 4: The effect of Fe-EDTA adding in the number of spikes m^{-1}**:**

average	location		Fe-EDTA
	Muthanna	ThiQar	
114.50	110.00	119.00	0
120.83	116.00	125.67	50
124.75	120.00	131.50	100
126.33	122.00	131.67	150
	117.00	139.21	average
Location* Fe	location	Fe-EDTA	L.S.D0.05
ns	8.2	4.3	

The effect of Fe-EDTAadding at the flag leaf area (cm^2):

Results shown in the table (5) that the level of Fe-EDTA added 100 mg / liter significant effect in increasing the flag leaf area compared to other treatments amounted to above in this treatment 37.1 and 33 cm^2 in the provinces of ThiQar,andMuthanna, respectively, cultivated treatments excelled in ThiQar province significantly on cultivated treatments in the province of Muthanna and 13% rate of increase in the average flag leaf area in the province of ThiQarhigher than Muthanna province, while there were no significant differences in levels of interaction between the Fe-EDTA and my experience.

Table 5: shows the effect of Adding Fe-EDTA at the flag leaf area (cm^2)

average	location		Fe-EDTA
	Muthanna	ThiQar	
18.15	16.10	20.20	0
19.40	17.20	21.61	50
35.05	33.00	37.10	100
23.35	23.00	23.70	150
	22.33	25.65	average
Location* Fe	location	Fe-EDTA	L.S.D0.05
ns	2.03	4.16	

The effect of Adding Fe-EDTA in the number of grains/ spike:

The table shows (6) that the Fe-EDTA levels (100-150) mg / L significant effect in increasing the number of grains/spike first level 50 mg / L and the treatment of control has increased the proportion of the number of grains (33-25%) compared to the treatment control.

The results showed no significant differences in the number of grains/spike between my experience as well as the results of interaction.

Table 6: shows the effect of Adding Fe-EDTA in the number of grains/ spike

average	location		Fe-EDTA
	Muthanna	ThiQar	
41.77	40.20	43.33	0
42.17	39.00	45.33	50
60.81	57.12	64.50	100
57.55	58.10	57.00	150
	48.61	52.54	average
Location* Fe	location	Fe-EDTA	L.S.D0.05
ns	ns	6.45	

The effect of Adding Fe-EDTA in 1000 grains (g)

The table shows (7) that the iron levels claw added significant effect in increasing 1000-grain weight as the increase ratios (34-34-36%) of levels (50-100-150) mg / L, respectively, compared to the treatment control is due to the role of iron effective in giving up and building many of the components in the plant and the necessary enzymes and this has been confirmed by several studies in Plant Physiology ,. Havlin(1999) This is consistent with the (Jarallah, 2005) who pointed out that increasing the levels of addition of iron led to increased 1000-grain weight and are significant and which attributed the cause of those big response in the plant holds wheat indicators, including the 1000-grain weight to a lack of iron content in the ready-media growth used in the study. Cultivated treatments Excelled in the province of ThiQar significantly cultivated on treatments in the province of Muthannaby 25-24-21% rate of increase in the average weight of 1000 grain and levels (50-100-150) mg / L, respectively, compared to the treatment control in ThiQar province by province in Muthanna there was also a significant difference in the interaction between the levels of Fe-EDTA and my experience was high value of interaction 54.44 g at a level of 150 mg / L in the provinces of ThiQar, Muthanna, respectively.

Table 7: The effect of adding Fe-EDTA in 1000 grains (g(

average	location		Fe-EDTA
	Muthanna	ThiQar	
35.17	35.00	35.33	0
46.50	40.00	53.00	50
47.75	42.00	53.50	100
49.30	44.60	54.00	150
	40.40	48.96	average
Location* Fe	location	Fe-EDTA	L.S.D0.05
3.4	6.1	4.62	

The effect of Adding Fe-EDTA in the grain yieldtons /ha:

Results showed in the table (8) that there was a significant increase in grain yield compared to compare the treatment of iron added to increase, reaching levels (35-49-52)% levels (50-100-150) mg / L of Fe-EDTA respectively compared to the treatment control. This due to the sum of grain with increasing iron concentration to the role of iron in the manufacture of chlorophyll as well as being a component synthesis of Ferredoxin (the first electronic transport chain to the process of photosynthesis (1993 Tisdal, al et), which was reflected in the increased outputs of photosynthesis and distribution to reproductive parts and this is what I agree with him (Ali 2006) cultivated treatments excelled in ThiQar province significantly cultivated on treatments in the province of Muthannaby17-35-44-28% rate of increase in the average grain levels (0-50-100- 150) mg / L, respectively, in the province of ThiQarhigher thanMuthanna province, while there were no significant differences in levels of interaction between the Fe-EDTA and my experience.

Table 8: Shows the effect of adding Fe-EDTA in the grain yield tons/ha

average	location		Fe-EDTA
	Muthanna	ThiQar	
1.76	1.60	1.92	0
2.41	1.90	2.91	50
3.06	2.20	3.91	100
3.46	2.90	4.01	150
	2.15	3.19	average
Location* Fe	location	Fe-EDTA	L.S.D0.05
ns	0.27	0.78	

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