

INTERACTION OF FOLIAR NUTRIENTS AND HERBICIDES INTO PRODUCTION

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ABSTRACT

A field trial was carried out at the fields of Baghdad University - Jadriya for the first location during the summer season of 2018, while the second location was in Mishkab Rice Research Station, Al-Najaf al-ashraf governorate during the summer season of 2019. This study was aimed investigate rice (*Oryza sativa* cv. Anber) response to foliar application of nutrition with the use of different herbicides. The design was RCBD within using split plot arrangement four replicates. The nutrition treatments; (Humic acide, Seaweed, Nano fertilizer, Normal fertilization and Without fertilizer) were in main plots. Herbicides treatments (Ronstar, Oscar, Rainbow, Super flag, weed free and weedy) occupied the sub plots. The results indicated that Ronstar herbicide was superior in giving the lowest average weeds density value 6.55 and 9.60 plant m⁻² respectively, and highest average of grain yield was 2.53 and 3.42 t.h⁻¹, respectively. The normal fertilization treatment was superior gave the highest average grain yield value 3.07 and 4.13 t h⁻¹. As for the effects of interaction, the Ronstar combination with normal fertilization gave highest grain yield value 3.55 and 4.59 t h⁻¹, respectively. Concluded from this trial that the Ronstar herbicide is the best among the herbicides used with different fertilization treatments by achieving the highest averages with most of the studied characteristics.

Key word: Herbicides, humic acide, nano fertilizer, rice weeds, grain yield

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تداخل المغذيات الورقية ومبيدات الادغال واثرها في انتاج الرز

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مدرس

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المستخلص

نفذت تجربة حقلية في حقول كلية علوم الهندسة الزراعية - جامعة بغداد - الجادرية للموسم الصيفي 2018 وأعيد تنفيذها في محطة أبحاث الرز في المشخاب/ محافظة النجف الاشراف التابعة الى دائرة البحوث الزراعية خلال الموسم الصيفي 2019. بهدف دراسة تأثير تداخل مبيدات ادغال مختلفة مع التغذية الورقية في صفات النمو والحاصل ومكوناته للرز صنف عنبر-33 فضلاً عن صفات الادغال. استعمل تصميم القطاعات الكاملة المعشاة بترتيب الألواح المنشقة وبأربعة مكررات. مثلت معاملات التغذية الألواح الرئيسية (حامض الهيومك والطحالب والتسميد النانوي والتسميد الاعتيادي و بدون سماد)، بينما ضمت معاملات مبيدات الادغال الألواح الثانوية (الرونستار والاوسكار والرنيبو والسوير فلاك ومعاملة غياب الادغال و المعاملة المدغلة). بينت النتائج تفوق المبيد رونستار بعد 108 يوماً من الزراعة بتحقيق اقل متوسط لكثافة الادغال (6.55 و 9.60 نبات م⁻²) وأعلى حاصل للحبوب (2.53 و 3.42 طن ه⁻¹). تفوقت معاملة التسميد الاعتيادي بتحقيق اعلى متوسط في حاصل الحبوب (3.07 و 4.13 طن ه⁻¹) اما فيما يخص تأثيرات التداخل فقد اعطت توليفة الرونستار مع التسميد الاعتيادي اعلى حاصل الحبوب (3.55 و 4.59 طن ه⁻¹). يُستنتج من هذه التجربة ان المبيد رونستار هو الأفضل من بين المبيدات المستعملة مع معاملات التسميد المختلفة بتحقيق اعلى متوسطات مع غالبية الصفات المدروسة.

الكلمات المفتاحية: مبيدات لادغال، الهيومك اسد، التسميد النانوي، ادغال الرز، حاصل الحبوب

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INTRODUCTION

The optimal use of fertilizers and management of the weeds is very important for rice grown by the dry direct seeded rice (DDSR) method, just as in the management of the weed, unbalanced fertilization leads to a reduction in yield, and the use of inappropriate fertilizer doses leads to an increase in the height of the weeds plants as well as stimulating their distribution into rice fields, the integration of information on the effect of fertilization and weed management on rice grown by the DDSR method may be beneficial in achieving the highest yield and reducing production costs (25). Rice grown by DDSR is more likely to lose grain yield due to the presence of weeds compared to the seedling method, and the weeds effect is not only limited to reducing the yield, but also in poor quality (10). The yield grain of DDSR is reduced from 35 to 91% depending on water and fertilizer management (30). Maximum utilization of production sources especially with the use of nanofertilizers and the enhancement of photosynthesis efficiency can reduce the environmental risks associated with the excessive application of chemical fertilizers (24). With the progress of the development in the agricultural field and the emergence of modern types of fertilizers that are used as a spray on the shoot, especially since the time of the first addition is at times coinciding with the dates of weeds control, it became necessary to know the presence or absence of interaction between the chemicals used (herbicides and nutrients) and since there are types There are

many herbicides and many types of nutrients, and may be there some of them interaction. The experiment was aimed to study of the interaction of leaf nutrients with herbicides in giving the best yield for rice (cv. Anbar-33) and knowing the real effect of different types of nutrients separately from conventional fertilizers.

MATERIALS AND METHODS

A field experiment was carried out at the College of Agricultural Engineering University of Baghdad the first season / Al-Jadriya on 23/6/2018 and it was re-implemented for the second season on 6/7/2019 at the Rice Research Station in Al-Mishkhab / Najaf Al-Ashraf Governorate affiliated to the Agricultural Research Department / Ministry of Agriculture. The Rice Research Station in Al-Mishkhab / Najaf Al-Ashraf Governorate affiliated to the Agricultural Research Department / Ministry of Agriculture. The experiment aimed to study the interaction of the types of leaf nutrients with weeds herbicides to give the best yield for rice (cv. Anbar-33). Before the implementation of the experiment, random soil samples were taken in different areas of the experiment field at a depth of 0-30 cm for the purpose of studying the physical and chemical properties of the soil, the samples were soil was analyzed and the ratio of soil separations and soil texture, soil interaction pH and the degree of electrical conductivity EC in the laboratories of the College of Agricultural Engineering Sciences - Baghdad University. (Table 1).

Table 1. Some physical and chemical properties of the experiment soil

Type of analysis	measruing unit	Value in the first season 2018	Value in season two 2019
PH	-	7.12	7.80
EC	(ds.m)	3.30	4.20
N	mg kg ⁻¹	25.11	12.00
P	mg kg ⁻¹	8.35	2.18
K	mg kg ⁻¹	80.71	93.12
Ca	mg L ⁻¹	18.10	13.00
Mg	mg L ⁻¹	10.41	12.05
Na	mg L ⁻¹	3.89	1.50
Cl	mg L ⁻¹	28.22	20.15
HCO ₃	mg L ⁻¹	2.10	1.20
SO ₄	mg L ⁻¹	2.56	3.13
CaCO ₃	mg L ⁻¹	31.10	13.01
O. M	%	71	85
Sand	%	37.20	20.40
Clay	%	13.14	32.40
Silt	%	49.66	47.20

The experimental field was plowed by the tipping plow and smoothing operations were carried out by means of a rotary smoothing and leveling of the ground using a leveling machine according to the recommendations. The experiment was carried out according to a Randomized Complete Block Design with Split Plot arrangement. The feeders occupied the main plots, while the herbicides occupied the secondary plots with four replications. The field was divided into experimental units of 4m² (2m x 2m). The seeds were sown by Direct Dry Seeded Rice (DDSR) method on 15 cm lines between lines, at seeding rate of 120 kg h⁻¹. Each plot included 13 lines with length of 2 m, with weight of 3.7 g per line. The experiment parameters for the main panels included: 1- Nanofertilizer (liquid) sprayed on the shoots at a rate of use of 6 liter h⁻¹ containing (N:8%, P: 6%, K: 5%, Mg: 120ppm, Mn: 160ppm, Fe: 5000 ppm, Zn: 6000 ppm, Cu: 160ppm. 2-Humic acid sprayed on the shoot at a rate of use of 9 liter h⁻¹ containing [Humic crystal (Humic + Folic acid) 25%, Potassium oxide (K₂O) 5%, N: 3%, Organic matter 40% and Fulvic acid 15%]. 3- Marine algae sprayed on the shoots at a rate of use of 12 liter h⁻¹ containing (Seaweed Extract 16%, N:0.1%, P:1.5%, Organic matter 7% and K: 2.5%). 4-traditional fertilization (DAP fertilizer was added at a rate of 120 kg h⁻¹ when preparing the soil, and nitrogen fertilizer at a rate of 280 kg h⁻¹ added in the form of urea (46 N%) (comparison treatment). 5- Without adding fertilizer (Comparison). Urea and foliar fertilizers were added according to their treatments in three batches. The herbicide treatments included 1- Ronstar herbicide (Oxadiazon 25%), with an application rate of 2400 cm³h⁻¹ (comparison). 2- Oscar herbicide (Bispyribac sodium 10%), with a rate of use of 400 cm³ h⁻¹. 3- Rainbow herbicide (Penoxsulam 15%) with a rate of use of 1000 cm³ h⁻¹. 4- Super flag herbicide (Fenoxaprop + Azimsulfuron 50 +6.7), with an

application rate of 100 gm h⁻¹. 5- weed free. 6- Weedy (Control) treatment. A hand sprinkler was used that was calibrated on the basis of adding 400 liters of water per hectare to both herbicides and nutrients. The herbicides used in the 2-3-leaf stage (23 days from planting) were sprayed to control weeds broad-leaved and weeds narrow-leaved, except for the herbicide Ronstar was added after 2 days of planting (after planting before emergence) as a comparative herbicide, The studied characteristics were of weeds density (plant m⁻²), plant height cm, number of panicles, number of panicle grain, 1000 grains weight (g) and grain yield (ton h⁻¹). use of the lowest significant difference below the probability level of 5%. To method of analysis of variance, and the diagnose statistical differences were analyzed statistically by the between the arithmetic means of the data treatments the result Steel and Torrie (29), using the computer, within the program Genstat-Version (7).

RESULTS AND DISCUSSION

Weeds kinds

The results of the first season, which shows in Table 2, indicate that leafed weed species are the most diverse in the experiment and for both seasons, despite the variation of the species spread in the two seasons, and these was a result of the difference in location between the first season and the second season, but there are types of weed plants accompanying for the rice crop, regardless of the change of location, with variation in the plant density of the weeds of the same type, and it was shown that the weeds of *Echinochloa colonum* (L) Link., *Echinochloa crus-galli* L., and *Paspalum distichum* L are widespread in the two locations. This result is in agreement with (23) in that the thin weeds come at the forefront of the most widespread and most dangerous and competitive weeds of rice.

Table 2. Types of weeds spread in the experiment for the first and second seasons

English name	The scientific name	the family
The weeds of narrow leaves in the first season		
Panic grass	<i>Echinochloa colonum</i> (L) Link.	Poaceae
Barnyard grass	<i>Echinochloa crus-galli</i> L.	Poaceae
Egyptian crowfoot grass	<i>Dactyloctenium aegyptium</i> (L.) Willd	Poaceae
Paspalum	<i>Paspalum distichum</i> L	Poaceae.
Bermuda grass	<i>Cynodon dactylon</i> L.	Poaceae
Large crab grass	<i>Digitaria sanguinalis</i> (L). Scop	Poaceae
The weeds of broad leaves in the first season		
Gratiola	<i>Portulaca oleracea</i> L.	Portulacaceae
Mat amaranth	<i>Amaranthus blitoides</i> S. Wats.	
Amaranthaceae		
Fild bind weed	<i>Convolvulus arvensis</i>	
Convolvulaceae		
Prikly liquorice	<i>Alhagi maurorum</i> L.	Fabaceae
The weeds of narrow leaves in the two season		
Panic grass	<i>Echinochloa colonum</i> (L) Link.	Poaceae
Barnyard grass	<i>Echinochloa crus-galli</i> L.	Poaceae
Paspalum	<i>Paspalum distichum</i> L.	Poaceae
Sabat	<i>Diplanche fusca</i> (L) Beaur.	Poaceae
The weeds of broad leaves in the first season		
false daisy	<i>Eclipta prostrata</i> L.	Asteraceae
Coffee bean	<i>ASesbania herbacea</i> L	Fabaceae

The effect of herbicides, fertilization, and the interactions on weeds density

It is evident from the results of Table 3 that the herbicide Ronstar was superior by achieving the lowest average density of weeds value 6.55 and 9.60 plants m², significantly outperforming on the weedy treatment, as it gave the highest average for the characteristic value 52.45 plants m². The decrease, are attributed to the efficiency of the herbicide Ronstar in affecting early emergence of weed species seeds without giving a chance to emergence and grow, especially in the early stages of growth. These results are in agreement with the results of other researchers (1, 5, 9, 11, 12, 15, 20) they showed that the use of herbicides led to a significant decrease in density of the weeds. The fertilization results at the first season show in Table 3, it reveal that the nanofertilization treatment gave the lowest density of the weeds value 13.58 plants m⁻² and did not differ from the humic acid treatment and the treatment without fertilizer compared to the traditional fertilization as it gave the highest average for the characteristic value 19.38 plants m⁻², Which did not differed from algae, but in the second season, the humic acid treatment was significantly superior to achieving the lowest average in the total density of the weed, 12.25 plants m⁻² and

did not differentiated from the treatment without fertilizer compared to the traditional fertilization treatment, as it gave the highest average value 17.04 plants m². The reason may be due to the effectiveness of the total herbicides within the humic acid fertilization, meaning that the treatment of humic is less inconsistent with the action of the herbicides within it, or perhaps adding humic has increased the effectiveness of the herbicides against weed plants. In the first season, after 108 days of planting, the interaction indicates the superiority of the herbicides Oxadiazon in treating algae by achieving the lowest significant value in weed density avalue 2.75 m⁻² plants, respectively, while the highest density of the weed interaction the fertilized treatment with nanofertilizer of 65.25 plants m⁻², respectively. The reason for the decrease in the weeds may be due to the absence of negative interaction (inconsistency) between the action of the herbicide Oxadiazon and the treatment of adding humic, which was reflected in a decrease especially that the herbicide was added to the soil before emergence. As for the second season, it was explained by the interaction Oxadiazon within the nanofertilizer treatment was demonstrated significantly by achieving the lowest density of the weeds a value 4.25 plants m², respectively, compared to the weedy treatment

within nanofertilization, as it gave the highest value in the same two durations of 38.50 m², respectively, plant in succession. The reason for the decreases in the weeds may be due to the efficiency of the herbicide Oxadiazon in affecting a higher rate of emergence of weed

seed, as there is no negative interaction between the action of the herbicide Oxadiazon and the treatment of nanofertilizer, which was reflected in the significant decrease in the density of the weed since the early stages of growth.

Table 3. The effect of herbicides and fertilization, and the interactions between them, on weeds density (plants m⁻²) after 108 days of planting

herbicides treatments	weed density 108 days after planting for the 2018 season					mean
	Nutrition treatments					
	Humic acid	Marine algae	Nano nutrition	Normal fertilization	Without fertilizer	
Ronstar	5.00	2.75	3.50	15.75	5.75	6.55
Oscar	16.00	15.25	10.75	8.75	5.00	11.15
Rainbow	10.25	15.75	12.25	11.25	4.50	10.80
Super flag	17.25	23.00	13.75	17.00	6.25	15.45
Weed free	0.00	0.00	0.00	0.00	0.00	0.00
Weedy	33.25	59.00	41.25	63.50	65.25	52.45
mean	13.63	19.29	13.58	19.38	14.46	
L.S.D. 5%	nutrition		Herbicides		nutrition * herbicides	
	1.42		1.42		3.17	
herbicides treatments	weed density 108 days after planting for the 2019 season					mean
	Nutrition treatments					
	Humic acid	Marine algae	Nano nutrition	Normal fertilization	Without fertilizer	
Ronstar	5.50	8.75	4.25	18.25	11.25	9.60
Oscar	6.75	16.00	11.50	15.00	7.25	10.30
Rainbow	9.25	15.00	15.50	16.75	7.75	12.85
Super flag	13.75	17.50	15.50	17.50	12.25	15.30
Weed free	0.00	0.00	0.00	0.00	0.00	0.00
Weedy	38.25	37.75	38.50	34.75	35.50	36.95
mean	12.25	15.83	14.21	17.0	12.33	
L.S.D. 5%	Nutrition		Herbicides		nutrition * herbicides	
	0.74		0.95		2.06	

Plant height

It is evident from the results of Table 4 that the herbicide Ronstar was superior in the first season and the herbicide Oscar in the second season in significance by achieving the highest rice height of 90.8 and 111.1 cm for the two seasons in respectively, superior to the weedy treatment, as it gave the lowest value of the characteristic of 69.4 and 95.0 cm for the two seasons in the respectively, and there is no significant between the herbicide Ronstar and weed free. The reason may be due to the effect of the herbicides in reducing the density of weeds (Table 3), which provided an appropriate opportunity for the crop plants to grow without severe competition. On the contrary, for the herbicide treatment, as the weeds are widely spread and the crop plants are highly competitive on the different growth requirements. These results are in agreement with the results of other researchers (2, 24,

28), they showed a significant increases in plant height when using herbicides, while Al-Ziady et al. (6) showed that there were no significant differences in plant height when using herbicides. As for nutrition at the first season and shows in Table 4, it was found that the normal fertilization treatment gave the highest plant height with an average value 104.8 and 117.1 cm for the two season respectively, in succession compared to all other treatments, while the treatment without fertilizer gave the lowest average for the characteristic with an average of 70.1 and 98.1 cm for the two seasons, respectively. This result explains that the normal fertilization treatment it has an abundant amount of the two basic N and P elements to increase the plant height, while the crop plants remain lower when the fertilizer is not added due to the lack of the necessary mineral elements necessary for growth in the soil of the experiment except

with a small amount that does not enable it to grow at its full potential. These results did not in agreement with Osman et al. (20) and Kheyri et al. (18) who indicated that organic and mineral foliar fertilizers lead to a significant increase in plant height compared to the normal fertilization treatment, nor are they consistent with Aljutheri et al (4) who They indicated that there were no significant differences between mineral and organic foliar fertilizers compared to normal fertilization. The interaction indicates to the superiority of Oscar in the treatment of normal fertilization, as the highest significant value in plant height

was recorded at 108.2 and 122.2 cm for the two seasons respectively, compared to the weedy with no fertilizer, which gave the lowest plant height of 55.9 and 93.5 cm for the two seasons, respectively. This is due to the abundance of nutrients necessary for growth and the increase in the normal fertilization treatment, and on the contrary, the treatment without fertilizer suffers with weedy due to the scarcity of the presence of nutrients on the one hand and to the intense competition by weed plants on the other hand, as this treatment gave the highest density of the weeds (Table 3).

Table 4. The effect of herbicides and nutrition and the interaction between them on plant height (cm).

herbicides treatments	plant height for the 2018 season					mean
	Nutrition treatments					
	Humic acid	Marine algae	Nano nutrition	Normal fertilization	Without fertilizer	
Ronstar	87.3	80.7	81.9	107.3	96.6	90.8
Oscar	65.1	78.6	82.3	108.2	69.6	80.8
Rainbow	63.4	59.5	81.6	106.7	66.8	75.6
Super flag	66.4	72.8	69.4	102.2	54.9	73.1
Weed free	77.9	91.0	82.7	113.8	76.5	88.4
Weedy	63.5	73.6	63.4	90.5	55.9	69.4
mean	70.6	76.1	76.9	104.8	70.1	
L.S.D. 5%	Nutrition 6.30		Herbicides 4.87	nutrition * herbicides 11.48		
herbicides treatments	plant height for the 2019 season					mean
	Nutrition treatments					
	Humic acid	Marine algae	Nano nutrition	Normal fertilization	Without fertilizer	
Ronstar	108.0	105.0	104.0	120.0	107.0	108.4
Oscar	107.2	102.8	111.2	122.2	112.0	111.1
Rainbow	95.2	103.5	111.2	115.0	102.0	105.4
Super flag	99.5	93.4	102.2	120.8	107.2	104.6
Weed free	114.5	97.8	112.2	123.2	108.8	111.3
Weedy	92.8	86.2	101.2	101.5	93.5	95.0
mean	102.9	98.1	106.7	117.1	105.1	
L.S.D. 5%	Nutrition 7.17		Herbicides 3.36	nutrition * herbicides 9.60		

Number of rice panical (M^2)

It is evident from the results of Table 5 that the herbicide Ronstar excelled by achieving the highest value of the number of panicles of the rice crop in the first season, which mean 339.0 panical m^{-2} , and it was not significantly different from the super flag, while in the second season, the herbicide superior Oscar by achieving the highest number of panicles by an mean of 318.0 panical m^{-2} , significantly superior to the weedy, as it gave the lowest mean for the characteristic 295.2 and 243.3 panical m^{-2} for the two seasons on, respectively. This is attributed to the effect of

the Ronstar herbicide in reducing the density of weeds (Table 3), which provides a more favorable opportunity for crop plants to grow without intense competition, and thus encourages them to produce the highest number of panicles by increasing the number of effective tillers, on the contrary, in the comparison treatment, as the weeds dominate greatly and high competition with crop plants for different growth requirements. These results were consistent with the results of other researchers (7, 14, 24) indicated a significant increase in the number of panicles when using herbicides compared to the

weedy. As for fertilization, it is noticed that the normal fertilization treatment recorded the highest number of panicles which reached 401.9 and 358.8 panical m^{-2} for the two seasons in respectively, compared to the treatment without fertilizer, as it gave the lowest average for the characteristic 300.2 and 249.7 panical m^{-2} for the two seasons in respectively, and this effect is attributed to the efficiency of normal fertilizer due to the abundance of the two elements N and P necessary to give better growth and as a result an increase in the total number of panical, while not adding fertilizers necessarily led to A decrease in the number of total panicales as a result of the absence of the nutrients necessary for the emergence and tillers growth, which led to the reduction of the number of panicles. This result is not in agreement with Al-Jubouri et al. (3) as they found no significant differences in the number of panicles when comparing types of organic fertilizers with normal fertilization. The interaction indicates the superiority of the Rainbow treatment with normal fertilization in the first season by registering the highest significant value in the number of panicles with a value of 406.9 panical m^{-2} , which does

not differ significantly from the two herbicides Ronstar and Super flag within the same fertilization treatment, while in the second season, the Oscar treatment within the normal fertilization was significant superioered by achieving the highest number panical 386.3 panical m^{-2} . As for the lowest number of panicles, it was in the interaction of the weedy treatment with a treatment without fertilizer, with means to 255.6 and 187.7 panical m^{-2} for the two seasons, respectively. The increases in the treatment of Rainbow with normal fertilization and Ronstar with normal fertilization is due to the decrease in competition due to the effect on the density of the weeds and on the other hand to the abundance of nitrogen and phosphorus, which are two basic elements in plant growth which is reflected in the increase in tillers and the resulting increase in the number of panicles. On the contrary, the decrease in the number of panicles in treatment of not adding fertilizer came from non-addition of nutrients on the one hand and to intense competition by weed plants on the other hand, which gave this treatment the highest density of the weed (Table 3).

Table 5. The effect of herbicides and fertilization and the interaction between them on the number of rice panicles (m^2).

herbicides treatments	number of rice panicles for the 2018 season					mean
	Nutrition treatments					
	Humic acid	Marine algae	Nano nutrition	Normal fertilization	Without fertilizer	
Ronstar	315.0	313.1	340.0	398.7	328.1	339.0
Oscar	260.6	301.9	294.4	368.1	321.2	309.2
Rainbow	315.0	293.7	261.9	406.9	291.9	313.9
Super flag	343.3	318.8	273.1	401.9	296.9	326.8
Weed free	341.2	328.7	361.7	494.6	307.3	362.3
Weedy	319.4	266.9	271.2	341.2	255.6	295.2
mean	315.8	303.9	300.4	401.9	300.2	
L.S.D. 5%	Nutrition		Herbicides		nutrition * herbicides	
	15.8		13.1		30.4	
herbicides treatments	number of rice panicles for the 2019 season					mean
	Nutrition treatments					
	Humic acid	Marine algae	Nano nutrition	Normal fertilization	Without fertilizer	
Ronstar	310.7	300.4	341.9	364.3	250.7	313.6
Oscar	323.9	284.4	349.5	386.3	245.7	318.0
Rainbow	318.8	292.5	263.6	332.0	270.4	295.5
Super flag	262.9	280.9	337.4	354.1	235.2	294.1
Weed free	346.9	306.1	357.0	388.4	288.6	337.4
Weedy	207.5	226.4	267.6	327.4	187.7	243.3
mean	291.8	281.8	319.5	358.8	249.7	
L.S.D. 5%	Nutrition		Herbicides		nutrition * herbicides	
	14.2		10.3		24.7	

Number of grains panical⁻¹

The results in Table 6 show a significant superiority of herbicide Ronstar recorded the highest number of panical grains, it reached 66.36 and 95.04 grain panical⁻¹ for the two season of the respectively, while the weedy treatment recorded the lowest average for the characteristic with an average of 47.30 and 72.66 grain panical⁻¹ for the two season of the respectively. The reason is due to the significant effect of the herbicide Ronstar in reducing the density of the weeds m², which is reflected in giving a suitable environment for rice plants to grow with less competition, in contrast to the conditions of intense competition with the weedy. This result was in agreement with the results of other researchers (7, 13, 14, 18, 24) who indicated that the use of herbicides leads to a significant increases in the number of grains panical⁻¹ compared to weedy. As for the fertilization treatments, the normal fertilization was significantly exceeded by achieving the highest number of grains in the panical with an average of 82.85 and 104.48 grain panical⁻¹, while the weedy treatment gave the lowest average for the characteristic in the first season of 48.18 grain panical⁻¹, and the humec treatment gave the lowest value for the characteristic at the second season, amounted 72.53 grain panical⁻¹ with no significant differences compared to the treatment of algae. It should be noted that the normal fertilization treatment led to a significant increase in the grain yield components, especially the number of panical grains, due to the rice plants obtaining the two elements nitrogen and phosphorus, which are of fundamental importance in giving the best crop growth compared to the types of foliar fertilizers as

well as the treatment without fertilizer. This result does not agree with Hamid and others (16), who explained that some of the organic fertilizers used led to a significant increases in the number of panical grains in the first season, and there was no significant differences between the other used organic fertilizers and the normal fertilization in the second season, which did not agree with Al-Jubouri and others (3). They found no significant differences in the number of panical grains when comparing types of organic fertilizers with normal fertilization. The results of the first season showed that there was a significant differences between the herbicides and fertilizers, as the herbicide Ronstar achieved within the normal fertilization the highest significant value in the number of panical grains , it reached 89.80 panical⁻¹), as shown in Table 7 that the herbicide Rainbow with nano-fertilization recorded the highest value in the number of panical grains of the two season , it reached 110.90 panical⁻¹, while the lowest value was for the interaction in the weedy treatment with no fertilizer, it reached 37.80 and 48.4 panical⁻¹. The reason is due to the effect of the herbicide Ronstar in the first season, the herbicide Rainbow in the second season in controlling the weed, with the presence of fertilizer in an adequate amount for growth, and the decrease in the number of panicals for the weedy treatment due to (Compensation Relationship) between the number of tillers and the number of grains in the components of the yield and that the number of grains is controlled by the available ready-made foodstuffs, the exact opposite is in the fertilized treatment without fertilizer.

Table 6. The effect of herbicides and fertilization and the interaction between them into number of panical grains

herbicides treatments	number of panical grains for the 2018 season					mean
	Humic acid	Marine algae	Nano nutrition	Normal fertilization	Without fertilizer	
Ronstar	70.20	53.10	63.00	89.80	55.70	66.36
Oscar	52.10	55.10	61.60	77.70	45.70	58.44
Rainbow	73.00	50.30	60.90	85.40	38.00	61.52
Super flag	47.90	34.40	54.00	76.80	40.90	50.80
Weed free	73.90	62.80	69.50	99.20	71.00	75.28
Weedy	39.10	40.40	51.00	68.20	37.80	47.30
mean	59.37	49.35	60.00	82.85	48.18	
L.S.D. 5%	Nutrition 3.3		Herbicides 3.2	nutrition * herbicides 7.2		
herbicides treatments	number of panical grains for the 2019 season					mean
	Humic acid	Marine algae	Nano nutrition	Normal fertilization	Without fertilizer	
Ronstar	98.90	87.60	95.00	110.20	83.50	95.04
Oscar	104.00	89.40	93.90	108.80	72.20	93.66
Rainbow	76.50	89.40	110.90	101.00	81.30	91.82
Super flag	74.60	60.00	106.00	95.10	68.90	80.92
Weed free	91.50	96.40	119.40	126.00	80.90	102.84
Weedy	78.10	61.60	89.40	85.80	48.40	72.66
Average	87.27	80.73	102.43	104.48	72.53	
L.S.D. 5%	Nutrition 7.8		Herbicides 5.9	nutrition * herbicides 13.9		

Thousand grain weight

The results of Table 7 indicate the superiority of the herbicide Ronstar by gave the highest average in the weight of 1000 grains value 19.58g, superior to the herbicide Rainbow as it gave the lowest average for the characteristic value 18.82 g and there was no significant differences compared to the weedy. The reason is due to the effect of the herbicide Ronstar in reducing the total density of the weeds (Table 3) without intense competition, which provided a good chance for rice plants to grow and this is what. It was reflected to the better filling of grains as a result of the efficiency of the source. In the second season, the herbicide rainbow was significantly superior by achieving the highest average in the weight of 1000 grains value 24.96 g It was significantly superior to the weedy treatment, as it gave the lowest average for the characteristic of 23.80 g .The reason may be due to the effect of the herbicide on the weeds density (Tables 3). This result is similar to with the reported by Al-Ziyadi and Al-Fatlawi

(7), Danmaigoro (13), Ghosh and others (14), Islam and others (16) and Riaz and others (24). As for fertilization, the data in Table 7 show that there were no significant differences in the weight of 1000 grains of rice between all fertilizer treatments and for both two seasons. The interaction indicates the superiority of the treatment of Ronstar with nano fertilization at the first season by registering the highest significant value in the 1000 weight of grains reached 20.14g, while the minimum weight of 1000 grains was 18.14g into the interaction of the weedy treatment with the without fertilizer. The increase in the Ronstar treatment with regular fertilization is due to the decrease in competition due to the effect on the density of the weeds and on the other hand the abundance of nitrogen and phosphorous necessary for plant growth and improvement of the source. In the second season, no significant differences were found when the herbicides interacted with nutrients.

Table 7. The effect of herbicides and fertilization and the interaction between them into the 1000 grains weight

herbicides treatments	weight of 1000 grains for the 2018 season						
	Nutrition treatments					mean	
	Humic acid	Marine algae	Nano nutrition	Normal fertilization	Without fertilizer		
Ronstar	19.33	20.06	20.14	19.75	18.64	19.58	
Oscar	19.14	18.64	19.25	19.99	18.94	19.19	
Rainbow	18.70	18.29	18.27	19.60	18.70	18.71	
Super flag	19.67	18.54	18.46	19.27	20.02	19.19	
Weed free	19.78	19.60	19.27	18.85	19.18	19.34	
Weedy	18.65	18.75	19.20	19.36	18.14	18.82	
mean	19.21	18.98	19.10	19.47	18.94		
L.S.D. 5%	Nutrition NS		Herbicides 0.53		nutrition * herbicides 1.15		
herbicides treatments	weight of 1000 grains for the 2019 season						
	Nutrition treatments					mean	
	Humic acid	Marine algae	Nano nutrition	Normal fertilization	Without fertilizer		
Ronstar	24.00	23.90	23.60	25.20	24.60	24.26	
Oscar	24.40	24.60	24.20	25.80	25.50	24.90	
Rainbow	24.00	25.30	25.30	25.50	24.70	24.96	
Super flag	24.20	23.10	22.80	24.40	23.40	23.58	
Weed free	25.20	24.40	25.60	25.90	25.60	25.34	
Weedy	23.20	23.80	24.70	24.20	23.10	23.80	
mean	24.17	24.18	24.37	25.17	24.48		
L.S.D. 5%	nutrition NS			Herbicides 0.79		nutrition * herbicides NS	

Grain yield

It is evident through the results of the first season 2018 and shows in Table 8 that the herbicide, Ronstar outperformed by registering the highest average in the grain yield of rice, 2.53 and 3.42 tons h⁻¹ for the two season respectively, superior on the weedy treatment as it gave the lowest average for the characteristic of 1.58 and 2.49 tons tons h⁻¹ for the two season respectively, with an increase of 38% and 29% respectively. The reason is due to the effect of the herbicide Ronstar in reducing the density of weeds (Table 3). This result was in agreement with the results of other researchers (2, 7, 8, 11, 22, 24, 27) as their results showed a significant increase in the yield of rice grains when using herbicides. As for fertilization result of Table 7 shows that the normal fertilization treatment recorded the highest average grain yield of rice value 3.07 and 4.11 tons h⁻¹ for the two season respectively, compared to the treatment without fertilizer in the first season and the algae treatment in the second season, which gave the lowest average for the characteristic 1.56 and 2.76 tons tons h⁻¹ respectively, with an increases in grain yield of 48% and 46%,

respectively. The significant increases in grain yield is explained by the availability of nutrients, as normal fertilization contains a greater amount of the two elements N and P, which are necessary for the growth of the crop, as it gave the highest number of panical and panical grains (Table 5, 6). This result is of this study in agreement with Aljutheri et al. (4), who showed that the use of Super Micro Plus nanofertilizer significantly increased the grain yield, while, the results are not in agreement with Osman et al. (21), whose results showed that the organic fertilization treatments were significantly superior to humic by giving the highest value of the trait in comparison to normal fertilization. The interaction, was observed that the herbicide Ronstar was significantly superior within normal fertilization by achieving the highest grain yield of 3.55 and 4.59 tons h⁻¹, and it did not differ significantly with Oscar and Rainbow within the same fertilization treatment compared to the treatment with humic as it gave The lowest value of 1.08 and 2.29 tons is h⁻¹, as the increases reached 50%. The increase the treatment of Ronstar with normal fertilization is due to the decreases in

competition due to the effect on reducing the density of the weeds (Table 3).

Table 8. The effect of pesticides and fertilization and the interaction between them on grain yield (ton h⁻¹).

herbicides treatments	grain yield for the 2018 season					mean
	Nutrition treatments					
	Humic acid	Marine algae	Nano nutrition	Normal fertilization	Without fertilizer	
Ronstar	1.88	2.58	2.44	3.55	2.21	2.53
Oscar	1.45	1.71	2.52	2.49	1.81	2.00
Rainbow	1.57	1.67	2.37	3.12	1.09	1.96
Super flag	1.43	1.64	1.56	3.01	1.14	1.76
Weed free	2.92	2.34	2.04	3.80	2.05	2.63
Weedy	1.40	1.53	1.46	2.43	1.08	1.58
mean	1.78	1.91	2.07	3.07	1.56	
L.S.D. 5%	Nutrition		Herbicides		nutrition * herbicides	
	0.23		0.12		0.32	
herbicides treatments	grain yield for the 2019 season					mean
	Nutrition treatments					
	Humic acid	Marine algae	Nano nutrition	Normal fertilization	Without fertilizer	
Ronstar	2.99	2.98	3.72	4.59	2.82	3.42
Oscar	3.03	2.62	3.65	4.41	2.86	3.31
Rainbow	3.18	2.97	3.59	4.56	2.68	3.40
Super flag	3.42	2.45	3.54	3.64	2.83	3.18
Weed free	3.48	3.11	3.76	4.84	3.61	3.76
Weedy	2.29	2.43	2.67	2.60	2.48	2.49
mean	3.07	2.76	3.49	4.11	2.88	
L.S.D. 5%	Nutrition		Herbicides		nutrition *	
	herbicides		0.12		0.28	
	0.15					

It is concluded that herbicides vary in their effect on the weeds according to the type of active ingredient and their specialization in affecting species without others, in varying proportions. The early addition of the herbicide Ronstar gives an appropriate time in dealing with the weeds before they reach the vegetative stages, thus affecting the absorption of ready-made nutrients from the soil and competing with the crop plants. The presence of negative interference in the action of the added herbicides after emergence (2-3 leaves) with the leaf nutrients as they follow the same paths and with a close addition time. The presence of negative interference in the action of the added herbicides after emergence (2-3 leaves) with the leaf nutrients as they follow the same paths and with a close addition time. Regular fertilization is appropriate for the rice crop, through the superiority of this treatment by achieving the highest values in the grain yield and its components. Separate additions in spraying nutrients do not match the same dates

for additions for normal fertilization. Fertilization with algae is the least effect on the growth of rice and gives less results in most of the studied traits, and is closely related to a large extent with treatment without adding fertilizer. Nanofertilization is the best type of leaf nutrient involved in the experiment in most of the studied characteristics, which was reflected in achieving the highest value in the grain yield.

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