EFFECT OF PALM POLLEN,PUMPKIN EXTRACT, NANO FERTILIZER AND THEIR INTERACTIONS WITH WHEAT HERBICIDES

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ABSTRACT

This experiment was aimed to study the effect of the interaction of herbicides and varieties with different types of foliar nutrition in production the highest yield for three wheat varieties. A field experiment was carried out at the College of Agricultural Engineering Sciences - University of Baghdad / Jadiriyah for two seasons, as the seeds of the first season were sown on 13/12/2018 and harvested on 15/5/2019, and the seeds of the second season were sown on 4/12/2019 and harvested on 10/5/2020. The randomized complete block design (RCBD) was used in the arrangement of split plots, the nutrition included the main plots, while the varieties with herbicides treatments occupied the secondary plots with three replications. The treatment of V3H3 was significantly superior in achieving the highest average in the grain yield value 4.75 and 5.10 ton h^{-1} for the two seasons, respectively. As for the nutrition, treatment F3 gave the highest average in the grain yield amounted to 4.74 and 4.69 ton ha^{-1} for the two seasons, respectively. It could be concluded that V3H3 the best treatment to compete with the weeds by giving it the highest yield. Also, It is noted that the leaves feeding treatments all led to a significant increases in the yield and some of its components despite the normal fertilization treatment was the best treatment by giving it the highest grain yield and a significant increases in two of the yield components.

Key words:interaction, varieties, nutrition, pumpkin seeds and weeds

تأثير حبوب لقاح النخيل ومستخلص القرع والاسمدة النانوية وتداخلاتها مع مبيدات ادغال الحنطة

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المستخلص

هدفت التجربة الى دراسة تأثير تداخل معاملات مكافحة الادغال والاصناف مع انواع المغذيات الورقية في اعطاء افضل نمو وحاصل لثلاثة اصناف من الحنطة. نُفذت تجربة حقلية في كلية علوم الهندسة الزراعية– جامعة بغداد / الجادرية للموسمين اذ زرعت بذور الموسم الاول بتاريخ 13 / 12/ 2018 وحصدت في 15/ 5/ 2019، وزرعت بذور الموسم الثاني بتاريخ 4 / 12 / 2019 وحصدت بتاريخ 10/ 5/ 2020. استعمل تصميم القطاعات الكاملة المعشاة RCBD بترتيب الالواح المنشقة ، شملت الاسمدة الالواح الرئيسة فيما احتلت الاصناف مع معاملات مكافحة الادغال الالواح الثانوية بثلاثة مكررات. تفوقت معاملة V3H3 معنوياً بتحقيق اعلى متوسط في حاصل الحبوب اذ بلغ 4.75 و5.10 طن $هـ^{-1}$ للموسمين على التتابع قياساً الى المعاملة V1H1 التي اعطت اقل متوسط للصفة بلغ 3.57 و3.52 طن $هـ^{-1}$ للموسمين على التتابع. اما بالنسبة لمعاملات التغذية فقد اعطت المعاملة F3 اعلى متوسط لحاصل الحبوب بلغ 4.74 و4.69 طن $هـ^{-1}$ للموسمين على التتابع. يستنتج ان المعاملة V3H3 افضل المعاملات اذ اعطت اعلى حاصل. كذلك كانت معاملات التسميد الورقي قد تفوقت معنوياً على معاملة المقارنة على الرغم من ان معاملة التسميد الاعتيادي افضل المعاملات من خلال اعطائها اعلى حاصل حبوب وزيادة معنوية في اثنين من مكونات الحاصل.

الكلمات المفتاحية: التداخل، الاصناف، التغذية، بذور القرع، الادغال

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INTRODUCTION

The importance of the wheat crop is increasing due to the large amount consumed and increasing demands with the increasing population. Therefore, wheat occupies the first degree in the world production among all crops grown on the surface of the globe, as the global production rate for the year 2020 of the wheat crop reached 763.49 million tons for a cultivated area is 216.20 million hectares with an average yield of 3.53 ton h^{-1} (10), while in Iraq, the total area planted with wheat in the year 2020 reached 143.2 million hectares, producing 6.238 million ton with an average yield of 2.910 ton h^{-1} (7). The inputs of the crop are essential in producton a high grain yield, as the nutrients and fertilization are two cornerstones in the growth of crops. Fertilization is necessary to supply the plant with the elements required to activate the work of enzymes and the action of photosynthesis. The lack of addition of nutrients leads to a significant decreases in the growth and yield of wheat, and weed control is important great in reducing weeds competition for the crop on different growth requirements (water, nutrients, light and space), and since the wheat crop is the first in terms of the wide cultivated area, so the weeds cannot be controlled by mechanical control methods, but requires the addition of chemical herbicides, and when there are many types of nutrients fertilizer and other types of herbicides. This experiment was to study the presence or absence of interaction between nutrients and herbicides, as well as studying the effect of nutrients and herbicides independently.

MATERIALS AND METHODS

A field experiment was carried out at the College of Agricultural Engineering Sciences - University of Baghdad / Jadiriyah for two seasons, as the seeds of the first season were planted on 13/12/2018 and harvested on 15/5/2019. The seeds of the second season were sown on 4/ 12/ 2019 and harvested on 10/5/2020 The experiment was aimed to study the effect of the interaction of herbicides and variety treatments with different types of foliar fertilizers in production the highest yield for three variety of wheat (research 22(v1), Abu Ghraib (v2) and Babylon(v3)). Before carrying out the experiment, random samples of soil were taken from different areas of the experiment land for the two seasons at a depth of 0-30 cm for the purpose of studying the physical and chemical properties of the soil. They were analyzed in the laboratories of the College of Agricultural Engineering Sciences - University of Baghdad (Table 1). The experimental land was plowed and smoothing, and leveling operations were carried out according to the recommendations. The experiment was carried out according to a randomized complete block design in the order of split plots. The fertilizers included the main plots, while the varieties with control treatments occupied the secondary plots with three replications. The field was divided into experimental units with an area of 4 m^2 (2 m x 2 m). DAP fertilizer was added at a rate of 120 kg ha^{-1} when preparing the soil, and the seeds were sown on 15 cm between one and another lines at a seed rate of 120 kg. One plot included 13 lines with a length of 2 m. The experiment parameters for the main plots included: 1- palm pollen (F1) flour at a rate of use of 100g $liter^{-1}$ foliar application in two batches (after 30 and 60 days of planting) and according to the recommendations. 2- Nano fertilizer (F2) (liquid) with a foliar application rate of 5ml liters $liter^{-1}$: major and minor elements (N=8%, p=6%, k=5%, Mg=120ppm, Mn=160ppm, Fe=5000 ppm, Zn=6000, Cu=160ppm) spraying over the cover green vegetatine (Micro Plus). 3- Nitrogen fertilization(F3) with an added rate of 280 kg N h^{-1} in the form of urea (46 N%) according to the recommendations. 4- Pumpkin seeds(F4) flour at a rate of use of 100g $liter^{-1}$ foliar application in two batches (after 30 and 60 days of planting) and. 5- Control treatment(F5) free of fertilizer additives and herbicides.

Table 1. Physical and chemical properties of soil and its texture

type of analysis	measuring unit	value in the first season 2018-2019	value in second season 2019-2020
PH	-	7.2	7.2
EC	(ds.m)	2.0	2.2
N	mg kg^{-1}	78.3	52.30
P	mg kg^{-1}	12.25	8.05
K	mg kg^{-1}	120.7	123.00
Ca	mg L^{-1}	18.10	17.08
Mg	mg L^{-1}	10.41	11.05
Na	mg L^{-1}	3.89	3.50
Cl	mg L^{-1}	29.22	27.15
HCO_3	mg L^{-1}	2.10	2.20
SO_4	mg L^{-1}	2.56	3.03
$CaCO_3$	mg L^{-1}	31.10	31.01
O. M	%	71.0	69.5
Sand	%	36.20	36.20
Clay	%	17.20	18.20
Silt	%	47.60	46.20

As for the secondary plots, three varieties of wheat with weed control treatments included, 1- Quluex herbicide (H1) with a rate of use of 50 gm h^{-1} commercial material for weeds control of broad-leaved, and variety of wheat research-22 (v1). 2- Pallas (H2) with a rate of use of 90 gm h^{-1} commercial material and variety of wheat Abu Ghraib (v2). 3- mixture of the two herbicide (H3) Quluex 50% + Pallas 50% for control of broad-leaves weed and narraw-leaves weed and variety of wheat Babylon (v3). A hand sprinkler was used that was calibrated based on adding 400 liters of water per hectare. All herbicides used were sprayed at 3-4 leaves stage (25 days from sowing) to control of broad-leaves weeds and narrow-leaves weeds accompanying wheat. Table 2 shows the trade names and active ingredient of the two herbicides used in the experiment.

Table 2. Lists the trade names, common name and %active ingredient of the two herbicides

N	trade names	common name	%Active ingredient
1	Pallas	pyroxsulam	45
2	Quluex	florsulam+halauxifen-methyl	10+ 10.4

The weed types were identified and the characteristics of the density of broad-leaved weeds and narrow-leaved weeds per square meter and the dry weight at harvest of the weeds (g m^{-2}) were studied by taking a sample of an area of one square meter from each experimental unit, counting manually in each square meter taken randomly and then the counted weeds were cut and placed in paper bags and entered into the electric oven at a temperature of 75 °C for 48 hours and until your weight is stable, it has also studied the number of spikes, the number of grains per spike, the weight of 1000 grains, and the grain yield were measured. The data were statistically analyzed by analysis of variance, and the least significant difference was used under the 5% probability level to diagnose the statistical differences between the arithmetic averages of the treatments (19).

RESULTS AND DISCUSSION

Weeds types

Table 3 shows that there are two types of weeds: the broad-leaved weeds and the narrow -leaved weeds. The dominant weeds at the experimental land is the broad-leaved weeds, which belongs to different plant families, some of theh contain allelopathic substances such as the weeds of *Chenopodium album* L, in addition to their great impact on the competition of the crop.

Table 3. Types of weeds studied

English name	The scientific name
broad leaves of weeds	
Prickly lettuce	*Lactuca scariola* L.
Lambs quarter	*Chenopodium album* L.
Door weed	*Polygonum aviculare* L.
Sweet clover	*Mililotus indica* Mill.
Dwarf mallow	*Malva praviflora*
Field bind weed	*Convolvulus arvensis* L.
narrow leaves of weeds	
Wild out	*Avena fatua* L.
Rigid rye grass	*Lolium rigidum* Gau.D.

Weed's density (plants m^{-2})

The results of Table 4 indicate the significant superiority of the treatment V3H3 by achieving the lowest average weeds density of 35.07 and 32.04 plants m^{-2} for the two seasons respectively, comparison with the treatment V2H2, which gave the highest weeds density of 53.13 and 53.25 m^{-2} plants for the two seasons respectively. These results agreed with the resaltes of other researcher (4, 8, 11 15). This is due to the efficiency of the herbicide H3 in reducing the density of the weeds. As for the nutrition treatments, spraying with a solution of squash seeds F4 gave the lowest weeds density of 19.00 and 12.09 plants m^{-2} for the two seasons, respectively. The highest weeds density were with the weedy treatment, which contact 130.67 and 163.31 plants m^{-2}, these may be since the use of pumpkin seed solution may reduce the tolerance of weeds plants or improve the effectiveness of the herbicides. The interaction indicates that the treatment V3H3 and F4 in the first season had the lowest weeds density of 5.00 plants m^{-2} for each of them, while in the second season the lowest value of the weeds were 7.00 plants m^{-2} compared to the treatment V2H2 with F4, which gave the highest value for the characteristic 148.00 and 214.33 plants m^{-2} for the two seasons, respectively.

Table 4. Effect of the interaction of herbicides and varieties of wheat with some nutrients into weeds density (plants m^{-2}).

varieties * herbicides	nutrition treatments for the season 2018-2019 F1	F2	F3	F4	F5	means
V1H1	12.00	23.33	29.67	22.67	122.00	41.93
V2H2	30.00	22.67	35.67	29.33	148.00	53.13
V3H3	22.00	12.00	14.33	5.00	122.00	35.07
means	21.33	19.33	26.56	19.00	130.67	
L.S.D. 5%	herbicides * varieties		Herbicides *		(herbicides * varieties) nutrition treatments	
	2.81		2.87		5.73	
varieties * herbicides	nutrition treatments for the season 2019-2020 F1	F2	F3	F4	F5	means
V1H1	12.00	14.20	15.47	18.33	167.00	45.57
V2H2	18.20	13.07	13.67	7.00	214.00	53.25
V3H3	14.93	15.67	10.93	10.93	107.00	32.074
means	15.04	14.31	13.36	12.09	163.31	
L.S.D. 5%	herbicides * varieties		Herbicides		(herbicides * varieties) * nutrition treatments	
	2.62		2.73		5.33	

Weeds of weight (gm m^{-2})

The results of Table 5 show that the treatment V3H3 had the lowest dry weight of the weeds, which was 97.88 and 51.65 gm m^{-2} for the two seasons, respectively compared with the treatment V2H2, which gave the highest dry weight of the weeds, which reached 114.94 and 59.77 gm m^{-2} for the two seasons, respectively. These results agree with the results of (4, 5, 14). As for nutrients, F4 had

the lowest dry weight of the weeds, which amounted to 43.57 and 13.22 gm m^{-2} for the two seasons respectively, while the lowest average for the characteristic was in the F4 treatment, which amounted to 43.57 and 13.22 gms m^{-2} for the two seasons, respectively. these may be since the use of pumpkin seed solution may reduce the tolerance of weeds plants or improve the effectiveness of the herbicides. The interaction indicates that the treatment V3H3 with F4 achieved the lowest value in the dry weight of the weeds, which was 14.70 and 2.73 gm m^{-2} for the two seasons, respectively compared with V2H2 in the first season within F5 and treatment V3H3 within F5, which gave the highest values for the characteristic amounted to 248.00 and 189.40 gm m^{-2} for the two seasons, respectively.

Table 5. Effect of interaction of herbicides and varieties of wheat with some nutrients into weeds dry weight (gm m^{-2}).

herbicides * varieties	nutrition treatments for the season 2018-2019					means
	F1	F2	F3	F4	F5	
V1H1	70.70	63.30	105.30	60.00	229.30	105.72
V2H2	70.70	108.00	92.00	56.00	248.00	114.94
V3H3	80.00	82.70	84.00	14.70	248.00	97.88
Means	73.80	84.67	93.77	43.57	235.10	
L.S.D. 5%	herbicides * varieties		Herbicides *		(herbicides * varieties) nutrition treatments	
	14.80		6.64		18.02	
herbicides * varieties	nutrition treatments for the season 2019-2020					means
	F1	F2	F3	F4	F5	
V1H1	32.87	22.73	24.30	18.93	198.53	59.47
V2H2	32.73	35.03	23.67	18.00	189.40	59.77
V3H3	22.80	28.27	12.73	2.73	191.70	51.65
means	29.47	28.68	20.23	13.22	193.21	
L.S.D. 5%	herbicides * varieties		Herbicides * varieties) *		(herbicides * nutrition treatments	
	6.68		8.10		15.76	

Number of spikes (spikes m^{-2})

Through Table 6 it was found that treatment V3H3 achieved the highest number of spikes of 292.0 and 298.0 spikes m^{-2} for the two seasons, respectively, compared to treatment V1H1, which gave the lowest value for the characteristic, which amounted to 227.3 and 218.0 spikes m^{-2} respectively. These results agree with others (4, 5, 15). and this may be attributed to the ability to the variety was to compete with the weeds, it gave the highest number of spikes despite the weed's density and dry weight (table 4, 5) being higher than the other treatments. Concerning the nutrition treatments, the normal fertilization treatment gave the highest average of characteristic that reached 303.3 and 323.3 spikes m^{-2} for the two seasons respectively, compared to the no-addiction treatment which gave the lowest average for the characteristic 211.1 and 212.4 spikes m^{-2} for the two seasons respectively. The result agrees with (15), and this is due to the adequacy of the normal fertilization for the growth requirements of the crop. The interaction indicates that the treatment of V3H3 with F3 gave the highest average number of spikes of 366.7 and 380.0 spikes m^{-2} for the two seasons, respectively.

Table 6. Effect of the interaction of herbicides and varieties of wheat with some nutrients into the number of spikes (spikes m^{-2})

herbicides * varieties	nutrition treatments for the season 2018-2019 F1	F2	F3	F4	F5	means
V1H1	243.3	200.0	213.3	270.0	210.0	227.3
V2H2	256.7	226.7	330.0	223.3	200.0	247.3
V3H3	230.0	336.7	366.7	303.3	223.3	292.0
means	243.3	254.4	303.3	265.6	211.1	
L.S.D. 5%	herbicides * varieties		Herbicides *		(herbicides * varieties) nutrition treatments	
	33.93		20.81		48.10	
herbicides * varieties	nutrition treatments for the season 2019-2020 F1	F2	F3	F4	F5	average
V1H1	226.7	200.0	223.3	256.7	183.3	218.0
V2H2	260.0	206.7	360.0	253.3	214.0	258.8
V3H3	223.3	320.0	380.0	326.7	240.0	298.0
Means	236.7	242.2	323.3	296.7	212.4	
L.S.D. 5%	herbicides * varieties		Herbicides varieties) *		(herbicides * nutrition treatments	
	30.95		18.78		43.59	

Number of grains per spike (grains $spike^{-1}$)

The results of Table 7 show the superiority of the treatment V3H3 by achieving the highest number of grains per spike of 90.5 and 92.53 grains $spike^{-1}$ for the two seasons, respectively in comparison to treatment V1H1, which gave the lowest value for the characteristic amounted to 47.5 and 44.73 grains $spike^{-1}$ respectively, these results agree with the resaltes of other researchers (4, 5, 12, 15). As for nutrients, the number of spike grains reached the highest value for the characteristic with the F3 treatment, which amounted to 81.7 and 78 grains $spike^{-1}$ for the two seasons in respectively, compared to F5 treatment, which gave the lowest number of grains for the spike, which amounted to 56.3 and 61.00 grains $spike^{-1}$ for the two seasons respectively. These results agree with (1, 11, 16, 18), This may be due to the efficiency of the usual fertilizers in supplying the crop with the necessary elements (nitrogen and phosphorous). Through the interaction, It was found that treatment V3H3 with F3 and F4 in the first season and the same treatment with F1 in the second season gave the highest number of grains for the spike, which amounted to 97.0 grains $spike^{-1}$ for each, compared to treatment V1H1 with F5, which gave the lowest values for the trait, which were 29.0 and 24.7 grains $spike^{-1}$ for both seasons, respectively.

Table 7. The effect of the interaction of herbicides and varieties of wheat with some nutrients into the number of grains per spike (grains spike^{-1}).

herbicides * varieties	nutrition treatments for the season 2018-2019					means
	F1	F2	F3	F4	F5	
V1H1	41.7	56.3	64.3	46.0	29.0	47.5
V2H2	85.0	83.0	83.7	64.7	52.7	73.8
V3H3	80.7	90.0	97.0	97.7	87.3	90.5
Means	69.1	76.4	81.7	69.5	56.3	
L.S.D. 5%	herbicides * varieties		Herbicides * nutrition treatments		(herbicides * varieties)	
	3.56		3.50		7.03	
herbicides * varieties	nutrition treatments for the season 2019-2020					means
	F1	F2	F3	F4	F5	
V1H1	57.7	57.3	41.0	43.0	24.7	44.7
V2H2	63.3	82.7	96.0	64.7	65.7	91.5
V3H3	96.7	85.3	97.0	91.0	92.7	92.5
Means	72.6	74.33	78.0	66.2	61.0	
L.S.D. 5%	herbicides * varieties		Herbicides * varieties) * nutrition treatments		(herbicides *	
	5.70		3.30		7.80	

Thousand grains weight (gms)

Table 8 shows the significant superiority of treatment V2H2 by giving the highest of 1000 grains weight which amounted to 42.39 and 44.16 gms respectively by comparison to treatment V3H3 which gave the lowest value for the characteristic amounted to 36.57 and 38.65 gms for the two seasons respectively, These results are in agreement with (12 , 13, 15), due to the decreases in the two components of the number of spikes and the number of grains reflected by an increases in the weight of 1000 grain. The F2 treatment gave the highest average in the weight of 1000 grains, which amounted to 43.46 and 44.03 gms for the two seasons respectively, compared to the F5 treatment, as it gave the lowest value for the characteristic 36.62 and 39.89 gms for the two seasons respectively, these results agree with the resaltes of others (3, 12, 16, 18). The reason may be that the number of spikes and the number of grains in the lower spike are within these treatment with the presence of a nutrient provided a suitable opportunity to increase the size of the grain. As for the interaction, treatment V2H2 with F2 gave the highest value of 45.70 and 46.50 gms for the two seasons, compared to treatment V3H3 within F4 in the first season and treatment V3H3 within F5 in the second season, as it gave the lowest value of the trait amounted to 31.77 and 32.60 gms for the two seasons, respectively.

Table 8. Effect of interaction of herbicides and varieties of wheat with some nutrients into the weight of 1000 grains (gms).

herbicides * varieties	nutrition treatments for the season 2018-2019					means
	F1	F2	F3	F4	F5	
V1H1	38.57	43.13	38.36	45.05	41.43	41.31
V2H2	43.63	45.70	44.27	43.37	35.00	42.39
V3H3	42.23	41.53	33.90	31.77	33.43	36.57
Means	41.48	43.46	38.84	40.06	36.62	
L.S.D. 5%	herbicides * varieties		Herbicides *		(herbicides * varieties) nutrition treatments	
	3.56		3.50		7.03	
herbicides * varieties	nutrition treatments for the season 2019-2020					means
	F1	F2	F3	F4	F5	
V1H1	39.03	41.17	39.23	42.77	43.73	41.19
V2H2	39.02	46.50	45.97	46.00	43.33	44.16
V3H3	47.00	44.43	35.37	33.83	32.60	38.65
Means	41.68	44.03	40.19	40.87	39.89	
L.S.D. 5%	herbicides * varieties		Herbicides * varieties) *		(herbicides * nutrition treatments	
	2.07		1.53		3.30	

Grain yield

Table 9 shows the superiority of treatment V3H3 significantly by giving the highest grain yield of 4.75 and 5.10 ton ha^{-1} for the two seasons respectively in comparison with treatment V1H1, which gave the lowest value for the characteristic amounted to 3.57 and 3.52 ton ha^{-1} for the two seasons respectively. These results agree with (4, 5, 12, 13, 15, 17). This increases came to an increases significance in the characteristics of the number of spikes and the number of grains in the spike (Table 5 and 6). The F3 treatment gave the highest grain yield of 4.74 and 4.69 ton ha^{-1} for the two seasons respectively, compared to the no addition treatment, which gave the lowest value for the characteristic 3.53 and 3.92 ton ha^{-1} for the two seasons respectively, These results are in agreement with (2, 3, 6, 12, 18, 20). This may be due to the efficiency of the normal fertilization in providing Crop growth requirements from contains nitrogen and phosphorous, which are necessary for the growth and to give a high yield. The interaction indicates the superiority of treatment V3H3 with F2 in the first season and treatment V3H3 with F4 in the second season, it gave the highest value of grain yield amounted to 5.49 and 5.47 ton ha^{-1} for the two seasons respectively, while the lowest value of grain yield was when treatment V3H3 with F5. The lowest value of the characteristics was 2.72 and 3.17 ton ha^{-1} for the two seasons, respectively. These results agreed with (9), they showed the superiority of the triple interaction of some varieties over other varieties.

Table 9. Effect of the interaction of herbicides and varieties of wheat with some nutrients into the grain yield (ton ha^{-1}).

herbicides * varieties	nutrition treatments for the season 2018-2019					average
	F1	F2	F3	F4	F5	
V1H1	4.02	3.76	3.98	3.37	2.72	3.57
V2H2	3.52	4.01	4.87	5.20	3.71	4.26
V3H3	4.39	5.49	5.36	4.34	4.15	4.75
Average	3.98	4.42	4.74	4.30	3.53	
L.S.D. 5%	herbicides * varieties		Herbicides * nutrition treatments		(herbicides * varieties)	
	0.35		0.28		0.60	
herbicides * varieties	nutrition treatments for the season 2019-2020					average
	F1	F2	F3	F4	F5	
V1H1	3.64	3.42	3.59	3.76	3.17	3.52
V2H2	3.81	4.16	5.06	3.99	4.26	4.26
V3H3	4.41	5.40	5.41	5.47	4.34	5.10
Average	3.95	4.33	4.69	4.41	3.92	
L.S.D. 5%	herbicides * varieties		Herbicides * varieties) * nutrition treatments		(herbicides *	
	0.42		0.32		0.68	

It could be concluded that the V3H3 the best treatment to compete with the weeds by giving it the highest yield, also characterized by achieving the best results in reducing the density and dry weight of the weeds. It is noted that the leaves feeding treatments all led to a significant increases in the yield and some of its components despite the normal fertilization treatment was the best treatment by giving it the highest grain yield and a significant increases in two of the yield components. I recommend adding palm pollen, pumpkin extract and nano fertilizer with normal fertilizing in order to improve the effectiveness of the herbicide on the one hand and ensure complete nutrition on the other hand with a group of varieties.

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