

IMPACT OF HERBICIDES WITH DIFFERENT CONCENTRATIONS OF FOLIAR NUTRIENTS OF TWO RICE VARIETIES YIELDS

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ABSTRACT

This study was aimed to investigate the effect of herbicides and foliar nutrients on the yields of two rice varieties (Anbar and Yasamin). A field experiment was carried out at the rice research station at Al-Mishkhab, Najaf during two seasons, 2020 and 2021. A factorial experiment using a Randomized Complete Block Design was conducted with 3 within replicates. The treatments included two rice varieties (12), four weeding treatments (H1, H2, weed-free, and control without weed control) with two concentrations of nano fertilizer (F1:21 g L⁻¹ and F2:10.5 g L⁻¹) as well as normal fertilization. The results showed that V1H4F3 had a significant superiority in reducing the density and the dry weight of the weeds, which gave the lowest values of 84.3 and 82.0 plant m⁻² and 101.0 and 123.0 g m⁻² for the two seasons, respectively. Variety V2 achieved the highest values for the grain yield, with V2H3F3 reaching 5.43 and 5.31 ton h⁻¹ for the two seasons. The herbicide H2 gave the lowest weed density of 27.3 and 22.3 g m⁻² for the two seasons, respectively. It is concluded that variety V1 is better at tolerating weed competition.

Key words: rice varieties, combination, nano fertilizer, weeds competition, grain yield



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INTRODUCTION

Rice (*Oryza sativa* L.) is one of the most widely used grains for human consumption, and its production is attributed to one of the most important activities for the world's population, due to its economic yield and nutritional value (Madhukumar, 2023). The rice crop represents one of the main basics for human nutrition, as about 50% of the population depends on its cultivation and its importance is evidenced by the fact that it accounts for 25% of global grain production. The rice crop suffers from multiple problems that lead to a decrease in productivity, and the weeds accompanying the crop take the first place in reducing its production, and lead to a loss in the grain yield of rice, so the use of herbicides led to an increase in grain yield that ranged from 29% -38% in Iraq, according to the type and density of the weeds (Al-ziady, 2021). The use of herbicides with a number of

varieties could be achieved as part of the integrated control, as the rice varieties differ in their competition with the accompanying weeds or increase its height or give it the highest number of tillers. Plant nutrition is an important necessity for crop plants to obtain one of the most important requirements for growth, and nano-foliar feeding is an effective nutrient source to supply the crop by micronutrients that are characterized by rapid absorption and a clear response. Micronutrients and despite the use of good chelated or organic sources, the efficiency of their use does not exceed 3-5% when added to the soil, and the values are much higher when spraying on shoots or mixed applications (Kaur, 2022). This experiment was aimed to investigate out which two varieties (Anbar-33 and Yasamin) are better or more tolerant of weeds under competition conditions, and to compare the two varieties of rice to the use of

herbicides to achieve integrated control to determine the best response and nutritional interaction between the two varieties of rice and the nutrients used, as well as the individual comparison between normal fertilization and foliar application.

MATERIALS AND METHODS

A field experiment was carried out at the rice research station in Al-Mishkhab/ The honorable Najaf Research Department/ Agriculture Ministry of Iraq during two summer agricultural seasons

2020 and 2021. Before conducting the experiment, random soil samples were taken from the soil of the experimental field with a depth of 0-30 cm for the purpose of studying the physical and chemical properties of the soil. The samples were 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	Measuring unit	Value in the first season 2018	Value in season two 2019
PH	-	7.8	7.6
EC	(ds.m)	4.10	4.20
N	mg kg ⁻¹	12.10	12.00
P	mg kg ⁻¹	2.22	2.18
K	mg kg ⁻¹	92.71	93.12
Ca	mg L ⁻¹	13.10	13.00
Mg	mg L ⁻¹	11.41	12.05
Na	mg L ⁻¹	1.59	1.50
Cl	mg L ⁻¹	28.22	20.15
HCO ₃	mg L ⁻¹	1.15	1.20
SO ₄	mg L ⁻¹	3.16	3.13
CaCO ₃	mg L ⁻¹	13.10	13.01
O. M	%	86	85
Sand	%	21.20	20.40
Clay	%	31.14	32.40
Silt	%	48.06	47.20

The experiment was carried out according to the factorial experiment within Randomized Complete Block Design (RCBD) with three replications. The field was divided into experimental units with an area of 12 m² (3m x 3m). 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 soil using a leveling machine according to the recommendations. The seeds were sown using dry direct seeded rice (DDSR) on 19/ 6/ 2020 for the first season and harvested on 27/ 11/ 2020, while in the second season the seed, were sown on 28/ 6/ 2020 and harvested on 2/ 12/ 2021. Phosphate fertilizer was added 160 kg h⁻¹ in the form of a dab fertilizer when soil preparing, and nitrogen fertilizer 280 kg h⁻¹ nitrogen in the form of urea (46% N) in two batches, the first batch at the beginning of the tillering stage after 35 days of planting and the second batch 30 days after the first batch. The experiment included 12 combinations of herbicides and fertilizers for both varieties of

rice (Anbar-33: V1 and Yasamin: V2). The herbicides represented the use of two herbicides spraying after emergence (nominee with application rate 400ml h⁻¹ = Bispyribac sodium at a concentration of 30 ml a.i. h⁻¹ + 300 ml of the auxiliary substance A100: H1 and Super flag with application rate 100g h⁻¹ = the Fenoxaprop+ Azimsulfuron at a concentration of 50 a.i. +6.7 a.i.: H2) mixed with the use of 400 liters of water h⁻¹ in addition to a weed-free treatment: H3 and weedy treatment: H4. As for the nutrients treatments, included dry nano fertilizer (powder) which sprayed on the shoots after 40, 55, 70, 85 and 100 days of cultivation, as it contains N = 5%, P = 3% , K = 3%, Mg = 2%, Ca = 2%, Fe = 2%, Zn = 5%, Cu = 0.65%, Mn = 0.7%, B = 0.65% and Mo = 0.1%. It was used after dissolving it with water (at two concentrations of 21 g L⁻¹: F1 and 10.5 g L⁻¹: F2) in addition to the normal fertilization (recommendation): F3. Below is an explanation of the combinations of treatments (Table 2):

Table 2. Experimental treatments combination

Treatments	varieties	herbicides	nutrients
V1H1F1	Anbar	nominee	nano fertilizer 21 g L ⁻¹
V1H1F2	Anbar	nominee	nano fertilizer 10.5 g L ⁻¹
V1H2F1	Anbar	Super flag	nano fertilizer 21 g L ⁻¹
V1H2F2	Anbar	Super flag	nano fertilizer 10.5 g L ⁻¹
V2H1F1	Yasamin	nominee	nano fertilizer 21 g L ⁻¹
V2H1F2	Yasamin	nominee	nano fertilizer 10.5 g L ⁻¹
V2H2F1	Yasamin	Super flag	nano fertilizer 21 g L ⁻¹
V2H2F2	Yasamin	Super flag	nano fertilizer 10.5 g L ⁻¹
V1H3F3	Anbar	weed-free	normal fertilization
V1H4F3	Anbar	weedy	normal fertilization
V2H3F3	Yasamin	weed-free	normal fertilization
V2H4F3	Yasamin	weedy	normal fertilization

Before harvesting, the trait of weed density (plant m⁻²) and dry weight (gm⁻²) were studied. Also, the weed types traits, the number of days from cultivation to 50% flowering, the number of days from 50% flowering to physiological maturity, the plant height (cm) were studied by calculating the plant height from the base of the plant to the end of the stem of ten main stems of different plants, the number of panicles (panicle m⁻²), the number of panicles were calculated in the sample area from which the yield was taken, the number of grains per panicle (grain panicle⁻¹), by calculating the number of grains for 10 panicles from the area of the yield sample, the 1000 grains (g) weight of the yield sample was measured, the percentage of infertility was measured by dividing the number empty grains over the total number of grains (full + empty). The trait of the grain yield was measured by harvesting a random sample of 1 m² from each experimental unit, then the plants were threshing when harvested, the yield was calculated on the basis of 14% moisture, then

the weight was converted to tons.h⁻¹, the trait of the biological yield was calculated by weighing the entire sample (grain yield + straw yield), and the trait of the harvest index was measured through the equation:

$$\text{Harvest index} = (\text{grain yield} / \text{biological yield}) \times 100$$

The data were analyzed statistically using the analysis of variance method, using the least significant difference, under the 5%. The means compared.

RESULTS AND DISCUSSION

The results in Table (3) show the types of weeds growth in the experiment of fields for the two seasons, like the Poaceae family 50% density of the types of weeds found in the experiment (*Echinochloa crus-galli* L., *Echinochloa colonum* L) Link. and *Diplanche fusca* (L) Beur.), and the types of the Cyperaceae family (*Cyperus spp* L. and *Cyperus odoratus* L.) ranked second, while the broad-leaved weeds were represented by only one species (*Eclipta prostrata* L.).

Table 3. Types of weeds spread in the experiment for the first and second seasons

English name	Scientific name	Weed types	Family
Panic grass	<i>Echinochloa colonum</i> (L) Link.	Narrow leaves	Poaceae
Barnyard grass	<i>Echinochloa crus-galli</i> L.	Narrow leaves	Poaceae
Sabat	<i>Diplanche fusca</i> (L) Beur.	Narrow leaves	Poaceae
Nut grass	<i>Cyperus spp</i> L.	Narrow leaves	Cyperaceae
Calingale	<i>Cyperus odoratus</i> L.	Narrow leaves	Cyperaceae
False daisy	<i>Eclipta prostrata</i> L.	Narrow leaves	Cyperaceae

Weeds density: The results of Table (4) indicate that variety V1 with the weed treatment V1H4F3 had a significant superiority weeds density, had the lowest

value 84.3 and 82.0 plants m⁻² for the two seasons, respectively, compared to the variety V2, which had the highest weed density of 132.3 and 98.7 plants m⁻². for the two seasons

in succession. This could be attributed to a higher possibility of variety V1 in weed competition, especially that variety V1 had highest plant height than variety V2 (Table 4). These results agreed with (Al-Latif, 2022) they demonstrated the variation of rice varieties in weeds competition. Regarding herbicides, it was observed that the V2H2F2 treatment superioered in the first season by achieving the lowest weed density of 27.3 plants m^{-2} , with non-significant differences in any treatments V1H1F1, V1H2F1, V1H2F2, V2H1F1, V2H1F2, and V2H2F1, compared to the weedy treatment (V2H4F3), which had the highest weed density of 132.3 plants m^{-2} . In the second season, the treatment V1H2F2 excelled by achieving the lowest weeds density of 22.3 plants m^{-2} , and there was non-significant differences among treatments V1H2F1, V2H2F1 and V2H2F2 compared to the weedy treatment V1H4F3, which had the lowest value for the trait amounted to 82.0 plants m^{-2} , and the decreases could be attributed to the density of weeds indicates the effectiveness of the herbicides in affecting the weeds, regardless of the variety used, and the variation in the results of the effect is according to the specialization of the herbicide and the types of weeds spread. These results agreed with (Aaron et al, 2022; Abbas, 2019; Al-ziady, 2021; Habimana, 2019, Samoy-Pascual, 2020). they showed that the use of herbicides is reflected in the decreases into weeds density. It is note that there were no significant differences between the two varieties (A and B) when used with Fenoxaprop + Azimsulfuron, with less weeds density for both seasons. Table (4) indicates did not significant differences between the two concentrations of nano-fertilizer (a concentration of 10.5 g L^{-1} of nano-fertilizer and a concentration of 21 g L^{-1} of nano-fertilizer) in weed density for both seasons.

Weeds dry weight

The results of Table (4) show that variety V1 within the combination V1H4F3 was significantly superioered to reducing the dry weight by achieving the lowest value of 101.0 and 123.0 g m^{-2} for the two seasons, respectively, compared to the B variety, which gave the highest dry weight of the weeds at

230.33 and 144.0 g m^{-2} for the two seasons in succession, and this could be attributed to the competitiveness of variety V1, especially plant height which higher than variety V2 (Table 4), and this trait produced crop plants a higher potential into weed competition due to their shading by weeds early and continues until the end of the crop life (4 and 10). The two treatments V1H1F1 and V2H1F1 achieved into the first season the lowest dry weight of the weeds amounted to 27.33 g m^{-2} for each of them, and there was no significant difference with the treatment V2H1F2 compared to the control treatment with both cultivars (V1H4F3 and V2H4F3), which produced the highest weeds dry weight amounted to 101.00 and 230.33 g m^{-2} respectively. Also, treatment V1H1F1 superioered in the second season by achieving the amounting lowest weeds dry weight 28.7 g m^{-2} , and there was no significant difference with the treatments V1H1F2, V2H1F1 and V2H1F2 compared to the two treatments with both varieties (V1H4F3 and V2H4F3), which had the highest dry weeds weight amounted to 123.0 and 144.0 g m^{-2} respectively. These results are attributed to the efficiency of the two herbicides in affecting the growth of the weed and, as a result, the decrease into dry weight. These results agreed with (Abd El-Naby, 2023; Al-Ziady, 2015; Kothari, 2021). They confirmed the decrease in the dry weight of the weeds when using herbicide.

Plant height

The results of Table (4) show that all the treatments of variety V1 were significantly superioered to the treatments of variety V2. The treatment V1H2F1 in the first season and the treatment V1H1F1 in the second season achieved the highest plant height in the chemical control treatments, which reached 104.0 and 93.0 cm for the two seasons, respectively, and there was non significant differences among the treatments V1H1F1, V1H1F2, V1H2F1 and V1H2F2 for both seasons compared to the treatment V2H1F2 into the first season and treatment V2H2F2 which had the lowest plant height with 65.0 and 64.0 cm for the two seasons respectively. This could be attributed to the genetic susceptibility of variety V1 by giving it the

highest plant height compared to the other variety. These results agreed with results of other researchers (Elekhtyar, 2021; Ghalwash, 2015) they showed the variation among varieties in plant height according to their genotype. It is noted that the hand weeding treatment was significantly superior to the control treatment and for both varieties by achieving the highest plant height, as the two treatments V1H3F3 and V2H3F3 produced the highest plant height of 138.3, 91.7, 135.3 and 93.0 cm for the two seasons, respectively, compared to the weedy treatment of the two varieties (V1H4F3 and V2H4F3), which had the lowest plant height of 118.7, 73.0, 125.3, and 77.3 cm for the two seasons, respectively. This could be attributed to the fact that the hand weeding treatment provided an appropriate opportunity for crop plants to grow and increase the plant height as a result of the decreases in competition with weed plants, whose presence is negatively reflected in reducing the growth traits of the crop, including plant height, These results agreed with (Al-ziady, 2021; Ghalwash, 2015;

Ibrahim and Jimin; 2023; Jatto and Yakubu, 2022). They showed that control led to a significant increase in plant height. To compare the types of fertilizers, it was observed that the treatment of normal fertilization was significantly superior to the two treatments of foliar fertilization within the chemical control treatments for both varieties, as the V1H3F3 treatment gave the highest plant height of 138.3 and 135.3 cm for the two seasons, respectively, compared to all the foliar fertilization treatments, while the treatment gave V2H1F2 into the first season. The V2H2F2 treatment in the second season had the lowest value for the trait, which reached 65.0 and 64.0 cm, respectively. This may be attributed to the fact that the normal fertilization was sufficient for the good growth of the plants of the crop, while the crop still needed nutrition in the foliar fertilization treatments. These results were consistent with (Al-ziady, 2021; Elekhtyar, 2021; Madhukumar, 2023), as they indicated that the use of fertilizer was reflected in a significant increase in plant height.

Table 4. Density of weeds, dry weight of weeds and height of plant

Treatments	weeds density (plant m ⁻²)		weeds weight dry (g m ⁻²)		plant height (cm)	
	2020	2021	2020	2021	2020	2021
V1H1F1	34.7	34.7	27.3	28.7	104.7	93.0
V1H1F2	40.3	39.3	46.3	39.0	108.7	84.0
V1H2F1	28.7	23.0	61.0	70.3	112.0	91.7
V1H2F2	29.7	22.3	55.0	47.3	104.0	89.3
V2H1F1	33.0	40.7	27.3	40.3	65.3	69.0
V2H1F2	37.0	34.3	30.0	32.7	65.0	65.7
V2H2F1	31.0	27.3	83.3	70.0	73.3	66.0
V2H2F2	27.3	24.3	66.0	48.3	66.7	64.0
V1H3F3	4.7	4.0	3.67	6.7	138.3	135.3
V1H4F3	84.3	82.0	101.0	123.0	118.7	125.3
V2H3F3	5.3	7.7	8.33	9.0	91.7	93.0
V2H4F3	132.3	98.7	230.33	144.0	73.0	77.3
LSD 0.05	11.4	9.9	14.33	17.40	9.0	10.2

Infertility%: Table (5) indicates that variety V1, within the hand weeding treatment and normal fertilization (V1H3F3), had the lowest amounting percentage infertility to 5.07% and 6.23% for the two seasons, respectively, compared to variety V2, the hand weeding treatment and normal fertilization (V2H3F3), which produced the lowest percentage of

infertility 9.00% and 10.70% for the two seasons, respectively. This finding agreed with (Al-Ziady, 2015; Hadi and Salem, 2026; Nazir, 2022) showed that varieties differed in the percentage of infertility. As for the control treatments, the two hand weeding treatments V1H3F3 and V2H3F3 gave the lowest percentage of infertility at 5.07%, 9.00%,

6.23%, and 10.70% for the two seasons, respectively. These could be revealed the fact that conditions of reduced competition would improve fertilization as well as improve the fullness of grain. These results agree with the results of others researchers (Abd El-Naby, 2023; Elekhtyar, 2021; Ibrahim and Jimin, 2023) they showed a decrease in the percentage of infertility when weed removal. It is clear from the results of Table (5) that there are significant differences for the normal fertilization treatments with hand weeding, as the two treatments V1H3F3 and V2H3F3 had the lowest percentage of infertility amounting to 5.07%, 9.00%, 6.23%, and 10.70% for the two seasons, respectively, compared to the foliar fertilization treatments, as they gave the two treatments, V2H2F1 in the first season and V2H1F1 in the second season, had the highest infertility percentage, reaching 20.90% and 19.83% for the two seasons, respectively, and the sufficiency of fertilization in meeting the needs of crop plants is equal to or greater than weed control with foliar fertilization. It should also be noted that the treatments of chemical herbicides with foliar fertilization had percentages of infertility relative to weedy treatment including the normal fertilization, and this indicates that foliar fertilization alone does not it is better than normal fertilization under control conditions or not. These results agreed with (Al-ziady, 2020), which indicated a decreases in the infertility percentage in the normal fertilization treatments.

Number of panicles. Plant⁻¹

The results of Table (5) also show the superiority of the V2 (V2H1F1) treatment by achieving the highest number of panicles into the first season, which amounted to 321.7 panicle m⁻², compared to the two treatments V1H2F1 and V2H1F2, which had the lowest value for this trait amounted to 238.0 and 237.3 panicle m⁻², respectively. This could be attributed to the efficiency of the cultivar. V2 with herbicide H1 and fertilization F1, which enabled the plants of the crop to increases tillering and thus, which was reflected in the increases in the number of panicles, but in the second season, there were no significant differences between the chemical control treatments and the weedy treatment. The two

varieties A and B, with the treatments of normal fertilization and hand weeding (V1H3F3 and V2H3F3), achieved the highest number of panicles of 376.0, 382.7, 323.3, and 410.3 panicle m⁻² for the two seasons, respectively, compared to the same two varieties with the weedy treatment (V1H4F3 and V2H4F3), which It gave the lowest values of 280.0, 268.3, 276.0, and 388.0 panicle m⁻². This result agreed with (Abd El-Naby, 2023; Al-Ziady, 2015; Kothari, 2021) they formal that the number of panicles increases into control treatments compared to the weedy treatments. It was found that the normal fertilization in the two treatments (V1H3F3 and V2H3F3) was significantly superioired in achieving the highest number of panicles with values of 376.0, 382.7, 323.3 and 410.3 panicle m⁻² for the two seasons, respectively, compared to the foliar fertilization treatments in variety V1 and B within the two treatments V1H2F1 and V2H1F2 in the first season and V1H1F1 and V2H2F1 in the second season as it gave the lowest values for the trait amounted 238.0 (V2H1F2) and 262.3 and (269.0) panicle. m⁻² for the two seasons , respectively. This may be explained by the fact that the normal fertilization guarantees for the plants of the crop their sufficient need of the basic elements necessary for tillering, which is reflected in the increase in the number of panicles. These results agreed with (Al-ziady, 2021; Ghalwash, 2015).

Number for grains. panicle⁻¹

The results of Table (4) show the superiority of treatment V2H1F1 by achieving the highest number of grains of 108.7 and 110.5 grain panicle⁻¹, which was significantly superioired to the treatments V1H1F1, V1H1F2, V1H2F1, V1H2F2, and V2H1F2, which gave the lowest number for grains panicle of 85.8, 80.2, 91.1 and 84.4 grains panicle⁻¹, respectively for the first season, and the treatments V1H1F1, V1H1F2 and V1H2F2, which gave the lowest values for the trait with range of 72.8, 76.9, and 78.2 grains panicle⁻¹, respectively, for the second season, these could results be attributed to the genetic susceptibility of variety V2, and its better response to foliar fertilization on the other hand, compared to variety V1 into both herbicide treatments, these results agreed with

the researchers (Ghalwash, 2015). The treatment of variety V2 within the V2H3F3 treatment gave the highest number of grains for this trait, which amounted to 174.8 and 177.7 grain panicle⁻¹ for the two seasons, respectively, compared to the same variety within the weedy treatment, which gave the lowest values for the trait amounted to 119.0 and 124.0 grains panicle⁻¹ for the two seasons, respectively, with a decreases percentage from the weedy treatment amounted to 30.22% and 31.92% for the two seasons, respectively, while the percentage of panicles for variety V1 in the weedy treatment was 10.04% and 18.27% for the two seasons, respectively, and these enhances the response of variety V2 to conditions of absence of competition compared to variety V1, which is more tolerant of the existence of weeds and its competition, and confirms that the removal of weeds is positively reflected in a significant increase in the number of grains of panicle. These results agreed with (Abd El-Naby, 2023; Ghalwash, 2015). As for the fertilization treatments, it is noted that most of the normal fertilization treatments under control

conditions (V1H3F3 and V2H3F3) superior by achieving the highest values in the number of grains panicle⁻¹ of 167.5, 174.8, 156.4 and 177.7 grain panicle⁻¹ for the two seasons, respectively, compared to all the foliar fertilization treatments. While the treatment V1H1F2 in the first season and the treatment V1H1F1 in the second season gave the lowest values for the trait amounted to 84.4 and 72.8 grains panicle⁻¹ for the two seasons, respectively, and these indicates that the normal fertilization gives the variety V1 better performance to increase the number of grains panicle⁻¹, despite the differences in performance for the two varieties. It is also indicated that the normal fertilization gave the varieties A and B, with the weedy treatment, a higher ability to increase the number of grains in the panicle, compared to the chemical control treatments of weeds into the foliar fertilization treatments. These results are in agreement with (Al-ziady, 2021; Madhukumar, 2023). The use of fertilizers led to an increase in the number of grains panicle⁻¹.

Table 5. Percentage (%) of infertility, number of panicles, and number of grains per panicles

Treatments	infertility%		number of Panicles (p. m ⁻²)		number of grains number grains number grains number	
	2020	2021	2020	2021	panicle ⁻¹ (grain panicle ⁻¹)	panicle ⁻¹ (grain panicle ⁻¹)
V1H1F1	12.10	16.33	267.7	262.3	85.8	72.8
V1H1F2	16.93	13.97	252.7	275.3	80.2	76.9
V1H2F1	17.67	16.40	238.0	301.3	91.1	89.8
V1H2F2	19.13	11.77	259.7	281.7	84.4	78.2
V2H1F1	15.93	19.83	321.7	354.3	108.7	110.5
V2H1F2	18.87	12.43	237.3	292.3	96.5	89.3
V2H2F1	20.90	17.17	287.0	269.0	102.9	106.8
V2H2F2	14.40	15.23	320.3	343.3	101.1	97.9
V1H3F3	5.07	6.23	376.0	323.3	167.5	156.4
V1H4F3	9.00	10.70	280.0	276.0	136.9	140.7
V2H3F3	7.00	6.47	382.7	410.3	174.8	177.7
V2H4F3	14.10	16.93	268.3	388.0	119.0	124.0
LSD 0.05	1.06	1.10	77.4	105.4	11.81	28.2

1000 grains weight

Results in Table (6) show significant superiority of the V1H1F2 treatment by achieving the highest weight of 1000 grains, which reached 22.17 g into the first season and there was non significant differences with the V1H1F1, V1H2F1 and V1H2F2 treatments. In the second season, the V1H2F2 treatment

produced the highest significant value of 22.50 g, and there was no significant differences with the treatments of V1H1F1 and V1H1F2, compared to treatment V2H4F3 into the first season and treatment V2H2F1 into the second season, which gave the lowest value for the trait amounted to 17.40 and 18.97 g, respectively. These could be explained by the

genetic nature of variety V1 with a larger grain size compared to variety V2. These results agreed with others (Al-ziady, 2020; Ghalwash, 2015) they showed that the weight difference of 1000 grains between varieties. It should be noted that there were did not significant differences for variety V1 between the hand weeding treatment and the weedy treatment, while a significant increases was found for variety V2 in the hand weeding treatment that gave a weight of 1000 grains of 21.37 and 20.73 g for the two seasons, respectively. Perhaps the reason for this is due to the fact that variety V2 is affected by the presence of weeds in the weedy treatment, while this trait did not affected with variety V1. With regard to the control treatments, it was noted that the two chemical control treatments (V1H1F2 and V1H2F2) were significantly superior in achieving the highest weight of 1000 grains, which reached 22.17 and 22.50 g for the two seasons, respectively, compared to the two treatments V1H4F3 and V2H4F3, which gave the lowest value for the trait amounted to 21.03, 17.40, 21.40 and 19.63g for the two seasons, respectively. These could be due to the fact that weed control led to a significant increases in the weight of 1000 grains as a result of reducing the weeds density and the dry weight of weeds (Table 4), and compensatory relationship between the yield components (the number of panicles, the number of grains per panicle and the 1000 grains weight) has a clear effect with an increases in the weight of 1000 grains in the treatments that decreased the number of panicles and the number of grains per panicle. These result agreed with (Al-ziady, 2020; Ghalwash, 2015; Jatto and Yakubu, 2022). They showed that the use of herbicides leads to an increase in the weight of 1000 grains. It should be noted that the control and fertilization treatments within variety V1 were all significantly superior to the same treatments within variety V2. These may be attributed to the relationship of this trait genetically to variety V1, as the 1000 grain trait is a genetic trait inherent to the varieties.

Grains yield

The results of Table (6) indicate the superiority of the treatment V2H2F1 in the

first season by achieving the highest grain yield of 2.85 tons h⁻¹ and there is non significant differences determine the two treatments V2H1F1 and V2H2F2, but in the second season the treatment V2H1F2 superioered by producing the highest grains yield of 2.49 tons h⁻¹ and There is non significant differences with the treatments V2H1F1, V2H1F2 and V2H2F2 compared to the treatments of herbicides and fertilization for the same variety (V1H1F1, V1H1F2, V1H2F1 and V1H2F2), which gave the lowest values for the trait amounted to 2.68, 2.19, 2.79, 2.22, 2.18, 1.93, 2.28 and 2.12 tons h⁻¹ for the two seasons, respectively, and this may be due to the varieties genetic potential to increases the yield and vary the response between varieties depending on the conditions of the experiment. These results agreed with (Al-ziady, 2020, Elekhtyar, 2021, Ghalwash, 2015), they explained the variation in the amount of grains yield between varieties. The hand weeding treatment within the two varieties V1H3F3 and V2H3F3 to note that a significant increases in grains yield by 30.84%, 34.62%, 32.63% and 37.48%, respectively, and through the higher increases rate of variety V2 into grains yield, these means that the variety responds more than the other variety to weeds control and low competition, while in variety V1 it is more tolerant of the presence of weeds by increasing its plant height (Table 4) and this is reflected into a lowest percentage of grains yield., and through the higher percentage of increases of variety V2 in grains yield, these means that the variety responds more than the other variety to weeds control and low competition, while into variety V1 it is more tolerant of the presence of weeds by increasing its height (Table 4) and these is reflected in a lower percentage decreases in grains yield. Regard to control, it was found that the mechanical control in the two treatments V1H3F3 and V2H3F3 achieved the highest grains yield of 4.41, 5.43, 4.72 and 5.31 ton h⁻¹ for the two seasons, respectively, compared to the two weedy treatments (V1H4F3 and V2H4F3), which gave the lowest grain yield of 3.05, 3.55, 3.18 and 3.32 ton h⁻¹ for the two seasons, respectively. These may be attributed to the

fact that weed control allows crop plants to grow with maximum effort and increase yield components (Tables 5 and 6), which is positively reflected into an increase of grain yield. These results agreed with (Abd El-Naby, 2023; Al-ziady, 2021; Ghalwash, 2015, Nazir, 2023) they showed a significant increases into grains yield when weed control. It should be noted that the normal fertilization of the two varieties within the weed treatment (V1H4F3 and V2H4F3) were significantly superior to all foliar fertilization treatments and for both herbicides, and here it could be confirmed that foliar fertilization alone is not sufficient for the growth of yield and increase into yield in a way that is equivalent to the weedy treatment with normal fertilization, and this means that foliar fertilization It is a supplementary nutrition to meet some of the needs of the crop and is not essential and cannot be compared with normal fertilization, and these comes within the framework of the specialization of the roots in absorption and filling the crop's need for basic elements on the one hand, and for the sufficient amount of added ground fertilizer on the other hand. These results agreed with (Elekhtyar, 2021; Kothari, 2021 and Vinci, 2023), who showed that the use of normal or foliar fertilizers or both positively affects the increase of grains yield.

Harvest index%

The results of Table (6) indicate that there were significant differences, of the treatment V2H2F2 into the first season the highest harvest index of 44.83%, and there was no significant difference for the two treatments V2H1F2 and V2H2F1, but the second season, the treatment V2H1F2 excelled by achieving the highest value for the trait amounted to 44.69% and there was no significant differences with the treatment V2H1F1 compared to the lowest value with the treatment V1H2F2 into the first season and the treatment V1H2F1 into the second season that gave the lowest value for the trait as it amounted to 38.36% and 37.77% respectively, and it is noted that the treatments of variety V2 were all significantly superior to the treatments

of variety V1, and these is due to the fact that the plant height of variety V1 is higher than that of variety V2 (Table 4), and this is reflected in a higher straw yield for variety V1 compared to variety V2. On the other hand, the grain yield of variety V2 is higher than that of variety V1. With regard to control, it was found that the hand weeding treatment was within the two varieties A and B (V1H3F3) and (V2H3F3) gave the highest harvest index of 44.24%, 50.97%, 42.22% and 47.73% for the two seasons, respectively, compared to the weedy treatment within varieties A and B (V1H4F3 and V2H4F3), which gave the lowest harvest index of 40.27%, 40.80%, 42.12%, and 41.49% for the two seasons, respectively. These may be due to the fact that the control treatments led to a significant decreases in the weeds density and dry weight (Table 4) and a significant increases into grains yield, which was reflected in a significant increases in the harvest index. These results agreed with they showed a significant increase in harvest index when weeds were hand weeding or chemically control. The normal fertilization treatment within the two varieties A and B (V1H4F3 and V2H4F3) achieved the highest yield index of 44.24%, 50.97%, 42.22% and 47.73% for the two seasons, respectively, compared to the foliar fertilization treatments (V1H2F2 and V2H1F1) into the first season and (V1H2F1 and V2H2F1) into the second season, which gave the lowest harvest index of 38.36%, 42.74%, 37.77% and 40.61%, respectively. These is explained by the fact that the addition of normal fertilization was reflected in a significant increase in the number of panicles and the number of grains in the panicle (Table 5). which was reflected in a significant increases in grains yield (Table 5) and, as a result, a significant increase in the harvest index. These results did not agree with (Al-ziady, 2020; Yadav, 2021). They indicated a significant increase in the harvest index when adding normal or foliar fertilizers. or both. Table (6) 1000 weight grains, grain yield, and harvest index.

Table 6. 1000 grains, grain yield, and harvest index.

Treatments	1000 weight grains(g) 2020	1000weight grains(g) 2021	grain yield yield (t h ⁻¹) 2020	grain yield yield (t h ⁻¹) 2021	harvest index% 2020	harvest index% 2021
V1H1F1	21.63	21.87	2.68	2.19	40.61	40.19
V1H1F2	22.17	22.03	2.79	2.22	39.98	40.02
V1H2F1	21.80	21.40	2.18	1.93	39.73	37.77
V1H2F2	21.67	22.50	2.28	2.12	38.36	40.67
V2H1F1	17.77	19.03	2.81	2.28	42.74	43.85
V2H1F2	18.20	18.93	2.46	2.49	43.97	44.69
V2H2F1	17.47	18.97	2.85	2.28	44.05	40.61
V2H2F2	18.07	18.98	2.83	2.40	44.83	43.06
V1H3F3	21.10	21.47	4.41	4.72	44.24	42.22
V1H4F3	21.03	21.40	3.05	3.18	40.27	40.80
V2H3F3	21.37	20.73	5.43	5.31	50.97	47.73
V2H4F3	17.40	19.63	3.55	3.32	42.12	41.49
LSD 0.05	0.78	1.05	0.25	0.23	1.38	1.35

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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تأثير مبيدات الادغال مع تراكيز مختلفة من المغذيات الورقية على صنفين من الرز

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المستخلص

بهدف تحقيق المكافحة المتكاملة وتحديد افضل توليفة بين صنفين الرز والمبيدات والمغذيات. نفذت تجربة حقلية في محطة ابحاث الرز في المشخاب/ دائرة بحوث النجف الاشرف / وزارة الزراعة في الموسمين 2020 و2021. استعمل تصميم القطاعات الكاملة المعشاة RCBD بتوليفات ثلاثية تضمنت اثنين من اصناف الرز مع اربع معاملات ادغال (المبيد H1 والمبيد H2 ومعاملة خالية من الادغال والمعاملة المدغلة) مع تركيزين من السماد النانوي (F1:21 g L⁻¹ and F2:10.5 g L⁻¹) فضلاً عن التسميد الاعتيادي. توضح النتائج ان V1H4F3 تفوق معنوياً بخفض الكثافة والوزن الجاف للأدغال اذ اعطى اقل قيمة 84.3 و82.0 نبات م⁻² و101.0 و123.0 غم م⁻² للموسمين بالتتابع. حقق الصنف B اعلى قيم في حاصل الحبوب ضمن (V2H3F3) بلغ 5.43 و5.31 طن ه⁻¹ للموسمين بالتتابع. اعطى المبيد H2 اقل كثافة للأدغال بلغت 27.3 و22.3 نبات م⁻² للموسمين بالتتابع، للموسمين بالتتابع. يستنتج ان الصنف عنبر -33 مع المبيدات حقق مبدأ المكافحة المتكاملة من خلال قابليته على المنافسة. ان قابلية الصنف A افضل في لتحمل وجود الادغال وذلك بفعل منافسته للأدغال في حين يعد الصنف B ذو تحمل ضعيف لوجود الادغال، من جانب اخر يتفوق الصنف B على الصنف A بزيادة حاصل الحبوب في معاملات مكافحة الادغال. لا يمكن تعويض الاضافات السمادية الاعتيادية بالسماد الورقي. المبيدان المستخدمان ذا قابلية تأثير متقاربة بتأثيرها في مكافحة الادغال. معاملات الرش الورقي مع اضافة مبيدات الادغال كانت توازي معاملات التسميد الاعتيادي مع المكافحة المدغلة.

كلمات مفتاحية: اصناف الرز، توليفات، التسميد النانوي، منافسة الادغال، حاصل الحبوب.