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EVALUATION OF DIFFERENT CONCENTRATIONS OF TARZEC AND AXIAL HERBICIDES AND SEEDING RATES ON WHEAT (*TRITICUM AESTIVUM* L.) GROWTH, YIELD, AND WEED CONTROL

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ABSTRACT

The study is conducted during the winter season of season 2022-2023 in two locations, Al-Jarn village/Nimrud district/Nineveh Governorate and Bartella district, to evaluate the efficiency of concentrations of herbicides "TARZEC" and "AXIAL" and seeding rates on the growth and yield of wheat and accompanying weed, The results showed that the seeding rate of 160 kg h1 recorded the best seed rate for the number weight weed, number of weeds, the number grains, the number spikes, and the grain yield amounted to 6.03, 2.05 weed.m2, 3.38, 6.61 g.m2, 38.59, 37.17 grain.spike1, 504.1, 474.1 spike.m2, and 578.73, 516.06 g.m^2 for the above traits and for both locations respectively. weed control efficiency in weeds number and weight TARZEC 100% and AXIAL 100% was 65.3%, 60.94%, 64.4%, 51.54%, 55.74%, 53.0%, 46.53% and 49.44% for both locations respectively. the highest rate of the number of grains in spike, the number of spikes and the yield of grains was recorded with the TARZEC 100%, TARZEC+25, AXIAL 100% and AXIAL +25. Conclude from the above that the best seeding rate is 160 kg.h in addition to the use of herbicides "TARZEC" and "AXIAL" in the recommended concentrations.

INTRODUCTION

Wheat (*Triticum aestivum* L.) is one of the most necessary cereal crops. It has an important role in human nutrition and global food sustainability and is a food source for more than 40% of the world's population (Al-Jobouri & Alabar 2021; Gyawali and et al., 2022). With increasing population growth, FAO has predicted an increase in the world's population to nine billion by 2050, which requires doubling crop production to meet the population's food needs in the future (FAO, 2020). According to global statistics, world cereal production in 2023/2024 amounted to about 784.91 million metric tons (STATISTA. 2024). Iraq is considered one of the original habitats of wheat origin, but the rate of wheat production in Iraq is still low compared to global production, as the cultivated area in Iraq for the year 2022 reached (7,487,196 million dunums) and an estimated productivity of (2,764,692 tons) (ASGIS., 2023).

The Weeds are one of the most important vital factors that affect agricultural production and cause losses in crop yields worldwide (Anthimidou et al., 2020); because it negatively affects the yield based on competition for light, place, soil moisture and food, as it causes yield losses ranging between (30-50%) as the weed is a determining factor in the growth and productivity of this crop (Halawa, 2019) ، Herbicides (especially systemic herbicides) are one of the most efficient tools to control weed and avoid or reduce crop productivity losses as they are easy to use as well and have a rapid effect in eliminating the weed and reducing the damage it causes to the growth and yield of different crops (Wahab and Aljuburi 2023b) .The seeding rate may be considered the most critical factor that significantly affects the quality and productivity of wheat crop grains. The lack of attention to the seeding rate leads to an increase in the cost of production, leading to a decrease in crop productivity and quality (Batool et al., 2022). Moreover, the optimal seeding rate is essential in creating a crop with a high yield and high-quality seeds (Megerssa et al., 2023) .The study aims to determine the best planting rate and the appropriate concentration of the herbicide through which the numbers and weights of dry weed plants associated with the wheat crop can be suppressed and the highest productivity can be achieved.

MATERIALS AND METHODS

An experiment was conducted during the 2022-2023 season in two locations, the first one in the Al-Jarn area of Hammam Al-Alil district (30 km) southern of the Mosul city center, and the second in Bartella district (28 km) southeast of the Mosul city center, to comparing the efficiency of different herbicides concentrations of [TARZEC] and [AXIAL] herbicide and seeding rates in the growth and yield of wheat (*Triticum aestivum* L.) and accompanying weed.

Experiment Factors

The study included two factors:

The first one was weed herbicides in different concentrations:

1. TARZEC -25 [-25 means “less than the recommended concentration” (R.C.) of 25].
2. TARZEC*100% [100%, means (R.C.)].
3. TARZEC +25 [+25 mean more than (R.C.) by 25%].
4. AXIAL -25.
5. AXIAL *100%.
6. AXIAL +25.
7. Control [non-herbicides sprayed].

The second factor is seeding rates: [120, 140, and 160 kg. ha $^{-1}$].

Experiment Design and Statistic

The experiment was designed with a [R.C.B.D.] with the split-block system, where the seeding rates were placed in the main plot (planting by seeder), while the chemical herbicide concentrations were placed in the sub-plot, the Duncan multi-range test (D.M.R.T.) was used to compare the treatments averages. SAS [statistical analysis system program] is used for data analysis, and the averages that have the same letter mean there are no significant differences among the treatments.

Agricultural practice's

The field was prepared for planting, and the seeds of the (Babylon-113) variety were sown on 28th Nov. 2022 at the Jarn location and 29th Nov. 2022 at the Bartella location. The area for the experimental plot was (6 × 4 meters). Using [planting by seeder] with a 17 cm distance between one row and another, herbicide treatments were applied in the 3-5 leaves stage of weed life. DAP [Di-Ammonium Phosphate] fertilizer was added at 200 kg. ha $^{-1}$, beside Urea fertilizer with 120 kg. ha^{-1} for two stages: 1st when planting, 2nd at the tillers stage. The harvest occurred on 27th May 2023 at the Al-Jarn location and 29th May 2023 at the Bartella location.

Studied traits

[Weeds No. (weed.m^{-2}), weeds weight (g.m^{-2}), Plant height (cm), Flag leaf area* [FLA] (cm^{-2}), Chlorophyll content index SPAD, Spikes No. (m^{-2}), Grains No. Per spike (grains.spike^{-1}), 1000 grains weight (g), Grains yield (g.m^{-2})].

*Flag leaf area (cm^{-2}). Using the following equation:

$$Flag\ leaf\ area\ (cm-2)\ =\ leaf\ length\ \times\ maximum\ width\ x\ 0.95$$

Table (1): The most critical weeds spread in two experimental locations.

Scientific name	Plant family
Capsella bursa-postoria L., *Raphanus raphanistrun* L., *Brassica arvensis*	Brassicaceae
Bromus spp., *Lolium rigidum* L., *Avena fatua* L., *Hordeum glaucum*	Poaceae
Carthamus oxyacanthus M.B., *Silydum marinum* L.	Compositae
Malva rotundifolia L.	Malvaceae

Table (2): Detailed information on herbicides used in the experiment.

Trade Name	Active substance	Chemical Group	Utilization rate	Target Weeds
TARZEC	Pyroxsulam 250 g/Kg + Halauxifen-methyl 69.5 g/K. + Cloquintocet mexyl	Triazolopyrimidine Arylpicolinate	75-90 gm + 500-750 ml	"Control broad and narrow-leaved weeds in wheat fields."
AXIAL	Flurasulam 5g/L + Pinoxaden 45 g/L + Cloquintocet mexyl 11.25g/L	Phenylpyrazoline	1.25 L/ 400 L/ha	"Control broad and narrow-leaved weeds in wheat fields."

RESULTS AND DISCUSSION

Total Number of weeds

Table (3) shows the effect of herbicides at the Al-jaren location, where the significant superiority of [Tarzec*100%] and [Axial*100%] were recorded (4.89 and 5.51 weed. m^{-2}) with a treatment rate of efficiency (65.3% and 60.94%) respectively. At the Bartella location, the same treatments were recorded (10.67 and 11.33 weed.m^{-2}) with an increase of (55.74% and 53.00%) respectively, while the non-sprayed treatment (Control) recorded density of weeds (24.11 weed.m^{-2}). The reason for the low density of weed plants is due to the effectiveness of these systemic herbicides and their efficiency in the recommended concentrations, as their components contain substances that inhibit enzymes responsible for Acetolacticacid synthesis (ALS), which led to the death of weed plants and reduced their numbers, and These results are consistent with(Aljuburi & Anter, 2021; Mamnoie et al, 2022) who confirmed that the use of herbicides led to a decrease in weed number plants.

Table (3): Effect of Herbicides and Seed rates and the Interaction between them in the traits of the number of weeds for the season 2022-2023.

Al-jaren location				
Herbicides	Seeding rates			Means of Herbicides
	120/ha[1]	140/ha[1]	160/ha[1]	
TARZEC -25%	15.67 b	10.0 e-h	6.67 h-l	10.78 bc
TARZEC 100%	7.0 h-l	3.67 kl	4.0 jkl	4.89 e
TARZEC +25%	12.33 b-e	8.67 f-i	5.67 i-l	8.89 cd
AXIAL -25%	15.0 bc	11.33 d-g	7.33 h-k	11.22 b
AXIAL 100%	7.67 g-j	5.33 i-l	3.52 l	5.51 e
AXIAL +25%	11.67 c-f	7.67 g-j	6.67 h-l	8.67 d
Control	20.0 a	14.0 bcd	8.33 f-i	14.11 a
Means of Seeding rates	12.76 a	8.67 b	6.03 c	
Bartella location				
TARZEC -25%	19.0 b-e	19.33 b-e	15.0 d-h	17.78 b
TARZEC 100%	13.67 d-i	11.0 f-i	7.33 i	10.67 c
TARZEC +25%	17.0 c-g	13.67 d-i	9.67 ghi	13.44 c
AXIAL -25%	25.0 ab	17.33 c-f	14.0 d-i	18.78 b
AXIAL 100%	15.33 d-h	9.67 ghi	9.0 hi	11.33 c
AXIAL +25%	20.33 bcd	12.0 e-i	9.33 hi	13.89 c
Control	28.33 a	24.0 abc	20.0 bcd	24.11 a
Means of Seeding rates	19.81 a	15.29 b	12.05 c	

Table (3) shows the effect of seeding rates at the Al-jaren location to the significant superiority of (160 kg.ha^{-1}) and recorded (12.05 weed. m^{-2}) with an increased rate (39.17%, and 22.81%) compared with (140, and 120 kg. ha^{-1}) respectively, while (120 kg. ha^{-1}) recorded the highest weed density reached (19.81 weed.m^{-2}). At the Bartella location, the treatment (160 kg. ha^{-1}) was superior, and the lowest density was recorded (12.05 weed.m^{-2}) with an increase of (39.17% and 22.81%) compared with (140 and 120 kg. ha^{-1}). In contrast, the non-sprayed treatment recorded the highest density (19.81 weed. m^{-2}). The reason for the decrease in the number of weeds at the seeding rate (160 kg. ha^{-1}) is that the increase in the seeding rate may have led to a rise in the number of plants per square meter, which in turn led

to shading weed plants and reducing the access of sunlight to them, and then affected the efficiency of photosynthesis and other vital processes negatively, especially growth, and then limited their growth and decrease their numbers, These results are consistent with(Hayawi and Hamad, 2021, Jalal and Naby, 2023).

Table (3) at the Al-jaren location for herbicide effect and seeding rates indicates that the treatment of Axial*100% herbicide is superior with seeding rate (160 kg. ha^{-1}) and the lowest weeds density recorded (3.521 weed. m^{-2}) and a treatment efficiency rate (57.74%) Comparison with the comparison treatment of the same transaction. The comparison treatment was recorded with the seeding rate (120 kg.ha^{-1}) and recorded (20.0 weed. m^{-2}). At the Bartella location, the treatment of Tarzec*100% with a seeding rate (160 kg. ha $^{-1}$) was recorded (7.33 weed. m^{-2}) with a rate of efficiency (63.35%) Comparison with the comparison treatment of the same transaction. While the comparison treatment was recorded with the seeding rate (120 kg. ha^{-1}) and reached (28.33 weed. m^{-2}).

Total dry Weight of weed

Table (4) shows the effect of herbicides at the Al-jaren location to the significant superiority of Tarzec*100% and Axial*100% and recorded (4.15 and 4.67 g. m^{-2}) with a treatment rate efficiency (64.4% and 59.94%) respectively. In contrast, the control treatment recorded the highest dry weed weight (11.66 g). At the Bartella location, the same treatments were superior (9.19 and 8.69 g.m^{-2}) with an increase of (46.53% and 49.44%) respectively, while the control treatment recorded the highest weed density (17.19 g. m^{-2}); The reason for this is the effectiveness of herbicides in these concentrations, which is due to the decrease in the number of weed plants and their inhibition of growth (Table 3). This result is consistent with (Wahab and Aljuburi, 2023b).

Table (4): Effect of Herbicides and Seed rates and the Interaction between them in the traits of the weight of weeds for the season 2022-2023.

Al-jaren location				
Herbicides	Seeding rates			Means of Herbicides
	120/ha^1	140/ha^1	160/ha^1	
TARZEC -25%	16.76 b	6.06 ef-i	3.57 f-i	8.8 b
TARZEC 100%	8.37 d	2.17 hi	1.93 i	4.15 e
TARZEC +25%	13.18 c	4.35 e-h	3.19 f-i	6.91 c
AXIAL -25%	15.26 b	6.3 e	4.8 efg	8.78 b
AXIAL 100%	8.59 d	3.55 f-i	1.86 i	4.67 de
AXIAL +25%	9.04 d	4.95 efg	2.95 ghi	5.65 a
Control	21.3 a	8.34 d	5.35 ef	11.66 a
Means of Seeding rates	13.22 a	5.1 b	3.38 c	
Bartella location				
TARZEC -25%	20.6 ab	13.57 c-f	7.05 ghi	13.74 b
TARZEC 100%	12.83 c-g	9.76 e-i	4.99 hi	9.19 c
TARZEC +25%	14.56 cde	10.1 e-i	5.53 hi	10.07 c
AXIAL -25%	17.09 bcd	14.58 cde	8.12 f-i	13.26 b
AXIAL 100%	12.25 d-g	9.27 e-i	4.54 i	8.69 c
AXIAL +25%	13.54 c-f	9.82 e-i	5.3 hi	9.56 c
Control	22.67 a	18.14 abc	10.76 e-h	17.19 a
Means of Seeding rates	16.22 a	12.18 b	6.61 c	

Table (4) on Al-jaren location showed the effect of seeding rates to the significant superiority of (160 kg.ha^{-1}) and recorded (3.38 g.m^{-2}) with an increase of (74.43% and 61.42%) compared to (140 and 120 kg. ha $^{-1}$) respectively, while (120 kg. ha $^{-1}$) recorded the highest weeds density (13.22 g. m^{-2}). At the Bartella location, the treatment of (160 kg.ha^{-1}) was superior. The lowest density recorded (6.61 g. m^{-2}) with an increased ratio reached (59.24% and 24.9%) compared with (140 and 120 kg. ha^{-1}), while (120 kg. ha^{-1}) recorded the highest density of weed (16.22 g.m^{-2}), The reason for the higher seeding rates in inhibiting the dry Weight of weed plants is due to the increase in plant density of the wheat crop per unit area, which led to a rise in its competition with the weed for nutrients, moisture, and sunlight, which reduced its numbers as well as reducing its dry weight, and These results are consistent with (Riya *et al*., 2017, Hayawi and Hamad, 2021 and Jalal and Naby, 2023).

Table (4) of herbicide effect and seeding rates at the Al-jaren location indicates the superiority of Tarzec*100% and Axial*100% beside a seeding rate of (160 kg. ha $^{-1}$) where record (1.93 and 1.86 g. m^{-2}) and a rate of treatment efficiency (63.92% and 65.23 %) respectively, compared with the control treatment for the same treatment, which did not differ significantly from Tarzec-25%, Tarzec +25% and Axial +25% with the same seeding rate. The comparison treatment was recorded with the seeding rate (120 kg. ha $^{-1}$) and recorded (21.3 g.m^{-2}). At Bartella location, the treatment of Tarzec*100% and Axial*100% with seeding rate (160 kg. ha^{-1}) and (4.99, and 4.54 g. m^{-2}) and a treatment efficiency rate of (53.62%, and 47.52%) respectively Comparison with the comparison treatment of the same transaction was not significantly different from all herbicide treatments within the same seeding rate in addition to the same herbicides at the recommended concentration and +25% concentration. The comparison treatment recorded with the seeding rate (120 kg.ha^{-1}) was reached (22.67 g. m^{-2}).

Plant height

Table (5) at the Al-jaren location shows the effect of herbicides, which have significant superiority on the control treatment , which recorded the highest height of the plant (98.41 cm). In comparison, the herbicide Axial + 25% recorded the lowest height of the plant reached (95.09 cm), while the rest did not record any significant differences between them. Also, at the Bartella location, the comparison treatment Superior (104.34 cm), while the treatment of Tarzec*100%, Axial*100%, Tarzec+25%, and Axial+25% recorded the lowest plant height (96.24, 95.59, 95.43 and 95.59 cm) respectively. The reason may be because of the efficiency of herbicides in these concentrations in decreasing the number and weight of the weeds (Table 3 and 4), the crop competition with the weeds decreased, in addition to the better entry of sunlight between planting lines, and this led to a decrease in the height of plants (Wahab & Aljuburi 2023a).

Table (5) shows the effects of seeding rates at the Al-jaren location on the significant superiority of the treatment (160 and 140 kg. ha $^{-1}$) and recorded increase in plant height (97.46 and 96.21 cm), respectively. At the Bartella location, the treatment (160 kg. ha^{-1}) was superior and reached (100.64 cm), while there were no significant differences between both treatments (140 and 120 kg. ha $^{-1}$) and recorded (96.91 and 95.65 cm) respectively. The superiority of high seeding rates in the traits of plant height may be because of an increase in the number of plants growing Per

square meter area, and their dry weights (Tables 3 and 4) led to the shading of plants and, therefore, will work to increase auxins, which work to elongate phalanges and increase the growth of stems, and These results are consistent with (Kumari & Kataria, 2023; Alhamadany & Alrijabo 2020)

Table (5) at the Al-jaren location for herbicide effect and seeding rates indicates the superiority of the comparison treatment with seeding rate (160 kg. ha^{-1}), and the increase in plant height was recorded (102.12 cm). In comparison, the treatment of Axial*100% herbicide was recorded with a seeding rate (120 kg. ha^{-1}), and the decreasing plant height reached (92.13 cm). At the Bartella location, the comparison treatment was significantly superior with the seeding rate (160 and 140 kg. ha^{-1}) and recorded the highest plant height (105.33 and 104.9 cm). In comparison, Axial-25% herbicide was treated with (120 kg. ha^{-1}), and the plant height reached (92.67).

Table (5): Effect of Herbicides and Seed Rates and their Interaction in the Plant height traits for the season 2022-2023.

Al-jaren location				
Herbicides	Seeding rates			Means of Herbicides
	120/ha^1	140/ha^1	160/ha^1	
TARZEC -25%	93.23 efg	97.07 bc	98.83 b	96.38 b
TARZEC 100%	93.37 d-g	95.37 b-g	95.4 b-g	94.71 bc
TARZEC +25%	92.93 fg	95.23 c-g	95.0 d-g	94.39 bc
AXIAL -25%	93.13 efg	97.13 bc	97.67 bc	95.98 bc
AXIAL 100%	92.13 g	95.07 d-g	96.73 bcd	94.64 bc
AXIAL +25%	92.8 fg	95.97 b-f	96.5 b-e	95.09 c
Control	95.47 b-g	97.65 bc	102.12 a	98.41 a
Means of Seeding rates	93.3 b	96.21 a	97.46 a	
Bartella location				
TARZEC -25%	98.0 efg	97.4 e-h	102.23 c	99.21 b
TARZEC 100%	94.33 ijk	95.13 hij	99.27 de	96.24 c
TARZEC +25%	92.67 jk	95.1 hij	99.0 def	95.59 c
AXIAL -25%	96.67 f-i	96.4 ghi	101.1 cd	98.06 b
AXIAL 100%	93.0 jk	94.4 ijk	98.9 d-g	95.43 c
AXIAL +25%	92.67 k	95.1 hij	99.0 def	95.59 c
Control	102.77 bc	104.9 ab	105.33 a	104.34 a
Means of Seeding rates	95.65 b	96.91 b	100.64 a	

Chlorophyll content index

Table (6) shows the effect of herbicides at the Al-jaren location to the significant superiority of Axial*100% and Axial +25% and recorded (49.07 and 48.17 SPAD) while the control treatment recorded lowest chlorophyll content reached to (45.76 SPAD). At Bartella, we note the significant superiority of Tarzec*100%, Tarzec+25%, Axial*100%, and Axial+25% (46.12, 45.93, 46.52, and 45.93 SPAD), respectively. These results can be explained by the effectiveness of herbicides in these concentrations in decreasing the number of weed plants Per square meter and inhibiting their dry weights (Table 3 and 4), which reduced the intensity of competition and thus allowed the crop plants to grow in better conditions, making

them more efficient in absorbing nutrients necessary in the construction of chlorophyll. These results are consistent with (Abdulateef, 2023).

Table (6) on Al-jaren location showed the effect of seeding rates to the significant superiority of (120 kg.ha^{-1}) and recorded (49.58 SPAD). The treatment (140 and 160 kg. ha^{-1}) recorded the lowest chlorophyll content (47.59 and 45.48 SPAD), respectively. At the Bartella location, the treatment of (120 and 140 kg. ha^{-1}) was Superior, and (46.0 and 45.21 SPAD) was recorded (160 kg.ha^{-1}) with the highest chlorophyll content (43.61 SPAD). The reason for the decrease in the rate of this trait may be due to the increase in seeding rates and the increase in the number of plants per m^{-2}, which decrease the concentration of nutrients, especially magnesium in the plant, which was negatively reflected in the low concentration of chlorophyll pigment.

Table (6) of herbicide effect and seeding rates at the Al-jaren location indicates the significant superiority of all herbicide treatments with seeds (120 kg. ha^{-1}) in addition to the herbicide Axial*100% with seeding rate (140 kg. ha^{-1}) and Tarzec-25% besides seeding rate (160 kg. ha^{-1}). They recorded the control treatment with (160 kg. ha^{-1}) besides the decreased chlorophyll content (44.54 SPAD). At Bartella location, Axial*100%, Axial +25%, Tarzec*100% and Tarzec*100% were treated with a seeding rate of (120 kg. ha^{-1}) and highest chlorophyll content (47.34, 47.44, 47.39 and 47.44 SPAD) respectively, while the comparison treatment with a seed producer (160 kg. ha $^{-1}$) had decease chlorophyll content (39.71 SPAD).

Table (6): Effect of Herbicides and Seed rates and the Interaction between them in the traits of the Chlorophyll content index for the season 2022-2023.

Al-jaren location				
Herbicides	Seeding rates			Means of Herbicides
	120/ha^{1}	140/ha^{1}	160/ha^{1}	
TARZEC -25%	48.93 ab	46.41 d-g	44.55 g	46.63 cd
TARZEC 100%	50.48 a	47.74 bcd	45.93 d-g	48.05 b
TARZEC +25%	50.14 a	47.63 b-e	45.53 fg	47.76 b
AXIAL -25%	49.69 a	47.47 b-e	45.0 g	47.39 bc
AXIAL 100%	50.56 a	49.7 a	46.95 c-f	49.07 a
AXIAL +25%	49.9 a	48.78 abc	45.84 d-g	48.17 ab
Control	47.38 b-e	45.37 fg	44.54 g	45.76 d
Means of Seeding rates	49.58 a	47.59 b	45.48 b	
Bartella location				
TARZEC -25%	44.11 fg	44.31 fg	44.22 fg	44.21 b
TARZEC 100%	47.34 a	46.16 bcd	44.87 efg	46.12 a
TARZEC +25%	47.44 a	46.34 a-d	44.02 g	45.93 a
AXIAL -25%	45.99 cde	44.5 fg	42.33 h	44.27 b
AXIAL 100%	47.39 a	47.3 ab	44.88 efg	46.52 a
AXIAL +25%	47.44 a	46.34 a-d	44.02 g	45.93 a
Control	42.44 h	40.8 i	39.71 j	40.98 c
Means of Seeding rates	46.0 a	45.21 a	43.61 b	

Flag leave area.cm^{-2}

Table (7) of the effect of herbicides at the Al-jaren location showed the significant superiority of Axial*100% and Axial +25% and reached the highest flag

leave area (44.63 and 44.29 cm^{-2}), respectively. In contrast, the control treatment recorded the lowest leaf area (38.62 cm^{-2}). As for Bartella, the treatment of Tarzec*100%, Tarzec+25%, and Axial*100% Superior did not differ significantly from the treatment of Axial + 25% and recorded (37.71, 37.05, 37.3, and 36.23 cm^{-2}), while the control treatment recorded the highest weeds density (32.53 cm^{-2}). The reason for the superiority of these treatments in increasing the flag leaf area may be due to the effectiveness of these herbicides, which affected the weed plants and reduced their growth, which allowed the wheat plant to grow better and take advantage of growth requirements such as light, water, and nutrients, and thus increase the process of photosynthesis and vital activities, including the growth and division of science leaf cells. These results are consistent with (Abdulateef, 2023 and Jabbar *et al*., 2023).

Table (7) shows the effects of seeding rates at the Al-jaren location to the significant superiority of (120 kg. ha $^{-1}$) and recorded (45.58 cm^{-2}) while (160 $kg.ha^{-1}$) recorded the lowest paper area of (40.22 cm^{-2}). Bartella location is also superior to the (120 $kg.h^{-1}$) transaction and recorded (38.55 cm^{-2}), while (160 $kg.ha^{-1}$) recorded the lowest leave area (32.34 cm^{-2}). Perhaps the reason for the decrease in the area of the flag leaf when the seeding rates increase is because increasing in plant density Per area and, thus, the increase in the intensity of competition between crop plants on the factors necessary for the growth and division of science leaf cells such as light, water and nutrients, and These results are consistent with (Bektash and Naas, 2016 ; Anter & Al-Mashhadani, 2020).

Table (7): Effect of Herbicides and Seed Rates and the Interaction between them in the traits of the Flag Leave Area for the Season 2022-2023.

Al-jaren location				
Herbicides	Seeding rates			Means of Herbicides
	120/ha^{1}	140/ha^{1}	160/ha^{1}	
TARZEC -25%	43.02 d	40.79 f	38.44 g	40.75 d
TARZEC 100%	45.91 bc	42.94 d	41.12 f	43.32 b
TARZEC +25%	45.31 c	42.68 d	40.79 f	42.93 bc
AXIAL -25%	46.31 b	41.41 ef	40.46 g	42.73 c
AXIAL 100%	49.38 a	42.2 de	42.3 de	44.63 a
AXIAL +25%	48.63 a	42.14 de	42.09 de	44.29 a
Control	40.51 f	39.02 g	36.33 h	38.62 e
Means of Seeding rates	45.58 a	41.6 b	40.22 c	
Bartella location				
TARZEC -25%	35.37 cde	34.79 c-f	31.4 fgh	33.85 bc
TARZEC 100%	41.66 a	38.4 abc	33.08 efg	37.71 a
TARZEC +25%	39.78 ab	36.44 b-e	34.92 c-f	37.05 a
AXIAL -25%	37.41 bcd	35.49 cde	31.09 gh	34.66 cd
AXIAL 100%	41.01 a	37.13 bcd	33.76 d-g	37.3 a
AXIAL +25%	39.55 ab	36.41 b-e	32.73 e-h	36.23 ab
Control	35.05 cde	33.11 efg	29.45 h	32.53 d
Means of Seeding rates	38.55 a	35.96 b	32.34 c	

Table (7) at Al-jaren location for herbicide effect and seeding rates indicates the significant superiority of Axial * 100% and Axial +25% with (120 kg. ha $^{-1}$) and

a reached to (49.38 and 48.63 cm^{-2}), while the comparison treatment with the seeding rate of (160 kg. ha^{-1}) recorded the lowest rate of the trait was (36.33 cm^{-2}). At Bartella location, the treatment of Tarzec*100% and Axial*100% with (120 kg. ha^{-1}) and (41.66 and 41.01 cm^{-2}) respectively compared with the control for the same treatment was recorded and didn't differ significantly from each, while the control treatment was recorded with the seeding rate (160 kg. ha^{-1}) and the lowest rate of the trait was recorded (29.45 cm^{-2}).

Grains Number Per spike

Table (8) of the effect of herbicides at Al-jaren location shows the superiority of Axial * 100%, which recorded (38.46 grains.$spike^{-1}$) and an increase of (16.3%) from the comparison treatment, which did not differ significantly from Tarzec*100% and Axial*100% herbicide and recorded (37.78 and 37.79 grains.$spike^{-1}$) with an increase of (14.79 and 14.81 grains.spike-1) respectively. In contrast, the comparison treatment was recorded (32.19 grains.$spike^{-1}$). In Bartella, Axial *100% surpassed (35.52 grains.$spike^{-1}$) with an increase of (20.88%) from the comparison treatment, which did not differ significantly from Tarzec*100% and Axial*100% and recorded (34.89 and 34.81 grains.$spike^{-1}$) with an increase of (19.46 and 19.27 grains.$spike^{-1}$) respectively, while the comparison treatment recorded (21.1 grains.$spike^{-1}$). The effectiveness of these treatments and their high efficiency in the Control of narrow and broad-leaved weed (Table 3 and 4) plants spread in the experimental fields in reducing their numbers and inhibiting their dry weights, which provided sufficient opportunity for wheat crop plants to consume and exploit all growth factors such as lighting, moisture, and nutrients and increase the efficient photosynthesis and dry matter production of dry matter, which in turn reflected positively on the transfer of this material to the spikes and the formation of grains and increased their numbers in the spike and this result is consistent with (Kumar et al., 2019 ; Wahab and Aljuburi 2023b).

Table (8) on Al-jaren location showed the effect of seeding rates to the moral superiority of (160 kg. ha^{-1}) and recorded (38.59 grains.$spike^{-1}$) while (120 kg. ha^{-1}) recorded the lowest grains number Per spike amounted to (34.24 grains.$spike^{-1}$). Also, in the Bartella location, the treatment (160 kg. ha^{-1}) recorded (37.17 grains.$spike^{-1}$) while the treatment (120 kg. ha^{-1}) recorded a decreasing number of grains per spike, amounting to (28.6 grains.$spike^{-1}$).

Table (8) of herbicide effect and seeding rates at Al-jaren location indicates the superiority of Tarzec*100%, Tarzec+25%, Axial*100%, Axial +25%, with (160 kg. ha^{-1}) and (40.14, 39.83, 40.69 and 40.05 grains. $spike^{-1}$). At the same time, the comparison treatment was recorded with the seeding rate (120 kg. ha^{-1}) and the trait's lowest rate (29.87 grains.$spike^{-1}$). At Bartella, the treatment of Tarzec*100%, Tarzec+25%, Axial*100%, and Axial +25% were significantly superior, with (160 kg. ha^{-1}) and recorded (38.66, 38.85, 79.17 and 38.74 grains.$spike^{-1}$). In contrast, the comparison treatment was recorded with the seeding rate (120 kg. ha^{-1}), and the lowest rate of the trait was recorded (24.27 grains.$spike^{-1}$). The reason for the decrease in grains number Per spike when increasing the seeding rates explains the inverse relationship between the seeding rates and grains number Per the spike, and this is due to the increase in the number of plants per m^{-2}, which leads to increased competition between the crop plants on the requirements of growth and then

insufficient nutrients, which in turn affect the efficiency of the photosynthesis process and affect the vital activities of the wheat crop, which reduced the processed materials in the source that move to the estuary, And caused a reduction in grains number Per spike. (Aljuburi and Antar, 2021).

Table (8): Effect of Herbicides and Seed rates and the Interaction between them in the traits of the number of grains.spike^{-1} for the season 2022-2023.

L-jaren location				
Herbicides	Seeding rates			Means of Herbicides
	120/ha^{1}	140/ha^{1}	160/ha^{1}	
TARZEC -25%	32.96 g	35.71 cde	37.44 b	35.37 c
TARZEC 100%	35.37 ef	37.83 b	40.14 a	37.78 ab
TARZEC +25%	35.06 ef	36.83 bc	39.83 a	37.24 b
AXIAL -25%	34.23 f	34.7 ef	37.71 b	35.55 c
AXIAL 100%	36.72 cde	37.97 b	40.69 a	38.46 a
AXIAL +25%	35.49 def	37.85 b	40.05 a	37.79 ab
Control	29.87 h	32.44 g	34.26 f	32.19 d
Means of Seeding rates	34.24 c	36.19 b	38.59 a	
Bartella location				
TARZEC -25%	26.95 f	31.08 e	35.51 bc	31.18 d
TARZEC 100%	30.12 e	35.88 bc	38.66 a	34.89 ab
TARZEC +25%	30.3 e	34.7 c	38.85 a	34.62 b
AXIAL -25%	27.39 f	33.15 d	36.8 b	32.45 c
AXIAL 100%	31.06 e	36.33 b	39.17 a	35.52 a
AXIAL +25%	30.13 e	35.56 bc	38.74 a	34.81 ab
Control	24.27 g	27.57 f	32.46 d	28.1 e
Means of Seeding rates	28.6 c	33.47 b	37.17 a	

Number of spikes.m^{-2}

Table (9) shows the effect of herbicides at the Al-jaren location on the superiority of Tarzec*100% and Axial*100%. It did not differ significantly from Axial + 25% pesticide and recorded (472.9, 476.0, and 468.3 spikes.m^{-2}) With efficiency and increase of (24.55%, 25.04%, and 23.8%) respectively. In contrast, the comparison control treatment recorded decreased spikes (356.8 spikes.m-2). At the Bartella location, Axial*100% superiority significantly from Tarzec*100%, Tarzec+25%, and Axial*100% and recorded (443.2, 438.1, 423.4 and 438.0 spike-m^{-2}) with an increase of (26.39%, 25.54%, 22.95% and 25.52%) respectively, while the comparative treatment was recorded (326.2.m^{-2}). Perhaps the reason for the superiority of the herbicide sprayed treatments compared to the comparison treatment is because the sensitivity of weed plants to these herbicides, which were greatly affected, reducing their numbers and inhibiting their dry weights (Table 3, 4) due to these concentrations of herbicides, which allowed the crop to grow without competition for nutrients, water and light, which led to increasing the efficiency of photosynthesis and improving the performance of vital activities, especially in the vegetative growth stage and subsequent stages, and this was reflected in the increase in the spikes number. These results are consistent with (Al-Ziady et al., 2019 and Abdulateef, 2023).

Table (9) on Al-jaren location showed the effect of seeding rates to the significant superiority of (160 kg.ha^{-1}) and recorded (504.1 spike.m^{-2}) with an increase rate reached (14.56% and 22.13%) compared with (140 and 120 kg. h^{-1}) respectively, while (120 kg. ha^{-1}) recorded the Lowest Number of spike reached (392.5 spike. m-^{2}). At Bartella location, the treatment of (160 kg.ha^{-1}) recorded (474.1 spikes.m^{-2}) with an increase of (13.05% and 29.67%) compared to the treatment of (140 and 120 kg. ha^{-1}), while the treatment of (120 kg. ha^{-1}) recorded the Lowest Number recorded (333.4 spikes.m^{-2}). The reason for the increase in the seeding rate (160 kg. ha^{-1}) On the rest of the other rates, the reason may be an increase in plant density per unit area, which is directly proportional to the number of active spike-bearing shoots; this causes a high in the number of spikes per meter area. This result agreed with (Anter & Al-Mashhadani, 2020).

Table (9) of herbicide effect and seeding rates at Al-jaren location indicates the superiority of Tarzec*100% and Axial*100%, which did not differ significantly from Tarzec + 25% and Axial * 100+25% with a seeding rate of (160 kg. ha^{-1}) and recorded (535.5, 529.8, 524.3 and 517.0 spikes.m^{-2}) with an efficiency rate of (2033%, 19.47%, 18.63% and 17.48%) respectively Comparison with the comparison treatment of the same transaction., while the comparison treatment was recorded with the seeding rate (120 kg. ha^{-1}) and recorded (299.1 spike.m^{-2}).

At Bartella location, the treatment of Axial* 100% with (160 kg. ha^{-1}) seeding rate, that did not record significantly different from all other herbicide treatments, was recorded (530.8 spikes.m^{-2}) With efficiency and increase of (32.79%) Comparison with the comparison treatment of the same transaction, while the comparison treatment was reached with the (120 kg. ha $^{-1}$) seeding rate and reached (265.0 spikes. m^{-2}).

Table (9): Effect of Herbicides and Seed rates and the Interaction between them in the number of spikes.m^{-2} traits for the season 2022-2023.

Al-jaren location				
Herbicides	Seeding rates			Means of Herbicides
	120/ha^{1}	140/ha^{1}	160/ha^{1}	
TARZEC -25%	378.9 i	401.2 gh	509.6 b	429.9 c
TARZEC 100%	429.9 e	453.4 d	535.5 a	472.9 a
TARZEC +25%	408.0 fg	452.6 d	524.3 ab	461.6 b
AXIAL -25%	384.9 hi	423.5 ef	485.8 b	431.4 c
AXIAL 100%	427.9 ef	470.4 bc	529.8 a	476.0 a
AXIAL +25%	419.2 efg	468.8 bc	517.0 ab	468.3 ab
Control	299.1 k	344.8 j	426.6 ef	356.8 d
Means of Seeding rates	392.5 c	430.7 b	504.1 a	
Bartella location				
TARZEC -25%	315.0 gh	380.0 d-g	457.2 a-d	384.0 c
TARZEC 100%	350.0 fg	433.6 c-f	530.8 a	438.1 ab
TARZEC +25%	351.4 fg	427.2 c-f	491.8 abc	423.4 abc
AXIAL -25%	333.3 gh	391.6 d-g	454.4 a-d	393.1 bc
AXIAL 100%	368.3 efg	454.2 a-b	507.1 abc	443.2 a
AXIAL +25%	351.3 fg	442.0 b-e	520.6 ab	438.0 ab
Control	265.0 h	357.1 fg	356.7 fg	326.2 d
Means of Seeding rates	333.4 c	412.2 b	474.1 a	

Weight of 1000 grams.g^{-1}

Table (10) shows the effect of herbicides at the Al-jaren location on the significant superiority of Tarzec*100% and Tarzec +25% and recorded (33.21 and 33.15 g). In contrast, the control treatment reached the lowest Weight at (30.68 g). Also, at the Bartella location, Axial*100% and Axial +25% (35.13 and 33.3 g) were outclassed, while the control reached the decreased Weight reached (29.45 g). The reason for the superiority of these herbicides and recording the highest Weight of grains compared to the treatment of the weed is attributed to their effectiveness and efficiency in reducing the number of weed plants and inhibiting their dry weights, which in turn limits competition between weed plants and crop plants, Which gave space to crop plants by exploiting all growth factors (water, nutrients, and light), which led to increasing the efficiency of photosynthesis process and an increase in the processed materials in the source and their transfer to grains, and this, in turn, led to the accumulation of dry matter during the fullness of the pill, which increased the Weight of the grains. This is consistent with (Al-Jubouri & Anter, 2021).

Table (10): Effect of Herbicides and Seed rates and the Interaction between them in the number of spikes.m^{-2} traits for the season 2022-2023.

Al-jaren location				
Herbicides	Seeding rates			Means of Herbicides
	120/ha^{1}	140/ha^{1}	160/ha^{1}	
TARZEC -25%	32.06 e-f	31.25 efg	30.58 fg	31.29 cd
TARZEC 100%	34.29 a	33.49 ab	31.83 d-g	33.21 a
TARZEC +25%	34.3 a	33.3 abc	31.86 d-g	33.15 a
AXIAL -25%	32.38 b-e	32.1 e-f	30.9 fg	31.79 bc
AXIAL 100%	32.96 a-d	32.16 e-f	31.5 d-g	32.21 b
AXIAL +25%	32.93 a-d	32.16 e-f	31.45 efg	32.18 b
Control	31.72 d-g	30.89 fg	29.43 h	30.68 d
Means of Seeding rates	32.95 a	32.19 b	31.08 c	
Bartella location				
TARZEC -25%	32.34 e-h	32.09 f-i	30.86 ij	31.77 c
TARZEC 100%	34.83 b	33.96 bcd	32.88 d-h	33.89 b
TARZEC +25%	34.77 b	33.43 cde	31.71 ghi	33.3 b
AXIAL -25%	32.99 c-f	32.23 e-h	31.66 hi	32.29 c
AXIAL 100%	36.43 a	34.75 b	34.21 bc	35.13 a
AXIAL +25%	34.77 b	33.43 cde	31.71 ghi	33.3 a
Control	30.16 j	29.79 j	28.39 k	29.45 d
Means of Seeding rates	34.04 a	32.92 b	31.84 c	

Table (10) on the Al-jaren location showed the effect of seeding rates to the significant superiority of (120 kg.ha^{-1}) and recorded (32.95 g) while (160 kg.ha^{-1}) reached the decrease Weight of (31.08 g). At the Bartella location, the same treatment was Superior (34.04 g) while (160 kg.ha^{-1}) recorded the lowest Weight recorded (31.84 g). The decrease in the Weight of 1000 grain when increasing seeding rates can be explained by the increase in plant densities per unit area, which increased the intensity of competition between crop plants for growth requirements; this reduced the efficiency of photosynthesis and dry processed matter at the source that moves to the grain, as well as that the dry matter manufactured at the source is distributed over

the most significant number of spikes The reason may be the increase in the number of spikes in high seeding rates (Table 9) and as a result of high plant density, it decreases according to So weigh the grain according to the compensation principle. This result agreed with (Shoaib et al., 2022).

Table (10) of herbicide effect and seeding rates at Al-jaren location indicated the superiority of Tarzec*100% and Tarzec +25% and did not differ significantly from Axial*100% and Axial +25% with the seeding rate (120 kg. ha^{-1}) and recorded (34.29, 34.3, 32.96 and 32.93), while the comparison treatment with the seeding rate (160 kg. ha^{-1}) recorded the lowest Weight (29.43 g). At the Bartella location, Axial*100% was significantly superior, with a seeding rate of (120 kg. ha^{-1}) and recorded (36.43 g). The comparison treatment with of (160 kg. ha^{-1}) seed rate recorded the decrease Weight of.(28.39)

Grain yield gm^{-2}

Table (11) showed the effect of herbicides in Al-jaren location to the significant superiority of Tarzec*100%, Tarzec +25%, Axial*100% and Axial +25%, and recorded the highest grain yield of (534.07, 537.47, 541.58 and 549.13 g. m^{-2}) and the efficiency rate of the treatment amounted to (32.96%, 33.38%, 33.89% and 34.8%) respectively, while the control treatment recorded the lowest number of spikes reached (358.03 $g.m^{-2}$). Also, in the Bartella location, the same treatments superior significantly and recorded (530.04, 503.5, 546.56, and 540.2 spike-m^{-2}) with an increase of (48.28%, 45.55%, 49.84%, and 49.25%) respectively, while the comparison treatment recorded lowest yield reached (274.12 $g.m^{-2}$). The absence of weed plants and their narrow and broad-leaved types in the treatments that were sprayed with herbicides used in the study from the beginning of the crop growth stage until the stage of physiological maturity provided the opportunity for wheat crop plants to benefit better and optimally to the growth requirements (water, nutrients, and light), It resulted in increasing the efficiency of photosynthesis and an increase in the dry matter manufactured at the source and its transfer to the outfalls (grains) in the stage of grain formation and fullness, as well as increasing growth rates and reflecting it. Positive on the components of yield and grain yield. This result was consistent with (Sharma et al., 2018; Al-Khafji et al, 2020; Abdulateef, 2023).

Table (11) on Al-jaren location showed the effect of seeding rates to the significant superiority of the treatment of (160 kg. ha^{-1}) and recorded the highest yield of (578.73 $g.m^{-2}$) with an increase of (14.85% and 33.45%) compared to the treatment of (140 and 120 kg. ha^{-1}) respectively, while the treatment of (120 kg. ha^{-1}) recorded the highest density of the weed amounted to (384.62 $g.m^{-2}$). At the Bartella location, the treatment of (160 kg. ha^{-1}) was higher and recorded (at 516.06 $g.m^{-2}$), with an increase of (9.61% and 30.03%) compared to the transaction of (140 and 120 kg. ha^{-1}), while the transaction of (120 kg. ha^{-1}) recorded the lowest yield of (361.03 spikes.m^{-2}). The reason for the decrease in grain yield at the seeding rate (120 kg. ha^{-1}) in the three sites under study is due to the decline in plant density, the number of plants per unit area, and the decrease in the number of spikes (Table 9), which is the essential characteristic affecting grain yield. These results are the opposite of what was obtained by increasing the seeding rate (160 kg. ha-1). These results are consistent with (Hayawi and Hamad, 2021, Shoaib et al., 2022), who indicated an

increase in grain yield when seeding rates increased, and yield decreased with a lower seeding rate.

Table (11) of herbicide effect and seeding rates at the Al-jaren location indicates the significant superiority of Tarzec*100%, Tarzec+25%, Axial*100%, and Axial +25% with a seeding rate (160 kg. ha^{-1}) and the highest grain yield (620.27, 634.05, 648.16 and 652.3 $g.m^{-2}$) with a treatment efficiency rate of (26.98%, 28.57%, 30.12% and 30.57%) respectively compared to the control treatment of the same transaction, while the comparison treatment with the seeding rate (120 kg. ha^{-1}) recorded the lowest yield of (283.34 g. m^{-2}). Also, on the Bartella site, the treatment of Tarzec*100%, Axial*100% and Axial +25% with (160 kg. ha^{-1}) and the highest yield of grain (619.54, 627.84, and 623.58 $g.m^{-2}$) and an efficiency rate of (52.98%, 53.61% and 53.29%) respectively Comparison with the comparison treatment of the same transaction. Moreover, did not differ significantly with the treatment of Tarzec + 25% with (160 $kg.ha^{-1}$), Tarzec+25% and Axial * 100% with (140 kg. ha^{-1}), while the treatment of compared with the (120 kg. ha^{1}) recorded the lowest yield reached (211.05 $g.m^{2}$).

Table (11): Effect of Herbicides and Seed rates and the Interaction between them in the traits of the Grain yield $g.m^{-2}$ for the season 2022-2023.

Al-jaren location				
Herbicides	Seeding rates			Means of Herbicides
	120/ha^{1}	140/ha^{1}	160/ha^{1}	
TARZEC -25%	367.07 e	428.43 d	514.08 c	436.52 b
TARZEC 100%	421.4 d	560.54 b	620.27 a	534.07 a
TARZEC +25%	415.97 d	562.4 b	634.05 a	537.47 a
AXIAL -25%	366.99 e	421.53 d	529.39 bc	439.3 b
AXIAL 100%	417.71 d	558.89 bc	648.16 a	541.58 a
AXIAL +25%	419.87 d	575.22 b	652.3 a	549.13 a
Control	283.34 f	337.86 e	452.89 d	358.03 c
Means of Seeding rates	384.62 c	492.12 b	578.73 a	
Bartella location				
TARZEC -25%	298.83 i	346.7 ghi	381.96 fgh	342.5 c
TARZEC 100%	416.83 efg	553.75 abc	619.54 a	530.04 a
TARZEC +25%	398.69 fgh	524.55 bcd	587.27 ab	503.5 a
AXIAL -25%	323.76 hi	388.99 fgh	480.97 cde	397.91 b
AXIAL 100%	454.5 def	557.35 abc	627.84 a	546.56 a
AXIAL +25%	423.56 efg	573.47 ab	623.58 a	540.2 a
Control	211.05 j	320.07 hi	291.25 i	274.12 d
Means of Seeding rates	361.03 c	466.41 b	516.06 a	

CONCLUSIONS

It is concluded from the above research that the best seeding rate is 160, and the seeding rates of 120 and 140 $kg.h^{1}$ have affected the yield and its components and is considered a loss for the farmer in economic terms.in addition to that the use of herbicides weed "TARZEC" and "AXIAL" in the recommended concentrations gives the best efficiency to control the weeds and increase in the yield of grains and its components are considered economical, and stay away from increasing concentration because it does not cause a significant increase in the yield and its components.

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CONFLICT OF INTEREST

Author declares no conflicts of interest regarding he publish this article.

تقييم كفاءة تراكيز مختلفة من مبيد TARZEC و AXIAL ومعدلات البذار في نمو وحاصل حنطة الخبز (*Triticum aestivum* L.) والادغال المرافقة

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الخلاصة

أجريت الدراسة خلال الموسم الشتوي 2022–2023 في موقعين قرية الجرن/قضاء النمرود/محافظة نينوى وناحية برطلة، لتقييم كفاءة تراكيز مبيدي الأدغال "TARZEC" و" AXIAL" ومعدلات البذر في نمو وحاصل الحنطة والأدغال المرافقة، وأظهرت النتائج أن معدل البذر 160 كغم/هـ سجل أفضل معدل بذر لصفات عدد ووزن الأدغال وعدد الحبوب وعدد السنابل وحاصل الحبوب بلغ 6.03، 2.05 دغل.م$^{-2}$، 3.38، 6.61 غم.م$^{-2}$، 38.59، 37.17 حبة.سنبلة$^{-1}$، 504.1، 474.1 سنبلة.م$^{-2}$، 578.73، 516.06 غم.م$^{-2}$ للصفات أعلاه ولكلا الموقعين على التوالي. بلغت كفاءة مكافحة الأدغال في عدد ووزن الأدغال لمعاملة TARZEC 100% و 65.3% AXIAL 100% و60.94% و64.4% و51.54% و55.74% و53.0% و46.53% و49.44% للموقعين على التوالي، وسجلت أعلى نسبة لعدد الحبوب في السنبلة وعدد السنابل ومحصول الحبوب مع TARZEC 100% و TARZEC 25+ و AXIAL 100% و AXIAL 25+، ونستنتج مما سبق أن أفضل معدل بذر هو 160 كجم/هـ بالإضافة إلى استخدام مبيدي TARZEC و AXIAL بالتركيزات الموصي بها.

الكلمات المفتاحية: تقييم، تراكيز، مبيدات الادغال، معدلات البذار، *Triticum aestivum* L.، TARZEC و AXIAL.

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