Response of Bread Wheat to Post-emergence Herbicides and Seeding rates on Growth, Yield and associated weeds in Ninevah Governorate.

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Abstract
The experiment was carried out in season (2022-2023) in Nineveh Governorate, in two locations, the first one in the Nimrud district, and the second in the Hammam Al-Alil district, the experiment included two factors, the first factor is chemical herbicides (navigator Tarzek, timeline trio) according to the recommended concentrations (Table 1), in addition to the weedy treatment (weedy), and the second factor is three seeding rates (120, 140 and 160 kg. ha-1), with the wheat variety (Babylon 113). The herbicides in reducing the total number of weed and their dry weights outperformed the treatment of the weed in both locations, the three chemical herbicides used in this study excelled in reducing the total number of weed and their dry weights compared to the weedy treatment, the height of wheat plants increased with the increase in seeding rates at the Nimrud location and as the height of wheat plants decreased when using chemical herbicides for both locations compared to the weedy treatment, the number of spikes increased with increasing seeding rates as seeding rate (160 kg. ha-1) recorded significant difference and by an increase in the number of spikes amounting to (134.709, 53.7 spikes. m-2) for both locations respectively, compared to the seeding rate (120 kg. ha-1), and the number of spikes increased when using chemical herbicides compared to the weedy treatment, as (Timeline Trio) exceeded and recorded increase rate of (58.6, 38.0%) sequentially, the amount of grain yield (ton. ha-1) increased when the seeding rates increased, especially at the seeding rate (160 kg. ha-1) by (1.512, 1.364 ton. ha-1) in order compared to the seeding rate (120 kg. ha-1), as well as an increase in the yield of grains in herbicide sprayed treatments compared to the weedy, as the (Timeline Trio) outperformed in both locations with an increase of (80.6, 54.4%.(

Keywords: Post-emergence herbicides, Bread-wheat, Seeding rates, Tarzek, Timeline Trio, Navigator .

Introduction

The wheat crop (Triticum aestivum L.) is an important cereal crop belonging to (Poaceae), which man cultivated and improved thousands of years ago until the present day, so it is one of the oldest crops [1]. "King of grains" is a nickname given to the wheat crop because of its vital role in the human diet globally and is the most important basic source of energy needed by humans, and with the increasing population growth, FAO predicted an increase in the world population to nine billion by (2050), and this requires doubling crop production for the purpose of meeting the nutritional needs of the population in the future [2]. The seeding rate is one of the most important factors that significantly affect the

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quality and productivity of grains in wheat, and lack of attention to the seeding rate can lead to a high cost of production and thus will lead to a decrease in crop productivity and quality [3], and the optimal seeding rate is important to create a uniform crop and obtain high-quality seeds [4.[

The weed is one of the most important vital factors affecting agricultural production and causing losses in the yield of various crops around the world [5] because it causes a reduction in the quality and quantity of crops and also causes some of them dangerous to human and animal health. herbicides (especially systemic herbicides) are one of the most efficient tools to control the weed and avoid or reduce the productivity losses of agricultural crops [6], as they are easy to use as well as their rapid effect in eliminating the weed and reducing the damage it causes to the growth and yield of different crops [7.[

Based on all of the above, this experiment aims to find out the best seeding rate and herbicides in vegetative growth and yield characteristics, and weed associated with the bread wheat in Nineveh Governorate

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Materials and Methods

The study experiment conducted during season (2022-2023), in the fields of wheat farmers in Nineveh Governorate, with locations, the first was in Nimrud district, which is located 35 km southeast of mousl city center and the second was in Hammam Al-Alil district, which is located 25 km south of mousl city center, the locations located within the semi-rain-guaranteed areas, where the cultivated area in each location reached (850 m2). The land was prepared by plowing it perpendicular to the plow by the dump plow, and the soil was smoothed by disc combs machine, and cultivation was conducted in the experimental land on (22nd Nov. 2022 and 1st Dec. 2022) respectively, with the cultivar (Babylon 113), DAP fertilizer (Di-Ammonium Phosphate) was added once when planting at a rate of (200 kg.ha-1) and according to the recommendations of the Iraqi Ministry of Agriculture, and nitrogen fertilizer (Urea 46% Nitrogen) was added in two batches (at the branching, and elongation stage) with (240 kg.ha-1), the experiment was irrigated complementary by fixed sprayers, herbicide spraying was carried out using a knapsack sprayer capacity of (16 liters) after calibration at the stage of (3-5 leaves) of the life of bush plants, the experiment was harvested on (24th ,and 28th May 2023) respectively. The experiment included two factors, the first factor with three chemical herbicides (Timeline Trio, Navigator, Tarzek) according to the recommended concentrations in addition to the comparison treatment and the second factor is three rates of seeding, which are (120, 140, and 160 kg. ha-1). The following characteristics were studied [total weed number m-2, total dry weight of weed g. m-2, plant height cm, number of spikes spike. m-2, number of grains per spike grain. spike-2, 1000 grains weight, biological yield ton. ha-1, grain yield ton. ha-2.[

Statistical Analysis:

The statistical analysis of the studied traits was carried out according to the system of factorial experiments, the system of split-block with the complete random block design (R.C.B.D), with three replicates, where the main plot included chemical herbicides and sub-plots on the seeding rates, and the averages were compared according to the Duncan multiple range test (DMRT), where the different

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treatments were distinguished by different alphabets and below the probability level of 5% [8]. The statistical analysis by using the SAS program (Statistical Analysis System .(

Table (1), the traditional name, effective substance, mean of using, and chemical group for herbicides.

Trade name	Active ingredient	Dose
Navigator	Flurasulam+ Pinoxaden+ Cloquinocet Mexyl	1.25 L.400 L. of water. ha^{-1}
Tarzek	Pyroxsulam + Halauxifen-methyl	75-90 gm+ 500-750 ml dispersible
Timeline Trio	Pinoxaden+ Clodinafop-Propargyl+Florasulam	1.25 L.400 L. of water. ha^{-1}

Results and discussion:

.1 Effect of Chemical herbicides and seeding rates on total weed number (weed. m-2:(

The results in Table (2) showed the treatment with the herbicide (Timeline Tiro) recorded the lowest number of total weed (35.33, and 1.44 weed. m-2) in the two locations (Nimrud, and Hammam Al-Alil) respectively, this result may be due to the effectiveness of the herbicides used in the study and their effect on the number of narrow, and broad-leaved weed plants, and then this led to a decrease in the total number of weed plants in these treatments compared to the weedy treatment that recorded the highest rate of trait (117.111, and 13.222 weed. m-2) for both locations respectively. This finding is consistent with [9.[

the seeding rate (160 kg. ha-1) was significantly superior to another seeding rates, where treatment recorded the lowest number of weed plants (35.33, and 1.833 weed. m-2) for both locations respectively, while the seeding rate (120 kg. ha-1) gave the highest rate of the trait (96.167, and 9.33 weed. m-2) respectively, that the reason for the higher seeding rate (160 kg. ha-1) was due to the decrease in the number of narrow and broad-leaved weed for the same treatment of the number of narrow and broad weed. Hence the total number of weed plants decreased. This finding is consistent with [10.[

The interaction between the chemical herbicides with the seeding rates in the study had a significant effect, as Table (2) indicated that the treatment (Timeline Trio +160 kg. ha-1) recorded the lowest number of total weed plants, reaching (9.33 weed.m-2) at the (Nimrud) location, while in the (Hammam Al-Alil) location the treatment (Navigator +160 kg. ha-1) gave the lowest rate of trait (0.333 weed. m-2) sequentially, while the highest rate of total weed at the treatment (weedy+ 120 kg. ha-1) with the highest quality rate (89.342, and 27.3000 weed .m-2) for both locations respectively.

Table (2) effect of chemical herbicides seeding rates, and their interaction on the number of total weeds (m^2)

Nimrud				
Herbicides	120 kg. ha^{-1}	140 kg. ha^{-1}	160 kg. ha^{-1}	**Mean of herbicides**
weedy	a146.000	b110.667	c94.667	**a117.111**
Navigator	e81.333	h41.333	k15.333	**c 46.000**
Tarzek	d88.000	g58.667	j22.000	**b56.222**
Timeline trio	f69.333	i27.333	l9.333	**d35.333**
Means of seeding rates	**a96.167**	**b59.500**	**c35.333**	
Hammam Al-Alil				
weedy	a20.000	b14.000	de5.666	**a13.222**
Navigator	cd7.000	f3.667	f0.333	**b3.666**
Tarzek	c 7.666	e5.333	f0.666	**b4.555**
Timeline trio	f2.666	g1.000	f0.666	**c1.444**
Means of seeding rates	**a9.333**	**b6.000**	**c1.833**	

.2 Effect of chemical herbicides and seeding rates on dry weight of total weed (g.m-2:(

The results in Table (3) showed indicate the superiority of the chemical herbicides used in the study in reducing the dry weight of total weed plants compared to the herbicides-free treatment as well as the superiority of herbicides among them, the (Timeline Trio) significantly outperformed with another treatments where record the lowest rate of trait, reaching (20.524 g. m-2) compared to the weedy treatment, which recorded the highest rate of trait (69.968 g. m-2), while the (Navigator, and Tarzek) recorded an average trait of (25.857, and 31.600 g. m-2) sequentially. In the (Nimrud) location, as for the study location (Hammam Al-Alil), the (Timeline Trio) followed the same behavior in the (Nimrud) location, as it significantly outperformed with another treatments where recorded the lowest rate of the trait (1.006 g. m-2) compared to the weedy treatment that recorded the highest rate of the trait (12.998 g. m-2) while there was no significant difference between the two herbicides (Navigator and Tarzek) who recorded an average trait of (3.243 and 4.078 g. m-2) respectively, perhaps the reason for the superiority of chemical herbicides over the treatment of the penetrator in reducing the dry weight of the plants of the total weed is the effectiveness and efficiency of these herbicides being selective systemic herbicides that are absorbed by the roots and leaves and bidirectionally as they move in all parts of the plant and act as an inhibitor of amino acid biosynthesis as they affect the protein formation in the plant and then stop the division of cells and plant growth so the dry weight of narrow and broad-leaved weed plants was inhibited and as a result the total dry weight decreased for weed plants. This is consistent with his findings [11.[

As the results in Table (3) that there are significant differences in the seeding rates

used in the study, as the seeding rate (160 kg. ha-1) significantly exceeded with another seeding rates and in both study locations, the highest rate of the trait was recorded (20.630, and 0.897 g. m-2) for the both locations respectively, and perhaps the reason for the superiority of the seeding rate (160 kg. ha-1) was due to its superiority in the dry weight characteristics of narrow and broad-leaved weed plants, and as a result, it exceeds the total dry weight, while the seeding rate (120 kg. ha-1) had the lowest average trait (57.062, and 11.660 g. m-2) respectively, which this result was consistent with [12.[

The interaction between the chemical herbicides and the seeding rates used has a clear significant effect in both study locations, in (Nimrud) location, the treatment (Timeline Trio +160 kg. ha-1) significantly outperformed with another the interactions where recorded the lowest rate of dry weight characteristic of total weed plants as it reached (5.973 g. m-2), while the treatment (weedy+ 120 kg. ha-1) recorded the highest rate of trait (89.342 g. m-2), and in the (Hammam Al-Alil) location, recorded the treatment (Navigator +160 kg. ha-1) significantly superior to most transactions with a rate of (0.003 g. m-2) compared to the transaction (weedy+120 kg. ha-1), which recorded the highest rate of the trait (27.300 g. m-2 .(

Table (3) effect of chemical herbicide and seeding rates on total dry weight of weed (g.m^{-2})

Nimrud				
Herbicides	120 kg. ha^{-1}	140 kg. ha^{-1}	160 kg. ha^{-1}	**Mean of herbicides**
Weedy	a 89.342	b 66.469	c 54.095	**a 69.968**
Navigator	e 47.253	h 20.747	j 9.573	**c 25.857**
Tarzek	d 51.160	g 30.760	i 12.880	**b 31.600**
Timeline trio	f 40.493	i 15.107	k 5.973	**d 20.524**
Means of seeding rates	**a 57.062**	**b 33.271**	**c 20.630**	
Hammam Al-Alil				
Weedy	a 27.300	b 8.336	c 3.360	**a 12.998**
Navigator	b 8.370	de 1.356	f 0.003	**b 3.243**
Tarzek	b 8.591	c 3.552	ef 0.091	**b 4.078**
Timeline trio	cd 2.380	ef 0.503	ef 0.136	**c 1.006**
Means of seeding rates	**a 11.660**	**b 3.437**	**c 0.897**	

-3Effect of chemical herbicides and seeding rates on plant height (cm:(

Table (4) indicates that there are significant differences among the chemical herbicides that used in the study in their effect on the height of the wheat plant compared to the weedy treatment, the weedy treatment recorded the highest rate of the trait in both locations, reaching (106.261, and 101.749 cm) respectively, while the plant height decreased in the three herbicides sprayed treatments in both locations, and the reason for the superiority of the weedy treatment in the plant height characteristic may be due to the

increase in the number of weed plants and their competition with crop plants on light resulting in an increase in the height of the crop plants and this is consistent with his findings [13 .[

Table (4) indicates also that there are significant differences in the seeding rates used in the study in their effect on the plant height characteristic in the (Nimrud) location, as the seeding rate exceeded (160 kg. ha-1) over with another seeding rates and recorded the highest rate of the trait (103.254 cm) compared to the seeding rate (120 kg. ha-1), which recorded the lowest rate of the trait (98.213 cm), while the seeding rates did not differ in their effect on the plant height characteristic at the (Hammam Al-Alil) location. The superiority of high seeding rates in the characteristic of plant height can be explained by the increase in the number of plants growing per unit area, which led to the shading of plants, and therefore it will work to increase auxins, which work to elongate the phalanges and increase the growth of stems, and this depends on what he found [14 .[

The interaction between [chemical herbicides] and [seeding rates] and has a significant effect on the plant height characteristic, as the treatment (weedy treatment +160 kg. ha-1) in the (Nimrud) location by giving it the highest height of the wheat plant reached (111.667 cm), and the treatment exceeded (weedy treatment +120 kg. ha-1), in the (Hammam Al-Alil) location where the highest rate of trait was recorded at (108.33 cm), while the treatment (Navigator+ 120 kg. ha-1) recorded the lowest rate of the trait (93.317 cm) respectively.

Table (4) effect of chemical herbicides, seeding rates, and their interaction on plant height (cm)

Nimrud				
Herbicides	120 kg. ha^{-1}	140 kg. ha^{-1}	160 kg. ha^{-1}	**Mean of herbicides**
Weedy	bc 102.450	ab 104.667	a111.667	**106.261 a**
Navigator	bc 98.767	bc 97.333	bc 99.867	**b 98.656**
Tarzek	c 95.133	bc 96.200	bc 100.933	**b 97.422**
Timeline trio	bc 96.500	bc 97.200	bc 100.550	**b 98.083**
Means of seeding rates	**b 98.213**	**ab 98.850**	**a103.254**	
Hammam Al-Alil				
Weedy	a 108.330	cd 94.800	abc 102.117	**a101.749**
Navigator	d 89.800	bcd 95.111	bcd 95.000	**b 93.304**
Tarzek	dc 93.700	bcd 98.700	bcd 95.400	**b 95.933**
Timeline trio	d 92.467	ab 104.400	bcd 96.733	**ab97.867**
Means of seeding rates	**a 96.074**	**a 98.252**	**a 97.312**	

4

-Effect of chemical herbicides and seeding rates on the number of grains per spike (grain. spike-1.(

Table (5) shows the number of grains per spike for both locations, indicated the significant effect of the chemical herbicides used in the study in the description of the number of grains in spike, as the results indicate that the (Navigator, Tarzek, Timeline Trio) achieved a significant increase in the number of grains per spike compared to the

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weedy treatment and in both locations, as the (Timeline Trio) outperformed and recorded the highest rate of the trait (48.494 grains. spike-1) and without a significant difference from the (Navigator), as for the (Hammam Al-Alil) location, the (Timeline Trio) topped other transactions and a Significant and recorded the highest rate of trait, reaching (54.633 grains. spike-1), while the weedy treatment recorded the lowest rate of the number of grains per spike, reaching (37.522, 44.100 grains. spike-1) sequentially. The effectiveness of these herbicides and their high efficiency in the control of narrow and broad-leaved weed plants spread in the fields of experiment 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 efficiency of the photosynthesis process and the production of dry matter, which in turn reflected positively on the transfer of this substance to the spikes and the formation of grains and increase their numbers in the spike and this result is consistent with the findings [15 .[

The results of Table (5) where the seeding rate (120 kg. ha-1) recorded the highest rate of the number of grains per spike as it reached (47.025 grains. spike-1) without a significant difference from the seeding rate (120 kg. ha-1), which recorded a rate of (45.250 grains. spike-1), while the seeding rate (160 kg. ha-1) recorded the lowest rate of the trait was (41.537 grains. spike-1) at the (Nimrud) location, while in the (Hammam Al-Alil) location, the seeding rate was (120 kg. ha-1) the same behavior and recorded the highest rate of the trait reached (54.866 grains. spike-1) and a significant rate on the rates of sowing (140, and 160 kg. ha-1), as the rate of seeding (140 kg. ha-1) recorded an average of (50.156 grains. spike-1), while the rate of seeding (160 kg. ha-1) recorded the lowest rate of the trait, reaching (47.254 grains. spike-1). The decrease in the number of grains per spike when seeding rates increase is due to the increase in plant density per unit area and thus the increase in competition between crop plants and then between spikes for processed nutrients in photosynthesis, especially in the stage of grain formation, which in turn led to a decrease in the number of grains per spike, [16 .[

The indicated between the chemical herbicides and seeding rates used in the study has a significant effect on the characteristic of the number of grains in spike, in the two locations (Nimrud and Hammam Al-Alil), the treatment (Timeline Trio +120 kg. ha-1) significantly outperformed most of the transactions and recorded the highest rate of the number of grains per spike amounted to (51.283, and 60.400 grains. spike -1) for both locations respectively, while the treatment (weedy +160 kg. ha-1) recorded the lowest rate of the trait was (34.250, and 40.550 grains. spike -1) for both locations respectively .

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Table (5) effect of chemical herbicides seeding rates, and their interaction on number of grains in a spike (grain. spike $^{-1}$)

Nimrud				
Herbicides	120 kg. ha^{-1}	140 kg. ha^{-1}	160 kg. ha^{-1}	**Mean of herbicides**
Weedy	gh 40.067	h 38.250	i 34.250	**c37.522**
Navigator	ab 49.883	bcd 47.517	ef 44.117	**ab 47.172**
Tarzek	b-e 46.867	cde 46.267	fg 42.550	**b 45.227**
Timeline trio	a 51.283	abc 48.967	def 45.233	**a 48.494**
Means of seeding rates	**a 47.025**	**a 45.250**	**b 41.537**	
Hammam Al-Alil				
Weedy	g46.666	h 45.083	i 40.550	**d44.100**
Navigator	b 57.133	e 51.708	f 49.600	**b 52.813**
Tarzek	c 55.266	ef 50.300	f 48.900	**c 51.488**
Timeline trio	a 60.400	d 53.533	f 49.966	**a54.633**
Means of seeding rates	**a 54.866**	**b 50.156**	**c 47.254**	

-5Effect of chemical herbicides and seeding rates on the number of spikes (spike. m-2.(

Table (6) shows that there are significant differences between the treatments of the herbicides used in the study in the characteristic of the number of spikes, in the (Nimrud) location the (Timeline Trio) significantly outperformed the rest of the transactions and recorded the highest rate of the trait amounted to (500.722 spikes. m-2) followed by the (navigator), while the (Tarzek) recorded an average of (448.389 spikes. m-2), as for the (Hammam Al-Alil) location, the (Timeline Trio) recorded the highest rate of the trait if it reached (511.383 spike. m-2) without a significant difference from the (Navigator), while the number of spikes decreased with treatments sprayed with the (Tarzek), as a rate of the trait was recorded (452.22 spike. m-1), while the weedy treatment recorded the lowest rate of the trait reaching (315.556, and 370.89 spike. m-2) for both locations respectively. The reason for the superiority of the treatments perhaps that were sprayed with herbicides compared to weedy treatment is due to the sensitivity of weed plants to these herbicides, which were greatly affected, reducing their numbers and inhibiting their dry weights due to these 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 number of spikes. This is consistent with [9, 17[

Table (6) shows the significant impact of the seeding rates applied in the experiment, the high seeding rates exceeded significantly in both study locations in the number of spikes per square meter, in the (Nimrud) location the seeding rate (160 kg. ha-1) significantly exceeded the seeding rates (120, and 140 kg. ha-1) and the highest rate of the trait was recorded (482.667 spikes. m-2), while the seeding rate (140 kg. ha-1) recorded an average of (443.458 spikes. m-2) for both

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locations respectively, while the seeding rate was recorded (120 kg. ha-1) recorded the lowest rate of the trait (347.958 spikes. m-2), and in the (Hammam Al-Alil) location the seeding rate (160 kg. ha-1) recorded the highest rate of the trait (491.83 spikes. m-2) while there was no significant difference between the two seeding rates (120, 140 kg. ha-1) who recorded an average of (438.13, 440.00 spikes. m-2) respectively. The reason for the increase in the seeding rate (160 kg. ha-1) over of the other rates is due to the increase in plant density per unit area, which is directly proportional to the number of active shoots bearing spikes, which in turn leads to an increase in the number of spikes per unit area, and this result agreed with [14.[

As for the interaction between the chemical herbicides and seeding rates used in this study and their effect on the number of spikes, the treatment (Timeline Trio +160 kg. ha-1) was significantly superior to the rest of the coefficients and the highest rate of the trait was recorded (561.333 spikes. m-2) while the treatment (weedy +120 kg. ha-1) recorded the lowest rate of the trait was (293.333 spikes. m-2) at the (Nimrud) location, while for the (Hammam Al-Alil) location, the treatment (Navigator +160 kg. ha-1) significantly outperformed on the rest of the transactions and recorded the highest rate of the trait (572.00 spikes. m-2.(

Table (6) effect of chemical herbicides seeding rates, and their interaction on Number of spikes. (m^{-2})

Nimrud				
Herbicides	120 kg. ha^{-1}	140 kg. ha^{-1}	160 kg. ha^{-1}	**Mean of herbicides**
Weedy	i 293.333	h 319.000	h 334.333	**d 315.556**
Navigator	f406.000	d 481.667	b 522.667	**b 470.111**
Tarzek	g 359.00	d 473.833	bc 512.333	**c 448.389**
Timeline trio	e 441.500	c 499.333	a 561.333	**a 500.722**
Means of seeding rates	**c 347.958**	**b 443.458**	**a 482.667**	
Hammam Al-Alil				
Weedy	g 369.33	g355.50	fg 387.83	**c370.89**
Navigator	de 436.00	cd 467.00	a 572.00	**a491.67**
Tarzek	de 446.67	ef 417.50	bc 492.50	**b 452.22**
Timeline trio	bc 500.50	b 520.00	b 515.00	**a 511.83**
Means of seeding rates	**b 438.13**	**b 440.00**	**a 491.83**	

-6Effect of chemical herbicides and seeding rates on the weight of thousand grains (g.(

The results in Table (7) showed a the significant effect of chemical herbicides used in the study on the weight of grains in both locations, as all herbicides excelled morally in this trait among themselves compared to the treatment of the weed, in the (Nimrud) location outperformed the (Timeline Trio) significantly over all transactions and recorded the highest rate of the trait reached (41.513 g), as for the (Hammam Al-Alil) location has outperformed the (Tarzek) and recorded the highest rate of the trait reached (42.286 g) and without a significant difference from the

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(Navigator), while the weedy treatment recorded the lowest trait rate (34.097, and 38.730 g) respectively. The reason for the superiority of these chemical herbicides and recording the highest weight of grains compared to the weedy treatment 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 the opportunity for crop plants to exploit all growth factors (water, nutrients and light), which led to an increase in the efficiency of the 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 his findings [18,19 .[

As the results of Table (7) indicate significant effect of seed rates on the weight of one thousand grains, as the seeding rate (120 kg. ha-1) significantly exceeded the seeding rates (120, 140 kg. ha-1) in both locations, and the highest rate of trait was recorded (41.125, and 41.472 g) respectively, and the seeding rate (160 kg. ha-1) recorded the lowest rate of the trait was (37.048, and 40.311 g). The decrease in the weight of thousand grains when increasing seeding rates can be explained to the increase in plant densities per unit area, which increased the intensity of competition among crop plants on the requirements of growth, which led to a decrease in 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 to the largest number of spikes due to the increase in the number of spikes in high seeding rates and as a result of high plant density, so the weight of grain according to the principle of compensation. This result is consistent with [20 .[

As for the interaction between the chemical herbicides and seeding rates, the results of the statistical analysis at the (Nimrud) location showed that the treatment (Timeline Trio +120 kg. ha-1) was significantly higher than the rest of the treatments and recorded the highest rate of the trait, reaching (44.010 g), while the treatment recorded (weedy +160 kg. ha-1) recorded the lowest rate of the trait was (32.376 g), while for the (Hammam Al-Alil) location the treatment recorded (Tarzek +120 kg. ha-1) the highest rate of trait and a significant difference on most transactions, it reached (42.180 g), while the treatment (weedy treatment+ 140 kg. ha-1) recorded the lowest rate of (37.926 g.(

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Table (7) effect of chemical herbicides seeding rates, and their interaction on 1000 Grain weight (g).

Nimrud				
Herbicides	120 kg. ha^{-1}	140 kg. ha^{-1}	160 kg. ha^{-1}	**Mean of herbicides**
Weedy	i 35.926	j 33.990	k32.376	**d34.097**
Navigator	b 42.703	de 40.593	g 38.840	**b 40.712**
Tarzek	c 41.860	ef 40.076	h 37.390	**c 39.775**
Timeline trio	a 44.010	d 40.943	f 39.586	**a41.513**
Means of seeding rates	**a 41.125**	**b 38.900**	**c37.048**	
Hammam Al-Alil				
Weedy	cde 39.646	e 37.926	de 38.616	**c38.730**
Navigator	ab 42.180	abc 41.430	bcd 40.150	**ab 41.253**
Tarzek	a42.865	ab 42.111	ab 41.883	**a 42.286**
Timeline trio	a 41.200	bcd 40.198	bcd 40.595	**b 40664**
Means of seeding rates	**a41.472**	**b 40.416**	**b 40.311**	

-7Effect of chemical herbicides and seeding rates on the biological yield (ton. ha-1:(

Table (8), showed that there were significant differences among the chemical herbicides used in the study compared to the weedy treatment, in the two locations (Nimrud, and Hammam Al-Alil), the (Timeline Trio) was significantly superior and recorded the highest rate of trait, reaching (21.375, and 16.058 ton. ha-1), while the weedy treatment recorded the lowest rate for the trait and in the both locations, reaching (13.325, and 12.130 ton. ha-1) respectively. The reason for the superiority of the treatments that were sprayed with the three herbicides compared to the weedy treatment may be due to the efficiency of these herbicides and their containment of specialized substances in the control of narrow and broad-leaved weed plants, and then these led to least growth, reducing their preparation and inhibiting their dry weights, which led to the availability of more nutrients, light and moisture, as well as the place for the crop plants, and this reflected positively on the growth of crop plants in more suitable conditions for the formation of a large vegetative group, which increased the biological yield. This finding is consistent with [21, 22] who confirmed that the use of chemical herbicides in the control of weed plants led to an increase in plant biological yield.

As the results of Table (8) the seeding rate (160 kg. ha-1) significantly exceeded the seeding rates (120, and 140 kg. ha-1) in both study locations, in the (Nimrud) location the seeding rate exceeded (160 kg. ha-1) significantly over the rest of the seeding rates and recorded the highest rate of the trait, reaching (21.583 ton. ha-1), while the seeding rate (120 kg. ha-1) recorded the lowest rate of the trait reached (15.512 ton. ha-1), and in the same way the seeding rate exceeded (160 kg. ha-1) and recorded the highest rate of trait, which reached (16.345 ton. ha-1), while there

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was no significant difference among the seeding rates (120, and 140 kg. ha-1), which recorded an average trait of (13.204, and 13.384 ton. ha-1), sequentially at the (Hammam Al-Alil) location. The increase in biological yield at high seeding rates can be explained by the increase in plant density per unit area, the increase in the number of plants, the height of the plant and the number of tilers, which leads to an increase in the number of leaves in the plant, improving the efficiency of photosynthesis, and increasing the exploitation of the largest amount of nutrients stored in the soil by intercepting the vegetative total for the largest amount of sunlight, and then improving the performance of the crop plants for various vital processes, including increasing cell division and increasing plant size, which in turn was reflected. positively in increasing the biological yield of the crop. .(

This conclusion was consistent with his findings [23 .[

The interaction between chemical herbicides and seeding rates has a significant impact on the biological yield characteristic, at the (Nimrud) location, the treatment (Timeline Trio +160 kg. ha-1) significantly outperformed the rest of the treatments except for the treatment (Tarzek + 160 kg. ha-1) and the highest rate of the trait was recorded (24.425 ton. ha-1) while the treatment (weedy +120 kg. ha-1) recorded the lowest rate of the trait was (11.475 ton. ha-1), and as in the (Hammam Al-Alil) location, the treatment exceeded (Tarzek +160 kg. ha-1) significantly over the rest of the treatments and recorded the highest rate of the trait reached (18.250 ton. ha-1) while the treatment (weedy + 140 kg. ha-1) recorded the lowest rate of the trait reached (11.533 ton. ha-1

Table (8) effect of chemical herbicides seeding rates, and their interaction on Weight of biological yield (ton. ha^{-1})

Nimrud				
Herbicides	120 kg. ha^{-1}	140 kg. ha^{-1}	160 kg. ha^{-1}	**Mean of herbicides**
Weedy	11.475 i	12.766 h	15.733 g	**13.325 c**
Navigator	16.275 g	20.983 de	22.6 bc	**19.952 b**
Tarzek	16.1 g	20.03 e	23.575 ab	**19.902 b**
Timeline trio	18.2 f	21.5 cd	24.425 a	**21.375 a**
Means of seeding rates	**15.512 c**	**18.820 b**	**21.583 a**	
Hammam Al-Alil				
Weedy	11.733 fg	11.533 g	13.123 efg	**12.130 c**
Navigator	13.466 ef	12.946 efg	16.483 bc	**14.298 b**
Tarzek	12.463 efg	13.560 de	18.250 a	**14.757 b**
Timeline trio	15.153 cd	15.490 c	17.526 ab	**16.058 a**
Means of seeding rates	**13.204 b**	**13.384 b**	**16.345 a**	

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-8Effect of chemical herbicides and seeding rates on grain yield (ton. ha-1.(

The results of the statistical analysis in Table (9) on the data of grain yield in the study locations indicated that the existence of significant differences for the chemical herbicides used in the study in the characteristic of grain yield, as all the treatments that were sprayed with chemical herbicides significantly outperformed the weedy treatment, in the (Nimrud and Hammam Al-Alil) locations, the (Timeline Trio) significantly outperformed the rest of the transactions and recorded the highest rate of trait, reaching (5.088, and 5.811 ton. ha-1), while the grain yield decreased significantly in the weedy treatment, as the lowest rate of the trait was recorded (2.816, and 3.763 ton. ha-1) respectively. The absence of weed plants and their narrow and broad-leaves types in the treatments that were sprayed with chemical 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), which led to an increase in 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 [24, 25, and 26.[

As Table (9) shows the seeding rate (160 kg. ha-1) significantly exceeded the seeding rates (120, and 140 kg. ha-1), as the highest rate of grain yield was recorded (4.941, and 5.865 ton. ha-1) for both study locations respectively, while the seeding rate (120 kg. ha-1) recorded the lowest rate of trait, reaching (3.429, and 4.501 ton. ha-1) respectively. The reason for the decrease in grain yield at the seeding rate (120 kg. ha-1) at both locations is due to the decrease in plant density, the number of plants per unit area and the low number of spikes, which is the most important characteristic affecting grain yield. This is the opposite of what was obtained for an increase in the seeding rate (160 kg. ha-1). This is consistent with the findings of [10, 20, and 23 .[

The interaction between [chemical herbicides] and [seeding rates] has a significant impact on the grain yield characteristic, as the treatment (Timeline Trio +160 kg. ha-1) in the (Nimrud) location significantly outperformed all the transactions and recorded the highest rate of the trait (6.416 ton. ha-1) while the treatment (weedy +120 kg. ha-1) recorded the lowest rate of the trait (2.316 ton. ha-1), while for the (Hammam Al-Alil) location the treatment recorded (Navigator +160 kg. ha-1) The highest rate of trait was (6.466 ton. ha-1), while the treatment (weedy+140 kg. ha-1) recorded the lowest rate of the trait (3.420 ton. ha-1) and without a significant difference with (120, and 160 kg. ha-1.(

Table (9) effect of chemical herbicides seeding rates, and their interaction on Grain yield (ton. ha^{-1})

Nimrud				
Herbicides	120 kg. ha^{-1}	140 kg. ha^{-1}	160 kg. ha^{-1}	**Mean of herbicides**
Weedy	2.316 h	2.9 g	3.233 f	**2.816 d**
Navigator	3.883 e	4.366 d	5.333 b	**4.527 b**
Tarzek	3.416 f	4.175 de	4.783 c	**4.125 c**
Timeline trio	4.1 de	7.750 c	6.416 a	**5.088 a**
Means of seeding rates	**3.429 c**	**4.047 b**	**4.941 a**	
Hammam Al-Alil				
Weedy	3.520 e	3.420 e	4.350 e	**3.763 c**
Navigator	4.503 de	5.036 cd	6.466 a	**5.335 b**
Tarzek	4.150 e	5.190 bc	6.396 a	**5.245 b**
Timeline trio	5.833 ab	5.350 bc	6.250 a	**5.811 a**
Means of seeding rates	**4.501 c**	**4.749 b**	**5.865 a**	

Conclusions

Weed plants negatively affect the amount and components of the yield in light of their competition with crop plants on the requirements of growth and their impact depends on their type and intensity of spread. In addition, decrease in the number of weed plants and their dry weights, whether narrow or broad-leaves, when seeding rates increase. Beside low numbers of weed (narrow and broad-leaves) and their dry weights when using dual-purpose chemical herbicides, which was positively reflected in the growth and yield characteristics of cultivated wheat plants. On other hand most of the characteristics (plant height, number of spikes, biological yield and grain yield) had a positive response when seeding rates increased. The use of chemical herbicides (Navigator, Tarzek, Timeline Trio) had a positive effect in controlling bush plants associated with the wheat crop and limiting their growth and damage, as well as competing with the wheat crop, as their addition led to an increase in yield and its components compared to the weedy treatment (without herbicide.(

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