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The Role Of Some Agricultural Applications In The Yield And Components Of Varieties Of Bread Wheat (Triticum Aestivum L.)

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Abstract:

This study was carried out at the Agricultural Research and Experiments Station (Bani Maqan) in Chamchamal district (2019-2020) and (2020-2021), and it is within an area that is almost guaranteed rain and has a silty clay texture. Two types of cultivation systems are used in this study, which is (the traditional farming system and the cultivation system without tillage) with two levels of speed (3 and 5) km/hour and two depths of tillage (3 and 6) cm to study and some growth and yield (Number of Spike, Number of Grain per spike, Thousand Grain Weight and Crop Yield) and their effect of net profit. The experiment field was divided according to the design of (RCBD) and a factor arrangement in the split-split plot's design. The parameters were randomly distributed among the experimental units within the sector. The experiment field was divided into three sectors. The range is below the level (0.05).

Keywords: Number of Spike/m^2, Thousand Grain weight, Thousand Grain Weight, Crop Yield.

Introduction:

Fine wheat is an important and staple food crop for people around the world (Rauf, Munir, ul Hassan, Ahmad, & Afzal, 2007), And it comes first among cereal crops in Iraq. The increase in the productivity per unit area of wheat required at present is caused by facing the increased demand for it as a result of the increasing population growth in many countries of the world (Hamam, 2008), In Iraq, the productivity per unit area is still much lower compared with many other countries of the world, and he explained the reasons for the decline in wheat productivity in general to abiotic factors (related to environmental pressures, especially the wide variation in temperature, drought, and salinity) and vital factors, including disease and insect infestation....etc. (Sial et al., 2005), Tillage is an essential part of the agricultural production system that strongly manipulates the physical system of soil. When tillage is not used over the years, mechanical soil reversal does not take place, thus entering the soil system and the plant into physical equilibrium, Long-term no-till cultivation system modifies the physical infrastructure of the soil and its pore network, and in so doing, basic physical parameters such as bulk density, overall stability or water retention changes, along with the change in soil organic carbon content (Blanco-Canqui & Benjamin, 2013), Conservation agriculture (without tillage) increases the activity of microorganisms that, in turn, improve soil construction by increasing the accumulation and stability of soil particles, in contrast to the negative effects of tillage, which works to dismantle the clusters of minutes and sabotage the building of the soil (Verhulst et al.,

2009), It was found that when applying conservation agriculture and making sure that its pillars are fully adhered to for an appropriate period, it leads to improving the quality of soils, especially in their upper layers (Verhulst et al., 2009), The application of the conservation agriculture system works to achieve sustainability in the production of agricultural projects, fulfill its principles and be able to overcome the weaknesses of modern agricultural practices (Kassam & Friedrich, 2012), However, the CA system has been slowed down in the first years of application only, as this situation changes with the years of application, as the CA system often outperforms the crop yields with statistically significant differences (Aulakh, Pasricha, & Azad, 1990; Jat et al., 2012; Nurbekov, 2008), In general, it was found that with repeated application of conservation agriculture, crops grown with the system surpass the productivity of the same crops with traditional farming systems. This was explained by the improvement of the properties and quality of agricultural soils with the CA system and the provision of accurate timing for planting and serving crops (Erenstein, 2003; Sisti et al., 2004), The superiority in productivity with the conservation agriculture system is clearer and with greater differences under conditions of fluctuating rains and droughts, especially in semi-arid and arid regions (Hobbs & Govaerts, 2010; Kassam, Friedrich, Shaxson, & Pretty, 2009), The study aims to compare two types of cultivation systems (conservative cultivation system meaning without tillage and traditional farming system) with two basic speeds, depth of tillage, and four bread wheat varieties.

Material and Methods:

Field of Experience:

The experiment was conducted at the Agricultural Research and Experiments Station (Bani Maqan) in Chamchamal district of the Directorate of Agricultural Research and Experiments in the Sulaymaniyah Governorate, which is 40 km north of Kirkuk governorate for the years (2019-2020) and (2020-2021). One dunum is in a technical and economic study to compare the performance of different seeding techniques to grow bread wheat.

Experience design:

The experiment field, which has an area of one dunum, was divided into three sectors. The whole sector is divided into two parts, each of which includes a specific cultivation system and each experimental plot on which the techniques of seeds and varieties are applied to the secondary plots of (16) secondary plots represented by the combination of four varieties and four seeding techniques, and applied to randomized complete plots design (RCBD) in split-plots design.

The studied factors:

First: two types of farming systems:

1-No-till planting system using no-till planting seed only.

2-The traditional farming system, which includes tillage, smoothing, leveling, and seeding perations.

Second: seeding techniques include combinations of ground velocity and seeding depth.

1-Depth (3) cm, at a ground speed of (3) km/hour.

2-Depth (6) cm, at a ground speed of (3) km/hour.

3-Depth (3) cm, at a ground speed of (5) km/hour.

4-Depth (6) cm, at a ground speed of (5) km/hour.

Third: Four varieties of bread wheat, of which they are classified as long, which are Al Fayaz, Sulaymaniyah 2, Adana 99, and Sham 6, and the quantity of seeds is 120 kg/hectare.

Thus, the experiment included sixteen-factor treatments (2 × 2 × 4), and with three replicates by (32) experimental units, the length of one sector is (20) m and the width is (40) m while leaving the distance (2.5) m between the repeaters for the drawer gaining its speed. During which the studied traits were calculated, and the averages of the transactions were tested using (Duncan's)

Field and yield characteristics of the crop:

1. Number of heads (spike / m^2):

Upon maturity of the yield, (1 m^2) of the middle lines were harvested from each experimental unit, and a number of branches bearing spikes were calculated.

2.Number of grain per spike:

The average number of grains was taken for ten ears of each experimental unit, after neglecting and cleaning these ears manually**.**

3. Weight (1000) grain:

A random sample of the grains was taken for each experimental unit. (1000) grains were counted from them and their weight was extracted.

4. Grain yield (kg/ha):

When the yield was ripened, (1 m ^{2}) was harvested from the middle lines. Wheat was separated from the straw and weighed, then it was converted to weight (kg/ha).

Result & Discussions:

The result and its components;

1-number of spike(spike(spike/m^2):

The results of Table (1) showed that the seasons had an insignificant effect on the number of spikes.m2, as the second season showed a superiority in this trait amounting to 421.20 spikes.m2 because the second season had accumulated organic matter which was decomposed for two successive seasons, which contributed to providing growth requirements. for nutrients and lowering the pH of the soil, which contributes to the readiness of the elements and is reflected in the increase in the number of effective layers per unit area.

Sowing techniques showed a significant effect in this trait, as planting at a depth of 6 cm at a speed of 3 km.h was significantly superior to all other factor levels with an average of 413.81 spikes.m2 and was followed by a non-significant difference in planting at a depth of 6 cm and at a speed of 5 km.h. Planting at a depth of 6 cm has contributed to an increase in the number of periods, regardless of the seeding speed, and this is an indication of the possibility of increasing the seeding speed and reducing the time it takes for the seeding process, and this is consistent with (Gawęda & Haliniarz, 2021; Govaerts, Sayre, & Deckers, 2005; Jajo, 2016)

The farming systems showed that there are no significant differences in the average of the trait. The type of tillage is affected by the type of tillage, and this encourages the fact that no-till agriculture, which did not differ significantly from traditional agriculture, has a crop advantage for this system increases the net profit and a greater

economic return by reducing the costs of plowing operations and entering the machine into the field, and this is consistent with (Aryal, Sapkota, Jat, & Bishnoi, 2015; Keil, Mitra, McDonald, & Malik, 2020).

The cultivated varieties varied in the number of spikes.m^2, as the Fayaz variety was significantly superior to the rest of the varieties with the highest average number of spikes, which amounted to 427.46 spikes.m^2, which was superior by giving it the highest number of spikes. It gives a longer period of time for this stage(Ahmad, Hussain, Ahmad, Tabassam, & Shabbir, 2013; Gholami, Asgari, & Zeinali, 2014; Ruiz et al., 2019).

The interaction of seeding techniques and seasons showed significant differences between the averages of this interaction, as the seeding technique (6 cm + 3 km.h) was superior to the highest average of (436.54) spike.m^2 in the second season, which generally gave the highest average for this trait in all interventions compared to the season the first. It is followed by a non-significant difference of the two seeding techniques (3 cm + 3 km.h) and (6 cm + 5 km.h) with an average of (422.42 and 424.75) spikes.m^2, respectively, the seeding depth of 6 cm with different seeding speed contributed to the increase in viability. The branching of the varieties, especially in the second season, which accumulated the percentage of organic matter, which increases the chemical and physical characteristics that contribute to providing the requirements for growth. As for planting at a depth of 3 cm + 3 km.h, it increased the percentage of field emergence and thus reflected on the increase in the number of spikes.m^2 and these agree results with (Ahmad, Hussain, Ahmad, Tabassam, & Shabbir, 2013; Al-Douri & Mohammed, 2019; Gholami, Asgari, & Zeinali, 2014).

The interaction of farming systems and seasons had significant differences between the average number of spikes for the combinations of this interaction. The no-till farming system and conventional plowing excelled in the second season by giving it the highest number of spikes, which amounted to 421.96 and 420.44 spikes.m^2 respectively, and this is a gain in favor of no-till agriculture, which has the lowest input costs. Production and in the second season in which the soil characteristics improved in favor of providing the requirements for good growth. These results are consistent with (Al-Banna, Karim, Muhammad, & Al-Sheikhly, 1986; Al-Taie, Al-Tahan, & Abdulaziz, 2013; Jeghata, 2021; Tripathi, Raju, & Thimmappa, 2013).

The interaction of cultivars and seasons showed a significant difference between the average number of spikes and the superiority of the Fayaz cultivar in the second season, with a significant difference compared to the rest of the interference combinations, which amounted to (453.37) spike. Nutrients and the ability of soil to retain water and increase organic matter. These results are consistent with (Al-Jamas, 2018; Gholami et al., 2014).

The interaction between seeding techniques and planting systems showed a significant difference in the average number of spikes.m^2, as it outperformed conventional planting and cultivation at a depth of 6 cm and at a speed of 5 km.h with the highest average number of spikes.m2 reached (421.71) spikes.m^2, with an insignificant difference when planting with a depth of 6 cm The speed of 3 km.h and did not differ significantly when planting without tillage and cultivation at depths of 3 and 6 cm and at a speed of 3 km.h, and this is an indicator when the seeding speed is reduced, the depth of planting determines the time required and the efficiency of the seeding equipment increases and the seed is placed in the appropriate and specific place while in the depth of the seed 6 cm, the seeding speed did not affect that, so the higher speed can be used to save the time needed for sowing, and the insignificance of the farming system is an indication that the survival of crop residues for years contributed to its decomposition and dismantling the surface layer and gave the soil the ability to retain moisture and increase the readiness of nutrients, which reduced From the costs of cultivating and entering the tillage machine that works to loosen the soil as is common. . These results are consistent with (.Jasim & Mankhi, 2012; Abdul-Kreem, 2017; Al-Douri & Mohammed, 2019; Jeghata, 2021; Tahir, 2007).

And from the interaction of seeding techniques and varieties, which showed significant differences for the combinations of this interference in the number of spikes.m2 and the Fayaz cultivar excelled in it when planting with a depth of 6 cm and a seeding speed of 3 and 5 km.h and an average of (431.42 and 437.00) spikes.m2 due to the superiority of these varieties due to their high branching ability The early branching pattern, as well as the depth of 6 cm, provides a greater opportunity to increase the number of branches from the branching area, which is deeper in deep cultivation compared to shallow cultivation and is consistent with (AL-dawoode, 2013; Al-Hayali, 2014; AL-Rabati, 2017).

Among the interaction of farming systems is the cultivation systems and varieties, whose combinations differed in the number of seedlings.m2 and the Fayaz variety was significantly superior in conventional agriculture with an average of (438.21) spikes.m2 and this is due to the genetic factors possessed by this variety in increasing its branching efficiency if the requirements for good growth were met, which were Where traditional agriculture has contributed to this and this is consistent with (AL-dawoode, 2013; Al-Hayali, 2014; AL-Rabati, 2017).

From the triple interaction of seeding techniques, planting systems and seasons, the average number of spikes affected by their combinations was significantly different, and the combination of no-till cultivation and cultivation at a depth of 6 cm at a speed of 3 km.h. In the second season, the highest average number of spikes was 441.33 spikes with a non-significant difference compared to the traditional cultivation at a depth of 3 km. 6 cm at a speed of 3 and 5 km.h and without tillage at a depth of 3 cm and at a speed of 3 km.h. In the second season. This is an indication of an increase in the depth of cultivation. The effect of speed decreases in traditional agriculture in placing the seeds in the right place, which allows the highest percentage of field emergence and the best depth for an area Branching in wheat to give branches. As for cultivation with a depth of 3 cm, the speed must be limited to ensure an increase in the percentage of germination in the field, especially in the cultivation without tillage, which indicates the possibility of using it without affecting the main important components of the crop, which is the number of branches and that the second season has It surpassed the first season to increase the accumulation of decomposing organic matter, which contributes to providing the requirements for good growth, and this corresponds to (Gholami et al., 2014; Othman, AL-Zoubi, & AL-Ouda, 2020; Parvej et al., 2020; Shariatipour, Alavikia, Vahed, Velu, & Heidari, 2020).

Among the interaction of seeding techniques, cultivars and seasons, in which the average number of spikes showed a significant and valuable difference between the combinations of this interaction, the Fayaz cultivar was significantly superior by giving the highest number of spikes when planted with a depth of 6 cm and a seed speed of 5 km.h in the second season, which amounted to (453.00) spike.m^2 and followed by With an insignificant difference, the closest to it is the combination of Fayadh cultivar when planted with a depth of (6 cm and a speed of 3 km.h) and Sulaymaniyah 2 when planted with a depth of 6 cm and at a speed of 5 km.h, with an average of 440.83 and 440.00 spikes.m^2 respectively. This is an indication that the depth of 6 cm is appropriate in increasing one of the most important basic components of the crop, and that the Fayaz variety is distinguished in its ability to have the highest number of spikes per unit distance. These results agree with (Abdul-Kreem, 2017; Al-Luizy, 2009; Mahmoud & Younes, 2010).

From the interaction of the planting system, varieties and seasons, it is noted that the Fayaz cultivar has significantly outperformed this trait in the no-till agriculture and in the second season with an average of 449.42 and 457.33 spikes. M^2 and this confirms the excellence of the Fayaz cultivar in this trait. And that the lack of difference in the cultivation systems of this variety confirms the possibility of cultivation without tillage, especially when it is adopted for several years while keeping the residues of the previous crop and increasing the accumulation of organic matter contribute to making the soil.

The triple interaction in seeding techniques, planting systems and cultivars showed significant differences in the average number of spikes.m2 to match the treatments of this interaction. The Fayaz cultivar showed significant superiority in conventional cultivation and cultivation at a depth of 6 cm at a speed of 5 km.h with an average of 453.00 spikes.m2 followed by an insignificant difference. Sham 6 in cultivation without tillage and cultivation at a depth of 6 cm and at a speed of 5 km.h and Fayadh in traditional agriculture and seeding technique (6 cm + 3 km.h). It is noted that the Fayaz cultivar excels in this trait because it possesses the genes controlling its increase and multiplication, and the depth of cultivation is 6 cm. Regardless of the seeding speed, a suitable location for the seed and a location for the branching area has been provided, which provides the possibility for it to give a higher number of ears per unit area despite the low percentage of emergence.

The four-way interaction also notes that the average number of spikes, according to the combinations of this interaction, was significant and outperformed by the Fayad cultivar in traditional cultivation and cultivation at a depth of 6 cm and a speed of 5 km.h. It reached 473.00 spikes.m^2 and Sham 6 in no-till cultivation at the same seeding technique amounted to 470.33 Sunbulah.m2 and both in the second season, which surpassed in all combinations from the first season for the reasons mentioned above.

Table (1) Effect of seasons, planting systems, seeding techniques and cultivars and their interactions on the number of Spike

The concordances of the studied factors		season				
		first	second	Planting technique	Cultivar's systems	Varieties
Interaction of seasons and planting techniques	3cm+3km	372.25^{c}	422.42^{a}	397.33^{bc}		
	6cm+3km	391.08^{b}	436.54^{a}	413.81^{a}		
	3cm+5km	370.46^{c}	401.08^{b}	385.77^{c}		
	6cm+5km	394.62^{b}	424.75^{a}	409.69^{ab}		
Interaction cultivar systems and seasons	NO-TILLAGE	372.42^{c}	421.96^{a}		397.19^{a}	
	Conditional tillage	391.79^{b}	420.44^{a}		406.11^{a}	
Varieties and seasons interaction	AL-fayaz	401.54^{bc}	453.37^{a}			427.46^{a}
	Sulaimani 2	375.71^{de}	407.33^{b}			391.52^{c}
	Adana 99	360.33^{e}	386.75^{cd}			373.54^{d}
	Sham 6	390.83^{bcd}	437.33^{a}			414.08^{b}

Planting technique	Cultivar's systems	First season	Second season	The average effect of the interaction between seeding techniques and planting systems
3cm+3km	**No-tillage**	369.67^{h}	435.75^{ab}	402.71^{ab}
6cm+3km		375.08^{gh}	441.33^{a}	408.21^{abc}
3cm+5km		361.67^{h}	398.67^{d-g}	380.17^{d}
6cm+5km		383.25^{e-f}	412.08^{bcd}	397.67^{cd}
3cm+3km	**conditional tillage**	374.83^{gh}	409.08^{cd}	391.96^{dc}

6cm+3km		407.08^{cde}	431.75^{abc}	419.42^{ab}
3cm+5km		379.25^{fgh}	406.00^{de}	391.37^{cd}
6cm+5km		406.00^{de}	437.42^{ab}	421.71^{a}
Planting technique	Varieties wheat	First season	Second season	The average effect of the interaction between cultivars techniques and varieties
3cm+3km	AL-fayaz	412.00^{b-g}	418.67^{a-f}	415.33^{bc}
	Sulaimani 2	407.83^{b-g}	381.50^{g-l}	394.67^{de}
	Adana 99	390.83^{f-l}	369.50^{h-m}	380.17^{ef}
	Sham 6	400.17^{e-h}	398.17^{e-k}	399.17^{cde}
6cm+3km	AL-fayaz	422.00^{a-f}	440.83^{abc}	431.42^{a}
	Sulaimani 2	403.33^{e-i}	368.83^{i-m}	386.08^{ef}
	Adana 99	405.50^{d-h}	434.17^{a-e}	419.83^{a-d}
	Sham 6	402.00^{e-i}	433.83^{a-e}	417.92^{a-d}
3cm+5km	AL-fayaz	411.83^{b-g}	440.33^{a-d}	426.08^{ab}
	Sulaimani 2	360.83^{lk}	365.50^{j-m}	363.17^{g}
	Adana 99	360.00^{lm}	343.67^{mn}	351.83^{g}
	Sham 6	388.00^{f-l}	416.00^{b-g}	402.00^{b-e}
6cm+5km	AL-fayaz	421.00^{a-f}	453.00^{a}	437.00^{a}
	Sulaimani 2	404.33^{d-i}	440.00^{a-d}	422.17^{abc}
	Adana 99	322.00^{n}	362.67^{klm}	342.33^{g}
	Sham 6	443.33^{ab}	431.17^{a-e}	437.25^{a}

Cultivar's systems	Varieties	First season	Second season	The average effect of the interaction between cultivars systems and varieties
No-tillage	AL-fayaz	384.00^{efg}	449.42^{a}	416.71^{b}
	Sulaimani 2	374.67^{gh}	413.50^{cd}	394.08^{cd}
	Adana 99	353.50^{h}	385.67^{efg}	369.58^{e}
	Sham 6	377.50^{fgh}	439.25^{ab}	408.37^{bc}
Conditional tillage	AL-fayaz	419.08^{bcd}	457.33^{a}	438.21^{a}
	Sulaimani 2	**376.75^{fgh}**	401.17^{def}	388.96^{d}
	Adana 99	374.67^{gh}	387.83^{efg}	377.50^{de}
	Sham 6	404.17^{de}	435.42^{abc}	419.79^{b}

Planting technique & cultivation systems		Varieties	First season	Second season	The average effect of the interaction between cultivars systems, planting techniques, and varieties
cultivation systems	Planting technique				
No-tillage	**3cm + 3km**	AL-fayaz	360.33^{p-v}	463.67^{abc}	374.50^{h-l}
		Sulaimani 2	383.00^{g-t}	432.67^{a-g}	373.83^{h-l}
		Adana 99	359.00^{p-v}	422.67^{a-l}	358.83^{j-m}

		Sham 6	376.33^{j-u}	424.00^{a-k}	381.83^{g-k}
	6cm + 3km	AL-fayaz	388.33^{g-r}	455.67^{a-e}	410.83^{efg}
		Sulaimani 2	381.33^{h-t}	425.33^{a-i}	367.33^{h-l}
		Adana 99	383.00^{g-t}	428.00^{a-i}	402.17^{e-i}
		Sham 6	347.67^{s-v}	456.33^{a-e}	384.00^{g-k}
	3cm + 5km	AL-fayaz	374.33^{j-u}	449.33^{a-f}	397.83^{f-i}
		Sulaimani 2	348.33^{s-v}	373.33^{k-u}	352.83^{j-m}
		Adana 99	354.33^{r-v}	365.67^{n-v}	344.67^{lm}
		Sham 6	369.67^{m-u}	406.33^{e-q}	344.67^{g-j}
	6cm + 5km	AL-fayaz	413.00^{c-o}	429.00^{a-i}	423.00^{b-f}
		Sulaimani 2	386.00^{g-t}	422.67^{a-l}	408.83^{e-h}
		Adana 99	317.67^{v}	326.33^{uv}	335.67^{m}
		Sham 6	416.33^{c-n}	470.33^{a}	411.00^{efg}
Conditional tillage	3cm + 3km	AL-fayaz	388.67^{g-s}	448.67^{a-f}	456.17^{ab}
		Sulaimani 2	364.67^{s-v}	398.33^{f-s}	415.50^{d-g}
		Adana 99	358.67^{p-v}	380.33^{i-t}	401.50^{e-i}
		Sham 6	387.33^{g-s}	409.00^{d-p}	416.50^{c-g}
	6cm + 3km	AL-fayaz	433.33^{a-g}	448.33^{a-f}	452.00^{abc}
		Sulaimani 2	353.33^{r-v}	384.33^{g-t}	404.83^{e-h}
		Adana 99	421.33^{b-l}	447.00^{a-f}	437.50^{a-e}
		Sham 6	420.33^{b-m}	447.33^{a-f}	451.83^{abc}
	3cm + 5km	AL-fayaz	421.33^{b-l}	459.33^{a-d}	454.33^{ab}
		Sulaimani 2	357.33^{q-v}	373.67^{l-u}	373.50^{h-l}
		Adana 99	335.00^{tuv}	352.33^{r-v}	359.00^{j-m}
		Sham 6	403.33^{f-r}	428.67^{a-i}	417.50^{d-g}
	6cm + 5km	AL-fayaz	433.00^{a-g}	473.00^{a}	451.00^{a-d}
		Sulaimani 2	431.67^{a-h}	448.33^{a-f}	435.50^{a-e}
		Adana 99	353.67^{r-v}	371.67^{l-u}	349.00^{klm}
		Sham 6	405.67^{e-q}	456.67^{a-e}	463.50^{a}
Season effect	first	407.06^{a}			
	second	442.58^{a}			

2-Number of Grain per spike:

In Table No. (2), it was shown that there were no significant differences between the average number of spike grains due to the influence of seasons, and the sowing techniques showed a significant difference in the averages of this trait, as the cultivation excelled at a depth of 3 cm and at speeds of 3 and 5 km.h (49.85 and 49.33) grains. A spike, and this is an indication that it does not affect the seeding speed in this trait, and it is possible to use the speed of 5 km per hour, as it gives the best productivity and reduces the time taken to complete the seeding process. The depth of planting 3 cm has caused giving the highest number of spike grains as it contributes to providing the balance requirements between the source and the downstream. And it has outperformed in the leaf area of the flag paper, which may increase the origins of the flowers. These results agree with (Buczek, Migut, &

Jańczak-Pieniążek, 2021; De Vita, Di Paolo, Fecondo, Di Fonzo, & Pisante, 2007; Dinnes et al., 2002; Gawęda & Haliniarz, 2021; Madar et al., 2021; Roozbeh & Rajaie, 2021).

In the cultivation systems, it is noticeable that the cultivation without tillage was significantly superior in the number of spike grains, amounting to 49.17 grain. The number of grains decreases, and it may be due to a decrease in the area of the flag leaf whose area decreases when the number of straws per unit area increases, and this is consistent with (Abdul Hamid, AL-Khafaf, & Al-Jassim, 1995; De Vita et al., 2007; Woźniak & Rachoń, 2020).

Varieties varied in values among them in the number of spike grains, as the Fayaz cultivar outperformed by giving the highest number of grains reached 50.92. spike, with a significant difference from the rest of the cultivars, and this confirms that the period of floret synthesis is governed by genetic factors, which have a role in the length of the spike and the number of spikes in it. These results agree with(AL-dawoode, 2013; Madar et al., 2021).

From the overlapping of seasons and seeding techniques, it is noted that the average number of grains is affected by the combinations of interference, that the second season was higher than the first season, and the cultivation excelled at a depth of 3 cm and a speed of 3 and 5 km.h, reaching (51.77 and 50.65) grains. Limited for this trait, while the depth of 3 cm would have resulted in the least number of ribs, and therefore the relationship from the source and the estuary may be in favor of the estuary, which is the number of spike grains due to the lack of competition between plants and this is consistent with (.Jasim & Mankhi, 2012; Al-Taie et al., 2013; Jeghata, 2021).

From the overlapping of farming systems and seasons, significant differences appear from the averages of this trait, as the second season significantly outperforms the first season in both farming systems and reached 50.65 grains. This means that the cultivation without tillage may provide a water balance in favor of increasing the leaf area or providing the requirements of agriculture as in agriculture The increase in the percentage of field emergence, which led to an increase in the number of grains in the spike in the second season, and that the remnants of the previous crop must be left for two seasons on the surface. So this is consistent with (Al-Douri & Mohammed, 2019; Jajo, 2016; Jeghata, 2021).

And from the interaction of varieties and planting seasons, in which the average number of spike grains differed significantly in the combinations of this interference, the Fayaz cultivars differed, and in the second season it was significantly superior, amounting to 53.66 grains. spike, the second season had the productive potential as it accumulates and decomposes organic matter, which may contribute to providing the requirements for Increasing the number of spike grains, and the cultivar's ability to create the number of florets is governed by genetic factors, which differ from one variety to another. The Fayaz variety is distinguished in that it was superior in the leaf area of the flag leaf and was also in the number of spikes. The photosynthetic that achieved superiority in the number of spike grains.

From the interaction of seeding techniques and cultivation systems, it is noted that the averages of this trait differed significantly, as the cultivation at a depth of 3 cm and at a speed of 5 km.h achieved the highest number of spike grains in the no-till farming system with an average of 51.64 grains. spike with an insignificant difference compared to cultivation at a depth of 3 cm and at a speed 3 km.h at the same planting system (50.51) grains. spike, that the increase or decrease in the number of plants per unit area according to the percentage of field emergence is reflected in the number of shoots, which may lead to a discrepancy in competition between plants when the formation and emergence of grain sites begins, it decreases or increases Directly, the number of grains originated for each plant, and that a decrease in the number of grains with an increase in the number of plants varies. The plants bear the inter-competition between plants, and the decrease in the area of the flag leaf may be one of the reasons for the decrease in the origins of the grain sites, as the high branching ability of the variety. Higher rates than traditional agriculture in order to provide growth requirements through the decomposition of the remnants

of the previous crop, maintain moisture and increase the readiness and efficiency of nutrient absorption, which is reflected in the increase in characteristics that achieve an increase in the number of grains of the spike consistent These results with (Al-Douri & Mohammed, 2019; AL-Rabati, 2017; Zhang et al., 2021).

And from the interaction of seeding techniques and cultivars, in which the averages of this trait differed significantly, and the Fayaz cultivar excelled in cultivation at a depth of 3 cm and at speeds of 3 and 5 km.h significantly compared to the rest of the combinations of this interaction. The Fayaz cultivar, despite its superiority in the number of stems per unit area, possessed a foliar area with photosynthesis efficiency, which contributed to the balancing of the relationship between source and estuary and the creation of the highest number of seedlings of grains and florets. And that the depth of 3 cm, regardless of the seeding speed, has achieved an increase in the number of grains in the spike compared with the depth of 6 cm, which had contributed to an increase in the number of stalks and the number of spikes. Decreased emergence of grain sites and these results agree with (Al-Aridi, 2011; AL-Rabati, 2017; Al-Taie et al., 2013).

It is noticed from the interaction of farming systems, varieties, and seasons, which differed in the combinations of this interaction, the average number of spike grains, and the Fayaz cultivar in the no-till farming system exceeded 51.78 grains. spike, followed by a non-significant difference of the same variety in conventional cultivation, 50.05 grains. spike. The superiority of the Fayaz variety is due to its ability and efficiency to balance in the inter-competition between its plants and its representative efficiency, which is reflected in the increase in grain sites and flowerbeds, and the cultivation without plowing contributed to providing a water balance and maintaining it to increase all the traits that contributed to increasing the grain of the spike (leaf area of the flag leaf) due to the availability of growth requirements, the readiness of the elements, the low pH of the soil and an increase in its content of organic matter in the second season, which had a longer opportunity for the decomposition of the remnants of the previous crop these results agree with (AL-dawoode, 2013; Al-Douri & Mohammed, 2019; AL-Rabati, 2017).

Among the three interactions are the cultivation systems, seeding techniques, and seasons, in which the average number of spike grains had a significant difference between the combinations of this interaction, and the cultivation of 3 cm depth and 3 km.h speed excelled in the second season in both cultivation systems (no-till and conventional) with an average of (52.69 and 50.86) grains. A spike and is for the benefit of no-till agriculture, in which the production input costs are lower and contribute to increasing the most important component of the yield (the number of spike grains). The increase in the number of spike grains in cultivation maybe 3 cm deep and at a speed of 3 km.h, due to a decrease in the number of spikes.m2 Affect the lack of competition in the stage of formation and emergence of grain sites, and thus increase it, especially in the second season, which provided the requirements for good growth for the longer period that contributed to the decomposition of the residues of the previous crop for two seasons these results agree with (Jajo, 2016; Jeghata, 2021).

From the interaction of seeding techniques, cultivars, and seasons, the average number of spike grains showed a significant difference in the combinations of this interaction, and the Fayaz cultivar excelled in it when planting with a depth of 3 cm and a speed of 3 km.h and in the second season with an average of 57.95 grains. spike followed by a non-significant difference also Fayaz cultivar when planting with the same depth At a speed of 5 km.h with an average of 56.15 grains. spike, that is due to the ability of the Fayaz variety to balance the products of photosynthesis as a result of the superiority in the area of the flag leaf and the balance in the relationship between the source and the estuary and its possession of genes that contribute to increasing the origins and synthesis of florets, and at a depth of 3 cm, which The least number of spikes per unit area (45.62) grains. This is reflected in the word competition between plants in the stage of formation and emergence of grain sites and the increase in the plants' endurance to competition, and the second season has achieved better conditions than the

first season to increase the decomposition of residues, which was reflected in providing the growth requirements of the plant. These results with (AL-dawoode, 2013; Al-Hayali, 2014; Jeghata, 2021; Omara et al., 2019).

And from the interaction between farming systems, seeding techniques, and cultivars, we notice significant differences in the number of spike grains by the effect of the combinations of the studied factors, as it is noted that the Fayaz cultivar excelled in cultivation without tillage at a depth of 3 cm and a speed of 3 km. an hour and in the second season with an average of 57.03 grains. The variety when planted with a depth of 3 cm and a seeding speed of 5 km.h in conventional cultivation and in the second season with an average of 55.03 grains. spike and this confirms the variation of genotypes to the nature of the interaction between its genetic structure and available growth factors, which is reflected in the transformation of the net photosynthesis process in the vegetative part To the emerging flowers and the increase in the percentage of knots and their variation in the number of spikes and the number of florets in the formed spike, due to the possession of the Fayaz cultivar genes that contribute values. The highest number of spike grains was achieved at the lowest number of spikes in m2 and in the second season, which provided the best requirements for growth compared to the first season. These results with (Azizi, Mousavi-Boogar, Feizian, & Eisvand, 2021; Chen, Wang, Wang, Bao, & Zhou, 2018; Wang et al., 2020).

In the interaction between farming systems, seeding techniques, varieties, and seasons, in which Fayadh cultivar showed when planting with a depth of 3 cm and a speed of 3 km.h in the cultivation without tillage and in the second season the highest average number of spike grains with a significant difference of (60.20) grains. spike and an insignificant difference for the same variety When planted at a depth of 3 cm, regardless of seeding speed or tillage system, and in the second season.

Table (2) Effect of seasons, planting systems, seeding techniques and cultivars and their interactions on the number of grain per Spike

The concordances of the studied factors		season				
		first	second	Planting technique	Cultivar's systems	Varieties
Interaction of seasons and planting techniques	3cm+3km	47.93^{b}	51.77^{a}	49.85a		
	6cm+3km	43.97^{c}	47.28^{b}	45.63b		
	3cm+5km	48.01^{b}	50.65^{a}	49.33a		
	6cm+5km	44.23^{c}	47.46^{b}	45.85b		
Interaction cultivar systems and seasons	**NO-TILLAGE**	47.29^{b}	51.04^{a}		49.17^{a}	
	Conditional tillage	44.79^{b}	47.54^{b}		46.17^{b}	
Varieties and seasons interaction	AL-fayaz	48.18^{bc}	53.66^{a}			50.92^{a}
	Sulaimani 2	46.43^{cd}	48.44^{b}			47.44^{b}
	Adana 99	44.60^{d}	47.37^{bc}			45.99^{c}
	Sham 6	44.94^{d}	47.69^{bc}			46.32^{bc}
Planting technique	Cultivar's systems		51.77^{a}	Second season	The average effect of the interaction between seeding techniques and planting systems	
3cm+3km	**No-tillage**		48.33^{bcd}	52.69^{a}	50.51^{ab}	

6cm+3km		45.93^{d-g}	49.78^{bc}	47.86^{dc}
3cm+5km		49.75^{bc}	53.52^{a}	51.64^{a}
6cm+5km		45.13^{efg}	48.16^{bcd}	46.65^{de}
3cm+3km	conditional tillage	47.52^{c-f}	50.86^{ab}	49.11^{bc}
6cm+3km		42.02^{h}	44.77^{fgh}	43.40^{f}
3cm+5km		46.27^{def}	47.77^{bcd}	47.02^{d}
6cm+5km		43.33^{gh}	46.76^{def}	45.05^{ef}
Planting technique	Varieties wheat	First season	Second season	The average effect of the interaction between cultivars techniques and varieties
3cm+3km	AL-fayaz	52.23^{bc}	57.95^{a}	55.09^{a}
	Sulaimani 2	47.98^{d-i}	51.03^{cde}	49.51^{b}
	Adana 99	44.17^{i-l}	47.38^{d-i}	45.77^{ef}
	Sham 6	47.33^{e-j}	50.73^{cde}	49.03^{bcd}
6cm+3km	AL-fayaz	43.63^{jkl}	49.25^{c-g}	46.44^{de}
	Sulaimani 2	43.23^{kl}	45.33^{h-l}	44.28^{ef}
	Adana 99	44.67^{i-l}	47.35^{d-j}	46.01^{e}
	Sham 6	44.37^{i-l}	47.18^{e-j}	45.77^{ef}
3cm+5km	AL-fayaz	50.30^{c-f}	56.15^{ab}	53.22^{a}
	Sulaimani 2	49.12^{c-h}	49.52^{c-g}	49.32^{bc}
	Adana 99	48.10d-i	50.22^{c-f}	49.16^{bcd}
	Sham 6	44.53^{i-l}	46.72^{f-k}	45.62^{ef}
6cm+5km	AL-fayaz	46.53^{f-k}	51.28^{cd}	48.91^{bcd}
	Sulaimani 2	45.40^{h-k}	47.90^{d-i}	46.63^{cde}
	Adana 99	41.47^{l}	44.53^{i-l}	43.00^{f}
	Sham 6	43.53^{jkl}	46.15^{g-k}	44.84^{ef}

Cultivar's systems	Varieties	First season	Second season	The average effect of the interaction between cultivars systems and varieties
No-tillage	AL-fayaz	48.20^{cde}	55.37^{a}	51.78^{a}
	Sulaimani 2	48.73^{cd}	50.51^{bc}	49.62^{b}
	Adana 99	46.73^{d-g}	50.11^{bc}	48.42^{bc}
	Sham 6	45.48^{efg}	48.17^{cde}	46.83^{cd}
Conditional tillage	AL-fayaz	48.15^{cde}	51.95^{b}	50.05^{ab}
	Sulaimani 2	44.13^{gh}	46.37^{d-g}	45.25^{ed}
	Adana 99	42.47^{h}	44.63^{fgh}	43.55^{e}
	Sham 6	44.40^{gh}	47.22^{def}	45.81^{d}

Planting technique & cultivation systems		Varieties	First season	Second season	The average effect of the interaction between cultivars systems, planting techniques, and varieties
cultivation	Planting				

systems	technique				
No-tillage	3cm + 3km	AL-fayaz	53.87^{b-e}	60.20^{a}	57.03^{a}
		Sulaimani 2	48.33^{e-q}	52.17^{b-h}	50.25^{b-f}
		Adana 99	44.67^{l-v}	48.17^{g-r}	46.42^{f-k}
		Sham 6	46.47^{i-r}	50.23^{c-l}	48.35^{e-i}
	6cm + 3km	AL-fayaz	43.07^{q-v}	50.43^{c-k}	46.75^{f-k}
		Sulaimani 2	47.07^{h-t}	48.90^{e-p}	47.98^{e-j}
		Adana 99	47.13^{h-t}	50.37^{c-k}	48.75^{d-h}
		Sham 6	46.47^{i-t}	49.43^{c-n}	47.95^{e-j}
	3cm + 5km	AL-fayaz	47.33^{h-t}	57.27^{ab}	52.30^{bcd}
		Sulaimani 2	53.87^{b-e}	53.30^{b-g}	53.58^{abc}
		Adana 99	52.13^{b-h}	55.57^{abc}	53.85^{ac}
		Sham 6	45.67^{i-t}	47.97^{g-r}	46.82^{f-k}
	6cm + 5km	AL-fayaz	48.53^{e-q}	53.57^{b-f}	51.05^{b-e}
		Sulaimani 2	45.67^{i-t}	47.67^{i-r}	46.67^{f-k}
		Adana 99	43.00^{q-v}	46.33^{i-t}	44.67^{i-l}
		Sham 6	43.33^{p-v}	45.07^{m-u}	44.20^{j-m}
Conditional tillage	3cm + 3km	AL-fayaz	50.60^{c-j}	55.70^{abc}	53.15^{abc}
		Sulaimani 2	47.63^{i-s}	49.90^{d-m}	48.77^{d-h}
		Adana 99	43.67^{o-v}	46.60^{i-t}	45.13^{h-l}
		Sham 6	48.20^{g-r}	51.23^{c-i}	49.72^{c-g}
	6cm + 3km	AL-fayaz	44.20^{n-v}	48.07^{f-r}	46.13^{g-k}
		Sulaimani 2	39.40^{v}	41.77^{tuv}	40.58m
		Adana 99	42.20^{s-v}	44.33^{m-v}	43.27^{klm}
		Sham 6	42.27^{s-v}	44.93^{k-v}	43.60^{klm}
	3cm + 5km	AL-fayaz	53.27^{c-g}	55.03^{a-d}	54.15^{ab}
		Sulaimani 2	44.37^{m-v}	45.73^{i-t}	45.05^{i-l}
		Adana 99	44.07^{n-v}	44.87^{k-v}	44.47^{i-m}
		Sham 6	43.40^{o-v}	45.47^{j-u}	44.43^{i-m}
	6cm + 5km	AL-fayaz	44.53^{m-v}	49.00^{e-o}	46.77^{f-k}
		Sulaimani 2	45.13^{m-u}	48.07^{g-r}	46.60^{f-k}
		Adana 99	39.93^{uv}	42.73^{s-r}	41.33^{lm}
		Sham 6	43.73^{o-v}	47.23^{h-t}	45.48^{h-k}
Season effect		first	46.04^{a}		
		second	49.29^{a}		

3-Thausand Grain Weight:

From Table No. (7), it appears that there are no significant differences in the effect of seasons despite the apparent difference of the second season, with an increase in grain weight with an average of 32.95 gm compared to 30.69 gm in the first season. It is also noted that the traditional cultivation was superior in the weight of 1000 grains with a significant difference compared to the no-till cultivation with an average of 32.53 g. This may be due to the decrease in the percentage of field emergence, which contributed to a smaller number of plants, which reduced

the dry matter settling of grains due to the increased competition for growth requirements. It is also noted that the sowing techniques had a significant effect on the characteristics of the weight of a thousand grains, as the cultivation was superior to a depth of 6 cm and a speed of 3 km.h, with a significant difference with an average of 34.21 g, due to the decrease in the percentage of field emergence in it, which was reflected in the number of plants per unit area and the number of spikes. m2, which Contributes to increasing the capacity of the source, that is, increasing the effective leaf surface of each plant as a result of the lack of competition and misleading of the lower leaves, and thus positively reflected on the weight of a thousand grains, and this is consistent with (Huang, Qiang, Feng, & Yu, 2012; Jajo, 2016; Khedir, Abdulrhman, & Younis, 2015; Roozbeh & Rajaie, 2021).

Varieties varied in weight of one thousand grains, as the Fayaz and Sulaymaniyah 2 wheat cultivars outperformed with a significant difference compared to the rest of the cultivars, with an average of (32.97 and 33.22 g). In Fayaz cultivar, it was superior in leaf area, which is reflected by the highest dry matter deposition in the grains, while Sulaymaniyah 2 variety was lower in the percentage of Branching and the number of spikes.m2 is reflected in a decrease in competition for growth requirements and an increase in the weight of a thousand grains of this variety. These results are consistent with (Ahmad et al., 2013; AL-dawoode, 2013; Bakhsh et al., 2020; Darguza & Gaile, 2019; Woźniak & Rachoń, 2020).

From the interaction of seeding techniques and seasons, it is noted that the seed depth of 6 cm and a speed of 3 km.h in the second season is significant compared to the combinations of this interference with an average of 35.15 g. This is due to a decrease in seed depth and an increase in its speed, which leads to homogeneity, depth, and distribution of seed, and this is reflected in the difference in moisture independence at different depths, which causes a decrease in the percentage of emergence and that some seeds are at a shallow depth, which is vulnerable to birds or the lack of sufficient moisture for germination due to the decrease in the efficiency of the seeding equipment accordingly. As for the second season, it achieved an increase in the weight of a thousand grains compared to the first season with different seeding techniques, because it contributed to the decomposition of the remnants of the previous crop And for two seasons while providing the growth requirements to increase this trait, these results are consistent with (Ahmed & AL-Rajbo, 2014; Gawęda & Haliniarz, 2021; Haider et al., 2016; Hilal, 2010).

And from the interaction of tillage systems and seasons, which shows the significant differences in the weight of a thousand grains according to the combinations of this interaction, that traditional tillage excelled with the highest average weight of a thousand grains in the second season, with an average of 33.66 g, with an insignificant difference compared to no-till cultivation in the same season, which amounted to 32.23 g, indicating that the agricultural season is Who contributed to these differences and that the farming systems, especially in the second season, have no difference between them, which is an indicator in favor of no-till agriculture to reduce the costs of plowing and achieve it in a short period, due to the accumulation and decomposition of dry matter in the second season and the availability of nutrients better than in the first season and increasing the ability of the soil to retain With moisture, these results are consistent with (Al-Bayati & Zedan, 2017; Al-Douri & Mohammed, 2019; Al-Jarrah, 2011; Higashi et al., 2014).

The interaction of cultivars and seasons showed significant differences between the averages of a thousand grains for this interaction combination, as the Fayaz and Sulaymaniyah 2 cultivars excelled in the second season with a significant difference of (34.50 and 34.21 gm, respectively, and this is an indication that the Fayaz cultivar was parallel, as it excelled in the percentage of emergence and spikes and in the number of grains in The spike and the weight of a thousand grains, which is a genetic advantage for this variety if the appropriate growth requirements are met, as in the second season. As for the Sulaymaniyah 2 variety, it was low in the number of spikes due to its low branching ability, which is reflected in the distribution of photosynthetic products to the lowest number of

grains in the plant, in addition to being less In the row the number of grains in the spike corresponds to (Jeghata, 2021; Li Liu et al., 2017; Mulki & von Korff, 2016; M. Singh et al., 2020). As the variety that can exceed the weight of a thousand grains is the one that will have space for the flag paper capable of processing representations to the grains during the grain filling process withstand the surrounding environmental conditions.

And from the interaction of sowing techniques and cultivation systems, it is noted that the superiority of cultivation at a depth of 6 cm and at a speed of 3 km.h in a no-till cultivation with a weight of a thousand grains, and this may be the low percentage of emergence from them and therefore a smaller number of plants at this depth as it may be due to early growth, especially in No-till agriculture, which achieved an accumulation of organic matter, a higher readiness for nutrients, and an increase in the ability to retain moisture, which may allow for an increase in the accumulation of dry matter during the vegetative growth of one plant, which leads to an increase in the weight of a thousand grains and the results are consistent with (Gathala et al., 2009; Jajo, 2016; Mulki & von Korff, 2016; Omara et al., 2019).

Among the interaction of seeding techniques and cultivars, in which the average weight of a thousand grains differed significantly according to the combinations of this interaction, the Fayaz cultivar excelled when planting with a depth of 3 cm and a speed of 3 km/hour for a weight of 33.16 g, due to the ability of this variety to better exploit the growth factors because it has the heirs that control that While it is noted that all cultivars gave a high and superior weight of one thousand grains without significant differences when planting with a depth of 6 cm and a seeding speed of 3 km.h. This may be due to the low percentage of germination in them, which gave all cultivars the possibility of a good distribution of the products of photosynthesis without competition to the grains. While when planting at a depth of 3 cm and at a speed of 5 km.h, the Fayaz and Sulaymaniyah 2 cultivars have the highest weight of one thousand grains (34.03 and 33.60) g. While at a depth of 6 cm and at a speed of 5 km.h, the Sulaymaniyah 2 variety had the highest weight of seeds with an average of 34.17 g. This indicator may be due to the difference in cultivars in seeding techniques in the percentages of emergence and their variation in the number of stalks and spikes per unit area and their difference in the area of the flag leaf, which may be due Variations in the interaction of genes and their expression according to the available growth conditions and these results are consistent with (AL-dawoode, 2013; Knežević, Antunović, Balicević, & Ranogajec, 2010; Omara et al., 2019; Zhang et al., 2021).

From the interaction of cultivation systems and varieties, it appears that the Fayaz and Sulaymaniyah 2 cultivars were significantly superior to the average weight of a thousand grains by the effect of the combinations of this interaction, which amounted to 34.4 and 33.97 gm in conventional cultivation, respectively. This may be due to a decrease in the percentage of field emergence and a decrease in the number of plants per unit area, which contributes to the distribution of products The photosynthesis and dry matter that was deposited during the vegetative growth period to the lowest number of grains, and the superiority of the Fayaz cultivar, although it had a significant increase in the number of spikes and the number of grains of the spike, to the efficiency of this variety in the perfect balance between the source and the estuary and the contribution of the leaf flat of the flag leaf to achieving an ideal mark As well as in early flowering, which allows for a long period of filling the bean, while the Sulaymaniyah2 variety may be superior to its low branching ability, which achieves the least number of ears per unit area and thus less competition for growth requirements and better deposition of dry matter in the grains. These results are in agreement with (Ahmad et al., 2013; AL-dawoode, 2013; AL-Rabati, 2017; Li Liu et al., 2017; Si et al., 2018).

The average weight of a thousand grains for the interaction combinations between planting systems, seeding techniques and seasons showed significant differences. It was noted that the treatment of no-till cultivation was superior to a depth of 6 cm and a speed of 3 km.h in the second season, with an average of 36.54 g. This may be

due to the decrease in the number of plants per unit area as a result of the lack of field emergence and thus competition Fewer among plants with the availability of growth requirements of nutrients and decomposing organic matter, causing an increase in the readiness of the elements and retaining soil moisture, which is reflected in the increase in the capacity of the source area, in addition to an increase in the leaf surface of the flag leaf per plant, due to a decrease in the misleading effect of the lower leaves, which is positively reflected in the weight of a thousand grains of this plant and this It was evident in the second season and these results are consistent (Huang et al., 2012; Kamkar, Ahmadi, Soltani, & Zeinali, 2008; Taner, Arisoy, Kaya, Gültekin, & Partigöç, 2015; Yang et al., 2020).

And from the interaction of sowing techniques, varieties and seasons, which shows the differences in the average of a thousand grains by the effect of this interference combinations, as the Sulaymaniyah 2 variety excels when planting with a depth of 6 cm and a speed of 3 km.h with an average of 35.92 g in the second seasons. This may be due to the low percentage of field emergence in this seeding technology and to the nature of the variety and its branching ability, which is reflected on the accumulation and deposition of dry matter for a smaller number of grains in the plant. Also, the Fayaz cultivar when planted at a depth of 3 cm and a speed of 5 km.h, outperformed in the weight of a thousand grains with an average of 35.62 g and in the second season also as the high seeding speed with a lower depth of sowing It may lead to the inefficiency of the seeding equipment in placing the seed in its depth and appropriate place, which is reflected in the low percentage of emergence in addition to the ability of this variety in the efficiency of the leafy flat of the flag leaf in the deposition of dry matter in the seeds for early branching and entering into the stage of filling the bean early. As for the second season, it was Outperforming the first season in all the combinations of the studied factors to allow a longer opportunity for the decomposition of the residues of the previous crop and increase the organic matter that improved the growth requirements of the crop. These results agree with This agree (dos Santos Soares et al., 2019; Ehsanullah, Qamar, Ghaffar, & Mustafa, 2013; Guo et al., 2020; Iqbal, Akbar, Ali, Sattar, & Ali, 2010; Khan et al., 2017; Khedir et al., 2015).

The interaction of tillage systems, seeding techniques and cultivars showed a significant difference between the averages of a thousand grains with different combinations of factors, as the cultivar Adana 99 when planting without tillage, with a depth of 6 cm and a seeding speed of 3 km.h, with the highest average weight of one thousand grains reached 36.77 g. This may be due to the decrease in the number of plants of this variety. In the combination of the above farming system and seeding technique, which was reflected in an increase in the weight of one thousand grains, followed by an insignificant difference of 6 when planting without tillage and planting with a depth of 6 cm and a seeding speed of 3 km.h with an average of 36.32 g. The Fayaz cultivar when planting traditional and cultivation with a depth of 3 cm and a seed speed of 5 km. hour may be due to the small number of plants, which results in a better distribution of dry matter grains in the plant better. These results are consistent with (Bogunovic, Pereira, Kisic, Sajko, & Sraka, 2018; Giambalvo et al., 2018; Khaledian, Mailhol, & Ruelle, 2012).

From the interaction between the studied factors and the seasons, the average weight of one thousand grains showed significant differences, as the Fayaz cultivar outperformed significantly in conventional cultivation and cultivation at a depth of 3 cm and a speed of 5 km.h, and in the second season with an average of 37.77 g and an insignificant difference for the same combinations and cultivation at a speed of 3 km.h due to The genetic ability of the cultivar to own the area of the flag leaf contributes to increasing the weight of the bean, and that the increase in the weight of the bean in seeding technique with a depth of 3 cm and at speeds 3 and 5 km.h was the lowest in the percentage of emergence and the number of spikes.m2, which results in a distribution of dry matter for a smaller number of grains, In the second season, the average weight of the bean is increased in order to meet the growth requirements, in order to decompose the residues of the previous crop and for two seasons.

Table (3) Effect of seasons, planting systems, seeding techniques and cultivars and their interactions on the

The concordances of the studied factors		season				
		first	second	Planting technique	Cultivar's systems	Varieties
Interaction of seasons and planting techniques	3cm+3km	28.69^{f}	31.67^{cd}	30.18^{c}		
	6cm+3km	33.27^{b}	35.15^{a}	34.21^{a}		
	3cm+5km	30.72^{de}	32.94^{bc}	31.83^{b}		
	6cm+5km	30.09^{e}	32.04^{bcd}	31.06^{bc}		
Interaction cultivar systems and seasons	NO-TILLAGE	29.98^{c}	32.23^{ab}		31.11^{b}	
	Conditional tillage	31.40^{bc}	33.66^{a}		32.53^{a}	
Varieties and seasons interaction	AL-fayaz	31.45^{b}	34.50^{a}			32.97^{a}
	Sulaimani 2	32.23^{b}	34.21^{a}			33.22^{a}
	Adana 99	29.99^{cd}	31.74^{b}			30.86^{b}
	Sham 6	29.09^{d}	31.34^{bc}			30.22^{b}

Planting technique	Cultivar's systems	First season	Second season	The average effect of the interaction between seeding techniques and planting systems
3cm+3km	**No-tillage**	27.49^{g}	30.31^{ef}	28.90^{f}
6cm+3km		34.84^{ab}	36.54^{a}	35.69^{a}
3cm+5km		29.17^{fg}	31.79^{de}	30.48^{d}
6cm+5km		28.42^{fg}	30.28^{ef}	29.35^{ef}
3cm+3km	**conditional tillage**	29.88^{ef}	33.03^{bcd}	31.46^{cd}
6cm+3km		31.71^{de}	33.75^{bc}	32.73^{bc}
3cm+5km		32.27^{cd}	34.08^{bc}	33.17^{b}
6cm+5km		31.75^{de}	33.79^{bc}	32.77^{bc}

Planting technique	Varieties wheat	First season	Second season	The average effect of the interaction between cultivars techniques and varieties
3cm+3km	AL-fayaz	30.90^{g-k}	35.42^{ab}	33.16^{a}
	Sulaimani 2	28.83^{klm}	31.70^{e-i}	30.27^{b}
	Adana 99	28.17^{lm}	30.23^{h-l}	29.20^{bc}
	Sham 6	26.85^{m}	29.33^{j-m}	28.09^{c}
6cm+3km	AL-fayaz	32.48^{c-i}	34.75^{a-d}	33.62^{a}
	Sulaimani 2	33.80^{a-f}	35.92^{a}	34.86^{a}
	Adana 99	33.43^{a-g}	34.82^{a-d}	34.13^{a}
	Sham 6	33.38^{a-g}	35.10^{abc}	34.24^{a}
3cm+5km	AL-fayaz	32.43^{c-i}	35.62^{a}	34.03^{a}
	Sulaimani 2	32.80^{b-h}	34.40^{a-e}	33.60^{a}
	Adana 99	28.38^{klm}	30.07^{i-l}	29.23^{bc}
	Sham 6	29.25^{g-m}	31.67^{f-i}	30.46^{b}

6cm+5km	AL-fayaz	29.97^{i-l}	32.22^{d-i}	31.09^{b}
	Sulaimani 2	33.50^{a-g}	34.83^{a-d}	34.17^{a}
	Adana 99	29.98^{i-l}	31.83^{f-j}	30.91^{b}
	Sham 6	26.90^{m}	29.27^{j-m}	28.08^{c}

Cultivar's systems	Varieties	First season	Second season	The average effect of the interaction between cultivars systems and varieties
No-tillage	AL-fayaz	30.07^{d-g}	33.01^{c}	31.54^{bc}
	Sulaimani 2	31.52^{c-f}	33.43^{bc}	32.47^{b}
	Adana 99	29.82^{efg}	31.72^{cde}	30.77^{cd}
	Sham 6	28.52^{g}	30.78^{def}	29.65^{d}
Conditional tillage	AL-fayaz	32.82^{c}	35.99^{a}	34.40^{a}
	Sulaimani 2	32.95^{c}	35.00^{ab}	33.97^{a}
	Adana 99	30.17^{d-g}	31.76^{cd}	30.96^{cd}
	Sham 6	29.68^{fg}	31.91^{cd}	30.79^{cd}

Planting technique & cultivation systems		Varieties	First season	Second season	The average effect of the interaction between cultivars systems, planting techniques, and varieties
cultivation systems	Planting technique				
No-tillage	3cm + 3km	AL-fayaz	29.30^{n-v}	33.40^{c-k}	31.35^{f-j}
		Sulaimani 2	25.83^{vw}	28.87^{o-v}	27.35^{lm}
		Adana 99	27.60^{q-w}	29.27^{n-v}	28.43^{kl}
		Sham 6	27.23^{r-v}	29.70^{k-t}	28.47^{kl}
	6cm + 3km	AL-fayaz	32.93^{d-n}	34.80^{a-h}	33.87^{b-f}
		Sulaimani 2	35.10^{a-g}	36.53^{a-d}	35.82^{abc}
		Adana 99	35.83^{a-e}	37.70^{ab}	36.77^{a}
		Sham 6	35.50^{a-f}	37.13^{abc}	36.32^{ab}
	3cm + 5km	AL-fayaz	30.10^{m-t}	33.40^{c-k}	31.75^{f-j}
		Sulaimani 2	32.20^{e-p}	34.23^{a-i}	33.22^{c-g}
		Adana 99	27.27^{r-w}	29.53^{l-v}	28.40^{kl}
		Sham 6	27.10^{s-w}	30.00^{k-u}	28.55^{kl}
	6cm + 5km	AL-fayaz	27.97^{q-w}	30.43^{i-s}	29.20^{jkl}
		Sulaimani 2	32.93^{d-n}	34.07^{a-j}	33.50^{c-g}
		Adana 99	28.57^{p-v}	30.37^{j-s}	29.47^{i-l}
		Sham 6	24.23^{w}	26.27^{uvw}	25.25^{m}
Conditional tillage	3cm + 3km	AL-fayaz	32.50^{e-o}	37.43^{ab}	34.97^{a-d}
		Sulaimani 2	31.83^{f-p}	34.53^{a-h}	33.18^{c-g}
		Adana 99	28.73^{o-v}	31.20^{h-q}	29.97^{h-l}
		Sham 6	26.47^{t-w}	28.97^{o-v}	27.72^{lm}
	6cm + 3km	AL-fayaz	32.03^{e-p}	34.70^{a-h}	33.37^{c-g}

		Sulaimani 2	32.50^{e-o}	35.30^{a-f}	33.90^{b-f}
		Adana 99	31.03^{h-q}	31.93^{f-p}	31.48^{f-j}
		Sham 6	31.27^{m-q}	33.07^{d-n}	32.17^{e-i}
	3cm + 5km	AL-fayaz	34.77^{a-h}	37.83^{a}	36.30^{ab}
		Sulaimani 2	33.40^{c-k}	34.57^{a-h}	33.98^{b-f}
		Adana 99	29.50^{m-v}	30.60^{i-s}	30.05^{h-l}
		Sham 6	31.40^{g-q}	33.33^{c-l}	32.37^{d-h}
	6cm + 5km	AL-fayaz	31.97^{f-p}	34.00^{b-j}	32.98^{d-g}
		Sulaimani 2	34.07^{b-j}	35.60^{a-f}	34.83^{a-e}
		Adana 99	31.40^{g-q}	33.30^{d-m}	32.35^{d-h}
		Sham 6	29.57^{l-v}	32.27^{e-p}	30.92^{g-k}
Season effect	first	30.69^{a}			
	second	32.95^{a}			

4- Crop Yield (kg.hactare):

It was shown from Table (8) that the seasons had a significant effect on the average grain yield per unit area, or the second season was significantly superior to the first season with a grain yield of 6438.2 kg.ha. Contributes to increasing the readiness of nutrients and the ability of the soil to retain moisture, lowering the pH and increasing the activity of soil organisms and the biological balance, and this is consistent with the results of (Abdul-Kreem, 2017; Azizi et al., 2021; Pal, Patra, & Mukhopadhyay, 2018; V. Singh, Srivastava, Singh, & Savita, 2011; Verhulst et al., 2009).

Sowing techniques had a significant effect on this trait, as the planting with a depth of 6 cm and a speed of 3 km.h was significantly superior, and gave the highest average of 6080.2 kg.ha. This resulted from the superiority of this treatment in the leaf area of the flag leaf and the increase in the number of spikes.m2 and the number of spike grains and the weight of one thousand grains. 5665.8, 5741.4 and 5502.3) kg.ha^{-1}, by achieving a balance between the source represented by the area of the flag leaf and the estuary represented by the weight of the grain, and the increase in the number of plants per unit area, which is reflected in the most important components of the yield, which is the number of spikes.m2 through regularity The distribution and depth of seeding at a speed of 3 km.h. These results agree with (Ajit, Singh, Singh, Suresh, & Kumud, 2010; Darguza & Gaile, 2019; El-Lattief, 2011; Hadjichristodoulou, Della, & Photiades, 1977; Jajo, 2016).

The cultivation systems did not show a significant effect on the grain yield, and it is noted that the cultivation without tillage approached its yield with the traditional cultivation, and this is an advantage for it because it has the lowest costs and facilitates the completion of the sowing process in record time while maintaining the fertility of the soil and the sustainability of its production.

Varieties differed in grain yield significantly, as the Fayaz cultivar was significantly superior in its yield compared to the other cultivars, with an average of 6775.9 kg.ha. This cultivar was efficient and had a high productive capacity for the components of the crop, including the increase in the percentage of field emergence, the number of spikes, the number of spike grains, and the weight of one thousand grains (5782.2 and 4986). 6 and 5445.0) kg.ha, which may be formed as a result of a genetic potential for this variety in the accumulation of dry matter for the efficiency of its leaf surface and the interception and exploitation of sunlight during the growing season, so the difference in

net photosynthesis per unit area, which results from this distinction in its productive qualities results with (Ahmad et al., 2013; AL-dawoode, 2013; Al-Hadithi, 2015; AL-Rabati, 2017).

The interaction of seeding techniques and seasons showed significant differences in the rates of grain yield to match this interaction, as the treatment planted with a depth of 6 cm and a speed of 3 km.h showed a significant superiority of this trait (6804.7) kg.ha equal to the yield of the treatment planted with a depth of 6 cm and a speed of 5 km. An hour in the second season, and this is evidence that the depth of the seed is 6 cm, regardless of its speed, which contributes to increasing the components of the yield, as it outperformed in the number of spikes. Better production, and that the second season achieved higher results than the first season, as it gave a longer opportunity for the decomposition of the residues of the previous crop and for two seasons, which provided a good growth environment to increase the yield. These results are consistent with (Ahmed & AL-Rajbo, 2014; Ajit et al., 2010; Buczek et al., 2021; Jajo, 2016).

The interaction of farming systems and seasons had a significant difference in the average grain yield, as no-till and conventional agriculture were significantly superior in the second season in this trait, reaching (6523.23 and 6353.15) kg.ha, respectively. and accomplish it in the shortest time.

From the interaction of cultivars and seasons, it is noted that the average grain yield differed significantly, as the Fayaz cultivar excelled in the second season with the highest grain yield of 7108.20 kg. hectare. In the second season, in order to increase the readiness of nutrients and the appropriate environment. These results are consistent with (Ahmad et al., 2013; AL-dawoode, 2013; Al-Hadithi, 2015; AL-Rabati, 2017; Othman et al., 2020).

And from the interaction of seeding techniques and cultivation systems, which were significant differences between the average yield of grains for the combination of these two factors, it is noted that the superiority of cultivation at a depth of 6 cm and at a speed of 3 km.h and in cultivation without tillage averaged 6556.7 kg.ha. cm has outperformed in increasing the number of plants per unit area and the number of total ribs in order to increase the readiness of nutrients and increase their transportation during the stages of floret formation and grain filling, including giving high rates of grain weight and yield components, which was reflected in the grain yield in no-till agriculture, which was accompanied by the decomposition of crop residues and an increase Soil organic content and improving the availability of fertilizer elements by decreasing the pH and increasing the activity of microorganisms. These results are consistent with (Al-Taie et al., 2013; Ashour & Safi, 2015; Wang et al., 2020; Wu, Chen, Jiang, Jiang, & Chen, 2021).

Among the interaction of seeding techniques and cultivars, which showed significant differences in the combination of this interaction on the grain yield, the Fayaz cultivar excelled when planting with a depth of 3 cm and at speeds 3 and 5 km.h. It reached a rate of (7176.9 and 7324.9) kg. hectare^{-1}, respectively, due to the increase in the percentage of field emergence In this treatment, the Fayaz cultivar, which has a high efficiency in the accumulation of dry matter for net photosynthesis, excelled, which was reflected in an increase in the leaf area, the number of total and effective branches, and an increase in yield components. These results are consistent with (Jiao et al., 2021; Knežević et al., 2010; Lafond & Fowler, 1989; McMaster, Palic, & Dunn, 2002).

And from the interaction of the cultivation systems and cultivars, of which there was a significant difference from the average grain yield to the compatibility of this interaction, in which the Fayaz cultivar excelled in the conventional cultivation with the highest rate of grain yield amounting to 7862.9 kg.ha-1, which outperformed in the number of spikes.m2, the number of spike grains and the weight of a thousand grains 6304.6, 5455.4, 6129.9) kg.ha^{-1}. These results agree with (AL-Rabati, 2017; Govaerts et al., 2005; Ruiz et al., 2019; Si et al., 2018; Song, Lehne, Le, Ge, & Huang, 2009).

And from the interaction of sowing techniques, farming systems and seasons, in which the average grain yield differed significantly, as the cultivation excelled in it at a depth of 6 cm and a speed of 3 km.h and cultivation without tillage and in the second season the highest rate of grain yield reached 7509.30 kg.ha^{-1} because in this seeding technique It has achieved the highest percentage of field emergence and regularity of cultivation and help in increasing the ability to add to branching, and that of no-till cultivation, which contributes to the decomposition of crop residues and for two seasons, increases the organic matter in the soil surface and the nitrogen content, which contributes to increasing the chlorophyll content of the leaves and the area of the leaf surface, especially the flag leaf Which contributes to increasing the components of the yield and this is consistent with (Jajo, 2016; Jeghata, 2021; Zhang et al., 2021).

And from the interaction of seeding techniques, varieties and seasons, in which the average grain yield differed in accordance with these factors of the study, where the Fayaz cultivar excelled when planting at a depth of 3 cm and at speeds of 3 and 5 km.h and in the second season with an average of (8715.6, 8499.9) kg.ha^{-1}, with a difference Significantly, compared to the rest of the averages, planting at a depth of 3 cm achieved the highest percentage of field emergence, which was reflected in the number of plants per unit area, represented by its superiority in the number of spikes. The yield components were significantly superior to the rest of the cultivated cultivars by its early branching pattern and spike expulsion, which yielded a higher number of buds and superior grain weight. These results are consistent with (AL-dawoode, 2013; AL-Rabati, 2017; Jajo, 2016; Zhang et al., 2021).

And from the interaction of farming systems, seeding techniques and varieties, in which the average grain yield of the combinations of the levels of the studied factors differed, that the Fayaz cultivar in conventional plowing and cultivation at a depth of 3 cm and a seeding speed of 5 km.h was significantly superior to an average of 8122.9 kg.ha^{-1} compared to all other combinations and this is what It confirms that this variety has achieved superiority for the components of the yield in traditional tillage and agriculture in the seeding technique that contributes to increasing the number of plants by increasing the branching efficiency of the variety and achieving a balance between the source represented by the area of the flag leaf through its ability to intercept solar radiation and its independence during the growing season and downstream represented by grains. These results are in agreement with (Ahmad et al., 2013; AL-Rabati, 2017; Jeghata, 2021; Ruiz et al., 2019).

From the averages of the grain yield of the interaction between the study factors and the seasons, it appears that the Fayaz cultivar was significantly superior to the highest grain yield of 8150.2 kg.ha-1 in conventional cultivation and cultivation at a depth of 3 cm and a seeding speed of 5 km.h and in the second season followed by a non-significant difference in the grain yield for this The variety when planting at a depth of 3 cm and at speeds of 3 and 5 km.h. In traditional agriculture and without plowing in the second season, this is an advantage in favor of farming without plowing because it is the lowest costs and the fastest achievement of the seeding process. The speed of 5 km.h increases the speed of the seeding process and thus reduces costs Agriculture, especially in the Fayaz variety and in the second season, as the remnants of the previous crop for two seasons have improved the physical and chemical properties of the soil and the readiness of nutrients, which has achieved superiority in the components of the yield that was reflected in the grain yield. These results are in agreement with (Al-Jamas, 2018; Giambalvo et al., 2018; Ruiz et al., 2019; Zhang et al., 2021).

Table (4) Effect of seasons, planting systems, seeding techniques and cultivars and their interactions on the yield Crop

The concordances of the	season		

studied factors		first	second	Planting technique	Cultivar's systems	Varieties
Interaction of seasons and planting techniques	3cm+3km	4790.6^{e}	6541.0^{ab}	5665.8^{b}		
	6cm+3km	5355.8^{d}	6804.7^{a}	6080.2^{a}		
	3cm+5km	5144.1^{de}	6338.7^{bc}	5741.4^{b}		
	6cm+5km	4936.2^{e}	6804.7^{a}	5502.3^{b}		
Interaction cultivar systems and seasons	NO-TILLAGE	4925.20^{c}	6523.23^{a}		5724.21^{a}	
	Conditional tillage	5188.13^{b}	6353.15^{a}		5770.64^{a}	
Varieties and seasons interaction	AL-fayaz	6443.6^{b}	7108.2^{a}			6775.9^{a}
	Sulaimani 2	5923.4^{c}	5641.1^{cd}			5782.2^{b}
	Adana 99	5204.9e	4768.2^{f}			4986.6^{d}
	Sham 6	5325.0^{de}	5565.0^{cde}			5445.0^{c}

Planting technique	Cultivar's systems	First season	Second season	The average effect of the interaction between seeding techniques and planting systems
3cm+3km	**No-tillage**	4579.7^{f}	6563.5^{b}	5571.6^{b}
6cm+3km		5604.1^{cd}	7509.3^{a}	6556.7^{a}
3cm+5km		4907.6^{ef}	6394.9^{b}	5651.2^{b}
6cm+5km		4609.4^{f}	5625.2^{dc}	5117.3^{c}
3cm+3km	**conditional tillage**	5001.5^{ef}	6518.5^{b}	5760.0^{b}
6cm+3km		5107.5^{def}	6100.0^{bc}	5603.8^{b}
3cm+5km		5380.6^{de}	6282.6^{b}	5831.6^{b}
6cm+5km		5262.9^{de}	6511.5^{b}	5887.2^{b}

Planting technique	Varieties wheat	First season	Second season	The average effect of the interaction between cultivars techniques and varieties
3cm+3km	AL-fayaz	5638.2^{e-h}	8715.6^{a}	7176.9^{a}
	Sulaimani 2	4823.4^{i-m}	6279.7^{cde}	5551.6^{e}
	Adana 99	4175.2^{mn}	5370.9^{g-j}	4773.0^{fg}
	Sham 6	4525.7^{k-n}	5797.8^{e-h}	5161.7^{ef}
6cm+3km	AL-fayaz	5453.4^{f-j}	7246.1^{b}	6349.7^{b}
	Sulaimani 2	5106.4^{i-l}	6195.8^{efd}	5651.1^{cde}
	Adana 99	5588.4^{e-h}	6755.7^{bcd}	6172.0^{bc}
	Sham 6	5275.0^{g-k}	7021.2^{bc}	6148.1^{bcd}
3cm+5km	AL-fayaz	6150.0^{def}	8499.9^{a}	7324.9^{a}
	Sulaimani 2	5280.2^{g-k}	5942.6^{efg}	5611.4^{de}
	Adana 99	4416.4^{lmn}	5092.9^{i-l}	4754.6^{fg}
	Sham 6	4729.8^{j-m}	5819.6^{e-h}	5274.7^{ef}
6cm+5km	AL-fayaz	5514.4^{f-i}	6990.0^{bc}	6252.2^{b}
	Sulaimani 2	5829.5^{e-h}	6800.2^{bcd}	6314.9^{b}

	Adana 99	3891.0^{n}	4602.1^{k-n}	4246.5^{g}
	Sham 6	4509.9^{lmn}	5881.1^{efg}	5195.5^{ef}

Cultivar's systems	Varieties	First season	Second season	The average effect of the interaction between cultivars systems and varieties
No-tillage	AL-fayaz	5179.7^{e}	7707.6^{a}	6443.6^{b}
	Sulaimani 2	5352.9^{de}	6493.8^{b}	5259.9^{d}
	Adana 99	4637.2^{fgh}	5772.6^{cd}	4517.7^{e}
	Sham 6	4531.0^{gh}	6118.9^{bc}	4760.1^{e}
Conditional tillage	AL-fayaz	6198.3^{bc}	8018.1^{a}	7862.9^{a}
	Sulaimani 2	5166.9^{ef}	6115.4^{bc}	6304.6^{b}
	Adana 99	4398.2^{h}	5138.2^{ef}	5455.4^{cd}
	Sham 6	4989.2^{efg}	6140.9^{bc}	6129.9^{b}

Planting technique & cultivation systems		Varieties	First season	Second season	The average effect of the interaction between cultivars systems, planting techniques, and varieties
cultivation systems	Planting technique				
No-tillage	**3cm + 3km**	AL-fayaz	5297.0^{o-y}	8683.9^{ab}	6990.5^{bc}
		Sulaimani 2	4464.1^{z-E}	6094.2^{i-p}	5279.2^{h-m}
		Adana 99	4133.0^{A-E}	5561.4^{k-u}	4847.2^{lmn}
		Sham 6	4424.6^{z-E}	5914.5^{k-r}	5169.6^{j-m}
	6cm + 3km	AL-fayaz	5153.5^{z-D}	7493.1^{cde}	6323.3^{c-g}
		Sulaimani 2	5900.8^{m-r}	7103.4^{c-i}	6502.1^{c-f}
		Adana 99	6016.2^{j-q}	7593.5^{cd}	6804.9^{bc}
		Sham 6	5345.7^{n-x}	7847.5^{bc}	6596.6^{cde}
	3cm + 5km	AL-fayaz	5004.4^{z-D}	8049.5^{abc}	6527.0^{c-f}
		Sulaimani 2	5623.4^{k-t}	6371.7^{f-n}	5997.6^{d-h}
		Adana 99	4747.8^{z-D}	5648.6^{k-p}	5198.2^{j-m}
		Sham 6	4254.7^{z-E}	5509.6^{l-v}	4882.2^{lmn}
	6cm + 5km	AL-fayaz	5263.6^{o-z}	6604.0^{d-k}	5933.8^{e-i}
		Sulaimani 2	5423.3^{m-w}	6406.0^{f-o}	5914.7^{e-j}
		Adana 99	3651.8^{e}	4286.8^{z-E}	3969.3^{o}
		Sham 6	4099.0^{cde}	5204.0^{z-B}	4651.5^{mno}
Conditional tillage	**3cm + 3km**	AL-fayaz	5979.3^{j-r}	8747.2^{ab}	7363.3^{b}
		Sulaimani 2	5182.7^{z-B}	6465.2^{e-m}	5823.9^{f-j}
		Adana 99	4217.3^{z-E}	5180.4^{z-B}	4698.9^{mno}
		Sham 6	4626.8^{z-E}	5681.0^{k-t}	5153.9^{klm}
	6cm + 3km	AL-fayaz	5753.2^{K-S}	6999.0^{e-j}	6376.1^{c-g}
		Sulaimani 2	4312.0^{z-E}	5288.3^{o-z}	4800.1^{lmn}
		Adana 99	5160.5^{z-C}	5918.0^{k-r}	5539.2^{h-l}

		Sham 6	5204.3^{z-A}	6194.8^{h-p}	5699.6^{g-k}
	3cm + 5km	AL-fayaz	7295.5^{c-g}	8950.2^{a}	8122.9^{a}
		Sulaimani 2	4937.0^{z-C}	5513.4^{m-v}	5225.2^{i-m}
		Adana 99	4085.0^{ed}	4537.2^{z-E}	4311.1^{no}
		Sham 6	5204.9^{z-A}	6129.6^{h-p}	5667.2^{g-k}
	6cm + 5km	AL-fayaz	5765.1^{k-s}	7376.0^{c-f}	6570.6^{c-f}
		Sulaimani 2	6235.7^{i-o}	7194.5^{c-h}	6715.1^{bcd}
		Adana 99	4130.2^{c-e}	4917.4^{z-D}	4523.8^{mno}
		Sham 6	4920.8^{z-D}	6558.2^{d-l}	5739.5^{g-k}
Season effect	first	5056.7^{a}			
	second	6438.2^{a}			

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