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RESPONSE OF BREAD WHEAT TO SOWING METHODS AND WEED CONTROL TREATMENTS

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ABSTRACT

Two field experiments were carried out at the farm of Fac. Agric. Minia University during 2018/2019 and 2019/2020 seasons to study the effect of sowing methods, weed control treatments and their interaction on associated weeds, growth, yield and its components of bread wheat, Misr-2 cultivar. A split – plot arrangement in RCBD design with 3 replicates was used in which main plots assigned to sowing methods and sub- plots allocated to weed control treatments.

The results revealed that weeds and plant growth traits were not significantly affected by sowing methods in both seasons except plant dry weight which was responded significantly. Sowing in furrows recorded the highest plant dry weight in both seasons. Weed control treatments possessed significant effect on weeds and growth traits in both seasons. Atlantis herbicide application recorded the lowest dry weight of total annual weeds at 75 and 105 DAS (days after sowing). Hand weeding, hoeing and pallas gave relatively higher flag leaf area and plant dry weight in both seasons. Most interactions between the two factor were not significant. All yield components traits in both seasons were significantly affected by sowing methods except tillers/ plant in the first season and grains number / spike in both seasons, while weed control treatment had significant effect on all yield components in both seasons. Terraces sowing method was superior method for obtaining the highest values for yield components traits in both seasons, while the best weed control treatment for giving the greatest yield components traits in most cases was the application of pallas herbicide in both seasons. Grain and straw yields were significantly affected by sowing methods and weed control treatments in both seasons except straw yield for weed control

treatments in the first season. The highest grain yield in both seasons and straw yield in the second season were achieved by sowing on terraces, while the greatest grain yield was recorded for the application of atlantis herbicide in both seasons.

Key words: sowing methods, weed control, hoeing, hand weeding and herbicides.

INTRODUCTION

During recent years, many approaches have been made towards increasing yield capacity of wheat which reached 8.8 million tons in 2018, while consumption needs increased to 16 million tons (FAO Statistics Division 2018).

Therefore, raising wheat production through cultivation of high yielding varieties and /or improving cultural practices viz., sowing methods, weed control and ….. etc. is an important national target to minimize the gab between Egyptian production and consumption.

Choice of appropriate sowing and weed control method may help in increasing wheat productivity. Method of sowing wheat play an important role to maintain plant population and geometry to provide optimum conditions for growth and development, consequently maximizing productivity. Sowing wheat in bed either in furrows or on terraces become better in water efficiency and distribution and decrease seeding rate without reducing yield. Raised bed system at any parts of the world had been used since long years ago and become familiar methods by farmers (Hobbs *et al*, 2000) .

In comparing between sowing wheat in ridges and in rows, sowing in ridges gave higher increases in growth, yield and most of yield attributes and lower values in dry weight of associated weeds either broad or grassy weeds (Kabesh *et al* 2009a &b and Radwan *et al* 2013). However, raised bed planting method could be recommended for wheat sowing in middle Egypt region (El sherif *et al*, 2016). Also, Majeed *et al*, (2015) concluded that bed planting surpassed flat method in yield and economic return . In comparison among four sowing methods of wheat (broadcasting, rows, hills on ridges and rows on beds, sowing in rows on bed gave the greatest yield and its attributes (Mehasen *et al*, 2019). On contrary El Ashmouny *et al* (2016) reported that drill in rows method gave the highest yield and its attributes compared to terraces and furrows methods.

Weeds are considered a great constraint in agriculture, particularly in wheat. The globally yield reduction in wheat due to weeds was estimated by 13.1% (salim *et al*, 2017), wheat is often infested with numerous types of weed, which compete with crop plants resulting in decreasing grain yield. Weed control is achieved through either direct methods i.e., herbicides application, hand weeding or hoeing or indirect methods such as agricultural practices as crop rotation, land preparation and sowing methods. Management of weeds through

mechanical and physical ways involves labor and implements costs making these methods more expensive. Chemical method (herbicides) for controlling weeds was effective, practical and economical for reducing weed competition and crop losses and enable farmers to obtaine higher yield per unit area with lower production cost (Ashiq *et al*, 2007).

Mechanical weed control surpassed cultural weed control for suppressing weed and improving wheat grain yield (Jabran *et al*, 2012), while hand weeding gave the lowest weed biomass and weed control efficiency compared to the herbicidal treatments .

The herbicidal control involving Atlantis and Pallas was the best in controlling broad leaved and grassy weeds and gave the highest values for yield and its attributes of wheat, while hand weeding produced taller plants (Kabesh *et al* 2009b and Cornelia *et al* 2009) . Application of Pallas and Atlantis with hand weeding once or twice gave the highest values of growth, yield and its attributes and reduced weed density and its dry weight (Mosaad and Tagour, 2017 and safina and Absy, 2017). However, Sharif *et al*, (2019) reported that herbicidal application effectively controlled weeds by 95.56% followed by hand hoeing (84.55%).

The present study aimed to evaluate the effect of sowing methods, weed control treatments including mechanical and chemical ways and their interaction on associated weeds, growth, yield and its attributes of wheat under El Minia Governorate conditions.

MATERIALS AND METHODS

Two field experiments were conducted at the Faculty of Agriculture farm of Minia University, El-Menia Governorate, Egypt, during the two successive seasons of 2018/2019 and 2019/2020, to investigate the effect of three sowing methods, six weed control treatments and their interaction on associated wheat weeds and growth characters, yield and its components of bread wheat (*Triticum aestivum* L.) Masr-2 cultivar. The sowing dates were 15th and 17 th of November in the first and second season, respectively. The harvesting was done on 20th and 23 th of April in both seasons, respectively. The seeding rate was 45 kg / fed at different sowing methods in both seasons. Each experimental unit was 3 m in length and 2.4 m in width occupied an area of 7.20 m^2. Calcium superphosphate of 15.5 % p_2o_5 at rate of 100 kg./fed was added during the preparation of land to planting. However, nitrogen fertilizer was applied in the form of ammonia nitrate (33.5% N) at rate of 75 kg N/Fed in two equal doses before the first and second irrigation. The preceding crop was maize in both seasons. A Split-plot arrangement in Randomized Complete Blocks Design with three replicates was used where sowing methods were designed to the main plots and weed control treatments were allocated to sub- plots as the following:

A. Main- plots: Three sowing methods:

1. Afir drill in rows of 20 cm apart (12 rows/ plot).

2. Afir in furrows (4 ridges / plot) represent 12 rows / plot.
3. Afir on terraces (2 terraces (bed) /plot) represent 12 rows / plot.

B- Sub-plots: Weed control methods:

1. Unweeded control.
2. Hand weeding at 21 and 35 days after sowing (DAS).
3. Hoeing at 21 days after sowing (DAS).
4. Pallas herbicide (4.5% OD) at rate of 160 cm^3 /fed applied at the age of 3-5 leaves.
5. Atlantis herbicide (1.2% OD) at rate of 400 cm^3 / fed applied at the age of 2-4 leaves.
6. Broadcasting fenugreek among wheat plants at rate of 12 kg/fed as intercropped system.

The common name of pallas and atlantis are Pyroxsulam and mesosulfuron-methyl, respectively.

Characters studied:

1. weed characters:

Weeds were hand pulled from one square meter randomly chosen from each plot at 75 and 105 days after sowing (DAS), then dried at a 105°C for 48 hours and weighted to record total dry weight of weeds in g./m^2 at (75 and 105 DAS).

2. Growth characteristics: -

At heading stage, ten guared plants were randomly chosen to record the following growth traits:

2.1. Flag leaf area (cm^2) : Data on length and width of flag leaf were recorded by randomly taking a sample of ten flag leaves in each plot to calculate flag leaf area according to the following equation (leaf length × maxim width × 0.75) according to **Radford (1967)**

2.2. Dry weight / plant (g.): The randomly guarded plants were dried to constant weight, then weighted to obtain dry weight / plant (g.).

3. Yield components:

At harvest, six inner rows from each plot were harvested and ten plants were randomly taken to estimate the following yield components:

3.1. **Plant height (cm):** Determined by the length of the main stem from the soil surface up to the top of plant

3.2. **Number of tillers/plant.**

3.3. **Number of spikes/plant.**

3.4. **Number of grains/spike.**

3.5. **1000- grain weight (g.)**: using two samples per plot, then the main of seed index was recorded.

4. **Overall yields**:

4.1. **Grain yield (ardab/fed.)**: was estimated on the basis of six inner rows (3.6 m^2) of each plot in kg, then transformed into ton and ardab / fed.

4.2. **Straw yield (ton/fed.):** was determined by weighting the biological yield (kg/fed.) of each plot then subtracting the grain weight (kg /fed.) to record straw yield (kg /fed.) then transformed to ton / fed.

Statistical analysis:

All data were statistically analyzed according to technique of analysis of variance (ANOVA) for the split-plot design as mentioned by Gomez and Gomez (1984) by using MSTAT-C computer software package and revised least significant difference (RLSD) at 5 % level of

probability was calculated for comparing amongtreatment means.

RESULTS AND DISCUSSION

1. Associated weeds:

Means of dry weight of total annual weeds at 75 and 105 DAS as affected by sowing methods and weed control treatments in 2018/2019 and 2019/2020 are presented in Table (1). The results indicated that the above two traits did not show significant response towards sowing methods with favour of sowing in furrows at 75 DAS in the first season and at 105 DAS in both season where recorded the lowest dry weight of total annual weeds. Similar results were reported by Kabesh *et al* (2009a & b) and Radwan *et al* (2013).

With regard to the effect of weed control treatments, it could be concluded that dry weight of total annual weeds at 75 and 105 days was significantly affected by weed control treatments in both seasons. All weed control treatments recorded lower dry weight of total annual weeds at 75 and 105 DAS than unweeded check in both seasons. Atlantis gave the lowest values of dry weight of weeds at 75 DAS in both seasons and at 105 DAS in the first season followed by pallas treatment, however dry weight of weeds at 105 DAS in the second season recorded the lowest values with pallas followed by Atlantis. The same results were reported by Ashiq *et al* (2007), Cornelia *et al*, (2009), Mosaad and Tagour, (2017).

The interaction between sowing methods and weed control treatments showed significant effect on dry weight of total annual weeds at 75 and 105 DAS in the second season as illustrated in Figures (1) and (2). Maximum dry weight of total annual weeds was recorded for unweeded check with sowing on terraces at 75 and 105 DAS in the second season, while the lowest values for this trait was recorded for application of atlantis and pallas with sowing on terraces and furrows at 75 and 105 DAS, respectively in the second season.

2. Growth characters:

Flag leaf area and dry weight /plant were estimated at heading stage in 2018/2019 and 2019/2020 seasons as indicator of wheat growth as shown in Table (1).

2.1. Flag leaf area (cm^2):

Flag leaf area was not significantly affected by sowing methods in both seasons with favour of drilling in rows and in furrows sowing in the first and second seasons, respectively. while this trait was significantly affected by weed control treatments in both seasons. Hoeing and pallas treatments gave the greatest flag leaf area of 27.92 and 29.03 cm^2 in the first and second seasons, respectively . The lowest values of flag leaf area recorded for unweeded check in both seasons. The same results were reported by Mosaad and Tagour, (2017).

Sowing methods ×weed control treatments (the interaction) showed significant effect on flag leaf area in the first season. As shown figure 3, the highest flag leaf area recorded for sowing on terraces with application of Atlantis, while the lowest value for this trait was recorded for terracing sowing in unweeded plots.

Table (1): Means of dry weight of total annual weeds at 75 and 105 DAS, flag leaf area and plant dry weight as affected by sowing methods and weed control treatments in 2018/2019 and 2019/2020 seasons.

Treatments	**Dry weight of total annual weeds at 75 days (g.)**		**Dry weight of total annual weeds at 105 days (g.)**		**Flag leaf area (cm^2)**		**Dry weight/plant**	
	2018 /2019	2019/2020	2018/ 2019	2019/2020	2018/2019	2019/2020	2018/2019	2019/ 2020
Sowing Methods:								
Drilling (rows)	19.56	35.10	17.11	82.17	27.80	25.98	11.70	13.16
Furrows	14.00	38.31	17.11	70.83	25.33	27.39	14.02	14.62
Terracing	17.33	50.48	24.44	79.52	26.02	25.32	12.87	13.43
LSD 0.05	N.S	N.S	N.S	N.S	N.S	N.S	1.48	1.03
Weed control:								
Unweeded	36.89	76.41	52.89	148.47	23.55	24.36	10.25	11.39
Hand weeding	14.67	37.58	10.22	80.15	27.19	26.96	14.55	12.19
Hoeing	22.22	33.28	24.00	67.52	27.92	27.30	13.63	14.24
Pallas	7.11	32.13	2.67	33.58	25.42	29.03	12.90	15.54
Atlantis	3.56	27.41	2.22	49.94	28.74	24.78	14.25	16.16
Fenugreek	17.33	40.96	25.33	85.36	25.47	24.95	11.60	12.91
R-LSD 0.05	2.09	16.21	2.64	24.62	3.77	3.73	3.31	2.87

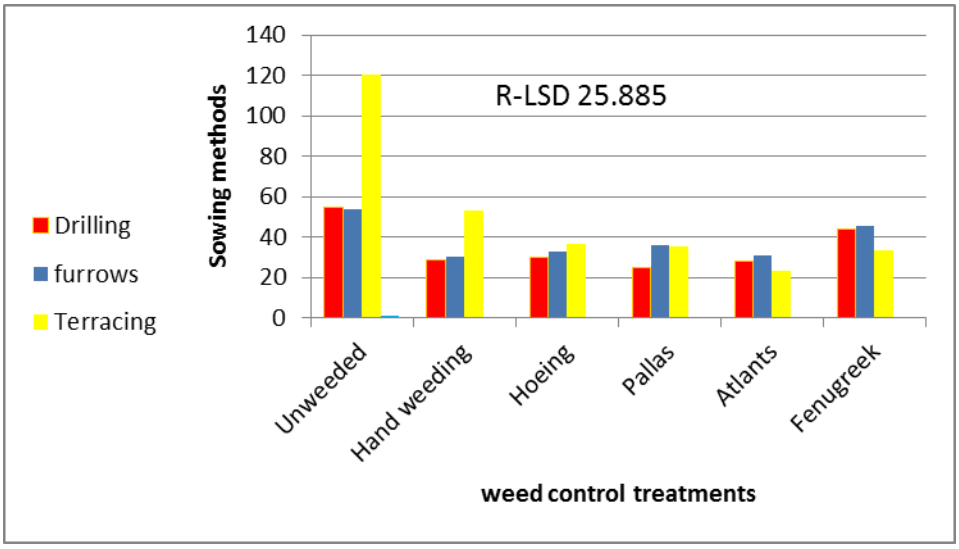

Fig. (1): Dry weight of total annual weeds as affected by the interaction of sowing methods ×weed control treatments at 75 DAS in 2019/2020 season.

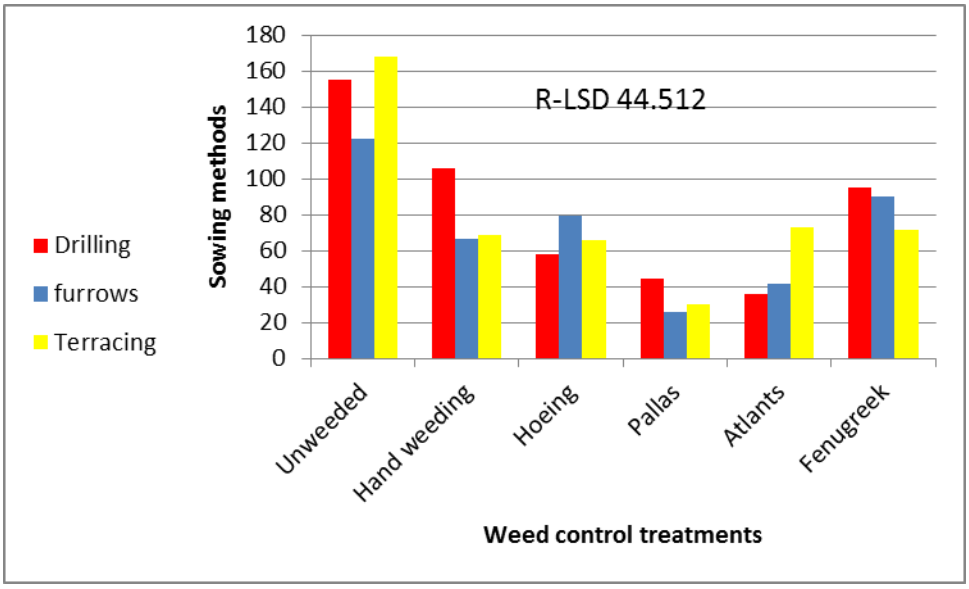

Fig. (2): Dry weight of total annual weeds as affected by the interaction of sowing methods ×weed control treatments at 105 DAS in 2019/2020 season.

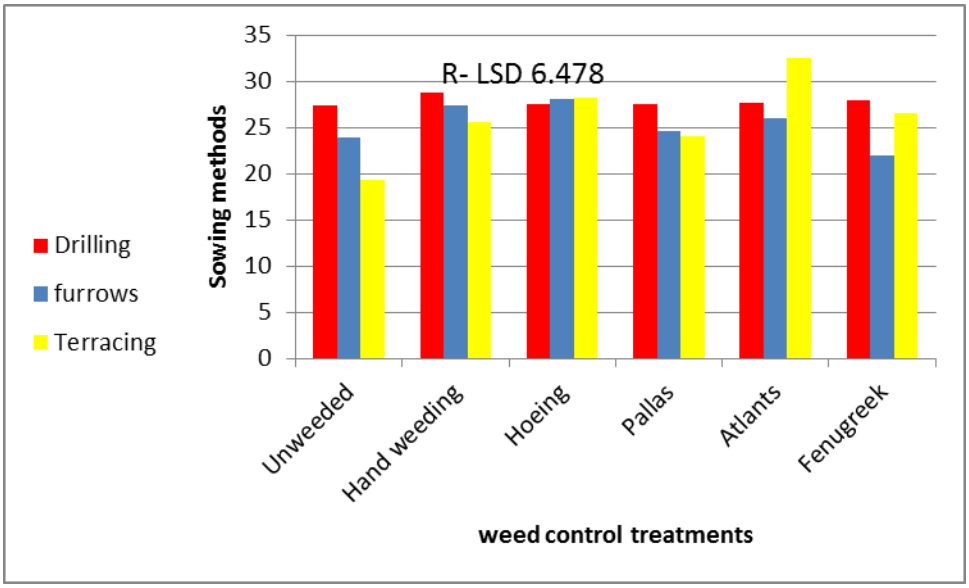

Fig. (3): Flag leaf area as affected by sowing methods ×weed control treatments the interaction of at heading stage in 2018/2019 season.

2.2. Dry weight / plant (g.):

The data presented in Table (1) express dry weight / plant as affected by sowing methods and weed control treatments at heading stage in both seasons. Sowing methods significantly affected plant dry weight in both seasons. The maximum plant dry weight was obtained with sowing in furrows which recorded 14.02 and 14.62 g. in the first and second seasons, respectively followed by sowing on terraces in both seasons with no significant difference in the first season. The present findings are in the same trend reported by Kabesh *et al*, (2009a & b).

Sowing methods ×weed control treatments interaction had significant effect on dry weight / plant at heading in the first season. As shown in Fig. (4) sowing in furrows with hoeing maximized plant dry weight, while the lightest dry weight was recorded for drill in rows sowing with cultivation wheat with fenugreek.

3. Yield components traits:

Means of yield components traits i.e., plant height, tillers and spikes/plant, grain number / spike and 1000- grain weight as affected by sowing methods and weed control treatments at harvesting in 2018/2019 and 2019/2020 seasons are shown in Table (2).

The results indicated that all the above-mentioned yield components traits were significantly affected by sowing methods in both seasons except plant height and grains number / spike in the second and both seasons, respectively.

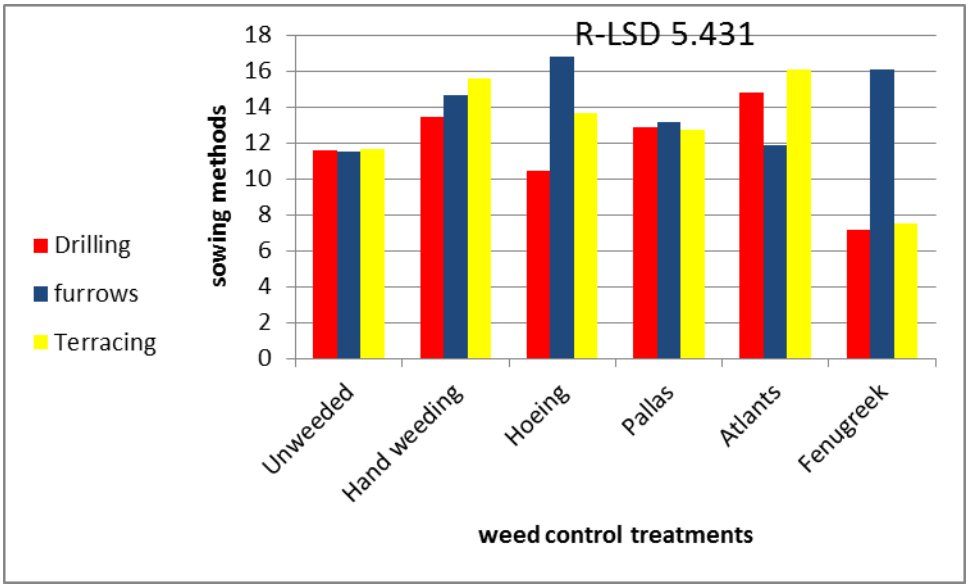

Fig. (4): Dry weight/plant as affected by sowing methods ×weed control treatments the interaction of at heading stage in 2018/2019 season.

The maximum values of all yield components characters were recorded for sowing on terraces in 2018/2019 and 2019/2020 seasons except plant height in the first season which reached the maximum with sowing in furrows, while the lowest values for these traits were recorded in the most cases with drill in rows sowing in both seasons. These results are in agreement with those obtained by Mageed *et al*, (2015), El Sherif *et al*, (2016), and Mehasen *et al*, (2019).

Concerning the effect of weed control treatments on yield components characters, data shown in Table (2) revealed that weed control treatments had a significant effect on all yield components traits in both seasons.

All weed control treatments recorded higher values for yield components traits than unweeded control in both seasons. Hand weeding twice produced taller plants (109.72 cm) and higher tillers / plant (8.29) in the first season in addition to heavier 1000- grain weight (47.57) in the second season, while hoeing gave the higher spikes / plant (5.14) in the second season. Pallas herbicide application recorded taller plants (109.49 cm) in the second seasons, highest grains number / spike of 56.54 and 48.95 in the first and second seasons, respectively in addition to heavier 1000- grain weight (50.77) in the first season. Moreover, Atlantis herbicide produced the highest number of tillers (6.12) and spikes (6.81) per plant in the second and first seasons, respectively. Similar results were reported by Mosaad and Tagour, (2017), Safina and Absy (2017) and Sharif *et al*, (2019).

Table (2): Means of yield components traits at harvesting as affected by sowing methods, and weed control treatments in 2018/2019 and 2019/2020 seasons .

Treatments	Plant height (cm)		Number of tillers		Number of spikes /plant		Number of grains/ spike		1000 grain weight	
	2018/ 2019	2019 /2020	2018/ 2019	2019/ 2020	2018/ 2019	2019/ 2020	2018/ 2019	2019/ 2020	2018/ 2019	2019/ 2020
Sowing methods:										
Drilling (rows)	109.23	107.78	5.87	5.72	4.55	4.59	44.05	43.35	48.81	44.41
Furrows	109.35	107.85	6.38	5.06	5.25	4.24	49.33	43.00	49.12	44.99
Terracing	106.06	107.99	6.74	5.91	5.77	4.93	49.57	44.73	50.59	45.41
LSD 0.05	2.20	N.S	1.03	0.53	0.80	0.51	N.S	N.S	1.27	0.71
Weed control:									46.73	
Unweeded	106.15	103.18	3.02	4.41	2.38	3.49	40.94	37.82		42.21
Hand weeding	109.72	108.33	8.29	5.83	6.14	4.66	46.02	40.52	50.66	47.57
Hoeing	109.38	111.97	5.97	6.02	5.70	5.14	49.50	45.32	50.50	45.89
Pallas	108.20	109.49	6.18	5.63	5.53	4.61	56.54	48.95	50.77	43.44
Atlantis	107.64	108.11	7.13	6.12	6.81	5.02	47.25	46.23	50.30	45.54
Fenugreek	108.19	106.16	5.41	5.34	4.58	4.62	45.65	43.33	48.07	44.98
R- LSD 0.05	2.35	2.55	2.13	0.97	1.70	0.84	10.54	4.84	3.48	2.15

The interaction effect between the two factors had significant effect on plant height and tillers number / plant in both seasons as well as number of spikes, grain number / spike and 1000- grain weight in the second season. As shown in Figures (5 and 6), the tallest plants were recorded for drill in rows and terracing sowings with hoeing in the first and second seasons, respectively. The shortest ones were obtained by sowing on terraces with mixed cultural of wheat and fenugreek as well as drilling sowing with unweeded in the first and second seasons, respectively.

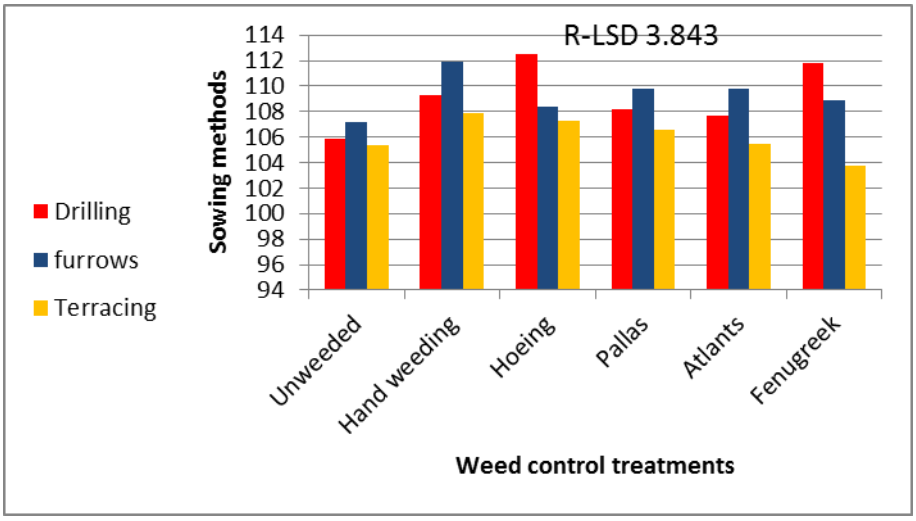

Fig. (5): Plant height as affected by sowing methods ×weed control treatments interaction at harvesting stage in 2018/2019 season.

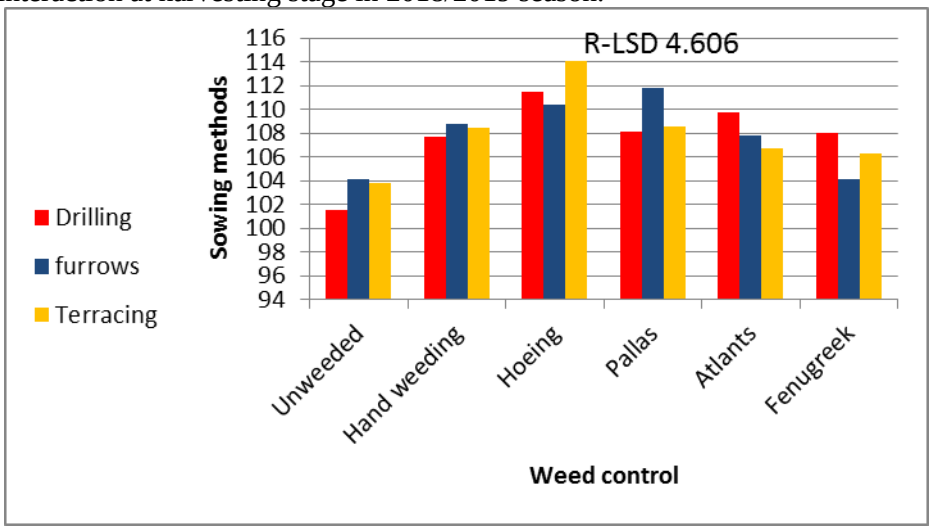

Fig. (6): Plant height as affected by sowing methods ×weed control treatments interaction at harvesting stage in 2019/2020 season.

Sowing on terraces with application of Atlantis and hoeing produced the highest amount of tillers / plant in the first and second seasons, respectively, while the lowest values for this trait were recorded for drilling sowing with unweeded check in both seasons as shown in Figures (7 and 8).

Maximum number of spikes / plant and number of grains / spike were produced with sowing on terraces and in furrows with hoeing, respectively in the second season, while the heaviest 1000- grain weight was recorded for terraces sowing with pallas herbicide in the second season. On the other hand the lowest values for the previous three traits were recorded for drilling or terracing sowing with unweeded except spike grain number which recorded the lowest value with sowing in furrows plus mixed cultural wheat with fenugreek.

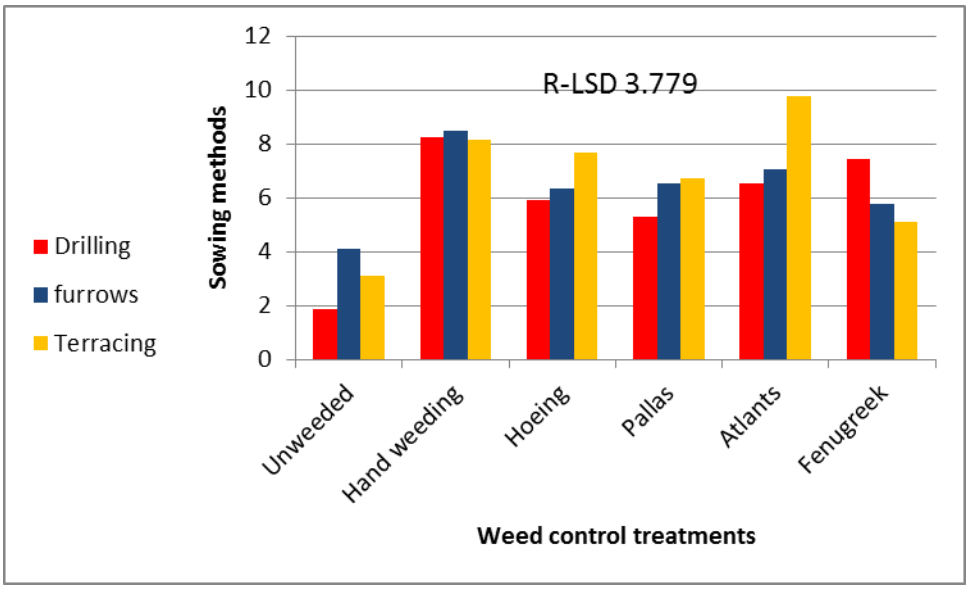

Fig. (7): Number of tillers/ plant as affected by sowing methods ×weed control treatments interaction at harvesting stage in 2018/2019 season.

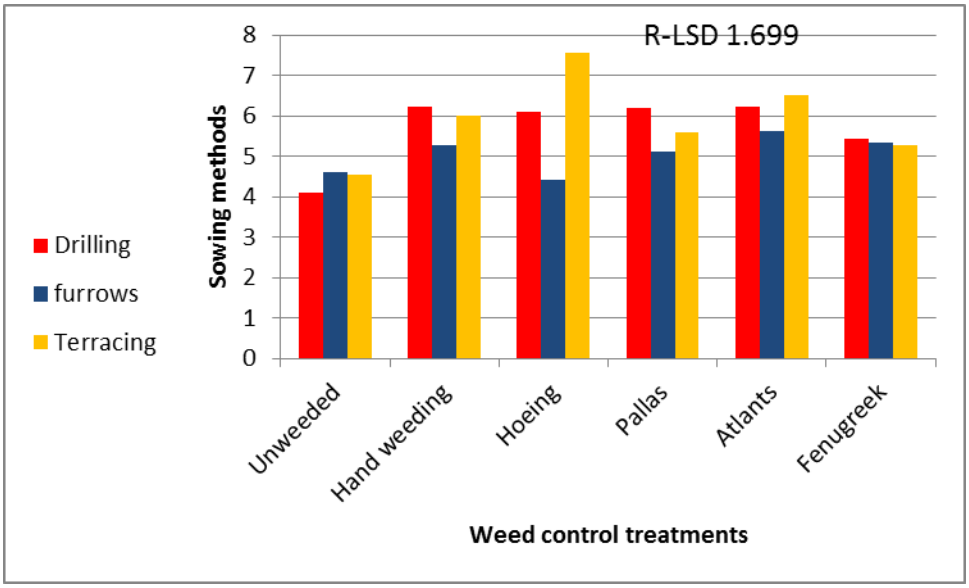

Fig. (8): Number of tillers/ plant as affected by sowing methods ×weed control treatments interaction at harvesting stage in 2019/2020 season.

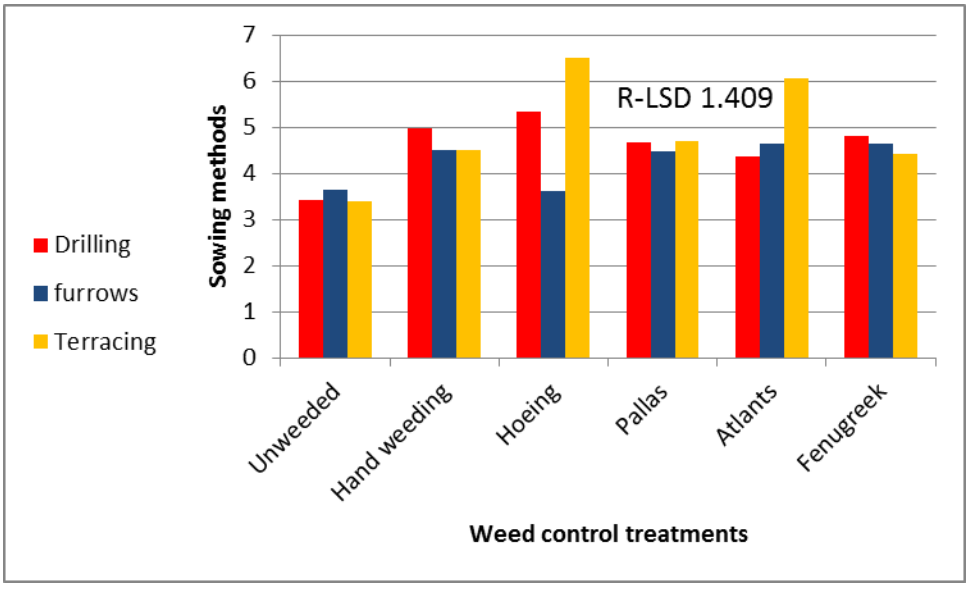

Fig. (9): Number of spikes/ plant as affected by sowing methods ×weed control treatments interaction at harvesting stage in 2019/2020 season.

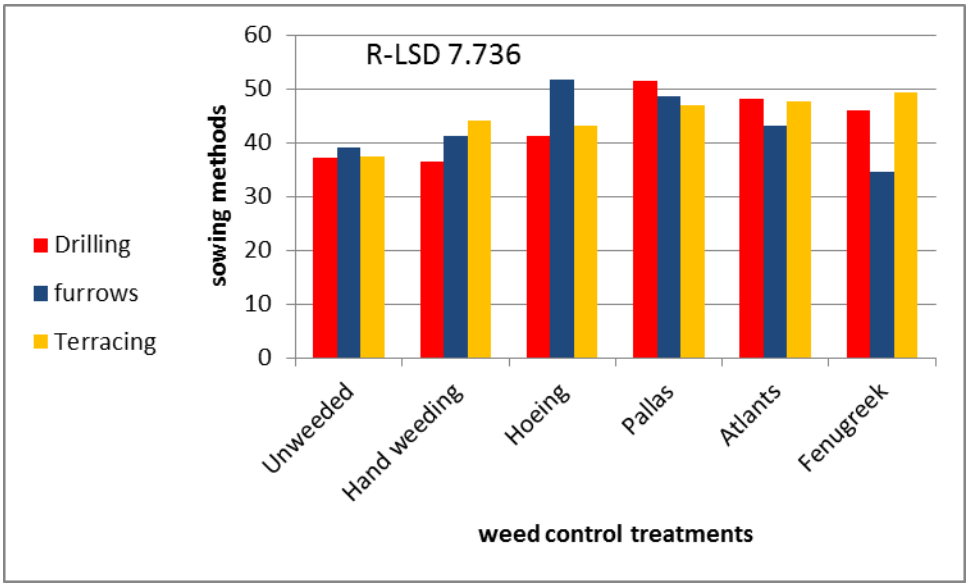

Fig. (10): Number of grains/spike as affected by sowing methods ×weed control treatments interaction at harvesting stage in 2019/2020 season.

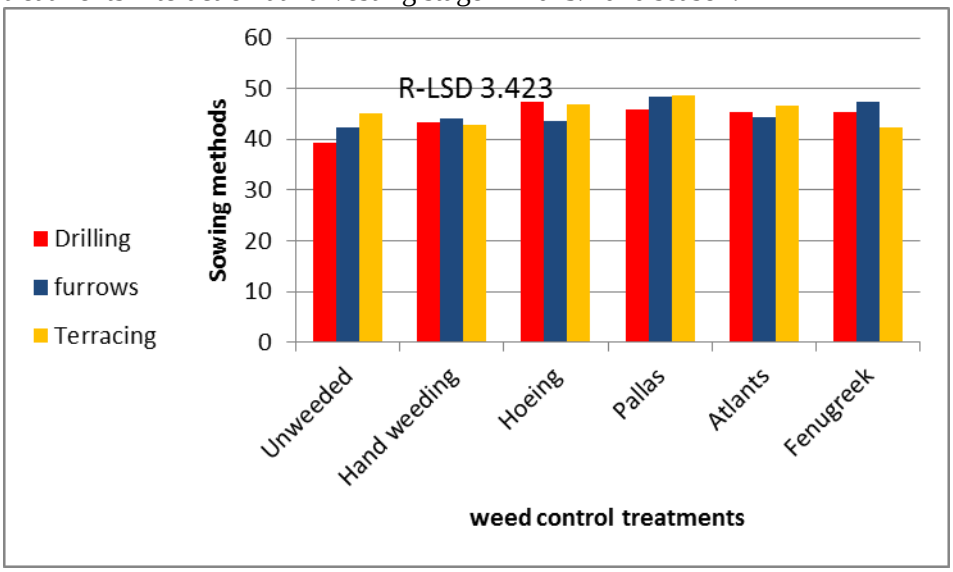

Fig. (11): 1000- grain weight as affected by sowing methods ×weed control treatments interaction at harvesting stage in 2019/2020 season.

4. Grain and straw yields:

Means of grain and straw yields as affected by sowing methods and weed control treatments in 2018/2019 and 2019/2020 are recorded in Table (3) .

The results indicated that grain and straw yields were significantly

affected by sowing methods in both seasons. The heaviest grain yields of 21.13 and 19.49 ardab /fed. in both seasons in addition to straw yield (5.19 ton/fed.) in the second season were recorded for sowing on terraces, while the highest straw yield (4.58 ton/fed.) was obtained with sowing in furrows in the first season. On the other hand, the lightest grain and straw yields were recorded for furrows method in both seasons, except straw yield in first season. These results are in agreement with El Sherif *et al*, (2016) and Mehasen *et al*, (2019).

Concerning the effect of weed control treatments, it could be concluded that grain and straw yields were significantly affected by weed control treatments in both seasons except straw yield in the first season. Generally, all weed control treatments had higher grain and straw yields / fed. in both season compared with unweeded check. The highest grain yields of 22.3 and 24.43 ardab /fed. were recorded for application of atlantis and pallas herbicides in first and second seasons, respectively, while the heaviest straw yields in ton / fed. of 4.6 and 6.4 were recorded for hoeing and pallas herbicide in the first and second seasons, respectively. Minimum values of grain and straw yields were observed with unweeded check in both seasons. Mosaad and Tagour, (2017), Safina and Absy, (2017) and Sharif, (2019) found the same trend of our findings.

Table (3): Means of grain and straw yields as affected by sowing methods and weed control treatments in 2018/2019 and 2019/2020 seasons .

Treatments	**Grain yield (ardab/fed.)**		**Straw yield (ton/fed.**	
	2018 2019	2019/2020	2018/2019	2019/2020
Sowing Methods:				
Drilling (rows)	20.96	18.48	4.72	4.60
Furrows	19.41	15.10	4.58	3.50
Terracing	21.13	19.49	4.03	5.19
LSD 0.05	0.46	3.18	0.24	0.57
Weed control:				
Unweeded	17.93	11.96	4.29	2.89
Hand weeding	21.61	15.55	4.56	3.91
Hoeing	21.32	16.72	4.60	4.49
Pallas	20.39	24.43	4.54	6.40
Atlantis	22.30	23.07	4.38	5.52
Fenugreek	19.45	14.42	4.29	3.37
R-LSD 0.05	1.78	3.84	N.S	1.14

Moreover, maximum grain yield /fed. (24.01 ardab) was recorded for sowing on terraces with the application of hoeing or pallas, while the minimum one (15.85 ardab) was recorded for terracing method with unweeded check in the first season as shown in Figure (12). The maximum and minimum straw yield (ton/fed). of 7.64 and 2.7 were obtained for sowing

on terraces with the application of pallas and unweed check, respectively in the second season as shown in Figure (13).

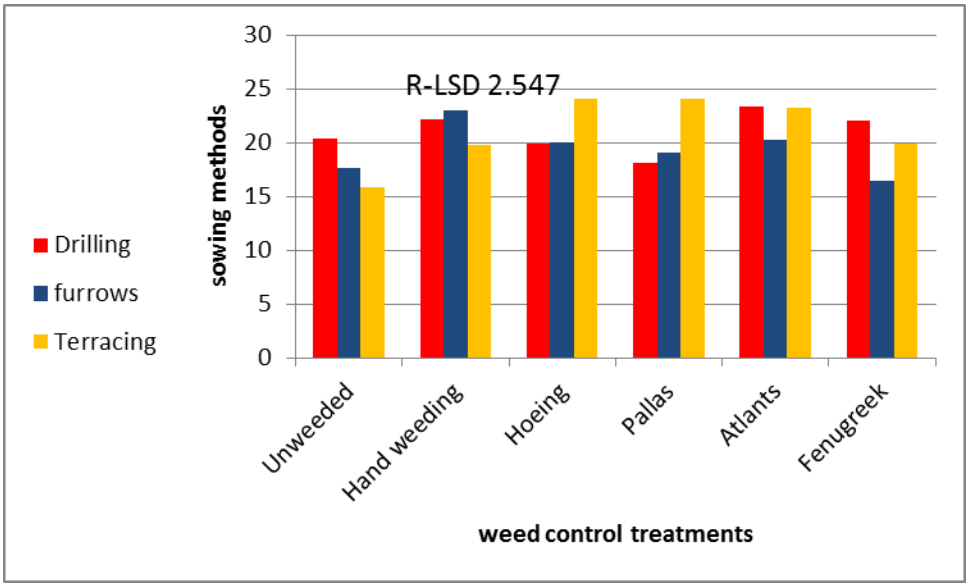

Fig. (12): Grain yield as affected by sowing methods ×weed controltreatments interaction at harvesting stage in 2018/2019 season.

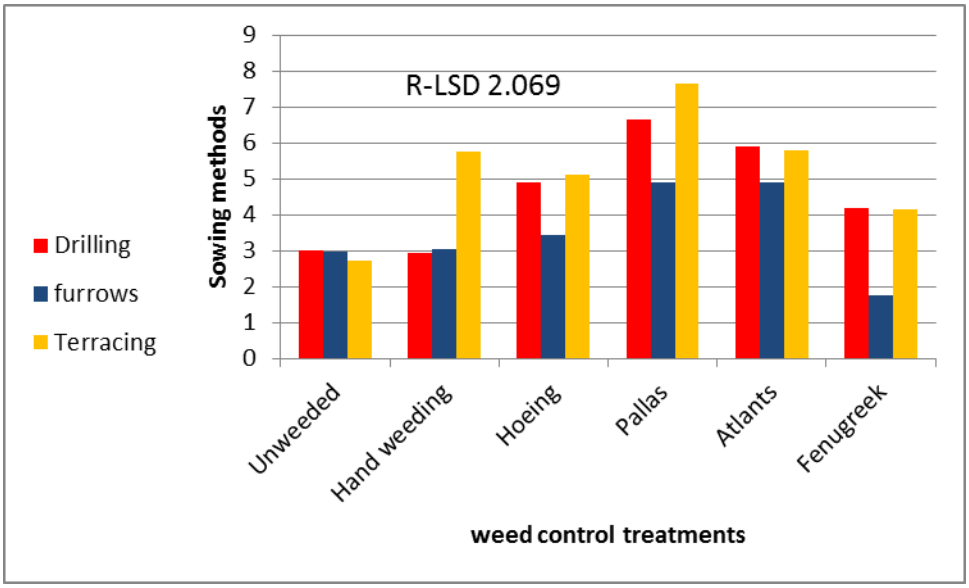

Fig. (13): Straw yield as affected by sowing methods ×weed control treatments interaction at harvesting stage in 2019/2020 season.

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استجابة قمح الخبز لطرق الزراعة ومعاملات مقاومة الحشائش

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أجريت تجربتان حقليتان بمزرعة كلية الزراعة – جامعة المنيا خلال موسمى 2019/2018, 2020/2019 لدراسة تأثير طرق الزراعة, معاملات مقاومة الحشائش و التفاعل بينهم على الحشائش المصاحبة و النمو و المحصول و مكوناته لقمح الخبز صنف مصر2 فى ترتيب القطع المنشقة و تصميم القطاعات الكاملة العشوائية بثلاث مكررات حيث خصصت القطع الرئيسية لطرق الزراعة ووزعت معاملات مقاومة الحشائش عشوائيا على القطع المنشقة .

بينت النتائج أن كل صفات الحشائش فى عمر 75, 105 يوم بعد الزراعة و النمو فى مرحلة الطرد لم تتأثر معنويا فى كلا الموسمين ماعدا الوزن الجاف / نبات الذى أظهر تأثير معنوى فى كلا الموسمين, و سجلت طريقة الزراعة على خطوط أعلى وزن جاف للنبات فى الموسمين. بينما تأثرت كل الصفات السابقة معنويا بمعاملات مقاومة الحشائش . فى الغالب سجل مبيد الحشائش Atlantis أقل قيم لصفات الحشائش فى الأعمار المختلفة فى كلا الموسمين. أعطت المقاومة اليدوية, العزيق, مبيد الحشائش Pallas نسبيا أعلى القيم لمساحة ورقة العلم ووزن االنبات الجاف فى كلا الموسمين, و كانت معظم التداخلات بين العاملين غير معنوية.

أظهرت كل صفات مكونات المحصول أستجابة معنوية لطرق الزراعة ماعدا عدد الأشطاء فى الموسم الأول و عدد حبوب السنبلة فى كلا الموسمين. بينما سجلت معاملات مقاومة الحشائش تأثيرا معنويا على صفات مكونات المحصول فى كلا الموسمين, كانت لطريقة الزراعة على مصاطب التفوق عن الطرق الاخرى فى الحصول على أعلى القيم لصفات مكونات المحصول فى كلا الموسمين و كانت أحسن طريقة لمقاومة الحشائش و التى أعطت أعلى القيم لصفات مكونات المحصول فى معظم الحالات هى المقاومة عن طريق مبيد الحشائش Pallas . ولم تظهر معظم هذه الصفات تأثيرا معنويا بالتداخل بين العاملين.

تأثر محصول الحبوب والقش معنويا بكل من طرق الزراعة ومعاملات مقاومة الحشائش فى كلا الموسمين ماعدا محصول القش لمقاومة الحشائش فى الموسم الاول. تحقق أعلى محصول للحبوب فى الموسمين و للقش فى الموسم الثانى بالزراعة على مصاطب, بينما أعطت المعامله بمبيد الحشائش Atlantis أعلى محصول من الحبوب فى كلا الموسمين.