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Sowing Dates Effect on Yield and Grain Quality of some Wheat Cultivars

Soad A. EL-Sayed[1]; Eman N. M. Mohamed[1]; Dalia A. A. El Hag[2] and Amany M. Mohamed[2]
[1]**Seed Technology Research Department, Field Crops Research Institute, Agricultural Research Center (ARC), Giza, Egypt**
[2]**Agronomy Department, Faculty Agriculture, Kafrelsheikh University, Kafrelsheikh Egypt**

ABSTRACT

In order to illustrate the importance of studying sowing dates of some wheat cultivars, a field experiment was carried out at Sakha Agri. Res. Stat. ARC at the north region of Delta Egypt during the two winter successive seasons 2015/16 and 2016/17. Six Sowing date were *i.e* 15th October, 1st November, 15th November, 30st November, 15th December and 30st December. Four bread wheat cultivars, Gemmeiza 11, Giza 168, Misr 1and Misr 2. The obtained results could be summarized as; The fourth sowing date (30st November) gave the highest values of most studied characters under this investigation such all agronomic traits, globuline content (non-glotein protein), gliadine content (gluten protein), followed by third sowing date (15th November). Such glotenine content (gluten protein). On the other hand, the first sowing date (15th October) gave the highest values of albuimine content (non-glutein protein). Sowing on third (15th November) and fourth sowing date (30st November) gave the highest value of germination and storability (accelerated aging germination). The sixth sowing (30st Decmber) gave the highest values of grain crude protein, soluble and non-soluble protein. There were significant differences among wheat cultivars in all agronomic studied were observed. Gemmeiza 11 recorded the highest number of tillers/m^2, 1000 grain weight, grain yield, harvest index, glotenine content (gluten protein), wet and dry gluten and soluble protein content. Meanwhile, Misr 1 and Misr2 cultivars recorded the highest values of globuline (non- gluten protein), gliadine content, glotenine content (gluten protein), germination% and storability (accelerated aging germination). On the other hand, G.168 cultivar recorded the lowest value of gliadine and glotenine content (gluten protein), while gave the highest value of albuimine content (non-gluten protein). Gemmeiza 11 superior the other cultivars for grain yield and Giza 168 superior the other cultivars straw yield in 2015/2016 and 2016/2017.

Keywords: wheat cultivars, varieties, genotypes, sowing dates, yield and yield components and grain quality,

INTRODUCTION

Bread wheat (*Triticum aestivum* L.) is the most important grain crop. It provides foods for human as well as for domestic animals. In Egypt, wheat is the main winter cereal crop. The cultivated area reached about 3.1 million feddan wheat in the winter season of 2016/2017 produced an average of 18.1 ardab/fed of the grain production and the average yield was about 8.2 million tons (FAO 2017).

Abdullah *et al.* (2007) found that a small endosperm and low grain weight were accompanied to the raising in temperature in post an thesis period of late sown which result to short the grain filling period and increased crude protein content. Therefore it is very important to the choice of the suitable sowing date and there are enough possibilities to increase wheat yields through developing new high yielding varieties and by adopting proper sowing date. Thus, the sowing date and genotype are the most important factors that affect grain yield and quality, where the optimum sowing date of wheat cultivars lead to increase 1000-grain weight (Ali *et al.* 2010) and test weight, grain protein content as well as wet and dry gluten content (Jie *et al.*2005). Zhu and Khan (2001) declared that protein and its quality traits were substantially affected by genotype, environment and their interaction. Motzo *et al.* (2007) indicated that the environmental condition pertaining before and during grain filling greatly affecting quality of wheat and can therefore be modified by manipulation of cultivar and sowing date. A delay in sowing date was associated with a decrease in main grain weight but not in grain nitrogen content, thus leading to an overall increase of crude protein percentage. The observed increase in protein % partially explained the smaller gluten index. Sowing time decide the growth habit of the crop as climatic conditions vary from optimum conditions. Cereals respond significantly to varying environmental features as their growth and grain development is highly temperature and moisture dependent (Eslami *et al.,(* 2014). The reduction in wheat yield and its components with delayed sowing date was the result of exposure of plants to high temperature, which decreased season length (Suleiman *et al*., (2014). Seleiman *et al*.(2011) determined the effect of different sowing dates i.e. 1st November,15th November, 1th December and 15th December on growth, grain filling traits and yield and its components as well as grain quality and rheological properties of bread wheat (*Triticum aestivum* L.) cultivar Gemmeiza 9. The results revealed that sowing date on 15th November surpassed the other sowing date s in all of yield studied parameters, grain filling rate, flour percentage.

However, sowing date on 15th December caused an increase in most of technological properties (protein as well as wet and dry gluten percentage). Planting on the onset of November resulted in the highest grain yield (2.48 t/ha), stalk yield (2.203 t/ha) and harvest index (23.27%) (Yassin and Kittani 2009). Also, studied the effect of six sowing date s (1 st Oct. 15th Oct. 1 st Nov., 15th Nov. 1 st Dec. and 30th Dec.) on anthesis date, physiological maturity date, grain number/m^2, grains number/spike, grain, straw and biological yield. Results indicated that, sowing wheat in Oct. reduced grain yield by about 10% . Whereas, delay of sowing date till the end of December decreased yield by about 16% . The highest grain yield was obtained when wheat was sown on the first of December followed by 15th of November, compared with other sowing date s.

El hag (2012) found significant variation in yield and its components among wheat genotypes under normal and late planting. She also reported that delaying sowing date reduced number of kernels spike^{-1}, 1000-kernel weight and grain yield.

Wheat breeders are continuously trying to improve the wheat yield under different conditions but

paying less attention on its quality characteristics. The quality of wheat grains greatly affects the quality of flat breads (Rehman *et al.,* 2009).

Therefore the target of the present study was to identify superior cultivars under different sowing dates, to investigate the interactive effects of sowing date and wheat cultivars and to evaluate some grain quality and technological properties of cultivars at six sowing dates.

MATERIALS AND METHODS

A field experiment was conducted during 2015/2016 and 2016/2017 seasons at the Experimental Farms of Sakha Agriculture Reache . Station Field Crop Research Institutes ARC, Egypt. The present work aimed to study the effect of six sowing date on yield and its components and grain quality of four bread wheat cultivars Every sowing date was performed in separate experiment. Every experiment of sowing date was carried out in complete randomized block design (CRBD) for wheat cultivars in three replications. The plot area of the experimental unit was 1.2 m width (6 rows × 20 cm apart) and 3.5 m long (4.2m^2). Experimental factors included the following treatments:

1- **Sowing date:** Six sowing date every 15 days i.e 15th October (S 1), 30st October (S 2), 15th November (S 3), and 30st November (S 4), 15th December (S 5) and 30st Decmber (S 6).

2- **Wheat cultivars:** Four bread wheat cultivars i.e Gemmeiza 11, Giza 168, Misr 1 and Misr 2 were used.

In both seasons, wheat was preceded by Maiz (*Zea mays L*). The soil of experimental sites was well prepared.

Phosphorus fertilizer in the form of calcium super-phosphate (15% P_2O_5) at the rate of 100 kg/fed was incorporated in the soil after the leveling. Nitrogen fertilizer at the rate 75 kg N/fed was split in two portions and applied before the first and second irrigation. Normal agricultural practices for growing wheat were applied. The mechanical and chemical analyses of the experimental soil are presented in Table 1.

Table 1. Mechanical and chemical properties of the experimental soil at the experimental site during 2015/16 and 2016/17 seasons.

Character								
Physical characteristics				Soil texture	Chemical analysis			
seasons	Sand%	Silt%	Clay%		N (exchangeable ppm)	P (exchangeable ppm)	K (exchangeable ppm)	Soil pH
2015/2016	23.12	36.10	40.15	clay	21.0	23.5	327	7.90
2016/2017	19.3	37.5	42.2	clay	23.0	26.7	340	7.75

Studied traits:

I-Agronomic traits: number of spikes/m^2, number of grain/spike, 1000-grain weight (g), grain yield (t/fed), straw yield (t/fed) and harvest index (HI) was estimated at harvest(one feddan=4200 m^2)

II-Seed quality-

A- Germination percentage (G.P):

Eight replications of 50 seeds per lot were planted in plastic boxes of 40 x 20 x20 cm dimensions and contained sterilized sand. The boxes were watered and kept at 25 °C in an inculcated chamber for 8 days. Normal seedlings were counted at 4, 8 days (first and final accounts) according to International Rules of ISTA (1999). Germination percentage was calculated using the following equation that Krishnasamy and Seshu (1990).

$$\text{G.P} = \frac{\text{Number of normal seedlings}}{\text{Number of seed tested}} \times 100$$

B-Physical properties:

- Wet and dry gluten :

Wet and dry gluten were determined by hand-washing the meal according to the standard method (Pleshkar, 1976) until starch detected in washing water then dried and weighed

C- Chemical properties:

1- **Crude protein :** Known weight of the fine powdered seeds (ca 0.1g) was diyested using a micro kjeldahl apparatus. The crude protein was calculated by multiplying the total nitrogen by 5.85 (A.O.A.C) method (1990).

2- **Protein fraction :** Determination of protein fractions was carried out according to the method of Shoch *et al*. (1970). In this method, the samples subjected to successive extraction processes using the following solvents. Distilled water for the extraction of albumins, 5% sodium chloride for the extraction of globulins, 80% ethanol containing 0.2% sodium acetate solution for gliadins and 0.2% sodium hydroxide solution for glutamine.

Soluble protein = albumins + globulins + gliadins + glutenins

Non- soluble protein = Crude protein – soluble protein

Statistical analysis:

All data collected for the two seasons was subjected to tcombing analysis of variance (ANOVA) for the complete randomized block design for wheat cultivars to each experiment (sowing dates), than combined analysis was done among sowing dates published by Gomez and Gomez (1984) by using MSTAT-C computer. The means of treatments were compared using Duncan Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

Sowing date effects:

Data presented in Tables 2, 3 showed that the combined analysis indicated that the variation due to sowing date were highly significant for number of tillers/m^2,one thousand grain weight, number of grain/spikes, grain yield, straw yield in both seasons and harvest index was significant and highly significant in the first and second seasons respectively. Sowing date in 30 th November recorded the highest values for number of spikes/m^2 (320.2 and 400.2) one thousand grain weight (40.7 and 40.3g), number of grain/spikes (66.9 and 83.6), more productivity for grain yield (2.041 and 2.333 t/fed) due to increases number of spikes/m^{2}and highest values for one thousand grain weight and number of grains/spike ,

straw yield (3.995 and 5.212 t/fed) Sowing in the first of December or end of November is favorable conditions for production of more tillers due to lowest temperature after sowing time and favorable condition for produce heavy grain weight due long vegetative growth. El Hag (2012) reported that, sowing in a normal recommended time (20th Nov.) recorded the highest plant height, numbers of spikes/m^2, number of grains/spike, number of spikelets/spike, spike length, biological, grain and straw yields/fed Haroun *et al.,* (2012) recorded that planting on the control date 20th Nov.) surpassed the other sowing dates in all yield studied parameters. Sowing early in 15Th October recorded the highest values for harvest index (36.4 and 41.7%). Mahboob *et al.* (2005), El-Nakhlawy *et al*. (2015) and Mumtaz *et al*. (2015) recorded same results and recorded that delay in sowing suppressed the yield caused by reduction in the yield contributing traits; number of productive tillers, grains spile^{-1} and grain yield plant^{-} Haroun *et al.* (2012) and Mumtaz *et al.,* (2015).

Table 2 . Means of number of tillers/m2, 1000 grain weight(g) and number of grain/spike as affected by sowing date, varietal deference's and their interaction in 2015/16 and 2016/17 seasons.

Treatment	Number of tiller/m2		1000 grain weight		Number of grain/spike	
	2015/2016	2016/2017	2015/2016	2016/2017	2015/2016	2016/2017
Sowing date						
15 Oct.	208.3 e	208.3 e	37.1 bc	36.1 c	57.3e	59.4e
30-oct	241.8 d	256.3 d	38.4 ab	38.4 b	59.0de	62.5d
15-Nov	294.1 b	304.3 c	40.0 a	39.1 b	64.3 b	71.3 b
30- Nov	320.2 a	400.2 a	40.7 a	40.3 a	66.9 a	83.6 a
15-Dec	274.1 c	336.15 b	36.2 bc	39.1 b	61.9 c	70.5 c
30- Dec.	272.5 c	298.6 c	34.7 c	35.7 c	60.1 cd	65.8 b
F test	*	*	*	*	*	*
Cultivar						
Gemz. 11	284.4 a	323.3 a	42.2 a	40.3 a	54.1d	62.5 d
G.168	243.7 c	271.7 d	37.2 b	35.3 b	59.9 c	66.5 c
Misr 1	263.4 b	293.1 c	37.4 b	39.9 a	63.5 b	70.2 b
Misr 2	282.5 a	314.5 b	34.6 c	36.9 b	68.7 a	76.2 a
F test	*	*	*	*	*	*
Interaction	*	*	*	*	*	*

*** and NS indicated P<0.05 and not significant, respectively.**
Means designated by the same letter are not significantly different at 5 % level according to Duncan's Multiple Range Test.

Wheat cultivars performance

Data in Table 2 and 3 show that the varietal difference in the combined analysis indicated that the variation due to wheat cultivars were highly significant for number of tillers/m^2, one thousand grain weight, number of grain/spikes, grain yield, straw yield and harvest index in both seasons. Highly number of tillers were recorded by Gemz. 11and Misr 2 were recorded (284.4 and 282.5) in first season and Gemmeiza 11 (323.3) in the second season. Gemz. 11 were recorded the highest thousand grain weight (42.2 and 40.3 g) in both seasons, respectively. Misr 2 was recorded the highest number of grains/spike (68.7 and 76.2 g) in both seasons, respectively. Gimmiza 11 produced the highest grain yield (31.984 and 2.209 t/fed) in the first and second seasons, respectively. Misr 1 produced the highest straw yield (3.502 and 3.855 t/fed in both seasons, respectively. Gemz. 11recorded the highest harvest index (39.9 and 40.1%) in the first and second seasons, respectively. Difference in number of spikes/m^2 among wheat genotypes may be due to the genetic constitution, which seriously affected by environmental conditions. Such results were found by Abdel-Hameed (2012), Haroun *et al*. (2012), Hasina *et al*.,(2012), El-Nakhlawy *et al.* (2015) Fazal *et al*. (2015) and Mumtaz *et al.* (2015). Reported that yield components were play important role effect for grain yield production.

Interaction effects:

Data presented in Table 4 showed effect of the interaction between sowing date and wheat cultivars for number of spikes/m^2, one thousand grain weight and number of grain/spike in both seasons. For number of spikes/m^2, Gemz. 11 recorded 341.7 with Sowing in 30st November and 340 with Sowing in 15th December in 2015/16. Giza 168 recorded 427 with sowing with Sowing in 30st November in 2016/17. And for 1000 grain weight, Gemmeiza 11 and Misr 2 were recorded the highest values (50.0 and 42.9) with sowing in 15th November in the first and second season, respectively. And for number of grain/spike, Misr 2 and Gemmeiza 11 were recorded 75.3 and 94.2 with sowing in 30st November in 2015/16 and in 2016/2017respectively.

Table 3. Means of grain yield t/fed, straw yield t/fed, harvest index% as affected by sowing date, wheat cultivars and their interaction in 2015/2016and 2016/2017seasons.

	Grain yield t/fed		Straw yield t/fed		Harvest index%	
	2015/2016	2016/2017	2015/2016	2016/2017	2015/2016	2016/2017
Sowing dates						
15 Oct.	1.222e	1.399f	2.165f	1.987e	36.4a	41.7a
1-Nov	1.539d	1.731e	3.028e	3.111d	33.8bc	35.9b
15-Nov	1.825c	2.072c	3.783b	4.153b	32.6c	33.39c
1-Dec	2.041a	2.333a	3.995a	5.212a	33.9bc	30.99d
15-Dec	1.930b	2.1323b	3.545c	4.113b	35.2ab	34.1c
30-Dec.	1.773c	2.045d	3.337d	3.552c	34.8ab	36.6b
F test	*	*	*	*	*	*
LSD 0.05	0.091	0.009	0.199	0.155	2.06	1.08
Cultivars C						
Gemz. 11	1.984a	2.209a	3.042c	3.504c	39.9a	40.1a
G.168	1.499c	1.686c	3.309b	3.697b	31.6c	32.4d
Misr 1	1.712b	1.953b	3.502a	3.855a	32.8bc	34.0c
Misr 2	1.691b	1.959b	3.380ab	3.694b	33.4b	35.2b
F test	*	*	*	*	*	*
Interaction						
S x C	*	*	*	*	*	*

*** and NS indicated P<0.05 and not significant, respectively.**
Means designated by the same letter are not significantly different at 5 % level according to Duncan's Multiple Range Test.

Table 4. Mean of number of tillers/m^2, 1000 grain weight and number of grain/spike as affected by interaction between sowing date and bread wheat cultivars in 2015/16 and 2016/17 growing seasons

Sowing date	Wheat cultivars	Number of spikes/m^2		1000 grain weight		Number of grain/spike	
		2015-2016	2016-2017	2015-2016	2016-2017	2015-2016	2016-2017
15 Oct	Gemz. 11	193.	210	33.3	33.5	45.0	56.7
	G.168	210	210	33.5	33.5	56.7	56.7
	Misr 1	210	210	36.7	33.5	64.3	56.7
	Misr 2	220	210	30.2	36.7	63.3	64.3
30-Oct	Gemz. 11	230	220	44.2	30.2	49.7	63.3
	G.168	232	243	32.4	34.3	57.0	52.6
	Misr 1	252	246	37.3	33.7	61.3	60.4
	Misr 2	251	267	34.5	39.6	68.0	65
15-Nov	Gemz. 11	286	266	50	36.5	57.7	72.1
	G.168	242	318	37.3	37.7	60.0	64
	Misr 1	257	269	38.7	37.7	65.0	66.6
	Misr 2	310	285	34.2	42.9	74.3	72.2
30- Nov	Gemz. 11	341	344	35.3	37.9	61.0	94.2
	G.168	312	427	44.6	40	65.3	76.3
	Misr 1	304	390	41	38	66.1	81.6
	Misr 2	322	380	41.8	42	75.3	82.6
15-Dec	Gemz. 11	340	402	34	41.3	57.3	82.5
	G.168	246	408	37.9	39.4	61.7	68.8
	Misr 1	289	276	37	35.3	62.7	69.1
	Misr 2	300	324	36	41.4	66.0	70.2
30-Dec.	Gemz. 11	314	336	36.1	40.3	54.0	73.9
	G.168	218	349	37.4	37.0	59.3	59.9
	Misr 1	267	237	34	33.7	61.7	64.7
	Misr 2	290	291	31	37.1	65.3	67.2
F test		*	*	*	*	*	*
LSD 0.05		18.8	21.4	4.9	4.2	4.3	5.5

Data presented in Table 5 showed the effect of the interaction between sowing date and wheat cultivars for grain yield, straw yield and harvest index in 2015-16 and 2016-17. Gemmeiza 11 recorded 4.178 and 3.890 with sowing 30st October in 2011/2012 and 2012/13 seasons. Giza 168 produced the highest straw yield with sowing 30st November (4.460 t/fed,) in 2015/2016 and (5.792 t/fed) in 2016/17 seasons. Gemmeiza 11 recorded the highest harvest index 43.9 and 50.6% under sowing 15th October.

Table 5. Mean of grain yield, straw yield and harvest index as affected by the interaction between sowing date and wheat cultivars in 2015-16 and 2016-17.

Sowing date	Wheat cultivars	Grain yield t/fed		Straw yield t/fed		Harvest Index%	
		2015-2016	2016-2017	2015-2016	2016-2017	2015-2016	2016-2017
15 Oct	Gemz. 11	1.362	1.567	1.738	1.533	43.9	50.6
	G.168	1.076	1.215	2.064	1.925	34.3	38.7
	Misr 1	1.233	1.407	2.547	2.373	32.6	37.3
	Misr 2	1.218	1.411	2.31	2.117	34.5	40.1
30-Oct	Gemz. 11	1.761	1.937	2.582	2.666	40.7	42.2
	G.168	1.367	1.502	3.089	3.222	30.6	38.7
	Misr 1	1.525	1.74	3.375	3.454	31.1	33.5
	Misr 2	1.506	1.745	3.067	3.103	32.9	36.0
15-Nov	Gemz. 11	2.08	2.319	3.494	3.868	37.4	37.5
	G.168	1.592	1.798	3.926	4.327	28.8	29.4
	Misr 1	1.825	2.082	4.111	4.506	30.7	31.6
	Misr 2	1.802	2.089	3.6	3.908	33.3	34.8
30- Nov	Gemz. 11	2.454	2.611	3.806	5.002	37.5	34.4
	G.168	1.793	2.025	4.46	5.792	28.6	25.9
	Misr 1	2.056	2.345	3.931	5.138	34.3	31.4
	Misr 2	2.03	2.352	3.783	4.915	34.9	32.4
15-Dec	Gemz. 11	2.284	2.507	3.214	4.295	43.3	36.9
	G.168	1.606	1.814	3.487	3.891	31.5	31.8
	Misr 1	1.842	2.101	3.615	4.01	33.7	34.4
	Misr 2	1.819	2.108	3.861	4.254	32.0	33.1
30- Dec	Gemz. 11	1.967	2.319	3.42	3.661	36.8	38.8
	G.168	1.564	1.765	2.832	3.026	35.6	36.8
	Misr 1	1.792	2.045	3.435	3.652	34.2	35.9
	Misr 2	1.77	2.051	3.661	3.869	32.5	34.7
F test		*	*	*	*	*	*
LSD 0.05		0.181	0.081	0.309	0.272	3.2	2.4

Sowing date effects:

Viability and grain quality

Data regarding germination percentage of wheat shown in Table (6). Analysis of date showed that germination percent were considerably influenced by sowing date. Data revealed that germination percent were significantly and gradually increased versus sowing date of wheat till reached its maximum value by sowing on 30 November which produced higher germination percentage (99.17, 99.17) in both season comparing to sowing early or late in the same season.

The results presented in Table 6 revealed that sowing date significant and highly significant effect for storability during both seasons. The data assuned that storability (accelerated aging germination) of wheat grains significantly affect versus late or early sowing , i.e. sowing thired (15 November) until fourth sowing date (30 November) gave the highest value of storability in both season (92.75, 92.33 and 93.75, 93.33), respectively.

Regarding the effect of sowing date on wet and dry gluten. The data of the studied traits are shown in Table 6 data revealed that wet gluten was significantly and gradually decreased versus sowing date of wheat till reached its less value by sowing on 15 November (23.94%, 27.28%) in both season. Respectively. From the other side, wet gluten was gradually and markedly increased from 15 November up to 1 January in both season (23.94%, 27.28% up to 27.65% , 29.82%), respectively. It was also, cleared from Table 6 that the dy gluten was significantly and decreased versus sowing date of wheat till reached its less value by sowing on 15 November in both season (12.90% , 12.64 % up to 10.35% , 11.0%), respectively. On other hand, dry gluten was increased from sowing 15 November up to sowing 1 January in both season (10.35% , 11.0, up to 12.30% , 11.96%) , respectively. The effect of sowing date on grain quality was in accordance with Shahzad *et al*. (2002), Aslam *et al*.(2003).

The data of crude protein, soluble and non-soluble protein of wheat grains versus sowing dates were studied and the data are shown in (Table 7). Concerning crude protein were higher by early sowing on 15 October (12.08 %, 11.83%) in both season, respectively. Thereafter delaying sowing to 15 November accompanied with substantial decrease in crude protein (11.33 %, 11.17 %) in both season, respectively. From the other side, crude protein were gradually and markedly increased up to sowing 1 January (12.47 %, 12.05 %), in both season, respectively (Abdullah *et al*. 2007). This finding could be explained that, at earlier sowing, wheat plants removed more N from the soil than in optimum or late sowing. Therefore, the mean crude protein was higher by early sowing Fergany *et al*. (2014) and Abdullah *et al.* (2007). Thereafter, delaying sowing date to 1 January accompanied with substantial increased in crude protein percent reaching (12.47 % and 12.05%) in both season, respectively.

Regarding the effect of sowing date on Non-soluble protein percent of wheat grains, the data of the studied traits are shown it Table 7 concerning Non-

soluble protein were higher by early sowing on 15 October (11.89 % , 11.75%) in both season, respectively. Thereafter delaying sowing to 15 November accompanied with substantial decrease in Non-soluble protein (11.13 %, 11.10 %) in both season, respectively. From the other side, Non-soluble protein were gradually and markedly increased up to sowing 30 December (12.18 %, 12.15 %), in both season, respectively.

Form the presented data in Table 7. It was found that the highest value of soluble protein was obtained by early sowing on 15 October. Delay sowing date up to 15 November was accompanied with decrease of soluble (0.244 % , 0.194 %) in both season. Thereafter delaying sowing date to 1 January accompanied with substantial increase in soluble protein percent reaching (0.345 % and 0.295 %) in both season, respectively.

Table 6 . Means of Germination, Accelerated aging germination Wet gluten and Dry gluten as affected by sowing date, wheat cultivars and their interaction in 2015/2016and 2016/2017seasons.

Treatment	Germination %		Accelerated aging germination		Wet gluten %		Dry gluten %	
	2015/16	2016/17	2015/16	2016/17	2015/16	2016/17	2015/16	2016/17
Sowing date								
15- Oct	90.50 b	90.0 b	76.83 c	75.83 c	27.27 a	29.19 a	12.90 a	12.64 a
30 -Oct	95.83 ab	95.83 ab	90.17 ab	90.83 ab	26.31 a	30.31 a	10.31 d	11.53 bc
15 -Nov	98.33 a	98.33 a	92.75 a	93.75 a	23.94 b	27.28 b	10.35 d	11.00 c
30 -Nov	99.17 a	99.17 a	92.33 a	93.33 ab	26.38 a	28.80 ab	10.42 d	11.31 c
15 -Dec	90.42 b	90.42 b	79.08 c	78.33 c	27.45 a	28.95 ab	11.18 c	11.38 c
30-Dec	96.25 ab	96.25 ab	87.08 b	86.67 b	27.65 a	29.82 a	12.30 b	11.96 b
F. Test	**	**	**	**	**	*	**	**
Cultivar								
Gemz. 11	96.00 a	96.39 a	83.17 b	82.78 b	27.43 a	29.60 a	12.41 a	13.12 a
G.168	91.17 b	91.11 b	85.11 ab	85.00 ab	25.71 b	27.88 b	10.78 b	10.59 c
Misr 1	95.67 a	95.56 a	88.5 a	88.61 a	26.64 ab	29.69 a	10.98 b	11.41 b
Misr 2	96.44 a	96.94 a	88.72 a	89.44 a	26.22 b	29.05 ab	10.80 b	11.42 b
F. Test	**	**	**	**	**	**	**	**
A x B	**	*	*	*	**	**	N.S	N.S

****, * and NS indicated P< 0.01, 0.05 and not significant, respectively.**
Means designated by the same letter are not significantly different at 5 % level according to Duncan's Multiple Range Test

Table 7. Means of Crude protein , Non- soluble protein and Soluble protein as affected by sowing date, wheat cultivars and their interaction in 2015/2016and 2016/2017seasons.

Treatment	Crude protein		Non- soluble protein		Soluble protein	
	2015/16	2016/17	2015/16	2016/17	2015/16	2016/17
Sowing date						
15- Oct	12.08 ab	11.83 ab	11.89 ab	11.75 ab	0.262 c	0.212 c
30 -Oct	11.91 ab	11.71 ab	11.70 a-c	11.63 ab	0.244 d	0.194
15 -Nov	11.33 b	11.17 b	11.13 c	11.10 b	0.251 cd	0.201 cd
30 -Nov	11.58 b	11.23 b	11.39 bc	11.24 b	0.332 b	0.281 b
15 -Dec	11.71 b	11.27 ab	11.41 bc	11.42 ab	0.345 a	0.295 a
30-Dec	12.47 a	12.05 a	12.18 a	12.15 a	0.345 a	0.295 a
F. test	**	**	**	**	**	**
Cultivars						
Gemz. 11	12.56 a	12.42 a	12.30 a	12.19 a	0.305 a	0.255 a
G.168	11.67 b	10.96 c	11.42 b	11.44 b	0.296 ab	0.206 ab
Misr 1	11.55 b	11.39 b	11.31 b	11.28 b	0.294 b	0.244 b
Misr 2	11.60 b	11.40 b	11.36 b	11.28 b	0.290 b	0.240 b
F. test	**	**	**	**	**	**
A x B	**	**	**	**	**	**

****, * and NS indicated P< 0.01, 0.05 and not significant, respectively.**
Means designated by the same letter are not significantly different at 5 % level according to Duncan's Multiple Range Test

The data of protein fraction of wheat grains versus sowing date were studied and the data are shown in Table 8. The data assumed that albuimine percent, globuline percent, gliadine percent and glotenine percent of wheat grains significantly affect versus late or early sowing dates, i.e. albuimine percent ((non-gluten protein) was gradually and markedly decreased from (42.92% , 43.34%) in both season at early sowing date on 15 Octaber up to 30 November being (24.21% , 24.21%) in both season, respectively. Thereafter delaying sowing date to 1 january accompanied with substantial increased in albumine percent (non-gluten) reaching (33.88% , 33.88%) in both season, respectively.

Data presented in Table 8 show clearly that globuline percent (non-gluten protein) was gradually and markedly increased from (13.80% , 14.01%) in both season at early sowing date on 15 October up to 30 November being (21.5% , 21%) in both season, respectively. Thereafter delaying sowing date to 1 January accompaied with

substantial decreased in globuline % (non-gluten protein) reaching (19.24% , 19.43%) in both season, respectively.

Data in Table 8 revealed that gliadine percent (gluten protein) was gradually and markedly decreased from (7.73%, 7.68%) in both season at early sowing date on 15 October up to 15 November being (6.89% , 6.94%) in both season, respectively. While, it reached its maximum value by sowing on 30 November, thereafter delaying in sowing date to 1 January accomanied with substantial decrased in gliadine percent (15.33 ,15.50) in both season respectively.

Data in Table 8 revealed that glotenine percent was significantly and gradually incresed versus sowing date of wheat till reached its maximum value by sowing on 15 November (41.17% , 41.59%) in both season, respectivelly. Thereafter delaying sowing date to 1 January accompanied with substantial decreased in glotenien percent (gluten protein) reaching (30.33%, 30.82%) in both seasons, respectively. The effect of sowing date on grain quality was in accordance with Shahzed *et al*(2002). Aslam *et al*. (2003) and Yan *et al*.(2008).

Table 8. Means of Albuimine. Globuline, Gliadine, Glotenine of wheat cultivars as affected by sowing date. wheat cultivars and their interaction in 2015/2016 and 2016/2017 seasons.

Treatment	Soluble protein							
	Albuimine%		Globuline%		Gliadine%		Glotenine%	
	2015/16	2016/17	2015/16	2016/17	2015/16	2016/17	2015/16	2016/17
Sowing date								
15- Oct	42.92 a	43.34 a	13.80 c	14.01 d	7.73 d	7.68 d	33.51 cd	33.77c
30 -Oct	40.40 b	40.69 b	14.98 c	15.21 c	6.80 d	6.80 d	38.08 b	38.50 b
15 -Nov	34.97c	34.97 c	15.98 c	16.05 c	6.89 d	6.94 d	41.17 a	41.59 a
30 -Nov	24.21 e	24.21 e	21.5 a	21.00 a	19.23 a	19.51 a	34.21 c	33.91 c
15 -Dec	30.33 d	30.33 d	19.58 b	19.85 b	17.48 b	17.72 b	31.22 d	31.78 d
30-Dec	33.88 c	33.88 c	19.24 b	19.43 b	15.33 c	15.50 c	30.33 e	30.82 d
F. Test	**	**	**	**	**	**	**	**
Cultivars								
Gemz. 11	34.85 b	34.16 b	17.48 b	17.69 b	11.79 c	11.81 c	36.48 a	36.34 a
G.168	35.12 a	35.65 a	17.83 b	18.02 b	11.86 c	11.89 c	33.97 b	34.44 c
Misr 1	34.28 b	34.58 b	18.71 a	18.96 a	12.17 b	12.45 b	33.61 b	34.02 c
Misr 2	32.17 c	32.50 c	18.42 a	18.76 a	13.16 a	13.29 a	34.94ab	35.44 b
F. Test	**	**	**	**	**	**	**	**
A x B	**	**	**	**	**	**	**	**

****, * and NS indicated P< 0.01, 0.05 and not significant, respectively.**
Means designated by the same letter are not significantly different at 5 % level according to Duncan's Multiple Range Test

Wheat cultivars performance:

Data presented in Table 6 indicate that wheat variety Misr 1 and Misr 2 had significant highest germination percent. (95.67% ، 96.44 % and 95.56% ، 96.94 %) in both season, respectively.

Data cleared in Table 6 indicate that wheat variety, Misr1 and Misr 2 had significant highest strobility (88.5%, 88.72 %, and 88.61%, 89.44%) in both season , respectively .It means that the gentic make- up of wheat Misr1 and Misr 2 were more adapted to grow under the environmental conditions of Sakha.

Data in Table 6 revealed that the studied wheat cultivars were significantly differed in their quality characters. Gemmeza 11 cultivar followed by Misr 1 produced the highest value of wet and dry gluten percent (27.43 % , 29.60 % and 26.6 % , 29.69 %), (12.42 %, 13.12 % and 10.98 , % 11.41%) in both season, respectively. A slight difference was noticed between Giza 168 and Misr 2 in both season.

Data presented in Table 7 indicate that wheat Gemmiza 11 had significant highest crude protein (12.56 %, 12.42 %) in both season, respectively.

Data cleared in Table 7 indicate that wheat variety Gemmeiza 11 had the highest soluble protein exhibiting (0.305% and 0.255%) in both seasons, respectively. The superiority of Gemmeiza 11 may be due to higher rate of translocation of nitrogenous compounds from source to sink comparing to to other studied cultivars. This finding could be attributed to genetic make up of the cultivar (Fergany *et al* 2014).

Data presented in Table 8 indicate that wheat variety Giza 168 had significant highest albuimine percent (non-gluten protein) exhibiting (35.12%, 35.65%) in both season , respectively.

Also, data in Table 8 indicate that wheat varieties Misr1 and Misr2 had significnt highest globuline percent (non–gluten protein) (18.71%,18.96% and18.42%,18.76%) in both season, respectively.

From the other side, data in Table 8 indicate that wheat variety Misr2 had significnt highest gliadine percent (gluten protein) exhibiting (13.16%/ and 13.29%) in both season, respectively.

Also data presented in Table 8 indicate that, wheat variety Gemmeza 11 had significant highest glotenine percent (gluten protein) exhibiting (36.48 % and 36.34%) in both season, respectively. The differences in quality of studied cultivars might be attributed to their genetic make-up. These results are coincided with those of Shahzad *et at*. (2002)

Interaction effects:

The data in Table 9 indicate clearly that effect of the interaction between sowing dates and wheat cultivars on germination percent were significantly. It was found that the highest value was obtained by sowing on 15 and 30 November comparing to sowing early or late in both season. A slight difference was

noticed between all cultivars by sowing on 15 and 30 November.

Also, the interaction between wheat cultivars and sowing dates on sorability (Accelarated aging) was studied and shown in Table (9). The data cleared that storability was significantly among cultivars and sowing dates. It was found that the highest values were obtained by delay sowing date up to 15 and 30 November were accompanied with increase of storability. Aslight difference was noticed between all cultivars by sowing on 15 and 30 Novermber.

The interaction between sowing date and wheat cultivars on wet gluten percent wet gluten percent was significant in 2015/16 and 2016/17 seasons, respectively. Results presented in Table 9 found that the highest values were obtained by early sowing date on 15 Octobrt. Delay sowing date up to 15 November was accomained with decrease of wet gluten. On the other hand, delay sowing date up to 15 Decmber and 1 January were accompanied with increase of wet gluten percentage. It was noticed that grain cultivar Giza 168 and Misr 1 are characterized by higher wet gluten percent by late sowing on 1 January, while Gimmiza 11 characterized by higher wet gluten percent by sowing on 15 December.

Table 9. Effect of the interaction between wheat cultivars and sowing dates on Germination , Accelerated aging germination (storability) and Wet gluten 2015/2016 and in 2016/2017 seasons.

Sowing dates	Cultivars	Germination %		Accelerated aging germination		Wet gluten %	
		2015/16	2016/17	2015/16	2016/17	2015/16	2016/17
15- Oct	Gemz. 11	93.00	91.67	61.00	58.33	28.67	31.00
	G.168	80.00	80.00	76.00	75.00	26.68	27.68
	Misr 1	94.33	93.33	87.67	86.67	27.79	29.12
	Misr 2	94.67	95.00	82.67	83.33	25.95	28.95
30- Oct	Gemz. 11	95.00	95.00	89.33	90.00	27.66	31.33
	G.168	93.67	93.33	90.67	91.67	25.25	28.58
	Misr 1	94.67	95.00	88.67	88.33	25.65	31.65
	Misr 2	99.33	100.0	92.00	93.33	26.67	29.67
15 –Nov	Gemz. 11	97.67	100.0	94.33	95.00	23.71	24.71
	G.168	98.00	98.33	93.33	95.00	22.95	26.29
	Misr 1	96.33	96.67	91.33	91.67	23.90	27.57
	Misr 2	98.00	98.33	92.00	93.33	25.51	30.54
30 -Nov	Gemz. 11	96.67	95.00	90.67	91.67	27.65	29.65
	G.168	99.00	80.00	94.33	95.00	24.44	26.11
	Misr 1	98.33	93.33	92.33	93.33	26.12	29.12
	Misr 2	97.33	93.33	92.00	93.33	27.33	30.33
15 –Dec	Gemz. 11	95.33	95.00	78.33	76.67	29.08	32.08
	G.168	81.00	80.00	68.67	66.67	26.49	27.49
	Misr 1	93.67	93.33	83.00	83.33	27.69	29.03
	Misr 2	93.33	93.33	86.33	86.67	26.53	27.20
30-Dec	Gemz. 11	98.33	98.33	85.33	85.00	27.82	28.82
	G.168	95.33	95.00	87.67	86.67	28.48	31.15
	Misr 1	96.67	96.67	88.00	88.33	28.68	31.68
	Misr 2	96.00	99.00	87.33	86.67	25.61	27.61
F tese		**	**	*	*	**	**

****, * and NS indicated P< 0.01, 0.05 and not significant, respectively.**

The interaction between sowing dates and wheat cultivars was found to be non significantly in dry gluten percent.

The data in Table 10 indicate clearly that the effect of the interaction between sowing dates and wheat cultivars on crude protein percentage were significantly. It was found that the highest value was obtained by early sowing on 15 October. Delay sowing date up to 15 November was accompanied with decrease of crude protein. From the other side, the crude protein percentage was gradually and markedly increased up to 15 Decmber. Therefore, the mean crude protein percentage was higher by early sowing [Abdullah *et al* 2007 and Frgany accompanied with substantied increase in crude protein percentage. It was noticed that grains cultivar Gemmiza 11 characterized by higher crude protein percentage by late sowing on 15 December.

The data in Table 10 indicate clearly that the effect of the interaction between sowing dates and wheat cultivars on Non-soluble protein percentage were significantly. It was found that the highest value was obtained by early sowing on 15 October. Delay sowing date up to 15 November was accompanied with decrease of Non-soluble protein. From the other side, non-soluble protein percentage was gradually and markedly increased up to 15 Decmber. Therefore, the mean Non-soluble protein percentage was higher by early sowing [Abdullah *et al* 2007 and Frgany *et al* 2014] accompanied with substantied increase in crude protein percentage. It was noticed that grains cultivar Gemmiza 11 characterized by higher Non-soluble protein percentage by late sowing on 15 December.

The interaction between wheat cultivars and sowing dates on soluble protein percent was studied and shown in Table (10). The data cleared that soluble protein was significantly among cultivars and sowing dates. It was found the highest value were obtained by delay sowing dates up to 15 December and 1 January were accompained with increase of soluble protein percent. It was noticed that grains of wheat cultivars Giza 168 characterized by higher soluble protein percent in both season (0.367 %, 0.317 %), respectivelly.

Albumen percent (non- gluten protein) was highly significantly affected by interaction between sowing dates and cultivars in both growing season Table 11. It was found that the highest value was obtained by early sowing on 15 October. Delay sowing date up to 15 December was accompined with decrease of albumen percent. From the other side, the albumen percent was markedly increase by late sowing on 30 Dec. Albumen percent (non- gluten protein) was highy significantly affected by interaction between sowing dates and cultivars in both growing season Table 11. It was found that the highest value was obtained by early sowing on 15 October. Delay sowing date up to 15 December was accompined with decrease of albumen percent. From the other side, the albumen percent was markedly increase by late sowing on 30 Dec. Also, noticed that grains of wheat cultivar Misr 1 and Gemmeza 11 gave characterized by higher albumine percent (non- gluten protein) in both season (45.27, 45.49 and 44.44, 44.94), respectivelly .

Table 10. Effect of the interaction between wheat cultivars and sowing dates on Crude protein , Non- soluble protein and Soluble protein in 2015/2016 and 2016/2017 seasons.

Sowing dates	Cultivars	Crude protein		Non- soluble protein		Soluble protein	
		2015/16	2016/17	2015/16	2016/17	2015/16	2016/17
15- Oct	Gemz. 11	12.82	12.77	12.62	12.37	0.243	0.193
	G.168	11.80	11.17	11.62	11.27	0.238	0.188
	Misr 1	11.60	11.33	11.00	11.47	0.252	0.202
	Misr 2	12.11	12.03	11.92	11.90	0.244	0.194
30- Oct	Gemz. 11	12.50	12.33	12.28	12.23	0.273	0.223
	G.168	11.26	10.73	11.07	11.07	0.248	0.198
	Misr 1	11.35	11.30	11.13	11.10	0.265	0.215
	Misr 2	12.52	12.47	12.31	12.10	0.263	0.213
15 -Nov	Gemz. 11	11.71	11.77	11.49	11.40	0.267	0.217
	G.168	11.37	10.67	11.17	11.09	0.249	0.199
	Misr 1	10.81	11.06	10.63	10.60	0.238	0.188
	Misr 2	11.43	11.20	11.23	11.30	0.249	0.199
30 -Nov	Gemz. 11	12.57	12.50	12.26	12.10	0.351	0.301
	G.168	11.34	10.47	11.05	11.17	0.334	0.284
	Misr 1	11.93	11.83	11.65	11.53	0.321	0.271
	Misr 2	10.47	10.13	10.19	10.15	0.320	0.270
15 -Dec	Gemz. 11	13.34	13.00	13.04	12.93	0.340	0.290
	G.168	11.72	11.02	11.43	11.43	0.343	0.293
	Misr 1	11.15	10.97	10.85	11.03	0.393	0.303
	Misr 2	10.62	10.10	10.33	10.27	0.343	0.293
30-Dec	Gemz. 11	12.42	12.17	12.12	12.10	0.357	0.307
	G.168	12.53	11.73	12.21	12.60	0.367	0.317
	Misr 1	12.46	11.83	12.17	11.97	0.337	0.287
	Misr 2	12.47	12.47	12.20	11.93	0.321	0.271
F tese		**	**	**	**	**	**

****, * and NS indicated P< 0.01, 0.05 and not significant, respectively.**

Also, in Table 11 indicted clearly that the effect of the interaction between sowing date and wheat cultivars was found be too significant in globulin percent (non- gluten protein). It was found that the highest value was obtained by sowing 30 November comparing to sowing early or late in the same season.

Regarding gliadin percent (gluten protein) was highly significant affect by interaction between sowing dates and cultivars in both seasons. Data in Table 11 revealed that was significantly increased versus sowing date of wheat till reached its maximum value by sowing on 30 novermber. From the other side, delay sowing date up to 1 January accompanied with decrease of gliadin percent. It was also, noticed that grains of wheat cultivar Misr1 was characterized by higher gliadin percent (gluten protein). Grain of wheat cultivar Misr 1 gave the highest value of gliadin percent by sowing on 30 November (21.33 %, 21.95%) in both seasons, respectivelly.

Regarding the interaction between cultivars and sowing dates on gluteanin percent (gluten protein) of wheat grains. The data of the studied traits are shown in Table 11. It was noticed that grains of wheat cultivar Gemmiza 11 and Misr 2 gave characterized by higher glutenin percent (gluten protein) by sowing on 15 November in both season (42.33 %, 42.69 % and 42.67 %, 43.11%), respectively.

Table 11. Effect of the interaction between wheat cultivars and sowing dates on Albuimine, Globuline, Gliadine and Glotenine in 2015/2016 and 2016/2017 seasons.

Sowing dates	Cultivars	Albuimine%		Globuline%		Gliadine%		Glotenine%	
		2015/16	2016/17	2015/16	2016/17	2015/16	2016/17	2015/16	2016/17
15- Oct	Gemz. 11	44.40	44.94	14.27	14.43	7.53	7.55	32.70	33.08
	G.168	41.67	42.16	15.00	15.13	8.13	7.90	34.67	34.82
	Misr 1	45.27	45.49	15.30	15.51	6.10	6.05	32.67	32.94
	Misr 2	40.33	40.77	15.33	15.77	9.17	9.20	34.00	34.26
30- Oct	Gemz. 11	40.93	40.95	13.80	13.97	5.13	5.10	39.67	39.98
	G.168	44.00	44.71	13.90	14.26	7.90	7.78	32.67	33.26
	Misr 1	38.00	38.17	13.50	13.62	6.62	6.78	41.00	41.43
	Misr 2	38.67	38.93	14.00	14.19	7.53	7.55	39.00	39.33
15 -Nov	Gemz. 11	37.67	38.04	14.03	14.13	5.13	5.14	42.33	42.69
	G.168	38.00	38.48	15.60	15.40	6.37	6.46	39.00	39.65
	Misr 1	32.20	33.49	17.47	17.65	7.92	7.98	40.67	40.89
	Misr 2	31.00	31.68	16.83	17.02	8.13	8.19	42.67	43.11
30 -Nov	Gemz. 11	23.50	23.81	22.33	22.60	17.50	17.62	38.67	35.96
	G.168	18.37	18.67	25.67	26.46	18.23	18.37	36.17	36.50
	Misr 1	19.60	19.67	28.33	28.92	21.33	21.95	28.67	29.16
	Misr 2	21.03	21.45	24.00	24.41	19.87	20.11	33.33	34.03
15 -Dec	Gemz. 11	25.27	25.33	21.33	21.71	17.73	17.78	34.87	35.19
	G.168	32.00	32.61	20.00	20.06	15.67	15.97	30.67	31.36
	Misr 1	34.07	34.35	17.67	17.85	17.00	17.35	28.67	30.45
	Misr 2	30.00	30.33	19.33	19.78	19.53	19.78	31.33	30.11
30-Dec	Gemz. 11	31.33	31.86	19.13	19.33	17.70	17.65	30.67	31.16
	G.168	36.67	37.29	16.83	16.81	14.83	14.84	30.67	31.05
	Misr 1	35.53	36.01	20.00	20.19	14.07	14.57	28.67	29.23
	Misr 2	32.00	31.83	21.00	21.41	14.73	14.93	31.33	31.83
F tese		**	**	**	**	**	**	**	**

****, * and NS indicated P< 0.01, 0.05 and not significant, respectively.**

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تأثير مواعيد الزراعة على محصول وجوده بعض اصناف قمح الخبز

سعاد عبد الهادى السيد[٢] ، ايمان نبيل محمود محمد[١]، داليا عبد ربه الحاج[٢] وامانى محمود محمد[٢]

[١]قسم بحوث تكنولوجيا البذور- معهد بحوث المحاصيل الحقلية- مركز البحوث الزراعية- الجيزه- مصر.

[٢]قسم المحاصيل - كلية الزراعة - جامعة كفر الشيخ – مصر.

لدراسة أهمية مواعيد الزراعة لأصناف القمح تم زراعة أربعه أصناف من القمح جميزه ١١، جيزة ١٦٨ ، مصر ١ ومصر ٢ فى ستة مواعيد كل خمسة عشر يوما اعتبارا من ١٥ أكتوبر فى موسمى الزراعة ٢٠١٥/٢٠١٦ و ٢٠١٦/ ٢٠١٧ اقيمت التجربة بمحطة البحوث الزراعية بسخا – مركز البحوث الزراعية، بشمال الدلتا – مصر. وتم إجراء تجربة فى تصميم قطاعات كاملة العشوائية فى ثلاث مكررات. أخذت الصفات الحقلية التالية: عدد الاشطاء/م٢، وزن الالف حبة، عدد حبوب السنبلة ،محصول الحبوب، محصول القش ومعامل الحصاد.أما بالنسبه للاختبارات المعملية فقد تم تقدير نسبة الانبات ، الشيخوخة ، جلوتين الرطب ، والجلوتين الجاف ، الالبيومين ، الجلوبيولين ، الجلياذين ، الجلوتنين ، البروتين الخام ، البروتين الذائب ، البروتين الغير ذائب. ويمكن تلخيص النتائج كما يلى:- أثرت الزراعة فى ٣٠ نوفمبر ايجابيا على كل الصفات تحت الدراسة وسجلت اعلي القيم, تلاها الزراعة فى ١٥ نوفمبر فى الموسمين. أدى التبكير او التأخير عن هذين الموعدين الى نقص القيم لجميع الصفات الحقلية تحت الدراسة. وقد اشارت النتائج المتحصل عليها الى ان ميعاد الزراعة الرابع (٣٠ نوفمبر) اعطى معنوية لكل صفات الجودة تحت الدراسة وهى ؛ محتوى الحبوب من البروتين الخام والبروتينات غير الذائبة والبروتينات الذائبة والجلوتين الطرى والجلوتين الجاف ونسبة الانبات والقدرة التخزينية ، كذلك محتوى الحبوب من البروتينات غير الجلوتينية (الالبيومين و الجلبيولين) والبروتينات الجلوتينية (الجلياذين والجلوتين) . وقد اشارت النتائج المتحصل عليها ان الميعاد الرابع للزراعة (٣٠ نوفمبر) اعطى اعلى القيم لمعظم الصفات تحت الدراسة كالجلبيولين وهو بروتين غير جلوتينى والجلياذين وهو بروتين جلوتينى بينما اعطى الميعاد الاول للزراعة (١٥ اكتوبر) اعلى القيم فى صفة الالبيومين وهو بروتين غير جلوتينى . وعلى الجانب الاخر فقد اعطى الميعاد الثالث للزراعة ١٥ نوفمبر وحتى الميعاد الرابع للزراعة وهو(٣٠ نوفمبر) اعلى القيم فى نسب الانبات والقدرة التخزينية (اختبار الشيخوخة). فى حين ان الميعاد الزراعة السادس (٣٠ ديسمبر) اعطى اعلى القيم فى البروتين الخام والبروتينات الذائبة والبروتينات الغير الذائبة.كذلك اوضحت النتائج المتحصل عليها معنوية لصفات الجودة بالنسبة للاصناف . فقد سجل الصنفان مصر ١ ، مصر٢ اعلى قيما للبروتينات الذائبه الجلوبيولين و الجلياذين والجلوتينين, كذلك نسب الانبات والقدرة التخزينية. وعلى الجانب الاخر فقد سجل الصنف جيزة ١٦٨ اقل قيمة للجلياذين والجلوتنين بينما اعطى اعلى قيمة للا لبيومين وهو بروتين غير جلوتينى.كذلك اوضحت النتائج معنوية فى الصفات تحت الدراسة بالنسبة للاصناف فقد سجل الصنف جميزة ١١ اعلى قيم فى عدد الأشطاء للمتر المربع ووزن ١٠٠٠ حبه ودليل الحصاد ، والمحتوى من الجلوتين سواء الرطب او الجاف (البروتين الجلوتينى) والبروتينات الذائب.وبذلك اظهرت النتائج المتحصل عليها تفوق الصنف جميزة ١١ على جميع الاصناف تحت الدراسة فى المحصول بينما سجل الصنفان مصر ١ ، مصر ٢ اعلى قيما بالنسبة للبروتين الذائب جلوبيولين و الجلياذين ، الجلوتنين ونسبة الانبات و كذلك القدرة التخزينية. وعلى الجانب الاخر سجل الصنف جيزة ١٦٨ اقل قيما للجلياذين والجلوتينين , بينما اعطى اعلى قيما فى الالبيومين.