J. Agric. Sci. Mansoura Univ., 29 (10): 5529 - 5537, 2004

STUDY OF LATE SOWING DATES OF BARLEY FOR MAXIMIZING THE UTILIZATION OF IRRIGATED LANDS AFTER LATE SUMMER CROPS

El-Moselhy, M.A.
Barley Res. Dept., Field Crops Res. Inst., Agric. Res. Center, Giza, Egypt

ABSTRACT

A Filed experiment was conducted in two consecutive seasons,2002/2003 and 2003/2004 at Gemmeiza Agricultural Research Station ,EL-Garbeia Governorate (Middle Delta),to study the effect of late sowing date on yield and yield components of five barley genotypes .

Split Plot Design in three replications was used . Four sowing dates (1st December ,15th December,1st January and 15th January) were arranged in the main plots. Five barley genotypes were arranged randomly in the sub–plots .

Data were recorded for heading date , maturity date , plant height , spike length , number of spikes /m^2 , number of grains /spike , weight of kernels /spike , grain yield , straw yield and biological yield .

The results could be summarized as follows : sowing dates and genotypes treatments showed significant effect on grain , straw and biological yields as well as yield attributes for both seasons with some exception .

The highest values of grain , straw and biological yields were recorded for the two sowing dates, Dec.1 and Dec.15. Delaying sowing date up to Jan.1 decreased grain yield on the average of the two seasons about (19 %) as compared with sowing date Dec.15 and about (34%)when Delaying sowing date up to Jan.15 . Giza 128 recorded the highest values of plant height , weight of kernels /spike ,while Giza 127 recorded highest values of number of spikes /m^2 and grain yield .

INTRODUCTION

In middle Delta (Gharbia, Dakahlia and Menoufia Governorates) , farmers used to grow about 16237 fedden with Nili potato every year*. Harvesting potato usually terminated in January, where most of winter crops had been cultivated . However, barley among cereals, is probably the most tolerant to environmental stresses .In this respect (Acevedo 1991) reported that the major phonological trait that enabled barley to yield better than other winter crops in the stressful environments was earliness in flowering associated with shorter grain filling . Therefore the life cycle of the plant could be terminated rapidly .This statement interpret whey barley plant considered the early cereal crop under stress conditions. Barley is escaped crop from different stresses as drought and heat more than other cereals. This advantage character gave this crop the ability to compete the other winter cereals in rainfed and late sowing in irrigated lands conditions .In this respect Austin and Craufurd (1989) stated that compared the temperate cereals, barley is the best adapted to harsh environments characterized by high temperature and drought stress .The traits of barley associated with high and stable yield being, rapid early growth and the attainment of full ground cover , early flowering and rapid grain growth.

---

* **Ministry of Agriculture (Area, Yield and Production of Summer, Nili and Winter Potatoes) 2001.**

Early growth of barley is generally more rapid than that of wheat because of its greater specific leaf area and consequently greater interception of radiation and this gives barley greater water use efficiency (Singh and Kumar 1981).

Utilization of irrigated lands after late summer crops in barley production could be used to solve the problem of feeds shortage if barley used as forage crop. On the other hand, same food barley varieties (hull-less barley)could be used in those areas for human consumption in bread making without any competition with wheat for irrigated lands.

Sowing date has remarked effect on barley yield and its components. In this respect several investigators reported that early sowing was favorable for high grain yield and yield component because the post anthesis period coincides with relatively lower temperature . Late sowing was unfavorable for grain yield since the period between anthesis and leaf senescence was curtailed by the onset of relatively higher temperature (Ikononmi 1972 and Cromack and Clark 1987)

Recently , many scientists reported suitable different sowing dates for barley under different environments. In Upper Egypt Mahmoud (1992) studied the effect of sowing dates (Nov.15, Nov.30 and Dec .15) on productivity of the barley varieties

(Giza 121, Giza 123 and CC89). He found that the highest values of yield and yield components were obtained with sowing date on November . EL-Sayed et al., (1998) found that the best sowing date in the new valley ranged between (Oct .20 and Nov.5) .Under Ismailia condition ,Megahed et al .,(2002) found that the highest values of grain, straw and biological yields were recorded from sowing barley on Nov.20 followed by Nov.5 and Dec.5.

The objective of this investigation is to study the proper late sowing date and proper barley variety to utilize those irrigated areas escaped from sowing wheat and other winter crops in barley production.

MATERALS AND METHODS

A Filed experiment was conducted in two consecutive seasons,2002/2003 and 2003/2004 at Gemmeiza Agricultural Research Station, EL-Garbeia Governorate (Middle Delta) to study the effect of late sowing on yield and yield components of five barley genotypes .The various treatments were arranged in a Split Plot Design with three replications .Four sowing dates were arranged in the main plots. Five barley genotypes were arranged randomly in the sub – plots .

The treatments were

A-**Sowing dates** (SD) :

1-SD1= 1st December

2-SD2=15th December

3-SD3=1st January

4-SD4 =15th January.

B- **Genotypes (G) :**

G1 =ESCOBA/3/MOLA/SHYRI//ARUPO*2/JET/4/ALELT CMB94A.732-G-3M-4Y-OM (two rowed).

G2=Giza 127 ; two rowed released barley variety .

G3= Giza 128 ; two rowed released barley variety.
G4= Bweet ; two rowed introduced barley variety.
G5= Sharm ; two rowed introduced barley variety .

The experimental unite area was 4.2 m^2 i.e 6 rows , 3.5 meter length and 20 cm apart. Seeds were drilled followed applying super phosphate and covered with soil . Soil chemical analysis of the experimental soil was showed in table 1 .

Table 1 : Soil chemical analysis of the experimental site

pH Soil susp., 1:2.5	EC*, dSm^{-1}	Cations*, meq/l				Anions*, meq/l			
		Na^+	K +	Ca^{++}	Mg^{++}	CO_3^{--}	HCO_3^-	Cl^-	SO_4^{--}
7.86	1.06	3.90	0.10	4.30	2.40	--	4.20	2.50	4.00

*** In soil saturation extract.**

Studies Characters :

1-Heading date (day) :number of days from sowing to 50% spike emergence on the whole plot basis .

2-Maturity date (day) :number of days from sowing to the yellow stage of maturity .

3- Plant height (cm) :at harvest measured from the soil surface to the top of the main spike, excluding owns of ten main stems taken at random from each plot .

4- Spike length (cm): Ten randomly main spikes selected in random and were measured ,their average was calculated to express spike length in cm.

5- Number of spikes/m^2 : Number of fertile tillers / m^2 were calculated by counting all spikes per square meter .

6-Number of grains/spike : Average number of grains in ten randomly chosen spikes, was estimated .

7- Weight of kernels / spike (gm) : Recorded in grams as average weight of the grains weight of ten randomly selected spikes.

8- Grain yield (kg/fed.) :Was recorded for the harvested area after threshing and then converted to kg/fed.

9- Biological yield (kg/fed.): Was recorded for the harvested area and converted to kg/fed.

10- Straw yield (kg/fed.) : The straw yield of the previous sample was estimated in kg/ m^2 = (Biological yield (kg/ m^2)-Grain yield (kg/ m^2), then it was converted to kg/fed.

The obtained data were subjected to appropriate statistical analysis and the means were compared using L.S.D test at 5% level (Steel and torrie,1980) .

RESULTS AND DISCUSSION

Data in (Table 2) show that the effect of sowing dates and genotypes on heading date, maturity date, plant height, spike length and number of spikes/m^2.

Results in (Table 2) show that sowing dates had significant effect ($P<0.05$) on heading date, maturity date, spike length and no. spikes/m^2 in both seasons .

It could be observed that number of days to heading and to maturity increased when barley was sowing earlier in both seasons .With this respect Jadav and Jadon (1987) reported that plant efficiency in solar energy conversion into chemical energy induced earlier beginning of flowering . The tallest (plants and spikes) were recorded with early sowing Dec.1 while the shortest ones were recorded with late date Jan.15, this were true for two seasons .The increase in plant height and spike length may be due to the role of photoperiod and light intensity that prevailed during growth period of early planting in increasing number and length of internodes for barley plants . The highest number of spikes/m^2 was obtained when barley was sown on Dec.15 followed by Dec.1 while the lowest number resulted from sowing barley on Jan.15. this were true for two seasons .

Results in (Table 2) show that genotypes had significant effect ($P<0.05$) on heading date, maturity date and plant height in the two seasons and no. spikes/m^2 in the first season only .

Table 2. Effect of sowing dates and barley genotypes on some plant characters in 2002 / 2003 and 2003 / 2004 growing seasons .

* Treat.	Heading Day		Maturity date Day		Plant height Cm		Spike length Cm		No. spikes/ m^2	
	1st season	2nd season	1st season	2nd season	1st season	2nd season	1st season	2nd season	1st season	2nd season
Sowing dates										
SD 1	100	96	139	138	95.2	90.0	8.9	9.4	550	596
SD 2	91	89	127	129	86.5	89.0	7.9	9.2	570	633
SD 3	84	86	123	121	83.2	83.0	8.1	8.8	476	523
SD 4	76	75	115	111	78.5	79.6	7.6	8.0	424	466
L.S.D 5%	2.3	0.84	1.6	0.79	3.9	2.2	0.69	0.63	64	54
Genotypes										
G 1	73	71	110	115	80.8	81.0	7.1	8.2	435	536
G 2	85	81	121	120	91.1	90.3	8.4	9.1	568	593
G 3	88	87	127	123	93.8	90.0	8.2	8.7	533	528
G 4	94	92	131	129	84.8	82.7	8.1	8. 9	512	556
G 5	101	100	141	136	78.8	83.1	8.4	9.3	478	560
L.S.D 5%	2.2	0.88	1.1	1.4	2.4	3.14	N.S	N.S	N.S	47

*** SD=Sowing date G =Genotype number**

The obtained results indicated that the shortest period for heading and maturity was recorded by genotype no. 1 (73 and 71 days) for heading and (110 and 115 days) for maturity in the first and the second season,

respectively . However the latest one was Sharm cv. Which recorded (101 and 100 days) for heading and (141 and 136 days) for maturity date for the first and the second seasons respectively .

Differences in heading and maturity dates among genotypes may be attributed to the genetic constitution . These results are in harmony with those of Afifi (1999) .

Barley cultivars Giza 127 and Giza 128 (local varieties) had the tallest plants in booth seasons, also Giza 127 exceeded the four genotypes in number of spikes/m^2 in both seasons.

Data in (Table 3) show the effect of the interaction between sowing dates and genotypes on heading date, maturity date, plant height, spike length and number of spikes/m^2. The effect of the interaction between sowing dates and genotypes reached the level of significance with heading and maturity dates and plant height in the two seasons while spike length and number of spikes / m^2 in the first season only .

Obtained results revealed that the earliest heading and maturity dates were obtained when barley genotype no. 1 was sown on Jan.15 .Giza 127 recorded the tallest plants when it was sown on Dec.1 while, the longest spike was produced with Beweet cv when it was sown on Dec.1.The highest number of spikes were recorded with Giza 127 when it was sown on Dec.1

Table 3. Interaction effects of sowing dates and barley genotypes on some plant characters in 2002/2003 and 2003/2004 growing seasons .

Treatments	Heading (day)		Maturity date (day)		Plant height (cm)		Spike length (cm)		No of spikes/ m^2	
	1st season	2nd season	1st season	2nd season	1st season	2nd season	1st season	2nd season	1st season	2nd season
SD1xG1	78	76	119	128	84.6	85.6	6.3	8.6	401	484
SD1xG2	101	93	140	139	107.3	98.4	9.0	9.6	616	645
SD1xG3	100	99	140	140	104.0	93.7	9.6	9.6	585	576
SD1xG4	107	104	144	137	95.9	85.5	10.7	9.3	601	624
SD1xG5	113	109	152	145	84.2	86.6	9	9.6	548	653
SD2xG1	75	74	113	119	82.6	83.1	7.1	7.6	544	608
SD2xG2	89	85	123	127	90.3	98.4	8.7	9.7	590	685
SD2xG3	92	91	125	125	96.0	96.4	7.7	8.8	561	618
SD2 xG4	98	94	133	133	88.0	83.4	8.4	9.5	553	643
SD2xG5	102	101	144	140	75.8	84.6	7.6	10.2	603	614
SD3xG1	74	72	109	112	80.7	77.3	6.7	8.6	450	538
SD3xG2	80	78	116	111	90.4	84.2	8.0	8.8	542	541
SD3xG3	82	84	123	118	89.0	91.1	8.1	8.6	519	493
SD3xG4	90	90	127	128	77.7	81.0	8.0	8.6	458	521
SD3xG5	99	98	140	136	78.3	81.3	8.6	9.2	414	522
SD4xG1	65	63	98	100	75.3	78.0	8.0	7.9	346	513
SD4xG2	70	69	107	103	76.2	80.3	7.8	8.0	524	500
SD4xG3	75	73	120	108	86.3	79.0	7.3	7.8	466	424
SD4xG4	81	85	119	120	77.6	81.0	7.5	8.1	436	443
SD4xG5	87	89	130	125	77.0	79.8	7.3	8.0	346	451
L.S.D 5%	1.76	1.52	1.53	2.3	4.7	6.2	1.73	N.S	111	N.S

Data in (Table 4) show the effect of sowing dates and genotypes on number of grains/spike, kernels weight of spike, grain yield , straw yield and biological yield .

Results in (Table 4) show that either sowing dates or genotypes has significant effect ($P<0.05$) on number of grains/spikes, kernels weight of spike, grain yield , straw yield and biological yield . The highest number of grains/spike were produced by sowing barley on Dec.1 in the first season and on Dec.15 in the second season while sowing barley on Jan.15 gave the lowest number of grains /spike in the both seasons . It could be notify that late sowing resulted in significant decrease in number of grains /spike, that may be due to the short periods of vegetative growth and ear flowering ,i.e unfavorable date for spike initiation and seed setting which affects number of grains/spike. On the other side, the heaviest grains weight / spike were recorded by sowing barley Dec.1 and on Dec.15 in the first and the second seasons, respectively . The lowest weight of grains / spike was recorded by sowing barley on Jan.15 . It could be observed that decreasing the kernels weight /spike as a result of delay sowing could be attributed to the decrease in number of kernels /spike as well as spike length which may affect the kernel weight. These results are in harmony with those obtained by Hefnawi (1993) .

Table 4. Effect of sowing dates and barley genotypes on some plant characters in 2002/2003 and 2003/2004 growing seasons .

Treatments	No. Grains /spike		Weight of kernels /spike (gm)		Grain yield Kg/fed.		Straw yield Kg/fed.		Biological yield Kg/fed.	
	1st season	2nd season	1st season	2nd season	1st season	2nd season	1st season	2nd season	1st season	2nd season
Sowing dates										
SD 1	22.6	26.2	1.47	1.44	2102	2603	7424	4671	9526	7274
SD 2	25.5	27.8	1.31	1.47	1983	2832	6902	5313	8885	8145
SD 3	24.4	25.0	1.16	1.36	1607	2346	5551	4344	7158	6690
SD 4	23.4	23.6	1.12	1.17	1340	1888	4928	4822	6268	6710
L.S.D 5%	1.48	0.97	0.09	0.16	122	472	800	743	1162	785
Genotypes										
G1	22.6	24.4	1.32	1.41	1670	2553	4924	3197	6594	5750
G2	25.4	25.0	1.31	1.44	1987	2778	6137	4098	8124	6876
G3	25.7	25.8	1.46	1.61	1868	2579	6321	4830	8190	7409
G4	27.9	29.0	0.95	1.10	1793	2120	6963	4596	8756	6716
G5	23.0	23.9	1.25	1.28	1471	2056	6662	7218	8133	9274
L.S.D 5%	1.45	1.13	0.07	0.12	178	202	718	714	669	711

The highest grain yield were obtained by sowing barley on Dec. 1 followed by Dec.15 in the first season and by sowing barley on Dec.15 followed by Dec.1 in the second season.

No significant differences were observed between sowing barley on Dec.1 and Dec.15. Therefore the best sowing date for barley under this condition ranged between (Dec.1 to Dec.15) .The decrease in grain yield due to delaying sowing date up to Jan.1 resulted in depression in grain yield

reached (19% and 18%) for the first and the second season compared to growing barley in Dec.15 . As well the decrease in grain yield due to delaying sowing date up to Jan .15 reached (33% and 34%) . It could be observed that early sowing (Dec.1-Dec.15) had a longer period for flowering and grain filling which consequently resulted the higher grain weight intern higher grain yield . Also, it might be attributed to the favorable effects of early sowing dates on increasing number of spikes /m^2,number of grains/spike and weight of kernels / spike . Similar results were obtained by Megahed et . al. (2002) .The highest biological and straw yields were recorded by early sowing on Dec.1 in the first season and on Dec.15 in the second season but the lowest yields were obtained by sowing on Jan.15 in the two seasons .

The rate of solar energy converted in chemical energy in plant sown early at December could be higher than those when plants sown late at January .Early sowing caused increase in plant height, spike length and number of spikes /m^2 which consequently gave higher straw and biological yields while on the late sowing at January, the plants finish their life cycle early, so the growth process is terminated early and the growth attributes were negatively affected compared to those of the early sowing . Similar results were obtained by Mahmoud (1992).

Table 5. Interaction effects of sowing dates and barley genotypes on some plant characters in 2002 /2003 and 2003 /2004 growing seasons .

Treat.	No . grain / spike		weight of kernels/ spike		Grain yield Kg/fed.		Straw yield Kg/fed.		Biological yield Kg/fed.	
	1st season	2nd season	1st season	2nd season	1st season	2nd season	1st season	2nd season	1st season	2nd season
SD1xG1	23.6	24.0	1.53	1.40	1700	2550	5900	3715	7600	6265
SD1xG2	27.0	26.3	1.45	1.69	2372	2944	7394	4587	9766	7531
SD1xG3	25.3	26.3	1.63	1.63	2109	2750	7872	4387	9981	7137
SD1xG4	31.3	30.0	1.0	1.20	2485	2445	7181	3993	9666	6438
SD1xG5	23.6	24.3	1.44	1.15	1846	2328	8772	6671	10618	9000
SD2xG1	22.3	26..3	1.27	1.68	2058	2875	5788	3104	7846	5979
SD2xG2	26.0	26.6	1.28	1.56	1866	3273	6300	4789	8166	8063
SD2xG3	27.3	27.6	1.53	1.75	1992	3012	6674	5322	8666	8335
SD2xG4	28.0	31.0	1.14	1.19	1894	2636	7705	4946	9851	7612
SD2xG5	24.0	27.3	1.32	1.42	2107	2367	8040	8371	10148	10738
SD3xG1	22	25.0	1.25	1.38	1713	2449	4687	3130	6400	5580
SD3xG2	24.6	24.0	1.22	1.55	1898	2652	6007	3667	7905	6320
SD3xG3	25.0	25.3	1.42	1.73	1832	2561	5806	4602	7638	7163
SD3xG4	27.6	29.0	0.84	1.14	1531	2050	5801	4358	8333	6408
SD3xG5	23.0	21.6	1.08	1.09	1061	2016	4454	5962	5516	7979
SD4xG1	22.6	22.3	1.25	1.19	1211	2340	3321	2835	4523	5175
SD4xG2	24.0	23.3	1.21	1.30	1815	2242	4843	3345	6658	5589
SD4xG3	25.3	24.0	1.28	1.43	1540	1994	4934	5000	6475	7002
SD4xG4	23.6	26.3	0.72	1.55	1263	1351	6160	5055	7424	6406
SD4x4G5	21.3	22.3	1.16	1.03	871	1511	5379	7869	6250	9380
L.S.D 5%	2.9	N.S	0.15	N.S	356	N.S	1439	N.S	1342	N.S

Bweet barley cv. (G 4) exceed the other genotypes in number of kernels /spike for the two seasons . Differences among genotypes were recorded previously by Saleh (2000).. Giza 128 barley cv. gave the heaviest number kernels /spike for the two seasons. With this respect EL-Hag (2001) found that Giza 128 barley cv. gave the heavies kernels compared with Bweet , Derkada , Sharm and Marsi barley varieties.

Giza 127 produced the higher grain yield in both seasons. It could be attributed this result mainly to the genetic background of each cultivar as well as its interaction with environmental factors . These results are in harmony with those obtained by Afifi (1999) . Barley cv. Bweet gave the highest biological and straw yields in the first season but Sharm cv. gave the highest yield in the second season .

Data in (Table 5) show the effect of the interaction between sowing dates and genotypes on no . grains /spike , weight of kernels / spike, grain yield, straw yield and biological yield .

The effect of the interaction among sowing dates and genotypes reached the level of significance with no .grains /spike ,kernel weight of spike , grain yield ,straw yield and biological yield in the first season only .

As shown in (Table 5) Bweet barley cv. gave the highest kernels /spike and highest grain yield with sowing early on Dec. 1 , also the heaviest kernels weight were produced by Giza 127 with sowing early Dec.1,while the highest biological and straw yields were obtained by sowing Sharm barley cv. earley on Dec.

CONCLUSION

It could be concluded from this study that barley as winter cereals crop is suitable to utilize the areas which escaped from the suitable sowing date for winter crops(wheat or berseem) as a result of delaying harvesting the preceding late summer crops as potato.

REFERENCES

Acevedo, E. (1991) . Morphphysiological traits of adaptation of cereals to Mediterranean environments .Proceeding of the ICARDA-INIA Symposium Cordoba,Spain .PP 85-95

Afifi , H.A.A. (1999). Evaluation of some barley genotypes to drought tolerance.M.Sc . Thesis , Fac. Agrc. ,AL-Azhar Univ., Egypt .

Austin, R.B and P.Q. Craufurd (1989).The ecophysiology of barley .Proceeding of an International Symposium 6-10 March 1989,Tunis .

Cromack , H.T.H. and A.N.D.Clark (1987). Winter wheat and winter barley . the effect of seed rate and sowing date on grown Quality.Aspects of Applied BiologNo.15.

EL-Sayed, A.A., A.A. Mansour, M.A. EL-Moselhy and A.M.Orabi (1998). Effect of sowing date and seeding rate on barley production in the New Valley, J.Agric Sci.,Mansoura Univ.,Vol.23(2):633-641 .

El-Hag, A.A. (2001) Agronomic studies on barley .Ph.D Thesis, Fac. Agric. Mansoura University.

Hefnawi , F.A.M.(1993).Effect of different sowing and harvesting dates on yield and yield components of some new released wheat cultivars. M. Sc .Thesis , Fac . Agric., AL-Azhar Univ., Egypt .

Ikononmi, A.K. (1972) . Effect of time of cultivation on malting barley .Buletime Shklencave Bujesori, 11 (3) , 1972 (C.F. filed crop Abst . 28 (3) ,1975).

Jadav, B.K.and B.S. Jadon (1987) . Path analysis in wheat under different sowing dates . wheat In formation Service No. 64, (1987) .

Mahmoud, M.A.H. (1992). Effect of sowing dates and time of nitrogen application on some wheat and barley varieties .Ph .D .Thesis , Fac. Agric., Minia Univ.

Megahed, M.A, M.A. EL-Mosalhy and A.A.EL-Sayed (2002). Effect of sowing dates and N,P fertilization on vegetative growth and yield of two Hull-less Barley genotypes in sandy soils. Egypt .J. Appl. Sci, 17 (11)162-176.

Saleh, M.E. (2000). Effect of seeding rate on yield , yield component and some agronomic characters of two wheat cultivars. J. Agric Sci., Mansoura Univ ., 25 (3) :1467-1473 .

Singh, K.P. and V. Kumar (1981) . Water use efficiency of wheat and barley in relation to seeding dates , levels irrigation and nitrogen fertilization .Agric . water Management , 3 : 305 - 316.

Steel, R.G.D. and J.H. Torrie (1980). Principles and procedures of statistics 2nd ed . Mc Gaw-Hill Book Co., Inc . New York , 633pp . 1973 .(C.F. Field crop Abst., 27 (11) ,1974) .

دراسة مواعيد الزراعة المتأخرة للشعير لاستغلال الأراضي المروية بعد المحاصيل الصيفية المتأخرة

محمود أمين المصيلحى

قسم بحوث الشعير- معهد بحوث المحاصيل الحقلية- مركز البحوث الزراعية

أقيمت تجربتان حقليتان بمحطة البحوث الزراعية بالجميزة - غربية (وسط الدلتا) خلال موسمى ٢٠٠٢/٢٠٠٣ , ٢٠٠٣/٢٠٠٤ لدراسة تأثير مواعيد الزراعة المتأخرة على المحصول ومكوناته لخمس تراكيب وراثيه من الشعيرو كان تصميم التجربة هو تصميم القطع النشقة مرة واحدة فى ثلاث مكررات وقد إشتملت القطع الرئيسة على أربع مواعيد زراعة هي ١ ديسمبر ، ١٥ ديسمبر ، ١ يناير و ١٥ يناير وإشتملت القطع الشقية على خمس تراكيب وراثيه.

تضمنت الدراسة الصفات التالية : ميعاد طرد السنابل، ميعاد النضج ، طول النبات، طول السنبلة ، عدد السنابل/ م٢، عدد حبوب السنبلة، وزن حبوب السنبلة، محصول الحبوب ، محصول القش و المحصول البيولوجي .

ويمكن تلخيص أهم النتائج فيمايلى :-

كان لكل من مواعيد الزراعه والتراكيب الوراثية تأثير معنوى على كل من محصول(الحبوب، القش و البيولوجى) . و كذلك بعض الصفات الاخرى . بلغت أعلى قيم لمحصول (الحبوب، القش ، البيولوجى) عندما زرع الشعير فى ميعاد زراعه من ١ - ١٥ ديسمبر و أدى تأخير زراعه الشعير الى ١ يناير الى نقص محصول الحبوب بنسبه حوالى ١٩% عند المقارنه بالزراعه فى ١٥ ديسمبر وكذالك أدى التأخير إلى ١٥ يناير إلى نقص المحصول بنسبه ٣٤% عند المقارنه بالزراعه فى ١٥ ديسمبر

أعطى صنف الشعير جيزه ١٢٨ اعلى قيم لطول النبات و وزن حبوب السنبله .

وأعطى الصنف جيزة ١٢٧ أعلى قيم لعدد السنابل بالمتر المربع ومحصول الحبوب.

الخلاصة :

يمكن إستغلال الأراضى التى هربت من زراعة المحاصيل الشتوية نتيجة تأخر حصاد المحصول الصيفى السابق (بطاطس) بزراعتها بمحصول الشعير وذلك لزيادة أنتاج الحبوب .