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Vegetative Growth of Onion Sets as Affected by Seeding Rate and Planting Date Under Assiut Conditions *

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Abstract:

Field experiments were carried out on the clay soil of the Experimental Farm, Faculty of Agriculture, Assiut University, Assiut in two consecutive winter seasons 2007-2008 and 2008-2009. The aim of this investigation was to study the effects of three planting dates and three seeding rates in cv. Giza 6 on yield and quality of onion sets under Assiut conditions.

The obtained results indicated that the minimum average plant length was recorded for January 1st planting, and maximum plant length was found with planting on November 1st in both seasons and sampling dates. Sowing rate of 30 kg/fed of onion seeds gave significantly the tallest onion plants. Average bulb diameter increased significantly with earlier planting compared with later planting. Lower seeding rate gave significantly the biggest average bulb diameter. The authenticity bulb was obtained from planting on December 1st in the second sampling date (105 days). However, no true bulb was obtained from any planting date in the first sampling date (75 days) in both seasons. Lower seed rate (30 kg/feddan) significantly gave the truth bulb in both seasons.

Introduction

Onion (*Allium cepa L.*) is one of the most important vegetable crops grown in Egypt not only for local consumption but also fore exportation. Onion is grown in more than 135 countries in the world producing 29.3 billion kilograms onion bulbs each year. Sets are typically weighing 2-3 g fresh, produced by growing a crop from seed sown at the very high density of 1000-2000 plants/m^2. The production of onion from sets has traditionally been performed in the Upper Egypt regions of Beni Suef, Menia, Sohage and Assiut and to a minor extent in a few scattered localities in the Lower Egypt like Kalubia, Dakahliya and Gharbia (El-Amir, 1981 and Awad, 1983).

Bulb sets, small bulbs about

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2–3 cm in diameter, are sometimes used for planting onions during the late fall through winter (October through December). Sets are grown in field nurseries by seeding thickly (20–3o kg seed per feddan) in rows 60 cm apart. About 300–350 kg/fed of sets 2–3 cm in diameter is required. Generally, seeds for the production of sets are sown in December through March to help ensure that the young seedlings will be exposed to the longest days possible during their two-to-three-leaf stage. About 8–12 weeks after sowing, the small bulbs are harvested, cured, and maintained in a shaded, well ventilated area (Brewster, 1994).

The onion cultivated area in Egypt in 2007 was 202385 feddan (4200 m^2) and the total production was about 1050000 tons*. However, in 2008, it came down to 125917 feddan but the total production was increased to 1728417 tons. This high decrease in area and increasing in production demand a high attention in onion agricultural practices like fertilization, irrigation, new cultivars introducing and pest control. (*FAO Production Year Book Vol. 60, 2010)

Onion in Egypt is planted between mid-August and December. Bulbing on onion is controlled by the day length and temperature to which growing onion plants are exposed before bulbing begins. Bulbing requires long photoperiods and warm temperatures (Steer, 1980).

Yield of onions is the result of the plant density and the mean size of onions. However, with increasing plant density the proportion of small bulbs will increase (Bleasdale, 1966; Hatridge-Esh and Bennett, 1980; Chapman, 1981). From low plant densities a high proportion of large bulb size will result, but at the cost of a lower total yield (Frapell, 1973).

The purpose of present studies was to get the desirable size of onion set by sowing the seed on different dates and different seed rates, so that diameter of set may be reduced to a desirable size.

Materials and Methods:

Field experiments were carried out in the clay soil of the Experimental Farm, Faculty of Agriculture, Assiut University, Assiut, in two consecutive winter seasons of 2007/2008 and 2008/2009. The aim of this investigation was to study the effects of four planting dates and three seeding rates in cv. Giza 6 on the yield and quality of onion sets under Assiut conditions.

Experimental factors:-

1- Planting dates:

The three planting dates were November 1st, December and 1st, January1st in both seasons. Unfortunately, seeds planted in the last date, February 1st, failed to germinate in the two seasons. Therefore, from this point onwards, we will only mention the

results of the first three sowing dates.

2- Seeding rates (plant density):

The three tested seeding rates were 30, 45 and 60 kg/fed at the rate of 7.5, 11.25 and 15 g/m^2, respectively.

In each season, the experiment consisted of 9 treatments, which included the combination of 3 seeding rates in 3 planting dates. The three planting dates and the three seeding rates were arranged in the field as a split plot design in randomized complete block design with four replicates according to Snedecor and Cochran (1986). The three planting dates were in the main plots, while seeding rates were randomly distributed to the sub-plots. Each sub-plot (10.5 m^2) consisted of 5 ridges each of 3.5 meters in length and 0.6 meter in width forming a plot area of about 10.5 m2 equal to ($\frac{1}{400}$ Fed). Ridging direction was east-west with sowing on both ridge sides.

Levels of applied fertilizer in the field were at or slightly above the guidelines. The following amounts and types of fertilizers were applied. Local cultivation practice recommendations for control of weeds, insects and diseases were followed and were sufficient to maintain normal crop growth in each sowing date. Data on some physical and chemical properties of experimental site for the two seasons 2007-2008 and 2008-2009 are shown in Table (1).

Table 1: The physical and chemical properties of the soil used for growing onion plants in the two seasons.

Year	Sand %	Silt %	Clay %	Texture	pH 1:1	ECe dS/m	Total CaCO3 %	Total N %	Available nutrients ppm				
									P	K	Fe	Mn	Zn
2007-2008	19.3	31.0	49.7	Clay	7.80	1.42	3.13	1.80	16.4	354	9.7	10.3	1.2
2008-2009	21	29.2	47	Clay	7.5	1.1	3.5	1.72	12.2	325	8.6	12	1.5

Data of maximum and minimum temperatures (°C) for the two seasons (2007/2008 and 2008-2009) that prevailed during the experimental period are shown in Figs. 1and 2, respectively.

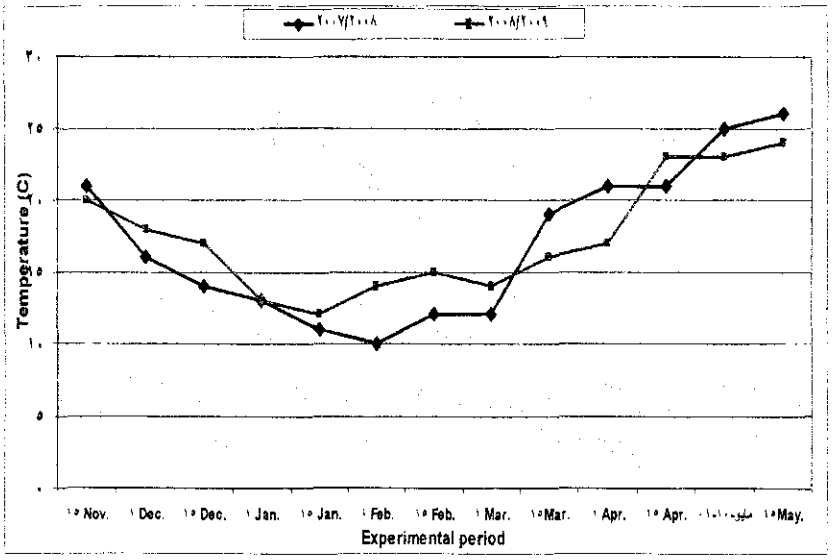

Fig. (1): Average daily temperature (°C) during the two seasons of 2007/2008 and 2008/2009. (With permission of Assiut University Agricultural Meteorological Station)

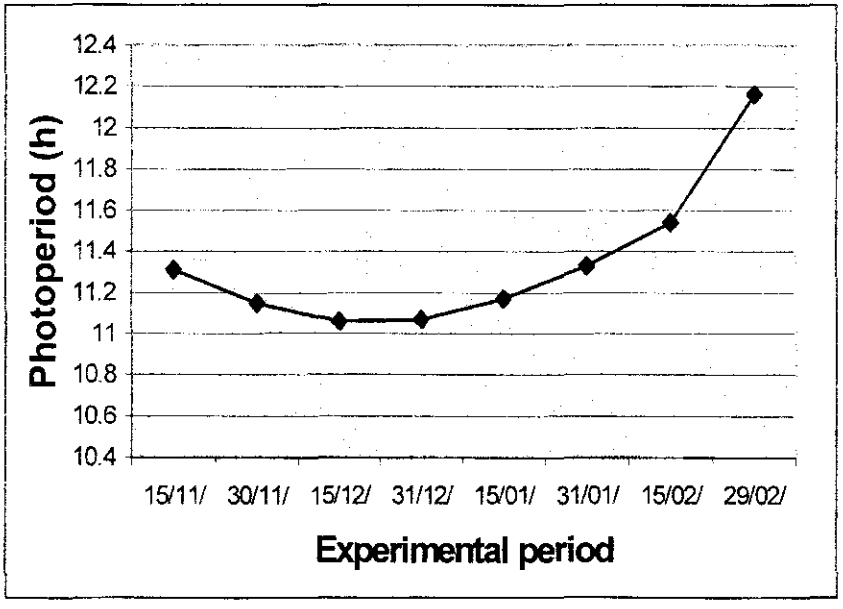

Fig. (2) Average photoperiod (h) prevailed during the experimental period of all tested planting dates of the study.

General observation and measurements:

The following characters were measured in two samples at 75 and 105 days from planting date. A random sample of 10 plants from the second ridge of each sub-plot was taken.

The following data were recorded in the two seasons.

Plant morphological measurements:

1- Vegetative characters:

1. Average plant height (cm).

The length of 10 randomly selected plants was measured from the bulb base to the tip of the leaf blade in each treatment and average was calculated.

2. Average bulb diameter (cm). The diameter of 10 randomly selected bulbs in each treatment was measured and average was calculated.

3. Average neck diameter (cm). Neck diameter of 10 randomly selected bulbs in each treatment was measured and average was calculated.

4. Bulbing ratio. Measured according to Mann's study (1952), using the following formula.

$$\text{Bulbing ratio} = \frac{\text{Neck diameter (cm.)}}{\text{Bulb diameter (cm.)}}$$

5. Average leaves number per plant.The number of leaves of 10 randomly selected plants in each treatment was counted and average was calculated.

6. Average plant fresh weight (g)

Statistical analysis

Data were subjected to statistical analysis according to Gomez and Gomez (1984). Significance among means was tested using the LSD range test.

Results and Discussion

1.Average plant height (cm)

Data of the influence of planting date and seeding rate treatments on plant height are presented in Table (2) for 2007/2008 and 2008/2009 seasons. Plant height average overall mean of the three plant densities decreased with delay in planting date, so that the minimum average plant length was recorded for January 1st planting, and maximum plant length was found with planting on November 1st in both seasons and sampling dates (after 75 and 105 days from planting). These results agree with those of Rajesh *et al.* (2003a) who found that sowing on December resulted in the greatest plant height, foliage weight, bulb weight and diameter, number of large (>5-10 g) sets and total bulb yield; these parameters decreased with the delay in sowing. Gupta *et al.* (1999) who reveled that earlier sowing dates which had done on 25 December and 15 January recorded taller plants than sowings done in February.

Seed rates also varied significantly in their overall mean average plant height in the second sampling date (105 days) but in the second season only. Sowing rate of 30 kg/fed of onion seeds gave significantly the tallest onion plants (41.3 cm) as compared with the other two seeding rates (45 and 60 kg/fed)

which produced shorter plants (37.9 and 38.9 cm, respectively). Opposite findings were recorded by Gupta *et al.* (1999) who reported that higher seed rates of 30 and 45 g/m^2 resulted in taller plants than the lower seed rates of 15 g.

The interaction between sowing dates and seeding rates treatments did not significantly affect the average plant height in either season or any sampling date.

Table 2: Average plant height (cm) after 75 and 105 days from planting as affected by the three planting dates and the three seeding rate treatments during the two winter seasons of 2007/2008 and 2008/2009.

Planting Dates (A)	Seeding rates (B)			Mean
	30 kg	45 kg	60 kg	
After 75 Days				
2007-2008				
November 1st	33.435	31.995	33.315	32.915
December 1st	29.253	30.210	31.200	30.221
January 1st	25.595	25.302	25.027	25.308
Mean	29.427	29.169	29.847	29.481
2008-2009				
November 1st	36.333	35.743	36.860	36.312
December 1st	27.490	29.265	28.165	28.307
January 1st	25.925	26.915	27.115	26.652
Mean	29.916	30.641	30.713	30.423
After 105 Days				
2007-2008				
November 1st	45.592	47.307	45.820	46.240
December 1st	35.215	37.545	37.395	36.718
January 1st	25.538	24.325	23.760	24.541
Mean	35.448	36.392	35.658	35.833
2008-2009				
November 1st	52.608	49.247	50.670	50.842
December 1st	40.290	36.527	36.375	37.731
January 1st	30.960	28.005	29.740	29.568
Mean	41.286	37.927	38.928	39.380

L. S. D. 0.05

	2007/2008		2008/2009	
	75 Days	105 Days	75 Days	105 Days
A – Planting date	**0.94**	**1.26**	**1.45**	**2.47**
B – Seeding rate	**N.S.**	**N.S.**	**N.S.**	**2.24**
Interaction (A x B)	**N.S.**	**N.S.**	**N.S.**	**N.S.**

2. Average bulb diameter (cm)

Average bulb diameter, as an average of all tested seeding rates, was significantly affected by planting date during the two seasons of the study (Table 3).

In the first sampling date (after 75 days from planting) average bulb diameter was significantly affected by planting date in the second season only. However, in the second sampling date (105 days) significant differences were recoded in the first season. Average bulb diameter increased significantly with earlier planting (November 1st) compared with later planting (December1st and January 1st) in the first sample. On the other hand, December 1st planting date gave significantly the highest average bulb diameter in the first season when it measured after 105 days from planting. Moreover, later planting dates (January 1st) gave significantly the lowest average bulb diameter in the second sample. The same trend was also recorded in the second season in spite of the insignificant differences. These results agree with those reported by Rajesh *et al.* (2003a) who found that sowing on December resulted in the greatest plant height, foliage weight, bulb weight and diameter, number of large (>5-10 g) sets and total bulb yield; these parameters decreased with the delay in sowing. The same was also found by Ansari (2007) who reported that sowing date had a significant effect on the bulb size.

Seeding rates also varied significantly in their overall mean average bulb diameter. Seed rate of 30 kg/fed in the first sampling date (75 days) in the second season and the second sampling date (105 days) in both seasons gave significantly the highest average bulb diameter. Moreover, the higher seed rate 60 kg/fed gave significantly the lowest average bulb diameter and average bulb diameter increased up to 75 days from planting. The same was recorded by Rajesh *et al.* (2003b) who revealed that bulb weight and bulb diameter increased up to 106 days after planting (when the last observation was taken). Both these parameters decreased with the increase in seed rate

The interaction between sowing dates and seeding rates treatments was not significantly affected by average plant height in either season or any sampling date.

Table 3: Average bulb diameter (cm) after 75 and 105 days from planting as affected by the three planting dates and the three seeding rate treatments during the two winter seasons of 2007/2008 and 2008/2009.

Planting Dates (A)	Seeding rates (B)			Mean
	30 kg	45 kg	60 kg	
After 75 days				
2007-2008				
November 1st	0.522	0.505	0.525	0.518
December 1st	0.517	0.520	0.522	0.520
January 1st	0.555	0.490	0.515	0.520
Mean	0.532	0.505	0.521	0.519
2008-2009				
November 1st	**0.573**	**0.515**	**0.535**	**0.541**
December 1st	**0.523**	**0.515**	**0.507**	**0.515**
January 1st	**0.555**	**0.510**	**0.488**	**0.518**
Mean	**0.550**	**0.513**	**0.510**	**0.524**
After 105 Days				
2007-2008				
November 1st	1.485	1.343	1.198	1.342
December 1st	1.500	1.330	1.363	1.398
January 1st	0.920	0.858	0.782	0.853
Mean	1.302	1.177	1.114	1.198
2008-2009				
November 1st	1.607	1.333	1.082	1.341
December 1st	1.498	1.292	1.015	1.268
January 1st	1.365	1.120	1.107	1.198
Mean	1.490	1.248	1.068	1.269

L. S. D. 0.05

	2007/2008		2008/2009	
	75 Days	105 Days	75 Days	105 Days
A – Planting date	**N.S.**	**0.17**	**0.01**	**N.S.**
B – Seeding rate	**N.S.**	**0.09**	**0.02**	**0.17**
Interaction (A x B)	**N.S.**	**N.S.**	**N.S.**	**N.S.**

3. Average neck diameter (cm)

As shown in Table (4) planting dates and seeding rates had a significant effect on average neck diameter in 2007/2008 and 2008/2009 seasons. The highest average neck diameter was obtained from the earlier planting date (November 1st) which gave significantly the highest average neck diameters regardless the season or the sampling date while January 1st gave the lowest record.

Average neck diameter was significantly affected by seeding rate treatments except in the first

season with the first sampling date after (75 days from planting) Lower seed rate (30 kg/fed) gave significantly the highest average neck diameter in both sampling dates except in the first season of the first sampling date.

There was insignificant interaction between planting dates and different seeding rate treatments in both seasons and both sampling dates except in the first season after 105days from planting. Planting on November 1st with the lower seeding rate (30 kg/fed) gave significantly the greatest neck diameter (0.953 cm), however, planting on January 1st with either 45 or 60 kg/fed gave significantly the smallest average neck diameter (0.285cm in both seeding rates).

Table 4: Average neck diameter (cm) after 75 and 105 days from planting as affected by the three planting dates and the three seeding rate treatments during the two winter seasons of 2007/2008 and 2008/2009.

Planting Dates (A)	Seeding rates (B)			Mean
	30 kg	45 kg	60 kg	
After 75 Days				
2007-2008				
November 1st	0.395	0.391	0.383	**0.390**
December 1st	0.373	0.386	0.358	**0.372**
January 1st	0.351	0.328	0.336	**0.338**
Mean	**0.373**	**0.368**	**0.359**	**0.367**
2008-2009				
November 1st	0.425	0.400	0.392	**0.406**
December 1st	0.353	0.353	0.358	**0.354**
January 1st	0.375	0.330	0.292	**0.332**
Mean	**0.384**	**0.361**	**0.347**	**0.364**
After 105 Days				
2007-2008				
November 1st	0.953	0.907	0.813	**0.891**
December 1st	0.465	0.435	0.406	**0.435**
January 1st	0.297	0.285	0.285	**0.289**
Mean	**0.572**	**0.543**	**0.501**	**0.538**
2008-2009				
November 1st	0.703	0.587	0.603	**0.631**
December 1st	0.625	0.562	0.482	**0.557**
January 1st	0.528	0.413	0.400	**0.447**
Mean	**0.618**	**0.521**	**0.495**	**0.545**

L. S. D. 0.05

	2007/2008		2008/2009	
	75 Days	**105 Days**	**75 Days**	**105 Days**
A – Planting date	0.02	0.04	0.01	0.06
B – Seeding rate	N.S.	0.03	0.02	0.05
Interaction (A x B)	N.S.	0.05	N.S.	N.S.

4. Bulbing ratio

The effect of planting dates and seeding rates on bulbing ratio is shown in Table (5) in 2007/2008 and 2008/2009 seasons.

The term "bulbing ratio" is used in this study to describe the degree of bulbing. It is the maximum bulb diameter divided by the minimum pseudostem (neck) diameter. A bulbing ratio greater than 2.0 or less than 0.5 has frequently been taken as inductive of definite bulbing in common onion (Steer, 1980 and Mondal *et al.*, 1986).

In spite of the insignificant values in both sampling dates, results of the two seasons as an average of all tested seeding rates indicated that the authenticity bulb (0.338) was obtained from planting on December 1st in the second sampling date (105 days from planting). However, no true bulb was obtained from any planting date in the first sampling date (75 days) in both seasons.

The combination of the second season with the first sampling date (0.811) and the first season with the second sampling date (0.727) gave significantly mendacious bulbs.

Bulbing ration was significantly affected by the seeding rate treatments except in the first season when measured after 105 days from planting. Lower seed rate (30 kg/fed) significantly gave the truth bulb in both seasons in the second sampling date, in spite of the insignificant values in the second season.

There was insignificant interaction between planting dates and different seeding rate treatments except in the second season after 105 days from planting. Planting on November 1st with the higher seeding rate (60 kg/fed) gave significantly the greatest bulbing ratio values (0.592), however, planting on January 1st with either 30, 45 or 60 kg/fed gave significantly the lowest values of bulbing ratio (0.475, 0.465 and 0.428 in 30, 45 and 60 kg/fed seeding rates, respectively). Its worth to mention that the earlier planting date (November 1st) delayed bulb formation in onion plants under any given seeding rates.

5. Average number of leaves per plant

The effect of planting dates and seeding rates on the average number of leaves per plant is shown in Table (6) in 2007/ 2008 and 2008/2009 seasons. The average number of leaves per plant varied significantly among the different planting dates in the first sampling date (75 days from planting) in both seasons. The maximum average number of leaves per plant was found in the earliest planting date, November 1st, (3.307 and 3.290 in the first and second seasons, respectively) and in January 1st (3.407) in the second season. However, planting on January 1st and December 1st significantly

possessed the minimum average number of leaves per plant (2.966

Table 5: Bulbing ratio after 75 and 105 days from planting as affected by the three planting dates and the three seeding rate treatments during the two winter seasons of 2007/2008 and 2008/2009.

Planting Dates (A)	Seeding rates (B)			Mean
	30 kg	45 kg	60 kg	
After 75 Days				
2007-2008				
November 1st	0.763	0.907	0.750	**0.807**
December 1st	0.752	0.755	0.708	**0.738**
January 1st	0.672	0.705	0.688	**0.688**
Mean	**0.729**	**0.789**	**0.715**	**0.744**
2008-2009				
November 1st	0.760	0.910	0.763	**0.811**
December 1st	0.690	0.690	0.700	**0.693**
January 1st	0.685	0.657	0.630	**0.657**
Mean	**0.712**	**0.753**	**0.698**	**0.721**
After 105 Days				
2007-2008				
November 1st	0.702	0.730	0.748	**0.727**
December 1st	0.328	0.355	0.330	**0.338**
January 1st	0.365	0.367	0.407	**0.380**
Mean	**0.465**	**0.484**	**0.495**	**0.481**
2008-2009				
November 1st	0.490	0.498	0.592	**0.527**
December 1st	0.465	0.492	0.518	**0.492**
January 1st	0.475	0.465	0.428	**0.456**
Mean	**0.477**	**0.485**	**0.512**	**0.491**

L. S. D. 0.05

	2007/2008		2008/2009	
	75 Days	**105 Days**	**75 Days**	**105 Days**
A – Planting date	N.S.	0.03	0.10	N.S.
B – Seeding rate	N.S.	0.02	N.S.	N.S.
Interaction (A x B)	N.S.	N.S.	N.S.	0.5

Table 6: Average number of leaves per plant after 75 and 105 days from planting as affected by the three planting dates and the three seeding rate treatments during the two winter seasons of 2007/2008 and 2008/2009.

Planting Dates (A)	Seeding rates (B)			Mean
	30 kg	45 kg	60 kg	
After 75 Days				
2007-2008				
November 1st	3.38	3.27	3.27	3.31
December 1st	3.01	3.08	2.9	3.01
January 1st	2.92	2.99	2.99	2.97
Mean	3.10	3.12	3.06	3.09
2008-2009				
November 1st	3.49	3.16	3.21	**3.29**
December 1st	2.80	2.68	3.09	**2.86**
January 1st	3.64	3.42	3.15	**3.41**
Mean	**3.31**	**3.09**	**3.15**	**3.18**
After 105 Days				
2007-2008				
November 1st	3.28	2.90	2.90	**3.02**
December 1st	2.97	2.82	2.74	**2.85**
January 1st	3.21	2.94	3.01	**3.05**
Mean	**3.15**	**2.89**	**2.89**	**2.97**
2008-2009				
November 1st	3.52	3.31	2.96	**3.26**
December 1st	3.66	3.24	2.94	**3.28**
January 1st	4.03	3.48	3.17	**3.56**
Mean	**3.74**	**3.34**	**3.02**	**3.37**

L. S. D. 0.05

	2007/2008		2008/2009	
	75 Days	105 Days	75 Days	105 Days
A – Planting date	0.16	N.S.	0.16	N.S.
B – Seeding rate	N.S.	0.32	0.16	0.17
Interaction (A x B)	N.S.	N.S.	N.S	N.S

and 3.008, respectively) in the first season.

The average number of leaves per plant was significantly affected by seeding rate treatments except in the first season when measured after 75 days from planting. The Lowest seed rate (30 kg/fed) significantly gave the highest average number of leaves per plant in both seasons with the second sampling date and in the second season only with first sampling date.

The same trend was also found in spite of the insignificant values recorded in the first season with sampling measured after 75 days from planting.

There was insignificant interaction between planting dates and different seeding rate treatments on average number of leaves per plant in both seasons.

6. Average plant fresh weight (g)

Data of the influence of planting date and seeding rate treatments on average plant fresh weight are presented in Table (7) for 2007/2008 and 2008/2009 seasons.

The average plant fresh weight varied significantly among the different planting dates in the two sampling dates (75 and 105 days from planting) in both seasons. November 1st, as an early planting date, gave significantly the highest average plant fresh weight in both seasons regardless the sampling date. On the other hand, the average plant fresh weight significantly decreased with delaying planting date beyond November 1st in all sampling dates or both seasons.

The average plant fresh weight was significantly affected by seeding rate treatments except in the first season after 75 days from planting. The lowest seed rate (30 kg/fed) significantly gave the heaviest average plant fresh weight. In spite of insignificant values in the first season in sampling measured after 75 days from planting, the same trend was recorded. Moreover, the highest seeding rate (60 kg/fed) gave significantly the lightest average plant fresh weight in both seasons and sampling dates except in the first season with measurements taken after 75 days from planting. These results agree with those reported by Anant *et al.* (2003) who found that the maximum fresh weight of the whole plant (13.48 g) and the roots (1.09 g) was obtained at a lower seed rate of 10 g/m^2.

There was insignificant interaction between planting dates and different seeding rate treatments on number of leaves plant in both seasons.

Table 7: Average plant fresh weight (g) after 75 and 105 days from planting as affected by the three planting dates and the three seeding rate treatments during the two winter seasons of 2007/2008 and 2008/2009.

Planting Dates (A)	Seeding rates (B)			Mean
	30 kg	45 kg	60 kg	
After 75 Days				
2007-2008				
November 1st	2.82	2.46	2.40	**2.56**
December 1st	2.12	2.17	2.11	**2.13**
January 1st	1.46	1.60	1.34	**1.47**
Mean	**2.14**	**2.08**	**1.95**	**2.05**
2008-2009				
November 1st	4.05	3.20	3.02	**3.43**
December 1st	2.11	2.21	2.30	**2.21**
January 1st	2.16	1.86	1.41	**1.81**
Mean	**2.78**	**2.42**	**2.25**	**2.48**
After 105 Days				
2007-2008				
November 1st	10.99	8.53	6.60	**8.71**
December 1st	6.74	5.85	5.26	**5.95**
January 1st	1.71	1.49	1.23	**1.48**
Mean	**6.48**	**5.29**	**4.37**	**5.38**
2008-2009				
November 1st	14.53	9.87	7.85	**10.75**
December 1st	10.28	8.27	4.56	**7.70**
January 1st	5.73	3.74	3.78	**4.42**
Mean	**10.18**	**7.29**	**5.40**	**7.62**

L. S. D. 0.05

	2007/2008		2008/2009	
	75 Days	**105 Days**	**75 Days**	**105 Days**
A – Planting date	0.25	1.65	0.41	1.50
B – Seeding rate	N.S.	1.11	0.38	1.74
Interaction (A x B)	N.S.	N.S.	N.S.	N.S.

References

Anant-Bahadur; Raghavendra-Singh 2003. Effect of seed rate on seedling growth and bulb production of onion. Farm-Science-Journal. 2003; 12(1): 77-78

Ansari,-N-A 2007 Effect of density, cultivars and sowing date on onion sets production. Asian-Journal-of-Plant-

Sciences. 2007; 6(7): 1147-1150

Awad, El-S.A. 1983. Studies on production of onion (Allium cepa L.) from dry-sets. Ph.D. Thesis, Fac. Agr., Univ. Assiut, Egypt.

Bleasdale, J.K.A., 1966. The effect of plant spacing on the yield of bulb onions (Allium cepa L.)grown from seed. J. Horti. Sci. 41, 145±153.

Brewster, J.L. 1994. Onion and other vegetable Alliums. Univ. Press, Cambridge, MA. Cotner, S., J. Parsons, J. Johnson, and C. Cole. 1996. Onion planting.

Chapman, E.A., 1981. Methods of analysing yield from trials in which the produce is graded according to diameter. J. Agric. Sci. 97, 55±68.

El-Amir, M.S. 1981. The use of seeding and planting machines for onion crop production. Dr.Sc. Thesis, Fac. Agr. Univ. Cairo, Egypt.

Frapell, B.D., 1973. Plant spacing of onions. J. Horti. Sci. 48, 19±28..

Gomez, K.A. and A.A. Gomez. 1984. Statistical procedures for Agricultural Research. 2nd (ed.). John Wily & Sons. New York, pp. 680.

Gupta,-R-S; Bhutani,-R-D; Khurana,-S-C; Thakral,-K-K 1999 Effect of sowing time and seed rate on the production of onion setts for kharif crop. Vegetable-Science. 1999; 26(2): 137-139

Hatridge-Esh, K.A., Bennett, J.P., 1980. Effects of seed weight, plant density and spacing on yieldresponses of onion. J. Horti. Sci. 55, 247±252.

Mann, L.K. 1952: Anatomy of the garlic bulb and factor affecting bulb development. Hilgardia, 21: 195-228.

Rajesh-Kumar; Khurana,-S-C; Bhutani,-R-D; Bhatia,-A-K; Dudi,-B-S (2003a) Effect of sowing time on kharif onion (Allium cepa L.) set production. Haryana-Journal-of-Horticultural-Sciences. 2003; 32(1/2): 134-137

Rajesh-Kumar; Khurana,-S-C; Bhutani,-R-D; Bhatia,-A-K; Dudi,-B-S 2003b Effect of seed rate on kharif onion (Allium cepa L.) sets production. Haryana-Journal-of-Horticultural-Sciences. 2003; 32(1/2): 134-137

Sendcore, C.W. and W.G. Cochran 1986. " Statistical Methods" 6th ed. Iowa Univ. Press, Ames, Iowa, USA.

Steer, B. T. 1980. The bulbing response to day-length and temperature of some Australian cultivars of onion (Allium cepa L.). Aust. J. Agric. Res. 31:511-518.

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النمو الخضري لبصيلات البصل وتأثره بمعدل التقاوي وموعد الزراعة تحت ظروف محافظة أسيوط

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الملخص:

أجريت هذه الدراسة بمزرعة التجارب البحثية – كلية الزراعة – جامعة أسيوط وذلك خلال موسمين زراعيين هما ٢٠٠٧/٢٠٠٨ و ٢٠٠٨/٢٠٠٩

استخدمت فى هذه الدراسة ثلاث مواعيد للزراعة (الأول من نوفمبر والأول من ديسمبر والأول من يناير) وثلاث معدلات تقاوى هى (٣٠ و ٤٥ و ٦٠ كجم/فدان) بمعدل ٧،٥ و ١١،٢٥ و ١٥ جم/للمتر المربع في الصنف جيزة ٦.

دلت النتائج المتحصل عليها على أن الزراعة المبكرة في موعد الأول من نوفمبر أدت الى زيادة طول النبات وقطر العنق والبصلة وعدد الأوراق ومتوسط وزن النبات الطازج في موسمي الزراعة بينما تأخير موعد الزراعة حتي الموعد الأخير وهو الأول من يناير ادي الي قصر طول النبات وقلة قطر العنق والبصلة وعدد أوراق النبات ومتوسط وزن النبات الطازج في كلا الموسمين. وأدت الزراعة بالكثافة النباتية المنخفضة ٣٠ كجم/فدان الي زيادة معنوية في طول النبات وقطر العنق والبصلة وعدد أوراق النبات ومتوسط وزن النبات الطازج في موسمي الزراعة. بالنسبة لمعامل التبصيل فقد أعطيت الزراعة في موعد الزراعة الثاني(الأول من ديسمبر) اقل قيمة لمعامل التبصيل . وذلك في العينة الثانية (١٠٥ يوم من الزراعة) علي العكس في العينة الأولي (٧٥ يوم من الزراعة) التي لم تعطي أي بصلة حقيقية في أي موعد زراعة في موسمي الزراعة. وأدت الزراعة بمعدل ٣٠ كجم/فدان إلي إعطاء أبصال حقيقية في الموسمين.