

Influence of Planting Date on the Production and Quality of Onion Seeds

¹M.A. El-Helaly and ²S.S. Karam

¹Department of Vegetable Crops, Faculty of Agriculture, Cairo University, Giza, Egypt

²Field Crops Research Institute, Agriculture Research Center, Egypt

Abstract: A field experiment was conducted at Experiment Station of the Faculty of Agriculture, Cairo, University, Giza Governorate during 2008/2009 and 2009/2010 seasons, to study the influence of planting date (15 November, 15 December and 15 January) on seed production of onion (*Allium cepa* L.) cv. Giza 20. Results of planting date showed significant effect for most of studied characters. The highest significant increases of scapes number/ plant, scape diameter, main scape length, umbel diameter, seed yield /plant, seed yield /fed, weight of 1000-seeds and percentage of seed germination were resulted from planting on mid of November, Meanwhile the lowest significant values were recorded with delaying planting up to mid of January. On the other hand, sprouts number/plant was not affected by planting dates. It could be concluded that the favorable planting date to produce high seed yield with best quality is mid of November for Onion Giza 20 cultivars under Giza region.

Key words: Onion • *Allium cepa* L. • Planting date • Seed yield • Seed germination

INTRODUCTION

Onion is one of the most important vegetable crops grown in Egypt either for local consumption or for export in fresh or dried condition it has good return and income for farmers, also it provide hard currency for local income. The cultivated area reached to 102703 fed. in 2010 (1 fed. = 4200 m²) and total production was 1259007 ton with an average yield of 12.633 tons /fed.(Annual Report of the Statistics and Agricultural Economics Department, The Ministry of Agriculture, Egypt), this cultivated area requires onion seeds with high-quality. Seed production is affected by many factors resulted in fluctuation in quantity of seed production and quality consequently the price of seed. Planting date is important factor affect onion seeds production and quality especially with current climate changes that affect the productivity of various agricultural crops.

Many researchers studied the impact of planting dates on onion seeds production and quality and a lot of work has been conducted but in Egypt a little information's are available on onion seeds production. Improved seed contributes substantially to enhance crop yield as high as 30% [1]. Yield and quality of onion seeds is greatly affected by the soil fertility and environmental conditions during growth and

development. Farghali [2] studied the effect of planting dates of 1st September, 1st October and 1st November, on the onion cv. Giza 20 in Egypt, he reported that on the dates of November and October compared to September, the number of umbrella in plants and number of capsules in the umbrella were significantly increased, the highest seed yield and seed thousand weight were obtained by planting in 1st September. Khodadadi [3] in Iran compared between two planting dates mid September and mid November, planting in mid September had the highest seed yield on onion Gholi Ghese variety. Amin and Rahim [4] indicated that, planting date is one of the most important factors that greatly influence the growth and yield of onion. Mostafa [5] pointed out that late planting on January associated with decreased number of seed stalk/plant, fewer number of capsules/umbel, maximum percentage of seed setting and decreased seed yield. Khodadadi [6] found that planting date had significant effect only on traits number of the plant emergence and the final height of plant and seed yield per hectare. Moreover, the highest seed yield belongs to planting date 6 of November. El-Aweel and Ghobashi [7] reported the benefits of late planting dates on increasing of onion seed production in Oman as well. Some researcher reported the benefit effects of proper planting date and medium and large motheral bulbs on onion seed yield and seed quality traits [8-10].

In the same token, Khodadadi [3] in a research in Iran on onion Gholi Ghese variety reported that planting in mid September recorded the highest seed yield. Mohamedali and Nouri [11] found that the optimum planting dates were mid-October to mid-November and high significant onion seed yield were obtained from sowing early in the winter season (November). However the decreases in seed yield with delayed planting was not significant, the reduction in seed yield as a result of late sowing was mainly a result of increased flower abortion. And reduction in seed yield with delayed sowing date were associated with reduction in plant size, umbel size and total flower number, plants of late sowing date were also subjected to adverse high temperature during March-May unfavorable for seed setting and development.

Anisuzzaman *et al.* [12] found that planting time significantly affect onion development and seed production. Ibrahim *et al.* [13] found that average number of sprouts, number of scapes and number of umbels/plant were not markedly affected by planting date. The maximum diameter of umbel and longest scape were obtained with early planting, the highest seed yield /plant was obtained from the planting of November 25th and concluded that early planting date November 25th was associated with highest seed yield with best quality.

Malik *et al.* [14] reported that the highest yield and quality of onion seed was obtained with early planting on 15th October in India. Mosleh [15] indicated that planting date had significant influence on onion growth and yield of seed production and early planting were favourable for

getting higher bulb and seed yield in Bangladesh. El-Aweel and Ghobashi [7] found that seed yield was significantly increased with planting on 10 November in this respect; the increase in seed yield due to planting on 10Nov. was mainly attributed to increase in weight of seed and number of umbels per plant and 1000 seed weight.

Therefore, this study was conducted to determine the effect of planting date on production of onion seeds and its quality.

MATERIALS AND METHODS

Field experiment was conducted at Experiment Station of the Faculty of Agriculture, Cairo University, Giza Governorate during 2008/2009 and 2009/2010 seasons, to evaluate three planting dates on onion seed production and seed quality. A complete randomize blocks (CRB) design with four replicates was adopted. Each experimental unit was 10.5 m² and consisted of 5 rows, each 3.5 m long and 0.6 m wide. Mother bulbs were planted 25 cm apart on rows. The soil of the experimental area was clay. The physical and chemical analysis of the experimental soil presented in Table 1. Agricultural practices of onion growing were followed, monthly. Means of temperature, relative humidity at Giza Governorate during onion growing seasons of 2008/2009 and 2009/2010 are listed in Table 2. The three planting dates were, planting on mid of November, mid of December and mid of January each season.

Table 1: Physical and chemical analysis of the experimental soil.

Physical analysis		Chemical analysis					
Soil texture	Clay	Ca ⁺⁺ meq/l	7.11	CO ₃ ⁻ HCO ₃ ⁻ meq/l	10.39	Fe ppm	1.13
Clay %	36.55	K ⁺ meq/l	0.31	SO ₄ ⁻ meq/l	2.42	Zn ppm	0.39
Silt %	35.31	Na ⁺ meq/l	6.1	Ec mmohs/cm	1.63	Mn ppm	0.59
Fine sand %	24.5	Mg ⁺⁺ meq/l	2.94	N ppm	30.0	Cu ppm	0.54
Coarse sand%	3.55	Cl ⁻ meq/l	3.65	P ppm	21.0	pH	7.96

Table 2: Monthly temperature (C°) and relative humidity (%) at El-Giza Governorate during 2008/2009 and 2009/2010 seasons

	Temperature (C°)			Relative humidity (%)	Temperature (C°)			Relative humidity(%)
	Max.	Min.	Mean		Max.	Min.	Mean	
	2008/2009 season				2009/2010 season			
November	25.40	14.00	19.70	63.00	28.60	17.10	22.85	63.00
December	23.20	12.00	17.60	61.30	23.60	12.10	17.85	61.30
January	21.80	9.40	15.60	59.00	22.50	10.90	16.70	59.00
February	22.90	9.80	16.35	54.00	25.00	11.50	18.25	54.00
March	24.10	13.00	18.55	55.70	27.10	13.90	20.50	55.70
April	29.30	15.20	22.25	55.00	29.60	16.00	22.80	55.00
May	31.00	18.40	24.7	51.00	33.90	19.20	26.55	51.00
June	37.40	22.10	29.75	49.30	37.00	22.70	29.85	49.30

Data Recorded: Number of sprouts/plant, number of scapes/plant, scapes diameter (mm), length of main scape (cm), number of umbels/plant, umbel diameter (mm), seed yield/plant (g), seed yield (kg/fed), 1000-seed weight (g) and seeds germination (%) was recorded according to ISTA [16], where random sample 400 seeds (4 replicates) was taken for each plot and paced on 2 layers of Watman No.102 filter paper moistened with water in Petri dishes, then incubated at 20±2 °C. Number of normal seedlings was counted at 7, 9 and 12 days from the beginning of germination test.

Data were subjected to the statistical analysis according to Snedecor and Cochran [17] and the means were compared using L.S.D. test at 5% significance level. Bartel's test before combined analysis was done according to Gomez and Gomez [18]. Combined analysis of variance over the two seasons was done according to Steel and Torrie [19].

RESULTS AND DISCUSSION

Data presented in Table 3 show that planting date not affected the sprouts number per plant either in the first and second season or combined analysis. However, Abdel El-latif [20] found that earlier planting in November or December significantly increased the number of sprouts/plant.

The highest significant value of scapes number per plant, scape diameter, main scape length, umbel number per plant and umbel diameter was obtained with early planting during mid of November. Mean while the lowest significant values were recorded with delaying planting date to Mid of January. Similar results were obtained by

Farghali [2] who found that the number of umbrella in plants and number of capsules in the umbrella were significantly increased in November and October compared to September.

Mean while, Ibrahim *et al.* [13] found that average number of sprouts, number of scapes and number of umbels/plant were not markedly affected by planting date. The maximum diameter of umbel and longest scape were obtained with early planting, the highest seed yield /plant was obtained from the planting of November 25th. Mostafa [5] pointed out that late planting on January 5 associated with decreased number of seed stalk/plant.

Seed yield per plant (Table 4) was significantly affected by planting dates on the two seasons and combined, the highest seed yield per plant was recorded with planting on mid of November. Meanwhile, the lowest seed yield was obtained by delaying planting to mid of January. Similar results were detected by Ibrahim *et al.* [13], they found that the highest seed yield per plant was detected by planting mother bulbs on November 25th, followed by planting on December 12 and December 30. Decreasing in seed yield may be due to reduce weight of 1000– seeds or decreased umbel diameter. These results are in harmony with Mostafa [5] who indicated that high temperatures during March- May unfavorable for seed setting and development.

Regarding seed yield /fed., significant markedly effect was recorded for planting dates on onion seed yield /fed. In both season, combined mean revealed that the highest significant seed yield /fed. was obtained with early planting on mid of November (Table 4). On the other hand, the lowest one was recorded with planting on mid of January.

Table 3: Effect of planting date on sprouts number /plant, scapes number /plant, scapes diameter, main scape length, umbels number /plant and umbel diameter of onion cv. Giza 20 in 2008/2009 and 2009/2010 seasons

Seasons	Planting Date	Sprouts no. /plant	Scapes no. /plant	Scapes diameter (cm)	Main scape length (cm)	Umbels no. /plant	Umbel diameter (mm)
2008/2009	Mid of November	5.35	4.80 a	2.63 a	103.37 a	4.60 a	7.15 a
	Mid of December	5.23	3.57 b	2.60 a	86.07 b	3.53 b	6.37 b
	Mid of January	4.37	3.07 b	1.97 b	77.75 c	2.85 c	5.07 c
	LSD at 0.05	NS	0.66	0.25	6.95	0.54	0.28
2009/2010	Mid of November	5.55	5.32 a	2.83 a	109.00 a	5.20 a	7.45 a
	Mid of December	5.20	4.35 b	2.43 b	94.50 b	4.17 b	6.75 b
	Mid of January	5.22	3.65 c	2.13 c	81.25 c	3.40 c	5.37 c
	LSD at 0.05	NS	0.36	0.18	7.76	0.37	0.43
Combined	Mid of November	5.45	5.06 a	2.73 a	106.18 a	4.90 a	7.30 a
	Mid of December	5.21	3.96 b	2.51 b	90.28 b	3.85 b	6.56 b
	Mid of January	4.80	3.36 c	2.05 c	79.50 c	3.12 c	5.23 c
	LSD at 0.05	NS	0.34	0.14	4.64	0.31	0.21

Table 4: Effect of planting date on seed yield /plant, seed yield (kg/fed.), Weight of 1000-seeds and Seed germination (%) of onion cv. Giza 20 in 2008/2009 and 2009/2010 seasons

Seasons	Planting Date	Seed yield /plant (g)	Seed yield (kg/fed.)	Weight of 1000-Seeds (g)	Seed germination (%)
2008/2009	Mid of November	23.65 a	422.2 a	4.675 a	94.00 a
	Mid of December	14.47 b	319.2 b	4.500 ab	89.25 b
	Mid of January	11.13 c	227.5 c	4.300 b	85.75 c
	LSD at 0.05	2.43	62.21	0.299	2.531
2009/2010	Mid of November	24.38 a	557.9 a	4.775 a	92.00 a
	Mid of December	17.45 b	423.8 b	4.400 b	84.25 b
	Mid of January	11.38 c	354.7 b	4.175 b	82.25 b
	LSD at 0.05	3.021	95.92	0.289	6.519
Combined	Mid of November	24.01 a	490.1 a	4.725 a	93.00 a
	Mid of December	15.96 b	371.5 b	4.450 b	86.75 b
	Mid of January	11.25 c	291.1 c	4.238 c	84.00 b
	LSD at 0.05	1.728	50.19	0.185	3.387

Increased of seed yield in early planting may be due the longest growth period. Farghali [2] in two years of research on the onion Giza variety in Egypt, studied the effect of planting dates on 1st September, 1st October and 1st November. He reported that on the dates of November and October compared to September, the number of umbrella in plants and number of capsules in the umbrella were significantly increased. Consequently, the highest seed yield and weight of thousand seed were obtained by planting on 1st September. The reduction in seed yield as a result of late planting was may be due to flower abortion and low seed yield per plant. Mohamedali and Nouri [11] and Ibrahim *et al.* [21] concluded that early planting on first of December is favoured for onion seed production compared with first of October or mid of January under Ismillia governorate.

Data of Weight of 1000- seed illustrated in Table 4 show that planting date had significant effect on weight of 1000-seed in the first and second seasons, means of combined indicate that the highest weight of 1000-seed was obtained with planting on mid of November. Meanwhile, the lowest value was observed with planting on mid of January, the reason for increasing 1000-seed weight may be due to more favorable environment, temperature. Also, El-Aweel and Ghobashi [7] found that seed yield was significantly increased with planting on 10 Nov. and the increase in seed yield due to planting on 10Nov. was mainly attributed to increases in weight of seed and number of umbels per plant and 1000 seed weight.

As shown in Table 4 data of seed germination percentage revealed that planting date had significant effect on this traits in both seasons, combined means

show significant effect for planting dates, the highest percentage of seed germination was obtained by planting on mid of November and lowest value was recorded with planting at mid of January. The propel reasons for increasing the percentage of seed germination in early planting may be due to the highest seed size and seed weight. Abdel El-latif [20] concluded that Germination percentage of onion seed was insignificantly decreased with delaying the date of planting from 15th November up to 15th February.

The study concluded that the favorable planting date to produce high seed yield with best quality is mid of November for Onion Giza 20 cultivars under Giza region.

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