J. Plant Production, Mansoura University, Vol. 1(8): 1153 - 1163, 2010

PERFORMANCE AND GENETIC PARAMETERS FOR SOME EGYPTIAN ONION GENOTYPES EVALUATED UNDER SOHAG CONDITIONS

Marey, R. A. and M.G. Morsy
Onion Res. Dept., Field Crops Res. Inst., Agric. Res. Center, Giza, Egypt.

ABSTRACT

This study was carried out at Shandaweel Agricultural Research Station, Sohag Governorate, Egypt, during 2007/2008 and 2008/2009 seasons to estimate mean performance, genetic variability, heritability and genetic advance (GS%) of eight genotypes of onion. These genotypes were Shandaweel 1, Giza 6 Mohassan, Giza 20 Original, Sabeeni, Shandaweel Early, Giza 20 White Flesh, Giza White and Giza Red. The highest means of plant height, number of leaves/plant, plant fresh weight were obtained by Giza Red genotype in both seasons. The highest means of plant dry weight was obtained by Giza 20 Original and Giza 6 Mohassan in the first and second seasons, respectively. The earliest genotype in maturity was Sabeeni followed by Shandaweel Early and Giza White, While Giza 20 Original and Giza Red were the latest genotypes. Giza Red genotype had the highest average total yield/fed followed by Giza 20 Original. While Sabeeni genotype had the lowest mean yield. Giza 6 Mohassan attained the highest mean of marketable yield/fed, while Giza 20 White Flesh genotype showed the highest means of average bulb weight and remained bulbs%. The lowest means of culls yield/fed, double bulbs% and bolters% were obtained by Sabeeni genotype. Total soluble solids percentage (TSS%) was not significantly affected by onion genotype. Heritability in broad sense (H^2_{bs}) ranged from 13.04 to 97.35%. The highest estimate of H^2_{bs} was obtained for culls yield followed by remained bulbs% and total yield. Percentages of genetic advance (GS%) ranged between 5.32% for bulbing ratio and 80.31% for double bulbs%. High Percentages of H^2_{bs} along with high GCV% and GS% were observed for culls yield and double bulbs%. High percentages of H^2_{bs} along with low GCV% and GS% were noticed for days to maturity and TSS%.

INRODUCTION

Onion (*Allium cepa* L.) is one of the most important vegetable crops of Alliaceae family in the world. Successful onion production depends on the selection of varieties that are adapted to different conditions imposed by different environments. Thus, evaluations of local onion genotypes have been carried out all over the world. Most of these characterizations are based either on morphological, agronomical or physical and chemical measurements. Successful bulb production in any district depends upon selecting cultivars that will grow and bulb satisfactorily under the conditions imposed by a specific environment (Jones and Man, 1963). Wide variations in bulb characteristics were observed among the cultivated genotypes by several workers. El-Kafoury *et al.* (1996) noticed that Hazera 7 cv. was the earliest in maturity, followed by other cultivars which did not show wide variations in between. The highest bulb weight, marketable and total bulb yields were produced from Composite 16 cv., whereas Composite 8 and Ben

Shemen produced the lowest means for the previous mentioned traits. The highest culls yield was obtained from Hazera 7, followed by Giza20, Behairy No Pink and Ben Shemen. Bulbs of Composite 16, Giza 20 and Behairy No Pink proved to be the best in keeping quality, while Hazera 7 was the worst one in storability. Mohamed and Gamie (1999) revealed that Giza 20 cultivar was the best in plant height, number of leaves/plant, bulb weight and total yield as compared to Shandaweel 1 and Giza 6, while, Shandaweel 1 cultivar was the best for the early bulb development. Leilah *et al.* (2003) cleared that local onion strains markedly differed in most of growth and yield characteristics. Gamie and Yaso (2007) stated that the genotypes of Giza 20 Pink Flesh, Giza 20 White Flesh and Giza 20 Original were the tallest in plant height. Giza 20 Original was the highest in total soluble solids (TSS%) among the tested genotypes, while, Giza 20 White Flesh showed the greatest potential for storage. Yaso (2007) reported that Giza 20 and Red Giza and (Giza 20 x TEYG) genotypes had the highest means for plant height and No. of leaves/plant, while Comp. 13 Oblong gave the lowest ones. Compo. 13 Ob. was the earliest in bulb maturity, while Giza 20 and Red Giza were the latest ones. Giza 20, Red Giza, (Giza 20 x TEYG) and Group of Composites were the highest in total and marketable yield and average bulb weight. Mohanty and Prusti (2001) studied the behavior of 12 varieties of onion during kharif season. They concluded that Arka Kalyan recorded the highest yield (21.06 t/ha) followed by Arka Niketan (19.64 t/ha) and Pusa Madhavi (18.96 t/ha), while Agrifound Dark Red and N 53 displayed moderately high yield of 18.06 and 17.85 t/ha, respectively. In Ghana, Abbey *et al.* (2000) grew eight short-day onion cultivars for storability assessment under natural ventilation. They recorded that physiological weight loss at the end of the 6 months of storage in all cultivars ranged from 35 to 90 percent. Rots and sprouts were generally low in the Red onion bulbs.

For starting any improvement work, information about the genetic variability in the population is a prerequisite. Mohanty (2001) revealed that moderate to high estimates of heritability, genotypic coefficient of variation (GCV) and genetic gain from selection (GS%) were recorded for weight of bulb and number of leaves/plant which could be improved by simple selection. Haydar *et al.* (2007) pointed out that among the parameters, plant height, bulb yield and bulb length were found to show high broad sense heritability. Bulb yield per hectare and number of green leaves per plant had high broad sense heritability estimates with high genetic gain. Pavlović *et al.* (2003) cleared that the phenotypic coefficient of variation (PCV) for bulb yield of onion was greater than genotypic coefficient of variation (GCV). They added that heritability confirmed that the genotypic variability was strong in the overall phenotypic variability. Yaso (2007) reported that high values of heritability, GCV%, and GS% were observed for total and marketable yield and bulb weight. While moderate to high estimates of heritability coupled with low GCV% and GS% were noticed for days to maturity.

The objectives of this work were (a) to evaluate the performance of some Egyptian onion genotypes and (b) to assess the magnitude of genetic variability, heritability and genetic advance from selection of important traits of onion.

MATERIALS AND METHODS

The present study was conducted at Shandaweel Research Station , Sohag Governorate, Egypt, during 2007/2008 and 2008/2009 seasons to evaluate the performance of eight onion genotypes and to estimate the genetic variability, heritability and expected genetic advance from selection. These genotypes were Shandaweel 1, Giza 6 Mohassan, Giza 20 Original, Sabeeni (local strain), Shandaweel Early (selected from Shandaweel 1), Giza 20 White Fresh (selected from Giza 20 Original), Giza White and Giza Red. Seeds of the eight genotypes were sown in the nursery on the 1st of September of each growing season. Transplanting was done in the 1st of November in both seasons. These genotypes are representing a diverse genetic base and all of them have maintained for a number of years in Egypt by Onion Research Section, ARC, Egypt. The soil of the experimental field was clay loam. The plot size was 2x3 m (1/700 feddan). Each plot consisted of 10 rows spaced at 20 cm with 3 m long. Seedlings within each row were spaced at 7 cm. All cultural practices concerning onion production were applied. The experimental design used in this experiment was randomized complete blocks design in three replicates.

Data recorded:

Vegetative growth characteristics:

After 120 days from transplanting, 10 randomly selected plants were taken from each plot to measure plant height (cm), number of leaves/plant, plant fresh weight (g), plant dry weight (g) and bulbing ratio. Bulbing ratio = bulb diameter (cm)/nick diameter (cm), according to Mann (1952). Number of days from transplanting to bulb maturity was counted. Maturity stage was determined based on both softening of bulb neck and 50% top-down of bulb leaves.

Bulb yield and its components:

At harvest time, all plants in the experimental plot were uprooted and the following data were recorded:

a- Total yield (ton/fed): It was calculated on basis of yield for the experimental plot in tons/fed.

b- Marketable yield (ton/fed): It was determined as the weight of single bulb yield for each experimental plot.

c- Culls yield (ton/fed): It includes bulbs of less than 3 cm diameter, doubles, bolters, off-color and scallions.

d- Average bulb weight (g): It was calculated by dividing weight of single bulbs by its number.

e- Percentage of double bulbs: It was estimated by dividing number of double bulbs by the total number of bulbs x 100.

f- Percentage of bolters: It was estimated by dividing number of bolter bulbs by the total number of bulbs x 100.

Internal bulb characteristics:

At harvest, a random sample of 10 bulbs was taken from each plot, and cross sectioned to record number of entire rings which completely encircling the growing centers and number of growing centers with one or

more contact growing points. Percentage of total soluble solids (TSS %) was determined at the end of the storage period, by using a hand refractometer.

Storageability:

Marketable yield of each plot was placed in common burlap bags and kept under normal storage conditions. Weight of remained bulbs after 180 days was recorded for each plot and divided by marketable yield x 100.

Statistical analysis:

The analysis of variance was carried out separately for each season, then a combined analysis for the two seasons was calculated (Gomez and Gomez, 1984). Significance of difference among means was tested using LSD method. Estimates of phenotypic and genotypic variance were obtained from the combined analysis for the eight genotypes. The expected mean squares were calculated according to Snedecor and Cochran (1967). Broad sense heritability (H^2_{bs}) was calculated according to Falconer (1981) as follows:

$$H^2_{bs} = б^2_g / б^2_{ph} \times 100$$

Where

$б^2_g$ is the genotypic variance = $(MS_g - Ms_{gy})/ry$

$б^2_{ph}$ is the phenotypic variance = $б^2_g + б^2_{gy} + (б^2_e/r)$

Where:

$б^2_e = MS_e$.

$б^2_{gy} = (MS_{gy} - Ms_e)/r$

r = replications

Y= years

The phenotypic coefficient of variation (PCV) was calculated as:

$$PCV = б^2_{ph} / \bar{x} \times 100$$

The genotypic coefficient of variation (GCV) was calculated as:

$$GCV = б^2_g / \bar{x} \times 100.$$

Where: $\bar{x}$ =Grand mean of all genotypes.

Predicted genetic advance under selection (GS) in absolute units and as percentage of grand mean (GS%) was computed according to Johnson *et al.* (1955) as follows:

$$GS = K \times H^2_{bs} \times б_{ph}.$$

Where: K is the selection differential and equals 2.06 at selection intensity of 5%.

$GS\% = GS/\bar{x} \times 100$

RESULTS AND DISCUSSION

Performance of genotypes:

Vegetative growth characteristics:

Results in Table (1) indicated significant differences among the eight genotypes for plant height, number of leaves/plant, plant fresh weight, plant dry weight, bulbing ratio and number of days to maturity in both seasons.

It is clear from the data that the highest means of plant height, number of leaves/plant, plant fresh weight were obtained by Giza Red genotype in

both seasons. The highest mean of plant dry weight was obtained by Giza 20 Original in the first season and by Giza 6 Mohassan in the second season. For the bulbing ratio, Shandaweel Early and Sabeeni attained the highest means in the first and second seasons, respectively. Data also revealed that Giza White gave the lowest means of plant height in the first season, and plant fresh weight and plant dry weight in both seasons. While, Sabeeni genotype gave the lowest means of number of leaves/plant in both seasons and plant height in the second season. Giza 20 Original and Giza Red attained the lowest means of bulbing ratio in the first and second seasons, respectively. The differences between onion genotypes in respect to Vegetative growth characteristics were reported by other investigators including Mohamed and Gamie (1999), Gamie *et al.* (2000), El-Damarany and Obiadalla-Ali (2005), Gamie and yaso (2007) and yaso (2007).

From data in Table (1) it could be concluded that there were a wide range among genotypes in number of days to maturity. The earliest genotypes in maturity were Sabeeni (108.00 and 100.33 days) and Shandaweeel Early (111.00 and 117.6 days). While, Giza 20 Original (133.67 and 127.33 days) and Giza Red (137.00 and 136.33 days) were the latest genotypes in the maturity. These results may be attributed to the genetic variations between genotypes in the first and second seasons, respectively. The results of this research match the results of Leilah *et al.* (2003), El-Damarany and Obiadalla-Ali (2005) and Yaso (2007) who reported that there were a wide differences among onion genotypes in respect to number of days to maturity.

Bulb yield and its components:

It is obvious from Table (2) that the differences between means of total yield/fed, culls yield/fed, bulb weight and percentage of double bulbs of the eight genotypes were significant in both seasons, while marketable yield/fed and bolters% were significantly affected by genotype in the first season only.

Data revealed that Giza Red genotype had the highest mean total yield/fed (19.09 and 18.67 t/fed), followed by Giza 20 Original (18.29 and 18.52 t/fed) with no significant differences between them in the first and second seasons, respectively. While Sabeeni genotype had the lowest means for bulb yield (14.58 and 12.72 t/fed) in the first and second seasons, respectively (Table 2). These results are in partial agreement with the findings of Mohamed and Gamie (1999). Genotypic differences in onion yield were reported by many investigators (Mohanty and Prusti, 2001; Leilah *et al.*, 2003; El-Damarany and Obiadalla-Ali, 2005 and Yaso, 2007).

Results of marketable yield indicated that the highest means were obtained from Giza 6 Mohassan (14.30 and 14.82 t/fed), while the lowest ones were obtained from Shandaweel 1 (11.90 t/fed) and Sabeeni (11.32 t/fed) in the first and second seasons, respectively. Results also indicated that Giza 20 White Flesh showed the highest means of bulb weight (109.64 and 104.37g) in the first and second seasons, respectively. These results are in partial agreement with that reported by Gamie and yasso (2007). The lowest means of culls yield, double bulb% and bolters% were obtained by Sabeeni genotype in both seasons.

T1-2

Giza 20 Original exhibited the highest means of culls yield/fed (5.65 and 5.88 t/fed) and double bulbs% (9.17 and 10.62%) while Shandaweel 1 attained the highest means of bolters% (1.08 and 0.64%) in the first and second seasons, respectively (Table 2).

Internal bulb characteristics:

Data presented in Table (3) showed that the tested genotypes exhibited significant differences in mean number of entire rings and number of growing centers in the second season only. Results revealed that Giza Red gave the highest means of number of entire rings/bulb, while Giza White gave the lowest means, in both seasons. For number of growing centers/bulb, data showed that Giza White attained the highest means of number of growing centers/bulb, whereas Sabeeni genotype attained the lowest means, in both seasons. The differences between onion genotypes in respect to these traits were reported by El-Sayed and Atia (1999) and Abo-Dahab (2006).

Data also showed that mean percentage of total soluble solids (TSS%) was not significantly affected by different genotypes in both seasons (Table 3). These results confirm those of Singh (1993), Pakyurek *et al.* (1994) and Leilah *et al.* (2003). However, it could be noticed that Giza White attained the maximum values of TSS%, while Giza 6 Mohassan attained the minimum means in both seasons.

Table (3): Means of internal bulb characteristics and remained bulbs (%) for 8 onion genotypes evaluated in 2007/2008 and 2008/2009 seasons.

Genotypes	Season 2007/2008				Season 2008/2009			
	No of entire rings	No of growing centers	T.S.S (%)	Remained bulbs (%)	No of entire rings	No of growing centers	T.S.S (%)	Remained bulbs (%)
handweel 1	3.45	3.00	14.28	55.24	3.55	2.89	14.22	56.69
iza 6 Mohassan	4.11	2.76	14.00	57.00	3.63	3.11	13.39	59.26
iza 20 Original	3.89	2.55	15.22	61.45	3.00	2.89	14.22	59.41
abeeni	3.89	2.17	14.78	56.69	3.22	2.22	14.72	62.01
handweel Early	4.11	3.00	14.50	61.91	3.55	2.89	14.11	57.11
iza 20 White Flesh	3.44	2.84	14.50	62.11	3.55	3.45	14.11	66.60
iza White	2.89	3.11	15.72	41.56	2.78	3.89	15.39	40.98
iza Red	4.33	2.44	14.05	52.02	4.23	2.54	13.78	54.36
$LSD_{5\%}$	N.S	N.S	N.S	9.70	0.72	0.91	N.S	8.26

N.S = not significant at o.o5 probability level.

Storageability:

Data presented in Table (3) indicated significant differences among the studied genotypes for remained bulbs%. Giza 20 White Flesh had the superiority for obtaining the highest remained bulbs% (62.11 and 66.60%) in the first and second seasons, respectively. These results were in agreement with those reported by Gamie and yasso (2007) who found that Giza 20 White Flesh showed the greatest potential for storage. Giza White had the lowest means of remained bulbs% (41.56 and 40.98%) in the first and second seasons, respectively. It is clear from the previous results that Giza White had the lowest storageability (Table 3). Therefore, it is recommended to market the bulb yield of this genotype as soon as it is harvested. The

differences between studied genotypes in storageability may be due to the genetic variation between them. The differences between onion genotypes in respect to storageability were reported by many investigators (Warid and Loaiz, 1993; El-kafoury *et al.*, 1996; Abbey *et al.*, 2000 and Leilah *et al.*, 2003).

Genetic parameters:

Estimates of phenotypic (PCV) and genotypic (GCV) coefficient of variation, broad sense heritability (H^2_{bs}), genetic advance under selection in absolute units (GS) and genetic advance expressed as a percentage of grand mean for the studied traits are presented in Table (4).

The highest estimate of coefficient of phenotypic variation (PCV) was observed by double bulbs% (44.48%) followed by culls yield (36.27%) and bolters% (33.18%). While the lowest PCV estimate was observed by TSS% (4.11%) followed by marketable yield/fed (8.34%) and days to maturity (8.47%). The highest estimate of genetic coefficient of variation (GCV) was noticed by double bulbs% (41.64%) followed by culls yield (35.79%) and bolters% (24.98%). While the lowest GCV estimate was noticed by TSS% (3.86%) followed by marketable yield/fed (6.34%) and bulbing ratio (7.15%). The relatively high genetic coefficient of variation for some traits indicated that these traits might be more genetically predominant and would be possible to achieve further improvement in them. In general, the estimates of phenotypic coefficient of variation (PCV) were higher in magnitude than genotypic coefficient of variation (GCV) for all studied characters, but the gap between PCV and GCV was narrow for days to maturity, total yield, culls yield, average bulb weight, TSS% and remained bulbs%, indicating a little influence of environment in the expression of these characters. Thus, selection for the improvement of such characters based on phenotype would be rewarding in the present genotypes.

Estimates of heritability in broad sense (H^2_{bs}) ranged between 13.04 to 97.35%. High estimates of (H^2_{bs}) were obtained for culls yield/fed (97.35%), remained bulbs% (88.92%), total yield/fed (88.16%), days to maturity (88.09%), TSS% (87.82%) and double bulbs% (87.64%), while moderate and low estimates were observed for the remaining attributes (Table 4). High heritability estimates for some traits indicated that they were little affected by environmental factors and hence these traits may be improved by selection. Estimates of genetic advance (GS%) based on 5% selection intensity ranged from 5.32% for bulbing ratio to 80.31% for double bulbs%. High estimates of heritability along with high GCV% and GS% estimates were observed for culls yield/fed and double bulbs % which might be attributed to additive gene action in regulation of their expression. This indicated that simple selection process for these traits would certainly results in improvement in the studied genotypes. High heritability along with low GCV% and GS% estimates were noticed for days to maturity and TSS%. This indicated that these traits might be governed by non-additive gene action and the interaction between genotypes and environment, and hence these traits may be improved by development of hybrid varieties. Results of genetic parameters were similar, more or less to those reported by Rajalingam and Haripriya (1988), Wall and Corgan (1999), Mohanty (2001) and Yaso (2007).

Table (4): Estimates of of phenotypic (PCV) and genotypic (GCV) coefficient of variation, heritability (H^2_{bs}) and expected genetic advance for 8 genotypes of onion (data are combined across 2007/2008 and 2008/2009 seasons)

Characteristics	Parameters					
	Grand mean	PCV	GCV	H^2_{bs}	GS	GS%
Plant height (cm)	67.50	11.35	7.70	45.94	7.25	10.74
No of leaves/plant	9.42	18.41	14.08	58.47	2.09	22.18
Plant fresh weight (g)	168.88	18.01	15.88	77.72	48.71	28.84
Plant dry weight (g)	18.19	18.78	15.26	65.98	4.64	25.53
Bulbing ratio	3.06	19.81	7.15	13.04	0.163	5.32
Days to maturity	121.17	8.47	7.95	88.09	18.63	15.37
Total yield (t/fed)	16.81	11.44	10.74	88.16	3.49	20.76
Market. Yield (t/fed)	13.01	8.34	6.34	57.77	1.29	9.92
Culls yield (t/fed)	3.79	36.27	35.79	97.35	2.76	72.82
Aver. Bulb weight (g)	92.52	10.56	9.57	82.16	16.52	17.87
Double bulbs (%)	6.34	44.48	41.64	87.64	5.09	80.31
Bolters (%)	0.522	33.18	24.98	56.67	0.20	38.73
No of complete rings	3.60	12.73	10.39	66.66	0.629	17.84
No of growing centers	2.85	15.17	12.60	68.98	0.615	21.56
T.S.S (%)	14.44	4.11	3.86	87.82	1.07	7.44
Remained bulbs (%)	56.53	12.69	11.97	88.92	13.14	23.24

Conclusion:

From the data presented in this study, it can be concluded that Giza Red and Giza 20 Original were the best genotypes in total yield/fed, Giza 6 Mohassan was the best in marketable yield/fed, Sabeeni was the earliest in maturity and Giza 20 White Flesh was the best in storageability.

REFERENCES

Abbey, L.; O.A. Danquah; R.A.L. Kanton and Nana S. Olympio (2000). Characteristics and storage performance of eight onion cultivars. Ghana J. Sci., 40: 9 - 13.

Abo-Dahab, A.M.A. (2006). Studies on male sterility, varietal stability and genetic improvement in some onion cultivars. Ph.D. Thesis, Fac. Agric., Cairo Univ., Egypt.

El- Kafoury, A.K.; A.K. Mostafa; M.Y. Ibrahim and A.M. Hegazy (1996). Performance of some onion cultivars concerning yield, quality, chemical constituents and storability of bulbs. J. Agric. Sci. Mansoura Univ., 21 (4): 1275 - 1285.

El-Damarany, A.M. and H.A. Obiadalla-Ali (2005). Growing five onion (*Allium cepa* L.) cultivars under two irrigation systems. Assiut J. Agric. Sci., 36 (6): 83-94.

El-Sayed A.M. and A.A.M. Atia (1999). A comparative study on some onion (*Allium cepa* L.) cultivars. Egypt. J. Hort., 26 (1): 67-75.

Falconer, D. S. (1981). Introduction to Quantitative Genetics, Ed. 2. Longmans Green, London/New York.

Gamie, A.A. and I.A.A. Yaso (2007). Evaluation of some Egyptian onion genotypes in Sohag Governorate. J. Adv. Agric. Res. (Fac. Agric. Saba Basha), 12 (1): 77-85.

Gamie, A.A., K.A. Mohamed, Abo-EL-Wafa, A.M. and A.A. Rayan (2000). Studies on some Egyptian onion varieties under Upper Egypt codition. I- Effect of soil moisture on some growth characters for some onion varieties and its water consumptive use. Assiut J. of Agric. Sci., 31 (5): 105-114.

Gomez, K.A. and A.A. Gomez (1984). Statistical procedures for Agricultural Research. 2nd Ed. John Wiley and Sons, Inc. New York.

Haydar, A.; N. Sharker; M.B. Ahmed; M.M. Hannan; M.A. Razvy; M. Hossain; A. Hoque and R. Karim (2007). Genetic variability and interrelationship in onion (*Allium cepa* L.). Middle-East J. Scientific Res., 2 (3-4): 132-134.

Johnson, H. W.; H. F. Robinson and R. E. Comstock (1955). Estimates of genetic and environmental variability in soybean. Agron. J. 47: 314-318.

Jones, H. A. and L. K. Mann (1963). Onion and their allies. Interscience publishers, Inc., New York.

Leilah, A.A.; S.A. El-Kalla; A.K. Mostafa; and H. M. A. Afifi (2003). Performance of some local Egyptian onion strains under different planting dates. Scientific J. of King Faisal Univ. (Basic and Applied Sciences), 4 (1): 119 - 136.

Mann, L.K. (1952). Anatomy of garlic bulb and factors affecting bulb development. Hilgardia, 21: 195 - 228.

Mohamed, E.I. and Gamie (1999). Evaluation of some organic fertilizers as substitutions of chemical fertilizers in fertilizing onion. Egypt. J. Appl. Sci., 14 (7): 664-678

Mohanty, B.K. (2001). Genetic variability, inter-relationship and path analysis in onion. J. Tropical Agric., 39: 17-20.

Mohanty, B.K. and A. M. Prusti (2001). Performance of common onion varieties in kharif seasons. J. Tropical Agric., 39: 21-23.

Pakyurek,Y.; K.Abak and N.Sari (1994). Effects of sowing dates and plant densities on the yield and quality of some onion varieties in south east Anatolia. Seventh International Symposium on timing field production of vegetables, Skierniewice, Poland 23-27 Aug. Acta Hort., No. 371, 209 - 214.

Pavlović N., B. Zečević, M. Zdravković, M. Ivanović, and M. Damjanović (2003). Variability and heritability of average yield of onion bulb (*Allum cepa* L.). Genetika, 35(3): 149-154.

Rajalingam, G.V. and Haripriya (1988). Genitic variability in onion. Madras Agric., J. 85 (5/6): 248-250.

Singh, R.S. (1993). Studies on the effect of different transplanting dates on growth and yield of onion. Current Agric., 17 (1 - 2): 41 - 45.

Snedecor, G.W. and W.G. Cochran (1967). Statistical Methods. 6th Ed. The Iowa State Univ. Press, Ames., Iowa, U.S.A..

Wall, A.D. and J.N. Corgan (1999). Heritability estimates and progeny testing of phenotypic selections for soluble solids content in dehydrator onion. Euphytica 106 (1): 7-13.

Warid, W.A. and J.M. Loaiz (1993). Effect of cultivars and planting methods on bolting and yield of short day onions. Newsletter for the Tropics, No. 5: 30 - 33.

Yaso, I.A.A. (2007). Performance and genetic parameters for six onion genotypes in Nubaria area. Egypt. J. plant Breed., 11 (3): 307-318.

تقييم الاداء وبعض المعايير الوراثية لبعض التراكيب الوراثية للبصل المصرى تحت ظروف سوهاج

رفعت علام مرعى و محمد جمعه مرسى

قسم بحوث البصل - معهد بحوث المحاصيل الحقلية - مركز البحوث الزراعية - الجيزة- مصر

اقيمت هذه الدراسة فى محطة البحوث الزراعية بشندويل خلال موسمى ٢٠٠٨/٢٠٠٧ و٢٠٠٩/٢٠٠٨ لتقييم اداء ثمانية تراكيب وراثية للبصل وهى شندويل ١، جيزة ٦ محسن، جيزة ٢٠، السبعينى، شندويل مبكر النضج، جيزة ٢٠ ابيض اللحم، جيزة ابيض، جيزة احمر. كما تم دراسة التباين الوراثى وكفاءة التوريث والتحسين الوراثى المتوقع بالانتخاب لجميع الصفات تحت الدراسة.

وتشير اهم النتائج المتحصل عليها الى:

١- تم الحصول على اعلى القيم لطول النبات وعدد الاوراق للنبات ووزن النبات الغض من الصنف جيزة احمرفى كلا الموسمين.

٢- تم الحصول على اكبر القيم للوزن الجاف للنبات مع الصنف جيزة٢٠ فى الموسم الاول ومع جيزة ٦ محسن فى الموسم الثانى.

٣- كان التركيب الوراثى السبعينى هو ابكر التراكيب فى ميعاد النضج تلاه شندويل مبكر النضج ثم جيزة ابيض. بينما كان صنفى جيزة ٢٠ و جيزة احمر هما الاكثر تاخراً فى ميعاد النضج.

٤- اظهر الصنف جيزة احمر اعلى القيم للمحصول الكلى تلاه جيزة ٢٠، بينما اظهر التركيب الوراثى السبعينى اقل القيم.

٥- اعطى الصنف جيزة ٦ محسن اعلى القيم للمحصول التسويقى بينما اعطى التركيب الوراثى جيزة ٢٠ ابيض اللحم اعلى القيم لمتوسط وزن البصلة والنسبة المئوية للابصال السليمة المتبقية بعد التخزين%.

٦- تم الحصول على اقل القيم لمحصول النقضة ونسبة الابصال المزدوجة% ونسبة التزهير الحولى% مع التركيب الوراثى السبعينى.

٧- اظهرت النتائج ان قيم نسبة المواد الصلبة الذائبة الكلية لم تختلف معنوياً فى التراكيب الوراثية المختلفة.

٨- تراوحت قيم كفاءة التوريث بالمعنى العريض للصفات تحت الدراسة من ١٣.٠٤ الى ٩٧.٣٥%.

٩- تم الحصول على اعلى قيمة لكفاءة التوريث بالمعنى العريض لصفة محصول النقضة تلتها صفة نسبة الابصال السليمة المتبقية بعد التخزين% ثم صفة المحصول الكلى .

١٠- اظهر التحسين الوراثى المتوقع من الانتخاب فعالية تراوحت من٥.٣٢% لصفة معامل التبصيل الى ٨٠.٣١% لصفة الابصال المزدوجة%.

١١- اظهرت صفتى محصول النقضة ونسبة الابصال المزدوجة% قيم عالية من كفاءة التوريث بالمعنى العريض وقد كانت هذه القيم مقترنة بقيم عالية من معامل الاختلاف الوراثى والتحسين الوراثى المتوقع.

١٢- اظهرت صفتى عدد الايام حتى النضج ونسبة المواد الصلبة الذائبة% اعلى قيمة لكفاءة التوريث بالمعنى العريض ولكنها كانت مقترنة بقيم منخفضة من معامل الاختلاف الوراثى والتحسين الوراثى المتوقع.

قام بتحكيم البحث

أ.د / محمود سليمان سلطان — كلية الزراعة – جامعة المنصورة

أ.د / احمد مدحت النجار — كلية الزراعة – جامعة القاهرة

Table (1): Means of vegetative growth characteristics for 8 onion genotypes evaluated in 2007/2008 and 2008/2009 seasons.

Genotypes	2007/2008						2008/2009					
	Plant height (cm)	No of leaves/ plant	Plant fresh weight (g)	Plant dry weight (g)	Bulbing ratio	Days to maturity	Plant height (cm)	No of leaves/ plant	Plant fresh weight (g)	Plant dry weight (g)	Bulbing ratio	Days to maturity
handweel 1	74.44	8.45	154.45	18.33	2.42	119.67	56.22	8.78	166.89	17.89	3.59	120.00
iza 6 Mohassan	79.22	9.56	222.00	22.99	2.41	125.67	64.67	10.44	185.57	20.11	3.07	125.33
iza 20 Original	79.67	10.22	192.23	24.11	1.94	133.67	61.78	8.44	151.10	16.34	3.94	127.33
abeeni	61.67	7.22	150.11	17.11	2.90	108.00	51.67	7.78	140.31	18.22	4.47	100.33
handweel Early	64.00	9.78	187.78	21.22	3.58	111.00	66.00	9.22	169.11	19.00	3.62	117.67
iza 20 White Flesh	70.44	10.22	177.67	17.78	2.93	120.00	64.00	9.78	154.00	16.22	3.19	120.33
iza White	58.56	7.78	116.67	11.11	3.29	115.33	63.67	8.11	122.44	11.78	3.12	121.00
iza Red	78.33	14.44	225.17	21.11	2.23	137.00	76.67	10.56	186.58	17.67	2.30	136.33
$LSD_{5\%}$	9.74	2.24	35.97	6.09	0.61	4.17	8.56	1.70	30.30	3.11	0.80	2.72

N.S = not significant at o.o5 probability level.

Table (2): Means of bulb yield and its components for 8 onion genotypes evaluated in 2007/2008 and 2008/2009 seasons.

Genotypes	2007/2008						2008/2009					
	Total yield (t/fed)	Mark. yield (t/fed)	Culls yield (t/fed)	bulb weight (g)	Double bulbs (%)	Bolters (%)	Total yield (t/fed)	Mark. yield (t/fed)	Culls yield (t/fed)	bulb weight (g)	Double bulbs (%)	Bolters (%)
handweel 1	15.66	11.90	3.76	84.93	8.75	1.08	15.80	12.44	3.36	80.00	8.85	0.64
iza 6 Mohassan	17.73	14.30	3.43	98.20	5.84	0.57	18.11	14.82	3.29	87.81	4.72	0.62
iza 20 Original	18.29	12.64	5.65	84.93	9.17	0.43	18.52	12.63	5.88	90.99	10.62	0.41
abeeni	14.58	13.44	1.14	85.08	2.82	0.40	12.72	11.32	1.40	77.17	1.15	0.37
handweel Early	17.97	13.79	4.19	102.17	5.92	0.51	17.75	13.92	3.83	100.82	5.52	0.50
iza 20 White Flesh	18.13	13.66	4.46	109.64	7.51	0.46	16.27	11.93	4.32	104.37	5.49	0.49
iza White	14.68	11.96	2.72	88.94	3.70	0.50	15.00	11.75	3.25	86.87	3.74	0.48
iza Red	19.09	14.16	4.93	96.61	7.86	0.43	18.67	13.57	5.05	101.75	9.79	0.46
$LSD_{5\%}$	1.90	1.72	1.25	10.80	3.64	0.32	2.75	N.S	1.40	9.01	2.40	N.S

N.S = not significant at o.o5 probability level.