



**SUMMARY
AND CONCLUSION**

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Two field Experiments were carried out at the experimental Farm of the Agricultural Research Station in Seds, Beniswaf governorate, Agricultural Research Center, during the successive winter seasons of 2001/2002 and 2002/2003 to study the effect of different fertilization source, plant density and seedlings age on vegetative growth, bulbs yield and its components as well as bulbs quality for some onion cultivars.

First experiment:

*** Effect of plant density and fertilization source on vegetative growth, bulb yield and its quality.**

This experiment was conducted to elucidate the effect of plant density and fertilization source either as mineral form (NPK) or organic form (town refuse, compost, chicken manure and farmyard manure) on vegetative growth, bulb yield and its components as well as bulb quality.

The results of this experiment could be summarized as follows:

a- Vegetative growth.

- 1- The growth characters of onion plants expressed as plant and leaves length, leaves number and weight as well as bulb weight, weight of the whole plant, neck and bulb diameter

and bulbing ratio were affected by different studied plant density where the onion plants were grown in 2 rows per ridge 50 cm wide, 3 rows per ridge 60 cm wide or 6 rows per ridge 90 cm wide, i.e., the distance between rows was 25, 20 and 15 cm, respectively. In this respect, the highest values for plant height and leaves length were recorded in case of closest transplanting distance (15 cm between rows), while the highest values for weight of leaves, bulb, and whole plant as well as average bulb and neck diameter and bulbing ratio were obtained in case of widest planting distance (25 cm between rows).

- 2- The growth characters of onion plants mentioned before were greatly affected by the application of organic fertilizers. In this regard, application of chicken manure at 4 tons/fed. reflected the highest values in all the measured growth characters followed by the application of recommended dose of mineral fertilizer (90 kg N + 30 kg P_2O + 24 kg K_2O /fed.).
- 3- No significant differences can be noticed in all the studied growth parameters due to the interaction between plant density and fertilization treatments. However, the highest values for most studied growth aspects were recorded as a result of growing onion plants on ridges 50 cm wide and using chicken manure at rate of 4 tons /fed.

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b- Yield and its components.

- 1- Growing the plants in three rows per ridge 60 cm width gave the highest values of total bulb yield, yield of single bulbs and the highest average bulb weight compared with growing the plants in two rows per ridge 50 cm width and six rows per ridge 90 cm width. In addition, the lowest values in all measured yield parameter were obtained as a result of transplanting the seedling at a rate of six rows per ridge 90 cm width.
- 2- The highest percentage of culls bulbs was recorded in case of wide spacing i.e., growing the plants in two rows per ridge 50 cm wide.
- 3- Fertilizing onion plants with the addition of chicken manure at 4 tons /fed. or with the recommended dose (90 kg N + 30 kg P_2O_5 + 24 K_2O /fed.) of mineral fertilizers produced the highest total and single bulb yields with the largest average single bulb weight compared with other used organic fertilizer treatments.
- 4- Application of compost at 5 tons/fed. and FYM at 14 tons /fed. reflected the lowest values of total and single bulb yields during the first and second seasons, respectively. In this respect, using town refuse at 8 t/fed. gave the highest % of cull bulbs.

- 5- The maximum total and single bulbs yield were obtained in case of growing plants in three rows per ridge 60 cm in width and fertilized with either chicken manure at 4 tons /fed. or recommended dose of mineral fertilizer at 90 kg N + 30 kg P_2O_5 + 24 kg K_2O /feddan. Moreover, the lowest values for culls weight and its percentage were noticed in case of medium plant density (3 rows / ridge 60 cm width) combined with chicken manure at 4 tons/fed.

c- Bulb quality.

c-1- Physical bulb quality.

- 1-Physical bulb characters i.e., average bulb diameter, bulb firmness, TSS and dry matter percentage were not significantly affected due to different tested plant densities. However, the widest spacing between rows (2 rows /ridge 50 cm wide) reflected the highest value of bulb diameter. On the contrary, the closest spacing between rows (6 rows /ridge 90 cm wide) gave the highest values for bulb firmness, TSS and dry matter percentage.
- 2- Application of chicken manure at 4 tons/fed. or mineral fertilizers at the recommended dose produced bulbs of higher values of diameter, firmness, TSS and dry matter %.

- 3- As for the effect of the interaction between plant density and fertilization treatments on physical bulb characters, no significant differences were noticed in all the measured bulb characters during both seasons of study.

c-2- Chemical composition of bulbs.

- 1- Total nitrogen, phosphorus and potassium percentage were not significantly affected with the different tested plant densities. However, increasing the distance between rows (25 cm apart) in case of planting two rows / ridge 50 cm wide gave the highest macro-elements percentage during both seasons of study.
- 2- Irrespective of potassium percentage, which was significantly affected during the two seasons of study, both total nitrogen and phosphorus percentage were not affected by different used fertilizer treatments. In this respect, using chicken manure at 4 tons /fed. during the second season produced bulbs with higher potassium content than other treatments.
- 3- Concerning the combined effect, only potassium percentage was significantly affected due to the international effect of plant density with fertilization application where the highest the highest values were noticed in case of growing onion plants on two rows/ridge 50 cm wide and using mineral

fertilizers at 90 kg N + 30 kg P₂O₅ + 24 kg K₂O /fed. during the first season and composite manure at 5 tons/fed. during the second one.

d- Storageability.

- 1- Obtained results on bulbs storageability show that these were no significant differences in total weight loss percentage of bulbs during the storage period (7 months) among the studied planting densities. In this respect, planting onion seedlings at a rate of six rows /ridge 90 cm wide gave the lowest values of total weight loss during the storage period in both seasons of study.
- 2- The lowest values for weight loss during the different months of storage were obtained in case of using mineral fertilizers at rate of 90 kg N + 30 kg P₂O₅ + 24 kg K₂O /fed. compared with other studied fertilizers treatments.
- 3- As for the effect of the interaction between the studied treatments on the storageability of bulbs, obtained data show that except the total weight loss during the last month of storage period (December) in the second season of study which was significantly affected, no significant differences were obtained in weight loss of onion bulbs during the different months of storage.

- 4- Total weight loss of onion bulbs was gradually increased with prolonging the storage period during the two seasons of study.

Second experiment.

****Effect of seedlings age, cultivars and their interaction on vegetative growth, bulb yield and its quality.**

This experiment was conducted to elucidate the effect of transplants age and cultivars as well as their interaction on plant growth, bulb yield and its components, bulb quality as well as storageability of onion bulbs. This experiment included nine treatments, which were the combinations of three transplants age (75, 60 and 45 days old) and three cultivars of onion i.e., Giza 20, Giza 6-Mohasen and Behairy Red. The results of this experiment could be summarized as follows: -

a-Vegetative growth.

- 1- Irrespective of bulb weight and bulb diameter during the first season and leaves length, bulb height and neck diameter as well as bulbing ratio during the second season which were not significantly affected, other tested growth aspects referred as plant length, number of leaves /plant, leaves length and

weight as well as plant weight and bulb diameter were significantly differ among the tested cultivars. In this respect, cv. Behairy Red recorded the highest values in all studied growth parameters followed by cv. Giza 20 and at last Giza 6-Mohasen.

- 2- The highest values in all the studied growth traits were obtained as a result of using transplants 75 days old compared with 60 and 45 days old transplants during the two seasons of growth.
- 3- As for the interaction effect, using cv. Behairy Red transplants with 75 days old reflected the highest values in all the studied growth parameters during the two seasons of growth.

b-Bulbs yield and its components.

- 1- The highest total bulb yield and its components expressed as average weight of bulb, single bulbs yield and weight of culls were obtained in case of cv. Behairy Red followed by cvs. Giza 20 and at last Giza 6-Mohasen during the two season of growth.
- 2- Using old seedlings in age (75 days old) exhibited the highest total and single bulbs yields as well as average weight for produced bulbs.

- 3- Concerning the effect of combination between the tested cultivars and transplants age. Obtained results show that the highest values of total yield and its components were recorded due to using 75 days old transplants for Behairy Red in both seasons of growth.

c- Bulb quality.

- 1- Bulb quality expressed as bulb diameter, firmness, TSS and dry matter percentage were varied among the tested onion cultivars. In this regard, the largest bulb diameter was noticed in case of bulbs produced by cv. Behairy Red, while the highest values for bulb firmness, TSS and dry matter percentage were obtained in case of bulbs of cv. Giza 20.
- 2- No, significant differences were noticed in all measured bulb quality due to the different ages of used seedlings. However, using old (75 days old) or medium (60 days old) age transplants produced bulbs with good bulb quality.
- 3- As for the effect of the interaction, except bulb firmness during the first season, which was significantly affected no significant differences in all measured bulb quality can be noticed due to the interaction between the tested cvs. and seedlings age.

d- Storageability

- 1- Obtained results indicated that the lowest values of total weight loss for onion bulb during the different months of storage period was achieved in case of bulbs for cv. Giza 20. On the contrary cv. Behairy Red showed the highest values for total weight loss during the storage.
- 2- The total weight loss of bulbs was increased with increasing the age of seedlings at transplanting from 75 days to 60 and 45 days old. Such increments in total weight loss reached level of significance during the second and last months of storage in the first season and the third, fourth, fifth and sixth month of storage in the second one.
- 3- Regarding the effect of the interaction, obtained results showed that the lowest values for total weight loss and consequently the highest marketable bulb yield after storage were recorded as a result of using seedlings 45 days old in case of cv. Giza 20 compared with other tested seedlings ages and cultivars.