V- SUMMARY AND CONCLUSION

Three field groups of experiments were carried out at the Farm of Nubaria Research Station, Agricultural Research Center near North of Tahrir Region, during 1995/96 and 1996/97 winter growing seasons.

Each group of experiments was consisted of three triats which were performed in each season of this work.

Such experiments were as follows:

A) Effect of sulphur and nitrogen, phosphorus and potassium fertilizers levels on vegetative growth, yield and its components, storageability and of onion bulbs during storage:

A split plot design with three replicates was used, where four rates of sulphur were applied, as soil application, before transplanting in the main plots, at the rates of 0, 100, 200 and 300 kg/fed. The N, P and K-fertilizers were also added as soil application at three different levels. They were randomly distributed in the sub-plots at the levels of 45, 90 and 135 kg N/fed., 30, 60 and 90 kg P_2O_5/fed. and 24, 48 and 72 kg K_2O/fed. In other words the three used N, P and K-fertilizers levels were (45, 30 and 24), (90, 60 and 48) and (135, 90 and 72 kg) N, P_2O_5 and K_2O per feddan, respectively.

Collected data:

The data collected in this work were related to the characters of vegetative growth, yield and its components, storageability and keeping quality during storage. The obtained results are summarized as follows:

1- Vegetative growth parameters:

Some vegetative growth parameters such as plant, blades and bulb length, plant, blades and bulb weight and leaves number per plant were significantly affected by sulphur and N, P and K-fertilizers doses where such characters were significantly affected by both of the used factors of this study (sulphur rate and N, P and K-fertilizer level). The highest used rate of sulphur (300 kg/feddan) in combination with the highest applied level of N, P and K fertilizers resulted in the highest values of most studied vegetative growth characters of onion plant during both seasons of this work.

In other words, it may be concluded that the vegetative growth parameters gave higher values by soil application of sulphur at the highest used rate (300 kg/fed.) and N, P and K-fertilizers at the highest added level (135 kg N, 90 kg P_2O_5 + 72 kg K_2O/fed.).

2- Bulb yield and its components:

Respecting bulb yield and its components parameters as total and marketable bulbs yield, percentages of both bolters and double bulbs as well as average weight of bulb, obtained data show that such characters were significantly affected by used both studied factors (sulphur rate and nitrogen, phosphorus and potassium fertilizers levels) and their interaction in both seasons of this work. It has been found, in general, that using the highest applied rate of sulphur (300 kg/fed.) in combination with the highest used level of N, P and K-fertilizers (135 kg N, 90 kg P_2O_5 + 72 kg K_2O/fed.) resulted in the highest values of studied yield and its components parameters.

Hence, it is generally advisable that application of 300 kg/fed. sulphur at time of soil preparation and fertilizing onion plants with

135 kg N + 90 kg P_2O_5 + 72 kg K_2O/fed. leads to obtain the highest onion bulb yield either as total or marketable yield as well as average bulb weight without clear effect on double and bolters bulbs where increments in this respect did not affect bulb marketable yield.

3- Storageability paramters:

The percentages of sprouting, rotting, total weight loss and marketable onion bulbs after storage for a period of 5 months under normal room conditions (28.51±2°C) were significantly affected by all used treatments of sulphur soil application rate and N, P and K fertilization level.

It is generally found that increasing sulphur application rate up to the highest used one (300 kg/fed.) in combination with the highest applied level of N, P and K-fertilizer (135 kg N, 90 kg P_2O_5 + 72 kg K_2O/fed.) significantly improved the storageability of onion bulbs after five months of storage period showing that such treatment decreased the percentage of sprouting, rotting and total weight loss and increased the percentage of marketable onion bulbs at the end of storage period compared with other treatments.

B) Effect of planting date and cultivar on vegetative growth, bulb yield and its components as well as storageability of onion:

A split plot within complete randomized blocks (CRB) design with four replicates was used in this work where three transplanting dates in combination with three cultivars were studied. The planting dates *i.e.*, early in December 5th, medium in December 25th and late in January 15th were situated in the main plots. Moreover, the three tested cvs. *i.e.*, Giza 20 and Giza 6-Mohassen and Composite El-Bostan cvs. were randomly distributed at sub-plots.

The collected data regarding the characters of vegetative growth, bulb yield and its components as well as storageability were as follows:

1- Plant vegetative growth parameters:

The length of either bulb, blades or whole plant, the weight of whole plant, blades or bulb, leaves number per plant and T.S.S.% were significantly affected with transplanting date in all seasons where early planting on December 5th resulted in more vigorus growth than other tested planting dates.

Regarding the effect of cultivar on some characters hereabove, significant variations were detected in both seasons of this work where plants of Giza 20 and Composite cvs. were of significantly higher values than those of Giza 6-Mohassen in this respect.

With respect to the interaction between transplanting date and cultivar, the plant vegetative growth parameters were significantly affected during the two successive seasons of this work.

As a general conclusion, early transplanting (December 5th) of the cultivars Giza 20 and that of composite produced plants of the highest growth parameters than other tested treatments.

2- Bulb yield parameters:

The total and marketable bulbs yield as well as average bulb weight were significantly affected with transplanting date and cultivar where plants grown early on December 5st of the cultivar Giza 20 cv. produced the highest total and marketable yield as well as the heaviest average bulb weight compared with other combinations between planting date and cultivar in both the two seasons of this work.

Generally, it may be advisable to transplant the onion transplants of Giza 20 or Composite cvs. on early planting date (December 5th) other than growing transplants of Giza 6-Mohassen cv. on the late planting date (January 15th) under similar conditions of this experimental work to obtain higher total and marketable bulbls yield of large onion bulbs.

3- Some bulbs quality parameters:

Concerning the effect of transplanting date on some bulbs quality, *i.e.*, shape index, number of complete rings/bulb, number of growing centers/bulb, thickness of complete rings/bulb, double bulbs%, bolting bulbs % and T.S.S. %, significant differences were resulted where all such studied characters showed higher values with the early planting (December 5th) than those of medium planting date (December 25th) than those of the late one (January 15th).

Regarding the effect of cultivar on the studied bulbs quality characters, obtained results show that each of Giza 20 and Composite cvs. were of higher values of bulbs quality parameters than those of Giza 6-Mohassen cv.

Respecting the effect of interaction between transplanting date and cultivar on some bulb quality characters, significant differences were detected where the transplants of each of Giza 20 and Composite cvs. when grown early on December 5th resulted in the highest values of studied characters compared with other studied treatments during both seasons of this work.

Under similar conditions of this work, it may be recommended to grow either Giza 20 or Composite cvs. of onion in the earliest used

planting date, *i.e.*, December 5th to obtain bulbs of better quality than those of Giza 6-Mohassen cv. grown in the other used planting dates.

4- Storageability parameters:

The collected data showing the storageability parameters such as percentages of sprouting, rotting, total weight loss and marketable yield reveal that such parameters were significantly affected with transplanting date in the two seasons of this work.

Respecting effect of cultivar on the studied bulb quality characters, the same results show that bulbs of Giza 20 and Composite cvs. were of better storageability than those of Giza 6-Mohassen cv.

Concerning effect of the interaction between planting date and cultivar, in this respect, significant effects were resulted where bulbs of Giza 20 or those of composite cvs. when they were grown on the medium planting date (December 25th) showed the best storage quality parameters where the lowest percentage of bulb sprouting, rotting and total weight loss and the highest marketable yield percentgae were recorded.

Hence, it may be concluded that, under similar conditions of this work, planting Giza 20 or composite cvs. on December 20th is prefairable for getting onion bulbs of better keeping quality more than those of Giza 6-Mohassen cv. at other used planting dates. However, transplanting on the early planting date (December 5th) is stell prefairable in general for its superiority in producing higher marketable yield than other tested planting dates.

C) Effect of some cultivars and transplants size on yield and quality of onion bulbs production:

A split plot design with three replicates was used, where the two studied cultivars, *i.e.*, Giza 20 and Giza 6-Mohassen were situated in the main plots while the three studied transplants sizes, *i.e.*, large (< 16 mm), medium (8-16 mm) and small (> 8 mm) were assigned in the sub-plots. The obtained results are summarized as follows:

1- Total bulbs yield (ton/fed.):

Data showing the total bulb yield of the studied two cvs. of onion as affected by the three tested different sizes of seedlings in both growing seasons of this work, reveal that Giza 20 cv. gave higher total bulb yield than that of Giza 6-Mohassen cv.

With regard to the effect of size of seedling on total bulb yield, the same obtained results show that significant variations were detected during both growing seasons of this work where large seedlings (< 16 mm) produced the highest bulbs yield of onion in this respect.

Concerning the effect of interaction between the studied two factors (cultivar and seedling size), obtained results show that total bulb yield was significantly affected in this respect where the largest used transplants (< 16 mm) of the Giza 20 cv. produced plants of the highest total bulb yield (ton/fed.).

2- Marketable bulbs yield (ton/fed.):

Obtained results in this respect, show that the marketable bulbs yield was significantly affected by used cultivars, size of seedlings and their interaction.

Respecting the effect of either used cultivar, transplant size or the interaction between the tested cultivars and seedling size on marketable bulb yield, similar results to those of the total bulb yield (ton/fed.) were reported where the highest values in this respect were those of the largest used seedlings of the cultivar Giza 20.

3- Average bulb weight (g):

The obtained results showing the average of bulb weight, as affected by different used seedlings size, cultivar and their interaction, revealed that bulbs produced from plants of Giza 20 cultivar grown by the largest used transplants were of the heaviest average weight.

4- Percentage of doubling (split bulbs):

The doubling percentage in onion bulbs as affected by seedling size and cultivar as well as their interaction showed the highest values were obtained with the largest used seedlings (< 16 mm) of Giza 6-Mohassen cv. Hence, using the small sized transplants (> 8 mm) of the cultivar Giza 20 is prefairable to produce onion bulbs of the lowest doubling percentage.

5- Percentage of bolters (premature flowering):

The obtained results, showing the effect of each of cultivar, seedling size and their interaction on the percentage of onion bulbs boltering revealed that small transplants (> 8 mm) of the cultivar Giza 20 produced bulbs of the lowest percentage of bolters.

Generally, it may be concluded that using transplants of large size (< 16 mm) of Giza 20 cv. is prefaired than those of either small medium or large size transplants of Giza 6-Mohassen cv. and also than the small or medium sized transplants of, Giza 20 cv. This is due to its higher total and marketable bulb yield (ton/fed.) as well as higher