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SUMMARY

Field experiments were carried out in Tag AL-Ezz, Agricultural Research Station Farm, Dakahlia Governorate, Agricultural Research Center, Egypt, during the two successive winter growing seasons of 2007/2008 and 2008/2009. The main objective of these experiments was to determine the effect of storage methods, bulb sizes and harvesting times of seeds as well as their interactions on onion (*Allium cepa* L.) growth, seed yield and its components as well as seed quality of onion cv. Giza 20.

Each storage method *i.e.* normal (under normal room conditions) and cold (at 5 °C for 2 months before sowing) was carried out in separate experiment. Every experiment of storage method was done in split plot design with four replications.

The main plots were occupied with the following three bulb sizes:

1. Large (> 7cm).
2. Medium (5-6 cm).
3. Small (3-4 cm).

The sub plots were assigned to three harvesting times of onion seed heads as days after sowing (DAS) as follows:

- 1- Early (150 DAS).
- 2- Medium (157 DAS).

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3- Late (164 DAS).

❖ **The following traits were recorded:**

1- Seed yield and its attributes:

- 1- Plant height (cm).
- 2- Number of leaves/plant.
- 3- Number of scapes/plant.
- 4- Scape height (cm).
- 5- Seed head weight (g).
- 6- Seed head diameter (cm).
- 7- Number of flowers/seed head.
- 8- Number of seeds/seed head.
- 9- Weight of seeds/seed head (g).
- 10- 1000 – seed weight (g).
- 11- Seed yield/plant (g).
- 12- Seed yield/fed (kg).

2- Seed quality:

- 2.1- Germination percentage
- 2.2- Speed of germination.

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2.3- Plumule length (cm.

2.4- Radical length (cm.

2.5- Seedling dry weight.

- *The most important results obtained from this investigation can be summarized as follows:*

A. Storage method effect:

1- Growth, seed yield and its attributes:

Storage methods of onion bulbs caused significant effects on growth attributes as well as seed yield and its components in both seasons. Cold storage method of onion bulbs at 5 °C for 2 months before sowing markedly resulted in the highest values of plant height, number of leaves/plant, number of scapes/plant, scape height, seed head weight, seed head diameter, number of flowers/seed head, number of seeds/seed head, weight of seeds/seed head, 1000 – seed weight, seed yield/plant and seed yield/ha as compared with normal storage method (under normal room conditions) in both seasons.

2- Seed quality:

Obtained data of this study revealed that there were significant differences between the two storage method on onion seed quality in both seasons. The most marked and maximum values of seed quality characters such as shoot and root length were resulted from storage onion bulbs in at 5 °C for 2 months before sowing in both seasons. The highest values of germination percentage, speed of

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germination and seedling dry weight were resulted from normal storage method in both seasons.

B. Bulb size effects:

1- Growth, seed yield and its components:

These was significant effect of mother bulb size on plant height, number of leaves/plant, number of scapes/plant, scape height, seed head weight, seed head diameter, number of flowers/seed head, number of seeds/seed head, weight of seeds/seed head, 1000 – seed weight, seed yield/plant and seed yield/fed in both seasons, except 1000 – seed weight in the first season only. Planting onion by using large size of mother bulb significantly surpassed other studied bulb sizes (small and medium) in all growth and yield component characters and also seed yield per plant and per feddan, with exception number of scapes/plant and 1000-seed weight in both seasons. Moreover, its recorded the highest values of all characters in the two growing seasons, except number of scapes/plant in both seasons. Whereas, the last rank values were obtained from small bulb size, except number of scapes/plant in both seasons. The best bulb size of onion mother bulb that can be used on a large scale was medium size of mother bulbs (5-6 cm in diameter) considering economic outcome, where, large size bulbs if used will need a very high seed rate and become uneconomic. Therefore, medium size of bulb might be recommended.

2- Seed quality:

Significant differences among the three studied size of mother bulbs in seed quality characters *i.e.* germination percentage, speed of germination, shoot and root length and seedling dry weight in both seasons. From the obtained data, using large size of mother bulbs produced the highest values of previously mentioned traits in both seasons, except speed of germination in the second season. On the other hand, the lowest values of seed quality characters were resulted from using small size of mother bulbs in both seasons, except speed of germination in both seasons.

C. Harvesting time effects:

1- Growth, seed yield and its attributes:

Harvesting time had significant effects on number of leaves/plant (in the first season), number of scapes/plant, seed head weight, number of flowers/seed head, number of seeds/seed head, weight of seeds/seed head, seed yield/plant and seed yield/fed in both seasons. Harvesting onion seeds after 157 days after sowing (medium harvesting time) markedly recorded the highest seed yield per plant and per feddan and also most its components *i.e.* seed head weight, number of flowers/seed head, number of seeds/seed head, weight of seeds/seed head in both seasons as well as seed head diameter and 1000-seed weight in the second season as compared with early and late harvesting time. Conversely, the lowest values of these characters were obtained from early harvesting time in both seasons.

2- Seed quality:

The obtained results of this study exhibited that the effect of harvesting time on seed quality characters was insignificant, except for root length in the first seasons only.

D. Interactions effect:

1- The interaction between storage method X bulb size:

Our results indicate that there is a significant effect of the interaction between storage method X bulb size on all studied characters in both seasons, except number of leaves/plant, scape height, 1000 – seed weight, and all seed quality traits in both seasons.

2- The interaction between storage method X harvesting time:

It had a significant effect of the interaction between storage method X harvesting time on number of scapes/plant, seed yield/plant and seed yield/fed in both seasons.

3- The interaction between bulb size X harvesting time:

The results appears a significant effect of the interaction between bulb size X harvesting time on number of scapes/plant, number of flowers/seed head, seed yield/plant and seed yield/fed in both seasons.

4- The interaction among the three factors:

Non of the interactions among the three studied factors had a significant effect on all studied characters in any of the two seasons under the local

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conditions of the present investigation except for number of scapes/plant, seed yield/plant and seed yield/fed in both seasons.

CONCLUSION

According to the results obtained from this study, it can be concluded that, cold storage large or medium size of mother bulbs at 5 °C for 2 months before sowing and harvesting after 157 days from sowing could be recommend to raise onion productivity and seed quality under the environmental conditions of Tag El-Ezz district, Dakahlia Governorate.