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SUMMARY

SUMMARY

Two field experiments were conducted at the Experimental Farm of Agronomy Department, Faculty of Agriculture, Mansoura University, Egypt and the Laboratory of Seed Technology Research Unit. El Mansoura, Dakahlia Governorate, Egypt during 2007/2008 and 2008/2009 seasons.

The aim of the first experiment, was to study the effect of harvesting dates 45, 55, 65 and 75 days from 50% heading and three wheat seed classes (foundation, registered and certified) on yield and its components of wheat (c.v. Giza168). Seed of wheat classes were obtained from Wheat Research Department, Field Crops Research Institute, ARC. A split plot design with four replicates was used and main plots were assigned to harvesting dates and the seed classes were allocated to the sub plots. The area of each sub plot was 10.5 m² (3×3.5m). The preceding summer crop was maize (*Zea mays L.*) in both seasons.

Field studies

Treatments and factors studied:

1- Harvesting dates

Number of days from swing to 50% heading of the tested wheat cultivar Giza 168 was recorded under the experiment conditions and was 100 days in both seasons. The four times of harvesting were allocated in the main plots.

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- 1- The first harvesting date (45 days from 50% heading).
- 2- The second harvesting date (55 days from 50% heading).
- 3- The 3ed harvesting date (65 days from 50% heading)
- 4- The 4th harvesting date (75 days from 50% heading).

2- Seed classes

The three seed classes were allocated randomly in the sub plots as follows:

- 1- Foundation (Basic) seed.
- 2- Registered seed.
- 3- Certified seed.

Studied characteristics

Growth characters:

1. Flag leaf area (cm²).
2. Plant height (cm).
3. Seed moisture content (%).

Yield components attributes:

1. Number of spikes/m².
2. Spike length (cm).
3. Number of spikelets/ spike.

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4. Spike weight (g).
5. Number of grains/ spike.
6. Grains weight / spike (g).
7. 1000-grain weight (g).
8. Grain yield (ardab/fed).
9. Straw yield (kg/fad).

2- Laboratory studies:

The second experiment was conducted at the laboratory of Seed Technology Research Unit, El-Mansoura, Dakahlia Governorate and aimed to study the effect of harvesting dates of wheat seed classes and three storage periods, i.e. (0, 3 and 6 months after harvesting). The experimental design was completely randomized design with four replications.

The treatments were:-

- 1- Harvesting dates (after 45, 55, 65 and 75 day from 50% heading).
- 2- Seed classes (Foundation (Basic) seed, registered seed and certified seed).
- 3- Storage period (0, 3 and 6 months).

After each harvesting time. Samples of wheat seed were stored for the three storage periods i. e.

- 1- Initially after harvest (0 month).

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2- After 3 months from harvest.

3- After 6 months from harvest.

Studied characteristics:

1. Germination percentages.
2. Speed of germination.
3. Germination energy
- 4- Mean germination time
- 5-Germination rate:
6. Plumule and radical length.
7. Seedling fresh and dry weights.
8. Insect infestation percentage.
9. Seed dry weight losses percentage:
- 10- Protein content
- 11- Carbohydrate percentage

The most important results could be summarized as follows:

1- Field studies

Effect of harvesting dates, seed classes and their interactions:

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Harvesting dates had a significant effect on grain moisture content, number of spikes/m², spike weight, number of spikeletes/ spike, number of grains/spike, grains weight/ spike, 1000-grain weight and grain yield.

1- With respect to the effect of harvesting dates on seed moisture content during harvest, the results revealed that, harvesting wheat seed after 45 days from 50% heading had the highest moisture content as compared with wheat seed harvested after 55, 65 and 75 days from 50% heading.

2- Harvesting dates significantly affected on seed yield and its components (number of spikes/m², spike weight, number of spikeletes/ spike, grains weight/spike, 1000-grain weight and grain yield). Harvesting wheat plants early (after 45 days from 50% heading) lead to the reductions in yield and its components characters compared with the other harvesting times except grains number /spike only in the first season followed by the second harvesting date (55 days from 50% heading) which produced the highest means of grains number/spike only in the second season.

3- Harvesting wheat plants after 65 day from 50% heading produced the highest means of yield and its components traits i.e. (spikes number/m², 1000-seed weight, grain yield) in the both seasons. Meanwhile the reduction in yield and its components began with late harvesting date (75 days from 50% heading) except number of spikes/m², weight of spike and number of spikeletes/spike.

4- There were insignificant differences among seed classes on growth characters, yield and its components.

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5- The interaction between harvesting dates and seed classes had insignificant effect on growth characters, yield and its components in the two seasons.

2- Laboratory studies

A- Effect of harvesting dates:

1- The highest mean of speed of germination (91.9) was obtained with 3rd harvesting date (65 days after 50% heading) in the first season. On contrast the lowest mean of speed of germination (89.8) was obtained with first harvesting date (45 days after 50% heading). The highest mean of germination energy (70.6) and (72.3) were obtained from the 3rd harvesting date (65 days after 50% heading) in both seasons.

2- The highest means of germination rate (0.828 and 0.834) were obtained from the 3rd harvesting date (65 day after 50% heading) in the first and second seasons. On contrast, the lowest means (0.983 and 0.703) were obtained from the first harvesting date (45 day after 50% heading) in both seasons.

3- The maximum seedling fresh weight (1.80 and 1.94 gm) was obtained from harvesting wheat after 65 day from 50% heading. Meanwhile, the minimum seedling fresh weight (1.59 and 1.55 gm) were obtained from harvesting date 45 day after 50% heading in 2007/2008 and 2008/2009, respectively.

4- Seedling dry weight increased to (0.43 and 0.35 g), (0.44 and 0.38 g) at 55 and 65 days after 50% heading, respectively. On the other side it decreased

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to (0.42 and 0.34 g) at harvesting date after 75 days from 50% heading, respectively.

5- At the first harvesting date (45 days after 50% heading) insect infestation percentage were (5.3 and 4.4%), while it decreased to (4.6 and 4.1%), (3.7 and 3.6%) and (3.3 and 3.1%) with increasing harvesting dates to 55, 65 and 75 day after 50% heading in the first and second seasons, respectively.

6- The lowest means of seed dry weight losses (1.3 and 1.1%) were obtained at the fourth harvesting date (75 days after 50% heading). While the highest mean of seed dry weight loss (2.3 and 1.9%) were recorded at the first harvesting date (45 days after 50% heading) in the first and second seasons, respectively.

7- At the first harvesting date (45 day after 50% heading) protein content were (11.0 and 11.2), while it increased to (12.7 and 13.0), (13.1 and 13.3) and (13.2 and 13.4) with increasing harvesting dates to 55, 65 and 75 day after 50% heading in the first and second seasons, respectively.

8- The lowest carbohydrate percentage (63.9 and 64.7%) were obtained from the first harvesting date (45 day after 50% heading), whereas, it increased to (65.9 and 66.4%), (66.1 and 66.5%) and it decreased to (65.4%) at harvesting dates 55, 65 and 75 day after 50% heading in the first and second seasons, respectively.

B- Effect of seed classes:

1- Foundation and certified seed recorded the highest mean of seedling dry weight (0.35 g). On contrast the lowest mean of seedlings dry weight (0.33 g) was obtained from registered seed. On contrast, no significant effects were observed on all the studied trails i.e. (germination percentages, speed of germination, germination energy, mean germination time, germination rate, plumule and radicle length, seedling fresh weight, insect infestation percentage, seed dry weight losses percentage, protein content and carbohydrate percentage).

C- Effect of storage periods:

1- Prolonging storage period from 0 up 6 months lead to significant decrease in germination percentage from (97.7 and 98.4%) to (81.8 and 86.9%), speed of germination from (98.4 and 99.0%) to (83.3 and 88.2%), germination energy, germination rate from (0.863 and 0.876) to (0.695 and 0.702) and the decrease in seedling vigor traits (seedling length, fresh and dry weight) carbohydrate percentage from (65.7 and 66.0) to (65.0 and 65.5%) in the first and second seasons, respectively.

2- Increasing storage period lead to increases in mean germination time (day) from (2.7 and 3.0 days) to (3.5 and 3.8 days), protein content from (12.2 and 12.4%) to (12.9 and 13.0%) in the first and second seasons, respectively. Also increasing storage period from 3 to 6 months lead to increases in insect infection percentage from (4.3 and 3.8%) to (8.3 and 7.6%) and seed dry weight

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losses percentage from (0.9 and 0.6%) to (4.5 and 3.9%), in the first and second seasons, respectively.

D- Effect of the interaction between harvesting dates and storage periods:

1- The interaction between harvesting dates and storage periods had a significant effect on mean germination time, insect infection percentage and seed dry weight loss in the first and second seasons while it had different effects on seedling fresh weight and seedling dry weight only in the first season.

2- At the first storage period (0 month), harvesting wheat seed after 75 days from 50% heading produced the fastest germination time (2.3 and 2.7 days). Meanwhile at the second storage period obtained seed from harvesting date 65 day from 50% heading produced the highest seedling dry weight (0.41 gm) in the second season.

3- After storage of 3 months late harvesting at 75 days from 50% heading gave the lowest mean of insect infestation and seed dry weight losses.

4- After 6 months from storage earlier harvesting date (45 day from 50% heading) resulted in the highest mean of insect infestation and seed dry weight loss in the two seasons.

E- Effect of the interaction between harvesting dates and seed classes:

1- At the first storage period (0 month) harvesting the foundation seed after 45 day from 50% heading produced the highest plumule length (6.04 and 6.23 cm) and radicle length (6.68 cm) meanwhile the registered seed produced the lowest weight of dry seedlings (0.34 cm).

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2- Harvesting after 55 days from 50% heading the foundation seed produced the highest dry weight of seedlings (0.45 cm), meanwhile the registered seed produced the tallest radicle length (7.13 cm). On the other side the certified seed class produced the tallest plumule length (6.94 and 7.13 cm).

F- Effect of the interaction between seed classes and storage periods:

1- At the first storage period (0 month), the highest mean of seedling fresh weight (2.68 g) was obtained from foundation seed, whereas, the lowest value of seedling fresh weight (1.20 g) was produced after 6 months from storage with the certified seed only in the first season.

G- Effect of the interaction among harvesting dates \times seed classes \times storage periods:

1- At the first storage period, the highest mean of germination energy (98.0 and 99.8) resulted from foundation seed when harvested after 55 days from 50% heading meanwhile the highest seedlings dry weight resulted from foundation seed class when harvested after 75 days from 50% heading in the first season meanwhile at the second season the highest seedlings fresh weight (2.43 cm) produced when harvested after 55 days from 50% heading.

2- After 6 months from storage the lowest means of germination energy (37.0 and 38.0) and seedling fresh weight (1.14 cm) were produced from the foundation seed class when harvested after 45 days from 50% heading.

Conclusion

The results suggested that maximum yield for wheat seed (c.v. Giza 168) could be achieved under the Dakahlia Governorate conditions through planting the seed classes (certified or foundation) and harvesting after 65 days from 50% heading with possibility of storage period for 6 months with maintain with high seed quality.