Contents

5.SUMMARY

The present study was carried out in Tag Al-Ezz, Agricultural Research Station Farm, ARC, Dakahlia Governorate during the two successive seasons of 2003 and 2004.The objective of this investigation to evaluate the quality seed of some Egyptian rice varieties. Seed has been an important agricultural commodity since crop were first domesticated. Part of the success of farmer 's crop depends on the quality of seed he plants. So, quality seed is one of the cheapest and most essential inputs for crop production. Even good management can not produce good yields from un adapted and contaminated varieties. If the seed had low viability, the plant stand would be poor. Similarly, if the seed were mixed with inert matters or weeds the crop will go down. The aim of this investigation was to identify four rice varieties namely Giza 177,Giza 178,Sakha 101 and Sakha 102 for studying the genetic purity of tested variety through the following seed classes: basic seed, registered seed, certified seed and commercial seed.

A split plot design with four replicates was used. The main plots included four rice varieties as follows:

1-Giza 177. 2- Giza 178. 3-Sakha 101. 4-Sakha 102.

The sub- plots were allocated to four seed classes as follows:

1-Basic seed. 2-Registered seed. 3-Certified seed. 4-Commercial seed.

Studied characters:

A-Laboratory experiment:

V-Germination and seedlings characters:

1- Germination percentage % .

2- Shoot length (cm).

3- Root length (cm).

4- Shoot/root (S/R).

5- Coleoptile length (mm).

6- Speed of germination index.

7- Seedlings dry weight (g).

IV-Grain reaction to Phenol and HCl acid:

1-Phenol colour reaction.

2-Colour reaction to Hcl acid.

IIV-Sodium Dodecyl Sulfate-Polyacrylamide Gel Electrophoresis.

B -Field experiments:

I-Quantitative characters:

1- Seed characters:

1.1-Seed length(mm).

1.2-Seed width(mm).

1.3-Seed thickness(mm).

1.4-Seed shape.

2- Quantitative plant characters:

2.1-Flag leaf area(cm^2).

2.2-Plant height(cm).

2.3-Number of tillers/hill.

2.4-Angle of the flag.

2.5-Culm diameter(mm).

2.6-Time of heading(days of 50% heading plants).

2.7- Uppermost node length of culm (cm).

3-Panicle characters and grain yield:

3.1-panicle length(cm).

3.2-Number of grains/panicle.

3.3-Panicle density.

3.4-Panicle weight(g).

3.5-Number of primary branches/panicle

3.6-Number of secondary branches/panicle.

3.7-1000 grain weight(g).

3.8-Grain yield (ton/fed).

3.9-Off-types percentage %.

II-Qualitative characters:

1- Flag leaf colour.

2-Ligule shape.

3-Collar colour.

4-Grain colour.

5-Auricle colour.

6-Awing.

7-Lemma and palea pubescence.

The main results obtained from this investigation could be summarized as follows:

A-Laboratory experiments:

I-Germination and seedlings characters:

1-Germination characters were significantly affected by four rice varieties. Giza 177 gave the highest coleoptile length(mm) in both seasons. Giza 178 gave the highest seedlings dry weight (g),shoot length (cm),root length (cm) and speed of germination index. Sakha 101 recorded the highest Germination percentage % . Sakha 102 recorded the highest shoot/root (S/R).

2-All germination characters were insignificantly affected by seed classes in both seasons except speed of germination index which were significantly affected by seed classes. Basic seed recorded the highest speed of germination in both seasons.

3-The interaction between varieties and seed classes had insignificant effect on all germination characters in both seasons.

II-Grain reaction to Phenol and HCl acid:

1-Phenol colour reaction:

All seed classes of Giza 178 variety took light brown colour. On the other hand, all seed classes of Giza 177,Sakha 101 and Sakha 102 varieties showed no

reaction during observation period in both seasons. Giza 178 could be easily identified by Phenol colour reaction.

2-Color reaction to Hcl acid:

All seed classes of Giza 177 variety showed light brown colour (++) in both seasons. All seed classes of Giza 178,Sakha 101 and Sakha 102 varieties showed dark brown colour (+++) in both seasons. Giza 177 could be easily identified by color reaction to Hcl acid.

III-Sodium dodecyl Sulfate-Polyacrylamide Gel Electrophoresis:

1-Basic ,registered, certified and commercial seed of **Giza 177** variety had 17,17,17 and 16 total proteins bands, respectively. commercial seed of Giza 177 variety had 2 distinguished total proteins bands with molecular weights of 105.66 and 10.74 KD. Basic ,registered, certified and commercial seed of **Giza 178** variety had 15,15,16 and 15 total proteins bands, respectively. Basic ,registered, certified and commercial seed of Sakha 101 variety had 14,14,15 and 12 total proteins bands, respectively. Commercial seed of **Sakha 101** variety had 2 distinguished total proteins bands with molecular weights of 178.47 and 72.83 KD. Basic ,registered, certified and commercial seed of **Sakha 102** variety had 14,14,14 and 13 total proteins bands, respectively. Registered seed of Sakha 102 variety had 1 distinguished total protein band with molecular weight of 155.27 KD.

B -Field experiments:

I-Seed and growth characters:

1-In both seasons, the four tested rice varieties were significantly varied among them on seed length(mm),seed width(mm),seed thickness(mm),seed shape, flag leaf area(cm^2),plant height(cm),number of tillers/hill, angle of the flag leaf, culm diameter(mm) and time of heading. Giza 177 variety gave the highest uppermost node length(cm), seed width(mm) and seed thickness(mm) in both seasons. Giza 178 variety recorded the highest flag leaf area(cm^2),number of tillers/hill and culm diameter(mm) in both seasons. Sakha 101 variety recorded the highest seed length(mm),seed shape and angle of the flag leaf in both seasons. Sakha 102 variety gave maximum plant height in both seasons.

2-There were insignificant differences among seed classes on seed length (mm), seed width(mm), seed thickness (mm), seed shape, flag leaf area(cm^2),plant height(cm) ,number of tillers/hill, angle of the flag leaf, culm diameter(mm) time of heading and uppermost node length(cm) in both seasons.

3-The interaction between varieties and seed classes had significant effect on seed length , seed width, seed thickness, seed shape, flag leaf area, plant height and node length of culm. The basic seed and registered seed of Sakha 101 variety recorded the highest seed length(mm) and seed thickness(mm),respectively. The commercial seed of Giza 177 variety and Giza 178 variety gave the highest seed width(mm) and seed shape, respectively. Sowing basic seed of Giza 178 variety and certified seed of Sakha 101 variety produced the highest flag leaf area(cm^2)and plant height(cm) ,respectively. Cultivation registered seed and basic

seed of Sakha 102 variety produced the highest angle of the flag leaf and uppermost node length(cm) in, respectively .

II-Panicle characters and grain yield:

1-Yield and yield attributes were significantly affected by four rice varieties in both seasons. Giza 178 variety recorded the maximum number of grains/panicle, panicle density, number of secondary branches/panicle and grain yield (ton/fed) in both seasons. Sakha 101 variety recorded the highest panicle weight(g)and number of primary branches/panicle in both seasons. Morever, Sakha 102 variety exceeded Giza 178 variety in 1000 grain weight by 36.14 and exceeded Giza 177 variety in panicle length by 18.18 % as an average of both seasons.It could be concluded that planting Giza 178 variety exceeded Giza 177 in grain yield/fed by 9.33 % in number of secondary branches per panicle by 10.7 %, in number of grains per panicles by 18.64 % and in panicle length by 18.8 % as an average of both seasons. In addition, Sakha 101 variety exceeded Giza 178 variety in number of primary branches /panicle by 26.8 % and in panicle weight by 28.5 % as an average of both seasons. finally, Sakha 102 variety gave the highest panicle length(cm) and 1000 grain weight(g) in both seasons.

2- There were insignificant differences among all Seed classes on panicle length and number of primary branches/panicle. Sowing commercial seed gave the lowest of panicle density, panicle weight(g) and number of secondary branches/panicle .Basic seed recorded the highest 1000 grain weight in both seasons. Sowing certified seed produced the highest grain yield(ton/fed) in both seasons.

3- The interaction between varieties and seed classes had significant effect on panicle length, panicle density, 1000 grain weight and grain yield (ton/fed).There were significant differences between planting certified seed and commercial seed of Giza 177 variety on panicle length and grain yield, significant differences were observed among sowing basic seed , registered seed and commercial seed of Giza 177 variety on panicle density. There were significant differences between certified seed and commercial seed of Sakha 101 variety on grain yield. There were significant differences between planting certified seed and commercial seed of Sakha 102 variety on grian yield. Planting registered seed of Giza 177 variety and Giza 178 variety produced the highest panicle density and panicle length, respectively. Sowing basic seed of Giza 178 variety recorded the highest grain yield(ton/fed).It could be summarized that planting Giza 178 variety with registered seed exceeded 1000 grain weight and grain yield/fed by 45 % and 8.8 % ,respectively compared with planting Giza 177 variety with commercial seed as an average of both seasons. Commercial seed of Sakha 101 produced the highest off – types plants percentage in both seasons. There were not any off - types plants from planting basic seed of four studied rice varieties. Basic seed of Sakha 102 variety gave the highest 1000 grain weight in both seasons.

III-Qualitative characters:

1-Giza 177 variety was identified by green flag leaf colour, cleft ligule shape, pale green collar colour, pale straw grain colour, pale green auricle colour, partly awned and medium pubescence of lemma and palea.

2- Giza 178 variety was identified by dark green flag leaf colour, cleft ligule shape, pale green collar colour, gold grain colour, pale green auricle colour, absent awned and medium pubescence of lemma and palea.

3-Sakha 101 variety was identified by green flag leaf colour, cleft ligule shape, pale green collar colour, straw grain colour, absent awned and strong pubescence of lemma and palea.

4- Sakha 102 variety was identified by green flag leaf colour, cleft ligule shape, pale green collar colour, straw grain colour, partly awned and medium pubescence of lemma and palea.

CONCLUSION

It could be summarized that seed has been produced under a seed certification program are the best for high grain yield due their high vigor ,viability and genetic purity. The verification of genetic purity , seed quality characters and identification of studied rice varieties under the environmental conditions of Dakahlia Governorate are shown in the following Tables:

Table 32 : Averages of Field and laboratory characters of seed classes for Giza 177 variety during 2003 and 2004 seasons.

Seed classes / Varieties	Basic	Registered	Certified	Commercial
Flag leaf area (cm^2).	24.42	25.75	24.52	22.29
Plant height (cm).	97.25	97.15	95.1	96.8
Number of tillers/hill.	18.3	18.6	17.8	17.8
No. of grains/panicle.	123.1	124.5	122.1	116.2
1000 grin weight (g).	27.53	27.52	27.52	26.05
Grain yield (ton/fed).	3.665	3.698	3.736	3.642
Off-types plants percentage %	Zero % 0 : 10.000	0.037 % 1 : 2700	0.7 % 7 : 1000	2 % 20 : 1000
Seedlings dry weight(g).	12.72	13.22	12.9	12.48
Speed germination index	19.06	19.40	17.12	17.25
No. of total bands.	17	17	17	16
No. of distinguished bands	----	----	----	2

Table 33 : Averages of Field and laboratory characters of seed classes for Giza 178 variety during 2003 and 2004 seasons.

Seed classes / Varieties	Basic	Registered	Certified	Commercial
Flag leaf area (cm^2).	39.33	36.80	38.32	36.62
Plant height (cm).	95.8	93.9	95.6	94.8
Number of tillers/hill.	23.7	22.3	23.2	22.7
No. of grains/panicle.	145.8	141.0	147.4	141.0
1000 grin weight (g).	20.87	20.16	20.83	19.13
Panicle weight (g).	2.87	2.97	3.06	2.72
Off-types plants percentage %	Zero % 0 : 10.000	0.037 % 1 : 2700	0.8 % 8:1000	1.7 % 17 : 1000
Speed germination index	18.23	18.37	18.37	17.7
Grain yield (ton/fed).	4.133	3.963	4.043	3.972
No. of total bands.	15	15	16	15
No. of distinguished bands	----	----	----	----

Table 34: Averages of Field and laboratory characters of seed classes for Sakha 101 variety during 2003 and 2004 seasons.

Seed classes / Varieties	Basic	Registered	Certified	Commercial
.Panicle density	7.8	7.7	7.4	7.2
No. of grains/panicle.	140.0	141.4	138.6	137.4
1000 grin weight (g).	27.57	27.27	27.32	25.55
Panicle weight (g).	3.82	3.74	3.86	3.52
Off-types plants percentage %	Zero % 0 : 10.000	0.04 % 1 : 2500	0.9 % 9 : 1000	4.1 % 41 : 1000
Grain yield (ton / fed).	3.943	3.922	3.935	3.873
No. of total bands.	14	14	15	12
No. of distinguished bands	----	----	----	2

Table35: Averages of Field and laboratory characters of seed classes for Sakha 102 variety during 2003 and 2004 seasons.

Seed classes / Varieties	Basic	Registered	Certified	Commercial
Flag leaf area (cm^2).	27.22	26.64	26.19	25.82
Panicle length (cm).	18.9	19.0	18.8	18.7
No. of grains/panicle.	125.1	124.1	125.7	120.6
Panicle density.	6.6	6.4	6.6	6.4
Panicle weight (g).	3.67	3.68	3.87	3.50
Off-types plants percentage	Zero % 0 : 10.000	0.038 % 1 : 2600	0.7 % 7 : 1000	2.6 % 26 : 1000
Speed germination index	16.35	15.96	16.28	15.25
Grain yield (ton/fed).	3.805	3.837	3.862	3.770
No. of total bands.	14	14	14	13
No. of distinguished bands	----	----	----	1

Table36: Field identification (quantitative and qualitative characters), phenol colour reaction and colour reaction to Hcl acid.

No.	Characters	Degree	Code	Rice varieties			
				Giza 177	Giza 178	Sakha 101	Sakha 102
1	Seed width	Thin	3	5	3	5	5
		Mdeium	5				
		Broad	7				
2	Plant height	Short	3	5	5	3	7
		Medium	5				
		Long	7				
		Very long	9				
3	Flag leaf angle	Erect	1	1	1	3	3
		Intermediate	3				
		Horizontal	5				
4	Culm diameter	Thin	3	5	7	5	3
		Medium	5				
		Thick	7				

Table 36 : Continue

No.	Characters	Degree	Code	Rice varieties			
				Giza 177	Giza 178	Sakha 101	Sakha 102
5	Time of heading	Early	3	3	5	5	3
		Medium	5				
		Late	7				
6	Panicle length	Short	3	3	5	7	7
		Medium	5				
		Long	7				
7	1000 grain weight	Low	1	3	1	3	5
		Medium	3				
		High	5				
8	Grain colour	Pale straw	1	1	5	3	3
		Straw	3				
		Gold	5				
9	Awns	Absent	1	3	1	1	3
		Partly awned	3				
		Awned	5				

Table 36 : Continue

No.	Characters	Degree	Code	Rice varieties			
				Giza 177	Giza 178	Sakha 101	Sakha 102
10	Lemma and palea pubescence	Absent	1	5	5	7	5
		Weak	3				
		Medium	5				
		Strong	7				
11	Reaction to phenol	Colourless	1	1	5	1	1
		Weak	3				
		Medium	5				
		Strong	7				
12	Reaction to Hcl	Colourless	1	3	5	5	5
		Weak	3				
		Medium	5				
		Strong	7				