Journal of Plant Production

Journal homepage: www.jpp.mans.edu.eg
Available online at: www.jpp.journals.ekb.eg

Performance of some Rice Varieties for Some Morphological, Yield and Effect of Popping Temperature and Sample Size on Popping Rice Characters

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ABSTRACT

Two field and laboratory experiments were conducted at Rice Research and Training Center (RRTC), Sakha. Egypt The first experimental was conducted with randomized complete block design with three replications to identify the mean performance of some rice varieties for morphological and yield characters, chemical, quality characters. The second experimental carried out at Rice Technology Training Center (RTTC) at Alexandria to study the effect of temperature, sample weight and their interaction on technological traits with split-split plot design with three replications during two seasons. The results showed that highly differences found for days to heading, plant height, number of panicles/plant, panicle weight, total grains/panicle and grain yield (t/fed) among the studied varieties. The Sakha 108 variety recorded the superior values for all the studied characters except days to heading. The Black rice variety recorded the lowest value for days to heading and plant height characters, while, recorded the desirable values for micro elements, zink, iron and protein, moreover, the short glutinous variety recorded the desirable values for fired characters. The Egyptian Yasmin was later one for days to heading, for the grain quality characters, moreover, recorded the desirable values for cooking characters as aromatic rice. Finally, it could be recommended these varieties used as adorners to improvement the grain quality characters in rice breeding program. Moreover, the denderogram analysis showed that the Egyptian yasmin as indica type was in one group, while, all japonica type was in second group, that confirmed with morphological, yield and grain quality characters.

***Keywords*:** Rice, varieties, fired rice.

INTRODUCTION

Rice (*Oryza sativa* L.) is one of the major staple food crops being grown worldwide. It is a nutritious cereal crop, provides 20 percent of the calories and 15 percent of the protein consumed by world's population. The world population is expected to reach 8 billion in 2025 and it is estimated that 50 % more food is required to feed the increased Khush, (2004). So, the breeders should be concerning on developing high yield varieties with good grain quality.

In Egypt the total cultivated area 1.186000 fed and the total production 4.5 million ton with average production 3.77 t/ fed EAS (2018) referred to decrease the cultivated area with increasing the shortage of irrigation water. So, should be finding out different ways to increase the productivity/unit area thorough using different growth regulators to increase the yield component.

The consumption in Egypt preferred the highly grain quality especially with hulling, milling and head rice percentage, also, the eating quality become preferred to some consumption. Designing snack foods today can be a complex process to meet changing consumers taste. Most snack manufacturers use some form of existing technology as the basis for creating snack products and incorporate variations that increase the resulting snacks' health image. Therefore, popping using advance technologies are processes, which could be accomplishing all these targets. The whole grain produce contributes numerous beneficial nutrients for human health including dietary, fiber, vitamins, minerals and phytochemicals Maisont and Narkrugsa, (2010). Moisture loss decreases popping performance Song and Eckhoff, (1994)

To avoid the limitations of conventional popping methods, electromagnetic waves such as microwaves are used now-a-days, which provides better energy efficiency in very short time. Microwave energy is worldwide used for producing popcorn. Though a wide range of cereals are used for popping; only few of them pop well. High popping could be achieved with paddy containing moisture content between 14 and 15%. Time of heating is a sensitive parameter for sharp rise in popping percentage as compared to power level Swarnakar *et al.*, (2014). Zinc and amylose content had significantly negative correlation with pop ability (Bhatupadya *et al.* 2008). The previous results showed that, it was found that the optimum conditions for producing popped rice with best yield were Giza 178 variety with 14% moisture content, 300 ºC heating temperature, one min time and 50 grams of paddy rice Abd El Salam (2006), should be select for eating quality and popping rice in rice breeding program.

Therefore, this study was conducted to assess the relationship between yield components and grain quality characters in some rice varieties and determine the effect of processing conditions, including temperature and sample weight on expansion of popped rice cultivars.

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DOI: 10.21608/jpp.2021.178922

MATERIALS AND METHODS

Newly harvested certified seeds in 2019 and 2020 growing seasons of five rice varieties namely Short Glutinous, Black Rice, Egyptian Yasmin, Sakha Super 300, and Sakha 108 were provided by Rice Research Program, Field Crop Research Institute, Agriculture Research Center, Sakha, Kafr El-Sheikh, Egypt.

Two field and laboratory experiments were performed at experimental farm for Rice Research and Training Center – Sakha and grain quality Labs; Rice Technology Training Center (RTTC), Alexandria, Egypt. The first experimental was conducted to identify the mean performance of some rice varieties for morphological, yield, chemical, quality characters. The second experimental carried out to study the effect of temperature, sample weight and their interaction on popping expansion of rice cultivars. The date of sowing was 1st May during 2019 and 2020 seasons and then the rice varieties were transplanted in seven rows with 5 m long as individual plants with plant spacing 20x20 cm, the rice varieties were grown in a Randomized Complete Block Design (RCBD) with three replications. All recommended cultural practices for rice cultivation were applied as recommended by RRTC (2008). Data were recorded on 25 randomly selected plants from each replication and mean values were used for statistical analysis. The second experimental design was A split-split plot design with three replicates was used in both seasons. The main plots were devoted to rice cultivars and the sub plots were occupied by three temperature levels (160, 180, and 200ºC) whereas, the sub-sub plots were assigned to three sample weight (30, 40 and 50 gm). The characters were measured on 14 % moisture content basis and fixed time for popping was 40 seconds.

Studied characters:

The data were recorded according to standard evaluation system of IRRI (2018) for all studied characters; days to heading, plant height, number of panicles/ plant, panicle weight, number of total grains / panicle and grain yield (t/fed) and quality characters hulling%, milling % and head rice% and chemical characters such as protein and elements (Zn, Fe, Mn, Mg), eating and cooking characters gelatinization temperature, gel consistency test, elongation ratio and popping characters were weight after popping (excluding loss in moisture), weight of popped rice (g), popping percentage (%), expansion ratio and density (g/cm^3).

Popped and unpopped grains were separated using a USA standard testing sieve (No. 6 Fischer Scientific co. Pitsburgh, PA). The popping percentage was calculated as mentioned by Swarnakar *et al*. (2014) as follows: Popping % = weight of popped grains / weight after popping X 100. Expansion ratio was the ratio of the volume of the popped grains without the husk to that of whole brown rice obtained from 25 g paddy Murugesan and Bhattacharya, (1989). Density was determined as described by Delost-Lewis *et al*. (1992).

Analysis of variance was carried out according to Gomez and Gomez (1984) using SAS program, version 8.0. Means were compared using least significant difference (LSD) at 0.05 level of probability. The combined analysis of the two experiments was done whenever homogeneity of variance was not significant.

RESULTS AND DISCUSSION

The results in the Table 1 clarified that there were a significant differences among the rice varieties in some characters namely days to heading, plant height and no. of panicles / plant. The rice variety Black rice recorded the shortest duration for days to heading and the shortest stature, whereas, the rice variety Sakha 108 recorded the highest value for number of panicles per plant.

The results in the Table 2 clarified that there were a significant differences among the rice varieties for the yield characters.

Table 1. Mean performance for morphological characters of some rice varieties during 2019 and 2020 seasons and their combined data..

Genotypes	Days to heading (day)			Plant height (cm)			No. of panicles / plant		
	2019	2020	Comb	2019	2020	Comb	2019	2020	Comb.
Short Glutinous	101.00	102.66	101.83	96.00	98.65	97.33	15.32	16.00	15.66
Black Rice	89.66	90.33	90.00	91.33	92.68	92.01	10.00	11.66	10.83
E. Yasmin	113.00	114.00	113.50	103.67	106.00	104.84	18.00	18.00	18.00
Sakha Super 300	108.66	110.33	109.50	107.00	106.00	106.50	16.33	17.00	16.67
Sakha 108	97.67	99.67	98.67	97.66	99.33	98.50	20.66	20.33	11.50
LSD 0.05	1.73	1.37	1.54	2.65	1.76	2.21	2.78	2.35	2.57

Table 2. Mean performance for yield and component characters of some rice varieties during 2019 and 2020 seasons and combined data.

Genotypes	Panicle weight (g)			No. of total grain / panicle			1000 grain weight (g)			Grain yield (t/ fed.)		
	2019	2020	Comb	2019	2020	Comb	2019	2020	Comb.	2019	2020	Comb
Short Glutinous	4.13	4.16	4.15	165.66	164.00	164.83	26.22	26.30	27.26	4.22	4.34	4.28
Black Rice	3.50	3.30	3.40	97.33	97.66	97.50	26.10	26.60	26.35	3.13	3.22	3.18
E. Yasmin	4.65	4.61	4.63	173.00	181.33	177.17	26.00	26.39	26.19	4.44	4.57	4.51
Sakha Super 300	4.25	4.27	4.26	165.66	167.33	166.50	28.08	28.55	28.29	4.63	4.65	4.64
Sakha 108	4.66	4.69	4.68	166.33	172.33	169.33	29.30	30.00	29.65	4.81	4.85	4.83
LSD 0.05	0.41	0.40	0.41	6.69	4.80	5.75	0.654	0.720	0.688	0.105	0.130	0.118

The varieties Sakha 108 and E. yasmin recorded the highest values for these traits during two seasons. While, Black rice recoded the undesirable values for yield and its components during two seasons. The increases in grain yield of Sakha108 and E. yasmin when cultivated under wider or medium spacing might be due to the vigorous growth in both shoots (canopy) and roots, so the wider or medium spaces are suitable for minimizing the competition among

both shoots and roots which led to increase both nutrient uptake and light penetration through the leaves of their canopy specially flag leaf plus second and third leaves which are representative for about 75% from total photosynthesis consequently increase the photosynthesis process and its products (assimilates) that translocate to the panicle and efficiently fill most of the spikelet's resulted in increase the number of filled grains consequently grain yield. These results coincidence with that recorded by Koutroubas and Ntanos (2003) and Sorour *et al.,* (2016).

The results in Table 3 Highly differences among rice genotypes for 1000- grain weight length, width grain, thickness, grain shape, Hardness and GT characters, where the rice variety Sakha 108 recorded the desirable values for hardness and GT , while short glutinous recorded the desirable values for length ,width, kernel ,thickness and shape , on the other side the Egyptian yasmine showed undesirable values for most of the studies characters, could be used the short glutinous as donor improve the grains physical characters during the two seasons, While Sakha 108 rice variety could be used as donor for improve, hardness characters in rice breeding program .

For grain chemicals characters, the results in Table 4 showed highly variability among the rice varieties during the two seasons , where , the short glutinous and black rice recorded the highest values for the protein content , while the black rice recorded the highest values for Zn,Fe and Mg, but, Sakha 108 rice variety recorded the highest value for Mn content , indicated to could be used the short glutinous as donor for improvement , the total protein content, while the black rice used as donor for improvement , the Zn ,Fe and Mg content , moreover, could be used the Sakha 108 rice variety as a donor for improvement the Mn content in rice breeding program.

Table 3. Mean performance for rice grain physical characters of some rice varieties as combined data for 2019 and 2020 seasons.

Genotypes	Grain Shape			Thickness			Hardness			Gel consistency test		
	2019	2020	Comb.	2019	2020	Comb.	2019	2020	Comb.	2019	2020	Comb.
Short glutinous	1.25	1.32	1.57	2.20	2.10	2.15	4.40	4.80	4.60	4.15	4.17	4.16
E. yasmin	3.17	3.15	3.16	1.70	1.75	1.72	6.30	6.16	6.23	4.25	4.09	4.17
Black rice	1.89	1.97	1.93	2.01	2.08	2.04	5.45	5.41	5.43	4.28	4.33	4.30
Sakha super 300	1.81	1.85	1.83	2.04	2.01	2.03	4.43	4.87	4.65	4.31	4.36	4.33
Sakha 108	1.70	1.82	1.76	1.72	1.86	1.78	4.35	4.67	4.51	4.68	4.78	4.73
LSD 0.05	0.065	0.071	0.034	0.474	0.482	0.478	0.095	0.117	0.106	0.275	0.280	0.278

Table 4. Mean performance for rice grain chemical characters of some rice varieties as combined data for 2019 and 2020 seasons.

Genotypes	Protein %			Zinc (Zn) ppm			Iron (Fe) ppm			Manganese (Mn) ppm			Magnesium (Mg) ppm		
	2019	2020	Comb.	2019	2020	Comb.	2019	2020	Comb.	2019	2020	Comb.	2019	2020	Comb.
Short glutinous	9.67	9.73	9.70	47.00	63.00	55.00	46.67	46.96	46.80	47.35	49.65	48.50	25.35	27.94	26.70
E. yasmin	7.38	4.62	7.50	70.48	70.52	70.50	55.08	55.14	55.11	47.25	49.76	48.50	43.42	44.58	44.00
Black rice	8.35	8.64	8.50	118.00	122.5	120.00	62.40	64.58	63.50	48.38	50.74	49.7	46.54	47.46	47.00
Sakha super 300	6.50	6.99	6.75	77.40	82.60	80.00	27.06	29.20	28.13	47.36	47.24	47.30	18.10	19.90	19.00
Sakha 108	7.40	7.90	7.65	54.00	57.40	55.70	46.85	47.17	47.00	63.05	64.00	63.50	20.85	21.15	19.50
LSD 0.05	0.285	0.297	0.291	2.009	2.015	2.012	6.63	8.51	7.57	1.201	1.273	1.237	1.55	1.95	1.75

The results in Table 5 showed that, the highly differences were found among the studied rice varieties, where the Sakha 108 rice variety was superior for the hulling%, milling% and head rice% characters, while the Egyptian yasmine recorded the lowest value for hilling and short glutinous recorded the lowest values for milling and head rice characters indicated to the Sakha 108 rice variety could be used as donor for improve in rice breeding program . Highest milling% (72%) was recorded for promising line Sakha108, compared with other check varieties

Table 5. Mean performance for rice grain quality characters of some rice varieties as combined data for 2019 and 2020 seasons.

Genotypes	Hulling (%)			Milling (%)			Head rice (%)		
	2019	2020	Comb.	2019	2020	Comb.	2019	2020	Comb.
Short glutinous	78.90	78.70	78.80	64.70	64.86	64.78	46.62	48.67	47.64
E. yasmin	75.15	77.18	76.17	68.90	71.06	69.98	62.75	64.91	63.83
Black rice	77.45	78.46	77.96	70.15	71.84	71.01	69.15	69.22	69.18
Sakha super 300	81.40	81.52	81.46	72.60	72.78	72.69	68.30	68.42	68.36
Sakha 108	83.70	83.82	83.76	72.80	72.98	72.89	69.45	69.81	69.63
LSD 0.05	1.023	1.111	1.067	1.478	1.500	1.489	2.605	2.208	2.606

The results in Table 6 showed that the short glutinous and Egyptian yasmine recorded the desirable values for timing popping, weight after pooping, popping %, expansion % and density % compared to other varieties, indicated to short glutinous and Egyptian yasmine considered as the best rice genotypes for pooping temperature, This might be due to genetic differences between cultivars in grain structure and endosperm characteristics. Abd El Salam *et al.,* (2006). Also, resulted showed the desirable treatment was 180 co compared to other treatments for all the studied traits. For weight sample to popping, the results showed that, the desirable values for the studied traits were recorded with 40 gm as sample weight compared to the other treatments, so, the all interaction were highly significant. This might be due to that increasing the popping temperature could accelerate both melting of rice kernels and evaporation of water in rice. The melting renders the rice grain elastic and expandable whereas, the evaporation exerts the pressure needed for expansion. Therefore, the expansion of rice increased with

increasing heating temperature. Similar results was reported by Swarnakar *et al* (2014) showed The maximum popping percentage of 63.47% was obtained at a moisture content of 14.15% and energy level of 80 kJ (1000 W and 80 s) while the maximum expansion ratio of 4.42 was obtained at 14.94% moisture content and energy level of 68 kJ (850 W and 80 s). Optimum values of microwave power, time of heating and moisture content of paddy were achieved at 1000 W, 80 s and 15%, respectively, corresponding to popping percentage and expansion ratio of 58.73 and 3.58.

Table 6. The effect of different temperature and sample weight of some rice varieties on the popping character as combined data for 2019 and 2020 seasons.

Main effect	Timing Popping			Weight after popping			Popping (%)			Expansion (%)			Density (%)		
Varieties (V)	**2019**	**2020**	**Comb.**	**2019**	**2020**	**Comb.**	**2019**	**2020**	**Comb.**	**2019**	**2020**	**Comb.**	**2019**	**2020**	**Comb.**
Short Glotinious	0.80	0.78	0.79	34.90	34.95	34.92	80.55	80.71	80.63	7.81	7.85	7.83	126.70	126.82	126.76
E. Yasmin	0.85	0.89	0.87	34.60	34.71	34.65	81.12	81.15	81.13	9.35	9.51	9.43	126.90	127.1	127.00
Black Rice	1.01	1.07	1.06	35.09	35.13	35.11	46.25	46.37	46.31	8.05	8.61	8.33	146.35	147.15	146.75
Sakha super 300	1.40	1.58	1.49	33.85	35.97	34.91	70.68	70.60	70.64	7.35	8.04	7.69	136.13	136.07	136.10
Sakha 108	0.94	1.02	0.98	35.53	35.58	35.55	62.95	63.11	63.03	7.95	8.02	7.97	139.90	139.93	139.91
LSD 0.05	0.079	0.076	0.078	0.190	0.197	0.193	1.310	1.322	1.316	0.345	0.356	0.351	1.149	1.145	1.147
Temperature (T)															
160	1.55	1.50	1.53	34.80	34.72	34.76	67.85	68.13	67.99	8.20	8.26	8.23	134.50	134.60	134.55
180	0.90	0.93	0.91	34.95	35.01	34.96	68.88	69.00	68.94	8.35	8.45	8.40	135.34	135.40	135.37
200	0.67	0.69	0.68	35.28	35.44	35.36	68.10	68.12	68.11	8.09	8.15	8.12	135.90	136.12	136.00
LSD 0.05	0.020	0.026	0.023	0.061	0.068	0.064	0.574	0.584	0.579	0.030	0.038	0.034	0.749	0.747	0.748
Weight sample(W)															
30	0.80	0.94	0.87	26.20	26.25	26.22	66.60	68.84	67.67	8.19	8.25	8.21	136.12	136.20	136.15
40	1.17	1.10	1.13	35.16	35.18	35.17	71.50	71.92	71.70	8.35	8.37	8.36	132.31	132.33	132.32
50	1.13	1.09	1.11	43.50	43.88	43.69	65.77	65.52	65.67	8.15	8.20	8.18	137.48	137.41	137.45
LSD 0.05	0.045	0.040	0.042	0.094	0.090	0.092	0.401	0.398	0.396	0.018	0.024	0.020	0.410	0.413	0.406
Interaction															
V * T	*	**	**	**	**	**	*	**	**	**	**	**	**	**	**
V * W	**	**	**	**	**	**	**	*	**	**	*	**	**	*	**
T * W	**	**	**	**	**	**	*	**	**	**	**	**	**	*	**
V * T *W	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**

The results in Table 7 showed that, the desirable results was recorded from short glutinous and Egyptian yasmine with 180c pooping temperature and gm sample weight compared to other treatments of the studied rice varieties , indicated to could be used the short glutinous and Egyptian yasmine as a donor to improvement traits in rice breeding program. Expansion during cooking due to water absorption and hence increase in cocked rice volume is directly affected by amylose content.

Table 7. Time popping and weight after popping of some rice varieties as affected by different pooping temperature and sample weight as combined data as combined data for 2019 and 2020seasons

Varieties	Temperature	Time popping			Weight after popping		
		Weight sample			Weight sample		
		30	**40**	**50**	**30**	**40**	**50**
Short Glotinious	160	1.05	1.80	1.18	26.06	34.90	42.98
	180	0.78	0.35	0.80	25.85	35.67	42.94
	200	0.42	0.34	0.40	26.41	35.19	44.28
E. Yasmin	160	1.38	1.51	2.27	25.99	34.22	43.15
	180	0.38	0.46	0.53	26.23	35.35	43.32
	200	0.37	0.45	0.48	26.40	34.89	42.31
Black Rice	160	1.26	1.38	1.82	25.46	34.4	43.66
	180	0.55	0.80	1.33	25.83	34.82	43.46
	200	0.32	1.02	1.05	27.00	36.54	44.84
Sakha Super 300	160	1.17	2.15	2.44	26.33	35.13	42.79
	180	1.14	2.22	1.11	27.16	34.91	43.05
	200	0.49	1.18	1.52	25.12	36.63	43.08
Sakha 108	160	1.22	1.82	0.47	26.72	34.83	44.80
	180	1.30	1.06	0.79	26.16	34.17	45.45
	200	1.29	0.37	0.51	26.59	35.92	45.27
LSD 0.05		0.165			0.359		

Low amylose content rice varieties (17- 22%) are Egyptian consumer`s preference. Sakha108 and check varieties exhibited excellent cooking quality with amylose content ranged between 18 to 19%.

The results in Table 8 and 9 showed that , the density % was affected by different popping temperature and popping weight sample , whereas the treatment 180 c^o popping temperature and 40 gm popping weight sample of short glutinous were recorded the desirable values compared the other treatments, indicated to this characters , could be improved through rice breeding program. Popping quality is always determined by calculating the expansion ratio.

Table 8 . Popping and expansion (%) of some rice varieties as affected popping temperature and sample weight as combined data as combined data for 2019 and 2020 seasons .

Varieties	Temperature	Popping %			Expansion		
		30	**40**	**50**	**30**	**40**	**50**
Short Glotinious	160	81.77	83.98	76.30	7.81	8.13	7.87
	180	84.41	88.32	79.62	7.79	7.98	7.68
	200	74.52	79.30	77.46	7.71	7.84	7.68
E. Yasmin	160	83.18	84.05	79.81	9.22	9.50	9.21
	180	78.03	83.73	78.51	9.32	9.91	10.00
	200	75.37	85.18	82.35	9.34	9.29	9.08
Black Rice	160	40.33	50.77	45.28	8.16	8.46	8.27
	180	38.81	45.14	42.14	8.15	8.34	8.30
	200	49.36	60.49	44.46	8.38	8.58	8.33
Sakha Super 300	160	71.22	80.32	72.52	7.66	8.17	7.70
	180	76.35	68.67	74.78	8.36	7.46	8.66
	200	67.19	68.42	56.30	7.26	7.42	6.55
Sakha 108	160	57.06	58.54	54.78	7.87	7.92	7.58
	180	74.16	64.75	56.73	8.22	8.11	7.72
	200	63.33	73.86	64.08	7.96	8.37	8.03
LSD 0.05		1.534			0.076		

It is defined as ratio of the volume of the popped without husk to that of raw brown rice at a constant weight (Murugesan and Bhattcharya, 1989). Moreover, determinations of Flake size, popping density, hydration power, hardness, whiteness, size and shape of the end product are of significant importance. Expansion ratio as well as other quality indices have been found to depend on many factors, such as moisture content of rice, kernel size, shape and other physical properties of variety or genotype, harvesting and handling practices, drying conditions, kernel damage, kernel structure, amount and distribution of protein, starch composition, popping temperature, popping method, and several other unexplained factors Srinivas and Desikachar (1973) and Gokmen, (2004). However, among all these factors affecting expansion ratio, moisture content is the most critical factor, because it affects the rate and extent of pressure build up in starch granules Hoseney *et al.*, (1983) and Tain *et al* (2011)

Table 9. Density % as affected by pooping temperature and weight sample of some rice varieties as combined data for 2019 and 2020 seasons.

Varieties	Temperature	Weight Sample		
		30	40	50
Short Glotinious	160	122.50	116.3	134.75
	180	119.45	115.90	131.10
	200	135.15	132.65	133.05
E. Yasmin	160	123.80	123.05	129.75
	180	133.40	125.35	132.85
	200	134.80	120.20	119.85
Black Rice	160	150.15	144.05	146.05
	180	150.95	149.4	149.20
	200	143.90	140.55	146.55
Sakha Super 300	160	136.60	126.15	137.05
	180	135.25	137.55	133.80
	200	138.60	137.65	142.30
Sakha 108	160	142.55	142.05	143.50
	180	135.20	138.75	142.4
	200	140.05	135.20	139.55
LSD 0.05			1.574	

The denderogram for morphological, grain yield, quality and chemical and eating for grain characters of some rice varieties showed that, these varieties divided to two main groups, the first one for japonica type which divided to sub group, one sub group for Black rice and second sub group for Sakha super 300 with one single branch, while the second branch included Sakha 108 and short glutinous, on the other side, the Egyptian yasmine was found in one group that confirmed with rice taxonomy where, the genetic diversity was highly between indica and japonica type, as shown Fig 1 these results were confimed with Hammoud *et al* (2020) they mentioned that, the Sakha 108 as japonica type early maturing, high yielding and resistance to blast.

Finally, it could be recommended these varieties used as adorners to improvement the grain quality characters in rice breeding program. Moreover, the denderogram analysis showed that the Egyptian yasmin as indica type was in one group, while, all japonica type was in second group, that confirmed with morphological, yield and grain quality characters.

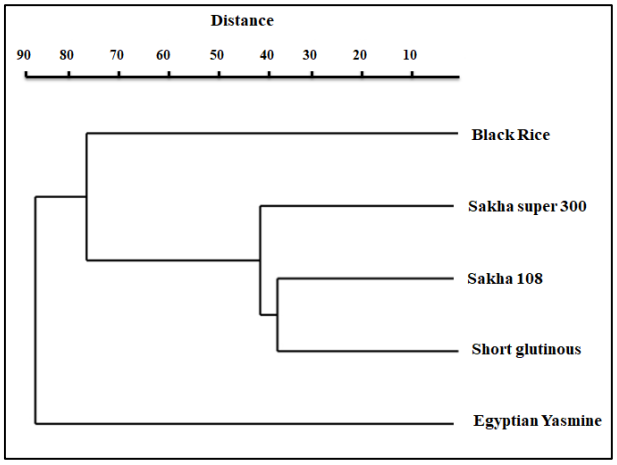

Fig 1. Cluster analysis among some rice varieties for morphological, yield and its component traits.

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أداء بعض أصناف الأرز للصفات المورفولوجية والمحصول وتأثير درجة الحرارة وحجم العينة علي صفات جودة الأرز الفشار

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مركز تكنولوجيا والتدريب في الارز- معهد بحوث المحاصيل الحقلية- مركز البحوث الزراعية

أجريت تجربتان الاولي حقلية في قسم بحوث الأرز بسخا، صممت التجربة في قطاعات كاملة العشوائية في ثلاث مكررات للتعرف علي سلوك بعض أصناف الأرز للصفات المورفولوجية والمحصولية والكيماوية والجودة ، بينما التجربة الثانية أجريت في مركز بحوث تكنولوجيا الارز بالأسكندرية لتجربة قطع منشقة مرتين في ثلاث مكررات لدراسة تأثير درجات الحرارة وحجم العينة علي بعض أصناف الأرز. أوضحت النتائج وجود فروق عالية المعنوية بين أصناف الأرز للصفات المحصولية حيث سجل الصنف سخا 108 أفضل القيم المرغوبة للصفات المدروسة عدا صفة عدد الايام حتي التزهير، كذلك سجل الصنف الأرز الأسمر أفضل القيم المرغوبة لصفتي عدد الايام حتي التزهير وارتفاع النبات بالإضافة لمحتواه العالي من العناصر الصغري والبروتين سجل الصنفان الشمعي القصير والياسمين المصري أفضل القيم المرغوبة لصفات الأكل والتفشير لانه صنف عطري لكن سجل اعلي القيم لصفة عدد الأيام حتي التزهير. أظهر التحليل العنقودي بأن الصنف الياسمين المصري كصنف هندي وجد في مجموعة بينما بقية الأصناف وجدت في المجموعة الثانية بكونها أصناف يابانية طبقا للصفات المورفولوجية والمحصولية والجودة. وتوصي الدراسة باستخدام هذه الأصناف كأباء لتحسين صفات المحصول والجودة في برامج التربية.