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EFFECT OF SEEDLING AGE AND PLANT SPACING ON GROWTH CHARACTERS AND YIELD OF SOME RICE CULTIVARS

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ABSTRACT

Two field Experiments were carried out in summer seasons of 2008 and 2009 at the Experimental Farm of Rice Research section Agricultural Research station, El-Gemmiza, Gharbia Governorate. This investigation was conducted to study the response of two rice cultivars (Giza 178 and Egyptian Hybrid 1), Three seedling ages (15, 20 and 25 days after planting) and three transplanting spaces (20 × 20, 25 × 25 and 30 × 30 cm) as well as their interactions on growth characters, yield and its attributes. The main results could be summarized as follows: cultivars significantly differed for all traits, Egyptian Hybrid 1 variety produced the maximum number of tillers / m^2, number of panicle / m^2, panicle length (cm) , number of total grains / panicle, 1000- grain weight (g) and grain yield (t/fed). While lowest values of these traits were recorded when using Giza 178 cultivar. Seedling ages had asignificant effect on all studied charactarist. Younger seedlings (15 day old) produced significantly the highest values. While the minimum values of the previous traits were obtained when plants were transplanting at (25 day old) seedlings. Plant spacing significantly differed for all traits. Wider spacing (30 × 30 cm) gave maximum number of tillers/ m^2, number of panicle/ m^2, panicle length (cm), number of total grains / panicle, 1000- grain weight (g). and grain yield (t/fed) While closer spacing (20 × 20 cm) gave the lowest values. Significant effect for the the interaction between the three factors under study. The highest values of all traits were recorded when using Egyptian Hybrid 1 cultivar, youngest seedling age (15 day old) and widest spacing between hills (30 × 30 cm).On the other hand, the lowest values were recorded when using Giza 178 cultivar, the oldest seedling age (25 day old) and closest spacing between hills (20×20cm)in the both seasons. In general it could be recommended that, using Egyptian Hybrid 1 with seedling age 15 days and plant spacing of 30 × 30 cm under transplanting.

Keywords: Rice cultivars, Seedling age,Transplanting spaces.

INTRODUCTION

Rice (*Oryza sativa L*.) is one of the important cereal crops in the worled as well as in Egypt and the principle food for more than half of the worldpeople. The need to raise grain yield of rice per unit land area is considered anative goal to meet the consistent demande from this crop. Among various factors affecting rice production, such as cultivars, seedling age, transplanting spacing between hills, planting methods, nitrogen fertilization and other most important agronomic practice.

High yielding ability cultivars is very important to raise productivity. For this reason and other several traits are aming to evaluate the new promsing cultivars with the old traditional for scooping light on the best cultivar that can be used on a large scale .Many investiglators indicated that rice cultivars significantly differed in grain yield and its attributing characters, as reported by El-kassaby *et al.*1991, Ibrahim 1995, El- Hissewy *et al.* 2002, Abdel-Rahmn *et al.* 2004. El-Bably *et al*.2007, El-Maksoud 2008 and Zaki *et al*. 2009.

Seedling ages are considered in most cases the limiting factor for grain yield and quality. The youngest seedling recorded the highest significant values of grain yield and most of its components.In this regard Chopra *et al.*2002 found that theirty- five day old seedlings had grater number of panical/hill, panical length, 1000 seed weight and seed yield than 55 to 65 day old seedlings. Kewat *et al.* 2002 indicated that transplanting seedlings of 21 and 28 day old recorded significantly higher grain and straw yilds. Upandhyay 2003 recorded that 20 and 30 day old seedlings produced significantly higher grain over growing of 40 and 50 day old seedlings. Mohammad *et al.* 2004 stated that rice yield decreased with transplanting the older seedlings. On the other hand, Molla 2001 found that twenty-eight day old seedlings produced more tillers, panicles/m² and grain yield than 21 days old seedlings.

Transplanting spaces plays essential role in increasing rice crop productivity. Chopra and Chopra 2004 noteced that widder spacing of 20 × 15 and 30 × 15 cm recorded significantly higher number of panicles than the closer spacing of 15 × 15 cm. However, the seed yield was not affected due to diffenent spacing Shinde *et al* 2005 indicated that wider spacing of 30 cm produced significantly higher grain (t/ha) attribated mainly due to significantly higher value of number of panicle / m², length of panicale and 1000 grain weight over the closer spacing of 25 cm. On other hand, Patra and Nayak 2001 found that closser spacing of 15 × 10 cm gave significantly higher panicale/ m², grain and straw yields as compare to wider spacing 20 × 10 cm. Hwever panicale length, panicale weight and 1000 grain weight did not influenced significantly by the spacing. Kewat *et al.* 2002 indicated that transplanting seedlings at closer spacing of 20 × 10 cm produced significantly highest grain and straw yields than the wider spacing of 20 × 15 cm but was comparable to 15 × 15 cm spacing. Shivay and Singh 2003 on hybrid rice PRH10, planting geometry of 20 × 15, 15 × 12 and 30 × 10 cm did not influnced significantly number of panicale/ hill, panicale linght, filled grains/ panicle, panicle weight, 1000 grain weight.This might be due to equal area was provided in each planting geometry / hill.Gunri *et al.* 2004 and Pol *et al*. 2005 recorded the same rasults.

The present investigation aimd to evaluate the effect of seedling age and spacing between plants on two cultivars and their interactions under the system of rice intensification (SRI) on yield and yield components.

MATERIALS AND METHODS

Two field experiments were carried out at the Farm of Rice Research section Agricultural Research station, El-Gemmiza, Gharbia Governorate, during the two successive summer seasons of 2008 and 2009. The objective of these experiments was to evalluatte the influence of the seedling ages and spacing between transplanting seedlings on some rice cultivars on yield and its components.

Rice grains of the studied cultivar Giza 178 and Egyptian Hybrid 1 was obtained from Rice research section, El-Gemmiza Agricultural Research station, Gharbia Governorate.

The nursery seedbed preparations were well performed, the nursery land was fertilized with calcium super phosphate (15.5 % P2O5) at the rate of 4kg /kirat (175 m²) on the dray soil before ploughing. Nitrogen form of urea (46 % N) was added at the rate of 3 /kirat (175 m²) after the last ploughing and before leveling. Seeds of rice Giza 178 and Egyptian Hybrid 1 rice cultivars at the rate of 60 and 10 kg/fed, respectively. Were planted dry seed on dry soil and then irrigation on 6th May. Weeds were chemically controlled with Saturn (50%) at seven days after sowing. And then transplanting on 21^{st}, and 26^{th} and 31^{st} in 2008 and 2009 seasons, respectively.

The permanent field was well performed, calcium super phosphate (15.5 % P2O5) was added at the rate of 100kg /fed. On the dray soil before ploughing, the land was flushed with water. Nitrogen fertilizer in the form urea (46 % N) was added at the rate of 60 units/fed. The first part was added before transplanting the seedlings, the second was added after 30 days after 30 days from sowing, and the third was added after 20 days from the second one.

Transplanting was done by using 15, 20 and 25 day old seedlings under 20 × 20, 25 × 25 and 30 × 30 cm spacing between hills, under the system of rice intensification (SRI). Weeds were chemically controlled with Saturn 50 % EC at the rate of 2 L/fed.

The experimental plot size was 3m width and 3.5m length, resulted an area of 10.5 m² (1/400 fed). The previous crop was Egyptian clover (*Trifolium alexandrinum*) in both seasons.

However, the common agricultural practices for growing rice according to the recommendations of Ministry of Agriculture and Land Reclamation were followed, except the factors under study. SRI watering management was followed (Irrigation was when the onset of cracking of the soil, or once a week).

The experiments were carried out in split split plot design with three replications. The two cultivars (Giza 178 and Egyptian Hybrid 1) were randomly arranged in the main plots, while the sup plots received to three seedling ages (15, 20 and 25 days) and The sup sub plots were devoted to three transplanting spaces (20 × 20, 25 × 25 and 30 × 30 cm).

All data of this study were subjected to the statistical analyzed as the technique of analysis of variance (ANOVA) for the split split plot design as

mentioned by Gomez and Gomez 1984, by using means of "MSTAT-C" computer software package. Least Significant Difference (LSD) method was used to test the differences between treatment means at 5 % level of probability as described by Snedecor and Cochran 1980.

RESULTS AND DISCUSSION

Effect of cultivars:

In both seasons the results in Table 1 indicated that the two tested cultivars significantly differed in all studied characters. Egyptian Hybrid 1 rice cultivar significantly produced the highest number of tillers /m², number of panicles /m², panicle length (cm), number of total grains / panicle, 1000- grain weight and grain yield (t/fed),. While Giza 178 rice cultivar produced the lowest values. Differential performance of two cultivars may be attributed to differences in genetic back ground and constitution of these cultivars. These results were parallel with those reported by Abou khalifa *et al* 2009.

Table 1: Means of number of tillers /m², number of panicles /m², panicle length (cm), number of total grains/ panicle, 1000- grain weight and grain yield(t/fed) of rice as affected by cultivar, seedling ages and transplanting spaces during 2008 and 2009 seasons.

Characters / Treatments	Number of tillers /m²		Number of panicles /m²		Panicle length (cm)		Number of total grains/ panicle		1000-grain weight		Grain yield (t/fed)	
	2008	2009	2008	2009	2008	2008	2009	2009	2008	2009	2008	2009
A- Rice cultivars:												
Giza178	407.82	405.64	384.49	395.43	21.78	22.07	141.03	139.03	25.37	25.27	3.96	3.64
Egyptian Hybrid 1	423.15	420.60	402.52	410.58	22.90	23.94	164.07	162.03	26.38	26.28	4.75	4.95
F. test	**	**	**	**	*	*	**	**	**	**	**	**
B seedling ages:												
15 day	427.03	425.72	406.44	415.63	23.48	24.12	166.61	164.55	26.91	26.80	4.61	4.45
20 day	412.65	414.27	388.09	404.00	22.06	22.50	150.50	148.50	25.88	25.75	4.36	4.03
25 day	406.78	399.36	385.98	389.37	21.48	20.91	140.55	138.55	24.83	24.77	4.09	3.50
F. test	**	**	**	**	**	**	**	**	**	**	**	**
LSD at 5%	4.17	3.08	2.50	3.16	0.22	0.13	7.50	7.4	0.26	0.09	0.14	0.05
C- Transplanting spaces:												
20 × 20 cm	403.48	403.15	382.58	393.09	21.67	21.81	149.50	147.50	23.83	23.78	4.01	3.38
25 × 25 cm	417.72	414.26	396.92	403.82	22.31	22.48	153.00	152.94	25.82	25.78	4.30	4.10
30 × 30 cm	425.26	421.94	401.02	412.09	23.04	23.23	155.16	155.16	27.97	27.76	4.46	4.90
F. test	**	**	**	**	*	*	**	**	**	**	*	*
LSD at 5%	2.42	1.25	3.03	3.66	0.03	0.06	0.30	3.04	.026	0.24	0.14	0.11
D- The interactions:												
A × B	**	NS	NS	NS	**	*	**	**	*	NS	*	**
A × c	NS	**	NS	**	**	NS	NS	**	NS	**	*	**
B × C	NS	**	**	**	**	**	**	**	NS	NS	**	**
A × B × C	**	**	.**	**	NS	NS	**	**	*	*	NS	NS

Effect of seedling ages:

The results in Table 1 indicated that all measured traits were significantly affected by seedling ages. The highest number of tillers /m², number of panicles /m², panicle length (cm), number of total grains / panicle, 1000- grain weight and grain yield (t/fed), were produced when using the youngest seedling 15 day old in the first and second seasons. On the other hand the oldest seedling age 25 day old gave the lowest values of these traits. These are in agreement with those obtained by Khusrul and Aminul

2009 Salem. *et al* 2011. On other hand, Molla 2001 found that twenty – eight day old seedlings produced more tillers, panicle / m² and grain yield than 21 day old seedlings. Similar results were also obtained by Mohammad *et al.* 2004.

Effect of transplanting spaces:

The statistical analyses of data in Table 1, recorded that all measured trait were significantly affected by transplanting spaces. The highest number of tillers /m², number of panicles /m², panicle length (cm), number of total grains / panicle, 1000- grain weight and grain yield (t/fed), Were produced when using the widest spacing between hills (30 × 30 cm) in both seasons. While the lowest values were obtained when using the closest spacing between hills (20 × 20 cm). These results are in agreement with those obtained by Srivastav and Tripathi 1998. These increases in all traits may be due to the regular space between plants that make solar radiation which enable to pass all canopies and make plants are well in photosynthesis process.

Effect of the interaction between cultivars and seedling ages:

The results in Table 2 indicated that the interaction between cultivars and seedling ages had a significant effect on some measured traits. The highest number of tillers /m² in the first season, panicle length (cm), number of total grains / panicle in the first and second seasons, respectively., 1000-grain weight in first season and grain yield (t/fed) in the first and second seasons, respectively. were recorded when using Egyptian Hybrid 1 cultivar and youngest seedling ages (15 day old). On the other hand, the lowest values of these characters were obtained when using Giza178 cultivar and oldest seedling ages 25 day.

Table 2: Means of number of tillers /m² , number of panicles /m² , panicle length (cm), number of total grains/ panicle, 1000- grain weight and grain yield (t/fed), of rice as affected by the interaction between cultivars and transplanting ages during 2008 and 2009 seasons:

Characters / Treatments		Number of tillers /m²	Panicle length (cm)		Number of total grains/ panicle		1000- grain weight	Grain yield (t/fed)	
		2008	2008	2009	2008	2009	2008	2008	2009
cultivars	ages								
Giza178	15 day	418.7	22.9	23.7	135.22	133.22	26.27	4.11	3.92
	20 day	407.2	21.4	22.1	126.00	124.00	25.44	4.06	3.71
	25 day	397.5	20.9	20.3	111.88	109.88	24.38	3.71	3.30
Egyptian Hybrid 1	15 day	435.3	24.0	24.5	176.33	174.33	27.55	5.12	4.98
	20 day	418.0	22.7	22.8	153.11	151.11	26.33	4.66	4.36
	25 day	416.0	21.9	21.4	144.11	142.11	25.27	4.47	3.70
F. test		**	**	*	**	**	*	*	**
LSD at 5%		2.28	0.11	0.18	5.87	5.87	0.27	0.21	0.12

Effect of the interaction between cultivars and transplanting spaces:

The results in Table 3 indicated that the interaction between cultivars and transplanting spaces on all measured traits had a significant effect. The highest number of tillers /m², number of panicles /m² in the second season, panicle length (cm) in the first season, number of total grains / panicle in the

second season, and 1000- grain weight in the second season and grain yield (t/fed) in the first and second seasons, respectively.. Were recorded when using Egyptian Hybrid 1 and widest spacing between hills (30 × 30 cm). On the other hand, the lowest values of these traits were produced when using Giza178 and closest spacing between hills (20 × 20 cm).

Table 3: Means of number of tillers /m², number of panicles /m², panicle length (cm), number of total grains/ panicle, 1000- grain weight and grain yield of rice as affected by the interaction between cultivars and transplanting spaces during 2008 and 2009 seasons:

Characters / Treatments		Number of tillers /m²	Number of panicles /m²	Panicle length (cm)	Number of total grains/ panicle	1000-grain weight	Grain yield (t /fed)	
		2009	2009	2008	2009	2009	2008	2009
cultivars	spaces							
Giza178	20×20cm	395.3	385.2	21.1	121.66	3.90	2.91	23.46
	25×25cm	405.7	395.0	21.8	119.55	4.01	3.87	25.30
	30×30cm	415.8	405.9	22.3	125.88	3.97	4.14	27.06
Egyptian Hybrid 1	20×20cm	410.9	400.9	22.1	153.11	4.72	3.85	24.10
	25×25cm	422.7	412.5	22.7	155.22	4.58	4.33	26.27
	30×30cm	428.0	418.2	23.7	159.22	4.95	4.86	28.46
F. test		**	**	**	**	**	*	**
LSD at 5%		1.66	1.75	0.11	5.87	0.20	0.21	0.12

Effect of the interaction between seedling ages and transplanting spaces:

The results in Table 4 showed that, the interaction between seedling ages and transplanting spaces on some measured traits differ significantly. The highest number of tillers /m² in the second season, number of panicles /m², panicle length cm, number of total grains / panicle and grain yield (t/fed) in the first and second seasons, respectively.

Table 4: Means of number of tillers /m², number of panicles /m², panicle length (cm), number of total grains / panicle and grain yield of rice as affected by the interaction between transplanting ages and transplanting spaces during 2008 and 2009 seasons.

Characters / Treatments		Number of tillers /m²	Number of panicles /m²		Panicle length (cm)		Number of total grains/ panicle		Grain yield (t/fed)	
		2009	2008	2009	2008	2009	2008	2009	2008	2009
Ages	Spaces									
15 day	20×20 cm	419.6	395.2	409.3	22.5	23.5	153.33	151.33	4.41	3.73
	25×25 cm	424.3	407.9	414.0	23.2	24.0	144.66	142.66	4.40	4.48
	30×30 cm	433.2	416.1	423.5	24.5	24.8	169.33	167.33	5.03	5.15
20 day	20×20 cm	401.7	380.1	391.9	21.7	21.9	151.83	149.83	4.35	3.51
	25×25 cm	416.9	394.0	406.0	22.2	22.5	137.83	135.83	4.35	4.13
	30×30 cm	424.1	390.0	414.0	22.2	23.0	129.00	127.00	4.40	4.46
25 day	20×20 cm	388.0	372.3	378.0	20.7	19.9	122.16	120.16	4.16	2.90
	25×25 cm	401.5	388.7	391.4	21.3	20.8	132.50	130.50	4.15	3.70
	30×30 cm	408.4	396.8	398.6	22.3	21.9	129.33	127.33	3.96	3.90
F. test		**	**	**	**	**	**	**	**	**
LSD at 5%		2.18	5.25	2.89	0.23	0.25	6.90	6.90	0.25	0.19

Were recorded when using youngest seedling ages (15 day old) and widest spacing between hills (30 × 30 cm). On the other hand, the lowest values of these traits were obtained when using oldest seedling ages (25 day old) and closest spacing between hills (20 × 20 cm). These results are in good accordance with those reported by Chandrakar *et al.* 2008, as well as Sreedhar *et al.* 2010. Studied the effect of three seedling ages (12, 14 and 16 day old) under three spacing (30 × 30, 25 × 25 and 20 × 20 cm). They found that 16 day old seedlings and planted under (25 × 25 cm) spacing recorded the highest values for seed yield and its attributes.

Effect of the interaction between cultivars, seedling ages, and transplanting spaces:

The results in Table 5 indicated that the interaction between cultivars, seedling ages and transplanting spaces on some measured traits differ significantly. The highest number of tillers /m², number of panicles /m², number of total grains / panicle and 1000- grain weight in the first and second seasons, respectively. Were recorded when using Egyptian Hybrid 1 cultivar, youngest seedling ages (15 day old) and widest spacing between hills (30 × 30 cm). On the other hand, while the lowest values of these traits were obtained when using Giza178 cultivar, oldest seedling ages (25 day old) and closest spacing between hills (20 × 20 cm).

Table 5: Means of number of tillers /m² , number of panicles /m², number of total grains/ panicle and 1000- grain weight of rice as affected by the interaction between cultivars, seedling ages and transplanting spaces during 2008 and 2009 seasons:

Characters / Treatments			Number of tillers /m²		Number of panicles /m²		Number of total grains / panicle		1000-grain weight	
			2008	2009	2008	2009	2008	2009	2008	2009
Cultivars	Ages	Spaces								
Giza178	15 day	20 × 20cm	406.86	412.10	386.40	401.70	142.33	140.66	24.16	24.30
		25 × 25cm	421.00	417.43	401.36	407.46	157.00	145.33	26.33	26.40
		30 × 30cm	428.26	423.80	403.70	414.03	157.66	155.00	28.33	28.00
	20 day	20 × 20cm	396.43	391.23	375.93	381.36	135.00	148.33	23.50	23.63
		25 × 25cm	412.36	409.96	382.06	397.93	140.00	138.00	25.50	25.30
		30 × 30cm	412.90	419.73	382.33	409.66	150.33	133.00	27.33	27.03
	25 day	20 × 20cm	384.36	382.66	362.66	372.73	119.66	117.66	22.33	22.46
		25 × 25cm	396.90	389.86	375.93	379.80	131.33	129.33	24.50	24.20
		30 × 30cm	411.33	404.00	390.03	394.16	136.00	134.00	26.33	26.16
Egyptian Hybrid 1	15 day	20 × 20cm	425.16	427.13	404.10	416.90	166.66	166.66	25.50	25.06
		25 × 25cm	435.10	431.20	414.46	420.60	178.66	174.66	27.30	27.16
		30 × 30cm	445.80	442.70	428.63	433.13	197.33	195.00	29.86	29.90
	20 day	20 × 20cm	406.00	412.30	384.43	402.50	144.00	148.00	24.33	24.20
		25 × 25cm	420.66	423.86	397.70	405.06	159.66	157.66	26.16	26.10
		30 × 30cm	427.53	424.53	406.10	409.50	174.00	162.00	28.50	28.26
	25 day	20 × 20cm	402.06	393.50	381.96	383.36	148.66	140.66	23.16	23.03
		25 × 25cm	420.33	413.26	401.60	403.10	150.66	148.66	25.16	25.56
		30 × 30cm	425.73	426.90	413.73	414.06	157.00	155.00	27.50	27.23
F. test			**	**	**	**	**	**	*	*
LSD at 5%			3.95	2.87	7.03	3.03	9.71	9.75	0.46	0.36

Finally, for improving the productivity of rice crop under the conditions of the present study it is suggested that is to sow Egyptian Hybrid 1 cultivar with youngest seedling ages (15 day old) and widest distance between hills (30 × 30 cm).

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تـأثيركلا مـن عمرالشـتلة والمسـافة بـين الشـتلات علـى صـفات النمـو و المحصـول لبعض أصناف الأرز

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أقيمت تجربتـان حقليتـان فـي محطـة البحـوث الزراعيـة بـالجميزة خـلال موسـمى الزراعـة ٢٠٠٨ و٢٠٠٩م وذلك لدراسـة تـأثيركلا مـن عمـر الشـتلة والمسـافة بـين الشـتلات علـى المحصـول ومكوناتـه لصـنفى جيزة ١٧٨ و هجين مصـرى١. تم تنفيذ التجربـة فـي تصـميم قطـع منشقة مـرتين وضعت الأصناف (صنف جيزة ١٧٨ و هجين مصـرى١) فـي القطـع الرئيسية وعمـر الشتلة (١٥, ٢٠ و ٢٥ يـوم مـن زراعـة المشـتل) فـي القطـع المنشـقة الأولـى و المسـافة بـين الشـتلات (٢٠×٢٠, ٢٥× ٢٥ و٣٠ ×٣٠سم) فى القطع المنشقة الثانية. وتشيرأهم النتائج المتحصل عليها إلى مايلى:
إختلفت الأصناف فيما بينها فى تأثيرها علـى كـلا مـن عـدد الأفـرع القاعديـة / م٢, عـدد السـنابل/ م٢, طول السنبلة سم, عدد الحبوب الممتلئة بالسنبلة, وزن الألف حبة ومحصـول الحبـوب للفدان, وسـجل صنف هجين مصرى ١ أعلـى هـذه القيم بينمـا أعطـى الصـنف جيزة ١٧٨ أقلهـا. أثـر عمـر الشـتلات على كل الصفات المدروسة , فقد أعطى أقل عمر للشتلات (١٥ يوم مـن الزراعـة) أعلـى القيم بينمـا أعطى أكبر الشتلات عمرا (٢٥ يوم من الزراعـة) أقلهـا. أثـرت مسـافات الزراعـة بـين الجـور تـأثيرا معنويا على كل الصفات المدروسة, وأعطت المسافات الواسعة (٣٠×٣٠سم) أعلـى هـذه القيم بينمـا كان أقلها عند إستخدام المسافات الضيقة (٢٠×٢٠سم) بين الجور. أثـر التفاعـل بـين عوامـل الدراسـة تـأثيرا معنويا على معظم الصفات تحت الدراسة وكـان أعلـى هـذه القيم عنـد إسـتخدام صـنف الهجين مصرى ١ والزراعة بأصـغر الشـتلات عمـرا (١٥ يـوم مـن الزراعـة) وزراعتهـا علـى أوسـع مسـافة (٣٠×٣٠سم). بينما كان أقل هذه القيم عند إستخدام الصـنف جيزة ١٧٨ وأكبـر الشـتلات عمـرا (٢٥ يوم من الزراعة) والزراعة على أقل مسافة (٢٠×٢٠سم) بين الجور.
من النتائج المتحصل عليهـا فـى هـذه الدراسـة فإنـه يمكـن التوصـية بإسـتخدام صـنف هجين مصـرى١, وإسـتخدام شـتلات صـغيرة العمـر (١٥ يـوم مـن زراعـة المشـتل) وزراعتهـا علـى أوسـع مسـافة بـين الجـور(٣٠ × ٣٠سـم). وذلـك للحصـول علـى أعلـى إنتاجيـة مـن محصـول الأرز تحـت ظروف منطقة محطة البحوث الزراعية بالجميزة – محافظة الغربية.

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