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A Study About the Possibility of Eearly Planting of Late-Maturing Ricecultivars in Lordegan Using Plastic Covered Nursery

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ABSTRACT

In order to investigate the possibility of planting six late maturity rice cultivars from northern Iran using early plastic covered nursery (for increasing the length of growing season), a study was conducted as randomized complete blocks design with three replications during 2012-2013.Experiments were carried out in the Lordegan county of Chaharmahal and Bakhtiari province. After disinfection and germination,seeds were planted separately in seedling trays and transported under the plastic cover after emerging. Transplanting was done one month before usual time of area at four to five leaves stage. Two-year variance analysis showed that Domsiah and Sahel cultivars had the highest yield with a mean of 6436 and 6217 kg per hectare, respectively. Koohrang cultivar as control genotype with an average yield of 5736 kg/ha was ranked lower than Domsiah and Sahel cultivars and above the other cultivars. Overall, Considering the superiority of Domsiah and Sahel cultivar sand on condition of at least one month of cultivation, these cultivars seem appropriate.

***Keywords**:* Late maturity cultivars, Rice, Plastic cover, Grain yield, Early cultivation

INTRODUCTION

Rice is one of the strategic products of the world, especially Asia and now it provides food for about half of the world's six billion people, so that the term "rice" is synonymous with life on this continent (Emam, 2007). Given the growing trend of demand for rice Especially in developing countries, an increase of 40% per unit area by 2020 is inevitable (Maurice, 2010).In general, the proper cultivation datewill make better use of effective factors in plant growth and optimal yield. The minimum temperature for rice germination is 10 to 12℃ (Sinha et al. 2011). Since the length of the growth season, the number of days to flowering and the average temperature in different stages of growth have significant effects on rice yield, therefore, proper planting dates can play an important role in the good production of this product. Rice work in Chaharmahal and Bakhtiari province with a surface of about 3000 hectares has a special place and in case of introducing high quality cultivars in accordance

with the climatic conditions of the province, expansion of the cultivated area is also expected. Therefore, finding high quality cultivars with a higher production potential than local genotypescan be an important step in improving the economic position of farmers in the province, especially in the Lordegan region. Therefore, an experiment was conducted to find the best cultivars for cultivation in the province.

MATERIALS AND METHODS

In order to investigate the possibility of planting six late maturity rice cultivars from northern Iran using early plastic covered nursery (for increasing the length of growing season), a study was conducted as randomized complete blocks design with three replications during two consecutive years.

In the first year (2011), eight common or introduced cultivars from the north of the country (Neda, Fajr, Tarom, Damasiah, Hashemi, Kadus, Shafagh and Sahel) were cultivated along with Koohrang cultivar as a control; However, in the second year of experiment (2012), Fajr and Neda cultivars were eliminated due to lack of compatibility and lack of grain yield in the first year.Experiments were carried out in Lordegan area, 200 km southeast of Shahrekord with warm temperate climate and dry summers.Seeds were placed in a warm, dark and humid environment to germinate after soaking (for 48 hours) and disinfecting with Benomyl fungicide (2/1000).After germination, the seeds of each cultivar were plantedinseedling trays and after emergence in the darkness, they were transported to the nursery and Plastic was pulled onto the nursery after the installation of woods. These actions took place in early April, just a month before the traditional time of the region. Thus, transplanting was also a month earlier than the local custom, at a stage of four to five leaves. By providing the necessary crop care operations during the growing season,times of mid flowering and late maturity in each plot were recorded.After maturity, samples were taken to evaluate the grain yield components.The yield per unit area was measured by harvesting four square meters from the middle of each plot. Obtained data were analyzed by SAS program.Mean comparison was done by LSD method (least significant difference). For interactive effects, the mean comparison tests were performed using MSTATC program.

RESULTS AND DISCUSSION

The number of days to the phenological stages

Results of combined variance analysis of the number days to the phonological stages showed that there were significant differences between the studied cultivars (Table 1).Based on an average of two years, Shafagh cultivar was recognized as the latest genotype with 100.7and 127.7 days from planting to the stages of emerging 50% of panicles and 80% of maturity, although it did not differ statistically from Kadus. On the other hand, Hashemi was the earliest genotype, so that after 79.5 and 11.25 days reached to mentioned phenological stages.Although the number of days to mid-flowering of this cultivar was not significantly different from of Tarom, Koohrang and Domsiah cultivars, the difference was significant for the number of days to maturity. Koohrang as control cultivar reached to maturity after 118.7

days and due to the early maturity, was placed after Hashemi along with the cultivars of Domsiah and Tarom (Table 2).

The number of panicles per plant

Total number of stems and number of fertile stems per plant were influenced only by the cultivar; However, the effects of year and the interaction of year and cultivar on this trait were not significant as other agronomic traits (Table 1). The Sahel cultivar with 39.1 stems and Kadus and Koohrang cultivars with about 24 stems had the highest and lowest number of stems per plant, respectively. On the other hand, the number of fertile stems per plant were varied from 11.1 in Kadus to 32.1 in Sahel. Koohrang cultivar with 17.8 of fertile stems per plant was ranked lower than the cultivars of Sahel, Hashemi, Domasiah and Tarom and higher than Kadus and Shafagh cultivars (Table 2).

The number of grains per panicle

Cultivar affected the total number of grains and the number of filled grains significantly, but the effects of year and the year-cultivar interaction on these traits were not significant (Table 1).In a total of two years, Domsiah genotype had the highest total number of grains and the number of filled grains per panicle (131 and 112 seeds respectively) and was ranked higher than other cultivars.The lowest total number of grains per paniclewas about 65 and was related to the Sahel cultivar, but the lowest number of filled grains per panicle was belonging to Shafagh and Kadus cultivars with an average of about 37 seeds. Koohrang cultivar, as a control, with about 105 filled grains, was ranked in the second place after the Domsiah cultivar (Table 2).

Table 1. Combined variance analysis of some studied traits

Source of variance	Degrees of freedom	Days to panicle emergence	Days to 80% of maturity	The number of panicles per plant	The number of filled grains per panicle	the weight of 1000 seeds	grain yield
Year	1	10.86ns	11.19ns	2.95ns	58.50ns	0.035ns	0.139ns
Replication (year)	4	9.14	10.59	1.47	46.25	0.017	0.070
Cultivar	6	448.41**	138.05**	196.61**	3123.04**	6.472**	26.70**
Cultivar*year	6	10.41ns	11.43ns	7.81ns	20.82ns	0.335ns	0.839ns
Error	24	41.30	9.02	7.02	52.06	0.091	0.030
CV (%)		9.93	6.22	12.22	17.28	1.76	2.64

* and ** indicate and ns indicate significant differences at 5% and 1% probability levels and nosignificant difference, respectively

Table 2. mean comparison results of some studied traits

Genotype	Days to 50% of panicles emergence	Days to 80% of maturity	Number of fertile panicles per plant	Number of filled grains per panicle	seeds -1000 weight	Grain yield (tons/ha)
Domsiah	82.7c	119.6bc	20.33bc	112.12a	19.48c	6.436a
Sahel	93.7b	122.6b	32.10a	52.62c	21.71a	6.217a
Shafagh	100.7a	127.7a	12.85d	36.35d	19.49c	1.173e
Tarom	79.9c	119.3bc	23.90b	48.20c	19.02d	3.291d
Kadus	96.3ab	127.8a	11.12d	37.61d	21.76a	1.117e
Hashemi	79.5c	115.2c	22.60b	70.70b	21.12b	4.866c
Koohrang	80.0c	118.7bc	17.78c	105.32a	19.73c	5.736b
LSD	5.2	4.1	4.57	9.17	0.41	0.433

there is no significant difference between means of each column with at least one common letter, according to LSD test

The weight of one thousand seeds

Although 1000-seeds weight was affected by cultivar at 1%probability level, but this trait was not influenced by year or the interaction of year and cultivar (table 1). Considering the two-year average, the 1000-seeds weight of studied cultivars varied from 21.74g for Kadus and Sahel cultivars to 19.02g for Tarom cultivar. Koohrang cultivar as control (19.73g) with Shafagh cultivar was ranked lower than Kadus, Sahel, Hashemi and higher than Tarom and Domsiah cultivars (Table 2).

Paddy yield

Like other evaluated traits in this experiment, paddy yield per hectare was only affected by the cultivar, and the year of the experiment did not affect it significantly (table 1).Based on the two-year average,the highest yields, 6436 and 6217 kg/ha, were belonging to Domsiah and Sahel cultivars, respectivelywhich were in the top class without any significant difference. Koohrang as a local controlcultivar with an average yield of 5736 kg per hectare was alone in a class below those two varieties and above other cultivars.The lowest yield per unit area was observed in Shafagh and Kadus cultivars (1173 and 1117 kg / ha, respectively), which had the lowest rank (Table 2).

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