Journal of Tropical Agriculture 40 (2002): 1-3

CHARACTER ASSOCIATION IN RATOON CROP OF RICE *(ORYZA SATIVA* L.)

Ambili S. Nair and C. A. Rosamma
College of Horticulture, Thrissur 680 656, Kerala, India

Abstract: The present investigation was carried out with 24 rice genotypes, which exhibited ratoon performance. Observations recorded on various characters were subjected to correlation and path analysis. The characters viz. number of productive tillers plant^{-1}, straw yield, total number of tillers during flowering, and LAI (flowering) were found to be the major contributing characters towards ratoon yield.

Key words: Character association, ratoon crop, rice, varietal evaluation

INTRODUCTION

In Kerala there has been a reduction of area under rice from 8.74 lakh ha in 1972-73 to 4.2 lakh ha in 1997-98. Due to various socio-economic constraints, a chance of bringing more area under rice cultivation is very remote. Hence to achieve the target of increased rice production, it requires raising the production per unit area. Ratooning can be suggested as an important means for intensifying the rice production. Therefore superior ratooning genotypes with other desirable attributes are to be identified. In this context, the study was carried out to find out the ratoon crop characters, which can influence the ratoon performance.

MATERIALS METHODS

Field experiments were carried out at the experimental fields of the Agricultural Research Station, Mannuthy of Kerala Agricultural University during Kharif 1999-2000. The experiment was laid out in randomized block design (RBD) with three replications at a spacing of 20 x 15 cm. The main crop was harvested at the time of physiological maturity, leaving a stubble height of 30 cm. Stubbles left over were then allowed to regenerate. Fertilizer schedule of 90:45:45 kg NPK ha^{-1} was adopted for the main crop. Fertilizers @ one fourth of the main crop recommendations were applied to the ratoon crop two days after the harvest of the main crop. Observations were recorded from the ratoon crop and data subjected to correlation and path analysis.

RESULTS AND DISCUSSION

Ratoon yield was positively and significantly correlated at genotypic and phenotypic levels with tiller number (during panicle initiation and flowering), plant height, number of productive tillers, panicle length, grains panicle^{-1}, flag leaf area, LAI (during panicle initiation and flowering), straw yield, grain production day^{-1}, and ratooning ability (Table 1). Days to flowering and days to visual panicle initiation had negative and significant correlation with ratoon yield. At genotypic level, chlorophyll b content during flowering showed significant positive correlation with ratoon yield and 1000-grain weight showed significant negative correlation.

Path analysis was carried out using significant genotypic correlation of 11 ratoon crop characters viz. number of tillers during flowering, plant height, number of productive tillers plant^{-1}, panicle length, grains panicle^{-1}, 1000- grain weight, flag leaf area, LAI during flowering, days to flowering, straw yield and ratooning ability with yield in ratoon crop. Abstract of results are given in Table 2.

The residual effect was found to be 0.02. The low residual effect indicates that the characters included in the study are enough to explain the variability in ratoon yield. Ninety eight per cent of variation in yield was contributed genotypically by the 11 components included in the study. The highest positive direct effect was exhibited by number of productive tillers plant^{-1} (0.444) on ratoon yield. This was followed by straw yield, total number of tillers during flowering and LAI at the time of flowering. The highest negative direct effect on ratoon yield was obtained for ratooning ability (-0.276), followed by panicle length (-0.057) and flag leaf area (-0.043).

Positive correlation of ratoon yield with most of the earhead characters and negative correlation with 1000-grain weight reflects that the improve - ment in ratoon yield is possible by increasing the earhead characters, plant height, number of productive tillers, LAI (flowering) and chlorophyll b content and not by increasing the weight of grains or duration. Supporting result

Table 1. Genotypic and phenotypic correlations among selected ratoon crop characters and ratoon yield

	1	2	3	4	5	6
1	1 (1)					
2	0.372* (0.353)	1 (1)				
3	0.886** (0.831*)	0.313 (0.301)	1 (1)			
4	0.479** (0.456*)	0.606** (0.572*)	0.410* (0.390)	1 (1)		
5	0.437* (0.422)	0.665** (0.655*)	0.491** (0.463*)	0.665* (0.635*)	1 (1)	
6	-0.422* (-0.409)	-0.138 (-0.135)	-0.367* (-0.341)	0.023 (0.017)	-0.207 (-0.207)	1 (1)
7	0.407* (0.389)	0.663** (0.656*)	0.390* (0.369)	0.753** (0.720*)	0.635** (0.630*)	0.016 (0.016)
8	0.941** (0.899*)	0.472** (0.467)	0.812** (0.767*)	0.519** (0.498*)	0.558** (0.554*)	-0.381* (-0.378)
9	-0.613** (-0.585*)	0.077 (0.077)	-0.736** (-0.696*)	-0.135 (-0.127)	-0.068 (0.069)	0.068 (0.065)
10	0.691** (0.660*)	0.651** (0.642*)	0.627** (0.597*)	0.642** (0.621*)	0.670** (0.663*)	-0.350 (-0.346)
11	0.961** (0.921*)	0.340 (0.307)	0.847** (0.726*)	0.388* (0.359)	0.385* (0.352)	-0.373* (-0.340)
12	0.890** (0.848*)	0.549** (0.542*)	0.879** (0.833*)	0.587** (0.566*)	0.668** (0.661*)	-0.371* (-0.367)

Table 1. Continued

	7	8	9	10	11	12
7	1 (1)					
8	0.435** (0.435)	1 (1)				
9	-0.035 (-0.035)	-0.495** (-0.494*)	1 (1)			
10	0.561** (0.559*)	0.679** (0.694*)	-0.215 (-0.215)	1 (1)		
11	0.329 (0.296)	0.887** (0.803*)	-0.567** (-0.506*)	0.622** (0.559*)	1 (1)	
12	0.524** (0.523*)	0.896** (0.893*)	-0.501** (-0.500*)	0.875** (0.875*)	0.818** (0.736*)	1 (1)

*Significant at P= 0.05, **Significant at P = 0.01; Figures in parentheses indicate phenotypic correlation; Characters: 1. Tiller number (flowering), 2. Plant height, 3. Number of productive tillers plant^{-1}, 4. Panicle length, 5. Grains panicle^{-1}, 6. 1000-grain weight, 7. Flag leaf area, 8. LAI (flowering), 9. Days to flowering, 10. Straw yield, 11. Ratooning ability, 12. Ratoon yield

was reported by Prakash and Prakash (1987). Results of path analysis revealed that greater emphasis has to be laid for characters of ratoon crop such as number of tillers during flowering, number of productive tillers plant^{-1}, LAI (flowering) and straw yield which have exerted positive and high direct effects towards yield. Reports of Singh (1988) and Zheng and Zhang (1996) are also in conformity with the above results.

ACKNOWLEDGMENT

This paper forms a part of the M.Sc. (Ag.) thesis of the senior author submitted to the Kerala Agricultural University in 2000. The authors express their deep sense of gratitude to the Associate Dean, College of Horticulture, Vellanikkara, Trichur for the facilities provided to carry out this work.

Table 2. Direct and indirect effect of ratoon characters on ratoon yield

Characters	Tiller at flowering	Plant height	No. of productive tillers / plant	Panicle length	Grains/ panicle	1000-grain weight
Tiller at the time of flowering	0.299	0.005	0.394	-0.027	0.030	-0.033
Plant height	0.111	0.013	0.139	-0.034	0.046	-0.011
Number of productive tillers plant^{-1}	0.265	0.004	0.444	-0.023	0.034	-0.029
Panicle length	0.143	0.008	0.182	-0.057	0.046	0.002
Grains panicle^{-1}	0.131	0.009	0.218	-0.038	0.070	-0.016
1000-grain weight	-0.126	-0.002	-0.163	-0.001	-0.014	0.079
Flag leaf area	0.222	0.009	0.173	-0.043	0.044	0.044
LAI (flowering)	0.281	0.006	0.361	-0.029	0.039	-0.030
Days to flowering	-0.183	0.001	-0.327	0.008	-0.005	0.005
Straw yield	0.207	0.009	0.278	-0.036	0.047	-0.028
Ratooning ability	0.287	0.005	0.377	-0.022	0.027	-0.029

Characters	Flag leaf area	LAI (flowering)	Days to flowering	Straw yield	Ratooning ability	Correlation with ratoon yield (r)
Tiller no. at the time of flowering	-0.017	0.257	-0.041	0.289	-0.265	0.890
Plant height	-0.028	0.129	0.005	0.272	-0.094	0.549
Number of productive tillers plant^{-1}	-0.017	0.222	-0.049	0.262	-0.234	0.879
Panicle length	-0.032	0.142	-0.009	0.268	-0.107	0.587
Grains panicle^{-1}	-0.027	0.153	-0.005	0.280	-0.106	0.668
1000-grain weight	-0.001	-0.104	0.005	-0.146	0.103	-0.371
Flag leaf area	-0.043	0.119	-0.002	0.234	-0.091	0.524
LAI (flowering)	-0.019	0.273	-0.033	0.291	-0.245	0.896
Days to flowering	0.001	-0.135	0.067	-0.090	0.157	-0.501
Straw yield	-0.024	0.191	-0.014	0.418	-0.172	0.875
Ratooning ability	-0.014	0.243	-0.038	0.260	-0.276	0.818

Bold figures represent direct effects

REFERENCES

Prakash, K. S. and Prakash, B. G. 1987. Path analysis in ratoon rice. *Oryza*. 24: 215-218

Singh, B. K. 1988. Scope for rice ratoon cropping in the central and northern belts of India. *Proc. of the International Workshop on Rice Ratooning Held at Bangalore, India, April 21-25, 1986.* IRRI, Manila, Philippines, p.23-128

Zheng, C. M. and Zhang, C. M. 1996. A preliminary study of growth and development of ratooned rice and its yield components. *China Ric.* 4: 11-12