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Original Article:

Correlation studies in Rice (*Oryza sativa* L.)—Correlation of Yield Components with Yield in the Strain TKM. 6*

by

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Synopsis: The correlation coefficients in respect of seven characters which are components of yield in rice studied in a short duration strain TKM. 6 are recorded in this paper along with a detailed review of literature on the subject.

Introduction: Breeding for high yield is the major objective in ..., ... improvement programme. The study of the association of yield components with yield assumes importance to the rice breeder for fixing up characters which have a decisive role in influencing the yield so that these components of yield may form additional indices for selection from the breeding material. In this paper correlation coefficients in respect of seven characters which are components of yield in rice have been studied in a short duration popular fine riced strain of hybrid origin viz., TKM. 6 with a view to find out their degree of relationship with yield. A detailed review of the previous work in rice has also been given.

Review of Literature: In rice different degrees of association between yield and other characters have been recorded. Vibar (1920) reported that duration, height and length of panicle were correlated with yield although greater straw weight was not always associated with yield. Mendiola (1926) found inter-varietal variation in correlation of many characters with yield and Bhide (1926) and Bhide and Bhalerao (1927) found high correlation of tillering with yield and a low correlation in length of main panicle. Mahalanobis (1934) studying various characters of 147 rice varieties in Bengal found that mean yield moderately correlated with the number of tillers per plant and length of leaf but appeared to be independent of characters like grain dimensions, height, duration etc. Narasinga Rao (1937) also reported that the highest correlation of yield was found between yield and number of tillers followed by the number of grains per ear and panicle length. Chakravarthy (1940) found no significant relationship between minor characters like length, breadth and thickness of grain, flag leaf dimensions, exsertions, etc. Ganguli and Sen (1941) stated that height of tillers, length of panicle and the number of grains per panicle were positively correlated with yields. Ramiah (1953) summarising the results obtained at various research stations reported that a moderate correlation existed between mean yield and number of tillers per plant. Height, ear length and the mean number of grains per ear were

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feebly correlated with yield. Eikichi Iso (1954) recorded high correlations of yield with tillering, weight of ear, length of ear, number of grains per ear etc. Syed and Krishnamoorthy (1956) found the ear length and number of tillers contributing mainly to yield and ear bearing tiller number is the most potent yield component in rice crop. Ghose *et al.* (1956) after a study of inter-varietal correlation at Cuttack taking into account the number of panicles, length of panicle and height of plant at harvest, stated that contribution of height towards yield was negligible in all cases, while other factors showed positive correlation with variation in different degrees.

Material and Methods: The strain TKM. 6 which was grown under an inter-strain comparative yield trial was chosen for the study. A brief description of the strain is given belo

Name	...	*Sanna swarnavari*
Origin	...	Progeny of the cross GEB. 24 x Co. 18
Habit	...	Erect
Height	...	Medium
Number of tillers	...	High
Pigmentation in plant parts	...	Absent
Panicle type	...	Open
Panicle length	...	Long
Spikelet arrangement	...	Ordinary
Kernel size	...	Medium
Ripening colour of glume	...	Straw
Awning	...	Awnless

The trial was laid out in Randomised block design with 5 replications. TKM. 6 was planted in 5 plots with dimensions 3' 4" × 5' adopting a spacing of 10 inches between rows and 6 inches along the row. Single seedlings were planted and there were five rows of eleven plants each. The border rows in each plot were discarded for purposes of experiment leaving 3 rows of 9 plants each making a total of 27 plants in each plot.

Out of the net 27 plants in each plot, ten plants were selected at random with the help of "two digit random numbers" (Fisher and Yates, 1948). These plants were marked with paraffin paper labels. Thus 50 plants (10 plants from each of the 5 replications) were studied individually for the following characters: (1) Plant height, (2) Number of ear bearing tillers, (3) Length of primary ear, (4) Number of grains in primary ear, (5) Number of grains per plant, (6) Weight of 100 grains and (7) Yield of straw per plant. The plant height and length of main ear were measured to the nearest centimetre and millimetre respectively. The hundred grains weight and the yield of grain and straw were recorded in a precision balance correct to 1/100 of a gram.

In order to estimate the degree and strength of association of the six characters with yield as well as between the characters, correlation coefficients were calculated as per the method described by Panse and Sukhatme (1957). The significance was tested by means of Fisher's 't' test.

Results and Discussion: The mean values of characters and yield on individual plant basis are furnished in table 1 and the correlation co-efficients worked out between the characters and yield as well as between the characters themselves are given in table 2. A scrutiny of the values of correlation co-efficients reveals that among the characters studied, number of ear bearing tillers, number of grains per plant and yield of straw have very high correlation with yield. It is also interesting to note that the correlation coefficients have been found to be significant at 1% level. Plant height and number of grains per primary ear are moderately correlated with yield while length of ear and weight of 100 grains have very feeble insignificant correlation with yield. From the correlation coefficients between the various characters, it is seen that the three characters viz., number of ear bearing tillers, number of grains per plant and yield of straw, which have a very high association with yield are themselves having high correlation between each other. The character weight of hundred grains which has the least association with yield is also having very feeble and insignificant association with plant height, number of grains per primary ear and number of grains per plant and negative correlation with number of ear bearing tillers and length of ear.

The results obtained in the studies have indicated that the number of ear bearing tillers has high correlation with yield. Bhide and Bhalerao (1927), Narasinga Rao (1937), Ramiah (1953), Eikichi Iso (1954) and many other investigators have reported positive correlation between the number of ear bearing tillers and yield. Another yield attribute viz. number of grains per plant appears to have not been studied previously by investigators in rice. The results obtained in the present study have indicated that this character is very highly associated with yield. Yield of straw has also been found to have high and positive correlation with yield of grain. Very little work in rice has been done in this regard except the report of Vibar (1920) who has found that greater straw weight

TABLE 1.

The mean values of characters and yield on individual plant basis of the strain TKM. 6

1.	Plant height in centimetres	... =	109·80
2.	Number of ear bearing tillers	... =	10·10
3.	Length of ear in centimetres	... =	23·46
4.	Number of grains per primary ear	... =	91·42
5.	Number of grains per plant	... =	669·16
6.	Weight of 100 grains in grams	... =	1·63
7.	Yield of straw per plant in grams	... =	11·44
8.	Yield of grain per plant in grams	... =	11·33

TABLE 2.

Simple correlation coefficients of characters with yield as well as between themselves

	Weight of grains per plant	Number of ear bearing tillers	Length of ear	Number of grains per primary ear	Number of grains per plant	Weight of hundred grains	Weight of straw per plant
1. Plant height	0·578**	0·594**	0·550**	0·392*	0·557**	0·136	0·594**
2. Number of ear bearing tillers	0·715**		0·043	0·201	0·757**	0·155	0·869**
3. Length of ear	0·246			0·490**	0·280	0·009	0·313*
4. Number of grains per primary ear	0·475**				0·435**	0·086	0·263*
5. Number of grains per plant	0·987**					0·229	0·757**
6. Weight of hundred grains	0·106						0·136
7. Yield of straw	0·732**						

* Significant at 5% level. ** Significant at 1% level.

was not always associated with yield. In wheat, however, Smith (1936) and Simlote (1947) have recorded positive correlation between yield of straw and yield of grain. In this study, the character plant height has recorded positive correlation with yield. This is in conformity with the findings of Ganguli and Sen (1941) who also recorded positive correlation between these factors. Length of primary ear has been found to have very low and insignificant correlation with yield. Bhide and Bhalerao (1927) have reported similar results while Eikichi Iso (1954), Narasinga Rao (1937) and Syed and Krishnamoorthy (1956) however have recorded varying degree of associations of this character with yield. Number of grains per primary ear has been found to have moderate correlation with yield. This is in conformity with the results obtained by Eikichi Iso (1954) although other investigators like Ramiah (1953) and Abraham *et al.* (1954) have reported very low association of this character with yield. Weight of hundred grains has been found to have the least association with yield. Similar results have been obtained by Narasinga Rao (1937) and Eikichi Iso (1954).

Summary and Conclusion: Seven characters viz. plant height, number of ear bearing tillers, length of ear, number of grains per primary ear, number of grains per plant, weight of one hundred grains and yield of straw which are the components of yield in rice, were studied in relation to yield in the strain TKM. 6. Correlation coefficients were worked out between these characters and yield as well as between the characters themselves. It was found that while number of ear bearing tillers, number of grains per plant and yield of straw have very high association with yield, plant height and number of grains per primary ear showed moderate correlation with yield. However, the characters length of

ear and weight of 100 grains have very feeble correlation. From the present study as well as from the previous work done in rice it is seen that the number of ear bearing tillers has high association with yield and it can serve as an additional index for selection in rice.

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