

Correlation and Path Analysis of Yield and Yield Contributing Traits in Rice under Intermediate Hill Zone of Jammu and Kashmir

ANJANI KUMAR SINGH¹, A. P. SINGH², A. K. SINGH¹, S. B. SINGH AND VINEETA SINGH

¹Regional Agricultural Research Station, ²Krishi Vigyan Kendra, Rajouri, SK University of Agricultural Sciences & Technology-J, Jammu, India

Abstract

Phenotypic and genotypic correlations were studied for eight characters in 22 rice genotypes. Days to 50% flowering, panicle length and tillers/plant were positively correlated with grain yield. Path analysis revealed that panicle length was the most important character because of its higher direct positive effect, followed by tillers/plant. Hence for improving grain yield in hilly rice, selection should largely depend on days to 50% flowering, panicle length and tillers/plant.

Key words : Correlation, Path analysis, Yield contributing traits, Rice.

In India, rice is grown in approximately 1.6—2.0 million hectares in hilly areas at various elevations and agroecological situations like direct seeded, irrigated and transplanted under hill conditions. These areas are characterized by rugged topography ; low night temperatures and high incidence of blast, glume and sheath rot among diseases ; and stem borer and leaf folder among insects. Injury due to low temperature is also a major production constraint. Cold injury causes poor germination, slow growth of seedlings and leaf discoloration. Under intermediate hill conditions, rice is cultivated on terraces at altitudes ranging from 800 to 1,500 meters above mean sea level, mostly under rainfed conditions. Temperature during the growing period ranges from 20 to 30 C. The maturity duration of varieties at elevations between 800 to 1,200 meters is limited to around 120 days and at higher elevations it extends up to 140 days. Despite various high yielding cultivars released for intermediate zone of Jammu and Kashmir the expected yield is not yet been harvested because of several production constraints. However, selection for yield remains not so fruitful in achieving desirable results, because it is dependent on various component characters. Therefore, knowledge of association and cause and effect relationship of yield component traits with yield would help in formulation of effective selection schemes. The present study was conducted to assess the genetic relationships among yield components, through correlation and path analysis for en-

hancing the usefulness of selection for better rice yields under intermediate hill conditions of Jammu and Kashmir.

Methods

Experimental material comprised 22 promising genotypes most of these bred to suit hill conditions were raised in randomized block design with three replications at RARS, Rajouri. Each genotype was planted in individual rows of 3 m length adopting a spacing of 20 × 15 cm. Normal cultural and manurial practices as applicable to hilly rice were followed. Data were recorded on five random plants for days to 50% flowering, plant height, days to maturity, panicle length, tillers/plant, 1,000-seed weight, grains/panicle and grain yield/plant. The phenotypic, genotypic and path coefficients were computed following the standard statistical procedures (1, 2).

Results and Discussion

The genotypic correlation coefficients were higher than the phenotypic correlation coefficients in general (Table 1), thus indicating that low phenotypic correlations might be due to the masking/modifying effects of environment in genetic association between characters (3). Each of the three characters, days to 50% flowering, panicle length and tillers/plant were positively correlated with grain yield. These find-

and this association would form useful indices of selection for improvement of yield. The days to 50% flowering, panicle length and tillers/plant showed significant positive correlation with grain yield. Similar trend was also observed by Borbora and Hazarika (5).

Days to flowering was positively and significantly correlated with days to maturity and panicle length. Panicle length shows a positive and significant association with grain/panicle. Tillers/plant was positively and significantly correlated with grains/panicle. Wilfred and Rangaswamy (6) and Niranjana Murthy et al. (7) also obtained similar results. Therefore, selection for any one of the characters would offer scope for simultaneous improvement in all these three characters in addition to improving the grain yield.

Path analysis revealed that panicle length was the most important character because of its higher positive direct effect followed by days to maturity, plant height and tillers/plant (Table 2). The maximum positive direct effect on grain yield/plant exerted by panicle length was also reported by Padhi and Singh (8). Hence, days to flowering, tillers/plant and panicle length were the major yield contributing traits under intermediate hill conditions and have to be given im-

portance in selection for hill stress situations.

References

1. Singh R. K. and B. D. Choudhary. 1979. *Biometrical methods in quantitative genetic analysis*. Kalyani Publ., New Delhi, India.
2. Dewey D. R. and K. H. Lu. 1959. A correlation and path coefficient analysis of components of crested wheat grassseed production. *Agron. J.* 51 : 515—518.
3. Johnson A. W., H. F. Robinson and R. E. Comstock. 1955. Estimates of genetic and environmental variability in Soyabean. *Agron. J.* 47 : 314—318.
4. Li Q., G. T. Li., G. C. Guo, Ji Ang and Y. Z'hu. 1991. Study on high yield breeding and genetic analysis of yield components of main rice cultivars in Jilin, China. *Hereditas* 13 : 3—6.
5. Borbora T. K. and G. N. Hazarika. 1998. Study of genetic variability, heritability and genetic advance for panicle characters in rice. *Oryza* 35 : 19—21.
6. Wilfred M. W. and M. Rangaswamy. 1993. Correlation and path analysis in hybrid rice. *Oryza* 30 : 248—250.
7. Niranjana Murthy G., S. Shanker, S. Hittamani and M. Uday Kumar. 1999. Association analysis among yield some physiological traits in rice. *Oryza* 28 : 257—259.
8. Padhi A. K. and M. Singh. 1991. Inter-relationship of major quantitative traits in some rice varieties under alkaline stress. *Madras Agric. J.* 79 : 374—378.