

## Path Analysis in Rainfed Upland Rice (*Oryza sativa.L*) Under Natural Stress



### Agriculture

**KEYWORDS** : Rainfed upland rice, Path analysis, Natural stress

**KRANTIKUMAR .H. PATIL**

Ph.D Scholar, Department of Plant Breeding and Genetics, College of Agriculture, Vellayani, Thiruvananthapuram-695522 Kerala Agricultural University, Thrissur-680656 (Kerala), India.

**C. LEKHA RANI**

Associate Professor, Department of Plant Breeding and Genetics College of Agriculture, Vellayani, Thiruvananthapuram-695522 Kerala Agricultural University, Thrissur-680656 (Kerala), India.

**LEENAKUMARY, S**

Professor and Head, Rice Research Station, Moncombu Thekkekkara. P.O., Alappuzha-688 503(Kerala), India.

**ROY STEPHEN**

Associate Professor and Head Department of Plant Physiology College of Agriculture, Vellayani, Thiruvananthapuram-695522. Kerala Agricultural University, Thrissur-680656 (Kerala), India.

**VIJAYARAGHAVAKUMAR**

Associate Professor and Head, Department of Agricultural Statistics, College of Agriculture, Vellayani, Thiruvananthapuram-695522. Kerala Agricultural University, Thrissur-680656 (Kerala), India.

**V.G. JAYALEKSHMY**

Associate Professor, Department of Plant Breeding and Genetics College of Agriculture, Vellayani, Thiruvananthapuram-695522 Kerala Agricultural University, Thrissur-680656 (Kerala), India.

### ABSTRACT

*A study of path analysis was carried out using twenty rice varieties under natural moisture stress. Path analysis revealed that the biological yield per plant (1.07715) had the highest positive direct effect on grain yield followed by harvest index (0.36397), 1000 seed weight (0.26241), number of spikelets per panicle (0.24955), days to 50% flowering (0.12013), plant height at tip of leaf (0.03614) and filled grain per panicle (0.0055). Positive direct effects of these traits on grain yield indicated their importance in determining this complex character and therefore, should be kept in mind while practicing selection aimed at the improvement of grain yield. Present path analysis for grain yield indicated that biological yield was the major contributor in terms of direct effect and indirect effects on grain yield per plant at genotypic levels so that this particular trait should be considered when breeding program for higher grain yield in rice are to be planned.*

### INTRODUCTION

The basic objective of most of the crop improvement programs is to realize a marked improvement in crop yield. But yield is a complex character which is controlled by association of various characters. Before placing strong emphasis on breeding for yield improvement trait, the knowledge on the association between yield and yield attributes will be helpful to the breeder for the improvement of grain yield. Correlation coefficient may also help to identify characters that have little or no importance in the selection programme. The existence of correlation may be attributed to the presence of linkage or pleiotropic effect of genes or physiological and developmental relationship or environmental effect or a combination of all (Oad *et al.*, 2002). The information on association of yield attributes and their direct and indirect effects on grain yield are of paramount significance. Hence path analysis is of much importance in any plant breeding program. Path analysis is that, it permits the partitioning of the correlation coefficient into its components, one component being the path coefficient that measures the direct effect of a predictor variable upon its response variable; the second component being the indirect effect (s) of a predictor variable on the response variable through another predictor variable (Dewey and Lu, 1959). In agriculture, path analysis has been used by plant breeders to assist in identifying traits that are useful as selection criteria to improve crop yield (Milligan *et al.*, 1990; Surek and Beser, 2003). The present research study was conducted to find out the direct and indirect contribution of these parameters towards rice yield and to identify better combinations as selection criteria for develop-

ing high yielding rice genotypes.

### MATERIAL AND METHODS

The present experiment was conducted with twenty rice varieties under rainfed upland condition during kharif, 2014 at the Instructional Farm, Department of Plant Breeding and Genetics, College of Agriculture Vellayani, Thiruvananthapuram. The study was laid out in a randomized block design with three replications with a plot size of 2 x 5 m<sup>2</sup>. The entries were direct seeded with 20 x 15 cm spacing. Care was taken to maintain 1-2 seedlings per hill but observation was taken on only one plant. The material consisted of twenty diverse genotypes including varieties recommended for uplands and rice popular high yielding varieties widely cultivated in Kerala. They were raised under upland rainfed conditions without irrigation, exposed to natural moisture stress. Morphological observations were taken at appropriate plant growth stages following the Standard Evaluation System for Rice [IRRI, 1996]. The screening of genotypes was done as per the protocols of DRR (2012). Five plants from each replication and each variety were selected at random and observations were recorded on 15 characters viz., days to 50 % flowering, plant height to tip of leaf (cm), plant height at maturity (cm), panicle length (cm), number of spikelets per panicle, number of filled grains per panicle, spikelet sterility (%), grain weight per panicle (g), 1000 grain weight (g), grain yield per plant (g), straw yield per plant (g), biological yield (g) and harvest index (%). Days to 50 percent flowering was computed on plot basis. Dewey and Lu (1959) was followed for path analysis.



Department of Plant Breeding and Genetics, College of Agriculture, Vellayani, Thiruvananthapuram-695522, Kerala, India.

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