Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2018; 6(4): 1774-1777

Received: 01-05-2018
Accepted: 03-06-2018

Anand Singh
M. Sc. (Ag) Student Dept. of G.P.B N.D.U.A.T Faizabad, Uttar Pradesh, India

Amar Pal Singh
Asst. Prof. Dept. of Hort. and Forestry, N.D.U.A.T Faizabad, Uttar Pradesh, India

Abhineet Singh
M. Sc. (Ag) Student Dept. of Agronomy N.D.U.A.T Faizabad, Uttar Pradesh, India

MK Maurya
M. Sc. (Ag) Student Dept. of Pathology N.D.U.A.T Faizabad, Uttar Pradesh, India

Vivek Yadav
M. Sc. (Ag) Student Dept. of G.P.B N.D.U.A.T Faizabad, Uttar Pradesh, India

Himanshu Singh
M. Sc. (Ag) Student Dept. of G.P.B N.D.U.A.T Faizabad, Uttar Pradesh, India

Ankit Singh
M. Sc. (Ag) Student Dept. of Agronomy N.D.U.A.T Faizabad, Uttar Pradesh, India

Sooraj Avasthi
M. Sc. (Ag) Student Dept. of Agril. Ext. C.B.G.P.G. College BKT, Lucknow, Uttar Pradesh, India

Correspondence
Anand Singh
M. Sc. (Ag) Student Dept. of G.P.B N.D.U.A.T Faizabad, Uttar Pradesh, India

Study of simple correlation coefficients for yield and its component traits in rice (*Oryza sativa* L.)

Anand Singh, Amar Pal Singh, Abhineet Singh, MK Maurya, Vivek Yadav, Himanshu Singh, Ankit Singh and Sooraj Avasthi

Abstract
An experiment was carried out during *Kharif*, 2017-18 at Central Research Station, Masodha, (Faizabad), KVK, Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj), Faizabad (U.P.) to study the simple correlation coefficients among 14 quantitative characters with 27 genotypes along with three checks in three replications using RBD (Randomized Block Design). Estimates of simple association coefficients among 14 quantitative characters estimated during 2017-18 displayed that Seed yield per plant exhibited highly significant and positive correlation with days to Maturity (0.985) and panicle bearing tiller per plant (0.989), tillers per plant (0.660), and panicle bearing tillers per plant (0.710), Seeds per panicle (0.843) characters showed significant and positive correlation with these traits. All the other characters under study also displayed highly significant associations with each other besides seed yield per plant. The characters included in the study viz., days to 50% flowering, days to maturity, plant height, number of seeds per panicle, panicle length, harvest index, number of tillers per plant, biological yield, number of panicle bearing tillers per plant, 1000-seed weight, Germination percent, Seedling length, Vigour index and Seed yield per plant.

Keywords: Germination percent, simple correlation, vigour index, associations

Introduction
Rice (*Oryza sativa* L.) is a semi-aquatic annual grass plant belongs to the genus *Oryza*, tribe Oryzeae and family Poaceae. It is the second largest principal food crop in the world after wheat and is one of the main staple food crop in India. Besides being the staple food crop, it has been the cornerstone of food and culture for our people. Among seven billion people on the earth, more than half of them depend on this crop for principal source of energy in their daily diet. Rice is distributed over a wider range of latitude from 50 ^{0} N to 40 ^{0} S and is being grown up to an altitude of 2500 meters. It evolved in humid tropics as a semi aquatic plant and it has got unique adaptive nature to hot humid environment, which is not seen in any other major cereal crop.

Rice (*Oryza sativa* L.) is the most important staple food crop of the world because of being the major source of calories of more than half of the total global population. The importance of rice is not only as a fundamental commodity and primary food source for more than half of the world's population, but also influences issues of global concern such as food security and development. More than 90 per cent of the world's rice is grown and consumed in Asia, known as rice bowl of the world, where 60 per cent of the earth's people and two third of world's poor live. Rice being the staple food for more than 70 per cent of our national population and source of livelihood for 120-150 million rural households is backbone to the Indian Agriculture.

Protein content of milled rice is 6-7 per cent, rice however, compares favorably with other cereals in amino acid content. The biological value of protein is high, the fat content of rice is low (2.0-2.5%) and much of the fat is lost during milling. Rice grain contains as much B group vitamin as wheat. Milled rice losses valuable proteins, vitamins and minerals in the milling process during which embryo and aleurone layer are removed and much of the loss of nutrients can avoided through parboiling process. The by-products of rice milling are used for a variety of purposes. Rice bran is used as cattle and poultry feed. Rice hull can be used in manufacture of insulation materials, cement and cardboard as well as a litter in poultry keeping. Rice straw

can be used as cattle feed as well as litter during winter. Rice is grown almost throughout the year in hot and humid reasons of eastern and southern parts of India where two or three crops in a year is uncommon. Rice, being the staple food for more than 70 percent of our national population along with the source of livelihood for 120-150 million rural households.it is a backbone to the Indian agriculture. Rice production (according to USDA 2016/2017) is forecast higher at 105 MMT from 43.5 million hectare compared to 2015/16 production of 103.5 million tons in India (Grain report 2016).

Materials and Methods

The study was designed to work out the status of association of different seed yield traits and direct and indirect effects of these different traits on seed yield per plant among twenty seven rice genotypes at field experiment under present investigation was conducted during Kharif 2017-18 at the Central research station (Mashodha, Faizabad) and lab experiments were conducted in Seed Testing Laboratory, Seed Technology Section, N. D. University of Agriculture and Technology, Narendra Nagar (Kumarganj), Faizabad (U.P.) India. The experimental materials of studies comprised of twenty seven Rice varieties/ lines/ genotypes excluding three check varieties *viz*., NDR97, Baranideep and Shushk Samrat these varieties were procured from genetic stock available in Rice section, Department of genetics and Plant Breeding, N. D. University of Agriculture and Technology, Narendra Nagar (Kumarganj), Faizabad (U.P.) India. The experiment was laid out in Randomized Block Design. The observation were recorded on Fourteen different seed yield traits *viz*., days to 50% flowering, days to maturity, plant height, number of seeds per panicle, panicle length, harvest index, number of tillers per plant, number of panicle bearing tillers per plant, 1000-seed weight, biological yield, Germination percent, Seedling length, Vigour index and Seed yield per plant. Standard statistical techniques such as correlation between different characters and path coefficient analysis.

Seed germination percentage was investigated under lab condition germination was estimated on the basis of 100 randomly selected seeds kept for germination in germination paper at room temperature in germinator. The samples were kept in seed germinator maintained at 20^0 c ±1. Ten seedlings were randomly taken from each replication. On 8th day seedlings were measured on meter scale, the unit of length was in cm. The vigour index was conducted as per the method prescribed by Abdul-Bali and Anderson (1973) and expressed in whole number. The seed were kept for germinate fallowing ISTA method. The seedlings were measured for seedling length to obtain seedling length.

Results and Discussion

The progress in plant breeding depends upon effective selection scheme based on the correlated and non-correlated response. The seed yield or economic yield in almost all the crops is referred as super character which results from the multiplicative interactions of several other characters which are termed as yield components.

Thus, identification of important yield components and information about their association with seed yield and also with each other is very useful for selecting efficient genotypes for evolving high yielding varieties. In this respect, the correlation coefficient which provides symmetrical measurement of degree of association between two variables or characters, help us in understanding the nature and magnitude of association among yield and yield components. The phenotypic correlation coefficients are presented in table 1.

Correlation coefficient was worked out at phenotypic and genotypic levels for different yield contributing characters and seed quality parameters in rice (*Oryza sativa* L.) genotypes are presented in Table 1 and 2, respectively. Seed yield per plant exhibited highly significant and positive correlation with days to Maturity (0.985) and panicle bearing tiller per plant (0.989), tillers per plant (0.660), and panicle bearing tillers per plant (0.710), Seeds per panicle (0.843) characters showed significant and positive correlation with these traits. The correlation coefficients of seed yield per plant with remaining nine characters were non-significant (Shivani *et al.* (2000) [10], Aditya and Bhartiya (2014) [1]. Verma *et al.* (2013) [11], Prasad *et al.* (2013) [6], Jayasudha and Sharma (2010) [4], Raut *et al.* (2009) [7], Saravanana and Sabesan (2009) [9], Wattoo *et al.* (2010) [13] and Sarangi *et al.* (2009) [8].

All the other characters under study also displayed highly significant associations with each other besides seed yield per plant. Therefore, these characters emerged as most important factors influencing seed yield in chickpea. The strong positive correlation of seed yield with the characters mentioned above has also been reported earlier.

Table 1: Estimate of phenotypic correlation coefficients among different characters in rice germplasm

Characters	Days to Maturity	Plant Height cm	Tillers/ Plant	Panicle Bearing Tillers/ Plant	Panicle Length cm	Seeds/ Panicle	Test Weight	Biological Yield/Plant	Harvest Index	Germination %	Seedling Length	Vigour Index	Yield/ Plant
Days to 50%Flowering	0.985**	0.244	0.064	0.046	-0.093	-0.010	-0.274	-0.111	0.189	-0.291	-0.287	-0.341	0.030
Days to Maturity		0.250	0.083	0.068	-0.109	-0.040	-0.245	-0.142	0.194	-0.298	-0.269	-0.328	0.016
Plant Height cm			-0.138	-0.117	-0.297	-0.191	0.088	-0.154	-0.180	0.075	-0.048	-0.016	-0.204
Tillers/ Plant				0.907**	0.575**	0.685*	-0.041	0.547**	0.678**	-0.043	0.244	0.188	0.660**
Panicle Bearing Tillers/ Plant					0.583**	0.772**	-0.072**	0.569**	0.688**	0.004	0.328	0.272	0.710**
Panicle Length cm						0.550**	-0.036	0.439*	0.632**	0.262	0.236	0.289	0.603**
Seeds/ Panicle							-0.125	0.713**	0.616**	0.025	0.203	0.178	0.843**
Test Weight								-0.020	0.025	0.110	-0.135	-0.077	-0.002
Biological Yield/Plant									0.377	0.057	0.063	0.070	0.746**
Harvest Index										0.041	0.258	0.229	0.763**
Germination %											0.324	0.612**	0.076
Seedling Length												0.946**	0.197
Vigour Index													0.190

*** Significant at 5 (%) and 1 (%) probability levels, respectively.

Table 4.4: Estimate of genotypic correlation coefficients among different characters in rice germplasm

Characters	Days to Maturity	Plant Height cm	Tillers/ Plant	Panicle Bearing Tillers/ Plant	Panicle Length cm	Seeds/ Panicle	Test Weight	Biological Yield/Plant	Harvest Index	Germination %	Seedling Length	Vigour Index	Yield/ Plant
Days to 50%Flowering	0.985**	0.262	0.078	0.048	-0.094	-0.003	-0.281	-0.142	0.192	-0.330	-0.326	-0.377*	0.045
Days to Maturity		0.266	0.100	0.072	-0.113	-0.038	-0.250	-0.177	0.196	-0.336	-0.303	-0.360	0.027
Plant Height cm			-0.158	-0.130	-0.343	-0.230	0.091	-0.253	-0.191	0.075	-0.031	-0.003	-0.260
Tillers/ Plant				0.989**	0.685**	0.874**	-0.051	0.740**	0.788**	-0.028	0.270	0.211	0.964**
Panicle Bearing Tillers/ Plant					0.641**	0.877**	-0.075	0.705**	0.724**	-0.011	0.351	0.280	0.883**
Panicle Length cm						0.704**	-0.040	0.662**	0.702**	0.274	0.277	0.319	0.834**
Seeds/ Panicle							-0.134	0.840**	0.671**	0.012	0.236	0.195	0.870**
Test Weight								-0.024	0.026	0.127	-0.150	-0.082	0.004
Biological Yield/Plant									0.437*	0.072	0.118	0.120	0.906**
Harvest Index										0.042	0.282	0.243	0.890**
Germination %											0.419*	0.669**	0.050
Seedling Length												0.955**	0.234
Vigour Index													0.206

*,** Significant at 5 (%) and 1 (%) probability levels, respectively.

References

1. Aditya JP, Bhartiya A. Genetic variability, Correlation and path analysis for quantitative characters in rainfed upland rice of Uttarakhand Hills. J of Rice Res. 2013; 6(2):24-34.
2. Bhatia P, Jain RK, Chaudhary VK. Genetic variability correlation and path coefficient analysis for grain yield and its component in rice (*Oryza sativa* L.) Annals of Biology. 2013; 29(3):282-287.
3. Chaudhary M, Motiramani NK. Variability and association among yield attributes grain quality in traditional aromatic accessions. *Crop improvement* (India). 2003; 30(1):84-90.
4. Jayasudha S, Sharma D. Genetic parameters of variability, correlation and path-coefficient for grain yield and physiological traits in rice (*Oryza sativa* L.) under shallow lowland situation. Electronic J Plant Breeding. 2010; 1(5):1332-1338.
5. Malhotra RS, Jain RP. Path and regression analysis in barley (*Hardeum vugari* L.). Ind. J Agri. Sci. 1972; 42(5):404-406.
6. Prasad GS, Sujatha M, Rao LVS, Chaitanya U, Patroti P. Character Association and Path Analysis in Rice (*Oryza sativa* L.) Genotypes for cold tolerance. *Helix.* 2013; 3:349-352.
7. Raut KR, Harer PN, Yadav PS. Genetic variability and character association in rice (*Oryza sativa* L.). Journal of Maharashtra Agril. Univ. 2009; 34(2):174-178.
8. Sarangi DN, Pradhan B, Sial P, Mishra CHP. Genetic variability, correlation and path-coefficient analysis in early rice genotypes. Environment and Ecology. 2009; 27(1A):307-312.
9. Saravanan K, Sabesan T. Association analysis and path analysis for yield and its contributing traits in rice (*Oryza sativa* L.). International J Plant Sci. (Muzaffarnagar). 2009; 4(1):27-29.
10. Shivani D, Reddy NSR. Correlation and path analysis in certain rice (*Oryza sativa* L.) hybrids. Oryza. 2000; 37(3):183-186.
11. Verma OP, Singh NK, Khan AH, Chaudhary RK, Singh Karan. Identifying Physiological Markers from QTL. Population of rice for sodicity tolerances. *ARRW Golden Jubilee International Symposium-2013* on "Sustainble Rice Production and Livelihood Security Challenges and Opportunities" held from March 02-05, 2013, Cuttack (Udisha), India, Organized by Association of Rice Research Workers, Cuttack-753006 (Odisha), India. In collaboration with ICAR, IRRI, NAAS and CRRI, Cuttack, India. 2013; 13(2):552-555.
12. Vimal SC, Kumar Alok, Kumar S. Character association and path analysis of yield component and seed quality parameter in wheat (*Tritcum aestivum* L.). An Int. Jour. 2016; 11(1):546-547.
13. Wattoo JI, Khan AS, Zulfiqar Ali, Muhammad Babar, Muhammad Naeem Ullah, Nazim Hussain MA. Study of correlation among yield related traits and path coefficient analysis in rice (*Oryza sativa* L.). African J of Biotech. 2010; 9(46):7853-7856.
14. Wright S, Correlation and causation. J Agric. Res. 1921; 20: 557-585.