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GENETIC VARIABILITY AND CHARACTER ASSOCIATION IN MEDIUM DURATION UPLAND RICE VARIETIES GROWN IN MANIPUR

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Assessment of genetic variability, understanding the parameters for grain yield and its contributing traits and knowledge on association of yield component traits among themselves and with yield are paramount of importance in effective selection in breeding effort. It was reported in earlier studies that there may not be gene for yield but definitely for its components which decide the yield. Information on the association of yield components with yield and among themselves is essential in formulating an effective selection programme as the correlation co-efficient help the breeder in determining the direction of selection. Present study was conducted in medium duration rice varieties grown in upland condition of Manipur.

An experiment was conducted in randomized block design with 14 genotypes in three replications during 1999 kharif by direct seeding in a plot size of 4 m^2 in Lamphelpat farm of ICAR Research Complex for NEH Region, Manipur Centre. Observations were made on nine characters viz., days to 50% flowering, plant height, panicle length, ear length, ear bearing tillers/m^2, filled grains/ear, total number of spikels/ear, spikelet fertility, 100 grain weight and plot yield as per the standard evaluation system for rice developed by IRRI. Analysis of variance and correlation co-efficient were worked out as per the standard statistical methods.

Performances of the 14 genotypes were shown in Table 1. Perusal of the Table revealed that more number of genotypes showed significantly higher performance for plot yield than for any other traits. This was followed by ear bearing tillers/m^2 and total spikelets / panicle. Three genotypes each showed significantly higher performance for filled gains per panicle, spikelet fertility and plant height. IET 13459 was found to be the dwarf genotype while PL 1/SPS 1 the tallest one. There was not much variation in days to maturity. Except PL 1 / SPS 1, none of the genotypes showed significantly higher effect for panicle length.

The phenotypic coefficient of variation (PCV) and genotypic coefficient of variation (GCV) were high for the characters ear bearing tillers/m^2 (EBT), filled grains per ear and total number of grains per ear (Table 2). Among them EBT showed high heritability coupled with high genetic advance (GA) indicating the role of additive genetic factors in the inheritance of this trait. However for the other two characters heritability was high and GA was moderate indicating

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the role non additive factors in the inheritance of these characters. The GCV and PCV of other characters *viz,* 50% folowering, panicle length spikelet fertility, 1000 grain weight and plot yield was low. Heritability and GA were also low for 50% flowering panicle length and spikelet fertility indicating the limited scope for improvement of these characters. Similar type of different level of variance, heritbility and genetic advance for the different morpho-physiological traits of rice were observed by Niranjana Murthy *et al.* (1999).

In general, genotypic correlation coefficients were higher than the phenotypic correlation coefficients. The low phenotypic correlation might be due to the masking or modifying effect between characters (Johnson et al., 1955). At genotypic level the yield was positively and significantly correlated with days of 50% flowering, plant height, panicle length number of EBT and spikelet fertility. Both at genotypic and phenotypic levels, the yield was positively and significantly correlated with number of EBT and spikelet fertility. Similar results were reported by Arumugachamy *et al.* (1993) in ratoon rice. The traits total number of spikelets / ear and number of filled grains / ear showed non-significant positive correlation with grain yield at phenotypic and genotypic levels.

Inter-correlation among the yield components showed the nature and extent of relationship with each other, which will be useful in the breeding programme for simultaneous improvement of different traits along with grain yield. In the present study the important yield coponent traints viz., number of EBT per m^2, total number of spikelets / panicle were inter-correlated among themselves. Hundred gain weight was positively and significantly correlated with days to 50% flowering and number of EBT. However Pattanayak and Gupta (1999) reported negative correlation among these traits in upland rice genotypes developed through another culture. Spikelet fertility was positively and significantly correlated with days to 50% flowering and number of EBT/m^2. This was found in contrary to the reports of Wilfred Manual and Rangaswamy (1993) in hybrid rice.Number of filled grains per panicle was positively and significantly correlated with panicle length, number of EBT/m^2 and total no. of spikelet / panicle. Total number of spikelt / panicle and number of EBT /m^2 were significantly and positively correlated with panicle length and days to 50% flowering respectively

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Table 1. Mean performance of genotypes

Genotype	Plant Height (cm)	Days to maturity	panicle length (cm)	Ear bearing tillers/m2	Filled grains/ panicle	Spikelet fertility (%)	100 grain weight (g)	Total No. of spikelet. panicle	Plot yield (Kg)	Yield (t/ ha.)
PL 1/SPS 1	128.11**	114.33	24.93**	239.33	118.73	89.01	3.71	133.53	2.33**	5.83
PL 1/SPS 2	122.87	113.67	22.37	190.67	89.67	88.54	3.70	101.17	1.75	4.48
PL 1/SPS 4	115.93	114.00	23.97	231.33**	75.87	89.67	3.60	121.80	2.04**	5.10
PL 5/SPS 1	123.60	113.67	24.47	251.67**	143.33**	93.37**	3.27	153.60**	2.21**	5.53
PL 8/SPS 1	126.20	114.00	23.60	201.00**	112.70	93.66**	3.28	120.13	2.35**	5.88
PL 8/SPS 2	120.27	114.00	22.40	167.33	103.60	91.88	3.47	112.87	2.20**	5.50
PL 8/SPS 3	119.13	114.00	22.57	176.67	110.67	91.51	3.47	121.07	1.79	4.48
PL 11/SPS 1	113.27	114.33	22.00	193.67*	116.13	93.67**	3.46	124.07	1.59	3.98
Pl 11/SPS 2	120.17	111.33	24.50	156.67	139.73**	92.00	3.37	151.93**	1.72	4.30
IET 13459 (Ch)	113.20	111.33	24.50	156.67	140.27**	91.64	3.26	153.07**	1.75	4.38
IET 13783 (Ch)	120.17	111.33	24.33	169.00	127.33	87.32	2.99	147.40**	2.15**	5.38
RCM 5 (Ch)	122.17	111.00	24.37	131.33	107.33	89.28	2.91	120.27	1.61	4.03
IET 15046 (Ch)	116.33	110.00	22.60	136.00	78.90	71.26	2.87	110.73	0.75	1.88
Bali (Ch)	125.97	114.67*	21.60	136.00	105.80	90.13	3.02	117.33	1.63	4.08

Signicant at 5% level; ** Signicant at 1% level; Ch : Check variety

Table 2 . Genetic parameters for nine yielding contributing characters

Character	Genotypic Variance	Phenotypic variance	Heritability (Board Sense)	Genetic advance (%)
Days to 50% flowering	1.723	2.767	62.3	2.134
Plant height	16.282	33.809	48.2	5.769
Panicle length	0.846	1.873	45.2	1.274
Ear bearing tillers/m^2	1585.458	1706.236	92.9	79.068
Filled gains per ear	351.277	654.415	53.7	28.287
Total number of spikelets/ per ear	244.107	399.66	61.1	25.154
Spikelet fertility	29.282	35.901	81.6	10.068
100 grain weight	0.074	0.079	92.9	0.539
Plot yield	0.172	0.180	95.6	0.835

Table 3. Genotype and phenopic correlation co-efficient of yield and yield contributing characte4rs

		Days to 5% flowering	Plant height	Panicle length	Ear bearing tillers / m2	Total No. of Spikelet/ panicle	No. of filled Grains/ panicle	Spikelet fertility	100 grain weight	Yield / plot
Days to 50%	G		0.2045	-0.4087	0.5516*	-0.0976	0.1877	0.8577**	0.7865**	0.6116*
Flowering	P		0.1961	-0.0446	0.4206	0.0445	0.0894	0.5639*	0.5825*	0.4639
Plant height	G			0.0844	0.2532	-0.2610	0.1283	0.2807	0.0575	0.5485*
	P			0.2739	0.5922	0.2992	0.023	-0.0010	0.3521	
No. of ear bearing	G					0.1823	0.703**	0.3612	0.6556**	0.6473**
Tiller/,2	P					0.0840	0.035	0.3044	0.6473**	0.6184**
Total no. of	G						0.9398**	0.3865	0.0794	0.3458
Spikelet / panicle	P						0.7934**	0.2310	-0.0694	0.2728
No. of filld grains	G							0.5294*	-0.0502	0.4342
/panicle	P							0.4628	-0.0414	0.3104
Spikelet fertility	G								0.4617	0.7439**
	P								0.3970	0.6641**
100 grain weight	G									0.4505
	P									0.4294

* P = 0.05; ** P = 0.01; G = Genotypic correlation; P + Phenotypic correlation.