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GENETIC VARIABILITY IN SOMEE INDIGINOUS LOWLAND RICE GENOTYPES OF NORTH EAST INDIA.

P.K Singh. , M..N.Mishra*, D.K. Hore and A.S. Panwar
ICAR Research Complex for NEH Region, Barapani, Meghalaya

ABSTRACT

Phenotypic and genotypic variability for 15 quantitative characters were studied in 52 divert genotypes of lowland rice were evaluated to obtain information on genetic virility under mid hill altitude of Meghalaya. The high genotypic and phenotypic variances were observed for Grain yield/plant, panicle weight, grains/panicle and number of branch/panicle; medium for panicle length, grains/panicle and 1000 seed weight while lowest for panicle length and milling. Heritability in broad sense ranged from grain length 99.57 to 3.61 for number of effective tiller/plant. High heritability with high G.A. at percent of mean was found for grains/panicle followed by panicle weight and grain yield/plant.

INTRODUCTION

The north east part of India is predominntly rice production region. This region account 7.81% of total area under rice and shares 6.07% of the total rice production in India the region is area of the center of origin of rice and also considered to be rich in rice diversity. (Seeta Rama et.al. 1974). The rice breeding programmes are directed towards the exploitation of indigenous and exotic varieties for improvement for quantitative traits can be achieved through a clear understanding of the nature and amount of variability present in the genetic stocks and the extent to which the desirable traits are heritable. Therefore, improvement of the genetic parameters such as variance, coefficient of variance, heritability, genetic advance and the influence of environment on the expression of these characters will help the breeder to evolve suitable cultivars with in short time. An attempt was made to know the extent of gene tic variability present in the rice of northeast India rice collections and to assess the possibility of further improvement through selection and hybridization.

MATERIALS AND METHODS

Fifty two genetically divers lowland rice genotypes collected from five states of northeast India were evaluated for in randomized block design with three replication at experimental farm of NBPGR Regional Station, Barapani, Meghalaya, during kharif season in tow years 2000 and 2001.Each plot comprised of 4 rows of 4 meter length of single variety a spacing of 20 X20 cm. The recommended package and practices were followed to ensure better crop stand. Observation were recorded for five randomly selected plants in each replication from the two center rows on days to 50% flowering, plant height, flag leaf area, flag leaf angel, number of effective tillers/plant, panicle length, number of branches/ panicle, days to maturity, grains/panicle, panicle weight, seed length, seed breadth, 1000 seed weight, grain yield/plant, milling percent. Multivariate analyses were made on two years data. Phenotypic and genotypic variance of varieties were estimated as described by Burton and De Vane (1953), heritability as described by Hanson et al. (1956) and genetic advance an genetic advance as per cent of mean were worked out by using the formula suggested by Johnson et al. (1955).

RESULTS AND DISCUSSION

The analysis of variance showed that grain yield/plant exhibited grater variance indicated abundant chance of getting extreme type. The number of effective tiller/plant, number of branch/panicle and 1000 seed weight in both the populations showed larger variation. These results are in agreement with those of Mehetre et al. (1994), Rao and Srivastav (1994) and Venkataramana et al. (1999) who reported wide variability in number of tiller/plant, No. of branch/panicle and 1000 seed weight. Genetic parameters of variation for yield and its components are presented in Table 1. Revealed that grain yield/plant, panicle weight, grains/panicle and number of branch/panicle exhibited large GCV during both the year of experimentation which indicat that the observed variation was due to genetic influence. Rao and Srivastav (1994) and Venkataramana et al. (1999) reported similar results. High value of PCV and GCV of 84.52 was calculated in flag leaf angle, while lowest was with panicle length, days to maturity and milling percentage the remaining traits were in medium value, indicating a good amount of genetic variability in quantitative characters.

It was also observed that the magnitude of PCV and GCV for plant height, Flag leaf area, number of branch/panicle panicle weight, grains/panicle grain length, grain breadth, 1000 seed weight and milling percent were very less suggesting the minimal influence by environment factors (Patil et al. 1993).

High value of genetic advance (GA) were recorded of 69.38 and 65.48 percent for grains/panicle, while lowest 0.64 and 0.66 percent was with grain breadth during both the years 2000 and 2001 respectively. The heritable portion of the variability was determined with the help of heritability estimates. The heritability in broad sense was high (82.7 to 99.57 %) for all the traits excepting 1000 seed weight during 2001 and seed yield/plant during 2000 only. The character like plant height, flag leaf angel, days to flowering and grains/panicle showed high heritability estimates coupled with moderate to high genetic advance indicate preponderance of additive gene action in the expression of these traits would respond to selection effectively (Panse and Khargonkar, 1957) also reported similar results in rice.

Rest of the characters showed moderate to high heritability but low genetic advance indicating the presence of additive and non-additive effects and the expression might be influenced largely by non-genetic factor. This, estimates of heritability and genetic advance are in agreement with the earlier work Amarithadevarathinan (1983) and (Sreekumar et al. 1992).

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Table: 1. Genetic parameters important traits in paddy genotypes.

Character	Year	Mean	Range		Sem±	PCV	GCV	h%	GA	GAM
			Mai.	Max.						
Plant height (cm)	2000	110.61	52.20	143.43	1.76	17.46	17.24	97.48	39.79	35.06
	2001	114.79	54.23	150.33	2.09	17.12	16.83	96.59	39.12	34.08
Flag leaf area (cm^2)	2000	66.77	48.27	89.65	0.98	16.40	16.20	97.57	22.01	32.96
	2001	68.03	41.04	93.04	2.58	17.57	16.19	85.99	21.18	31.13
Flag leaf angle	2000	24.03	5.00	90.00	3.26	87.72	84.52	92.83	40.32	167.75
	2001	25.80	5.00	93.33	3.39	87.50	84.48	93.22	43.35	168.02
No. of effective tiller/plant	2000	9.16	5.33	12.73	0.30	18.76	17.88	90.81	3.21	35.10
	2001	10.83	5.90	13.66	3.73	60.72	11.53	80.61	0.45	4.51
Days to flowering	2000	142.35	123.33	182.33	0.96	10.95	10.88	98.85	31.75	22.30
	2001	137.00	107.00	173.33	1.31	11.33	11.20	97.86	31.29	22.84
Panicle length (cm)	2000	24.56	19.66	28.52	0.19	9.06	8.96	87.80	4.48	18.25
	2001	25.21	21.79	29.29	0.52	8.75	7.95	82.71	3.76	14.90
Days to maturity	2000	182.82	146.33	215.66	46.38	45.01	9.72	95.66	7.90	4.32
	2001	176.12	145.66	220.66	1.28	35.23	9.14	98.13	32.87	18.66
No. of branch/panicle	2000	9.58	5.81	13.34	0.18	19.02	18.72	96.91	3.63	37.97
	2001	9.77	6.76	13.26	0.23	18.77	18.32	95.19	3.59	36.82
Panicle weight (gm)	2000	3.99	2.13	5.40	0.08	24.31	24.02	97.60	1.95	48.89
	2001	4.18	1.72	5.87	0.14	25.02	24.30	94.28	2.03	48.60
Grains/panicle	2000	132.64	57.96	196.80	3.03	25.99	25.69	97.68	69.38	52.30
	2001	138.78	57.90	194.76	5.96	25.11	23.98	91.21	65.48	47.18
Grain length (mm)	2000	8.46	3.11	10.97	0.05	15.82	15.79	99.57	2.74	32.46
	2001	8.46	3.00	11.02	0.07	16.20	16.13	99.17	2.80	33.09
Grain breadth (mm)	2000	2.80	2.12	3.48	0.02	11.36	11.28	98.58	0.64	23.07
	2001	2.85	2.18	3.51	0.03	10.65	10.48	96.84	0.66	21.26
1000 seed weight (gm)	2000	24.26	16.72	29.61	0.25	15.60	15.50	98.61	7.69	31.70
	2001	25.12	21.57	30.51	3.01	26.67	16.69	36.17	5.40	21.52
Yield/plant (gm)	2000	20.03	8.63	29.61	0.62	32.72	32.28	97.32	13.14	65.61
	2001	23.37	8.42	37.65	3.90	40.47	28.33	49.01	9.55	40.86
Milling %	2000	73.79	34.90	79.10	0.81	8.59	8.37	95.10	12.41	16.83
	2001	75.47	67.86	81.83	0.38	4.28	4.14	95.07	6.31	8.36