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Short Communications

Genetic Variability in Ragi[1]

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Ragi (*Eleusine coracana* Gaertn.) constitutes an important crop for the southern India. It is also grown in the tribal areas of Gujarat State. Despite of being one of the hardiest crops grown under dryland agriculture and having high nutritive value, very scanty work has been done for improvement of this crop. To study the extent of variability present in the genetic stock maintained at Hill millet Research Station, Waghai, forty entries were raised in a randomized block design with three replications. Each strain was provided three-metre long plot consisting of three rows with 30 cm inter row and 15 cm intra row spacings. Ten plants were selected at random from each plot for recording the observations. The mean values were used for analysis of variance and covariance. Coefficients of variability (Burton, 1952; Miller *et al.* 1958), heritability (Burton and de Vane, 1953) and genetic advance (Johnson *et al.* 1955) were computed.

Highly significant varietal differences were observed for all the characters (Table 1) suggesting the presence of sufficient genetic variability. Varieties Dibyansinha and T-20-1 and dwarf. Bolder deed size was possessed by HR-374, TNAU-9, PR-1044 and BR-407. Varieties PR-722, JNR-981-2, PR-202 and JNR-1008 were high-yielders. Among the twelve characters studied, maximum variability was observed for plant height (73.53 to 127.07 cm), followed by days to flowering (68 to 113), straw weight per plant (7.66 to 43.33 gm), and weight of total earheads (9.49 to 33.06 gm). Moderate range was conspicuous for grain yield per plant, weight of main earhead and days to maturity. Rest of the characters showed relatively narrow range of phenotypic variability.

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TABLE 1

Mean values and genetic parameters in ragi.

Name of variety	*Source*	*Days to 50 per cent flowering (cm)*	*Plant height*	*Number of tillers*	*Length of main earhead (cm)*	*Breadth of main earhead(cm)*
KM-1	Unknown	84	108	6.4	8.1	5.5
KM-13	,,	75	113	4.0	9.2	6.2
PES-9	UP	91	116	4.1	9.5	6.4
PES-18	UP	90	118	4.0	7.9	6.3
JNK-380-1	MP	88	112	5.9	8.3	6.1
TNAU-46	TN	77	94	5.0	7.9	6.3
PR-1044	AP	96	119	4.3	7.5	5.9
PR-1091	AP	81	105	7.0	8.2	5.5
B-4-10-56	Ori	94	115	5.5	7.4	5.6
VR-415	AP	89	106	3.6	11.4	7.3
HR-231	KT	99	93	3.3	9.9	6.1
HR-344	KT	100	114	4.5	10.2	6.4
HR-374	KT	97	111	4.3	8.2	6.1
PR-202	AP	96	120	4.7	8.3	6.4
OO-10	OO	98	96	4.2	8.8	5.6
T-25-1	Ori	72	88	6.4	7.0	5.2
T-20-1	,,	68	73	5.7	6.7	4.5
Dibyasinha	,,	68	76	5.4	7.1	4.0
T-36-B	,,	74	82	5.9	7.0	4.9
PES-144	UP	72	87	6.3	7.4	4.8
CO-8	OO	71	83	5.2	7.1	4.8
PES-172	UP	83	100	3.7	9.6	6.0
BC-4847	TN	80	98	3.8	8.9	5.5
VL-201	UP	70	92	5.8	7.6	5.1
VL-7	UP	85	120	4.1	8.3	6.7
PPR-1791	AP	95	114	3.9	9.8	6.2
PR-717	AP	93	119	4.8	7.5	5.6
PR-722	AP	94	126	7.5	8.3	6.2
INDAF-5	KT	105	96	2.9	10.1	7.5
HR-23 A	KT	113	81	3.1	10.2	5.7
TAH-85-3	KT	99	107	3.9	9.8	6.4
Sodangi-6	Ori	90	127	5.7	7.8	5.8
JNR-1008	MP	92	121	5.2	8.4	5.8
PES-8	UP	92	122	4.6	8.0	6.0
JNR-852	MP	93	121	6.0	7.8	5.9
JNR-981-1	MP	94	116	5.9	7.6	5.9
TNAU-9	TN	93	118	5.9	7.6	5.6
HPR-7-6	Unknown	95	110	3.8	10.2	6.4
BR-407	Bihar	86	115	6.8	9.5	6.4
GN-1	Guj	101	98	3.5	10.4	8.2
Mean		87	105	4.9	8.5	5.9
S.Em.		0	3	0.4	0.2	0.2
C.D.5%		1	10	1.2	0.3	0.6
C.B.%		1	5	15.7	5.4	6.5
6^2p		118.1	238.7	1.9	1.4	0.7
6^2g		117.1	200.0	1.3	1.2	0.5
6^2e		1.0	38.6	0.6	0.2	0.1
GCV		12.3	13.3	23.4	13.1	12.5
h2(b)		99.1	83.8	68.8	85.5	78.9
GA		22.1	26.6	1.9	2.1	1.3
GA % of mean		25.2	25.1	40.0	25.0	23.0

Number of fingers per main earhead	*Days to 50 per cent maturity*	*Weight of main earheads (gm)*	*Weight of total earheads (gm)*	*Grain yield per plant (gm)*	*Straw weight per plant (gm)*	*Thousand grain weight (gm)*
6.6	112	4.6	14.7	12.6	24.5	2.68
7.2	114	6.2	15.2	12.3	21.6	2.89
8.0	123	8.5	18.0	12.6	26.0	3.03
7.9	119	7.7	18.3	11.8	26.3	3.04
7.1	120	6.8	21.0	18.4	21.6	2.93
6.5	105	5.7	25.2	13.4	23.3	2.98
7.0	125	6.7	17.3	15.0	25.0	3.22
6.6	104	5.2	20.2	17.3	23.6	2.67
6.7	125	6.6	22.5	18.5	37.3	3.14
8.0	124	6.4	13.3	11.1	18.3	3.10
6.7	123	7.7	15.4	11.5	21.3	2.85
7.2	129	8.3	19.0	14.2	34.0	1.42
6.7	115	6.4	18.4	14.3	22.5	3.33
7.0	123	8.0	23.4	19.3	34.1	3.09
6.7	107	6.3	17.2	14.6	18.6	2.80
6.4	97	4.1	15.1	12.7	13.3	2.67
5.5	91	2.9	10.7	8.5	8.6	2.29
5.7	91	3.0	9.9	7.5	7.6	2.42
6.7	98	3.8	11.2	9.2	10.0	2.98
6.3	97	4.6	14.5	12.5	15.8	2.69
6.5	96	2.9	9.4	8.3	11.0	2.81
7.6	120	6.4	15.7	13.4	17.3	2.85
7.0	106	5.4	15.1	12.5	17.8	2.80
6.1	99	4.5	14.2	11.9	18.0	2.52
10.0	120	8.7	20.2	13.1	21.6	2.55
7.6	124	7.3	19.6	12.6	25.8	2.89
6.6	124	7.2	20.7	17.1	30.0	3.12
7.1	133	8.8	26.5	22.1	43.3	3.08
7.5	131	8.3	12.6	9.5	25.5	2.70
5.1	238	6.3	10.0	7.7	20.6	2.39
7.2	127	8.9	18.5	13.7	23.0	2.91
6.8	122	7.4	20.7	15.2	31.3	2.13
6.7	125	7.7	22.4	18.8	23.5	3.14
6.7	124	8.1	20.8	17.7	22.6	3.05
6.9	125	7.2	33.0	17.1	38.3	3.11
7.2	124	7.6	23.4	19.4	33.3	3.10
6.5	123	6.7	22.3	18.4	30.6	3.26
8.7	120	6.4	17.0	12.7	20.6	2.98
8.3	114	6.0	20.8	17.6	23.1	3.18
7.0	130	10.2	24.7	18.8	23.6	2.50
7.0	116	6.5	17.7	14.1	23.3	2.85
0.2	0	0.3	1.1	0.9	2.0	0.05
0.6	1	0.9	3.1	2.6	5.7	0.01
5.8	1	8.9	10.7	11.4	15.1	3.48
0.8	148.5	3.3	21.2	15.3	68.4	0.07
0.6	147.0	2.9	17.6	12.6	62.2	0.06
0.1	1.4	0.3	3.6	2.6	6.2	0.01
11.8	10.4	26.1	23.6	25.0	33.7	9.0
80.4	99.0	89.4	82.8	82.6	90.8	87.2
1.5	24.8	3.3	7.8	6.6	15.4	0.5
21.8	21.3	50.8	44.3	46.9	66.2	17.4

The variance components for different characters (Table 1) revealed that the genotypic variation was comparatively higher in magnitude for all the characters and the environmental component contributed smaller share to total variation indicating that phenotypic variability was a reliable measure of genotypic variability.

High GCV was observed for thousand-grain weight, straw yield per plant, weight of main earhead, grain yield per plant. weight of total earheads and tillers per plant. Patnaik (1968), Dhagat *et al.* (1972), Mahudeswaran and Murugesan (1973), Setty *et al.* (1974), Appadurai *et al.* (1977) and Goud and Lakshmi (1977) have also reported similar results for a few or many of these characters. Lowest genetic variability observed in the present study for thousand-grain weight is in agreement with the findings of Dhagat *et al.* (1972).

Among various metric characters studied, higher estimate of heritability was observed for days to flower, day to maturity, straw yield per plant, weight of main earhead, thousand-grain weight, length of main earhead, plant height, weight of total earheads and grain yield per plant. Appadurai *et al.* (1977) also reported high heritability values for days to flowering and days to maturity. Similarly our results are akin to the findings of Mahudeswaran and Murugesan (1973) with respect to high heritability estimates for grain yield, straw yield, plant height, earhead length and thousand-grain weight suggesting that straight selection based on the phenotypic performance would be rewarding.

Heritability estimated in conjunction with genetic advance would prove more helpful in predicting the advance made through selection (Johnson *et al.* 1955). Moreover, since heritability estimated in the broad sense includes both additive as well as non-additive gene effects, it would be reliable only if it is accompanied by high genetic advance (Ramanujam and Tirumalachar, 1967). The straw yield per plant, weight of main earhead, grain yield per plant, weight of total earheads and number of tillers per plant exhibited high genetic advance expressed as percentage of mean values. Kempanna and Tirumalachar (1968), Narsimha Rao and Pardhasarathi (1968), and Setty *et al.* (1974) have also reported high genetic advance for grain yield. Interesting feature of the present investigation was found in having high genetic co-efficient of variation together with high heritability value and large magnitude of genetic advance for grain yield and earhead weight. Advantage of this nature deserves careful and sustained exploitation of genetic variability present in the ragi collection. Improvement in these economic characters could be brought about through coventional breeding methods.

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