

GENETIC VARIABILITY AND VARIETAL EVALUATION OF FINGER MILLET (*ELEUSINE CORACANA*) IN NORTH EASTERN REGION

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Finger millet or ragi (*Eleusine coracana* (L.) Gaertn.) falls under the group of small millets, which include several coarse cereals, and is a crop of environmentally fragile habitats. The cultivation of finger millet and other five small millets is extended from sea level in southern peninsula to almost 7000-m altitude in western and eastern hill (NEH) region. It is the third important cereal crop of NEH region. (Abraham et al, 1989). The crop is grown under diverse situation of soil, temperature and rainfall. The crop is cultivated on hill slopes, undulating fields, shallow and gravelly soils and in regions predominantly inhabited by tribals (Seetharam, 1994). The crop provides assured and reasonable harvest even in situations of highly inadequate moisture and nutrition supply. Because of these unique features, finger millet has become indispensable to tribal and hill agriculture. Utilization of this crop is both as a source of food grain and animal feed.

In view of its wide adaptation, varietal trials were carried out in three locations (Umiam and Umden in Meghalaya and Jorhat in Assam) in *Kharif* (rainy season) 2000. The experiments were laid out in randomized block design with nine varieties in three replications. The varieties were sown 20 cm apart in rows and the plants were maintained at 10cm within the rows. Each plot was consisted of 5 rows of 3 m length. Observations were recorded on 5 randomly selected plants from each plot on days to 50% flowering (DF), days to maturity (DM), plant height (PH), ear bearing tillers (EBT), ear length (EL), fingers/ear (F/E) and grain yield (GY). The data were subjected to biometrical analysis following standard statistical procedures. Mean values of the three locations were discussed with respect to variability and varietal performance.

Variability

Genotypic coefficient of variation (GCV) was very high for PH, fairly high for DF, DM and GY and low for EBT and F/E. Since GCV itself would not provide the reliable measure of the heritable variations, heritable estimates were considered along with it. The estimates of heritability in broad sense ranged from 20.90% for EBT to 86.07% for DM. DM, DF, EL, F/E had high heritability whereas EBT, and GY exhibited low heritability. Mishra *et al* (1980) also

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reported low heritability for EBT. Estimates of genetic advance (GA) expressed as percentage of mean varied from 8.76 for PH to 21.84 showing predominance of additive gene effects. DM and DF also had high heritability but with low GA indicating predominant effects of non-additive (dominance and epistasis) gene. Selection may be effective for EL and F/E since these characters possess high values for heritability and GA. (Table 1)

Varietal performance

The analysis of variance (Table 2) showed that the varieties differed themselves significantly for all the characters except EBT. As regard locations, there were significant differences for DM, EBT, F/E and GY while variety x location interactions were significant for EBT, F/E and GY. The results (Table 3) over locations indicated that VL 147 attained the shortest PH (92.3 cm) followed by VL 204 (97.0 cm) VL 204 was the earliest to flower (68.0 days) and earliest maturing (107.2 days) followed by VL 149. The varieties showing significantly more E1 were VL 149 and Muskey 5 whereas F/W were maximum in VL 204 (8.28) followed by VL 149. The varieties exhibiting high performance were Muskey 5 (28.97 q/ha) followed by PR 202 (24.03 q/ha) and VL 149 (23.96 q/ha). It may be concluded from the results of the three location that Muskey 5 and VL 149 may be recommended for the farmers in the medium altitude conditions of NEH region in view of their high yield and other desirable yield traits.

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Table 1. Genetic parameters for quantitative characters in finger millet

Character	Mean	Range	SE +/-	Genetic Variance	GCV (%)	Heritability (%)	Genetic advance	Genetic advance as percentage of mean
Plant height	108.6	85.6 – 122.3	8.89	80.53	73.76	48.14	9.71	8.76
Days to 50% flowering	73.7	67.0 – 85.7	1.69	24.30	32.67	78.53	8.48	11.46
Days to Mature	114.4	107.2 – 122.	1.41	35.46	31.31	86.07	10.41	9.11
EBT	2.08	2.30 – 2.40	0.21	0.02	0.83	20.90	0.21	8.72
Ear length	7.86	6.53 – 9.65	0.47	1.04	13.46	66.58	1.69	21.84
Fingers/ear	6.86	5.91 – 8.28	0.38	0.46	6.9	63.54	1.12	16.62
Grain yield (q/ha)	22.36	17.39 – 28.97	3.66	7.30	34.39	28.66	4.26	20.01

Table 2. Analysis of variance of different characters of finger millet

Source of variation	df	Days to mature	Plant height	EBT	Ear length	Fingers/ear	Grain yield
Variety	8	73.67**	213.28 **	0.02	2.48	1.33	34.53
Location	2	6612.30**	185.98	12.07**	1.78	1.64**	81.19**
Variety X Location	16	18.12	96.37	0.03**	0.50**	0.15**	4.37*
Pooled error	54	1.18	54.81	0.02	0.11	0.08	7.12

** P = 0.01

* = 0.05

Table 3. Performance of varieties of finger millet (mean of 3 locations)

Variety	Days to 50% flowering	Day to Maturity	Plant height (cm)	EBT	Ear length (cm)	Fingers/ear	Grain yield (q/ha)
VL 146	68.4	111.8	92.3	1.78	6.68	6.92	18.58
VL 149	68.3	110.4	117.4	1.057	9.14	7.41	23.96
VL 204	68.0	107.2	97.0	1.072	6.87	8.28	17.28
PES 400	70.6	111.0	115.1	1.66	7.02	6.66	20.83
HR 374	75.1	113.6	11.3	1.78	7.93	5.97	22.29
RAU 8	74.2	114.1	113.5	1.77	8.04	6.99	23.12
PR 202	78.9	122.0	110.2	1.73	7.60	6.57	24.03
A 404	77.4	119.9	111.1	1.78	8.33	6.53	22.18
Muskey 5	78.9	119.1	109.2	1.67	9.10	6.40	28.97
Sem	1.7	1.4	8.9	0.21	0.47	0.38	3.66
CD 5%)	3.9	3.3	20.5	0.49	1.09	0.89	8.45
CV (%)	3.0	1.6	10.1	13.96	7.32	6.80	20.09