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VARIABILITY PATTERNS IN QUANTITATIVE TRAITS OF RAGI (ELEUSINE CORACANA GAERTN.)

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ABSTRACT

A wide range of variability was observed for grain yield and its component characters in collection of 23 cultures of finger millet (Eleusine coracana Gaertn.). High genetic coefficients of variation were observed for grain yield and total number of ears per plant, whereas for productive tillers as well as tillers per plant, its estimates were moderate. Plant height, length of ear and number of fingers exhibited low estimates of genetic coefficients of variation. Moderate to high estimates of heritability (in broad sense) were obtained for almost all the characters studied. Grain yield and number of ears per plant possessed high heritability coupled with high estimates of genetic advance and hence selection at phenotypic level for these traits would be more effective.

KEY WORDS: Finger millet, Variability, Heritability, Genetic advance.

Ragi or finger millet (**Eleusine coracana Gaertn.**), an important crop among small grain cereals has quite nutritious food value. Moreover it thrives well under high temperatures in marginal, less fertile low lands under rainfed conditions as well as in saline and alkaline soils.

Varietal improvement for grain yield in ragi is mainly dependent upon the extent of genetic variability present in the population. For effective selection knowledge of relative heritable and non-heritable components of phenotypic variability is of imperative need. This may be achieved by estimating the genetic parameters namely genotypic coefficient of variation, heritability and expected genetic advance for grain yield and its component characters.

MATERIALS AND METHODS

Twenty three cultures of diverse origin were raised in randomised block design with four replications. Ten competitive plants chosen randomly were

used for recording observations on eight characters.

Data were subjected to analysis of variance, from which phenotypic variance (o^2ph), genotypic variance (o^2g) and error variance (o^2e) estimates were obtained and heritability (h^2) estimates were calculated from the variance components. Coefficients of genetic variation were estimated by the method suggested by Burton (1952). Expected advances resulting from selecting 5 per cent superior individuals were estimated by the formula suggested by Johnson et al. (1955).

RESULTS AND DISCUSSION

Assessment of variability is a pre-requisite for a plant breeder to select desirable genotypes based on their phenotypes. Analysis of variance revealed significant varietal differences for all the eight traits studied. Various variability patterns have also been studied for these traits by Prabhakar and Prasad (1984) among others, using different populations of ragi. Present study revealed wide range of phenotypic variability particularly for plant height, days to flowering, grain yield and total number of ears per plant (Table). In general, phenotypic coefficients of variation were higher than genotypic coefficients of variation in almost all the characters. It was noticed that genotypic variances were of higher magnitudes as compared to error variances for all the traits except for length of ear.

Genetic coefficients of variation ranged from 4.95% for plant height to 37.50% for grain yield. Total numbers of ears per plant also exhibited higher genetic as well as phenotypic coefficients of variation, whereas the other traits showed moderate to low phenotypic and genotypic coefficients of variation.

A perusal of heritability estimates indicated that all the characters under study showed moderate to high heritabilities. Characters like days to flowering, grain yield, number of fingers per ear and total number of ears per plant revealed high heritabilities whereas plant height, number of tillers, number of ear bearing tillers and length of ear exhibited moderate heritability estimates.

Genetic coefficient of variation together with heritability gives relatively a

Table. Genotypic and phenotypic variability in ragi

Variables	Days to flower	Number of tillers	Number of ear bearing tillers	Plant height	Length of ear	Number of finger	Total number of ears	Grain yield
Range	55.17 - 87.25	3.90 - 9.72	2.25 - 8.67	34.12 - 78.70	6.90 - 10.37	6.66 - 10.22	2.32 - 10.55	4.62 - 27.47
Mean	73.47 ± 3.05	6.85 ± 0.33	5.38 ± 0.31	57.41 ± 2.22	8.43 ± 0.18	7.59 ± 0.15	9.01 ± 0.69	15.69 ± 1.21
Phenotypic variance	96.84	2.60	2.25	11.51	0.77	0.50	10.91	36.18
Genotypic variance	96.06	1.79	1.55	8.09	0.34	0.43	8.68	34.64
Error variance	0.78	0.81	0.70	3.42	0.43	0.07	2.23	1.54
Genotypic coefficient	13.34	19.53	21.17	4.95	6.91	8.63	32.69	37.50
Phenotypic coefficient	13.39	23.51	24.90	5.91	9.97	9.61	36.69	38.33
Heritability (%)	99.13	68.85	68.61	70.20	44.15	86.43	79.56	95.71
Genetic advance (% of mean)	27.33	37.57	38.05	8.50	6.91	16.54	60.05	75.59

better picture of the amount of advance to be expected through selection. In present investigation, genetic advance expressed as percentage of mean was high for grain yield and total number of ears per plant. These characters also exhibited high heritability estimates. Rao and Pardhasarthi (1968) and Prabhakar and Prasad (1984) also observed high estimates of genetic coefficients of variation, heritability and genetic advance for grain yield in ragi. Significant positive associations between grain yield and ear bearing tillers were reported by Raj et al. (1973) and Prabhakar and Prasad (1983). Elucidating the aforesaid type of association, it can be suggested that additive gene effects for these characters are present and improvement can be attained in these characters through direct phenotypic selection. High to moderate heritability estimates accompanied by low genetic advances as observed for plant height, length of ear and number of fingers per ear may be due to non-fixable gene effects. Hence, direct phenotypic selection for grain yield and effective tillers per plant and line breeding for plant height, ear lengh and number of fingers per ear may be advocated for improvement in ragi.

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