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The present study revealed that direct selection for seed yield will not help because that character is influenced more by environment. By selecting for stem weight, it is possible to improve seed yield as the character stem weight is estimated to be governed by additivity and strangly associated with seed yield.

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DRY MATTER PRODUCTION AND HARVEST INDEX IN RELATION TO GRAIN YIELD IN PANIVARAGU - PROSO MILLET (*Panicum miliaceum* L).

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ABSTRACT

Eighteen genotypes of *panivaragu* - prosomillet (*Panicum miliaceum* L) were evaluated for dry matter production and harvest index in relation to grain yield. High GGV, heritability and genetic advance as percentage of mean observed for harvest index indicated that harvest index may be governed by additive genes. All the other characters which exhibited medium heritability and medium genetic advance may be governed partially by additive genes. Grain yield was positively associated with total biomass, earhead weight and harvest index. Earhead weight is also positively correlated with total biomass, root weight and harvest index. Though selection for improvement of grain yield is possible through positively associating yield contributing characters, they are mostly affected by environment. So, selection of genotypes for the improvement of grain yield through harvest index is appropriate in the present materials since harvest index is not much influenced by environment and also grain yield is positively correlated with harvest index.

The area under minor millets remain constant over decades since the yield potential is lower. Minor millets are capable of coming up well in soils of poor fertility where other crops seldom give any return. Among the minor millets, *panivaragu* (Prosomillet) (*Panicum miliaceum*) L.) is characterised by its short period of maturity which makes it very suitable as a catch crop. It has very low water requirement and is able to evade drought by its quick maturity (Rangaswami Ayyangar and Krishna Rao, 1938). Owing to its minor importance, little work has been done on the dry matter production of this crop. The present study was aimed at studying the dry matter production and harvest index in relation to the improvement of grain yield in *panivaragu* genotypes.

MATERIALS AND METHODS

Eighteen genotypes of *panivaragu* accessions maintained in the School of Genetics, Tamil Nadu Agricultural University, Coimbatore formed the material of study. They were grown during *kharif* 1984 in a randomised block design plot with three replications. Each entry was raised in a plot of 3 m x 1.8m size with a spacing of 22.5 cm between rows and the plants were thinned to leave 10cm between plants on tenth day. Observations were recorded on five randomly selected individual plants in each plot for grain yield, total dry matter, earhead weight, root weight and straw weight.Harvest index (HI) was calculated as HI = Grain yield/Biological yield.

Table 1. Genetic parameters for different characters in *Panivaragu* - Prosomillet.

Characters	Mean	PCV	GCV	Heritability	Genetic advance as percentage of mean
Grain weight	1.48	60.99	20.76	11.60	14.57
Total biomass	4.73	39.86	13.96	12.26	16.06
Straw weight	1.40	45.78	17.70	14.95	14.10
Root weight	0.49	53.20	19.93	13.98	15.32
Earhead weight	2.41	51.57	20.65	16.02	17.02
Harvest Index	29.84	56.09	27.79	24.56	28.38

PCV : Phenotypic coefficient of variability
GCV : Genotypic coefficient of variability

The mean value for the characters were subjected to statistical analysis. The analysis of variance (Panse and Sukhatme, 1957), heritability (Robinson *et al.*, 1949) and correlation (Miller *et al.*, 1958) were worked out.

RESULTS AND DISCUSSION

The analysis of variance is significant among genotypes for all the characters studied. Phenotypic coefficient of variability (PCV) is higher than genotypic coefficient of variability (GCV) in all the characters (Table 1). High GCV was obtained for grain weight and HI, indicating that these characters could be relied upon for exercising selection. High hertiability was obtained for harvest index and medium for the other characters. High genetic advance for harvest index and medium for the others were observed in *panivaragu*. According to Panse (1957), the high heritability in HI indicated additive gene effect for this trait. High heritability with high genetic advance for HI was also observed by Rosielle and Frey (1975) in oats.

Association of characters revealed that grain weight is positively and significantly correlated with total biomass, earhead weight and harvest index. Root weight significantly correlated with grain weight (Table 2).

Total biomass is highly correlated with earhead weight at 1 per cent level and straw weight with 5 per cent level. The root weight also has highly significant correlations with earhead weight but non-significant correlation with total biomass. Earhead weight is positively and significantly correlated with harvest index. Donald and Hamblin (1976) reported that grain yield is proportional to harvest index and their correlation is 1.0 and on the other hand, biological yield and harvest index are unrelated. They also reported that progress in breeding cereal cultivars seemed to be related to higher harvest indices with little change in biological yield. In the present material, the grain yield could be increased by selecting plants with higher harvest index. Harvest index could be increased by selecting plants with higher ear head weight. Selection of genotypes based on grain yield may be a misleading criterion since superior genotypes may go unrecognised. As a consequence, progress through grain yield has depended on combinations of characters designated largely by chance combination which may be better than those of existing cultivars. The components of grain yield as selection criteria suffer the disability that they tend to be mutually compensating so that an advance in any one component tend to be affecting the other (Adams, 1967). So, biological yield and harvest index are the simple but valuable criteria for selection since they are not influenced

Table 2. Association of characters in *Panivaragu* - Prosomillet

Characters	Total biomass	Straw weight	Root weight	Earhead weight	Harvest Index
Grain weight	.6507**	.0614	.5228*	.8379**	.7599**
Total biomass	-	.5329*	.4847	.7231**	.3824
Straw weight			.2473	.3129	.2238
Root weight			-	.5691**	.4317
Earhead weight				-	.5670**

* p = 0.05 ** p = 0.01

much by environment (Donald and Hamblin, 1976). In the present study also, selection for grain yield through harvest index is reliable since HI is positively correlated with yield along with high GCV, heritability and genetic advance.

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RELATIVE PERFORMANCE OF COTTON GENOTYPES UNDER DIFFERENT LEVELS OF SALINITY IN IRRIGATION WATERS

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ABSTRACT

Seven genotypes of cotton were screened for tolerance to different levels of salinity in irrigation water for four years. The genotypes showed significant variation in respect of mean kapas yield in all the four years. Further, the mean kapas yield decreased with increased salinity levels of irrigation water. The slope of regression line was found to be inversely related to kapas yield, and, therefore, it offered a better criterion for appraisal of salinity tolerance. Based on mean salinity index, tolerance index value and the slope of regression line, MESR-17 and JK125-2-5 were identified as fairly tolerant genotypes to salinity.

Cotton is one of the most important commercial fibre crops in India. In the arid and semiarid regions of the world, the salinity problems become accute with the advent of irrigation followed by indiscriminate use of water and also use of saline ground waters for irrigating the crops. Ground water accounts for 28 per cent of the net irrigated area in Karnataka State (Anon.,1989). However, the plants differ significantly in their tolerance to salinity and cotton is recognised as one of the most salt tolerant among field crops (Richards, 1954). Crop failure in saline environment is due to the accumulation of salts which results in the reduction of plant growth followed by kapas yield. Hence, the present investigation was undertaken to determine the effect of different levels of salinity in irrigation water on kapas yield of some of the genotypes of cotton.

MATERIALS AND METHODS

During the *kharif* season of 1984 and from 1986 to 88, 11 field experiments were conducted on medium black soil (vertisol) predominant in clay (52%) and silt (28%), possessing the following chemical properties: pH_2 - 8.2; ECe 0.83 to 4.84 dS/m, organic carbon -0.68% and $CaCO_3$ - 3.0%. Seven genotypes of cotton *viz.*, MESR-16, MESR-17, MESR-23, MESR-27, JK-125-2-5, JK-97 MB and Laxmi (local check) were sown in plots separated by a polythene sheet to a depth of a m to avoid lateral movement of salts. A split-plot design was adopted, with salinity levels (Good Water: GW-1, 4, 6, 8, 12 and 18 dS/m) of irrigation waters as the main treatments and the genotypes as sub-treatments being replicated thrice. The same plots received the same main treatments (saline waters) throughout the study. Each genotype sown in single row of 2.7 m length, maint