grain weight, were registered by the clusters XI,XIV, III and XIII respectively. The lowest mean values for plant height, tiller number, ear length and straw yield were recorded by the cluster IX while the cluster XI registered the lowest mean values for tiller number, grain weight and grain yield. The lowest mean values for the traits, days to flowering and ear girth were recorded by the clusteres VIII and XIV respectively.

Hence, inter crossing the types from these clusters may result in a wide range of variability and subsequent selection for these traits would result in genotypes with higher grain yield combined with earlines. Under such conditions, Chaudhary *et al.* (1975) suggested that selection of one type from each cluster and testing them by a series of diallel anyalysis may prove to be highly fruitful. Since clusters XIII and XIV were the widest in their genetic divergence, the two types may also be tested for heterosis breeding.

REFERENCES

CHAUDHARY,B.D., BHATT, P.N. and SINGH, V.P. (1975). Genetic diversity in cluster bean. **Indian J. agric. Sci., 45:** 530-535

CALUSEN,J. and HAISEY, W.M.(1958) Phenotypic expression of genotypes in contrasting environments. **Scot.P1. Br.St. Rep.,** pp 41-51

GUPTA, M.P. and SINGH, R.B. (1970) Genetic divergence for yield and its components in green gram. **Indian J.Genet.,** 30:212-221.

Madras Agric. J., 82(1): 11-13 January, 1995
https://doi.org/10.29321/MAJ.10.A01108

HERITABILITY AND CORRELATION STUDIES OF VARIOUS COMPONENTS OF DRY MATTER PRODUCTION IN *Sesamum indicum*

O.UMESH KUMAR REDDY and M.STEPHEN DORAIRAJ
School of Genetics, Tamil Nadu Agricultural University, Coimbatore 641 003

ABSTRACT

Fifty genotypes of *Sesamum indicum* belonging to various geographical background were grown in a field experiment during 1986 and five components,namely, root weight, stem wight, leaf weight, capsule weight and seed yield were recorded. Data subjected to heritability and correlation studies revealed that the highest genotypic coefficient of variability, heritability and genetic advance were observed for the component stem weight indicating additive gene action. Lower heritability and genetic advance as per cent of mean were recorded for root weight and seed yield indicating that variation in these characters was governed more by environment rather than the heritable genetic component. Stem weight had high genotypic correlation to seed yield followed by capsule weight, root weight and leaf weight respectively.

Sesame (*Sesamum indicum* L. is an important oil seed crop of tropics and subtropics. Variability has been exhaustively studied by several workers for various yield attributes. Total dry matter production is very important aspect with high heritability and high genetic advance and its direct effects are maximum to yield than any other plant character as recorded by Reddy and Stephen Dorairaj (1987). Very few workers studied the varia bility for dry matter production. The present investi gation is an attempt to study heritability and correla tion of various components of dry matter production.

MATERIALS AND METHODS

. Fifty genotypes of various plant types of wide geographical origin were grown in 1986 in a randomised block design with four replications. Observations were recorded on root weight, stem weight, leaf weight, capsule weight and seed yield from 5 samples in each genotypes from every replication. Phenotypic and genotypic variabilities and heritability (broad sense) were estimated Phenotypic and genotypic coefficients of variabilities (PCV and GCV) were estimated as per Burton (1952). Genetic advance (GA) was estimated according to Johnson *et al.* (1955a) and phenotypic and genotypic correlations were worked out according to Johnson *et al.* (1955b).

RESULTS AND DISCUSSION

Analysis of variance revealed that all treatments were highly significant. Highest PCV

Table 1. Variability studies in sesamum

Character	General mean	Range	PV	GV	PCV	GCV	PCV-GCV	Heritability	Genetic advance	Genetic advance as per cent of mean
Root weight (g)	1.10	0.34-1.92	0.14	0.11	34.02	30.15	3.87	76.3	0.61	55.45
Stem weight (g)	4.24	1.15-10.94	3.45	3.12	43.81	41.66	2.15	90.6	3.46	81.60
Leaf weight (g)	6.46	1.88-11.89	4.99	4.15	34.58	31.53	3.05	83.1	3.83	59.29
Capsule weight (g)	4.31	1.56-8.35	2.06	1.80	33.30	31.13	2.17	87.3	2.58	59.86
Seed weight (g)	5.82	2.08-11.22	4.06	3.13	34.62	30.39	4.23	77.2	3.21	55.15

has been recorded for stem weight and the least PCV was for capsule weight. The highest GCV was observed for stem weight and the least GCV was for root weight. For the character stem weight lowest difference of PCV and GCV was observed indicating the stability of that character followed by capsule weight (Table 1). The highest difference of PCV and GCV was for seed weight indicating that this character was influenced more by environment.

Heritability (h^2) estimates would indicate the heritable portion of the variation and the estimation of genetic advance would show the extent of genetic gain that could be expected through selection in the character to be improved upon. As heritability in the broad sense includes additive and epistatic genetic effects, it will be reliable only if accompanied by high genetic advance. Burton (1952) suggested that GCV together with heritability estimates would give the best picture of the extent of advance to be expected by selection.

Stem weight had heritability and high GA indicating additive inheritance for this character. This is further confirmed by GCV, which was the highest for stem weight. For capsule weight heritability was moderate and GA was lower indicating epistasis for this character. Heritability was low for root weight and also GA indicating much environmental influence. Heritability and GA as per cent of mean for seed yield very low indicating that only indirect selection through other characters could improve seed yield. Crop yield is an end product of the interaction of an number of other often interrelated attributes. Hence the efficiency of selection for yield mainly depends on the direction and magnitude of association between yield and its components and among the components themselves. It has been generally accepted that the correlations between different characters represent a coordination of physiological processes which is often achieved through gene linkage (Mather and Harrison, 1949; Mather and Jinks, 1971). A knowledge of strength and type of such association is an important pre-requisite for the formulation of breeding procedures (Breese and Haywards, 1972). Correlation studies revealed that all characters were highly significant and positively correlated with each other indicating strong association among themselves. Stem weight and capsule weight were highly associated with seed yield. The difference of phenotypic and genotypic correlations were the lowest between seed yield and stem weight indicating genetic stability in their association (Table 2).

Table 2. Correlation studies in sesamum

		Stem weight	Leaf weight	Capsule weight	Seed weight
Root weight	P	0.84**	0.76**	0.74**	0.81**
	G	0.77**	0.69**	0.69**	0.71**
Stem weight	P		0.81**	0.88**	0.84**
	G		0.75**	0.85**	0.78**
Leaf weight	P			0.73**	0.74**
	G			0.69**	0.66**
Capsule weight	P				0.81**
	G				0.77**

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.

REFERENCES

BREESE,E.L. and HAYWARDS,M.D.(1972). The genetic basis of present breeding methods in forage crops, **Euphytica 21** : 324-330.

BURTON,G.W. (1952). Quantitative inheritance in grasses. **Proc. 6th Int. Grassld. Congr., 1** : 277-283.

JOHNSON,H.W., ROBINSON,H.F. and COMSTOCK,R.E. (1955a). Estimates of genetic and environment variability in soyabean. **Agron. J., 47** : 314-318.

JOHNSON,H.W., ROBINSON,H.F. and COMSTOCK,R.E. (1955b). Genotypic and phenotypic correlations in soybean and other implications in selection. **Agron.J.. 47** : 477-483.

MATHER,K. and HARRISON,B.J. (1949). The manifold effects of selection. **Heredity 3** : 1-52.

MATHER,K. and JINKS,J.L. (1971). **Biometrical Genetics.** Chapman and Hall, London. 382 pp.

REDDY, O.U.K. and STEPHEN DORAIRAJ,M. (1987). Variability character association and genetic divergence of some yield components in *Sesamum indicum* L. M.Sc.(Ag.) Thesis, Tamil Nadu Agricultural University, Coimbatore.

Madras Agric. J., 82(1): 13-15 January, 1995

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

S.CHIDAMBARAM and S.PALANISAMY

School of Genetics, Tamil Nadu Agricultural University, Coimbatore - 641 003.

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.