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GENETIC PARAMETERS FOR GROUNDNUT IN SUMMER RICE FALLOWS

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Abstract: Genetic parameters for 15 metric characters in 80 divergent varieties of groundnut grown in the summer rice fallows were estimated. The varieties differed significantly in respect of all the characters. The pcv was higher than gcv for all the characters. High estimates of gcv, heritability and genetic advance were obtained for number of branches, flowers and leaves, spread of flowering and 100 pod weight whereas the values were low for fresh weight of pods and dry pod yield. So also the high pcv for dry pod yield suggests that the genetic improvement for the economic trait through selection for summer rice fallows is meagre. Oil content, shelling percentage and duration up to flowering and maturity registered high heritability, but low genetic advance.

INTRODUCTION

The national urgency for genetic improvmement in groundnut, the king of oilseeds in India, needs no emphasis. Crop sequence studies had proved the efficacy of including groundnut in the rice based cropping system. There is immense scope for extending its cultivation in the summer rice fallows during January to April (Nair, 1978) for which suitable varieties have to be identified. But no systematic work has been done in the past for the genetic improvmement of this crop for the summer rice fallows.

Genetic variability and genetic analysis of the biometric characters are essential prerequisites for effecting selection to achieve genetic improvement. The observed phenotype is a correlated response of heritable and nonheritable factors. Only the heritable portion of the variability which is estimated by genotypic coefficient of variation can contribute to genetic improvement through selection. Heritability in combination with genetic advance would be more useful in predicting the response to selection.

MATERIALS AND METHODS

A germplasm collection of 80 groundnut varieties was raised in RBD with three replications at the Agricultural Research Station, Mannuthy, Trichur, Kerala during summer in rice fallows. These varieties included all the habit groups, viz., spreading, semi-spreading and bunch. In each variety and replication 30 plants were grown in three rows at a spacing of 20 cm within and 30 cm between rows.

Five observational plants were marked at random from each variety in every replication. The characters studied were duration up to first flowering, duration up to maturity, number of flowers, spread of flowering, height of main shoot, number of branches, fresh weight of pods, haulm yield, number of leaves, number of mature pods, dry pod yield, 100 pod weight, kernel weight, shelling percentage and oil content. The oil content was estimated by the cold percolation method (Kartha and Sethi, 1957). The data were analysed by the analysis of variance technique. Genotypic, phenotypic and environmental variances were estimated adopting the method of Singh and Chaudhary (1977). Heritability in the broad sense and genetic advance were estimated by employing the formulae suggested by Hanson *et al.* (1956) and Allard (1960) respectively.

RESULTS AND DISCUSSION

The analysis of variance revealed that the 'F' values are significant for all the characters indicating wide variability. The 'F' values, range, means and standard error of the fifteen characters are given in Table 1 which further illustrate the diversity among the groundnut varieties in the different characters. Such wide variations between varieties of groundnut were reported earlier by Sivasubramonian *et al.* (1977) and Norden (1980). Genetic parameters such as coefficients of genotypic, phenotypic and environmental variation, heritability and genetic advance are given in Table 2.

Number of branches recorded the highest genotypic coefficient of variation (gcv) followed by number of leaves (30.50). This is in consonance with the reports of Majundar *et al* . (1969). Relatively high gcv was obtained for number of leaves, number of flowers and 100 pod weight. Dry pod weight recorded low gcv (13.19) as against a relatively high value reported by Dixit *et al.* (1971). The lowest gcv was for duration up to maturity (5.26) followed by oil content (5.74). This is in conformity with the results of Kushwaha and Tawar (1973).

The trend of values for phenotypic coefficient of variation (pcv) for the various characters was almost the same as that of gcv. The high pcv obtained for number of branches is in agreement with the results of Majundar *et al.* (1969). In conformity with the report of Khangura and Sandhu (1973), relatively high pcv was recorded for pod yield. It is interesting to note that for all the characters, the gcv was lower than the pcv. High values of gcv and pcv were recorded for number of mature pods and haulm yield suggesting scope for improvement through selection.

The heritability estimate was the highest for spread of flowering (85.80). Other traits with high values for heritability were 100 pod weight, duration up to flowering and maturity as already recorded by Stephen *et al.* (1979). In line with the reports of Kushwaha and Tawar (1973), moderate heritability was noted for 100 pod and kernel weights and shelling percentage. Low heritability value obtained for dry pod yield is in conformity with the reports of Basu and Ashokraj (1969) and Shatter (1974). As reported by Dixit *et al.* (1971), number of mauture pods recorded low heritability. Moderate heritability was noticed for oil content as against low value reported by Kushwaha and Tawar (1973).

According to Johnson *et al.* (1955), hertiability along with genetic advance is more useful in effecting reliable selection. The genetic advance was the highest for number of branches (70.48) as reported by Sanga and Sandhu (1970). Number of branches, number of leaves, 100 pod weight and number of flowers recorded high genetic advance. Duration up to maturity, shelling percentage, oil content and dry pod yield recorded low estimates of genetic advance. Heritability, gcv and genetic advance were high for number of branches, leaves and flowers, spread of flowering and 100 pod weight. Moderate heritability and genetic advance were recorded by 100 kernel weight and haulm yield.

Pod yield had got low, value for gcv, heritability and genetic advance and high value for pcv suggesting that the economic trait is under the profound influence of environment and genetic improvement through selection may be limited. This may be due to the fact that the present groundnut varieties are bred for the kharif uplands and not for

Table 1. F Values (varieties), range, mean and standard error of fifteen characters of groundnut in rice fallows during summer

Sl. No.	Characters	F value (varieties)	Range	Mean	Standard error
1	Duration up to first flowering (days)	11.96"	24.0-34.0	32.43	4.44
2	Duration up to maturity (days)	14.44**	94.7-119.7	103.98	9.87
3	Number of flowers	8.76**	64.0-213.0	103.42	31.52
4	Spread of flowering (days)	19.13**	29.7-65.3	49.84	9.68
5	Height of main shoot (cm)	3.13"	38.5-98.9	63.82	11.13
6	Number of branches	10.64"	4.8-21.5	7.78	2.61
7	Number of leaves	7.76"	70.5-213.5	111.37	40.09
8	Number of mature pods	2.73"	9.3-21.5	14.97	3.08
9	Fresh weight of pods (g)	1.99"	14.3-32.9	22.31	3.76
10	Haulms yield (g)	2.80"	36.4-90.5	52.95	11.37
11	Dry pod yield (g)	2.12"	7.6-21.2	10.69	3.92
12	100 pod weight (g)	601.06"	60.6-160.8	104.40	21.42
13	100 kernel weight (g)	502.34"	25.5-53.7	41.48	5.43
14	Shellingpercentage	7.39"	56.3-81.0	72.72	6.51
15	Oil content (%)	179.33"	41.4-54.3	47.41	3.10

(** Significant at 1 per cent level)

Table 2. Genetic parameters for groundnut in rice fallows during summer

Sl. No.	Characters	Coefficients of variation			Herita-bility (%)	Genetic advance
		Geno-typic	Pheno-typic	Enviorn-mental		
1	Duration up to first flowering	7.08	7.99	3.71	78.46	12.92
2	Duration up to maturity	5026	5.82	2.49	81.76	9.80
3	Number of flowers	25.49	30.01	16.02	72.12	44.60
4	Spread of flowering	18.70	20.18	7.61	85.80	35.68
5	Height of main shoot	12.89	20.00	15.29	41.53	17.11
6	Number of branches	39.17	44.85	21.85	76.28	70.48
7	Number of leaves	30.50	, 36.64	20.31	69.27	52.29
8	Number of mature pods	17.07	28.20	22.45	36.64	21.28
9	Fresh weight of pods	11.82	24.24	21.16	23.80	11.88
10	Haulm yield	19.05	31.09	24.57	37.56	24.06
11	Dry pod yield	13.19	25.31	21.01	27.16	14.16
12	100 pod weight	21.78	23.64	9.50	84.85	45.81
13	100 kernel weight	11.29	13.36	7.14	71.41	27.36
14	Shelling percentage	6.59	7.78	4.52	68.05	11.20
15	Oil content	5.47	6.27	3.06	67.20	12.68

summer rice fallows. However, genetic improvement to a large extent can be achieved through selection for number of branches, flowers and leaves, spread of flowering and 100 kernel wieight.

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