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HABITUAL AND VARIETAL VARIATION IN YIELD, HARVEST INDEX AND QUALITY CHARACTERISTICS OF GROUNDNUT*

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Three habit groups of groundnut comprising six varieties in bunch, three in each of semi-spreading and spreading were incorporated into the investigations. A wide difference in pod yield was noticed among the habits and in particular among the varieties within the bunch group due to high heterogeneity. The dependence of yield on Harvest Index was also clearly manifested among the habits. The quality characteristics such as shelling percentage and 100-kernel weight also showed a clear difference among the habits and varieties within the habit and they showed high values in the order of bunch, semispreading and spreading respectively. An inverse relationship was noticed between oil and protein and where deviations occur they are cocerned with varieites like TMV 9 with supra optimal oil content and TMV 6 with sub-optimal oil content.

The groundnut plant (*Arachis hypogaea L.*) is a cultivated annual or weekly-perennial herb grown in many tropical and sub-tropical countries and in the continental parts of temperate countries for its seeds which contain approximately fifty five percent of a non-drying oil and about thirty five percent protein and are used in oil seed industries or for confectionary. The cultivated species includes mainly three forms with bunch, semi-spreading and spreading growth habits possessing the advantages and disadvantages of their own.

Norden and Limpsomb (1974) concluded that close planting increased the yield in both bunch and spreading type of groundnut, at the same time significant difference was obtained in shelling percentage and seed weight. Rao *et al*, (1974) reported that the *Virginia* types were most efficient among the group followed by *Valencia* and *Spanish* types in dry matter production, podyield and other parameters. Jaya-Mohan Rao *et al*., (1975) opined that spreading type have higher number of pods, pod weight and shelling percentage than bunch types. By studying the spreading and semi-compact nature of pigeon pea, Tiwari *et al*. (1977) were able to obtain a distinct difference in yield between both the types, spreading giving the highest yield of 1329 kg/ha and semi-compact giving as low as 675 kg/ha George *et al*. (1975) suggested that the varietal characters were the main factors for yielding potentiality and observed wide difference in varieties of soybean namely, the variety JN 2750 recorded maximum 100-seed

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weight (20 gram) while the variety SS 69 showed minimum (12 grams). The seed size is also responsible for the shelling percentage and 100-kernel weight as suggested by Trehan *et al.*, (1977) in two varieties of sunflower. A wide variation was also noticed in oil and protein, content among the varieties and habits of growth in groundnut. Huang (1975) recorded that seeds of *Virginia* runner and bunch type had a higher protein and oil content than variety *Spanish*. A significant nagative correlation between oil and protien content was generally applicable to all the varieties according ot Tirumal Rao and Murthy (1960)

MATERIALS AND METHODS

The investigations were carried out in a field trial laid out in a randomized block design, in a red loamy soil at millet breeding station, Tamil Nadu Agricultural University, Coimbatore during the year 1977. The experiment was replicated thrice with twelve varieties viz., TMV 2, TMV 9, B 131, Ah 8068, Gangapuri and Pollachi Red among bunch, TMV 6, TMV 8 and TMV 10 among semi-spreading and TMV 1, TMV 3 and TMV 4 among spreading as the experimental meterial. A plot Size of 3.0m x 2.0m was maintained and 20.0 cm spacing between rows and 15.0 cm between plants was given. The NPK fertilizer was incorporated into the soil by broadcast after layout of the plot at the rate of 15:30:45 Kg/ha.

a) Yield of Pods

Pod yield per plot was calculated by recording the number of plants available at the time of harvest and their weight. The dry weight was recorded on air dry weight basis. From the dry weight obtained per plot and size of the plot maintained the hectare yield was worked out.

(b) Harvest Index:

The pod dry weight divided by the total dry weight of the plant expressed in percentage was regarded as the harvest index.

(c) Quality Characteristics:

(i) Shelling percentage:

Randomly selected five hundred pods in each variety was shelled and the percentage of Kernel weight to pod weight was determined in each variety to arrive at shelling percentage =

$$\frac{\text{Kernel weight}}{\text{Pod weight}} \times 100$$

(ii) 100 Kernel weight :

Totally five hundred Kernels was selected at random in each variety and their weight was recorded. From this the weight for 100-kernels was calculated and expressed in grams.

(iii) The protein and oil contents were estimated by the methods described by Alikhan and Youngs (1973) and AOAC (1960) respectively. Three samples in each variety were analysed for the above contents.

RESULTS AND DISCUSION

Data on yield and harvest index are appended in Table 1. Among the bunch varieties TMV 9, B 131 and TMV 2 are the highest yielders (2624), 2299 and 1899 Kg/ha, and maintained their superiority over the rest in that group. Among semi-spreading TMV 6 recorded a higher yield ranking 1841 Kg/ha

follwed by TMV 10 and TMV 8, 1750 and 1652 Kg/ha respectively. Similarly among spreading varieties TMV 3 stood superior with 3640 Kg/ha followed by TMV 4 and TMV 4 and TMV 1 with 2700 and 2240 Kg/ha respectively. The variation among the varieties and habits obtained here is strongly supported by the view made by Rao *et al.* (1984).

Harvest Index also high in the same varieties namely TMV 9 (19.7), TMV 6 (13.9) and TMV 3 (25.3) in respect of three habits of growth but variation in ranking in harvest index placed an additional dimension of productivity conditioned by profuseness of flowering apart from the biological yield of dry matter production.

The data on quality characteristics are appended in the Table 2. Quality characteristics, however possessed no ingredients of complexity and appear quite associated with habit of growth. The range of shelling percentage increased from bunch (47.83 to 57 62) to semi-spreading (62.28 to 67.84) and semi-spreading to spreading (65. 10 and 72.43). Consequently, 100-kenel weight was much less in buch (25.79 to 32.10) compared to semi-spreading (34.40 to 39.67) and spreading (34.82 to 35.55). The heterogenity of bunch varieties could be perceived in the wide variation in shelling percentage and 100-kernel weight. However semi-spreading and spreading showed apparently higher value for shelling percentage as well as 100-kernel weight.

Despite heterogenity among bunch varieties oil content remained stable while protein content showed wide variation. On the contrary semi-spreading and spreading varieties showed variation in oil content but protein content was quite stable. The negative correlation obtained by Holley and Hammons (1968) between oil and protein conte t of Kernels amply supported the result of the experiment, but deviation was met with in TMV 9 noted for Supra optimal oil content (52.03%) and TMV 9 noted for sub-optional oil content (45 23%).

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Table-1 Total Plant dry weight, pod yield and harvest index in six bunch, three semi-spreading and Three spreading varieties of groundnut. (Mean of three replicates)

Variety	Total Plant Weight (G)	Pod yield (Dry Weight)			Harvest Index
		Per Plant (g)	Per plot (kg)	Per hectare (kg)	
			Bunch		
TMV 2	62.1	9.7	1.14	1899	15.6
TMV 9	65.8	13.0	1.57	2624	19.7
B 131	59.7	11.5	1.38	2299	19.2
AH 8068	51.5	7.2	0.91	1516	13.9
Gangapuri	57.5	8.9	1.08	1800	15.4
Pollachi Red	61.0	9.0	1.09	1830	15.3
			Semi-Spreading		
TMV 6	65.2	9.1	1.10	1841	13.9
TMV 8	64.0	7.6	1.05	1750	11.9
TMV 10	58.0	8.6	0.99	1652	14.8
			Spreading		
TMV 1	67.3	10.9	1.34	2240	16.1
TMV 3	78.4	19.9	2.18	3640	25.3
TMV 4	67.3	13.8	1.75	2700	20.5

Table-2 Quality characteristics - in varieties of Groundnut (Mean of three Replicates)

Variety	Shelling percentage	100-Kernel Weight (g)	Oil percentage	Protein Percentage
		Bunch		
TMV 2	47.96	25.88	48.73	21.19
TMV 9	57.62	32.10	52.03	25.96
B.131	53.07	26.39	47.05	31.50
Ah 8068	51.72	25.79	47.88	46.90
Gangapuri	51 66	29.19	45.30	40.74
Pollachi Red	47,83	31.40	46.36	45.67
		Semi-spreading		
TMV 6	62.63	39.52	45.23	35.81
TMV 8	62.28	34 40	47 05	45.67
TMV 1(	67.89	39.67	57.85	38.28
		Spreading		
TMV 1	65.10	34.82	45.78	32.11
TMV 3	72.43	35.55	55.35	43.20
TMV 4	70.52	35.23	40.70	27.19
SED	1.20	0.50	0 21	0.39
C. D.	3.54	1.54	0.61	1.15

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