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SIGNIFICANCE OF DRY MATTER PRODUCTION OF GREENGRAM (*Vigna radiata* (L) WILCZEK) GENOTYPES IN RELATION TO YIELD.

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Dry matter production between the different parts of the plant showed very high correlation among themselves at most of the stages studies. The contribution of dry matter production towards yield was uncertain. The dry matter production at 29th and 57th day after sowing was alone significant with yield, being non-significant at rest of the stages.

Most of the pulses are grown as rainfed crop or used in inter-cropping and thus the production per unit area is naturally less. The vegetative dominance, flower shed, poor filling of pods, dry matter production and its distribution and other factors also reduce the yield. Production physiology has been the recent theme in food crops particularly in grain legumes. Many growth and yield parameters have been employed in grain legumes, not only to measure the growth and related aspects, but to predict the potentiality of the legumes to a reasonable extent. The distribution and variation of dry matter in dry bean varieties has been reported by wallace and Munger (1966). With light interception in soybean, Enyi (1973) established a negative correlation between dry matter production (DMP) and grain yield. In chickpea, Saxena and Sheldrak (1976) recorded that at flowering, 50 to 60 per cent of the total DMP was in the leaves and 30 to 40 per cent in stems and it was concluded that larger proportion of partioned DMP was during the reproductive phase.

MATERIALS AND METHODS :

Investigations outlined in the article were carried out during 1978-81 in the Department of crop physiology, Tamil Nadu Agricultural University, Coimbatore-3. The object of the study was primarily directed towards the significance of dry matter production and its distribution in the genotypes of greengram in relation to yield. The fifteen genotypes chosen, varied in yield which were arbitarily grouped into high (PIMS 4, CO3, 11/99, ML 69 and Pusa Baisakhi), medium (T44, 11/395, LAM GG 127 ML 73 and 10/303) and low (KM 1, PH6, ML 62, DM/2 and MH1) yielders but had a duration of 60-63 days. A sample of 10 plants (root, stem, leaves and reproductive parts) from each of the three replications collected at eight stages (15, 22, 29 36, 43, 50, 57, 64, days after sowing) was dried in an air over at 80°c for 24 hours and cooled in a desicator. The dry weight of root, stem, leaves and reproductive parts and total DMP was recorded and expressed in gram per plant. The yield of grain per plant was recorded. The data collected were subjected to statistical analysis.

RESULTS AND DISCUSSION

i Dry matter production of root (fig. 1):

Individually each genotype started with low values, which gradually in-

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creased upto highest. Till third or fourth stage, members of the high yielding group were dominating while DMP was comparatively lower in low yielders. But from fifth stage corresponding to flowering, there was a steep incease, which was not generally related to the growth. At seventh stage, there was slight improvement or drop in the genotypes. At harvest, each genotype recorded its maximum value but no inference could be made from the data.

ii Dry matter production of stem (Fig 1.)

Upto third or vegetative stage of the crop, it appeared that DMP of stem was higher in high yielders while it was generally moderate or lower in medium and low yielders. But at fourth stage with further improvement in all the genotypes, stem recorded better DMP though not with any uniformity. At fifth stage, again most of the high yielders recorded better DMP in stem. Towards last two stages there was some shifting of the values and the medium yielders T44 and ML 73 as well as low yielders DM/2 gave maximum dry matter.

iii Dry matter production of leaves (Fig 1.):

At the early stages upto vegetative, progressive dry weight increase was evident in each genotype. Although between the medium and low yielders there was negligible variation but in the high yielders most of the members showed relatively better values than low yielders. At fourth stage corresponding to stray flowering, the low yielders alone indicated lower values along with medium yielders. Again at fifth stage which related to flowering the high yielders except Pusa Baisakhi, recorded more values than rest of the genotypes. In the case of PIMS 4, Pusa Baisakhi, ML 62 and MHI, the major peak was at seventh stage, where as in the other 11 genotypes it was towards harvest. Maximum values at harvest were recorded by DM2, T44 and 11/99.

iv Dry matter production of reproductive parts (fig.1):

The data were collected from fifth or flowering stage. Even at this stage, except T44 (medium yielders) and MH1 (low yielders) the rest of the members recorded lower DMP than the members of the high yielding group. At the subsequent stage each genotype improved its position and still low yielding members generally recorded lesser values. The medium yielders were merging with high or low yielding group. An impressive increase was seen at the penultimate stage to harvest, and except PIMS 4 the rest of the high yielders recorded better values than medium or low yielding genotypes. At final stage, a slight improvement was seen in all the genotypes, recording their maximum values Except for genotype T44, a member of medium yielding group, the rest were identified with respective group.

v Total dry matter production (fig 1) and (table.1):

In respect of each genotype from the first to last stage there was an increase in total dry matter production and perticularly after the fourth stage the increase in total DMP was rather rapid Except at third and fifth, at the other stages the data were not signi-

TABLE-1. Total dry matter production (g/plant) in 15 genotypes of greengram at chosen stages of growth.

Genotype	I 15	II 22	III 29	IV 36	V 43	VI 50	VII 57	VIII stages 64 days	Yield/plant
PIMS 4	0.0803	0.2577	0.8192	1.6404	3.9813	6.5427	10.1148	11.5365	4.25
CO 3	0.0994	0.2764	0.9139	1.5720	4.1101	6.6811	10.9740	13.0525	4.15
11/99	0.1083	0.3903	0.9735	1.5722	4.2670	8.4644	11.2486	12.9738	3.80
ML 69	0.0857	0 3492	0.9680	1.7951	4.8533	7.2369	12.2969	13.4397	3.58
Pusa Baisakhi	0.0838	0.3361	0.8510	1.7077	3.9604	6.0522	11.5213	12.0676	3.56
T44	0.0753	0.2920	0.7931	1.5800	4.6789	8.4644	13.0496	13.7953	3 30
11/395	0.0893	0.2573	0.7104	1.4582	3.4110	4.4636	9.1447	11.8078	3.26
LAM GG 127	0.0779	0.2890	0.8783	1.5672	3.2196	6 4362	9.2280	11.8583	3.19
ML 73	0.0760	0.2878	0.8868	1.5678	3.4871	5.4924	11.1613	12.7701	3.16
10/303	0.0879	0.2931	0.7789	1.3455	2.8281	7.5716	10.3613	12.5042	3.09
KM 1	0.0814	0.2583	0.8207	1.1990	3.0523	6.6482	10.5238	11.8685	2.83
PH 6	0.0780	0.2881	0.7030	1.2274	2.6937	5.8106	9.1148	11.1911	2.56
ML 62	0.0762	0.2778	1.7350	2.4750	2 9286	6.3345	9.1148	10.0576	2 42
DM/2	0.0800	0.2336	0.6493	1.5516	3.8061	6.3757	11.5438	12.8201	2.38
MH 1	0.0700	0.2556	0.6311	1.5722	4.7699	6.0472	8.5889	9.2144	2.15
SE	0.0071	0.0288	0.0673	0.2430	0.5330	0.8330	1.2700	1.5100	0.25
CD	0.0205NS	0.0837NS	0.0195*	0.7050NS	1.5430*	2.4110N	3.6800NS	4.3700NS	0.73**

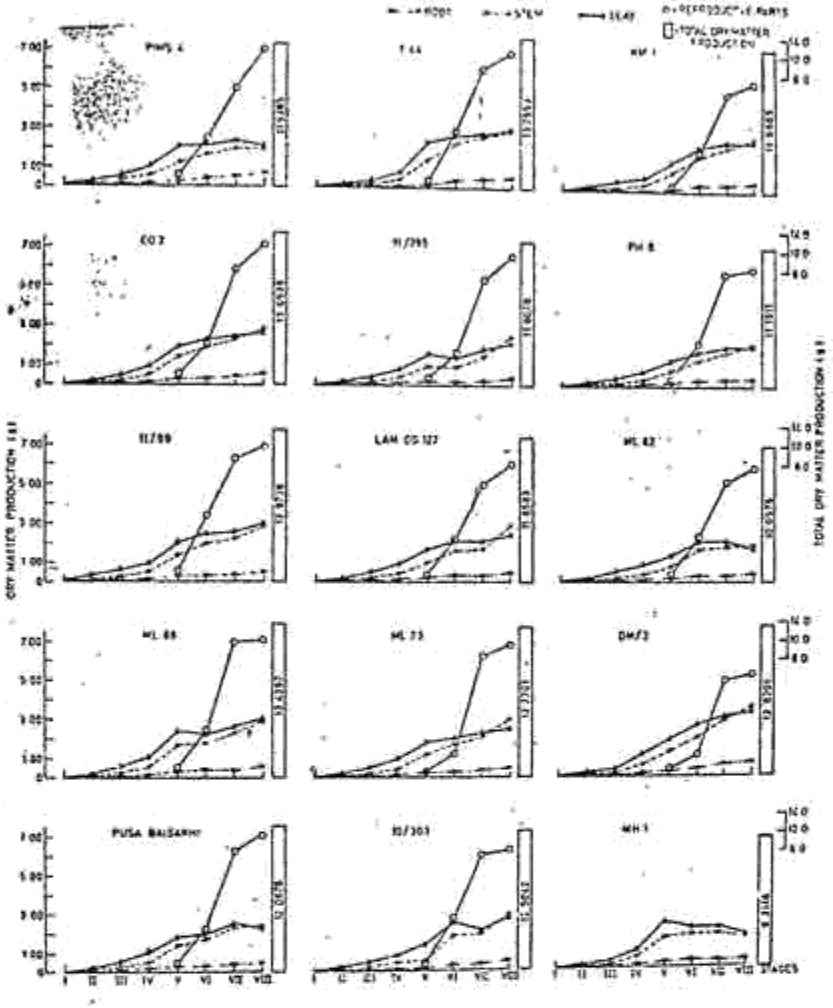

Table 2. Correlation matrix between dry matter production and yield in 15 genotypes of greengram

Characters	I 15	II 22	III 29	IV 36	V 43	VI 50	VI 57	VIII stages 64 days
DMP of root Vs yield	0.225	0.041	0 009	0.138	0.114	0.124	0.036	0.028
DMP of stem Vs yield	0.042	0.187	0 384*	0.312*	0.194	0.259	0.198	0.136
DMP of leaf Vs yield	0.042	0.172	0.251	0.223	0.124	0.183	0.151	0.192
DMP of reproductive parts Vs yield	—	—	—	—	0 310*	0.213	0 240	0.236
TDMP Vs yield	0.059	0.171	0.298*	0 265	0.163	0.246	0.296*	0.23

TDMP = Total Dry Matter production.

ficant. At the above two stages there was some suggestion that the low yielding group recorded lower total DMP as compared to the high yielders. At harvest also empirically the total DMP was higher in the medium and high yielders, but the data did not attain statistical significance except at third and fifth stages.

vi Correlation matrix between dry matter production and yield (*table 2*)

In the present study contrtbution of total dry matter production towards yield was uncertain. The total dry matter production at third and seventh stages were alone significant with yield, being non-significant at the rest of the stages. In soybean, Enyi (1973) established a negative correlation between DMP and grain yield. It was also found that dry matter production of stem *Vs* yield was significant at third and fourth stage. In the case of dry matter production of reproductive parts *Vs* yield, it was significant at fifth stage only.

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