benefits gained through diverting the saved water to irrigate additional land. The study provide an opportunity to select most efficient cultivar for maximizing the production for given water supply.

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Influence of Canopy Attributes on the Productivity of Groundnut

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Matching canopy size and duration to the seasonal moisture and irradiance pattern either through agronomic or genetic means is one of the main tasks of crop improvement. The mechanical manipulation of horizontal leaves canopy to erect leaves and tailoring of canopy architecture resulted in higher crop photosynthetic rate in rice. The dry matter production of many crops has been linked with light interception and radiation use efficiency (RUE) consider constant for a given crop species. RUE is critical in determining the productivity of pigeonpea under both well watered and moisture-deficit regimes[1]. However, in groundnut, very little work has been done to exploit variability in canopy geometry in the crop improvement. The present study examines the influence of canopy structure on various physiological attributes contributing to productivity.

The genotypes i.e. TMV 2 and TMV2-NLM, selected for this study have similar genetic background, with the latter being a mutant of TMV 2 with a narrow leaf character. The experiments were conducted during 1994-95 post rainy and 1995 rainy seasons on Alfisol at ICRISAT center, Patancheru, Andhra Pradesh During the 1994-95 post rainy season, experiment was laid in a randomized block design with four replications under adequately irrigated conditions. During the 1995 rainy season, the experiment was conducted in a split-plot design with two moisture regimes, adequately irrigated (equivalent to 80% of cumulative evaporation) at weekly interval (T1) and 25% of water given in T1 at weekly interval (T2), were imposed from 52 days after sowing (DAS) to the final harvest. Plants were sampled at various growth stages and total dry matter (vegetative weight of above ground parts + pod weight), pod weight, crop growth rate and partitioning co-efficient were estimated [2]. Fractional radiation interception was measured at the time of sampling for growth analysis using a light quantum sensor. Radiation use efficiency (RUE) was determined as the slope of the regression of cumulative light intercepted by the canopy and the total biomass produced at the sequential growth harvests. Light extinction coefficient was calculated as the slope of regression between the fractional radiations intercepted and leaf area index (LAI).

TMV 2-NLM, under adequately irrigated conditions (T1), produced 11% and 23% more total dry matter (TDM) than TMV 2 during 1994-95 post rainy and 1995 rainy seasons. respectively. Under water deficit conditions (T2). TMV 2-NLM produced 38.4% more TDM than TMV 2 during the rainy season (Table 1). The genotypic differences in TDM production were greater during the rainy as compared with the post rainy season.

Table 1. Yields (t/ ha) of TMV 2 and TMV 2 NLM grown under irrigated (T1) and water deficit conditions (T2) during two seasons

Genotypes	Post rainy 1994-95		Rainy 1995			
	TDM	Pod	TDM		Pod	
	T1	T1	T1	T2	T1	T2
TMV 2	11.7	7.3	6.1	5.2	2.3	1.4
TMV 2 NLM	13.0	7.4	7.5	7.2	1.9	1.3
Mean	12.4	7.4	6.5		1.8	
SE±	1.22	1.01	0.43		0.07	
CV%	17.7	25.3	7.8		13.3	

Table 2. Crop growth rate (CGR, g day^{-1}) and dry matter partitioning (p_f) to pods to TMV 2 and TMV 2 NLM grown under irrigated (T1) and water deficit conditions (T2) during two seasons

Genotypes	Post rainy 1994-95		Rainy 1995			
	TDM	Pod	TDM		Pod	
	T1	T1	T1	T2	T1	T2
TMV 2	11.9	0.57	6.3	5.2	0.52	0.45
TMV 2 NLM	13.2	0.54	7.1	6.8	0.50	0.41
Mean	12.5	0.56	5.8		0.47	
SE±	0.81	0.021	0.42		0.005	
CV%	11.5	7.3	9.5		14.9	

The greater TDM production in TMV2-NLM was due to its higher crop growth rate than TMV 2 under both irrigated and water deficit conditions during both the seasons (Table 2). The two genotypes accumulated different amount of TDM with the same amount of light radiation intercepted. TMV 2-NLM produced more TDM than TMV 2 with each unit of radiation intercepted during both the seasons (Table 3). This indicated the TDM production and radiation use efficiency are highly influenced by canopy structure [3]. The lower extinction coefficient of narrow leaf mutant under both the treatments (Table 3) indicated that the mutation caused a change in canopy geometry and made it more open and therefore, allowed more light to reach the bottom leaves. The narrow leaf mutant of TMV 2 intercepted more light radiation with similar LAI. This indicated that more TDM production is the openness of canopy structure in the mutant allows it to harvest more light radiations for TDM production during the growing season. These results suggested that total dry matter accumulation was linearly related to amount of radiation intercepted, which dependent upon the canopy geometry [4].

Table 3. Radiation use efficiency (RUE, g mj^{-1}) and extinction coefficient (EC) to pods of TMV 2 and TMV 2 NLM grown under irrigated (T1) and water deficit conditions (T2) during two seasons

Genotypes	Post rainy 1994-95		Rainy 1995			
	RUE	EC	RUE		EC	
	T1	T1	T1	T2	T1	T2
TMV 2	0.97	0.54	0.39	0.26	0.62	0.51
TMV 2 NLM	1.13	0.46	0.48	0.35	0.56	0.50
Mean	1.20	0.53	0.37		0.55	
SE±	0.063	0.032	0.022		0.003	
CV%	18.1	11.4	9.1		12.4	

Pod yield in TMV 2 was higher than its mutant, TMV2-NLM, under both irrigated and water deficit conditions during the 1995 rainy season (Table 1). Although the mutant had higher crop growth rate but dry matter partitioning to the pods was lower than TMV 2 under both irrigated and water deficit conditions (Table 2). The reduction is partitioning under water deficit condition as compared to irrigated condition was more in TMV 2-NLM (18%) than TMV 2 (13%). The present study suggests that the crop growth rate can be manipulated by modifying canopy architecture. However, separate approaches are required to improve partitioning ability along with over all crop growth rates.

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