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Studies on Drymatter Partitioning and Seed Yield in Redgram Varieties in *rabi*

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ABSTRACT

A field experiment was conducted during *rabi* 2009-10 to study the drymatter partitioning and seed yield of Redgram varieties in *rabi*. The results revealed that among the early maturing varieties,Piler local recorded highest seed yield (1672kg ha^{-1}) and more partitioning of drymatter to pods (53%) compared to other varieties at maturity .Among the late maturing varieties LRG41recored highest seed yield (1862kg ha^{-1}) and less partitioning of drymatter to pods (41%) compared to PRG148(42.2%) .The drymatter accumulated in different plant parts at maturity was 9.1% in roots ,4.76% in leaf ,27.7% in stem and 53% in pods in Piler local .

Key words : Drymatter partitioning, Redgram, Seed yield.

The yield obtained for any crop is the net result of photosynthetic productivity and drymatter partitioning. The efficient genotypes will have an efficient photosynthetic productivity and also efficient partitioning efficiency for which genotypic variation may exists .In a given environment the physiological performance like partitioning of drymatter and meniral nutrients to the economic product of different genotypes will indicate some of the characters which are essentially involved in contributing to higher yield. Satish kumar *et al* ., (2006) reported that contribution of leaf to total drymatter decreased from 60-65% to 5-10% at maturity where as in stem it increased from 30-35 to 40-45% at 90DAS and in pods from pod initiation to pod maturity (53-65%) in chickpea .Less information was available in this aspect. Hence the present investigation was planned study the drymatter partitioning and seed yield of Redgram varieties in rabi .

MATERIAL AND METHODS

A field experiment was conducted at Wet Land Farm of S.V. Agricultural College, Tirupati during *Rabi* season 2009-2010. The experiment was laid out in sandy clay loam soil in a randomized block design with six varieties and replicated four times. Treatments consists of six varieties of red gram obtained from RARS, Tirupati (Early maturing varieties group (3): LRG 30, Piler Local, , TRG 7; Late maturing varieties (3): PRG 148, LRG -41, TRG 22). The plot size was 6.0 x 5.0 mts. The crop was sown on 12th October 2009 with a spacing of 75 cm x10 cm. Need based life irrigations were given. The crop was grown following the recommended package of practices and timely plant protection measures were also adopted. Sampling was done at 15 days time intervals. Five plants from each treatment were dug out along with roots and separated into leaf, stem, root, pods and dried at 80^{0c} temperature in a hot air oven until constant weight was attained. The dryweight of the leaf, stem, root, pod and total dry matter of the plant was recorded separately.. The yield and yield components were recorded at harvest time. The data were analyzed statistically by following standard procedure outlined by Panes and Sukhatme (1985)

RESULTS AND DISCUSSION

There was a significant differences between the varieties for drymatter accumulation and partitioning at maturity in root ,leaf ,stem and pod (Table1).Among the early maturing varieties tested , Piler local recorded highest drymatter production and partitioning of drymatter to pods (53%) followed by LRG30(49.3%) and TRG7(41.7%) where as TRG7 recorded less drymatter production and highest partitioning of drymatter to root (10.5%) ,leaf (14.2%) and stem(33.6%) .Among the late maturing varieties, PRG48 recorded maximum partitioning of drymatter to pods (42.2%) followed by LRG41 (41%). The present study confirms the views of Fisher and Turner (1978) that the genotypes exerts major control over partitioning .The drymatter accumulated in different plant parts in Piler local was 9% in root, 10.3% leaf ,27.7% in stem and 53% in pods at maturity .

Table 1. Drymatter production and partitioning in redgram varieties in rabi.

Varieties	Total drymatter (g plant^{-1})	Root		Leaf		Stem		Pod	
		DMP (g plant^{-1})	Partitioning (%)	DMP (g plant^{-1})	Partitioning (%)	DMP (g plant^{-1})	Partitioning (%)	DMP (g plant^{-1})	Partitioning (%)
LRG 30	45.39	3.39	7.40 (15.79)	5.48	12.00 (20.27)	14.25	31.30 (34.02)	22.47	49.30 (44.60)
Piler local	46.85	4.27	9.10 (17.56)	4.76	10.20 (18.63)	12.96	27.70 (31.76)	24.86	53.00 (46.78)
TRG7	30.36	3.19	10.50 (18.91)	4.31	14.20 (22.14)	10.19	33.60 (35.43)	12.67	41.70 (40.22)
PRG148	42.30	4.53	10.70 (19.09)	4.68	11.10 (19.46)	15.22	36.00 (36.87)	17.80	42.20 (40.51)
LRG41	58.10	5.74	9.90 (18.34)	6.40	11.10 (19.37)	22.13	38.10 (38.12)	23.83	41.00 (39.82)
TRG22	52.01	5.39	10.40 (18.81)	6.12	11.80 (20.09)	19.41	37.30 (37.64)	21.09	40.50 (39.52)
CD at 5%	1.90	0.50	0.45	0.38	0.30	1.25	0.95	0.80	1.10

Figures in parenthesis indicate arch sine transformed values DMP: Drymatter production

Table 2. Yield and yield components of redgram varieties in *rabi*

Cultivars	No. pods plant^{-1}	No. seeds pod^{-1}	100 seed weight (g)	Seed yield (kg ha^{-1})	Harvest index (%)
LRG30	110.1	3.5	8.7	1511	41.16
PILER LOCAL	140.4	3.0	9.3	1672	44.98
TRG7	73.1	2.7	9.9	1483	28.79
PRG 148	64.2	2.3	10.2	1190	22.32
LRG 41	161.6	3.7	9.8	1862	47.95
TRG22	101.8	3.4	10.8	1714	41.66
CD(0.05)	16.8	0.13	0.41	71.3	7.25

Yield in crop plants is the ultimate expression of many yield attributes and are depended on each other. There was a significant difference between the varieties for number of pods per plant, number of seeds per pod and test weight and seed yield (Table 2). Among the early maturing varieties tested, piler local recorded significantly highest seed yield of 1672.7 kg ha^{-1} followed by LRG 30, TRG7, TRG 21, ICPL 87119 and ICPL 85063. Among late mature varieties tested, LRG 41 recorded highest seed yield of 1862 kg ha^{-1} followed TRG 22, ICPL 8863 and PRG 148. Sharma *et al.,* (1978) reported that higher yield in rabi pigeon pea was due to higher number of pods per plant, more grains per pod and bolder grains. Sheldrake and Narayanan (1979) recorded higher yields from the medium duration varieties .Mandal and Bera (1991) reported that LRG 30, ICPL 85063, ICPL 87119, ICPL 8863 have

performed well and yields were higher in *rabi* compared to that of *kharif* season. Reddy *et al.,* (1991) observed significant reduction in yield and yield components when the sowing was advanced beyond 15th October. This may be due to higher temperature during pod development of late sown crop which led to higher respiration rate and there by reduced availability of photosynthate for translocation to the developing seeds. 100 seed weight was more in case of ICPL 8863 (11.3 g) and LRG 30 recorded lowest test weight of 8.7 g. These results were in conformity with the results of Nagamani *et al .,* (1995).

Harvest index reflects the physiological capacity of a crop to mobilize and translocate photosynthates (Sink capacity) to organs having economic value. There were significant differences among the varieties for harvest index and LRG 41 recorded significant highest HI (47.95%) and in early maturing varieties, Piler local recorded highest harvest Index of 44.98%. The highest harvest index in these cultivars might be due to better partitioning of assimilates to sink. From these results it can be concluded that among varieties tested, Piler local recorded highest drymatter production and partitioning and seed yield and suitable for *rabi* cultivation in Chittoor district of A.P.

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