

INFLUENCE OF DURATION OF BLACKGRAM (*Vigna mungo*) (L.) (HEPPER) ON THE HARVEST INDEX AMONG THE DIFFERENT GENOTYPES

P.P.RAMASWAMI,¹ and G. OBLISAMI²

A field experiment was conducted with 430 germplasm collections of blackgram comprising of short, medium and long duration varieties in a red sandy loam soil under both inoculated and uninoculated conditions. Even though the grain yield increased with increase in duration of the variety the increase of grain yield was not proportionate to that of the total biological yield. Short duration varieties recorded significantly higher harvest index than medium or long duration varieties. Inoculation with rhizobia significantly increased the grain yield and harvest index.

Methods to improve the yield potential and high protein content of pulses might solve to a great extent the malnutrition of protein. Inoculation of leguminous seeds with rhizobia is considered as one of the important ways of getting atmospheric N to the plant and soil (Nutman, 1976). Wide genetic variability in the mung bean in respect of yield and yield component was reported by and Yohe and Poehlman (1972). Many factors like nutrient availability in soil, genetic potential, duration of the varieties, rhizobia inoculation and harvest index were reported to influence the yield of pulses.

Grain is the economic component of the dry matter and by any means the efficiency of converting the dry matter into the economic component must be improved. Varieties have great influence on the harvest index. Lal (1976) reported that strains of bengalgram which had poor harvest

indices, although quite efficient in accumulating dry matter, were very inefficient in apportioning the assimilating dry matter between the grain and other plant parts. He observed a very wide range in harvest index values among the varieties tested. It is considered as one of the most important characters in selection of varieties for high yield.

MATERIAL AND METHODS

Four hundred and thirty germplasm collections were sown in rows under both inoculated and uninoculated conditions separately in a red sandy loam soil. Efficient rhizobial culture was used for seed inoculation. Nitrogen as urea @25 kg N/ha and phosphorus as superphosphate @ 50 kg P₂O₅/ha were applied uniformly to all the varieties. Total dry matter yield and grain yield were recorded at harvest stage. The germplasm collections (430) tested in the field trial were classified based

¹Associate Professor of Soil Science and Agricultural Chemistry.

²Professor of Agricultural Microbiology TNAU, Coimbatore-641 003.

on their age into short (<75 days), medium (76 - 90 days) and long (>91 days) duration varieties. Harvest index was worked out for the three groups as per the method given here (Jain, 1975; Nijhawan and Chandra, 1977).

$$\text{Harvest index (\%)} = \frac{\text{Weight of grain}}{\text{Weight of total dry}}$$

$$\frac{\text{yield}}{\text{matter}} \times 100$$

RESULTS AND DISCUSSION

According to the age group 430 germplasm collections were classified into 307 short duration varieties, 77 medium duration varieties and 46 long duration varieties. The harvest index under inoculated and uninoculated conditions was worked out for the three age groups separately and given in Table 1. It was observed that as the duration of the crop increased the yield of grain also increased. However, considering the total dry matter production, the yield of grain was not proportionate with the total biological yield with medium and long duration varieties. Short duration varieties were found to be efficient in translocating and converting the biological yield into economic end product of grain. This was observed with the harvest index data. Short duration recording 38.87 and 32.03 per cent under inoculated and uninoculated conditions, respectively. Yohe and Pehlman (1972) observed that the high yielding strains of mung bean tended to be early maturing ones. Even though the dry matter yield of medium and long duration varieties were higher, they were observed to be poor translocators and converters of the photosynthate to the economic end product of grain. Such difference among the varieties of ben-

galgram was reported by Lal (1976). Harvest index is considered as one of the most important characters in selection of varieties and preference might be given to varieties with high harvest index (Lal, 1976).

It is observed from Table 2 that under both inoculated and uninoculated conditions short duration varieties recorded significantly higher harvest index than medium and long duration varieties. However, such difference could not be observed between medium and long duration varieties for harvest index.

Large sample test for 't' between treatments indicated that inoculated treatment recorded significantly higher harvest index with short, medium and long duration varieties than uninoculated treatment. Similarly, the grain yield was significantly increased due to inoculation with all the three duration groups over uninoculated conditions. Yield increase due to inoculation in different legumes was reported by many workers (Ramaswami and Nair, 1965). Therefore in screening programmes short duration varieties with high harvest index must be considered for hybridisation. Inoculation with rhizobia enhanced the grain yield.

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REFERENCES

- JAIN, H. K. 1975. Development of high yielding varieties of pulses: perspective, possibilities and experimental approaches. International Workshop on Grain Legumes, ICRISAT, Hyderabad pp. 177-185.
- LAL, S. 1976. Relationship between grain and biological yields in chickpea (*Cicer arietinum* L.). *Trop. Grain Legume Bull.* No. 6 : 29-31.
- NIJHAWAN, D. C. and S. CHANDRA, 1977. Genetic analysis for grain yield, harvest index and dry plant weight in mung bean (*Vigna radiata* (Roxb.) Wilczek.) *Legume Res.*, 1 : 49-55.
- NUTMAN, P. S. 1976. ¹⁵N field experiments on nitrogen fixation by nodulated legumes. In : *Symbiotic nitrogen fixation in plants* (ed) Nutman, P. S. Cambridge Univ. Press, Cambridge, pp. 211-237.
- RAMASWAMI, P. P. and K. S. NAIR, 1965. Nutritional factors affecting nitrogen fixation in *Sesbania Speciosa* Indian J. *Microbiol.* 5 : 77-84.
- YOHE, J. M. and J. M. PEHLMAN, 1972. Genetic variability in the mung bean, *Vigna radiata* (L.) Wilczek. *Crop Sci.* 12 : 461-464.

Table 1. Influence of duration and rhizobial inoculation on yield and harvest index.

Treatment	Duration	Grain yield (g/plant)	Harvest index (%)
Inoculated	Short	3.93	38.8
	Medium	5.64	29.1
	Long	9.20	28.7
	Over all	4.77	36.0
Uninoculated	Short	3.95	32.0
	Medium	5.23	27.2
	Long	7.47	25.6
	Over all	3.92	30.6
Per cent increase due to inoculation	Short	28.85	21.3
	Medium	6.84	6.8
	Long	23.17	8.0
	Over all	21.78	17.8

Table 2. Large sample test for 't' between treatment

Property	Comparison between	't' value
Short duration	Inoculated and uninoculated	7.35**
Medium duration	Inoculated and uninoculated	1.27
Long duration	Inoculated and uninoculated	0.99
Inoculated	Short and medium duration	6.78**
Uninoculated	Short and medium duration	3.44**
Inoculated	Short and long duration	5.36**
Uninoculated	Short and long duration	3.15**
Inoculated	Medium and long duration	0.20
Uninoculated	Medium and long duration	0.31
Short duration	Inoculated and uninoculated	4.99**
Medium duration	Inoculated and uninoculated	0.80
Long duration	Inoculated and uninoculated	1.78