

Effect of organic and inorganic foliar spray on growth and yield of blackgram (*Vigna mungo* L.)

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Abstract: Field experiment was conducted in the Dept. of Agronomy at Tamil Nadu Agricultural University, Coimbatore, to study the effect of organic and inorganic foliar nutrients on the performance of blackgram during summer 2002. The results revealed that the growth parameters *viz.*, plant height, leaf area index, drymatter production and yield attributes *viz.*, number of flowers plant⁻¹, number of pods plant⁻¹, number of filled grains pod⁻¹ and grain yield were significantly higher in the foliar treatment of 1% Urea spray at floral initiation and 15 days after flowering. This was on par with the treatment of 2% DAP spray with regard to the yield parameters. To conclude that the foliar spray of 1% Urea (T₂) or 2% DAP (T₃) at 35 and 55 DAS can be recommended to increase the productivity of blackgram.

Key words: *Organic, Inorganic, Foliar spray, Blackgram (Vigna mungo).*

Introduction

Pulses play an important source of dietary protein, energy, minerals and vitamins for the mankind. Pulses provide 25 per cent of protein requirements of predominantly vegetarian population. The WHO recommends a per capita consumption of pulses at 80 g / day and the ICMR has recommended a minimum consumption of 47 g. In 1968, the average consumption in India was 56 g per person per day. But at present, the actual consumption however is much less at around 30-35 g. India is the largest producer and consumer of pulses in the world accounting for 33 per cent of the world area and 22 per cent of world production. The productivity of pulse in India is low around 550-625 kg ha⁻¹ against 1600 kg in USA, 1400 kg in China, 1300 kg in US and a world average of 900 kg ha⁻¹. In Tamil Nadu, area under black gram cultivation

is 4.08 lakh ha with a production of 1.72 lakh tones and productivity of 423 kg ha⁻¹. Pulses have unique feature which are having inherent ability to fix substantial nitrogen in soil through their root nodules. Blackgram is favorable pulse crop since it will thrive better in all seasons and as sole or inter crop or fallow crop. Productivity of blackgram is low and this is due to the fact that the crop is mainly grown in rainfed conditions with poor management practices. The sluggish growth in pulse production in the country could be due to various physiological and biochemical as well as inherent factors associated with the crop (Mahala *et al.*, 2001). Apart from the genetic make up, the physiological factors *viz.*, insufficient partitioning of assimilates, poor pod setting due to the flower abscission and lack of nutrients during critical stages of crop growth play a major role on pulses production.

Table 1. Effect of organic and inorganic foliar spray on growth attributes of blackgram

Treatment details	Plant height (cm)			LAI			DMP (kg ha ⁻¹)		
	Before spray	After I spray	After II spray	Before spray	After I spray	After II spray	Before spray	After I spray	After II spray
T ₁ - Control	18.7	26.7	37.1	1.00	1.13	2.76	858	1028	1712
T ₂ - 1% Urea spray	18.9	35.9	47.8	1.04	1.42	3.79	857	1277	2486
T ₃ - 2% DAP spray	18.6	36.0	47.5	1.01	1.42	3.74	868	1243	2578
T ₄ - 1%KCl spray	18.6	31.5	45.2	1.01	1.23	3.30	857	1159	2086
T ₅ - Vermiwash spray	19.3	31.7	47.1	1.03	1.24	3.62	862	1173	2132
T ₆ - Goat extractant spray	19.2	27.4	42.3	1.03	1.14	3.48	865	1035	2053
T ₇ - Panchakavya spray	19.5	31.9	43.2	1.01	1.25	3.33	851	1146	2037
SEd	0.43	0.64	0.93	0.02	0.03	0.20	11.3	17.0	111.3
CD(P=0.05)	NS	1.37	2.01	NS	0.06	0.44	NS	36.4	238.7

Several steps were made to boost the productivity of blackgram. One among and the easiest way is foliar application of organic and inorganic spray for increasing and exploiting genetic potential of the crop. This is considered as an efficient and economic method of supplementing the nutrient requirements. Application of organic and inorganic spray will also enhance the nutrient availability and in turn increase the productivity. Considering the above facts, the experiment was carried out to study the effect of foliar spray on blackgram and to compare the efficacy of organic and inorganic spray on blackgram.

Materials and Methods

A field experiment was conducted at wet land farm, Tamil Nadu Agricultural University, Coimbatore during summer, 2002 to study the organic and inorganic foliar spray on blackgram for increasing the yield. The soil was well drained clay loam in texture, low in available N (181 kg ha⁻¹), medium in available P (17.9 kg ha⁻¹) and high in available K (384 kg ha⁻¹). Blackgram variety TMV-1 with field duration of 70 days was selected for the study. The experiment was laid out in randomized block design with the treatments replicated thrice. The treatments were: T₁ - control, T₂- 1% Urea spray, T₃- 2% DAP spray, T₄- 1% KCl spray, T₅- Vermiwash spray, T₆- Goat extractant spray and T₇ - Panchakavya spray. The fungicide (Thiram @ 2g kg⁻¹ seeds) and rhizobium culture (200 g ha⁻¹ seeds) pretreated seeds were hand dibbled with a spacing of 30 x 10 cm. The required quantity of nitrogen

Table.2. Effect of organic and inorganic foliar spray on yield and yield attributes of blackgram

Treatment details	Number of flowers plant ⁻¹	Number of pods plant ⁻¹	Flower set percentage	Number of seeds pod ⁻¹	Number of filled seeds pod ⁻¹	Filled seeds percent	100 seed weight (g)	Seed yield (kg ha ⁻¹)	Haulm yield (kg ha ⁻¹)
T ₁ - Control	45	27	61	9	6	68	3.1	630	1063
T ₂ - 1 % Urea spray	65	47	74	10	8	84	3.2	930	1682
T ₃ - 2% DAP spray	64	48	74	10	8	82	3.1	917	1668
T ₄ - 1% KCl spray	56	38	68	10	7	75	3.0	756	1352
T ₅ - Vermiwash spray	57	36	63	10	7	74	3.1	873	1537
T ₆ - Goat extractant spray	48	27	55	9	7	76	3.2	740	1334
T ₇ - Panchakavya spray	56	35	63	10	7	72	3.1	760	1372
SEd	2.1	1.3	1.6	0.3	0.2	2.3	0.05	48	50
CD(P=0.05)	4.6	2.8	3.5	0.7	0.4	4.8	NS	102	108

and phosphorus were applied in the form of urea and single super phosphate, respectively as soil application. All the agronomic practices were carried out as per schedule to raise the crop. Foliar spray was given twice at flower initiation and 15 days after flowering of the crop. Growth parameters such as plant height, leaf area index (LAI) and drymatter production (DMP) were measured. Yield parameters *viz.*, number of flowers plant⁻¹, number of pods plant⁻¹, number of seeds pod⁻¹, number of filled grains pod⁻¹ and 100 seed weight were measured. Grain and haulm yield were measured from the net plot yield. The data were subjected to statistical analysis as described by Gomez and Gomez (1984).

Results and Discussion

Growth attributes

Growth parameters of blackgram differed significantly due to various organic and inorganic spray applications (Table 1). Before organic and inorganic spray (35 DAS), the treatments were not varied significantly. Application of organic and inorganic spray influenced on growth parameters at 40 DAS. Foliar spray of 1% urea spray (T₂) recorded higher growth attributes of plant height, leaf area index and dry matter production than the other treatmental sprays. This was followed by the treatment of 2 % DAP spray (T₃). Almost similar trend was noticed at 60 DAS too. The positive influence on foliar spray has been reported by Patil *et al.* (1994).

Yield parameters

Yield parameters *viz.*, number of flowers plant⁻¹, number of pods plant⁻¹, per cent flower set, number of

seeds pod⁻¹, number of filled seeds pod⁻¹ and per cent filled seed pod⁻¹ were recorded and the results are presented in Table 2. Foliar spraying of 1% Urea (T₂) recorded higher number of flowers, number of filled seeds pod⁻¹, per cent filled seed pod⁻¹ and number of pods plant⁻¹ which were on par with 2% DAP (T₃) spray application. However, number of seeds pod⁻¹ was not varied due to different spraying of organic and inorganic spray. Similarly, growth regulators had not influenced on 100 seed weight.

Grain and haulm Yield

Effect of growth regulators on seed and haulm yield of blackgram were significant (Table 2). Seed yield was recorded higher in 1% Urea spray (T₂) which was on par with 2% DAP (T₃) foliar spray. The highest haulm yield was noticed with the application of 1% Urea spray followed by 2% DAP spray. This might be due to beneficial effect of nutrients applied at proper time and stage, which resulted in higher growth and yield attributes as reported by Kumaran and Subramanian (2001).

The present investigation revealed a positive role of 1% urea in induction of early flowering of blackgram. This was in conformity with the results of 50% flowering which showed significant increase over the control.

To conclude that the foliar spray of 1% Urea (T₂) or 2% DAP (T₃) at 35 and 55 DAS can be recommended to exploit the genetic potential and increase the productivity of blackgram.

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