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EFFECT OF FOLIAR NUTRITION ON GROWTH, YIELD ATTRIBUTES AND YIELD OF RICE FALLOW BLACKGRAM [*VIGNA MUNGO*]

*Ramesh, S., Sudhakar, P. and Elankavi S.

Department of Agronomy, Faculty of Agriculture, Annamalai University, Tamilnadu, India

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ABSTRACT

A field experiment was conducted during rice fallow season 2012 under deep clay soil at experimental farm, Faculty of Agriculture, Annamalai University, Tamil Nadu to study the effect of foliar nutrition on growth, yield attributes and yield of rice fallow blackgram. The experiment was conducted in randomized block design and replicated thrice. The experiment comprised of nine treatments viz., control, seed soaking with different liquid organic manures alone and along with foliar application of jeevamrutha, panchagavya, vermiwash and cow urine. The results of the experiment showed that seed soaking with 3% panchagavya + foliar spray of 3% panchagavya twice (30 and 40 DAS) significantly recorded higher growth, yield attributes, grain and haulm yields of rice fallow black gram viz., plant height, leaf area index (LAI), dry matter production (DMP), number of branches plant⁻¹, pod length, number of pods plant⁻¹, number of seeds pod⁻¹, grain and haulm yields. Significantly lowest values for growth attributes, yield attributes, grain and haulm yield of blackgram was recorded under control. Based on the above results, it could be concluded that cultivation of rice fallow blackgram with seed soaking 3% panchagavya along with foliar spray of 3% panchagavya twice (30 and 45 DAS) will be a promising combination which would result in higher grain and haulm yield under Cauvery delta region of Tamil Nadu.

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INTRODUCTION

Pulses are an important source of dietary protein, energy, minerals and vitamins for the mankind. It provides 25 per cent of protein requirements of predominantly vegetarian population. The World Health Organisation (WHO) recommends a per capita consumption of pulses at 80 g per day and the Indian Council of Medical Research 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 is much less than 30-35 g. Among the grain legumes, blackgram is an ancient and well known leguminous crop of India, is a favourable one since it thrives better in all the seasons and it can be grown as a sole or inter crop or fallow crop. It is popular because of its nutritional quality having rich protein (26.2%), carbohydrates (56.6%), fat (1.2%), minerals, amino acids, phosphoric acid and vitamins. The average productivity of pulses in Tamil Nadu is about 432kg ha⁻¹, which is very low when compared to Indian average of 610 kg ha⁻¹. The production of pulse crop in our country including blackgram is not sufficient enough to meet

the domestic demand of the population. Hence, there is an ample scope for enhancement of the production and productivity of blackgram by proper agronomic practices. Several strategies were initiated to boost the productivity of blackgram. One such strategy may be seed soaking and foliar nutrition for exploiting genetic potential of the crop. Foliar application is credited with the advantage of quick and efficient utilization of nutrients, elimination of losses through leaching and fixation and helps in regulating the uptake of nutrient by plants (Manonmani and Srimathi, 2009). Therefore, present study was conducted to study the effect of foliar nutrition on growth, yield attributes and yield of rice fallow blackgram (*Vigna mungo* L.) under Cauvery delta region of Tamil Nadu.

MATERIALS AND METHODS

Field experiment was conducted at the experimental farm during 2013, Department of Agronomy, Annamalai University, Annamalai nagar, Tamil Nadu to study the effect of foliar nutrition on growth, yield attributes and yield of rice fallow blackgram. The experimental farm is geographically located at 11°24'N latitude, 79° 44'E longitude and +5.79 m above mean sea level.

*Corresponding author: Ramesh, S.,

Department of Agronomy, Faculty of Agriculture, Annamalai University, Tamilnadu, India.

Table 1. Effect of foliar nutrition on growth, yield attributes, grain and haulm yields of rice fallow black gram

Treatments	Plant height (cm)	Leaf area index	DMP (kg ha ⁻¹)	Number of branches plant ⁻¹	Pod length (cm)	Number of pods plant ⁻¹	Number of seeds pod ⁻¹	Seed weight (g)	Grain yield (Kg ha ⁻¹)	Haulm yield (Kg ha ⁻¹)
T ₁	25.85	1.29	1990	5.17	3.10	12.93	2.59	3.49	672	1215
T ₂	36.12	1.81	2781	7.22	4.33	18.06	3.61	3.68	939	1698
T ₃	33.59	1.68	2586	6.72	4.03	16.80	3.36	3.64	873	1579
T ₄	31.87	1.59	2454	6.37	3.82	15.94	3.19	3.59	829	1498
T ₅	28.38	1.42	2185	5.68	3.41	14.19	2.84	3.54	738	1334
T ₆	46.34	2.32	3568	9.27	5.56	23.17	4.63	3.85	1205	2178
T ₇	43.21	2.16	3327	8.64	5.19	21.61	4.32	3.80	1123	2031
T ₈	40.28	2.01	3102	8.06	4.83	20.14	4.03	3.76	1047	1893
T ₉	37.27	1.86	2870	7.45	4.47	18.64	3.73	3.70	969	1752
SEd	1.21	0.04	084	0.23	0.12	09.54	0.13	0.36	024	046
CD (P=0.05)	2.38	0.08	165	0.42	0.26	18.06	0.24	NS	048	092

T₁ - control, T₂ - seed soaking with 3% panchagavya, T₃ - seed soaking with 5% jeevamrutha, T₄ - seed soaking with 5% vermiwash, T₅ - seed soaking with 5% cow urine, T₆ - T₂ + foliar spray of 3% panchagavya, T₇ - T₃ + foliar spray of 5% jeevamrutha, T₈ - T₄ + foliar spray of 5% vermiwash, T₉ - T₅ + foliar spray of 5% cow urine
 Note: As per treatment schedule foliar application given on 30 DAS and 45 DAS

The experimental soil was clay loam in texture with pH 7.7, EC 0.45 dsm⁻¹, organic carbon 0.58 and low N (223.0 Kg ha⁻¹), medium in P (22 Kg ha⁻¹) and high in K(259 Kg ha⁻¹). The experiment comprise of nine treatments viz., T₁ - control, T₂ - seed soaking with 3% panchagavya, T₃ - seed soaking with 5% jeevamrutha, T₄ - seed soaking with 5% vermiwash, T₅ - seed soaking with 5% cow urine, T₆ - T₂ + foliar spray of 3% panchagavya, T₇ - T₃ + foliar spray of 5% jeevamrutha, T₈ - T₄ + foliar spray of 5% vermiwash and T₉ - T₅ + foliar spray of 5% cow urine. The experiment was laid out in a randomized block design with three replications. Black gram variety ADT -5 was used in this experiment. Immediately after the harvest of rice the black gram seeds were dibbled @ 25 kg ha⁻¹ in rice stubbles with waxy soil condition. A spacing of 30 cm x 10 cm was adopted. As per treatment schedule liquid organic manures viz., panchagavya, jeevamrutha, vermiwash, cow urine were sprayed on 30 and 45 DAS (coinciding with flowering and pod filling stage). Rice fallow blackgram was raised with residual soil moisture. Standard cultivation practices were adopted. Black gram growth and yield attributing characters such as plant height, LAI, DMP, number of branches plant⁻¹, pod length, number of pods plant⁻¹, number of seeds pods⁻¹ and test weight were recorded from 5 randomly selected plants. Grain and haulm yields were also recorded from each plot. The data on various studies recorded during the investigation were subjected to statistical scrutiny suggested by Gomez and Gomez (1984).

RESULTS AND DISCUSSION

All the treatments significantly influenced growth attributes of rice fallow black gram. Among the treatments, seed soaking 3% panchagavya along with foliar spray of 3% panchagavya (T₆) recorded significantly higher plant height (46.34 cm), LAI (2.32) and dry matter production (3568 kg ha⁻¹). This might be due to influence of panchagavya that might have created stimuli in the plant

system and increased the production of growth regulators in cell system and the action of growth regulators in plant system stimulated the growth and development of crop. Besides, there is a significant quantity of vitamins and natural phytochemicals were present in panchagavya in a balanced form. The present findings were in accordance with the earlier reports of Kumawat *et al.* (2009). The yield potential of blackgram is determined by yield attributes and the values of yield attributes were in accordance with that of growth parameters. Among the treatments, seed soaking 3% panchagavya along with foliar spray of 3% panchagavya (T₆) registered higher number of branches plant⁻¹ (9.27), pod length (5.56 cm), number of pods plant⁻¹ (23.17) and number of seeds pod⁻¹ (4.63). Higher availability of growth promoting substances such as IAA, GA, cytokinin, kinetin, essential plant nutrients, effective microorganisms that directly influenced LAI, also increased photosynthetic activity and assimilate partitioning from source to sink might be attributed to increased yield attributes. The result was in agreement with the findings of Kumar *et al.* (2011). The control plot (T₁) recorded the least values of yield attributes. Among the treatments, seed soaking 3% panchagavya along with foliar spray of 3% panchagavya (T₆) significantly registered higher grain yield (1205 kg ha⁻¹) and haulm yield (2178 kg ha⁻¹). Presence of growth regulatory substances such as Indole Acetic Acid (IAA), Gibberlic Acid (GA3) and essential plant nutrients from panchagavya caused a tremendous influence on the yield of black gram. Panchagavya application not only increase the vegetative growth of the plant but it also triggers early flowering, pod formation and uniform grain filling, which leads to get higher grain yield. The positive effect of panchagavya on growth and productivity of crops has been reviewed and documented by Swaminathan *et al.* (2007). The least grain yield (672 kg ha⁻¹) and haulm yield (1752 kg ha⁻¹) was registered under treatment T₁ (control). Based on the above, it could be concluded that, seed soaking with 3% panchagavya along with foliar spray of 3% panchagavya on 30 and 45 DAS would help to increase yield of rice fallow blackgram in Cauvery delta region of Tamil Nadu.

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