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## Effect of foliar sprays on growth, yield, quality and economics of summer green gram (*Vigna radiata* L.)

**KK Phule, Dr. PU Raundal and Dr. JB Patil**

**Abstract**

A field experiment entitled, "Effect of foliar sprays on summer green gram (*Vigna radiata* L.). variety 'Vaibhav' was conducted at post graduate research farm R.C.S.M. College of Agriculture, Kolhapur during summer 2017. The trial was laid out in Randomized Block Design with seven treatments and three replicated. The growth characters and yield attributes viz. plant height, number of branches plant<sup>-1</sup>, leaf area plant<sup>-1</sup>, plant spread, dry matter plant<sup>-1</sup>, days to 50 % flowering, number of pods plant<sup>-1</sup>(22.44), number of seeds pods<sup>-1</sup> (9.63), weight of seed plant<sup>-1</sup>(6.03), length of pod plant<sup>-1</sup> (6.97) and test weight (42.08), were significantly influenced with different treatments and higher values were recorded by treatment of foliar spray of 12:61:00 (1.5%) which was followed by DAP and 19:19:19 spray. Significantly highest values of grain yield (16.26 q ha<sup>-1</sup>) and straw yield 30.72 (q ha<sup>-1</sup>) was recorded in treatment of foliar spray of 12:61:00 (1.5%) which was followed by DAP and 19:19:19 spray. Similar results was found as regards to gross monetary returns (Rs.97560 ha<sup>-1</sup>), net monetary returns (Rs. 59140 ha<sup>-1</sup>) and benefit cost ratio (2.53).

**Keywords:** Foliar spray, growth and yield, economics, green gram

**Introduction**

It is now well established fact that plants can utilize water soluble nutrients through their foliage, when applied in the form of foliar sprays. When problems of excessive leaching of nutrients exists, foliar application constitutes the most effective means of fertilizer application. This practice may be useful to early maturing crops under rainfed conditions where moisture is limiting factor. Inorganic phosphatic fertilizers when added to soil undergo various reaction with soil constituents rendering some of the added phosphate unavailable to plants. Foliar application of nutrients using water soluble fertilizer is one of the possible way to avoid such loss of phosphatic fertilizer (Pandurangi *et al.*, 1991) [7]. Nutrient play a pivotal role in increasing the seed yield in pulses. Foliar application of major plant nutrients like nitrogen and potassium was found to be good as soil application (Subramanian and Planiaappan, 1981) [12]. According to Kalita *et al.*, (1994) [4], supplementing urea at the reproductive stage significantly enhanced the seed yield by delaying leaf senescence in mungbean. Application of fertilizer to soil and due to formation of certain soil complexes the uptake of necessary element becomes difficult for the plants. The applied fertilizers are not fully utilized by the plants. in order to avoid or eliminate these situation foliar application of nutrients is important. (Velu and Srinivasan, 1984) [13].

**Materials and Methods**

The field investigation was under taken during summer 2017 at Agronomy Farm, R.C.S.M. College of Agriculture, Kolhapur (M.S.). The field experiment was laid out in randomized block design with three replications. The soil of experimental field was sandy loam, neutral in reaction (pH 7.6) with low available nitrogen (257.75 kg ha<sup>-1</sup>), medium available phosphorus (16.17 kg ha<sup>-1</sup>, high available potassium (261.09 kg ha<sup>-1</sup>) and medium organic carbon (0.54 per cent). There were 7 treatments formed with foliar spray of fertilizers viz. control (No spray), urea (1.5%), DAP (1.5%), 13:00:45 (1.5%), 19:19:19(1.5%), 00:52:34 (1.5%), 12:61:00(1.5%). The foliar spray of nutrients was applied just before flowering at 32 DAS. The RDF 20: 40:00 N:P:K kg ha<sup>-1</sup> was applied uniformly to all treatments at the time sowing. The crop was sown with spacing 30 X 10 cm. Variety Vaibhav was used for experiment.

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## Result and Discussion

### Effect on growth attributes

All the growth attributing characters viz. plant height, number of branches plant<sup>-1</sup>, dry matter plant<sup>-1</sup>, leaf area plant<sup>-1</sup>, plant spread, days to 50 % flowering were influenced significantly due to effect of different treatment. Plant height, dry matter accumulation and leaf area was recorded maximum in foliar spray of 12:61:00 (1.5%) which was at par with DAP spray

and 19:19:19 spray. But significantly superior over rest of treatment. Maximum branches, higher leaf area and lowest days to 50 % flowering was registered in 12:61:00 (1.5%) which was followed by DAP and 19:19:19 spray. Similar result were recorded by Patel and Patel (1994) [8], Verma *et al.*, (2011) [14], Mondal *et al.* (2011) [6] and Sritharan *et al.* (2005) [11].

**Table 1:** Effect of foliar sprays on growth contributing characters of summer green gram

Treatments	Plant height (cm)	Branches plant <sup>-1</sup>	Dry matter Plant <sup>-1</sup>	Leaf area Plant <sup>-1</sup> (dm <sup>2</sup> )	Plant spread (cm)	Days to 50% flowering
T1:Control (No spray)	51.97	6.28	25.33	5.99	46.74	38
T2:Urea (1.5 % spray)	62.64	6.46	25.56	7.07	50.19	38
T3:DAP (1.5% spray)	68.52	7.44	32.16	9.21	51.96	37
T4:13:00:45 (1.5 % spray)	60.21	6.58	27.86	8.09	48.63	38
T5:19:19:19 (1.5 % spray)	67.36	7.04	30.59	9.05	51.95	37
T6:00:52:34 (1.5 % spray)	60.48	6.45	26.78	7.98	47.89	38
T7:12:61:00 (1.5 % spray)	68.73	7.58	33.84	10.04	52.82	36
S.Em±	1.67	0.10	1.16	0.40	0.11	0.64
C.D at 5%	5.01	0.31	3.49	1.22	0.35	1.93
General mean	62.84	6.83	28.30	8.38	50.02	37.28

### Effect on yield attributes

Significant effect on yield attributes viz. number of pods plant<sup>-1</sup>(22.44), number of seeds pods<sup>-1</sup> (9.63), weight of seed plant<sup>-1</sup>(6.03), length of pod plant<sup>-1</sup> (6.97) and test weight (42.08) was found due to the effect of different foliar spray treatment. Significantly higher pod number, pod length and test weight was recorded in foliar spray of 12:61:00 (1.5%) which was at par with DAP spray over rest of treatment.

However, seed per pod and seed weight maximum in foliar spray of 12:61:00 (1.5%) which was at par with DAP spray and 19:19:19 spray and significantly more over all other treatment. This was might be due to higher growth characters in particular treatment. The results are close conformity to Patel and Patel (1994) [8], Sarkar and Pal (2006) [10], Godase *et al.* (2011) [3], Mondal *et al.* (2011) [6] and Verma *et al.* (2011) [14].

**Table 2:** Effect of foliar sprays on yield attributing characters of summer green gram

Treatments	Number of pods plant <sup>-1</sup>	Length of pod	Number of seeds pod <sup>-1</sup>	Weight of seed plant <sup>-1</sup>	Test Weight (1000 seeds)
T1:Control (No spray)	18.15	6.27	8.51	4.55	39.71
T2:Urea (1.5 % spray)	20.52	6.41	9.83	5.90	40.66
T3:DAP (1.5% spray)	24.36	7.53	10.55	6.72	43.64
T4:13:00:45 (1.5 % spray)	21.45	6.78	8.75	5.31	41.62
T5:19:19:19 (1.5 % spray)	24.78	7.19	10.23	6.58	42.86
T6:00:52:34 (1.5 % spray)	21.86	6.69	8.81	5.24	42.24
T7:12:61:00 (1.5 % spray)	25.97	7.93	10.78	7.92	43.89
S.Em±	0.42	0.05	0.20	0.51	0.06
C.D at 5%	1.30	0.15	0.60	1.52	0.19
General mean	22.44	6.97	9.63	6.03	42.08

### Effect on yield and quality

The foliar spray of 12:61:00 before flowering recorded the highest seed yield (16.26 q ha<sup>-1</sup>) and straw yield (30.72 q ha<sup>-1</sup>) and it was statistically at par with foliar spray of DAP and 19:19:19, but significantly superior over rest of treatment. The lowest seed yield was recorded in absolute control (11.29 q ha<sup>-1</sup>). The yield was increased due to the increased dry matter production and efficient assimilate translocation to the developing sink leading to increased pods and higher seed yield (Dixit and Elamnathi 2007) [2]. The retention of flower and pod can be increased by foliar application of nutrients as reported by Chandrasekhar and Bangarusam (2003) [1]. These results are supported by Patel and Patel (1994) [8], Satyanarayamma *et al.* (1996), Godase *et al.* (2011) [3],

Kuttimani and Velayutham (2011) [5] and Verma *et al.* (2011) [14]. The mean protein content in green gram seed was statistically non-significant due to foliar spray of different nutrients but maximum value was registered in 12:61:00 (1.5%) spray followed by DAP spray and 19:19:19 spray

### Effect on economics

Application of foliar spray of 12:61:00 was recorded the highest gross monetary returns (Rs. 97560 ha<sup>-1</sup>) and net monetary returns (Rs. 59140 ha<sup>-1</sup>). Also foliar spray of 12:61:00 recorded the highest benefit: cost ratio (2.53:1). Similar result were reported by Chandrasekhar and Bangarusamy (2003) [1], Dixit and Elamathi (2007) [2] and Verma *et al.* (2011) [14], Godase *et al.* (2011) [3].

**Table 3:** Effect of foliar sprays on yield, quality and economics of summer green gram

Treatments	Seed yield (Kg ha <sup>-1</sup> )	Straw yield (kg ha <sup>-1</sup> )	Harvest Index (%)	% Protein content	Gross monetary Returns (Rs ha <sup>-1</sup> )	Cost of cultivation (Rs ha <sup>-1</sup> )	Net Monetary Returns (Rs ha <sup>-1</sup> )	B:C Ratio
T1:Control (No spray)	11.29	25.39	30.80	25.18	67740	35150	32590	1.92
T2:Urea (1.5 %spray)	12.23	26.87	31.27	25.75	73380	36225	37155	2.02
T3:DAP (1.5% spray)	15.78	30.68	33.96	25.68	94680	37980	56700	2.49
T4:13:00:45 (1.5 %spray)	12.21	26.92	34.11	25.56	73260	36450	36810	2.00
T5:19:19:19 (1.5 %spray)	15.66	30.24	34.11	25.68	93960	37850	56110	2.48
T6:00:52:34 (1.5 %spray)	13.32	28.37	31.95	25.06	79920	37625	42295	2.12
T7:12:61:00 (1.5 %spray)	16.26	30.72	34.61	25.43	97560	38420	59140	2.53
S.Em±	0.96	1.04	-	0.01	-	-	-	-
C.D at 5%	2.88	3.13	-	NS	-	-	-	-
General mean	13.82	28.45	32.91	25.47	82928.57	37100	45828.57	2.22

### Conclusion

The foliar spray of 12:61:00 was applied just before flowering at 32 DAS to maximizing the yield and higher net return of green gram.

### References

- Chandrasekhar CN, Bangarusamy U. Maximizing the yield of mung bean by foliar application of growth regulating chemicals and nutrients. Madras Agriculture Journal. 2003; 90(13):142-145.
- Dixit PM, Elamathi S. Effect of foliar application DAP, micronutrients and NAA on growth and yield of green (*Vigna radiata*). Legume Research. 2007; 30(4):305-307.
- Godase MM, Deshmukh SB, Raundal PU, Kunjir NT, Thawal DW. Effect of different foliar sprays on growth, yield and quality of summer greengram. (*Vigna radiata* L.). Journal Agriculture Research Technology. 2011; 39(1):011-015.
- Kalita P, Dey SC, Chandra K, Upadhyaya LP. Effect of foliar application of nitrogen on morpho-physiological traits or pea (*Pisum sativum*). Indian Journal of Agriculture. Science. 1994; 64(12):850-852.
- Kuttamani R, Velayutham A. Foliar application of nutrients enhances the yield attributes and nutrient uptake of greengram. Agriculture Science Digest. 2011; 31(3):202-205.
- Mondal MM, Rahman MA, Akter MB, Fakir MSA. Effect of foliar application of nitrogen and micronutrients on growth and yield in mungbean. Legume Research. 2011; 34(3):166-171.
- Pandragi RB, Wankhede SG, Nasre RA. Response of mung (*Phaseolus auras* L.) to soil and foliar application of phosphatic fertilizers. Legume Research. 1991; 14(4):187-188.
- Patel JR, Patel ZG. Effect of foliar fertilization of nitrogen and phosphorus on growth and yield of summer greengram (*Phaseolus radiatus*). Indian Journal of Agronomy. 1994; 39(4):578-580.
- Pathak SS, Nema ML, Varughese K, Sakalley SK. Comparative study of soil and foliar application of diammonium phosphate on chickpea. Indian Journal of Agronomy. 1985; 30(2):251-253.
- Sarkar RK, Pal PK. Effect of pre-sowing seed treatment and foliar spray of nitrarte saltson growth and yield of greengram (*Vigna radiata* L.). Indian Journal of Agriculture Science. 2006; 76(1):62-65.
- Shritharan N, Aravazhi Anitha, Vangamudi Malika. Effect of foliar spray of nutrients and plant growth regulators (PGRs) for yield maximization in blackgram. Madras Agriculture Journal. 2005; 92(4-6):301-307.
- Subramanian A, Palaniappan SP. Effect of planting, plant density and fertilization on yield of blackgram in irrigated system. Madras Agriculture Journal. 1981; 68(2):96-99.
- Velu G, Srinivasan PS. Efficiency of foliar application of potassium on growth and protein yield in blackgram variety Co 4. Madras Agriculture Journal. 1984; 71(9):625-626.
- Verma CK, Yadhav RB, Dhyani BP, Tomar SS. Effects seed rates and foliar spray of urea on performance of blackgram (*Vigna mungo* L.) varieties. Indian Journal of Agriculture Science. 2011; 81(9):881-882.