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EFFECT OF FOLIAR APPLICATION OF DAP, MICRONUTRIENTS AND NAA ON GROWTH AND YIELD OF GREEN GRAM (*VIGNA RADIATA* L.)

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ABSTRACT

An experiment was carried out during *kharif* season of 2005-6 to study the effect of 2% DAP, NAA 40 ppm, B 0.2% and Mo 0.05% as foliar spray on K-851 green gram (*Vigna radiata* L.) Foliar application of DAP 2% + NAA 40 ppm + B 0.2% + Mo 0.05% at 30 DAS significantly increased the height and dry weight of plants, number of pods/plant, seeds/pod, test weight, grain yield and haulm yield over the control.

Contribution of pulses to Indian agriculture and daily life has been tremendous besides being one of the important constituents of our diet. Green gram (*Vigna radiata* L.) gives low seed yield mainly due to poor management and low soil fertility. Foliar application of nutrients using water soluble fertilizer is one of the possible ways to enhance the productivity of green gram. The foliar application of super phosphate and di-ammonium phosphate was found beneficial than soil application (Chandrasekhar and Bangarusamy, 2003). Growth regulators like GA and IAA significantly increased the number of flowers per plant, improved fruit setting and pod number per plant (Subramanian and Palaniappan, 1981). Growth substances as a foliar spray increased the yield either by increasing pod setting or seed number (Birari, 1986). Foliar application of macro and micronutrients and seed treatment with Rhizobium biofertilizer were reported to be effective in increasing the grain yield, haulm yield, NPK uptake and protein content of pulse grains (Gopal Singh and Sudhakar, 1991). Keeping the above points in view, the present study was carried out to study the effect of foliar application of DAP, micronutrients and NAA on the yield of green gram.

An experiment was carried out during rainy season of 2005 at the Department of Agronomy, Allahabad Agricultural Institute-Deemed University, Allahabad. The soil of experimental site was sandy loam with a pH 7.8, organic carbon 0.40%, low in available nitrogen (202 kg/ha), medium in available phosphorus (18 kg/ha) and potassium (236 kg/ha). The experiment was laid out in randomized block design with 3 replications. The treatments included foliar application of DAP 2%, NAA 40 ppm, B 0.2%, Mo 0.05%and their combinations at 30 days after sowing (DAS) as detailed in Table 1. K-851 green gram was sown at a spacing of 30 cm x 10 cm on March 15, 2006. The recommended inorganic fertilizer of 25:50:20 kg NPK/ha were applied to all the plots at sowing. Plant height, number of nodules/plant and dry weight/plant were recorded at maturity.

Growth parameters : The data on crop growth parameters as reported in Table-1 indicated that plant height, number of nodules and dry matter production per plant improved significantly with foliar application of DAP, micronutrient and NAA. The per cent increase in plant height and dry matter production with T_{12} was 3.4, 20.1 respectively, over the control. The per cent increase in number of nodules with T_{11} over T_1 (RDF) was 7.8. These observations are in conformity with those of Parasuraman (2001). Higher dry weight was recorded in T_{12} (RDF +DAP 2% + NAA 40 ppm + B 0.2% + Mo 0.05% at 30 DAS) followed by T_9 and T_7 which

TABLE 1. Effect of DAP, micronutrients and NAA spray on plant height, no. of nodules and dry weight/plant (g)

	Treatments	Plant height (cm)	No. of nodules/ plant	Dry weight / plant (g)
T_1	control	31.20	29.66	12.23
T_2	DAP 2%	29.89	29.88	13.70
T_3	NAA 40 ppm	32.26	29.55	11.00
T_4	B 0.2%	31.00	30.77	12.93
T_5	Mo 0.05%	31.46	31.33	13.33
T_6	DAP 2% + NAA 40 ppm	29.49	30.22	13.96
T_7	DAP 2% + B 0.2%	30.08	30.66	14.33
T_8	DAP 2% + Mo 0.05%	30.01	30.33	13.06
T_9	NAA 40 ppm + B 0.2%	30.50	31.44	14.53
T_{10}	NAA 40 ppm + Mo 0.05%	31.23	31.55	13.36
T_{11}	B 0.2% + Mo 0.05%	31.68	32.00	13.03
T_{12}	DAP 2% + NAA 40 ppm + B 0.2% + Mo 0.05%	32.27	30.99	14.70
	S.Ed	0.81	0.55	0.66
	C.D. (P=0.05)	1.68	1.15	1.37

TABLE 2. Effect of DAP, micronutrients and NAA spray on yield attributes and yield of green gram

	Treatments	No. of pods/ plant	1000-seed weight (g)	Grain yield (Q/ha)	Haulm yield (Q/ha)	B.C ratio
T_1	control	18.00	26.63	6.26	28.36	1.45
T_2	DAP 2%	18.26	28.20	7.90	27.53	1.77
T_3	NAA 40 ppm	20.06	29.36	7.53	29.23	1.70
T_4	B 0.2%	18.06	28.70	6.83	30.00	1.54
T_5	Mo 0.05%	19.33	27.00	6.53	26.46	1.35
T_6	DAP 2% + NAA 40 ppm	23.46	29.06	8.09	28.20	1.80
T_7	DAP 2% + B 0.2%	19.00	28.16	7.83	27.13	1.71
T_8	DAP 2% + Mo 0.05%	20.46	27.56	7.96	25.86	1.60
T_9	NAA 40 ppm + B 0.2%	20.53	27.90	7.90	26.23	1.72
T_{10}	NAA 40 ppm + Mo 0.05%	22.80	27.80	8.13	29.53	1.65
T_{11}	B 0.2% + Mo 0.05%	22.06	30.13	7.66	28.50	1.53
T_{12}	DAP 2% + NAA 40 ppm + B 0.2% + Mo 0.05%	25.86	30.33	10.16	30.33	1.97
	S.Ed	1.25	0.90	0.53	0.91	-
	C.D. (P=0.05)	2.59	1.86	1.11	1.97	-

were statistically at par with each other. The percentage increase in plant dry weight with T_{12}, T_9 and T_7 over T_1 were 20.1, 18.8 and 17.1 respectively. This is in corroboration with Revathy *et al.* (1997).

Yield attributes : Maximum number of pods/ plant and 1000 seed weight were recorded in T_{12} followed by T_6, T_{10} and T_{11}. The percentage increase in number of pods/plant and 1000-seed weight with T_{12} over T_1 was 43.6 and 13.8 respectively. Similar findings were reported by Majumjdar *et al.* (1989).

Grain and haulm yield : Maximum grain yield was recorded in T_{12} followed by T_{10} and T_6 which was significantly superior to other treatments, but for haulm yield T_{12} was at par with T_1, T_3, T_4, T_{10} and T_{11}. The percentage increase in grain yield and haulm yield with T_{12} over T_1 was 62.3

and 6.9 respectively. Foliar spray of DAP, NAA Combined with micronutrients registered higher grain yield. The causes for the increase in yield were the increased dry matter production and efficient assimilate translocation to the developing sink leading to increased pods and higher grain yield. These results are in line with the findings of Revathy *et al.* (1997). The retention of flowers and pods are increased by either foliar application of nutrients or plant growth regulators as reported by Sharma and Dey (1986) in soybean.

Benefit cost ratio : The highest benefit cost ratio was registered in T_{12} (1.97) followed by T_6 (1.80). Though T_{10} recorded the second best highest yield, the increased yield did not commensurate with the cost of additional input incurred.

Thus, it is concluded that foliar application of DAP, NAA, B and Mo significantly improved the seed yield of green gram. The increase in yield was due to the increase in the yield attributes, imparted by the foliar application of nutrients and NAA.

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