Internat. J. agric. Sci. Vol.3 No.1 January 2007 : 168-169

Studies on the time of nitrogen, application foliar spray of DAP, and growth regulator on yield attributes, yield and economics of green gram (*Vigna ratdiata* L.)

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ABSTRACT
An experiment was carried out during kharif season of 2005-06 at central Research Farm Allahabad Agricultural Institute-Deemed University Allahabad to study the time of nitrogen application, foliar spray of DAP and growth regulator on yield and yield attribute of green gram (*Vigna radiata*. L). The experiment consisted of 9 treatments includes RDF, foliar spray of DAP and NAA alone and combination, Results revealed that 2% foliar spray of DAP and NAA 40 ppm twice at 25 and 35 days after sowing significantly increased the number of pods/plant, number of seeds/pod, test weight, number of flowers, fertility coefficient, grain yield, haulm yield, cost of cultivation, total return, net return and benefit cost ratio.

Key words : DAP, NAA, Green gram, yield.

INTRODUCTION

Contribution of pulses to Indian agriculture and daily life has been tremendous besides being one of the important constituents of our diet, Green gram is the third important pulses crop in India, covering on area of 2.56 million hectares, with the share of 12 per cent of the total acreage, but constitutes only 8 per cent of the total pulse production of the country. This is due to the fact that average productivity of green gram is as low as 467 kg/ha in India while the average productivity of other legumes were 778 kg/ha. The causes for such low yield are due to some of physiological, biochemical as well as certain inherent factors associated with the crop. apart from the genetic constitution. The physiological factors such as inefficient partitioning of assimilates, poor pod setting, excessive flower abscission and lack of nutrients during the critical stages of crop growth were found to be some of the yield barriers of mungbean (Alberta and Bower, 1983).

Nutrients plays a pivotal role in increasing the seed yield in pulses. Foliar application of major nutrients like nitrogen and phosphorus was found to be as good as soil application (Subramanian and palaniappan, 1981). Mitra *et al*. (1988), opioned that nitrogen is the major limiting factor for yield in mungbean, Hamid (1991) and Kalita *et al.* (1994), suggested that supplementing urea at the reproductive stage significantly enhanced the seed yield by delaying leaf senescence in mungbean. Keeping on the above points in view, the study was conducted to develop a suitable combination of nutrient and plant growth regulating chemicals for improving the yield of the mungbean.

MATERIALS AND METHODS

A field experiment was carried during kharif 2005-06 season, in the Department of Agronomy, Allahabad Agricultural Institute-Deemed University Allahabad using variety K-851. The treatments comprised of T_1-RDF 25: 50 : 20 kg/ha.

T ½ basal N + ½ Foliar N through urea N through urea at 25 DAS, T_3-1/2 basal N + ½ foliar N through urea at 35 DAS, T_4 ½ basal N + ½ foliar N through DAP at 25 DAS, T_5 ½ basal N + ½ foliar N through DAP at 35 DAS, T_6- ½ basal N + ¼ at 25 DAS + ¼ at 35 DAS through urea, T_7 ½ basal N + ¼ at 25 DAS + ¼ at 35 DAS through DAP, T_8 ½ basal N + ½ foliar at 35 DAS through urea + 40 ppm NAA. T_9 ½ basal N + ½ foliar at 35 DAS through DAP + 40 PPM NAA. The soil of experimental site was sandy loam with a pH 7.8, organic carbon 0.4, low in available nitrogen (202 kg/ha) medium in available phosphorus (18 kg/ha) and potassium (236.2 kg/ha) The experiment was laid out in randomized block design with 3 replication K-851 green gram was sown at a spacing of 40 cm x 10 cm. The treatments were imposed as per schedule. The recommended inorganic fertilizer of (RDF) 25 : 50 : 20 kg NPK/ha were applied to all the plots. Plant height number of branches/plant, number of nodules/plant and dry weight/ plant, were recorded at different interval. The number of pods per plant was counted from five plants and mean arrived. The mean flower number per plant was assessed from the total number of flowers produced from the commencement to the end of flowering period, Fertility coefficient was also assessed from the relationship between number of flowers produced per plant and number of pods produced per plant.

RESULTS AND DISCUSSION

Yield attributes and yield

The maximum number of pods (38.3) were recorded with (T_9 ½ basal N + ½ foliar at 35 DAS through DAP + 40 ppm NAA) followed by T_8 (1/2 basal N + ½ foliar at 35 DAS through urea + 40 PPM NAA). T_9 recorded significant increase in pods/plant, which was significantly superior to other treatments and statistically at par with T_8 and T_7 respectively. The maximum number of seeds/pod was recorded with T_9 followed by T_8 which is significantly superior to all the treatments. The higher value of test weight was found in T_9 followed by T_8. Similar results were recorded

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Table 1: Effect of urea, DAP and growth regulator (NAA) on yield attributes, yield, and Benefit cost ratio.

Treatment	No. of pods/plant	No. of seed/pods	Test weight in (gm)	No. of flowers/ Plant	Fertility Coefficient	Grain yield (q/ha)	Haulm yield (q/ha)	Cost of cultivation (Rs./ha)	Total return	Net return (Rs/ha)	Benefit cost ratio
T_1- RDF 25 : 50 : 20 kg/ha as basal.	27.4	11.40	40.00	50.10	54.69	6.26	20.00	9079.00	14772.00	5693.00	1.62
T_2-1/2 basal N + ½ foliar N through urea at 25 DAS	28.1	11.50	40.50	52.40	53.62	7.90	27.50	7689.52	18755.00	11065.48	2.43
T_3-1/2 basal N + ½ foliar N through urea t 35 DAS	29.6	12.60	42.85	44.90	53.91	7.13	29.60	7689.52	17166.00	9476.48	2.43
T_4-1/2 basal N + ½ foliar N through DAP at 25 DAS	29.4	12.30	44.05	47.30	51.30	7.40	27.60	8632.00	17660.00	9028.00	1.05
T_5-1/2 basal N + ½ foliar N through DAP at 35 DAS	29.00	12.60	42.35	53.70	54.00	7.36	29.00	8632.00	17642.00	9010.00	1.05
T_6-1/2 basal N + ¼ at 25 DAS + ¼ at 35 DAS through urea	28.50	12.70	40.5	53.90	52.87	8.26	28.00	7689.52	19572.00	11882.00	2.431.05
T_7-1/2 basal N + ¼ at 25 DAS + ¼ at 35 DAS through DAP	35.10	12.60	43.85	55.50	63.24	7.90	27.90	8632.00	18775.00	10143.00	2.47
T_8-1/2 basal N + ½ foliar at 35 DAS through urea + 40 PPM NAA	37.20	13.80	45.8	62.00	60	8.20	32.10	7929.52	19645.00	11715.48	2.58
T_9- basal N + ½ foliar at 35 DAS through DAP + 40 PPM NAA	38.30	15.10	46.15	64.00	59.84	9.66	33.10	8872.00	22908.00	14036.00	
S.Ed	1.6	0.63	0.92	1.40		1.62	0.635				
C.D. (P = 0.05)	1.34	1.34	1.96	2.97		1.34	3.450				

in pigeonpea by Yellamanda Reddy *et al*. (1987).

Number of flowers and fertility coefficient

T_9 produced more number of flowers followed by T_8, However higher fertility coefficient was observed in T_7 followed by T_8 and T_9 respectively. The percentage increase infertility coefficient with T_7 over T_1 was 14.45, DAP and Plant growth regulators has increased the fertility coefficient. Flower retention is increased by foliar application of plant growth regulator like NAA and that was the reason in increased the fertility coefficient. This result corroborated with Sharma and Dey (1986).

Grain and Haulm yield

The maximum grain yield was recorded in T_9 (9.66 q/ha) followed by T_8 (8.20 q/ha) with which was significantly superior to other treatments, The percentage increase in grain yield and haulm yield with T_9 over T_1 was 54.31 and 65.5, respectively. Foliar spray of DAP. urea combined with NAA had registered higher grain yield. The causes for the increasing yield are due to increase in dry matter production and efficient assimilate translocation to the developing sink leading to increased pods and resulted in higher grain yield. The results are supported by the findings of Revathy *et al*. (1997). Cost of cultivation, total return and Benefit cost ratio was registered in the T_9 (2.58) followed by T_8 (2.47). The increase in yield was due to the increase in the yield attributes, higher fertility coefficient imparted by the foliar application of nutrients and NAA.

Benefit cost ratio

The highest benefit cost ratio was registered in the T_9 (2.58) followed by T_8 (2.47). Thus it is concluded that foliar application of Urea, DAP and NAA had significantly improved the seed yield of green gram. The increase in yield was due to the increase in the yield attributes, higher fertility coefficient imparted by the foliar application of nutrients and NAA.

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Received : May, 2006; Accepted : October, 2006