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Short Communication

Effect of foliar application of nutrients and NAA in mungbean

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Mungbean (*Vigna radiata* L. Wilezek) is the third most important pulse crop in India covering an area of 3.42 m. ha. However yield of the crop is quite low. The causes for low yield are a number 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 are some of the yield barriers of soybean. Kalita *et al.* (1994) suggested that supplementing urea at the reproductive stage significantly increased seed yield in pea. Keeping this in view, a field experiment was carried out during *kharif* season of 2005 at Allahabad Agricultural Institute, Allahabad using mungbean variety K 851. The treatments comprised of T1 -RDF 25:50:20 kg N, P_2O_5 and K_2O/ ha, T_2- DAP 2% , T_3. NAA 40 ppm, T_4- B 0.2 %, T_5 -Mo 0.05 %, T_6- DAP 2% +NAA 40 ppm , T_7 -DAP 2 % + B 0.2 %, T_8- DAP 2% + Mo 0.05 %, T_9- NAA 40 ppm + B 0.2 %, T_{10} - NAA 40 ppm + Mo 0.05 %, T11 B 0.2 %+Mo 0.05 % , T12- DAP 2 %+NAA 40 ppm + B 0.2 % + Mo 0.05 %. The foliar nutrients were applied at 30 days after sowing. The soil of the experimental site was sandy loam with 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 three replications. Mungbean (cv. K 851) was sown at a spacing of 30 cm X 10 cm. Boron and molybdenum were applied in the form of Borax and Ammonium molybdate, respectively. The recommended inorganic fertilizer of (RDF) 25:50:20 kg N, P_2O_5, K_2O/ha were applied to all the plots. Plant height, branches/ plant, nodules /plant and dry weight /plant were recorded at different intervals.The number of pods per plant was counted from five plants. The mean flower number per plant was assessed from the total number of flowers produced. Fertility co-efficient was also assessed from the relationship between number of flowers and pods produced per plant.

Plant height (32.27 cm) and branches/plant (4.17) were maximum in DAP 2% +NAA 40 ppm+B 0.2 % + M_0 0.05 % followed by NAA 40 ppm (Table. 1). Maximum dry weight was recorded in DAP 2 % + NAA 40 ppm +B 0.2 % + MO 0.05 % followed by NAA 40 ppm + B 0.2 % .The highest nodules / plant (32) was observed in B 0.2 % + Mo 0.05 % followed by NAA 40 ppm +Mo 0.05 % , NAA 40 ppm + B 0.2 % , Mo 0.05 % and DAP 2 % + NAA 40 ppm + B 0.2 % + Mo 0.05 % . Lower growth parameters was recorded in recommended fertilizer alone. The attributing reason for taller plants and higher dry weight in DAP 2 % + NAA 40 ppm + B 0.2 % + Mo 0.05 % might be due to the rejuvanile habit of mungbean with additional supply of N and P as foliar sparying. Similar findings was also reported by Chandrasekhar and Bangarusamy (2003). Maximum number of pods per plant was registered in DAP 2% + NAA 40 ppm + B 0.2 % + Mo 0.05 % which was found significantly superior to all treatments except DAP 2 % +NAA 40 ppm. Higher value of 1000 seed weight was found in DAP 2 % + NAA 40 ppm + B 0.2 % + Mo 0.05 % followed by B 0.2% +Mo 0.05 % which was statistically at par with NAA 40 ppm, B 0.2 % and DAP 2 % + NAA 40 ppm . The reason for more number of pods per plant, number of seeds per pod might be due to the balanced metabolism maintained continuously inside the plant to subsequent phases of growth. Similar results have been recorded in pigeonpea by Yellamanda Reddy *et al.* (1987).

Table 1. Effect of foliar application of nutrients on growth parameters

Treatment	Plant height (cm)	No. of branches/ plant	No. of nodules/ plant	Dry weight/ plant (g)
25:50:20: kg NPK/ha	31.20	3.22	29.66	12.23
DAP 2% .	29.89	3.31	29.88	13.70
NAA 40 ppm	32.26	4.0	29.55	11.00
B 0.2 %	31.00	3.12	30.77	12.93
Mo 0.05 %	31.46	3.60	31.33	13.33
DAP2% + NAA 40 ppm	29.49	3.78	30.22	13.96
DAP 2 % + B 0.2 %	30.08	3.28	30.66	14.33
DAP 2 % + Mo 0.05 %	30.01	3.20	30.33	13.06
NAA 40 ppm + B 0.2%	30.50	3.30	31.44	14.53
NAA 40 ppm +Mo 0.05 %	31.23	3.44	31.55	13.36
B 0.2 % + Mo 0.05 %	31.68	3.45	32.00	13.03
DAP 2% + NAA 40 ppm + B 0.2 % + Mo 0.05 %	32.27	4.17	30.99	14.70
S.Ed	0.81	0.074	0.55	0.66
C.D. (P=0.05)	1.68	0.153	1.15	1.37

Mo 0.05 % produced more number of flowers (40.86) followed by NAA 40 ppm+Mo 0.05% (38.73). This micronutrient was not able to retain the flowers unlike the growth regulators. However, higher fertility co-efficient was observed in DAP 2% +NAA 40 ppm +B 0.2% +Mo 0.05% (69.64) followed by DAP 2 % + NAA 40 ppm. The increase in fertility co-efficient with DAP 2 % + NAA 40 ppm + B 0.2% +

Table 2. Effect of foliar application of nutrients and NAA on yield attributes, yield and Benefit Cost Ratio

Treatment	No.of pods/ plant	No.of seeds/ pod	1000-seed weight (g)	No. of flowers / plant	Fertility coefficient (%)	Grain yield (q/ha)	Haulm yield (q/ha)	Benefit cost ratio
25:50:20: kg NPK/ha	18..00	7.73	26.63	33.06	54.44	6.26	28.36	1.45
DAP 2 %	18.26	8.20	28.20	32.00	57.06	7.90	27.53	1.77
NAA 40 ppm	20.06	7.86	29.36	36.53	54.91	7.53	29.23	1.70
B 0.2 %	18.06	8.40	28.70	34.93	51.70	6.83	30.00	1.54
Mo 0.05 %	19.33	7.60	27.00	40.86	47.30	6.53	26.46	1.35
DAP 2 % + NAA 40 ppm	23.46	8.46	29.06	37.00	63.40	8.09	28.20	1.80
DAP 2 % + B 0.2 %	19.00	9.00	28.16	34.60	54.91	7.83	27.13	1.71
DAP 2 % + Mo 0.05 %	20.46	7.86	27.56	36.46	56.11	7.96	25.86	1.60
NAA 40 ppm+ B 0.2 %	20.53	7.86	27.90	35.66	57.57	7.90	26.23	1.72
NAA 40 ppm +Mo 0.05 %	22.80	8.53	27.80	38.73	58.86	8.13	29.53	1.65
B 0.2 % + Mo 0.05 %	22.06	8.06	30.13	37.13	59.41	7.66	28.50	1.53
DAP 2% + NAA 40 ppm + B 0.2% + Mo 0.05 %	25.86	10.06	30.33	37.13	69.64	10.16	30.33	1.97
S.Ed	1.25	0.4	0.90	0.75	-	0.53	0.95	-
C.D. (P=0.05)	2.59	0.83	1.86	2.54	-	1.11	1.97	-

DAP-Rs. 9/kg, Borax-Rs. 225 / kg, Planofix- Rs. 200 / liter, Ammonium molybdate- Rs. 540 / kg, Price of mungbean - Rs. 18 / kg

Mo 0.05% over RDF 25:50:20 kg N, P_2O_5 and K_2O / ha was 27.9% . Micronutrient in the foliar spary solution, however, did not influence the fertility co-efficient as noticed in DAP 2% +NAA 40 ppm. DAP and the plant growth regulator increased the fertility co-efficient. Flower retention was increased by foliar application of plant growth regulators like NAA and that was the reason for increased fertility co-efficient. This result is corroborated by Singh (1989) in chickpea.

Maximum grain yield was recorded in DAP 2 % +NAA 40 ppm +B 0.2 % +Mo 0.05 % followed by NAA 40 ppm + Mo 0.05 %, and DAP 2% +NAA 40 ppm which were significantly superior to other treatments, but for haulm yield, DAP 2 % +NAA 40 ppm +B 0.2 % +Mo 0.05 % was at par with RDF 25:50:20 kg N, P_2O_5 and K_2O / ha, NAA 40 ppm, B 0.2 %, NAA 40 ppm + Mo 0.05 %, and B0.2 %+Mo 0.05 % . The percentage increase in grain yield and haulm yield with DAP 2 % +NAA 40 ppm +B 0.2 % +Mo 0.05 % over RDF 25:50:20 kg N, P_2O_5 and K_2O / ha was 62.3 and 6.9, respectively. Foliar spray of DAP, NAA, combined with micronutrients registred higher grain yield. The causes for the increase in yield are the increased dry matter production and efficient assimilate translocation to the developing sink leading to increased pods and resulting in higher grain yield. The foliar spraying could be exploited favourably for inderminate crop for prolonged and continuous translocation of photosynthates. Apart from this, delayed senescence may also be attributed for the increase in yield. These results are in concurrence with Revathy *et al.* (1997).

The highest benefit cost ratio was registred in DAP 2 %+NAA 40 ppm + B 0.2 % + Mo 0.05 % (1.97) followed by DAP 2% + NAA 40 ppm (1.80) .Though NAA 40 ppm + Mo 0.05 %, recorded the second best highest yield. The increased yield was not commensurated with the cost of additional input incurred. Thus , it is concluded that foliar application of DAP, NAA , B and Mo had significant effect on seed yield of mungbean.

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