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Evaluation of fertility levels and weed management practices on summer mungbean [*Vigna radiata* (L.) Wilczek] under tarai region of Uttarakhand

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Abstract

An experiment was conducted during 2016 at the GBPUAT, Pantnagar, the experiment was laid out in split plot design and comprised 5 treatments viz: Recommended dose of fertilizer (RDF-18 kg N + 48 kg P₂O₅ + 24 kg K₂O/ha), half RDF + 2% urea spray at 40 DAS, half RDF + 2% NPK mixture (12:32:16) spray at 40 DAS, RDF + micronutrients (Zn EDTA 0.045% + Boric acid 0.1% + Ammonium molybdate 0.1%) spray at 20 and 40 DAS and half RDF + micronutrients (Zn EDTA 0.045% + Boric acid 0.1% + Ammonium molybdate 0.1%) spray at 20 and 40 DAS were kept in main plots and 4 treatments such as Weedy check, Imazethapyr 10% SL @ 0.075 kg/ha PoE at 20 days after sowing (DAS), Pendimethalin 30% EC @ 1 kg/ha PE + one hand weeding (HW), at 30 DAS and Pendimethalin 30% EC @ 1 kg/ha PE + Imazethapyr 10% SL @ 0.075kg/ha PoE, at 20 DAS in sub plots. The application of RDF + micronutrients (Zn EDTA 0.045% + Boric acid 0.1% + Ammonium molybdate 0.1%) spray at 20 and 40 DAS and Pendimethalin 30%EC @ 1 kg/ha PE + HW at 30 DAS resulted in higher grain yield, protein yield, NPK uptake in grain, straw and total NPK uptake which were significantly higher than the remaining treatments. The fertility levels and weeds management practices did not influence the protein content significantly.

Keywords: fertility levels, micronutrients, protein, weeds management and yield

1. Introduction

Pulses are the important group of crops of Indian agriculture after cereals and oilseeds. These are basic ingredients in the diet of majority of Indian population, as they provide a perfect blend of vegetable protein of high biological value when consumed with cereals. Low productivity of pulses is a major constraint in achieving self-sufficiency in pulses production. The spring or summer season mungbean can only be grown under assured irrigated condition. In intensive cropping system soil becomes deficient in multi nutrients and weed infestation also causes more yield loss in summer mungbean. Balanced fertilization and effective weed management may help in realizing higher grain yield at a greater extent. Basal application of recommended dose of fertilizer (RDF) is not sufficient to meet out the nutritional demand of the crop at later crop growth stage. In contrast higher concentration may cause leaf injury and may damage entire plant. It is therefore, necessary to find out the adequate concentration and appropriate time of spray for increasing their efficiency. Farmers of this country do not follow any weed control measure and possibly it may be one of the causes for low yield of mungbean in the country. The time of weeding has an important effect on the growth and yield of mungbean.

2. Materials and Methods

A field experiment was conducted during summer season of 2016 in Pulses Agronomy Block of N. E Borlaug Crop Research Centre (NEBCRC) at G.B. Pant University of Agriculture & Technology, Pantnagar. Soil of the experimental site was sandy loam, high in organic carbon (0.86%) and available N (322kg/ha), medium in P₂O₅ (28kg/ha) and K₂O (220kg/ha), having pH (7.2). The experiment was conducted in a split plot design with three replications and experiment comprised 5 treatments viz: RDF (18 kg N + 48 kg P₂O₅ + 24 kg K₂O/ha), half RDF + 2% urea spray at 40 DAS, half RDF + 2% NPK mixture (12:32:16)

spray at 40 DAS, RDF + micronutrients (Zn EDTA 0.045% + Boric acid 0.1% + Ammonium molybdate 0.1%) spray at 20 and 40 DAS and half RDF + micronutrients (Zn EDTA 0.045% + Boric acid 0.1% + Ammonium molybdate 0.1%) spray at 20 and 40 DAS were kept in main plots and 4 treatments such as Weedy check, Imazethapyr 10% SL @ 0.075 kg/ha PoE 20 at DAS, Pendimethalin 30% EC @ 1 kg/ha PE + HW at 30 DAS and Pendimethalin 30% EC @ 1 kg/ha PE + Imazethapyr 10 % SL @ 0.075 kg/ha PoE at 20 DAS in sub plots.

3. Results and Discussion

Data pertaining to yield of mungbean has been given in table1. The result revealed that the maximum yield (853kg/ha) were recorded by the application of RDF + micronutrients spray (Zn EDTA 0.045% + Boric acid 0.1% + Mo- Ammonium molybdate 0.1%) at 20 and 40 DAS. But it was at par with RDF and significantly higher than the remaining treatments. Similar results were obtained by Biswas *et al.* (2009) [3]. And Patra and Bhattacharya (2009) [9]. Similar results find out by Pal *et al.* (2009) [8]. Reported that phosphorus level of 35 kg /ha produced the maximum grain yield. These results are in agreement with Jain *et al.* (2007) [6]. And Malik *et al.* (2003) [7]. Among the weed management

practices, significantly higher yield (1064kg/ha) were noticed by spray of Pendimethalin 30 EC @ 1 kg/ha as pre-emergence + one HW, at 30 DAS than remaining other treatment. Similar finding have been reported by Bhandari *et al.* (2004) [2], Bhowmick *et al.* (2015) [4]. And Choudhary *et al.* (2016) [5]. The yield increase was mainly because better growth and yield attributing characters. The data pertaining to protein content and protein yield recorded under different treatments have been presented in Table 1. The fertility levels and weeds management practices did not influence the protein content significantly but significantly influenced protein yield. However, higher value of protein content was recorded with RDF (18kg N+ 48 kg P₂O₅+ 24 kg K₂O/ha)+ micronutrients (Zn EDTA 0.045% + Boric acid 0.1% + Ammonium molybdate 0.1%) spray at 20 and 40 DAS coupled with Pendimethalin 30% EC @ 1 kg/ha PE + HW at 30 DAS. Similar result was also reported by Awomi *et al.* (2012) [1]. The higher protein yield was recorded with the application of RDF (18kg N+ 48 kg P₂O₅+ 24 kg K₂O/ha)+ micronutrients (Zn EDTA 0.045% + Boric acid 0.1% + Ammonium molybdate 0.1%) spray at 20 and 40 DAS along with Pendimethalin 30% EC @ 1 kg/ha PE + HW at 30 DAS and was significantly higher than the remaining treatments.

Table 1: Effect of fertility levels and weed management practices on yield, protein content and yield

Treatments	Grain yield (kg/ha)	Protein content (%)	Protein yield (kg/ha)
A. Fertility levels			
RDF (18 kg N+ 48 kg P ₂ O ₅ + 24 kg K ₂ O/ha)	843	21.45	154.70
Half RDF + 2% urea spray at 40 DAS	672	21.09	121.42
Half RDF + 2% NPK mixture (12:32:16) at 40 DAS	594	20.78	105.44
RDF + micronutrients spray (Zn EDTA 0.045% + Boric acid 0.1% + Ammonium molybdate 0.1%) at 20 and 40 DAS	853	21.66	158.06
Half RDF + micronutrients spray (Zn EDTA 0.045% + Boric acid 0.1% + Ammonium molybdate 0.1%) at 20 and 40 DAS	546	19.53	90.54
SEm±	38	0.56	6.78
CD at 5%	127	NS	22.47
B. Weed management practices			
Weedy check	431	20.60	76.55
Imazethapyr 10% SL @ 0.075 kg/ha PoE at 20 DAS	492	20.97	88.63
Pendimethalin 30% EC @ 1 kg/ha PE + HW at 30 DAS	1064	21.33	193.36
Pendimethalin 30% EC @ 1 kg/ha PE + Imazethapyr 10%SL @ 0.075 kg/ha PoE at 20 DAS	821	20.72	145.59
SEm±	31	0.22	5.69
CD at 5%	91	NS	16.52

Table 2: Effect of fertility levels and weed management practices on NPK uptake in crop

Treatments	Crop								
	N uptake (kg/ha)			P uptake (kg/ha)			K uptake (kg/ha)		
	Grain	Straw	Total	Grain	Straw	Total	Grain	Straw	Total
A. Fertility levels									
RDF (18 kg N+ 48 kg P ₂ O ₅ + 24 kg K ₂ O/ha)	24.75	23.28	48.03	4.54	4.44	8.99	6.26	24.74	31.01
Half RDF + 2% urea spray at 40 DAS	19.42	18.63	38.06	3.59	3.60	7.20	4.95	20.30	25.25
Half RDF + 2% NPK mixture (12:32:16) at 40 DAS	16.87	15.11	31.98	3.11	3.04	6.16	4.36	17.83	22.20
RDF + micronutrients spray (Zn EDTA 0.045% + Boric acid 0.1% + Ammonium molybdate 0.1%) at 20 and 40 DAS	25.30	23.08	48.37	4.60	4.25	8.86	6.36	23.84	30.20
Half RDF + micronutrients spray (Zn EDTA 0.045% + Boric acid 0.1% + Ammonium molybdate 0.1%) at 20 and 40 DAS	14.48	14.66	29.15	2.81	2.91	5.73	3.99	16.72	20.72
SEm±	1.08	0.67	1.09	0.21	0.09	0.21	0.33	0.48	0.54
CD at 5%	3.59	2.22	3.61	0.69	0.30	0.70	1.0	1.59	1.81
B. Weed management practices									
Weedy check	12.24	13.11	25.36	2.26	2.58	4.85	3.15	14.96	18.11
Imazethapyr 10% SL @ 0.075 kg/ha PoE at 20 DAS	14.18	14.57	28.76	2.58	2.84	5.43	3.63	16.21	19.84
Pendimethalin 30% EC @ 1 kg/ha PE + HW at 30 DAS	30.93	26.09	57.03	5.68	4.98	10.66	7.89	27.82	35.71
Pendimethalin 30% EC @ 1 kg/ha PE + Imazethapyr 10%SL @ 0.075 kg/ha PoE at 20 DAS	23.29	22.03	45.33	4.40	4.20	8.60	6.07	23.75	29.83
SEm±	0.91	1.03	1.21	0.21	0.14	0.25	0.26	0.66	0.74
CD at 5%	2.64	2.99	3.53	0.61	0.42	0.74	0.77	1.92	2.2

The data pertaining to NPK uptake in grain, straw and total NPK uptake recorded under different treatments have been presented in Table 2. The fertility levels and weed management practices significantly influenced the NPK uptake in grain, straw and total NPK uptake. Among the fertility levels, the application of RDF +micronutrients (Zn EDTA 0.045% + Boric acid 0.1% + Ammonium molybdate 0.1%) spray at 20 and 40 DAS being at par with RDF (18kg N+ 48 kg P₂O₅+ 24 kg K₂O/ha) recorded significantly higher NPK uptake in grain, straw and total NPK uptake than the remaining fertility levels. In case of weed management practices, the application of pendimethalin 30% EC @ 1 kg/ha PE + HW at 30 DAS recorded significantly higher NPK uptake in grain, straw and total NPK uptake. Lowest, NPK uptake in grain, straw and total NPK uptake was recorded in weedy check.

4. Conclusions

Based on the results obtained from the experiment, it can thus be concluded that a combination of RDF + micronutrients (Zn EDTA 0.045% + Boric acid 0.1% + Ammonium molybdate 0.1%) spray at 20 and 40 DAS coupled with timely weed management with pendimethalin @ 1 kg/ha PE + HW at 30 DAS was found to be the best strategy for optimum nutrient and weed management for realizing higher grain and protein yield in summer planted mungbean.

5. Acknowledgement

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6. References

1. Awomi TA, Singh AK, Kumar M, Bordoloi LJ. Effect of Phosphorus, Molybdenum and cobalt Nutrition on Yield and Quality of Mungbean (*Vigna radiata* L.) in Acidic Soil of Northeast India, Indian J Hill Farming. 2012; 25(2):22-26.
2. Bhandari V, Singh J, Randhawa JS, Randhawa RS. Studies on weed control in summer blackgram (*Phaseolus mungo*). Indian J Weed Sci. 2004; 36(1&2):129-130.
3. Biswas PK, Bhowmick MK, Bhattacharyya A. Effect of molybdenum and seed inoculation on nodulation, growth and yield in urdbean [*Vigna mungo* (L.) Hepper], J Crop and Weed. 2009; 5(1):141-144.
4. Bhowmick MK, Duary B, Biswas PK. Integrated weed management in blackgram. Indian J Weed Sci. 2015; 47(1):34-37.
5. Chaudhari VD, Desai LJ, Chaudhari SN, Chaudhari PR. Effect of weed management on weeds, growth and yield of summer mungbean (*Vigna radiata* L.) The Bios can. 2016; 11(1):531-534.
6. Jain AK, Kumar S, Panwar JDS. Response of mungbean (*Vigna radiata* L.) to phosphorus and micronutrients on N and P uptake and seed quality. Legume Res. 2007; 30(3):201-204.
7. Malik MA, Salim MF, Ali A, Manhood I. Effect of Nitrogen and Phosphorus application on growth and quality of mungbean [*Vigna radiata* (L.) Wilczek], Pak. J Agri. Sci. 2003; 40(3-4):133-136.

8. Pal A, Kumar P, Singh RP, Kumar P. Effect of different phosphorus levels on urdbean under Custard apple based Agri-horti-system. J Agri. Search. 2009; 1(1):30-34.
9. Patra PK, Bhattacharya C. Effect of different levels of boron and molybdenum on growth and yield of mungbean [*Vigna radiata* (L.) Wilczek] in Red and Laterite Zone of West Bengal. J Crop and Weed. 2009; 5(1):111-114.