

AGRO-QUALITATIVE RESPONSE OF *VIGNA RADIATA* TO BLEND APPLICATION OF PHOSPHORUS AND POTASSIUM

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Different blends of P and K viz. 0-0, 25-25, 50-50, 75-75, 100-100, 125-125 and 150-150 kg ha⁻¹ at a basal dose of 25 kg N ha⁻¹ were applied to mungbean in a sandy loam soil, containing 0.35% N, 6.2 ppm P₂O₅ and 130 ppm K₂O. The maximum grain yield of 1058 kg ha⁻¹ with protein contents of 26.22% was obtained from plots fertilized with 100-100 kg PK ha⁻¹ which was comparable with that obtained with the application of either 75-75 or 125-125 kg PK ha⁻¹. However, protein contents in grain tended to decrease beyond 100-100 kg PK ha⁻¹.

Key words: agro-qualitative, blend application, *Vigna radiata*

INTRODUCTION

The average grain yield of *Vigna radiata* (mungbean) obtained at farmer's fields is very low compared to its potential yield which is mainly attributed to poor nutrient management. It is evident from the literature that application of NPK had beneficial effect on mungbean yield (Mains, 1967; Gowda and Gowda, 1978). Patel *et al.* (1984) observed a significant increase in yield with the application of 20 kg N + 40 kg P₂O₅ ha⁻¹. They observed that further increase in P rate was not economical. Nazir (1993) reported that 60 kg P₂O₅ and 30 kg K₂O along with 30 kg N ha⁻¹ was considered the best proportion for obtaining higher grain yield of mungbean.

Hussain (1994) reported that fertilizer dose 60-100-100 kg NPK ha⁻¹ produced the maximum 1000-g grain weight, seed yield and grain protein contents. Similarly, Naeem (1995) found that application of P and K @ 75-50 kg ha⁻¹ with a basal dose of 25 kg N ha⁻¹ was an appropriate dose to obtain maximum yield (861.12 kg ha⁻¹) of mungbean. However, Mumtaz (1996) reported that application of 250 P₂O₅ + 100 kg N ha⁻¹ gave the maximum grain yield of mungbean. Keeping in view the above mentioned controversial statements the present study was planned to determine the effect of different levels of P and K at a constant level of N on agro-qualitative traits of mungbean cultivar 6601 under the irrigated conditions at Faisalabad.

MATERIALS AND METHODS

The effect of different levels of P and K on the yield and grain protein content of mungbean cultivar 6601 was studied at the University of Agriculture, Faisalabad. The experiment was laid out in a randomized complete block design with four replications. The net plot size measured 2.4 x 5.0 m.

The fertilizer treatments comprised 0-0 (F₀), 25-25 (F₁), 50-50 (F₂), 75-75 (F₃), 100-100 (F₄), 125-125 (F₅), 150-150 (F₆) kg PK ha⁻¹ with a basal dose of 25 kg N ha⁻¹. The crop was sown in paired rows 60 cm apart with a distance of 20 cm between the rows of a pair (20/60 cm) with a single row hand drill. All other cultural practices were kept uniform for all the treatments. Observations on relevant parameters were recorded using standard procedures. Nitrogen content in grain was determined by micro-Kjeldahl method (Anonymous, 1980) and protein content was determined by using the following formula:

$$\text{Crude protein content} = \text{Total nitrogen} \times 6.25$$

The data collected were subjected to analysis of variance technique and Duncan's new multiple range test was applied to compare the differences among treatment means at 0.05 P (Steel and Torrie, 1984).

RESULTS AND DISCUSSION

Different levels of PK significantly affected the plant height of mungbean. Although the maximum plant height (33.12 cm) was recorded in plots fertilized with 75-75 kg PK ha⁻¹ but it was statistically at par with other treatments except 150-150 kg PK ha⁻¹ and check (Table 1). Application of each of P and K beyond the level of 125 kg ha⁻¹ depressed plant height because excessive dose of P₂O₅ probably decreased the uptake of nitrogen. These results are substantiated by those of Gowda and Gowda (1978), Patel *et al.* (1984) and Hussain (1994). Pods plant⁻¹ were affected significantly by different PK rates. Fertilization @ 100-100 kg ha⁻¹ produced significantly more number of pods plant⁻¹ (13.50) than all other treatments except the treatment of 75-75 kg PK ha⁻¹ with which it was at par. The minimum number of pods (7.90) was

Table 1. Yield, yield components and grain protein content of mungbean as affected by blend application of P and K

	Plant height (cm)	No. of pods plant ⁻¹	No. of grains per pod	1000-grain weight (g)	Grain yield (kg ha ⁻¹)	Protein content (%)
0-0	25.15 c	7.90 d	5.29 c	38.75 c	5.66 c	22.63 d
20-0	28.65 abc	10.20 c	6.74 abc	43.62 bc	6.83 bc	23.63 cd
50-0	30.20 ab	11.17 bc	7.89 ab	46.07 ab	8.01 bc	24.49 c
75-0	33.12 a	12.40 ab	7.95 ab	45.70 abc	9.16 ab	25.55 ab
100-0	31.15 ab	18.50 a	8.35 a	47.00 a	10.58 ab	26.22 a
0-20	29.18 abc	10.10 bc	7.21 ab	42.22 bc	8.66 abc	24.16 c
0-50	27.14 bc	11.31 c	7.75 bc	40.42 bc	7.66 bc	23.52 d

observed in check plots. An increase in number of pods per plant under the influence of P and K might be due to enhanced enzymatic activities which controlled flowering and pod formation. Similar results were also reported by Hussain (1994) and Mumtaz (1996).

There was a significant increase in the number of grains per pod with the combined application of P and K over control. However, the differences within fertilizer treatments were non-significant with the exception of 150-150 kg PK ha⁻¹ treatment which was at par with control (Table 1). Reduction in grains per pod at higher dose of PK has also been reported by Bains (1967) and Patel *et al.* (1984). The 1000-grain weight of mungbean was also affected significantly by the application of different P and K combinations. Although crop fertilized @ 100 kg PZ05 + 100 kg K ha⁻¹ produced significantly heavier grains than the lowest and highest doses of PK, yet it was statistically equal to the treatments of 50-50 and 75-75 kg PK ha⁻¹. The lower 1000-grain weight at higher PK levels might be ascribed to disturbed nutritional balance. The various fertilizer treatments also significantly affected the grain yield ha⁻¹. The maximum grain yield of 1058 kg ha⁻¹ was obtained in plots fertilized @ 100-100 kg PK ha⁻¹ but it was at par with that obtained either with the application of 75-75 kg or 125-125 kg PK ha⁻¹. Higher grain yield in these treatments was attributed to more number of pods plant⁻¹, more grains per pod and heavier 1000-grain weight. These results coincide with those of Younis and Ahmad (1988), Nazir (1993), Hussain (1994), Naeem (1995) and Mumtaz (1996).

The data on grain protein contents revealed that the maximum protein contents (26.22%) were recorded in plots fertilized @ 100 + 100 kg PK ha⁻¹ which was statistically equal to that fertilized @ 75-75 kg PK ha⁻¹ against the minimum in check plots. This might be due to enhanced N uptake at these levels of PK.

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