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Effect of different moisture conservation practices and potash fertilization on yield, quality, and nutrient uptake by blackgram

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Abstract

Field experiment was conducted during the *kharif* season 2007 at Instructional Farm, Junagadh Agricultural University, Junagadh, to study the effect of different moisture conservation practices and potash fertilization on yield, quality and nutrient uptake of blackgram. The results showed that the broad bed and furrow being at par with between row subsoiling recorded maximum grain yield (1016 kg/ha), straw yield (1870 kg/ha) and protein content. N and P uptake by grain significantly increased by broad bed and furrow than flat bed. N and P uptake by straw and K uptake by grain and straw significantly increased by broad bed and furrow was found statistically at par with between row subsoiling. The application of 20 kg K/ha being at par with 40 kg K/ha recorded higher yield and quality of blackgram. The application of 20 kg K/ha recorded maximum N and P uptake by grain and straw and K uptake by grain.

Keywords: Moisture conservation, potash, blackgram yield, nutrient uptake

Introduction

Blackgram (*Vigna mungo* (L.) Hepper) also known as Urd, Udid or Mash is one of the important short duration pulse crop. The Saurashtra region of Gujarat is highly influenced by the vagaries of monsoon, which result in low and unstable crop yields. Moisture conservation practices like broad bed and furrow improve infiltration of rainwater and thus helps to improve moisture storage in soil profile for plants. Subsoiling breaks the hard pan or compact layer present in the profile and helps in sinking down of the rainwater in the lower layer of soil, which helps in better exploitation of stored soil moisture and applied nutrients from the profile, which ultimately boosts crop growth, and yield. The potassium is also one of the major plant nutrients, which is important for the growth and development of plants. The present investigation was carried out to study the effect of different moisture conservation practices and potash fertilization on yield quality and nutrient uptake of blackgram.

Materials and Methods

The field experiment was conducted during the *kharif* season 2007 at Instructional Farm, Junagadh Agricultural University, Junagadh. The experimental soil was clayey in texture and pH 7.8, containing 0.79% organic carbon, 235.4 kg available N/ha, 31.4 kg available P/ha and 264.2 kg available K/ha. The experiment comprising 12 treatment combinations was laid out in split plot design with three replications. The main plot treatments consisted of four moisture conservation practices (flat bed, broad bed and furrow, ridges and furrow and between row subsoiling) while sub plot treatments consisted of three levels of potash (0, 20 and 40 kg/ha). The recommended dose of N (20 kg/ha) and P (40 kg/ha) were placed 5cm below the seed before sowing of the seed. The crop was sown on 7 July 2007 and harvested on 26 September 2007.

Results and Discussion

Moisture conservation practices

Perusal of data (Table 1) revealed that the higher grain and straw yields with broad bed and furrow being at par with between row subsoiling. The higher grain and straw yields with broad bed and furrow and between row subsoiling, on an average, increased grain yield by 34.9 and 21.8% and straw yield by 35.0 and 26.0%, respectively over flat bed.

Protein content increased remarkably with broad bed and furrow, however, it did not differ significantly from between row subsoiling, on an average, increased protein content by 22.4 and 18.8% over flat bed. In view of vital role in fatty acid metabolism, higher uptake of nitrogen, phosphorus and potassium by pod (Jayapaul *et al.* 1996) [1]. N and P uptake by grain significantly increased by broad bed and furrow than flat bed. N and P uptake by straw and K uptake by grain and straw significantly increased by broad bed and furrow was found statistically at par with between row subsoiling. The higher nutrient contents coupled with higher grain and straw yields might had resulted in higher uptake of nitrogen, phosphorus and potassium by blackgram crop.

Potash fertilization

Various levels of potash significantly influence yield and quality. Potash fertilization with 20 kg K/ha and 40 kg K/ha while being at par with each other recorded significantly higher grain yield and protein content. The positive effect of potash on yield might have been due to its requirement in carbohydrates synthesis. The crop response usually decreases as the dose increased beyond its optimum level, (Mishra 1994) [2]. Straw yield remarkably increased in 20 kg K/ha than rest of the potash levels. The application of 20 kg K/ha recorded maximum N and P uptake by grain and straw and K uptake by grain. The increase in uptake by the black gram crop appears to be due to the cumulative effect of increase yield of grain and straw as well as increased content of nitrogen in grain and straw (Patra *et al.* 1995) [3].

Table 1: Effect of different moisture conservation practices and potash fertilization on yield, quality and nutrient uptake by blackgram.

Treatment	Grain yield (kg/ha)	Straw yield (kg/ha)	Protein content (%)	N uptake (kg/ha)		P uptake (kg/ha)		K uptake (kg/ha)	
				Grain	Straw	Grain	Straw	Grain	Straw
Moisture conservation practices									
Flat bed.	753	1385	19.80	23.74	17.67	3.06	2.01	5.15	10.59
Broad bed and furrow.	1016	1870	24.24	39.52	26.89	4.98	3.96	8.56	18.37
Ridges and furrow.	839	1696	22.21	30.45	23.99	3.98	3.06	6.81	15.06
Between row subsoiling.	917	1745	23.53	34.26	24.59	4.36	3.48	7.73	16.49
C.D. (P=0.05)	112	220	1.99	3.94	3.53	0.58	0.43	1.11	2.08
Potash level (kg K/ha)									
0	803	1424	21.27	27.43	18.00	3.32	2.43	5.60	14.27
20	950	1967	23.44	35.98	28.23	4.81	3.86	8.55	16.08
40	890	1630	22.63	32.56	23.62	4.16	3.10	7.04	15.03
C.D. (P=0.05)	64	105	1.06	2.68	2.19	0.34	0.29	0.74	1.10

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