RESEARCH NOTES:

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Uptake of Nutrients by Blackgram

Blackgram variety Pusa 1 was grown in a non-calcareous red soil of Coimbatore in the pot culture house during August—November, 1972. Nitrogen was applied as ammonium sulphate at three levels namely 0, 30 and 60 Kg/N per ha. Phosphorus was applied as P^{32} labelled superphosphate at four levels namely 0, 30, 60, and 90 kg P_2O_5 per ha. Two levels of rhizobial inoculation with and without seed treatment were included. Potassium was applied at the rate of 30 kg K_2O per ha. There were two replications. Hence a total number of (3 x 4 x 2 x 2) 48 pots were used.

Five plants were grown per pot, two were removed at flowering stage and the rest were allowed to maturity. The total nitrogen was estimated by Micro Kjeldahl's method. The total phosphorus and potassium were estimated colorimetrically and flame photometrically from the triple acid digest. The total uptake was calculated by taking into account of dry matter production and nutrient contents and were subjected to statistical scrutiny. The bulk soil used in this study was poor for the available nitrogen, phosphorus and potassium with neutral soil reaction.

The yield particulars are given in Tables 1 and 1 (a). The uptake of nitrogen was significantly influenced by the levels of phosphorus in the shoot, seed and husk samples, whereas in the seed sample alone nitrogen levels were significant (Tables 2 and 2 a). The uptake of nitrogen increases with increase in levels of phosphorus in all the samples. This is mainly due to the influence of applied phosphorus on the dry matter production. Danaraju (1972) found that the uptake of nitrogen increased due to phosphorus application in soybean shoot and seed. In seed

TABLE 1. Yield of shoot and husk

Phosphorus levels	Mean weight at flowering stage shoot portion (in ten mg)	Mean weight at post harvest stage shoot portion (in ten mg)	Mean husk weight in mg.
P_0	27.17	56.25	37.16
P_1	39.67	82.83	59.41
P_2	66.50	136.50	77.50
P_3	118.83	228.50	126.75
S. E. of mean	7.7	13.0	4.2
C. D.	22.53	38.0	12.29

TABLE 1 (a). Seed Yield (in ten mg)

Phosphorus Levels	Nitrogen levels			Mean	
	N_0	N_1	N_2		
P_0	55.2	61.2	61.5	59.30	S. E. of mean
P_1	84.5	84.5	99.0	89.33	4.7
P_2	119.0	136.0	176.0	143.67	C. D. 13.75
P_3	244.0	220.2	276.0	246.7	
Mean	125.8	125.50	152.50		
S. E. of Mean	4.1				
C. D.	11.9				
N X P SE of mean	8.1				
C. D.	23.7				

TABLE 2. Uptake of Nitrogen (mg/pot)

Levels of phosphorus	Flowering shoot	Post-harvest shoot	Seed	Husk
P_0	6.9	17.4	24.4	6.7
P_1	12.7	26.4	37.7	11.4
P_2	19.1	41.5	59.6	14.7
P_3	39.1	72.3	101.6	24.5
S. E. of Mean	5.3	4.4	3.7	0.9
C. D.	12.6	13.0	10.7	2.9

TABLE 2(a). Uptake of Nitrogen in seed (mg/pot)

Levels of Nitrogen	Mean
N_0	48.1
N_1	56.1
N_2	63.3
S. E. of mean	3.2
C. D.	9.24

samples even though significant treatment differences were observed for nitrogen, the levels were on par within themselves.

The uptake of phosphorus in the shoot, seed and husk samples were significant for phosphorus only (Table3). In general, with increase in levels of

phosphorus, the uptake of phosphorus increased in all the samples. Since the concentration of total phosphorus and dry matter production were significantly influenced by phosphorus, the uptake has also increased in all the cases. Similar results were reported by Indira Raja and Vivekanandan (1965) in *Sesbania*.

Significant treatment differences were noticed in the uptake of potassium for levels of phosphorus in the shoot, seed and husk samples (Table 4). In general, potassium uptake has increased with increase in levels of phosphorus in all the samples. This response of potassium uptake due to phosphorus was reported in soybean seed alone by Danaraju (1972).

TABLE 3. Uptake of Phosphorus (mg/pot)

Levels of phosphorus	Flowering shoot	Post-harvest shoot	Seed	Husk
P_0	0.54	1.09	1.67	0.54
P_1	0.95	2.26	3.04	1.09
P_2	1.58	3.87	4.25	1.43
P_3	3.11	6.60	10.67	2.41
S. E. of mean	0.19	0.34	0.67	0.11
C. D.	0.48	0.99	1.67	0.32

TABLE 4. Uptake of Potassium (mg/pot)

Levels of phosphorus	Flowering stage shoot	Post-harvest shoot	Seed	Husk
P_0	4.6	6.9	4.5	5.2
P_1	6.7	11.6	7.6	8.7
P_2	11.9	17.5	11.6	9.7
P_3	20.6	31.3	21.8	16.1
S. E. of mean	1.9	1.1	0.9	0.7
C. D.	4.7	3.2	2.6	1.9

The inter-relationship between the uptake of nutrients, nitrogen, phosphorus and potassium when computed showed positive relationship of high significance in each case (Table 5).

TABLE 5. Results of analysis of correlation coefficient for uptake of nutrients

Relation between	'r'	Regression equation	No. of pairs 'n'
I. Flowering Stage: Shoot			
Uptake of nitrogen vs phosphorus	0.884**	Y=0.0730× +0.089	24
Uptake of nitrogen vs potassium	0.821**	Y= 0.412× +0.277	24
Uptake of phosphorus vs potassium	0.945**	Y= 5.745× +2.117	24
II. Post-Harvest: Shoot			
Uptake of nitrogen vs phosphorus	0.909**	Y= 0.090× −0.093	48
Uptake of nitrogen vs potassium	0.904**	Y= 0.363× +2.563	48
Uptake of phosphorus vs potassium	0.880**	Y= 3.545× +4.627	48
III. Seed			
Uptake of nitrogen vs phosphorus	0.896**	Y= 0.113× −1.398	48
Uptake of nitrogen vs potassium	0.932**	Y= 0.215× −0.682	48
Uptake of phosphorus vs potassium	0.934**	Y= 1.709× +2.969	48
IV. Husk			
Uptake of nitrogen vs phosphorus	0.904**	Y= 0.095× +0.007	48
Uptake of nitrogen vs potassium	0.945**	Y= 0.583× +1.516	48
Uptake of phosphorus vs potassium	0.907**	Y= 5.276× +2.656	48

K. RAJENDRAN
K. K. KRISHNAMOORTHY

Department of Soil Science
and Agricultural Chemistry,
Tamil Nadu Agricultural
University, Coimbatore - 641003.

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