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STUDIES ON THE ROLE OF APPLIED PHOSPHORUS AND POTASH ON THE UPTAKE OF NUTRIENTS BY A LEGUME CROP (Co. 1. lab-lab) PLANTED AT DIFFERENT SPACINGS

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The results of a good number of experiments indicate the significant role of applied phosphorus and Potash on the uptake of other nutrients in addition to their own absorption (Acharya *et al* (1953), Vyas and Desai (1953), Shende and Sen (1958), and Raheja (1966)). The present work was undertaken with a view to study the effect of applied phosphorus and potash on the uptake of nitrogen and phosphorus by a legume crop (Co. 1. lab-lab) planted at different spacings.

Materials and Methods

The experiment was conducted at the Argicultural College, Vellayani during 1968-1969. The soil is of the red loam type with 0.071 percent total nitrogen, 0.041 percent total P2O5, 0.081 percent total K2O, 48 ppm available phosphorus (P), 42 ppm available potash (K) and with a pH of 5.8. The variety of lab-lab used was Co, *1* (*ottu mochai*). The treatments consisted of four levels of phosphorus (0, 25, 50 and 75 kg. P_2O_5/ha), three levels of potash (0, 15 and 30 kg. K_2O/ha) and three spacings (40 X 15 cm., 40 X 25 cm., and 40 X 35 cm.) . The design was a 4 X 3- partially confounded factorial experiment with two replications. Each plot receive cattle manure at the rate of 5600 kg/ha, nitrogen at the rate of 10 kg. N/ha as ammonium sulphate and lime as calcium hydroxide as per the lime requirement of the soil.

Results were assessed by analysing green pods and haulm for nitrogen and phosphorus contents. Micro-kjeldahl-gunning method was used for the estimation of nitrogen, Phosphorus content was estimated colorimetrically (Jackson, 1958).

Results and Discussion

The results are given in Tables 1 and 2. The data presented in Table 1 show an increase in nitrogen content of pods with increasing levels of phosphorus application. But significant increase being noticed only between O and higher levels. This increase in nitrogen content might have resulted by the increased uptake of nitrogen in the presence of phosphorus. This is

Table 1

Percentage of nitrogen in pods and haulm

P_2O_5 (kg/ha)	0 Pods	0 Haulm	25 Pods	25 Haulm	50 Pods	50 Haulm	75 Pods	75 Haulm	Average Pods	Average Haulm
Spacing										
40 x 15 cm	4.458	2.369	4.497	2.417	4.479	2.473	4.555	2.518	4.407	2.443
40 x 25 cm	4.423	2.363	4.525	2.474	[illegible]	2.497	4.538	2.459	4.508	2.451
40 x 35 cm	4.419	2.393	4.490	2.440	4.582	2.488	4.525	2.520	4.505	2.452
K_2O (kg/ha)										
0	4.423	[illegible]	4.478	2.441	4.542	[illegible]	4.498	2.480	4.487	2.445
15	4.416	2.342	4.520	2.482	4.536	2.48	4.572	2.523	4.527	2.452
30	4.462	2.430	4.446	2.411	4.5 3	2.471	4.572	2.427	4.421	2.452
Average	4.434	2.375	4.505	2.445	4.529	2.48	4.540	2.502		

K_2O (kg/ha)	0 Pods	0 Haulm	15 Pods	15 Haulm	30 Pods	30 Haulm	Average Pods	Average Haulm
Spacing								
40 x 15 cm.	4.410	2.410	4.511	2.438	4.562	2.479	4.497	2.448
40 x 25 cm.	4.490	2.464	4.501	2.424	4.411	2.824	4.503	2.451
40 x 35 cm.	4.550	2.457	4.466	2.444	4.402	2.484	4.505	2.462
Average	4.487	2.445	4.527	2.452	4.491	2.452		

	Pods	Haulm
CD (0.05) for levels of P	0.048	0.0116
CD (0.05) for levels of K or S	0.038	0.0102
CD (0.05) for combinations of P and K or combinations of P and S	0.0623	0.0492
CD (0.05) for combinations of K and S	0.0812	0.0175

Table 2

Percentage of phosphorus in pods and haulm

P_2O_5 (kg/ha)	0		25		50		75		Average	
	Pods	Haulm	Pods	Haulm	Pods	Haulm	Pods	Haulm	Pods	Haulm
Spacing										
40 X 15 cm.	0.537	0.248	0.553	0.272	0.517	0.261	0.583	0.261	0.547	0.260
40 X 25 cm.	0.496	0.274	0.566	0.286	0.590	0.275	0.583	0.284	0.559	0.280
40 x 35 cm.	0.496	0.262	0.556	0.265	0.589	0.303	0.549	0.313	0.547	0.286
K20 (kg/ha)										
0	0.503	0.217	0.540	0.246	0.542	0.260	0.563	0.281	0.537	0.251
15	0.470	0.276	0.606	0.292	0.563	0.268	0.563	0.291	0.550	0.282
30	0.556	0.291	0.529	0.285	0.590	0.311	0.590	0.286	0.566	0.293
Average	0.510	0.261	0.558	0.274	0.565	0.280	0.572	0.286		

K_2O (kg/ha)	0		25		30		Average	
	Pods	Haulm	Pods	Haulm	Pods	Haulm	Pods	Haulm
Spacing								
40 X 15 cm.	0.476	0.239	0.532	0.270	0.633	0.272	0.547	0.260
40 x 25 cm.	0.578	0.257	0.615	0,288	0.483	0.294	0.559	0.280
40 x 35 cm.	0.558	0.256	0.503	0.287	0.583	0.313	0.547	0.286
Average	0.537	0.251	0.550	0.282	0.566	0.293		

	Pods	Haulm
CD (0.05) for levels of P	0.00159	0.00116
CD (0.05) for levels of K or S	0.00139	0.00102
CD (0.05) for combinations of P and K or combinations of P and S	0.00277	0.00204
CD (0.05) for combinations of K and S	0.00241	0.00175

in conformity with the findings of Acharya *et al* (1953) Vyas and Desai (1953) and Shende and Sen (1958). The data in Table 1 also show that potash application at 15 kg K_2O per hectare significantly increases nitrogen content of pod. But the highest level of potash has depressed the nitrogen content of pod significantly. Similar depressing effect of potash at higher levels has been reported by Raheja (1966). The different spacings do not affect nitrogen content of pods. Goldin (1966) and Singh and Singh (1968) also reported that spacing does not influence protein content of grain.

Significant increase in nitrogen content of haulm with increasing levels of phosphorus is also seen. But highest level of potash has slightly reduced the nitrogen content of haulm. Similar depressing effect of potash at higher levels has been reported by Wallace (1957) in berseem. The closest spacing has recorded lowest nitrogen content and the nitrogen content increased as the spacing between plants increased. Donovan *et al* (1963) reported that protein content tended to be lower with closer spacings. The increase in nitrogen content of pods and haulm may be a reflection of increased symbiotic fixation of nitrogen in the soil induced by phosphatic fertilization.

The data in Table 2 show that incremental doses of phosphorus have recorded increased phosphorus content of pods. Significant increase in phosphorus content of pod has been recorded by the highest level of potash also. This is in agreement with the findings of Raheja (1966). Table 2 also indicate that graded doses of phosphorus increase the phosphorus content of haulm. Unnikrishnan (1961) observed that addition of phosphorus has reflected in the phosphorus content of grain and straw. The effect of potash on the phosphorus content of haulm is similar to that of pods, which is in agreement with the observation of Raheja (1966).

Summary

A field experiment to study the role of applied phosphorus and potash on the uptake of nutrients by a legume crop (Co. 1. lab-lab) planted at different spacings was conducted at the Agricultural College, Vellayani. The treatments comprised four levels of phosphorus (0, 2 50 and 75 kg P_2O_5 per hectare), three levels of potassium (0, 15 and 30 kg K20 per hectare) and three spacings (40 X 15 cm., 40 X 25 cm., and 40 X 35 cm).

The graded doses of phosphorus increased the nitrogen content of pods as well as haulm, whereas potash applied beyond 15 kg K_2Oha/ reduced nitrogen content of pods. Graded doses of phosphorus and potash

increased phosphorus content of pods and haulm. 40 X 35 cm. spacing was superior to other two spacings in increasing the nitrogen as well as phosphorus content of haulm.

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