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Effect of Different Leaves of Phosphorus and Zinc on Yield and Nutrient Uptake of Groundnut and Maize (Fodder)

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A field trial was conducted on a cultivator's field in *kharif* 1979 with groundnut GAUG 10 variety and in *rabi* 1978-80 with maize Ganga Safed as fodder to study the effect of phosphorus and zinc on yield and nutrient uptake by these crop grown in rotation on fixed plots. The treatment consisted four levels (0, 25, 50 and 75 kg P_2O_5/ha) of phosphorus and two levels (0 and 20 kg Zn/ha) of zinc which were arranged in a randomised block design with four replications. Besides the required dose of P and Zn as per treatments, a basal dose of 25 kg N/ha as urea was given to groundnut and maize crops, respectively. In case of maize, 50 kg N as urea was topdrsesed at knee high stage. P was applied as single superphosphate and Zn as $ZnSo_4$. The soil was calcareous in nature and clayey in texture with pH (1:2.5) 7.8 and EC (1:2.5) 0.35 mmhos/cm. It contained 0.92% organic carbon, 7.8 kg P_2O_5/ha Olsen's P, 454 kg K_2O/ha NH_4OAc extractable K and 0.68 ppm DTPA extractable Zn. groundnut was harvested at maturity, while maize at milk stage. Pod and haulm yield of groundnut and dry fodder yield of maize were recorded. Plant samples collected at harvest were analysed for N, P and K by standard precedures as described by Jackson (1973).

The data in Table 1 indicate that neither application of P nor of Zn alone was effective in increasing kernal, shell and straw yield except that of P which significantly incressed kernal yield. Application of 75 kg P_2O_5/ha gave the maximum kernal yield of 560 kg/ha which was at par with that produced with 50 kg P_2O_5/ha, but significantly superior to that with 0 and 25 kg P_2O_5/ha levels. However, the effect of the dose of 50 kg P_2O_5/ha was at par with that of 25 kg P_2O_5/ha.

The applied P at all levels significantly increased fodder yield of maize over control. Fertilization with 50 kg P_2O_5 partically did not increase fodder yield over 25 kg P_2O_5/ha but again raising this dose to 75 kg P_2O_5/ha increased fodder yield to the tune of 28 per cent over that of 25 kg P_2O_5/ha.

The application of 50 kg P_2O_5/ha and above significantly improved the uptake of N, P and K by kernal but it failed to produce significant effect on uptake of these nutrients by shell and haulm except P uptake by shell where significantly maximum uptake was recorded with 25 kg P_2O_5. It is interesting to note that fertilization of maize with 25 and 75 kg P_2O_5/ha over control significantly

TABLE 1

Groundnut and maize fodder yield as influenced by different levels of phosphorus and zinc.

P levels kg P_2O_5/ha.	*Groundnut (kg/ha)*			*Maize fodder (q/ha)*
	Kernel	*Straw*	*Shell*	
0	360	5075	304	62
25	446	5250	335	100
50	469	5149	332	101
75	560	5463	363	128
C. D. at 5%	106	N. S.	N. S.	19
Zn levels kg Zn/ha.				
0	456	5204	340	99
20	462	5264	327	96
C. D. at 5%	N. S.	N. S.	N. S.	N. S.

improved N and P uptake and only the latter dose improved K uptake.

The effect of Zn application yield and nutrient uptake of both the crops was non-significant (Table 1 & 2). This non significant effect can be attributed to slightly higher amount of DTPA extratable Zn (0.68 ppm) than suggested critical limit of 0.06 ppm (Dangarwala *et al.*, 1983).

Significant interacting effect of phosphorus X zinc was observed only on halum yield (Table 3). In the absence of Zn, application of 75 kg P_2O_5/ha produced the lowest halum yield (4861 kg/ha). however when this dose of P was incorporated with 20 kg Zn/ha. it gave maximum yield (6064 kg/ha). The results suggest that crop demand for Zn increase at higher dose of P. However, this higher production of dry matter was not reflected in pod yield.

From the above results it can be concluded that groundnut and maize show differential response to P fertilization in P deficient soil but they do not respond to Zn fertilization in the soil supplied with adequate amount of available zinc. However, higher dose of P may demand more Zn for dry matter production

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TABLE 2

Nutrient uptake by groundnut and maize as influenced by different levels of phosphorus and zinc.

P levels kg P_2O_5/ha	Nutrient uptake (kg/ha														
	Kernel			Haulm			Shell			Total			Maize fodder		
	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K
0	9.6	1.3	2.5	117	16.5	73	3.7	0.2	3.9	130	18.0	79.4	53	3.5	122
25	12.2	1.6	3.1	142	15.0	74	4.9	0.5	4.7	159	17.1	81.8	118	9.0	172
50	14.7	1.9	3.3	132	16.4	71	4.9	0.3	4.3	152	18.6	78.6	93	7.5	179
75	15.3	2.0	3.8	141	19.1	76	4.9	0.3	4.6	161	21.4	84.4	126	13.5	209
C. D. at 5%	2.97	0.52	0.79	N.S.	N.S.	N.S.	N.S.	0.12	N.S.	—	—	—	46	4.7	58
Zn levels kg Zn/ha															
0	12.4	1.6	3.2	134	17.2	71.9	5.1	0.7	4.5	152	19.5	79.6	101	7.3	172.6
20	13.5	1.7	3.2	131	16.3	74.6	4.1	0.6	4.3	149	18.6	82.1	94	9.5	168.0
C. D. at 5%	NS	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	NS	—	—	—	N.S.	N.S.	N.S.

TABLE 3

Interaction of phosphorus and zinc on haulm yield (kg/ha) of groundnut.

Phosphorus P_2O_5 kg/ha	*Zinc*	
	0	*20 kg/ha*
0	5151	4998
25	5686	5015
50	5318	4981
75	4861	6064
C. D. at 5%	958	

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