

EFFECT OF GRADED DOSES OF NITROGEN AND PHOSPHORUS ON THE AVAILABLE PHOSPHORUS STATUS OF SOIL DURING VARIOUS GROWTH STAGES OF RICE

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Very little information is available on the effect of graded doses of nitrogen and phosphorus on the available phosphorus status of sandy clay loam soil during the growth period of wet land rice crop. Hence with this object in view a study was conducted at the Agricultural College, Vellayani during the third crop season (Punja) of 1972.

Material and Methods

The experiment was laid out in a sandy clay loam soil analysing 0.153% nitrogen, 0.045% phosphorus and 0.1.71% potash with a pH of 4.9. Triveni, a high yielding, short duration variety of rice was used for the trial. The treatment consisted of four levels of nitrogen (0, 40, 80 and 120 kg N/ha as ammonium sulphate) and four levels of phosphorus (0, 15, 30 and 45 kg P_2O_5 /ha as superphosphate). In addition to this all the plots received a uniform dose of 34 kg K_2O /ha. as muriate of potash. Full dose of P_2O_5 and K_2O and half dose of N were applied as basal dressing and the remaining half dose of N on 40th day after sowing. The experiment was laid out as a 2^4 factorial experiment in randomised block design with three replications.

The treatment effects were studied by analysing soil samples collected prior to sowing, at maximum tillering stage, flowering stage and at harvest for the available phosphorus content by Bray's method. (Jackson, 1962)

Results and Discussion

The data on the available phosphorus status of soil during different stages of growth of rice are presented in Table I.

The data reveal that the available phosphorus in the soil which was 49.7 kg/ha before sowing gradually increased from sowing to maximum tillering stage and then showed a slight decrease at flowering stage and this decreasing trend continued till harvest at which time it was 60.7 kg/ha. The increase in available phosphorus status of soil from sowing to maximum tillering stage can be attributed to the flooded condition of the soil. (Chakravarthi and Kar, 1970 and Jose and Raj, 1971)

It is also evident from the Table that after a steep rise in the available phosphorus content of soil from sowing to tillering time, a reduction was noticed from tillering to flowering, even though the soil was submerged throughout from sowing to flowering stage. This may be due to the greater removal of available phosphorus by the growing crop from tillering to flowering time compared to the period from sowing to tillering. This is substantiated by the fact that even from the control plot the crop removed 4.7 kg phosphorus per hectare during this period, as compared to 0.82 kg per hectare from sowing to tillering time. The steep decrease from flowering to harvest time may also be due to the higher uptake of phosphorus by the plant and due to the oxidised condition provided in the field as the entire field was completely drained two weeks prior to harvest. Patrick and Mahapatra (1968) reported that the drying of soil decreases the available phosphorus content of soil.

Application of nitrogen had significant effect in reducing the available phosphorus status of soil during all the three growth stages. Similar effect of nitrogen has been reported by Trogdon and Volk (1950), Ensminger and Pearson (1957) and Sekhon and Joshi (1966).

Table 1
Available phosphorus status of soil (in kg/ha) during
different stages of growth of rice

<i>Treatments</i>	Before sowing	Maximum tillering 50 days after sowing)	Flowering (70 days after sowing)	Harvest (99 days after sowing)
1. Levels of nitrogen				
0 kg/ha	49.8	85.7	80.1	63.8
40 „	49.2	84.7	78.9	62.0
80 „	50.5	82.0	78.3	53.8
120 „	49.4	81.5	77.6	58.3
F test		Sig.	Sig.	Sig.
C. D. (0.05)		1.204	1.491	0.89
2. Levels of P ₂ O ₅				
0 kg/ha	49.7	82.4	77.8	59.1
15 „	48.8	83.4	78.3	59.8
30 „	49.9	83.6	79.3	60.8
45 „	50.5	84.5	79.3	63.1
F test		Sig.	Sig.	Sig.
C. D. (0.05)		1.204	1.491	0.89

Summary

An investigation was carried out at the Agricultural College and Research Institute, Vellayani, during the third crop season of 1972 to study the effect of graded doses of nitrogen and phosphorus on the available phosphorus status of soil during the different stages of growth of wet land rice. It was found that submergence of field significantly increased phosphorus availability in the soil. While incremental doses of nitrogen had decreased the available phosphorus status of the soil, addition of phosphorus was found to increase the available phosphorus status of the soil.

സംഗ്രഹം

വിവിധ അളവിൽ നൈട്രജനും, ഫോസ്ഫറസും നൽകുന്നതു നെല്ലിന്റെ വിവിധ വളർച്ചാഘട്ടങ്ങളിൽ മണ്ണിലെ ലഭ്യമായ ഫോസ്ഫറസിന്റെ അളവിലുണ്ടാകുന്ന മാറ്റങ്ങളെക്കുറിച്ച് പഠിക്കുന്നതിനായി ഒരു പരീക്ഷണം വെള്ളായണി കാർഷികകോളേജിൽ 1972 ലെ മൂന്നാം വിളയിൽ നടത്തുകയുണ്ടായി.

“ത്രിവേണി”—നെൽവിത്തുപയോഗിച്ച് നടത്തിയ പരീക്ഷണത്തിൽ നിന്നും മനസ്സിലായതു വയലിൽ വെള്ളം കെട്ടിനിറുത്തുന്നതുകൊണ്ട് മണ്ണിലെ ഫോസ്ഫറസിന്റെ ലഭ്യത കൂട്ടാൻ കഴിയുമെന്നാണ്. നൈട്രജൻ കൂടുതൽ നൽകുന്നതനുസരിച്ച് മണ്ണിലെ ലഭ്യമായ ഫോസ്ഫറസിന്റെ അളവ് കുറഞ്ഞു കുറഞ്ഞു വരമെന്നും, അതേസമയം ഫോസ്ഫറസ് കൂടുതൽ നൽകുന്നതനുസരിച്ച് മണ്ണിലെ ലഭ്യമായ ഫോസ്ഫറസിന്റെ അളവ് കൂടിക്കൂടി വരമെന്നും മനസ്സിലാക്കുകയുണ്ടായി.

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