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PHOSPHORUS FIXING CAPACITY OF MAJOR RICE SOILS OF KERALA*

Fixation of applied phosphorus is one of the greatest problems facing the supply of this essential nutrient to plants. Information on the quantity of applied phosphorus which is fixed in the soil and the soil factors affecting this process will be useful to take steps to counteract this problem The present study was carried out to assess the extent to which applied phosphates are fixed by the major rice growing soils of Kerala and to relate them to the various factors inffuencing this process.

Five soils representing the major rice growing tracts of Kerala namely karappadom, laterite, kayal, coastal sandy and kole soils were used for the study. The soils were analysed for their physical and chemical characteristics. The procedure of Waugh and Fitts (1966) was adopted for the estimation of P fixing capacity. Duplicate ten gram samples of different soils were incubated with 5 ml of water–soluble phosphate solution to get graded concentration of P ranging from 0 to 1.2 mg per gram of soil. The solutions were added carefully so as to moisten the soil completely and were then incubated for four days at room temperature. After incubation the samples were extracted using Bray No. 1 extractant. The extracted P was estimated colorimetrically by chlorostannous reduced molybdophosphoric blue colour using Spectronic-20.

The relationship between available (extracted) P and added P was found to be virtually linear in the concentration range used and therefore, the slope (b) of the curve relating extracted P (y) and added P (x) was calculated using the formula

$b = \frac{xy - N\bar{x}\bar{y}}{x^2 - N\bar{x}^2}$ and percentage fixation of added P as $100 - bx100$ where b is the fraction of added P remaining available under the condition of the experiment and N is the number af observations ie., different concentrations of P added (Nad *et al.*, 1965).

The soils were all acidic with low cation exchange capacity, high sesquioxide content and low in available as well as total phosphorus.

The phosphorus fixation capacity of kole, kayal, laterite, karappadom and coastal sandy soils were 84.4, 72.3, 80.6, 77.8, and 36.8 per cent respectively (Fig.1). The studies revealed that the applied water soluble phosphates were rapidly converted to unavailable forms in all the soils except in coastal sandy soil. P fixing capacities were related with different soil properties and presented in Table 1.

Significant positive correlations were obtained between P fixation and silt, clay, total calcium, total iron and sesquioxides. Similar observations were reported by Datta and Srivastava (1963), Oke (1970) and Nad *et al.* (1975). pH of soils did

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Table 1

Phosphorus fixing capacity of soils and its relation to soil characteristics

Soils	Per cent fixation of added P	pH of soil %	Organic carbon %	Coarse sand %	Fine sand %	Silt %	Clay %	Availa-ble P %	Free oxides of Fe %	Total Ca %	Total R_2O_3 %	Total Fe %
Karappadom	77.80	5.70	1.01	10.38	20.98	15.80	47.80	2.90	0.04	0.44	29.22	11.58
Laterite	80.60	5.40	2.62	27.10	11.60	12,80	34.30	4.18	0.10	0.55	19 98	9.03
KayaS	82.20	5.50	3.03	22.80	21.30	13.30	34.00	3.22	0.06	0.66	18.94	9.94
Coastal sandy	36.80	5.50	0.48	72.40	15.10	2.80	6.80	13.20	0.06	0.14	0.03	1.21
Kole	84.40	5.50	2.43	8.28	15.35	20.42	51.20	1.81	0.13	0.55	30.02	15.20
Correlation coefficient		0.18	0.78	0.95	0.23	091	0.92*	0.99*	0.19	0.95*	0.88*	0.91*

* Significant at 0,01 level

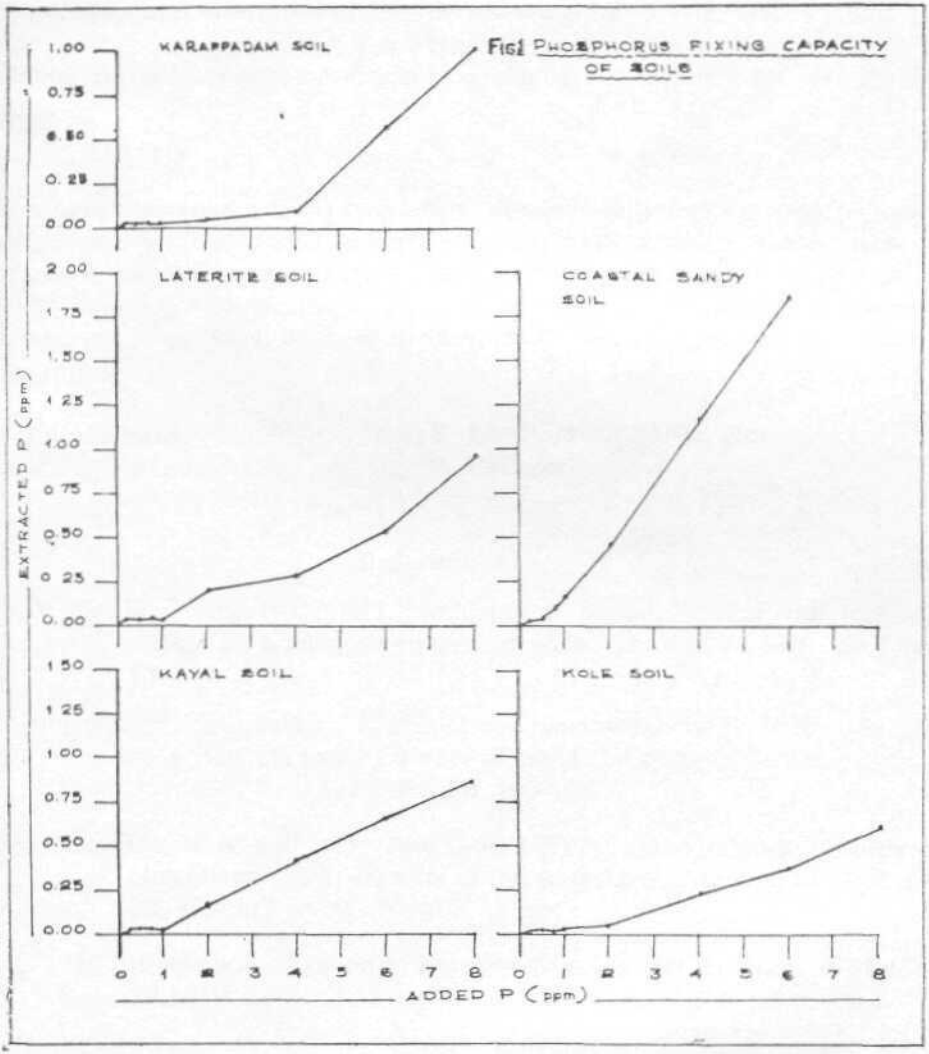

Fig. PHOSPHORUS FIXING CAPACITY OF SOILS

not show any relationship to their P fixing capacity. Mosi *et al.* (1975) made **an** observation of this kind. It is interesting to note the high negative correlation of P fixation with available phosphorus of soils as estimated by Bray's reagent and the silica content of soils. Irrespective of soil type, clay and sesquioxides appeared to be the dominant soil characteristics influencing the extent of fixation of applied phosphorus.

സംഗ്രഹം

വെള്ളത്തിൽ ലയിക്കുന്ന രൂപത്തിലുള്ള ഭാവഹസംയുക്തങ്ങളെ അലേയമാക്കുന്നതിന് കേരളത്തിലെ വിവിധ മണ്ണുകൾക്കുള്ള കഴിവിനെ സംബന്ധിച്ച് പരീക്ഷണങ്ങൾ നടത്തിനോക്കി. കോൾ, കായൽ, വെട്ടുകൽ, കരപ്പാടം, തീരപ്രദേശത്തെ ചൊരിമണൽ എന്നീ fflfji^tOigTrsi വെള്ളത്തിൽ raroejlaD^rm രൂപത്തിലുള്ള ഭാവഹ രാസവളങ്ങൾ നൽകുന്നതായാൽ അതിലെ യഥാക്രമം 84.4, 82.3, 80,6, 77.8, 36.8 ശതമാനം വരെ ഭാവഹം അലേയമാകാൻ സാദ്ധ്യതയുണ്ട്.

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