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POTASSIUM STATUS OF THE MAJOR RICE SOILS OF KERALA STATE IN RELATION TO THEIR GRANULOMETRIC COMPOSITION

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The important potassium bearing parent materials of soils are known to be various types of feldspars and micas, which are found in the coarse fractions of the soil while in the fine fractions like silt and clay potassium is predominantly present as interlayer K in illitic minerals (Jackson, 1964). Lodha and Seth (1970) found that the K contents decreased with increase in particle size in Rajasthan soils. Scheffer *et al* (1960) studying the mineral status of the Gottingen E plot found that 41.8 per cent of the total K was contained in the fine sand fraction as a component of micas and 28.2 per cent in the clay fraction as interlayer K in illitic clays. Sreedevi & Aiyer (1974) have studied the different forms of K, viz. exchangeable K, difficulty exchangeable K, HC1 soluble K and total K in five major rice soil groups of Kerala comprising *Kari, Karapadom* and *Kayal* soils of *Kuttanad* region and *Kole* soils of Trichur district and low level laterites of the ribbon valleys of the midland regions of the State. In the present communication the contribution of the various size fractions towards total K in these soil groups is discussed.

Materials and Methods

Fifty samples of surface soils, ten samples under each of the five acid rice soil groups, were collected from representative locations. The various size fractions were separated using International Pipette Method (Piper, 1950) and the total K in each size fraction determined by the hydroflouric acid method of Jackson (1962) using a E E L Flame Photometer, by direct intensity method.

Results and Discussion

Table 1 presents the mean values of mechanical composition, organic matter percentage and cation exchange capacity of the five rice groups under investigation. From the mean data it may be seen that there is wide variation in the mechanical composition of the major rice soil groups of the State. While clay is the dominating size fraction in *Kari, Kole* and Kayal soils, silt and clay are the dominating fractions in *Karapadom* soils. In the low level laterites of the ribbon valleys in the midland regions of the State, however coarse and fine sand fraction together form the major soil separate. In general, *Kole* soils had the highest percentage of clay while low level laterites had the highest percentage of coarse sand.

Table 1

Mechanical Composition, Organic matter and Cation Exchange capacity of five rice soil groups of Kerala

Soil Type	Coarse sand %	Fine sand %	Silt %	Clay %	O. C %	C. E. C. me/100g
1. Kole	5.4	6.4	19.1	66.3	2.8	18 7
2. Kan	4.6	6.0	25.7	54.7	10.5	42.1
3. Kayat	2.6	24.2	25.0	44.3	2.9	25.3
4. Karapadom	10.2	26.2	28.8	32.8	3.2	24.4
5. Low level laterite	44 3	13.4	10.1	283	20	7.3

* Mean values

Table 2

Total Potassium status of the different size fractions of the fire major rice soil groups

Soil Type	Total K in me/100g				
	Coarse sand	Fine sand	Silt	Clay	Soil
1. Kole	f.8.4	34.8	9.7	13.3	14.9
2. Kari	13.2	29.3	1.7	18.8	18.5
3. Kayal	22.5	49.1	6.1	20.5	34 5
4. Karapadom	19.5	51.3	4.5	14.5	34.2
5. Low level laterite	19.4	28.0	9.2	8.2	18.7

* Mean values

Table 2 presents data on the total K status of the different size fractions of the five major rice soil groups. From the results it can be seen that the coarse sand fractions of all the soil types except *Kari* soils have a total K contents in the range 19.4 to 22.5me/100g. While the fine sand fraction of *Kayal* soils and *Karapadom* soils have a total K content in the range of 49.1 to 51.3 me/100g the *Kole, Kari* and low level laterites the fine sand fraction has a total K content in the range of 28.0 to 34.8me/100g. The silt fraction from *Kole* soils and low level laterites have the highest values of total K of 9.7 and 9.2me/100/g while the silt from *Kari* soils have a K status of only 1.7me/100g. The K content in the silt of *Kayal* and *Karapadom* soils are 1.7 and 4.5m.e/100g. respectively. The clay fraction of *Kayal* and Kari soils have higher values of total K and the low laterites have the lowest values with *Kole* and *Karapadom* soils having intermediate values.

The low level laterile and *Karapadom* soils have a higher percentage of coarser particles (coarse and fine sand). It is significant to note that Sreedevi and Aiyer (1974) noticed highest amounts of HCl soluble K in *Karapadom* soils and ranked low level laterites second with respect to difficultly exchangeable K. The greater contribution of these forms of K by the coarser fractions in these soils is widest. In *Kole, Karapadom, Kari* and *Kayal* soils, there is considerable amounts of alluvial deposition by flood waters. The greater percentage of clay as well as the higher content of K in the clay fraction observed probably explain the lack of response to K fertilisers for rice in such soils. The high amounts of K in the coarse fractions in low level laterites of ribbon valleys in the midland regions of the State, suggest greater amounts of reserve K in these soils which could suitably be released by management practices. It is significant to note that these soils are comparatively deficient in their organic matter status and have a low C. E. C. Application of organic matter in these soils are likely to release the K from the coarser fractions for better rice production.

Summary

A study on the contribution of various size fractions towards !he total K content of the five major acid rice soil groups viz., Kari, *Karapadom, Kayal, Kole* and low level laterites of Kerala State was conducted. The possible reason for the lack of response of potassic fertilisers in the heavy clay soils like Kari, *Kole* and Kayal soils is discussed. Higher incidence of coarse fractions and high content of K in such fractions from the laterites suggest the possibility of increased release of reserve K by better soil management practices like application of organic matter.

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സംഗ്രഹം

കേരളത്തിലെ നെൽക്കൃഷിനടത്തുന്ന അമ്പു പ്രധാന മണ്ണിനങ്ങളിലടങ്ങിയിട്ടുള്ള ഒരു മുഖ്യ സസ്യാഹാര മൂലകമായ പൊട്ടാഷ്യത്തിന്റെ ഏറക്കുറച്ചിലുകളെപ്പറ്റി ഒരു വിശദ പഠനം നടത്തുകയുണ്ടായി. ഈ പഠനത്തിൽ നിന്നും കരി, കായൽ, കോൾ എന്നീ നിലങ്ങളിൽ ffl6ml6>9J പൊട്ടാഷ്യത്തിന്റെ അംശം ഏറിയിരിക്കുന്നത് അവയിലെ പെളി ഘടകത്തിലാണെന്നും, എന്നാൽ ഇടനാടുകളിലെ താഴ്വരപ്രദേശങ്ങളിൽ കാണപ്പെടുന്ന വെട്ടുകൽ മണ്ണുകളിൽ പൊട്ടാഷ്യാംശം ഏറിയ പങ്കും അതിലെ പരുക്കൻ ഘടകങ്ങളിലാണെന്നും കാണുകയുണ്ടായി. ഈ മണ്ണുകളിൽ ജൈവ വളങ്ങളം ചേർക്കുന്നതുകൊണ്ട് അതിലടങ്ങിയിരിക്കുന്ന റിസർവ് പൊട്ടാഷ്യം കൂടുതലായി സസ്യങ്ങൾക്ക് കിട്ടുന്നതിനുപകരിക്കുമെന്നു അനുമാനിക്കാം.

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