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A NOTE ON THE EFFECT OF MULTIPLE CROPPING ON THE EXCHANGEABLE CALCIUM STATUS OF UPLAND ALLUVIAL SOILS

The exchangeable calcium in the soil not only controls the pH of the soil solution, but also determines the quantity of lime or acidic constituents necessary to bring about a given change in soil pH. In multiple cropping where a very high intensity of cropping with heavy fertilization is adopted, it is likely that the exchangeable calcium status of the soil is severely affected. Hence the present investigation was undertaken with the object of finding out the exchangeable calcium status of the soil after various crops and crop cycles.

The soil samples for this study were collected from the multiple cropping experiment in progress at the Central Rice Research Institute, Guttack, since 1967. The soil of the experimental area was sandy loam of medium fertility. The cropping patterns tried were potato-rice-rice, maize-rice-rice, groundnut-jute-rice, rice-jute-rice and rice-rice. Soil samples were collected before starting of the experiment, as well as after every crop. The exchangeable calcium in the soil was determined by method of Chang and Bray (1951).

The data showing the exchangeable calcium status of the soil before starting of the experiment and after each crop and crop cycle during the years 1967-68 and 1968-69 are presented in Table 1. The data reveal that there was variation in exchangeable calcium status of soil after each crop and crop cycle. In cropping pattern potato-rice-rice there was an increase in exchangeable calcium by 0.29 m. e. / 100 gm of the soil after potato, a slight decrease after *dalua* rice and a further decrease (0.45 m. e. / 100 gm) after *kharif* rice. The same pattern of change was also noticed during the second year. In treatment maize-rice-rice, there was slight increase in exchangeable calcium after maize and a slight decrease after *kharif* rice during both the years. In treatment groundnut-jute-rice there was decrease in exchangeable calcium of the soil after every crop during both the years. Similarly in treatment rice-jute-rice, there was a decrease after every crop, except after *dalua* rice during the first year where there was a slight increase by 0.04 m. e. / 100 gm of soil. In continuous cultivation of rice, i.e. rice-rice treatment there was decrease after every crop during both the years.

From the data it is evident that there was an increase in exchangeable calcium both after potato and maize. This was due to the addition of

crop residues by potato and maize crop as well as due to the large quantity of farm yard manure applied to these crops. Dhar and Nagpal (1955) reported an increase in exchangeable calcium by the addition of organic manures.

Table 1

Exchangeable calcium status of the soil (in m. e. / SCO gm) after each crop

Treatment	Initial status	1967-68			1968-69		
		after potato	after *dalua* rice	after *kharif* rice	after potato	after *dalua* rice	after *kharif* rice
I. Potato-rice-rice	5.73	6.02	5.74	5.28	5.52	5.12	4.70
		after maize			after maize		
2. Maize-rice-rice	5.69	5.72	5.52	5.13	5.23	5.16	4.85
		after ground-nut	after jute		after ground-nut	after jute	
3. Groundnut-jute-rice	5.44	5.30	5.26	5.08	4.75	4.56	4.54
		after *dalua* rice			after *dalua* rice		
4. Rice-jute-rice	5.88	5.91	5:55	5.44	5.07	4.84	4.72
			after *dalua* rice			after *dalua* rice	
5. Rice-rice	5.29		5.14	5.04		4.72	4.75

The decrease in exchangeable calcium noticed after *kharif* rice in all cropping patterns was due to the leaching during the heavy rains of July and August months.

On the whole it is seen that after the completion of two cycles the exchangeable calcium in the soil has decreased to a very low level in all the treatments.

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