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Effect of varying parent materials and altitude on phosphorous fractions of deep subtropical soils

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Biological cycle is more dynamic than the sluggish pedogenic path way. Long-term evaluation of P- forms in soil ecosystems is controlled by pedogenic path which continually moves P into a sink consisting primarily of occluded -P. Variation in fractions of phosphorus, such as Ca-P, Al-P, Fe-P, occluded and organic P governs the available p status (Udo and ogunwale,1977) and response to applied P. The Ca-P gets transformed into Al-P (Fenton, 1983) with maturity of soils. Loss and transformation of phosphorus from one form to other occurred as the weathering proceeded from younger to the older stage (Harrison *et al.* 1994). In strongly weathered soils the reduced availability of inorganic phosphorus may limit its accumulation in soil organic matter. Variation in phosphorus fractions is the function of pedogenic manifestation (Walker and Syers 1976), stage of soil development (Smeck, 1976) and age of soils . The present paper deals with an objective to examine the effect of parent materials and altitude on the distribution pattern of phosphorous fractions and to discuss the degree of weathering of different soils on the basis of p fractions.

The area under study falls under humid tropical to subtropical climate lying between north latitude of $22^{0}15'$ and $23^{0}45'$ and east longitude of $84^{0}0'$ and $87^{o}30'$ forming parts of Ranchi and Palamau districts of Bihar comprises of high level aluminous laterites, and extends through Purulia and farther to the western fringe of West Bengal in Medinipur district as low level lateritic soils. The soils over the area according to Niyogi (1987) have developed on three stepped erosional geomorphic surfaces namely, Netarhat – Bagru surface (oldest and highest surface at approximately 1050 m, msl), Ranchi surface (intermediate, 700 m, msl) and Purulia – Kharagpur surface (the youngest and the lowermost, 265-50 m, msl). The parent materials of the area are chiefly of Archaean era containing granite, granitic gneiss, phyllite and phyllitic-schist, calc-

Schist/mica-schist, Meta amphibolites (gabbro), basic parent material (a patch of Deccan trap) and tertiary sediments of alternating sandstone and shale, and alluvium. Depending upon the type of parent material, landscape and vegetation coupled with climate change from higher to lower elevation, soils of varying taxonomic order have developed which differ in physical, physico-chemical and chemical components of fertility and managements requirements. The old gentle landform at higher elevation gave rise to moderately deep to very deep strongly weathered soil material, while the youthful landform areas or more recent erosion surfaces, where landscape dissection has been more active, generated a less weathered soil. In many places at lower elevation the soils are of detrital in origin.

Excepting those which are very deep and whose horizonization is not distinct, all the other sola were sampled according to pedogenic horizon employing standard techniques as in the handbook of Soil Survey Investigations field procedures (Soil Survey Staff, 1971). Altogether nine pedons were studied, of which two very deep pedons at Garbeta (150 m above msl) and Bagru (1050 m above msl), respectively from a *Nalla c*utting and from a quarry where Indian Aluminium Company has mined for bauxite ore, were studied and sampled and the rest seven pedons were dug at Kharagpur, Kurchiboni, Silda, Labani, Bara Ara, Lalgutuwa and Netarhat,

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