OXISOLS

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Oxisols are red, yellow and occasionally grey soils of tropical

- the cations: sodium, potassium, magnesium and calcium as well as the more soluble elements of the rock are removed in solution simultaneously contemporaneously, silica from silicate minerals starts to be leached from the system; the silica, iron and aluminium which are liberated after the destruction of the primary minerals tend to reorganize in a more stable form - kaolinite, an aluminosilicate, with some iron substitution; as the silica continues to be progressively leached, some iron and eventually some aluminium (due to under-saturation in respect to silica) precipitate as oxides or hydroxides; and, the leaching of silica may progress, such that all silica is lost from the soil; at this stage only oxides and hydro-oxides of iron and aluminium remain in the soil.

This sequence of chemical change is very simplistic and in nature the processes operating are far more complicated. Some stages may be bypassed, for example, the formation of kaolinite or the sequence may never develop to the ultimate stage. Also, the paleo-climatic factors must be taken into account for the formation of an

- a CEC in the fine earth fraction of 16 meq or less per 100g of clay (by NH_4OAc at pH 7) unless there is an appreciable amount of aluminium interlayered chlorite;
- only traces of primary aluminosilicates such as feldspars, micas and ferromangnesium minerals;
- a texture finer than sandy loam and having more than 15% clay;
- less than 5% by volume that shows rock structure.

Classification of Oxisols:

Definition of the Order

Oxisols are mineral soils that meet one of these two requirements:

1. Have an aquic moisture regime and have plinthite that forms a continuous phase within 30 cm of the soil surface; or

2. Have an oxic horizon at some depth within 2 m of the soil

a. A histic epipedon; or

b. If free of mottles, immediately below any epipedon that has moist colour value of less than 3.5 there is dominant chroma of 2 or less; or if there are distinct or prominent mottles within 50 cm of the soil surface, the dominant chroma is 3 or less.

Torrox

Other Oxisols that have a torric moisture regime.

Humox

Other Oxisols that:

1. Have 16 kg or more organic carbon per square metre to a depth of 1 m, exclusive or organic surface litter;

2. Have a weighted average base saturation in the oxic

soil surface.

- Plinth is the great group which relates to soils which have plinthite that forms a continuous phase within 1.25 cm of the soil surface.

- Ochr are soils with an ochric epipedon.

- Umbr are soils that have either an umbric epipedon or ochric epipedon that has more than 1% of carbon in all subhorizons to a depth of 75 cm or more below the mineral surface.

- Sombri are Oxisols with a sombric horizon.

- Acr are Oxisols that have in some subhorizon of the oxic horizon a cation retention capacity of 1.5 meq or less per 100g of clay (from NH_4Cl), but do not have discernable structure in the oxic horizon or have only weak blocky or prismatic peds.

- Eutr are Oxisols that do not have an anthropic epipedon and have a base saturation of 35% or more in the epipedon and in all the subhorizons of the oxic horizon to a depth of at least 1.25 m.

- Hapl which is the central concept of the suborder, and applied

Table 1. List of suborder and great groups of the Oxisol in the

- Haplo-humic subgroups with more than 16 kg of organic carbon per m^2 to a depth of 1 m and do not fulfil the other requirements for a Humox.

- Plinthic subgroups have more than 5% or more by volume of plinthite or gravel-size aggregates that are cemented by gibbsite in all subhorizons within a depth of 1 m from the soil surface and a net positive charge in some subhorizon within 1.5 m of the soil surface.

- Sombric subgroups are those with a sombric horizon which meet all the requirements of the sombric except the base saturation and 16 kg of organic carbon/m^2 to a depth of 1 m.

- Aquic subgroups are those which do not meet the criteria for an Aquox but have mottles that have chroma of 2 or less accompanied by red or dark red mottles within 1.25 m of the soil surface.

- Epiaquic subgroups are those which have hues less red than 10 YR in all parts of the upper 75 cm and that have a colour value, moist, of less than 4.

- Quartzipsammentic subgroups have a texture that is coarser than sandy clay loam in all parts of the oxic horizon within 1.25 m of the mineral soil surface.

- Ultic subgroups are Oxisols with a regular clay distribution in the oxic horizons and discernable structure in the major part of the oxic horizon.

The subgroups are not listed according to the key for Oxisols.

4. Oxisols in the South West Pacific and Problems of Classification

In the islands of the South West Pacific the oxisol order is widely represented. They are found mostly on volcanic material undersaturated in quartz, in areas which are somewhat geomorphologically

unstable. In this they differ from the majority of the Oxisols in Africa or in Latin America which develop in areas of 'old' stable

[redacted]

classification remain.

structure and base saturation related closely to the criteria defined for a mollic epipedon. However, they cannot be classified as a Humox because of their base saturation and their temperature regime. Similar soils have been observed by P. Quantin (1972-1978) in Vanuatu.

(c) The presence of halloysite and meta-halloysite in many of the oxisols with lattice clays in the South Pacific. These clays are of the same family as those with a kaolinitic mineralogy class but have a slightly higher CEC. The CEC's of these soils are greater than the 16 meq/100g clay limit. They are very widespread in Vanuatu (Quantin 1972-1978).

(d) The presence of oxidic soil material over the oxic horizon is a problem in classifying some of the Oxisols in Vanuatu.

(e) The lack of any provision for soils with iron gravels or pisolithes. This characteristic is very important for the soils formed on ultra-basic rocks in the Region, in particular, New Caledonia (Latham, 1975). A pisolithic horizon of thicknesses greater than 50 cm can be formed, which overlies fine soil material. At present this feature classifies the family level as a fragmental to skeletal particle size class. It cannot be

Conclusion

The classification of the Oxisols presented in Soil Taxonomy (Soil Survey Staff, 1975) represents an important step toward the differentiation and the ordering of a pedological group of soils as yet little understood. In the South Pacific Region the classification shows some deficiencies and difficulties in its application. Many completely different soils will, by definitions prescribed, fall into the same not very distinctive classes of Typic- Acr- or Hapl- great groups of Orthox or Ustox and will have to be differentiated at the family level. Since the publication of the Soil Taxonomy in 1975, ICOMOX (International Committee for Oxisols) has been established to test, evaluate and prepare proposals for revision of the Oxisols

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