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Root System Distribution and Soil Sampling in Restinga Forest Ecosystem

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The Restinga forest vegetation, that occurs in the coastal plain sandy soil, of all ecosystems associated with Atlantic forest is the most fragile and susceptible to disturbance. The most impactful actions are arising from construction activities that promote the removal of the surface layer, changing completely the soil water regime. The root system is exposed to spatial and temporal changes regarding concentration of nutrients from the soil. Plants respond to this heterogeneity through physiological and morphological changes in order to change the architecture (spatial configuration) of their root systems. Typically, the roots grow profusely toward regions of greatest concentration of nutrients, probably a compensatory adaptive response to soil variability. Among the constraints of chemical factors of acid soil that more limited root development are toxic elements, especially aluminum and nutrient deficiency, especially phosphorus and calcium.This work aims to determine the depth of soil sampling in restinga forest on the basis of the data of soil fertility and root system distribution. Studies on soil fertility were made in depths from 0 to 5, 0 to 10, 0 to 20 and 20 to 40 cm for high, low, degraded soil and without restinfa forest vegetation in the Cardoso Island, Cananéia-SP, with five repetitions. For each layer were analyzed: pH, organic matter (MO), P, K, Ca, Mg, Al, S, H + B, Al, Cu, Fe, Mn, Zn, saturation by aluminum (m), sum of bases (SB), exchange capacity of cations (CTC), saturation of bases (V%), clay and root system distribution. The proportion of clay fraction was $\leq$ 20 g kg -1, with the sand fraction > 900 g kg -1.Vegetation of restinga is a typical formation that occurs in the sandy coastal plains soils in the Brazilian coast with high nutrient deficiencies, belonging to the orders of SPODOSOLS and QUARTZIPSAMMENT. Extremely sandy texture reflects on low capacity of water retention and unstable simple grain structure, very susceptible to degradation. However, there is no water deficit during the year because in the coast precipitation is significantly superior to other regions of the State of São Paulo, reaching annual averages of 2,200 mm. The combination between sandy texture and high precipitation that is submitted, leads to intense leaching of nutrients essential to plant development. These requirements characterize soils with low potential support for biomass production, where the forest regeneration process becomes very slow, especially when the deforestation is followed by long period of losses that exceed the additions. Under these conditions, taking into account the depths studied, the values obtained for phosphorus, organic matter, potential acidity, sum of bases and ionic exchange capacity were significantly higher in layers of soil from 0 to 5 and 0 to 10 cm for the three vegetation type studied. I.e. these values differ from those of the depth of 0 – 20 cm, which is the standard employed for depth of soil fertility evaluation. Considering that approximately 70% of the root system of restinga forest focuses on layer 0 – 10 cm deep, sampling of soil fertility evaluation is best represented by this layer.