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INFLUENCE OF SOME SOIL CHEMICAL PROPERTIES ON VAM SPORE DENSITY IN MATURE RUBBER PLANTATIONS

Spores are survival structures of vesicular-arbuscular mycorrhizal (VAM) fungi. In certain circumstances, VAM spores may represent the only infective propagules in the field, for instance after long fallow periods (Sieverding, 1991). Composition of VA mycorrhizal populations and relative abundance of different spore types in any site may depend on a number of factors like soil type, texture (Land and Schonbeck, 1991), nutrient status of the soil (Harinikumar and Bagyaraj, 1989), type of crop, fertilizer and herbicide application and other environmental factors (Sieverding, 1991). Very little information exists on the range of specific soil variables influencing production of VAM propagules, especially spores, in rubber plantations. Such information is vital for the successful management of VAM fungi in tropical agrosystems. This information is also necessary if soil-based VAM inoculum is to be a realistic option for resource-poor farmers. The study reported here was carried out to determine VAM spore load in soils from fields with mature rubber in relation to some of the chemical properties of the soils.

Approximately 1 kg of top (0-15 cm depth) soil was collected randomly (five sites in each) from five fields of mature monoclonal rubber in the Rubber Research Institute of Nigeria (RRIN) main station at Lyanomo. The clones were GT 1, RRIM 623, RRIM 600, Tjir 1 and PR 107. All soil samples from the same field were bulked, air-dried and divided into two sets. One set was used for mycorrhizal spore counts, under a stereomicroscope (at 50x), after VAM spore extraction by wet-sieving and decantation method (Gerdemann and Nicolson, 1963). The second set of soil samples was crushed to pass through a 2 mm sieve and subjected to analysis as described by Udo and Ogunwale (1986). Soil pH was determined in a 1:2.5 soil/water ratio using a single electrode pH meter. Organic carbon was determined by the Walkley-Black wet oxidation method. Phosphorus determination was done by Bray I method (Bray and Kurtz, 1945). Exchangeable basic cations were extracted with neutral ammonium acetate. K^+ and Na^+ were then read on a Corning flame photometer, while Ca^{2+} and Mg^{2+} were determined by EDTA titration. Total nitrogen was determined using a Technicon autoanalyser TM II, after digestion by the micro-Kjeldahl method (Udo and Ogunwale, 1986). The relationship between spore counts and soil properties was evaluated using correlation analysis.

The soil chemical properties and the corresponding mycorrhizal spore numbers are shown in Table 1. Significantly high spore numbers were obtained in location N4 (86.9/g soil) and OP 9 (78.0/g soil). Spore densities obtained in all other plots were not significantly different from each