Soil Sampling for Microbiological Analysis

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Soil is a unique medium containing a diverse community of organisms, representing many morphological and physiological types. Attempting to numerically characterize these organisms or their activities requires an understanding of both the spatial and temporal distribution of organisms within the soil environment. The fact that organisms in soils are rarely static in numbers or activity, compounds the problem of characterizing populations or their activities. Many organisms exist at relatively low levels numerically but can have a profound affect on nutrient availability, plant development, or environmental quality. In most cases, it is impossible to equate the numbers of a particular organism with its importance in the soil ecosystem. Further, the enumeration of any population or magnitude of activity represents a point-in-time measurement that is at some dynamic equilibrium governed by the physical, chemical, and biological environment.

Variability is a familiar problem to most scientists, especially those dealing with environmental issues or habitats. Even the novice soil scientist recognizes that soils differ from site to site, based on observable differences such as color, depth, or arrangement of soil horizons. Less obvious is the fact that not only do the gross soil properties vary from site to site, but within a site, significant variation may occur. Intuitively, one might suspect that microbial populations vary by depth, with the surface horizons generally having more organisms and a greater abundance of types than the subsurface horizons. Information provided by Waksman and Starkey (1931) support this contention. For different soils, organisms were always more numerous in the surface horizons as compared to the subsurface horizons. These differences were attributed to the fact that the physical and chemical properties were different for different layers of soil, thus giving rise to heterogeneous distributions of microorganisms.

Besides variation within the profile, it is reasonable to expect spatial variation in soil microbiological properties within sampling area smaller...