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Relationships between the litter colonization by saprotrophic and arbuscularmycorrhizal fungi in a tropical forest and in a nearby pasture

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Fungal colonization of litter has been described mostly in terms of fructification succession in the decomposition process or the process of fungal ligninolysis. No studies have been conducted on litter colonization by *arbuscular mycorrhizal* fungi (AMF) and their relationship with the presence of saprotrophic fungi. In the forest, litter colonization by saprotrophic fungi and AMF increased with depth but the saprotrophic fungal colonization of some litter fragments decreased in the lowermost level of the litter while AMF litter colonization continued to increase. Plant roots mycorrhizal colonization did not correlate with litter colonization. The external hyphae length of AMF is abundant and in common with sample humidity remained constant with increasing depth. In the pasture, litter and root colonization by saprotrophic fungi was higher than the colonization by AMF and both correlated. The external hyphae length of AMF was similar to the forest system but the sample humidity was less than a half. We conclude that in zones of riparian tropical forest with sufficient litter accumulation and abundant AMF external hyphae, the increase in litter colonization by AMF with depth correlates to the colonization by saprotrophic fungi but their presence in the deepest layers is independent of both litter colonization by saprotrophic fungi and root colonization by AMF. While in pastures of *Arachispintoi* both litter and root colonization by saprotrophic fungi is higher and perhaps faster than in forest due to the changing environmental conditions.

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Short-term effects of integrated nutrient management options on soil nutrient status and soil microbial properties in soils under rainfed post rainy Sorghum (*Sorghum bicolor* (L.) Moench)

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A field study was carried out at Agricultural Research Station, Tandur, Telangana during 2011-12 and 2013-14. The aim of the study was to determine the short-term effects of contrasting integrated nutrient management regimes on sensitive soil nutritional and microbial parameters under an annual post-rainy season rainfed Sorghum (*Sorghum bicolor*) grown on vertisols. The nutrient management regimes employed in the study were pre-sorghum green manures (*Sesbania, Sunnhemp* and *Greengram*) integrated with chemical fertilizers; N-levels (0, 20,40 and 60 Kg N ha^{-1}). The study also included a control where no fertilizers, whatsoever were applied. The variables studied were soil N, P and K buildup and soil microbial status after conclusion of the experiment. The influence of integrated nutrient management regimes was most evident soil nutrient status and soil microbial properties. After three years of study, pre-sorghum incorporation of *Sesbania* improved available N (from initial 205 to 224.6 Kg/ha.), P_2O_5 (from initial 19.0 to 25.3 Kg/ha.) and K_2O (from initial 375 to 427 Kg/ha.). Application of each incremental dose of N from 0 to 60 Kg/ha significantly improved the available N (from initial 205 to 218.0 Kg/ha.) and K_2O (from initial 375.0 to 406.2 Kg/ha.). However, available P_2O_5 linearly declined due to application of graded levels of N from 0 to 60 Kg/ha from 22.9 to 19.7 Kg/ha. Similarly, improvement in soil microbial status also found significant due to incorporation of pre-sorghum leguminous crops at the end of three year study. Pre-sorghum incorporation of *Sesbania* improved the *Actinomycetes* counts (from initial 132 to 297×10^4CFU g^{-1} of soil), Bacterial colonies (from initial 72 to 164×10^6 CFU g^{-1} of soil). However, Fungi remained almost unchanged with *Sesbania* incorporation (from initial 47 to 46×10^2 CFU g^{-1} of soil). While, application of each incremental dose of N from 0 to 60 Kg/ha has significantly reduced soil microbial counts of *Actenomycetes*, Bacteria and Fungi significantly. The strong effects of nutrient management regimes implied that soil biochemical/microbial parameters are sensitive enough to detect changes in soil quality even in the short-term.

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