

TITLE: ECOLOGICAL SUCCESSION IN PASTURES AND ITS EFFECT ON MICROBIAL BIOMASS

AUTHORS: FREITAS, I.C.; MALTAURO, R.F.; DOMINGOS, M.M.; FARIAS, V.L.; MELLONI, E.G.P.; MELLONI, R.

INSTITUTION: UNIVERSIDADE FEDERAL DE ITAJUBÁ, ITAJUBÁ, MG (AVENIDA BPS,1303, CEP 37500-903, ITAJUBÁ – MG, BRAZIL)

ABSTRACT:

Brazil still insists on extensive cattle ranching, which usually covers large areas and often presents low agricultural potential and susceptibility of degradation. This research aims to evaluate microorganism responses on different stages of ecological succession in pastures. For this, the Ribeirão José Pereira watershed in Itajubá, MG, Brazil, was studied in April 2019. To define ecological succession, four Argissolos (Brazilian Soil Classification System) areas were chosen: AC1 pasture in good condition; AC2 pasture in the initial stage of succession; AC3 pasture in a more advanced stage of succession than AC2; AC4 pasture in a very advanced stage of succession. The microbiological attributes analyzed were: microbial activity by CO₂ uptake, quantification of microbial biomass, and qCO₂, which is the ratio of microbial activity to its biomass, showing the level of stress on microbial activity, all determined by the irradiation/incubation method. The results were compared to establish a relationship between microbial activity and biomass, and the physicochemical properties of the soil. Statistical analyses showed that organic matter has a positive correlation with microbial activity, and consequently, present a positive correlation with higher values of aggregate diameters and lower values in soil density. Tukey tests showed that microbial activity does not differ among the sites. The test showed that microbial biomass was significantly higher for AC1, while the other sites were grouped with lower values. The test for qCO₂ showed that sites AC4 and 3 present higher levels of stress. Environments at advanced levels of succession have a lower value of microbial biomass, and, consequently, more significant stress to this microbial community (qCO₂). This fact may be influenced by the sampling period since there were no statistical differences in the mean values of microbiological activity. For the period, a greater vigour of the vegetation cover is expected, which associated with the rainfall of the period, guarantees favourable conditions for the cycling of organic matter by the microorganisms in all areas. From the PCA scores, it was possible to classify the areas in ascending order of quality: AC2, AC1, AC3 and AC4, indicating an improvement in the physicochemical and microbiological attributes studied here due to the ecological succession, indicating a possible ecosystem service provided by nature, in the regeneration of anthropized environments.

Keywords: soil degradation, soil microorganisms, organic matter, soil aggregation, pastures

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