

TITLE: FUNGAL DIVERSITY IN IMPACTED MINING TAILINGS AREAS IN MARIANA-MG, BRAZIL

AUTHORS: PRADO, I. G. O.¹; SILVA, M. C. S.¹; PEDROSA, B. G.¹; BITARÃES, M. V.¹; VELOSO, T. G. R.¹; PRADO, D. G. O.²; KASUYA, M. C. M.¹

INSTITUTIONS: ¹LABORATORY OF MYCORRHIZAL ASSOCIATIONS, DEPARTMENT OF MICROBIOLOGY/BIOAGRO, UNIVERSIDADE FEDERAL DE VIÇOSA, MG (AV. P. H. ROLFS, S/N, CAMPUS UNIVERSITÁRIO, CEP 36570-000, VIÇOSA, MG, BRAZIL)

²MATHEMATICS DEPARTMENT, UNIVERSIDADE TECNOLÓGICA DO PARANÁ (UTFPR), (APUCARANA, PR, BRAZIL).

ABSTRACT:

Fungi associated with plants perform central ecological processes for plant development. Thus, the study of microbial diversity in impacted areas is important for draw strategies for rehabilitation of contaminated soils. The objective of this work was to evaluate and characterize the fungal diversity in soil in the recovery process, after dump disaster, along of Rio Doce river hydrographic basin, in Mariana-MG. Four areas were selected: one undisturbed forest (UND) and three areas under different stages of recovery (REC 1, 2 and 3). Soil samples were collected in triplicate, at two different periods of time (Feb/2016; Sep/2016). The fungi community profile were evaluated after extraction of total DNA from the soil using the NucleoSpin Soil Kit, and the ITS1 region was sequenced on Illumina Mi-Seq platform. The analysis was performed using the Quantitative Insights Into Microbial Ecology Software, according to Brazilian Microbiome Project protocol for ITS sequences. All remained reads were clustered in OTUs (operational taxonomic unit) at 97% of identity, using Uparse method. Each OTU was assigned in a taxon using the UNITE database. The Chao index, which is related to the abundance to more common OTUs, was estimated for the different areas for each period and statistical analyses were performed. The species richness varied among areas and period of samplings. In the first sampling, UND presented greater richness, followed by REC2 and the lower richness were observed in REC1 and REC3. In the second sampling, the species richness did not vary ($p > 0.05$) among areas and the richness index for the REC areas were higher than the first sampling. The rarefaction analysis showed a greater diversity in UND (original forest) in both samplings. No difference was observed among recovery areas, but REC1 in the first sampling (total absence of vegetation cover) presented lower Chao index. The richness indices for the different areas and the vegetation covering observed in the field showed an increase OTUs in accordance with the process of revegetation. This dependence corroborates with groups of fungi that establish obligatory symbiosis with plants, such as arbuscular mycorrhizal fungi. Fungi are present in all analyzed areas, and the revegetation process increases fungi diversity and richness.

Keywords: recovery (REC), sequencing, species richness, undisturbed (UND)

Development Agency: FAPEMIG, CAPES, CNPq