

Abstract

The soil microbial community has a major impact on ecosystem processes on a global scale. Anthropogenic stress has a significant effect on the composition, biomass and activity of the microbial community. In addition, this effect depends not only on the anthropogenic activity, but also on the environmental conditions. Modern analytical and molecular methods, including the use of biochemical markers, can be well used to monitor changes in the microbial community. These methods do not monitor the community directly, but detect the substances that are secreted and transformed by microbes and, last but not least, those that are part of them. The amount of these biochemical markers reflects the biomass, condition and taxonomic composition of a particular microbial community. In the presented work, these markers were used to monitor the response of microorganisms in various ecosystems which are affected directly or indirectly by human activity. The results of the dissertation are presented in four articles. Three of them have been published in international journals with IF and one is prepared in the form of a manuscript for publication.

The first publication presents the results of research exploring the impact of traditional agriculture in Papua New Guinea on the soil microbial communities, soil organic matter and soil nutrients. With the exception of the available P, no significant differences were found between the areas variously affected by agriculture. This indicates the sustainability of traditional and proven cultivation practices. The second publication, which is attached as a manuscript, shows the significant effect of the non-native invasive plant *Piper aduncum* on the soil microbial community and on the nutrients in the soil, also in Papua New Guinea. The third publication deals with the occurrence of arbuscular mycorrhizal (AM) and ectomycorrhizal fungi (EcM) on spoil heaps after brown coal mining in the Sokolov region; the subject of the study was a gradient of early successional herbaceous and woody vegetation. Here it was found that the coexistence of *Calamagrostis epigejos* and *Salix caprea* favor EcM at the expense of AM. In the fourth article, the significant influence of tourism on the composition of the microbial community of cave soils is confirmed by means of markers.

This work provides a broader view of the application of biochemical markers in soils affected by direct or indirect human activity. It provides new information that can be used in practice as a basis for decision-making and planning.