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Impact of Wildfire on Biological Activity of Sandy Soil in The South of Russia

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Abstract: The authors considered the effect of a strong wildfire in deciduous and coniferous forests on the microbiological and enzyme activity as well as physical and chemical properties of sandy soil (Arenosol). Soil samples were taken from the top soil (0-10 cm) two weeks after wildfire in Ustdonetsk forestry (Rostov region, Russia). Three areas were selected for the research i.e. area check forest (without wildfire), area short-term wildfire, long-term wildfire. The areas were selected based on the condition of trees and amount of ash on the soil surface. Small amount of ash on the soil surface was indicative of weak fire intensity and large amount of ash was present in area with strong fire intensity. We have found that forest wildfire leads to the decrease in microbial biomass by 12-38 per cent when compared with the check area, decrease in nitrogen-fixing bacteria abundance by 22-52 per cent, decrease in enzyme activity by 11-50 per cent, change in pH level and increase in electrical conductivity.

Keywords: Wildfire, Sandy soil, Pyrogenic effect, Nitrogen-fixing bacteria, Microbial biomass, Enzyme activity