

Impact of Forest Harvesting on Soil Microbiological Component

Martina Cambi*, Donatella Paffetti, Cristina Vettori, Martina Pettenuzzo, Enrico Marchi
DEISTAF - Università di Firenze
Via S. Bonaventura 13, Firenze – 50145, Italia
martina.cambi@unifi.it

Abstract:

*Forest operation may have a significant impact on the physical properties of soil, reducing its porosity and workability. Heavy machinery is often used, both to cut the trees and extract the logs, thus causing serious soil compaction, which limits natural regeneration of the forest and induces runoff and erosion. The axle weight of forestry machinery and thus the impact on soil have increased over time. Although mitigated by low-pressure tyres and controlled tyre pressures, this increased weight is a matter of major concern in land management. The susceptibility of a soil to compaction and deformation depends on its water content at the time of logging and, therefore, is closely related to climatic conditions. The compaction becomes, therefore, one of the main aspects of soil degradation, impacting physical, biological and then chemical properties. In fact the species-specific composition of soil microbial communities is strictly dependent on the chemical-physical characteristics of the soil. At the same time soil variation, caused by external perturbations, can lead to changes in biogeochemical cycles, with consequences on the ecosystems. The main aim of this work is to evaluate and quantify the impact of forest logging on soil features (bulk density, pH, temperature, humidity and composition of microbial communities) in a *Pinus pinea* stand within the Park of Migliarino - San Rossore - Massaciuccoli (Italy). Soil samples and data were collected in patchy cut areas (strip cut) harvested in 2011 and 2006 and compared with a control area (not harvested). In particular specific and quantitative composition of soil microbial communities was analyzed with molecular approaches which allow to evaluate not only the cultivable microbial species, but also those non-cultivable.*

Keywords: soil compaction, bulk density, soil microorganisms