

## **Soil biodiversity in artificial black pine stands one year after selective silvicultural treatments**

Stefano Mocali (1), Arturo Fabiani (1), Silvia Landi (1), Elisa Bianchetto (1), Piergiuseppe Montini (2), Stefano Samaden (3), and Paolo Cantiani (4)

(1) CREA - Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria, Centro di Ricerca per l'Agrobiologia e la Pedologia, Firenze, Italy (stefano.mocali@crea.gov.it), (2) Unione dei Comuni Amiata val D'Orcia, Italy, (3) Unione dei Comuni Pratomagno, Italy, (4) CREA - Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria, Centro di Ricerca per la Selvicoltura, Arezzo, Italy

The decay of forest cover and soil erosion is a consequence of continual intensive forest exploitation, such as grazing and wild fires over the centuries. From the end of the eighteenth century up to the mid-1900s, black pine plantations were established throughout the Apennines' range in Italy, to improve forest soil quality.

The main aim of this silvicultural treatment was to re-establish the pine as a first cover and pioneer species. A series of thinning activities were therefore planned by foresters when these plantations were designed. The project Selpibiolife (LIFE13 BIO/IT/000282) has the main objective to demonstrate the potential of an innovative silvicultural treatment to enhance soil and flora biodiversity and under black pine stands. The monitoring will be carried out by comparing selective and traditional thinning methods (selecting trees from below leaving well-spaced, highest-quality trees) to areas without any silvicultural treatments (e.g. weeding, cleaning, liberation cutting). The monitoring survey was carried out in Pratomagno and Amiata Val D'Orcia areas on the Apennines (Italy) and involved different biotic levels: microorganisms, mesofauna, nematodes and macrofauna (Coleoptera) and flora.

The microbial (bacteria and fungi) diversity was assessed by both biochemical (microbial biomass, microbial respiration, metabolic quotient) and molecular (microbiota) approaches whereas QBS (Soil Biological Quality) index and diversity indexes were determined for mesofauna and other organisms, respectively, including flora.

The overall results highlighted different a composition and activity of microbial communities within the two areas before thinning, and revealed a significant difference between the overall biodiversity of the two areas. Even though silvicultural treatments provided no significant differences at floristic level, microbial and mesofaunal parameters revealed to be differently affected by treatments. In particular, little but significant differences were observed for mesofauna and nematode community diversity which displayed a higher diversity after thinning in both Amiata and Pratomagno. Nevertheless, Coleoptera showed higher richness values in Pratomagno, where the wood degrader *Nebria tibialis subcontracta* specie dominated, compared to Amiata.

In conclusion, a general increase of soil biodiversity occurred in the plots after thinning compared to untreated control within the two areas, but such results are still heterogeneous and poorly statistically significant. As expected, one year is not enough time to appreciate significant enhance of the overall biodiversity after such silvicultural treatments. Thus, more evident and significant results are expected on the next two years.