

Innovative silvicultural treatments to enhance soil biodiversity in artificial black pine stands



EU Biodiversity Strategy to 2020

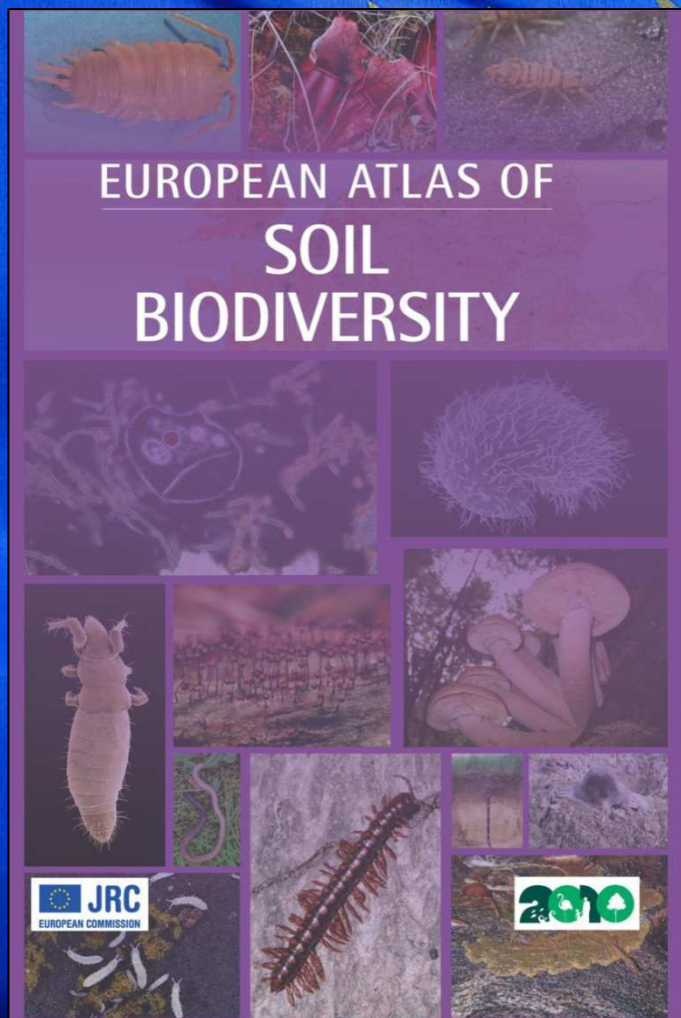
Soil biodiversity is analysed considering its main components (flora, fungi, bacteria, mesofauna, nematods and microarthropods), according with the EU 2020 Biodiversity Strategy (2011/2307(INI)).

In particular:

TARGET 3 - Increase the contribution of agriculture and forestry to maintaining and enhancing biodiversity:

1. **Action 11** - Encourage forest holders to protect and enhance forest biodiversity
2. **Action 12** - Integrate biodiversity measures in forest management plans





EUROPEAN ATLAS OF SOIL BIODIVERSITY

Key Message 1: Biodiversity loss and climate change are two of the most pressing challenges of our time. Soil biodiversity is part of the solution to both.

Key Message 2: The main goal of the atlas is to inform the general public, policy makers, land managers, teachers and the general scientific community of the unique characteristics of life in soil

Key Message 3: Soil contains at least one quarter to one third of all living organisms on the planet yet only around 1% of soil microorganisms have been identified.

Key Message 4: Most terrestrial ecosystem processes that sustain life on the planet (e.g. soil fertility, nutrient cycles, greenhouse gas fluxes, pollution control, antibiotics, etc.) are in fact all driven by soil biology.

Key Message 5: However, as identified in the EU Thematic Strategy for Soil Protection, land degradation and associated pressures are threatening soil biodiversity and, hence, the ability of the soil to perform its basic ecosystem functions and services.

Key Message 6: In addition, taking steps to protect soil biodiversity may be doubly useful as efforts to protect soil communities are very likely to help above ground habitats.

**Free
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http://eusoils.jrc.ec.europa.eu/library/maps/biodiversity_atlas/

The main purpose of the project is to evaluate the effects of a selective thinning on soil biodiversity in young black pine stands.



<http://www.selpibio.eu/>



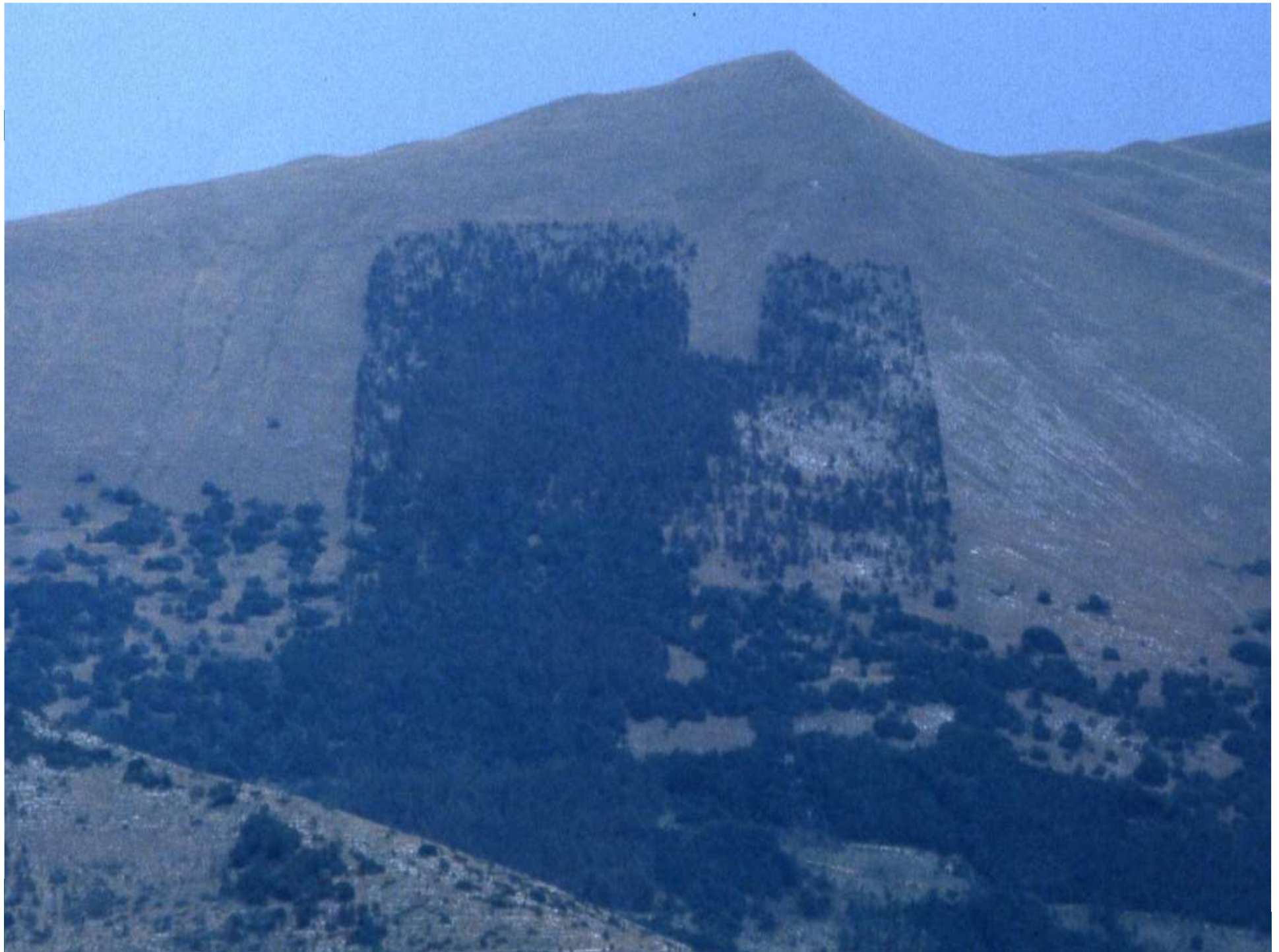
Silvicultural management of black pine stands

The black pine is the most representative species for reforestation in Italy.

The reason is related to its rapid growth rate and adaptative skills, also in strongly degraded soils.



In the 60'-70's black pine was “temporarily” used to restore many areas with the intent to protect the territory





The traditional thinning

The traditional thinning is “*selective from below*” and provide to leave the highest quality well-spaced trees.



However, it maintains essentially the same canopy

The selective thinning

The innovative thinning is conceptually based on the identification of the dominant plants and the removing of the plants around. This approach provides the following results:

1. Enhance the pine succession and Increase the economic value of the product
2. Enhance the pine dendrometric stability
3. Reduce the canopy cover and enhances the rate of light, water and temperature at the soil level.

The global effect is an increasing of the functionality of the ecosystem and of the soil biodiversity.

Before thinning



Traditional thinning



Selective thinning



Preliminary results

Traditional thinning



Tricholoma portentosum



Selective thinning



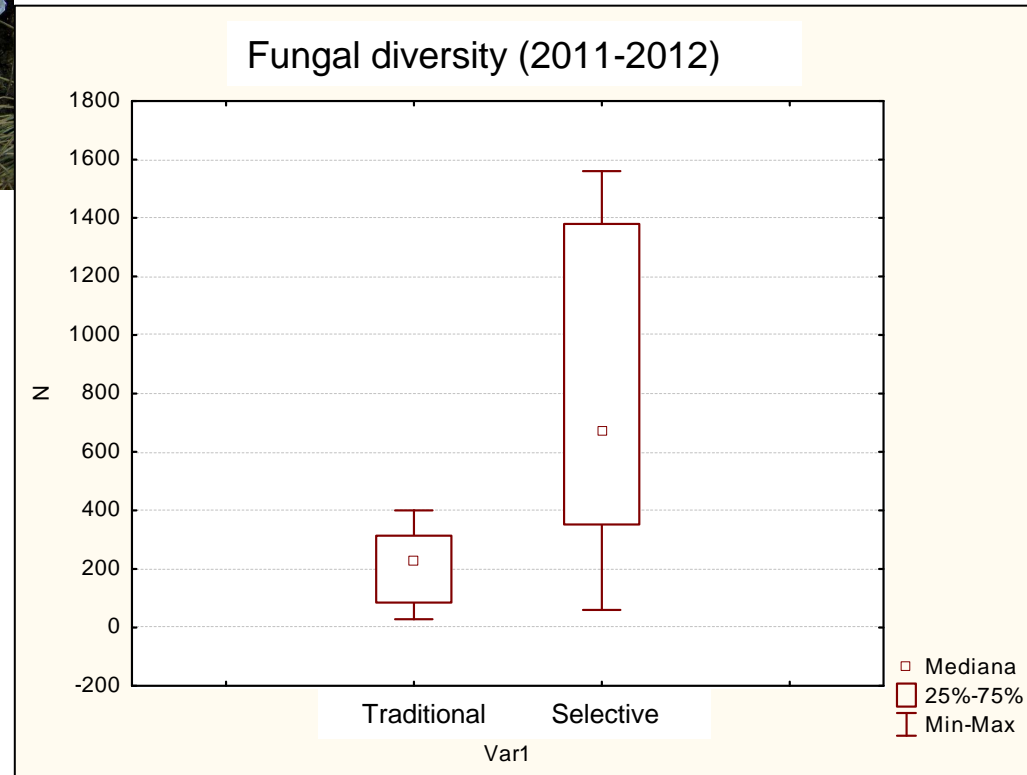
Suillus granulatus



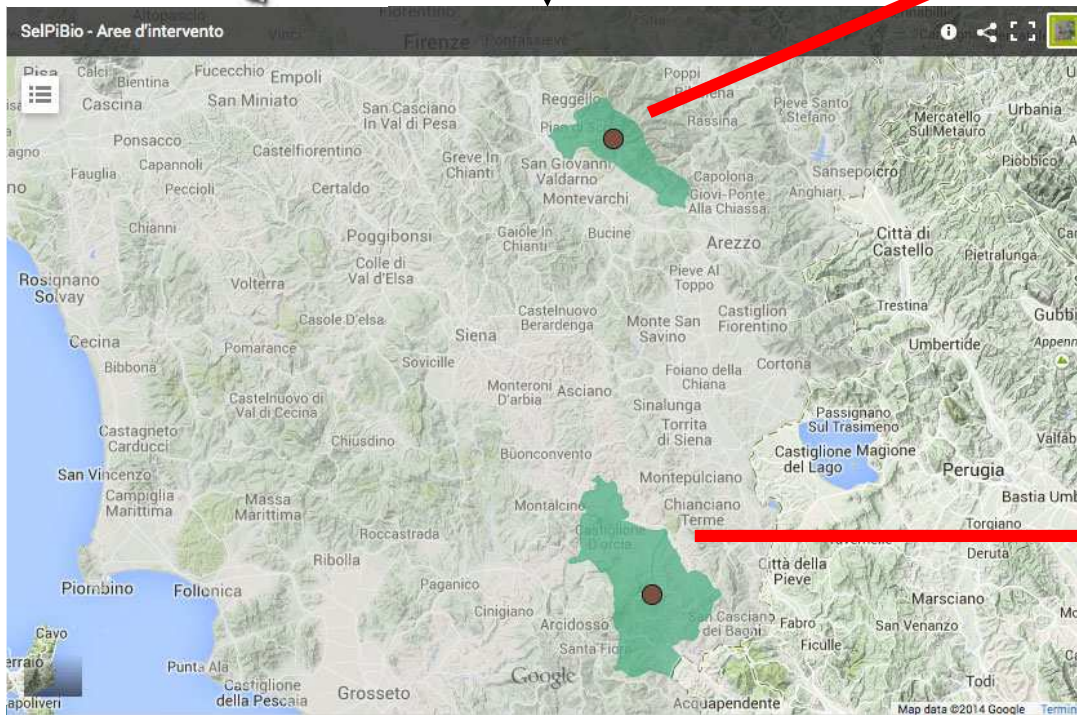
Suillus luteus



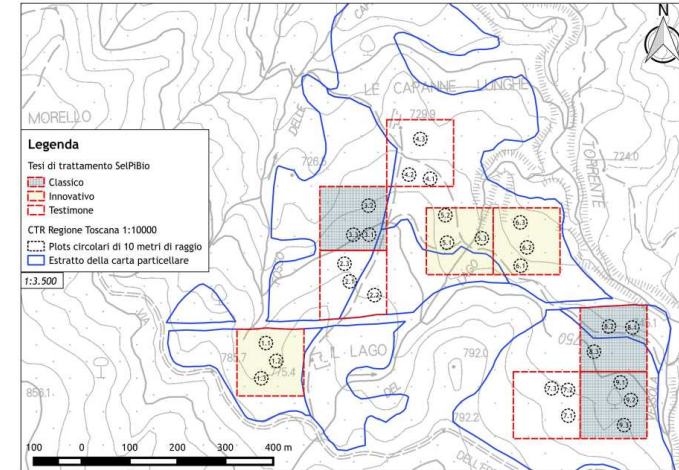
Macrolepiota procera



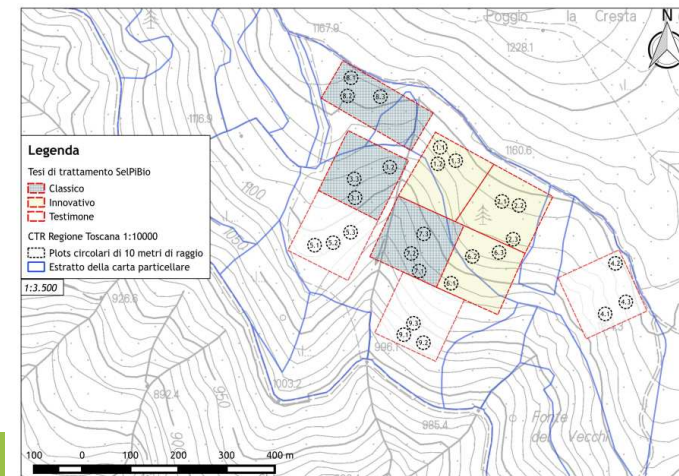
The experimental areas



Unione dei Comuni Pratomagno

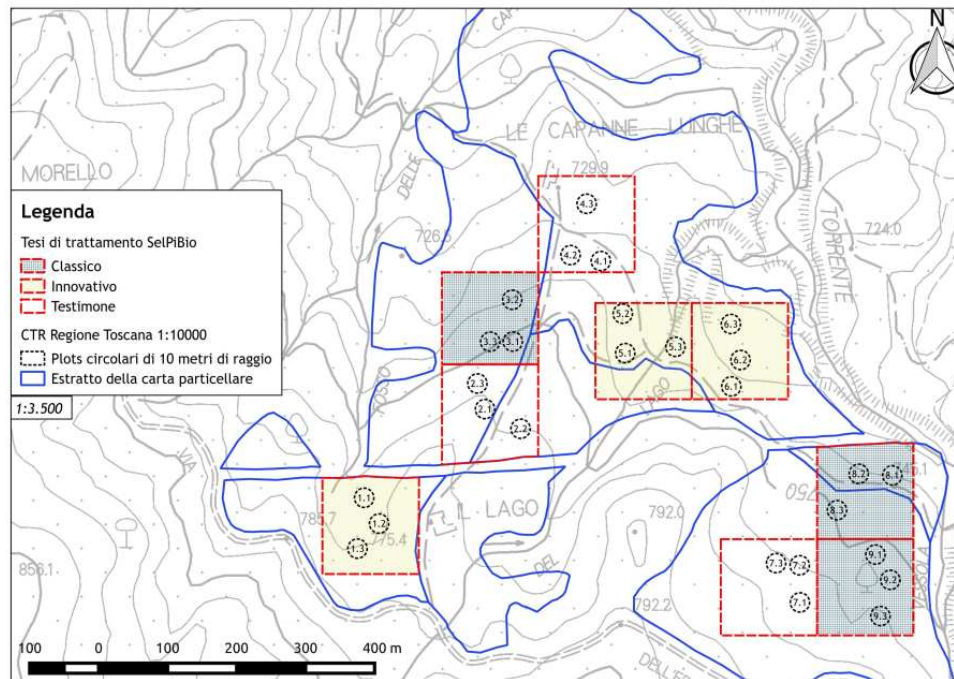


Unione dei Comuni Amiata e Val d'Orcia



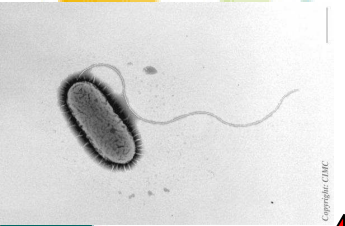
The experimental areas

Soil biodiversity will be assessed considering its main components (flora, fungi, bacteria, mesofauna, nematods and microarthropods), over 3 years.



- 27 plots have been delimited in 9 different areas (1ha each)
- 3 treatments (in triplicate):
 - **NO thinning (control)**
 - **Traditional thinning**
 - **Selective thinning**

“SOIL” BIODIVERSITY



PARTNERS

1. CRA – SEL (Dr. Paolo Cantiani – Coordinator): silvicultural management, Project Management
2. CRA – ABP (Dr. Stefano Mocali, Drs. Isabella De Meo, Drs. Elisa Bianchetto, Drs. Silvia Landi,): silvicultural management, Microbial diversity, Floral diversity, Nematodes and arthropods
3. University of Siena (Drs. Elena Salerni): Fungal diversity
4. Compagnia delle Foreste (Drs. Silvia Bruschini): Dissemination
5. UCP: silvicultural management
6. UCAVO: silvicultural management



<http://www.selpibio.eu/>

ACKNOWLEDGEMENTS



THANK YOU

