Project RESILFOR

Restoration of beech and silver fir forests in the Tuscan Marches Apennines

forests | Habitat Directive | improving biodiversity | renaturalisation | management tools | preservation techniques

PROJECT DESCRIPTION

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The silver fir, a conifer tree, which has seen a significant expansion in the period following the last ice age, in recent times has recorded a great regression of its distribution area due to several reasons among which the human interventions and the reduction of atmospheric humidity. Even if the main cause of this regression is the human intervention, the changed climate conditions impact negatively the silver fir's capacity to expand naturally by regeneration. Climate change forecasts for the near future don't promise any improvement, rather this species could face the risk of a yet more intensive regression due to the changing climate conditions in the next decades. If in the following years the forecasts turn out to be right, the isotherms will grow at a rate of 11 meters of altitude and 2-3 kilometers of latitude per year. This could lead to a shift, within the next 20 years, of the optimal thermal conditions of this species from the common altitudes, between 800 and 900 m asl, found in the phytoclimatic zone of the *castanetum freddo-fagetum*, to more than 200 meters higher, i.e. between 1100 and 1200 m asl. The LIFE Resilfor project had the objective to halt the loss of the habitat 9220* "Apennine beech forests with Abies alba and beech forests with Abies nebrodensis", through the reduction of the risk of genetic segregation of Abies alba relict populations and of the risk of their disappearance due to the climate change. The project activity was aimed at protecting the original populations and recreating in some area – which can be considered suitable at the light of the foreseen effects of the climate change - spatial models in which the genetic characteristics of the original populations are well represented in order to obtain spontaneous renewal phenomena in the short term. As secondary objective of the project further actions were carried out to protect other species of animals and plants, which are part of the same ecosystem; nucleuses of *Taxus* were reconstituted within beech formations, and the reproductive sites of *spectacled salamander, yellow-bellied toad, rosalia longicorn and lucanus cervus* were strengthened. The areas of intervention of the ReSilFor project, characterized by the presence of four indigenous beech-fir populations of the central Apennines, were **La Verna** in the province of Arezzo, **Bocca Trabaria** in the province of Pesaro-Urbino, **Pigelleto** in the province of Siena and **Valle della Corte** in the province of Macerata. The involved Sites of Community Importance were: SCI IT5190013 - Foresta del Siele e del Pigelleto di Piancastagnaio, SCI IT5180002 - Foreste alto bacino dell'Arno, SCI IT5180018 - Foresta di Camaldoli e Badia Prataglia, SCI IT5310010 - Alpe della Luna Bocca Trabaria, SCI IT5340008 - Valle della Corte. They are all located in mountain areas where the anthropic settlements are very small and the main economic activities are those related to forest management.

PROJECT PHASES

The preliminary phases of the project were aimed at investigating the presence in time of fir and taxus, and at investigating the genetics of the silver fir (*Abies alba*) populations in order to better understand – through the extraction of DNA – its genetic structure and the genetic characterization of the indigenous populations in the area of La Verna, Pigelleto and Bocca Trabaria.

The innovative value of the project consisted in testing on a large scale conservation actions of forest species by **techniques of assisted genetic translocation**. This was realized starting with the creation of a permanent monitoring network to observe the adaptive properties of the species, and then establishing reproduction patterns based on agamic propagation through grafting. The agamic progenies were then inserted in forest contexts where, in 10-15 years, they will become able to fructify and spread the seeds naturally in the adjoining forests.

The main actions of the project were:

- implementation, before the intervention, of an inventory to identify potential areas for the reintroduction of the native silver fir;
- collection of vegetative parts and propagation of the small plants of silver fir and taxus raised from cuttings;
- replacement of artificial populations of conifers with native deciduous forests and silver fir at the SCI of Pigelleto in an area of 14 ha;
- reintroduction of native silver fir on beech forest in the Casentino and Marche Apennines;
- reduction of native silver fir in the Casentino and the Bocca Trabaria forests;
- *in situ* conservation of native silver fir populations of Monti della Laga in the Marche Apennines;
- creation of breeding sites for amphibians (spectacled salamander and Appenine yellow-bellied toad) in wet environments of the Casentino and Bocca Trabaria forests;
- restoration of beech forests with taxus;
- complementary actions to increase the forest's biodiversity, such as creation of wet environments, increase of the quantity of dead wood, and diffusion of taxus in beech forests.

PROJECT RESULTS

This project is the first step of a series addressing the conservation of the silver fir in the central Appenine area by assisted genetic translocation techniques. About **60 mother plants** were reproduced in clonal copies with by grafting and distributed in the Central - Northern Apennines. In the long run, the project aimed at obtaining about 70 hectares of broad-leaved forest areas rich in white fir renewal, whose genetic characteristics will respond to those of the native populations of origin.

The tangible results of RESILFOR are the following:

- genetic analysis of **6 native populations** of silver fir in Apennine beech forests with Abies alba;
- monitoring, accordingly to the Habitats and Birds directives, of wildlife species in **5 Natura 2000 sites** presenting habitats with beech and fir, and habitats with beech and taxus;
- realization of **64 micro-arboretums** of 500 square meters planted with a total of 2000 plants of grafted silver fir. Each plant has been singularly protected from the ungulates by fences. The arboretums were created opening 500 square meters of space within the adult forests. Forecasts foresee that the seed production in the beech forests adjacent to the arboretums will begin in about 15 years;
- production, for vegetative propagation, of **9447 silver fir grafts** coming from the three autogenic sites of the Apennines, and of 5000 seedlings of Abies alba reproduced by seeds;
- production, by vegetative propagation, of **5.000 plants** coming from beech and taxus forests in the intervention areas of the project;
- restoration of **70 hectares of Apennine beech** forest with silver fir;
- replacement of exotic species (black pine) with native species (silver fir) in the SCI IT5190013 "Foresta del Siele e del Pigelleto di Piancastagnaio", which involved an area of over **35 hectares;**
- rehabilitation of **20 hectares** of beech forests with taxus in the SCI "Foresta di Camaldoli e Badia Prataglia";
- **40 hectares** of beech forest enriched with standing dead wood to give breeding sites for amphibians and saproxylic insect species, such as Rosalia longicorn (Rosalia alpina) and Lucanus cervus; 10 wet environments for amphibians (yellow-bellied toad and spectacled salamander) as well as 5 artificial pools.

A technical scientific publication on the project activities was issued in e-book format, which summarizes the main scientific results of the project and the developed intervention strategies. A Video of the project is also available.

The project is included in the Life GoProFor database. For further information click here

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Acronym
RESILFOR

Number of reference
LIFE08 NAT/IT/000371

Reference Programme
LIFE

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EU contribution
626.100,00

Call Year
2008

Start Year
2010

End Year
2014

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Region
Toscana

Description

Toscana, Marche, SIC IT5190013, SIC IT5180002, SIC IT5180018, SIC IT5310010, SIC IT5340008, habitat 9220