

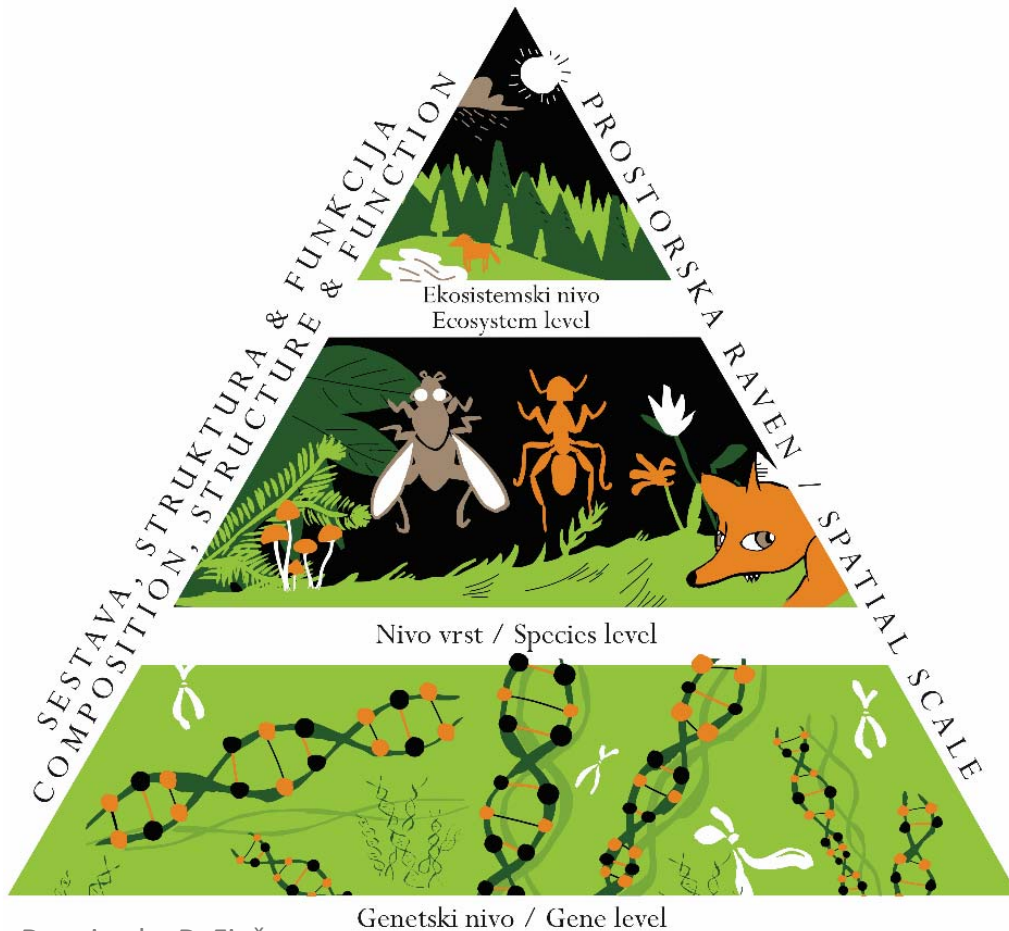


## **Monitoring of genetic diversity - an early warning system to aid the assessment of a species response to environmental change at a long-term temporal scale**

### **LIFEGENMON - LIFE for European Forest Genetic Monitoring System**

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Drawing by D. Finžgar

## Forest genetic monitoring (FGM)

- First proposed by experts from FAO, Group on forest genetic resources in 1996 (Namkoong *et al.* 1996, 2002)
- Simplified for practical use by experts from EUFORGEN working group on forest genetic monitoring (Aravanopoulos *et al.* 2013) and German programme for conservation of forest genetic resources (Konnert *et al.* 2011)

**Need (e.g. Koskela *et al.* 2012) and mandate (CBD, Article 7) to:**

- develop methodology of FGM
- implement and test FGM in practice





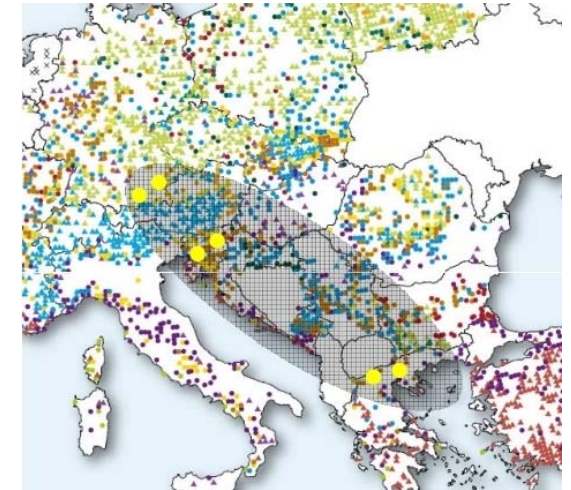
GOZDARSKI INŠTITUT SLOVENIJE  
SLOVENIAN FORESTRY INSTITUTE



## LIFEGENMON Data



RegPot No. 315982



Duration: 01.07.2014 – 30.06.2020.

Total costs: 5,48 M €, from which EU 49,9% = 2,7 M€;  
50,1% from partners' own (national) sources.

### 6 partners from 3 countries/states

- SFI: Slovenian Forestry Institute – leading partner;
- SFS: Slovenia Forest Service;
- CNVOS: Centre for information service, co-operation and development of NGOs;
- ASP: Bavarian Institution for Forest Seeds and Seedlings;
- FGL-AUTH: Aristotle University of Thessaloniki;
- GDDAY-DAMT: General Directorate of Forests and Agricultural Affairs - Decentralized Administration of Macedonia – Thrace.

**Advisory Board** members: experts from transect countries (National Focal Points), EUFORGEN SC and three ministry representatives







## Project Aims: Implementation of a long-term monitoring system of FGR

To define optimal indicators and verifiers for monitoring of genetic diversity changes in time across a transect from Bavaria to Greece for two selected stand-forming target species, European beech (*Fagus sylvatica*) and silver fir (*Abies alba* / *A. borisii-regis* complex)

To prepare guidelines for forest genetic monitoring for these two and additional five forest trees species:

- *Populus nigra*, *Fraxinus excelsior*, *Pinus nigra*, *Prunus avium*, *Quercus petraea* / *robur* complex,
- which differ in their biology and distribution

To prepare a Manual for Forest Genetic Monitoring & a Decision support system for an optimal choice of the level of FGM based on needs and means

- for implementation of FGM at a national, regional and EU scale, by development of guidelines for FGM monitoring, prepared for the participating countries, extended for the SEE transect, and promoted at the EU level, &
- To prepare background professional documents / guidelines for policy makers at the national, regional and the EU level for supporting development of possible new regulations at the national level, and future European Forestry and Biodiversity Conservation policies and strategies.





## Preliminary list of indicators & verifiers (demographic & genetic)

### • Selection

- Age / Distribution of developmental phases
- Mortality
- Regeneration presence & abundance
- Flowering & fructification
- Reproductive fitness (germination, seed quality)

### • Genetic variability & mating system

- Effective population size
- Sex distribution
- Allele / genotype frequency
- Genetic diversity:  $A_r$ ,  $N_a$ ,  $H_e$ ,  $H_o$ ,  $F$  statistics
- Hybridization
- Outcrossing & inbreeding

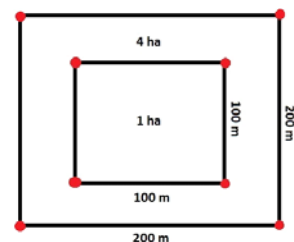
### Manual on genetic monitoring:

- Methodology
- On the field tested protocols & forms
- Database organization & reporting

Cost-benefit  
analysis

Decision support  
system

➤ Sampling and molecular  
protocols under preparation  
& standardisation



*The list is based on EUFORGEN WG (Aravanopoulos et al. 2013), Konnert et al. 2011, Aravanopoulos 2011.*

# LIFEGENMON ACTIVITIES

