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PRESERVING AND MANAGING FOREST HABITATS IN THE MEDITERRANEAN AREA

WORKSHOP - MONDAY DECEMBER 4, 2023

Co-funded by the European Union

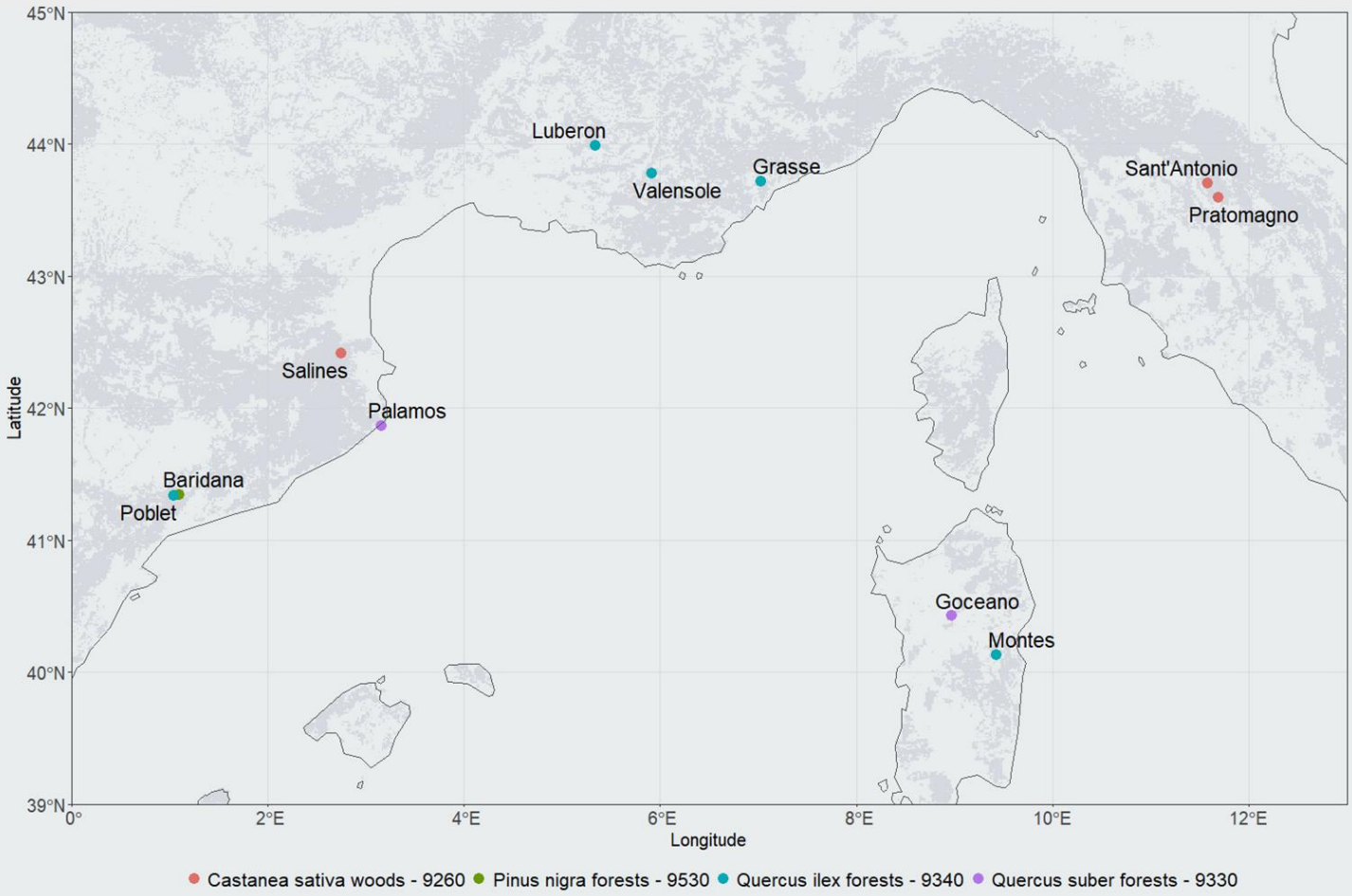
NATURA 2000

Monitoring Biodiversity

Resume and First Results

LORENZO BALDUCCI (SAPIENZA UNIVERSITY OF ROME)

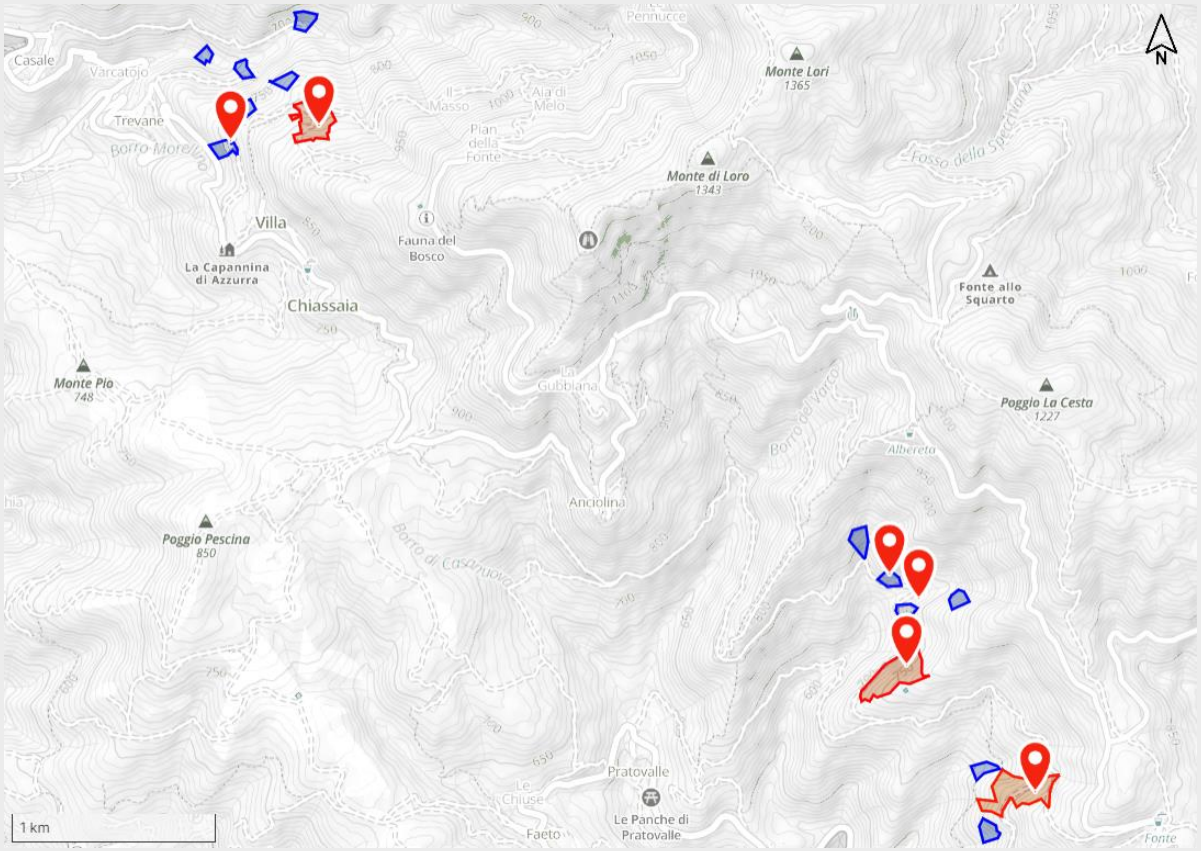
Sampling sites



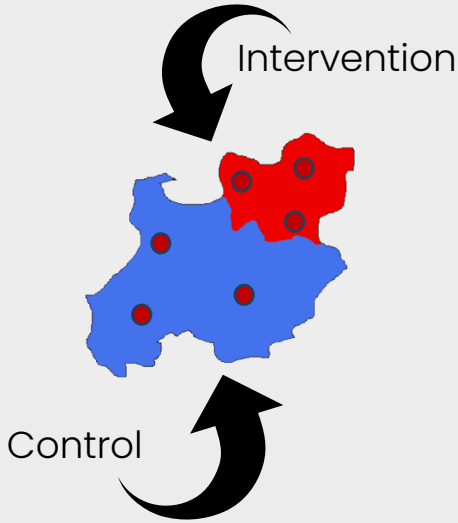
May-June 2023

About 3200 km by camper in 40 days

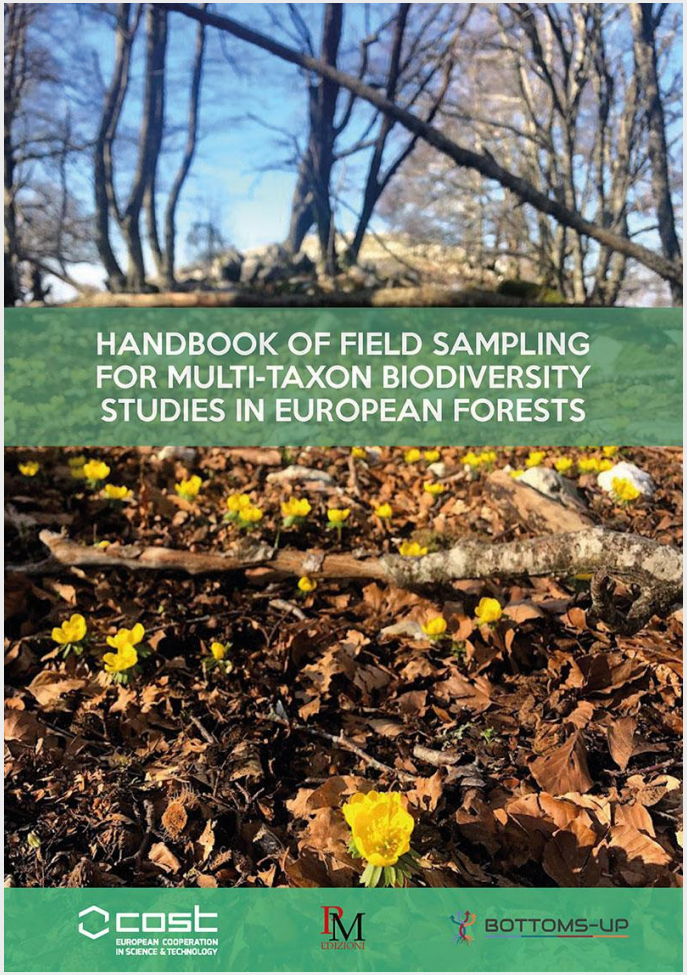
Sampling – Sites



Stratified random sampling design



Sampling – Sampling protocols



Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

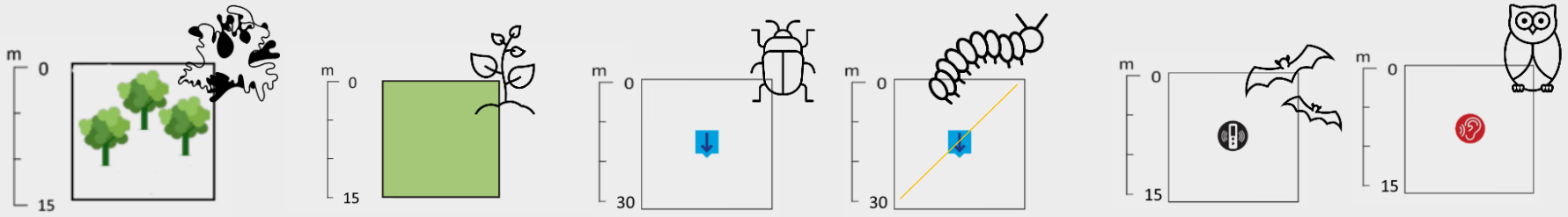
Review

Handbook of field sampling for multi-taxon biodiversity studies in European forests

Sabina Burrascano [a,*,1,42], Giovanni Trentanovi [b,2,42], Yoan Paillet [c,3], Jacob Heilmann-Clausen [d,4], Paolo Giordani [e,5], Simonetta Bagella [f,6], Andrés Bravo-Oviedo [g,7], Thomas Campagnaro [b,8], Alessandro Campanaro [h,9], Francesco Chianucci [i,10], Pallieter De Smedt [j,11], Itziar García-Mijangos [k,12], Dinka Matošević [l,13], Tommaso Sitzia [b,14], Réka Aszalós [m,15], Gediminas Brazaitis [n,16], Andrea Cutini [o,17], Ettore D'Andrea [p,18], Inken Doerfler [q], Jeňýk Hofmeister [r,19], Jan Hošek [s], Philippe Janssen [t,20], Sebastian Kepfer Rojas [u,21], Nathalie Korboulewsky [v,22], Daniel Kozák [r,23], Thibault Lachat [w,x,24], Asko Lõhmus [y,25], Rosana Lopez [z,26], Anders Mårell [v,27], Radim Matula [r,28], Martin Mikoláš [r,29], Silvana Munzi [aa,ab,30], Björn Nordén [ac,31], Meelis Pärtel [ad,32], Johannes Penner [ae], Kadri Runnel [y,33], Peter Schall [af,34], Miroslav Svoboda [r,35], Flóra Tinya [m,36], Mariana Ujházyová [ag,37], Kris Vandekerkhove [ah,38], Kris Verheyen [j,39], Fotios Xystrakis [ai,40], Péter Ódor [m,41]

Sampling – Sampling protocols

Target Groups



Target areas

3 sampling units X 2 treatments X 3 sites X 4 habitats

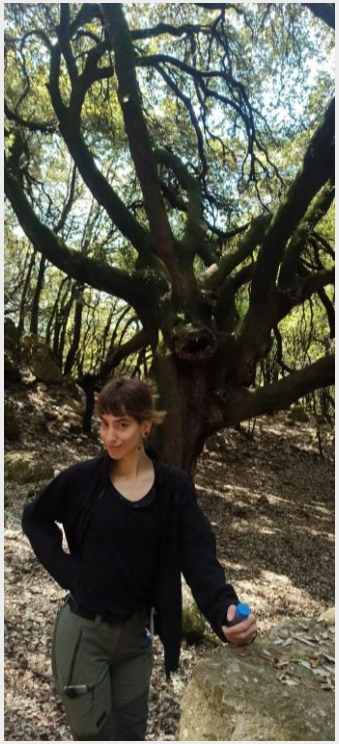
<u>72 sampling units</u>

Sampling – Sampling team

Elisa Caprasecca

Mirko Legnaro Diamanti

Francesco Di Pietro



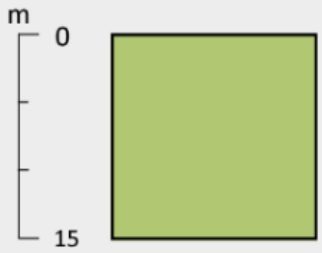
Giulia Bacco

Sabina Burrascano

Sampling – Sampling protocols

Vascular plants

	Vascular plants
Target taxonomic level	Species/species aggregate
Plot shape	Square
Plot size	15x15 m (225 m²)
Type of elements within the plot	-
Abundance score	Percentage cover for each species in each layer
Time needed (min.)	30-60/plot
Number of visits and season	1/year, early summer
Persons needed	1
Experts needed	1
Equipment costs (€)	<100



Each vascular plant species was recorded along with its estimated cover (%) inside 15x15 m square plots.

A minimum of 30 minutes to be spent in each plot

Recording separately species and abundance values for overstorey (height > 3 meters); shrub (1<height<3 meters); understorey (height<1 meter)

Sampling – Sampling protocols

Epiphytic Lichens

	Epiphytic lichens
Target taxonomic level	Species or morpho-functional groups
Plot shape	Square
Plot size	15x15 m
Type of elements within the plot	grid (5 quadrats) -> living trees
Number of elements	3 living trees
Element size	10x50 cm -> living trees
Abundance score	Frequency in standard sampling grids
Time needed	30-90/plot
Number of visits and season	1/year, no seasonality
Persons needed (min.)	1
Experts needed	1
Equipment costs (€)	<100

For each plot (15x15m), epiphytic lichens were sampled on 3 living trees.

For each tree trunk, 4 10x50 cm sampling grids at the four cardinal directions, between 100 and 150 cm from the ground.

If, within a plot, standing trees with biodiversity relevant features occur, e.g., trees with TreMs, these should be sampled to allow the detection of rare lichen species.

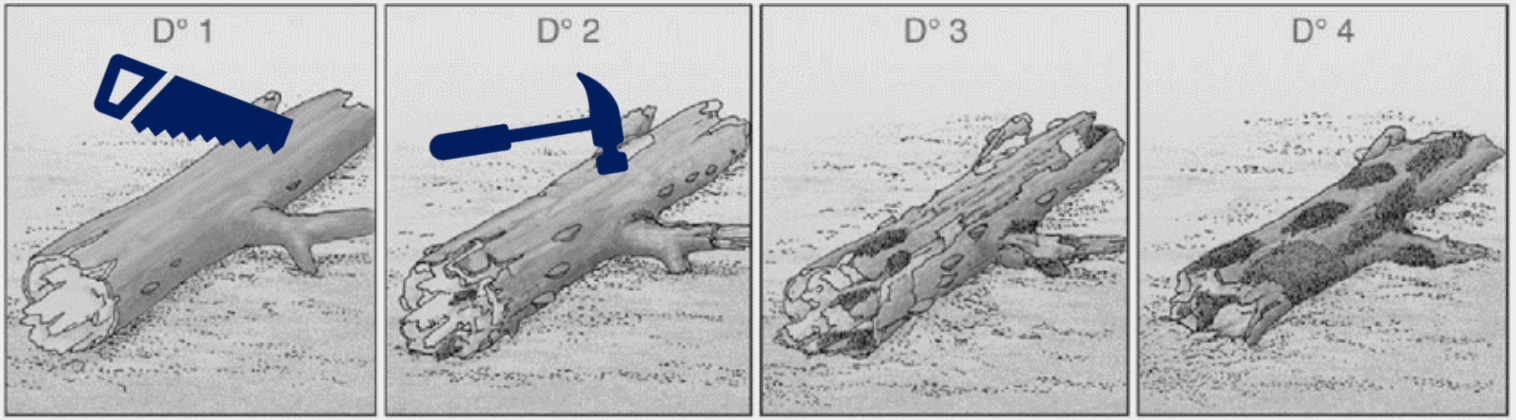
Sampling – Sampling protocols

Saproxylic Beetles

In each plot 3 logs (length 30-50 cm; diameter 10-15 cm) across different decay classes.

Each log will be manually dissected to pick up all arthropods (larvae, pupae and adults) living in there. Arthropods were collected and stored in a test tube filled with pure alcohol (ethanol).

Each tube was labelled with a unique code and site information. In the lab, the specimens collected will be separated and placed in single test tubes.



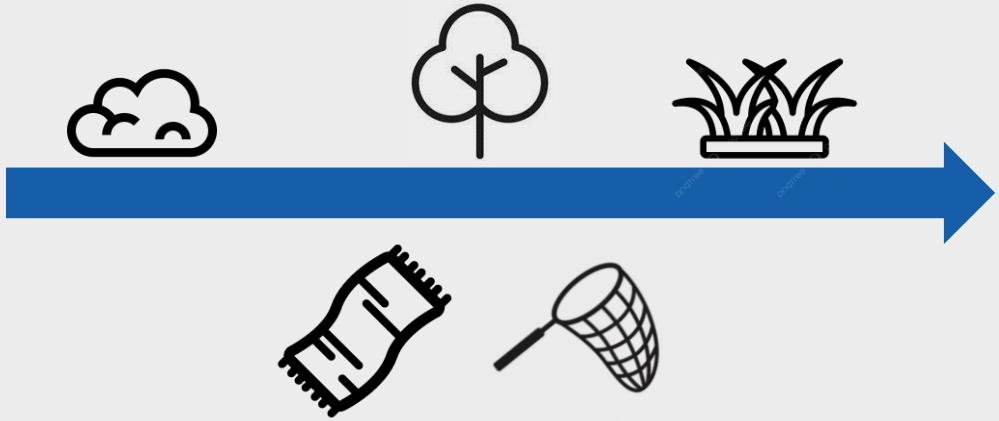
Sampling – Sampling protocols

Phytophagous insects

A linear transect 50 m long and 2 m wide will be established within each sampling plot.

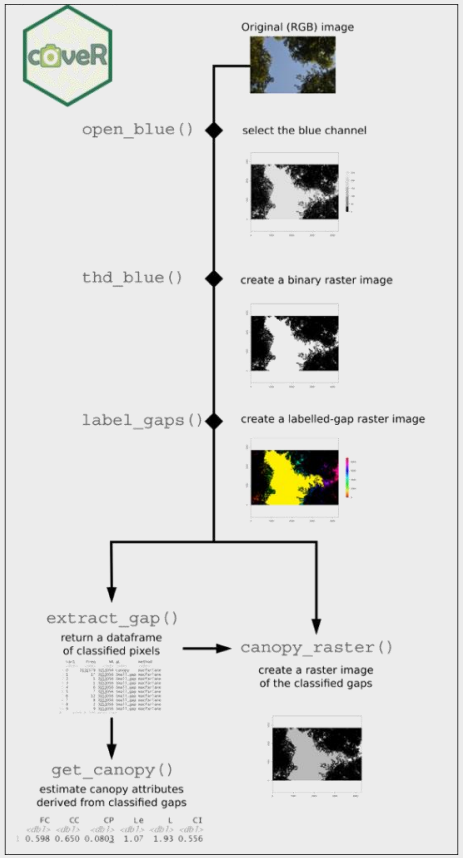
The collector will walk along the sampling plot for 20 minutes scanning the vegetation. All the caterpillars identified on sight will be opportunistically collected.

At the same time, the foliage of herbs, shrubs, and trees up to a height of 3 m will be shaken over a white sheet that will be moved along the transect. The white sheet will be moved forward while walking through the plot and at the end of the session, the caterpillars fallen on it will be collected.



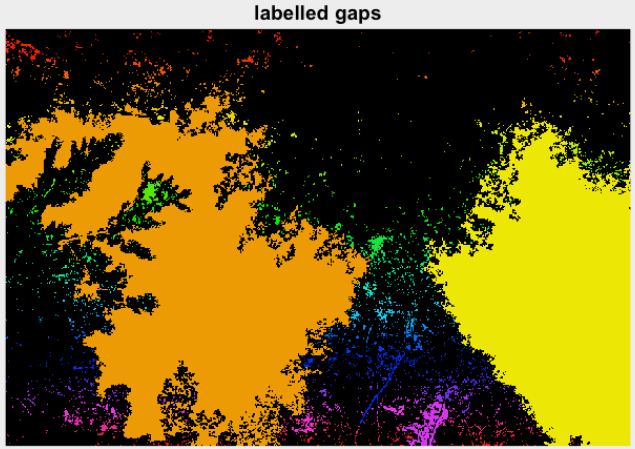
Sampling – Sampling protocols

Canopy photography



594 canopy photos shot and analysed

Analysing the light intensity under the canopy allows to refine the relationships between tree structure and biodiversity



$$GF = \frac{gT}{NR}$$

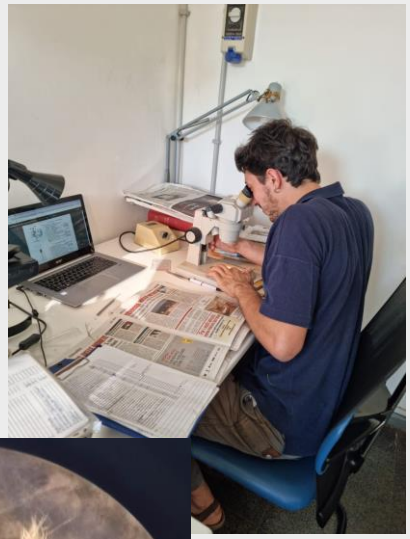
$$FC = 1 - GF$$

$$CP = 1 - \frac{FC}{CC}$$

$$Le = \frac{-log(GF)}{k}$$

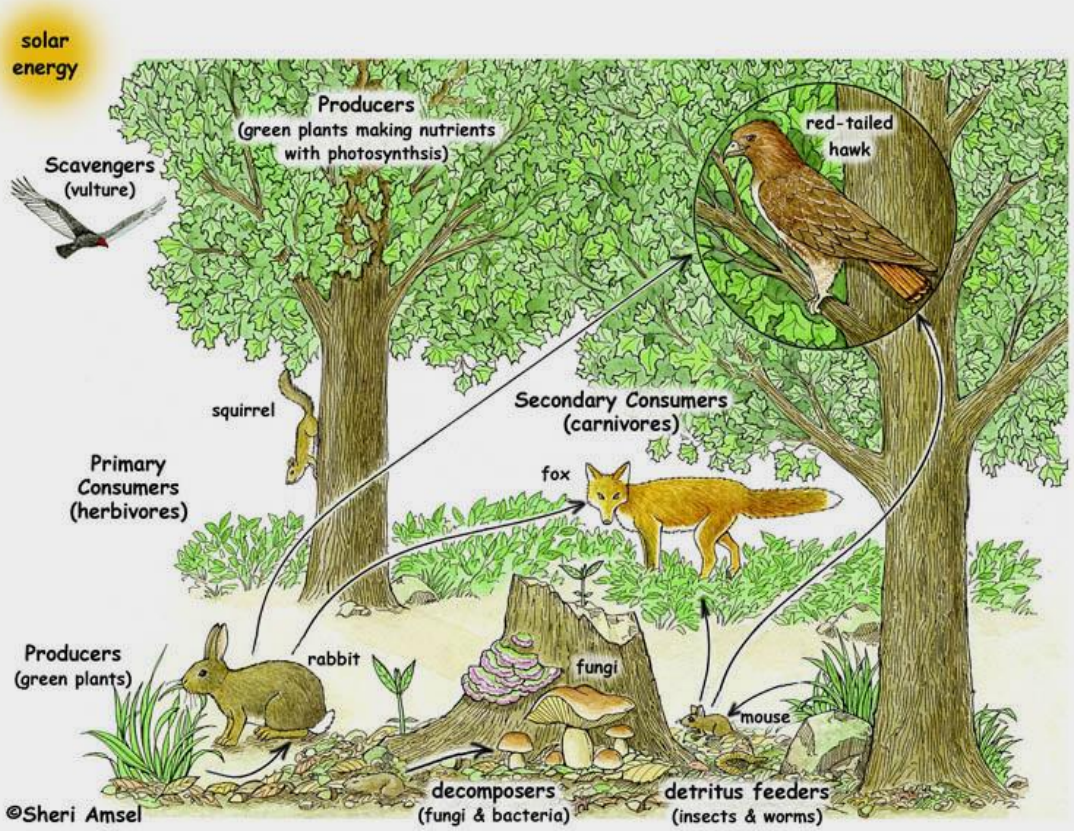
crea

Sampling – Samples identification



Species identification is almost finished!

Sampling – Analyses

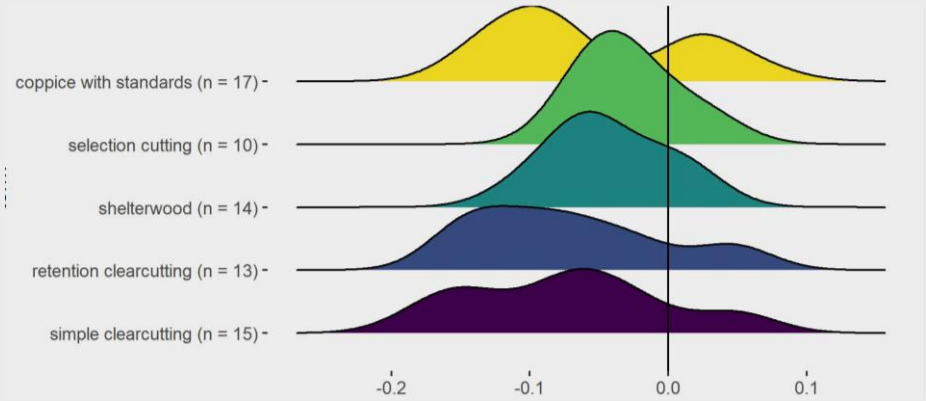


The idea is to have data on the different components of the forest trophic network

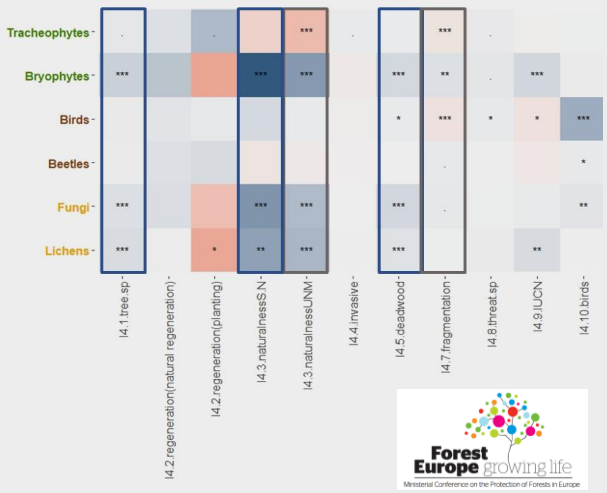
Sampling – Analyses

Assessing the links between multi-taxon biodiversity and:

1. Tree Related Microhabitats;
2. Dendrometric information;
3. Information on the past management of the areas.



Unpublished – Effect of different silvicultural regimes on bryophyte species



Unpublished – Links between Forest Europe indicators and species richness

Sampling – Analyses

Integration of our work in a broad European database on European forests.