



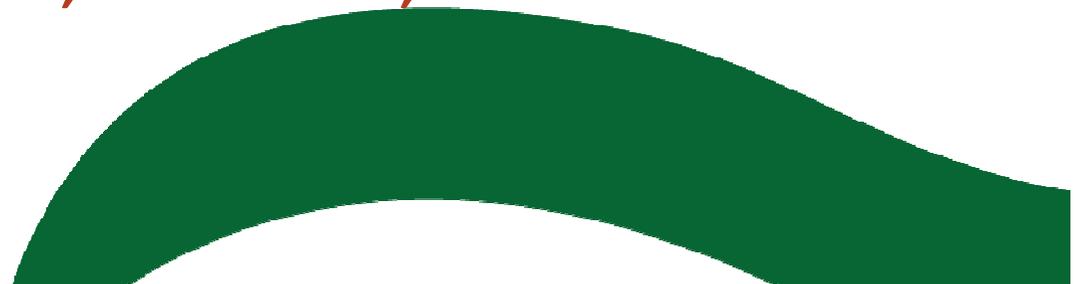
110° Congresso della Società Botanica Italiana onlus

II INTERNATIONAL PLANT SCIENCE CONFERENCE (IPSC)
Pavia, 14 - 17 September 2015



Selpibiolife: innovative silvicultural treatments to enhance soil biodiversity in artificial black pine stands

E. Salerni, C. Perini, E. Bianchetto, S. Mocali, I. De Meo, P. Mori, S.
Bruschini, P. Montini, S. Samaden, P. Cantiani



SelPiBio*Life* project

Reference

LIFE13
BIO/IT/000282

Duration

5 years
02-JUN-2014 to
31-MAY -2019

Budget

Total budget
1,549,975.00 €

EU contribution
768,594.00 €

Location

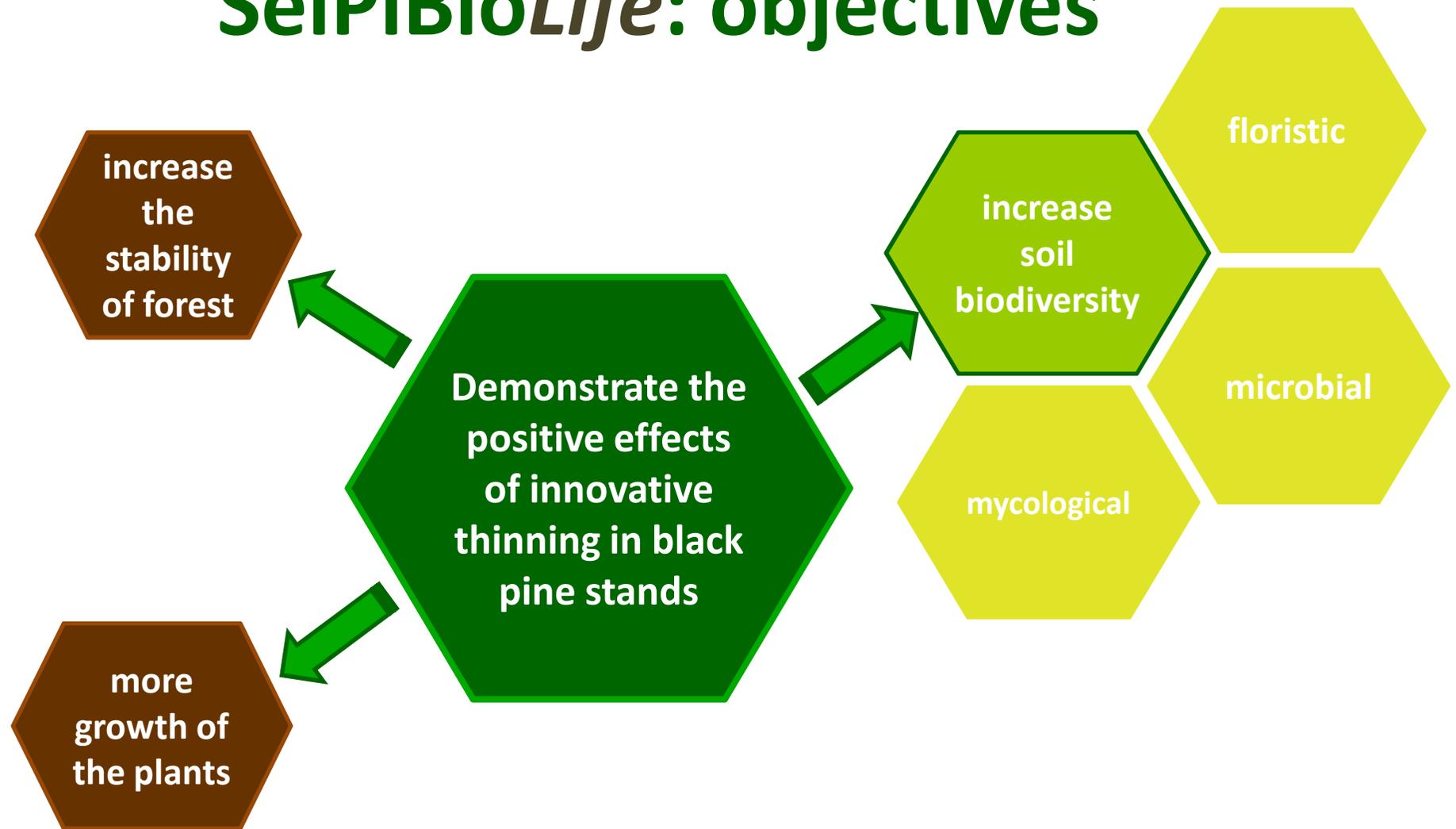
Tuscany



110° Congresso della Società Botanica Italiana onlus
II INTERNATIONAL PLANT SCIENCE CONFERENCE (IPSC)
Pavia, 14 - 17 September 2015



SelPiBioLife: objectives



110° Congresso della Società Botanica Italiana onlus
II INTERNATIONAL PLANT SCIENCE CONFERENCE (IPSC)
Pavia, 14 - 17 September 2015

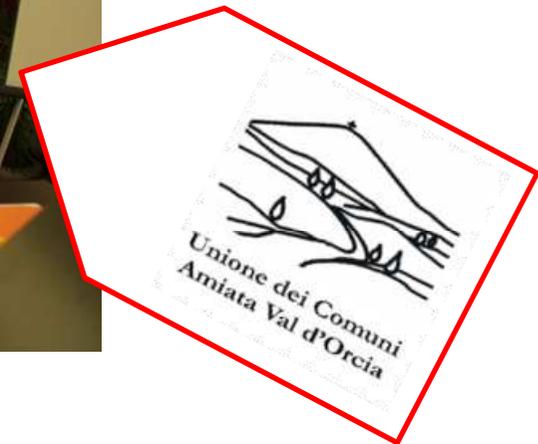


SelPiBioLife: partners



Coordinator of SelPiBioLife

**Forest Ecology and
Silvicultural Centre**



110° Congresso della Società Botanica Italiana onlus
II INTERNATIONAL PLANT SCIENCE CONFERENCE (IPSC)
Pavia, 14 - 17 September 2015

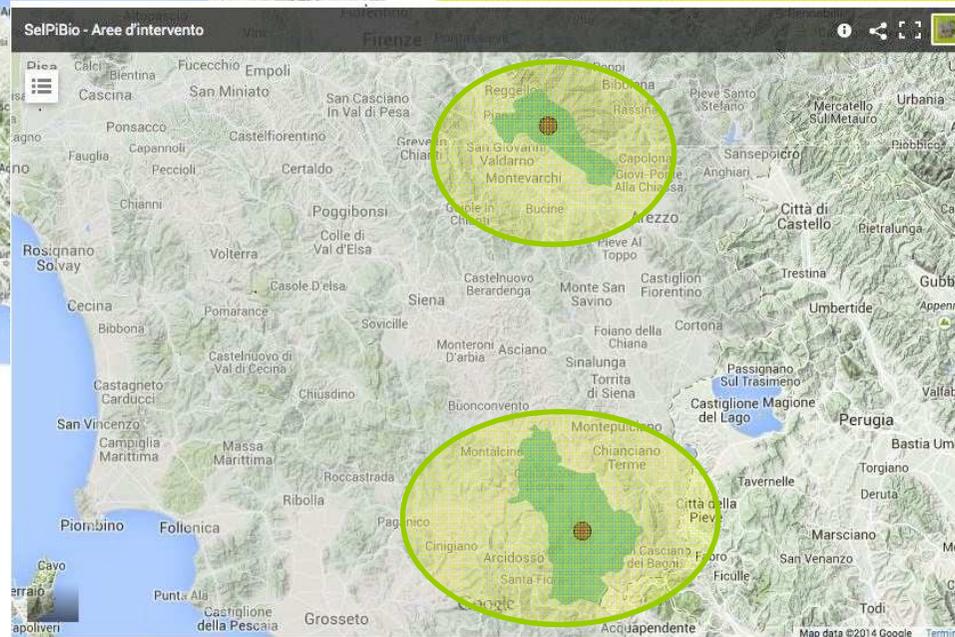


SelPiBioLife: pilot areas

Silvicultural treatments and biodiversity monitoring will be carried out in reforestations located in the regional Agricultural and Forestal Heritage of Toscana managed by the two following partners:
“Unione dei Comuni del Pratomagno” and “Unione dei Comuni Amiata Val d’Orcia”



Pratomagno-Valdarno Forest
3300.14 ha.



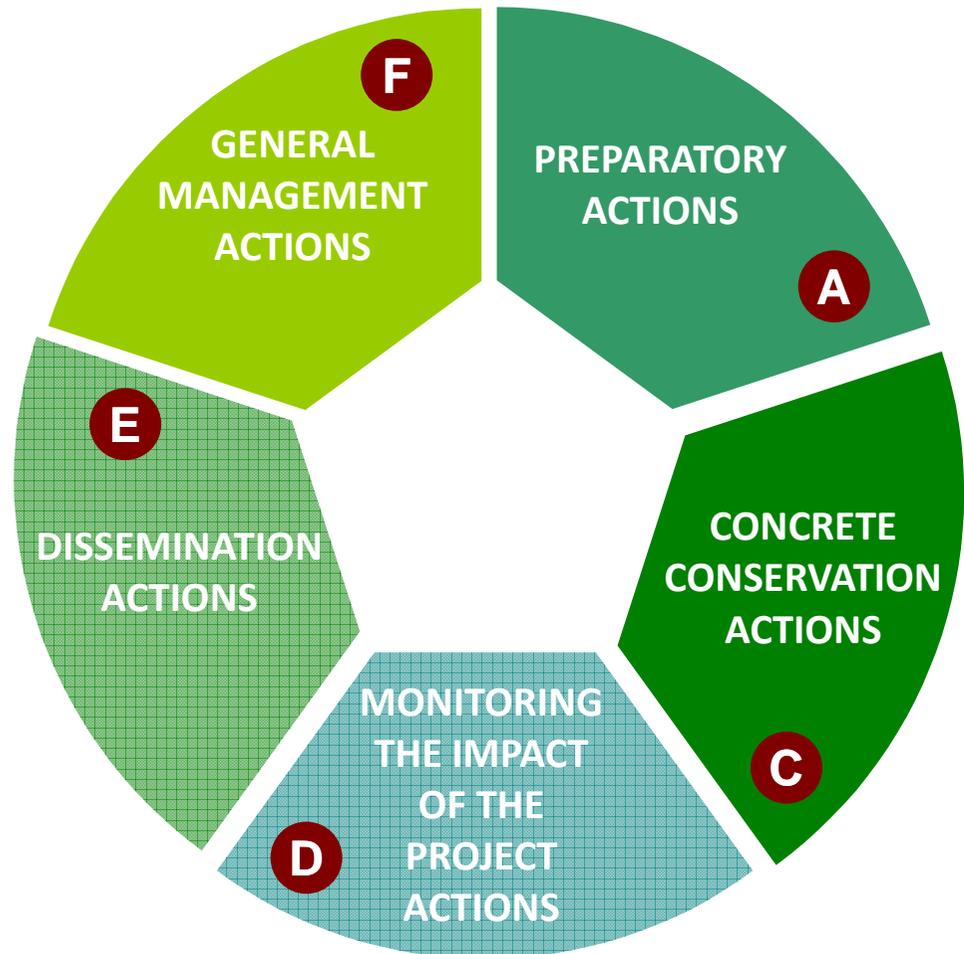
Forest complex
«Madonna delle Querce»
2168.60 ha



110° Congresso della Società Botanica Italiana onlus
II INTERNATIONAL PLANT SCIENCE CONFERENCE (IPSC)
Pavia, 14 - 17 September 2015



SelPiBioLife: actions

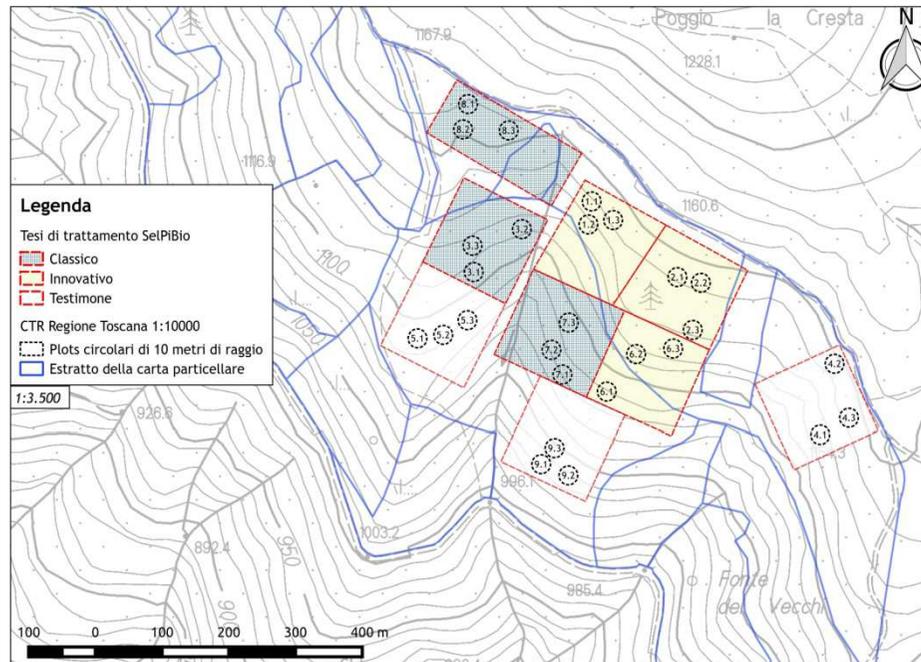


- A**
 - A1 Framework of the landscapes
 - A2 Assessment of structural and dendrometric parameters of forest stands before silvicultural treatment.
 - A3 -A4-A5 Biodiversity monitoring before treatment
- C**
 - C1 Definition and achievement of the thinning operations in the UC Pratomagno pilot area.
 - C2 Definition and achievement of the thinning operations in the UC Amiata Val D'Orcia.
- D**
 - D1 Assessment of structural and dendrometric parameters of forest stands post treatment.
 - D2-D3-D4 Biodiversity monitoring post treatment
- E**
 - E1 Identification of the stakeholders and of the main target audience subjects
 - E2 Planning, achievement and management of the web-site
 - E3 Realization of the notice board
 - E4 Realization of meetings
 - E5-E6 Dissemination of the results
 - E7 Layman's report realization
- F**
 - F1 General management of the project

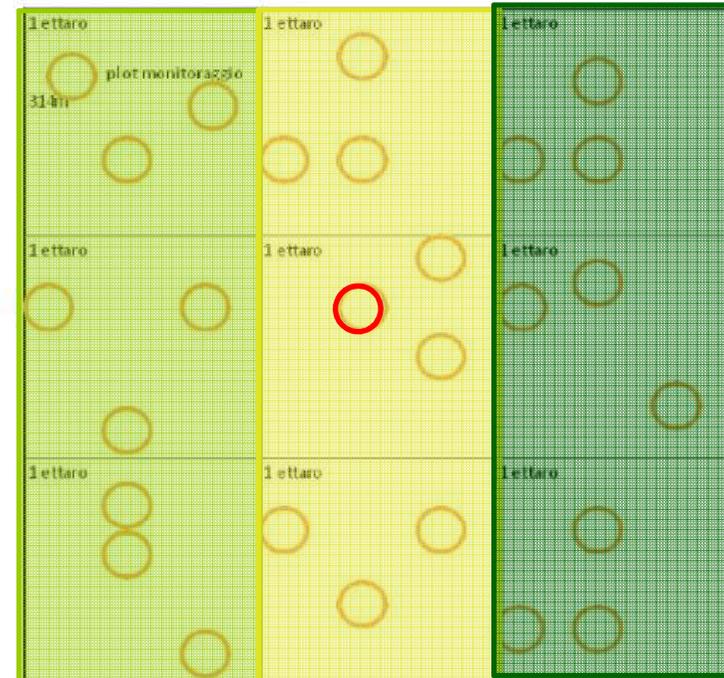


Silvicultural treatment was carried out in the middle of June 2015.

Pratomagno



Monitoring area (9 ha)



- ✓ TT – traditional thinning
- ✓ TI – innovative thinning
- ✓ T0 – control

○ 54 Monitoring biodiversity plot (314 m²)

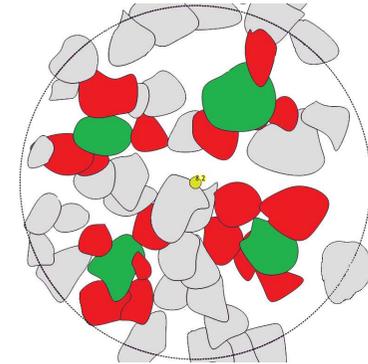


110° Congresso della Società Botanica Italiana onlus
II INTERNATIONAL PLANT SCIENCE CONFERENCE (IPSC)
Pavia, 14 - 17 September 2015



The **traditional thinning** “from below” is not able to modify the crowns competition and with the SelPiBio LIFE+ project a new thinning approach for even-aged pinewoods of *Pinus nigra* was tested: **the selective thinning**

The aim of this silvicultural treatment is to select approximately 100 strength trees ha⁻¹ to remove all the competitors around them



With this approach the horizontal and vertical structure of the stand is deeply modified, small gaps are opened, with an influence on the amount of rain and solar radiation on the soil.

control



Traditional thinning



Selective thinning



A

Assessment of soil biodiversity **before** silvicultural treatment

m
e
t
h
o
d
s



Macrofungi
Mycocoenological methodology
(Arnolds, 1981)

Flora
Braun-Blanquet methodology
(1965)

Soil analyses

ECM
Anatomical morphological analysis
Agerer (1987–2008)



110° Congresso della Società Botanica Italiana onlus
II INTERNATIONAL PLANT SCIENCE CONFERENCE (IPSC)
Pavia, 14 - 17 September 2015



SOIL SAMPLING



Pitfalls

1)



Carabidae diversity (coleoptera)
Pitfall sampling and direct analysis (Greenslade, 1964)



Soil samples 10x10x10 cm

2)



Microarthropod diversity (mesofauna)
Microarthropods extraction by Tullgren-Berlese method



Soil samples 20 cm depth

3)



Microbial diversity
DNA extraction and analysis through NGS sequencing (Microbiome)

4)



Microbial functional indicators
Microbial biomass and respiration (Alef, 1995; Grego et al., 2004)

5)



Free-living Nematode diversity
Nematodes extraction by modified Baermann method

A 3. Assessment of the floristic diversity before treatments

	Pratomagno	Madonna delle Querce
Total cover (%)	81	94
Forest cover (%)	71	73
Herbaceous cover (%)	47	83
Number species	66	99



Pratomagno

Pratomagno

- ✓ *Brachypodium rupestre* (24,0)
- ✓ *Viola reichenbachiana* (9,2)
- ✓ *Pteridium aquilinum* (8,6)
- ✓ *Rubus* sp. (5,8)

Madonna delle Querce

- ✓ *Brachypodium rupestre* (13,7)
- ✓ *Rubus* sp. (7,3)
- ✓ *Carex* sp. (5,3)
- ✓ *Hedera elix* (4,5)



Madonna delle Querce

Scientific referent
Dr.ssa Elisa Bianchetto
elisa.bianchetto@entecra.it
 Agrobiology and Pedology
 Research Centre



A

4. Assessment of the diversity of soil microbial communities before treatments



110° Congresso della Società Botanica Italiana onlus
II INTERNATIONAL PLANT SCIENCE CONFERENCE (IPSC)
Pavia, 14 - 17 September 2015



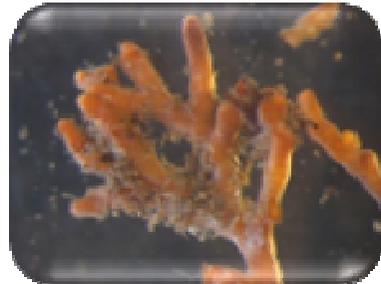
A

4. Assessment of the **mycological** diversity **before** treatments

Thanks to the morphological analysis was possible a first screening ECM community.

	Pratomagno	Madonna delle Querce	Total
Total root tips	2323	3602	5925
Ectomycorrhizal tips (ECM)	1237	1717	2954
Old roots	1886	1885	3771

E
C
M



Pratomagno

- ✓ YSMP (288 tips)
- ✓ OS (208 tips)



Madonna delle Querce

- ✓ BLI (503 tips)
- ✓ OS (305 tips)

Scientific referent
Dr.ssa Pamela Leonardi
leonardi.pamela@yahoo.com



110° Congresso della Società Botanica Italiana onlus
II INTERNATIONAL PLANT SCIENCE CONFERENCE (IPSC)
Pavia, 14 - 17 September 2015



A

4. Assessment of the **mycological** diversity **before** treatments

**m
a
c
r
o
f
u
n
g
i**

	Pratomagno	Madonna delle Querce	Total
species richness	105	106	180
No. of carpophores (cf)	3481	3220	6704
fresh weight (gr)	35888,04	9044,78	44953,15
dry weight (gr)	4256,87	1134,70	5395,25

*Russula xerampelina**Clitocybe nebularis**Phellodon niger*

Pratomagno

- ✓ *Russula xerampelina*
- ✓ *Chroogomphus rutilus*
- ✓ *Clitocybe nebularis*
- ✓ *Inocybe geophylla*

Madonna delle Querce

- ✓ *Galerina marginata*
- ✓ *Hemimycena gracilis*
- ✓ *Mycena arcangeliana*
- ✓ *Phellodon niger*

Scientific referent
Dr.ssa Elena Salerni
 elena.salerni@unisi.it



359 cf
13 Kg

Clitocybe nebularis

948 cf

5 Kg

Lycoperdon perlatum



Macrolepiota procera

47 cf

2.5 Kg





LIFE'S BIODIVERSITY
Project activities in the field of
and environmental research



www.selpibio.eu



Thank's for your attention