



The BioSoil Biodiversity Survey: What, How, Where?

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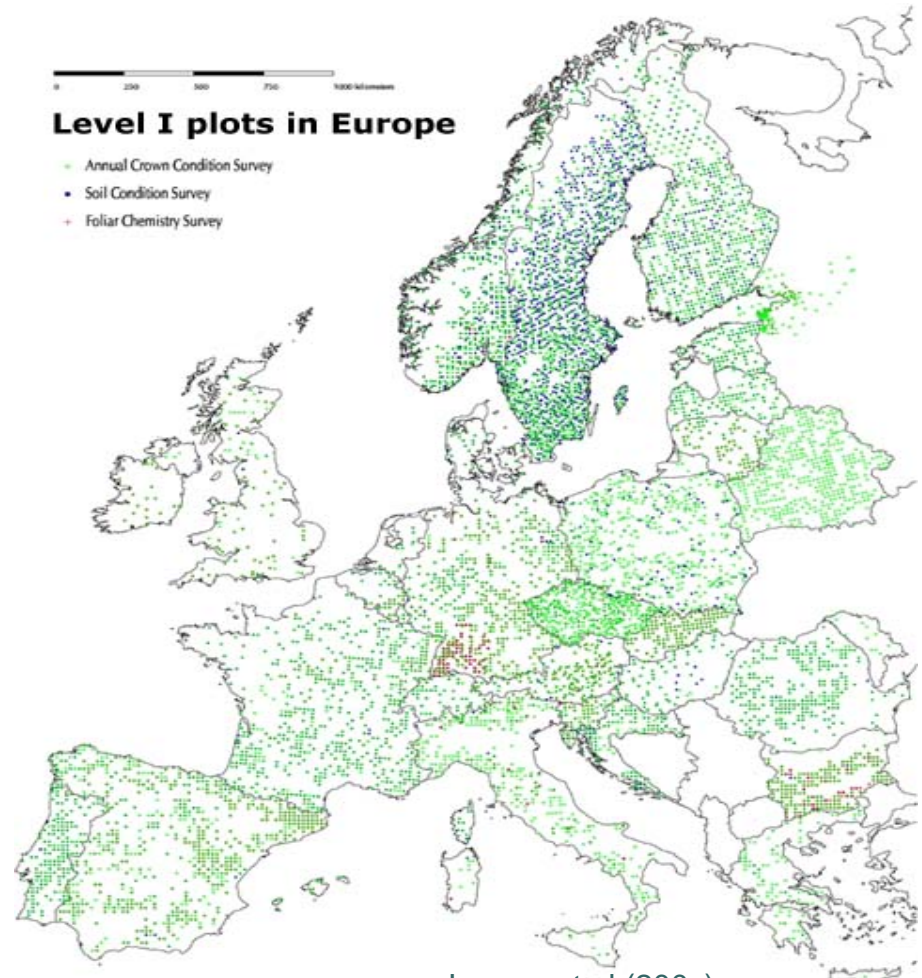
EUROPEAN COMMISSION
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Joint Research Centre



The Forest Focus Regulation

Council Regulation (EC) No 2152/2003

- Continuation of Regulation 3528/86
- European Community scheme for harmonised, broad-based, comprehensive and long-term monitoring of European forest ecosystems.



Lorenz et al (200y)

● ● ● Forest Focus Mandate



Photo: Bastrup-Birk

<http://europa.eu.int>

- **Implement forest monitoring:**
 - protection against atmospheric pollution
 - prevention of fires and their causes and effects
 - **biodiversity**, climate change, carbon sequestration, **soils** and protective functions of forests
 - continuous evaluation of monitoring activities



Partners



- Forest Focus Regulation operates in collaboration with UNECE ICP Forests
 - Programme also operates outside EU 25
 - Today 39 participating countries

<http://www.icp-forests.org>



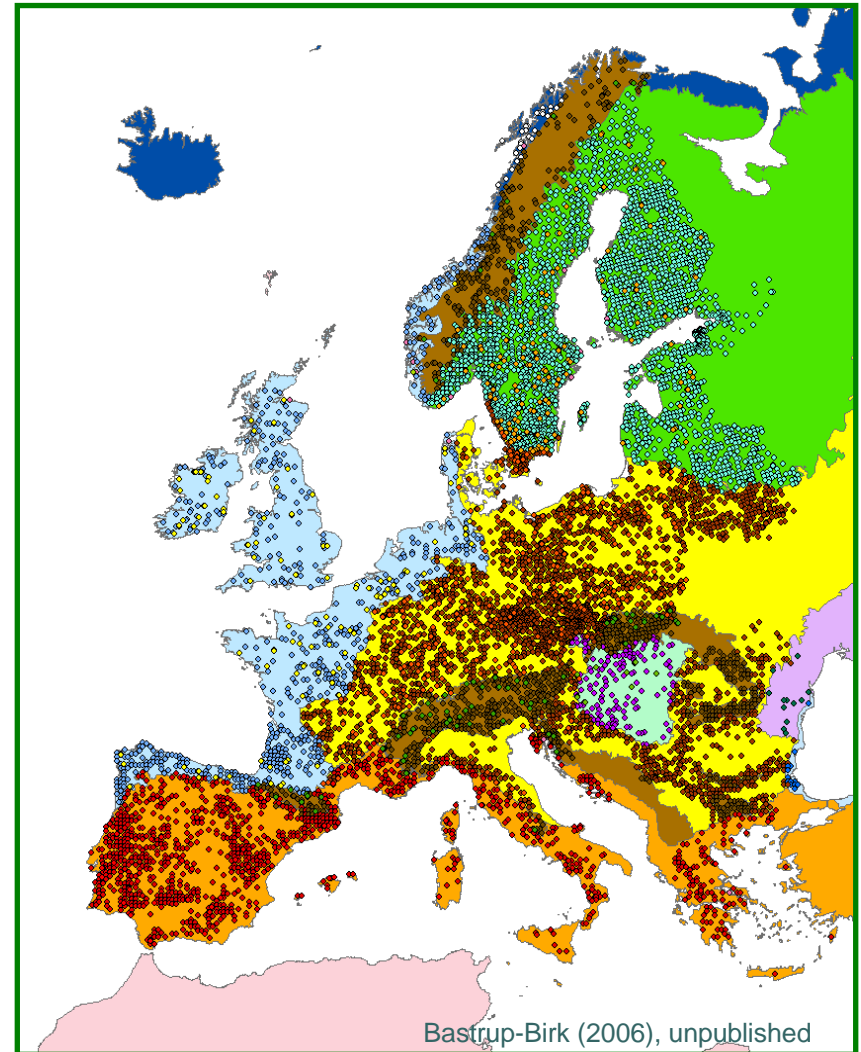
Photo: Bastrup-Birk



“BioSoil Conference 2009- results of the BioSoil study”: Bruxelles, 09/11/2009

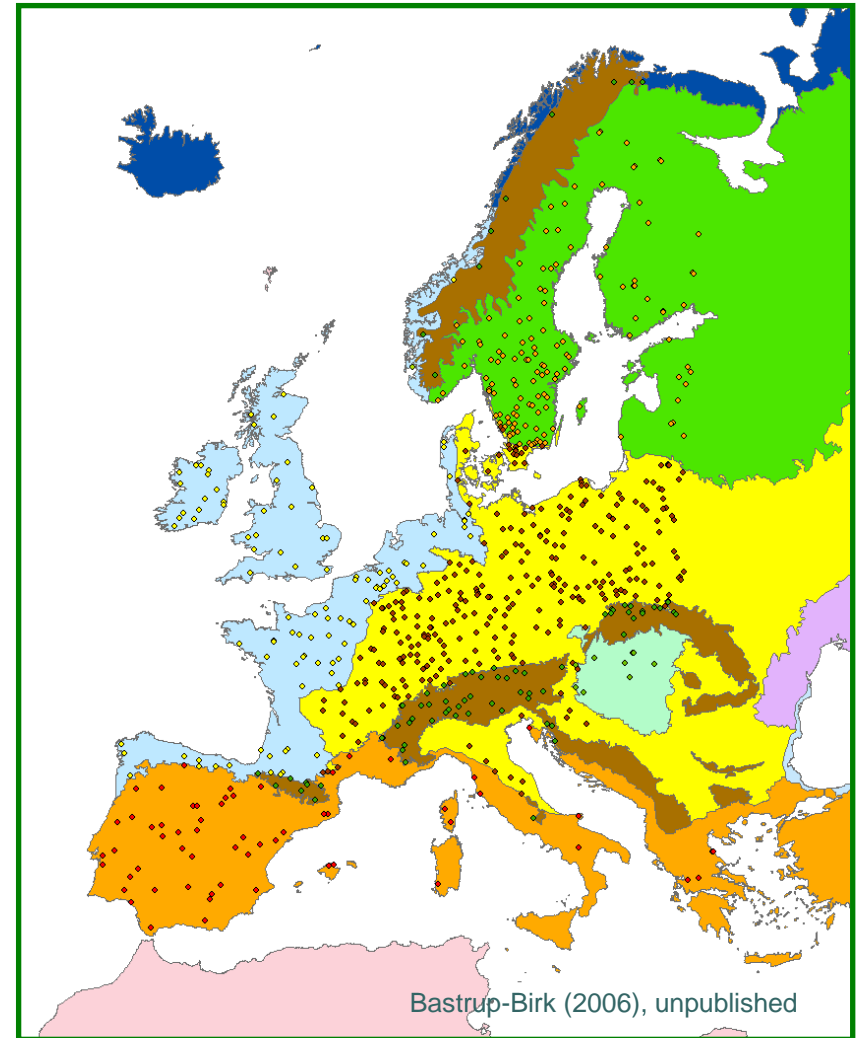
Forest Ecosystem Monitoring at 2 levels

- Extensive network of observation points ~ 6,000 (16 km x 16 km grid)
- Annual surveys of crown condition
- Surveys of soil & foliage every 10 years



Forest Ecosystem Monitoring at 2 levels

- Intensive network of ~ 900 plots
 - Crown condition
 - Meteorology
 - Air quality
 - Deposition
 - Soil & soil waters
 - Foliage
 - Growth
 - Ground vegetation



● ● ● Forest Biodiversity Monitoring

- Expert Panel on Forest Biodiversity and Ground Vegetation: investigate possibility and suitability of programme:
 - Programme can make **contribution** to European forest biodiversity data needs

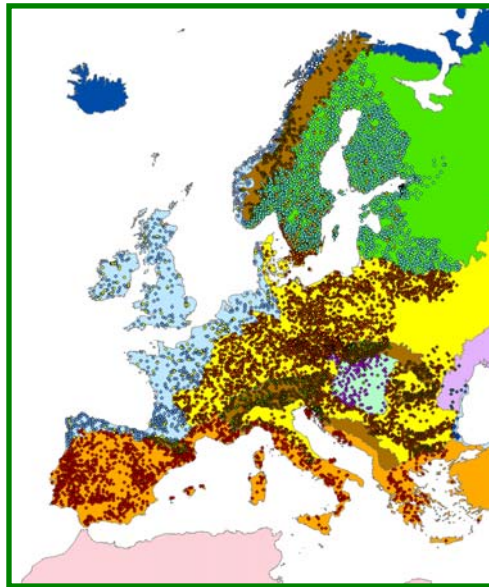
Biodiversity Approach

Forest
BIOIA

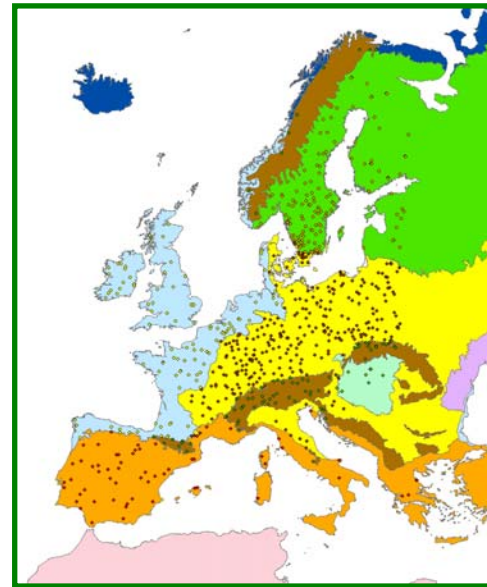
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BioSoil

To compliment different levels of forest monitoring



Level 1 plots



Level 2 plots

● ● ● BioSoil Background



- Study of soils and components of **forest biodiversity** on extensive forest monitoring plots
- Draft proposal by the Member States to the Commission
- Demonstration project under Forest Focus

Biodiversity Approach

- Stand structural approach
 - Assumption that structurally diverse stands have more associated habitats
- Make use of existing data sets of the Forest

Ecosystem monitoring

- Ground vegetation
- Forest growth
- Crown condition



Photo: Neville

The BioSoil biodiversity Approach

- Addition of new surveys
 - **Forest Deadwood**
 - **Forest Classification**



Photo: Neville

- **BioSoil contribution** to European forest biodiversity assessment

● ● ● Rationale

- A restricted budget of 700 k€
- Decision was taken to concentrate the resources on few relevant variables
- Biodiversity indicators selected from existing recognised processes, MCPFE, CBD etc.



Photo: Bastrup-Birk

Three colored circles (dark green, light green, and white) arranged horizontally to the left of the title.

BioSoil Indicators

- List of recognised sampling variables:

➡ SIMPLE - SHORT – QUICK & CLEAN

- Fully harmonised/standardised assessments:

➡ SAME VARIABLES ➡ SAME METHODS

Three colored circles (dark green, light green, and white) arranged horizontally to the left of the title.

BioSoil Parameters

- Tree species and diameter (DBH)
- Canopy characteristics
 - Vertical layers and canopy closure
- Forest deadwood assessment
 - Coarse woody debris, tree stumps, snags, standing & lying dead trees
- Ground vegetation, vascular species only
- Forest type classification (Barbati et al., 2007)

BioSoil Project – many project meetings

- Main progress during the workshop in Slovenia Spring 2006
 - Field testing and validation of approach
- Field manual of methods available: the BioSoil biodiversity manual
- 1st large scale standardised pan-European survey of components of forest biodiversity 2006 / 2007
- Communicate approach & results
- Development of database forms
- Data transmission 2007 / 2009 to JRC
- End of project – November 2009



Photo: Bastrup-Birk

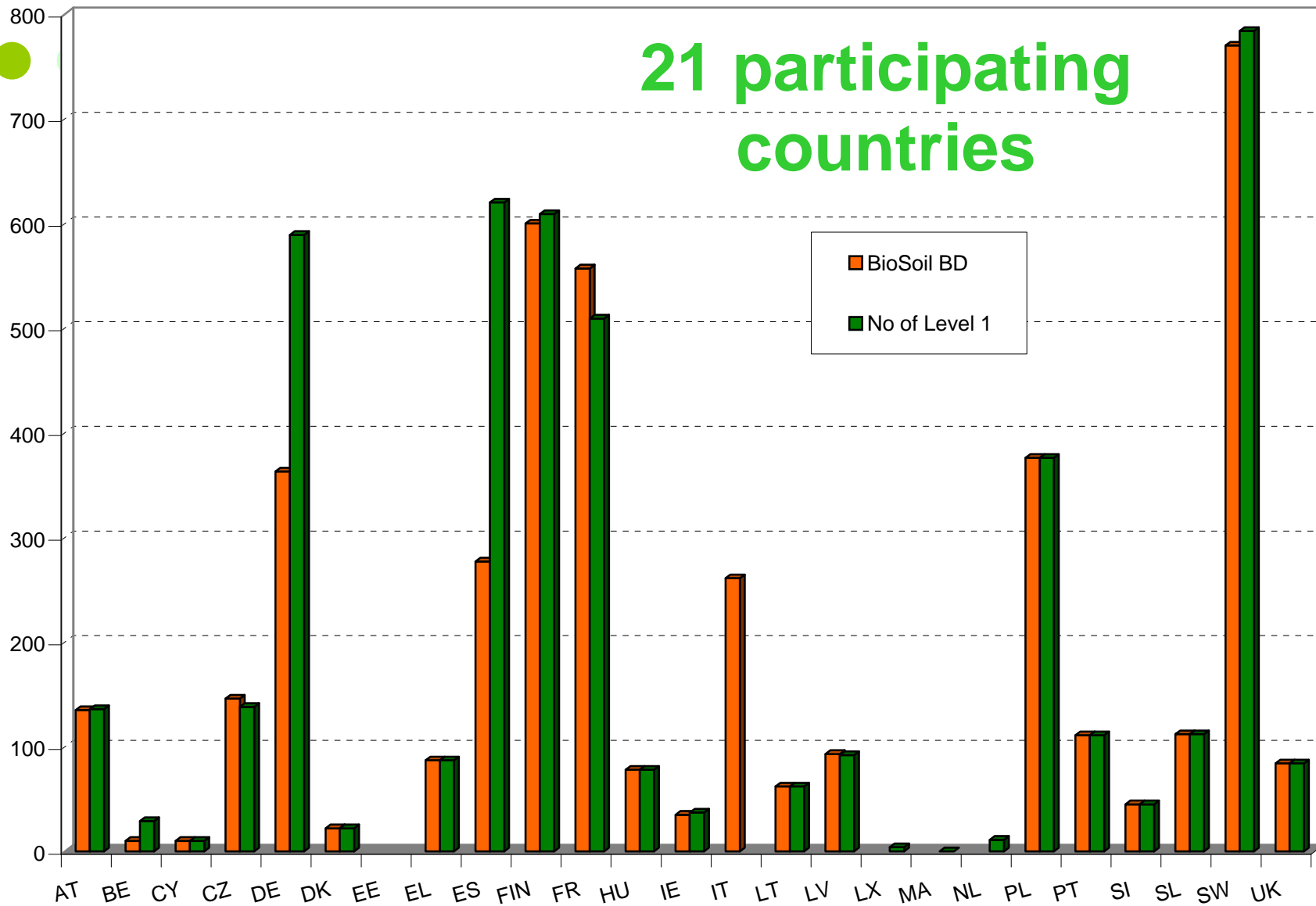
Biodiversity Field Manual



- Approach tested & validated in field in Slovenia ~ April 2006
- Sent to countries for the 2006 field survey

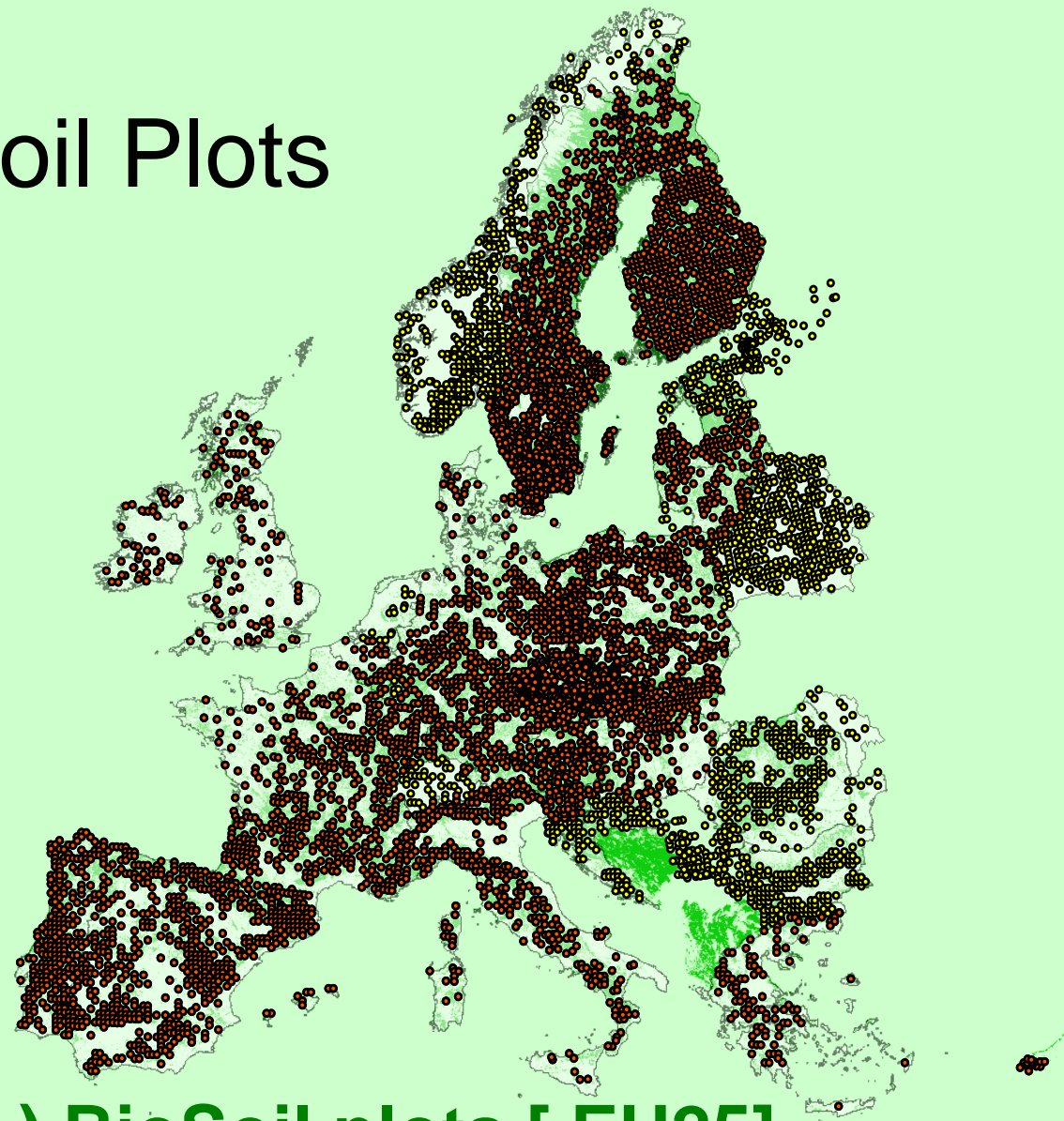


21 participating countries



The BioSoil Plots

# BioSoil plots	# Level I plots in BioSoil countries	%
4234	4545	93.2



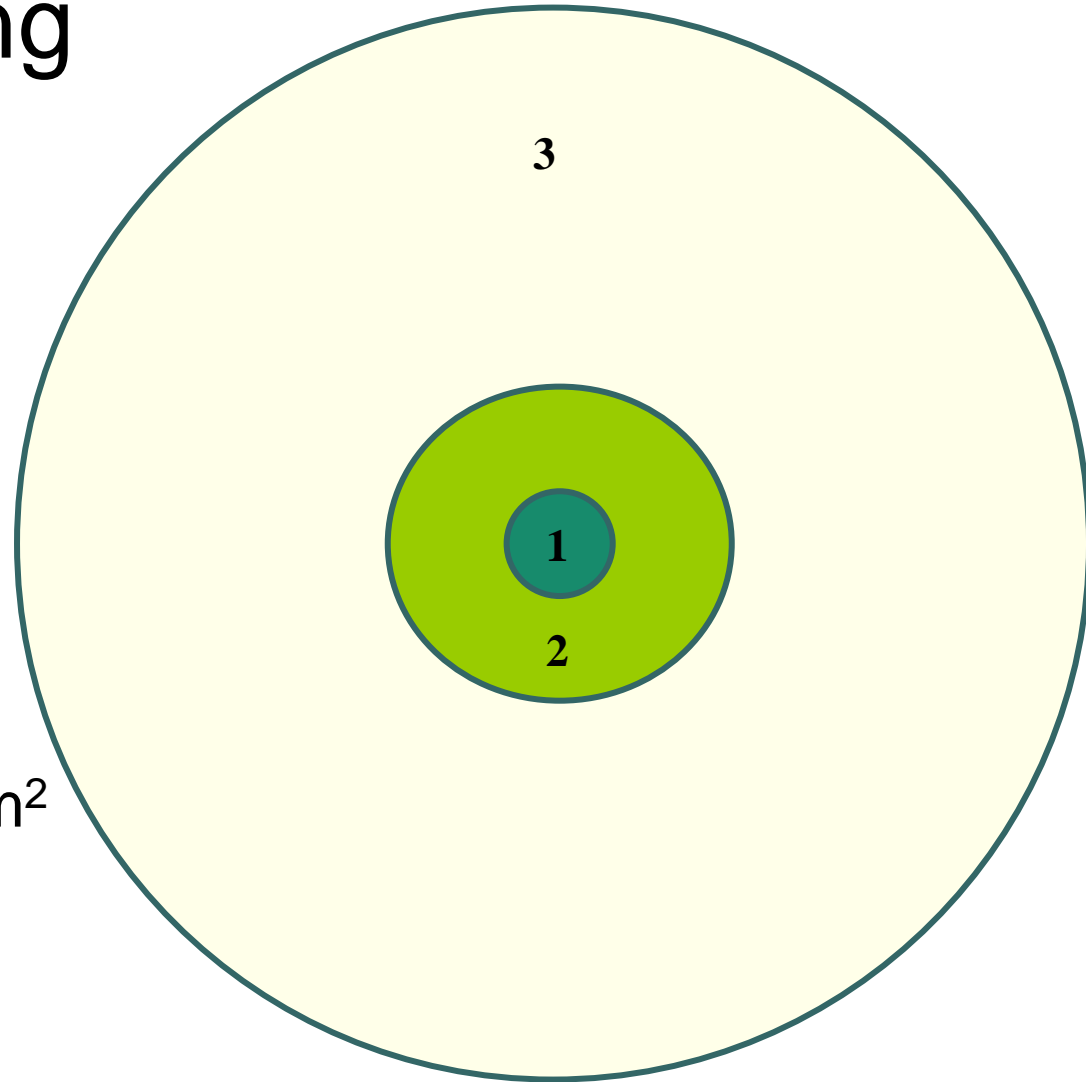
(●) BioSoil plots [EU25]

(●) Other Level I plots

BioSoil plot - move from point to plot sampling

- ● ●
- Geo-referencing
- 3 subplots
- Different sampling intensities:

- 1: $r=3\text{m}$, $A\sim 30\text{ m}^2$
- 2: $r=10\text{m}$, $A\sim 400\text{ m}^2$
- 3: $r=25\text{m}$, $A\sim 2,000\text{ m}^2$



Bastrup-Birk et al. (2006)

BioSoil Plot	Subplot 1 30 m ²	Subplot 2 400 m ²	Subplot 3 2000 m ²
General plot description	Yes		
Check of the European forest type classification	Yes		
DBH and species of all woody plants >130 cm (standing and lying, living and dead)	All trees DBH > 0 cm (taller than 130 cm)	All trees DBH ≥ 10 cm	Only trees DBH ≥ 50 cm
Top height and bottom of canopy layer	Selection of minimum 3 trees		
Coarse woody debris, snags, and stumps	D > 10 cm	D > 10 cm	No
Canopy closure (% visual)	Yes	Yes	No
Tree layering (no.)	Yes	Yes	No
Ground vegetation – vascular species list only	Yes	Yes	No



General plot description

- Previous land use and origin of actual stand
- Forest management such as thinning and selective felling
- Forest type
- Removal of coarse woody debris
- Patterns of tree mixture
- Age of the dominant tree layer
- Prevalent slope of the BIOSOIL plot (%)
- Prevalent orientation of the BioSoil plot in 8 main geographic directions).
- Fencing of the plot



Forest deadwood

- Diameter and length of coarse lying woody debris
 - Height and diameter of stump less than 130 cm in height with a diameter at normal cut height greater than 10 cm
 - Estimated diameter of snag and snag height
 - Species of all deadwood components if possible
 - Decay state (5 classes) of all deadwood components
-
- Diameter and length of fine woody debris
 - Species of fine woody debris species if possible

● ● ● Data file content



1. General BioSoil plot description, general information, location of the plot, plot age, some information also on history & management
2. Structural Biodiversity: DBH, species and (optionally) locations of all the trees within sampling areas 1, 2 and 3.
3. Structural Biodiversity: tree heights for the selected largest DBH trees within subplots 1 and 2.

Photo: Bastrup-Birk

Data file content (2)



4. Structural Biodiversity: deadwood dimensions and status.
5. Structural Biodiversity: state of canopy closure, total number of trees within the sampling area, % assessed for DBH
6. Compositional Biodiversity: Ground Vegetation, vascular species only

Photo: Bastrup-Birk



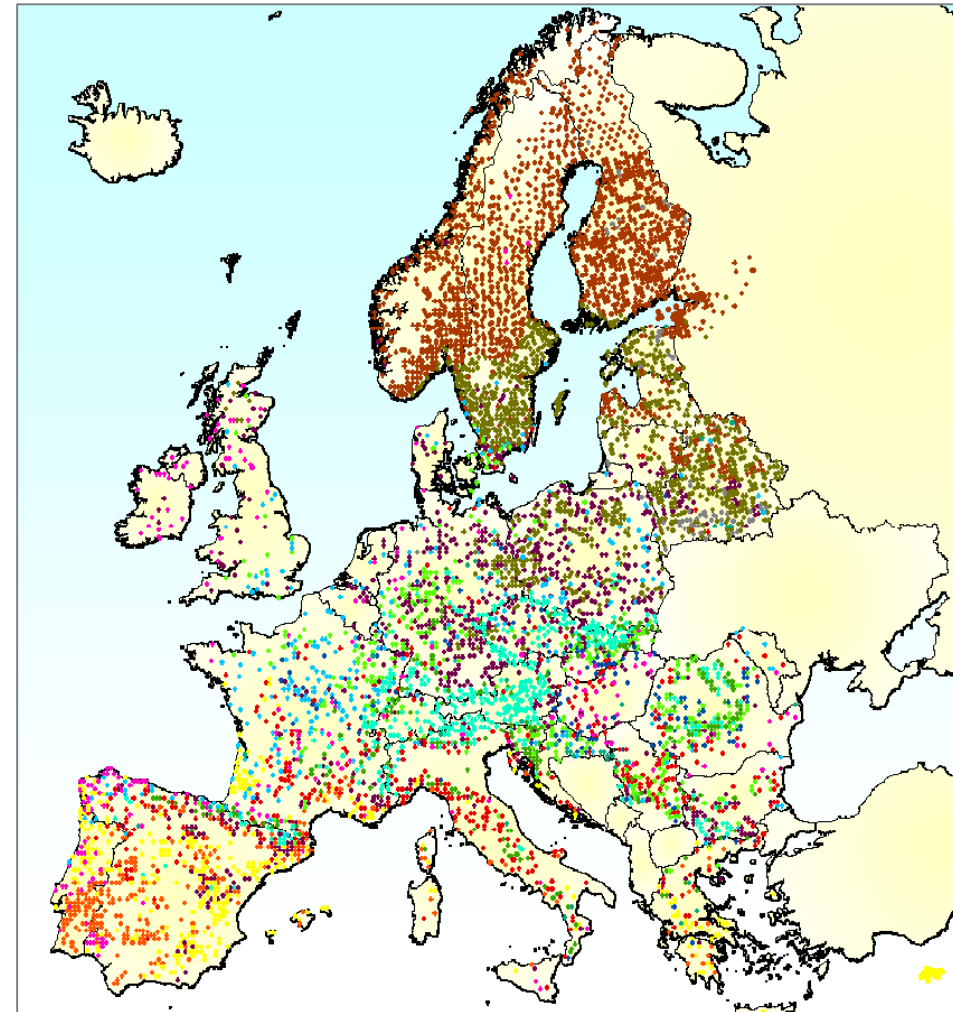
Examples of results using forest type classification



Forest type classification of the Level 1
plots (Spring 2005)

First results (2006) Forest Classification

- 1 Boreal forest (●)
- 2 Hemiboreal and nemoral Scots pine forest (●)
- 3 Alpine coniferous forest (●)
- 4 Atlantic and nemoral oakwoods, Atlantic ashwoods and dune forest (●)
- 5 Oak-hornbeam forest (●)
- 6 Beech forest (●)
- 7 Montane beech forest (●)
- 8 Thermophilous deciduous forest (●)
- 9 Broadleaved evergreen forest (●)
- 10 Coniferous forests of the Mediterranean, Anatolian and Macaronesian regions (●)
- 11 Swamp forest (●)
- 12 Floodplain forest (●)
- 13 Native plantations (●)
- 14 Exotic plantations and woodlands (●)



Chirici et al. (2006)

Where are we now?

The logo for BioSoil, featuring the word "BioSoil" in a stylized green font with a brown outline, set against a dark brown rectangular background.

- A large scale standardised inventory of forest biodiversity indicators **is** now feasible
 - Set-up of the 1st standardised pan-European survey of forest biodiversity
- Field manual of the standardised methods available
 - Tested and validated in the field
- Baseline data from ~5000 plots and open platform under the European Forest Data Centre at the JRC, Ispra
 - Opportunities to build onto this platform

Photo: Bastrup-Birk

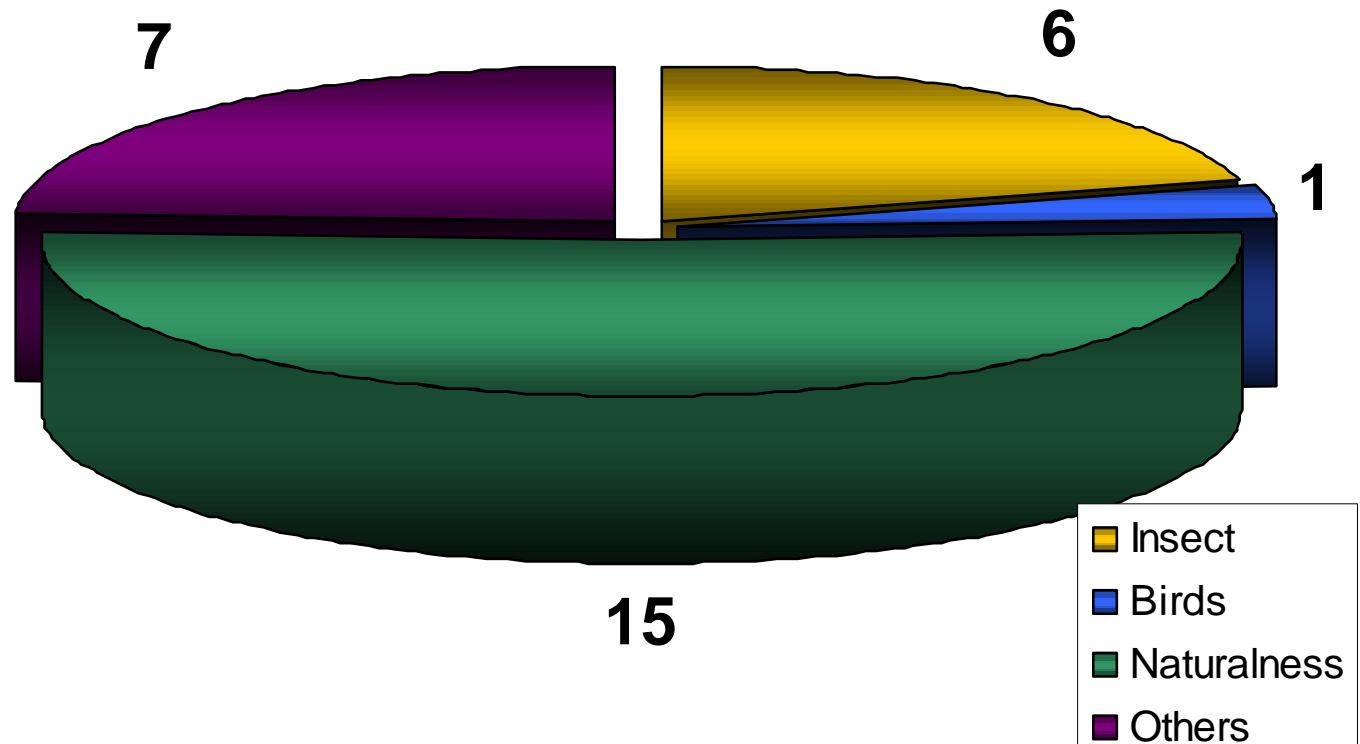
Future evaluations

- Evaluate results from ~5,000 forest plots
- Use forest category to interpret
 - Deadwood type, volume, distribution
 - Ground vegetation communities
 - Stand structural components
- Combine with....
 - the data from BioSoil Soil survey
 - Other surveys of the programme, e.g. N deposition etc.
 - Other surveys / bodies outside the programme?



Photo: Bastrup-Birk

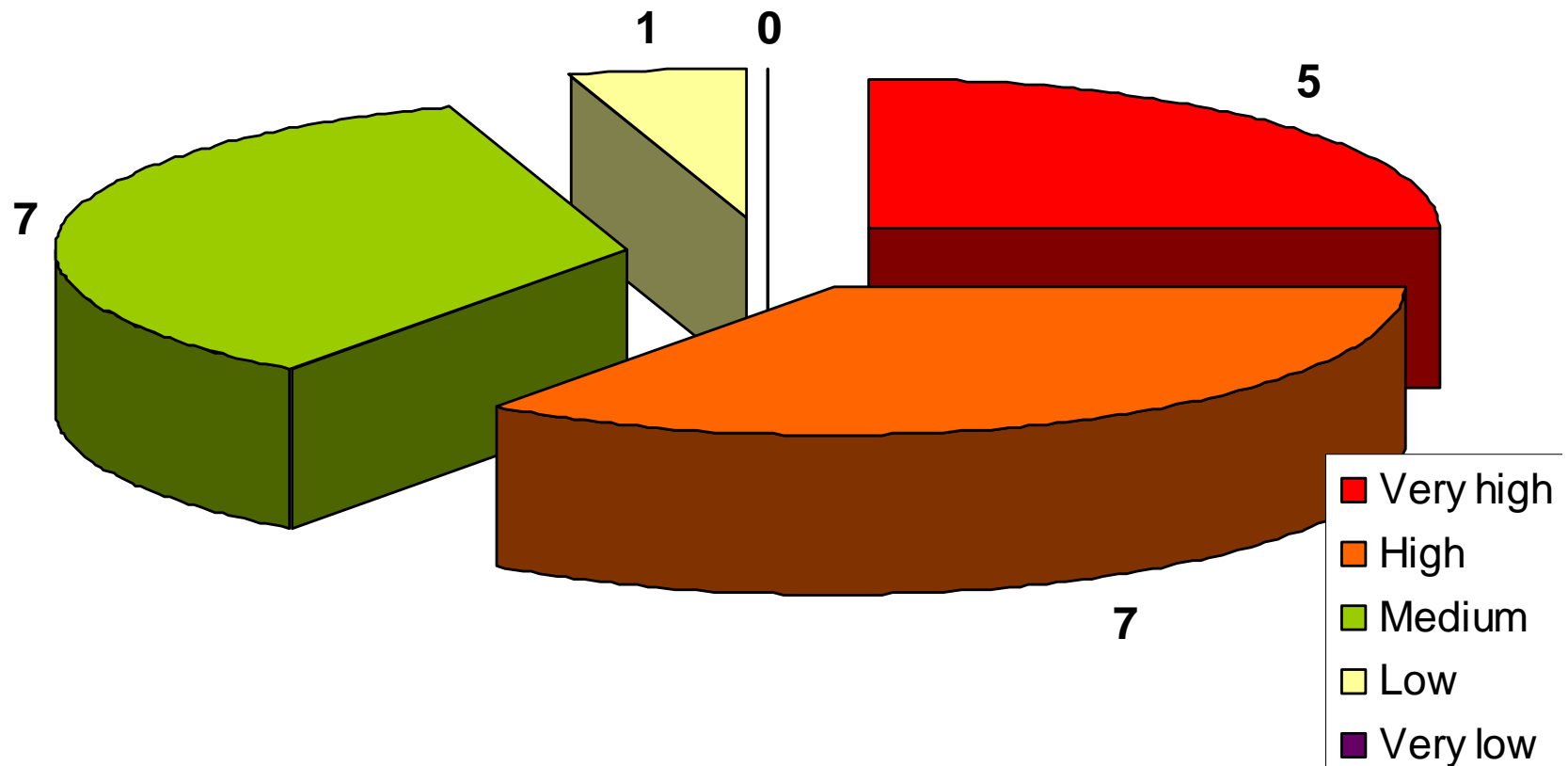
Future indicators



Other indicators:

Landscape biodiversity, indicator species, biotic factors, state of humus, soil fauna

Suitability of the BioSoil plots for future biodiversity monitoring



Thanks for your attention!



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Forest Category	Total
1	1379
2	707
3	397
4	219
5	59
6	231
7	153
8	260
9	233
10	307
11	56
12	8
13	718
14	199
999	8
Plots	4934