INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Tento projekt je spolufinancován Evropským sociálním fondem a Státním rozpočtem ČR InoBio – CZ.1.07/2.2.00/28.0018

evropský sociální fond v ČR
EVROPSKÁ UNIE
MINISTERSTVO ŠKOLSTVÍ, MLÁDEŽE A TĚLOVÝCHOVY
OP Vzdělávání pro konkurenceschopnost
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Which and how much outcomes

of research into natural forests

can we use

in the close-to-nature silviculture?

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Preface

VERY FREQUENT FORMULATION:

- natural forests are the base of knowledges for the close-to-nature silviculture;
- natural forests are the optimal model for the future of the forestry;
- research into natural forests yields results which are utilizable for the close-to-nature forestry (silviculture);

KEY QUESTIONS: WHICH outcomes?

HOW MUCH knowledges?

Preface

WHICH outcomes can we use?

Long-term scale: - forest sites (esp. soil condition)
- tree species composition

Middle-term scale: - stand structure (vertical)
- stand texture (horizontal structure)
- biomass (esp. wood) production
- deadwood volume and functions

Short-time scale: - changes of natural regeneration
- changes of herb layer (phytocoenoses)

Preface

TIME SCALES

Long-term scale: minimal 50 years long run of repeated measurements
Middle-term scale: 20-40 years long run
Short-time scale: cca 10 years long run (but repeated measurements are necessary)

USE LEVELS (HOW MUCH?)

full – limited - marginal

A – long-time scale (more 5 decades)

CHANGES OF SOIL CONDITION

Problem: development of laboratory methods impaired possibility of comparation

Merits: - indication of global climate changes
- long time acidification of soils etc.

Example: repeated measurements of research plots in Ukrainian natural forests after 70 years

Use: limited

A – long-time scale (more 5 decades)

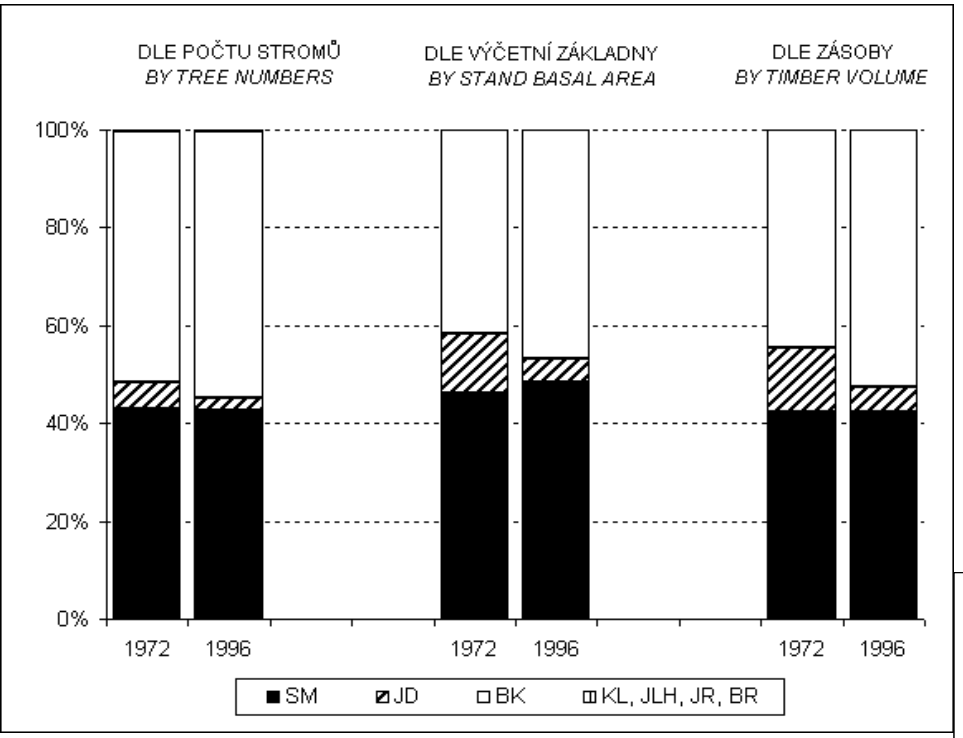
CHANGES OF TREE SPECIES COMPOSITION

Problem: relatively small natural forest reserves are impacted by secondary human activities (unsuitable systém of hunting, air pollutions etc.)

Merit: long terms changes of tree species in natural forests

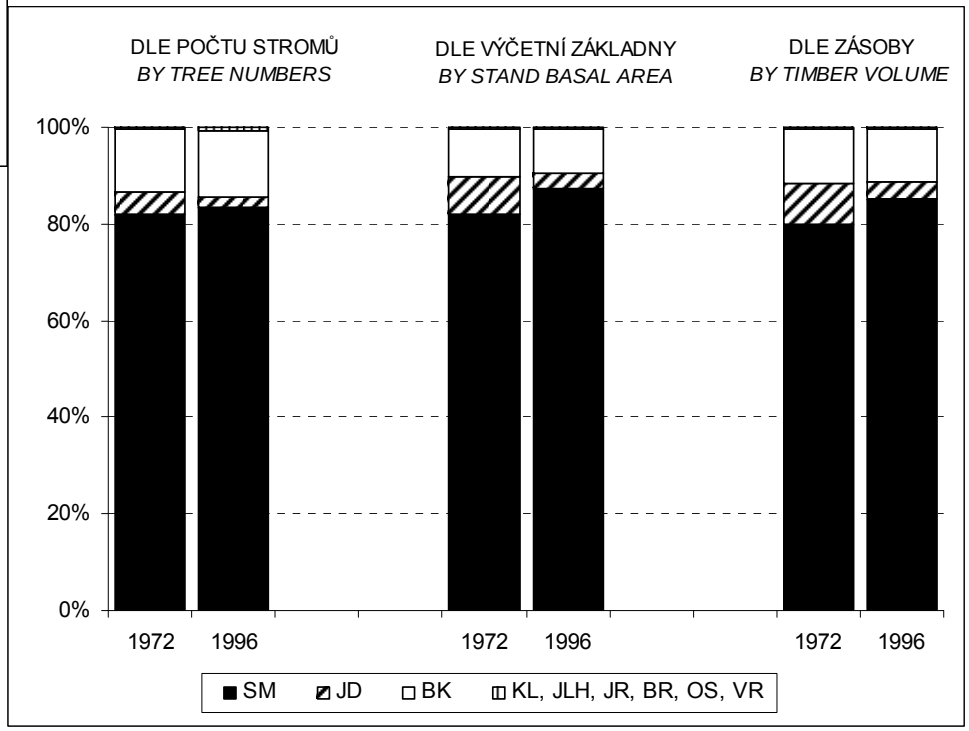
Example: repeated measurements in virgin forest Boubín

Use: limited



water unaffected sites

water affected sites



B – middle-time scale (2-4 decades)

CHANGES OF STAND STRUCTURE (vertical)

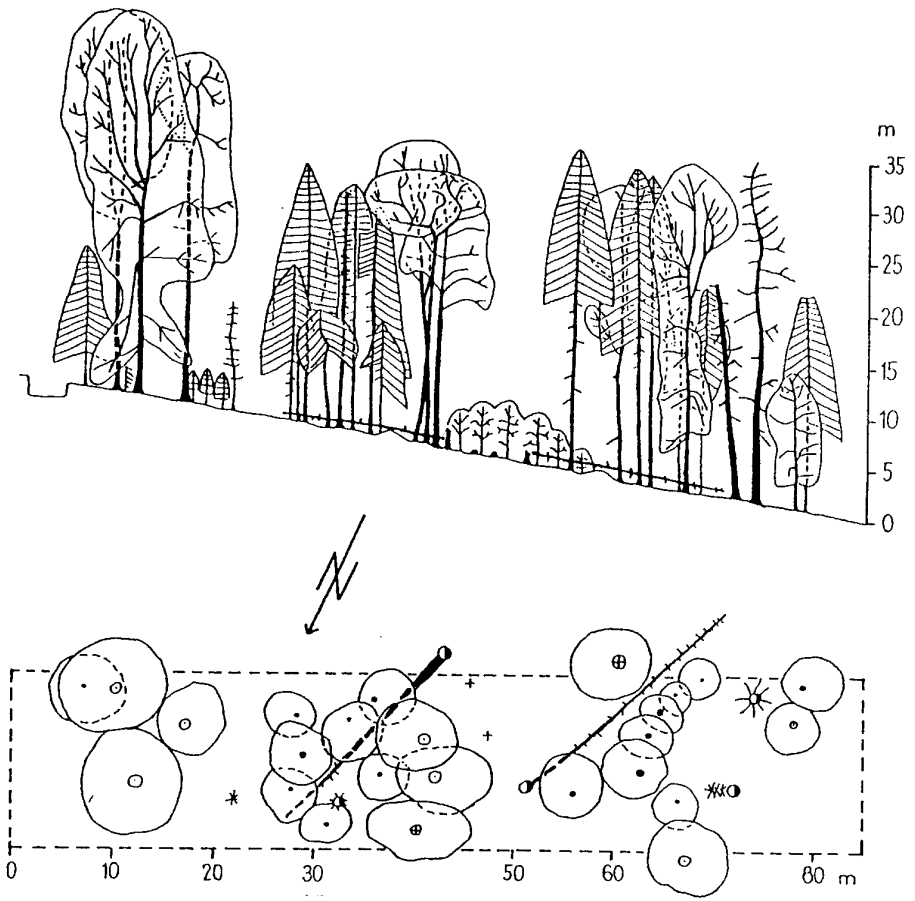
Problem: representative sample of transects (strips)

Merits: - indication of changes in stand structure due to changes of growth condition of trees and changes of tree species.

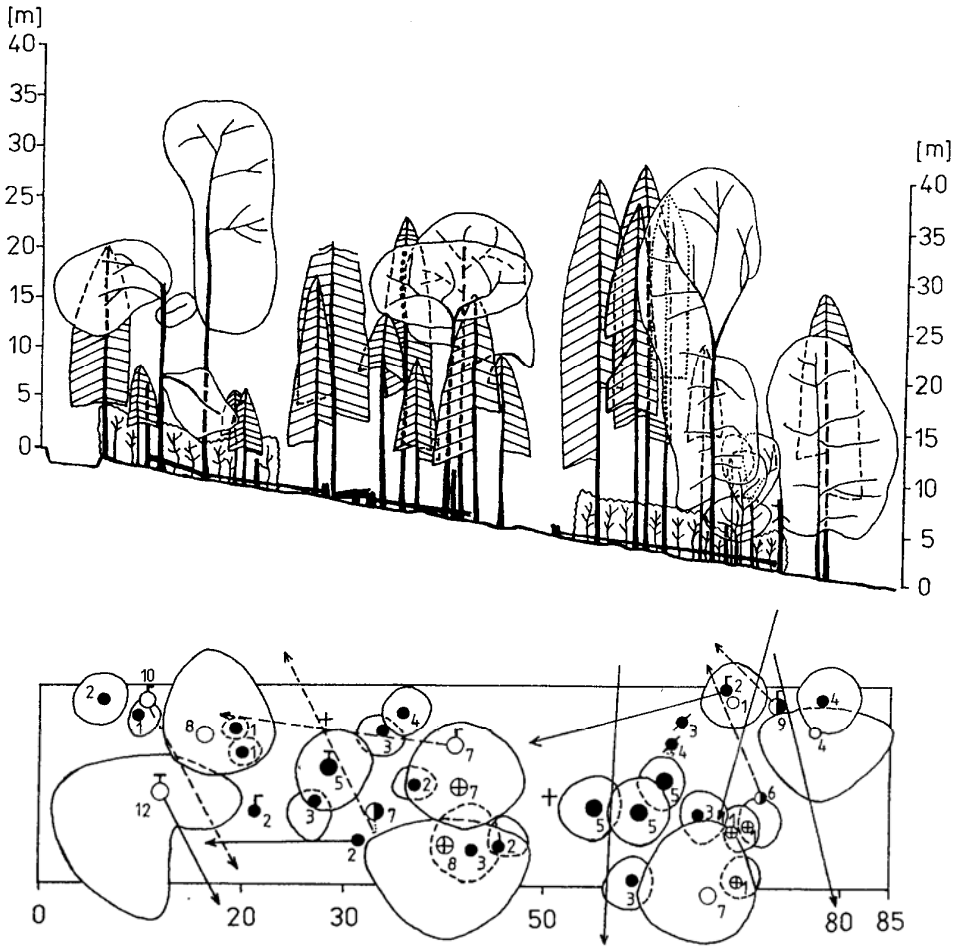
Example: repeated measurements of transects in Polom near-natural forest reserve

Use: limited

1973


m
35
30
25
20
15
10
5
0
0
10
20
30
50
60
80 m

1995


[m]
40
35
30
25
20
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5
0
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20
30
50
80
85
● smrk/Norway spruce (Picea abies)
◑ jedle/silver fir (Abies alba)
⊕ klen/sycamore maple (Acer pseudoplatanus)
○ buk/European beech (Fagus sylvatica)

B – middle-time scale (2-4 decades)

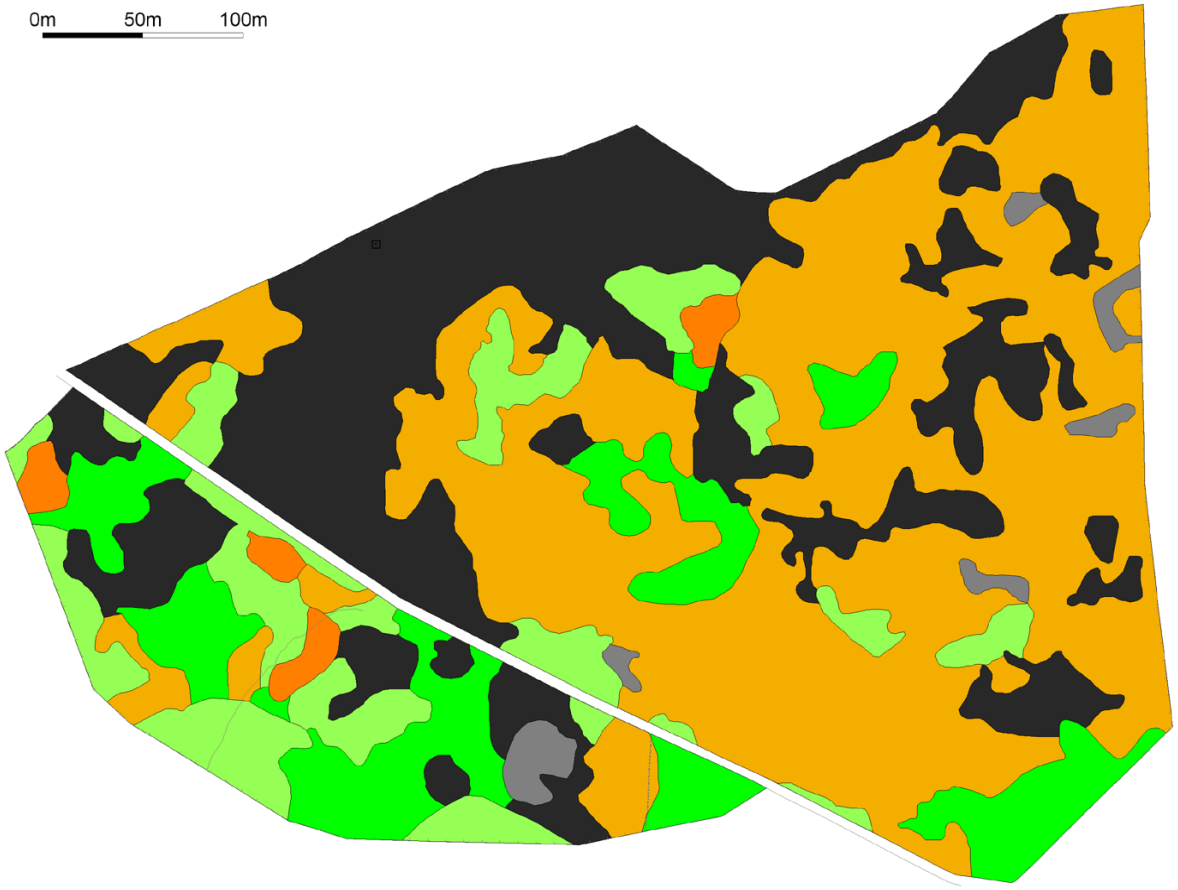
CHANGES OF STAND TEXTURE (horizontal structure)

Problem: mapping of developmental stages and phases

Merit: indication of ideal area of groups in group-selection cutting systém

Example: mapping of developmental stages and phases in Žákova hora natural forest reserve

Use: limited



Vysvětlivky / Legend :

stadium dorůstání / stage of gro th	1.90 ha
stadium dorůstání, fáze dožívání / stage of gro th, phase of expiration	2.06 ha
stadium optima / stage of optimum	7.72 ha
stadium optima, fáze terminální / stage of optimum, terminal phase	0.27 ha
stadium rozpadu / stage of disintegration	0.27 ha
stadium rozpadu, fáze zmlazování / stage of disintegration, regeneration phase	5.24 ha
CELKEM / TOTAL	17.46 ha

B – middle-time scale (2-4 decades)

BIOMASS (WOOD) PRODUCTION

Problem: methodology of research (repeated measurements)
smaple plots – statistical inventory – across the board measurements

Merit: indication of potential and continual production on the different site types

Example: synthesis of repeated measurements in the West Carpathians natural forest reserves during 25 years

Use: full

B – middle-time scale (2-4 decades)

DEADWOOD VOLUME AND FUNCTIONS

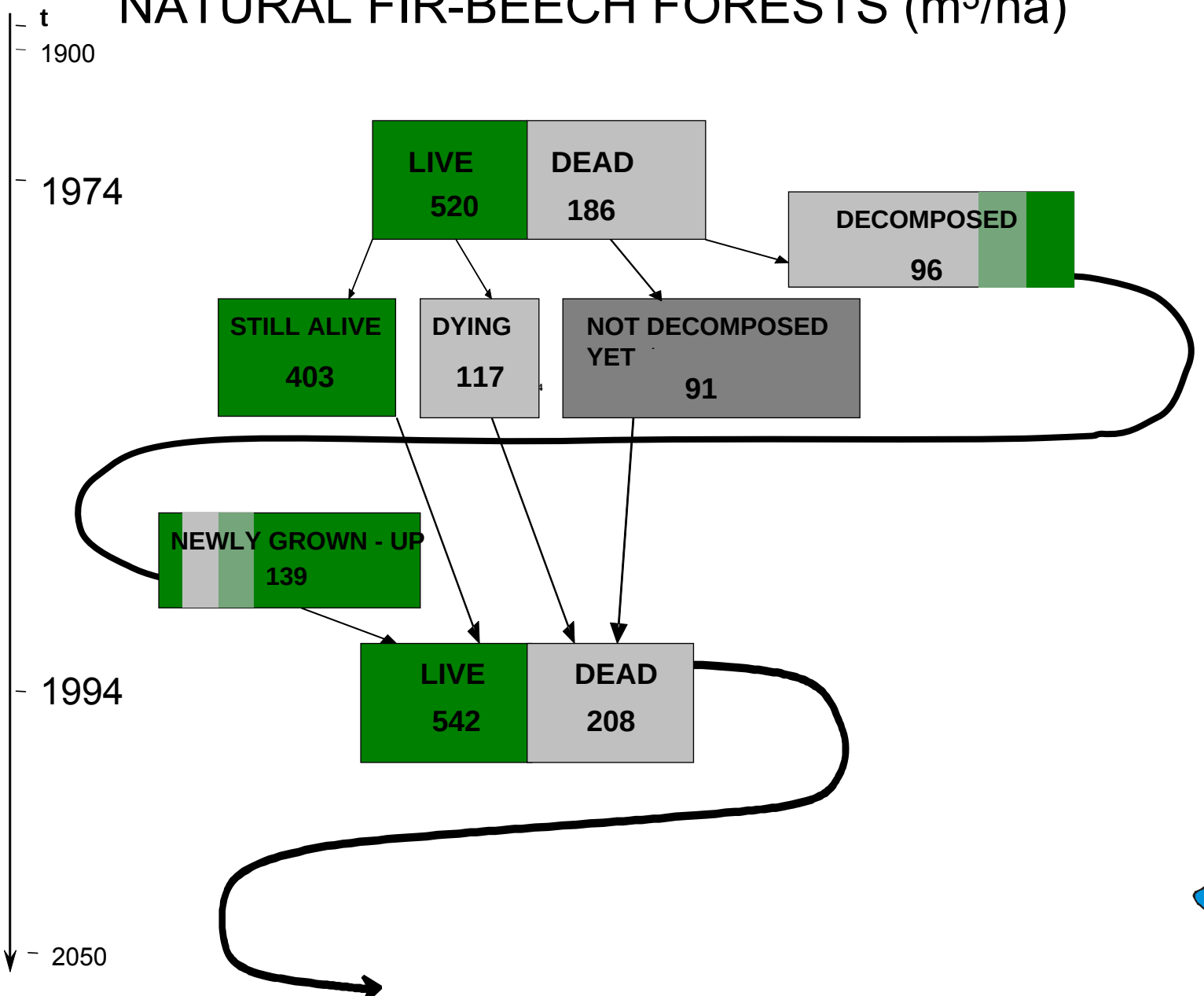
Problem: methodology of repeated measurements (large areas are better)

Merits: - deadwood functions in the protection of soil production
- how many deadwood is optimal for decomposition in productive forest?

Example: synthesis of repeated measurements in the West Carpathians natural forest reserves during 20 years

Use: full

WOOD CYCLE IN WEST CARPATHIANS
NATURAL FIR-BEECH FORESTS (m^3/ha)



Basic data – rich, fresh sites
– silver fir-European beech stands

- Timber volume of living and dead trees: 745 m3/ha

  living trees – 554 m3/ha (74%)
  dead trees – 191 m3/ha (26%)

- Average period of decomopisition of one tree - 40 years

- During 20 years died 18,5% of volume of living trees –
  it means – average age of one tree is 108 years

C – short-time scale (1-2 decades)

CHANGES OF NATURAL REGENERATION

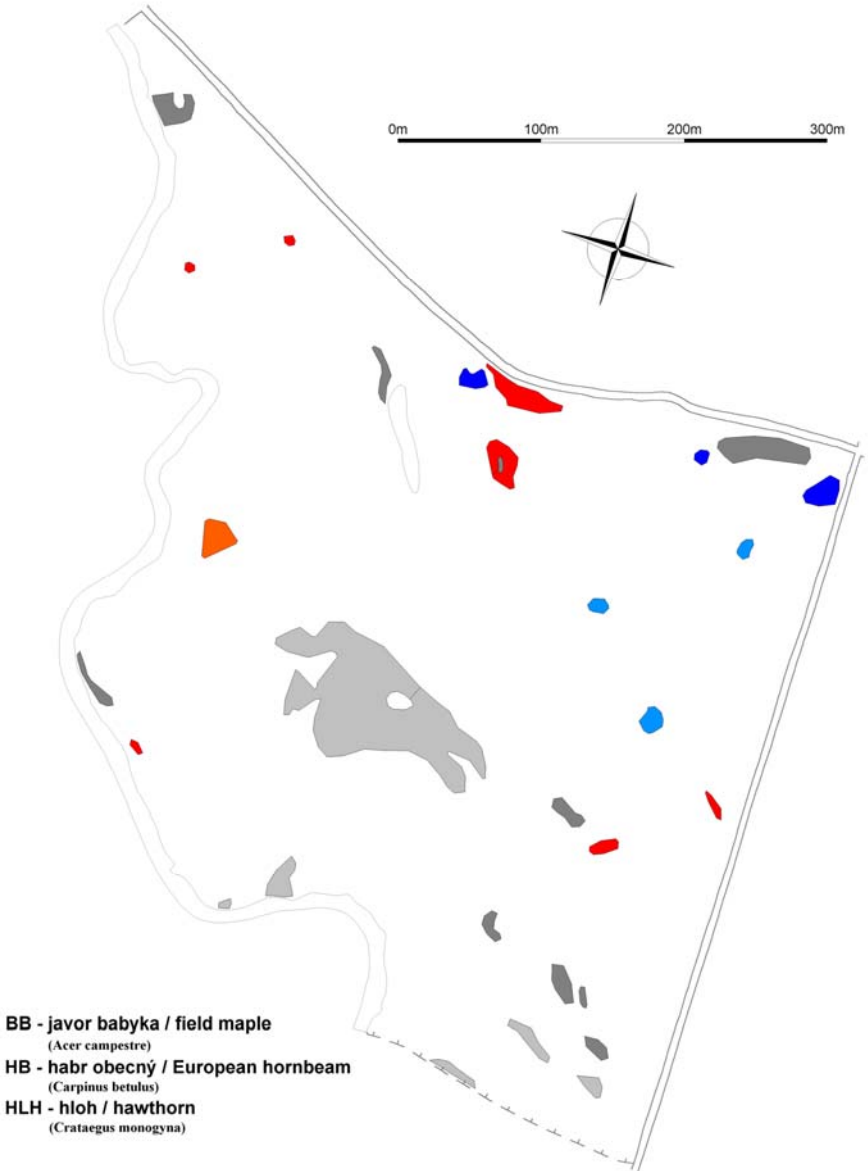
Problem: exact mapping of natural regeneration groups

Merit: indication of competitive ability of tree species

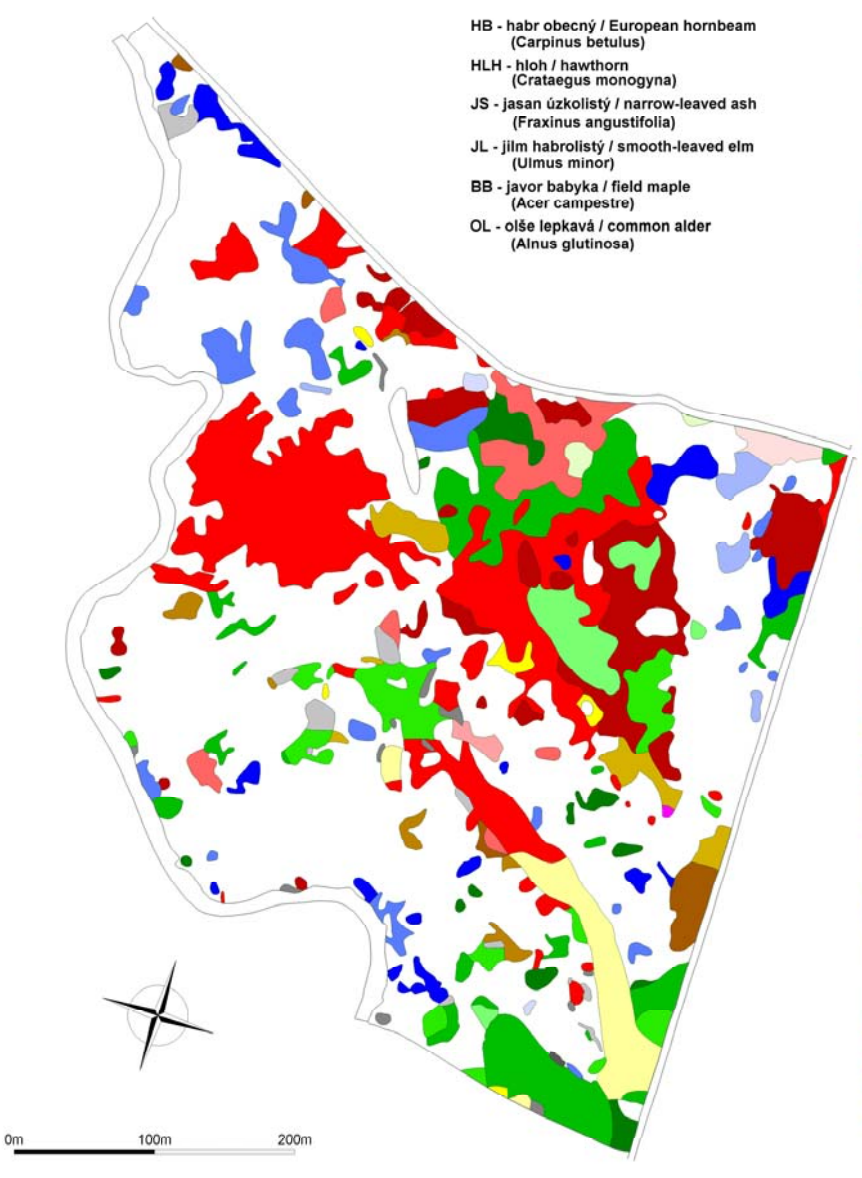
Example: repeated measurements in lowland natural forest reserve Ranšpurk during 20 years

Use: limited

1973


0m
100m
200m
300m
BB - javor babyka / field maple
(Acer campestre)
HB - habr obecný / European hornbeam
(Carpinus betulus)
HLH - hloh / hawthorn
(Crataegus monogyna)

1999


HB - habr obecný / European hornbeam
(Carpinus betulus)
HLH - hloh / hawthorn
(Crataegus monogyna)
JS - jasan úzkolistý / narrow-leaved ash
(Fraxinus angustifolia)
JL - jilm habrolistý / smooth-leaved elm
(Ulmus minor)
BB - javor babyka / field maple
(Acer campestre)
OL - olše lepkavá / common alder
(Alnus glutinosa)
0m
100m
200m

C – short-time scale (1-2 decades)

CHANGES OF HERB LAYER

Problem: - use of optimal research methods
- interpretation of outcomes

Merits: - spread of invasive herb species
- protection of populations of protected herb species

Example: repeated measurements in lowland natural forest reserve Ranšpurk during 20 years

Use: marginal – in commercial forests
limited - in protected forests under the restoration management

Results overview

changes of	full	limited	marginal
soil condition		●	
tree species composition		●	
stand structure		●	
stand texture		●	
biomass production	●		
deadwood volume and functions	●		
natural regeneration		●	
herb layer			●

Conclusions

- Use of outcomes in close-to-nature silviculture is generally limited, but necessary.
- It is the base which have to be compare with the owner`s concept, economical aims etc.

- Outcomes of research into natural forest reserves are full utilizable in restoration management of forests (which can use the principles of close-to-nature silviculture) – it is the special theme!


Thank you for your attention!