



Europäische Union. Europäischer
Fonds für regionale Entwicklung.
Evropská unie. Evropský fond pro
regionální rozvoj.



Changes in the vegetation of the Křinice river banks after 24 years (1994-2018)



Martin Adámek, Lucia Hederová, Hanrij Härtel & Petr Petřík

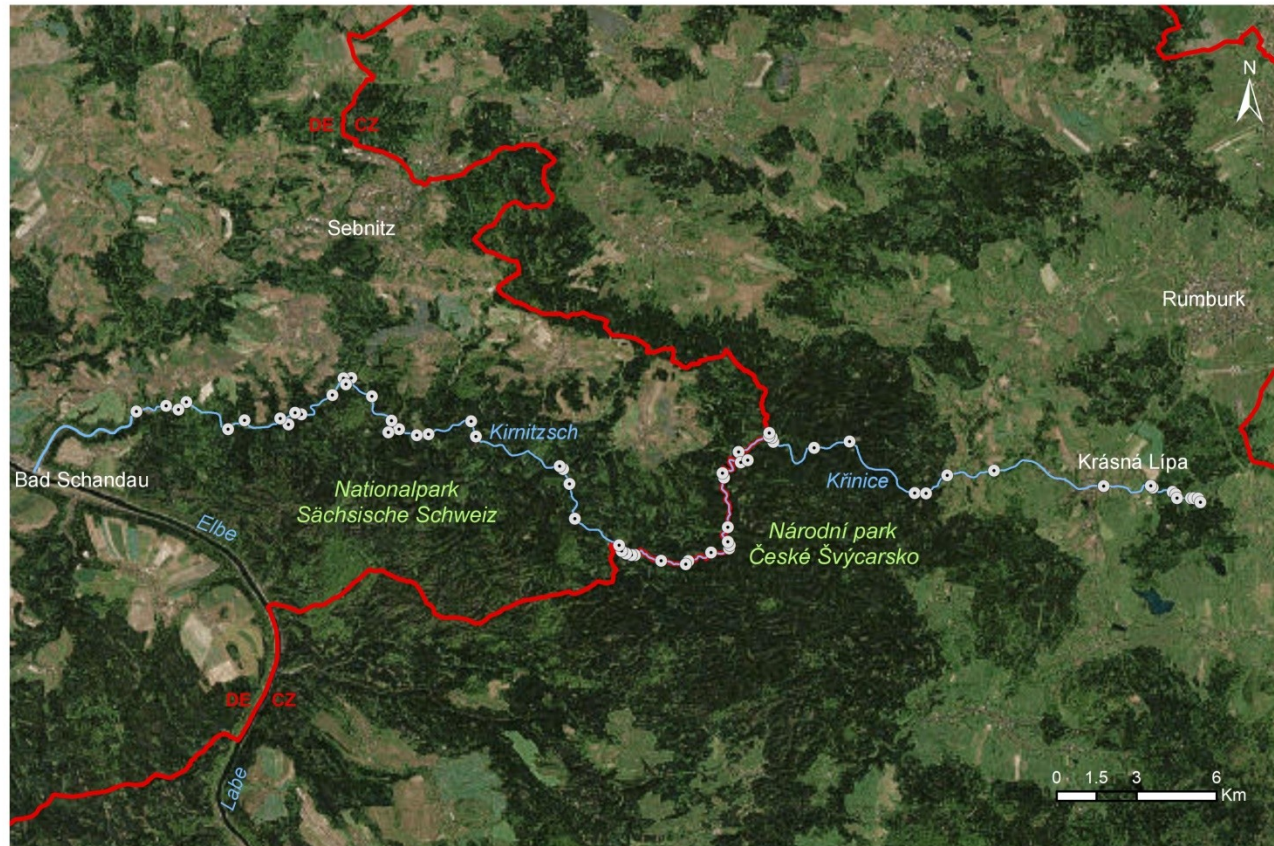
Aim of the study

- To detect changes in vegetation composition after 24 years
- Repeated sampling of Hanrij Härtel's vegetation plots – Křinice river banks
- Published in:

Schlußbericht zum Projekt „Biologisch/naturschutzfachliche Untersuchungen an der böhmisch-sächsischen Kirnitzsch“, *Bioservis s.r.o.*, Praha, 1994



Localization of vegetation samples along Křinice river

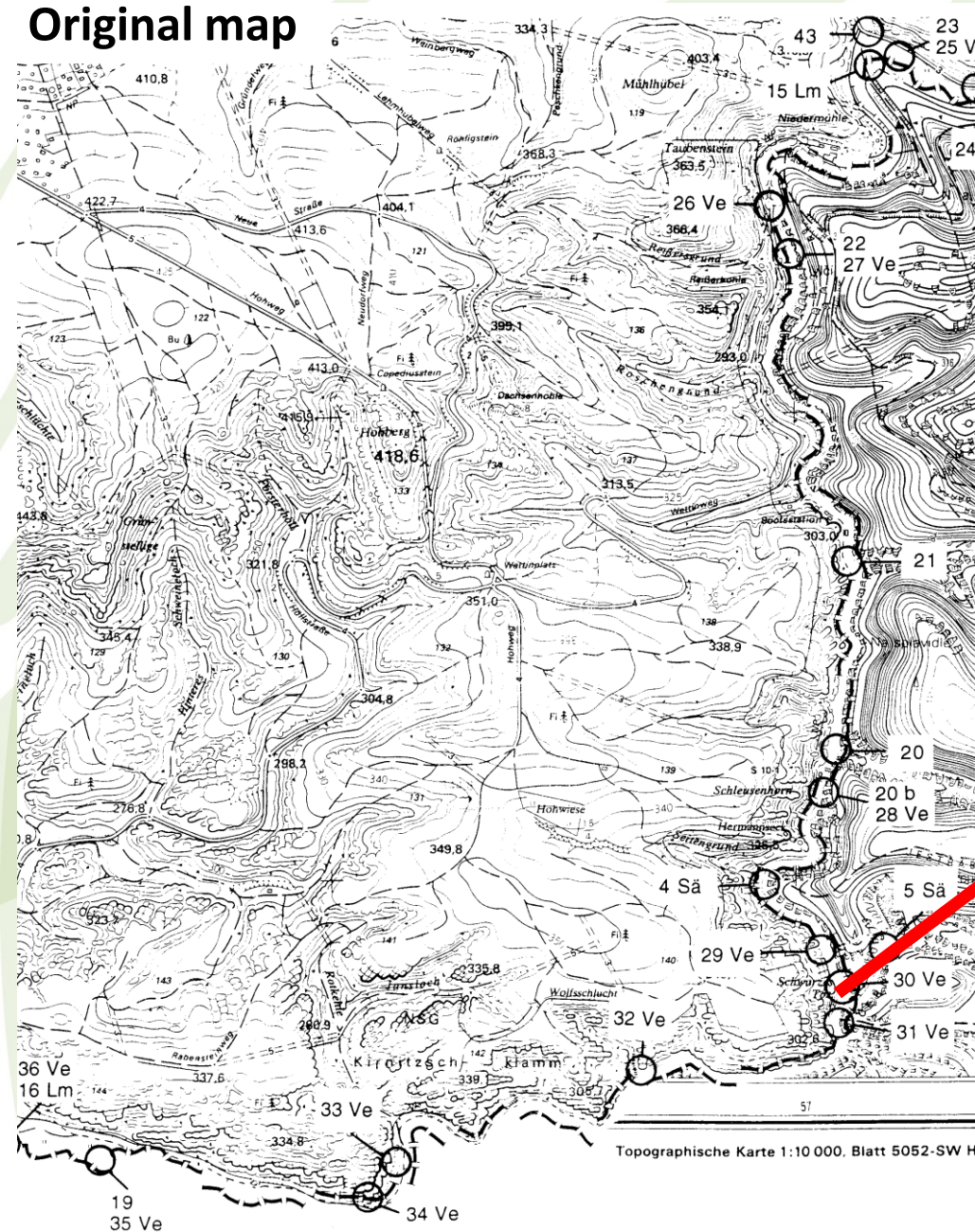


Vegetation sample

Relévé No. 47		Turboveg No.: 147	
Add species	Delete	Edit header	
No. of species:	9	(9 records)	
Shannon-Wiener Index:	1.05		
Evenness:	0.48		
<input checked="" type="radio"/> Cover as a code <input type="radio"/> Cover as percent. val.			
<input checked="" type="radio"/> Layer <input type="radio"/> Cover <input type="radio"/> Alph. <input type="radio"/> Seq.			
4	<i>Filipendula ulmaria</i>		[6]
m	<i>Equisetum palustre</i>		[6]
m	<i>Glyceria maxima</i>		[6]
1	<i>Carex brizoides</i>		[6]
1	<i>Calystegia sepium</i>		[6]
+	<i>Galium aparine</i>		[6]
+	<i>Persicaria amphibia</i>		[6]
+	<i>Symphytum officinale</i>		[6]
+	<i>Urtica dioica</i>		[6]
Table number:		147	
Relévé number:		147	
id:		11L	
year:		2018	
Field number:			
Cover tree layer (%):			
Cover shrub layer (%):			
Cover herb layer (%):		85	
Cover moss layer (%):			
Relévé area (m2):		50.00	
Date (year/month/day):		20180711	
Remarks:		d=8m	

Localization of vegetation plots

Original map



Original photos



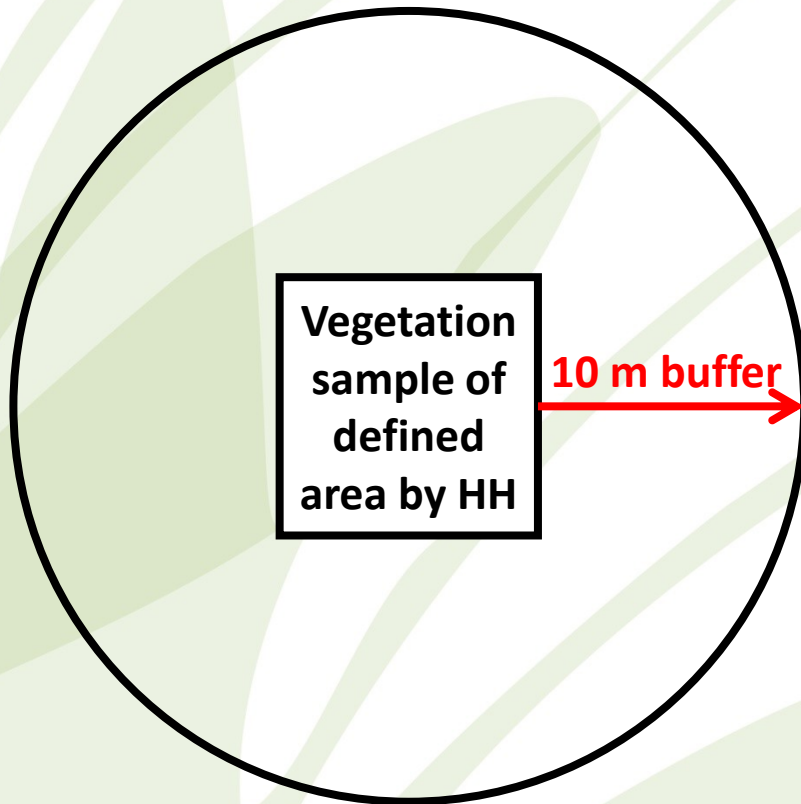
Plot 30Ve: year 1994



Plot 30Ve: year 2018

Methods

Dealing with inaccurate localization:



Vegetation sample: Species abundances
10 m buffer: Species presence

**In total: Repeated 40 samples
in the Czech part of the river valley**

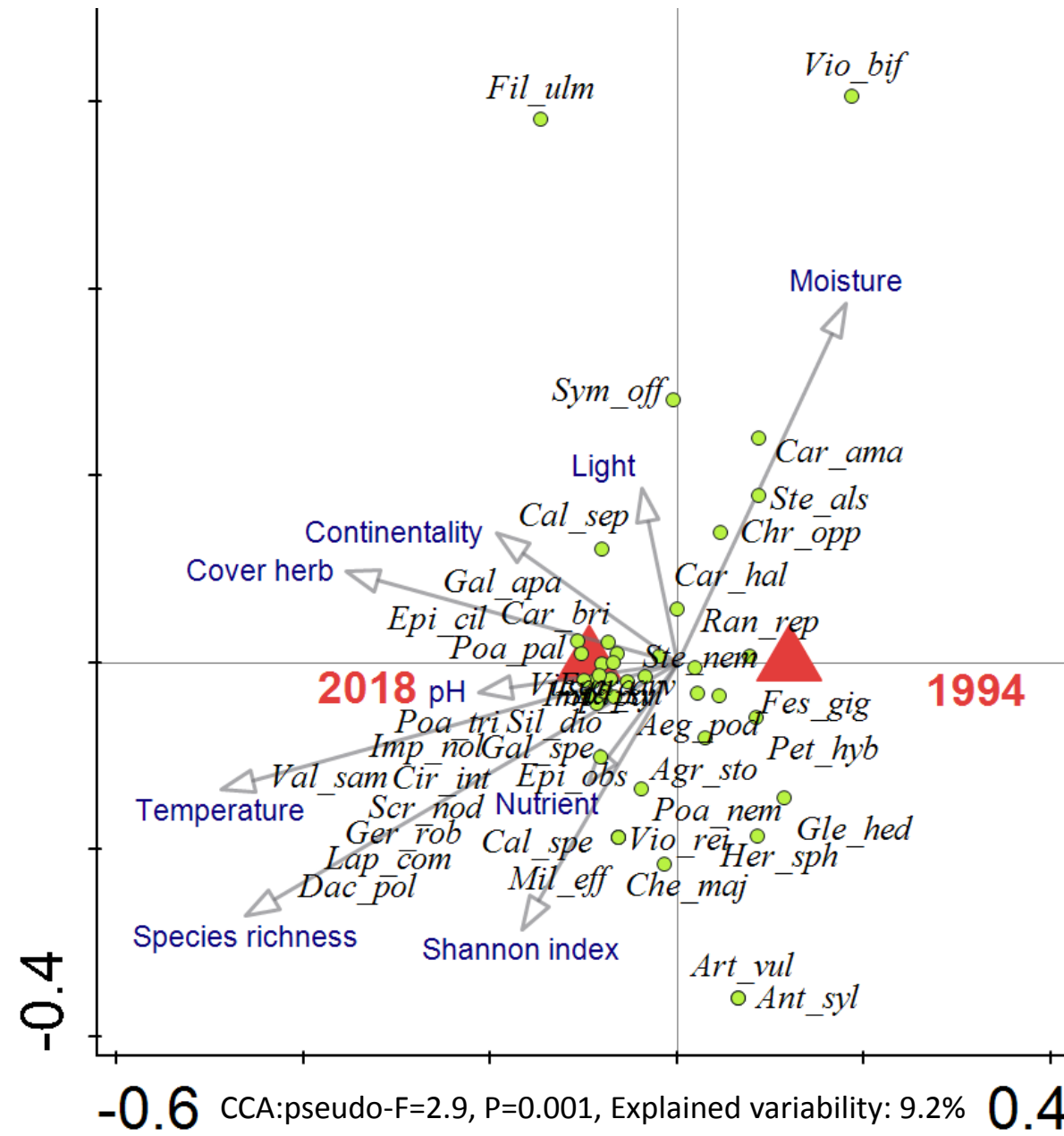


Multivariate and univariate statistical analyses of 80 samples (40 old & 40 new)

Changes in:

- Species composition
- Species richness (α -diversity)
- Vegetation heterogeneity (β -diversity)
- Ellenberg indicator values

Results: Species composition



More in 1994:

Petasites hybridus
Ranunculus repens
Glechoma hederacea
Chrysosplenium oppositifolium
Cardamine amara
Viola biflora (C4)



More in 2018:

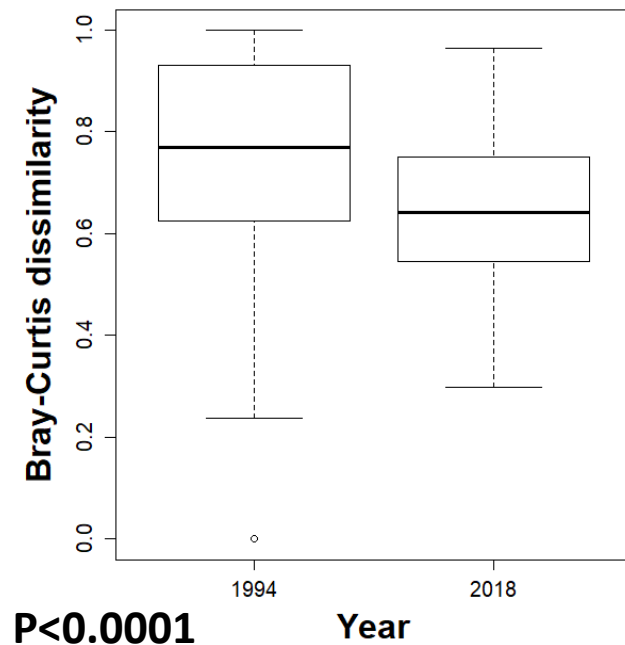
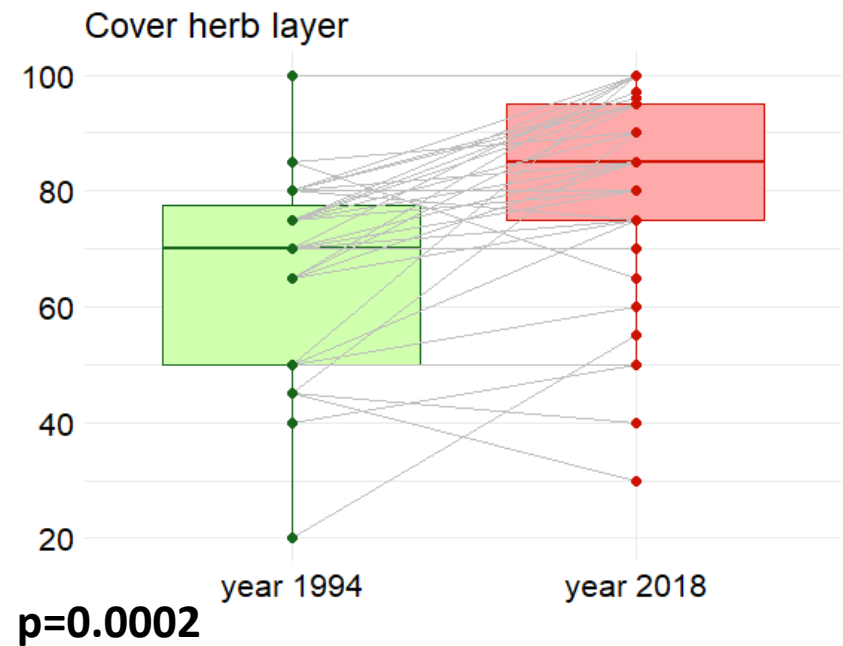
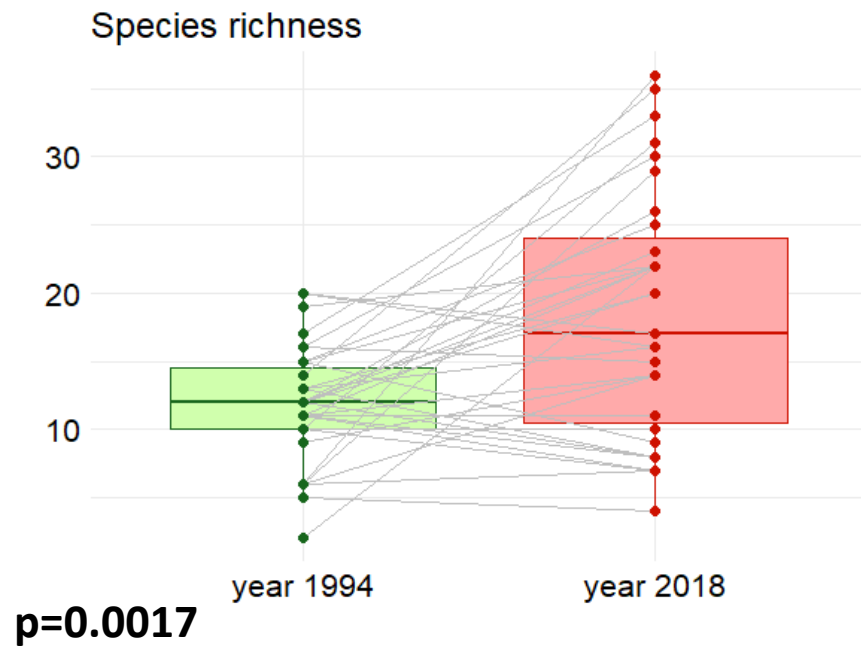
Galium aparine
Circaea x intermedia
Valeriana sambucifolia
Carex brizoides
Impatiens noli-tangere
Filipendula ulmaria
Epilobium ciliatum - invasive
Veronica montana (C4)



Higher, competitive,
 later-successional
 species?

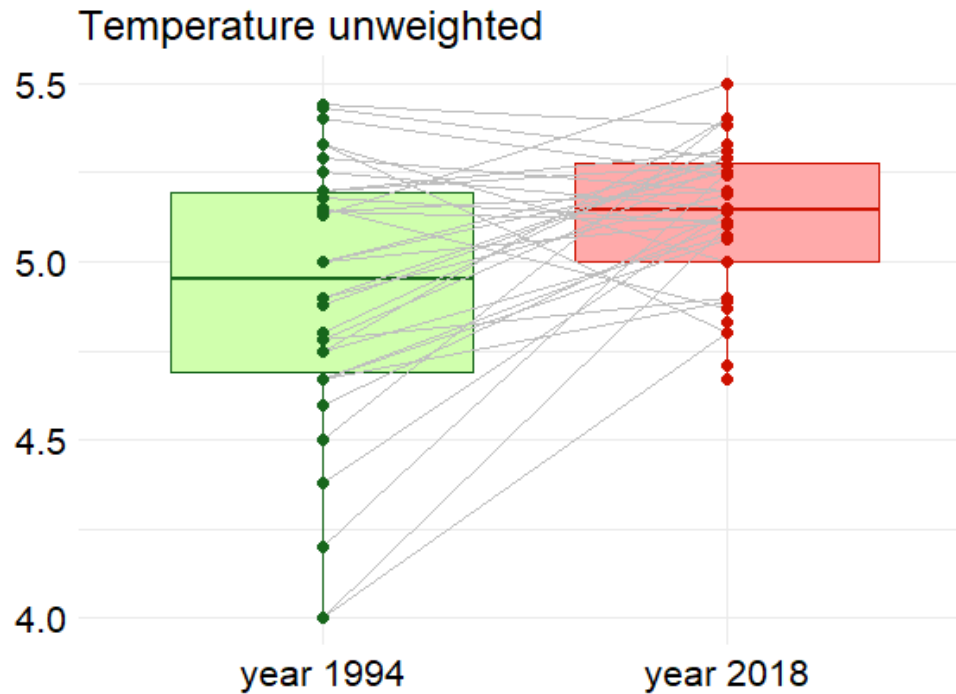


Results: Species diversity (α, β)



Pairwise comparisons using Wilcoxon rank sum test

Results: Ellenberg indicator values



$p=0.004$

Not Significant:

Light
Moisture
Nutrients
pH
Continentality

Significant only Temperature:
Evidence of Global Warming? ☺

Pairwise comparisons using Wilcoxon rank sum test



Summary

Vegetation changes after 24 years:

- Significant change in species composition with unclear trend (higher plants?)
- Higher vegetation cover and species richness
- Lower vegetation heterogeneity – homogenization?
- Shift towards more thermophilous vegetation (less de-montane species?)
- **We need more data!**



Erythranthe guttata
kejslířka obecná
Gefleckte Gauklerblume

Thank you for your attention