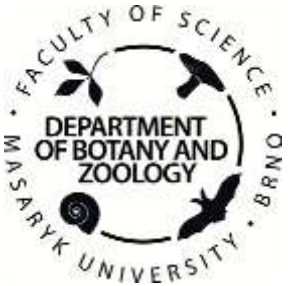
Six years of experimental litter collecting: Effects on forest understorey vegetation

Ondřej Vild, Radim Hédl



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Seven years of experimental litter collecting: Effects on forest understorey vegetation

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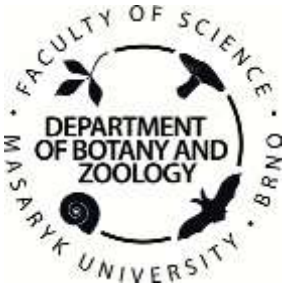

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Effects of simulated historical tree litter raking on the understorey vegetation in a central European forest

Ondřej Vild, Jesse M. Kalwij & Radim Hédl

Introduction

- Bedding for animals, fertiliser

Bürgi & Gimmi, 2007, orig. Brockmann-Jerosch 1928/30

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- Low number of historical records;
  but recorded in 40 percent of cadastres in Moravia
- Banned by the end of 19th century
- Possible application in conservation practice

Questions

- How much does litter raking deplete soil nutrient?
- What is the effect on species richness? Which species are favored?

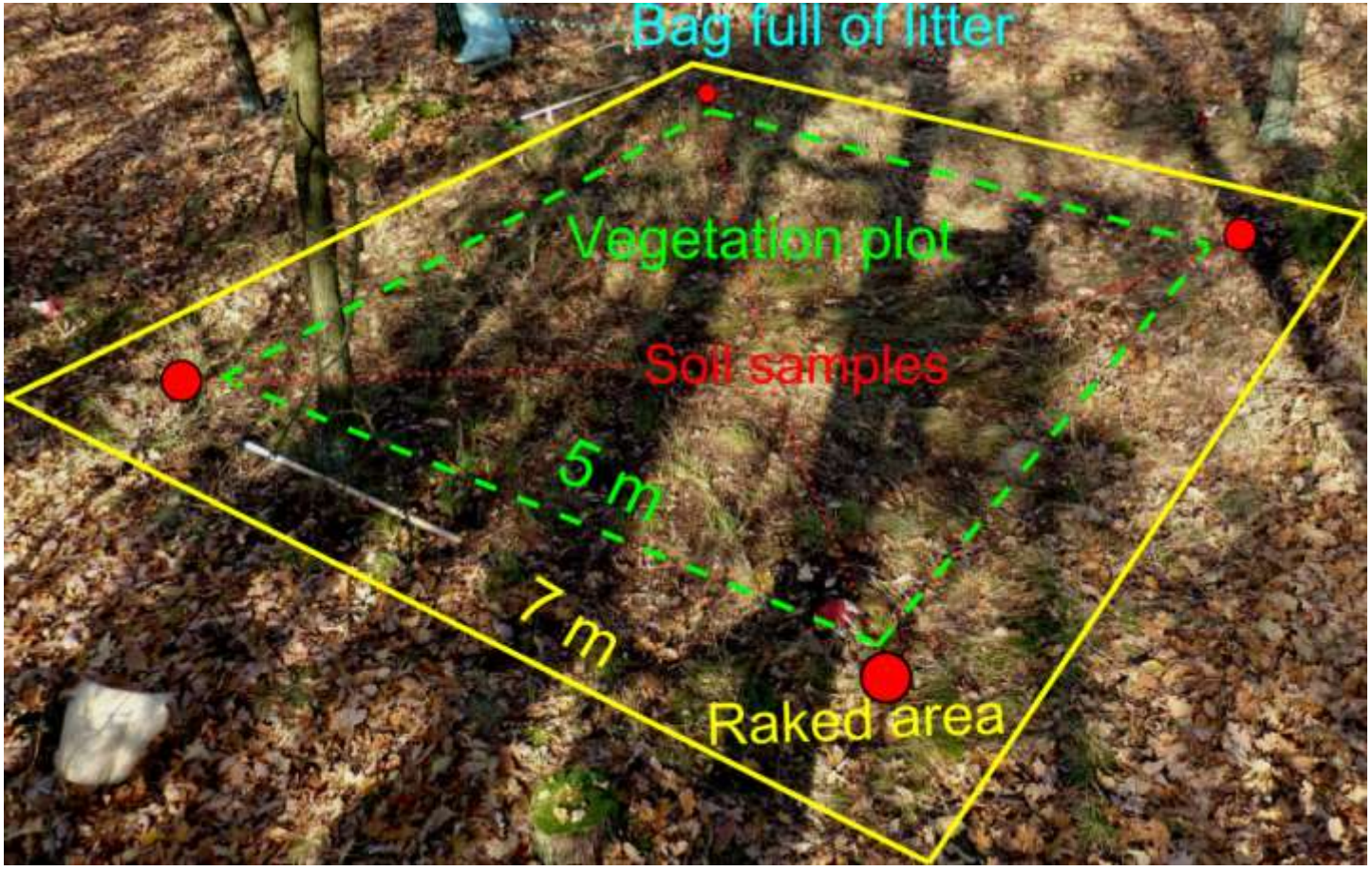
- **Spring** vs. **Autumn**

Methods

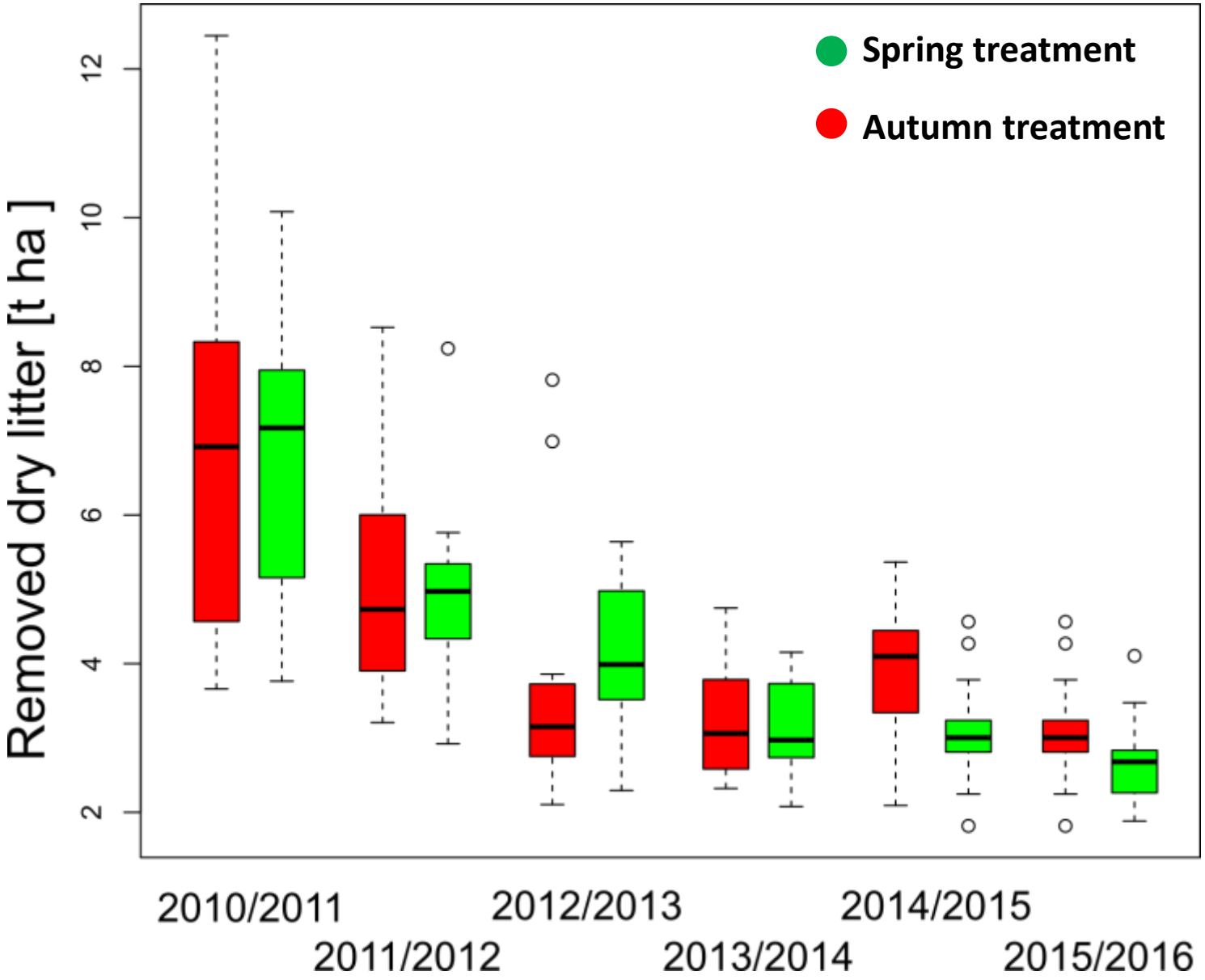
- Podyjí National park

Methods

- Podyjí National park
- **45** plots; **3** treatments: 1. **spring**, 2. **autumn**, 3. **control**
- Raking 7 × 7 m; vegetation sampling 5 × 5 m each year



Litter offtake

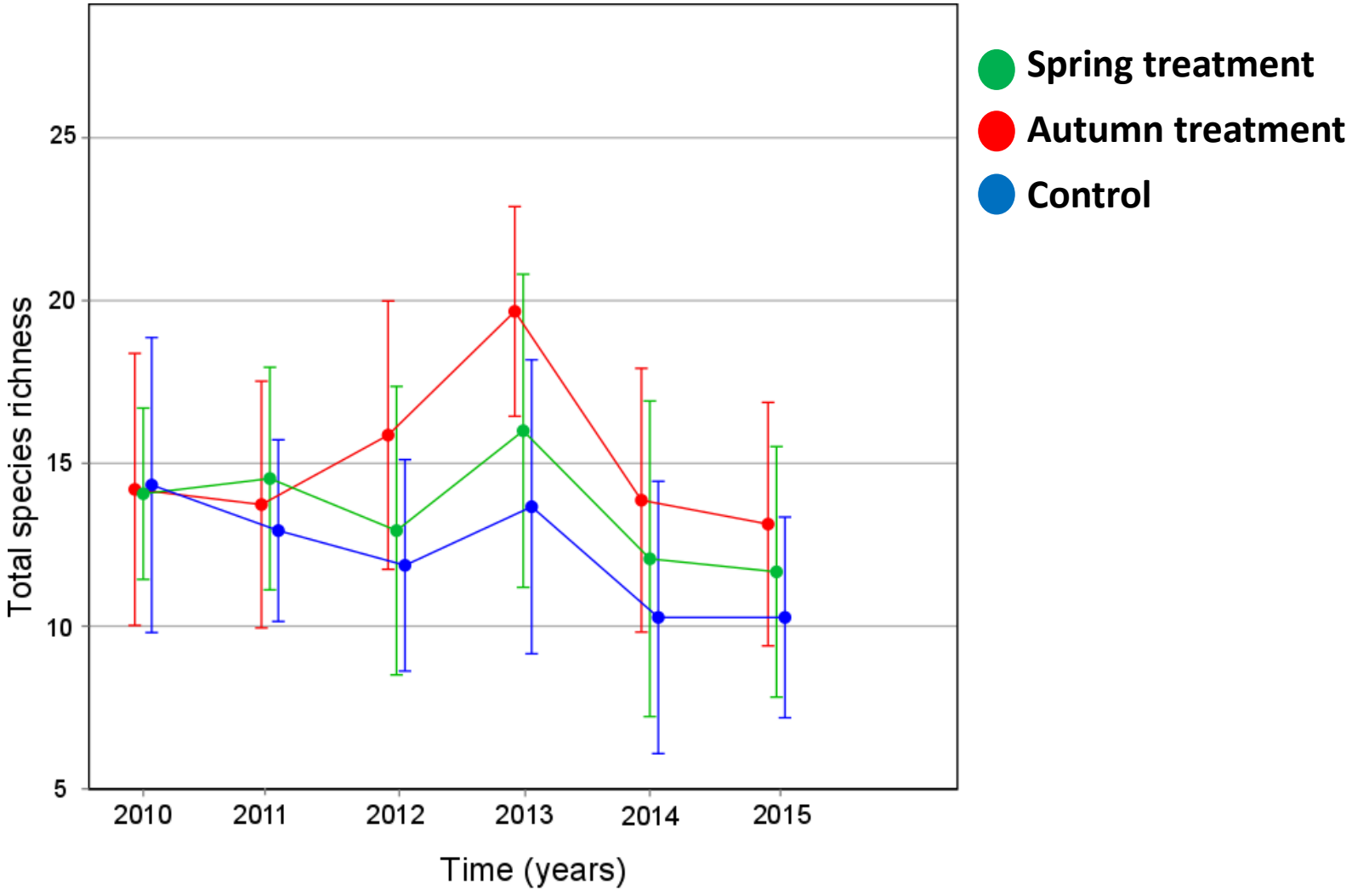


Effect on soil chemistry

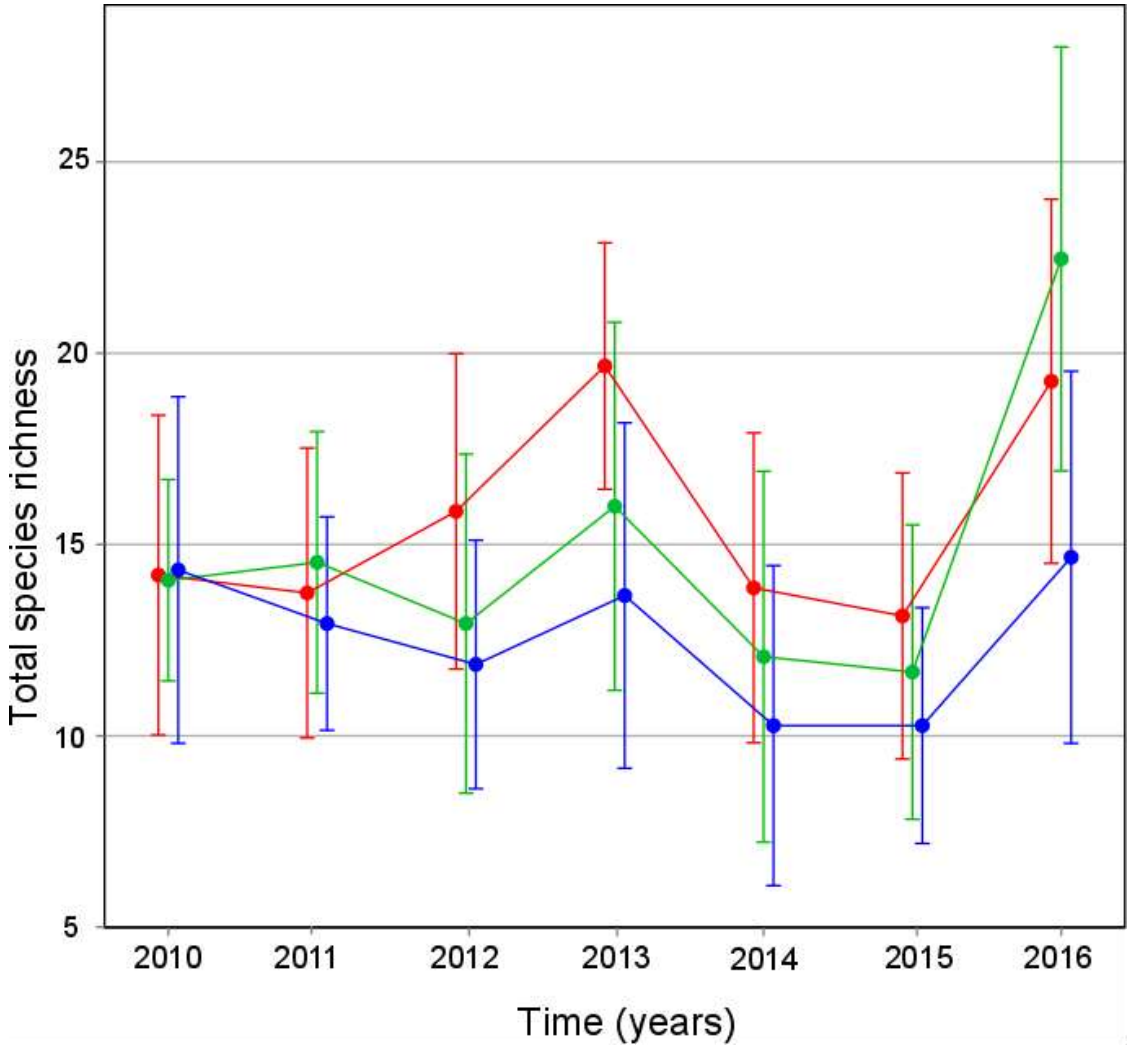
Soil variable	Observation year		
	2010	2011	2012
pH (A horizon)	4.59 ± 0.04	4.54 ± 0.03	4.63 ± 0.04
pH (B horizon)	4.39 ± 0.02	4.29 ± 0.02	4.35 ± 0.02
C:N ratio (A horizon)	16.23 ± 0.23	16.35 ± 0.29	15.81 ± 0.27
C:N ratio (B horizon)	17.38 ± 0.17	16.59 ± 0.51	18.25 ± 0.36
Organic C (%; A horizon)	8.01 ± 0.25	7.5 ± 0.2	7.44 ± 0.27
Organic C (%; B horizon)	3.09 ± 0.15	2.69 ± 0.09	2.84 ± 0.09
Total N (%; A horizon)	0.49 ± 0.02	0.46 ± 0.01	0.47 ± 0.02
Total N (%; B horizon)	0.18 ± 0.01	0.16 ± 0.01	0.16 ± 0.01
Ca^{2+} (mg g^{-1}; A horizon)	819.5 ± 42.8	857.3 ± 30.2	968.7 ± 49.8
Ca^{2+} (mg g^{-1}; B horizon)	247.3 ± 8.7	247.4 ± 9.8	273.7 ± 10.7
Mg^{2+} (mg g^{-1}; A horizon)	139.6 ± 2.6	137.4 ± 3.8	160.8 ± 6.1
Mg^{2+} (mg g^{-1}; B horizon)	51.58 ± 1.77	58.07 ± 1.95	54.69 ± 1.67
P (mg g^{-1}; A horizon)	17.65 ± 2.09	27.56 ± 1.31	23.42 ± 1.82
P (mg g^{-1}; B horizon)	8.6 ± 1.47	20.8 ± 1.79	19.27 ± 1.92
K^{+} (mg g^{-1}; A horizon)	227.7 ± 8.4	215.3 ± 7.6	221.1 ± 8.9
K^{+} (mg g^{-1}; B horizon)	70.39 ± 2.84	80.98 ± 2.84	77.84 ± 2.69

No treatment effect

Effect on plants



Effect on plants



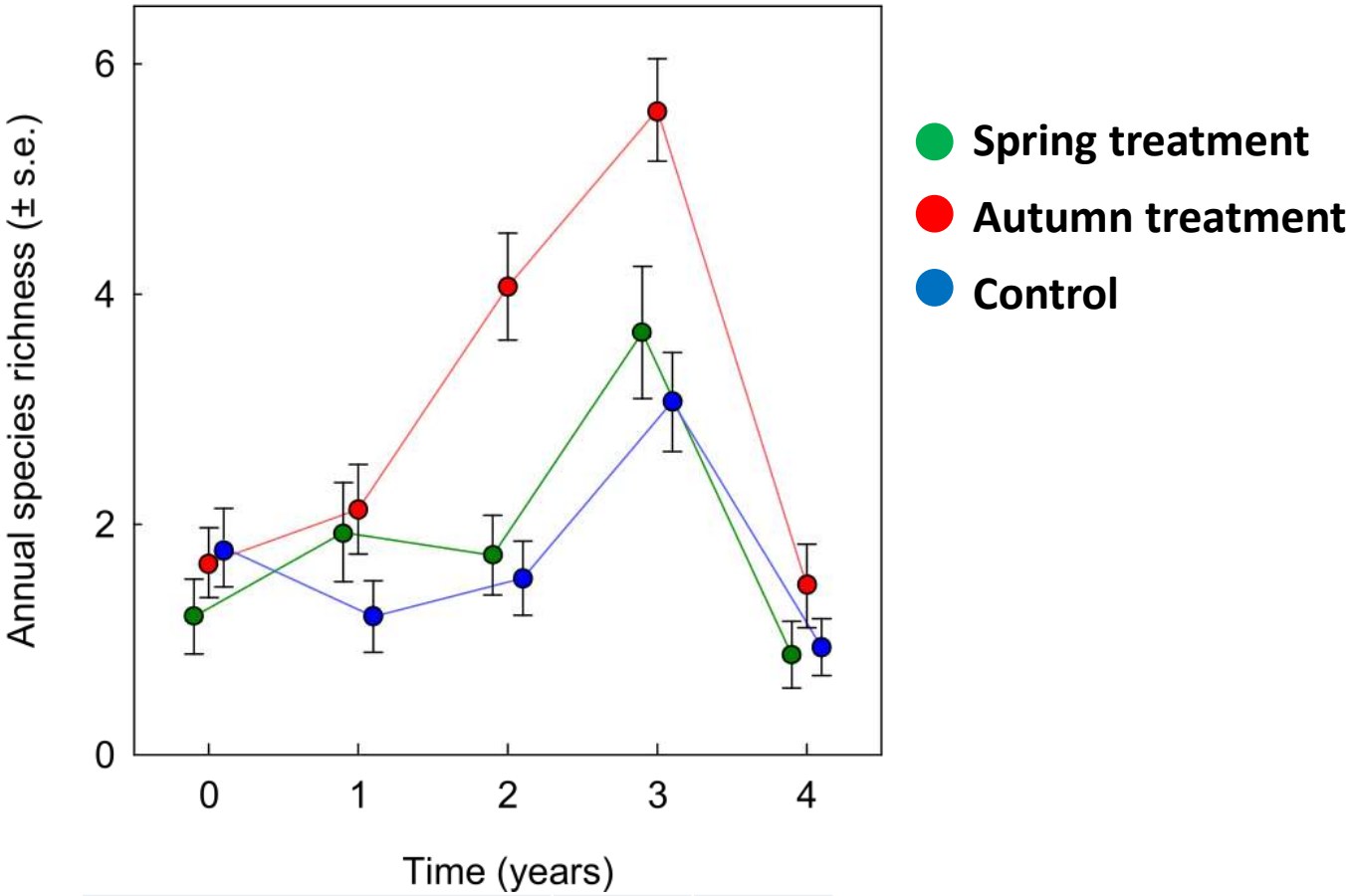
Spring treatment

Autumn treatment

Control

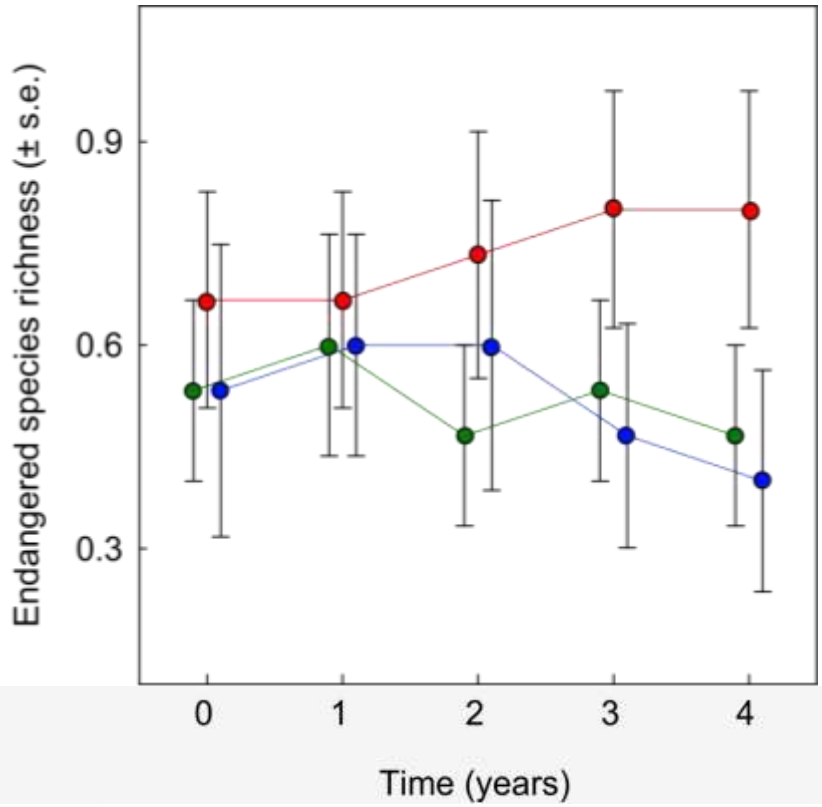
All species	F	p
Time*Treatment	13.367	<0.001

Effect on plants



Annual species		
Time*Treatment	5.682	<0.001

Effect on plants



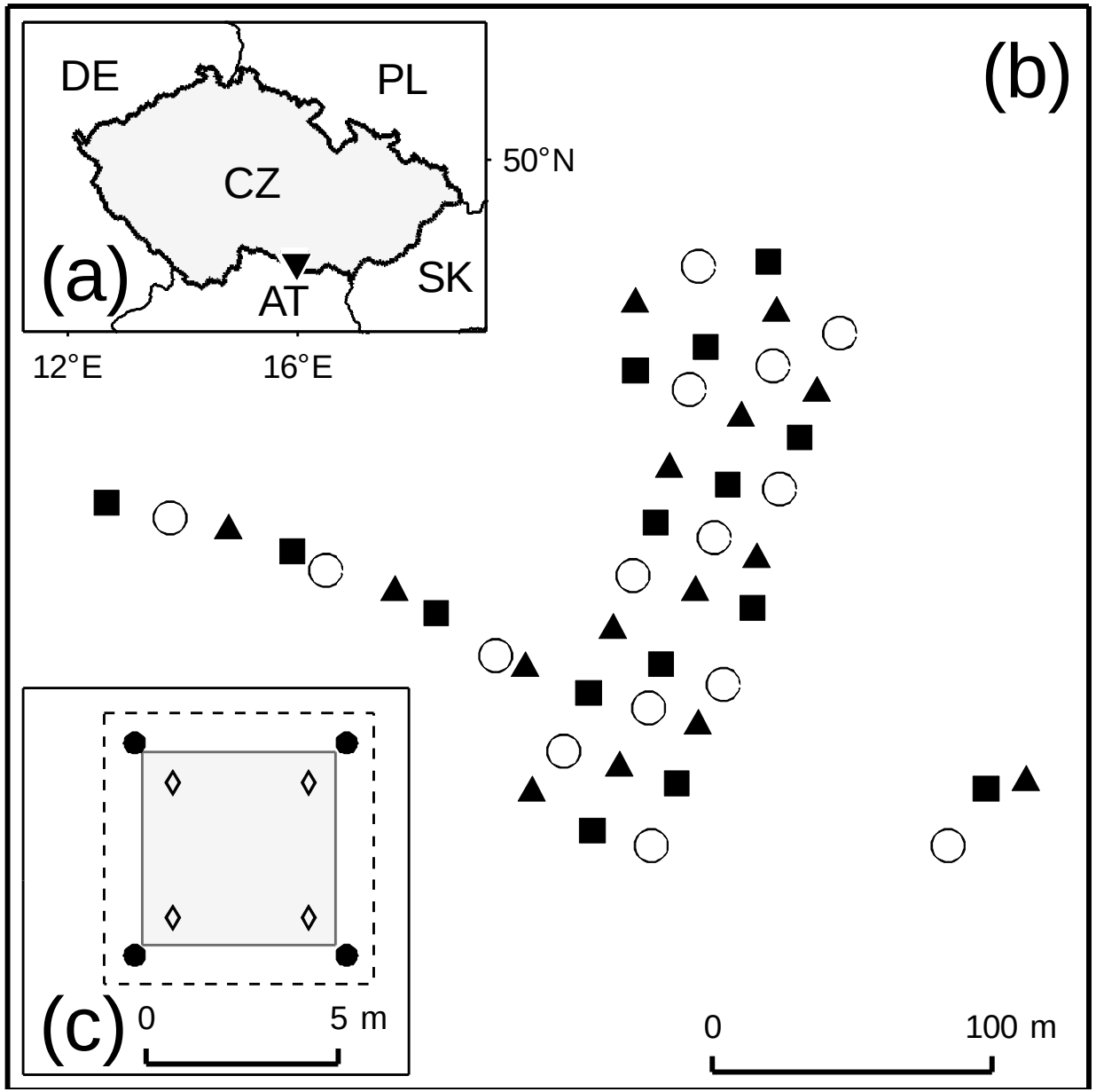
- **Spring treatment**
- **Autumn treatment**
- **Control**

Endangered species	F	p
Time*Treatment	0.995	0.442

Main conclusions and discussion

- Litter raking has no immediate impact on **soil chemistry**
- Higher species richness in raked plots
- Mostly annuals increased
- Explanation: soil disturbances lead to fluctuations in tempereature, moisture and light

Thank you for your attention!


DE
PL
CZ
SK
AT
(a)
50°N
12°E
16°E
(b)
(c)
0
5 m
0
100 m