Conservation of Wetlands in the Carpathians
16th–19th November 2009, Tatranská Štrba, Slovakia

Nutrient limitation of spring fen vegetation in the West Carpathian's flysch zone

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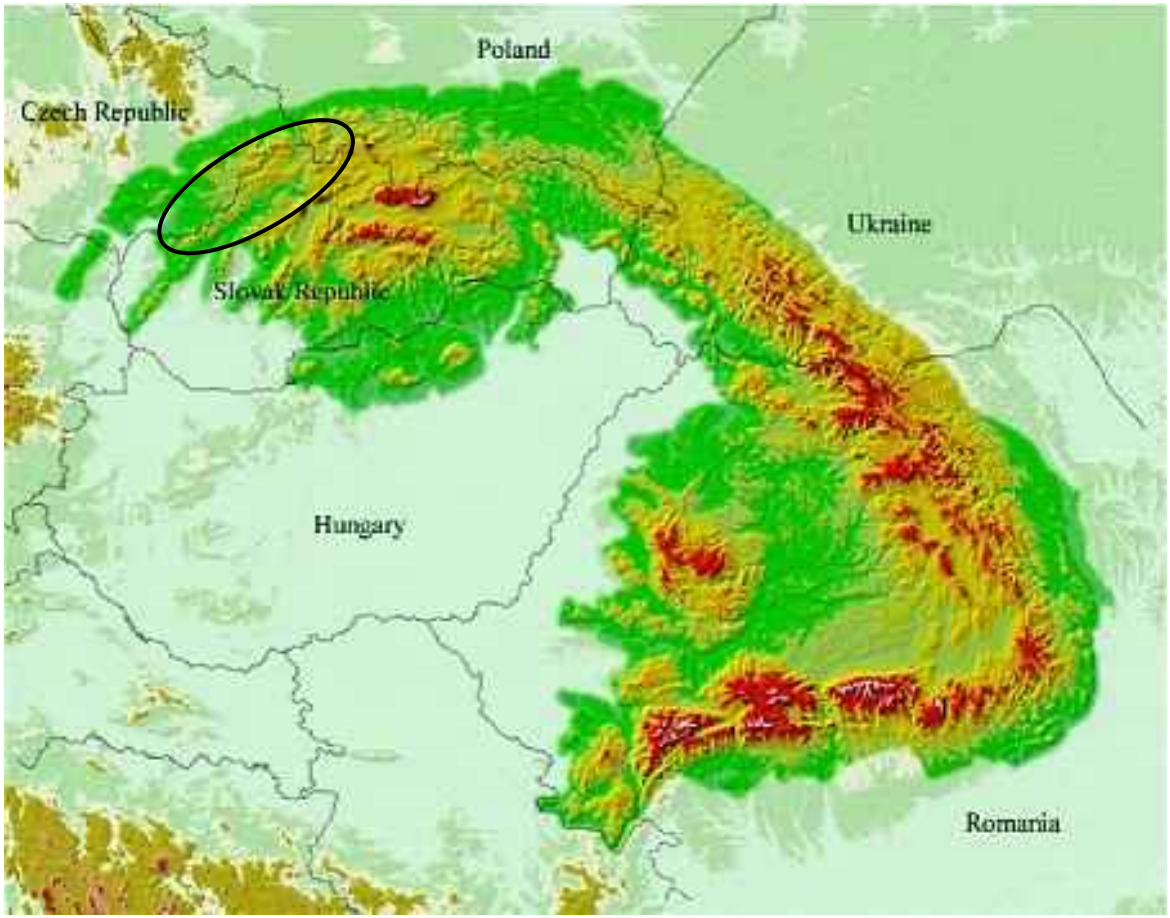
Question: What mechanisms* underlie the main vegetation gradients in spring fens and wet meadows?

*plant nutrient availability and limitation

Tool: Nutrient concentration and nutrient concentration ratio in above-ground plant biomass – indicator of nutrient availability and limitation

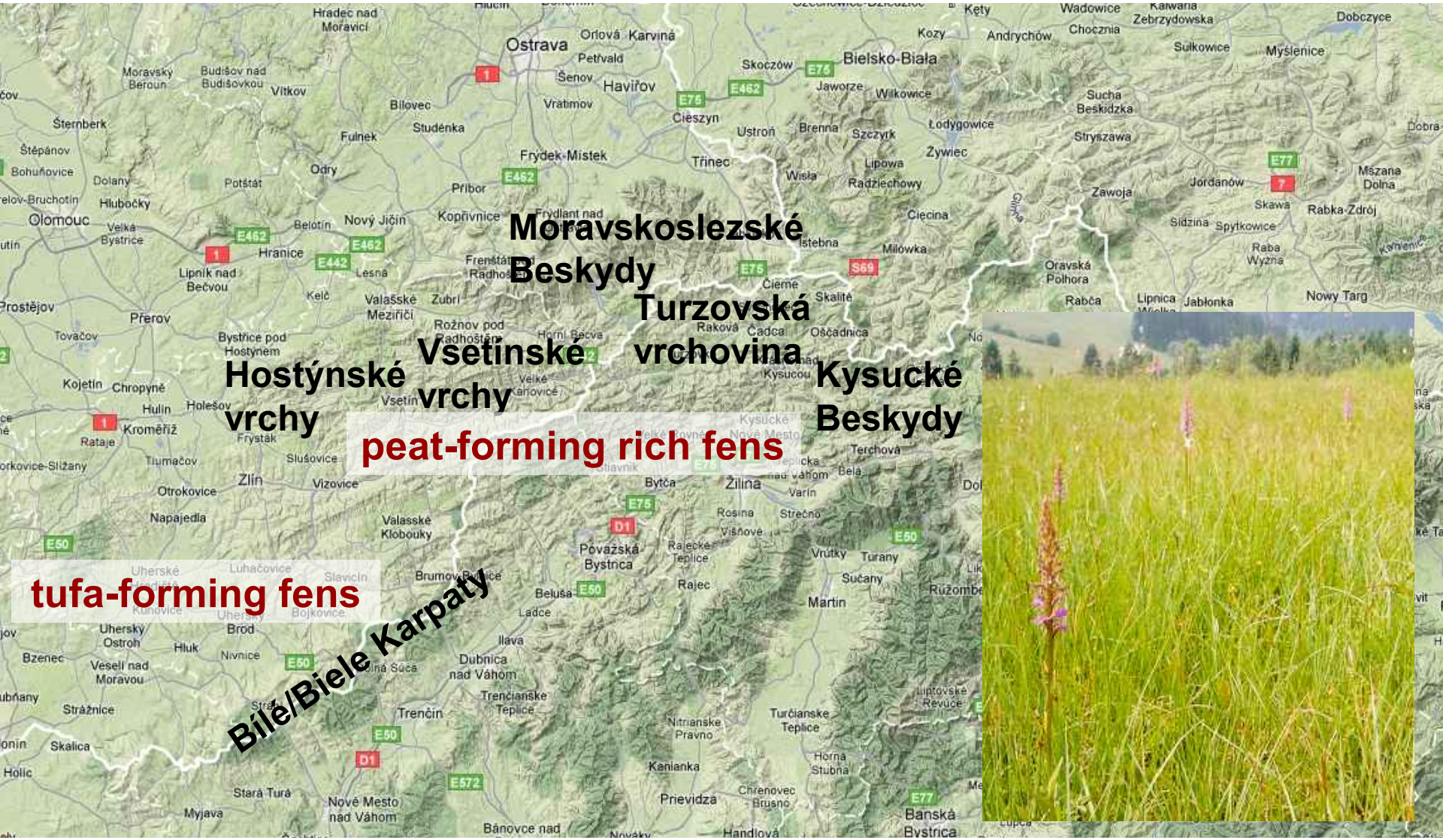
Study area: West Carpathians; flysch zone



www.sopsr.sk/karpaty/img/karpathia.jpg

Mora
Besk
Hostýnské vrchy
Vsetínské vrchy
tufa-forming fens
Bílé/Biele Karpaty
Štrba

http://mapy.hiking.sk/



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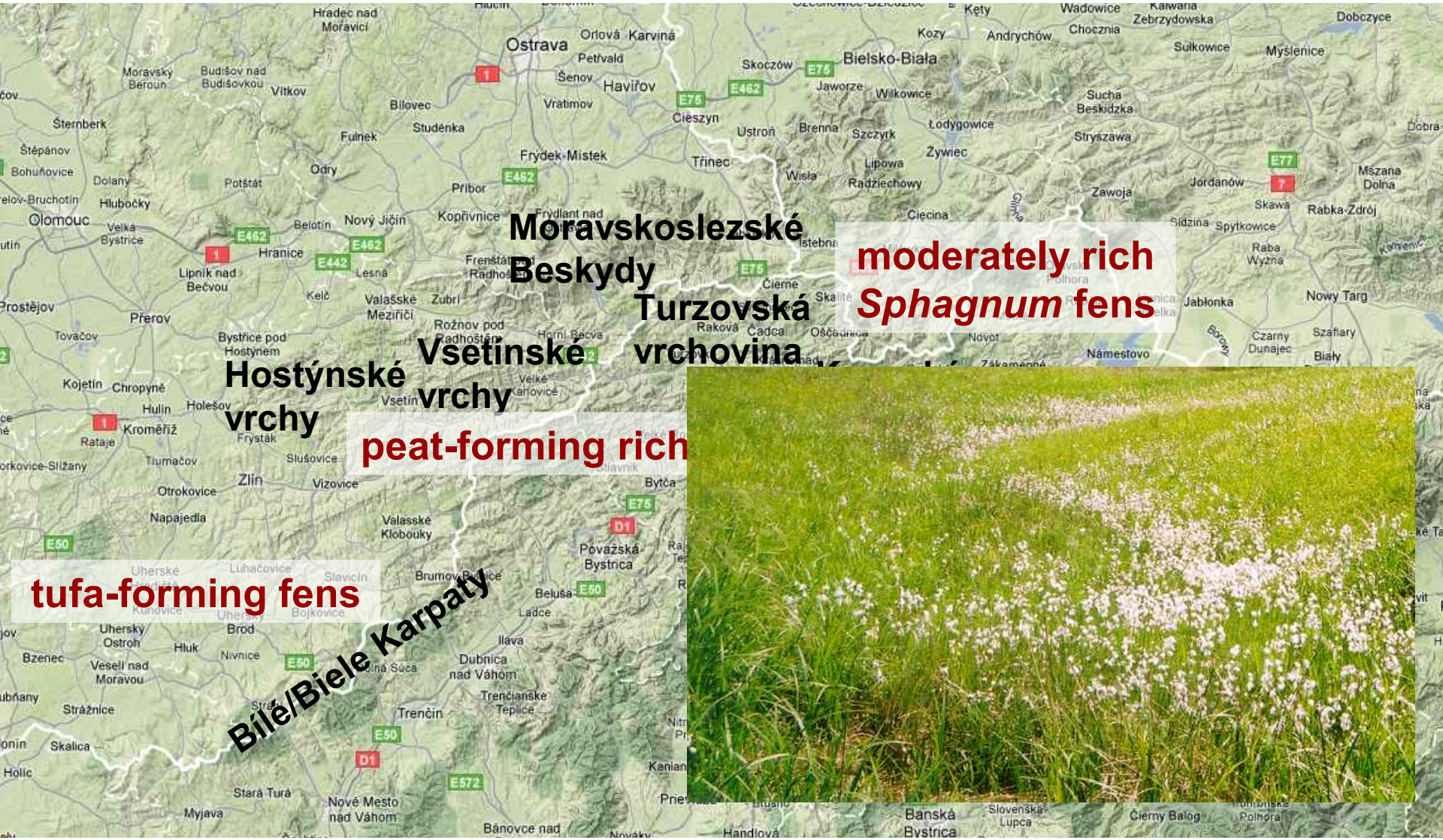

Moravskoslezské Beskydy

Turzovská vrchovina

Vsetínské vrchy

Hostýnské vrchy

Bílé/Biele Karpaty

moderately rich *Sphagnum* fens

peat-forming rich

tufa-forming fens

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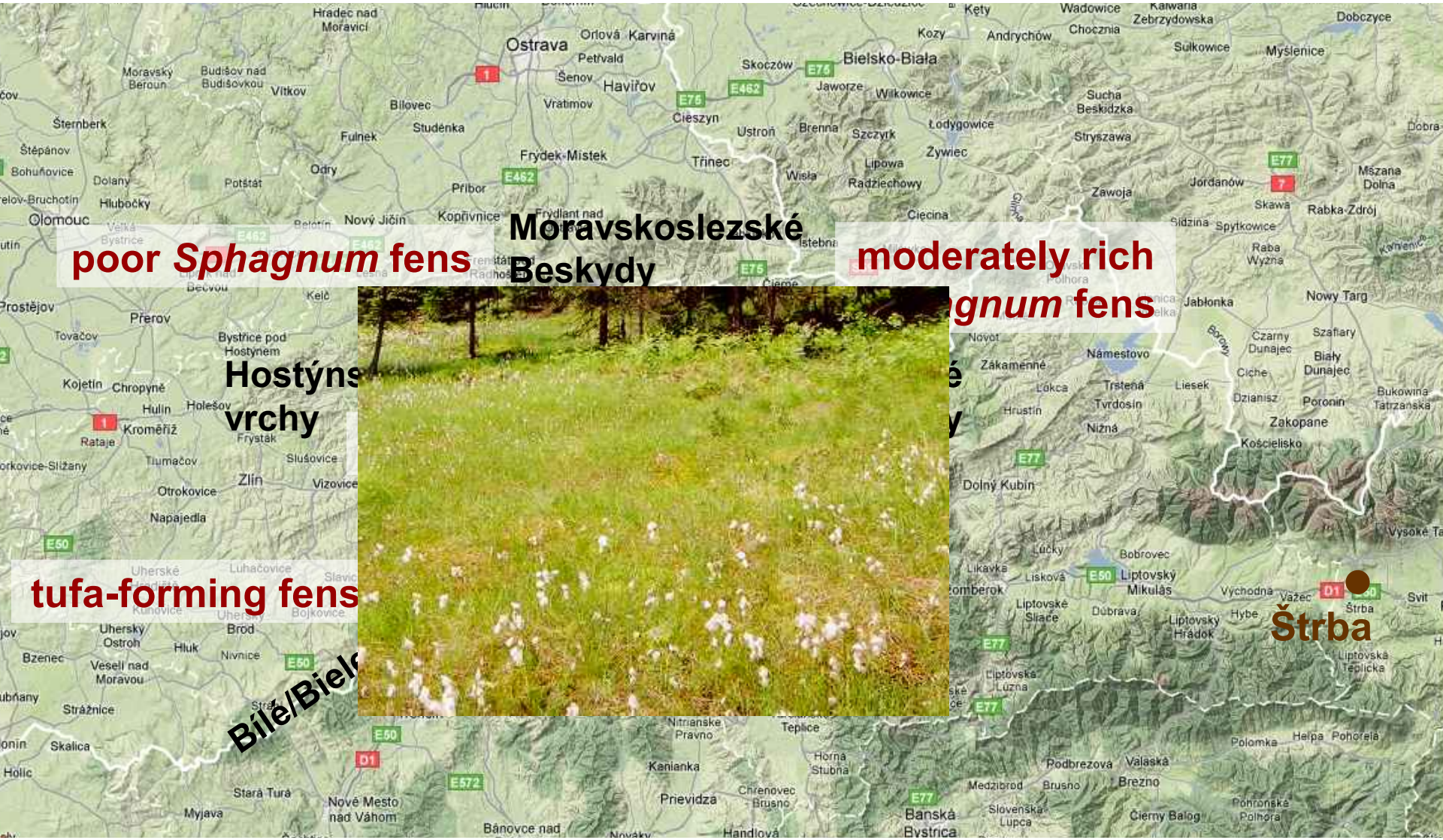

http://mapy.hiking.sk/

tufa-forming fens

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Moravskoslezské Beskydy

Turzovská vrchovina

setinské

chy

-forming rich fens

Kysucké Beskydy

moderately rich *Sphagnum* fens

Bílé/Biele Karpaty

***Calthion* meadows**

Štrba

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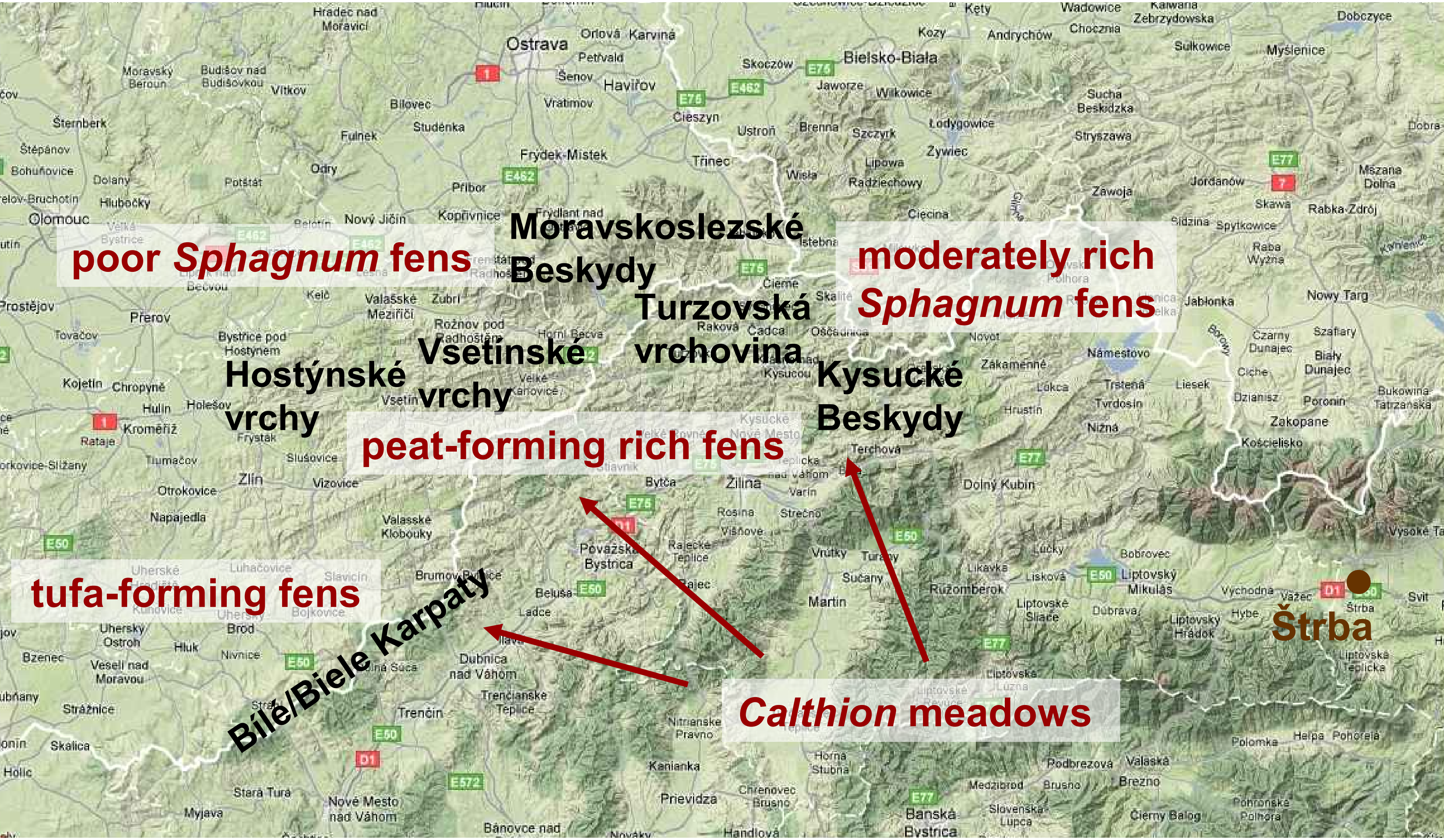


http://mapy.hiking.sk/

Methods

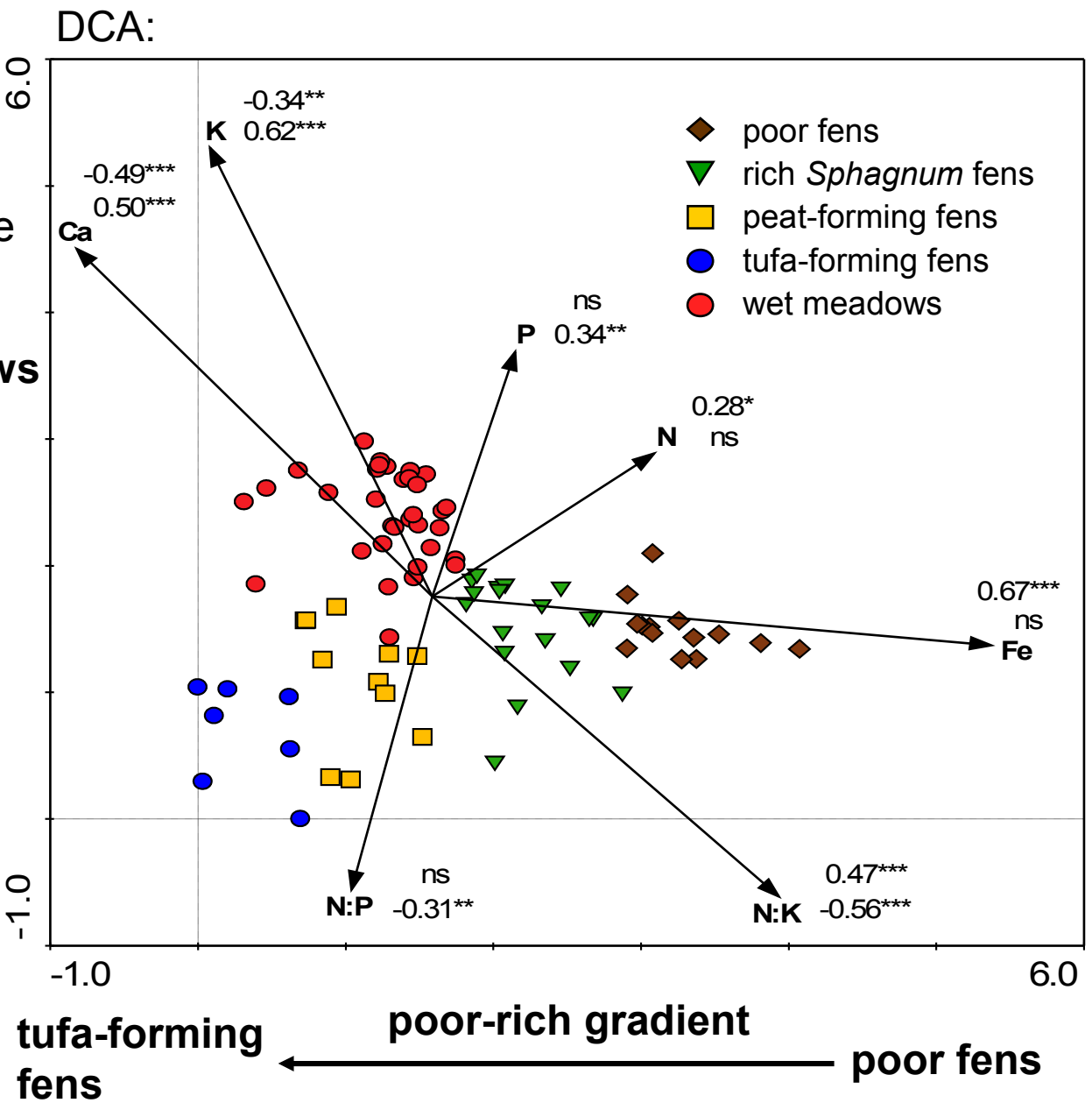
- vegetation data sampling:
  - 83 vegetation plots (9 m^2)
  - above-ground plant biomass samples (0.2 m^2)

- chemical analysis of plant material:
  - N, P, K, Ca, Fe concentration

- data analysis:
  - plant nutrient content x main gradients in vegetation
  - plant nutrient content x plant communities

Results

- Trends in element concentration along the vegetation gradients



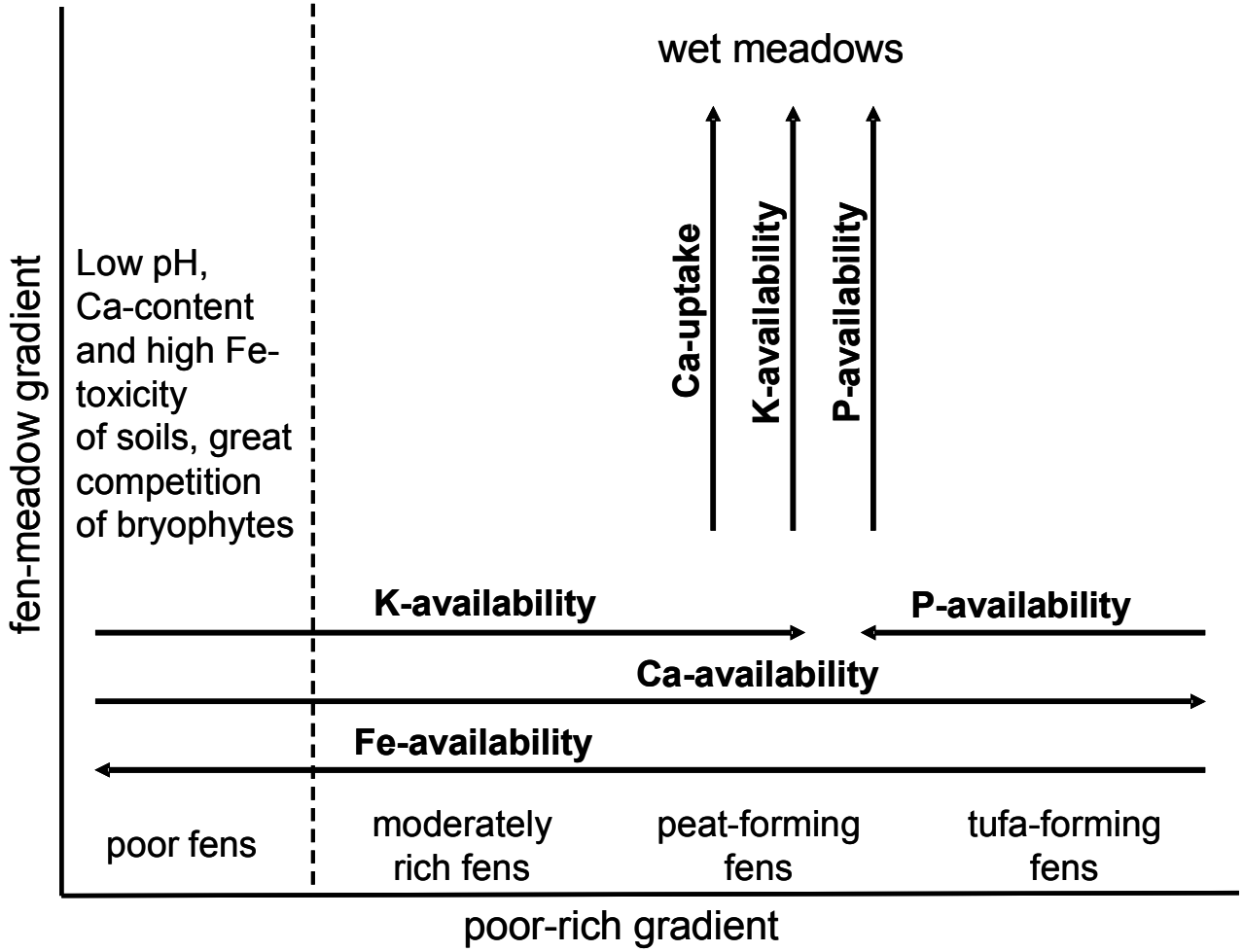
Results

- Differences in element concentrations among the plant communities

Kruskal-Wallis ANOVA, Dunn's post-hoc test:

	tufa-forming fens (7) R		peat-forming fens (11) R		moderately rich fens (18) R		poor fens (14) R		wet meadows (33) R	
N (mg.g^{-1})	17.64	a	17.71	a	18.89	a	19.84	a	19.96	a
P (mg.g^{-1})	0.87	a	1.67	bc	1.40	ab	1.55	bc	1.78	c
K (mg.g^{-1})	20.15	a	23.45	a	21.98	a	20.50	a	32.31	b
Ca (mg.g^{-1})	7.85	ab	8.04	ab	6.56	ac	3.69	ac	12.63	b
Fe (µg.g^{-1})	46.52	a	88.24	ab	135.93	bc	155.95	c	87.70	a
N:P	20.40	a	11.12	b	14.22	ab	13.28	b	11.61	b
N:K	0.89	a	0.77	ab	0.90	a	1.00	a	0.65	b

What mechanisms underlie the vegetation gradients in spring fens and wet meadows?



Conservation notes

- Ca-rich spring fens: P- (and K-) limitation

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P- (and K-) supply can alter species composition towards wet meadows

- poor fens: low pH, Fe-toxicity, competition of bryophytes

↓

not endangered by succession caused by nutrient availability increase


Thank you for your attention.