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What affects species richness of alpine springs in Western Carpathians and Swiss Alps?

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Main Aims

- the main natural factors, which influence the species richness of alpine spring vegetation;
- relative importance of micro site vs. larger scale valley characteristics;
- differences between two different mountain ranges.



Study area & Methods

Western Carpathian & Swiss Alps




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 Regression trees

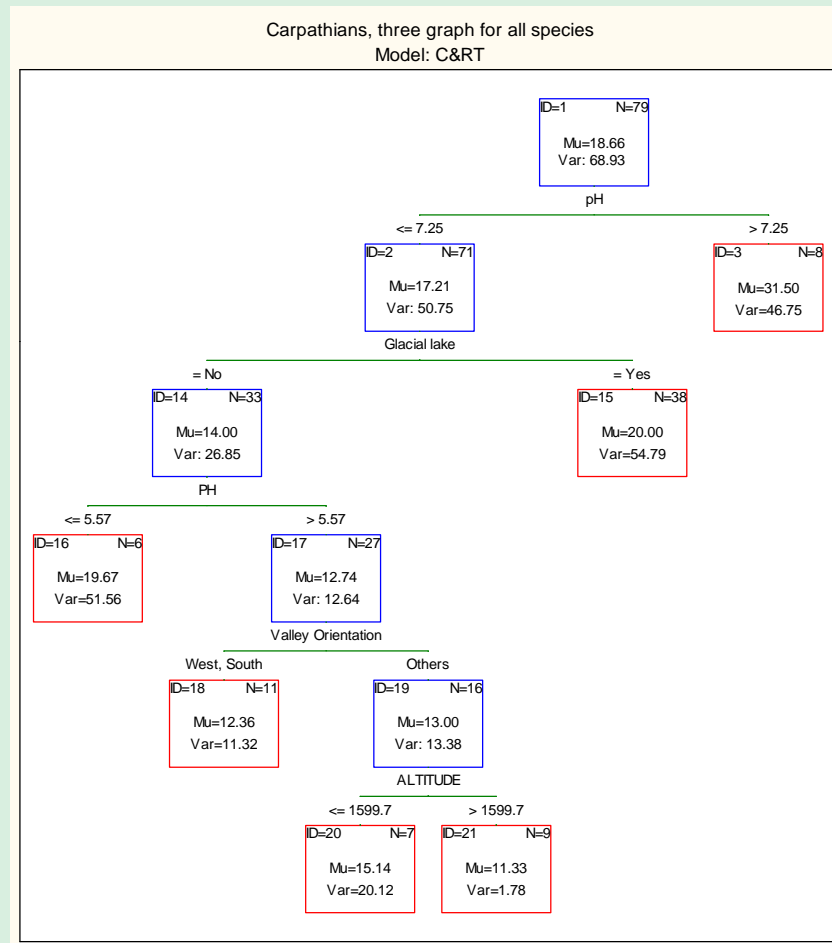
to show relationships between various factors (algorithm suitable for mixed data types)

 Spearman correlations

to show monotonic relationships



Short Results



Short Results

Western Carpathians

| | Node1 | Node2 | Node3 |
|-------------------|-----------------|--------------------|-------------|
| All plant species | pH | Lake | pH |
| Vascular plants | pH | Ellenberg Moisture | Bedrock |
| Bryophytes | Valley Wideness | Valley Orientation | pH and Lake |

Swiss Alps

| | Node1 | Node2 | Node3 |
|-------------------|------------------------|------------------------|----------------------------|
| All plant species | pH | Corr. cond. & Altitude | Inclination & Site Orient. |
| Vascular plants | Corrected Conductivity | pH & Site Orientation | Inclination |
| Bryophytes | Site Orientation | pH and Altitude | Corrected Conductivity |



Short Results

Swiss Alps

| | Altitude | Slope | Water pH | Corrected water conductivity | E Moisture | E Soil Reaction |
|-------------------|----------|--------|----------|------------------------------------|------------|--------------------|
| All plant species | n.s. | 0.39** | 0.31* | 0.45*** | -0.36* | 0.32* |
| Vascular plants | n.s. | n.s. | n.s. | 0.47*** | n.s. | 0.31* |
| Bryophytes | n.s. | n.s. | n.s. | n.s. | -0.31* | n.s. |

Western Carpathians

| | Altitude | Slope | Water pH | Corrected water conductivity | E Moisture | E Soil Reaction | Valley wideness |
|-------------------|----------|--------|----------|------------------------------------|------------|--------------------|--------------------|
| All plant species | n.s. | 0.25* | n.s. | 0.27** | -0.43*** | n.s. | 0.30** |
| Vascular plants | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | 0.42** |
| Bryophytes | n.s. | 0.29** | n.s. | 0.42*** | -0.44*** | n.s. | n.s. |



Conclusions

- Generally for overall and vascular plant species richness, water pH is the most important factor.
- For species richness of bryophytes, pH is less important, more important are other site characteristics:
 - in Western Carpathians valley shape plays a crucial role. In open, U-shaped valleys with the glacial lakes can be found more bryophyte species than in other valleys due to the presence of some arctic species.
 - In Swiss Alps is site orientation very important.
- In Carpathians is the altitude less important for species richness of plants than in the Alps due to lower altitude differences in the alpine belt.
- Next important factor is inclination. It seems to be more important in alpine springs in the Swiss Alps than in the Western Carpathians. It can increase relief heterogeneity what is important especially for bryophytes.





Thank you for your attention...

