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Hydraulic traits of *Juniperus communis* L. across elevations and European populations

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1 – BACKGROUND

Hydraulic safety } Plant hydraulics → determines the susceptibility to drought, and therefore plant vitality and species distribution
 Hydraulic efficiency }

Species' hydraulic plasticity → suitable to detect species' performance under changing climatic conditions

Plasticity depends on:

- Phenotype } Analyses →
- Genotype }
- Elevational transect
- Common-garden

Powerful approaches to explore the inter/intra-specific plasticity of traits (Körner 2007, Xiankui and Chuankuan 2018)

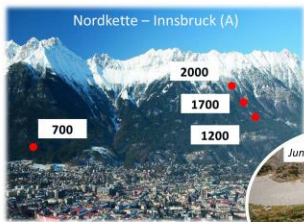
2 – OBJECTIVES

Analyses of the intra-specific hydraulic variability (hydraulic safety and efficiency) of *Juniperus communis* L. in terms of

- genome plasticity (through provenances experiment)
- phenotypic plasticity (through elevational transect)

3 – METHODS

ELEVATIONAL TRANSECT



PROVENANCES



Hydraulic safety (Vulnerability curves → P12-50-88)



Hydraulic efficiency (Ks)



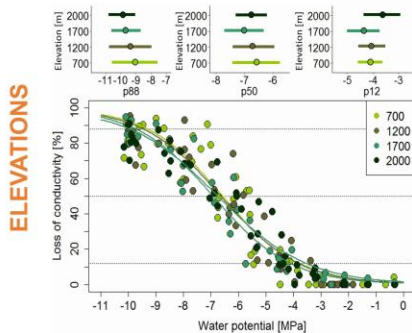
Flow meter (Sperry et al. 1998)

STATISTIC:

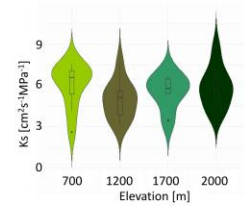
Anova + Tukey-post-hoc test

4 – RESULTS

HYDRAULIC SAFETY

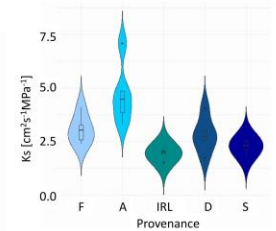
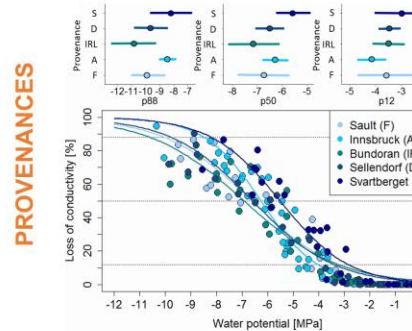


HYDRAULIC EFFICIENCY



Tukey-post-hoc test &

ANOVA: No significant differences between elevations for P12 - P50 - P88 and Ks



ANOVA: No significant differences between provenances for P12 - P50 - P88 and Ks

Tukey-post-hoc test:

- Irish provenance was the less vulnerable (P50 – P88)
- Swedish provenances was the most vulnerable (P50 – P88)
 - Austrian provenance was the most efficient

5 – DISCUSSION & CONCLUSION

- Common juniper is **highly resistant to drought** and showed surprisingly **homogenous** hydraulic traits
- Neither relevant genotypic nor phenotypic plasticity in studied hydraulic traits was observed
- However, due to its overall high drought resistant, Common Juniper can be considered as less susceptible to the effects of a warmer climate

REFERENCES

Cochard H (2002) A technique for measuring xylem hydraulic conductance under high negative pressures. *Plant, Cell Environ* 25:815–819
 Körner C (2007) The use of 'altitude' in ecological research. *Trends Ecol Evol* 22:569–574.
 Mayr S, Zubiasa V (2010) Ultrasonic emissions from conifer xylem exposed to repeated freezing. *J Plant Physiol* 167:34–40.
 Sperry JS, Donnelly JR, Tyree MT (1998) A method for measuring hydraulic conductivity and embolism in xylem. *Plant Cell Environ* 11:35–40.
 Xiankui Q, Chuankuan W (2018) Acclimation and adaptation of leaf photosynthesis, respiration and phenology to climate change: A 30-year *Larix gmelinii* common-garden experiment. *For Ecol Manage* 411:166–175.

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