

The impact of climate change on sessile oak along its xeric limit

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Tackling climate change: the contribution of forest scientific knowledge

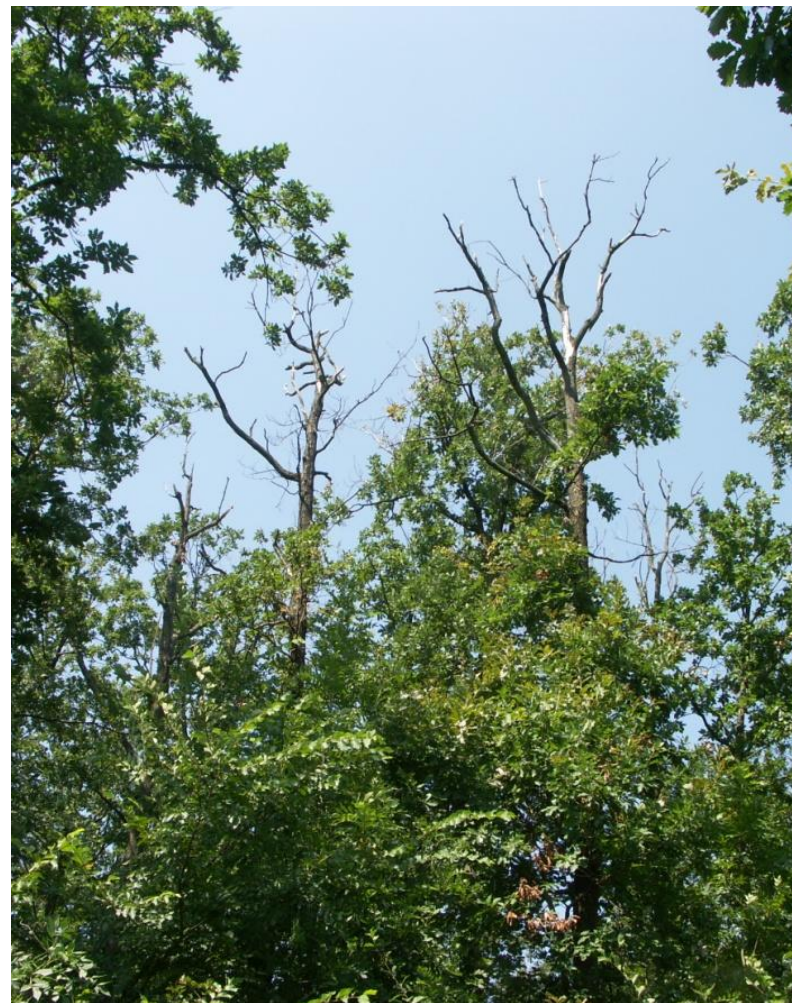
21 -24 May, 2012 Tours

Xeric limit

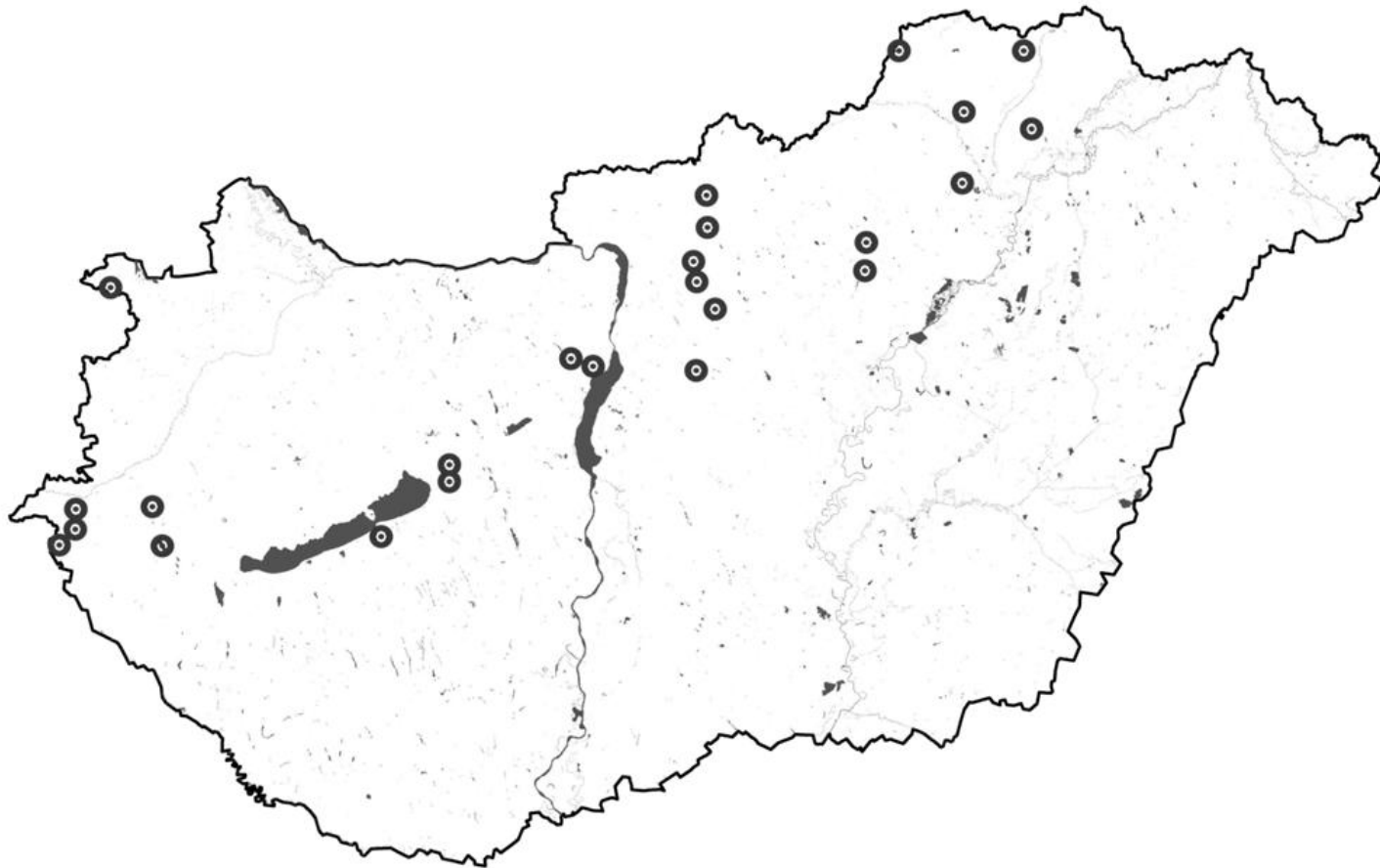
- Xeric / rear / trailing limit
- The low altitude or low latitude border of the distribution area
- Ecosystems on the xeric limit are dependent on rainfall, therefore sensitive to prolonged droughts

Sessile oak (*Quercus petraea*)

- Steppe – forest boundary
- Repeated drought events since the 80's
- Oak decline, significant mortality



Investigated stands



Investigated stands

- About 40 pure sessile oak stands (here only 24)
- Zonal forests on hill plateaus
- Medium to deep soils (no soil defect)
- No silvicultural thinning at least in the last two decades
- Along a transect from humid to dry regions
- Big differences in nutrient supply: soil type, air pollution, human influence (litter removal)

Measurements

- 50 x 50 m plots
- Soil analysis
- Stand parameters: DBH, height, stand density
- Health status of individual trees
- Leaf nitrogen content

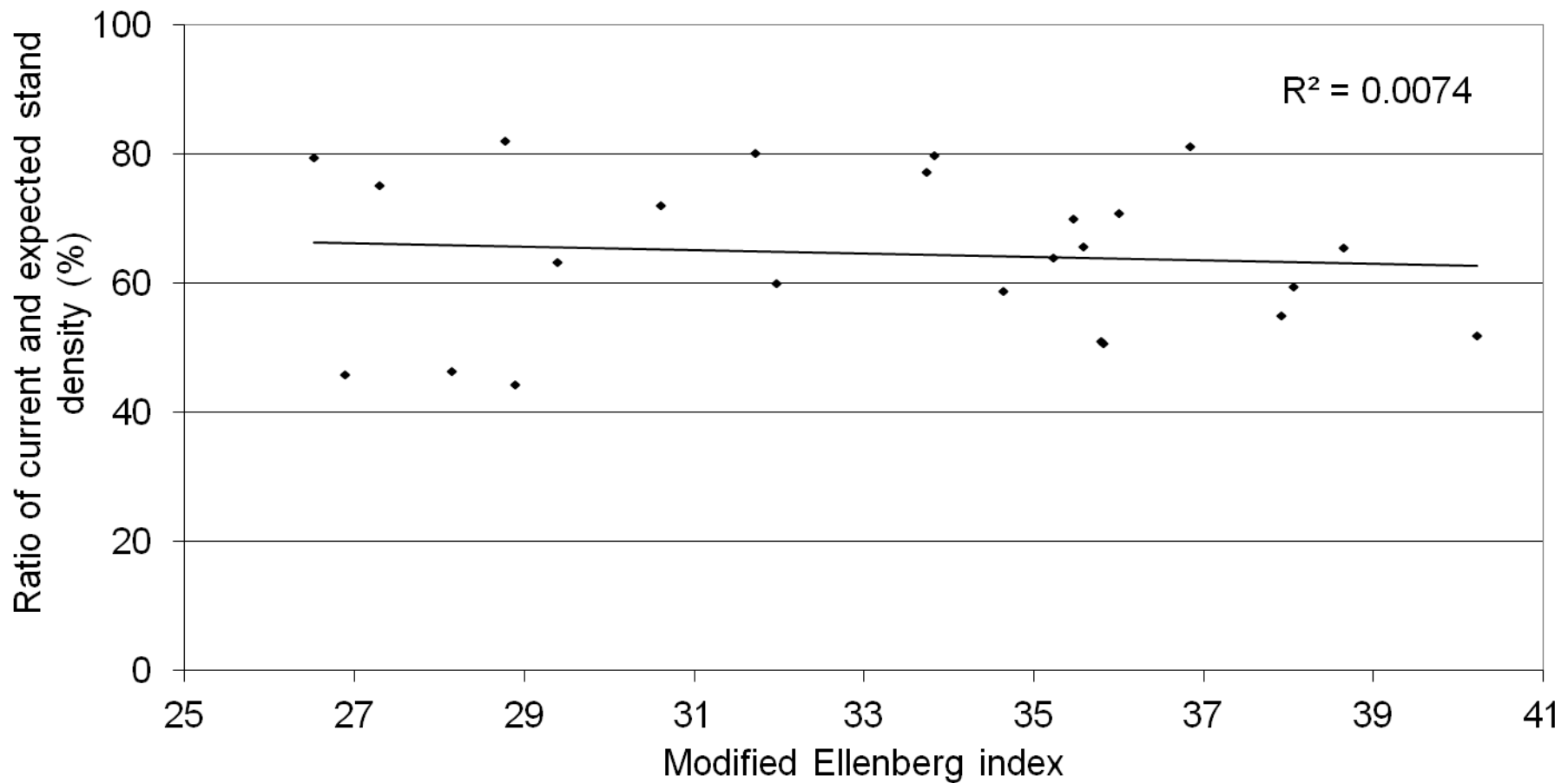
Climatic parameters

- Modified Ellenberg index

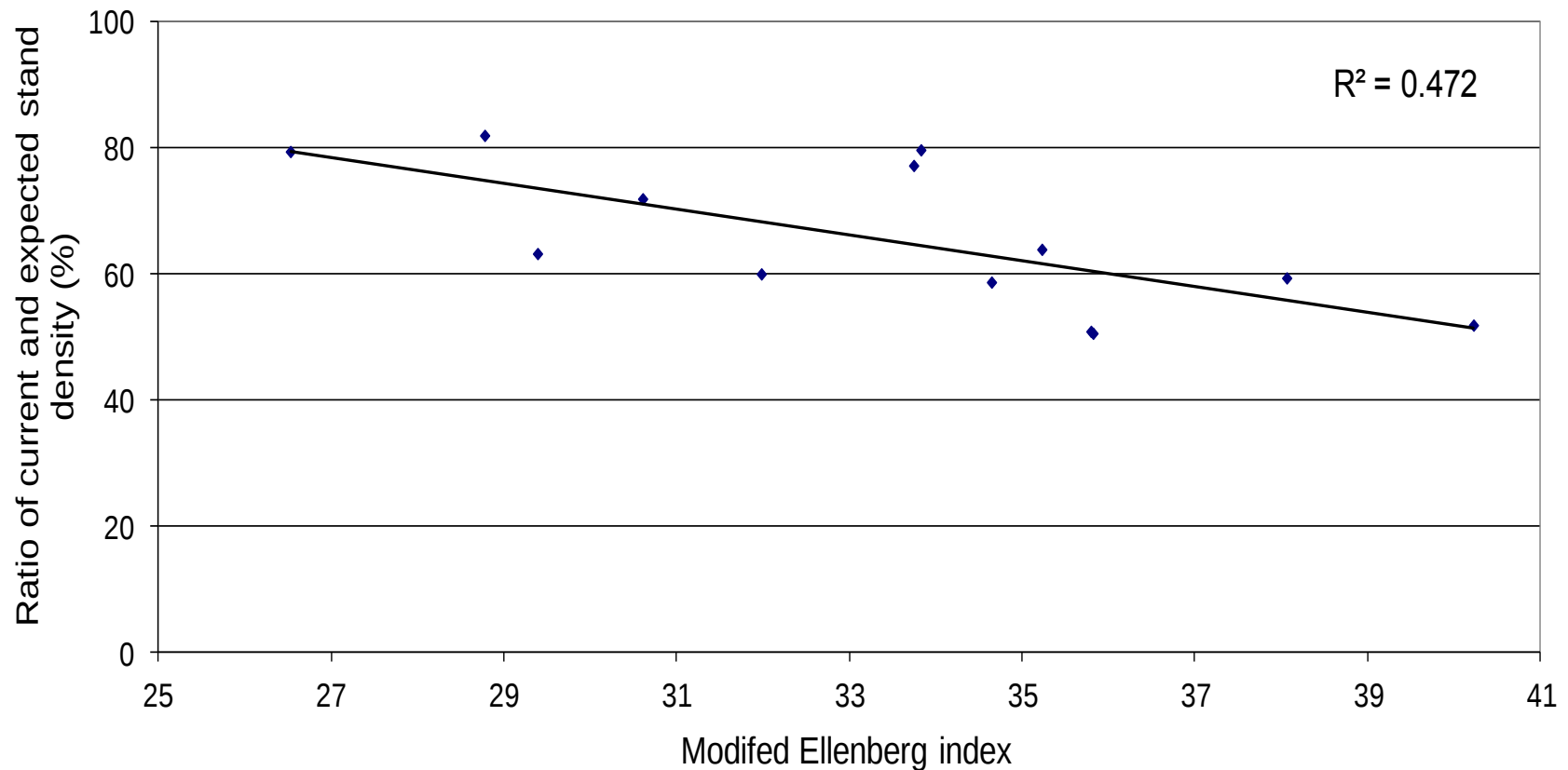
$$EQ = \frac{\text{Mean temperature of June, July and August}}{\text{Annual precipitation}} 1000$$

- EQ mean for the period 1975 - 2004

EQ and the ratio of current and expected density



EQ and the ratio of current and expected density with medium foliar nitrogen concentration (18 -23 g/kg)



Conclusion

- Comparison of the actual stand density and the yield tables shows significant decrease in all stands
- Considering all the stands, no correlation is found between climate (EQ) and health condition
- Considering only the stands with medium leaf nitrogen content, health status is inversely proportional with EQ
- Higher nitrogen supply provides higher drought resistance for the sessile oak

Thank you for your attention!

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