Semi-natural forests: Hot, dry, bright and poor

Thermophilization and decrease of species richness in Semi-Natural forests of the Tuscany region of Italy

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Much needed research on richness decline in semi-natural habitats in Italy

It is well known that there is an overall decline(3,4) and thermophilization(5) of plant communities across Europe. However, there is a distinct lack of research done on the Mediterranean area(3) and semi-natural habitats regarding these changes(6).

It`s of interest to understand the patterns of climate warming on semi-natural habitats since they are good preservers of biodiversity(6) By focusing on temporal change plant community composition in relation to species growth traits, one can identify the changing aspects of the habitat.

Analyzing community traits Ellenberg indicator values

We use linear models of Ellenberg indicator values(7), which place species on an ordinal scale according to environmental variable optimum and species interaction, in combination with species richness data to map habitat changes in plots in Tuscany, Italy.

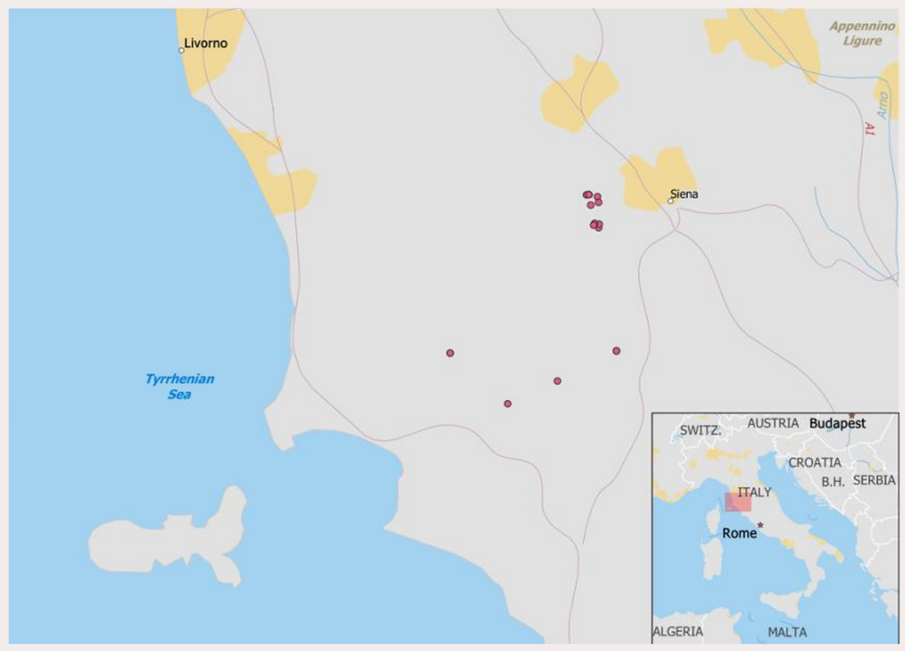
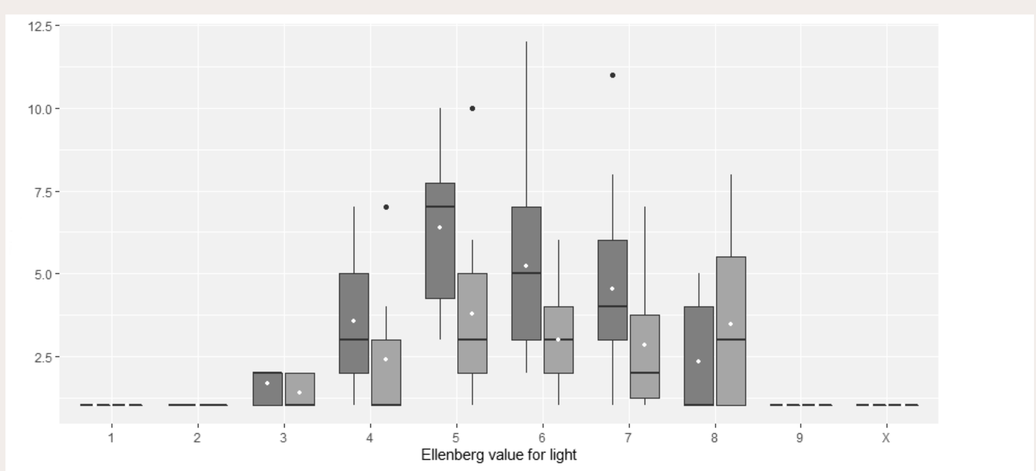


Fig 1. Map over plots resampled in 1973 and 2013



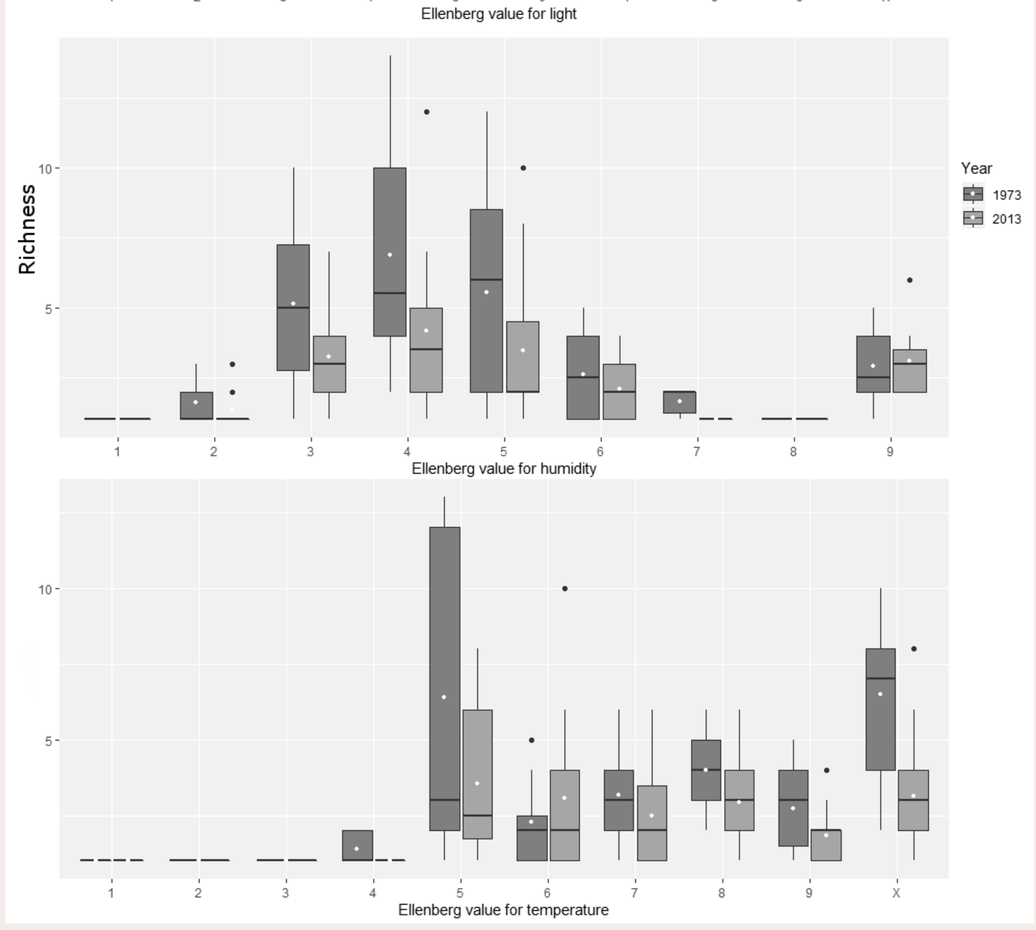


Fig 2: Richness for Ellenberg indicator value categories for light(top), humidity(middle) and temperature(bottom). Dark grey show values from 1973, grey are from 2013.

Abandoned agricultural forests

The data consisted of phytosociological data, which were sampled in 1973 and resampled in 2013, from chestnut (8) and holm oak forests(9). The forests were abandoned before 1970, after being used for agricultural and forestry for centuries, due to unfavorable substrates and pathological factors(8,9).

Forests become brighter, less humid and warmer

From our analysis we see a shift in species composition towards species which score higher on Ellenberg indicator values for light and temperature, while values for humidity decline. This shows the habitat become more suited for species which prefer bright, dry and warm habitats.

A troubling decline in richness:

The analyses pointed to a decline in species richness in all Ellenberg values. The decline can be argued to come from climate warming which cause habitat changes, as seen in other papers looking at the Mediterranean(6). However, pathogens, natural dynamisms of the abandoned forests, and unfavorable substrates should also be considered.

Semi-natural forests need attention

The need for more research on semi-natural Mediterranean forests is evident to further understand and apply measures to these troubling declines in species richness and habitat transformation.

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