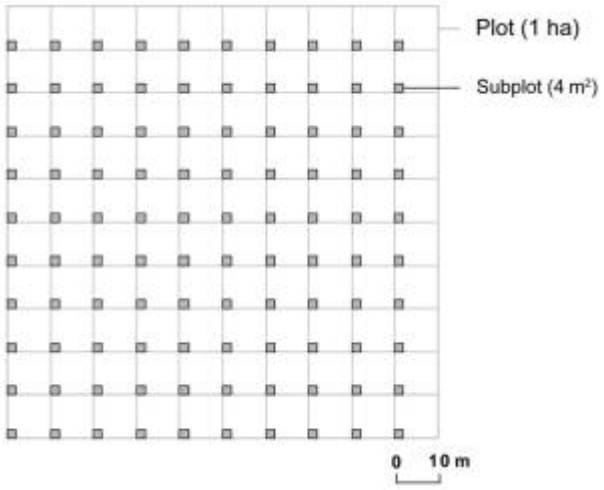
# Understory vegetation of thermophilous oak forest (1-ha permanent plot near Němčičky, Czech Republic)

## Source of data

Chudomelová, Zelený & Li (2019)

## Description of the dataset

We established a square plot of 100 × 100 m with 100 subplots of 2 × 2 m. The subplots were organized in a regular grid with 10-m lags between adjacent subplots. At each 2 × 2 m subplot, we recorded a list of vascular plant species along with visual estimates of species cover using the nine-degree Braun-Blanquet scale (Westhoff & van der Maarel 1978). Woody seedlings and saplings were later excluded from the analyses. In the center of each subplot, we took a hemispherical photograph of the canopy at the height of 1.3 m (using Nikon Coolpix 4500 camera with FC-E8 fishey lens). We also measured the slope inclination (using Silva ClinoMaster), aspect (using compass) and relative elevation of each subplot using the Field-Map device (IFER, Ltd., Jílové u Prahy, Czech Republic) with accuracy up to 0.2 m. At four locations within each subplot, we measured the soil depth using 30 cm long iron probe, and collected a mixed soil sample from the top 5 cm.




Sampling design within the 1-ha permanent plot (from the Appendix B of Chudomelová et al. 2017).



An example of a 2 m × 2 m sampling plot (photo credit: David Zelený).

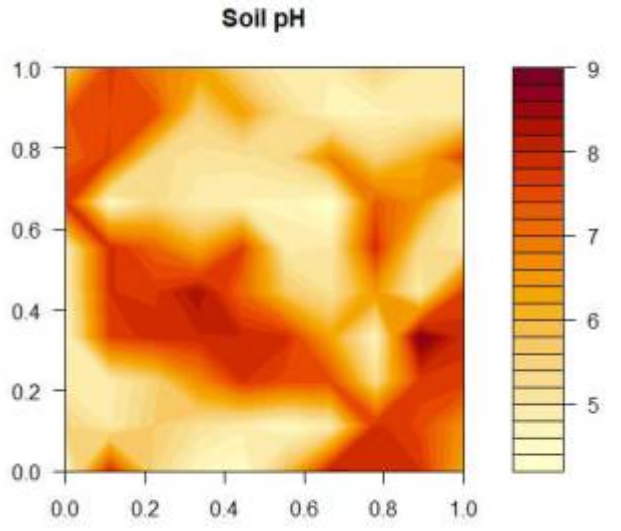
## Locality

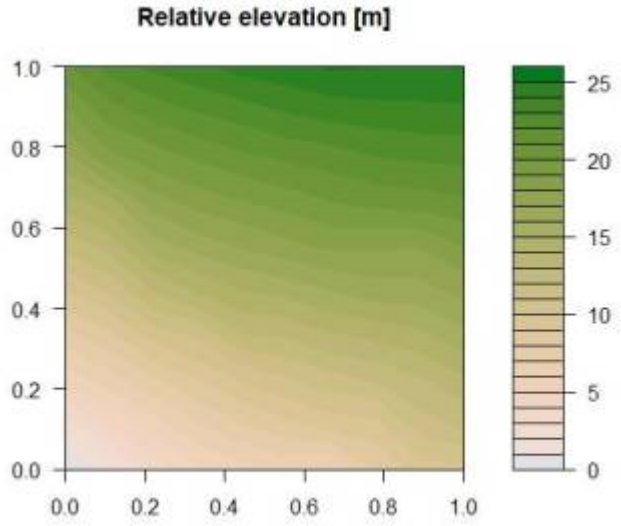
The study took place in a thermophilous oak forest dominated by *Quercus petraea*. The forest is located close to the village of Němčičky, south Moravia, Czech Republic, in low hills at the fringe of the flysch Carpathians (48.948° N, 16.837° E). The sampling area spreads over the upper part of an inconspicuous hill (322 m a.s.l.), in a forested complex surrounded by arable fields and pastures. The most prominent feature of the site is a pronounced fine-scale heterogeneity of soil pH and related variables (Ca and Mg concentration, conductivity, C:N). Although built of flysch, the hill is covered in partly decalcified loess deposits. The pH values can differ up to two units over a distance of 5 m (e.g. from about 5 to above 7) and the character of the ground herb layer obviously relates to them: patches with base-rich soil are densely overgrown by herb understorey, whereas patches with acid soil are almost bare. (From Chudomelová & Zelený, 2020).

## Environmental variables

| **Name of variable** | **Description** |
|---|---|
| FIELD_N | Field number (composed of X and Y coordinate separated by comma) |
| X | X coordinate of the subplot |
| Y | Y coordinate of the subplot |
| AUTOR | Author of species composition record (Marketa Chudomelova, David Zeleny, Helena Prokesova) |
| TREE | Presence of tree inside the plot (visual estimate) |
| MD | Presence of deadwood (visual estimate) |
| Z | Relative elevation [m]; within plot relative elevation measured by Field-Map device |
| ASPECT_NE | Folded aspect [°]; difference from north-eastern direction |
| SLOPE | Slope [°]; inclination measured by clinometer |
| RADIATION | Radiation; computation based on field measurements of slope and aspect (McCune & Keon 2002, Eq. 3) |
| HEAT | Heat load; computation based on field measurements of slope and aspect (McCune & Keon 2002, Eq. 3) |
| E3 | Tree layer cover [%] (visual estimate) |
| E2 | Shrub layer cover [%] (visual estimate) |

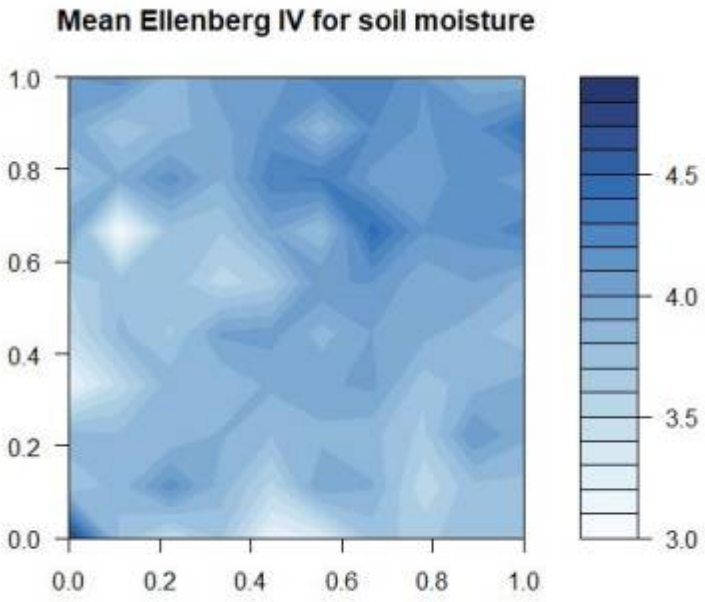
| Name of variable | Description |
|---|---|
| COND_I | Conductivity [µS.cm-1]; measured in water extract |
| COND_II | Conductivity [µS.cm-1]; measured in water extract |
| pH | Soil pH; measured in water extract |
| TC_S | Total carbon [mg.kg-1]; measurement based on solid sample ignition |
| TOC | Total organic carbon [mg.kg-1]; measurement from water extract |
| TC | Total carbon [mg.kg-1]; measurement from water extract |
| IC | Inorganic carbon [mg.kg-1]; measurement from water extract |
| TN | Total nitrogen [mg.kg-1]; measurement from water extract |
| C/N | C/N; ratio of total carbon and total nitrogen concentrations |
| Ca | Ca [mg.kg-1]; concentration in water extract |
| Mg | Mg [mg.kg-1]; concentration in water extract |
| K | K [mg.kg-1]; concentration in water extract |
| Fe | Fe [mg.kg-1]; concentration in water extract |
| P | P [mg.kg-1]; concentration of PO43- in Mehlich III extract |
| Fe_M | Fe [mg.kg-1]; concentration in Mehlich III extract |
| PCAN_OP | Canopy openness [%]; percentage of open sky calculated from hemispherical photographs |
| PSIT_OP | Site openness [%]; percentage of open sky given the influence of topographic shading, calculated from hemispherical photographs |
| LAI_4 | Leaf Area Index 4 Ring; effective leaf area index integrated over zenith angles 0 to 60°, calculated from hemispherical photographs |
| LAI_5 | Leaf Area Index 5 Ring; effective leaf area index integrated over zenith angles 0 to 75°, calculated from hemispherical photographs |
| TRA_DIR | Direct transmitted radiation [MJ.m-2.d-1]; amount of direct solar radiation transmitted by the canopy, calculated from hemispherical photographs |
| TRA_DIF | Diffuse transmitted radiation [MJ.m-2.d-1]; amount of diffuse solar radiation transmitted by the canopy, calculated from hemispherical photographs |
| TRA_TOT | Total transmitted radiation [MJ.m-2.d-1]; the sum of direct and diffuse transmitted radiation, calculated from hemispherical photographs |
| PTRA_DIR | Direct transmitted radiation [%]; percentage of direct radiation transmitted by the canopy from the amount of direct radiation above the canopy |
| PTRA_DIF | Diffuse transmitted radiation [%]; percentage of diffuse radiation transmitted by the canopy from the amount of diffuse radiation above the canopy |
| PTRA_TOT | Total transmitted radiation [%]; percentage of total radiation transmitted by the canopy from the amount of total radiation above the canopy |




## Species attributes (Ellenberg values, from Ellenberg et al. 1992)

| | |
|---|---|
| SPE | Species name (the same as in the “spe” sheet) |
| LIGHT | Ellenberg indicator value for light |
| TEMP | Ellenberg indicator value for temperature |
| CONT | Ellenberg indicator value for continentality |
| MOIST | Ellenberg indicator value for moisture |
| SOIL_REACT | Ellenberg indicator value for soil reaction |
| NUTR | Ellenberg indicator value for nutrients |




## Data for download

| File name | File type | Description |
|---|---|---|
| nemcicky.xlsx | Excel file | Contains species × sample matrix, environmental variables, explanation of species abbreviations and metadata |
| nemcicky_spe.txt | tab-delimited txt format | Sample × species matrix (97 samples in rows, 274 species in columns) |
| nemcicky_env.txt | tab-delimited txt format | Environmental variable matrix (samples in rows, variables in columns) |
| nemcicky_ell.txt | tab-delimited txt format | Ellenberg indicator values for all species (species in rows, indicator values in columns) |

## Script for importing data into R

```
nemcicky_spe <- read.delim
('https://raw.githubusercontent.com/zdealveindy/anadat-r/master/data/nemcicky_spe.t
xt', row.names = 1)
nemcicky_env <- read.delim
('https://raw.githubusercontent.com/zdealveindy/anadat-r/master/data/nemcicky_env.t
xt')
nemcicky_ell <- read.delim
('https://raw.githubusercontent.com/zdealveindy/anadat-r/master/data/nemcicky_ell.t
xt', row.names = 1)
```

## References


- Ellenberg, H., Weber, H.E., Düll, R., Wirth, V., Werner, W. & Paulissen, D. 1992. Zeigerwerte von Pflanzen in Mitteleuropa. 2nd ed. Scripta Geobotanica, 18: 1–248.
- Chudomelová M., Zelený D. & Li C.-F. (2017): Contrasting patterns of fine-scale herb layer species composition in temperate forests. Acta Oecologica, 80: 24–31.

https://doi.org/10.1016/j.actao.2017.02.003
- Chudomelová M. & Zelený D. (2020): Tracing the signs of local dispersal in the temperate forest understorey using spatially structured vegetation data. Journal of Vegetation Science, 31, 84–94. https://doi.org/10.1111/jvs.12835
- McCune B. & Keon D. 2002. Equations for potential annual direct incident radiation and heat load. Journal of Vegetation Science, 13: 603–606.

From:
https://anadat-r.davidzeleny.net/ - **Analysis of community ecology data in R**

Permanent link:
**https://anadat-r.davidzeleny.net/doku.php/en:data:nemcicky**

Last update: **2022/04/09 14:31**