Danube Meadow Data (Germany)

Source of data

Ellenberg (1956), Mueller-Dombois & Ellenberg (1974). The species data used here comes from the R package *dave* written by Otto Wildi (dataset `mveg`), which is citing as the source also Mueller-Dombois & Ellenberg (1974). Species names have been changed from abbreviations used in *dave* into full names according to the Mueller-Dombois & Ellenberg (1974). Header data have been retyped from Mueller-Dombois & Ellenberg (1974). Ellenberg indicator values (Ellenberg et al. 1992) have been manually assigned to species using JUICE software (Tichý 2002).



Partial scan of the original data table reprinted in Mueller-Dombois & Ellenberg (1974). Values represent percentage biomass, and the superscript added to some values (e.g. $+^{o}$) represents species vitality (low in this case).

Description of the dataset

Dataset represents an example of phytocoenological data of meadow communities, sampled along the gradient of increased biomass of *Arrhenatherum elatius*. Biomass (not cover) of each species was estimated, using the approach of Knapp (1929)[1)] - as a percentage proportion of total biomass, estimated for the whole plot (estimations were checked against real weightings of fresh biomass in the field). Therefore, sum of species values in each plot are close to 100%; the percentage proportion of openings within the plots were also recorded, together with plot area and hay yield (see Environmental data).

The original table contains 25 plots (10-25 m^2) and 94 species. In the original table, samples are sorted along increasing dominance of *Arrhenatherum elatius*. In Mueller-Dombois & Ellenberg (1974), three vegetation types are distinguished using manual table sorting (for details see Environmental variables) - while the first type (*Bromus-Arrhenatherum* community) is relatively distinct, the other two (*Geum-Arrhenatherum* and *Cirsium-Arrhenatherum* community) are relatively continuous, and the dataset contains one outlier[2)] (Gauch & Whittaker 1981).

This dataset has been used in numerous studies to demonstrate functionality of various methods of analysing community data. Hill (1979) used it as an example dataset for TWINSPAN, Hill & Gauch (1980) used it to demonstrate DCA.

Locality

Germany, Danube valley south of Ulm.

Environmental variables

Name of variable	Description
area	Relevé area [m^2]
openings	Openings in vegetation [% area]
yield	Hay yield [kg×100/ha][3)]
veg.type	Vegetation type (A, B, C or D, see details below)
Light, Temp, Cont, Moist, React, Nutr	Mean Ellenberg indicator values for light, temperature, continentality, moisture, soil reaction and nutrients (calculated as mean of species indicator values *not* weighted by species biomass)

Vegetation types (variable `veg.type`) are according to Table 9.7 in Mueller-Dombois & Ellenberg (1974). The codes A, B and C stands for:

- A - *Bromus-Arrhenatherum* community
- B - *Geum-Arrhenatherum* community
- C - *Cirsium-Arrhenatherum* community
- D - releve 19, which has been deleted from the original Ellenberg's table, since its composition is quite different (contains *Arrhenatherum elatius* and *Festuca pratensis*, but other dominant species are *Phalaris arundinacea* and *Glyceria fluitans*)

Data for download

File name	File type	Description
danube-meadow-data.xlsx	Excel file	Contains sample × species matrix, header data, Ellenberg indicator values for species
danube.spe.txt	tab-delimited txt format	Sample × species matrix (48 samples in rows, 171 species in columns, full species names, species values in percentage of biomass (not cover))
danube.env.txt	tab-delimited txt format	Environmental variable matrix (samples in rows, variables in columns, including calculated mean Ellenberg indicator values)
danube.ell.txt	tab-delimited txt format	species Ellenberg indicator values (species in rows, Ellenberg indicator values in columns), assigned to individual species according to Ellenberg et al. (1992)

Script for direct import of data to R

```
danube.spe <- read.delim
('https://raw.githubusercontent.com/zdealveindy/anadat-r/master/data/danube.spe.txt
', row.names = 1)
danube.env <- read.delim
('https://raw.githubusercontent.com/zdealveindy/anadat-r/master/data/danube.env.txt
```

```
', row.names = 1)
danube.ell <- read.delim
('https://raw.githubusercontent.com/zdealveindy/anadat-r/master/data/danube.ell.txt
', row.names = 1)
```

References

- Ellenberg H. (1956): Aufgaben und Methoden in der Vegetationskunde. In: H. Walter, Einführung in die Phytologie IV/1, Stuttgart.
- Ellenberg H., Weber H.E., Dull R., Wirth V., Werner W. & Paulissen D. (1992): Zeigerwerte von Pflanzen in Mitteleuropa. *Scripta Geobotanica*, 18: 1-248.
- Gauch H.G. & Whittaker R.H. (1981): Hierarchical classification of community data. *Journal of Ecology*, 69: 537-557.
- Hill M.O. (1979): *TWINSPAN: A FORTRAN Program for Arranging Multivariate Data in an Ordered Two-way Table by Classification of the Individuals and Attributes.* Cornell University, Ithaca, NY.
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- Mueller-Dombois D. & Ellenberg H. (1974): *Aims and Methods of Vegetation Ecology*. John Wiley & Sons, New York, Chichester, Brisbane, Toronto.
- Tichý L. (2002): JUICE, software for vegetation classification. *Journal of Vegetation Science*, 13: 451-453.

1)
This approach is considered to be more quantitative than Braun-Blanquet scale estimating just species cover, and "has been applied widely in investigating pastures and tall-grass stands for their feed value" (Mueller-Dombois & Ellenberg 1974, p. 64).

2)
classified into a group D here

3)
In original table (Tab. 9.7 in M-D & E 1974) were some values recorded as *<8* - these values were arbitrarily replaced by *5*.

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Last update: **2020/04/07 15:42**