

Using Ellenberg's indicator values as a proxies for effect of environment in three different wild pathosystems

The traditional view of a pathosystem being influenced by three main components (host, pathogen and environment) is frequently addressed in agro-ecosystems but has been often simplified in wild plant pathosystems. Most studies show effects of host resistance and pathogen virulence and their spatial distribution but **the role of environment** is either taken as unimportant or hard to measure. However, the variation in prevalence and incidence of disease in populations is often too large to be attributed only to the first two factors. Easy to obtain environmental data might give us some clues about the factors in play and prepare the way for targeted experiments. In central Europe **Ellenberg indicator values** are the tool-of-choice to study correlations with environment.

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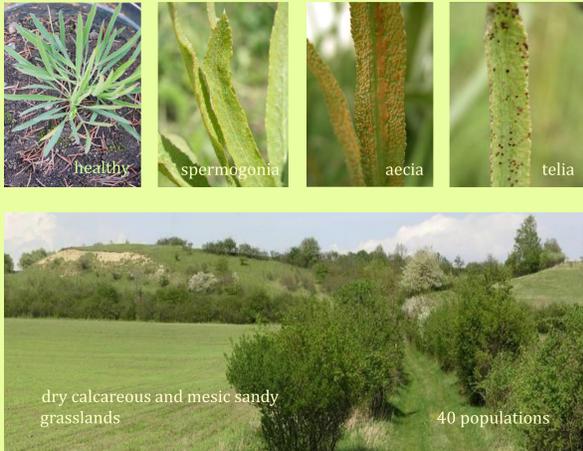
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PATHOSYSTEMS STUDIED

Falcaria vulgaris (Apiaceae)
Puccinia sii-falcariae (rust)



Impatiens noli-tangere (Balsaminaceae)
Podosphaera balsaminae (powdery mildew)

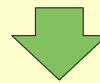


Dianthus carthusianorum (Caryophyll.)
Microbotryum violaceum (anther-smut)



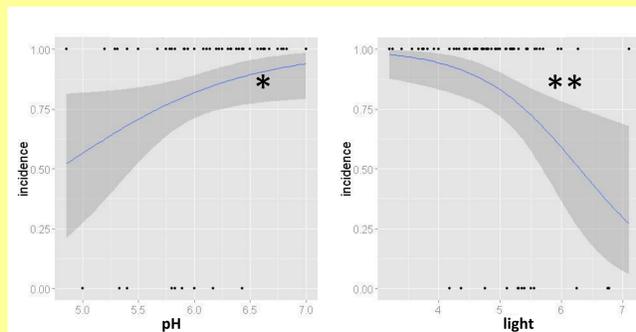
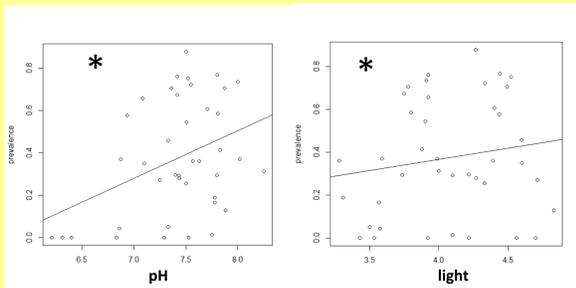
DATA

- pathogen **incidence** (presence/absence) and **prevalence** (proportion of plants infected)
- population **size**, **density** and **connectivity**
- plant species presence/absence data + tabulated Ellenberg's indicator values for **temperature**, **light**, **soil pH**, **nutrients** and **moisture** → population means



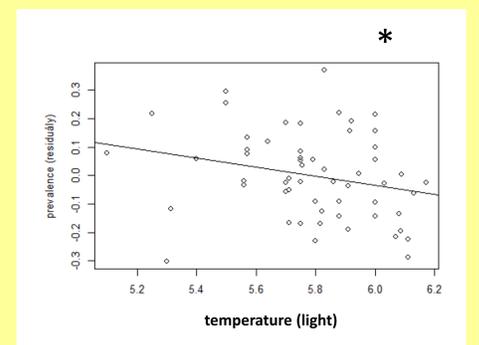
EFFECTS OF ENVIRONMENT

- incidence – no effects, only 5 populations clean



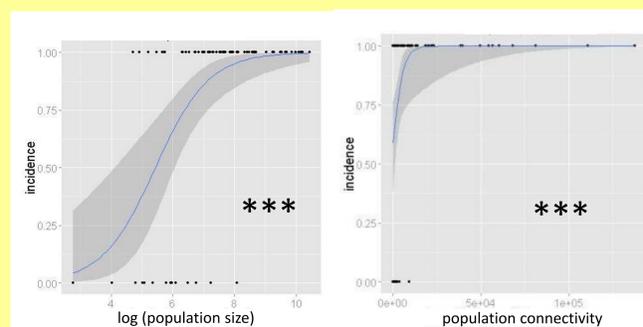
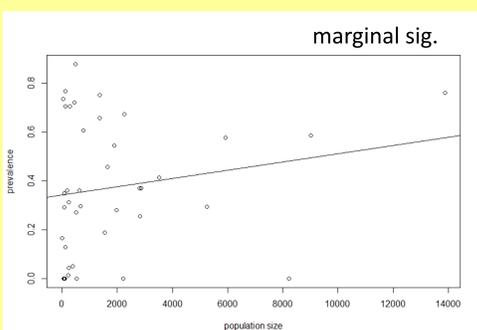
- incidence – also **moisture** (*)
- prevalence – only marginal effects

- incidence – only 3 clean populations



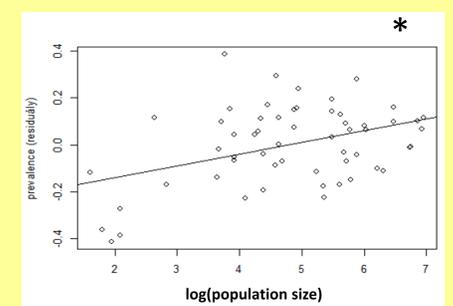
POPULATION EFFECTS

- incidence – no effects, only 5 populations clean



- prevalence – effect of **population size** (*)

- incidence – only 3 **very small** populations clean



- prevalence – also **density**(*), **connectivity**

There are some correlations of EIV's with environment – mostly of **light**, **moisture** and **soil reaction (pH)** – sometimes stronger but sometimes also weaker than population characteristics and their configuration. Although we can only speculate about the **causality** (e.g. **interaction with plant life history, spore germination ...**), they may be generally useful to design experiments with the causal agents.