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OOS 28-3 - Plant species responses: From expert knowledge to hard data

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The use of the Ellenberg indicator system is widespread. However, regression of Ellenberg's indicator values on field measurements always shows a large spread. We tested the hypothesis that this variation is caused by a vegetation-class dependent bias. We collected data containing vegetation relevés and measured pH. The relevés were assigned to a vegetation type by the program ASSOCIA. When the vegetation class was added as an explanatory factor to the linear regression analyses, the explained variance increased dramatically. Many of the regression lines per vegetation type were significantly different from each other. We concluded that Ellenberg indicator value for acidity is biased.

We developed a method to estimate species response based on direct measurements in the field. We were able to estimate the pH response of 556 species. The simplest statistical method gave the best prediction of pH:

- (1) The indicator value of a species is the average of the soil pH values of the sites where it was observed.
- (2) The predicted pH of a new site is the average of the indicator values of the species occurring there.

The responses were validated on European forest, the average absolute difference between predicted and measured pH was 0.5 pH units. We foresee that, when more data become available for other abiotic factors, our method will be able to replace the Ellenberg system. Based on the species responses and 160,000 relevés we also estimated the response of vegetation types to soil pH (www.abiotic.wur.nl).

See more of: [Inferring environmental conditions from biological observations: Tools for environmental management](#)

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