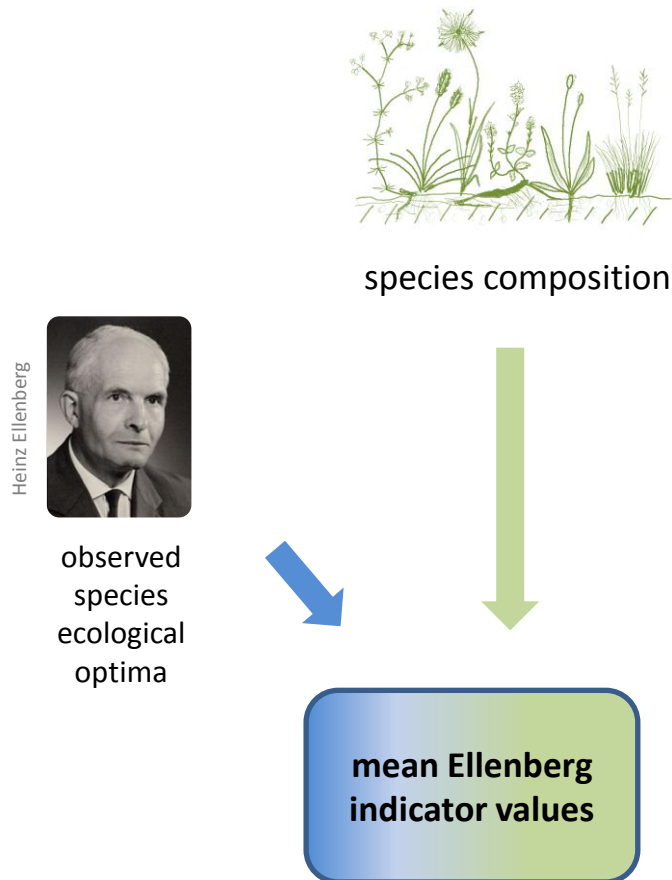


# Mean Ellenberg indicator values as explanatory variables in constrained ordination

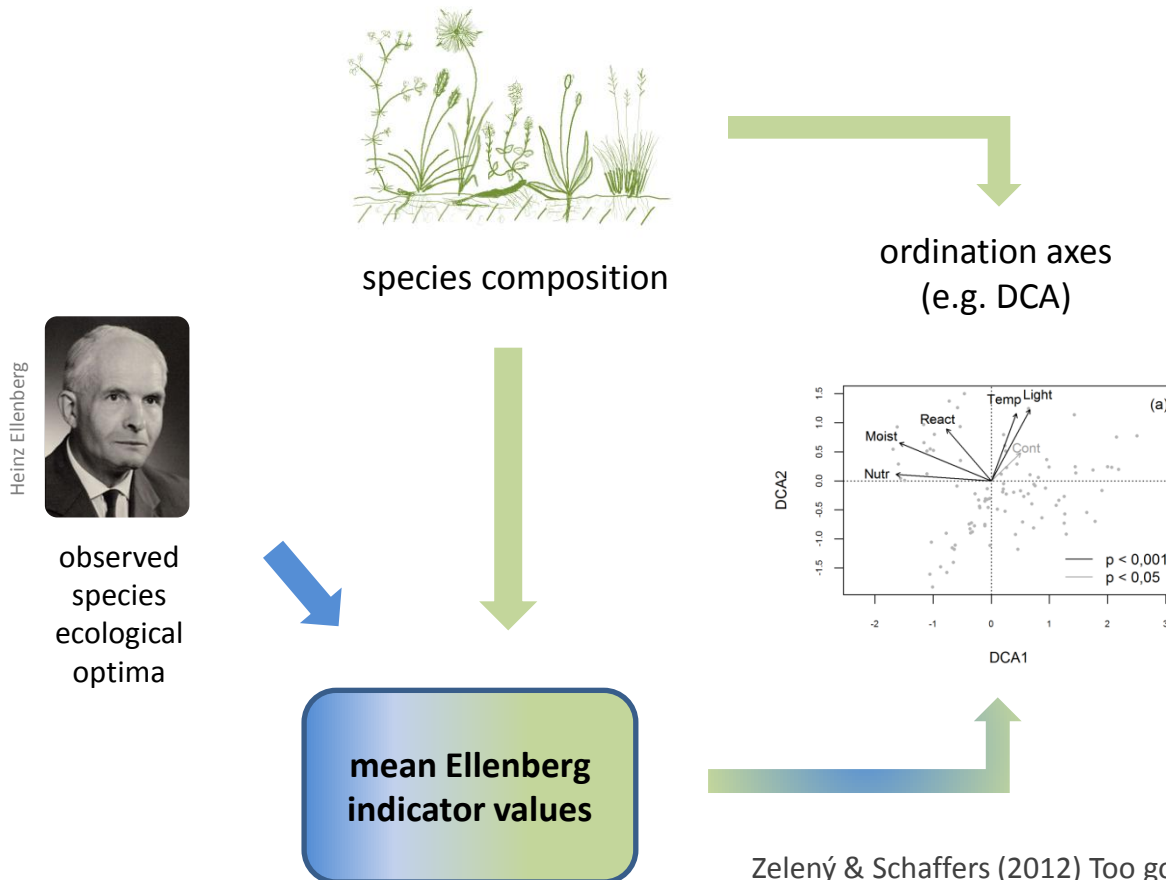
David Zelený



# Use of mean Ellenberg indicator values in vegetation analysis



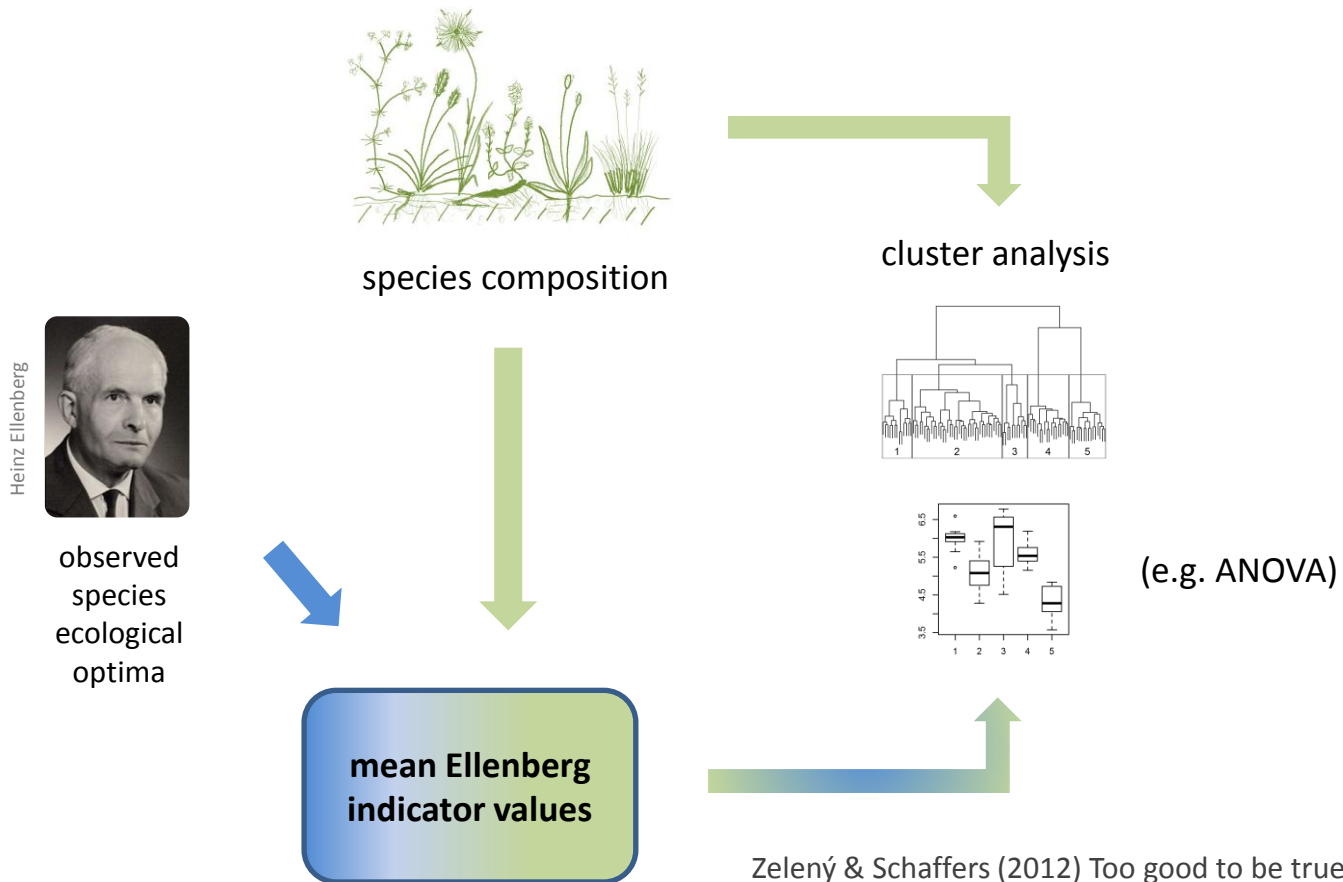
# Use of mean Ellenberg indicator values in vegetation analysis



Zelený & Schaffers (2012) Too good to be true: pitfalls of using mean Ellenberg indicator values in vegetation analyses. *Journal of Vegetation Science* 23: 419-431

[www.bit.ly/ellenberg](http://www.bit.ly/ellenberg)

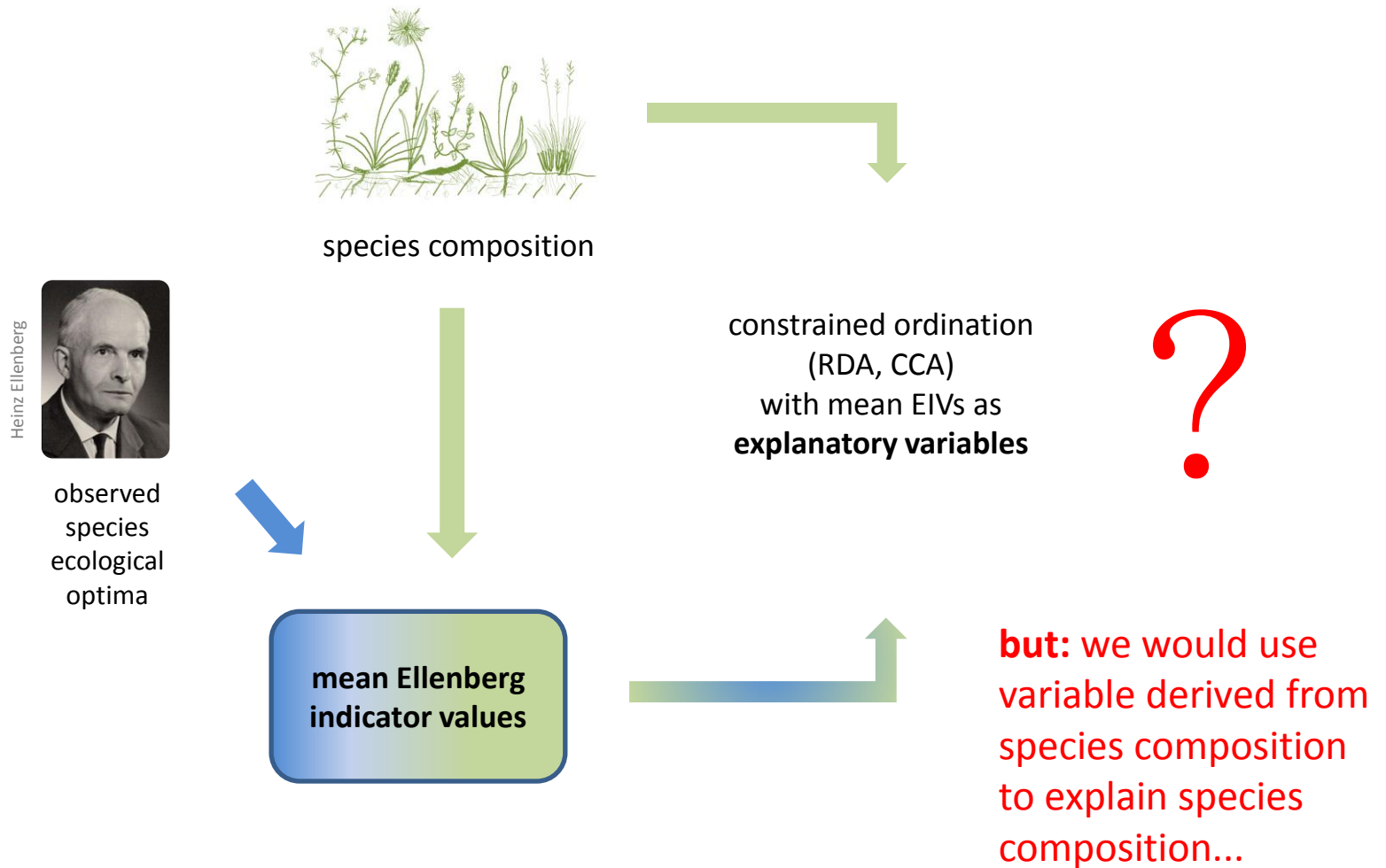
# Use of mean Ellenberg indicator values in vegetation analysis



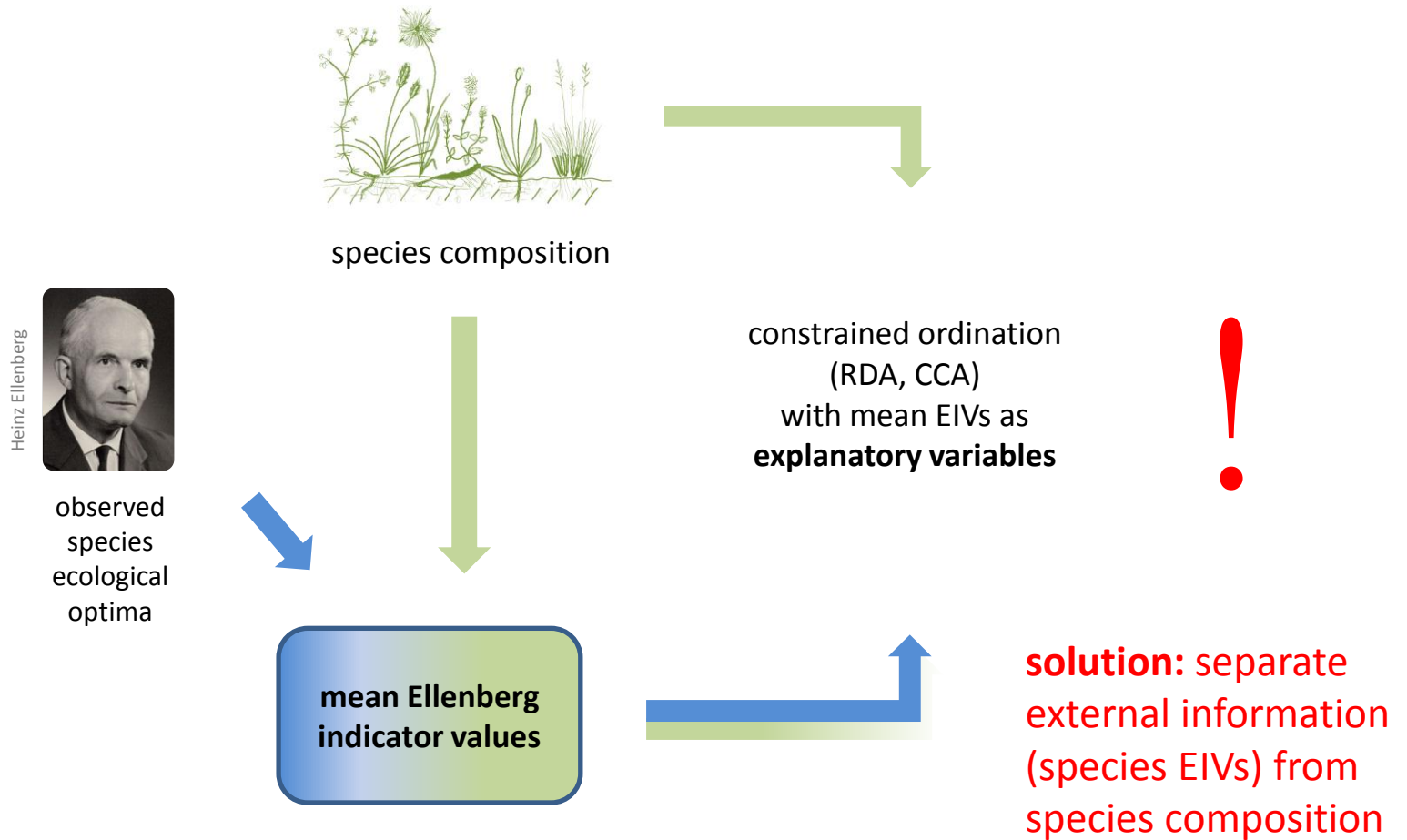
Zelený & Schaffers (2012) Too good to be true: pitfalls of using mean Ellenberg indicator values in vegetation analyses. *Journal of Vegetation Science* 23: 419-431

[www.bit.ly/ellenberg](http://www.bit.ly/ellenberg)

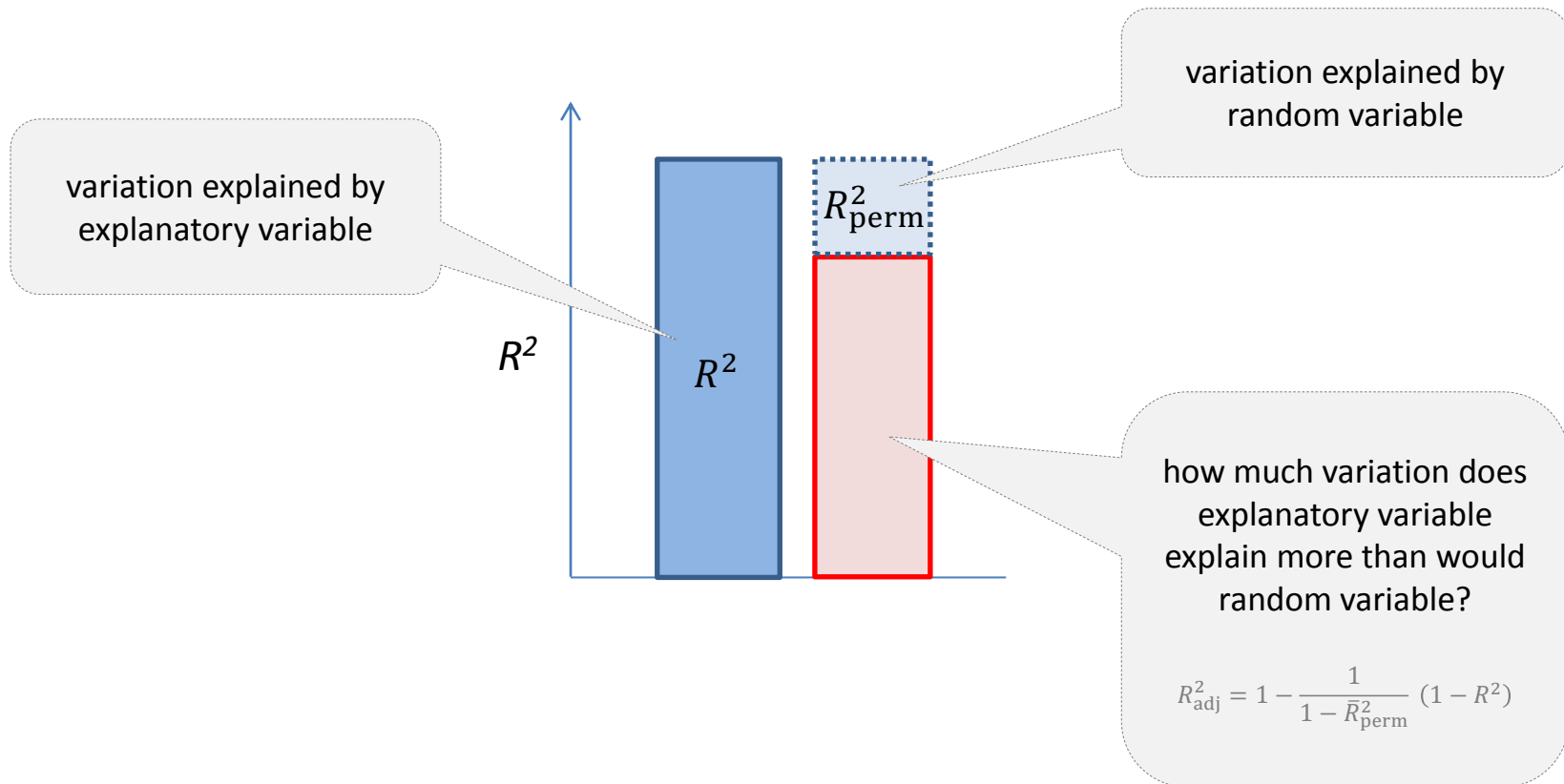
# Use of mean Ellenberg indicator values in vegetation analysis



# Use of mean Ellenberg indicator values in vegetation analysis

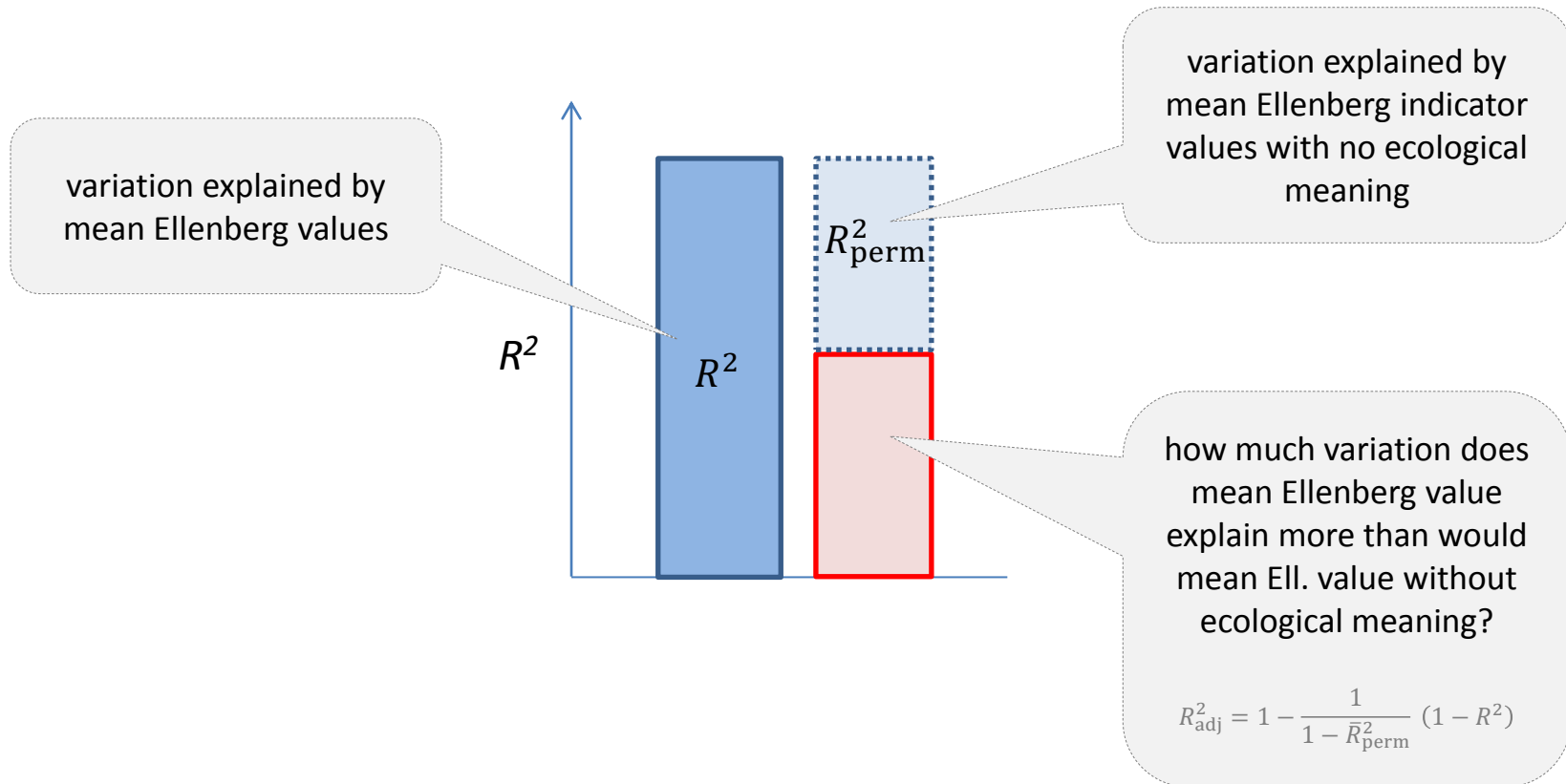


# Adjusted $R^2$ – how does it work?



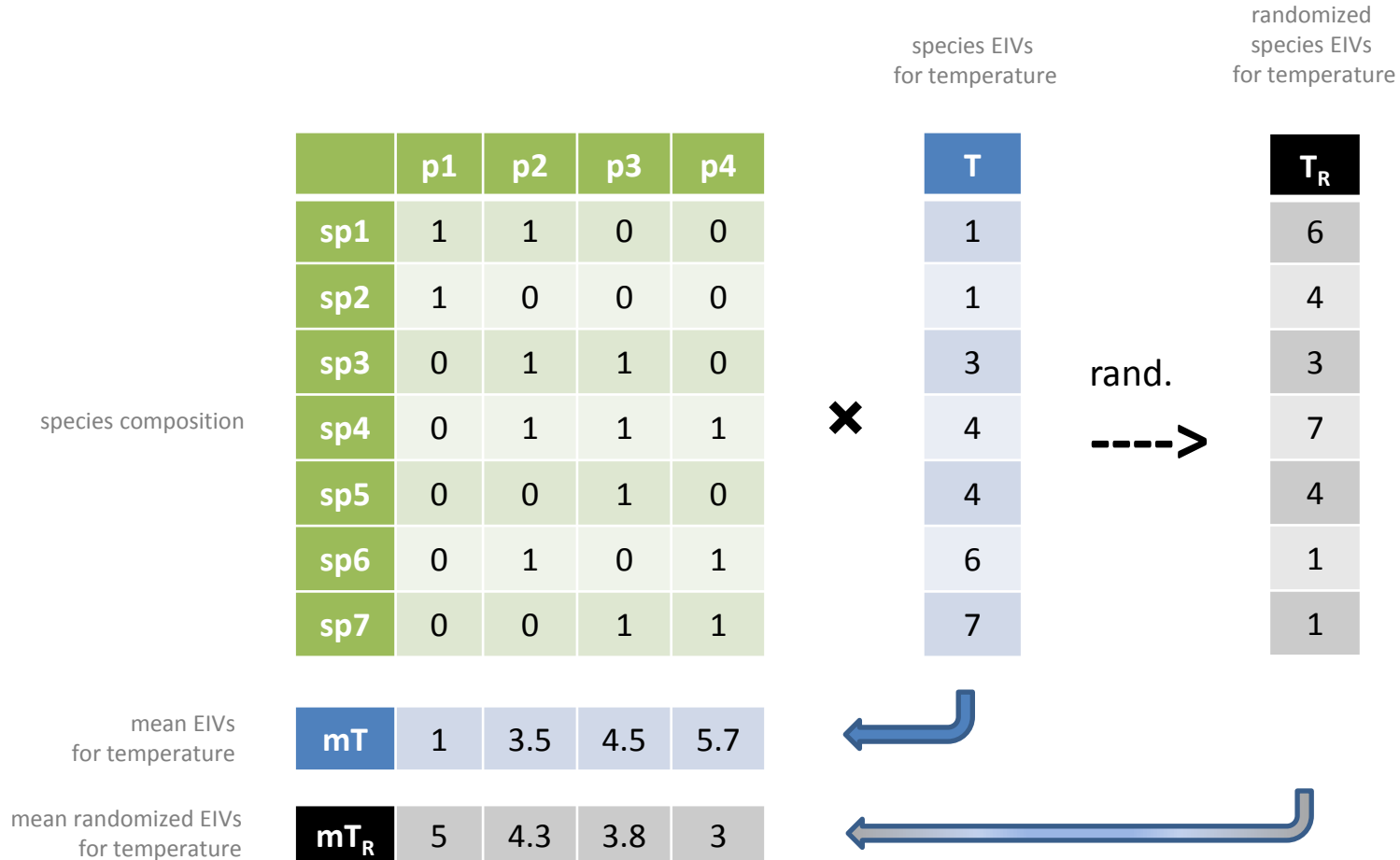
# Adjusted $R^2$ – how does it work?

(for mean Ellenberg indicator values)



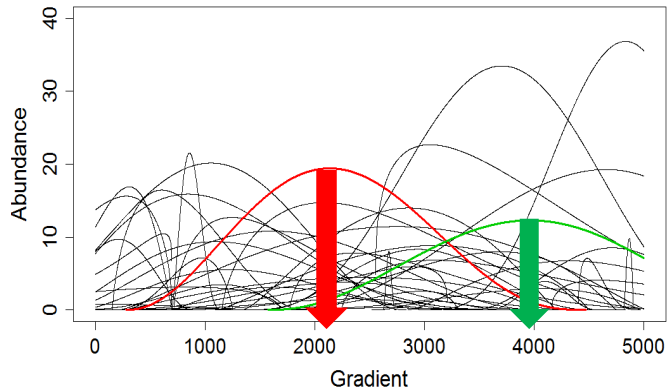


# Randomization of mean Ellenberg indicator values



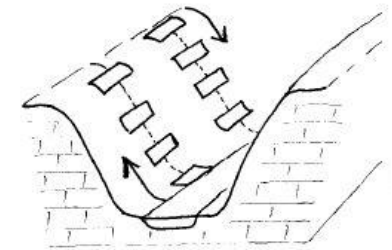
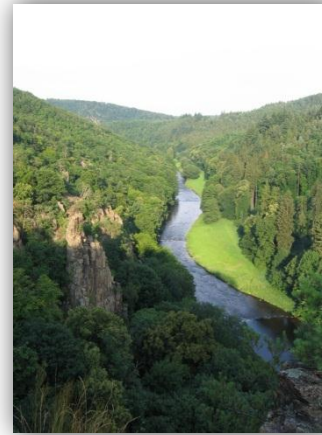
# Datasets

## Artificial data

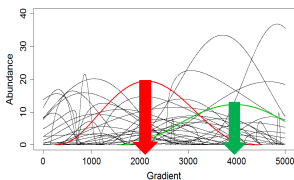


- one artificial gradient
- 300 species with random optima and niche widths
- 100 “survey” plots

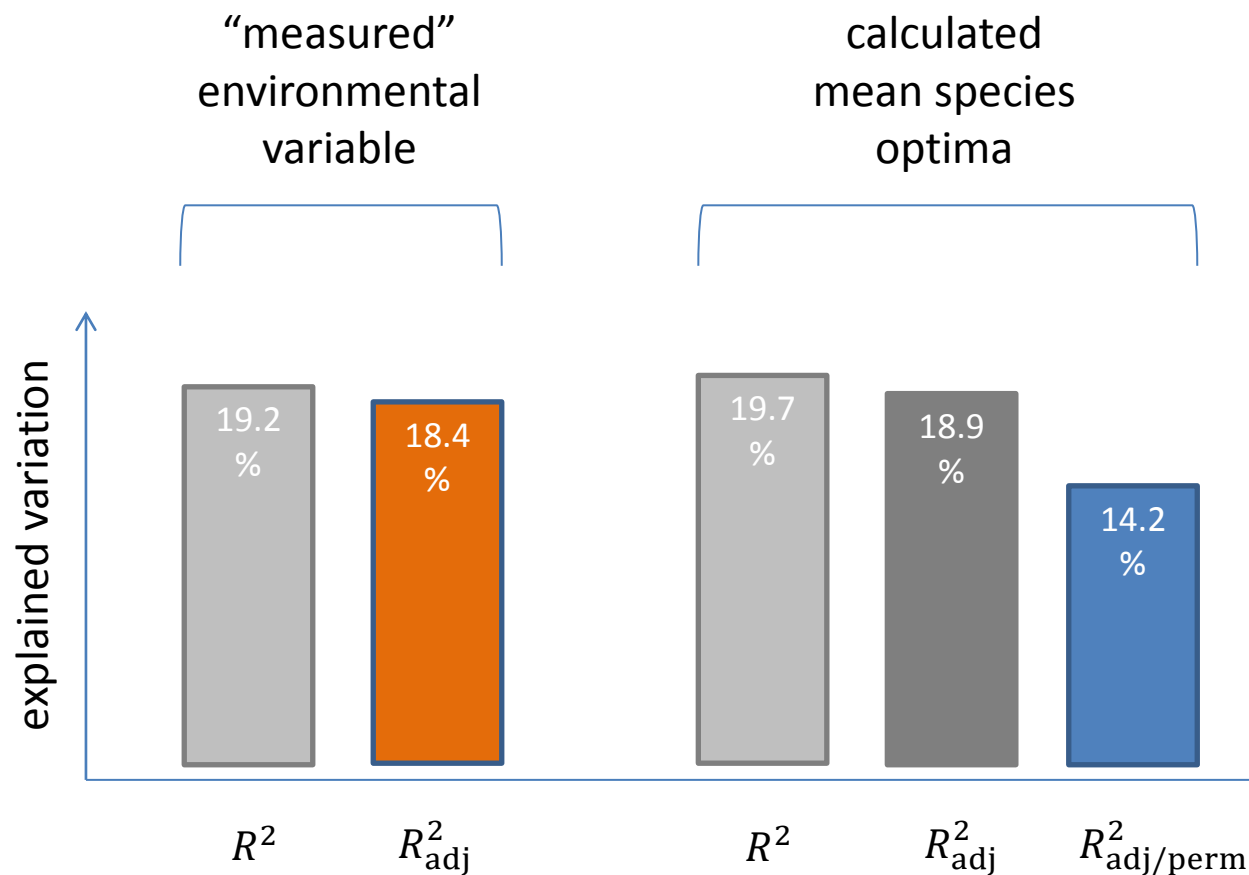
## Real data

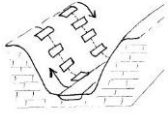
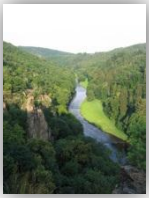


- forest vegetation in river valley
- heterogeneous landscape
- 97 plots sampled along transects
- 283 species
- measured soil pH

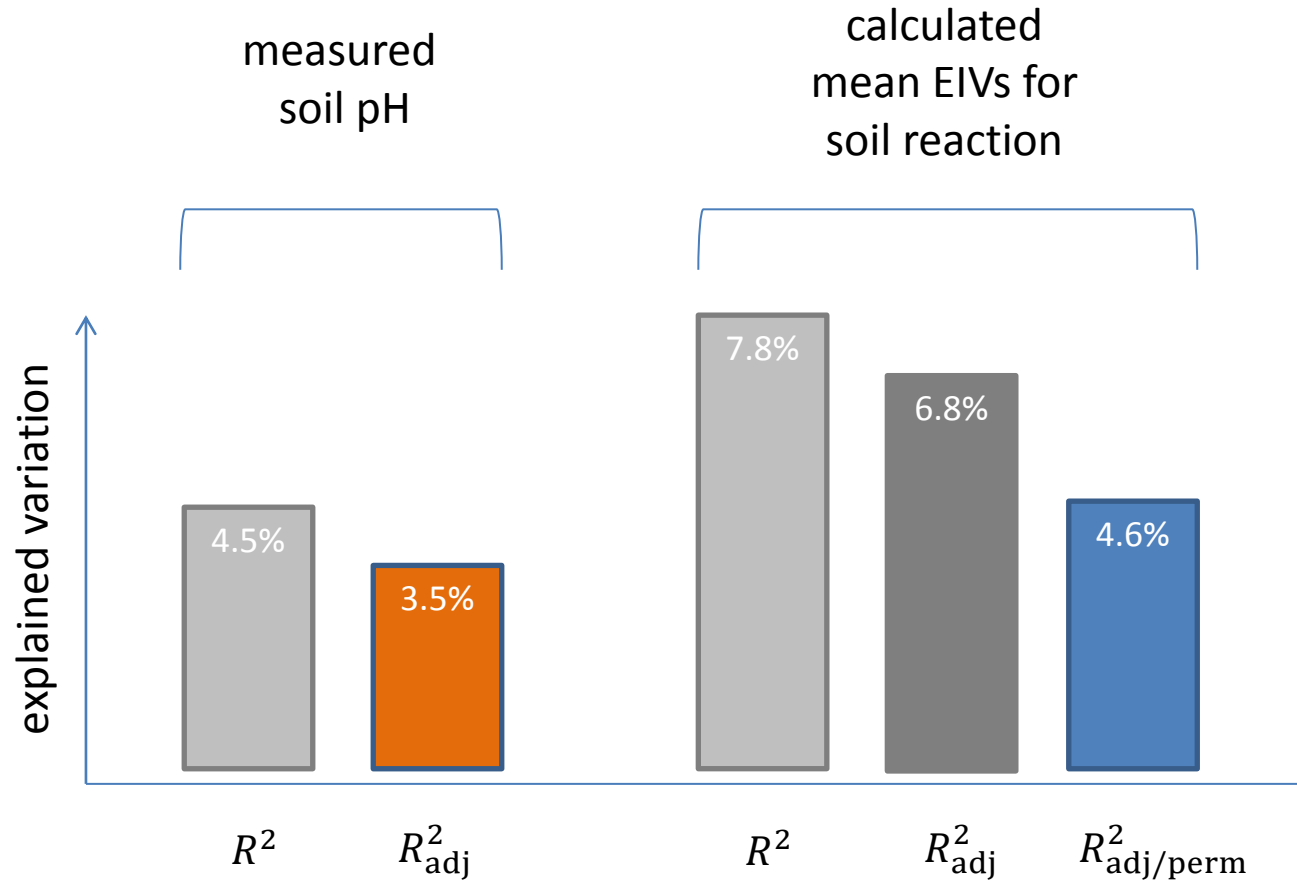


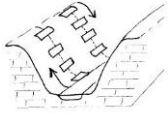
# Artificial dataset used in RDA



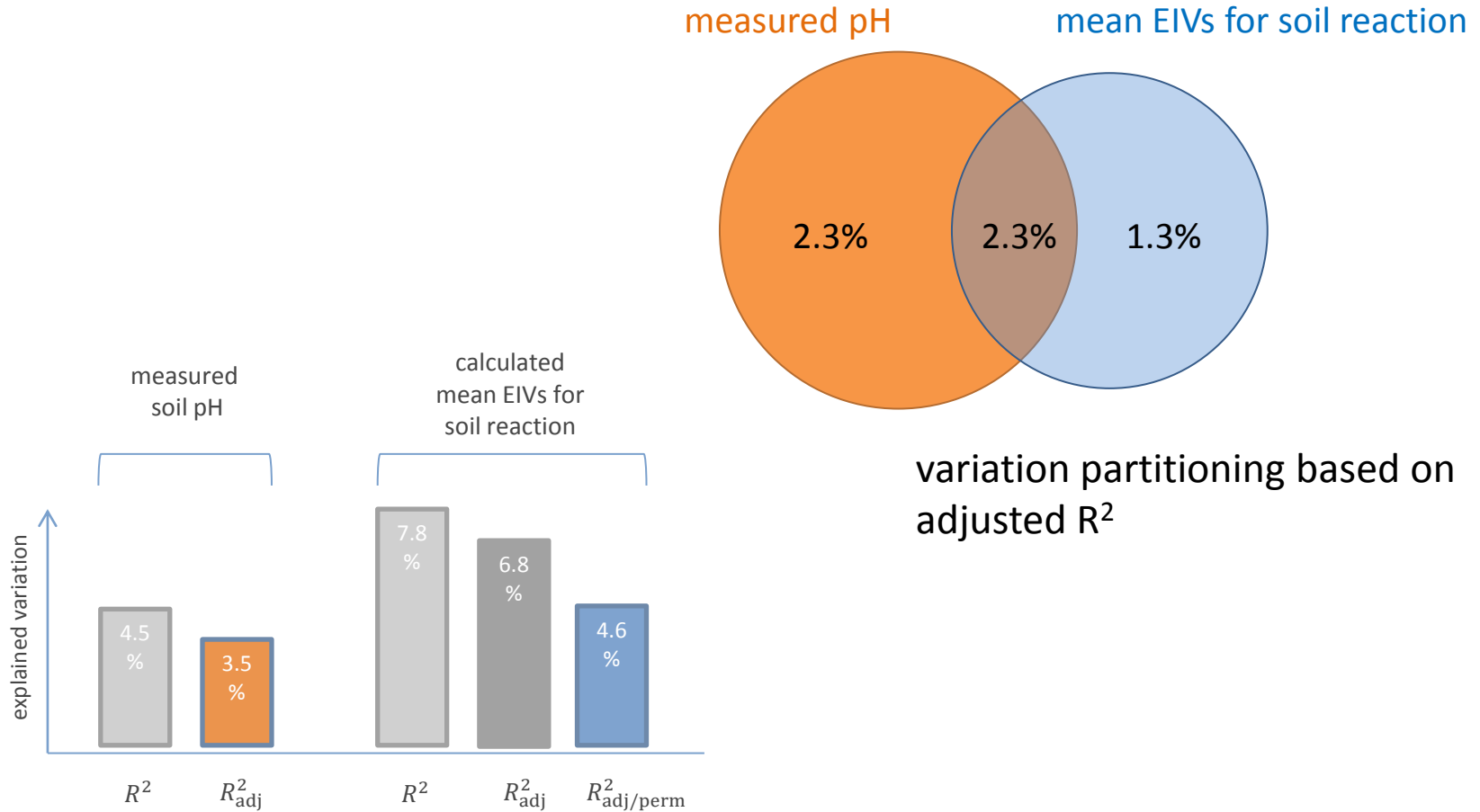


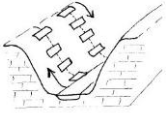
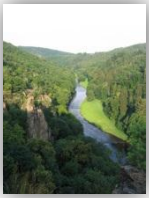
# River valley dataset used in RDA



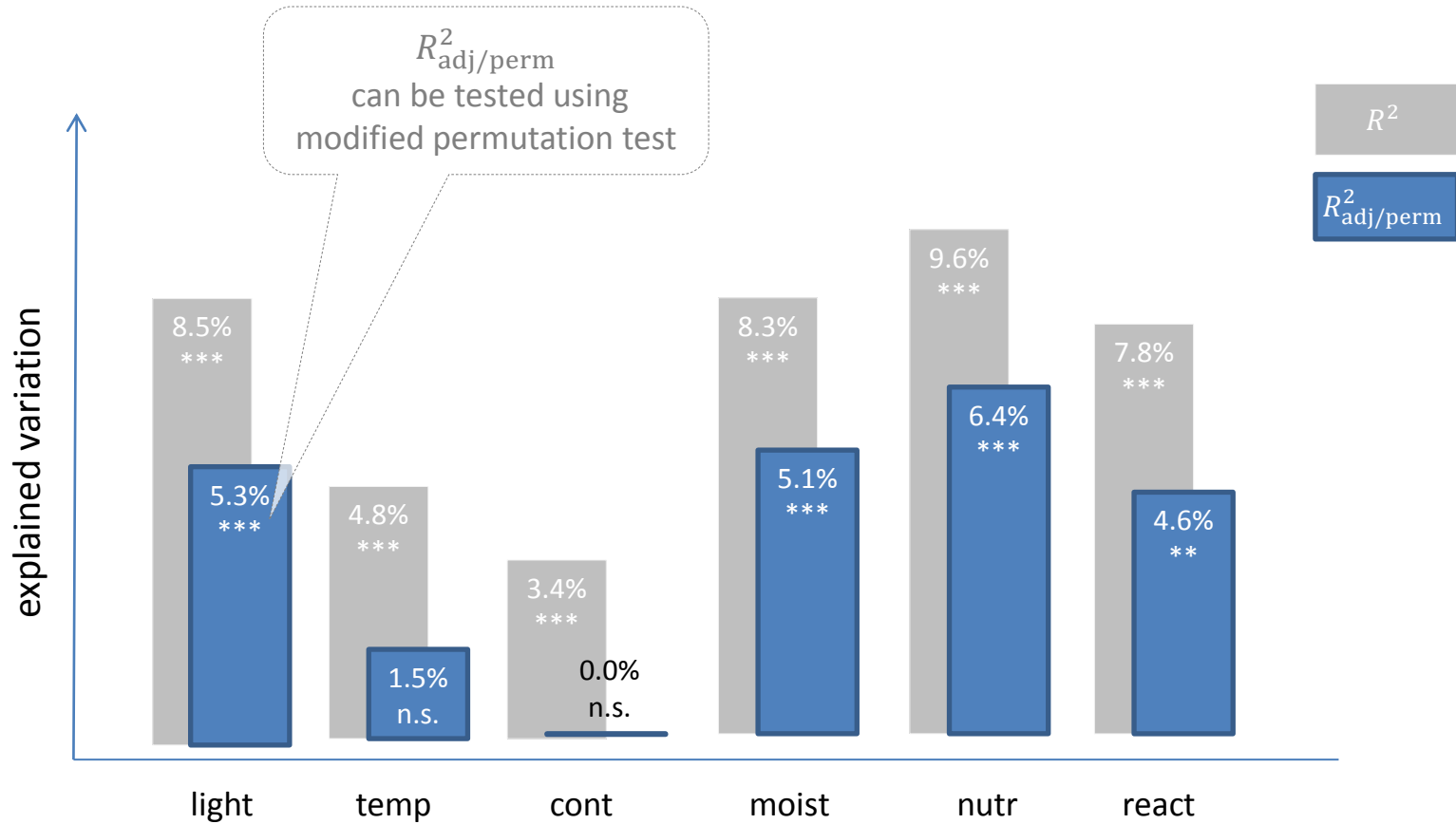


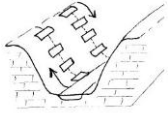
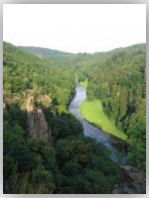
# River valley dataset used in RDA





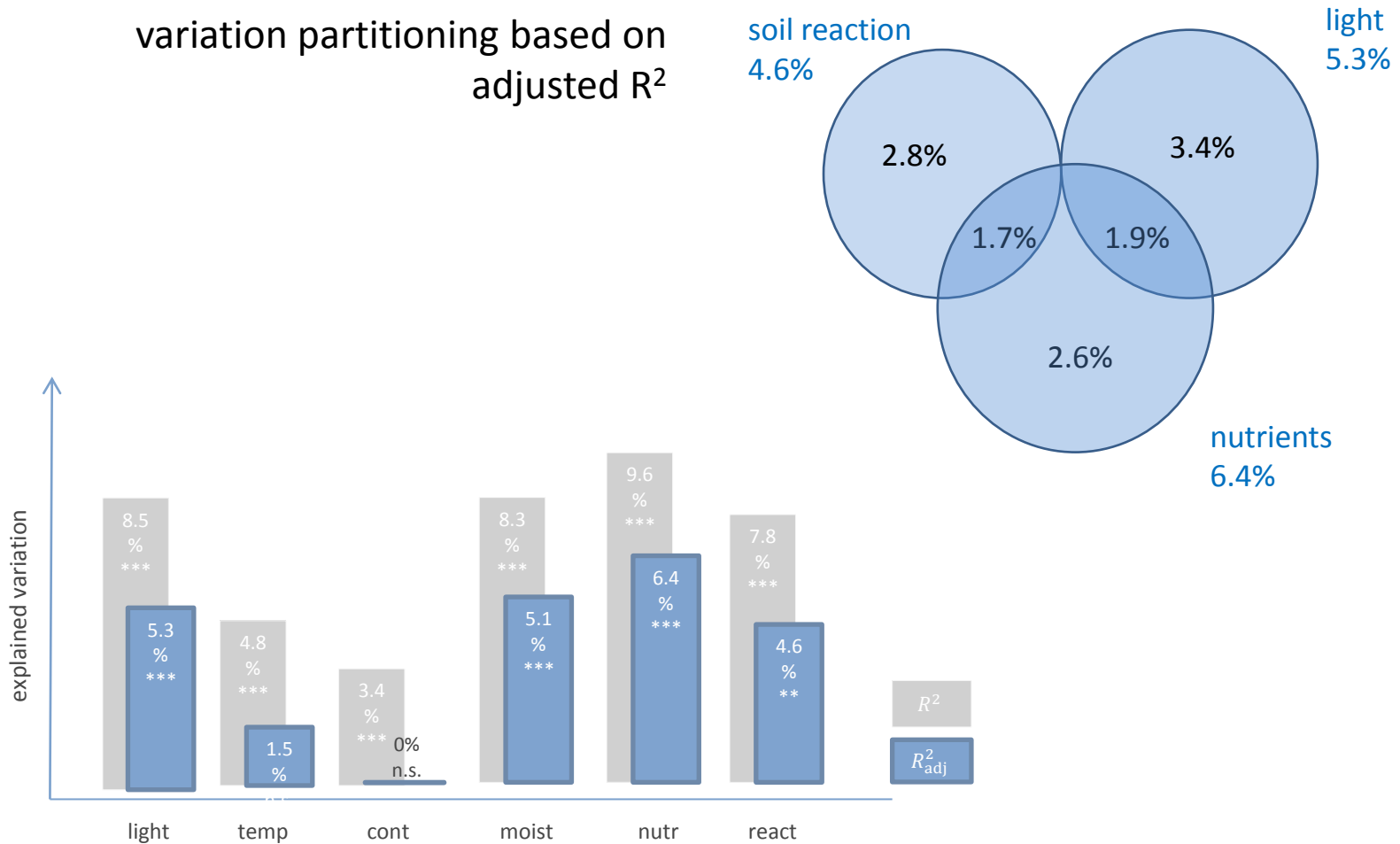
# River valley dataset used in RDA





# River valley dataset used in RDA

variation partitioning based on adjusted  $R^2$



# Conclusions

- concept of adjusted  $R^2$  enables to use mean Ellenberg indicator values as explanatory variables in constrained ordination
- adjusted  $R^2$  has to be calculated using modified permutation schema (permutation of assignments of indicator values to species)
- the question asked by this analysis:
  - ~~“How much variation does the mean EIVs explain?”~~
  - “Does the current assignment of indicator values to species says something more than if they are assigned randomly? And if so, how much?”



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**Thank you for your attention!**