

# Linking JUICE and R :

## New developments in visualization of unconstrained ordination analysis



David Zelený & Lubomír Tichý

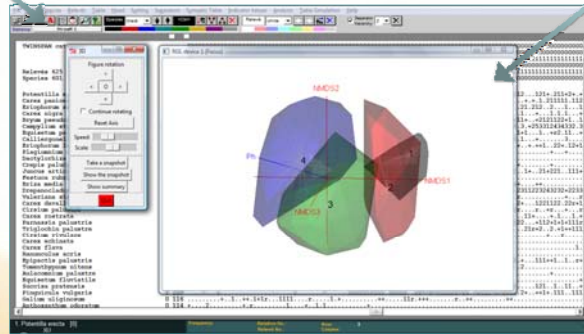
Institute of Botany and Zoology, Masaryk University  
Kotlářská 2, CZ-61137 Brno, Czech Republic  
e-mail: [zeleny@sci.muni.cz](mailto:zeleny@sci.muni.cz), [tichy@sci.muni.cz](mailto:tichy@sci.muni.cz)



### JUICE 7.0

is a Windows application for editing, classification and analysis of large phytosociological tables and other ecological data. It has been developed by Lubomír Tichý (Masaryk University Brno) since 1998, written in Visual Basic and optimized for Windows OS (but operating also under Linux via Wine emulator). JUICE can also automatically or semi-automatically operate other commercial or free software, such as PC-ORD, CANOCO, SYNTAX or Mulva.

For more information about JUICE and free program download, visit <http://www.sci.muni.cz/botany/juice/> or <http://tinyurl.com/cwtrf9>.



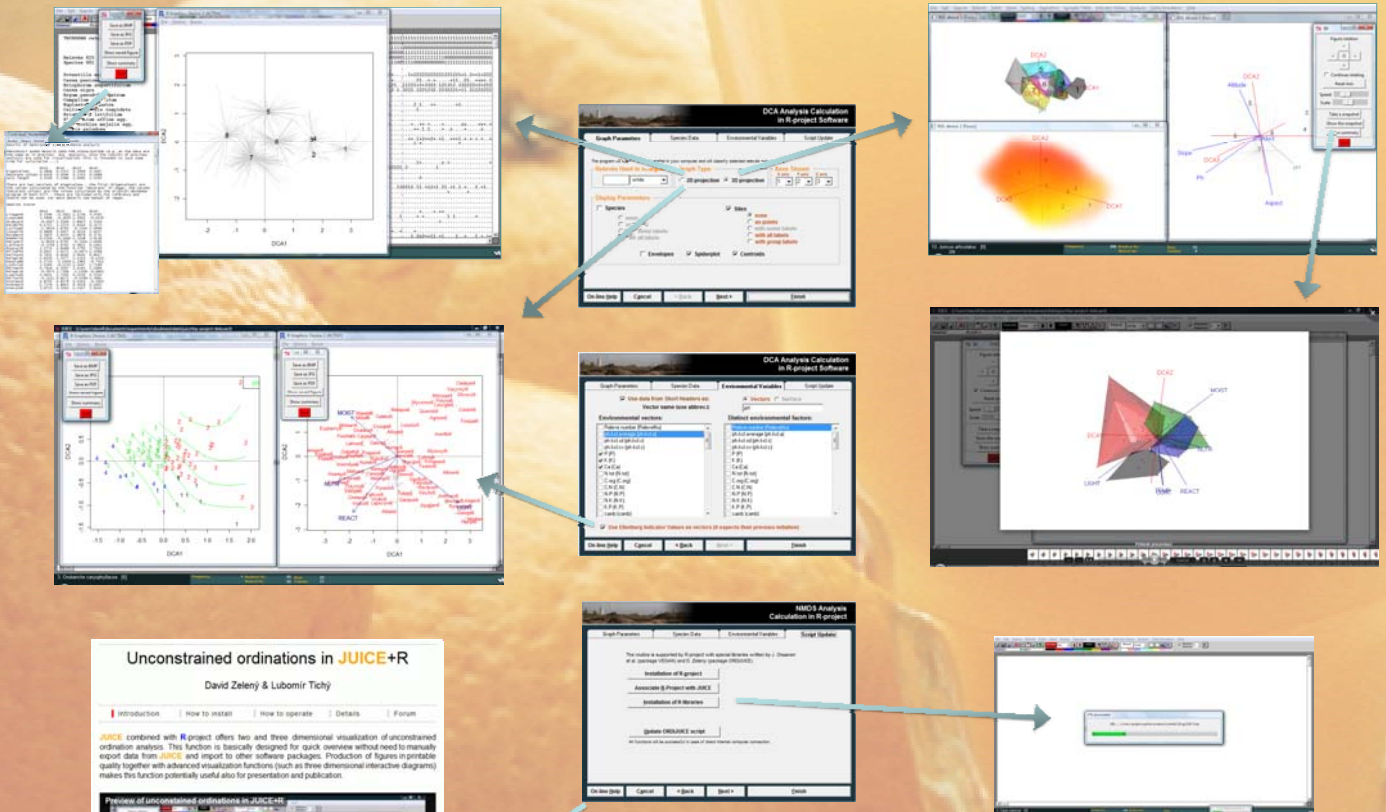
### R-project

is a free software environment for statistical computing and graphics, running on a wide variety of platforms. Following R packages are used by JUICE:

- **vegan** (Oksanen, Kindt, Legendre, O'Hara et al.) - number of tools for analysis of ecological communities, diversity and multivariate analysis;
- **ordjuice** (Zelený) - connecting JUICE and R and offering some additional visualization tools;
- **rgl** (Adler & Murdoch) - three dimensional interactive ordination diagrams;
- **geometry** (Grasman & Gramacy) - calculation of convex hulls;
- **tcltk** and **tkrgl** (Murdoch & Chen) - user interface for interaction with figures.

Linking JUICE and R offers quick and effective availability of selected R analytical and visualization functions: JUICE offers user friendly environment of vegetation data handling and import, R works as an engine for analysis and visualization.

Recently implemented unconstrained ordination analyses are Detrended Correspondence Analysis, Principal Component Analysis and Non-metric Multidimensional Scaling, all available in *vegan* library written by Oksanen et al.



### Technical solutions

Link between JUICE and R is mediated by sharing the files via R/bin directory and using libraries ordjuice. JUICE offers wizard for selection of appropriate analysis parameters and type of graphical output. Data are saved into R/bin file, and R is initialized to run in a batch mode by sending the script with selected parameters into Windows command line. R draws the figure onto graphical device (X11 or rgl) and opens Tcl/Tk panel; after either the device or Tcl/Tk bar is closed, R is termi-

nated. This design allows several R sessions to run simultaneously using the same data, but different parameters.

Updates of ordjuice library are available from R repository in <http://www.sci.muni.cz/botany/zeleny/R>. If ordinations are in use, once per day is checked for new updates and user is noticed about the option to update.