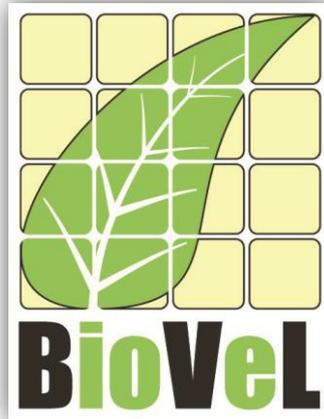


Keyfitz's delta Workflow for local execution



BioVeL – Biodiversity Virtual e-Laboratory

Workflow Documentation

Keyfitz's delta Workflow for local execution

July 2014

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283359
Mr Alex Hardisty
<http://www.biovel.eu>
36 months



Keyfitz's delta Workflow for local execution

1 Description

The Keyfitz's delta Workflow provides an environment to calculate the Keyfitz delta value. Keyfitz's delta is a measure of the distance between any two probability vectors (Keyfitz 1968). In this case is a measure of the distance between n (Observed Stage Distribution) and w (Stable Stage Distribution). The maximum value is 1 and the minimum value is 0 (when the vectors are identical).

2 General

2.1 Name of the workflow in myExperiment.

Name: Keyfitz's delta Workflow for local execution

Download: The workflow pack can be downloaded at myExperiment under the following address: <http://www.myexperiment.org/packs/650.html> or only the workflow: <http://www.myexperiment.org/workflows/4345.html>

2.2 Date, version and licensing

Last updated: 23th July 2014

Version: 1

Licensing: CC-BY-SA

2.3 How to cite this workflow

To report work that has made use of this workflow, please add the following credit acknowledgement to your research publication:

The input data and results reported in this publication (tutorial) come from data (Dr. Gerard Oostermeijer unpublished results and publication: Oostermeijer, J.G.B. M.L. Brugman, E.R. de Boer; H.C.M. Den Nijs. 1996. Temporal and Spatial Variation in the Demography of *Gentiana pneumonanthe*, a Rare Perennial Herb. *The Journal of Ecology*, 84: 153-166.) using BioVeL workflows and services (www.biovel.eu). Keyfitz's delta workflow was run on *<date of the workflow run>*. BioVeL is funded by the EU's Seventh Framework Program, grant no. 283359.

3. Scientific specifications

3.1 Keywords

Matrix Population Models, BioVeL, demography, Gentiana pneumonanthe, Keyfitz's delta, matrix, matrix population models, population, stable stage distribution (w)

3.2 Scientific workflow description

The Keyfitz's delta Workflow provides an environment to calculate the Keyfitz delta value. The workflow accepts input data in a .txt format. The output is provided as a set of R results.

This workflow produces the Keyfitz's delta, which is a measurement of the distance to the stable stage distribution (SSD). Keyfitz's delta is a measure of the distance between any two probability vectors (Keyfitz 1968). In this case is a measure of the distance between n (Observed Stage Distribution) and w (Stable Stage Distribution). The maximum value is 1 and the minimum value is 0 (when the vectors are identical).

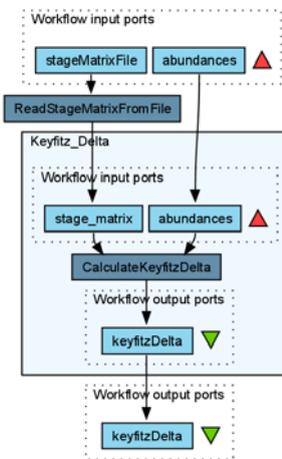


Figure 1. Keyfitz's delta workflow in Taverna workbench.

For more detailed description of the functions, please visit the Tutorial section.

4 Technical specifications

4.1 Execution environment and installation requirements

The Workflow requires a Taverna Engine. The simplest way to install a Taverna Engine is to install Taverna Workbench. The workflow also requires an Rserve installation with popdemo package installed. It is possible to setup the workflow to use a remote Rserve. However, instructions for installing a local Rserve are provided below.

4.2 Taverna installation, including updates and plugins

4.2.1 Taverna installations

- Taverna Workbench: Version 2.4 or 2.5. For installation files and instructions, please go to <http://www.taverna.org.uk/download/workbench>

4.2.2 Taverna Dependencies

- Install R software in your computer. See: <http://www.r-project.org/>
- Start R, and install package Rserve:
 - `install.packages("Rserve")`
- For package popdemo, as it is archived in CRAN, use the package devtools to install it
 - `install.packages("devtools")`
 - `require(devtools)`
 - `install_url("http://cran.r-project.org/src/contrib/Archive/popdemo/popdemo_0.1-3.tar.gz")`
- Local R Server: (Rserve) running at port 6311. See <https://wiki.biovel.eu/x/3ICD> for additional information.

4.2.4 How it works

- First, open R, once R is opened, type `library(Rserve)` and press enter; then type `Rserve()` and press enter again. You will see then the following message: Starting Rserve...

```
"C:\PROGRA~1\R\R-30~1.1\library\Rserve\libs\x64\Rserve.exe"
```

After this operation you can open Taverna and run the workflow.

5 Tutorial

5.1 Introduction

In this tutorial, you will use an input file MTers87_88.txt, called in myexperiment.org: Stage Matrix of *Gentiana pneumonanthe* 1987-88 File. You will use this file to perform several analyses on it. Finally you will be able to export your results to different formats.

5.2 Input data.

5.2.1 Data preparation/format

The workflow accepts input data (matrices) in a .txt format, all decimal numbers in each matrix must be indicated by dots e.g.: 0.578. All examples matrices for the tutorial are available in the PACK: <http://www.myexperiment.org/packs/650.html> or here below.

5.2.2 Input data

The input files are in a .txt format: to download click here in each file:

Terschelling

- [MTers87_88.txt](#)

5.3 Select input data dialogue boxes.

The first step is to fill out the input ports:

5.3.1 INPUTPORTS

1) **Abundance:** here appear the fields with the initial abundance per stage observed in the field (Fig 2). As an example *Gentiana pneumonanthe* has 5 stages with its respective abundance.

The abundance of the stages or categories must be added one by one. First press Add value, fill the abundance of the first stage and press enter; then press Add value and fill once again the next stage abundance; repeat the action until you have fill all the abundance of all stages (Fig 2).

Stage abundance of the year 1987:

S (seedlings)	69
J (Juveniles)	100
V (vegetative)	111
G (reproductive individuals)	21
D (dormant plants)	43

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e.g. [69, 100, 111, 21, 43]

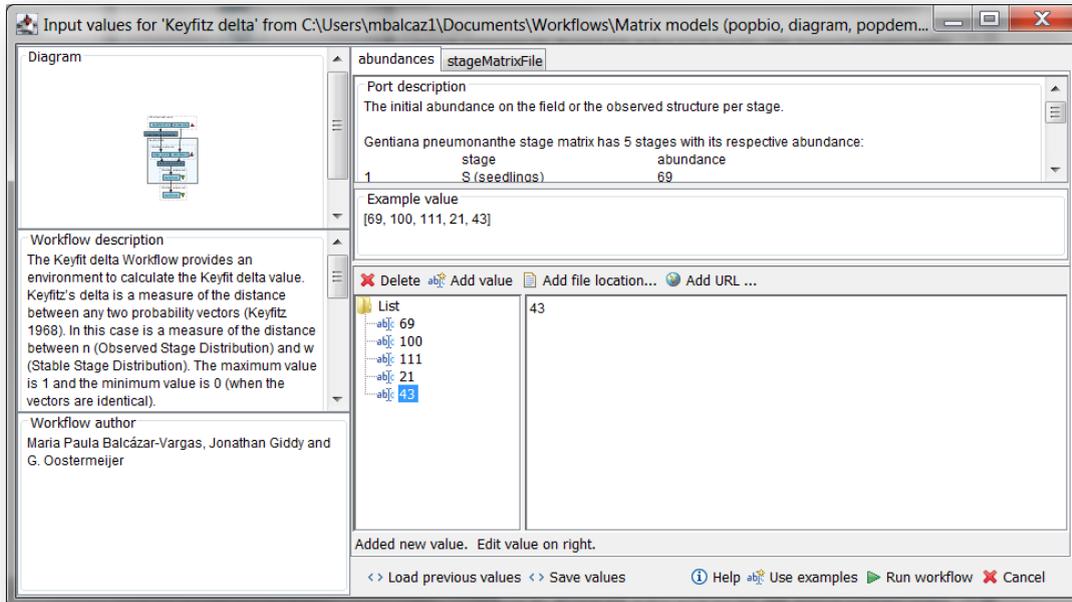


Figure 2. Abundance input. Fill in the abundance per stage appears.

2) **StageMatrixFile**: Matrix in a .txt file format. Click in Set file location (red arrow in Fig 3), a window dialog appears and the user selects the file (e.g. [MTers87_88.txt](#), Fig 4) and then clicks the Open button. Then the link to the file will appear on the Taverna window.

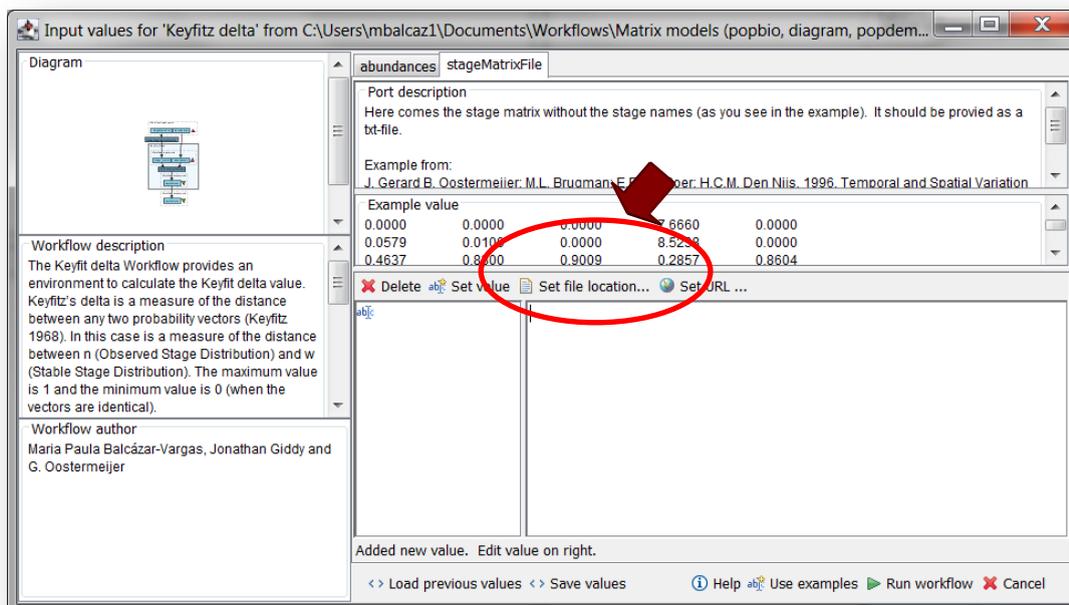


Figure 3. Set the Location of the matrix file.

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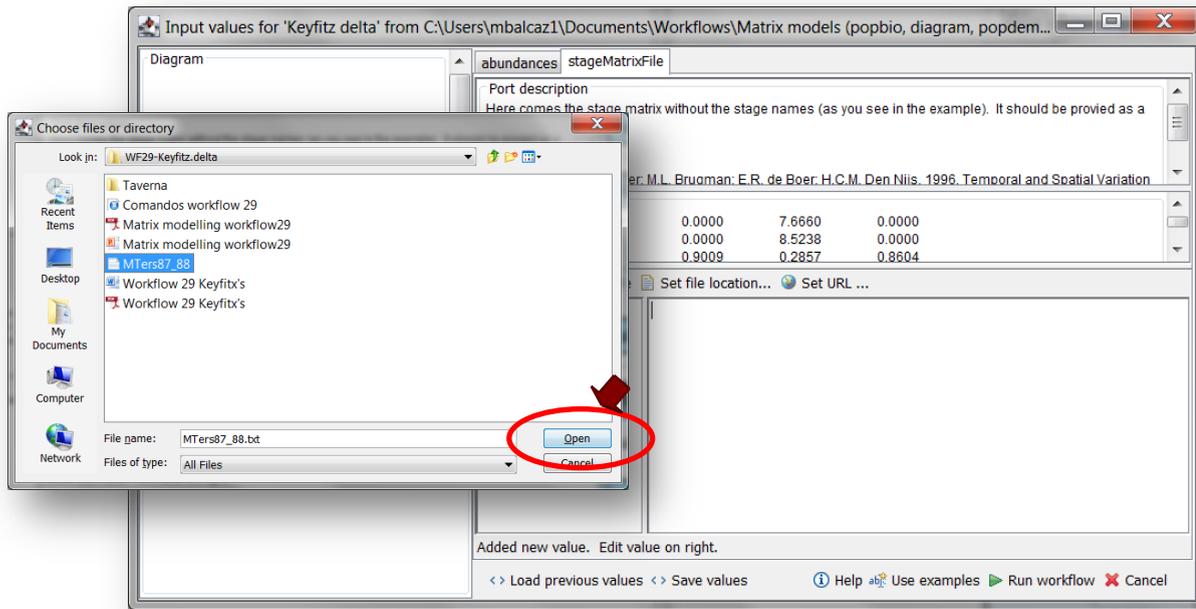


Figure 4. Choose the matrix file and click in Open.

After the user has filled out the input ports and has clicked the **Run Workflow button**, the analysis will few seconds.

When the analysis is completed, it appears on different windows under results in Taverna, then the user can save the result.

5.4 Save data/results

5.4.1 OUTPUTS

First, click in the selected result window e.g. **keyfitzDelta** (Fig 5, green oval). Second, click in the left window on value 1 (Fig 5, blue oval), Third, on the right window click on the save value (Fig 5, red oval). Fourth, name the file and determine the extension file. For a text file: e.g. .csv or .txt. Finally, save the file in the chosen map (Fig 6).

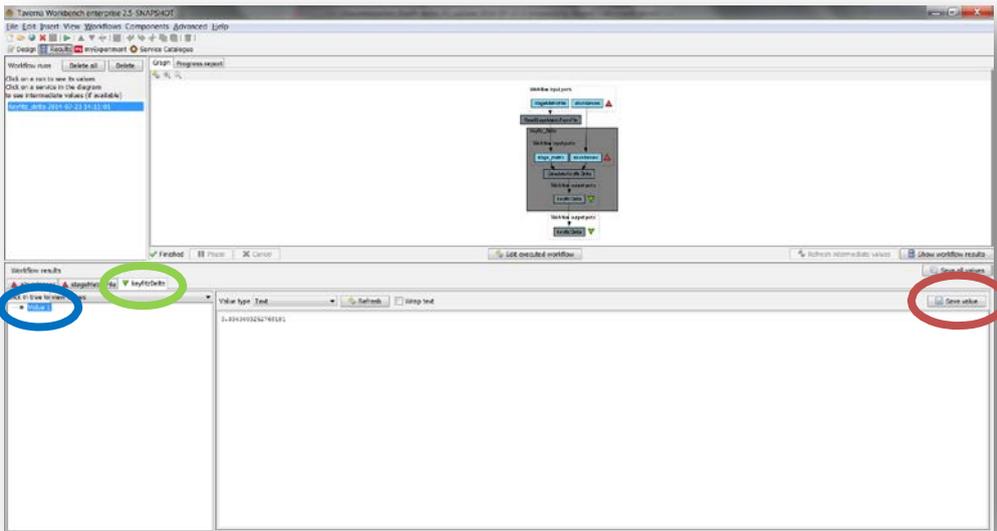


Figure 5. Keyfitz delta output window.

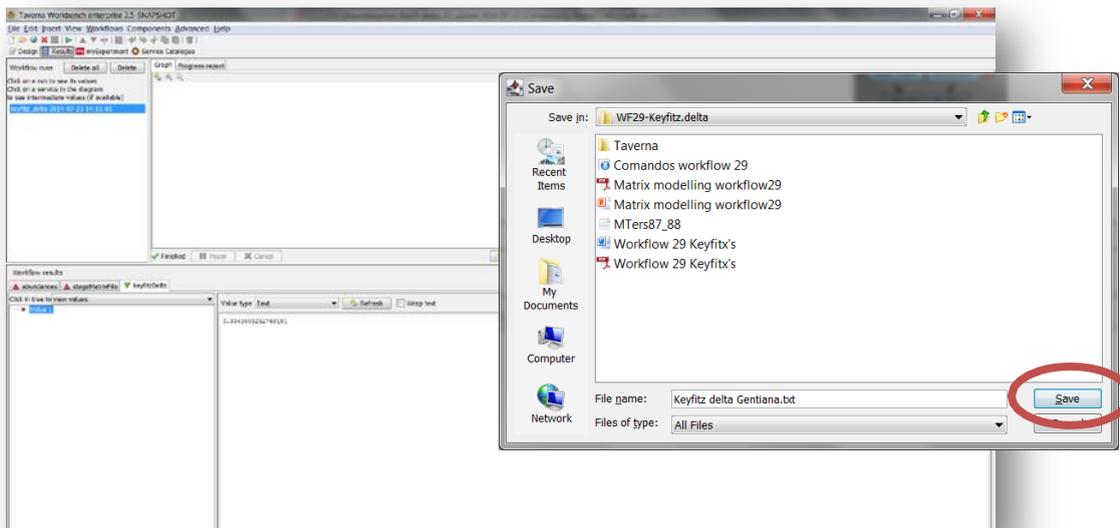


Figure 6. Name the file and determine the extension file. For a text file: e.g. .csv or .txt.

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1) Keyfitz's Δ : Keyfitz's delta is a measure of the distance between n (Observed Stage Distribution) and w (Stable Stage Distribution). Its maximum value is 1 and its minimum is 0 (when the vectors are identical).

e.g. 0.3367

For further details see: References

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6 Support

For questions with using the workflow, please write [support @biovel.eu](mailto:support@biovel.eu)

For definitions of technical and biological terms, please visit the BioVeL glossary page:
<https://wiki.biovel.eu/display/BioVeL/Glossary>

7 References

This workflow was created using and based the package popdemo (Stott, Hodgson and Townley, 2013)

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7.1 Acknowledgements

7.1.1 Authors

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7.1.2 Project funding

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BioVeL is funded by the European Commission 7th Framework Programme (FP7) as part of its e-Infrastructures activity. Under FP7, the e-Infrastructures activity is part of the Research Infrastructures programme, funded under the FP7 'Capacities' Specific Programme. It focuses on the further development and evolution of the high-capacity and high-performance communication network (GÉANT), distributed computing infrastructures (grids and clouds), supercomputer infrastructures, simulation software, scientific data infrastructures, e-Science services as well as on the adoption of e-Infrastructures by user communities.

7.2 Publications