



European *Daphnia* Species (EDS)

Digital catalogue and identification key of *Daphnia* from Europe and the Mediterranean

Adam Petrušek, Finn Bastiansen and Klaus Schwenk

Department of Ecology, Charles University, Prague, Czechia petrusek@cesnet.cz
 Department of Ecology and Evolution, J.W. Goethe-University, Frankfurt am Main, Germany

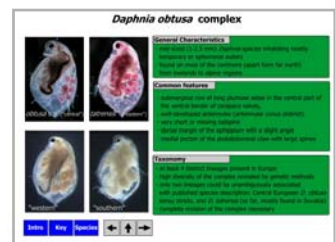
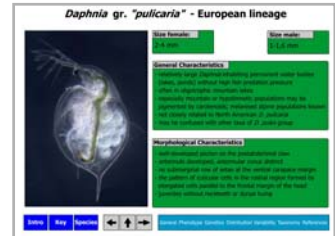


Why another *Daphnia* key?

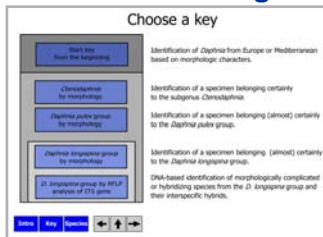
1. Until recently, no up-to-date key for the identification of European and Mediterranean members of this important cladoceran genus was available. Monographs in various languages were either outdated, regional, or virtually inaccessible.
2. A key included in the *Daphnia* monograph by Benzie (2005) contains inconsistencies in both topology and diagnostic characters, and does not include cryptic taxa, therefore has only limited use for European regions.
3. Our detailed genetic analyses of European and Mediterranean *Daphnia* populations uncovered much higher diversity than traditionally thought. Cryptic taxa are present within all major groups. These results demand a substantial revision of the nomenclature and a reassessment of diagnostic characters.
4. Widespread presence of interspecific hybrids does not allow a single identification method for every taxon, and phenotypic plasticity within some groups prevents unambiguous determination. We believe it is better to acknowledge uncertainty instead of providing unreliable names.
5. We provide a single, easily updateable platform briefly summarising up-to-date knowledge of the regional *Daphnia* diversity together with keys for identification using morphological characters and genetic tools for the identification of cryptic taxa and interspecific hybrids.
6. A digital key, including a photo documentation of various morphological characters, certainly has an educational value – for students and non-specialists alike.

What is covered by EDS?

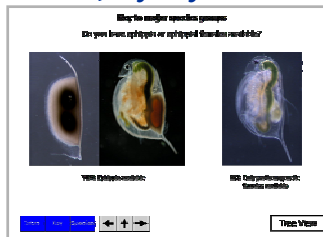
Regions: whole Europe up to its eastern borders, and the Mediterranean region including North Africa and part of Middle East.
Taxa: 31+ genetically distinct *Daphnia* lineages and several interspecific hybrids. See the list on the reverse side of the handout.



Features of the digital key. Please, try it yourself and feel free to suggest improvements.



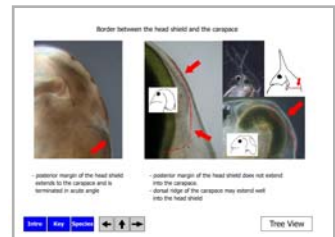
Start from the beginning or skip directly to species groups.



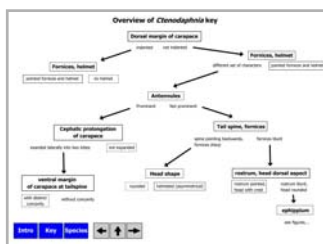
Click on the images... Alternative pathways may lead to the same end.



Multiple characters should simplify your decision.



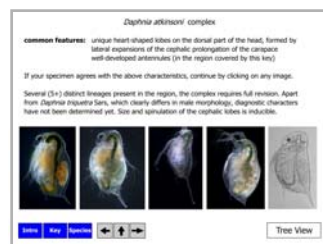
Point at the photograph, and see a schematic outline of the trait.



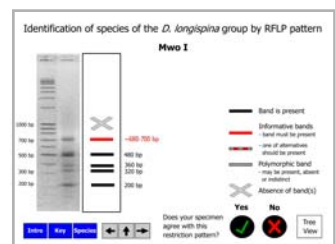
If you know where to go, take a shortcut.



Double check at the end: some species are easy to identify...



...and some not: genetic information is necessary (sequence the animal or help us to revise the complex.



Genetic key uses restriction analysis of ITS gene region to identify species and hybrids within the *D. longispina* complex.

Catalogue – feeding the data in...

The digital catalogue illustrates the most important morphological features of each species, its phenotypic variability, and provides basic information about species taxonomy, geographical distribution, phylogenetic relationship and genetics.

Images and information are now being transferred into the application. Examples on the right show how the result will look like.

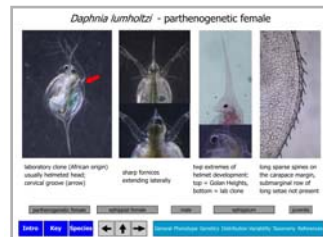
When will all this be ready to use?

Test version: download it from <http://www.natur.cuni.cz/ekologie/EDS>

Release of keys: after incorporating feedback provided by the symposium participants (October 2005).

Complete catalogue: December 2005 to February 2006.

Updates: we will try to incorporate new data whenever relevant information on *Daphnia* taxonomy, diversity, or distribution is published or provided by other researchers.



Acknowledgements:

funding sources: EU project BIOMAN, German Academic Exchange Service (DAAD), Czech Ministry of Education, ECODOCA

Many colleagues provided photos, samples and advice. In particular we thank: Jan Fott, Alžběta Kumstátová, Anders Hobæk, Jens Peter Niilssen, Christian Laforisch, Vladimír Kořínek, and many others for their invaluable contributions.