



Newsletter

ISSUE No. 3

Enthusiastic about BioFresh!

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I had the unforgettable chance to visit the lower reaches of Greek Acheron River in September 2011. This river formerly known as Styx which was the entrance to Hades, is the habitat of two critically endangered species of my lovely freshwater fishes. Such places are always interesting to see when one cares for conservation and nature. The Acheron delta is also a Natura 2000 site (GR2140001) but tourism infrastructure is expanding within the site and our Greek colleagues told us interesting stories about how conservation is (not) valued in this area. In the field, we had then an interesting discussion if projects like BioFresh are really able to help conservation or if this is just buzz words needed to find money from the EU? Will we look back in 20 years and say: yes, BioFresh made a difference and not just: yes, BioFresh kept me going for a while? In my opinion, this is a very critical question. Will we change something for freshwater biodiversity by performing BioFresh?

I am very enthusiastic about BioFresh and I deeply believe that yes, we will make a difference! BioFresh already raise much awareness for freshwater biodiversity and it is slowly convincing policy and decision makers, that it is freshwater biodiversity, which we will loose first and freshwater

ecosystems is where we need to act. Marine and terrestrial biodiversity are more than ever individually recognized!

We make very good progress not only to bring together up-dated data on freshwater biodiversity, we also find more and more new data sources and link them to the metadatabase as well as to the data platform. It is already very clear that the results of the hard work performed in the WP's will lead not only to new insights and predictions of future freshwater biodiversity patterns, we will also be able to deliver a robust network of Freshwater Key Biodiversity Areas and stimulate new freshwater biodiversity projects. Moreover, at our very fruitful BioFresh meeting in Montserrat in early spring 2011, it was obvious, that we are no longer a number of isolated scientists. Many BioFresh partners cooperate closely together and we have build up a dense network of experience and expertise.

Our midterm review will be held soon and let's cross our fingers, that the reviewers like it! Finally, I like to point your attention to the third BioFresh meeting at the 26-30 March 2012 in Oxford, close to the very interesting "Planet-under-Pressure" Conference. See you all then!

Best regards,

Jörg Freyhof, IGB

BioFresh Second Annual Meeting in Montserrat

BioFresh partners met to share the state of the art and discuss the next steps of the project

The annual meeting of the BioFresh partners and stakeholders was held in Montserrat, Barcelona, from 21 to 25 February 2011. It was hosted by the University of Barcelona and co-organised with the IGB coordination team of the Leibniz-Institute of Freshwater Ecology and Inland Fisheries. A total of 62 participants from all partner institutes attended.

During pleasant days on the inspiring Mountains of Montserrat, in one of the most active European monasteries, we shared and discussed key highlights of the project and next steps to follow. During the first day, advancements on

freshwater biodiversity data were on the agenda, namely the status of the BioFresh data platform and metadatabase. Particular attention was given to concerns and achievements on merging freshwater biodiversity data, from global to local scale. During the second and third day, simultaneous meetings with the participants of the various workpackages allowed to share and plan work to accomplish according to the calendar and objectives. All participants gathered during discussion regarding the 'top ten' freshwater biodiversity issues for the next years. At last, the fourth day, additional specific studies of each workpackage were presented to all partners.

During the beginning of the meeting, participants additionally discussed potential shared synergies among various global activities and initiatives on freshwater biodiversity worldwide with some representatives of the DIVERSITAS group.

A pleasant ice-breaker before starting the meeting and a short hike to Sant Jeroni in the middle of the meeting, the highest peak of Montserrat, gave us the necessary relaxing moments to keep up the enthusiasm among all participants.

Thank you all for the interesting inputs!

Núria Bonada & Ana Filipa, UB



The BioFresh team at the second meeting in Montserrat, Barcelona, February 2011. Photo: Núria Bonada.

BioFresh data platform

Update on the BioFresh data portal development

As announced in the newsletter from February 2011, we launched a major update to the data portal this spring. Our database currently holds over 10 million occurrence records for more than 31.000 species. On the data webpage (see screenshot), users can search for species or click the random button to view occurrence or species details. On the occurrence result page, data from GBIF (www.gbif.org) are shown on the map as clusters of points along with a shapefile depicting the faunistic region from FADA (Freshwater Animal Diversity Assessment).



The BioFresh data platform.

The species page currently focuses on data from FADA, but at this stage we are working behind the scene to include information from Catalogue of Life (<http://www.catalogueoflife.com>), which we hope to include in a release later this autumn.

Other developments in the pipeline are the establishment of an update workflow for GBIF and other basic biodiversity data. In the near future we will also start working on more advanced search options and a download capability. Although we still have a lot of

development work ahead of us, we warmly welcome any of your comments and suggestions on

- ➔ data@freshwaterbiodiversity.eu
- ➔ <http://data.freshwaterbiodiversity.eu/>

Aaike De Wever, RBINS

The BioFresh metadatabase needs your info!

The development of the BioFresh metadatabase has now reached its final stage and is available online

Along with the data for the portal, BioFresh also collects metadata – that means, data characterising these datasets. The aim of this metadatabase is to bring all possible information on freshwater related databases together (even if the data are not published on the BioFresh portal) and provide a resource where scientists, conservationists and policy makers can find databases relevant for their work.

The BioFresh metadatabase offers the unique possibility to

publish information about your dataset, to make it more visible to scientists and other interested persons.

The functionality of earlier versions of the metadatabase was extensively discussed within the BioFresh consortium and almost all suggestions and ideas were implemented. The final version of the metadatabase now offers the following features:

- ➔ The questionnaire serves for entering the

descriptive data of your dataset, like e.g. database name and owner (including an extensive section about the intellectual property rights), regional coverage, organism group addressed, additional environmental features etc. The questionnaire provides check boxes and selection lists as well as a classification system into mandatory, recommended and optional fields to guarantee user-friendly and harmonised data entry. All data filled into the questionnaire can

be printed in a neatly arranged format that can easily be included in a publication.

➤ The query tool serves for tracing data that might be interesting for your scientific analyses. Searching options include ecosystem type, region, organism group, time, and others.

➤ The full text search offers the possibility to search for any word included in the questionnaire.

Internally the BioFresh metadata database is equipped with a quality control feature: data entered by the data holder are first checked by the BioFresh quality control team and only will be released online after final approval of the data provider.

In future the BioFresh metadata database will be linked with the BioFresh portal. The availability of datasets via the portal can then be identified through a traffic light system. Further, we will link up with other metadata initiatives to offer a widespread and comprehensive metadata search (more on this in the next BioFresh Newsletter).

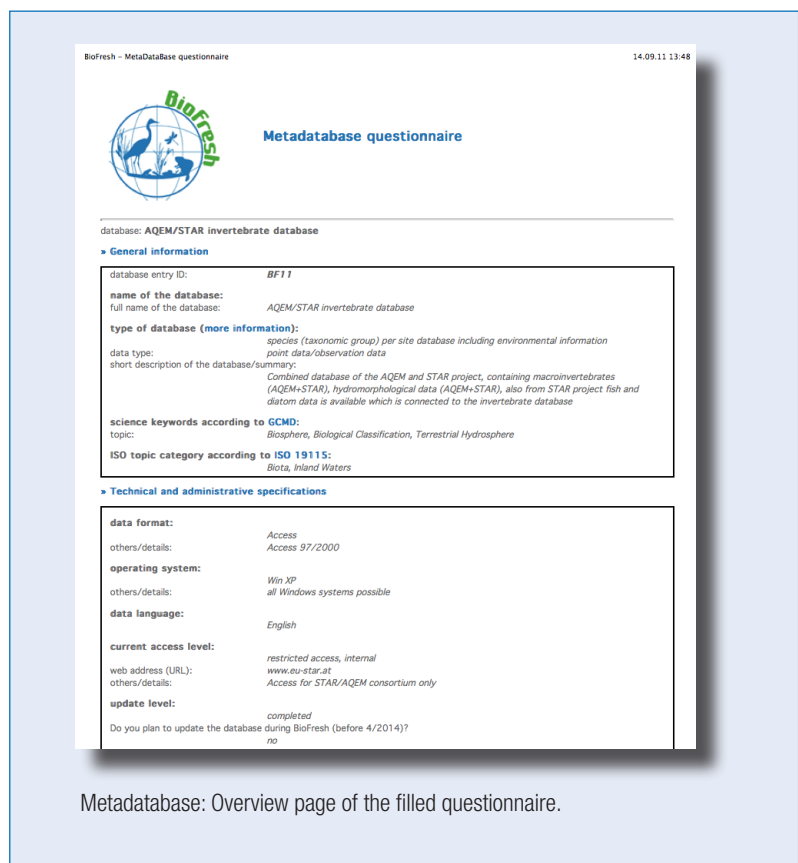
If you want to publish information about your dataset in our metadata database, we are happy to assist the data entry process. Please visit

➤ <http://www.freshwaterbiodiversity.eu/index.php/metadatabase.html>

and contact us at

➤ data@freshwaterbiodiversity.eu

Astrid Schmidt-Kloiber, BOKU



BioFresh Papers

The Barton Broad paper

A recent BioFresh paper from UCL in the journal *Freshwater Biology* focuses on Barton Broad, eastern England, and uses palaeolimnology (macrofossil analysis) and an array of documentary data: old photographs, written records and anecdotal reports to bring the botanical history of the broad to life. Prior to the late 1800s aquatic macrophyte communities were diverse and included a multi-layered mosaic of short and taller submerged and floating-leaved species.

With the progression of eutrophication after around 1900 the former community was displaced by the latter.

Diversity was maintained, however, since an encroaching *Scheuchzeria-potamogeton* swamp generated extensive patches of low energy habitat affording refugia for several macrophytes otherwise unable to withstand the hydraulic forces associated with open water conditions.

When this swamp vegetation disappeared in the 1950s, many of the 'dependent' aquatic macrophytes also declined leaving behind a sparse, species-poor community (as today) resilient both to eutrophication and turbulent open waters.

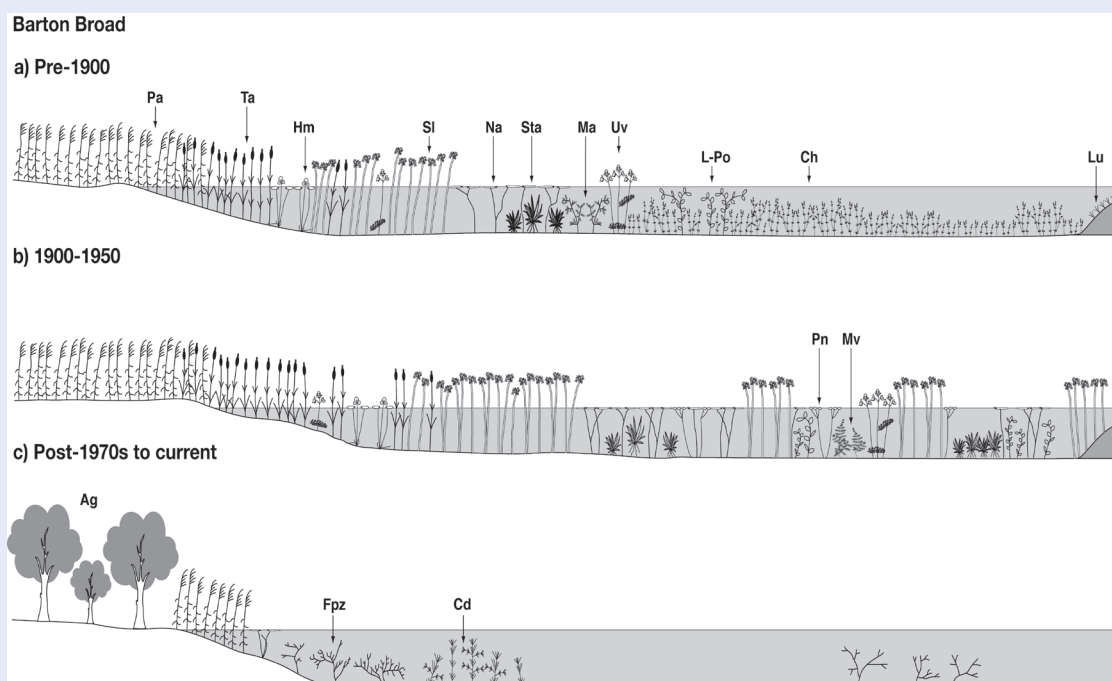
The study shows that restoration of submerged macrophyte communities in eutrophic lakes,

may often depend on the re-establishment of marginal swamp communities and thus former plant sociology. It also shows the incredible potential of combining palaeolimnology and historical records in long term studies of biodiversity change in lakes.

Genevieve Madgwick, Dave Emson, Carl D. Sayer, Nigel J. Willby, Neil L. Rose, Michael J. Jackson and Andrea Kelly, Centennial-scale changes to the aquatic vegetation structure of a shallow eutrophic lake and implications for restoration. *Freshwater Biology* doi:10.1111/j.1365-2427.2011.02652.x

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Martin Kernan, UCL

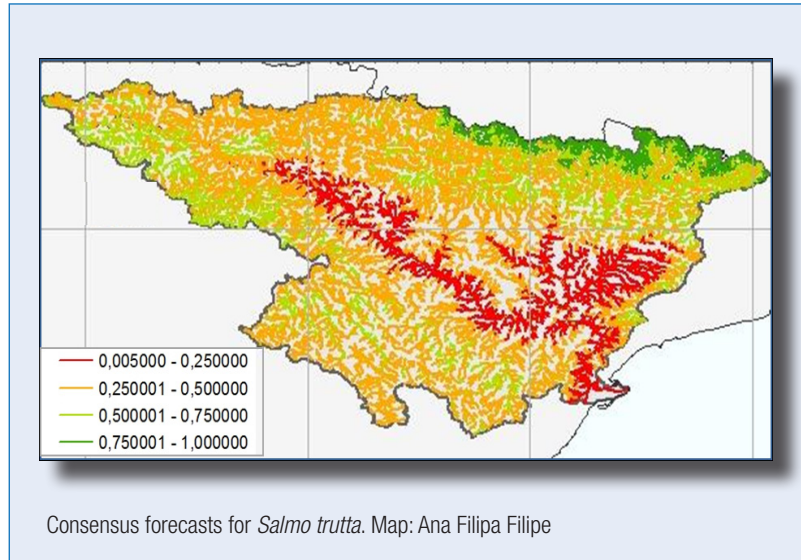


Reconstruction of macrophyte spatial relationships in Barton Broad over three time periods. Used with permission.

Trout in European catchments: forecasts for the future

Better predictions for a species with high ecological and economical importance in Europe

As an output of the biodiversity trend analysis key component within BioFresh, a study regarding current and future distributions of the cold-water species *Salmo trutta* was developed within the European river basins of Ebro, Elbe, and Danube. This species is among freshwater taxa with the highest economical and ecological importance in Europe. With the new and detailed dataset at a high scale resolution that gathers species presence-absence records and climatic and non-climatic environmental factors (as stream hydro-topography, and land use), the current and future distributions were predicted using niche modelling tools and an ensemble framework. Results are somehow according to previous predictions of the severe impacts of climate change for cold-water fish species. Models obtained achieved an 'excellent' performance and stream hydro-topography was highlighted as essential for the modelling.



At the end of June this study was presented at the 7th SEFS Symposium for European Freshwater Sciences by Ana Filipa Filipe and co-authors. The work was presented in a special session about "Assessing the impacts of global change and anthropogenic pressures on freshwater ecosystems, a role for long term ecological research" and the meeting was organised

by the Iberian Limnological Association (AIL), the Catalan Institute for Water Research (ICRA), and the UdG (University of Girona). This event allowed gathering important inputs from concurrent researchers and managers.

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Ana Filipa Filipe, UB

Cutting chubs into pieces

One of our BioFresh partners published a taxonomic review of chubs of Western Anatolia dividing the single species known from that area before in ten species, four of them newly described. New species are described regularly for fishes: between 300 and 500 new species in the world every year. Furthermore, old synonyms are frequently re-vitalised increasing the number of valid species and in this study, where six old names were available. While database holders love new data to flow into their database, they

hate if already accumulated data needs to be re-organised and if already available data gets lost or can no longer be used. This is what might happen if taxonomic reviews lead to splitting of one into more species. Many databases work species oriented: you type in the species name to receive, such as biological data of that species. If this species is now split into several new species or if old synonyms are considered as valid, this often leads to the situation, that biological data published, can no longer clearly be assigned to one of these species. By this, these data

might get lost. Furthermore, taxonomic changes often find their way slowly into various databases and users have a hard time to find out why different databases show so different results.

Jörg Freyhof, IGB

Özuluğ, M. & Freyhof, J. 2011. Review of the genus *Squalius* in Western and Central Anatolia, with the description of four new species (Teleostei: Cyprinidae). *Ichthyological Exploration of Freshwaters*, 22: 107-148.

BioFresh Data Acquisition Fund

BioFresh supports non-partner organisations in linking and adapting their data and databases to the BioFresh platform - an update

Development of HydroSHEDS through a collaboration with Bernhard Lehner of McGill University

At the start of July, Dr. Bernhard Lehner and Günther Grill from the Department of Geography at McGill University, Montreal, visited BioFresh partners at IUCN in Cambridge and the University of Oxford to discuss ongoing development of the HydroSHEDS database. HydroSHEDS has been developed by the Conservation Science Program of the World Wildlife Fund (WWF) in recognition that baseline data on river networks and watershed boundaries are essential for the management of aquatic systems across the world.

As part of the acquisition fund the BioFresh consortium has agreed to invest in the continued development of this tool to develop three new data layers together with a customised GIS toolbox that will provide a user friendly set of functions for analysis relevant to BioFresh and other freshwater scientists and managers.

During their visit the team from McGill gave demonstrations on the capability of HydroSHEDS for addressing scientific and practical problems in freshwater science. These ranged from quantifying fragmentation in river catchments to modeling the accumulation of pharmaceuticals in river systems as they pass through urban areas. HydroSHEDS will also form a key component of the Climate Vulnerability

Index being developed as part of work-package 5. Over the next three years as well as providing a standard watershed layer with a truly global extent, BioFresh will contribute to the development of layers providing a consistent high resolution map of floodplain extent at the global scale, and for the first time information on the location of waterfalls and cascades that will support studies on discontinuities and longitudinal connectivity. The most up to date version of HydroSHEDS (with an estimated 3 million catchments of average size 2-300 km²) was released at the start of September 2011. To find out further information please visit:

➔ <http://www.worldwildlife.org/hydrosheds>

The status and distribution of freshwater biodiversity in New Zealand

The North of England Zoological Society was granted funding from the BioFresh contingency to assess the status and distributions of freshwater species across New Zealand and to increase the profile of BioFresh in the southern hemisphere. A workshop was held in Auckland, NZ in July, to determine the status of all species of freshwater fishes, molluscs, odonates and aquatic plants native to New Zealand.

The workshop, supported by BioFresh and hosted by Auckland Zoo, brought together 16 experts to assess and map New Zealand's freshwater species using the IUCN Red List

Categories and Criteria. In total 42 species of fish, 83 species of mollusc, 17 species of Odonata and 105 species of aquatic plants were assessed to date.

These are due to be published in 2012, and will add to the global dataset of information on freshwater species, including spatial data for all taxa.

Global assessment of the status and distribution of freshwater shrimps

The Oxford University Museum of Natural History was granted funding from the BioFresh contingency to build a global, distributional database of freshwater caridean shrimps and assess their conservation status. In June IUCN carried out introductory training in the IUCN Red Listing process, GIS mapping, and the Species Information System for Dr. Sammy De Grave who will lead this project. The first workshop is scheduled for early December 2011 in Singapore.

➔ sammy.degrave@oum.ox.ac.uk

European assessment of Trichoptera

IUCN also trained Dr. Astrid Schmidt-Kloiber and Dr. Wolfram Graf in the IUCN Red Listing process, GIS mapping, and the Species Information System in preparation for their European Trichoptera mapping and assessment, also funded from the BioFresh contingency fund (see separate article).

William Darwall, IUCN

BioFresh data mobilisation

In September 2011 work package 8 started a special feature on the experience regarding biodiversity data mobilisation.

In this series of blogposts Aaike De Wever, Astrid Schmidt-Kloiber and Sian Davies discuss the progress, plans and use of the data portal, how they gather information on freshwater datasets, what issues they face when requesting data, how complex this can get for compiled datasets (e.g. for intercalibration datasets collected for the Water Framework Directive) and other data related topics.

Rob St. John, UOXF.AC

Puzzling the Pieces together: Georeferenced Freshwater Fish Distribution Data in BioFresh

Fishes are one of the most threatened groups of freshwater organisms in Europe and they are also a major victim and player when it comes to alien species invasions. Their diversity is moderately well known (currently 604 species in Europe). But the distribution ranges of many species have and still are shifting remarkably during the last 10 to 20 years. Detailed data about the historic and present distribution of European freshwater fishes are needed for several projects within BioFresh as Key Biodiversity Areas and European scale modeling.

Freshwater fish distribution data are very incompletely available by GBIF and other online data holders. They are scattered in various national and local databases as well as in grey literature and poorly known Atlas projects. In BioFresh, we bring georeferenced freshwater fish data together in one database. To do so we have contracted already specialists from Russia, Greece, Poland, Italy, Serbia and the Western Balkans for filling the largest gaps. All data should be complete at the end of 2012 and the BioFresh freshwater fish database will then be integrated in the BioFresh data portal.

Jörg Freyhof, IGB

Distribution Atlas of European Trichoptera (DAET)

A project supported by the BioFresh contingency fund

As it is the aim of BioFresh to collect freshwater biodiversity data of the whole world to evaluate status, trends, pressures and conservation priorities, the DAET project wants to contribute to this overall target and collect as many (adult) Trichoptera distribution data from Europe as possible. We

think that in times of increasing importance of biodiversity, we should also point the way regarding caddisflies and raise the public awareness of this important insect group.

Generally the data collected during the DAET project will be used for scientific analysis within BioFresh regarding

aspects of contemporary patterns in Trichoptera biodiversity, climate change and other stressor scenarios. Further, the data will be available on the BioFresh data portal, fostering the visibility of our work to scientists and other interested persons. Finally, we will also aim for an IUCN assessment of threatened species.



Caddisfly *Oligostomis reticulata*.

Photo: Wolfram Graf/Astrid Schmidt-Kloiber

Everybody who wants to join the DAET consortium is very welcome!

We know that such a project very much depends on the contribution of Trichoptera experts distributed over Europe. As we need good data coverage and reliable results, we welcome everybody to join and contribute data to the DAET project. For collecting the data, we have established a template, which contains the current European Trichoptera species list and

additional parameters that we need (for example coordinates, altitude, stage or information on who collected and identified the species). Further information, supporting material as well as the template can be found on our website. Visit us at:

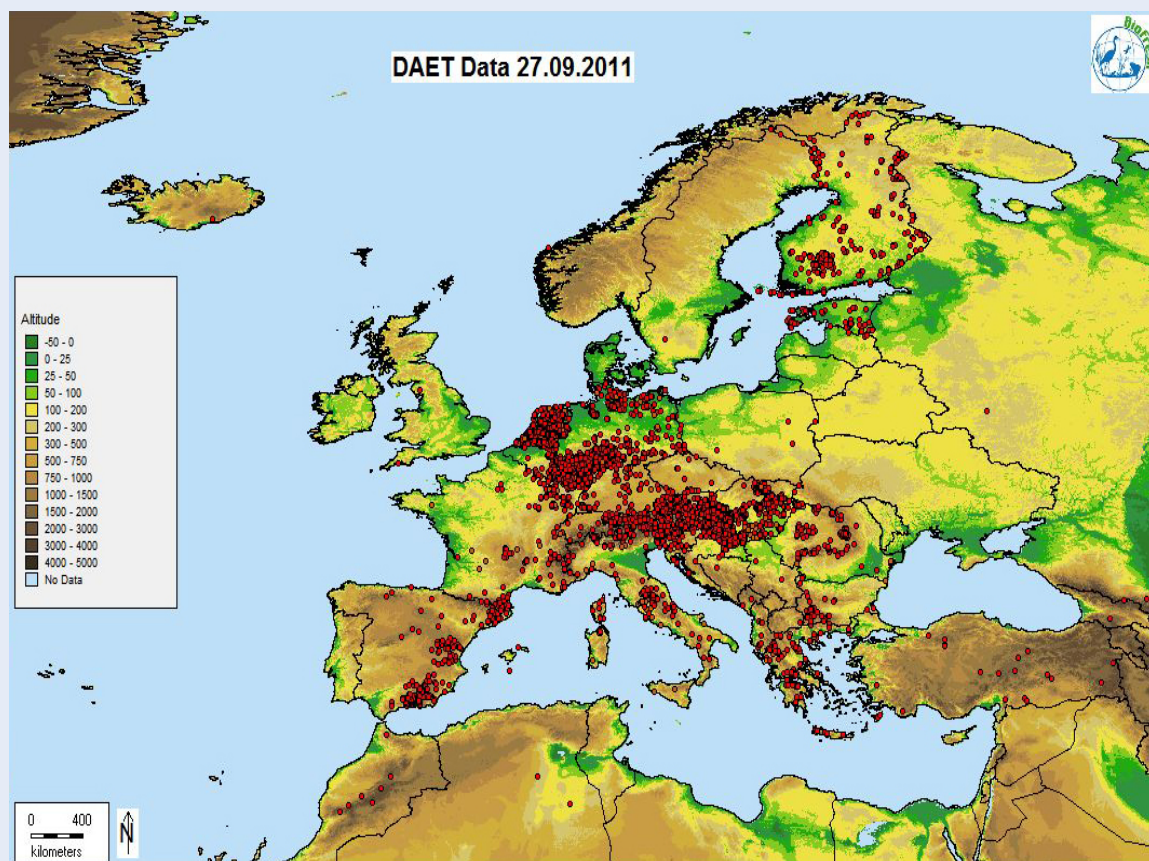
➔ www.freshwaterbiodiversity.eu/index.php/contingency-fund.html

Or contact:

➔ Peter Neu (peter.neu@trichoptera-rp.de), coordinator of DAET or

➔ Astrid Schmidt-Kloiber (astrid.schmidt-kloiber@boku.ac.at), BioFresh contact

Astrid Schmidt-Kloiber, BOKU



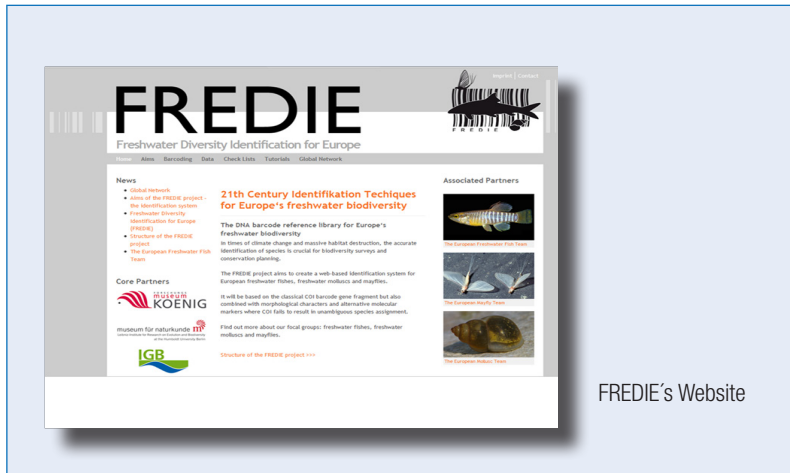
Current state of distribution data for Trichoptera collected within DAET.

Map: Peter Neu

FREDIE: Building-up an Online Identification System and a DNA Barcode Reference Library for Europe's Freshwater Biodiversity

In times of climate change and massive habitat destruction, the accurate identification of species is crucial for biodiversity surveys and conservation planning. FREDIE is a new project funded by the German Leibniz Association to build up a reference library and a web-based identification system for three major groups of freshwater biota (freshwater fishes, freshwater molluscs and mayflies). FREDIE covers all European species from Ural Mountains west to Portugal and for freshwater fishes also all of the rivers running to the Black and Mediterranean Seas, including the Atlantic drainages of Morocco.

It will be based on the COI barcode gene fragment but also



FREDIE's Website

combined with morphological characters and alternative molecular markers where COI fails to result in unambiguous species assignment. Data gathered together by the FREDIE in the next three years, will be linked to the BioFresh data portal.

If you want to find out more about FREDIE, have a look at our website:

➔ www.fredie.eu
(website available soon)

Jörg Freyhof, IGB

BioFresh & the Public-Dissemination Activities

Our press-kit

In August 2011 we compiled a BioFresh press kit, with range of information and resources about the project. The press kit can be downloaded in one click through the website here:

➔ <http://www.freshwaterbiodiversity.eu/index.php/press.html>

The zipped file contains the following information, useful for policy makers, the media, students and anyone else interested in the project:

- ➔ The BioFresh Flyer
- ➔ The project presentation
- ➔ BioFresh newsletters 1 & 2
- ➔ A partner list with a brief information and contact details
- ➔ Archived press releases

- ➔ Klement Tockner's interview and feature in International Innovation magazine
- ➔ A small selection of high-resolution photos of freshwater ecosystems and of meetings



The press kit will grow and develop over time, and will hopefully provide a useful resource

for our communication and dissemination work. Work-Package 8 is developing a strong and detailed framework for the communication of our research, developing links with media, policy, academic and public interest groups. We are always keen to hear from BioFresh partners looking for support and advice in how to best communicate and disseminate their research.

Paul Jepson and Rob St. John,
UOXF.AC

➔ paul.jepson@ouce.ox.ac.uk

➔ rob.stjohn@ouce.ox.ac.uk

The BioFresh Blog

Partner Profiles

We have initiated a series of successful interviews with BioFresh partners on the blog. BioFresh partners are interviewed in manner that aims to explain and demystify their work to an interested lay audience (taking inspiration from the New Scientist interview series).

In this way, we intend to include more scientific content on the blog, whilst keeping the tone open, approachable and engaging. We are keen for all BioFresh partners to take part, please email Rob St. John for details

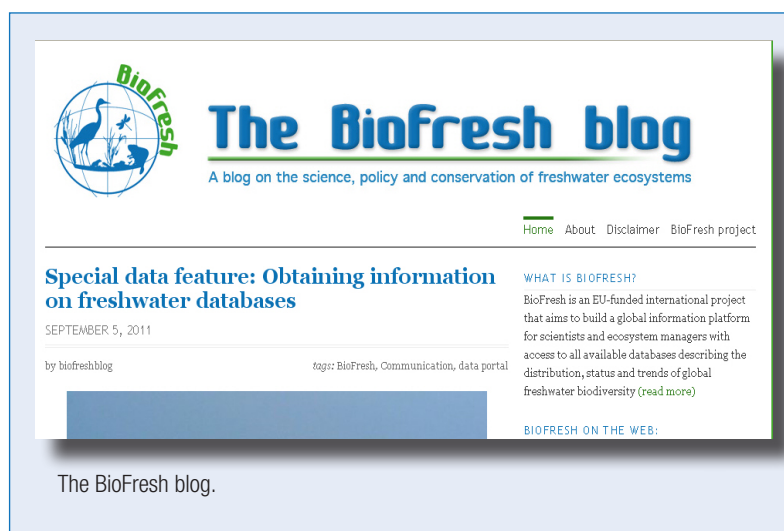
✉ <http://biofreshblog.wordpress.com/category/meet-the-team/>

Rob St. John, UOXF.AC

Contribute to the blog!

We are keen for BioFresh partners to submit ideas for blog pieces on their research, impending publications, important freshwater biodiversity journal articles, thought or opinion pieces, fieldwork travelogues, audio, video or photography and any other suitable topics. Please contact Rob St. John with your ideas.

✉ rob.stjohn@ouce.ox.ac.uk



The BioFresh blog.

BioFresh Stakeholders Survey

In June 2011, Work-Package 8 (Dissemination work package) – led by Eleftheria Kampa at Ecologic – undertook an online stakeholder survey of over 200 policy makers, NGOs, and other groups involved in forming freshwater biodiversity policy. The survey was designed to assess the status and profile of freshwater biodiversity as a policy issue; the potential synergies between freshwater biodiversity and other areas of policy; and the policy relevance of the scientific questions BioFresh has generated. By gaining a better understanding of the status of freshwater biodiversity within policy circles we hope to foster more effective channels of freshwater science-policy communication.

The results of this study are currently being analysed and will be circulated soon.

✉ <http://polls.ecologic.eu/indexhp?sid=15737&newtest=Y&lang=en>

Rob St. John, UOXF.AC

Still to Come...

BioFresh has exciting communication and dissemination plans for the autumn months. We are currently midway through the production of a second animation, which has brought together BioFresh scientists with cutting edge artists, animators, musicians and poets to produce a short animated video which highlights

the need for integrated freshwater policy by celebrating the importance of beauty of freshwater diatom diversity. The animation is produced by award-winning Scottish artist Adam Proctor and sound-tracked by BAFTA award-winning musician Tommy Perman from the band FOUND and will be finished by November 2011.

We are also looking to expand and develop the blog and Cabinet of Freshwater Curiosities as a means of testing current debates around science communication, and most importantly, providing a strong framework for the dissemination of BioFresh research.

Rob St. John, UOXF.AC

BioFresh - Barcelona Impressions

Second annual meeting - February 2011



Photos: Núria Bonada.

Impressum

- BioFresh is funded under the 7th EU Framework Programme, Theme 6 (Environment including Climate Change); Contract No.: 226874
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- release date of this newsletter: October 2011

