Newsletter

Content

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We are BioFresh!

Klement Tockner, coordinator of BioFresh, introduces the project.

Dear reader, dear colleague,

welcome to the inaugural newsletter of the project BioFresh. BioFresh is the first major global project - funded through the European Commission - that entirely focuses on freshwater biodiversity, its status, trends, and conservation challenges.

There is clear and growing scientific evidence that we are on the verge of a major biodiversity crisis. Despite the increasing public awareness of the problem, few are aware of the catastrophic decline in freshwater biodiversity at both local and global scales. While freshwater ecosystems cover less than 1 % of the earth's surface, they contain about 10 % of all animal species. More than 35 % of all vertebrates are restricted to freshwater habitats during at least part of their live. Increasing needs for water already makes freshwaters the most threatened ecosystem types. Freshwater biodiversity will also be the first victim of climate change and increasing water stress. Therefore, threats to freshwater biodiversity are growing and now global in scale. They include loss of habitat, water abstraction, pollution, invasive species, overexploitation, fragmentations and flow modifications. The implications to ecosystems and humans are immense because rivers, lakes, ground waters, and wetlands provide a diverse array of crucial natural functions and services; more than any other ecosystem type.

In the face of the dramatic alterations of freshwater ecosystems, their biodiversity and related ecosystem services, it is becoming evident that most conservation and restoration strategies probably do not achieve their goals because of non-linear relationships and time-lag effects between the causes and the effects of biodiversity decrease and ecosystem functioning; similar to what is seen for human demographic development and CO_2 increase.

The IGB BioFresh coordination team.

Concurrently, restoration targets compete with other targets and directives implemented at national, continental, and global scales. For example, strategies to reduce greenhouse gas emission support the continuing development of the use of hydropower, further accelerating loss of aquatic biodiversity and ecosystem services. The crisis puts billions of people at risk as biodiversity loss affects water purification, disease regulation, subsistence agriculture and fishing. For example, it is predicted that by 2025 many rivers in China, India, the Mediterranean, or in Africa will not reach the sea except during floods with tremendous effects for coastal fisheries.

Large rivers, for example, are the lifelines of the continents that connect land with sea as well as various biomes. Large rivers have been centres for the development of human civilisation and have served as nodes for most human activities - land reclamation, floodplain drainage, navigation, waste deposition, and biomass production. As a consequence, large rivers can now be considered as domesticated ecosystems that have been formed through and depend on human activities. Moreover, large river landscapes are more and more dominated by novel communities, i.e. a mixture of native and non–native assemblages that have no common evolutionary history. It remains a major challenge to understand how these novel communities form, how they alter ecosystem functions and stimulate evolutionary processes; and how to manage these novel ecosystems and its rated ecosystem services. At the same time, most representatives of the freshwater megafauna such as sturgeons, dolphins, and crocodiles are restricted in their occurrence to large rivers. And the risk is greater than ever that these charismatic species will become globally extinct in the wild within the coming few decades.

The project BioFresh will provide the basis for forecasting future freshwater biodiversity trends, for setting priorities in restoration and conservation, and for increasing the awareness of the unique biodiversity in freshwaters and the related ecosystem services. Overall, the BioFresh project faces three major challenges: The first and biggest challenge of the project is to identify and compile the vast amount of dispersed information on freshwater biodiversity, and to make this information publicly available, for scientists, mangers, as well as for a general audience. The second major challenge is to use the available data to predict future changes in freshwater biodiversity as a consequence of global change, and to identify key areas for conservation and restoration, globally, in Europe and within the three major catchments of the Danube, Elbe, and Ebro. The third major challenge is to increase the public awareness of the values of and the threats to freshwater biodiversity. Despite their pivotal ecological and economic importance, freshwaters have not been of primary concern in policy making. Only recently did the EU take the initiative to improve this situation through the EC Biodiversity Strategy. In the U.S., recent Supreme Court decisions have made wetlands and small streams more vulnerable to loss.

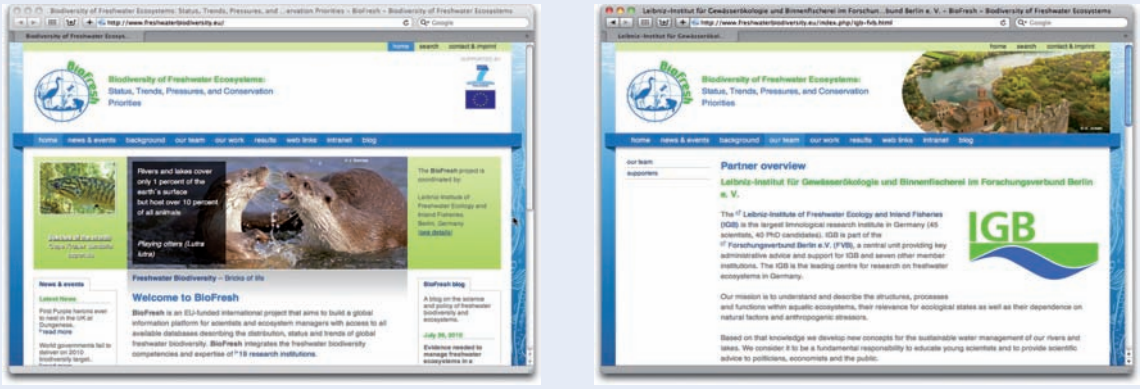
BioFresh is expected to serve as nucleus for complimentary activities in Europe and globally. Therfore, if you are interested to learn more about project, to support the activities of BioFresh, or to contribute to the data platform, please visit the BioFresh webpage or contact us:

- freshwaterbiodiversity@igb-berlin.de
- www.freshwaterbiodiversity.eu

Thank you for your interest in BioFresh.

Yours sincerely,

Klement Tockner



The BioFresh website, www.freshwaterbiodiversity.eu

Summary of the BioFresh kick-off meeting in Berlin

Scientists of all partner institutes met to discuss the aims of the project

The BioFresh kick-off meeting was the fist meeting of all partners involved in the BioFresh project. It took place from 23rd to 26th February 2010 in Berlin. Fifty persons from all partner institutes attended the meeting, most of them being present all days including the icebreaker at the 22nd in the evening, which was rainy and really cold. Everybody made great efforts to come and contribute in the discussions.

The invited stakeholders (see list below) presented their expectations to the BioFresh consortium and provided excellent ideas and views to be considered within BioFresh. We would like to thank the stakeholders for their fruitful input.

- Konrad Vielhauer, GWSP
- Vera Straskrabova, ALTER-NET
- Michael McClain, UNESCO-IHE
- Wouter Los, LifeWatch project
- Yde de Jong, PESI/SMEBD
- Jian-Hua Meng, WWF Dams Initiative
- Vishwas Chavan, GBIF

After introductions of the coordinator Klement Tockner and some administrative advices by Falk Fabich, Verena Kopf and Carla Pinho (all Forschungsverbund Berlin e. V.), all partners all partners introduced themselves and their institutions. This session was followed by a presentation of all workpackages allowing an intensive discussion about the aims and goals of the workpackages as well as the BioFresh project as a whole.

Main issues of the kick-off meeting were the data needs for the so-called science workpackages and how to start working. In this context the current state of the metadatabase was presented and discussed intensively (see also report on page 4). Further, the development of the BioFresh platform (see also report on page 3) as well as standard protocols and quality control procedures for the integration of databases were debated. Other topics included species conservation status, identification of important sites for freshwater biodiversity, the BioFresh Biodiversity Matrix and the Global Freshwater Atlas, freshwater biodiversity models and the planned comparative biodiversity trend analysis in the catchments of rivers Ebro, Elbe, Danube.

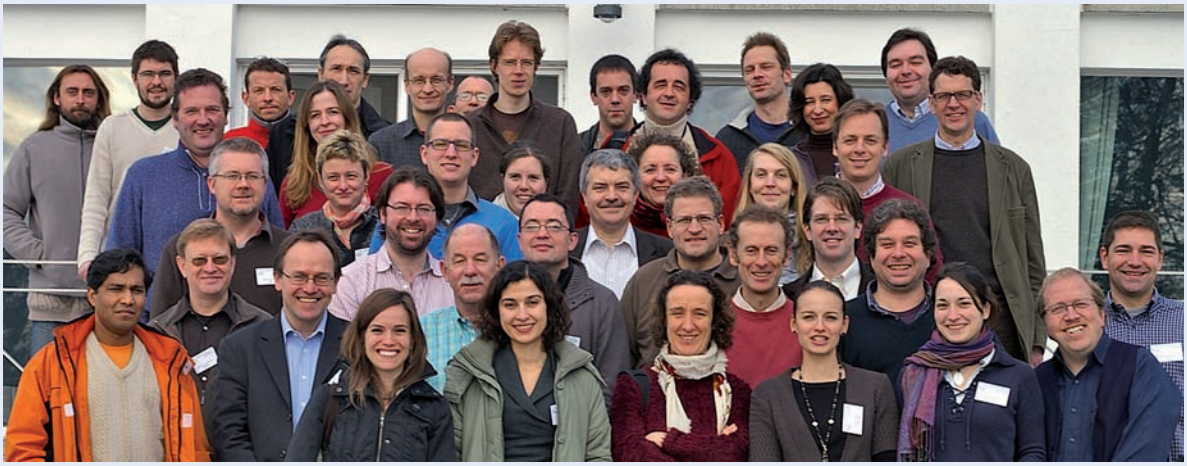
Another important issue tackled the strategy how to get in contact with underrepresented regions, how to stimulate initiatives in other countries and how to envisage linking with all important exisiting biodiversity projects.

Concerning the internal organisation, the publication strategy, the represantation of BioFresh at conferences and meetings and in different organizations was specified. A first version of the BioFresh webpage was presented and the communication and dissemination strategy was discussed.

Furthermore, the BioFresh General Assembly and the Executive Board met during the kick-off meeting.

Altogether, it was an intensive but very fruitful meeting!

Jörg Freyhof, IGB
Astrid Schmidt-Kloiber, BOKU



The BioFresh team at the kick-off meeting in Berlin, February 2010.

Development of the BioFresh data portal

The beating heart of BioFresh!

In March, our team started the construction of the BioFresh data portal. Through this web portal, anyone interested in freshwater biodiversity will be able to access data on biodiversity, from genes to ecosystems of continental aquatic habitats. In addition, the portal will offer tools to enable water managers to incorporate biodiversity science into effective conservation strategy, environmental management or related policy instruments.

From the start, we realised that the portal requires a solid structural basis. We therefore built upon internationally agreed and consolidated standards such as Darwin Core, developed by Biodiversity Information Standards (TDWG). This enables exchanging data with similar initiatives, such as, the Global Biodiversity Information Facility (GBIF).

Not only did we implement accepted technical standards, but the BioFresh portal also relies on a sound taxonomic backbone, which consists of global species databases. The main source of such authoritative species lists of freshwater organisms is the Freshwater Animal Diversity Assessment (FADA) Project, which currently holds data on Halacaridae, Hydroida, Cladocera, Copepoda, Mysidacea, Ephemeroptera, Plecoptera, Bivalvia, Rotifera, and Fish.

As the BioFresh portal construction is still in an early phase, we currently work with a preliminary set of data extracted from GBIF. This dataset consists of the result of a query on a list of freshwater megafauna (>45 kg) on the global network of databases connected through GBIF. In parallel, we started to inventory the available datasets on freshwater biodiversity, as well as the data needed for the scientific analyses planned in other BioFresh workpackages.

We aim for launching a first version of the portal by mid of August. Later this summer we will start integrating new datasets.

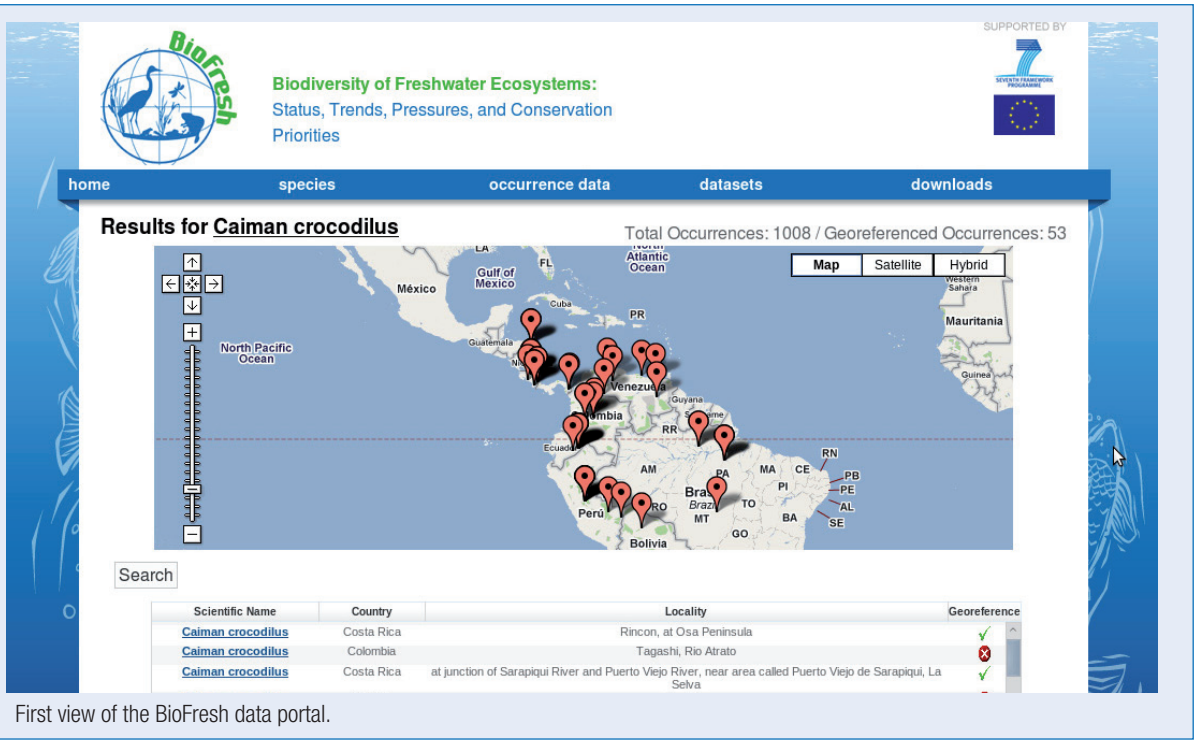
If you are interested in publishing your data through the portal, please do not hesitate to contact us:

- data@freshwaterbiodiversity.eu
- aaike.dewever@naturalsciences.be

Aaike De Wever,
BioFresh science officer, RBINS

Further information:

- TDWG: http://www.tdwg.org/activities/darwincore/
- GBIF: http://www.gbif.org/
- FADA: http://fada.biodiversity.be/



First view of the BioFresh data portal.

The BioFresh metadatabase

Information on all data included into the BioFresh data portal will be available through the project's metadatabase

More than other research projects, BioFresh largely relies on the quality and quantity of the data that will be included into the BioFresh data portal. BioFresh will make use of all kind of freshwater biodiversity data and will provide free and universal access to information that has been collected within numerous European and worldwide research initiatives, projects and campaigns.

General information that describes each of the background databases of the BioFresh data portal will be stored in a so-called metadatabase. This includes information about the data provider and the related intellectual property issues, as well as characterising parameters like regional coverage and spatial extent. To supplement the BioFresh science workpackages the general metadata will be complemented with information about environmental and climate related parameters. Simple queries will enable BioFresh partners to quickly identify the data potentially useful for their workplan in BioFresh.

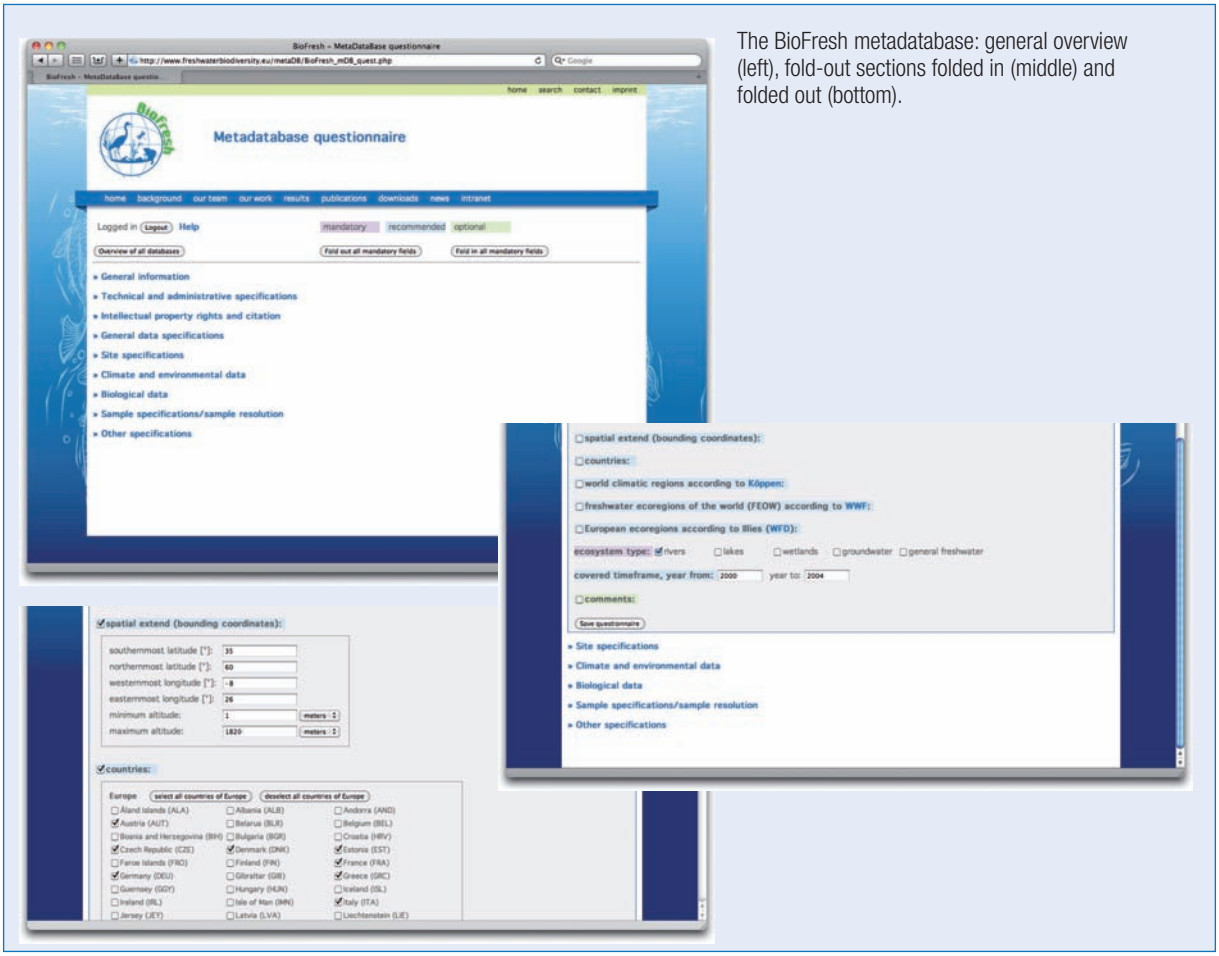
The establishment of the metadatabase started in January 2010. Regarding the collection of the relevant metadata a questionnaire for internal and external data holders was developed. To prioritise data entry, fields are marked as mandatory/conditional, recommended or optional. In terms of clearness and user friendliness fold-out sections as well as tooltips for further data field explanations are on-hand.

Currently - in its latest version - the metadatabase holds meta information from about 40 background databases.

If you are interested to publish your data through the BioFresh data portal and therefore – as a first step – want to submit your metadata to the BioFresh metadatabase, please do not hesitate to contact us:

- data@freshwaterbiodiversity.eu or
- astrid.schmidt-kloiber@boku.ac.at

Astrid Schmidt-Kloiber, BOKU



The BioFresh metadatabase: general overview (left), fold-out sections folded in (middle) and folded out (bottom).

BioFresh science gets started

BioFresh climate change and invasives modelling workshop

Modelling freshwater biodiversity is one of the major aims within BioFresh scientific Workpackages, namely regarding predictions on the impacts of global environmental changes.

A total of 18 scientists from nine BioFresh partner institutes and two external institutes met from 12th to 14th July 2010 in Toulouse, and discussed available data, possible approaches, modelling methods, and collaborative publication projects within BioFresh. The twelve presentations given led to intensive and fruitful discussions.

Species Distribution Modelling (SDM) is considered a robust tool to anticipate and manage future environmental changes. Particularities of current methods of such analysis when applied to freshwater biota, and procedures that take into account possible uncertainties were the stage of a deep debate. Reliability of the occurrence datasets available and adequacy of data spatial resolution were highlighted, as well as the role of biotic processes involving biotic interactions, evolution rates, and dispersal events. Predictions regarding introduced freshwater species will be the focus of special attention during the analytical procedure.

Further steps regarding the data merging and the analytical framework have been delineated and next meetings scheduled.

The workshop was organized by BioFresh partner University Paul Sabatier.

Ana Filipa Filipe, UB

BioFresh scientists at the Toulouse meeting.

Preview

BioFresh biodiversity trend analysis workshop in Barcelona

The analysis of biodiversity trends within the BioFresh focal study sites Danube, Ebro and Elbe is a major part within the scientific workpackages 4-6. All partners involved will meet for conceptual, analytical and result orientated discussions between 13th and 15th October 2010 in Barcelona. It is the aim of the workshop to join efforts to build the databases of the three target catchments and to establish a common data analyses procedure. The trend analysis workshop will be organized by BioFresh partner University Barcelona.

Núria Bonada, UB

BioFresh in Russia

Russian–European science cooperation

The huge biodiversity resources of Russia are of major global importance not only for conservation, but for the functioning of the whole global environment. In contrast to the major importance of Russia's biodiversity, the financial support for research and monitoring biodiversity in Russia is shrinking and Russian institutes and scientists are strongly underrepresented in collaborative European projects. To improve this situation is the overall strategic objective of the E-URAL project. The project also aims to increase the quantity and quality of the participation of Russian researchers and SMEs in the "Environment (including climate change)" theme of the 7th Framework Programme (FP7). BioFresh was represented by Jörg Freyhof during "The V Days of European Science in the Central Russia" in Voronezh, 28th June to 2nd July 2010. The overall objective of this biennial international conference is to provide a forum for the exchange of views on the ways of development of Russian–EU scientific and technological cooperation and for the discussion of challenges, trends and practical tools of mutually beneficial cooperation of Russia and EU in the field of research and its sustainable support.

Jörg Freyhof, IGB

➲ http://www.e-ural.vsu.ru/en/

Biodiversity and water

Links between EU nature and water legislation

Everybody active with Natura 2000 and the Water Framework Directive in Europe knows about potential and existing conflicts between both directives. To discuss the problems the Water and Nature Protection Units of the DG Environment in cooperation with a planning group comprising representatives from Member States organized a two-day workshop to provide an overview of the requirements of the Directives and insights into practical implementation issues through the use of case studies. The workshop was held in Bruxelles at the 17th and 18th June 2010. About 130 participants followed the 26 presentations. BioFresh was represented by Ana Cristina Cardoso (JRC) and Jörg Freyhof (IGB). Gustaaf Borchard, the director of the DG ENV D Water, Chemicals and Biotechnology explicitly mentioned the BioFresh project as a major step forward in the scientific research in freshwater biodiversity in Europe.

Jörg Freyhof, IGB

Species identification by DNA-barcoding

The use of this new technology for freshwater biodiversity

Correct species identification is the fundament of every study dealing with biodiversity. To overcome problems in species identifications, several initiatives aim to link the traditional knowledge about species diversity with appropriate molecular markers. In Europe, ECBO built up a new European infrastructure to firmly link names and thus all related information to a rapidly developing new standard in biology: the identification of species via DNA sequence signatures, a process known as "DNA barcoding". BioFresh was represented by Jörg Freyhof at the "2nd Conference of the European Consortium for the Barcode of Life (ECBOL2)", which was held from 1st to 5th June 2010 at the Universidade do Minho in Braga, Portugal.

Jörg Freyhof, IGB

➲ ECBOL: http://www.ecbol.org/

Biodiversity trend analysis

An analysis of the biodiversity patterns in the Ebro, Elbe and Danube catchments

A key component in BioFresh is to understand and predict current and future distribution patterns of freshwater organisms in three European catchments: Ebro, Elbe and Danube. Such objectives require having a spatially consistent dataset of biological and environmental attributes in each catchment and a standardized modelling approach. During the first months of the BioFresh project, we have concentrated our efforts towards compiling potential available information in each catchment and starting to contact data holders. The results achieved so far are a detailed list of available biological and environmental metrics per catchment that will be merged and used as a base to build the final dataset. Meanwhile, the Modelling Workshop held in Toulouse (see page 6), allowed us to discuss the common modelling approach to be used. The workshop in October in Barcelona (see page 6) will give us the opportunity to bring everything together and to proceed with data evaluation and analysis.

Núria Bonada, UB

The Ebro river from Miravet (Catalonia, Spain).

Some impressions of the BioFresh kick-off meeting in Berlin, February 2010.