Ten years of FishBase

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BIODATA

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FishBase is a large information system with key information on all 25,000 fishes of the world. It is available on CD-ROM and on the Internet at www.fishbase.org. Topics covered include taxonomy, population dynamics, trophic ecology, reproduction, genetics, and human uses. The Internet version of FishBase strives to give access to this information with a minimum of 'clicks'. For example, www.fishbase.org opens directly the 'Search FishBase' page. After entering a product name such as 'Bismarckhering', it takes just two clicks to arrive at the page for the herring *Clupea harengus*, with pictures and summary information on distribution, diagnosis, biology, etc. The 'More information' section of that page provides access to over 30 attached tables with key data.

The 'Internet sources' section offers species-level links directly into other Internet databases such as 'GenBank' for sequence data, 'FIGIS' for FAO catch data, 'Zoological Record' for references, and 'InFind' for an intelligent search of the Internet. One can also access 'self-registered' sites that have attached themselves to the current FishBase page, and one can view uploaded observations of 'Fish Watchers'. More involvement of the interested public in monitoring, e.g., occurrence and abundance of species is seen as a necessity for biodiversity studies, and the 'FishWatcher' tool is offering a publicly accessible database to store, view and analyse such observations.

New features drawing on FishBase data are various interactive graphs and maps, a biodiversity quiz, a monthly 'Best photos' page, trophic pyramids for various ecosystems, and a 'Key Facts' page that presents best estimates with error margins for important life history parameters of a given species. The 'Fish Forum' provides a much-frequented question and answer platform.

FishBase is maintained by a core team of about 10 people based at ICLARM in Los Baños and specialised in areas such as genetics or population dynamics. The team is supported by over 500 contributors from all over the world who have provided data or photos, or helped verify the content of the database. As of 2001, selected experts are able to directly add and edit data through the Internet.

The FishBase Web site receives over a million 'hits' per month from a wide variety of users, including teachers, students, fisheries managers, taxonomists, librarians, aquarists, anglers, divers, translators, illustrators, consultants, as well as other Internet databases. About a quarter of users are from developing countries. European users account for about 31%, North American users for 44%.

Over 150 scientific publications - including positive review articles in the journals *Nature* and *Science* - have so far cited FishBase, and the over 700 entries in the Guest Book document a variety of other and sometimes quite unexpected uses of the information. The Institute for Scientific Information has included it in its 'ISI Current Web Content' service.

Approaches and attitudes that have proven successful in the development of FishBase can be summarised as follows:

- Have a 'science first' attitude; strictly follow scientific standards in the presentation of information and in quality standards;

- Have a 'Yes' attitude towards people who approach you;

- Invite, accept, and act on criticism, even if it appears unjustified;

- Data quantity and quality is more important than a fancy interface;

- If you want it to be used, do it on the Internet;

- Keep the design of the system simple; avoid coding as much as possible as software and programmers change every few years;

- Make it run in a basic browser such as Netscape Navigator 4; use Html and JavaScipt on the user's computer rather than C++ on the server; don't use frames;

- Follow existing standards wherever possible;

- Have intermediate products that are already useful;

- Invest in people; have well-trained, long-term staff rather than a string of student assistants;

- Give as much credit as possible to contributors, always more than may have expected;

- Make the actual use of the information the criterion for judging the success of the information system and its parts; what is not used is useless.

This bullet list may appear rather simplistic and obvious, however, it is surprising how often one encounters exactly opposite attitudes or approaches with other information system.

Recently, new 'quality links' from FishBase to several large online databases have been added. If, e.g. Food items or Predators are identified to the species level, these are automatically linked to Species 2000, which provides onward links into the respective specialist databases. Others are in preparation. FishBase thus provides a quality gateway to other relevant information systems.

FishBase has been developed over the past 10 years at ICLARM, with major support from the European Community (see this *Bulletin* e.g. Vols. 10(1,2) 1997). Since November 2000 FishBase is led by a Consortium of mainly European institutions that have committed themselves to long-term support of the system. FishBase is updated monthly on the Internet. It is also available on 4 CD-ROMs together with the book "FishBase 2000: Concepts, Design and Data sources". Visit www.fishbase.org ! ∎