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FISHBASE as a worldwide computerized repository of ethno-ichthyology or indigenous knowledge on fishes[a]

by

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Abstract

FISHBASE is a computerized encyclopedia on the fishes of the world, presently developed at ICLARM, in cooperation with the Food and Agriculture Organization of the United Nations and numerous other institutions throughout the world. It is shown that the flexible structure of FISHBASE can accommodate both recent and ancient ethno-ichthyological information, i.e. "indigenous knowledge", not generally considered part of ichthyology. Readers are invited to cooperate with the FISHBASE project, and help turn this relational database into the world's database on indigenous knowledge of fish.

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Introduction

Can fishery scientists rely on the descriptions, anecdotes and stories of fishers? In spite of their often limited educational backgrounds, fishers, who usually have all their lives depended on fluctuating resources, have developed a profound understanding of aquatic life and of basic biological and environmental processes. It is therefore surprising that the world of science has to date not given much attention to tapping a resource as rich as the traditional knowledge of fishers.

This resource, as that of many of the world's fish resources themselves, is presently being threatened in numerous countries, by the rapid shift, from traditional fishing methods to modern and more powerful fishing techniques.

Thus, we agree with Arizpe (1989) that a "massive effort should be made, the world over, to record local and traditional knowledge...using computers and ethnographic methods".

We propose to capture (and make available worldwide) indigenous knowledge on fishes through the use of the computerized encyclopedia on fishes (FISHBASE) presently being developed at ICLARM. This can be done mainly by recording fishers' knowledge on three important aspects of fish resources: nomenclature (i.e., common names and identity), biology, behavior and ecology (e.g., relative abundances, habitats, spawning sites and times and economics (i.e., fish products, relative values, etc.).

FISHBASE as a Computerized Encyclopedia

FISHBASE is a joint project between the Food and Agricultural Organization of the United Nations (FAO) and the International Center for Living Aquatic Resources Management (ICLARM). The long-term project aims are to create and widely distribute, in the form of a low-priced CD-ROM (laser disk), a large relational database of information.

FISHBASE is being created with the help of a relational database that permits quick and easy development of applications by project staff. Through the resulting pre-programmed forms, users can converse with the database through a question and answer process. Thus, fairly complex searches can be performed by the users without knowledge of any programming language (Froese 1990, Pauly and Froese 1991, Palomares et al. 1991).

The bulk of the information incorporated in FISHBASE is entered either from multiple choice fields or as numerical data. However, the forms were designed such that some qualitative data can also be entered in form of free text. The structure of FISHBASE covers all aspects of ichthyology, notably:

a) systematics : valid scientific names as established in close cooperation with the FAO Program for Species Identification (Fischer 1976) and with reference to the California Academy of Science's "Recent Genera of Fishes" (Eschmeyer 1990);

b) common names in English, French and Spanish, as standardized by the FAO Species Identification Program and the American Fisheries Society (Robins et al. 1991);

c) distribution : by FAO fisheries area, by country, by habitat types and by latitude and longitude for occurrence records in museums, or from other sources such as the R/V Dr. Fridtjof Nansen survey project;

d) commercial importance : as target or bait species in industrial, artisanal or sport fisheries, in aquaculture, or in the aquarium trade;

e) morphology : morphometric and meristic characters of larvae and adults (with digitized black & white or colored fish pictures); features of eggs, gill surface area, striking features, etc.;

f) physiology : oxygen and food consumption of various life stages, swimming speed and related items;

g) ecology : relative abundance, ecological niches of larvae and adults, behavior, reproduction and life history (including data on egg development times), diet composition, predators, competitors, etc.;

h) population dynamics : growth parameters, natural mortality rates, length-weight relationships and related items;

i) genetics (allele frequencies, cellular DNA contents, etc.) and aquaculture systems (including genetic features of the strains used therein);

j) pathology : diseases and their symptoms, parasites, etc.;

k) species introductions between countries (from Welcomme 1988); and

l) the annotated, language-indexed bibliographic references documenting all in FISHBASE.

The final product will be a database on CD-ROM laser disk for MSDOS personal computers to be distributed in annual updates, starting in 1993. This database will be mainly used by scientists (fisheries biologists, environmentalists, etc.) but will also be of use to managers, libraries and most of all by educators of all levels.

FISHBASE and Indigenous Knowledge

How then can FISHBASE help capture fishers' knowledge of aquatic life? The database allows entry of referenced information on fishes; thus, through the structure described above, the information of entire books, reports or theses can be incorporated into the database, whether that information is qualitative or quantitative, provided that it can be reliably linked with a given species of fish. Thus, observations by fishers can be incorporated in FISHBASE if they have been documented in writing, e.g., by anthropologists. The examples below illustrate examples of indigenous knowledge reported from field work with fishers in various countries, and stored in FISHBASE.

Tell-tale Names

Fishers give their fish names, in their own languages, that often describe the fish's form, color pattern, habitats, or behavior. Such information can be entered in FISHBASE through its "common names" form (Exhibit 1), which enables entry of:

a) the common name, spelled phonetically (or transliterated if the original alphabet is different from the Roman alphabet used in FISHBASE);

b) the language, selected from our built-in worldwide list of 98 languages, or any other language (which is then to be specified);

c) the country where this language is spoken, selected from any of the more than 150 provided in our UN-inspired "country" list;

d) comments, e.g., the etymology of the name; and

e) the number of the reference in which the name in question and its related information are documented.

Exhibit 1. FISHBASE form for common names of fish.

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COMNAMES FORM     contributed by: _____________   date: ______

Common name: _____________________________________________  MainRef:_____

Country    : _____________________ Abbreviation: ________  C_Code :_____

Language   : _____________________ (see attached list for choices)

Remarks    : ____________________________________________________________


Valid scientific name
=====================
Species    : _____________________ _____________________  SpecCode :____
Family     : _____________________          Checked:___  StockCode:____
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In the Philippines, fish usually have tell-tale common names; the most famous is *lapu-lapu*, used for groupers (fam. Serranidae) and associated with the Mactan Chief, Lapu-Lapu who dispatched a would-be conquistador (Fernando Magellan) in May 1521. Names like *botete* [meaning tadpole used for most puffer fishes (fam. Tetraodontidae)] or *baka-baka* [meaning cow used for cowfishes (fam. Ostracidae)] indicate body forms. Other names indicate special characteristics, like *sungay-sungayan* (*sungay* = horns) which describes the long dorsal and ventral spines in tripodfishes (fam. Triacanthidae); *matang hari* [bigeyes (fam. Priacanthidae)] literally translated means king eyes; *isdang ilong* (= nose fish) describes the blunt horizontal horn in front of the eye in *Naso brevirostris*.

Stages in the life cycle of fish important to certain communities may also be reflected in the common names. Thus, in Bikol, a language spoken along the central Pacific coast of the Philippines, *payak* refers to sardine fry, and *tamban* to juveniles and adult sardines, while *gisao* refers to mullet fry, *banak* to market-sized mullets and *aguas* to large spawners (Herre and Umali 1948).

These and other "telling" names can be entered in FISHBASE. Their etymology and the occurrence of cognates between languages may then be used in various (inter-) cultural studies.

Fish Behavior

Fishers not only know what their fish looks like, but also have developed an understanding of the way they live. Davidson (1975) illustrates how Lao fishers wait for the upstream migration of *pa phong khunk* (*Leptobarbus hoevenii*). The same fish, migrating downstream in January/February, is called *pa phong long* and both Lao and Thai fishers regard them as "mad" fish which brings bad luck. These same fishers also report that another fish, the *pa sieu* (*Rasbora myersi*) make their twittering sounds to announce the arrival of the *pa phong*, an observation which may indicate a coincidence of the migratory activity of one species with, e.g., the reproductive season (and hence sound emission) of another.

From Palau, Johannes (1981) reports how the fishers increase their dropline and speargun catches through their knowledge of the reproductive cycle of *mokas* (*Plectropomus leopardus*), one of the most important resource species in the area. According to them, this species begins to form spawning aggregations in May and June, at full moon. During this period, *mokas* cease to be wary of baits, and the fishers report that when one *mokas* is hooked, its mate follows it to the surface, mistaking the sudden upward movement of the baited mate for a mating dance. This information is in line with earlier observations reported by Johannes (1978) suggesting that in most reef species, the spawning act is accompanied by an upward swimming movement.

In this example, Johannes (1978; 1981) not only documents the fishers' reports but also confirms that the information provided by the fishers indeed has a scientific basis. One can possibly generalize this: more often than not, fishers' reports of biological processes will turn out to be close to those of the scientists, once account is taken of the specific imagery and language used for reporting.

Such information (and its sources) can easily be incorporated in the various forms provided for in FISHBASE, e.g., in this particular case in the "reproduction" form.

Delectables Fetch a Good Market Price

Fishers know the value of their fish not only because they get a good price for a widely sought after species but also because they consume the fish they do not sell. Davidson (1975) gives some interesting insights on the culinary values of the fishes of Laos, in a book which not only catalogues scientific and common names but also how each species is used. For example, *pa sa nak* (*Barilius guttatus*) is caught by Lao fishers only in December and January and specifically at night when the fish is best used for *lap pa* or "fish tartar".

Also worth keeping are details on the various "fish sauces" produced throughout Southeast Asia, and especially in Indochina, to preserve seasonally abundant fishes, e.g. "patis" in the Philippines, "nuoc mam" in Cambodia, or "nam pla" in Thailand (Ruddle 1987).

These information not only gives insights on certain fish products themselves but also on the methods, locality and time of capture of the species required for such products. FISHBASE can accommodate this type of information through the text fields provided for in the commercial importance section of the FISHBASE "Species form", and other fields in the "Ecology form".

Ancient Ethno-ichthyology

The entries into FISHBASE covering "indigenous knowledge" need not be restricted to the present, or to the recent past. Rather, under the easily acceptable premise that all of humankind consisted of "indigenous" people only a few centuries ago, ancient knowledge of fish, so far documented, could also be entered into FISHBASE, just as, say, nomenclatural and morphological (i.e., osteological) and other information on fossil fishes.

Thus, FISHBASE could be used to computerize the ichthyological knowledge of the ancient Romans reported in Cotte (1944), Greeks (Thompson 1947), Egyptians (Brewer and Friedman 1989), Chinese (Fan Li 1986), Indians (Hora 1951) and of other people throughout the globe, so far as it can be safely linked to distinct species of fishes.

We shall elaborate elsewhere on the rich lode of information on fish that this source represents, and their potential uses for cultural and biological studies. For the time being, we would welcome comments and collaboration on this potential use of FISHBASE.

You and FISHBASE

The amount of work that is needed in order to capture the necessary information in FISHBASE is very large. That is why ICLARM and FAO, the two partners in this project, cooperate with other institutions, such as ORSTOM in France, several museums in Europe and the USA, fisheries research institutions in several developing countries, and individual colleagues. Therefore, from September 1992 on, until its public release as a CD ROM disk, FISHBASE will be available on diskettes to collaborators and experts willing to help check the integrity of the entries in the database.

We at ICLARM hope that colleagues, not only in fisheries research institutions, but also in institutions touching on any aspect of recent or ancient ethno-ichthyology will contribute information (e.g. in form of reprints, reports or theses) to FISHBASE. Also we are willing to cooperate with these colleagues on developing forms for FISHBASE which would allow entry of indigenous knowledge attributable to groups of species (as opposed to single species), such as may be required to accommodate certain elements of this knowledge. Please address your inquiries on this or related matters to either of the authors, at ICLARM, MC P.O. Box 2631, Makati, Metro Manila 0718, Philippines.

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