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**Draft User's Manual of  
FishBase  
A Biological Database on Fish  
(ver. 1.0)**

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December 1992

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Cover: Two important fish incorporated in FishBase - *Oreochromis niloticus* and *Plectropomus leopardus* - and a symbol of the global coverage of FishBase. Design by Robbie Cada.

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**Draft User's Manual of  
FishBase**

A Biological Database on Fish

(ver. 1.0)

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SOFTWARE 7

December 1992

International Center for Living Aquatic Resources Management  
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## INTRODUCTION

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Fishbase is a large relational database containing key information on the biology of fishes. Similar to an encyclopedia, FishBase contains different things for different people. For example, for teachers and students in courses on ichthyology, FishBase contains a checklist of the fishes in their country together with key information on these species; for taxonomists, it contains the latest revision of the genera and higher taxa of recent fishes (Eschmeyer 1990); for research directors and funding agencies, it shows for each species existing knowledge and research gaps; for conservationists, it lists all threatened species for a given country (IUCN 1990); for zoologists, it contains information on reproduction, morphology, brain sizes, eye pigments, etc.; for ecologists, it lists preferred habitats, environmental tolerance, prey and predators, food consumption, etc.; for aquaculturists, it provides information on genetic traits and on culture experiments; for the fishing industry, it contains proximate analyses and processing recommendations (Bykov 1983); for the game fish industry, it lists the occurrence of game fishes by country (IGFA 1991); researchers on indigenous knowledge will find more than 24,000 common names of fishes together with the language/culture in which they are used and with comments on their etymology.

From the viewpoint of ICLARM as a member of the Consultative Group on International Agriculture Research (CGIAR), FishBase plays two major roles. Firstly, it helps in strengthening the ability of National Agriculture Research Systems (NARS) to better understand and manage their national fish resources by providing them with the information that is available on their species. Secondly, FishBase documents key characters of fish germplasm and keeps track of its occurrence and status, similar to the database on rice varieties maintained by the International Rice Research Institute (IRRI) and to the activities of the International Board of Plant Genetic Resources (IBPGR).

FishBase is being implemented using DataEase, a powerful relational database which allows fast development of large applications without any programming (Level I in Fig. 1). The user can perform relatively sophisticated searches by filling in simple forms for record and field selection. There is little need to learn a complicated query language.

FishBase is built on an ichthyological structure (Level II in Fig. 1) which was created by ICLARM staff in cooperation with various specialists throughout the world. This makes it possible to capture as individual records, with the use of preprogrammed "forms", all aspects of ichthyology, notably:

- **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 Sciences' "Recent Genera of Fishes" (Eschmeyer 1990);

- **common names** : in English, French and Spanish, as standardized by the FAO Species Identification Program and the American Fisheries Society (Robins et al. 1991);
- **distribution** : by FAO fisheries area, by country, by habitat type, and by latitude and longitude, for occurrence records in museums or from other sources such as, the *R/V Dr. Fridtjof Nansen* survey project;
- **commercial importance** : as target or bait species in commercial small-scale or sport fisheries, in aquaculture or in the aquarium trade;
- **morphology** : morphometric and meristic characters of larvae and adults (with digitized black and white or colored fish pictures); features of eggs, gill surface area, striking features, etc.;
- **physiology** : oxygen and food consumption of various life stages, swimming speed and related items;
- **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.;
- **population dynamics** : growth parameters, natural mortality rates, length-weight relationships and related items;
- **genetics** : allele frequencies, cellular DNA contents, etc.;
- **aquaculture** : summaries of single and multispecies culture experiments, genetic features of strains;
- **pathology** : diseases and their symptoms, parasites, etc.;
- **introductions** between countries (Welcomme 1988); and
- the annotated, language-indexed bibliographic **references** documenting every single information incorporated in FishBase.

These forms consist to date of more than 1,200 fields, i.e., numeric choice and text fields, enabling the user to converse with FishBase through a question and answer process. Thus, for example, one does not "enter" into FishBase, for any fish to be described, the shape of the caudal fin; rather, one must select the appropriate shape from a preprogrammed list (i.e., "forked", "pointed", etc.). This procedure applied whenever descriptive information could be structured, has a number of advantages, notably:

- fast entry (no need to type the same words repeatedly);
- low storage requirements : only numbers are recorded, not the sometimes rather long texts of the choice field which they represent;
- automatic "translation" of descriptive data from the original version of FishBase (in English) to any other language, i.e., only the choice lists have to be translated and not whole records;
- possibility to perform various logical operations with, and statistical analyses of descriptive data.

The most important level, Level III (in Fig 1) contains the *raison d'être* of FishBase. This includes to date quantitative and qualitative data on over 6,400 species, one-quarter of the roughly 24,000 fish species existing in the world.

The fourth and last level of the FishBase structure consists of various graphical and statistical routines which can be used for the comparative analysis of quantitative and categorical data stored in FishBase. Of this element, however, only the MAPPER routine is included in the first diskette version of FishBase.

FishBase is being developed by the International Center for Living Aquatic Resources Management (ICLARM) in collaboration with the Food and Agriculture Organization of the United Nations (FAO) and with the support of the Commission of the European Communities (CEC). FishBase presents information on all aspects of ichthyology and of fishes as resources, notably on their nomenclature, distribution, ecology, reproduction, growth, mortality, etc. (see the references at the end of this manual for publications on FishBase, which provide details on its evolution and various aims: Achenbach and Froese 1990; Agustin et al. 1992; Froese 1990a, 1991, 1992; Froese and Friess 1992; Froese and Rechlin 1992; Palomares and Pauly 1992a, b; Pauly and Froese 1991a, b).

## FishBase

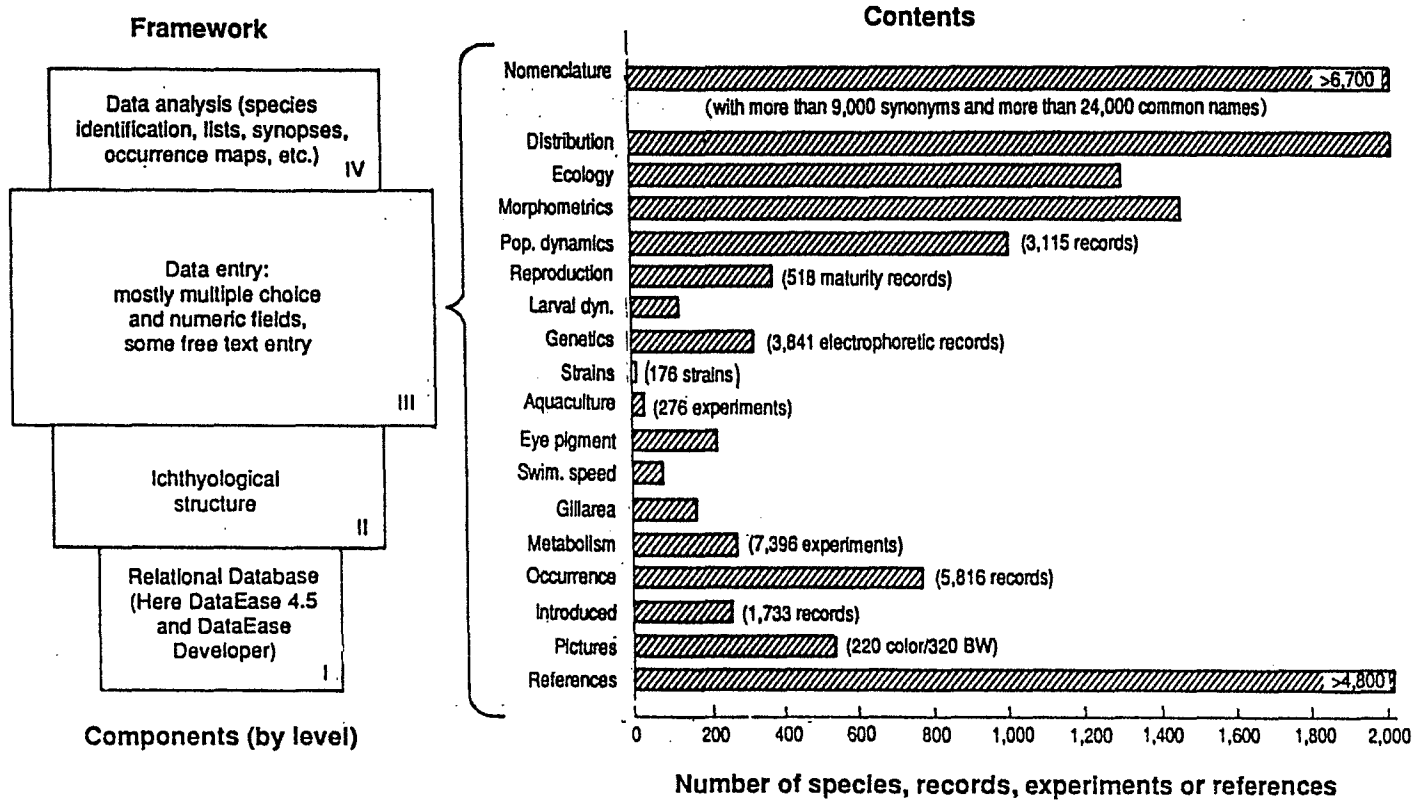


Fig. 1. Structure and contents of FishBase:

**Left:**

- Level I is represented by a commercial database, which can produce executable files that can be distributed royalty-free;
- Level II is the ichthyological structure, created by ICLARM staff in cooperation with various specialists throughout the world;
- Level III consists of the entries themselves, of which only a small fraction - the free text entries - will require translation when preparing versions of FishBase for languages other than English.
- Level IV consists of various graphical and statistical routines for the presentation and comparative analysis of the quantitative and categorical data entered into FishBase.

**Right:**

Information incorporated in FishBase as of December 1992. Note that the bars refer to the number of species (except for references). Numbers in parentheses indicate the number of records entered. There can be several records for one species.



## A QUICK TOUR THROUGH FishBase

---

The following section guides you through FishBase, which we assume has been successfully installed in your computer (see section on INSTALLATION). We also assume that your screen shows the **FishBase - Main Menu**:

### FishBase - Main Menu

1. Search and View Data
2. Predefined Search Routines (on screen)
3. Predefined Search Routines (printer)
4. Information on FishBase

This main menu consists of 4 choices, the first of which enables the user to view information on a fish species contained in FishBase through the forms discussed in the Introduction. Because of the particular structure of the DataEase software, printer and screen oriented outputs obtained from preprogrammed search routines using the Data Query Language (DQL) have to be separated. Thus, choices 2 and 3 refer respectively to screen and printer outputs of e.g., species synopses, checklists of species per country or a list of species used in aquaculture. The last choice gives the user some information on the making and origin of FishBase.

Let us assume that you want information on one of your favorite fishes, the common coral trout *Plectropomus leopardus*. First, select option 1 from the *FishBase - Main Menu*. To select from a menu, use the Up and Down arrow keys, or enter the number of the selection. Option 1 brings you to the **Search and View Data** menu:

### Search and View Data

1. Nomenclature and General Information
2. Ecology and Reproduction
3. Population Dynamics
4. Morphology and Physiology
5. Genetics, Aquaculture and Diseases
6. Introductions and Occurrences
7. References

Select option 1 again to go to the **Nomenclature and General Information** menu:

### Nomenclature and General Information

1. Family View
2. Species View
3. Common Names
4. Synonyms
5. Eschmeyer's GENERA

Option 2 of the **Nomenclature and General Information** menu opens the SPECIES form and displays an empty form (or table). Enter the name of the species that you are looking for in the appropriate fields. Note that the complete specific name requires entries in two fields (for the genus and the species separately) to the right of the label "Species". Note also that you can use the wildcard <\*> which allows use of the first few letters of a search term, e.g., <plec\* leo\*>. The wildcard <\*> can be used as a precaution to avoid misspelling especially of lengthy search terms; it also allows fast entry of search terms.

Help texts are available on each field in a form. Position your cursor on the field in question and press the Help key <ALT-F1> (i.e., hold down the <ALT> key, then press the <F1> key). You can get an additional help text for this form by pressing <F1>. Press <ESC> to close the Help windows.

Press the View key <F3> to start the search for *Plectropomus leopardus*. The form will soon fill up with information on coral trout as shown below:

<b>Species</b>	: <i>Plectropomus leopardus</i>	<b>Main Ref.</b>	: 002114
<b>Author</b>	: (Lacepède, 1802)	<b>AuthorRef.</b>	: 000551
		<b>SpecCode</b>	: 004826
<b>Subfamily</b>	: Epinephelinae		
<b>Family</b>	: Serranidae Sea basses, groupers and fairy basslets		
<b>Taxa</b>	: Perciformes Actinopterygii	<b>FamCode</b>	: 289
<b>Remarks</b>	:		
<b>List of other names</b>		<b>Author</b>	
<i>Holocentrus leopardus</i>		Lacepède, 1802	
<i>Plectropoma maculatum leopardus</i>		Whitley, 1926	
<i>Plectropomus maculatus</i>		Woodland and Slack-Smith	
<i>Cephalopholis miniatus</i>		Deas and Lawler, 1970	
<i>Plectropoma leopardinus</i>		Cuvier, 1828	
<b>List of common names</b>		<b>Country</b>	<b>Language</b>
Tsut-sing-poan		HONGKONG	Cantonese
Baraka		PHILIPPINES	Bikol
Inid		PHILIPPINES	Bikol
Pugapo		PHILIPPINES	Bikol
Common Coral Trout		AUSTRALIA	English
Leopard Coral Trout		GUAM	English

Note that if the name you have given is not found, the message "**No more records**" will appear on the upper right hand corner of your screen. This can mean that the species you are trying to locate has not been entered to date in the database or that the name you have is a synonym to the valid scientific name for this particular species. In this case, you should do your search in the SYNONYMS form, option 4 of the **Nomenclature and General Information** menu, to obtain the valid scientific name entered in the SPECIES form.

Information that is displayed in tabular fashion (e.g., other names, common names, FAO areas, countries) stems from linked forms. You can access these by positioning the cursor on one of the fields, e.g., on the common name Lapu-lapu, and then pressing the Multi key <F10>. FishBase will switch to the COMNAMES form and display a form with information on that common name.

<b>Common name</b>	: Lapu-lapu	<b>MainRef.</b>	:	2857
<b>Country</b>	: PHILIPPINES	<b>Abbreviation</b>	:	PHL
		<b>C_Code</b>	:	608
<b>Language</b>	: Tagalog			
<b>Remarks</b>	: Note that this common name is used for all groupers.			
<b><u>Valid scientific name</u></b>				
<b>Species</b>	: <i>Plectropomus leopardus</i>	<b>SpecCode</b>	:	004826
<b>Family</b>	: Serranidae	<b>Checked</b>	:	<u>no</u>
		<b>StockCode</b>	:	005055

If you want to see the reference from which the common name has been taken, position your cursor on the MainRef field of the COMNAMES form and again press the Multi key <F10>. FishBase will open the REFRENS form and display the following citation:

<b>REFRENS</b>	To return, press ESC EXIT.			
	Record 2804 on screen			
<b>Author</b>	: Herre, A.W.C.T. and A.F. Umali			
<b>Year</b>	: 1948	<b>Language</b>	: English	<b>Complete</b> : yes
				<b>RefNo.</b> : 002857
<b>Title</b>	: English and local common names of Philippine fishes.			
<b>Source</b>	: U.S. Dept. of Interior and Fish and Wildl. Serv. Circular No. 14, U.S. Gov't. Printing Office, Washington. 128 p.			

Pressing the Exit key <ESC> will bring you back to the COMNAMES form and pressing <ESC> again will bring you back to the SPECIES form. The SPECIES form is 8 pages long and you can "page down" <PGDN> to see them. Page 2 displays information on size and age, and on the FAO statistical area(s) from which the species has been reported. Page 3 gives information on economic importance, different uses, catching methods and specific remarks. Page 4 shows you what other information FishBase holds on the common coral trout (e.g., ecology, morphology, growth, mortality). Page 5 lists all the countries from which this particular species has been reported (so far noted

in FishBase). Page 6 shows all the references that have been used to extract information on the species. Page 7 lists the persons who have contributed, modified or checked information on a species, while page 8 shows the fields with the code numbers of the persons who entered, modified or checked information on this species. Press the Exit key <ESC> 3 times to go back to the **FishBase - Main Menu**.

- |   |
|---|
| <p><b>FishBase - Main Menu</b></p> <ol style="list-style-type: none"><li>1. Search and View Data</li><li>2. Predefined Search Routines (on screen)</li><li>3. Predefined Search Routines (printer)</li><li>4. Information on FishBase</li></ol> |
|---|

Assuming that you want to know which of the species occurring in your country are threatened, you can select option 3 which brings you to the **Predefined Search Routines (printer)** menu:

- |   |
|---|
| <p><b>Predefined Search Routines (printer)</b></p> <ol style="list-style-type: none"><li>1. References by Author, Title and Source</li><li>2. Species by Common Name</li><li>3. Species Synopsis</li><li>4. Checklists of Fishes by Country</li><li>5. Other Checklists</li></ol> |
|---|

This option will directly print any of the preprogrammed lists (choices 1-5) to the printer, if you don't want to use the printer, select option 2 for screen output routines in the **FishBase - Main Menu**.

Selecting option 4 brings you to the Checklists of Fishes by Country menu:

- |  |
|--|
| <p><b>Checklists of Fishes by Country</b></p> <ol style="list-style-type: none"><li>1. Freshwater Fishes</li><li>2. Marine Fishes</li><li>3. All Fishes</li><li>4. Introduced Fishes</li><li>5. IUCN's Threatened Fishes</li><li>6. Aquarium Fishes</li><li>7. Aquaculture Fishes</li><li>8. Halstead's Dangerous Fishes</li><li>9. IGFA's Game Fishes</li></ol> |
|--|

Option 5 in this menu prints country specific lists, adapted from the 1990 IUCN Red List of Threatened Animals (IUCN 1990). You are first asked to input the name of the country of interest. Note that here and in most of other search fields, you can use the wildcard <\*>. Thus, typing <phil\*> in the country field is sufficient to identify the Philippines. Press <F2> to start the procedure. The computer will now take a while to check the status for all Philippine fishes in FishBase and to sort and group the resulting output (wether on screen or on printer), as shown below:

**Checklist of Threatened Fishes of Philippines**

---

Population(s) in IUCN Red List

Perciformes

Centrarchidae

*Micropterus salmoides* (Lacepède, 1802)

Indeterminate (I)

Orectolobiformes

Rhincodontidae

*Rhincodon typus* Smith, 1828 **PatIng**

Syngnathiformes

Syngnathidae

*Cosmocampus maxweberi* (Whitley, 1933) **Dagum-dagum**

Perciformes

Gobiidae

*Pandaka pygmaea* Herre, 1927 **Tablos**

Serranidae

*Epinephelus rivulatus* (Valenciennes, 1830) **Lapu-lapu**

Rare (R)

Cypriniformes

Cyprinidae

*Puntius lindog* (Herre, 1924) **Lindog**

*Puntius tumba* (Herre, 1924) **Tumba**

Vulnerable (V)

Cypriniformes

Cyprinidae

*Puntius katolo* (Herre, 1924) **Katolo**

*Puntius lanaoensis* (Herre, 1924)

*Puntius manalak* (Herre, 1924) **Manalak**

*Puntius palata* (Herre, 1924)

*Puntius tras* (Herre, 1926) **Tras**

Perciformes

Gobiidae

*Mistichthys luzonensis* Smith, 1902 **Sinarapan**

Insufficiently known (K)

Lamniformes

Lamnidae

*Carcharodon carcharias* (Linnaeus, 1758)

Total: 15

---

FishBase 14/09/92

Press the <Esc> key twice to get back to the **FishBase - Main Menu**. You now have an idea of how to access information in FishBase. The database is write protected and there should be no problems if you experiment with the menus and try to run the predefined search routines for printer and screen output. For further details on using FishBase, please proceed to the section on **Using FishBase**.

## INFORMATION IN FishBase

---

Information in FishBase is accessed through a simple menu tree showing how menus are accessed from other menus, starting with the first choice in the **FishBase - Main Menu**. The main menu titles are printed in bold. The forms and procedures that are accessed through the menu system are described below:

### **FishBase - Main Menu**

#### **1. Search and View Data**

1. Nomenclature
    1. Family View
    2. Species View
    3. Common Names
    4. Synonyms
    5. Eschmeyer's GENERA
  2. Ecology and Reproduction
    1. Ecology
    2. Reproduction
    3. Eggs
    4. Larvae
    5. Larval Dynamics and Energetics
  3. Population Dynamics
  4. Morphology and Physiology
    1. Eggs
    2. Larvae
    3. Adult Morphometrics
    4. Oxygen Consumption
    5. Gill Surface Area
    6. Eye Pigments
    7. Swimming Speed
    8. Bykov's Proximate Analyses
  5. Genetics, Aquaculture and Diseases
    1. Genetics View
    2. Strains Registry
    3. Aquaculture Experiments
    4. Disease Descriptions
    5. Disease Occurrence by Species
  6. Introductions and Occurrences
    1. Introductions by Species
    2. Introductions by Country
    3. Occurrence by Species
    4. Museum Tables
      1. Availability of Types in Museums
      2. Example of a Museum Catalog
  7. References
- #### **2. Predefined Search Routines (on screen)**
1. Quick Identification
  2. Species by Common Name
  3. Fishes Used for Aquaculture
  4. Halstead's Dangerous Fishes

- 5. Checklists of Fishes by Country
  - 1. Freshwater Fishes
  - 2. Marine Fishes
  - 3. All Fishes
  - 4. Aquaculture Fishes
  - 5. IUCN's Threatened Fishes
  - 6. Aquarium Fishes
  - 7. Introduced Fishes
  - 8. Halstead's Dangerous Fishes
  - 9. IGFA's Game Fishes
- 6. Map of Occurrences
- 3. Predefined Search Routines (printer)**
  - 1. References by Author
  - 2. Species by Common Name
  - 3. Species Synopses
    - 1. Short Species Synopses
    - 2. Full Species Synopses
  - 4. Checklists of Fishes by Country (printer)
    - 1. Freshwater Fishes
    - 2. Marine Fishes
    - 3. All Fishes
    - 4. Introduced Fishes
    - 5. IUCN's Threatened Fishes
    - 6. Aquarium Fishes
    - 7. Aquaculture Fishes
    - 8. Halstead's Dangerous Fishes
    - 9. IGFA's Game Fishes
  - 5. Other Checklists
    - 1. All Fishes Used for Aquaculture
    - 2. All Dangerous Fishes
    - 3. All Fishes in FishBase
    - 4. Fishes by FAO Statistical Area
    - 5. Fishes by Family
    - 6. All Diseases
- 4. Information on FishBase**

### *Description of Menu Options*

The forms and predefined search routines as presented in the above menu tree are described below. Note that here, we refer to predefined search routines as preprogrammed Data Query Language (DQL) procedures that will output on screen or to the printer, species, topic or country specific information. Users who want to design their own search strategies are advised to purchase their own copy of DataEase.

## **FishBase - Main Menu**

### **1. Search and View Data**

#### **1. Nomenclature and General Information**

##### **1. Family View**

Form Name: FAMILIES. This form gives general information on a family, such as the number of genera and species it contains, their habitats, and remarks on morphometric characters, reproduction, and ecology. Also, the first reported occurrence in the fossil record is given, by period and epoch, based on Berg (1958), with updates. The family is linked to higher taxa following Eschmeyer (1990). Page 2 of the form lists all species of the family presently contained in FishBase.

##### **2. Species View**

Form Name: SPECIES. This form gives general information on nomenclature, maximum age and size, distribution, economic importance, and commercial and recreational uses of a species. The remark (or comment) fields contain additional information on habitats, reproductive behavior and other particular characters of the species; much of this information is shown in tabular form and is derived from other forms linked to the SPECIES form. Information in this table is derived from the most recent taxonomic literatures and FAO Species Catalogues and the "Checklist of fishes" (e.g., CLOFNAM, CLOFETA, CLOFFA) published by Unesco and others. Several hundred records in this form are derived directly from FAO's database SPECIESDAB.

##### **3. Common Names**

Form Name: COMNAMES. This form lists vernacular and common names used for a species in relation to the language and the country where the name is used. Sometimes, the etymology of the common name is given in the remark (or comment) field thus reflecting indigenous knowledge on the species. Note that a species does not necessarily occur in all the countries which have a common name for it.

##### **4. Synonyms**

Form Name: SYNONYMS. This form lists scientific names, other than the presently valid name, that have been used for the species. Such names may be synonyms or names of fishes now considered to belong to a different species. A synonym is a name given to the species because the author thought it was an undescribed or different species. Scientific names keep changing with better understanding of phylogenetic relationships (e.g., for the rainbow trout which recently changed from *Salmo gairdneri* to *Oncorhynchus mykiss*). FishBase makes use of the latest revisions to keep track of these changes.



## **5. Eschmeyer's GENERA**

Form Name: GENERA. This form contains taxonomic information on valid generic names and their synonyms, as compiled by Dr. W.N. Eschmeyer of the California Academy of Sciences and who kindly made these available to FishBase. The form is used to check the validity of generic names in FishBase and to assign them to the appropriate higher taxa as defined in Eschmeyer (1990).

### **2. Ecology and Reproduction**

#### **1. Ecology**

Form Name: ECOLOGY. This form displays ecological information such as environmental tolerances, preferred habitats, relative abundance, behavior, diet composition, daily ration, population food consumption, competing species, and predators.

#### **2. Reproduction**

Form Name: REPRODUC. This form displays information on reproduction, such as size and age at first maturity, sex ratio, relative fecundity, spawning season and area, spawning behavior, etc.. We expect this form to undergo a major review in 1993.

#### **3. Eggs**

Form Name: EGGS. This form contains information on the occurrence of eggs (locality, season, depth range, water parameters), as well as descriptive, meristic (oil globules), and morphometric characters that can be used for their identification. The form also displays information on egg development time and its major correlates (egg size and water temperature) from a linked form.

#### **4. Larvae**

Form Name: LARVAE. This form contains descriptive, meristic, and morphometric characters for yolk-sac and postlarvae and parameters characterizing their environment. It has been shown that the form can be used for the identification of postlarvae (Froese and Papassisi 1990).

#### **5. Larval Dynamics and Energetics**

Form Name: LARVDYN. This form contains information on larval dynamics and energetics such as growth rates, mortality rates, oxygen consumption, and food ingestion. The data have been compiled by E.D. Houde and C.E. Zastrow, of The University of Maryland System, Center for Environmental and Estuarine Studies, and are documented in Houde and Zastrow (in press).

### **3. Population Dynamics**

Form Name: POPDYN. This form originally based on data in Pauly (1978, 1980), was designed to provide entries for fish stock assessment models incorporating description of growth, natural mortality and length at first maturity. The data can also be used to generate empirical relationships linking growth parameters and their correlates (body shape, water temperature, etc.) or natural mortality and its correlates (growth parameters, body shape, water temperature, etc.), a line of research that is useful both for stock assessment and for increasing understanding of the evolution of life history strategies.

### **4. Morphology and Physiology**

#### **1. Eggs**

Form Name: EGGS. The description of this form is given above under **Ecology and Reproduction**. It is listed here again because it contains morphological data.

#### **2. Larvae**

Form Name: LARVAE. The description of this form is given above under **Ecology and Reproduction**. It is listed here again because it contains morphological data.

#### **3. Adult Morphometrics**

Form Name: MORPHDAT. This form contains descriptive, meristic, and morphometric characters for (late) juvenile and adult males and females. The form can be used for species identification (see **Quick Identification** below) and comparative studies of fish shapes and their relations to growth or swimming performance.

#### **4. Oxygen Consumption**

Form Name: OXYVIEW. This form shows information on oxygen consumption by species as contained in OXYGEN, a linked form. OXYGEN was developed by Thurston and Gehrke (1991), who compiled 6,800 records from the literature. FishBase staff have further developed the form and added several hundred records.

#### **5. Gill Surface Area**

Form Name: GILLAREA. This form summarizes data on the gill area of fishes, i.e., of that surface area which determines their oxygen intake and hence their metabolic rates. Most of the entries stem from a review by Hughes and Morgan (1973); Hughes is an expert in this field; his other publications on fish gills, notably Hughes (1984), should be considered when interpreting the information presented herein.

## **6. Eye Pigments**

Form Name: EYEPIG. This form devoted to the pigments on the retina of fish eyes, is to help access and use the rich information on those adaptations which enable fishes to see in different light conditions, ranging from well-lit surface waters to the total darkness of hadal depths.

## **7. Swimming Speed**

Form Name: SPEEDVIEW. This form shows the species-specific records on swimming speed contained in the linked SPEED form. Additional information relates to the aspect of ratio of the caudal fin and to the parameters needed to convert fishes' total length or fork length into standard length.

## **8. Bykov's Proximate Analyses**

Form Name: PROXIMS. This form is based on Bykov (1983) and contains the chemical composition and processing properties of many commercial species. As of December 1992, only one third of Bykov's records have been entered.

## **5. Genetics, Aquaculture and Diseases**

### **1. Genetics View**

Form Name: GENETICS. This form contains information on chromosome numbers, genetic markers, and DNA cell contents. Records on allele frequencies and genetic experiments are displayed from the linked forms ELECDAT and GENEDAT, respectively. Such information characterizes wild populations as well as broodstock used in aquaculture.

### **2. Strains Registry**

Form Name: STRAINS. This form contains records with key information on cultured strains of fishes such as source and size of founder stock, distinctive trait(s), effective breeding number, etc.. This form also establishes a Strain Registry, to be maintained by FAO and ICLARM.

### **3. Aquaculture Experiments**

Form Name: CULTSYS. This form summarizes information on aquaculture experiments and provides a model for a form which scientists might follow when reporting aquaculture experiments. The CULTSYS form is linked with the CULTSPEC form, which contains further information on the species used in a given experiment.

#### **4. Disease Descriptions**

Form Name: DISREF. This form contains descriptions of fish diseases, and it can be used for diagnosis (Achenbach and Froese 1990). Information on prophylaxis and treatment is also given. The form is preliminary and will be further developed in cooperation with Dr. T. Matsusato of FAO.

#### **5. Disease Occurrence by Species**

Form Name: DISEASES. This form reports the occurrence of diseases by species and by country and establishes a Global Disease Information System. Data entry and validation will be done by FAO in collaboration with various national and international institutions. So far, the form contains few cases compiled to test the form.

#### **6. Introductions and Occurrences**

##### **1. Introductions by Species**

Form Name: INTRODUC. This form shows records from FAO's INTRO database (Welcomme 1988). This is a list of introductions in chronological order by species from one country into another. Information on success or failure of a species in colonizing its new environment is also included. FAO and ICLARM will jointly update INTRO and expand it to include marine species.

##### **2. Introductions by Country**

Form Name: COUNTREF. This form contains the names of countries, territories, and islands as assigned by the United Nations. The form provides additional information on countries such as language(s) used, former names, and the corresponding FAO statistical areas. Use of this form by ICLARM does not imply any statements as to the status of these countries, territories, or islands. The form also displays all species that have been introduced into a given country.

##### **3. Occurrence of Species**

Form Name: OCCURVIEW. This form shows all the occurrence records for a species contained in FishBase, together with additional information on sampling date, depth, temperature, size range, and relative abundance. This information can be used, e.g., to verify the continued existence of rare specimens or to collect valuable species for use in aquaculture. The information is derived from the literature and from a variety of other databases such as research vessel records (e.g., Strømme 1992) and museum catalogs (e.g., Hureau 1991). The number of records is expected to increase significantly in 1993. See also the **Map of Occurrence under Predefined Search Routines (on screen)** below.

## **4. Museum Tables**

### **1. Availability of Types in Museums**

Form Name: MUSEGLOB. This form contains information on the availability of fish types (especially holotypes), i.e., which museum holds which types. The form was developed in collaboration with the Zoologisches Institut und Museum (ZIM) of the University of Hamburg, where records for tilapiine species are also entered.

### **2. Example of a Museum Catalog**

Form Name: MUSEDAT. This is a sample of a form which might be used to maintain a museum collection of fishes. This form was developed in cooperation with the Zoologisches Institut und Museum (ZIM) of the University of Hamburg. Work is underway to make it comparable with the MUSE format, now used by many museums.

## **7. References**

Form Name: REFRENS. This form lists all the references from which information included in FishBase has been extracted. The references are classified by keywords assigned to either English, French, Spanish, Portuguese, German, Italian, Japanese, Russian, Dutch, Latin or "other" (languages). Note that a search in this form is considerably faster if the year is entered as additional search criterion with the author's name.

## **2. Predefined Search Routines (on screen)**

### **1. Quick Identification**

This selection will run a procedure that helps identify fishes from information on the (FAO) area, the environment (marine, brackish, fresh) from which the fish has been collected and counts on spines and softrays in the dorsal and anal fin(s). The user typically receives a list of less than 10 species, often of the same family, which fulfill the specified criterion. The user can then compare the pictures (when available) and use the MORPHDAT form to verify an identification.

### **2. Species by Common Names**

This selection will run a procedure that produces a list of all species with a given common name. Note that the use of the wildcard character <\*> allows you to search, e.g., for all fishes with a common name starting with <golden\*>. Note also that names such as "trout" or "carp". Here, the wildcard character can be used to look for <carp\*>. This search will, however, be very slow since the wildcard is the first character of the search term, preventing FishBase from using the index files to speed up the search.

### **3. Fishes Used for Aquaculture**

This selection will run a procedure that produces a list of all fishes that are used for aquaculture, classified into *commercial*, *experimental*, and *possible future use*.

### **4. Halstead's Dangerous Marine Fishes**

This selection will run a procedure that produces a list, extracted from Halstead (1980) and Halstead et al. (1990), of dangerous marine fishes classified into *poisonous to eat*, *venomous*, *electrogenic*, *traumatogenic*, and *other*.

## **5. Checklists of Fishes by Country**

### **1. Freshwater Fishes**

This selection will run a procedure that produces a checklist of the freshwater fishes of a given country, together with their common names. This list of species is assembled from country records for species so far entered in FishBase. Not all extant species of fishes are included to date, nor have all species been assigned to the countries in which they occur. Thus, this list is likely to be incomplete, and we would appreciate being informed of species missing here (and of any published list that may be used to complete this). Conversely, this list may include fish that are very rare or extinct, or reported only once from a given country. Check under the name of the species in question for identifying such cases.

### **2. Marine Fishes**

This selection will run a procedure that produces a checklist of the marine fishes of a given country, together with their common names. With regard to the completeness of the list, please read the above comment for **Freshwater Fishes**.

### **3. All Fishes**

This selection will run a procedure that produces a checklist of the freshwater and marine fishes of a given country, together with their common names and indicators on whether they are used for fishery, culture, bait, aquarium trade, sports fishing, etc.. You have the option to display the English or the national common names. You can also specify for the list to include all the synonyms of each species. The references that have been used to compile the checklist will be appended to the printed list. With regard to the completeness of the list, please read the above comment for **Freshwater Fishes**.

### **4. Aquaculture Fishes**

This selection will run a procedure that produces a list of the fishes occurring in a given country that are classified as being used for aquaculture. The output is grouped into commercial, experimental use and possible future use. Please note that this does not

necessarily mean that these fishes are used for aquaculture in the country in question since the aquaculture information found in the SPECIES form of FishBase refers to the species in general. With regard to the completeness of the list, please read the above comment for **Freshwater Fishes**.

### **5. IUCN's Threatened Fishes**

This selection will run a procedure that produces a country-specific subset of the fishes in the 1990 IUCN Red List of Threatened Animals (IUCN 1990) and classifies them according to IUCN categories of threat. Note that we added the category "Population(s) in IUCN Red List" to deal with fishes such as *Micropterus salmoides* which has been introduced in many countries and is not threatened as a species. However, one of its native populations in Northern Mexico is endangered of extinction.

### **6. Aquarium Fishes**

This selection will run a procedure that produces a list of fishes occurring in a given country which are used as aquarium fishes, classified in commercial, potential, and show-aquarium. This does not necessarily mean that the fishes are used in the aquarium trade in the country in question. The information here refers to the species in general. With regard to the completeness of the list, please read the above comment for **Freshwater Fishes**.

### **7. Introduced Fishes**

This selection will run a procedure that produces a list of fishes that have been introduced to a given country. Note that some of these fishes have not established themselves in the wild. For the time being, this list is restricted to freshwater species. See also **Introductions by Country** (above).

### **8. Halstead's Dangerous Fishes**

This selection will run a procedure that produces a list of marine fishes occurring in a given country that are classified as being dangerous to humans (Halstead 1980; Halstead et al. 1990).

### **9. IGFA's Game Fishes**

This selection will run a procedure that produces a Checklist of Game Fishes as contained in the list of World Record Game Fishes by the International Game Fish Association (IGFA 1991) and other sources. Note that this does not necessarily mean that the fishes are considered to be sport or game fishes in the country in question. With regard to the completeness of the list, please read the above comment for **Freshwater Fishes**.

## 6. Map of Occurrences

This procedure will run **Mapper**, a 4th level routine (see introduction and Fig. 1) to plot on the screen (only VGA screens) all the occurrence records contained in FishBase for a given species. Also, the countries from which the species has been reported are highlighted. Note that the highlighted countries do not represent the distribution area. The mouse or the arrow keys can be used to select an area that you want to enlarge to the full size of the screen. Pressing <ESC> ends the **Mapper** routine and returns you to FishBase. Note that the **Mapper** is still being developed and might not work properly on your system.

## 3. Predefined Search Routines (printer)

### 1. References by Author, Title and Source

This routine can be used to print selected references, e.g., all publications of an author that have been used for extracting information.

### 2. Species by Common Name

This selection will print the output obtained in the **Species by Common Name** option of the **Predefined Search Routines (on screen)** menu described above.

## 3. Species Synopses

### 1. Short Species Synopses

This selection produces a short, standardized printout of basic information on a given species from selected entries in FishBase. We cannot guarantee the accuracy of the information therein; also we are aware that it is incomplete and the readers are thus invited to send complementary information and/or corrections, preferably in form of reprints or reports to the FishBase Project.

### 2. Full Species Synopses

This procedure will assemble, in standardized form, all the information on a species incorporated in FishBase. The format is inspired from that suggested for synopses by Rosa (1965). The printout is meant to be a working document, not a publication (see **Short Species Synopses** (above) for comments on completeness). Note that for some species (e.g., *Oreochromis niloticus*, *Clupea harengus*, or *Oncorhynchus mykiss*), the printout will require more than 100 pages.



#### **4. Checklists of Fishes by Country**

This selection will display the same choices as the **Checklists of Fishes by Country** selection (above), but with the output directed to the printer.

#### **5. Other Checklists**

##### **1. All Fishes Used for Aquaculture**

This selection will produce a printout of all fishes that are used for aquaculture, classified into *commercial*, *experimental*, and *possible future use*.

##### **2. All Dangerous Fishes**

This selection will produce a printout of dangerous marine fishes (Halstead 1980; Halstead et al. 1990), classified into *poisonous to eat*, *venomous*, *electrogenic*, *traumatogenic*, and *other*.

##### **3. All Fishes in FishBase**

This selection will produce a printout of all species contained in FishBase (>7,000) by order, family, subfamily, and with valid scientific name, author(s), year (of original description), and English common name for each species. Note that the printout requires more than 100 pages.

##### **4. Fishes by FAO Statistical Area**

This selection will produce a printout of all fishes by FAO statistical area.

##### **5. Fishes by Family**

This selection will print a family description and all the species contained in FishBase with English common name, maximum length, environment (marine, brackish, fresh), main uses (fishery, aquaculture, aquarium, sport, bait), and an indication whether they are considered dangerous or threatened. There is an option to also include FAO areas or synonyms. The references that have been used to compile this list are appended.

##### **6. All Diseases**

This selection prints for all diseases contained in FishBase the name, the agent of disease and typical hosts grouped by disease type.

#### 4. Information on FishBase

This selection displays the following:

**Information on FishBase**  
=====

FishBase is a biological database on fishes developed by the International Center for Living Aquatic Resources Management (ICLARM) in collaboration with the Food and Agriculture Organization of the United Nations (FAO) and with the support of the Commission of the European Communities (CEC).

This is a preliminary version of FishBase. We cannot guarantee the accuracy of the information herein and we are aware that it is incomplete. Users are invited to send complementary information or corrections, preferably in the form of reprints or reports to:

ICLARM  
FishBase Project  
MC P.O. Box 2631  
Makati, Metro Manila 0718  
PHILIPPINES

(press ESC to return to FishBase Main Menu)

#### ***Pictures in FishBase***

The CD-ROM release of FishBase will contain three types of pictures:

- 1) black and white figures of adult fish and of their larvae and eggs;
- 2) color pictures of the adults (and of some juvenile forms, if differently colored) of important species;
- 3) distribution maps, generated by MAPPER, a level IV routine of FishBase (see Fig. 1) presently under development, which will display occurrence records and distribution areas at various degrees of resolution.

To date (December 1992), about 300 black and white, taxonomically correct figures of adult fish such as illustrated in Fig. 2 have been scanned, then "cleaned up". Also, 127 figures of larvae and three figures of eggs are available, mainly from the North Atlantic and originating from the work of the late H.-W. Halbeisen (1988) and Froese (1990).

About 140 color pictures are available so far, and of which an example is presented (in shades of gray) in Fig. 3 and on the cover of this manual. These color pictures are scanned from black and white pictures, to which at most 16 colors, usually based on two or more color photos, have been added. They require a VGA screen (color or monochrome) for display.

These black and white and color figures are not automatically supplied with this version of FishBase; if requested, they will be supplied with advice on installation, and on how

they can be called from within FishBase. Note that the current number of pictures will occupy an additional 28 megabytes on your hard disk. [Note also that, presently, the sources of the pictures are not given. Usually, they stem from the MainRef for the SPECIES, LARVAE, or EGG forms to which they are attached; sources of figures will be given in the next version of FishBase].

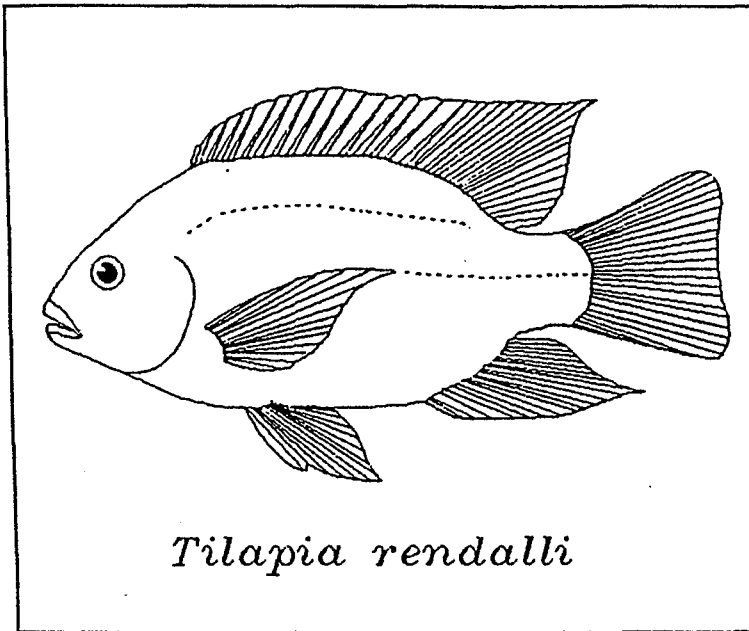


Fig. 2. A picture of *Tilapia rendalli*, as an example of black and white figures of fish so far created for FishBase.

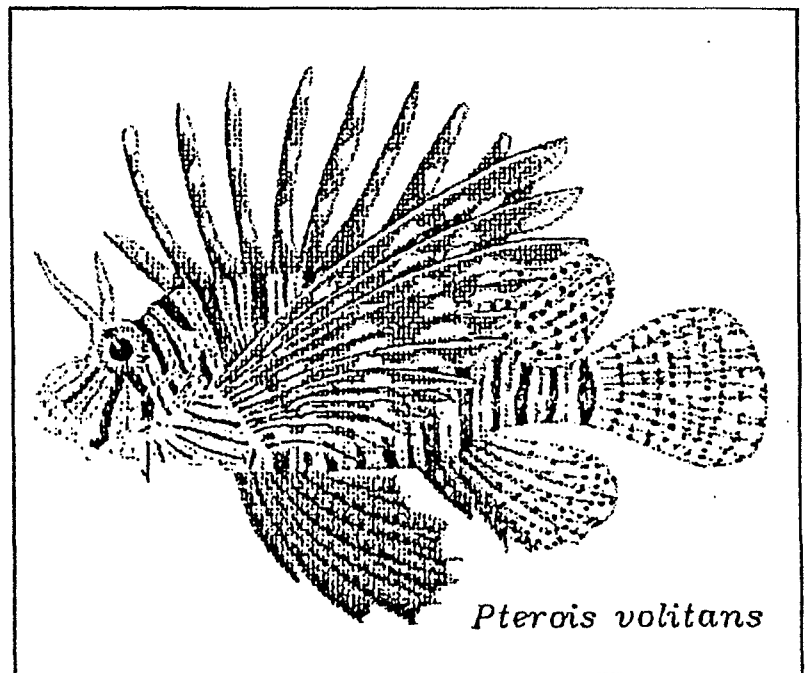


Fig. 3. A picture of *Pterois volitans*, as an example - here as a raster printout of color pictures so far created for FishBase.

# USING FishBase

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## Getting Started

This section describes how to use FishBase for day-to-day operation. The procedures to install and set up the software are described in the section on **Installation**. If you need to install DataEase or FishBase, read the installation section first. If DataEase and FishBase are already installed, begin here. If you are not familiar with the use of computers, refer first to the section on **User Interface**.

### Starting with the RunTime Version

This set of instructions are designed for users who do not have their own copy of DataEase. Once FishBase is installed, you can start it from any directory (the INSTALL software added the \FINFISH directory to your DOS path). If \FINFISH is not contained in your DOS path, you have to manually switch to that directory by typing CD \FINFISH at the DOS prompt. To call FishBase, just type <FB> and press <RETURN>.

### Automatic Signing On

The first thing that is displayed at startup is the Sign-On screen. At the top of the screen, information such as the version of DataEase in use, its serial number, and the amount of expanded memory (if any) in use are displayed. FishBase uses only free expanded memory; it does not conflict with other programs using expanded memory. Also, when you exit FishBase, it frees any expanded memory it used when it was running. Your name **user** and your password, **ENTER** are automatically filled in, the Sign-On screen disappears and the **FishBase - Main Menu** is displayed.

### Starting with DataEase 4.5

A special copy of FishBase is available for those users who already have DataEase 4.5 installed in their machines. This allows the use and access of all DataEase 4.5 features including DQL programming. To run FishBase, type <FB> at the DOS prompt and press <ENTER>. If the error message "**Bad file name**" occurs, check the **FB.BAT** file as directed in the section on **Files used by FishBase**.

Another option is to first start DataEase 4.5. At the Sign-On screen, change the default entry behind "Directory:" to the directory that contains FishBase, e.g., <D:\FINFISH>. Enter <**FishBase**> as database name. Enter <**user45**> as your user name. You do not need a password, i.e., press <ENTER> when the cursor is on the password field. This brings you to the **FishBase - Main Menu** which contains an additional option: **5. DataEase - Main Menu**. This menu option allows you to access DataEase.

## *User Interface*

The following section explains some of the basics you need to know to use a personal computer (PC). If you are familiar with using computers, you may want to skip this section.

### **The Cursor**

When you look at a computer screen, you usually see a blinking white line or rectangle; this is called the **cursor**. This tells you where you are on the screen. When you start typing, the characters are entered on the screen, at the position of the cursor. When characters are inserted or deleted, they are inserted or deleted where the cursor is located. You can move the cursor around on the screen with the TAB, the RETURN, the Arrow, and special cursor control keys.

### **The Keyboard**

Keyboards vary depending on the manufacturer and machine class (AT, PS/2, etc.), so your keyboard may differ slightly from the keyboard assumed in this section. Many keys on your computer keyboard correspond to those on a traditional typewriter. Most of these keys perform the same function on both typewriters and computers, except for the **RETURN** key. This (i.e., the **ENTER** key on some keyboards) is used to communicate an action, a keystroke, or a set of keystrokes to the system. If you have an IBM AT or PS/2, the keyboard has two keys labeled **ENTER**, and none labelled **RETURN**. Here, the **ENTER** key (i.e., the one with the carriage return symbol) should be used when asked to press **RETURN**.

### **Function Keys**

Depending on its type, your keyboard will have either 10 or 12 function keys labeled **F1** through **F10** (or **F12**). These are located either on the left-hand side or across the top of the keyboard. Since some keyboards do not have 12 function keys, only the first ten are used by FishBase. See the section, "**Using the Function Keys**," for further information.

### **Cursor Control Keys/Numeric Keypad**

On the right-hand side, there is, in most keyboards, a numeric keypad. This includes plus (+) and minus (-) keys (in some also multiply (\*) and divide (/) keys), and a **NUM LOCK** key. These keys also have arrows and words on them. When the **NUM LOCK** key is on, the keys are used to enter numbers; when it is off, the keys are used to control cursor movements. The **HOME** key (usually in the upper left hand corner of the pad) positions the cursor on the start of the first line of the first page of a FishBase form; **PGUP** moves one page up; **PGDN** moves one page down; and **END** (usually in the lower left-hand corner of the pad) moves to the last line of the last page of a FishBase form. These keys, thus, may move the cursor several lines, or entire pages at once.

Some keyboards also have a separate set of arrow and cursor control keys. If your keyboard has a separate set of cursor control keys, you can keep **NUM LOCK** on all the time and use the numeric keyboard strictly for entering numbers.

## Special Keys

A computer keyboard also includes some special keys not found on a typewriter, e.g., **DEL** (delete), **INS** (insert), **CTRL** (Control), **ALT** (alternate), **Esc** (escape), and **ENTER**. The **DEL** and **INS** keys are used to delete and insert characters, respectively. The **CTRL** and **ALT** keys are used in combination with other keys to perform special functions. The specific uses of these keys are discussed below in the section "**Using the Function Keys**". The **Esc** key is used to cancel or exit from an operation. The **ENTER** key is used to signal that you have finished typing and will register (i.e., store in memory) what you have typed. The **RETURN** key works identically to the **ENTER** key.

### *FishBase, The Basics*

This section explains some of the basic information you need to know to use FishBase, for example:

- How FishBase uses the screen
- How to make selections from menus
- How to use the function keys
- How to search information in the **Record Entry** form.

## The Screen

The left section of the top line of the screen is the **Title Area**. This displays the name of the operation in use at any given moment.

The right section of the top line of the screen is the **Message Area**. This is used by FishBase to display messages indicating that an operation is in progress or has been completed, and any error message generated while running an operation.

The middle section of the top line is the **Mode/Cursor Position Area**. Here, FishBase displays the position of the cursor when you are editing a form or procedure. It also affixes the word **INSERT** to indicate that you have pressed the **INS** key to switch to the insert mode.

The second line on the screen is the **Function Key Line**. This lists the most commonly used function keys at any point in FishBase. Note that these keys change, depending on which operation you are performing. A complete list of the valid function keys is always available on the **Pull Down Command Menus**. See the section "**Getting Help**" for more information on these menus.

In addition to function keys, this line displays:

- The drive and directory (complete pathname) of FishBase
- The current system date
- The current system time.

The remainder of the screen (lines 3-24) is used as the **Work Area**. Here, FishBase displays the form, procedure, query, etc., that you are working on. FishBase also uses this area to display full screen menus and Help messages.

### **Auto Help**

If you are a first-time user of FishBase, or if you are using a function that you have not used before, you can place yourself in **Auto help** mode. First, press and hold the **ALT** (alternate) key while pressing **F1** function key (i.e., **<ALT-F1>**) to display the help window. Then press and hold the shift key (**SH**) while pressing the **F1** (i.e., **<SH-F1>**) to turn the Auto help function on. Every time you move to a new question, a new help screen will automatically appear. To turn the Auto help function off, press **<SH-F1>** again.

### **Getting Help**

You can easily get help at any time in FishBase: just press **<F4>** (i.e., CMDHELP) to display the **Pull Down Command Menus**. These menus list all the functions that are currently active and the keys used to execute them. If you need more information, press **<ALT-F1>** (i.e., HELP). FishBase then displays help messages relating to the function you are performing when you request help. This is known as **context-sensitive help**. The first help screen displayed is pertinent to your immediate function. Often, more general help is also available. To get more help, press the **<F1>** (i.e., MORE) key.

You can remove the help window by pressing any key; FishBase then switches back to entry mode.

### **Selecting From Menus**

FishBase uses four different types of menus: full screen menus, line menus, window menus, and Pull Down Command menus.

#### *Full Screen Menus*

To select an option from a full screen menu, you can either type the number next to your choice, use the cursor keys to move the highlight bar to your choice and press **<RETURN>**, or type the first letter(s) of your choice and press **<RETURN>**.



**Note:** When typing the letters of a choice, the highlight bar moves to the first choice beginning with that letter. If more than one choice begins with that letter, type more until you have specified a unique combination.

### *Line Menus*

To select from a line menu, you can type either the number or the first letter(s) of the selected option. Line menus do not have highlight bars. If the last choice displayed on a line menu is **F1** (i.e., MORE), this means all the available choices could not be displayed on the single line menu. Pressing **<F1>** will open a window menu that displays all the available choices. If you know the number that corresponds to the choice you want, you can type the number even if the choice does not appear on that line or in the current window.

### *Window Menus*

When a window menu of choices is displayed, the first 20 choices are shown, and the bottom of the window shows the total number of available choices. You can highlight the option of your choice by pressing **<F1>**, by using **<PGDN>**, **<PGUP>**, the up and down arrow keys or by typing the number of the choice. After you have highlighted a menu choice, press **<RETURN>** to select it.

### *Pull Down Command Menus*

To select an option from a **Pull Down Command Menu**, you must first press **<F4>** (CMDHELP) to display the command menus. Use the arrow keys to highlight and thus access options. Then press **<RETURN>** to make your selection.

### *Exiting from a menu*

To exit from a menu and to return to the previous menu, press **<ESC>**. If you press **<ESC>** when the Main Menu is on the screen, FishBase displays the message:

Exiting DataEase Are you sure?

Answer **<Y>** to return to the DOS (**drive:\**) prompt. Answer **<N>** to continue working where you are.

### **Using the Function Keys**

Most functions are executed by pressing the function key or the combination of keys assigned to the function. For example, to view a record in Record Entry, press **<F3>** (i.e., VIEW). Note that you do not have to type the word VIEW, the key name is provided here and elsewhere on this manual for reference only.

Some functions require that you press a function key in combination with either the Shift key (**SH**), the Alt key (**ALT**), or the Control key (**CTRL**). Thus, if you want to have a printout of the form on the screen, pressing the shift key (**SH**) along with the **F9** function key will output the screen to the printer. To execute these functions, press the first key (i.e., **<SH>**, **<ALT>**, or **<CTRL>**) and, without letting go, press the function key associated with the desired operation.

FUNCTION KEYS In FishBase		
<b>General</b>	Command Menu	F4
	System Help	Alt-F1
	More System Help	F1
<b>Forms</b>	Next Consecutive Record	F3
	Previous Consecutive Record	Shift-F3
	Clear Form	F5
	Clear Field	F6
<b>Tools</b>	Print	Shift-F9
	Recalculate	Ctrl-F9
	Suspend Calc	Alt-F9
<b>Search</b>	Begin Search for Criteria	F3
	Continue Search for Criteria	Alt-F3
	Go to Record Number	Ctrl-F3
	Begin search and display results in table view	Shift-F1
	Switch to Table View	Shift-F1
<b>Table</b>	Switch to Table View	Shift-F1
<b>Multi-form</b>	Switch to a record in a linked form.	Ctrl-F10

### Searching Data In Record Entry Forms

At any time, you can view records sequentially by pressing **<F3>** (VIEW). To recall a record, specify only the information that will uniquely identify it (i.e., the search string) and press **<F3>**. When you search for data in a form, you are given space to type the search string, just as you have space to write information on a printed form. The spaces where you enter the information are called **fields**. Entering a search string is straightforward and, with a few minutes of training, can be done by anyone. The procedure for entering search strings is briefly described below.

When a form is displayed, the cursor rests in the first field. Enter a search term (or string) by typing it into the proper field. If you make a mistake when entering a search string, you can use the backspace, left and right arrow, **<INS>**, **<DEL>** keys or the **<F6>** (i.e., FIELD CLEAR) function key to correct typing errors.

When a search string you have entered completely fills the field, the cursor automatically moves to the next field. If the length of the search string (i.e., number of characters) is shorter than the space provided by the field, press the **<RETURN>** or **<TAB>** key to move to the next field.

### *Multiple Choice Fields*

Some of the fields on a form may be multiple choice fields. When the cursor reaches one of these fields, a single line menu of choices for the field is displayed. To make a selection, press the corresponding number. If more than one digit is required to make the selection, the system asks you to type the second digit or a space to complete the selection. When you make a selection, the current field is filled and the cursor moves to the next field. **Do not** press **RETURN** after making a selection.

If there are more choices than can be accommodated on one line, **F1 (MORE)** is listed as the last choice on the menu. Press **<F1>** to display a window menu of choices.

### **Other Record Entry Functions**

To print a record that is shown on screen, press the keys **<SH-F9>** (PRINT). To clear the field in which the cursor rests, press **<F6>**. To leave the data-entry mode, press **ESC** (EXIT).

### **Multi-View**

The Multi-View functions enables you to view information in a sub-form attached to the current (main-) form, e.g., the POPLW form, which contains information on length-weight relationships and is attached to the POPDYN form. Pressing **<F10>** (MULTI-VIEW) displays the sub-form on screen and allows you to perform various operations, such as searching or printing, as if it were the main form. To return to the main form, press **<Esc>** (EXIT). Note that if the cursor is positioned in a field linked to a sub-form, FishBase goes directly to the sub-form when **F10** is pressed.

## INSTALLING FishBase

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FishBase was developed with version 4.5 of DataEase, a commercial database software which allows applications to be distributed, in combination with RunTime Module, without copyright restrictions. The DataEase RunTime Module is a streamlined version of DataEase, designed to run application software created with DataEase Developer. The RunTime Module excludes most of DataEase's application development features from the resulting software.

Users who would like to avail of the advanced features of DataEase must buy an Exec module for about US\$200 (contact DATAEASE International, FAX USA 2033652397 or your local dealer). DataEase Exec is a special version of DataEase which offers less programming routines than the standard DataEase product. However, there are more functions available in Exec than in the RunTime Module. The main difference between these two modules is that Exec can be used to access databases shared on a network while RunTime is designed as a single user product. Also, Exec provides the following:

- access to 16 megabytes of extended memory (in the Exec 16M version);
- multi-user locking capability (when more than one copy of Exec accesses the same application);
- the ability to define and save Quick Reports;
- the ability to define Configuration;
- the ability to define Printers; and
- the ability to define Screen Styles.

If you have more than one DataEase International product, each one must be installed in a separate directory to avoid conflict of system files (e.g., DataEase RunTime and DataEase Developer). Unpredictable behavior will occur if this precaution is not taken. The full version of DataEase 4.5 costs about US\$950.

### ***Hardware Requirements***

FishBase runs on IBM compatible Personal Computers and on Macintosh Computers with a MS DOS emulation software. Because of its ability to deal with harddisks and partitions larger than 32 MByte and to load memory resident programs and drivers into upper memory we recommend to use MS DOS version 5.0. Run the VER command from the MS DOS prompt to see your version.

FishBase makes use of expanded memory which is provided by memory managers (e.g., HIMEM.SYS or QEMM.SYS) for storing menus and speeding up operation. In addition, it needs at least 570 KByte of conventional memory. If you do not have expanded memory, FishBase needs at least 590 KBytes of conventional memory to run properly. Run the CHKDSK or the MEM command from the MS DOS prompt to

find out how much memory is actually available. You might have to disable (or 'loadhi') some memory resident programs and drivers to increase the available conventional memory.

To install FishBase you have to create a sub-directory with at least 59 MByte storage space in your harddisk or on the server in a Local Area Network (LAN). Use the DIR or the CHKDSK command from the DOS prompt to check your available storage space. You might want to use software such as STACKER or SPEEDSTORE to increase your existing harddisk storage capacity.

FishBase can be configured for one of the following display types: monochrome, color, or color-card with monochrome monitor.

The RunTime version of FishBase has to be configured at ICLARM to be compatible with your screen and printer. Thus, if you are having problems printing FishBase outputs, you are requested to contact FishBase Project staff for advice and possibly a copy of FishBase configured for your printer and screen.

If you have DataEase 4.5 you will be able to make use of additional DataEase features such as using the Quick Reports capabilities or adjusting FishBase better to your system (printer, monitor, memory, etc.). You also will be able to run FishBase in a LAN. If you have an older version of DataEase you have to upgrade to version 4.5. Make sure that this includes an upgrade to DataEase for Windows.

### **Computer Recommendations**

The CD-ROM version of FishBase will run under the WINDOWS environment. If you use this opportunity to purchase a new computer, please refer to the specifications listed below recommended for the MS DOS and the upcoming WINDOWS version of FishBase. Any IBM compatible brand or no-name computer with local service is fine. The computer should have:

- 386DX/33 or 486 CPU
- 4 - 8 MB RAM
- 1.44 MB Disk Drive plus 1.2 MB Disk Drive
- 120 - 200 or more MB Harddisk.
- Super-VGA card (capable of 640 \* 480 pixels in 256 colors) with WINDOWS driver and VGA color monitor.
- MicroSoft compatible mouse.

- Any printer compatible with WINDOWS and with local support and supply of ribbons, continuous form paper, etc. is fine. Make sure that the FormFeed command of the printer works properly with the paper size you have available (some printers cannot deal with DIN A4 paper length). FishBase is configured for 8.5 x 11 inch paper size.
- MS DOS 5.0 and WINDOWS 3.1
- CD-ROM drive with WINDOWS driver (you might want to purchase this later (early 1994) since CD-ROM drives are still getting faster and cheaper).

The WINDOWS version of FishBase will also run on 386SX computers with 2 MByte RAM, but it will be slow.

### ***Software Requirements***

- DOS 3.1 or higher (we recommend DOS 5.0); note that the CD-ROM version of FishBase will be optimized for Microsoft Windows; the diskette version is not.

**Important Note:** To run the install program properly, the MS-DOS file CONFIG.SYS on your computer must be modified to include the line: **FILES=100**. If no CONFIG.SYS file exists, one must be created and placed in the root directory of the boot drive of your computer. If your CONFIG.SYS file already contains the FILES command, be sure to change the number of files to at least 100. Refer to your DOS manual for information on other commands to include in your CONFIG.SYS file.

### ***Installing FishBase RunTime version***

To install FishBase, insert diskette number 1 in your floppy disk drive, change to the directory of that floppy drive (**a:** or **b:**) and type **<INSTALL>**. The installation program will then ask you to specify the directories where you would like DataEase RunTime and FishBase installed. The install program will show you the default directories C:\DERUN for RunTime and C:\FB for FishBase. Press the **<ENTER>** key to accept the default directories or type the paths of your choice at the install prompt and press **<ENTER>** to continue. If you change the directory names or install Runtime and FishBase in different drives, you have to change some BAT files (see below).

The installation program will proceed and will prompt you to insert the other diskettes as needed. You will then have to wait for several minutes for the installation program to proceed in merging and expanding the copied files to the directories of your choice the installation program also adds the FishBase directory to the PATH command in your AUTOEXEC.BAT file and it modifies the FILES command in your CONFIG.SYS file. When this is done, the installation program will display the message: **Installation finished**. Press **<ENTER>** to terminate the installation program. Type **<FB>** and press **<ENTER>** from the DOS prompt to run FishBase.

### ***Installing FishBase if you have DataEase 4.5***

If you have your own copy of DataEase 4.5, you will receive a special version of FishBase without the RunTime module. To install FishBase, insert installation diskette 1 in your floppy disk drive, change to the directory of the floppy drive (**a:** or **b:**), type **<INSTALL>** and press **<ENTER>**. The FishBase Data and MAPPER installation screen will show. On the upper left corner of this screen is the Install Options box which presents three choices/checkboxes. These can be checked/toggled on or off by positioning the cursor with the arrow key on the desired checkbox and then pressing **<ENTER>**. All three checkboxes are switched-on by default. Thus, for example, if the **"Install FishBase Data"** box is checked or switched-on, FishBase data will be installed. The third box, **"Test Mouse for MAPPER"**, if switched-on, will present a graphics screen at the end of the installation process that will give provisions to check if your mouse is compatible with the MAPPER software. Note that when the **"Test Mouse for MAPPER"** option is switched on, the **"Install MAPPER"** option is automatically switched on. This is because the mouse testing needs a directory where MAPPER is supposed to be installed. On the upper right corner are two **"entry fields"**. The first prompts for the drive and directory in which you would like your FishBase data to be installed and the second prompts for the drive and directory in which the MAPPER will be installed (if switched-on in the lefthand checkbox). The installation program will then ask you to specify the directory where you would like **FishBase** and **MAPPER** to be installed. The installation program will give you the default directories C:\FINFISH and C:\MAPPER. Press the **<ENTER>** key to accept the default or type the path of your choice. Select **"Start Installation"**, and press **<ENTER>** to start the installation.

The installation program will proceed and will prompt you to insert the other diskettes. When all the diskettes have been read, you will be asked to wait for several minutes as it proceeds in copying and expanding the files to the directories of your choice. When this procedure is over, the installation program will display the message **Installation finished**. At this point, if the install option **"Test Mouse for MAPPER"** was turned on at the start of the installation, the exit button would be marked **"Go to Mouse Test"**. To proceed to this mouse test, press **<TAB>** and **<ENTER>**; or press **<ESC>** if you want to exit to DOS right away. To start FishBase, follow the steps described above under **"Starting with DataEase 4.5"**.

### ***Installing FishBase Pictures***

To display the pictures that come with FishBase, you need a color VGA monitor and at least 585 KByte of available conventional memory. FishBase Data should have already been installed before installing FishBase Pictures.

Insert the first installation diskette in your floppy disk drive, change to the directory of that floppy drive (**a:** or **b:**), type **<INSTALL>** and press **<ENTER>**. The program will then begin immediately searching your available drives starting from drive **C:** if FishBase Data have previously been installed. Once it finds the directory of

FishBase Data it will stop searching and will put the proper drive and directory of FishBase Data in a second field which will be discussed below. The installation program will then ask you to specify the drive and directory where you would like the FishBase pictures to be installed. It will give you the default directory **C:\FINCUT** (the drive letter depends on where it has found FishBase Data). Press the **<ENTER>** key to accept the default or type the path of your choice. It will then again ask you to specify the drive and directory where FishBase Data have been installed. It will give you the default directory where it has found FishBase Data by its previous search as stated earlier. The installation program needs this directory so that it can put the batch file "**FBP.BAT**" in the FishBase Data Directory. Thus, if you have not installed FishBase Data yet, you should install it first; installing FishBase Pictures will be useless without FishBase Data.

When the installation is finished, you can start FishBase with pictures by typing **<FBP>** and pressing **<ENTER>** at the DOS prompt. A memory-resident program (VIEW16.EXE) will be loaded before the **FishBase Sign-on Screen**. To display a picture, press **<ALT-P>** (hold down the **ALT** key and shortly press **P**). The cursor changes to a small square and you can move it around the screen. Place the cursor on the first letter of a picture name and press **<ENTER>**; VIEW16 now reads 8 characters starting from the cursor position, searches for a file with that name and the extension **.CUT** in the FishBase Pictures directory, and displays the picture. For color pictures, an additional palette file with the same name and the extension **.PAL** is loaded to adjust the colors. Press **<ENTER>** to return to FishBase. You can remove VIEW16 from memory by pressing **<ALT-U>**.

### ***Files used by FishBase***

The installation process creates a number of files. If FishBase is not working properly after installation you might want to check the content of the following files:

- **FB.BAT** is located in the **\FINFISH** directory and contains the line:

```
C:\derun\derun C:\finfish f user""
```

If you have installed DataEase RunTime and FishBase in different directories, make sure the paths in this file are set accordingly. If you have DataEase 4.5, **'derun'** is replaced with **'dease'** or **'de16'** and **'user'** is replaced with **'user45'**. Check that **"C:\derun"** is replaced by the path where your DataEase 4.5 files are located.

- **FBP.BAT** is located in the **\FINFISH** directory if you have installed FishBase with pictures. The file contains the lines:

```
C:\fincut\view16 C:\fincut  
FB
```



Make sure the drives and directories correspond to the actual location of the FishBase pictures.

- **MAPPER.BAT** is located in the **\FINFISH** directory and contains the following lines:

```
C:  
cd\mapper  
copy c:\finfish\distr.dat  
copy c:\finfish\occur.dat  
mapper    nwmap3._fl    country3.dat    river3.dat    lake3.dat    distr.dat,  
occur.dat  river3.dat    lake3.dat/d  
exit
```

If you have installed DataEase and FishBase in different directories or drives make sure the paths in this file are set accordingly.

- **MAPMOUSE.BAT** is in the **\MAPPER** directory and contains information relevant to your mouse, which can be used in the MAPPER program. You can specify what type of mouse you have and where it is connected, e.g., a `4' in the first line means that you have a Logitech compatible mouse which is connected to the second serial port. Note that FishBase itself does not support a mouse in this version.

## ERROR MESSAGES

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This chapter describes Error Messages and Recovery Procedures. The messages are listed alphabetically. For each error message, an explanation of the message and the cause of the error is listed and then the procedure for recovering from the error is described. A series of special Recovery Procedures are listed at the end of this section. Please inform ICLARM of any persistent errors that you might encounter while using FishBase.

**Access to this Record Denied:** Your security level does not allow you to gain access to this record. This and future versions of FishBase distributed outside of ICLARM do not and will not allow entering or modifying data.

**An Unknown Printer is Installed:** The printer name specified in the Configuration form does not occur in the Printer's file. Either define the printer using the Printer Definition form, or change the Configuration form to refer to an existing printer.

**Cannot Continue - Exiting ...:** FishBase has encountered an error which it cannot resolve, and returns to DOS. The user must then restart FishBase by typing <FB>.

**Character not Allowed:** The character typed is not a valid character for the current file. For example, you may be trying to type a *letter* in a *number* field. Type a valid character.

**Choice Required:** In a query, you have tried to skip a required multiple choice question. Select a choice from those displayed on the prompt line.

**Configuration File Open Error:** The configuration file CONFIGUR.DAT is not found on the program disk. Exit FishBase. Reinstall FishBase or ask for a new copy.

**Configuration File Read Error/Configuration File Write Error:** There is an error in the configuration file. Reinstall FishBase or ask for a new copy.

**Create Error on File <filename>:** An attempt to create a new DOS file on the disk has failed. The disk space or the directory space may be full. Follow the **Disk Space Recovery** procedure at the end of this section.

**Enter a Space or a Digit to Complete:** This is not an error message. The current menu has more than 100 choices, and another digit or a space is required to complete the selection.

**Error in Open Relation <name>:** Either an error has occurred in the data file for the form selected to View or Modify, or the data file may be missing. Follow the **Missing File Recovery** procedure given at the end of this section.

**Errors Logged in File <filename>:** Errors were detected during this batch processing activity. Appropriate error messages were written to an ASCII file whose 8 character file name is the same as the Primary form in which records were entered and whose 3 character extension is **.Enn** where **nn** is a unique identifier for this set of error messages.

**Exiting DataEase -- Are you Sure ?:** Not an error message. You pressed **Esc** (EXIT) from the **FishBase - Main Menu**. To return to DOS, answer **y** to this prompt. If you pressed **Esc** accidentally, answer **n** to remain at the menu.

**Field Value is Too High/Field Value is Too Low:** The value entered in a field is outside its defined **Upper Limit** or **Lower Limit**. The cursor is positioned at the field in error and the prompt line shows the limit that has been exceeded. Type a value within the acceptable range.

**File <filename> not on Drive <n>:** **Correct and Hit any Key:** This program file was expected in the program drive but is missing. Insert the correct disk in the program drive.

**Form File <Filename> not Found:** An attempt to use a form, the form definition file could not be found on the data drive. The file may have been erased. Follow the **Missing File Recovery** procedure at the end of this section.

**Form not Found: When selecting a form from a user defined menu:** The form name specified on the menu cannot be found. **When Selecting a form from the Records menu:** The form definition or the data file for the form does not exist. Follow the **Missing File Recovery** procedure at the end of this section.

**Form not Saved:** Your security level does not permit you to save forms.

**Illegal Choice:** You have selected an invalid choice from the menu. Select a valid choice.

**Illegal Key, Ignored:** You have pressed a key that is not valid for the current operation. Press a valid key.

**Illegal Line Command:** When running a report or procedure, FishBase found a command line in an improper format. Abort running the report. Please inform ICLARM of any error of this type.

**Insufficient Memory for Menus:** The memory available for custom menus is insufficient. If your Start-up menu is user-defined, there must be enough memory to store all user-defined menus of FishBase.

**Internal Error (Protect Mode Violation):** See the section "Protect Mode Violations" further below.

**Invalid Date:** An invalid date has been typed in a **Date** field. Enter a valid date with the format DD/MM/YY.

**Invalid Key, Ignored:** An invalid key was typed as menu selection. Type a valid digit to select from the menu.

**Invalid Temporary Directory:** The directory specified to hold temporary files does not exist. Either specify a different directory or use the default data directory.

**Invalid Time:** An invalid time has been entered in a **Time** field. Enter a valid time.

**Invalid Version of DOS:** FishBase requires DOS version 3.1 or later.

**I/O Error on Record, Hit RETURN:** A disk error occurred when reading or writing a record while running a report. The system ignores the record and finishes the report. Follow the **Missing File Recovery** procedure at the end of this section.

**Menu <menuname> Does not Exist:** You have attempted to select a menu that either does not exist or for which you do not have the security level to view.

**Multi-View (20) Exceeded:** You have gone too deep into Multiview, probably along redundant paths. Use **Esc** (EXIT) to move back closer to the first form opened before continuing.

**No More Records:** This is not an error message. There are no more records to view. For sequential view in forward direction, the last record in the file has been displayed. For sequential view backwards, the first record in the file has been displayed. For selective view, no more records match your search criteria.

**No Search Criteria Specified:** You have pressed **ALT-F3** (CONTINUE VIEW), when no search criteria have been specified.

**Number Should be between 0 and <n>:** The number typed to select from the menu is outside the valid range for this menu. Type a valid number.

**Open Error on File <filename>:** A report definition file was expected but not found. Follow the **Missing Files Recovery** procedure at the end of this section.