EXPLANATORY NOTES TO THE FAO PROGRAMME ON SPECIES IDENTIFICATION SHEETS FOR FISHERY PURPOSES

Preamble

Under this programme, which is of worldwide scope, FAO is issuing a number of series of Identification Sheets arranged by regions (major fishing areas) and designed (a) to facilitate the identification of the world's principal commercial aquatic species, (b) to further the standardization of their names, and (c) to provide general information on their basic characteristics and exploitation.

Each regional series of sheets (in one or more volumes) will eventually lead toward a complete inventory of commercially important species found in a given fishing area (or areas). Although new sheets may be added and old sheets replaced (as a result of continuing research), the basic plan of the inventory will be maintained. It will serve as a permanent reference frame which will provide the basis for any classifications required for biological, statistical, or other purposes.

FAO is implementing this programme in close collaboration with the regional fishery bodies established in the various areas of the world and with the generous assistance of zoologists and fishery biologists actively engaged in research on the aquatic species occurring in these areas.

It is hoped that the use of this new work tool will contribute to the improvement of national and regional fishery statistics and will facilitate fishery resources survey work, sampling schemes and fishery activities in general.

Contents and Presentation

The Identification Sheet programme covers the following major groups of aquatic organisms:

seaweeds; echinoderms (sea urchins, sea cucumbers, etc.); crustaceans (shrimps, prawns, lobsters, crabs, etc.); molluscs (snails, bivalves, squids, octopuses, etc.); sharks/rays; bony fishes; aquatic reptiles (turtles, sea snakes); aquatic mammals (whales, dolphins, seals, etc.).

Other groups may be included in the future, e.g. sponges, tunicates, etc.

In areas containing very, large numbers of commercially important species (e.g. the Indo-Pacific), special Family Sheets are prepared. Such sheets contain information on the principal family characters, the appearance of typical representatives (drawings), distinction from similar families, explanations of technical terms, a key to the genera, and a list of species found in the area.

The Species Identification Sheets each describe a single species and give information on its name (scientific and vernacular), its appearance (drawing), its diagnostic field characters, its distinction from similar species in the area (including those for which no identification sheets have been prepared), its range and habits (where known) and data on its fishery and utilization.

The sheets of a regional series are filed in one or more volumes (binders) and for ease of handling the major groups of organisms and the Index are separated by plastic sheets with tabs.

The paramount aim in the arrangement of the sheets has been to ensure that species in a regional series can be found easily without impairing the open-ended character of the system. Species are numbered within each genus (in chronological order of preparation of sheets on a world basis), the genera are arranged alphabetically within families and the families are also arranged alphabetically within their major group. Higher taxonomic categories (Sub-orders, Orders, Classes) are omitted on the Identification Sheets, but are included in the Family Picture Guide where practicable (for example, the higher classification of fishes still lacks general agreement).

Four types of paper are used for the sheets:

(i) Yellow-edged: Introductory material

(ii) Blue-edged: Major Group Information Sheets (or Family Sheets, where present)

(iii) Pink-edged: User's guide

(iv) White-edged: Species Identification Sheets

For each region, major groups are printed, where possible, as soon as they are completed. The loose-leaf system will enable further groups to be added to their relevant regional series.

FAO Species Identification Sheets are issued, depending on the areas, in one or more of the working languages of the Organization. Usually, the first version of sheets for any major fishing area will be a preliminary one, intended to be periodically updated and, if necessary, re-edited after the sheets have been thoroughly tested in the field.

Areas Covered

The intention is to produce one or more volumes of sheets covering a single major fishing area, but in several cases two or more areas might be grouped together. The area breakdown is that of the FAO Classification of Major Fishing Areas for Statistical Purposes (see FAO Fisheries Circular No. 420, Rome, December 1972).

It is obvious that the limits of the major fishing areas adopted for statistical purposes (in many cases they coincide with the areas of existing regional fishery bodies) do not normally follow the natural faunistic boundaries as they are based on a number of other criteria and practical requirements (collection of fishery statistics, geographical divisions of the oceans and seas, areas of application of regional conventions, etc.).

Selection of Species

Each regional series of Identification Sheets is intended to include all species known to be of commercial importance occurring in the area(s). The selection is based on: (a) regional and national fishery statistics; (b) national lists of commercial species; (c) recommendations of fishery bodies and related working groups; and (d) experience of the authors of the sheets and other fishery biologists actively engaged in resources research within the area.

In some instances, particularly in areas which are little known or characterized by a large variety of edible aquatic organisms, the selection of species is difficult and may need to be updated as more information becomes available, or when certain species become more intensively exploited.

Pagination and Sheet Codes,

The Species Identification Sheets are a flexible work tool, capable of periodical updating through additions and revisions. Such an open-ended system cannot be paged like a book; it must be used in the manner of a dictionary. At the same time, however, it is desirable that at least similar fishes within a family are not widely separated. To satisfy these requirements, the following system of pagination and numbering has been adopted:

(i) Introductory sections and index (see Contents): Each independent section is separately paged to avoid complete re-issue when only one section is revised.

(ii) Species Identification Sheets: These bear Sheet Codes (top right, recto) composed of three elements - an abbreviation for the family name, e.g. ENGR for Engraulidae; an abbreviation for the generic name, e.g. Engr for Engraulis; and a serial number for the species within that genus, e.g.. 1 for Engraulis encrasicolus. Below the sheet number are written the year of preparation of the sheet and the corresponding fishing area and number.

(iii) Family Sheets (where present): These bear the abbreviation for the family name (top right, recto) and the fishing area and number.

This system enables sheets to be found, first by referring to the appropriate major group, then alphabetically by family and generic name, and finally by species number. The method is fully explained in the section User's guide (pink sheet).

Names

The correct scientific name for the species is given above the drawing. This is followed by other but invalid scientific names (synonyms) and the authors who have established them. Usually these refer to species once considered different but now known to be identical; a colon between the scientific name and the name of a zoologist shows that the latter was not the first to propose the species name (and may indeed have placed it in another genus).

The widespread use of vernacular or common names for commercial aquatic species, particularly in the fields of fish processing and marketing, demands that special attention be given to them. In view of the confusion in the use of such names in many fishing areas, the need for standardization and consistency must be strongly emphasized. It is a rather complex task and for this reason the vernacular names of the species in the first edition of any regional set of Identification Sheets may be missing, or when listed, subject to revision by national authorities and regional fishery bodies. Where possible, two kinds of vernacular species names are used on FAO Species Identification Sheets:

1 FAO species names: those used in the FAO Yearbook of Fishery Statistics and in the FAO Thesaurus of Species and Stocks. They have been selected on the basis of the following criteria:

(a) each name must apply to one species only;

(b) names must conform to FAO rules of spelling nomenclature;

(c) English, French and Spanish names commonly used within the area are preferred if they conform with (a) and (b).

Many FAO species names are consistent with those used by regional fishery bodies, and it is hoped that they will ultimately become regional standard species names and will generally remain unchanged, although there may be instances where an alteration is unavoidable.

2 National species names: those vernacular species names officially adopted by a country. They always apply to individual species and should not be confused with common names assigned to statistical categories, or with trade names applying to groups of species. Like the regional standard species names, national species names should remain unchanged as far as possible. However, for reasons of space, national names cannot be included in the case of fishing areas comprising a large number of bordering countries.

The choice of national species names is the responsibility of national authorities. However, to ensure consistency, it is recommended that in selecting such names, the following criteria be observed:

(a) each name should apply to one species only;

(b) each species should have only one official national name;

(c) the name should be selected, wherever possible, from among the "local names" most widely used within the country, and preference might be given to the closest or identifical to the FAO name;

(d) if a local name applies to more than one species (often to a genus or a family), a second word, characterizing the species, might be added (e.g. "hunched" snapper, "olive-striped" snapper, etc.);

(e) if a local name for a species is not availalbe, consideration should be given to the use of the FAO species name as the national one.

It is hoped that the progressive use of national species names in all official government documents will substantially contribute to the standardization of vernacular terminology within individual countries. It is recommended that national fishery authorities issue documents correlating scientific, national and local names for each of the species included in the regional set of Identification Sheets relevant to their area.

Illustrations and Maps

These include a drawing of each species and sketches showing characteristic features. The drawings are basically outlines of the species, in many cases omitting a great deal of detail. Where, for instance, the shape and number of scales or the colour pattern is not of prime importance for identification, they have been omitted or are only shown on part of the body. Generally, the illustrations are based on figures already published in pertinent scientific literature.

The purpose of the maps is to give at a glance an idea of the range of the species within the fishing area. In cases where data are incomplete, a certain generalization in the range is unavoidable. Being necessarily on a very small scale, the maps are of course limited in their use as a guide for detailed distribution patterns.

Fisheries Information

The catch data recorded in the area are largely based on fishery statistics supplied to FAO by member countries for inclusion in the FAO Yearbook of Fisheries Statistics. The information on fishing gear and forms of utilization of the species is provided by the authors of the sheets and completed by FAO taking into account the information made available to the Organization through national or regional institutions and field projects.

Indexing

An essential feature of the Species Identification Sheets is the comprehensive Index because the sheets will be used as a source of information (on correct nomenclature, vernacular names, succint biological information, etc.), as well as for identifying specimens. Since page numbers could not be used for the Identification Sheets (in order to maintain the open-ended character of the system), and since a taxonomic arrangement was impractical, the Index has been keyed to families and genera, both of which are found alphabetically within each major group. Those who wish to use a taxonomic arrangement should consult the introductory pages (blue) to each major group.

A system has been used in the Index by which it is possible to:

(i) determine from the code to which major group, family and genus a name applies;

(ii) locate the relevant sheet or sheets from a given scientific or vernacular name.

The system is described on the first page of the Index.

Revision of Sheets

From time to time, additional or revised sheets will be prepared. These should be filed in the binders by using the alphabetical system under families and genera, and the numerical system for species.

Replacement sheets will be marked with the indication Rev.1, Rev.2, etc., immediately below the Sheet Code (top right, recto), with their date of issue.

Users should amend the Index by hand upon receipt of additional or revised material. If a number of such sheets are issued at one time, a printed addendum to the Index will also be produced; a fully revised index will be prepared when appropriate.

INTRODUCTION TO THIS EDITION

This six volume set of Identification Sheets includes most of the marine and brackish-water species of interest to fisheries occurring in the Western Indian Ocean, e.g. individual species sheets for 894 bony fishes, 81 sharks, 21 lobsters, 46 shrimps, and 6 sea turtles, and a group Identification Sheet for 3 chimaeras. While format and presentation of the present set of Sheets are basically the same as in previous issues, some minor changes and improvements in style and illustrations have been introduced. In particular, plastic tearproof and waterproof sheets have been used that will enable these sheets to stand up to use under difficult field conditions.

This project received its initial impetus from a Regional Workshop organized at the Central Marine Fishery Research Institute (CMFRI), Cochin, South India, January/February 1980 supported by the Danish International Development Agency (DANIDA). On that occasion, 33 ichthyologists had the opportunity of compiling and testing the Identification Sheets for their respective families against fresh material and a large number of preserved specimens collected throughout the Western Indian Ocean by various institutions along the East African coast, Red Sea and India and assembled in Cochin by the CMFRI. The results of this Workshop are published in the report on the "FAO/DANIDA Expert Consultation on Field Identification of Commercial Aquatic Organisms in the Western Indian Ocean".

The main features and the scope of the programme of FAO Species Identification Sheets for Fishery Purposes are outlined in the Explanatory Notes preceding this Introduction, but attention should be drawn to the following points:

Geographical area covered

This publication covers the major statistical Fishing Area 51, which was not defined on a Geographical basis. As a result, a proportion of temperate-water species is included. The designation the "Gulf" used in the sheets refers to the body of water situated between the Arabian Peninsula and Iran.

Selection of Families and Species

The criteria on which the selection was based were the following:

(i) Species Identification Sheets: for all those foodfishes occurring in the sea or in brackish water, regularly seen in markets in any part of the area, exported or locally consumed.

(ii) Family Identification Sheets: (a) for all families represented by Species Identification Sheets (except when a family has a single species in the area); (b) for families having one or more marine or brackish-water representatives occasionally seen in markets or locally consumed, but of minor importance; (c) for families not normally exploited at present but believed to be of potential interest as foodfishes (including deep-water forms).

This rather broad coverage appears justified in the light of the greater variety of species now entering the catches as a result of the extension of fishing operations to deeper waters and the diversification of fisheries activities in general.

In fact, many of the less widely known species from the area that were formerly inaccessible to fishing gear or discarded as "unattractive", are now being exploited and hence require adequate means for proper field identification as a starting point for the collection of relevant data and information.

Names and Codes

Scientific names: the scientific names used here have been based, as far as possible, on the most recent taxonomic revisional work. As a result, some scientific names still widely used in fisheries within the area have had to be corrected, but alternative names (junior synonyms) can easily be retrieved from the Index.

Vernacular names: standard international names in English, French and Spanish, based on the criteria outlined in the Explanatory Notes (page 3), are given for every species. These so-called "FAO Species Names" have been selected by FAO mainly for use within the Organization, and they hence do not fall under the authors' responsibility. For species also occurring outside the Western Indian Ocean, the names used in previous sets of Identification Sheets are usually retained. In the cases where a name. or a code had to be changed due to compelling reasons, the denomination used previously has been given in brackets. Whenever possible, English vernacular names given in major compilations (e.g., by the American Fisheries Society) have been adopted. The French names were selected jointly with Dr. J.C. Ouéro, Institut Scientifique et Technique des Pêches Maritimes, Ministère de la Marine Marchande, La Rochelle, France.The names selected correspond to official French species nomenclature currently being established by the Direction des Pêches Maritimes. The selection of Spanish names presented considerable difficulties due to the lack of denominations for many species. Wherever possible, the "official" Spanish names adopted by F. Lozano in his book "Nomenclature ictiologica", Madrid 1963, were used.

National species names (by countries) have been omitted on the Sheets; they would occupy too much space and there are only very few countries where official national names exist. Users are invited to add, where possible, such names in the space for this purpose.

Figures and Sketches

As on previous occasions, the number of illustrations included here is unusually high, since they represent an essential complement to the text. Most figures and sketches have been redrawn or adapted from available literature, often following the recommendations of authors. Unfortunately, it is not possible here to quote the large number of sources used for this purpose. In cases where original figures were used, this is indicated at the end of the pertinent Family Sheet. Colour illustrations are given for 283 species on 39 plates. These are reproduced from 211 colour slides kindly provided by Dr J.E. Randall and 76 drawings prepared by various artists.

Distribution Maps

The distribution maps are meant to give only a rough idea of the geographical range of the species within the region. In many cases, meaningful information on occurrence of species in certain regions is very scanty due to unreliable identifications in the past, and such gaps are usually indicated by interrogation signs.

Information on Fisheries

This information has been generally compiled at FAO, but in all cases, the contributing author had an opportunity of checking and proof-reading the clean-typed versions of his Identification Sheets. Statistical data have been extracted from the FAO Yearbook of Fishery Statistics.

Index

The comprehensive Index of scientific and vernacular (FAO) names has been produced in the form of a leaflet separate from the cover-binders. This arrangement is intended to facilitate the use of the Index with every one of the volumes.

Future Improvements

The Identification Sheets covering the Western Indian Ocean are issued as working documents that should be tested in the field before revised versions can be prepared. Draft sheets for this area have already been tested by one of the editors on several occasions during cruises of the Norwegian research vessel DR F. NANSEN through the UNDP/FAO Global Project on Survey and Identification of World Marine Fish Resources. However, some of the Families are still in urgent need of revision, so that corrections or additions will doubtless become necessary as new information accumulates. Users are strongly urged to let FAO and the respective authors of this work benefit from their experience with the Sheets by sending suggestions and comments to the Editors. The Indian Ocean Fisheries Commission is encouraged to examine the proposed FAO species names for eventual adoption as standard regional family- and species names. National fisheries administrations are urged to establish one national name for each of the species included in this set.

Acknowledgements

The editors wish to express their deep gratitude to all those taxonomists and fishery workers who have contributed original draft accounts to the series and/or have collaborated in the revision and completion of this set of sheets. In many cases this has meant a personal sacrifice of time, more so because several other major compilations have been running concurrently.

This work could not have been undertaken without the generous support of the Danish International Development Agency (DANIDA), which financed the Workshop in Cochin and part of the printing costs of the Identification Sheets, through the FAO/Government Cooperative Programme as part of PROJECT GCP/RAS/074/DEN: Aid to Species Identification Sheets of Commercial and Aquatic Organisms in the Western Indian Ocean.

Especial gratitude goes to the Director Or E. Silas and staff of the Central Marine Fisheries Research Institute (CMFRI) in Cochin for kindly hosting the Workshop and generously making available their assistance and facilities for this meeting. Also much appreciated was the advice and experience of local fisheries workers in Cochin. Further valuable contributions were made to the Workshop by those organizations which provided specimens and literature, e.g., the CMFRI, the UNDP/FAO Project for the Development of Fisheries in Areas of the Red Sea and Gulf of Aden; the Musée National d'Histoire Naturelle de Paris; the Diregao Nacional de Pescas, Maputo, Mozambique; the National Museum of Kenya, Nairobi, Kenya; and the UNDP/FAO/SF Project in Mombasa, Kenya.

Thanks are also due to: Prof. M.M. Smith, former Director of the J.L.B. Smith Institute of Ichthyology, Grahamstown, South Africa for kindly making available to the Workshop a comprehensive list of fishes from southern Africa, as well for invaluable advice and help throughout the project; to Or J.E. Randall, B.P. Bishop Museum, Honolulu, Hawaii, both for his precious collaboration in authoring and revising the draft sheets for many of the fish families and for making available his excellent slides for the colour plates; to Dr P.C. Heemstra of the J.L.B. Smith Institute for his effective help in completing the accounts for a number of families that had not been assigned to authors during the Workshop; and to Or P.J.P. Whitehead, of the Bishop Museum (Natural History) for his valuable assistance in final editing of the Picture Guide to bony fish families and his generous support throughout the entire project.

Finally, the Editors wish to express their personal thanks to all those in FAO, who have assisted them in one way or another. Special recognition is due to Mrs M. Kautenberger-Longo and Mrs G. Sciarappa-Demuro for their invaluable assistance throughout the project, mainly in typing/composing on the word processor the highly technical texts, and to Mr P. Lastrico, Mr O. Lidonnici, Ms M. D'Antoni and Mr P.-L. Isola who skillfully prepared most of the illustrations.

USER'S GUIDE

While the sequence of families in the picture guide of any major group is governed primarily by similarity in appearance (to facilitate identification), the arrangement of Identification Sheets (in the cover binders) by families within major groups and by genera within families is alphabetic - to ensure easy retrieval.

Information from the sheets can be retrieved in several ways, depending on the user's requirements. Essentially, two approaches can be followed:

1. **Field identification**

   (a) Check your specimen against the Aid to Identification of Families (picture guides, illustrated keys, etc.). In the case of bony fishes, special attention should be paid to the shape and position of fins. Fins should be pulled forward to show their shape when erect. General appearance and arrows indicating conspicuous features will help you decide which family (or families) the specimen most resembles.

   (b) Find the Identification Sheets belonging to the family from its alphabetical sequence by using the capital letters of the Sheet Code (top right margin).

   (c) Determine the species by working through keys on the family sheet (when present) and by looking at <u>all</u> the Species Sheets belonging to the family. In some cases, the figure alone may be sufficient, but it is recommended that the sections "Distinctive Characters" and "Distinguishing Characters of Similar Species Occurring in the Area" be always read to ensure correct identification. This may also lead to identification of species for which a sheet is not included.

2. **Searching the index**

   (a) Scientific (valid or invalid) or vernacular names are included in a single index and can be found alphabetically. In the case of scientific names, both the genus and the species names are cross-indexed, e.g. <u>Engraulis encrasicolus</u> and <u>encrasicolus</u>, <u>Engraulis</u>. This will help on occasions when a species name is coupled in the literature with an unusual generic name.

   (b) The name in the Index is followed by symbols referring to the Sheet Code. Names for families are followed by the family abbreviation (capital letters) only, while species names are followed by the family abbreviation, the generic abbreviation and species number.

   (c) In the case of species names, first, locate the family from the family abbreviation; second, locate the genus from its abbreviation; third, locate the species from its number (see Note overleaf).

Example:

Engraulis encrasicolus

ENGR	Engr	1
Family	Genus	Species
(ENGRAULIDAE)	(Engraulis)	(encrasicolus)

(d) Remember that both the Index and the Identification Sheets indicate whether a scientific name is valid or obsolete, although it will always lead to the correct Identification Sheet.

NOTE: The coding system is worldwide. Gaps in sequence of species code numbers indicate that the missing number has already been allocated to a species occurring in another fishing area (i.e. SERRAN Epin 1, 2 and 3 used for Mediterranean species).

click for next page