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FISHES OF THE MALDIVES

MARINE RESEARCH SECTION
MINISTRY OF FISHERIES AND AGRICULTURE
MALE', REPUBLIC OF MALDIVES

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With assistance from

BOBP For Fisheries Management
BAY OF BENGAL PROGRAMME

FISHES OF THE MALDIVES

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FOREWORD

The Bay of Bengal Programme of the Food and Agriculture Organization of the United Nations are proud to be associated with this important document, which is a catalogue of fishes in the Maldives. The Message from the President of the Maldives reflects the importance he and the government accord to the subject.

The BOBP is committed to support the efforts of its member-governments to promote fisheries management. In the Maldives, we are assisting development of a model for participatory community-based integrated reef resources management.

Essential to such a process is knowledge of the rich fish resources of the Maldives. This comprehensive well-illustrated catalogue will be of great help to fishery scientists and officials, to fish exporters, students and to fishermen themselves, besides serving as an invaluable reference book for researchers around the world.

We compliment the Marine Research Section of the Ministry of Fisheries and Agriculture of the Republic of Maldives, and the scientists and researchers and artists who made this magnificent publication possible. We are sure it will promote the cause of fisheries management and economic development in the Maldives, besides being a useful contribution to knowledge.

Dr. Kee-Chai CHONG
Programme Coordinator
Bay of Bengal Programme / FAD

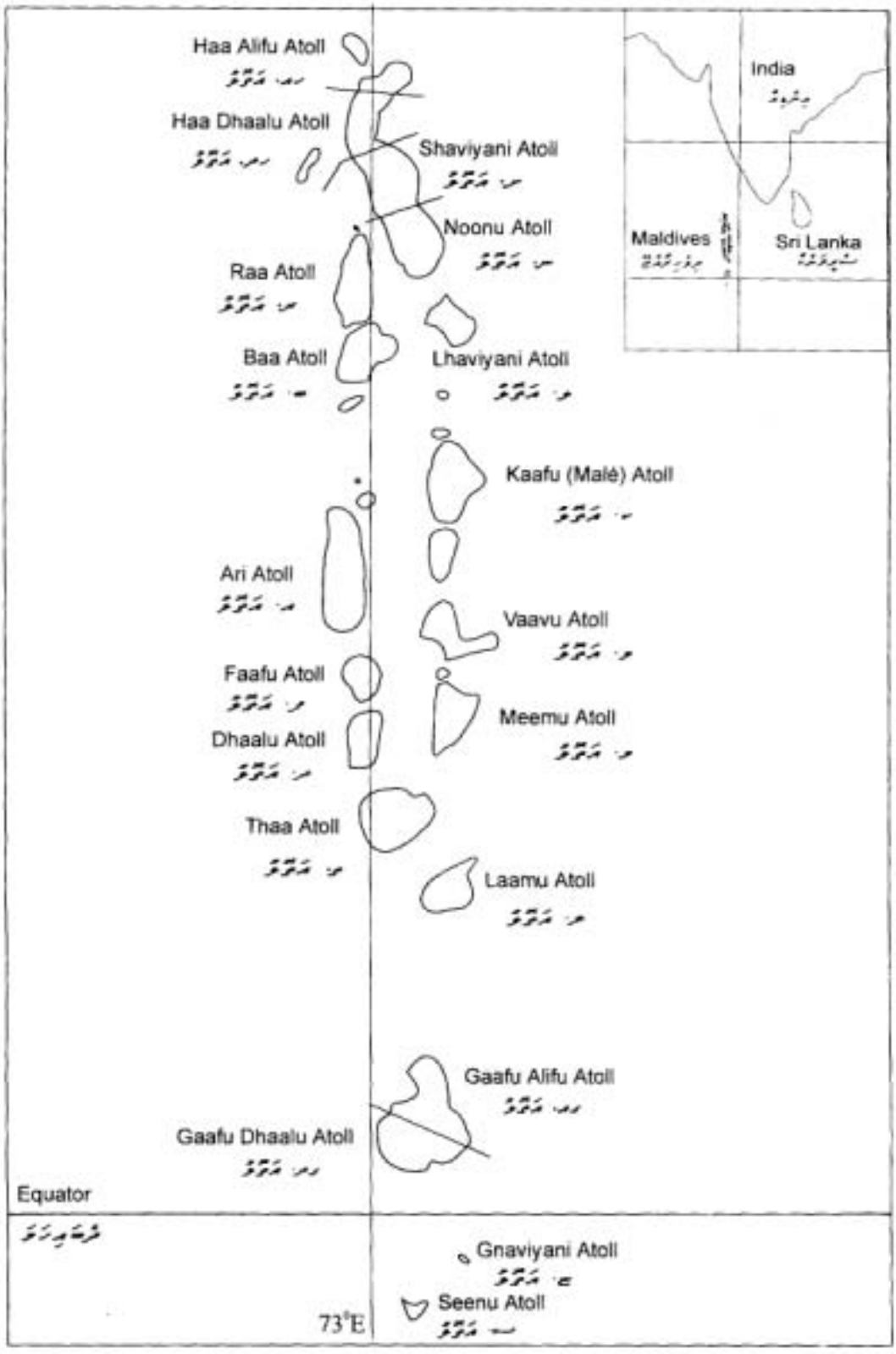
ACKNOWLEDGEMENTS

The production of this volume was a major team effort by the staff of the Marine Research Section. This work is largely based on the previous four Catalogues of Fishes of the Maldives; the efforts of all contributors to those earlier volumes are gratefully acknowledged. That this volume has been produced at all is in large part the result of the work of Ibrahim Naeem, who sorted and arranged all specimens in the MRS collection, checked identifications, revised existing sheets prepared new ones for new additions, and overseen the whole production of this work. Ahmed Hafiz wrote most of the Dhivehi sections. Dr. R. Charles Anderson prepared much of the English text, and also provided the colour slides for the plates. Most line drawings for new additions were prepared and many old line drawings were redrawn by Ibrahim Faizan. Ibrahim Nadheeh was responsible for layout and provided much editorial assistance; he and Fathimath Zeena carried out most of the word-processing. Other MRS staff members who have made contributions to this volume include Ajula Rasheed, Hussein Zahir and Hamid Shafeeu. Mr. Ahmed Shakir kindly assisted with the layout.

This book contains the most extensive and comprehensive Dhivehi text yet produced on the fishes of the Maldives. It is therefore most appropriate that His Excellency President Maumoon Abdul Gayyoom, who has long had a profound interest in and concern for the fish and fisheries of our country, has provided a Dhivehi message. We are most grateful to him.

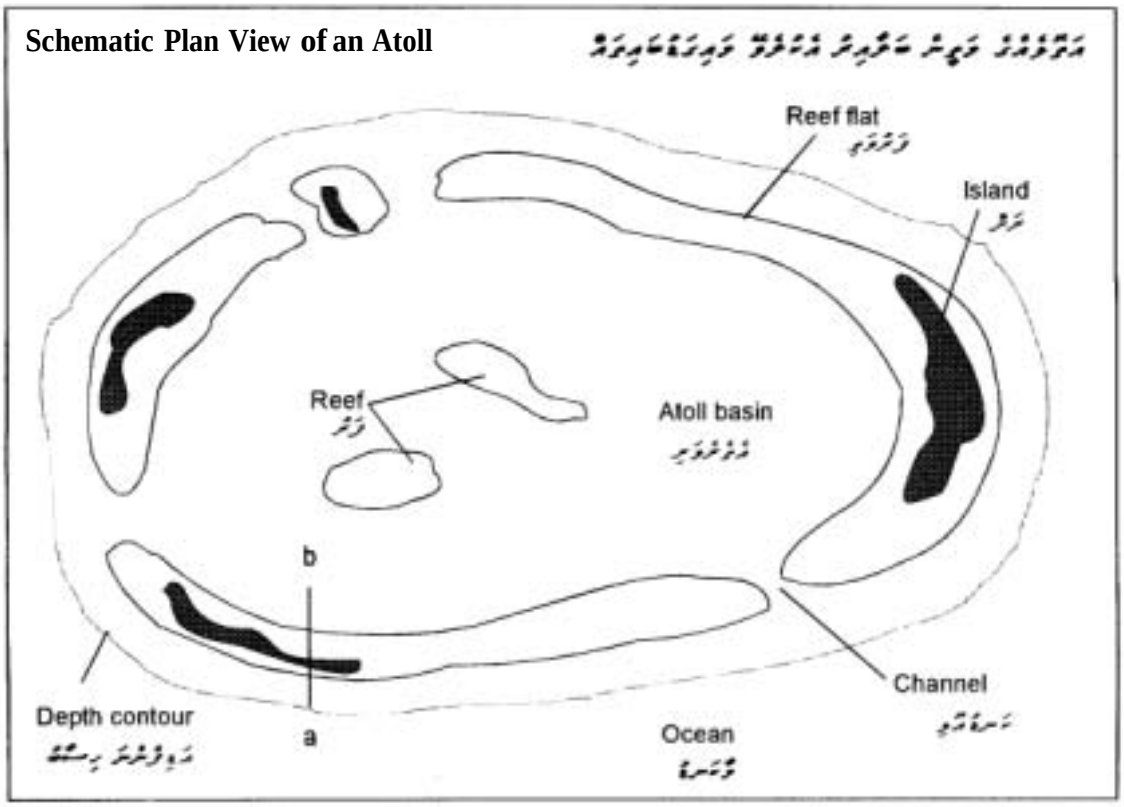
The Minister of Fisheries and Agriculture, the Hon. Hassan Sobir, provided much encouragement throughout. Funds for printing were generously provided by the Bay of Bengal Programme, a regional fisheries development programme based in Madras.

Map of Maldives

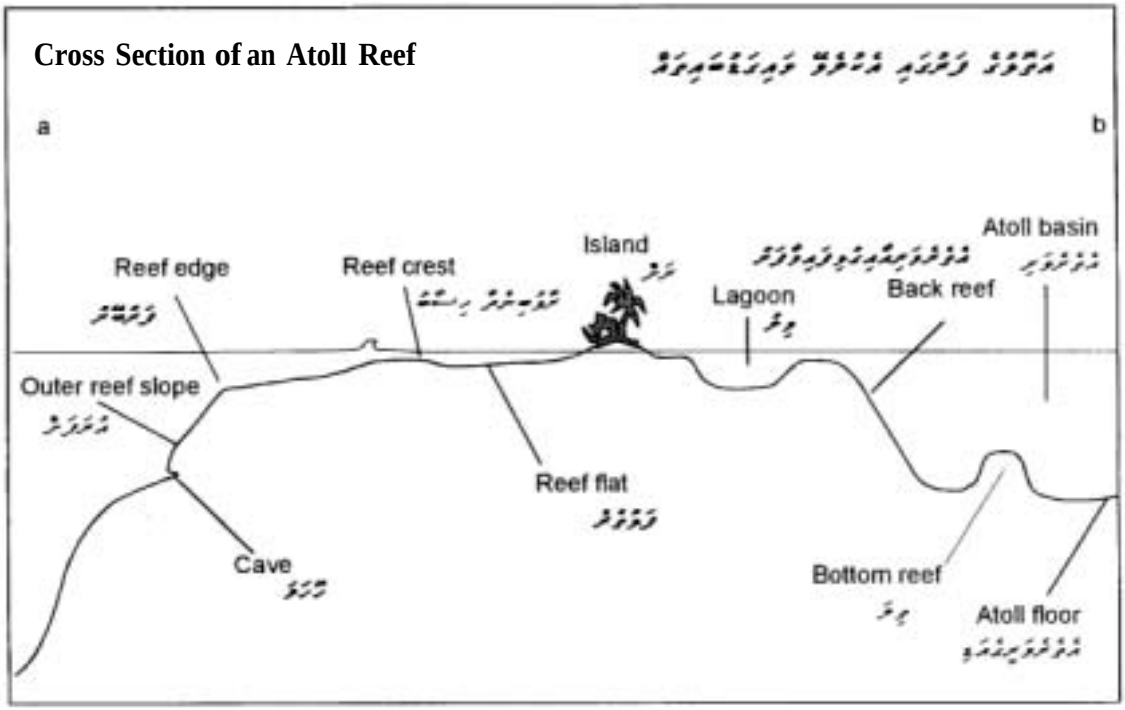


Atoll Plan and Profile

Schematic Plan View of an Atoll



Cross Section of an Atoll Reef



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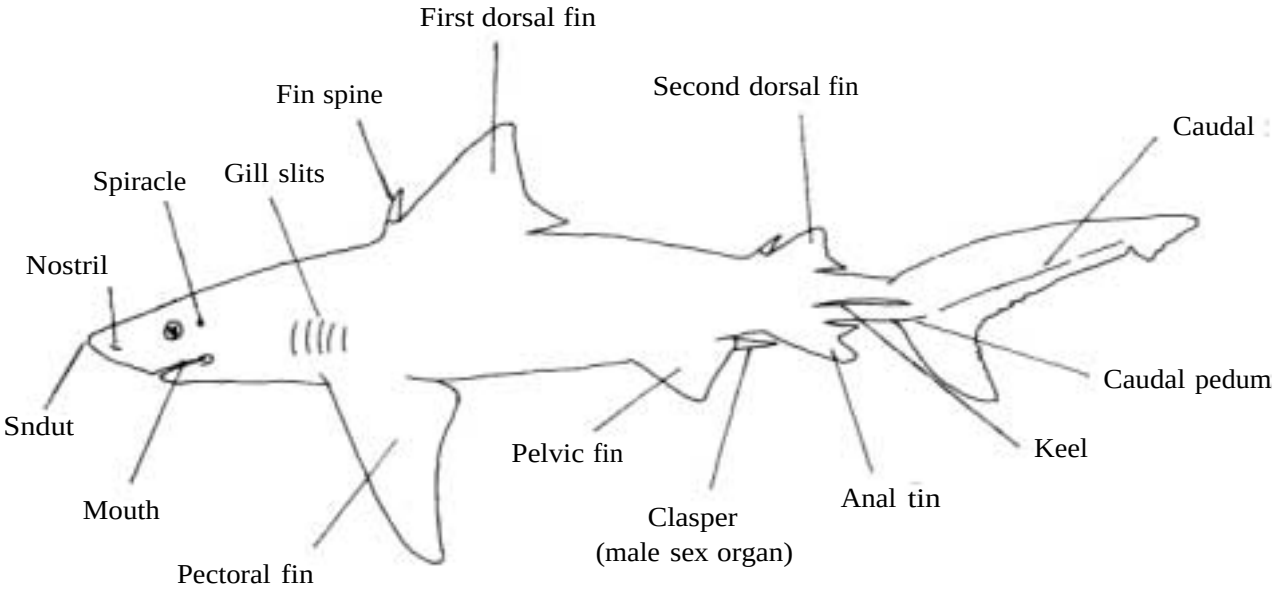
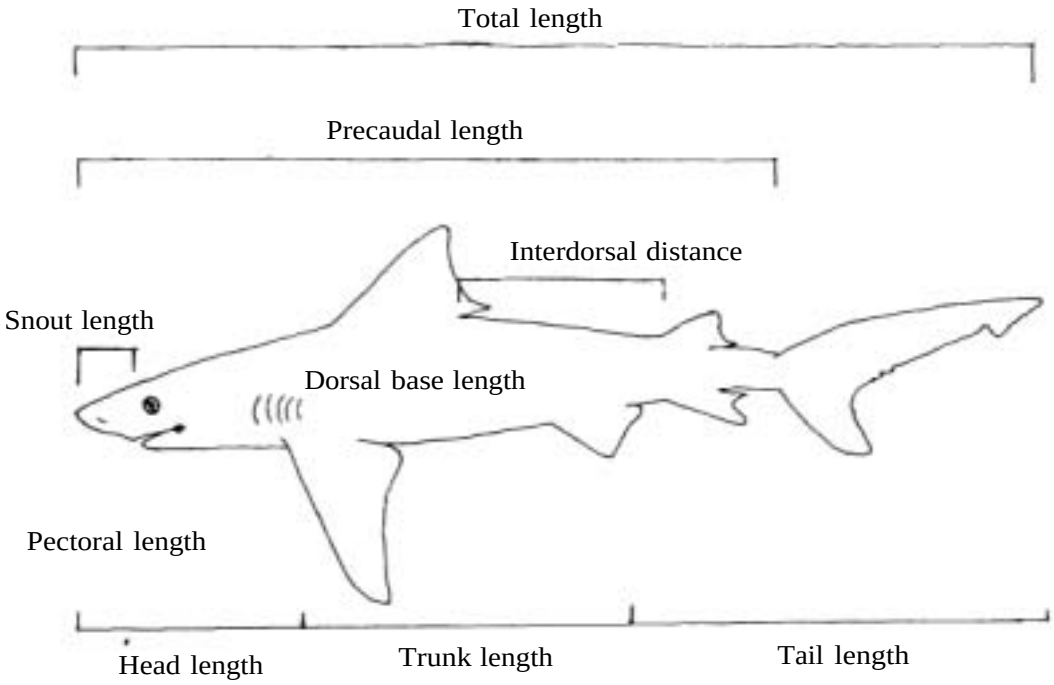
External Features of Fishes

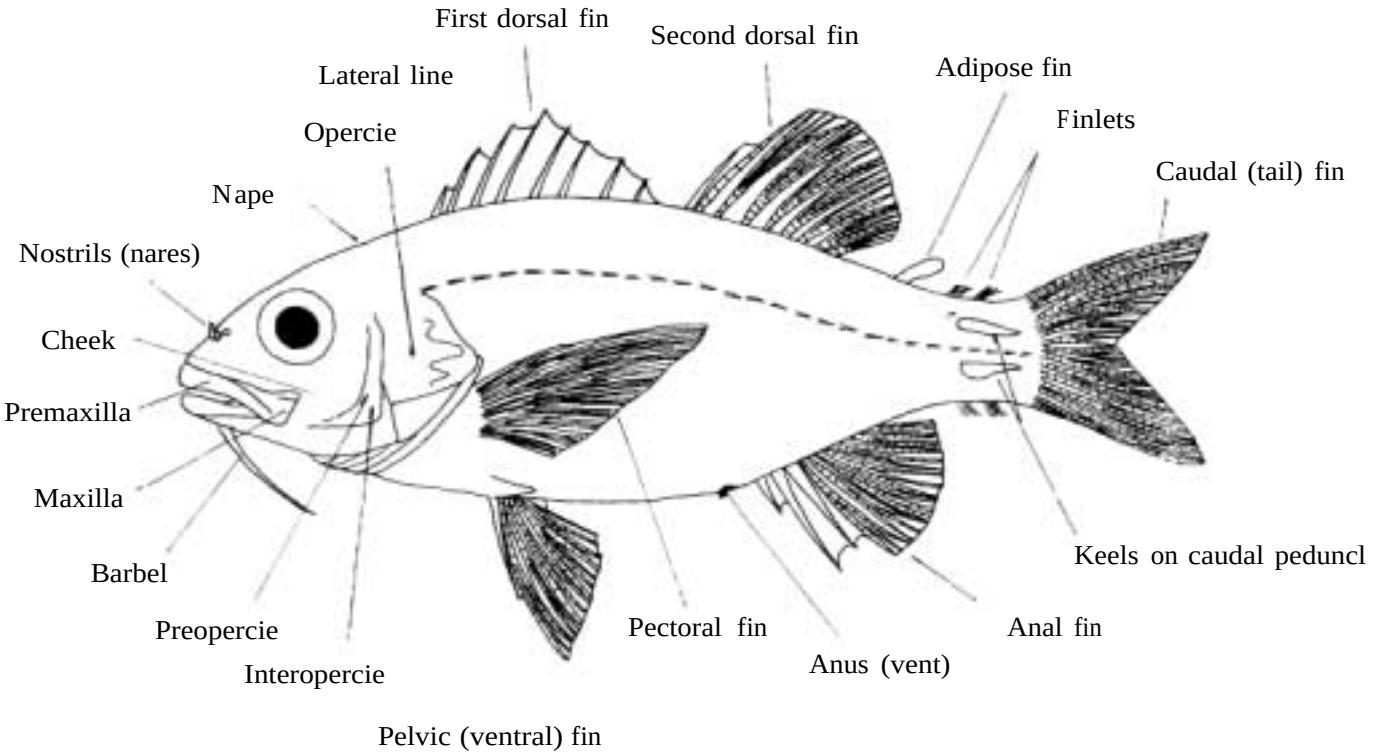
Cartilaginous Fish - Shark (External Features)



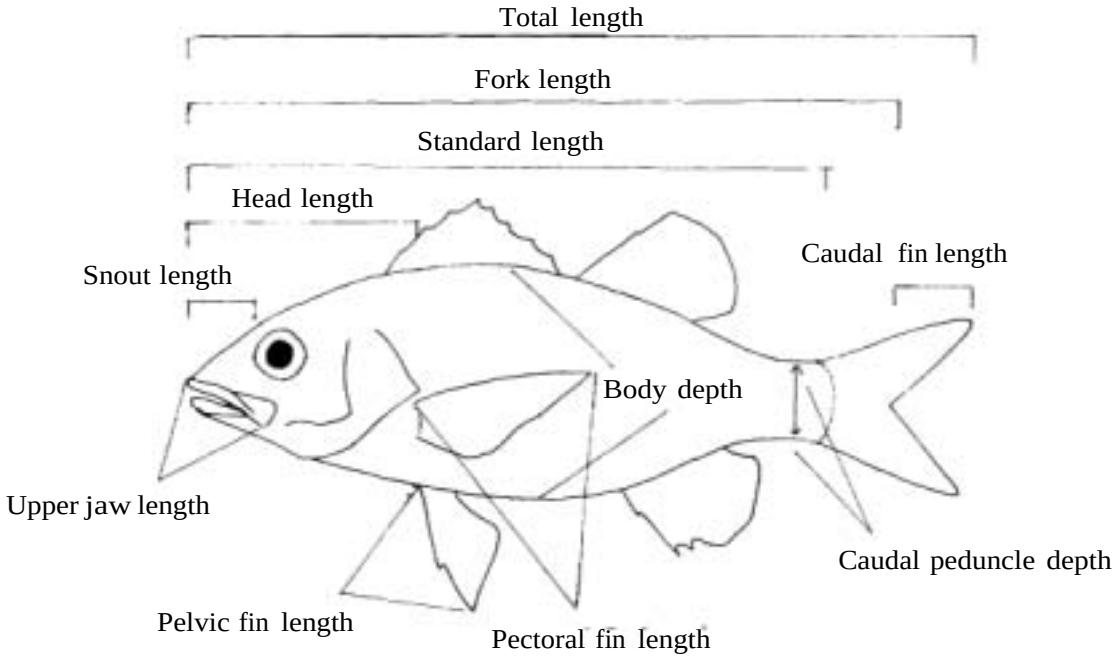
Cartilaginous Fish - Shark (Measurements)



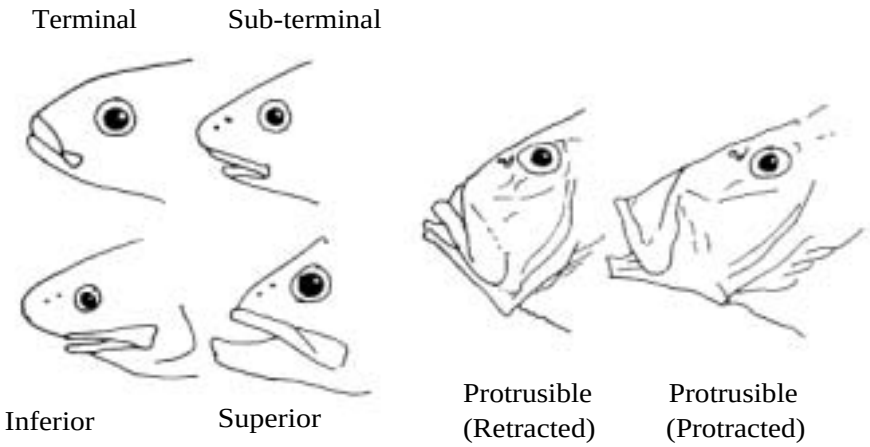
Bony Fish (External Features)



Bony Fish (Measurements)

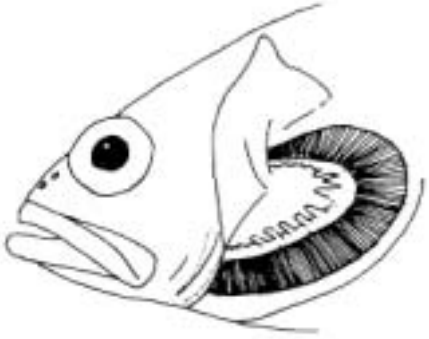


Fish Mouth Types

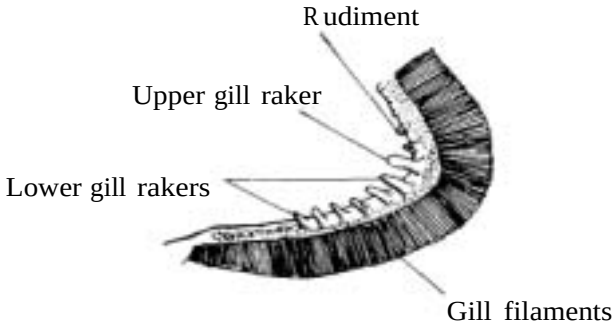


Fish Caudal Fin Types

Fish Gills



Position of first gill arch on the left side



First **gill arch**

INTRODUCTION

This volume is a compilation and expansion of four earlier Catalogues of the Fishes of the Maldives. Work On the first Catalogue started in 1986. At that time the first small volume of fishes was produced by the Marine Research Section of the then Ministry of Fisheries. Subsequently a further 3 volumes were produced, each being released on Fishermen's Day. This day, December 10th, celebrates the vital and long-standing role of fishermen in the life of the Maldives. It is therefore appropriate that this combined, enlarged and revised edition should also he released on Fishermen's Day. 1997.

The previous four issues of the Catalogue each covered about 70 species, with 285 species being covered in all. This volume details a total of 370 species. Different species of one family were sometimes included in more than one edition of the earlier Catalogues. All fishes of the same family are now listed together. In addition, the order of presentation has been changed to follow the latest scientific findings (Nelson, 1994). As a result the snappers and fusiliers, which had been treated as separate families in earlier editions, are here treated as a single family (Lutjanidae) with the fusiliers being relegated to subfamily status (Caesioninae). Another family for which it is useful to know the subfamilies is the enormous grouper family (Serranidae). which includes the fairy hasslets (Anthiinae). the groupers themselves (Epinephelinae, tribe Epinephelini), and the soapfislies (tribes Diploprionini and Grammistini). Within families, species are listed alphabetically. irrespective of subfamilies.

A major aim of this volume is to present information in Dhivehi to a local audience that does not have access to more specialized literature. In particular it should he of interest to students of fisheries science and related subjects. It also aims to aid all users in the identification of commercial fish species. To this end some emphasis has been placed on major commercial groups such as the groupers. jacks, snappers and sharks. However, records are only included here when a specimen (or photograph of a large specimen, denoted by a prefix P' to the specimen number) is held at MRS. Since the MRS collection is still far from complete, there are some omissions even within these groups.

The known fish fauna of the Maldives now stands at some 1100 species. This is double the number of species that was known from the Maldives prior to the formation of the Marine Research Section in 1984. This leap in knowledge reflects the great amount of work carried out by the Section, some of it in collaboration with the World's foremost authority on tropical reef fishes. Dr. John E. Randall of the Bishop Museum, Hawaii. There are undoubtedly many more species to he found in Maldivian waters, and the grand total is likely to exceed 1500 species.

Despite this rich fish fauna. Maldives has very few endemic species (i.e. ones that are found here and nowhere else). Even the so—called Maldive Anemonefish. *Amphiprion nigripes* is found in the Lakshadweep and Sri Lanka as well as Maldives. One species listed here that is so far known only from the Maldives is the tiny Maldive Blenny. *Ecsenius minutus.*

It may seem strange that so few endemic fishes arc found in Maldives. when sonic species appear to move no more than a few metres or even centimetres throughout their adult lives. The answer to this riddle is to he found in the larval stage. All reef fishes have what has been called a two-part life history: adult and larva. While adult reef fishes may he bound to their coral homes, the larvae are planktonic and free to drift with the currents.

The larvae of most species drift in the open ocean for at least one week, and in some cases for several months. During this time they can be carried for hundreds, if not thousands, of miles by the ocean currents. As a result, the majority of Maldivian reef fishes (probably about 80%) have very wide distributions that encompass the entire Indo-west Pacific or Indo-Pacific realm.

The Indian and Pacific Oceans are connected in tropical latitudes through the Indonesian archipelago and around the north of Australia. Therefore, the larvae of reef fishes from the two oceans can mix. In contrast, the tropical Atlantic Ocean is isolated from the warm waters of both the Indian and Pacific by wide expanses of cold water. Thus the tropical fish fauna of the Indian and Pacific Oceans are very similar, while that of the Atlantic is very distinct.

Interestingly, the latest research on both larval behaviour and lndo-Pacific reef fish taxonomy is showing that things may be more complicated than this. During the last Ice Age, when sea levels were approximately 120-1 30mi (400 ft) lower than they are today, the tropical Indian and Pacific Oceans were nearly separated. As a result, fish populations in the two Oceans started to diverge. Today most ichthyologists agree that many Indo-Pacific fish species show differences between their Indian and Pacific Ocean populations. In most cases these have been considered to be 'population' differences within a single species. Now more detailed studies are being carried out (including studies of genetics and of the areas of population mixing in the eastern Indian Ocean). It is becoming clear that some fish that had been considered to be widespread throughout the Indo-Pacific are actually two distinct species.

In addition, recent studies on fish larvae have shown that they are not as helpless in the face of ocean currents as was earlier believed. Indeed, they can swim against the current towards areef for many hours and many tens of kilometeres. As such, there is a basis for considering that apparently small differences between regional populations of widespread species do have taxonornic significance. It is therefore likely that further studies may reveal that the Maldives does have an even more unique fish fauna than the cui-rent low number of endemics would suggest.

Maldivian fishermen favour tunas and continue to exploit these offshore fishes, as they have done for centuries. Until relatively recently the only reef fishes caught in any quantity were the small live haitfish which are needed to catch the tunas by pole and line. During the last decade this situation has changed dramatically. Local demand for reef fish has grown. in line with the growth of resorts and of Male'. At the same time, export markets have boomed.

Reef shark stocks are now being fished down, as a result of the high price paid for shark fins. However, reef sharks also have real economic value as attractions for tourist divers. It has been estimated that in 1992 divers spent US$2,300,000 just on visits to specific shark watching dive sites. As tourist arrivals increase, the potential earnings from reef sharks should increase too. hut only as long as there are still sharks to be seen.

An export fishery for live grouper started in 1993. This fishery too is already showing signs of overfishing, and it is possible that it could collapse within a few years. Such a collapse would result in enormous economic losses to the country. The main markets for both shark fins and groupers are in the Chinese emporia of East Asia: in Singapore, Taiwan, Hong Kong and China itself. The economies of all of these countries and districts are booming. As a direct result, demand for luxury goods and foods is also increasing enormously.

The Maldives has gained a reputation among divers and snorkellers as an oasis for large fishes. In many other tropical countries sharks, groupers and other reef fishes have already been overfished. This has given Maldivian tourism a competitive edge in the diving market. It would be ironic indeed if the Maldivian reef sharks and groupers were fished to near extinction just as the Maldivian tourist industry is reaching maturity.

We live at a pivotal time, when more is being discovered about the natural world than ever before, but at the same time more is being lost than ever before. Without knowing what is here, it is almost impossible to initiate meaningful management and conservation activities. This applies particularly to marine organisms such as fish, which for too many people are "out of sight, out of mind." It is hoped that this volume will in a very small way contribute both towards the understanding of a key component of the Maldivian marine environment, and its conservation.