Proceedings of the Summer Institute in Recent Advances on the Study of Marine Fish Eggs and Larvae

14 JUNE to 3 JULY, 1989

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

Dr. SALIM ALI ROAD

COCHIN - 682 031.

CMFRI/SI/1989/Pr.I

STUDY OF THE ICHTHYOFAUNA OF THE LOCALITY OF WORK

By

A.A. Jayaprakash
Scientist (Selection Grade)

and

M. Badrudeen
Technical Officer

(Central Marine Fisheries Research Institute, Cochin)

(A) Aim: To study the fish fauna at two centres, Mandapam and Pamban by making collections there; to study the characteristic features of various groups; and to identify the important species with the aid of literature (both in the field and in the laboratory)

(B) Materials: Field note book, bucket with lid, ice box, polythene covers, scissors, scalpels, mounted needles, dividers, pins, measuring boards, scales, H.B.pencil, Indian ink, tags, labels, cotton, lab towels, hypodermic syringe, hand lens, microscope and chemicals such as methylated spirit, concentrated formalin (40%), Hexamine, Borax and Ammonia.

(C) Methods:

(I) COLLECTION

1. Visit the landing centre at the time of fish landings.
2. Collect the different types of fishes from various gears and note the total length, fork length and standard length.
3. Care should be taken to collect fresh specimens and to avoid mutilated and damaged specimens, unless otherwise interested.

4. Wash the fish thoroughly in sea water without damaging the fish.

5. Colour patterns are species-specific. Note this in the fresh condition itself as it may fade out after preservation.

6. Record details such as date, time, locality, depth, gear, nature of the fishing ground and additional information on the ecology if any, in the field note book. Keep the fish in polythene bags with proper labels or tags.

7. If the labortory is far away, preserve the specimens collected in formalin in the field itself or keep them in ice box.

8. Bring the fish to the laboratory for detailed examination and preservation. Each specimen may be fixed. Fins, spines, rays etc., may be stretched and fixed by pins with least damage, on a soft wooden board. Do not allow the fish to dry. Add a few drops of formalin on the stretched out fins and rays.

9. Small fishes: If alive, drop them into a mixture of equal parts of methylated spirit and water for five minutes and transfer them to dilute formalin (1 part of concentrated formalin to 6 parts of water).

10. Medium fishes: When dead, in a state of as fresh as possible, place the better side down on a smooth board. By means of pins set all fins, spines and rays. Try to prevent the head from turning up. Make a small incision on the belly on the right side and preserve it in dilute formalin.

11. Large fishes: Apart from making incision on the belly, large fishes may be injected with formalin using a hypodermic syringe. Also some incisions may be made dorsally on both sides of the backbone.

12. If the specimens are to be left for several weeks in formalin, household Borax (1 teaspoon per each ½ gallon of fixative) may be added to neutralise the acidic effect. Other methods are: a) To 1 pint (1 pint = 0.568 litre) of concentrated formalin add 2 oz (1 oz = 28 gm @) ordinary Hexamine and 6 pint water; b) To 1 pint concentrated formalin add 5 pints of water and 3 oz. Ammonia solution.

13. A good quality label is essential. Labels are best written with waterproof carbon ink or with a soft pencil.

(II) IDENTIFICATION

1. General features: Bony fishes are the largest class of living fishes coming under the Sub-Class Neopterigii which is divided into many orders. The characteristic features of the Sub-Class are that they have a firm skeleton of true bones, gillslits are covered with an operculum on both sides, caudal fin is more or less symmetrical and the fishes have vertical or unpaired fins and paired fins.

2. Body shape: Fusiform, oblong, elongated and cylinderical, usually laterally compressed, ventral side more convex than dorsal side; sometimes dorsoventrally flattened with eyes on one side, as in flatfishes.

3. Vertical or unpaired fins: The dorsal fin may consist of a single fin only or composed of a spiny dorsal and a soft dorsal. The spiny dorsal and soft dorsal may be continuous or separately placed. The numbers of spines and soft dorsal rays vary in different fishes. An adipose fin behind the dorsal fin is noticed in some fishes.

Apart from these, some swift and elongate fishes may have small detached finlets behind the dorsal. Note down these characters if any in the specimens collected. In scientific literature, the dorsal fin is abbreviated as D. Number of spines are to be indicated in Roman and soft rays in Arabic numerals, eg., D X 12 means the fish has two dorsals with ten spines in the first dorsal and 12 soft rays in the second dorsal. Follow the abbreviated methodology to identify the fishes.

4. Anal fin: Starts behind the vent. It has many rays and 1 to 3 spines. More than three spines are rarely found. Written as A III 10 means three spines and ten soft rays in the anal fin.

5. Caudal fin or tail fin: It may be pointed, rounded, truncate, emarginate, forked, lunate or wedge shaped.

6. Pectoral fin: The abbreviated form is P. P 16 means that the pectoral fin has 16 soft rays.

7. Ventral fin or Pelvic fin: Usually abbreviated as V. Note the position of the ventral fin in the fishes collected. If the ventral fin is located below the pectoral, they are said to be thoracic; further forward, jugular; and far back abdominal. Generally ventral fin may have one spine and 2 to 5 soft rays.

8. Mouth parts: Most of the fishes have some type of lips. The lower jaw is composed of mandibles and upper jaw is made up of premaxilla and maxilla. In some cases the maxillary bone may be elongated. The mouth may be at the tip of the snout, or sometimes the snout may overhang the mouth. Mouth may be oblique, with the lower jaw being the longer one; and sometimes it is protractile. Jaws are sometimes produced as beaks. Note down the number and disposition of pores on the chin as well as the number and disposition of barbels

if any. Examine the jaws for teeth pattern. Teeth may be villiform, conical, molariform, or in the form of canines or incisors. Sometimes teeth may be absent altogether. Vomerine and palatine teeth may be present in some fishes.

9. Branchial apparatus: The gill cover or the operculum is made up of four main bones - the opercle, preopercle, subopercle and interopercle. Observe for the presence or absence of scales as well as spines on them.

10. Gillrakers: These are important characters in fishes, seen as finger like or hair like cartilaginous projections of the gill arch, both on the upper and the lower limbs. In systematics these are denoted as GR (5-6) + (12-13), meaning 5-6 gill rakers on the upper limb and 12-13 gill rakers on the lower limb. Count is made on the 1st gill arch.

11. Scales: Note the scales in fishes. Some fishes possess the cycloid with smooth hind margin; and some the ctenoid, with comb like hind margin. See whether the scales are deciduous (easily shed) or adherent type. Count the number of scales in the lateral line (starting from the shoulder to caudal peduncle). Note and count the lateral transverse scales above and below the lateral line. It may be abbreviated as LI. 42, tr 3/9 meaning 42 scales in the lateral line and there are 3 rows above and 9 rows below the lateral line.

12. Lateral line: The position, curve and the branching if any of the lateral line may be noted. Some fishes may not have a lateral line at all.

(III) RECORDING OF DATA

1. After a careful study of the fish/fishes given or collected, note down the various characters in the abbreviated form, for example:-
D. X; I, 28-32. A. II, 8. L. lat. 50. Tr. (5-6) + (10-12). G.R (50-55) + (60-65).

2. Identify the fishes collected using standard identification manuals and texts (vide References)
3. Make an outline drawing of the fishes identified showing the various characters.
4. Briefly describe the important characters of each fish identified, such as body shape, fins, scale counts, lateral line, colouration etc. and also comment on the distribution.
5. Give the conventional hierarchy of nomenclature.
6. Preserve, if necessary, with proper labels.

References

Day, F. 1875-1878 The Fishes of India being a natural history of the fishes known to inhabit the seas and freshwaters of India, Burma and Ceylon. Tailor & Francis, London.

Day, F. 1889 The Fauna of British India, including Ceylon and Burma, Fishes, Vol. I and II. Taylor & Francis, London.

Fischer, W. (Ed.) 1978 FAO Species Identification sheets for fishery purposes, Western Central Atlantic, Fishing Area 31. Vol.I-VI. FAO, Rome.

Fisher, W. and G. Bianchi (Eds.) 1984 FAO Species Identification sheets for fishery purposes, Western Indian Ocean, Fishing Area 51. Vol. I-VI. FAO, Rome.

Fischer, W. and P.J.P. Whitehead (Eds.) 1974 FAO Species Identification Sheets for fishery purposes. Eastern Indian Ocean, Fishing Area 57 and Western Central Pacific, Fishing Area 71. Vol. I-IV. FAO, Rome.

Jones, S. and M. Kumaran 1980 Fishes of the Laccadive Archipelago. Nature Conservation and Aquatic Sciences Service, Trivandrum.

Misra, K.S. 1962 An aid to the identification of the common commercial fishes of India and Pakistan. Rec. Indian Mus., 57 (1-4): 1-320.

Munro, I.S.R. 1955 The Marine and Freshwater Fishes of Ceylon. Dept. of External Affairs, Canberra.

Smith, J.L.B. 1953 The Sea Fishes of Southern Africa. Central News Agency Ltd., Grahamstown.

Talwar, P.K. and R.K. Kacker 1984 Commercial Seafishes of India. Zoological Survey of India, Calcutta.

Weber, M. and de Beaufort. 1913-1936 The Fishes of the Indo-Australian Archipelago. E.J. Brill Ltd., Leiden, Vol. I-VIII