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CHARACTERS AIDING IN THE IDENTIFICATION OF EGGS AND LARVAE  
OF MAJOR GROUPS

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The various characters of the eggs, larvae, postlarvae of marine fishes as summarised by Ahlstrom and Moser (1976) may be considered group-wise, as follows. A perusal of the publications by Russell (1976), Jones, Martin and Hardy Jr. (1978), Fritsche (1978), Hardy Jr. (1978a,b), Johnson (1978) and Martin and Drewry. (1978) will also be of much use in this regard.

(1) Clupeiformes:

The Order Clupeiformes is composed of the Indian species of sardines (Sardinella), herrings (Ilisha, Pellona, Opisthopterus), shads (Hilsa), anchovies (Stolephorus, Thryssa, Coilia, Setipinna), wolf-herring (Chirocentrus) etc. The characters aiding in the identification of the Indian species have been summarised by Bensam (1971). The eggs of all the species have a vacuolated yolk eggs of anchovies elliphical; chorion unornamented; perivitelline space is quite wide in sardines but narrow in anchovies; single oilglobule present in most sardines, many in Escualosa, Nematalosa, Setipinna, Coilia, etc; embryonic pigmentation on the dorsal side present only in sardines. Larvae are pelagic, transparent, elongated, with anus situated far behind; Pigment spots present on the dorsal side of early larvae of only sardines; In newly hatched

larvae, the hinder end of yolk sac is globular and rounded off in sardines, but pyriform in anchovies; myomeres have an angular appearance and muscle fibres have a crossed arrangement. The position of vent changes with progressive development, thus altering the preanal and postanal number of myomeres. In postlarval development, the disposition of the dorsal fin in relation to the anal fin changes; in early postlarvae there is a slight increase in pigmentation and in late postlarvae the pigmentation increases; scales and scutes recognisable in the late postlarvae when the vent also occupies the adult position.

(2) Anquilliformes:

This Order comprises the eels, such as the Indian Anquilla, Echidna (Muraena) Urocongir, Muraenesea, Ophichthus, etc. The eggs are pelagic, spherical, with smooth chorion, vacuolated yolk, perivitelline specie wide and have one or more oilglobule. Larvae hatch out as leptocephali, with usually a straight gut and with a marked transformation to juvenile condition. Nair and Mohamed (1961) may be consulted for details in the development and metamorphosis.

(3) Gonorhynchiformes:

Represented only by a single species Chanos chanos found in India also, the eggs and larvae have many Clupeiform characters; but the muscle fibres have a parallel arrangement and not a crossed one.

(4) Myctophiformes:

In India this Order is represented by the Bombay Duck (Harpoden nehereus), lizard fishes (Saurida, Trachinocephalus), etc. The eggs are pelagic, spherical, with hexagonal pattern in some (Synodidae-Saurida, Trachinocephalus), yolk may be segmented or homogeneous, perivitteline space narrow and usually a single oilglobule is present.

The larvae are elongated, gut is straight or variously shaped, head spination may or may not be present and transformation may be either gradual or marked. Postlarvae with conspicuous ventrolateral spots of pigments.

(5) Atheriniformes:

In India this order is predominantly represented by the flying fishes (Exocoetus, Hirundichthys, Cypselurus), the half-beaks (Hemirhamphus, Tenarchopterus) and Garfishes (Belone or Tylosurus). Eggs mostly attached to other objects such as plants by means of well developed chorionic filaments. Usually most of the fins develop within the embryonic period itself; and the postlarvae are mostly pigmented.

(6) Perciformes:

This is perhaps the most diversified of all fish orders and the largest vertebrate order, encompassing the families of Indian salmon (Polynemidae), barracudas (Sphyraenidae), grey mullets (Mugilidae), mackerels, tunas, seerfishes (Scombridae), horse mackerels (Carangidae), perches (Epinephelidae), etc. The characteristic features of some of these families are summarised below:-

(a) Carangidae:

Eggs pelagic, spherical, with a single oilglobule, most species with segmented yolk and embryo, yolk and oilglobule pigmented. Alimentary canal short in the larvae, the body of which are pigmented. Pigmentation increases in postlarvae and juveniles.

(b) Sciaenidae:

Characters of eggs and larvae almost the same as those of Carangidae, but the yolk is homogeneous and unsegmented. Alimentary canal of larvae rather short with anterior anus. Postlarvae with distinctly oblique mouth and dense pigmentation.

(c) Scombridae:

Eggs, pelagic, spherical, with homogeneous yolk, with a single oilglobule and embryo as well as oilglobule with pigmentation. Alimentary canal of larvae short with anterior location of vent. Snout becomes prominent in later postlarval stages. Presence of preopercular spines is characteristic of the postlarvae of most genera but are absent in mackerels.

(d) Gobiidae:

Eggs mostly demersal, attached to submerged objects, shapes rather irregular, sometimes elliptical, characterised by enormous protoplasm and little yolk and with little pigmentation. Larvae elongated, with position of vent at about the middle of the specimens.

(e) Sphyraenidae:

Eggs pelagic, spherical, with an oilglobule, yolk segmented and the embryo as well as the oilglobule become pigmented as development progresses. Larval vent is placed towards the hinder end of the body which is pigmented. Postlarval development characterised by elongation of the snout.

(f) Mugilidae:

Eggs spherical, with a large oilglobule, which becomes pigmented along with the embryo and the yolk, as development progresses. Larval body and oilglobule usually heavily pigmented. Position of vent is almost at the middle region. Postlarval development characterised by dense pigmentation.

(7) Pleuronectiformes:

This order comprising flatfishes is made up in India of Indian halibut (Psettodes), left-eyed flounders (Pseudorhombus, Arnoglossus, Psettina, Bothus) right-eyed

soles (Solea, Synaptura) and left-eyed soles (Cynoglossus).

The eggs are predominantly pelagic and seldom demersal, spherical, usually with smooth chorion but with hexagonal pattern in some species, yolk homogeneous, perivitelline space is narrow and oilglobule is either absent or if present one or many in number (Embryo) and yolk sac may be pigmented. Larvae are with a coiled gut, with head spination and metamorphosis is marked with migration of one of the eyes to the other side in cases where both eyes are on one side.

(a) Bothidae:

Eggs pelagic, spherical having homogenous yolk, with a single oilglobule and pigmentation of embryo, yolk and oilglobule. Larvae with good pigmentation and position of vent at about the middle of body, which shifts forwards during postlarval development. Body becomes broader and the right eye shifts to the left side during metamorphosis. First dorsal fin ray usually long during postlarval phase.

(b) Pleuronectidae:

Eggs pelagic, spherical, having homogenous yolk usually without an oilglobule and the embryo with dense pigmentation. Larval pigmentation usually becomes localised as a few bands as development progresses. Postlarval development marked by a lateral broadening of the body and shifting of the left eye to the right side, involving metamorphosis.

(c) Soleidae:

Pelagic, spherical eggs, with a number of oil droplets, with homogeneous yolk and with stellate pigmentation for the embryo and the yolk. Larval finfold sometimes shows stellate pigments. During postlarval development there is a metamorphosis involving the shifting of the left eye to the right side.

(d) Cynoglossidae:

Eggs pelagic, spherical, yolk homogeneous, with many droplets of oil globule. In advanced stages the embryo is pigmented with stellate chromatophore on its body and larval finfold. A tentacle develops dorsal to the head in early postlarval stage which is actually the future first dorsal ray followed by the development of the second to a few more rays in further stages.

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