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PARENTAL CARE IN FISHES
SUBJECTS- CHORDATES
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CONTENTS

- *INTRODUCTION*
- *ADVANTAGES OF PARENTAL CARE IN FISHES*
- *DISTRIBUTION OF PARENTAL CARE IN FISHES*
- *TYPES OF PARENTAL CARE*
- *COST AND BENEFITS OF PARENTAL CARE*
- *PATTERNS AND DIVERSITY OF PARENTAL CARE IN FISHES*
- *DEPOSITION OF EGGS IN SUITABLE PLACES*
- *DEPOSITION OF EGGS INTO SELF MADE NEST*
- *CONCEALING EGGS AND YOUNGS IN OR ON THEIR BODY*

Introduction about Parental Care

- Parental care can be defined as an association between the parents and the off springs, so as to increase the chances of the survival of the young ones, and in fishes it includes all the post-spawning care of the off springs by the parents.
- The evolution of parental care is beneficial as it facilitates off springs performance traits they are ultimately tied to offspring's fitness.
- Parental care is involved in those organisms which produce limited number of eggs to ensure the continuity of their race.

ADVANTAGES OF PARENTAL CARE IN FISHES

- Survival
- Protection
- Reproductive fitness contribution
- Enhancing growth rate and quality
- Better Development

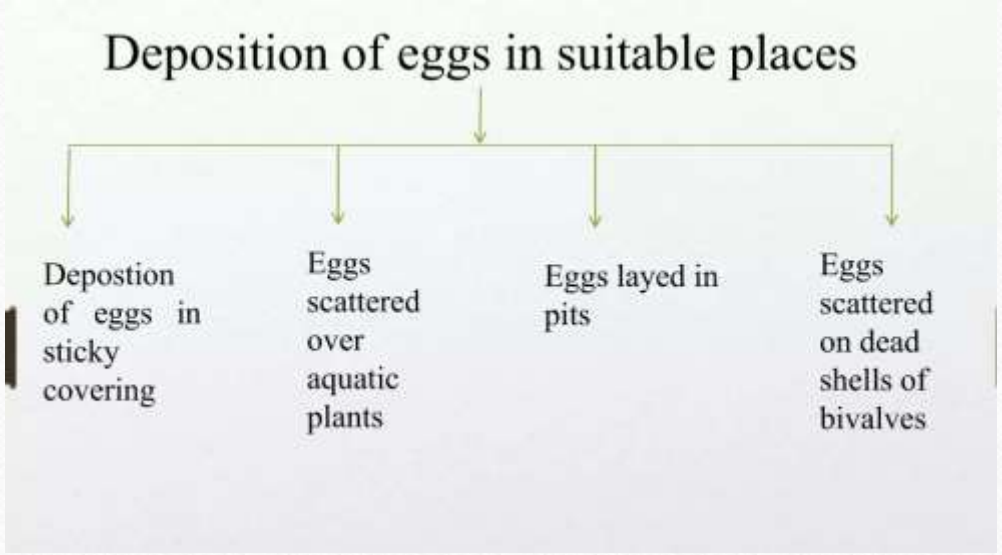
DISTRIBUTION OF PARENTAL CARE IN FISHES

- Around 77% shows parental care
- 17% care for eggs only
- 6% care for eggs and newly hatched ones.

TYPES OF PARENTAL CARE IN FISHES

- MATERNAL CARE
- PATERNAL CARE
- BIPATERNAL CARE

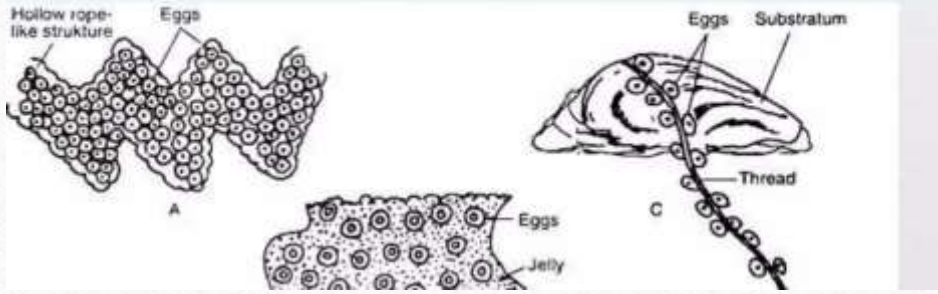
TYPES OF DEPOSITION OF EGGS



1.a. Deposition of eggs in sticky covering

In carps, eggs are usually laid with some special sticky covering by means of which they are attached to each other or to stones, weeds etc.

In yellow perch (Perca flavescens) eggs are deposited in a rope-like structure . The eggs are held together by a long floating membrane.



Introduction about Parental Care

1.b. Eggs scattered over aquatic plants

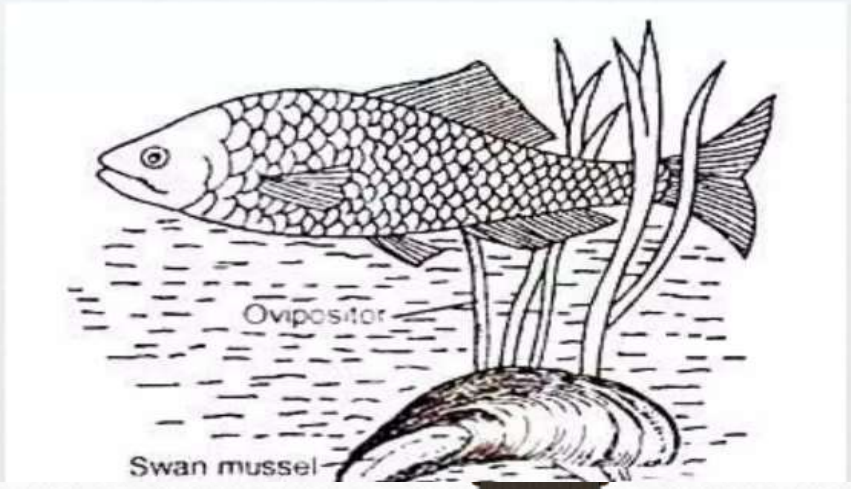
Eggs of fishes such as pikes (Esox lucius), carps (Cyprinus carpio), Carrassius auratus etc., are scattered over aquatic plants to which they remain attached.

1.c. Eggs laid in pits

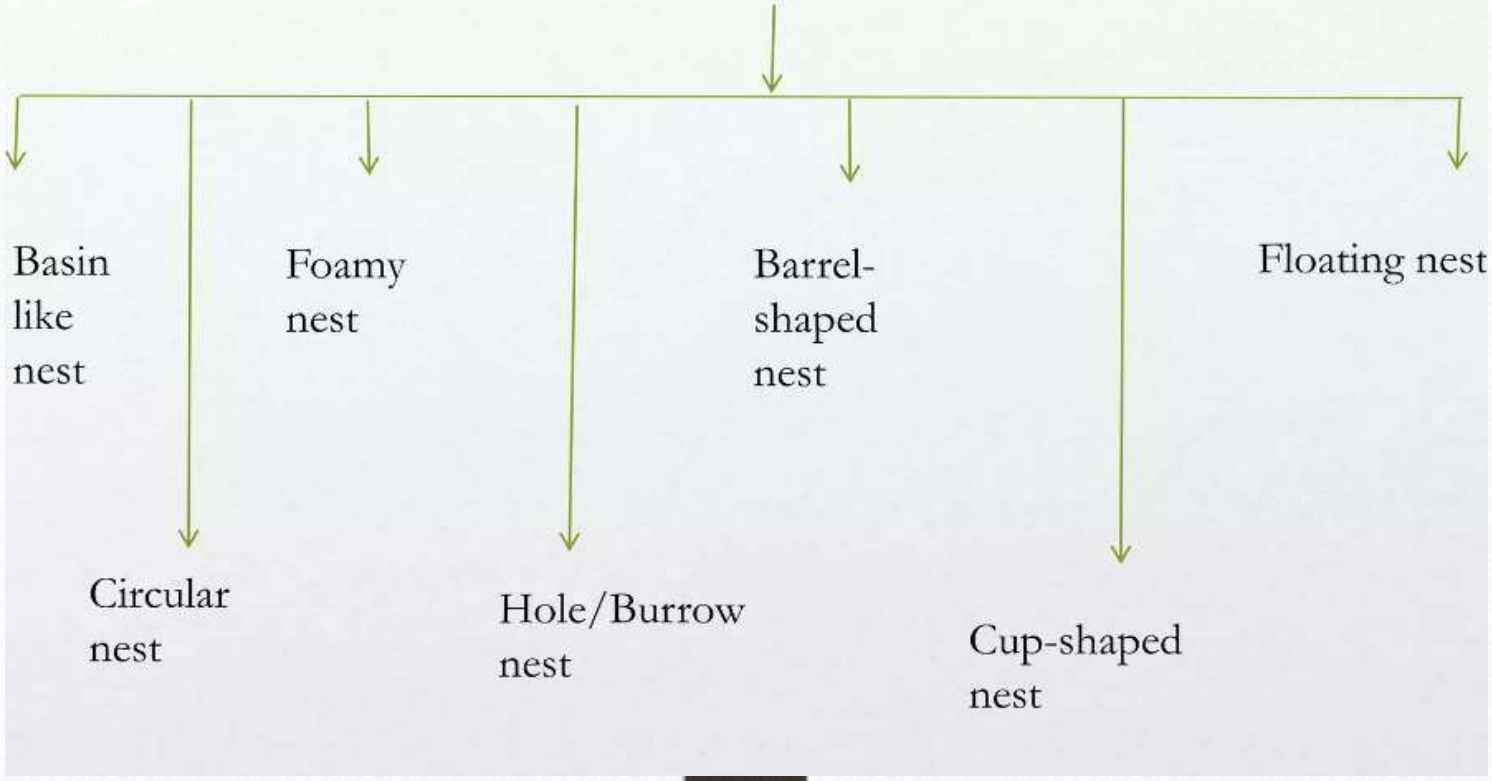
- In this method fishes dig excavation in gravel substrate, lay their eggs in the pits, cover them with gravel and desert them.
- For ex. Sand Gobi (Pomatoschistos minutus) lay their eggs in some protected place, where they are guarded by the male who also aerates them

1.d. EGGS SCATTERED ON DEAD SHELLS OF BIVALVES

(i) Females of cyprinid family deposit their eggs on the dead shells of mussels.
(ii) Females of European bitterling (Rhodeus amarus) deposit eggs in the siphon of a fresh-water mussel by means of a long tube acting as an ovipositor (Fig. 5.41). This ovipositor is a long tube drawn out from the oviduct. After oviposition male Rhodeus immediately sheds the sperm over the eggs and then guards them.



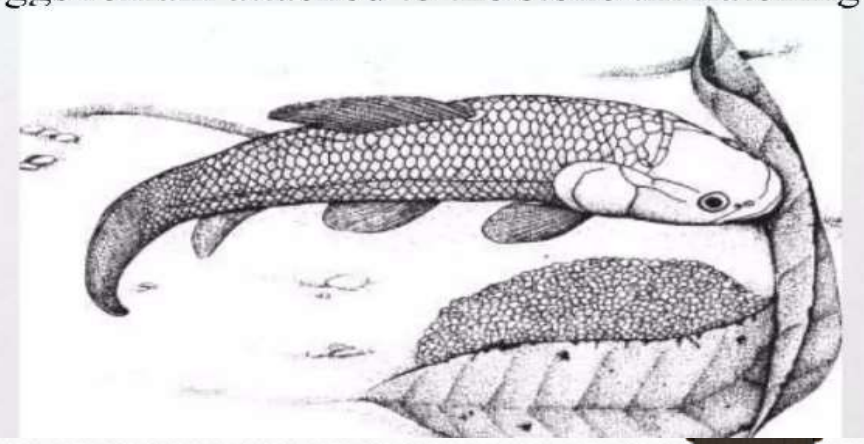
Types of Nest Fishes Self-made



1. Basin like nest

In the building of the nest, only the males or both sexes participate. Various kinds of materials such as pebbles, aquatic vegetation, secretion of their body etc., are used for nest formation.

The female makes a basin-like depression, sinks into it and deposits the eggs. The eggs are immediately fertilized by the male who covers the fertilized egg by a sticky secretion, secreted from its kidneys. These sticky eggs remain attached to the stone till hatching.



Ex. Darter (*Etheostoma congregata*),
Fresh water sunfishes

2. Circular Nest

The male Bowfin (Amia calva) prepares a crude pit-like circular nest among aquatic vegetation. The male then invites a female. She spawns and the male fertilizes the eggs. The fertilized eggs are then protected by the male who keeps guard over the nest till the young ones are hatched. The young ones are allowed to leave the nest in a boa/ under the protection of the father.

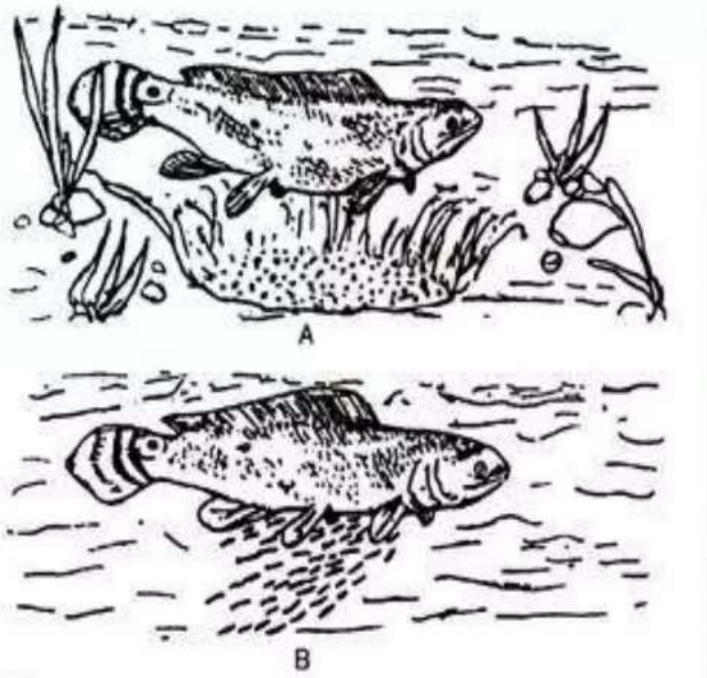


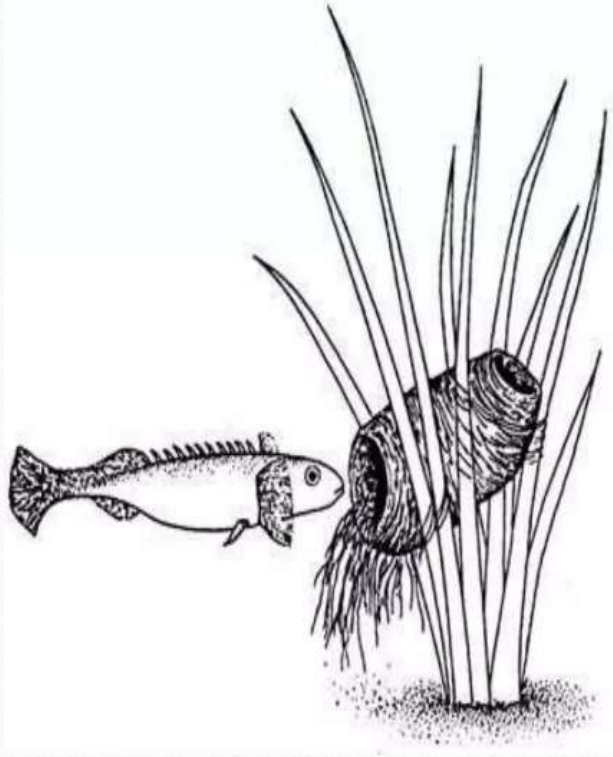
Fig. 5.43 : A. Male Bowfin prepares a circular nest. B. The hatchlings swims in a group under the protection of the father

3. Foamy Nest

The nest contains eggs that are suspended in a mass of bubbles and mucus produced by the male.

Ex. The male fighting fish (Beta) builds a nest by blowing bubbles of air and sticky mucus that adhere together forming a floating mass of foam on the surface of water. The fertilized eggs are collected by the male in his mouth, who gives them a coating of mucus and sticks them to the lower surface of the foamy nest. The male then stays on guard and fights till death to defend it.

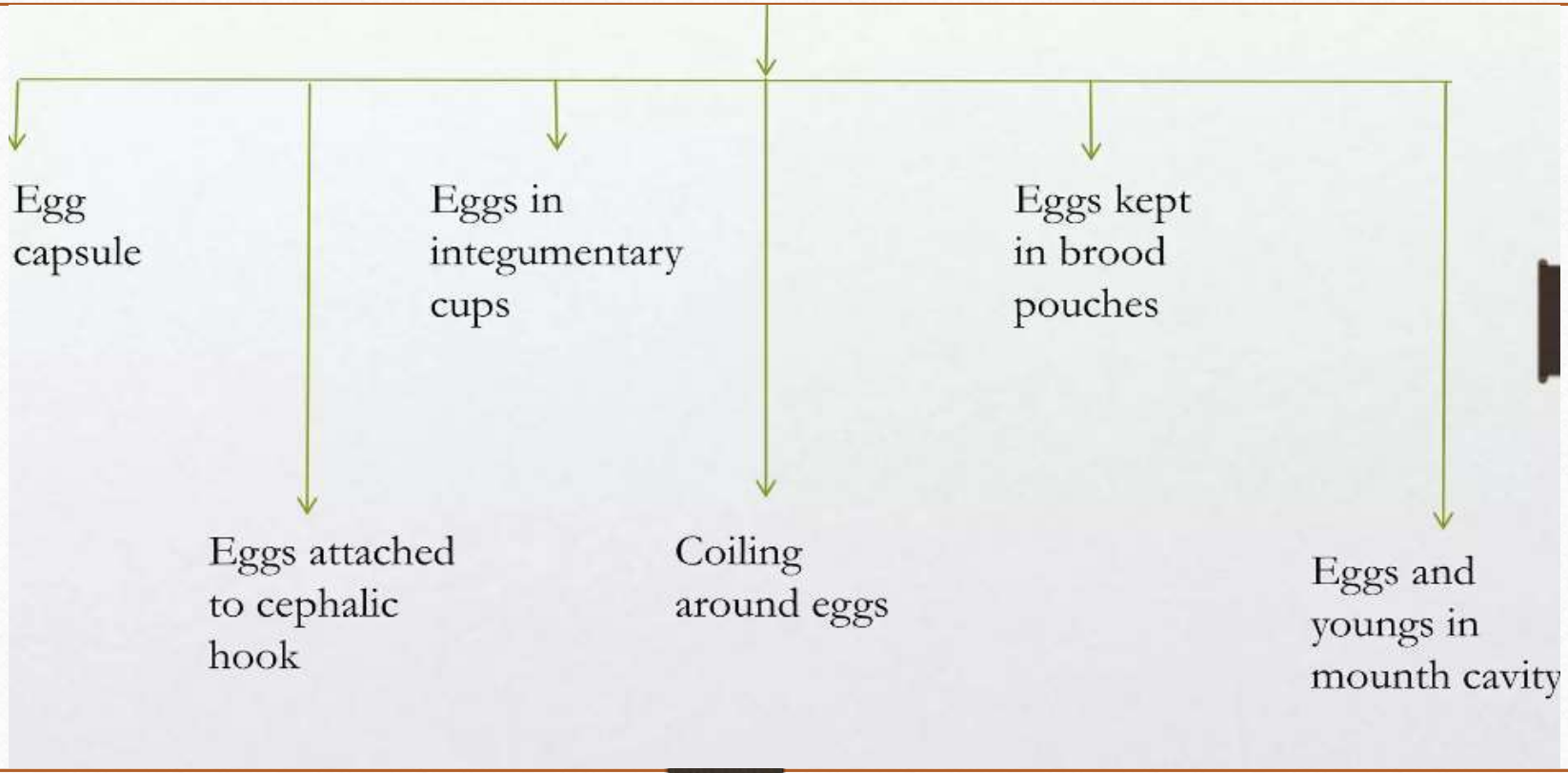
4. Barrel Shaped Nest



Before the start of courtship the male stickleback builds a quite elaborate nest. The male at first selects suitable place in shallow water where the flow of water is continuous but not swift.

He then builds a nest by collecting plant fragments, rootlets, weeds and then binds them together with the help of a sticky secretion from its kidney. The various activities of males such as probing, boring, sucking and glueing result in the formation of a compact nest with tunnel to receive the eggs

Concealing Eggs and Young ones In or On Their Body



1. EGG CAPSULES

In oviparous elasmobranchs such as sharks and rays, the fertilized eggs are laid inside protective Horney egg capsules called mermaid purse. The shape of the purse varies in different groups. The capsules remain attached to aquatic weeds by their tendrils. The development of the eggs is completed inside the purse.

2. EGGS ATTACHED TO CEPHALIC HOOK

The male nursery fish (Kurtus) of New Guinea, carries the mass of eggs on the forehead, held in a cephalic hook (Fig. 5.48).

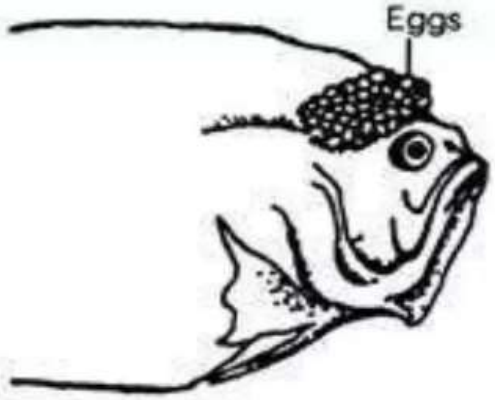
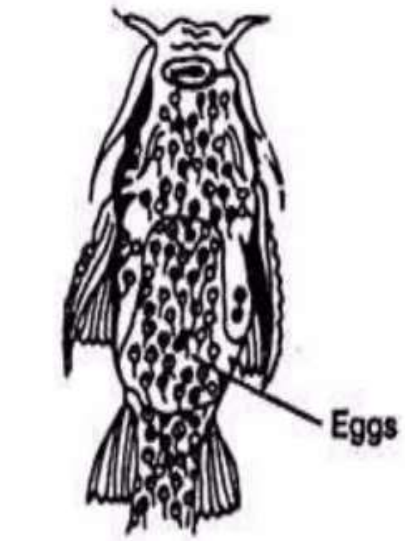


Fig. 5.48 : Male nursery fish carrying egg mass on fore-head

3. EGGS IN INTEGUMENTARY CUPS



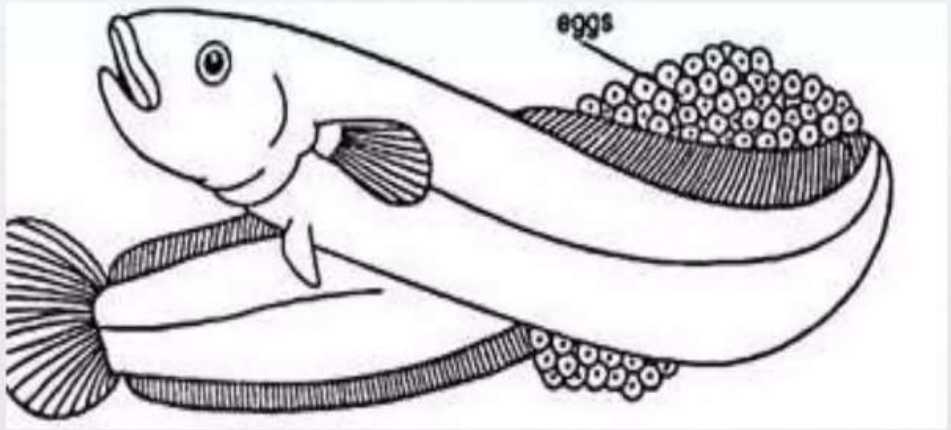
Platystacus bearing eggs in integumentary cups

During the breeding season, the skin of the lower surface of the body of female becomes soft and spongy. Immediately after the eggs are fertilized, the female presses her body against the eggs in such a manner that each egg becomes attached to the skin by a small, stalked cup. The eggs remain fixed in this position till hatching.

Ex. The cat-fish, Platystacus of Brazil

4. COILING AROUND EGGS

The butter fish (Pholis) rolls the eggs into a round ball and then one of them remains on guard by curling around it. It is often the male that guards the egg ball till hatching of young.



5. EGGS IN BROOD POUCHES

The fertilized eggs are transferred by the female into the brood pouch of the male. The brood pouch is found on the lower surface of the abdomen.

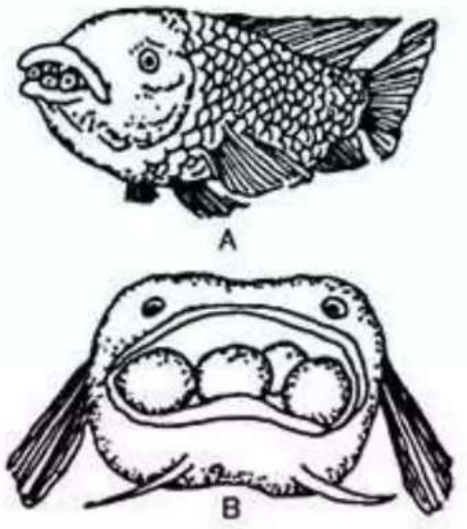
During the males so called 'pregnancy', he provides nutrients and oxygen to the fertilized eggs for several weeks.

After hatching, fry may return to the pouch when in danger.

5. EGGS IN MOUTH CAVITY

In many cichlids (Example: Tilapia), the female broods the fertilized eggs in her mouth . After hatching she allows the young to take refuge in her buccal cavity in times of danger.

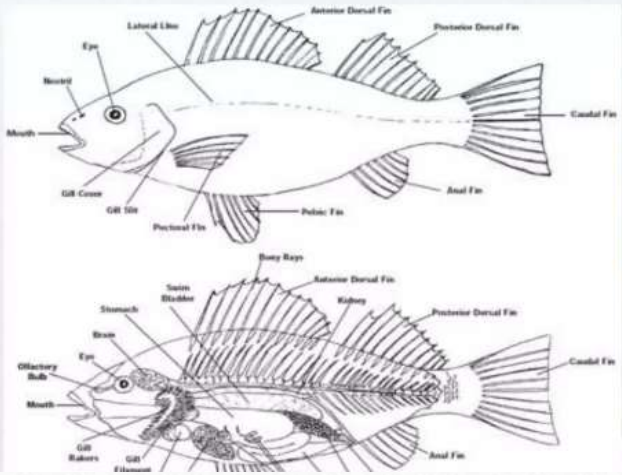
In most marine cat fishes (Arius) and cardinal fishes, the male carries the eggs and young ones in his mouth. The male does not take food during this period



A. Female *Tilapia* carrying eggs in her mouth. B. The male Brazalian cat fish carrying eggs in a pouch present inside the lower lip

OVOVIVIPARY

An intermediate condition between oviparous and viviparous is observed in the case of nurse shark (*Gingly mostoma*), called ovo-viviparous. Here the eggs are covered by a horny case and the development takes place in the uterus. The fully developed young ones hatch out by breaking the shell inside the uterus.



CARE OF INDEPENDENTLY SWIMMING YOUNG ONES

In some fishes, parental care does not stop with the caring of the eggs. These fishes defend their young ones by placing them in a safe place, away from predators and enemies.

Ex. Young ones of Tilapia, seahorse and pipe fish are protected by their parents either in the oral cavity of mother or in the brood pouch of the father.

In the case of cichlid fish, both male and female secrete a nutritious substance from their body, which are taken up by their young ones.


Thank
YOU!