Parental Care in Fishes

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. Most fishes do not care for their eggs or youngs and leave the spawning grounds soon after fertilisation.

The lack of parental behaviour is correlated with production of great numbers of eggs and sperms. But there are many fishes where definite parental care has been evolved. Various devices have been adopted to ensure proper development of the eggs into adults. One or both the sexes may participate in the process. These include selection of a suitable site, nest building and various other methods of protection of the larvae.

Species which do not exhibit any special device for safety of the ova, generally produce a very large number of eggs to increase the chances of survival of at least a few of them. Eggs of many species possess various mechanisms for attachment to stones, pebbles or aquatic vegetation, so that they are prevented from being washed away with the current of water.

A. Nest Building:

Some fishes prepare crude nests for egg laying. At first a suitable place for preparing the nest is selected and some species may defend the place till death. Males of many species like the Darters (*Etheostoma*), sunfishes and cichlids, prepare a shallow basin-like nest for laying eggs by females. The stones and pebbles are removed from such nest and male keeps close watch over the eggs till hatching.

i) Unprotected nest:

A few species, however, leave the nest unprotected. Many freshwater fishes prepare crude nest with aquatic vegetation where eggs are laid. *Protopterus* and *Lepidosiren* prepare deep hole into which the females lay eggs. Males protect the nest till development is complete. Amia calva (bowfin) prepare a crude circular nest among aquatic vegetation.

ii) Crude nest:

The fertilised ova are protected by male who keeps guard over the nest till the young ones are hatched. The young ones are allowed to leave the nest in a body under the protection of father. Both the male and female of some cat fishes of North America prepare a crude nest in the mud for egg-laying. The nest is sometimes provided with protective cover of logs, stones, etc.

iii) Nest in dead aquatic weeds:

Most interesting example is provided by the male stickleback *Gasterosteus aculeatus*, a small freshwater fish of North American lakes and ponds. The male fish actually builds a nest of dead aquatic weeds which are joined together by a sticky secretion produced from the kidneys.

When the nest assumes a considerable size, the male makes a small tunnel. After the formation of tunnel and an elaborate courtship ritual, the male drags a mature female into the tunnel for laying eggs. After laying eggs, the female swims away and the male keeps watch over the fertilised eggs till development is over.

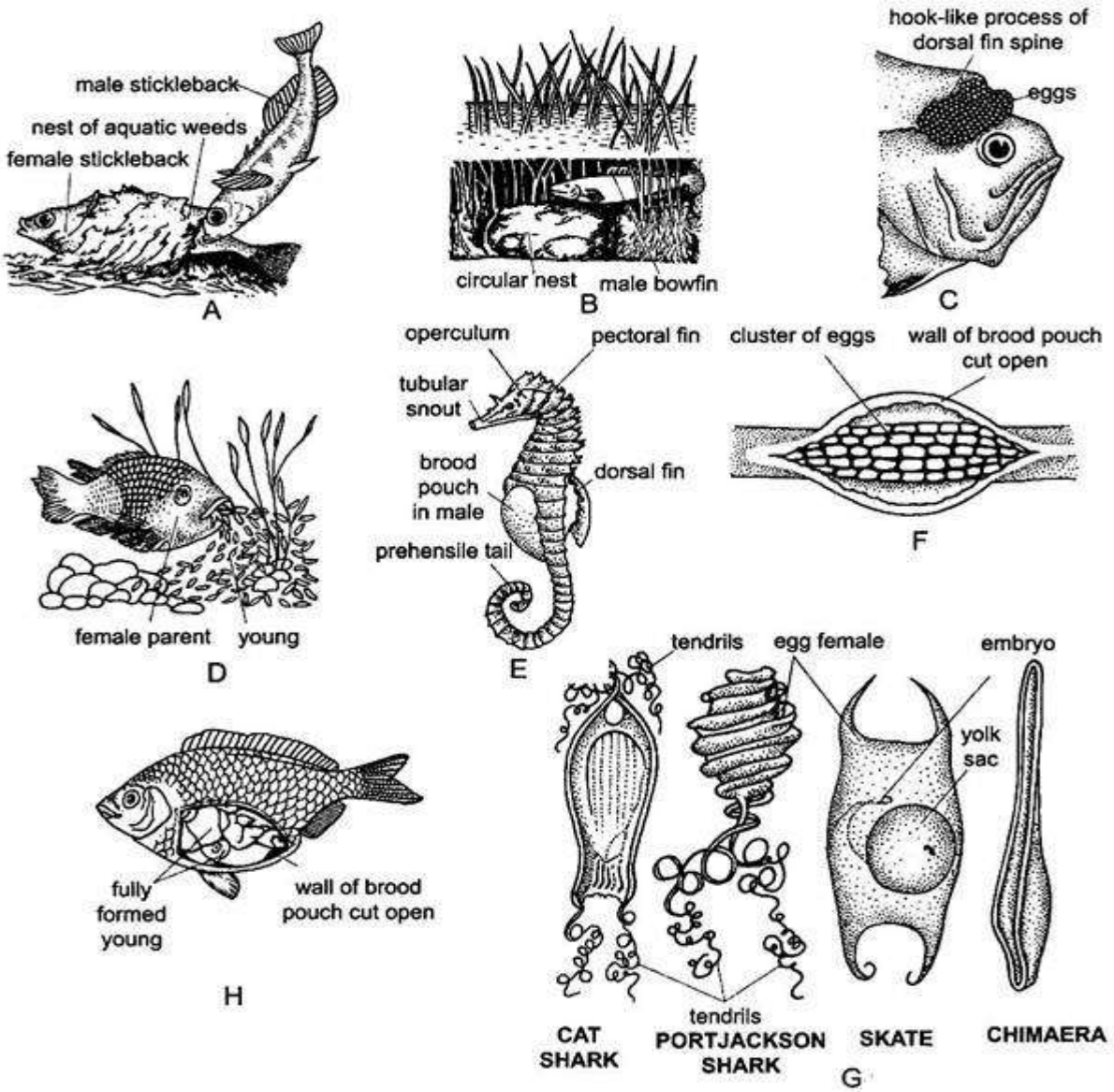

Fig. 17.9. Some interesting examples of parental care in fishes. A–Male stickleback (*Gasterosteus aculeatus*) muzzles female at the base of tail to stimulate her to lay eggs in a nest of dead aquatic plants; B–Male bowfin (*Amia calva*) guarding over circular nest; C–The male Australian *Kurtus* incubates eggs on its forehead; D–Very young of *Tilapia massambica* take refuge in female parents buccal cavity in times of danger; E–A male *Hippocampus* carrying brood pouch; F–Brood pouch of male *Syngnathus* opened to show eggs; G–Mermaids purses for eggs; H–Body cavity of *Cymatogaster aggregatus* cut open to show a fully formed young ready for hatching.

In addition, foamy nest prepared by blowing of bubbles of air and sticky mucus are also encountered in many fishes. The bubbles of air and mucus adhere to form a floating mass of foam. The eggs are collected by the male in his mouth cavity and he throws them in such a way that the eggs can adhere to the lower surface of foamy nest. This type of caring for eggs is found in *Betta*, *Macropodus* and many other fishes.

B. Mouth Cavity as Shelter:
In some species, eggs develop within the mouth of the parent. In many cichlids, the female carries the eggs in her oral cavity. After hatching, the young fry does not leave the shelter for some time, and swim about in water very near the mouth, so that they can return to it in case of danger (found in *Tilapia*). In the cat fish, *Arius* the male carries the eggs and young ones in his mouth, and does not take food during this period.

C. Coiling Round Eggs:
In butter fish, *Pholis* rolls the eggs into a rounded ball and then one of the parents remains on guard, possibly male, guards the egg-ball by coiling round it.

D. Attachment to Body:
In *Kurtus indicus* (Perciformes) the male develops a bony hook projecting from the forehead and is supported by a special process of skull bone. The eggs are grouped in two bunches with the help of filamentous processes of the egg membrane. The eggs are attached to the hook of the forehead, in such a way that one bunch of eggs lies on either side of the head of the male, as he swims in water.

E. Formation of Integumentary Cups:
In a cat fish, *Platystacus* of Brazil, shows an interesting method of parental case. During breeding season, the skin of lower surface of the body of the female fish becomes soft and spongy. Immediately after fertilisation of the eggs, the female presses her body against the eggs in such a way that each egg becomes lodged in a small integumentary depression. Each egg is attached inside the cup by an inconspicuous stalk. The eggs remain in this position till hatching.

F. Development of Brood Pouches:
In the pipe fish, *Syngnathus* and the sea horse, Hippocampus the eggs develop within the broad pouch of the male. The eggs are transferred into the brood pouch by the female and development takes place within the brood pouch.

G. Mermaid's Purses:

Oviparous sharks (e.g., *Scyllium*) lay fertilised eggs inside the protective horny egg capsules or mermaid's purses, which remain anchored to the sea weeds by their long tendrils. The young hatch out after rupturing the egg case.

H. Viviparity:

The highest degree of parental care is found in viviparous fishes where young develop within the oviduct of the female. A few species are viviparous, such as the dog-fish, *Scoliodon* and the surf fish *Cymatogaster aggregatus*. Both fertilisation and development are internal. Developing embryos are nourished mostly by a yolk sac placenta and the young are born with the characteristic of the adult. Viviparity provides maximum protection and represents the highest degree of parental case.