

## Reproductive Strategies in Fishes

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### INTRODUCTION

Reproduction is the process of producing offspring that are biologically or genetically similar to the parent organism. There are commonly two forms asexual and sexual one. In fishes sexual reproduction is present exclusively. Although the type is same but the methods of reproduction in fishes are varied. In common most fishes lay a large number of small eggs outside of the body in water to get fertilize by sperms released by male. The eggs of pelagic fishes usually remain suspended in the open water. Many shore and freshwater fishes lay eggs on the bottom or among plants. Some have adhesive eggs which remain adhered to substratum like plant or rock in water. So in fishes fertilization is mainly external. On the basis of fertilization fishes are classified in two classes. These include Ovuliparous fishes and Oviparous fishes.

### Ovuliparous fishes

Ovuliparous fishes are those which the lays unfertilised eggs (ova). These eggs are laid in water. Male fishes also released eggs in water. This is the place or medium where sperm and ova do come in contact. So in these types of fishes fertilization is external. Limitation of this type is that most eggs are eaten by carnivorous fishes and other organisms. Due to this there is need to produce eggs in large no. No special organ is required for reproduction. Examples of ovuliparous fish include salmon, goldfish, cichlids, tuna and eels.

### Oviparous fishes

Oviparous fishes are those which lays fertilised eggs or zygote. Some fishes also lays newly developing embryo. Here fertilisation is internal and requires some sort of intromittent organ to deliver sperm into the genital opening of the female by male. For instance oviparous sharks such as the horn shark and oviparous rays like skates. In these cases, the male is equipped with a pair of modified pelvic fins known as claspers.

Further for reproduction some fish changes their habitat. They migrate from fresh water into marine water and vice versa. This is known as Migration. It is of three types:

- Anadromous
- Catadromous
- Oceanodromous

Anadromous fish live in the sea (marine) and migrate to fresh water to breed. For instance Salmon (*Oncorhynchus mykiss*) also known as rainbow trout spawn in the cold and clear waters of lakes or upper streams. Then eggs

are laid in gravel beds. The young of the Atlantic salmon remain in fresh water for two to three years sometimes for six years. However Pacific salmon sometimes migrate to the sea in their first year. Adult fish usually stay in the sea for two to three winters but sometimes only for one. Then they grow into grilse (adolescents) or as adults and return to fresh water. After that they repeat the cycle and spawn after changes occur in colour and other external features. Uniquely some Atlantic salmon die in fresh water after a single spawning and others return to the sea.

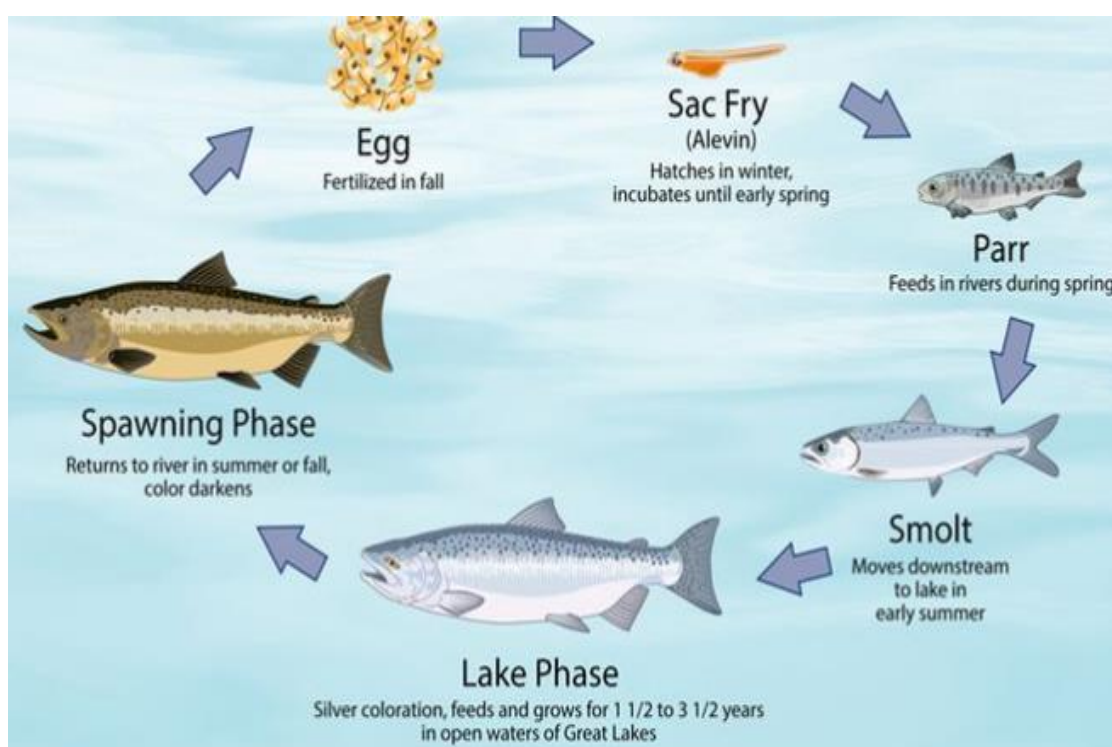


Fig.1 Anadromous migration

Catadromous fish spend most of their lives in fresh water and migrate to the sea for breeding. This is shown by eels of the genus *Anguilla* having 16 species. Out of these the best-known species for migration is North American eel (*A. rostrata*) and the European eel (*A. anguilla*). Each autumn eels leave European rivers to travel across the Atlantic

Ocean to breed for a single time after which they die. Eels arrive around the European coast as tiny glass eels, having drifted across the Atlantic for two or three years from the Sargasso Sea. In the autumn, the mature eels - growing up to one metre long - leave European rivers and fresh water and disappear into the ocean, never to be seen again.



**Fig.2 Eel life cycle and catadromous migration**

However oceanodromous migration is mainly for food instead of reproduction. Oceanodromous migration is the migration of fishes from sea water to sea water. There are no barriers within the sea and fishes have learned their best to migrate in order to take advantage of favorable conditions. Thus there are about 12,000 marine species of fishes that regularly migrate within sea water. The best example of oceanodromous migration can be Herrings, Sardines, Mackerels, Cods, Roaches and Tunas. Parental care as an association between parents and the offspring through which the chance of survival of young ones gets increased or any behaviour performed by parents that appears likely to improve the survival and reproduction of the young.

As the eggs are exposed to predators, fishes have adapted strategies to prevent them from predation so that maximum survival occur. This is achieved through parental care. Parental care can be explained as an association between parents and the offspring or eggs through which the chance of survival of young

ones gets increased or any behaviour performed by parents that appears likely to improve the survival and reproduction of the young. In the case of fishes, all fishes do not provide parental care, but in many species of fish, parental care is provided to increase the chance of survival and development of their eggs into adults. About 77 % of fishes show no parental care, 17 percent of fishes show care of eggs only and 6 percent of fishes care for their eggs and are newly hatched young. Various methods are adopted in fishes, in the process of parental care, in this process one and both sexes maybe get involved. These are:

- Deposition of eggs in suitable places
- The simplest form of fish parental care is hiding of the eggs
- Self-made nest for deposition of eggs
- Concealing eggs and young inside or on their body
- Viviparity in some fishes
- Care of independently swimming young ones