

Q 10. Describe parental care in Amphibians with examples.**Ans.**

Proper care of eggs and juveniles is taken by a number of parents in the animal kingdom so that the development may continue without any hindrance. This is called parental care. Parental care is evolved to reduce the energy expenditure on reproduction. Lower animals produce excessively large number of eggs and do not exhibit parental care but higher animals such as vertebrates, show varied degree of parental care.

Parental care is an important phenomenon in the trend of evolution.

Amphibians were the first vertebrates to have evolved different kinds of parental care to protect their young ones.

1. Selection of suitable places.
2. Construction of nests..
3. Carrying of the eggs by parents.
4. Development of brood pouch.
5. Viviparity or development in uterus.

1. Selection of suitable places: Eggs are laid in such a place where they can develop properly. Generally the eggs are laid in a hole on muddy bank of river or pond, e.g. *Rhacophorus schlegli*. The eggs are then covered by a dermal secretion to prevent them by desiccation. The development of egg takes place into water of pond or river when they reach there. Sometimes the eggs are attached to the aquatic weeds by glues, e.g. *Triton*. In some cases the eggs are deposited on the under surface of leaves overhanging rivers and ponds, e.g. *Hylodes*. *Gyrinophilus* lays eggs under the stones in streams.

2. Construction of nests: Many amphibian construct nests of various types for protecting the eggs. *Rhacophorus maculates* digs a hole just above the water level and fills it with foams. The eggs are laid in this hole.

A basin-shaped hole is prepared in the shallow water by the *Hyla faber*. Mud is deposited around the rim of the basin to convert it into a well. Some amphibians, like American tree frog, *Phyllomedusa*, a nest is prepared by folding the margin of the leaves and cloacal secretion is used to glue the margin of the leaves. Shoots of trees are used for making nests by *Triton* in which the eggs are deposited for further development. In *Salamandrella* the eggs are deposited in a gelatinous bag which is fixed to some aquatic object below the level of water. *Cryptobranchus* lives in eastern North America, where mating occurs in late summer or early fall. Males prepare nests below large, submerged stones or logs. Females lay long, paired strings of several hundred of eggs which are fertilized externally by male. Males guard the eggs until they hatch in 2-3 months after egg-laying.

3. Carrying of the eggs by parents: Some amphibians carry the eggs on their body. The female of *Ichthyophis* lays the eggs in damp places. The female coils around the egg clutch and periodically rotates it, till the eggs hatch. The mother caecilian or apoda does not take any food during the parental care period. The genus *Alytes* contains the midwife toads, such as *A. cisternasii* and *A. obstetricans*. Both species attach the fertilized eggs to their hind legs. When the eggs are ready to hatch, the male carries them to the nearest water where the larvae come out. Development and metamorphosis take place in water. In case of *Pipa pipa*, the female carries the eggs on the back during breeding season. The fertilized eggs are attached to the soft and spongy back of the female.

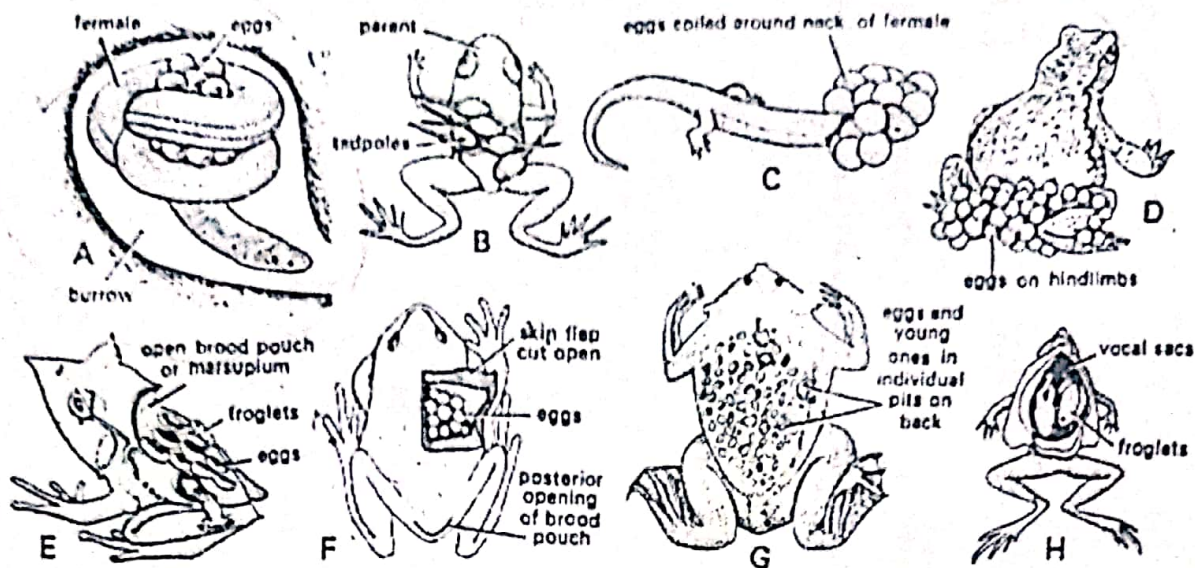


Fig. Parental care in Amphibia.

- A. Female *Ichthyophis* B. Tadpoles attached to parent C. *Desmognathus* with eggs.
 D. *Alytes* (male) E. Marsupial frog. F. *Nototrema* G. *Pipa* with eggs. H. *Rhinoderma* (male)

4. Development of brood pouch: In case of some amphibians, special pouches are developed for protecting the eggs. In Darwin's frog (*Rhinoderma darwini*) from Chile puts the tadpoles in its vocal sac for development. In *Gastrotheca marsupialia*, the female develops a special brood pouch on her back for carrying the eggs. The closed pouch has a small slit like opening in the posterior side. A horse-shoe shaped pouch develops on the dorsal side of the body during breeding season in female *Nototrema*. Eggs are carried in this pouch. In case of *Arthroleptis*, the larvae are kept inside the buccal cavity of the male at the time of danger.

5. Viviparity or development in uterus: In certain amphibians, entire development is completed inside the uterine cavity. The eggs are placed inside the uterus where they get attached to the wall of the uterus through a membrane. This membrane allows metabolic exchange of materials. The broad and vascular tail also helps in metabolic exchange.

Members of the African genus *Notophrynooides* retain eggs in the oviduct and some nourish the young as they grow. These are born as miniature adult. One species of genus *Eleuthrodactylus*, now thought to be extinct (*E. jasper*), also retained eggs in the oviduct to give live births. *Salamandra salamandra*, *S. atra* and some related species also give birth to larvae or completely metamorphosed juveniles. In *Geotrypetes* the yolky eggs remain inside the last part of the oviducts. The small embryo hatch and remain inside the oviducts till they grow in length of about 75 mm.

The diversity in modes and means adopted for parental care in amphibians force to believe that it evolved in response to their habit and the environment they live. It is surely instinctive in nature. The play of instinct may be influenced by hormonal action.
