

NEOTENY

B.SC. II HONS.

PAPER - III A

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NEOTENY

During the course of indirect development various type of intermediate stages are found. These stages in general are termed as the larval forms. As the development proceeds, the larvae develop into youngs and attain the sexual maturity, but possess the functional gills. Thus the possession of functional gills by larvae even after attaining sexual maturity is termed as neoteny.

According to Kollmann (1882) the retardation of the metamorphosis and retention of the larval characters beyond the normal period is termed as the neoteny."

Historical background: It has been reported that the larvae of spotted salamandra occasionally attain the size of 80 mm when it is of 40 mm it attains the sexual maturity but possesses the functional gills. Similarly the larvae of Triton when it is 80-90 mm long attains the sexual maturity, but possesses functional gills. De-Filippi (1881) reported the similar case in Lombardy.

Dummersill (1876) astonished the world by showing the conversion of gill breathing mexican axolotl into the lung breathing.

Ambystoma:- From the discovery, it has been proved that the (European Urodels) as well as (Anurans) postpone their metamorphosis

and attain the sexual maturity but they possess functional gills also.

For all such cases Kollmann (1882) introduced the term, neoteny which was first of all ~~used~~ by Beer (1886) De-Beer (1956) was in favour of the term paedogenesis which was given by W. Hasstong. The word heterochrony is used to designate the developmental changes in the paedogony (Reproduction)

TYPES OF NEOTENY:-

Depending upon the changes into the developmental characters Kollmann (1882) classified Neoteny into two types -

[a] Partial Neoteny.

[b] Total Neoteny.

[a] Partial Neoteny:-

The retardation of the metamorphosis beyond the normal period is termed as the partial neoteny.

eg - Bombinator pachypus.

Alytes obstetricans.

Hyla arborea

Rana esculenta etc.

[B] Total Neoteny:- The retention of the larval functional gills even after the possession of the sexual maturity is termed as the total neoteny.

eg - Triton walt.

Triturus cristatus.

Proteus sixeri

Ambystoma etc.

Explanation:- These are two views regarding the exact explanation of the neoteny.

(i) Some authorities are of opinion that the Neoteny is an adaptation, which tends the animal to retain certain larval characters.

(ii) Some one thought that the surrounding environment prevents the assumption of the adult characters into the animals.

There are certain experimental evidences, where the larval enters into the water hole, but could not gain the terrestrial mode of life. Their prolonged functional gills and tail stimulate their further growth on the expense of their terrestrial characters.

Weismann tried to explain the term neoteny that it is the case of the reversal of the modern amphibians into their etaristic ancestral forms. This view suggested that the amphibians were the aquatic and gill breathing forms formed which later on gave rise to the terrestrial lung breathing amphibians.

On the contrary the possession of the gills is the larval characters of the amphibians, which is not etaristic, while the possession of the lungs is the primary condition. Depending upon this the above given Weismann's view is incorrect.

Thus we satisfy by telling that the retardation of the metamorphosis and

The retention of certain larval characters even after the possession of the sexual maturity is the neoteny.

REPRESENTATIVES OF NEOTENY IN AMPHIBIANS:

Various neotenic forms of amphibiens belong to order Orodela only with the purpose to have a clear knowledge about the Neoteny in Orodela, it can be studied under the following suborders -

[A] Suborder - Cryptobranchioidea -

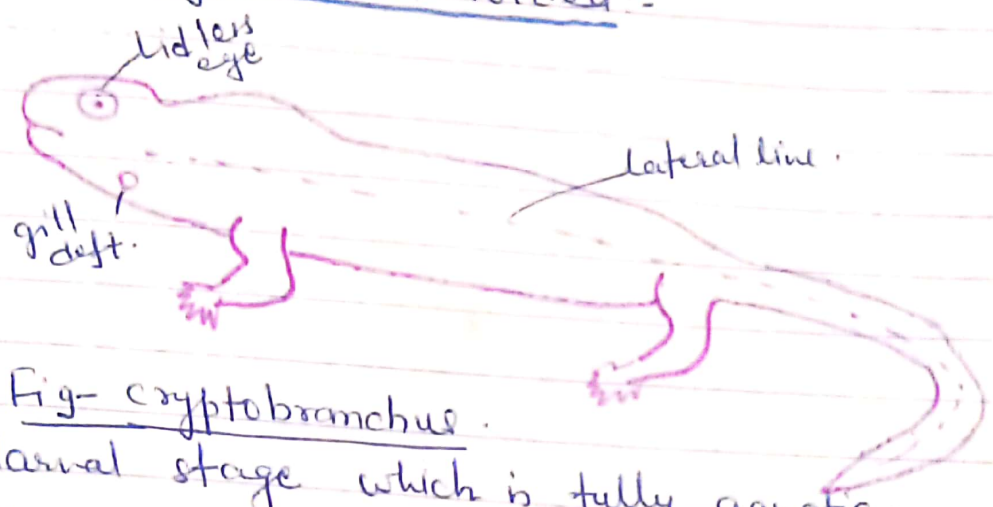


Fig - cryptobranchus.

- (i) Semilaval stage which is fully aquatic.
- (ii) Lidless eyes are present.
- (iii) One pair of gill slits are found for the outlet of water during respiration.
- (iv) Lateral line well developed.

[B] Suborder - Ambystomoides:
eg - Axolotl of Ambystoma.

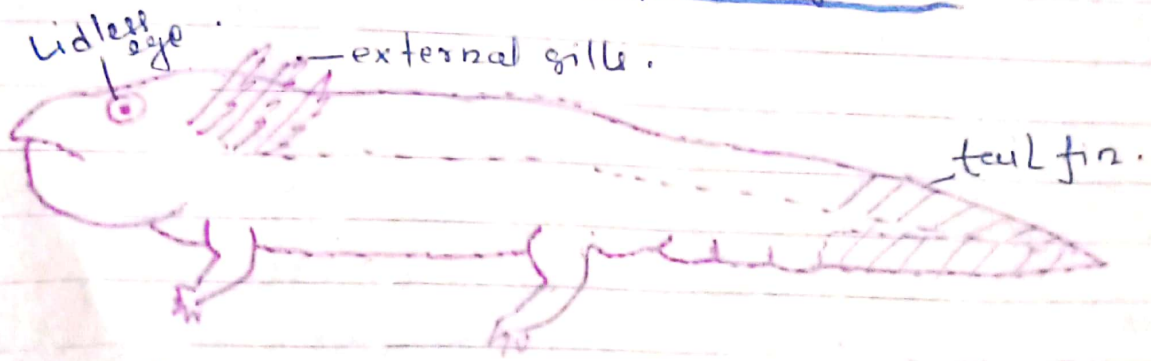


Fig - Axolotl of Ambystoma.

The adult Ambystoma shows a very few neotenic characters where as the Axolotl larva of Ambystoma is completely neotenic and shows the following features:-

- (i) Lidless eyes are present.
- (ii) External gills present.
- (iii) Lateral line well developed.
- (iv) A tail ~~found~~ fin is found.

[c] Sub order - Salamandroidea:-

eg - Amphiuma (longoee).

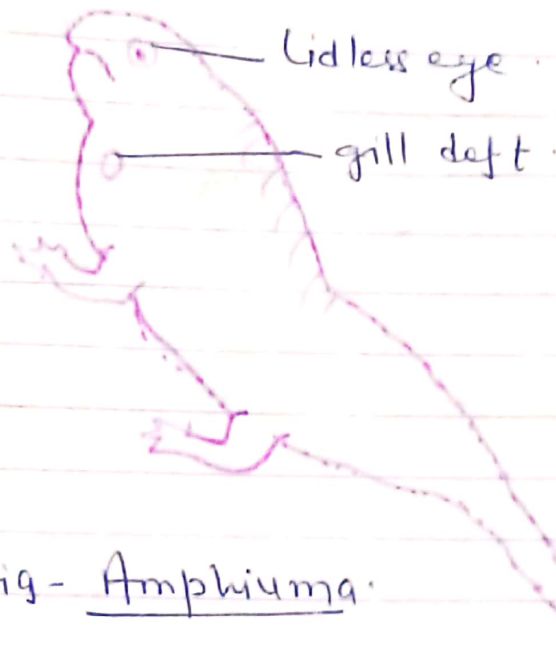


Fig - Amphiuma.

Semilaval stage possesses:-

- (i) A pair of lidless eyes.
- (ii) A pair of gill defts.
- (iii) A branchial arches.
- (iv) Arranged maxillary & vomerine teeth.

Typhlomolge:- Blind eye gills.

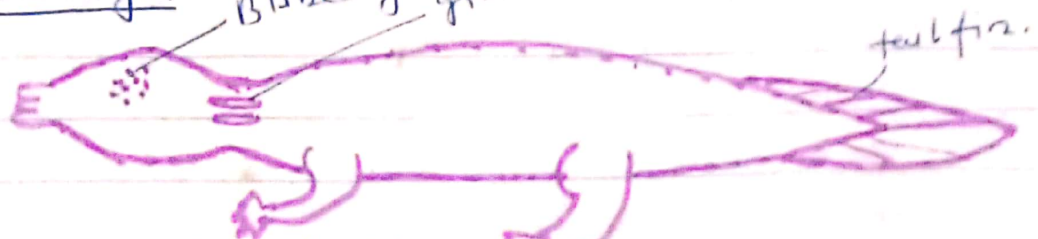


Fig - Typhlomolge.