ARO in Fishes

Generally adult fishes depended chiefly on pharyngeal gills for aquatic respiration. However, other devices also occur to supplement or replace gill respiration. All such additional respiratory organs, other than gills, are known as accessory respiratory organs. The development of accessory respiratory organs is found mostly in freshwater fishes of tropical region and very rarely in marine fishes.

Sometimes the fishes of the tropical freshwaters and hill-streams develop accessory respiratory organs to meet extra demand for oxygen, because depletion of oxygen occurs during summers as the water level falls to a considerable degree. Accessory respiratory organs enable the fishes to live in oxygen-deficient water, to aestivate over prolonged droughts in dry summer, to take excursions on land or simply to meet extra demand for oxygen. To overcome these adverse situations, accessory respiratory organs functionable in aquatic and/or aerial environment have been developed in fishes. So the development of such structures is essentially adaptive in native. Some accessory organs sub serve aquatic respiration, while others aerial respiration (Fig. 17.8).

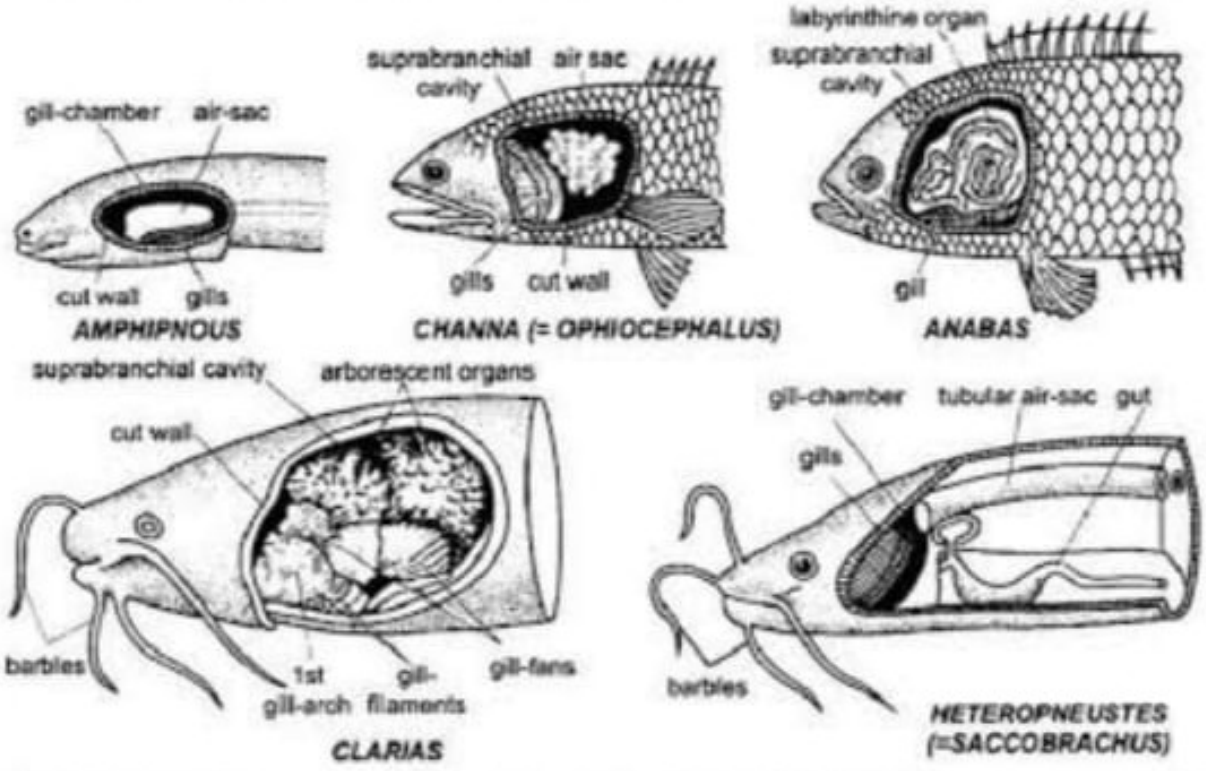

Fig. 17.8. Accessory respiratory organs dissected on the left side in some air-breathing teleost fishes.

Several types of accessory respiratory organs have been evolved in different species of fishes.

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These accessory respiratory organs of fishes are as follows:

1. Skin or Integument:

In the eel, Anguilla anguilla, Amphipnous cuchia and in Periophthalmus and Boleophthalmus, the skin is highly vascular and serves for exchange of gases as in frog, when the fish is out of water. These fishes habitually leave the water and migrate from one place to another through damp vegetation. During this period, the moist skin serves as an important organ in respiration. They can respire cutaneously both in air and in water.

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Since Amphipnous and Mastacembelus live in oxygen deficient stagnant water, the skin is of little use for respiration but it plays an important role in extracting oxygen from air, when the fishes are exposed in drying up muddy ponds, or when fish is moving out of water. The glandular secretions of the skin protect it from desiccation in the air.