

Flight Adaptations in Birds (Part. I)

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Introduction :- Birds are only organisms, specialised for flying in air. Birds. Most present day birds are heavier than air and almost every part of their organisation has been modified for aerial life. To fly in air, they have to possess following essential specializations in their morphology, anatomy and physiology.

A. Morphological Adaptations

1. Body Contour :- Because speed is much for aerial life, so, to minimize the resistance offered by air during flight, the body of birds is fusiform or spindle-shaped and it lacks any extra projection which may offer resistance in attaining speed in air like fish in water.

2. Compact Body :- Their compact body is light

and strong dorsally and heavy ventrally which helps in maintaining equilibrium in the air. The attachment of wings high upon the thorax, high imposition of lungs and liver and low central position of heavy muscles, sternum and digestive organs below the attachment of both the wings and consequently low centre of gravity are other morphological facts of great significance.

3- Body-Covering of feathers; - Body of all birds is covered by feathers, an integumentary derivative. The smooth closely fitting and backwardly directed contour feathers make the body fit streamlined, helping them to pass through the air by reducing the friction to the minimum. The feather covering makes the body light and protects it from hazards of environment temp. The feathers hold a considerable blanket of enveloping air around the body and add buoyancy to the body. The non-conducting covering of feathers completely the body perfectly and prevents loss of heat which enables the

birds to endure, intense cold at high altitudes and also to maintain a constant temperature. Feathers of wings form a broad surface for striking the air.

4. Fore-limbs modified into wings: - The forelimbs have

transformed into unique and powerful propelling organ, wings. The wings are the soul organs of flight. Their structure here is complicated structural construction consisting of a framework of bone, muscles, nerves, blood vessels, feathers etc. Both wings spring from the anterior region of trunk. During rest they remain folded against the sides of the body. But during flight, they become expanded. The surface area of wings is increased by development of elongated flight feathers, the remiges.

The vein of each remige of each remige forms a flexible and continuous surface for striking the air in flight. The flight feathers of a wing also form a broad surface for supporting the bird in air. The particular shape of the wing, with thick strong leading edge, coarse upper surface and coarse lower surface causes reduction of



air-pressure above and increase below with minimum turbulence behind. This helps in driving the birds to forward and upward during flight.

5. Mobile Neck and Head :- The transformation of fore-limbs into wings is duly compensated by the presence of beak or bill for feeding, nest building, preening, offense and defence. The mouth is drawn out into horny beak which acts as a pair of forceps. In picking up the things and in various other activities such as Nest-building, prunning etc which are normally done by the fore-limbs in other animals. The neck in birds is also very long and flexible for the movement of head, necessary for various functions.

6. Bipedal locomotion :- As anterior part of the body of birds become concerned with flight, the posterior part of the body becomes modified for movement on land. For locomotion on the ground and to support the entire body weight the hind limbs occupy somewhat anterior position on the trunk and become more stouter in case of ratites which are running birds.

7. Perching :- The hindlimbs of a bird are well specialized for an arboreal life. Their muscles are developed in such a manner (Control)