

FLIGHT ADAPTATIONS IN AVES

DEGREE – I

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Young (1958) has been aptly called the birds as 'masters of the air'. In birds, there is no system, or organ, that has not undergone modifications for flight. Some of the modifications are:

1. They have streamlined and spindle-shaped body designed to provide minimum resistance against air
2. Tail has a series of caudal feathers or rectrices arranged in a fanlike manner serving as a rudder for steering during flight, checking flight, and counterbalancing in perching.
4. Forelimbs modifies into wings.
5. Mouth is modified into horny beak used as forelimbs in nest-building, feeding, preening, offence and defence, etc.
6. Neck is very long and flexible.
7. hind limbs or legs spring somewhat anteriorly from the trunk to balance and to support the weight of entire body for locomotion. Bipedality is as characteristic of birds.
8. The skin is loosely fitted as it is responsible for extensive movement of skeletal musculature.
9. Pectoralis major and pectoralis minor are highly developed.

10. The hind limbs help in perching. Flexor tendons is highly developed.

11. Many of the bones are pneumatic and filled with air-sacs.

12. Uncinate processes of thoracic ribs help in producing compactness by concentrating the mass.

13. The heterocoelous vertebrae confer great flexibility.

14. All birds can move their neck through 180° which helps in preening feathers in all parts of the body and food collection.

15. Fusion of pelvis with synsacrum provides supports weight, and counteracts the effect of shock as the bird alights.

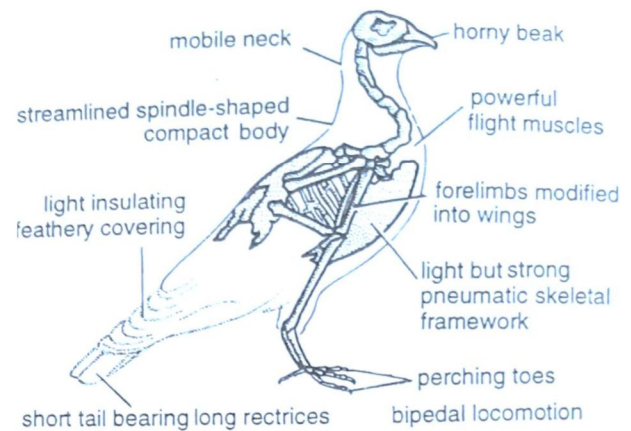


Figure 1 Flight Modification in Aves

16. The absence of amid-ventral *symphysis* of pubes and Ischia helps in laying of large calcareous eggs.

17. distal tarsals fuses with the metatarsals to form tarsometatarsus. Proximal tarsus fuses with the lower end of tibia to form a tibiotarsus. Tarsometatarsus and tibiotarsus help in bipedal gait.

18. Sternum is highly expanded. It bears a large mid-ventral ridge or keel for the attachment of major flight muscles. Keel is absent in running birds, like ostrich.

19. Birds do not have a urinary bladder.

20. Birds are uricotelic that helps in reducing water content of the body.

21. Birds' eyes are large.

22. Optic lobes greatly developed.

23. Both eyes of birds together are often heavier than the brain.

24. Cerebellum is much developed and convoluted. It shows delicate sense of equilibrium and the great power of muscular co-ordination.

25. Corpus striatum is enormously developed.

26. Birds have a single ovary to reduce the weight which is so essential for flight.