

FLIGHTLESS BIRDS,

Adaptations for flight :-

- Bone is pneumatic that makes it almost 50% wt less.
- Presence of air sacs in body makes body very lighter.
- They are having flight muscles (6 types) - these reduces to tiredness during flight and they can fly for longer duration.
- Feathers (various types)
- Size and weight of birds bodies reduced for flight. If size is big and weight is more then it will make bird less flying.

In flightless birds pneumatic bone are not found or if found then in less amount. Here air sac is poorly developed. Size and weight is more. Adapted for cursorial movement.

Classification of birds

Aves



Archaeo-ornithes. (Ancient birds)

e.g. Archaeopteryx.

flightless

extinct Odontognathae

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Paleognathae

flightless.

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Impenae

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Sphenisciforms

- Flying

eg. Hesperornis (Sternum without keel)
(reduced pectoral girdle)

These are large flightless marine.

Neo-ornithes (Modern birds)

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Patent system

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- Paleognathans have paleognathous type of palatal system.
 - Bird can respire and breath simultaneously only due to palatal system. It is just found in birds and mammals only. Here separate nasal and oral apertures.

Paleognathae or Ratitae

old jaw (and Ralf) like keel

It has divided in 7 diff orders.

- | | | | | |
|----------------------|-----|------|------|------|
| 1. Struthioiformes | 200 | 1000 | 1000 | 1000 |
| 2. Rheiformes | | | | |
| 3. Casuariiformes | | | | |
| 4. Apterygiformes | | | | |
| 5. Dinornithiformes | | | | |
| 6. Aepyornithiformes | | | | |
| 7. Tinamiformes | | | | |

Major group of flightless diving birds

* Flightless birds are flightless due to laziness. Their ancestors were flying and localized only in restricted areas.

* Flightless birds are flightless due to their laziness. Their ancestors were flying. They are localized only in restricted areas.

- There are big sized flightless birds having fluffy figure without keel. Wings are rudimentary. Feathers are devoid of interlocking system. Skull is palaeananthous. Tarsus is larger and broad.

Order-

Struthioiforme - e.g. Ostrich.

- There are four species^{known} which are found in Africa and Arabia. These are the largest flightless birds. They are polygamous in nature and height may go 2.5 m to 4 m. Body wt = 150 kg.
 - Head, neck, and legs are sparsely feathered.
 - Speed is 80 km/h, they are well equipped for cursorial life.
 - Egg - 1.5 kg (second).

Ostrich - Ist largest flightless bird
 Emu - IInd " "
 Casuari - IIIrd " "



- They have only 2 toes (3rd & 4th)
- Weight = 150 kg.

O-2. Rheiformes - R. ^{Represents} Repetition of toe pattern
 eg. Rhea americana (American Ostrich)

- Smaller.
- Lives in a group.
- Height is smaller than 1.5 m.
- 3 claws in toes.
- Head and neck are feathered.
- Male is polygamous + several female with single male.
- Male prepare nest where female lays egg.
- 50 eggs in a time and incubation period = 30 days.
- There are 3 species of Rhea.

O-3. Gall Casuariiforms - emu, casuaries (20 sp.)

- First largest flightless bird in densely wooded part of Australia.
- 20 spp. of casuaries.
- Very shy in nature.
- They are fond of 'bathing'.
- There are 3 claws in toes.
- Males are very attacking (offensive).

eg. Emu, All casuaries (20 spp.)

2nd largest flightless bird

O-4. Apterygiforms -

eg. Apteryx (Kiwi) National Bird of New Zealand.

- Smallest living flightless bird.
- Size = Domestic hen.
- 3 toes in front.
- Wings are rudimentary.

- Head & eyes are comparatively smaller.
- Nocturnal.
- Burrowing in habit.
- Kiwis lays a largest egg of any known animal comparative to the body weight and size - almost half of the body weight.

5. Dinorhithiforms → e.g. Moa. (Dinornis maximus)

- It is almost extinct now but -
- They lost all flight machinery.
- 6. Aepyornithiforms
- Giant elephant bird (Aepyornis titan)
- No more exist but 2 species still exist.

7. Tinamiforms →

2 species. i. bird egg (Tinamus)

New concept * Limited distribution of flightless birds
proves their origin from flying bird
but not from reptiles.

(old concept): Flightless bird bifurcated from stock showing that they are ancient (old concept)
⇒ Palates in birds - evolution goes on what -
① Huxley classified birds depending upon palates.

② Paleognathae



③ Neognathae



PALATE: There are several bones which are articulated to produce palate.

comparative

