

ZOOLOGY (HONS.)

SEMESTER 3

CORE COURSE 5 : Chordata

ZOOA-CC3-5-TH

UNIT -6

REPTILIA



General characteristics and classification up to living Orders (Young, 1981)

Definition of Reptiles: Reptilia can be defined as class of poikilothermic (An organism, such as a fish or reptile, having a body temperature that varies with the temperature of its surroundings; an ectotherm.) true terrestrial animals whose bodies are covered with dead dry cornified (The conversion of squamous epithelial cells into a keratinized horny material, such as hair, nails, or feathers) epidermal scales and whose digital tips are provided with claws and who appear to be crawling during locomotion.

Parker and Haswell (1962) said that reptilian is a heterogenous group who possess the above characters moreover lack the diagnostic characters of birds and mammals.

Classification: The classificatory scheme of class Reptilia was presented by Romer and Watson (1962). The same classification appeared in Text Book of Zoology Vo. II. Written by Parker and Haswell (1962) and edited by Marshall. The same scheme has been followed by Young (1981) with some variations in minor details.

The classification scheme of the class Reptilia follows Young's classification (1981):

In the classification of Class Reptilia only those subclasses which have living orders under them have been discussed here.

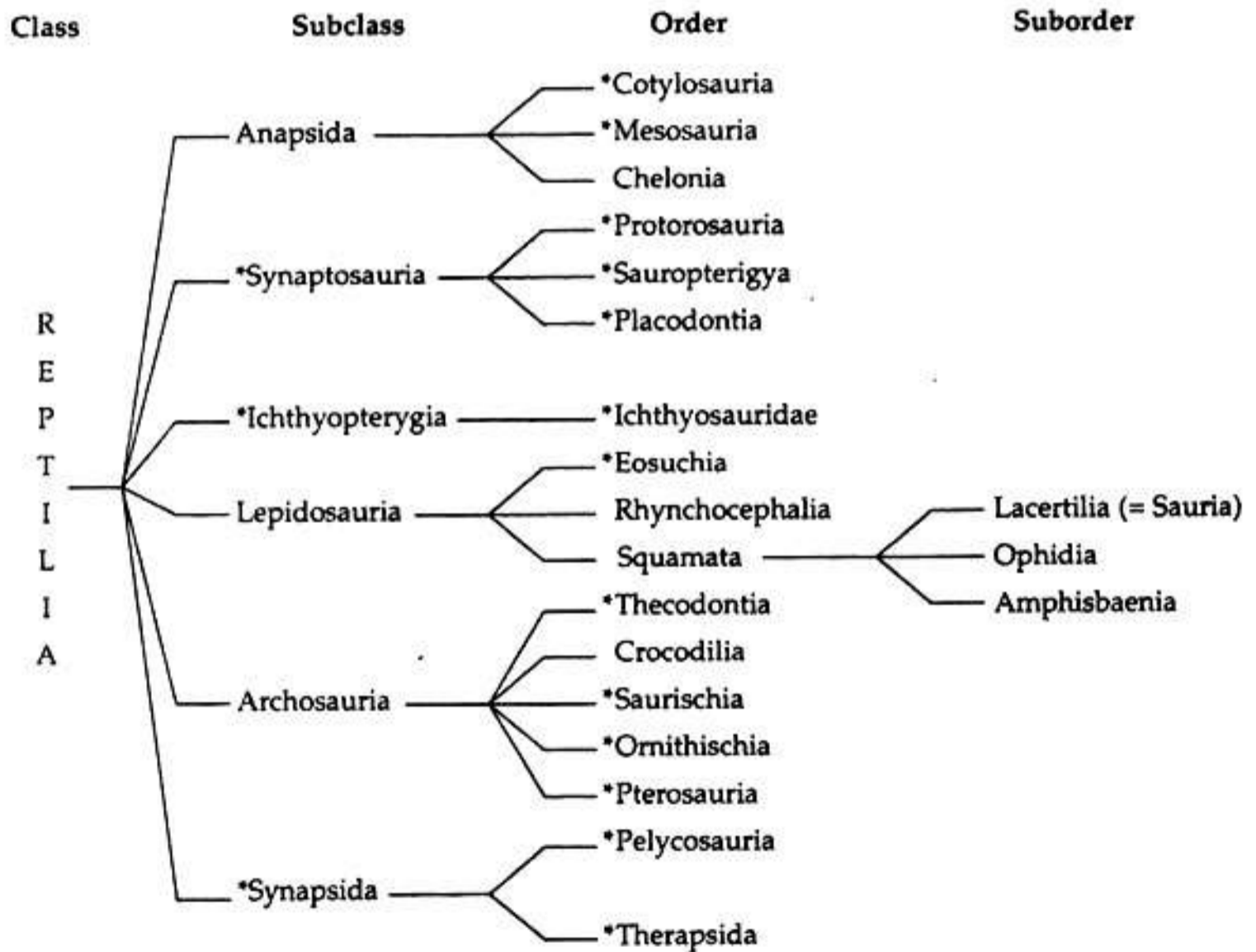
General characters of Class Reptilia:

1. Bilaterally symmetrical body, triploblastic, body covered with dry cornified skin which possess scales, scutes and shields.
2. Paired limbs, pentadactyles (Having five fingers or toes on each hand or foot) and clawed (limbs absent in snake).
3. Endoskeleton completely boney.
4. Single occipital condyle (A single or paired bony knob that protrudes from the occipital bone of the skull and articulates with the first cervical vertebra).
5. Presence of upper eyelids, lower eyelids and a nictitating membrane.
6. Tympanic membrane present (except snake).
7. Heart 3 chambered, 2 auricles and an incompletely divided ventricle. Heart four chambered in crocodiles.
8. No conus arteriosus.
9. All are poikilothermic.
10. Only pulmonary respiration takes place.
11. Kidney metanephric type.
12. Anal opening transverse, longitudinal in crocodilian and chelonian.
13. Male with copulatory organs except Sphenodon.
14. Brain more developed than amphibian and there are 12 pairs of cranial nerves except snakes.
15. Fertilization internal.
16. Female lay large shelled eggs.
17. Foetal membranes in the form of amnion, chorion, allantois and yolk sac, develop within the eggs.
18. There is no metamorphosis.

Outline classification

Class Reptilia has been divided into six (6) sub-classes. They are-

Classification scheme of Reptilia



On the basis of fossa or fossae of the reptilian skull they are classified into four groups (Fig. 1.81):

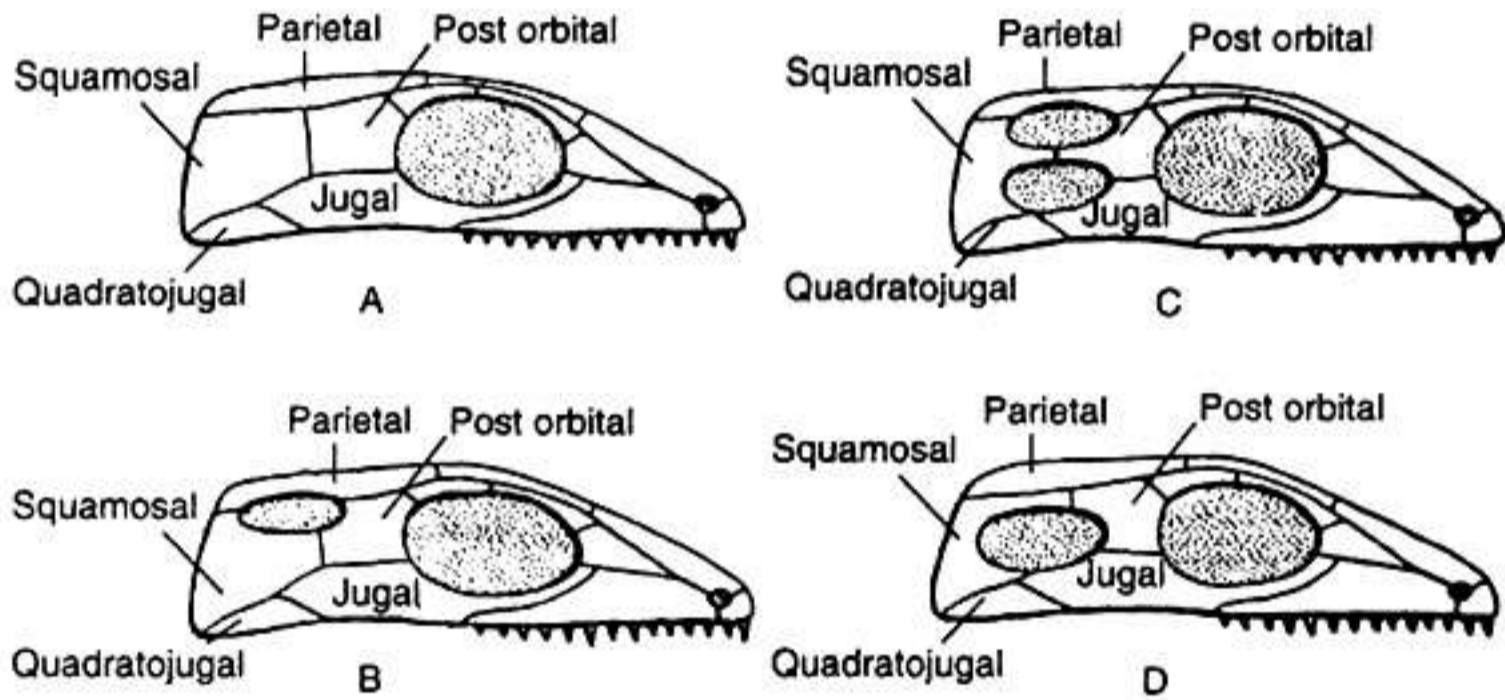


Fig. 1.81 : Different types of skull of reptiles : A. Anapsida, B. Parapsida, C. Diapsida, D. Synapsida

Classification with reasons and examples-

Subclass 1. Anapsida

Characters-

1. Roof of the skull is complete
2. There is no temporal vacuity in the skull. (There are three orders under this subclass.)

Order 1. Cotylosauria

Characters-

1. Complete roofy skull.
2. Pelvic girdle is disk-like and flat.

Examples- *Captorhinus, Diadectes*

Order 2. Mesosauria

Characters-

1. They were fresh water in habit.
2. Limbs modified into swimming paddles.
3. Long tail laterally compressed.

Order 3. Chelonia

This is one of the living order of the Reptilia and they are commonly known as boxed reptiles or reptiles in a box.

Characters-

1. Body is broader than its length so appears to be round in shape and dorso-ventrally flattened.
2. Body covered with shells, dorsal convex one is known as carapace, ventral flat one is known as plastron, both are reinforced by bony elements from inner side and by horny material from outside.
3. Pectoral girdle fuse with the carapace but the pelvic girdle is surrounded by ribs within the box.
4. Head, neck, limbs and tail can be retracted within the box.
5. In tortoise digits are free but in turtles digits are fused to form a swimming paddle.
6. Jaws are without any teeth but with horny sheath.
7. Lungs are spongy.
8. Kidney metanephric type.
9. Male with copulatory organ.
10. Cloacal opening longitudinal.
11. Oviparous, females make nest on land where eggs are laid.

Examples: *Trionyx, Emys, Testudo, Kachuga*

Subclass 2. Synaptosauria

Characters:

1. Single temporal vacuity high up in the skull a condition known as parapsid condition. There are three orders under this class.

Order 1. Protosauria

Characters-

1. Primitive lizard like reptiles.
2. Vertebrae amphicoelus (Amphicoelus vertebrae are vertebrae in which the main body is concave in the front (anterior) and back (posterior)).

Examples- *Araeoscelis*

Order 2. Sauropterygia

Characters-

1. Aquatic, long neck, limbs modified into paddles.
2. Vertebrae amphicoelus.

Examples- *Plesiosaur, Lariosaur*

Order 3. Placodontia

Characters-

1. Jaws and palate were provided with grinding teeth.

Examples- *Placodus, Cyamodus*

Subclass 3. Ichthyopterygia

Characters-

1. Single temporal vacuity low down in the skull a condition known as eurapsid condition.
2. They all were aquatic.

This sub-class has only one order.

Order 1. Ichthyosauridea

Characters-

1. Aquatic and stream lined body.
2. Large dorsal and tail fin.
3. Vertebrae amphicoelus.
4. Limbs modified into paddles.
5. Stout very long, teeth in the jaws.

Example- *Ichthyosaur*

Subclass 4. Lepidosauria

Characters-

1. Skull diapsid

Order 1. Eosuchia

Characters-

1. Lizard like.
2. Teeth on jaw and palate.
3. Inter parietal bone present.

Example- Youngina

Order 2. Rhynchocephalia

Represented by a single genus, a single species known as *Sphenodon punctatum*. They are restricted to the coastal islands of New Zealand.

Characters-

1. Terrestrial, burrowing, nocturnal and insectivorous.
2. Skull diapsid (The name Diapsida means “two arches”, and diapsids are traditionally classified based on their two ancestral skull openings (temporal fenestrae) posteriorly above and below the eye.), jaw with acrodont teeth (having no roots).
3. Premaxilla hangs like a beak.
4. Teeth wedge shaped hence the name Sphenodon.
5. Male without any copulatory organ.
6. Parietal and penial organs present.

Example- *Sphenodon*

Order 3. Squamata

Characters-

1. Skull diapsid.
2. Body distinctly divided into head, neck and trunk.

Suborder 1. Lacertilia (all lizards)

Characters-

1. Elongated body with head, neck, trunk and tail.
2. Eyes with nictitating membrane.
3. Typical diapsid skull.
4. Heart with 3 chambers.
5. Anal opening transverse.

Exmples- *Calotes, Gecko, Mabuia, Draco* etc.

Suborder 2. Ophidia

Characters-

1. Body worm-like, cylindrical without any limbs or limb girdles (vestiges of pelvic girdles are found in Boa and Python).
2. No eyelids.
3. No tympanic membrane.
4. Tongue bifid.
5. Skull streptostylic (skull bones are movable).
6. In poisonous snakes maxillary teeth are modified into grooved poison fangs.
7. Poisonous snake with poison gland.

Examples- *Naja naja naja, Vipera russeli* etc.

Subclass 5. Archosauria

Characters-

1. Skull diapsid
2. No palatine teeth.

Order 1. Thecodontia

Characters-

1. Teeth are present in the socket.

Examples- *Euparkeria*

Order 2. Crocodilia

Characters-

1. Long robust body.
2. Jaws very powerful.
3. Amphibious in habit.
4. Maxilla, palatine and pterygoid form a secondary palate.
5. Powerful eyes.
6. Forlimbs with 5 digits and hind limbs with 4 digits
7. They make nest on ground.

Examples (Indian)- *Crocodylus porosus*, *Alligator mississippiensis*, *Gavialis gangeticus*

Subclass 6. Synapsida

Characters-

1. Heterodont teeth (The anatomical term heterodont refers to animals which possess more than a single tooth morphology).
2. Lower jaw laterally pressed.
3. Large dentary.

Examples- *Varanosaurus*, *Cynognathus*