

S. S. College, Jehanabad

Department: Zoology

Class: M.Sc. Semester IV

Subject: Zoology

Topic: General organization of Holocephali

Mode of teaching: Google classroom & WhatsApp

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Q.13. Holocephali. (Structure & Affinities)

→ Classification →

Phylum - Chordata

Subphylum - Craniata

Superclass - Crinothostomata

Division - Pisces

Class - Holocephali

Genus - Chimaera

Introduction → Holocephali is a group of specialized ancient sea-fish which produces first of all in lower Tertiary period. It has characters of elasmobranch and teleost fishes as well as some special characters are also present. Dean, Leis, Woodruff, Chermann and Collige scientists has been proposed large description about holocephali.

Holocephali has following genera:-

(i) Squaloza } Extinct

(ii) Myriacanthus }

(iii) Callorhynchus antarcticus (Living):- found in south pacific

(iv) Chimaera monstrosa (Living) or

'King of Herrings' - found in Europe, Japan, Australia etc.

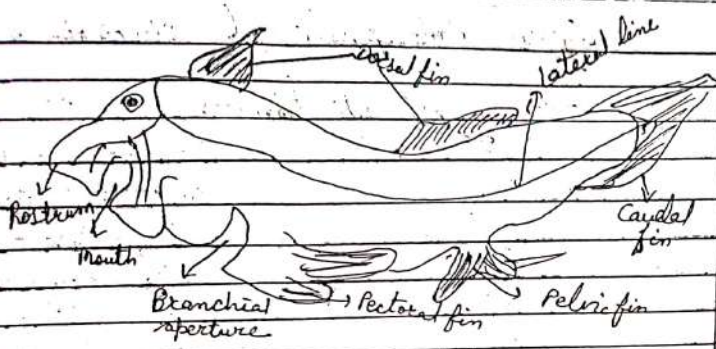


Fig. *Callothynechus antasticus*

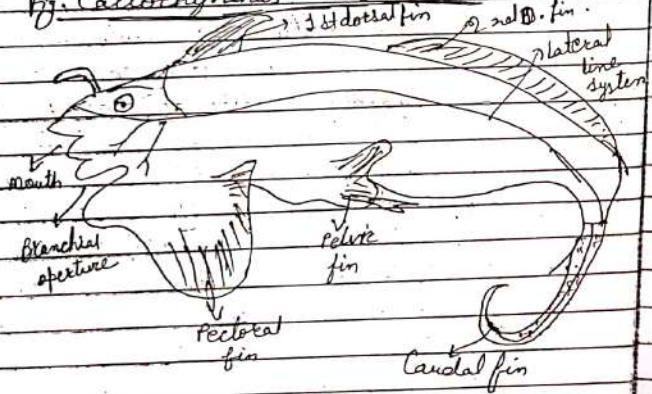


Fig. *Chimaera morosus*

(*Harriota pinatta* (living) - 'Found in deep sea of N. America. It is called ghost fish.

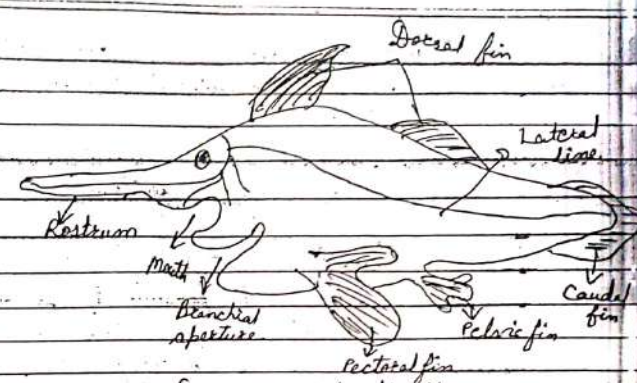


Fig. *Harriota pinatta*

Structural details of modern Holoccephali

Morphology →

- (i) Body sharp like and large head.
- (ii) Length of body is about 1.3 feet.
- (iii) Skin is soft muciligenous and sidery & clasper has placoid scale.
- (iv) Mouth bounded by three lip like folds which supported by lateral cartilage.
- (v) Claws absent and separate opening of anus and urogenital aperture.
- (vi) Dorsal, caudal, pectoral & pelvic fin are present.

(vii) Tail heterocercal but chimaera tail is modified in a filament like structure.

(viii) Lateral line system is well developed.

Endoskeleton \rightarrow

(i) Notochord persistent and uncontracted in which there is found cartilaginous arches. In chimaera notochord sheath has calcified rings.

(ii) Skull indistinct.

(iii) ~~The~~ Teeth as a tooth plate which has irregular layers.

(iv) The structure of bony arches are like branchial arches.

Visceral anatomy \rightarrow

(i) Alimentary canal \rightarrow Real stomach absent and a spiral valve in intestine.

(ii) Respiratory organ \rightarrow It included three pairs of holobranch and two pairs of hemibranch. Interbranchial septum reduced.

(iii) Nervous system \rightarrow In brain cerebral hemisphere is small and spindle shaped which connected by olfactory bulb through peduncle. Diencephalon is long. Pineal body present on pineal stalk.
Pituitary body made up in two parts infra and extra cranial portions.

(iv) Urinogenital organ \rightarrow

(a) one pair of deep red colour kidney also present which made up of uriniferous tubules.

(b) In female reproductive system one pair of ovaries and uterus present.

(c) In male one pair big and small testis present in which immatured ~~eggs~~ Eggs are filled with immatured egg. Vas deferens arises from testis which coiled in head region to form epididymus.

Affinities and systematic position
 \rightarrow According to F.W. Bridge Holocephali show similarities with

Chasmobranchs and teleosts as well as Holocephali has also peculiar characters hence divided as separate group:

(A) Resemblances with the chasmobranchs →

- (i) Smooth & silvery skin
- (ii) Placoid scale in clasper region
- (iii) Cartilaginous skeleton
- (iv) Heterocercal tail
- (v) Presence of spiral valve in intestine
- (vi) Similar brain & heart
- (vii) Absence of air bladder
- (viii) Urinogenital organs
- (ix) Persistent notochord
- (x) Large egg & similar mode of development

(B) Resemblances with teleosts →

- (i) An operculum covering of the gills
- (ii) Presence of single branchial aperture
- (iii) Reduced inter branchial septum
- (iv) Absence of cloaca
- (v) Absence of spiracle

(C) Special features of Holocephali -

- (i) Presence of anterior and ventral clasper
- (ii) Presence of tooth plate composed of vasodentine (enamel absent)
- (iii) Holostylic skull
- (iv) Mouth is bounded by lip like folds

Conclusion →

We can say that Holocephali produced from these primitive shark ancestor in which has found unmodified notochord. These Holocephali slowly leave off some characters like scales, spiracles, cloaca and etc. and some characters too take off like extra clasper in anal development as a specialised group.