Museum Specimens for Phylum Coelenterata compiled by: Dr. P. Jayaraj

Illustration Credit: Shalini, B.Sc (H) Zoology

Flow chart-Coelenrata

PHYLUM COELENTERATA

Class - Hydrozoa

Freshwater/marine

Solitary/colonial

Polyps without stomodaeum and septa

Medusae with true velum

Mesoglea noncellular

e.g. *Obelia*, *Physalia*, *Millepora*

Class - Scyphozoa

Exclusively marine, solitary

Medusa dominant stage, polyps reduced or absent

Mesoglea gelatinous

e.g.*Aurelia*

Class 3 Anthozoa (Actinozoa)

Exclusively marine, solitary /colonial

All polyps, no medusa

Mesoglea stout and cellular

Gastrovascular cavity divided by 8 or more septa or mesenteries

Mesenteries with nematocyst

e.g. *Tubiopora*, *Metridium*, *Corallium*, *Gorgonia*, *Favia*,*Alcyonium*, *Medrepora*, *Meandrina*, *Pennatula*, *Fungia*

Tubipora

Flow chart-Coelenrata

Common name: Organ pipe coral

Geographical Distribution: Found on coral reefs in warm waters of Atlantic,Indian and Pacific oceans.

Scientific Classification with Justifications

Phylum- Coelenterata: Multicellular, tissue grade, diploblastic and acoelomate

Class- Anthozoa: Exclusively marine and polypoid, medusoid stage absent; symmetry hexamerous, octomerous or polymerous; stomodaeum with one or more siphonoglyphs; gastrovascular cavity divided by complete or incomplete mesenteries.

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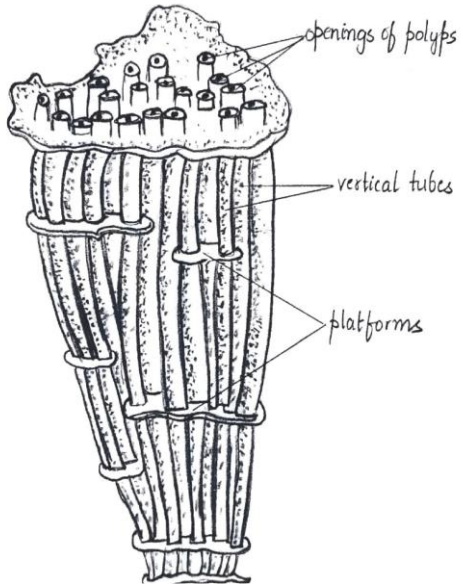
Characteristic features:

1. It is a marine colonial polypoid Anthozoa.
2. Colony consists of long parallel upright polyps enclosed in vertical skeleton tubes arising from a basal plate.
3. The polyps are united at definite intervals by **transverse or horizontal platforms** which are formed by the fusion of spicules.
4. The skeleton consists of a mass of closely erect tubes united at spaced levels by transverse platforms.
5. The skeleton is internal as it is covered by ectoderm in living condition.
6. The mesogleal spicules become closely fitted together and form a continuous tube for each polyp.
7. The polyps are green in colour, but skeleton becomes dull red due to the presence of iron salts.
8. Reproduction is **asexual** by budding.



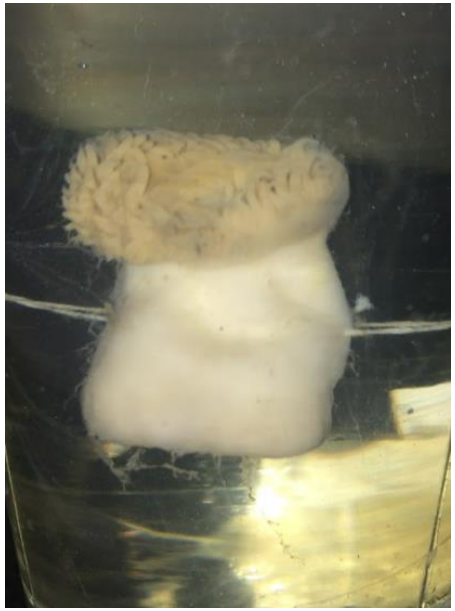
Tubipora

Additional resources:

https://www.youtube.com/watch?v=QQK-uHCr0HE

Metridium

Flow chart-Coelenrata



Common name: Plumose anemone or Sea anemone

Geographical Distribution: In the cooler waters of the northern Pacific and Atlantic oceans.

Scientific Classification with Justifications

Phylum: Cnidaria: Presence of special stinging cells called ‘Nematocysts’.

Class: Anthozoa: Tropical marine *habitat*. Mouth surrounded by tentacles with nematocysts.

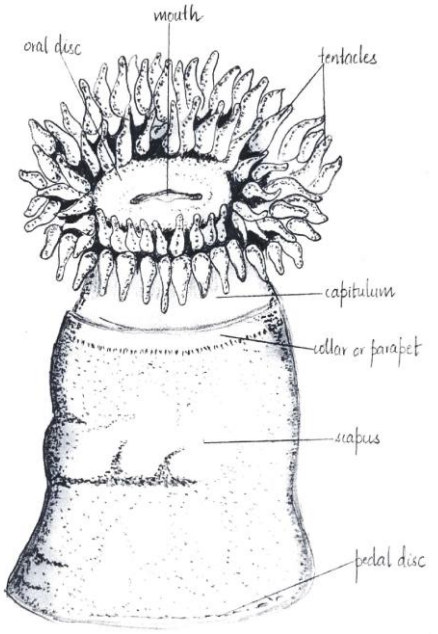
Partitioned gastrovascular cavity. Secretes non-living substance around outside

of *body* to support and protect *soft body* tissues.

Reproduces sexually by producing a free-swimming larva (planula) or asexually by budding or fission.

Characteristic features:

1. Body is cylindrical and divisible into 3 distinct regions; **pedal disc**, **column** and **oral disc**.
2. Pedal disc (foot) helps in attachment with substratum.
3. Column is differentiated into two parts: **Capitulum** (thin-walled) and **Scapus** (thick-walled).
4. The wall of scapus is perforated by small openings called **cinclides**.
5. Oral disc has a mouth in the centre which is surrounded by **numerous tentacles**.
6. Mouth opens into gastrovascular cavity via a short gullet.
7. Sea anemones are predaceous, immobilizing their prey with the aid of specialized stinging cells called **nematocysts.**
8. They feed on small planktons.
9. **Sexes are separate**. Gonads are present on mesenteries.



Metridium

Additional resources:

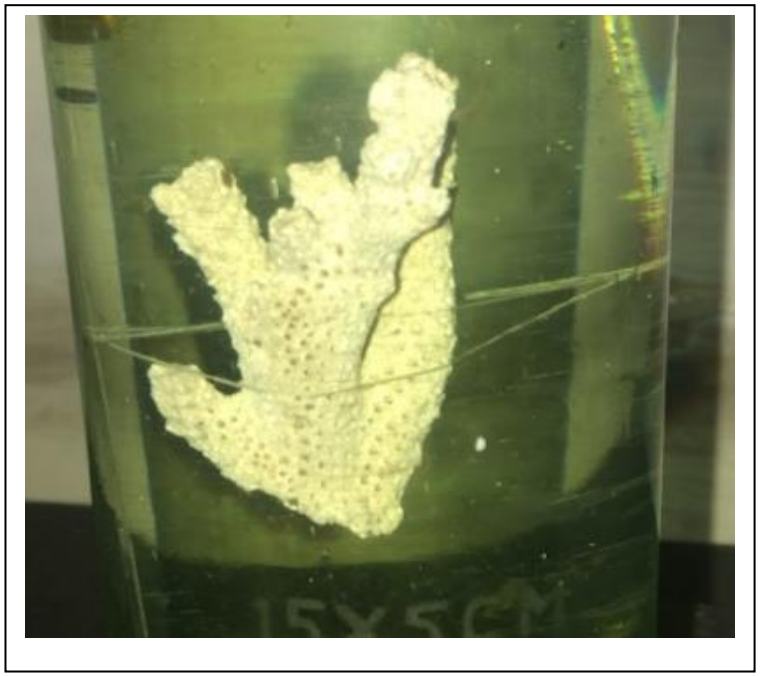
https://www.youtube.com/watch?v=ZeL97_YmfEI

Millipora

Flow chart-Coelenrata

Common name: Fire coral / Stinging coral

Geographical Distribution: In the Caribbean Sea, the Gulf of Mexico, Florida, the Cape Verde Islands and along the coast of Central and South America.



Scientific Classification with Justifications

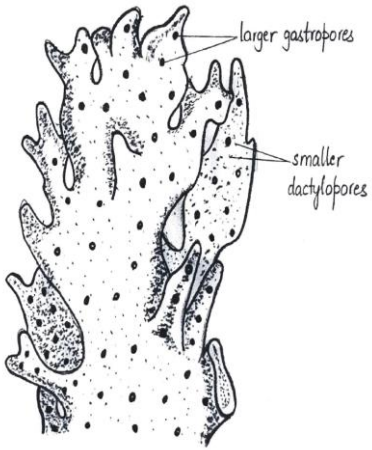
Phylum: Coelenterata: The presence of Nematocyst Cnidoblast Cells.

Class: Hydrozoa: Polyps without stomodaeum and septa; medusae with true velum.

Order: Anthoathecata: Polyps are not enclosed in hydrothecae and the medusae are also naked without gonotheca..

Characteristic features:

1. Colony consists of branching calcareous growths up to 30-60 cm in height and is white or yellowish in colour.
2. Epidermis secretes a calcareous perisarc which forms a broad base through which it is attached to the rocks.
3. The body surface contains innumerable pores which are of two types:
    a. Large gastropores; separated by each other by a distance of 1-2 mm.
    b. Small dactylopores, distributed irregularly.
4. Colonies have 2 kinds of zooids - gastrozooids and dactylozooids.
5. Gastrozooids are nutritive zooids which protrude through gastropores.
6. These are shorter and have a mouth surrounded by 4-6 tentacles.
7. Dactylozooids or protective zooids arise from dactylopores.
   These are longer, slender and are devoid of mouth. They are provided with short tentacles beset with batteries of namatocysts.
8. Medusae or gonophores are minute which do not have mouth and tentacles.
9. They bud off directly from the coenosarc and are present in calcareous rounded chambers called ampullae.



Millipora

Additional resources:

https://www.youtu.be/Lpd5HRPKNac

Corallium

Flow chart-Coelenrata

Common name: Red coral/ precious coral

Geographical Distribution: Western pacific, notably around Japan and Taiwan. Mainly found in Mediterranean Sea

Scientific Classification with Justifications

Phylum- Coelenterata:mulicellular;tissue grade;diploblastic and acoelomates

Class- Anthozoa: exclusively marine and polypoid, medusoid stage absent; symmetry hexameruos,octamerous or plymeruos

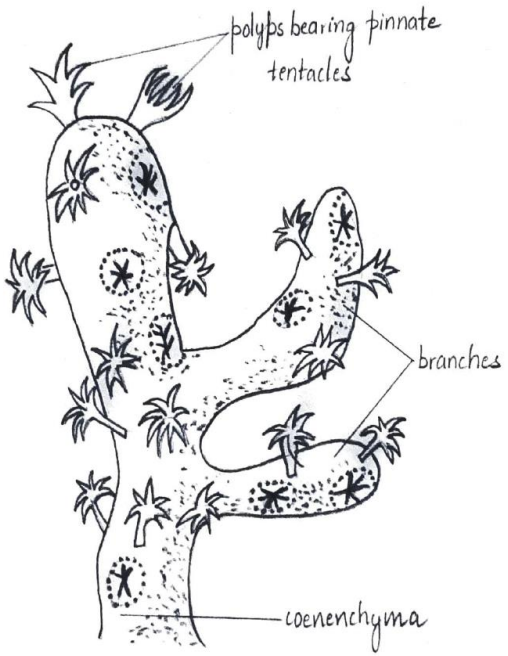
Order- Gorgonacea: colony plant like; axial skeleton of calcareous spicules or horn like material called gorgonin

Genus- ***Corallium***

Characteristic features:

1. Grow on rocky bottoms of the sea with low sedimentation, typically in dark environments
2. They are durable and intensely coloured red or pink-orange skeleton which is why they are used in making jewelries
3. They have shape of small leafless bushes and grow upto a meter in height
4. Skeleton is composed of intermeshed spicules of hard calcium carbonate
5. They are coloured in red and shades of red by carotenoid pigments
6. The polyps exhibit octameric radial symmetry
7. White transparent corallium polyps,each bearing eight tentacles form tall branching tree like colonies
8. Also known as; angel skin coral, midway coral,noble coral,Sardinia coral

Additional resources:
https://www.youtube.com/watch?v=-5p154fozcA



Corallium

Gorgonia

Flow chart-Coelenrata

Common name: Sea fan, sea whips or sea feathers

Geographical Distribution:. Sea fans are found in South Atlantic, Indo-Pacific, West Indies and also in Malay Archipelago, Bemunda and Bahamas.

Scientific Classification with Justifications

Phylum- Coelenterata:mulicellular;tissue grade;diploblastic and acoelomates

Class- *Anthozoa*: Exclusively marine, medusoid stage absent. Gastrovascular cavity divided by complete or incomplete mesenteries.

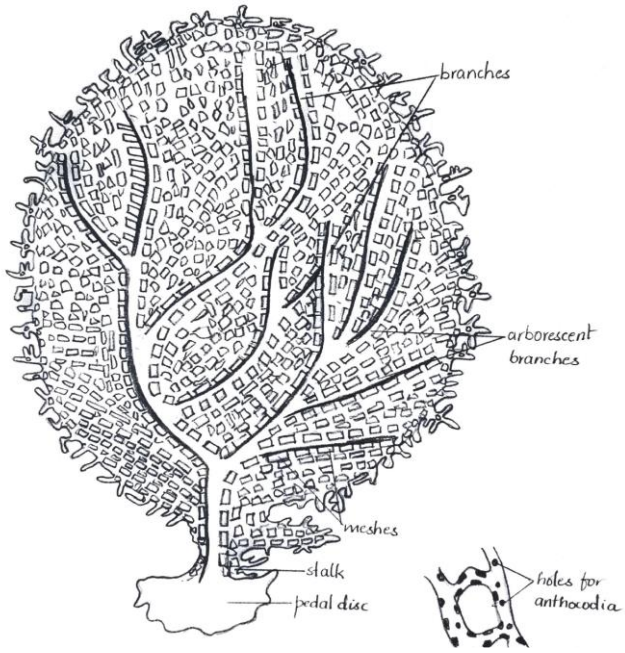
Order - Gorgonacea

Genus - *Gorgonia*

Characteristic features:

1. Marine, colonial, shallow water anthozoa.
2. Plant like branching system, attached to substratum by a pedal disc.
3. Branches are in one plane and are connected by many cross-branches forming a mesh or **network**.
4. Pedal disk act as a **hold fast organ** where the base of the colony is expanded.
5. Small anthocodia found on two sides of the stem.
6. Skeleton: Axial rod, made of horn like material, gorgonin, ectodermal origin.
7. Contains spicules in mesoglea of coenosarc.
8. Yellow, reddish colour colony.

Additional resources:
https://www.youtube.com/watch?v=fFwPW6L2Mvk



Gorgonia

Obelia

Flow chart-Coelenrata

Geographical Distribution: From arctic region to the Gulf of Mexico and the pacific coast and from southern California to Oregon

Scientific Classification with Justifications

PHYLUM:-Coelenterata:multicellular,tissue grade,dip[loblastic and acoelomate,having nematocysts

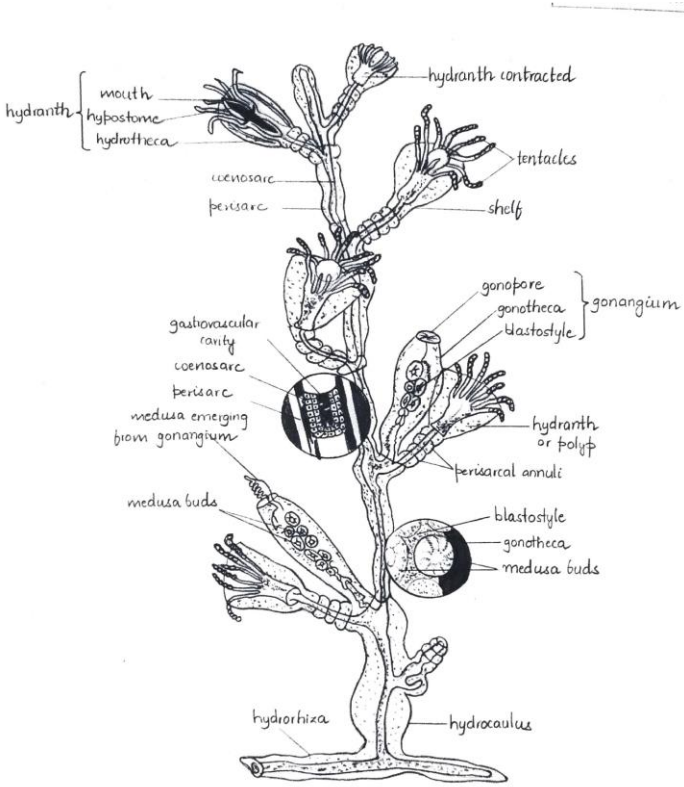
CLASS:-Hydrozoa:hydroids bearing medusa with true velum

GENUS:-***Obelia***

Obelia 4X image

Characteristic features:

- Obelia is a genus of hydrozoans, which consists mainly of marine and some freshwater animal species and have both the polyp and medusa stages in their life cycle.
- The polyp colony reproduces asexually
- The physical appearance of the male and female medusae velum, including their gonads, are indistinguishable, and the sex can only be determined by observing the inside of the gonads, which will either contain sperm or eggs.
- The main stalky body of the colony is composed of a coenosarc, which is covered by a protective perisarc.
- Through its life cycle, Obelia take two forms: polyp and medusa
- They are diploblastic, with two true tissue layers – an epidermis (ectodermis) and a gastrodermis (endodermis), with a jelly-like mesoglea filling the area between the two true tissue layers.
- They carry a nerve net with no brain or ganglia.
- A gastrovascular cavity is present where the digestion starts and later becomes intracellular



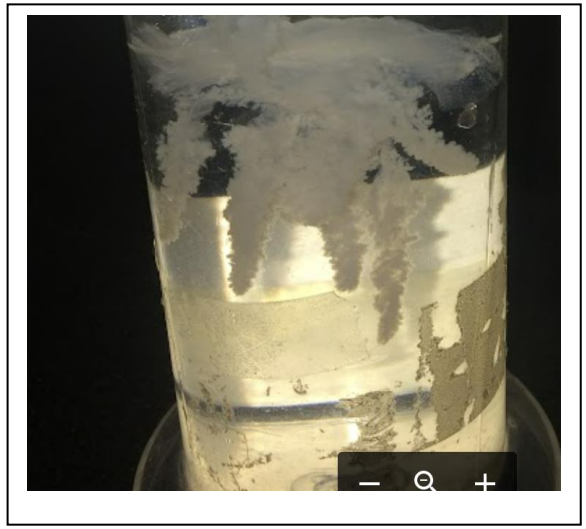
Obelia

Additional resources:

https://youtu.be/YITCAWl1uL8.

Aurelia

Flow chart-Coelenrata



Common name: Common jellyfish, moon jelly, or saucer jelly'

Geographical Distribution: Coastal waters of all oceans of the world.

Scientific Classification with Justifications

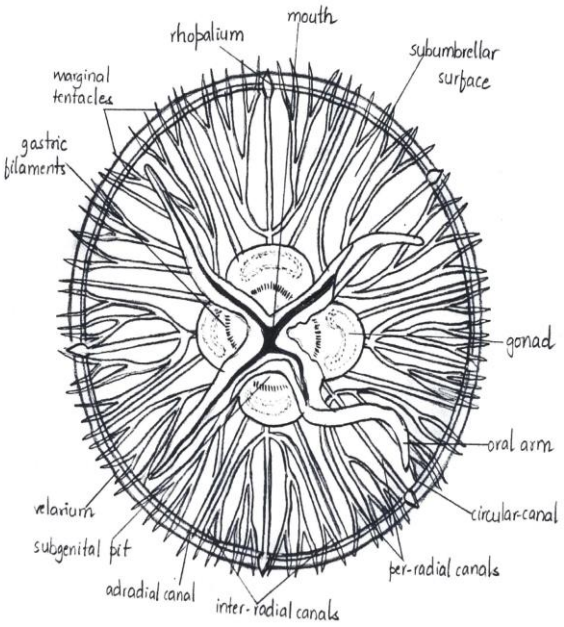
Phylum- Coelenterata: The body has single opening called hypostome surrounded by sensory tentacles that bear stinging cells or nematocysts.

Class- Scyphozoa: An exclusively marine class of the phylum- coelenterate, referred to as the true jellyfish. They have tentaculocysts as marginal sense organs.

Genus-***Aurelia***

Characteristic features:

1. Commonest jellyfish.
2. Solitary, marine jelly fish.
3. Medusa is bowl or saucer-shaped having tetramerous radial symmetry.
4. The medusa or umbrella has a slightly convex upper surface known as **exumbrellar surface** and a lower concave, the **subumbrellar surface**.
5. The margin of the umbrella is divided into eight lobes or lappets by notches. Each notch contains a **tentaculocyst** or **rhopallium** enclosed by a pair of marginal lappets.
6. Numerous short, hollow tentacles are present all round along the margin of the umbrella and are known as marginal tentacles.
7. The mouth is four-cornered situated on the short manubrium, which hangs down in the centre of subumbrellar surface.
8. Mouth leads into short gullet which opens into stomach. The stomach gives rise to four inter-radial gastric pouches.
9. On the subumbrellar surface lying between the oral arms are four rounded apertures leading into shallow pouches called **subgenital pits**.
10. It is unisexual. The four gonads (testes or ovaries) lie on the floor of the gastric pouches.
11. The fertilized ovum develops into a free-swimming **planula,** and finally into fixed **scyphiostoma** which gives rise to adult by transverse fission.



Aurelia

Additional resources:

https://youtu.be/oNgeR_xFwpQ

Madrepora

Flow chart-Coelenrata

Common name: Stag horn-coral

Geographical Distribution: It is a marine form and lives in colonies. It is commonly found in Florida and West Indies

Scientific Classification with Justifications

Phylum- Coelenterata: mulicellular;tissue grade;diploblastic and acoelomates

Class- Anthozoa: exclusively marine and polypoid, medusoid stage absent; symmetry hexameruos,octamerous or plymeruos

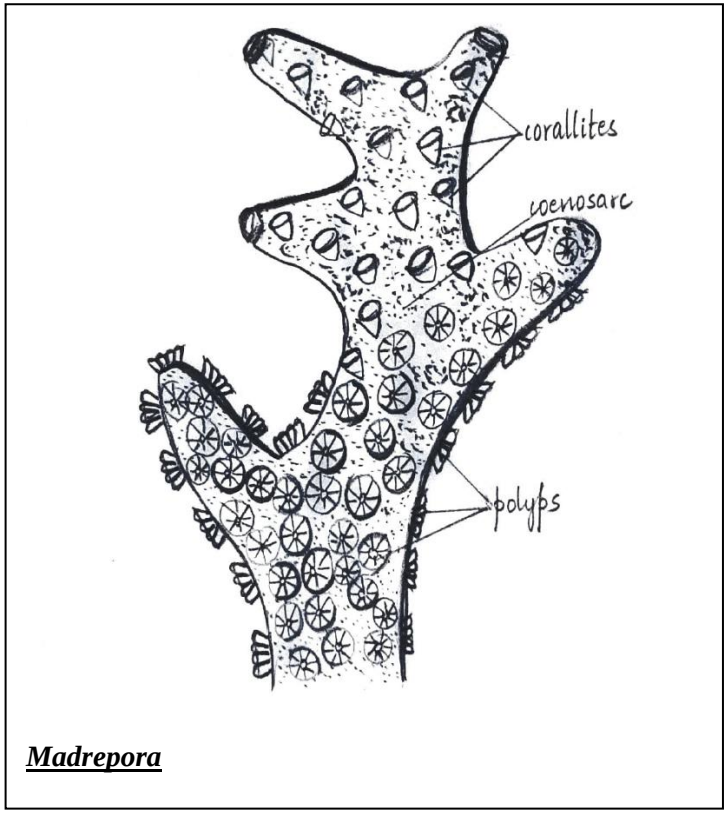
Order - Madreporaria

Genus - *Madrepora* or *Acropora*

Characteristic features:

1. Also called, ***Acropora***, it is a **colonial coral**.
2. Colony is highly **branched**, partly **porous** or **reticulate**.
3. Branching is less towards periphery.
4. The branches bear numerous small **polyps** in elevated cups separated by perforated coenosteum.
5. Polyps appear flower-like.
6. Terminal and lateral polyps contain six and twelve **tentacles**, respectively.
7. Corallite is made up of **calcium carbonate** and is secreted by the **basal disc** of polyp.
8. Corallite is **without any central columella**.
9. Colony increases in size by growth and budding of polyps.
10. The skeleton of ***Madrepora*** is very hard and it thus, plays an important role in
11. **coral reef formation**. It is thus, also called **hermatypic coral**

Additional resources:
https://www.youtube.com/watch?v=BRxohtySgL0



Madrepora

Alcyonium

Flow chart-Coelenrata

Common name: Dead man's fingers or Soft coral

Geographical Distribution: These are found mainly in temperate or cold seas,

Atlantic Waters on the North American Coast, Indo-Pacific Ocean waters or even in polar seas.

Scientific Classification with Justifications

Phylum- Coelenterata: mulicellular;tissue grade;diploblastic and acoelomates

Class- Anthozoa: exclusively marine and polypoid, medusoid stage absent; symmetry

hexameruos,octamerous or plymeruos

Order - Alcyonacea

Genus - *Alcyonium*

Characteristic features:

1. The polyps are elongated and yellow in colour.

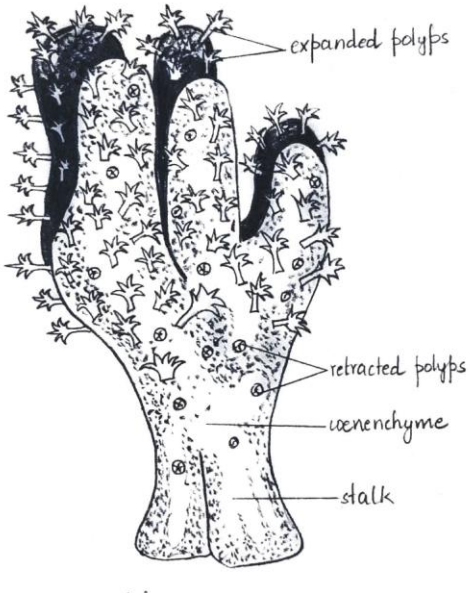
2. The anthocodia or polyps are buried on the coenchyme in such a way that only the oral
3. ends of these polyps are visible.

4. Stimulus pulls the anthocodia inside the gastrovascular cavity as a result of which the
5. whole column of the polyp gets inverted.

6. External fertilization takes place with a free swimming larval stage called Planula larva.

Additional resources:

https://www.youtube.com/watch?v=ArkMaRYBGWY



Alcyonium

Physalia

Flow chart-Coelenrata

Common name: Portuguese man-of-war
Geographical Distribution: The Portuguese man-of-war is a pelagic marine animal, blown about by the winds and pushed around by the currents. Men-of-war are most often found in warm, tropical and subtropical waters of the world's oceans

Scientific Classification with Justifications

Phylum: Coelenterata: The presence of Nematocyst Cnidoblast Cells.

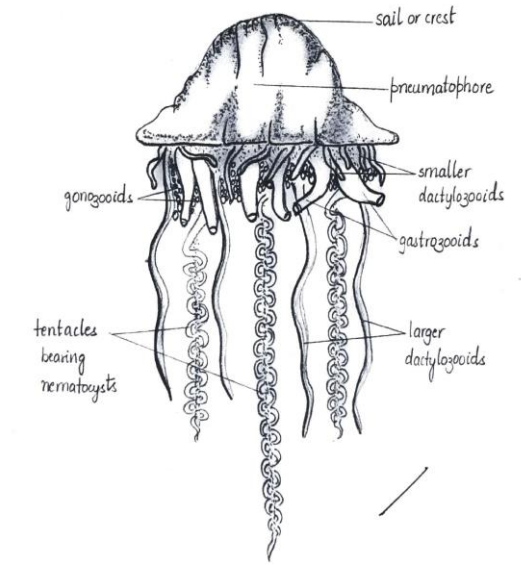
Class: Hydrozoa: Polyps without stomodaeum and septa; medusae with true velum.

Order: Anthoathecata: Polyps are not enclosed in hydrothecae and the medusae are also naked without gonotheca.

Characteristic features:

1. It is a colonial sponge. The colony bears a transparent bluish or pinikish balloon-like large float or pneumatophore at the top.
2. The pneumatophore floats above the surface and the whole colony remains inside water.
3. A pair of gas glands are located on the lower side along the inner surface and are responsible for floating of the colony.
4. The gas glands secrete gases similar in composition as air. The gas is a mixture of 90%; 1.5-3.5% 02 and other gases 5-7%.
5. The colony is polymorphic and is comprised of bunches of zooids comprising of a large gastrozoid in the centre, a few gonozoids along the base of gastrozoid and numerous dactylozoids around the gastrozoid.
6. The gastrozoid has a distinct mouth but no tentacles and is the nutritive zooid.

Additional resources:
https://www.youtube.com/watch?v=Dj5Nq5cL8N8



Physalia

Pennatula

Flow chart-Coelenrata

Common name: Sea Pen

Geographical Distribution: They occur **in shallow and deep waters from polar seas to the tropics**.

Scientific Classification with Justifications

Phylum: Cnidaria: Presence of special stinging cells called 'Nematocysts'.

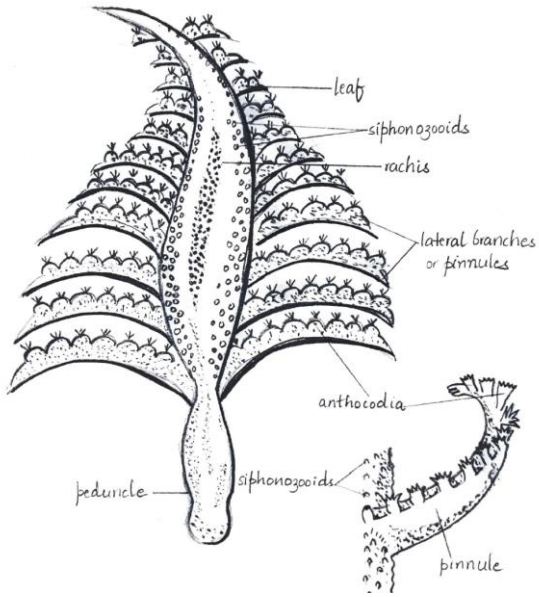
Class: Anthozoa: Tropical marine *habitat*. Mouth surrounded by tentacles with nematocysts.

Partitioned gastrovascular cavity. Secretes non-living substance around outside

of *body* to support and protect *soft body* tissues.

Reproduces sexually by producing a free-swimming larva (planula) or asexually by budding or fission

1. It is commonly known as “sea pen” and is found in the eastern coasts of North America.
2. The colour is usually red and the fully formed colony measures about 10 cm in height.
3. The colony is elongated, dimomorphic, feather-like and is differentiated into a lower peduncle or stalk and an upper rachis.
4. The peduncle is dialated at its lower tip into an end bulb, which remains burried in mud or sand at the sea bottom and is devoid of zoids.
5. The rachis is narow at two ends, dialated in the middle and bears two rows of lateral branches—the pinnules.
6. Each pinnule is a long, slightly curved, flattened and fleshy projection of the rachis and bears, along its upper margin, a row of anthocodia—the autozoids.
7. Each anthocodia (autozold) bears a ring of 8 tentacles, few gonads and mesentaries In multiples of eight. They serve to feed the colony and undertake the task of reproduction also.
8. The rachis, all through its length along dorsal and lateral sides, bears minute spinules— the siphonozoids.
9. The siphonozoids are without tentacles and gonads, with reduced mesentaries and are having distinct siphonoglyphs, which help in producing water currents.
10. Skeleton is a horny axis which supports only the peduncle and rachis but does not extend into pinnules.
11. Sexes are separate.



Pennatula

Additional resources:
https://www.youtube.com/watch?v=kthxHa3Hats