VIDYASAGAR UNIVERSITY

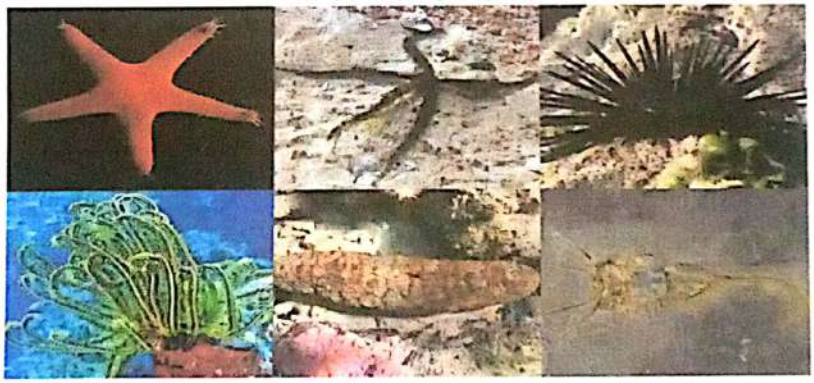
MUGBERIA GANGADHAR MAHAVIDYALAYA

Bhupatinagar :: Purba Medinipur

B.Sc. Zoology (Honours)

A Project on Echinodermata Larva, their Evolution & phylogenetic analysis

SEMESTER - II ;



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Certificate of Completion

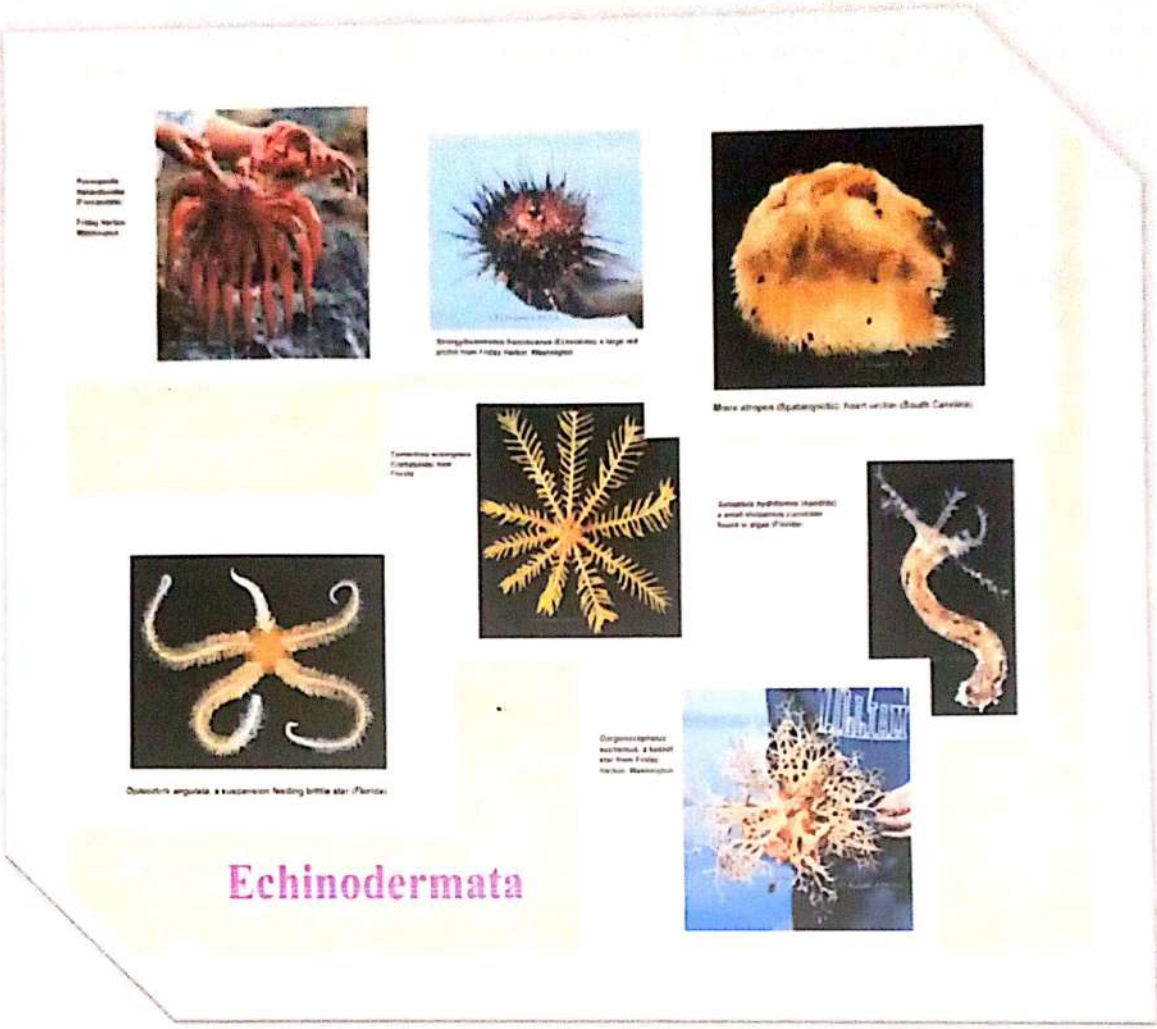
This is to certify that Anup Mandal Roll 1122129 No 220210 a UG student of SEM-II, Department of Zoology has successfully compelet a project on ***Echinodarmata Larva, their Evolution and Phylogenetic Analysis*** for the paper CC-3 (Non-Chordates-II) in the year 2023.

19-09-23
Signature of HOD

19-9-23
Signature of Principal

HOD
Department of Zoology
Mugberia Gangadhar Mahavidyalaya

Principal
Mugberia Gangadhar Mahavidyalaya



A PROJECT ON

ECHINODARMATA LARVA, THEIR EVOLUTION

AND PHYLOGENETIC ANALYSIS

* ACKNOWLEDGMENT *

We would like to express my sincere gratitude and respect to my supervisor Prof. Dr Kousik Mondal, who has given me this opportunity to do this scientific project work under Zoology Department, Mugberia Gangadhar Mahavidyalaya.

CONTENT

INTRODUCTION

Echinoderms (scientific name Echinodermata) are major group of only marine animals. the names come from the greek word for "Spiny skin". their are about 7,000 species found usually on the sea floor in every marine habitat from the intertidal zone to the ocean depths. they have a wide variety of colors. there are at least 800 species of echinoderm on the Great Barrier Reef.

Most living echinoderms like this sand dollar from Baja-California, are pentameral; that is, they have fivefold symetry. with rays or arms in fives or multiples of five. However, a of fossil echinoderms were not pentameral at all, and some had downright bizarre shaped. Echinoderm have a system of internal water-filled canals, which in many echinoderms form suckered "tube feet" with which the animal may move or grip objects.

ABOUT PHYIUM ECHINODERMATA

i) Larvival from is bilateral symmetrical and adult form is radial symmetrical.

ii) Spine present.

iii) Water vascular system present.

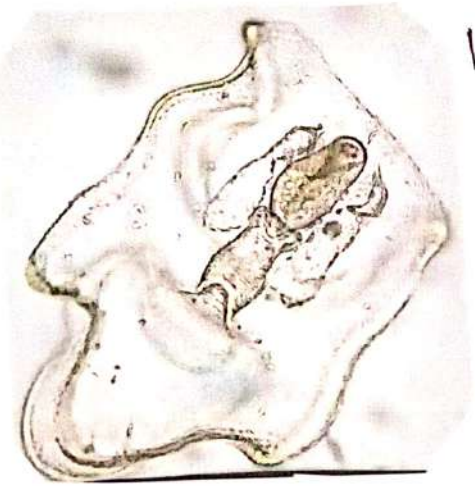
iv) pentamerous arm.

v) Locomotory organ - tube feet.

vi) Endo-skeletal made by calcium carbonate.

BIPINARIA LARVA

✳ Systematic position :-



Kingdom - Animalia
sub-kingdom - Metazoa
phylum - Echinodermata
sub-phylum - Asterozoa
class - Asteroidea
specimen - Bipinaria larva

✳ Characters of specimen (Bipinaria larva) :-

1. Free swimming larva, bilateral symmetrical.
2. Dorso-median and dorso-lateral arms present.
3. Mouth and Anus present.
4. present of pre-oral and post oral arms.
5. Locomotary organ is cilia.

✳ Economic Importantance :-(Bipinaria larva)

Astenoidean have an importent role as large scale detritus feeders. they cycle up to 90% benthic biomass in ocean.

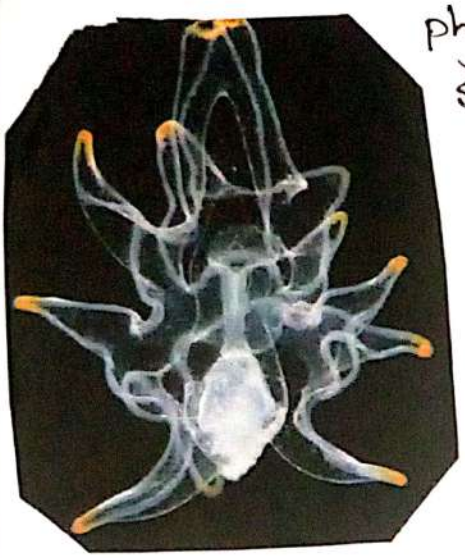
Died sea Asterias are an Importent food source and flavoring source in Asia. Before during the sea Asterias are boiled and bodies contract and thicken and organs are expelled. Sometimes sea asterias are considered on aphrodisiac.

Matured sea Asterias that release the toxin asteroidean with cuvierian tubule.

BRACHIOLARIA LARVA

✱ Systematic position :-

Kingdom - Animalia
Sub-kingdom - Metazoa
phylum - Echinodermata
Sub-phylum - Asterozoa
class - Asteroidea
Specimen - Brachiolaria larva



✱ Characters of specimen (Brachiolaria Larva) :-

1. Bilaterally symmetrical free swimming.
2. Arms are devoid of calcareous rods and have tube feet.
3. Brachiolar and pre oral arms present.
4. Mouth and anus present.

❋ Economic Importance - (Brachiolaria Larva)

Asteroidean have an important role as large scale detritus feeders. thye cycle up to 90% benthic biomass in Ocean.

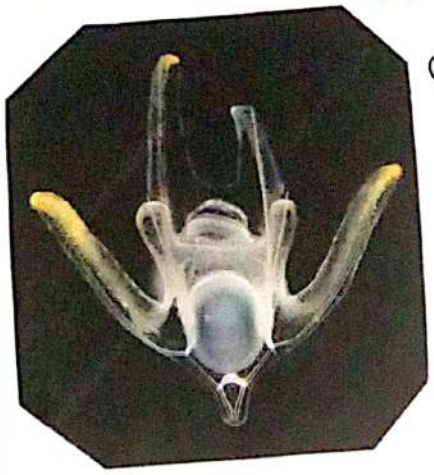
Died sea Asterias are an important food source and flavoring source in Asia. Before during the sea asterias are boiled and bodies contract and thiken and organs are expelled. Sometimes sea asterias are considered on Aphrodisiac.

Matured sea asterias that relese the toxin asteroidean with the cuvierian tubule.

OPHIOPLUTEUS LARVA

* Systematic position :-

Kingdom - Animalia
sub-kingdom - Metazoa
phylum - Echinodermata
sub-phylum - Asterozoa
class - Ophiuroidea
specimen - ophiopluteus larva



* Characters of specimen (ophiopluteus larva) :-

1. The typical ophiopluteus may be absent in certain forms.
2. The arms are small in ophiopluteus, lacks arms.
3. the larva may be elongated and without ciliated bands.

Echonomic Importance :- (ophiopluteus larva)

Echinoderms are efficient acavergers of decaying matter on the sea floar and they upon a variety of small organisms. there by hilping to regulate their numbers. When present in large numbers, sea urchins can devastate sea grass beds in the tropics. Adversisly affecting the organisms dwelling within. other tropical species of sea urching how ever controle the growth of sea weeks in coral reefs.

* ECHINOPLUTIUS LARVA *

Systematic position :-

Kingdom - Animalia
Sub-kingdom - Metazoa
phylum - Echinodermata
sub-phylum - Echinozoa
class - Echinoidea
Specimen - Echinoplutius larva

Characters of specimen (Echinoplutius larva) :-

1. Microscopic.
2. the skeletal rods simple or thorny or enestrated or branched.
3. Arms five or six pairs, pigmented and supported by calcareous skeleton.
4. the pstenolateral arms are very short and directed.
5. the supported by calcareous rod ($CaCO_3$).

✱ Economic Importance (Echinoplutes Larva) :-

Echinoderms are efficiant Acavergers of decaying matter on the sea floar and they prey upon a variety of small organisms. there by helping to regulate their numbers. when present in largest nummbers, sea urchins can devaslate sea grass beds in the tropical. Adversity affecting the organisms dwelling with in. others topical species of sea urching how ever controle the growth of sea weeds in coral reef.

* AURICULARIA LARVA *

Systematic position :-

Kingdom - Animalia
Sub-kingdom - Metazoa
phylum - Echinodermata
sub-phylum - Echinozoa
class - Holothuroidea
specimen - Auricularia larva

Characters of specimen (Auricularia larva) :-

1. The externally bilaterally symmetrical larva is present in Holothuroidea and is characterised in having a single longitudinal ciliated band.
2. the pre-oral lobe is very well formed.
3. There are no calcareous rods.
4. the hydrocoel becomes lobulated forming primary tentacels and communicated with the hydropore by a canal.
5. gut with mouth, sacciform stomach and right and left stomocoels, anus.

Economic Important (Auriculania Larva) :—

Holothurians have an important role as Large scale detritus feeders. they cycle up to 90% benthic biomass in ocean.

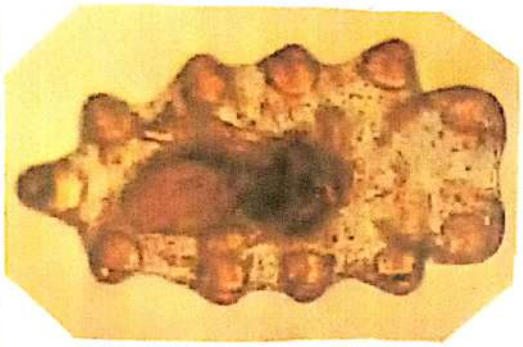
Died sea cucumber are an Importent food source and flavring source in asia. before drying the sea cucumber and thicken and organs are expelled. sometimes sea cucumbers as considered on aphrodisiac.

Macerated sea cucumbers that release the toxin holothurian with the cuvierian tubeules are been used by south pacific islands to catch tide pool fish.

* DOLIOLARIA LARVA *

Systematic position :-

Kingdom - Animalia
Sub-kingdom - Metazoa
phylum - Echinodermata
sub-phylum - Echinozoa
class - Holothuroidea
Specimen - Doliolaria larva



Characters of Specimen (Doliolaria larva) :-

1. The Externally bilaterally symmetrical larva is present in Holothuroidea and is charaters in having a single longitudinal ciliated band.
2. The pre-oral lobe is very well formed.
3. The larva form is observed in Holothuroidea.

Economic Importance :- (Doliolaria larva)

Holothuroideans have an important Role as large scale detritus feeders. they cycle up to 90%. benthic biomass in ocean.

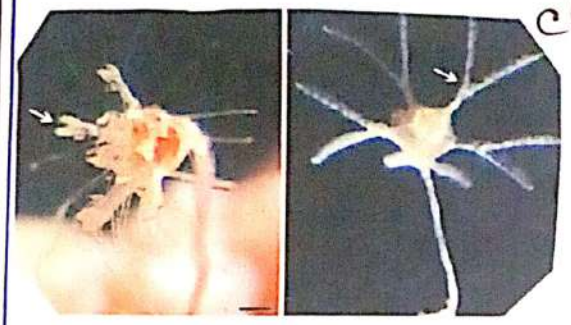
Died sea cucumber are an Important food source and flavoring source in asia. Before ~~During~~ drying the sea cucumber and thicken and organs are expelled.

Macerated sea cucumbers that release their toxin holothuroidean with the cuvierian tubules are been used by south pacific islanders to catch tide pool fish.

* PANTACARINOID LARVA *

Systematic position :-

Kingdom - Animalia
Sub-kingdom - Metazoa
phylum - Echinodermata
sub-phylum - crinozoa
class - crinoidea
specimen - pantacarinoid larva



Characters of specimen (pentacarinoid larva) :-

1. this larval stage also present crinoids. it is the secoend larviral stage of crinoids.
2. It looks like a sea lily.
3. It has a stalk.
4. the ciliated depression becomes a closed ectodermal vesicle is gradually shift to the free end.
5. Mouth and tentacles becomes exposed.

Economic Importance :- (pentacarinoid larva)

Asteroidean have an important Role as large scale detritus feeders. the cycle up to 90 %. benthic biomass in Ocean.

Died sea Asterias are an important food surce and flovering source in asia. Before during the sea asterias are boiled and bodies contract and thicken and organs are expelled.

Matured sea Asterias that release the toxin asteroidan with the cuvierian tubule.

CONCLUSION

- In echinoderms eggs and sperms are released in water and fertilization takes place in water forming zygote.
- Echinoderms are deuterosomes and hence cleavage is radial, holoblastic and indeterminate.
- the larvaes are bilaterally symmetrical but lose symmetry during Metamorphosis.
- Different classes of echinoderms shoe structurally different larval stages and their comparision can reveal their evolutionary ancestory.

Sruthi.
21/09/23

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