



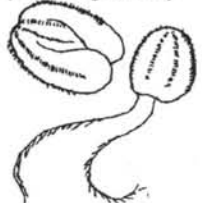

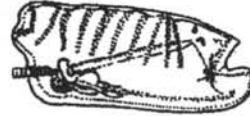
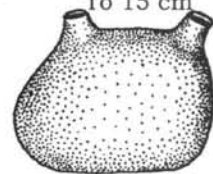
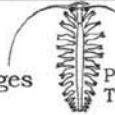

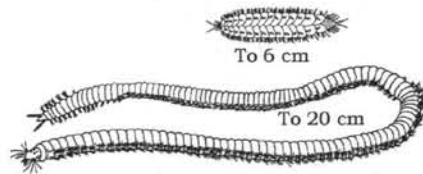

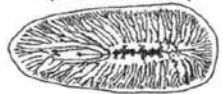
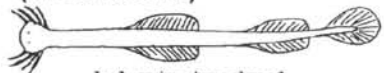

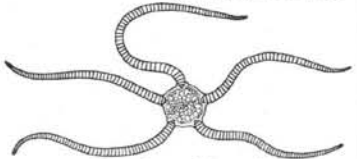




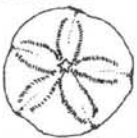

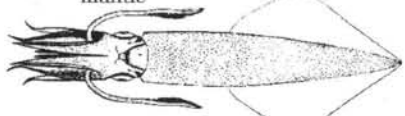


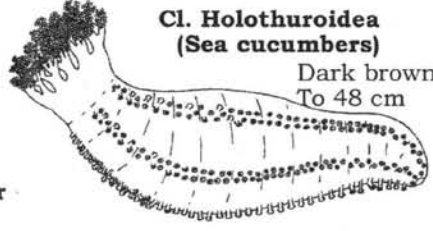
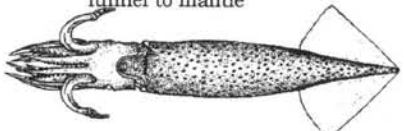
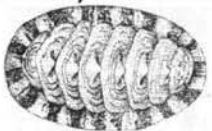


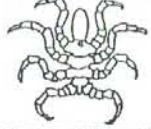
PREY SHEETS

Instructions: Select items from two pages to display prey photos

<p>Ph. Cnidaria</p> <p>Cl. Scyphozoa (true jellyfish)</p>  <p>To 40 cm high</p> <p>To 50 cm diameter</p> <p>Cl. Anthozoa (Sea anemones and corals)</p> 	<p>Cl. Hydrozoa (Colonial jellies and hydroids)</p>  <p>Hydroids (Benthic) Gold/brown Twig-like Soft</p>  <p>To 5 cm Often clear</p> <p>Siphonophores Colony to 60 cm; Bell-shaped pieces 1 cm long</p>	<p>Ph. Ctenophora (Comb jellies)</p>  <p>White/pink, cheesy when digested Often in dogs To 5 cm</p>	<p>Subph. Urochordata</p>  <p>Larvacean In herring/mackerel To 5 mm</p>  <p>Pelagic tunicate (Salp) To 10 cm</p>  <p>Sea squirt To 15 cm</p>
<p>Ph. Annelida</p> <p>Cl. Polychaeta</p> <ul style="list-style-type: none"> - Segmented, appendages off each segment - Variety of colors and shapes  <p>Pelagic To 20 cm</p>  <p>Sea mouse To 8 cm</p>  <p>To 6 cm</p> <p>To 20 cm</p>	<p>Ph. Nematoda (Roundworms)</p> <p>If alive = parasitic (not prey)</p> 	<p>Ph. Platyhelminthes (Flatworms)</p> 	<p>Ph. Chaetognatha (arrow worms)</p>  <p>In herring/mackerel 1-5 cm</p>
<p>Ph. Echinodermata</p> <p>Cl. Asteroidea (Sea stars)</p>  <p>Radius to 20 cm</p> <p>Cl. Ophiuroidea (Brittle stars)</p>  <p>Arm length to 10 cm</p>	<p>Ph. Nemertea (Ribbon worms)</p> <p>- No appendages</p>  <p>To 2 cm wide and 7 m long; pink</p>	<p>Ph. Mollusca</p> <p>Cl. Bivalvia - Clams, oysters, scallops - To 25 cm</p> 	<p>Cl. Gastropoda - Snails</p> 
<p>Cl. Echinoidea</p>  <p>Sea urchin</p>  <p>Sand dollar</p>	<p>Ph. Bryozoa</p>  <p>Calcified, fan-shaped or encrusting To 15 cm</p>	<p>Cl. Cephalopoda - Squids, Octopods</p> <p>Loligo: Fins > 1/2 mantle (body) length Grey; straight cartilage locking funnel to mantle</p> 	<p>Sea butterfly = Clione White and pink -4 cm long</p> <p>Shelled sea butterfly In herring/mackerel 1-3 mm</p>  <p>Nudibranch To 8 cm</p> 
<p>Cl. Holothuroidea (Sea cucumbers)</p>  <p>Dark brown To 48 cm</p>		<p>Illex: Fins about 1/3 body length Reddish/yellow; T-shaped cartilage locking funnel to mantle</p> 	<p>Cl. Polyplacophora (Chitons) To 4 cm long</p> 



Subph. Chelicerata
Cl. Pycnogonida
Sea spiders

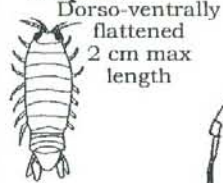


Ph. Arthropoda

Subph. Crustacea
(includes all on page except Pycnogonida)

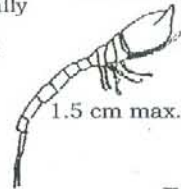
Miscellaneous crustacean groups:

Isopoda



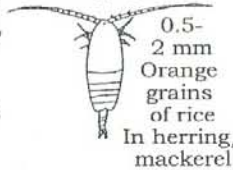
Dorso-ventrally flattened
2 cm max length

Cumacea



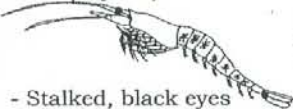
1.5 cm max.

Copepoda



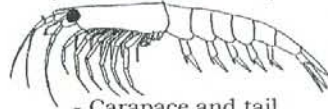
0.5-2 mm
Orange grains of rice
In herring/mackerel

Mysidacea (Mysid)



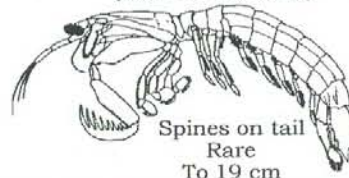
- Stalked, black eyes
- Black spots along abdomen
- Can straighten tail
- To 3 cm

Euphausiacea (Euphausiid/Krill)



- Carapace and tail approx same girth
- Usually reddish orange
- 2-3 cm long

Stomatopoda (Mantis shrimp)



Spines on tail
Rare
To 19 cm

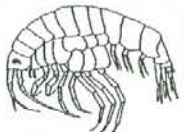
Cirripedia (Barnacles)

To 10 cm



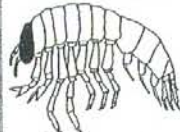
Or. Amphipoda - flattened sideways

Gammaridea



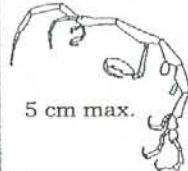
2 cm max.
Football shaped
Many colors

Hyperiid



1 cm max.
Large eyes
Black or grey

Caprellidae



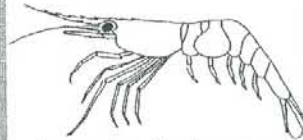
5 cm max.

Like a walking stick

Order Decapoda (=Ten legs)

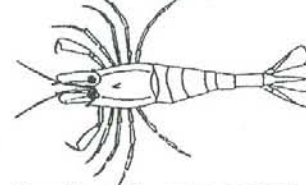
Decapod shrimp

Pandalidae (Pandalid shrimp)



- Long, toothed rostrum
- Cannot straighten tail
- Pale red or pink color
- To 10-15 cm

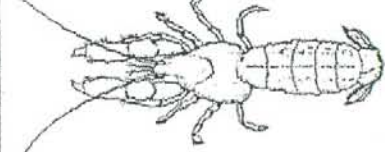
Crangonidae (Crangon)



- Sand/salt&pepper color
- Cannot straighten tail
- Rostrum short, no teeth
- Distinct hooked claw
- To 7 cm

Superfamily Thalassinoidae (Mud shrimp)

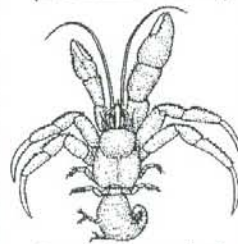
Rare; Inc. Fam. Axillidae, Callinassidae, Upogebiidae



- Weakly calcified
- Abdomen wider than carapace
- No spines on tail
- To 6-12 cm

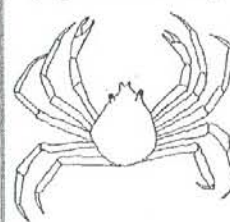
Decapod crab

Paguroidea (Hermit crab)



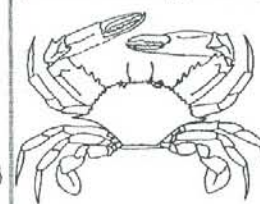
- Squishy, curled abdomen
- With or without snail shell
- Uneven claws
- To 5 cm long

Majidae (Spider crab)



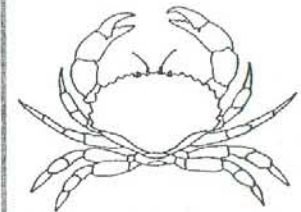
- Carapace longer than it is wide
- To 10 cm long

Portunidae (Swimming crab)



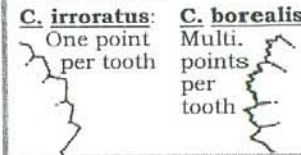
- Paddle-shaped back legs
- To 23 cm wide

Cancer sp.



- Nine teeth along each side of carapace
- To 15 cm wide

C. irroratus: One point per tooth
C. borealis: Multi. points per tooth



Related groups are contained within the same box.

If you cannot distinguish between two categories, call the prey item by the next outer box, up to phylum level. Eg., **Hermit crab (Paguroidea)** goes up to **Decapod crab**, which goes up to **Decapod**, which goes up to **Crustacea**, then finally to **Arthropoda**.

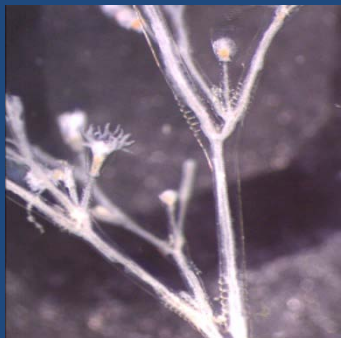
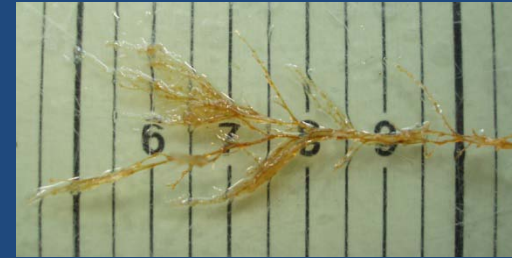
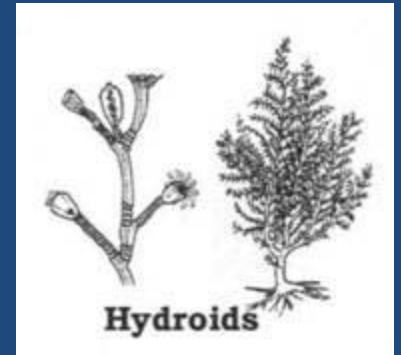


Phylum Cnidaria

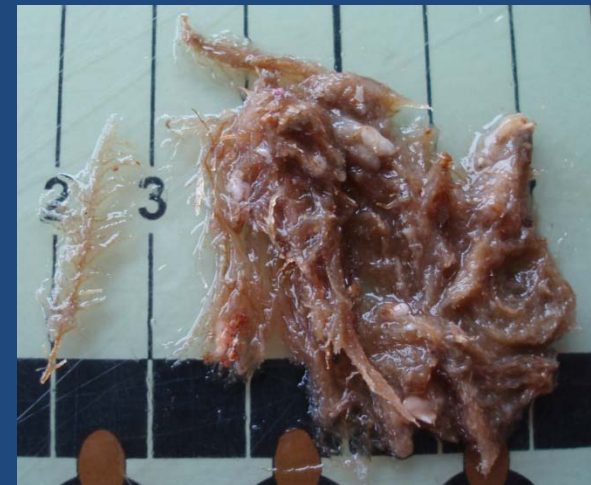


Class Hydrozoa

- Hydroids, siphonophores
- Exhibit sessile (polypoid) or pelagic (medusoid) forms, or both
- Majority of species are benthic hydroids
- Branching hydroids not to be confused with branching bryozoans
- Not very common in stomachs
- **HYDROID THECATE UNCL**



Hydroids



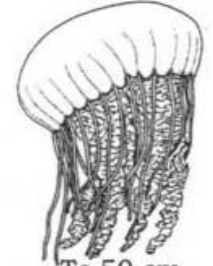
Hydroids (Digested)

Phylum Cnidaria



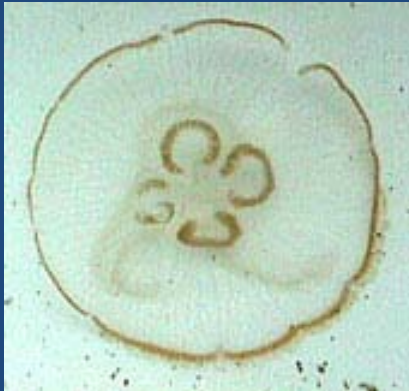
Class Scyphozoa

Cl. Scyphozoa
(true jellyfish)



To 50 cm
diameter

- JELLYFISH TRUE UNCL
- Primarily pelagic forms
- True jellyfish not to be confused with other pelagic gelatinous organisms (i.e. medusoid hydrozoans, ctenophores)
- Often disc-like body plan
- Dissolve quickly, not very common



Moon Jelly



Trawl-caught Jellyfish



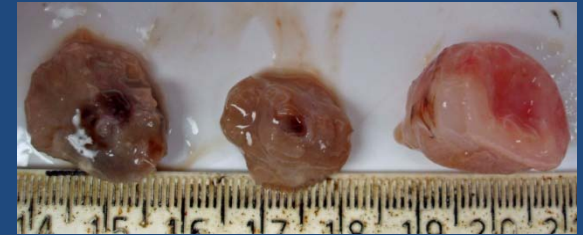
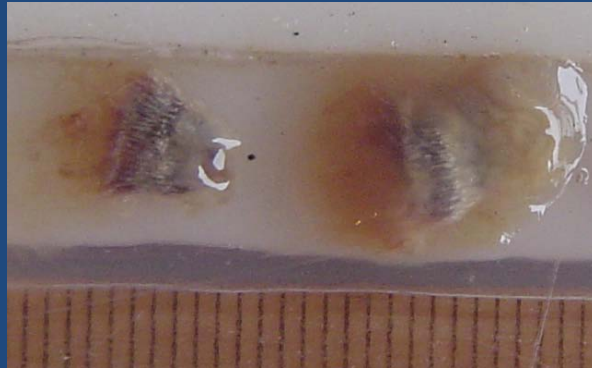
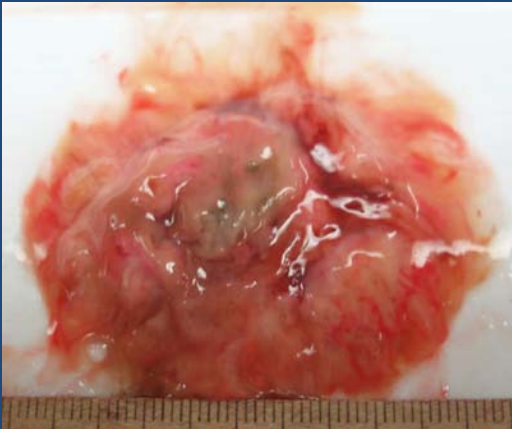
Jellyfish True Uncl (digested)

Phylum Cnidaria



Class Anthozoa (Digested Anemones)

- SEA ANEMONE UNCL
- Sea Anemones: Cup-like shape, “frilly” tentacles, common in benthivorous flatfish stomachs (Winter Flounder)
- Typically non-transparent when digested and vary in color



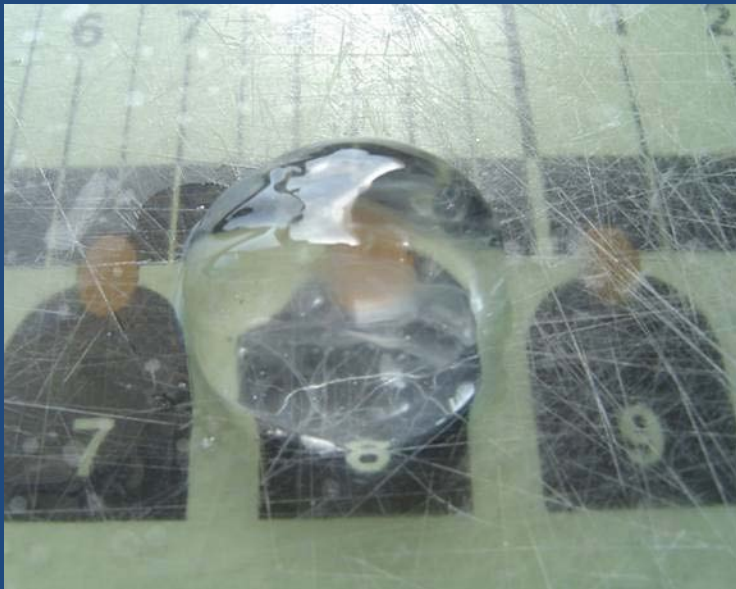


Phylum Ctenophora

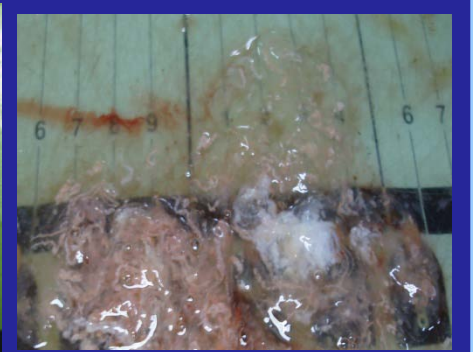
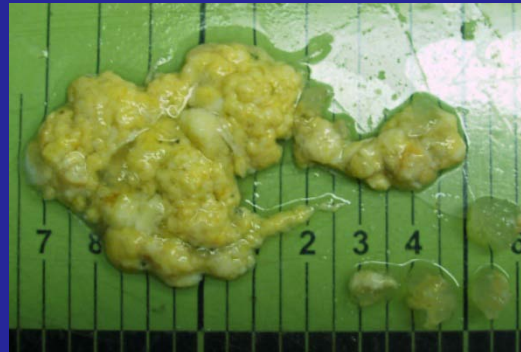
Ph. Ctenophora
(Comb jellies)



- Jelly-like (Comb jellies)
- Possess eight ciliated bands (comb rows)
- Entirely pelagic
- Body plan typically football-shaped
- Colloblasts (adhesive) instead of cnidocytes



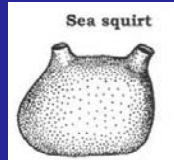
Digested
Ctenophores



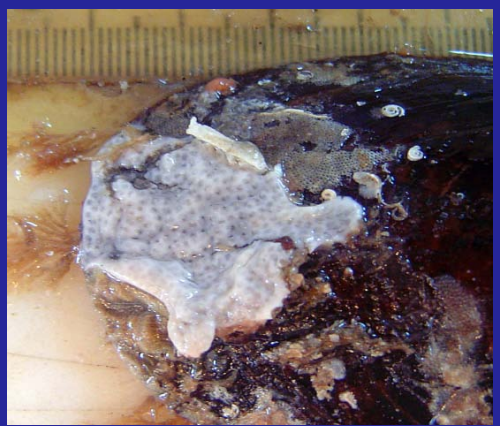
Subphylum Urochordata

↑ Classes

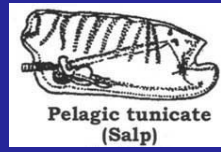
Ascidiacea



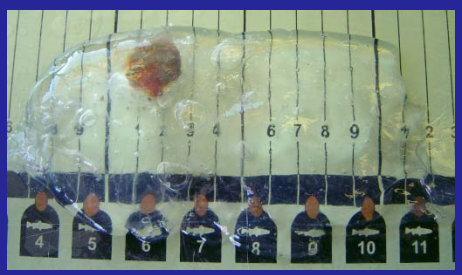
- 'Sea squirts'
- Sessile tunicates
- Solitary and colonial
- Inhabit large range of habitat types (soft, hard)
- Often tough exterior (tunic) with soft "fleshy" body



Thaliacea



- 'Salps'
- Gelatinous, transparent body
- Planktonic, free-swimming form
- Found in herring, mackerel, and butterfish stomachs



Larvacea

- Planktonic
- Transparent blob
- Head often green in color
- Found in herring and mackerel stomachs



Larvacean

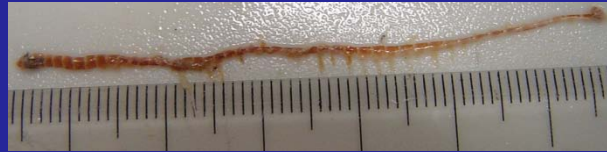
Phylum Cnidaria



Class Polychaeta

- Even when well digested, bristles are often still visible in stomach
- Sea Mouse bristles may appear as clumps of “fur”

Polychaeta

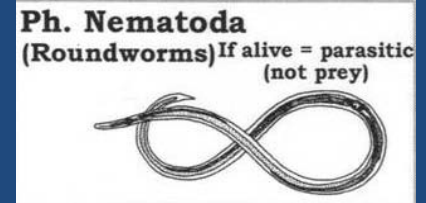


Polycheata: Sea Mouse

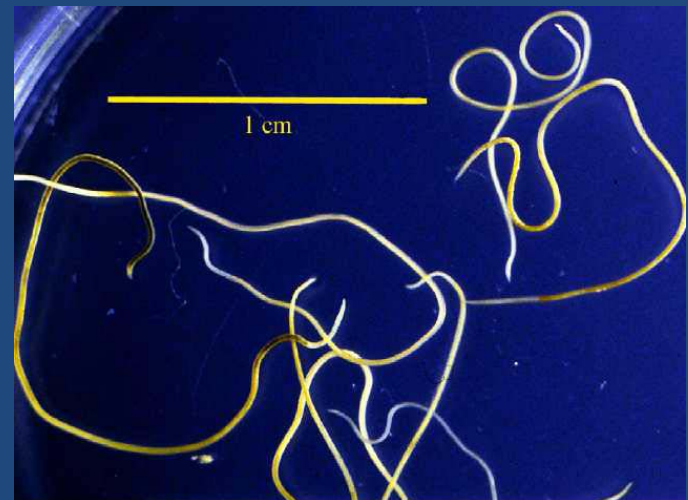




Phylum Nematoda




- Roundworms
- Free-living and parasitic
- Able to withstand stomach digestion
- Within stomach, often observed as “ball” of roundworms or single worm
- Very common parasite in benthivores





Phylum Nemertea

Ph. Nemertea
(Ribbon worms)
- No appendages

To 2 cm wide and 7 m long; pink

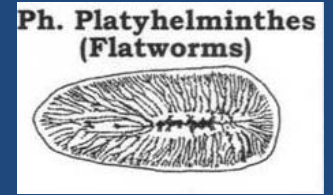
- Ribbon worms
- Nonsegmented worms
- Primarily benthic, non parasitic
- Resemble flatworms, but..
 - Body is thicker and more elongated



Ribbon Worm Uncl (Digested)



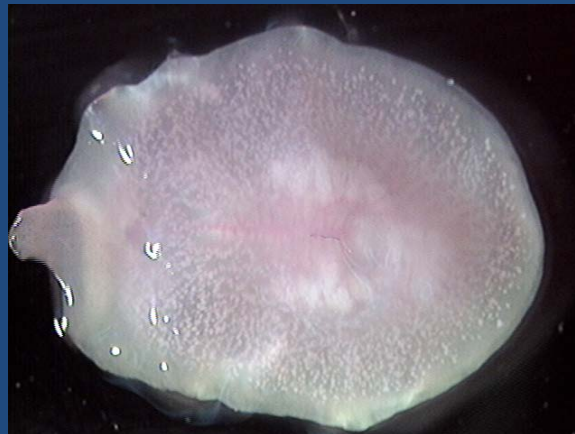
Phylum Platyhelminthes



- Flatworms
- Free-living and parasitic
- Very rare in stomachs
- Classes: Turbellaria, Cestoidea



Turbellarian Flatworms

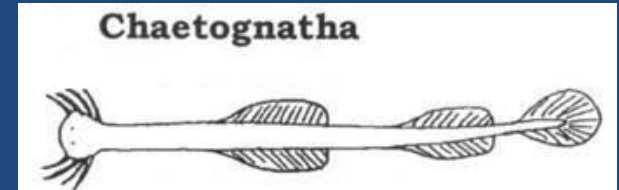


Tapeworm



Phylum Chaetognatha

- “Bristled jaws”
- Arrow worms
- Resemble translucent spaghetti
- Planktonic
- Herring and mackerel stomachs



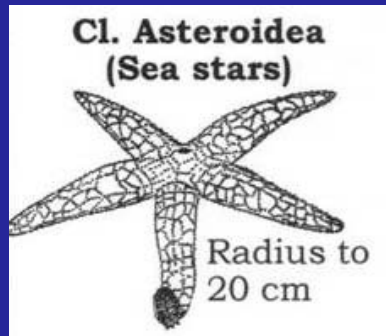
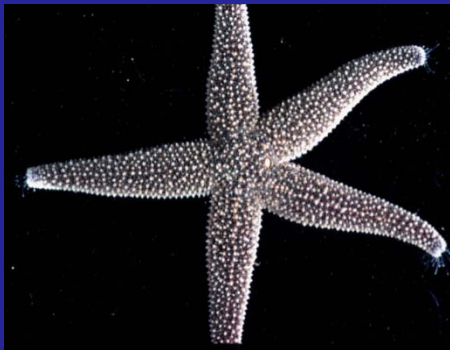
Chaetognatha (Digested)



Phylum Echinodermata

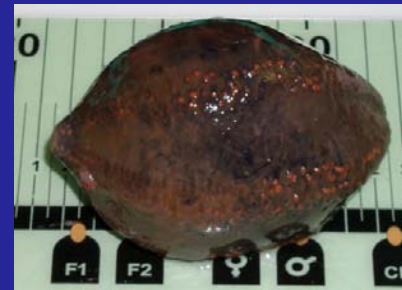
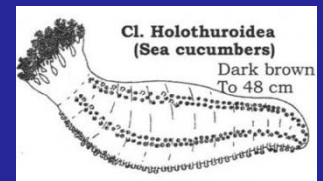
Class Asterozoa

- “Sea stars” or “starfish”
- Characteristic tube feet on arms of oral surface
- Commonly caught in trawl and appear as prey



Class Holothurozoa

- Sea cucumbers
- Often white / orange or purple color
- Rough leathery texture

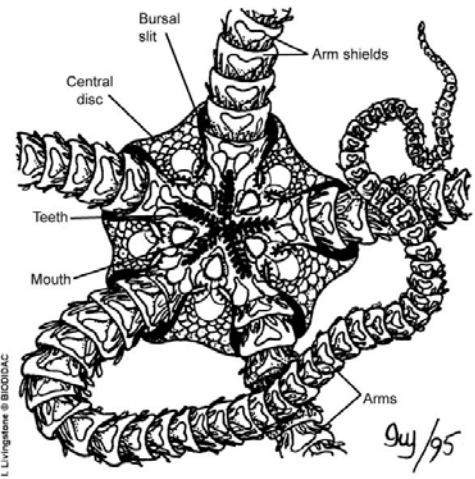
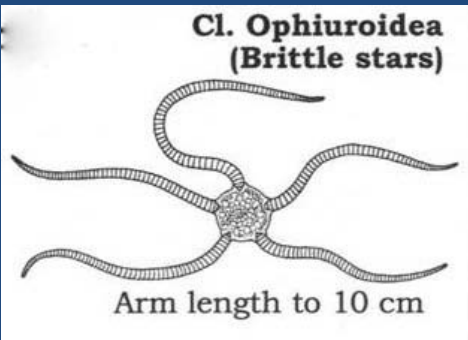


Phylum Echinodermata



Class Ophiuroidea

- Brittle stars and basket stars
- Long slender arms around central disk
- Arms tend to be very “fragile”
- Often arms separate from disc
- Daisy brittle star very common



Digested





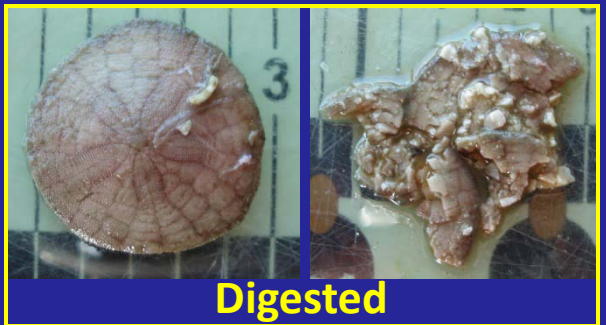
Class Echinoidea

Sand dollars

- *Echinarachnius parma*
- Usually break into small pieces



Sand dollar



Digested

Sea urchins

- Two species: Green, Purple
- Look for spines or pieces of shell (test)



Sea urchin



Digested

Phylum Bryozoa



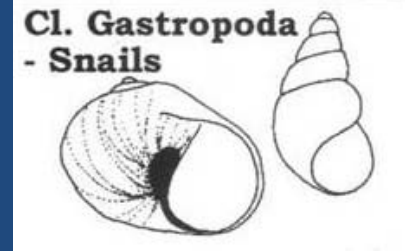
- Branching and encrusting forms
- Branching form more common as prey item
- Encrusting forms found on hard (shells, rocks) and soft (kelp) substrates
- Benthic
- Less common than hydroids



Phylum Mollusca



Class Gastropoda



- Snails, limpets, sea slugs, etc.
- Largest class of Molluscs
- Benthic and Pelagic
- Shelled and Unshelled gastropods
- Common Snails
 - Twisted shell: torsion
 - Right / left-handed



Phylum Mollusca



Class Gastropoda

Unshelled Gastropods

Nudibranchs (Sea slugs)

- Benthic
- Shell absent
- Slimy / "slug-like" (~1cm)



David Remsen



Naked Sea Butterfly

- Pelagic
- Shell absent
- 1-2 cm



Phylum Mollusca

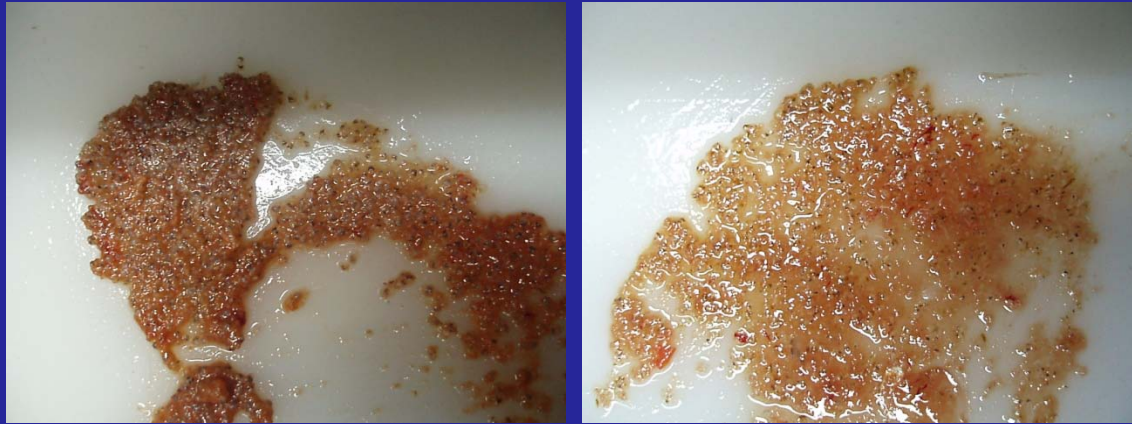
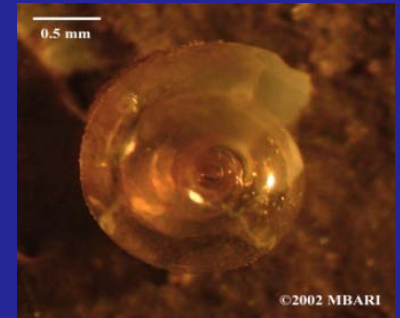
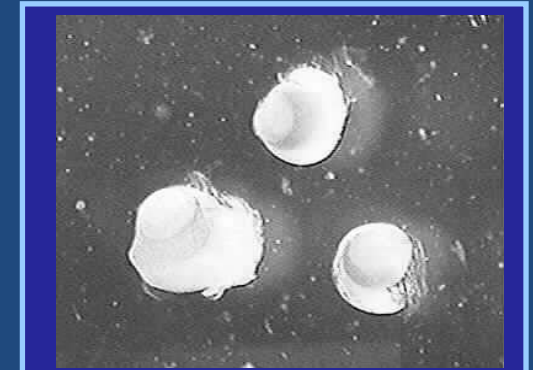


Class Gastropoda



Shelled Sea Butterfly – an unusual gastropod

- Pelagic
- Shell PRESENT
- < 1mm
- Feel “sand-like” in stomach, but ‘break’ when apply pressure
- Appear as large pepper grains

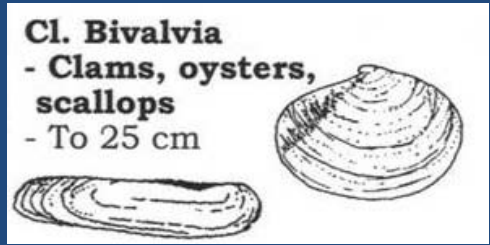


Digested Shelled Sea Butterflies

Phylum Mollusca



Class Bivalvia



- Clams, oysters, mussels, scallops
- “Two valves” – laterally compressed shells
- Habitats: burrowing into soft substrates, attached to hard substrates, and unattached on the seafloor



Surf Clam



Sea Scallop



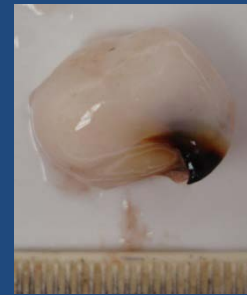
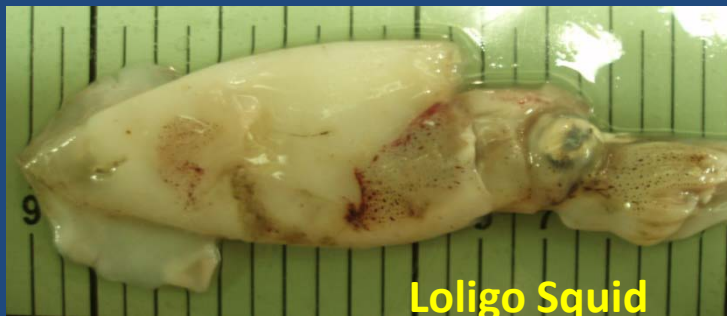
Razor Clam

Class Cephalopoda



Order Teuthoidea

- *Loligo sp.* and *Illex sp.*: Very common prey items
- Fin shape very useful for ID if present
- Often prey only consists of pieces of squid or internal hard parts

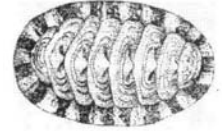


Phylum Mollusca



Class Polyplacophora

Cl. Polyplacophora
(Chitons) To 4 cm long



- Body covered by 8 overlapping plates
- Visible foot on dorsal surface
- Adheres to rocks and shells
- Generally 1-2 cm long

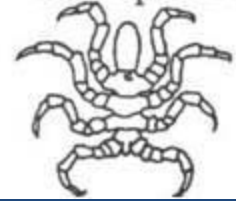


Phylum Arthropoda

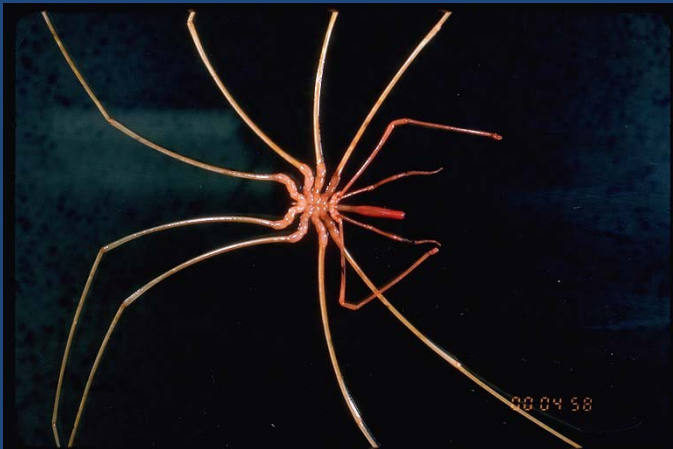


Class Pycnogonida

Subph. Chelicerata
Cl. Pycnogonida
Sea spiders



- Sea spiders
- Primarily benthic: Commonly seen attached to bryozoans and hydroids
- Usually 1- 10 mm
- Narrow body with 8 legs
- Rare as prey, occasionally seen in trawl



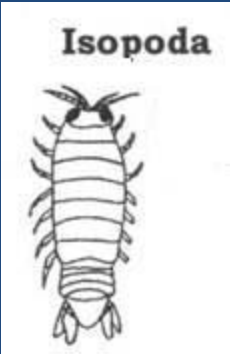
Digested



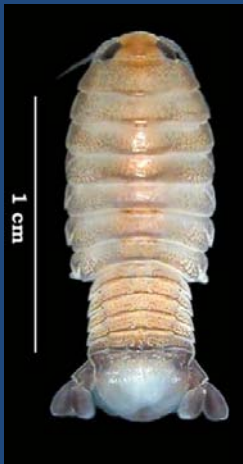
Subphylum Crustacea



Order Isopoda



- Dorsoventrally compressed
- Primarily benthic
- “Pill-shaped” body
- Common in stomachs
- Some parasitic (external)

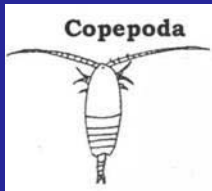


Subphylum Crustacea



Class Copepoda

- Copepods
- Primarily planktonic
- “Orange-colored” pieces of rice
- Size: Approximately 1-3 mm

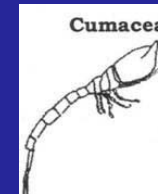


Copepod Uncl (Digested)

Class Malacostraca

Order Cumacea

- Cumaceans
- Distinct carapace
- Benthic (sand or mud)

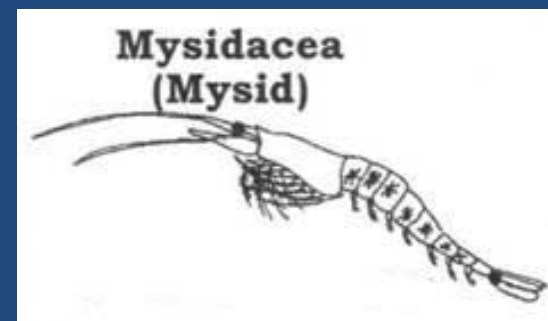


Cumacea (Digested)

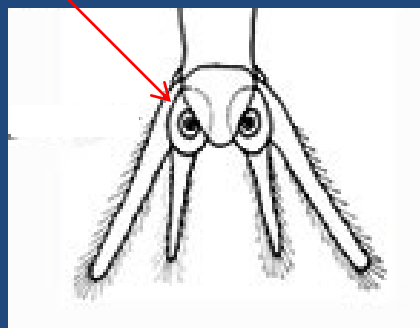
Class Malacostraca



Order Mysida



- 'Opossum Shrimp'
- Up to 2.5 cm total length
- Have 8 pairs of thoracic walking legs (instead of 5 pairs)
- Distinct dark spots/starbursts along body
- Rostrum is a short projection of the carapace
- Tail can extend straight
- Abdominal Appendages are short/small
- Have 2 statocysts (balance organs) at base of their tail

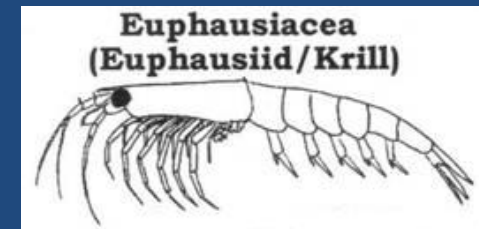


Digested

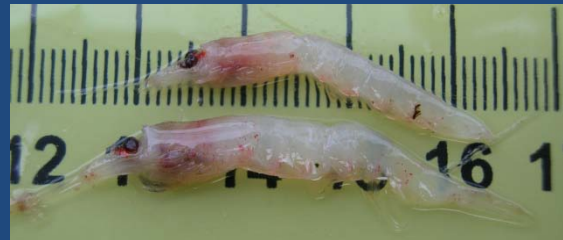
Class Malacostraca



Order Euphausiacea



- 'Krill'
- Up to 6cm in total length
- Have 8 pairs of thoracic walking legs (instead of 5 pairs)
- Rostrum is a short projection of the carapace
- Tail can extend straight
- Abdominal Appendages are easily observed
- When digested: Red/orange with black eyes

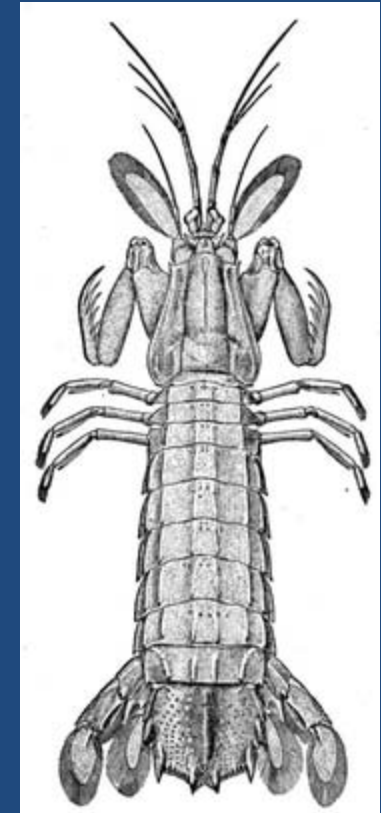
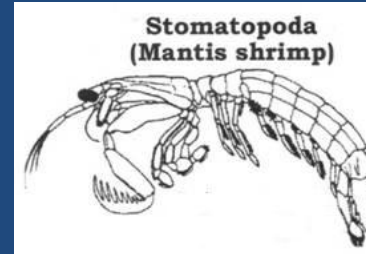


Digested



Order Stomatopoda

- 'Mantis Shrimp'
- Large tail w/ relatively small carapace
- Flattened top-to-bottom
- Spines on rear edge of tail
- Mantis-like arms
- Large eyes
- Occasionally seen in stomachs



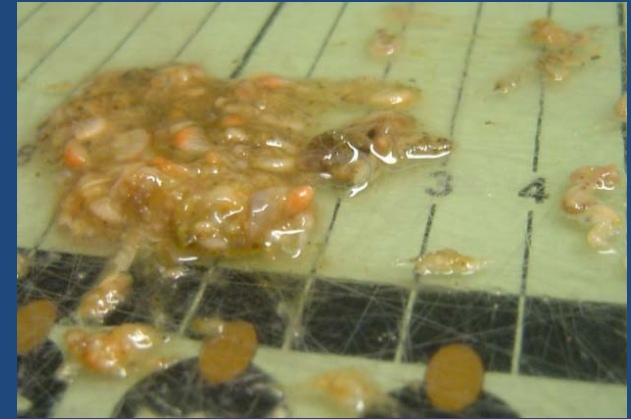
Digested

Subphylum Crustacea

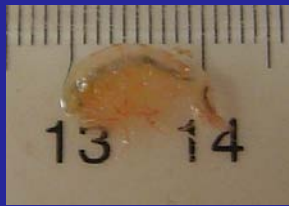
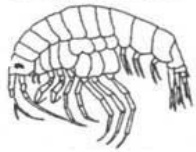


Order Amphipoda

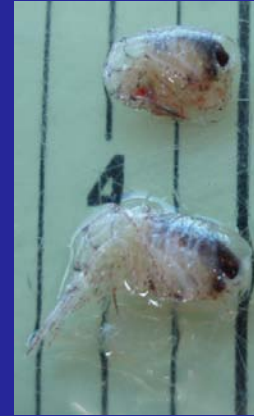
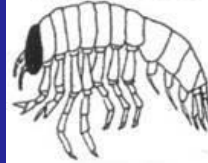
- **GAMMARIDS** (very common), Hyperiids, Caprellids
- Laterally compressed
- Benthic: Gammarids, and Caprellids
- Pelagic: Hyperiids



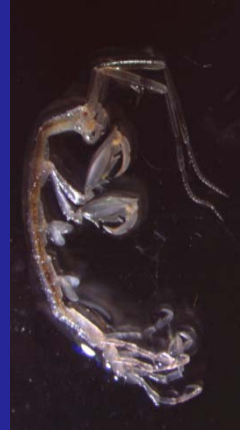
Gammaridea



Hyperiidae



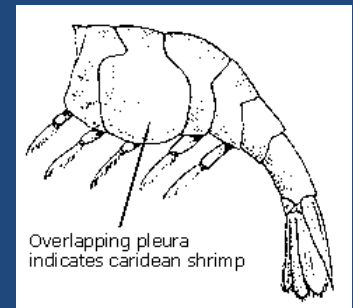
Caprellidae



Order Decapoda
Suborder Pleocyemata

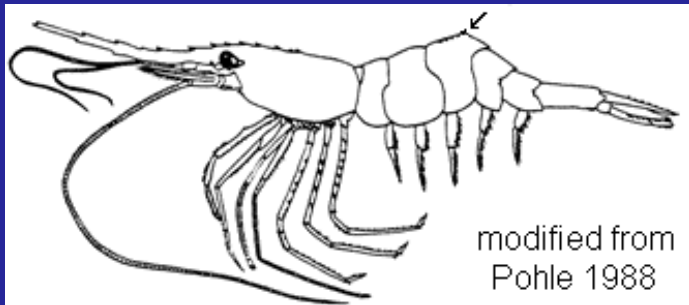


Family Pandalidae



- Usually deep red/pink or orange color
- Long rostrum (at least as long as carapace)
- Claws very small
- Common Northern family

MORE
PANDALIDS



Pandalus borealis 'Northern Shrimp'

Spine on 3rd tail segment
Reaches larger size than other
pandalids
Rostrum slightly arched over
eyes

Uniform pink to red
Very common from Greenland
to Martha's Vineyard



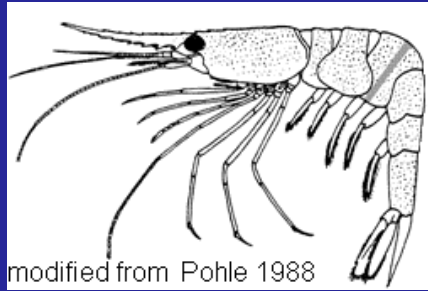
Order Decapoda

Suborder Pleocyemata

Family Pandalidae (cont)



BACK TO
P. BOREALIS

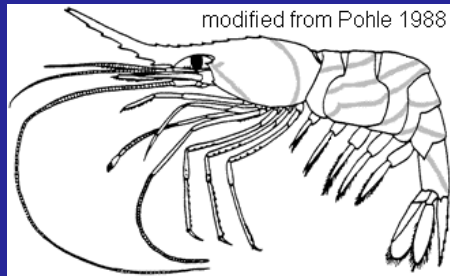


modified from Pohle 1988

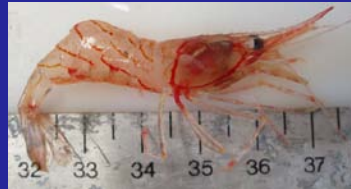


Dichelopandalus leptocerus

Red stripe on 3rd tail segment
Top of rostrum fairly straight
Rough short hairs on entire body
Very Common Canada to N.
Carolina

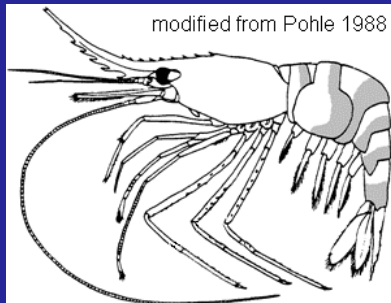


modified from Pohle 1988



Pandalus montagui

Entire body covered with thin red
'zebra like' stripes
Rostrum curved upward, no spines
on top edge
Common from NE Canada to RI



modified from Pohle 1988



Atlantopandalus propinquus

Rostrum upturned >45 degrees
Stronger teeth on lower side of rostrum
Each segment white at base, w/ red edges
Common from Canada to Delaware Bay

Order Decapoda

Suborder Pleocyemata



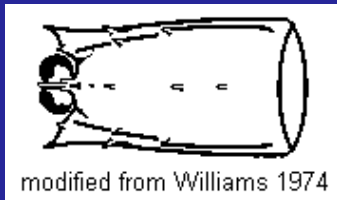
Family Crangonidae

- 'Sand shrimp'
- Body flattened top-to-bottom
- Have subchelate claw

Pontophilus norvegicus

Rostrum extends just beyond front edge of eyes

Carapace has 3 rows of small spines

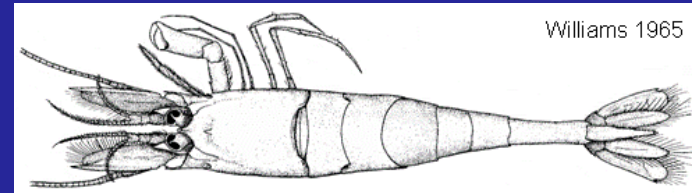


Crangon septemspinosa

Rostrum short, w/o spines

Salt/Pepper coloration

Very common



Digested

Order Decapoda



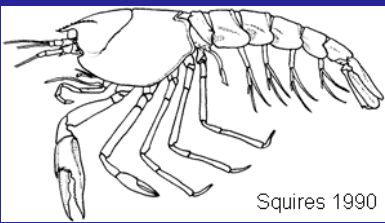
Suborder Pleocyemata

Infraorder Thalassinidea

- 'Mud, Ghost, Lobster Shrimp Uncl'
- Body deeper than tail

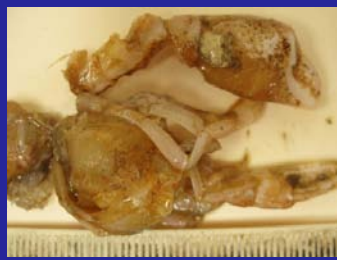
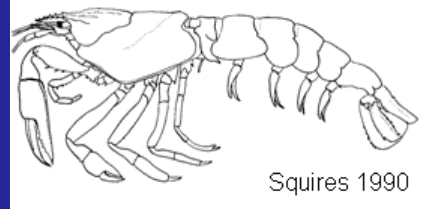
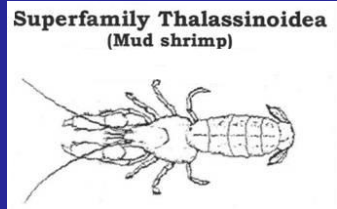
Calocaris templemani

- Rostrum triangular from above
- Unpigmented, whitish eye
- Body pale pink
- Rare



Axius serratus

- Lobster-like claws on 1st pair of legs
- Occasionally in stomachs
- Rostrum triangular from above with 'pinch' before tail



Digested

Order Decapoda

Infraorder Brachyura



- True Crabs
- Swimming vs. Non-swimming

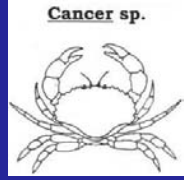
Family Portunidae

Swimming Crabs

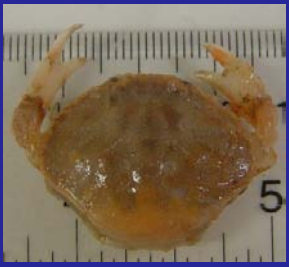
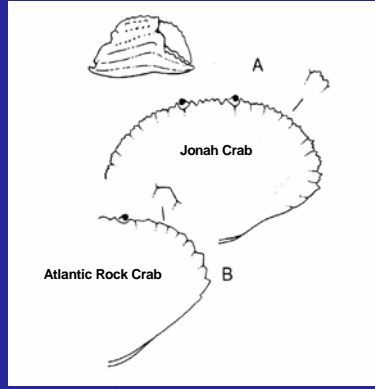


Family Cancridae

Cancer crabs



Cancer borealis



Digested *Cancer sp.*

Cancer irroratus



Digested

Family Majidae

Spider Crabs

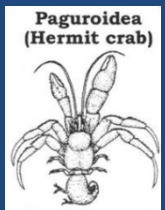


Digested *Hyas sp.*

Order Decapoda



Infraorder Anomura



- Hermit crabs, Galatheid crabs, Mole crabs, Stone crabs
- 5th pair of legs REDUCED
- Left / Right-handed hermit crabs

Right-handed Hermit Crab



Digested Acadian Hermit Crab (*Pagurus acadianus*)



Northern Stone Crab

Galatheid Crabs



Digested Galatheid Crab Uncl