MULTISPECIES RESEARCH GROUP

VIRGINIA INSTITUTE OF MARINE SCIENCE | WILLIAM & MARY

Invertebrates Identification Guide

for

ChesMMAP and NEAMAP Diet Analysis Studies

Chesapeake Bay Multispecies Monitoring and Assessment Program
Northeast Area Monitoring and Assessment Program

2/14/24

This book is a compilation of identification resources for invertebrates found by the Virginia Institute of Marine Science (VIMS) Multispecies Research Group (MRG) in fish stomach samples. By no means is it a complete list of all possible prey types. It is simply what has been found in past ChesMMAP and NEAMAP diet studies. Any photos or illustrations sourced outside of the MRG are numerically indicated in green next to the photo and referenced at the end of the document. A copy of this document is stored in both the ChesMMAP and NEAMAP lab network drives in a folder called ID Guides, along with other useful identification keys, articles, documents, and photos. If you want to see a larger version of any of the images in this document you can open the original file for the photo by navigating to the appropriate subfolder within the Fisheries Gut Lab folder.

Other useful links for identification:

Isopods
http://www.19thcenturyscience.org/HMSC/HMSC-Reports/Zool-33/htm/doc.html
http://www.19thcenturyscience.org/HMSC/HMSC-Reports/Zool-48/htm/doc.html

Polychaetes
http://web.vims.edu/bio/benthic/polychaete.html
http://www.19thcenturyscience.org/HMSC/HMSC-Reports/Zool-34/htm/doc.html

Cephalopods
http://www.19thcenturyscience.org/HMSC/HMSC-Reports/Zool-44/htm/doc.html

Amphipods
http://www.19thcenturyscience.org/HMSC/HMSC-Reports/Zool-67/htm/doc.html

Molluscs
http://www.oceanica.cofc.edu/shellguide/
http://www.jaxshells.org/slife4.htm

Bivalves
http://www.jaxshells.org/atlanticb.htm

Gastropods
http://www.jaxshells.org/atlantic.htm

Crustaceans
http://www.jaxshells.org/slifex26.htm

Echinoderms
http://www.jaxshells.org/eich26.htm

Getting Started

BLOB-LIKE (page)
fishes
fish parts
mollusc meat (7)
squid (12)
clam siphons (8)
tunicates (45)
anemones (5)
dead man's fingers (6)
trumpet worms (16)
sea cucumbers (44)
tunicates (45)

WORM-LIKE (page)
polychaetes (13-16)
fish bones
pipefishes
eels
lancelets (45)
squid tentacle (12)
brittle star arms (44)
nematodes (6)
acanthocephalans (6)
rat-tailed cucumbers (44)
sipuncula (17)
echiura (17)

PLANT-LIKE (page)
hydroids (5)
eelgrass (46)
macroalgae (46)
dead man's fingers (6)

HARD-SHELLY (page)
snails (7-8)
clams, etc (8-11)
squid beak (12)
barnacles (21)
ostracods (32)
hermit crabs (38)
sand dollars (44)
sea stars (44)
sea urchins (44)
fish parts

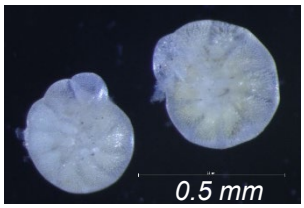
SOFT-SHELLY (page)
crabs (37-43)
shrimp (33-36)
horseshoe crab (18)
insect, beetle (19)
mantis shrimp (22-23)
mysids (30)

BUGGY/CREEPY, CRAWLY (page)
amphipods (24-26)
isopods (27-29)
mysids (30)
cumaceans (27)
copepods (20)
crab zoea/megalopa (38)
shrimp zoea (34)
insects (19)

0994 no sample
0995 unidentified species
0629 unidentified worm

Phylum Protozoa

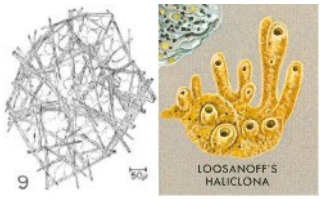
FORAMINIFERA
Class Granuloreticulosea
1090 unidentified foram



Very tiny spiral snail-like organisms

Phylum Porifera

SPONGES *very rarely encountered*
0548 unidentified sponge
0989 *Haliclona loosanoffi*



1, 2

Phylum Cnidaria

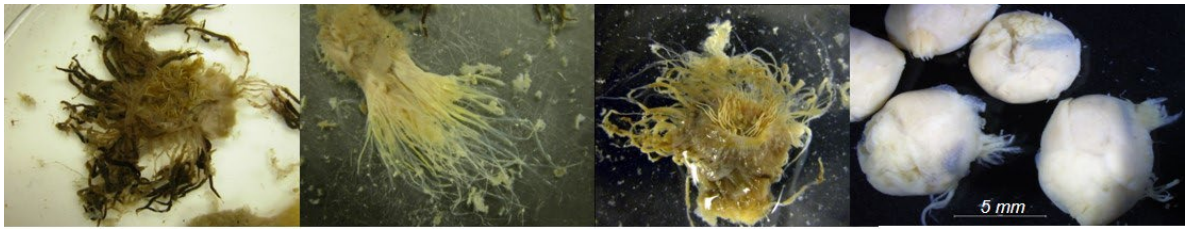
JELLYFISHES
0900 unidentified jellyfish

HYDROIDS
Class Hydrozoa
Order Hydroida
0703 unidentified hydroids

3

Found as a single strand, broken up, or in clumps like in ChesMMAP sheepshead. These are the colonial organisms that clog up the ChesMMAP net in summer, categorized as Habitat in FEED.

SEA ANEMONES
Class Anthozoa
Order Pennatulacea
0776 *Renilla reniformis*, sea pansy
Order Actiniaria
0643 unidentified sea anemones



Often found in winter flounder

Phylum Ctenophora

COMB JELLIES

0774 unidentified comb jelly

Phylum Nemata

NEMATODES

0901 unidentified nematode

Phylum Acanthocephala

SPINY-HEADED WORMS

1105 unidentified acanthocephalan

Most commonly in winter flounder and sometimes other species, parasitic

Phylum Ectoprocta

MARINE BRYOZOANS

Class Gymnolaemata

0689 unidentified marine bryozoans

0825 *Alcyonidium spp.*, dead man's fingers

Dead man's fingers - Alcyonidium spp. often found in sheepshead

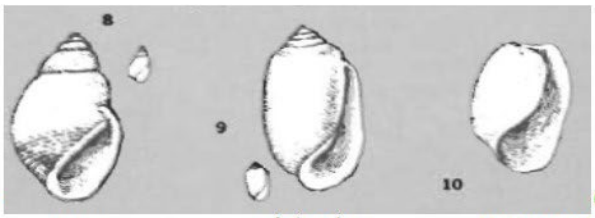
Phylum Mollusca

If you find a hermit crab in a snail/drill shell, use the hermit crab code and note in the comments "in [snail/drill taxa] shell".

0709 unidentified mollusc meat
5036 unidentified mollusc

SNAILS, DRILLS, NUDIBRANCHS
Class Gastropoda

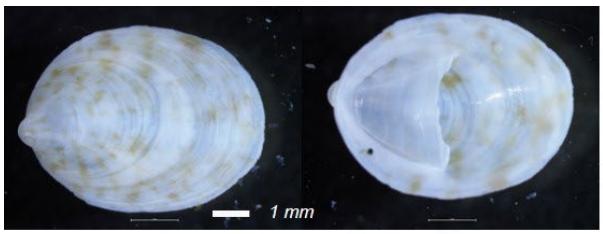
0884 unidentified snail or drill (aka unidentified gastropod)
0855 unidentified nudibranch
0048 unidentified whelk
5028 *Acteocina canaliculata*, barrel bubble
0514 *Rictaxis punctostriatus*, pitted baby-bubble
0806 *Haminoea solitaria*, solitary bubble



5 *Rictaxis punctostriatus* — *Acteocina canaliculata*

6 *Haminoea solitaria* – tiny black speckled snail commonly found without shell

1049 *Crepidula fornicata*, common Atlantic slipper shell
0881 *Crepidula spp.*, slipper shells
0891 *Sinum perspectivum*, ear shell



Crepidula spp. Top (left), Bottom (right)

Sinum perspectivum

5027 *Anachis spp.*, dove snails
5025 *Mitrella lunata*, lunar dove snail
0737 *Mitrella spp.*, dove snails
0818 *Littorina spp.*, periwinkles
0563 *Hydrobia spp.*, seaweed snails
0838 *Urosalpinx cinerea*, Atlantic oyster drill
0538 *Melampus bidentatus*, eastern melampus

7 *Anachis spp.*

8 *Mitrella lunata*

9 *Littorina spp.*

10 *Hydrobia spp.*

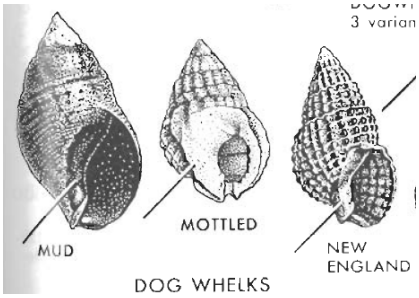
11 *Urosalpinx cinerea*

12 *Melampus bidentatus*

Phylum Mollusca (Gastropods continued)

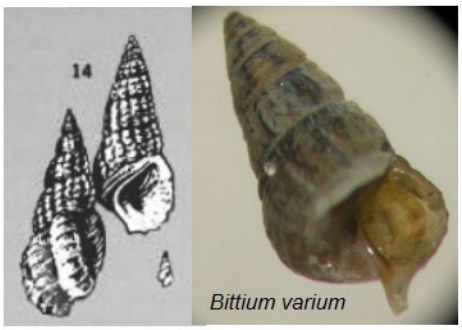
0742 *Nassarius trivittatus*, New England dog whelk - ***very common***
0506 *Nassarius vibex*, mottled dog whelk
1083 *Nassarius spp.*, unidentified whelk

Nassarius trivittatus



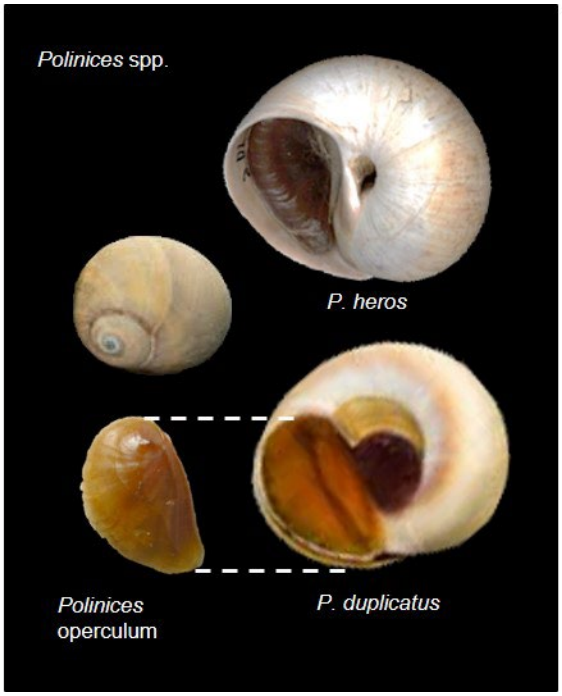
N. obsoletus *N. vibex* *N. trivittatus*

0800 *Polinices heros*, moon snail
0704 *Polinices duplicatus*, shark-eye moon snail
1059 unidentified moon snail
0984 *Bittium varium*, grass cerith
5015 *Turbonilla interrupta*, interrupted turbonilla
1021 *Turbonilla spp.*, turbonillas
1158 *Epitonium rupicola*, lined wentletrap



5

Epitomium rupicola



14

13

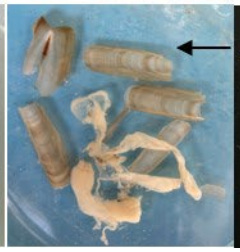
CLAMS, MUSSELS, SCALLOPS, OYSTERS
Class Bivalvia
5039 unidentified clams
5003 unidentified clam siphon
0498 unidentified bivalve *this includes all clams, mussels, oysters*

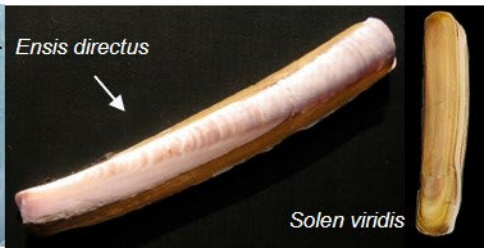
Phylum Mollusca (Bivalves continued)

0790 unidentified jackknife/razor clams

Superfamily Solenoidea includes Tagelus and Ensis, most common razor clams crushed up in samples

0888 *Tagelus plebeius*, stout tagelus
0803 *Tagelus divisus*
1020 *Tagelus spp.*, tagelus
0816 *Ensis directus*, Atlantic jackknife clam
0947 *Solen viridis*, green jackknife clam





0820 *Macoma spp.*, macoma clams
0583 *Macoma balthica*, baltic macoma
0964 *Macoma mitchelli*, Mitchell's macoma
0584 *Macoma tenta*, narrowed macoma

Macoma balthica

Macoma mitchelli

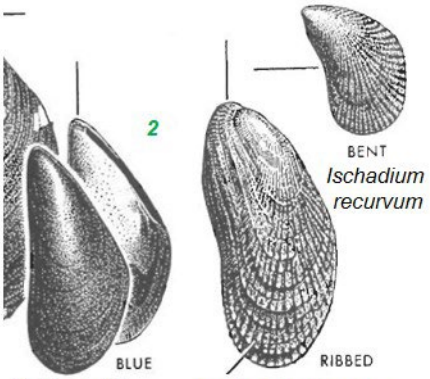
Macoma tenta

0801 *Mya arenaria*, soft shell clam
0882 *Mulinia lateralis*, dwarf surf clam *has sharp distinct ridge*

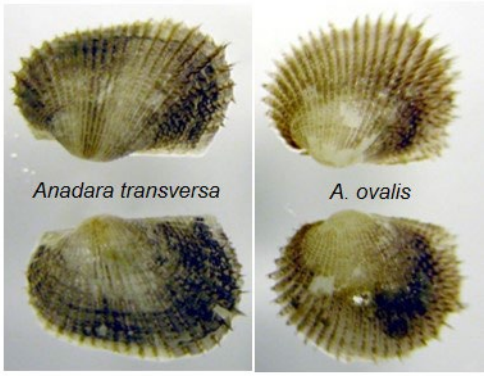
Mya arenaria (left) and *Macoma balthica* (right)

Phylum Mollusca (Bivalves continued)

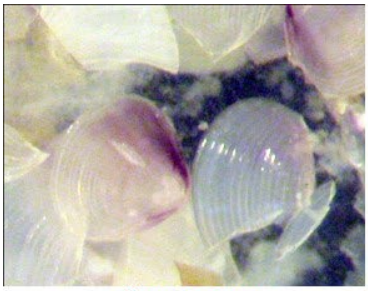
1053 unidentified mussel *may be smooth or ribbed,* ***iridescent inside***
0802 *Mytilus edulis*, blue mussel
0842 *Ischadium recurvum*, bent mussel
5024 *Geukensia demissa*, Atlantic ribbed mussel
0826 *Anadara ovalis*, blood ark
0886 *Anadara transversa*, transverse ark
0558 *Anadara spp.*, arks *shells have bristly covering, often broken up*



Mytilus edulis *Geukensia demissa*



5013 *Gemma gemma*, amethyst gemclam
1063 *Nucula proxima*, Atlantic nutclam
1068 *Solemya velum*, Atlantic awningclam
0022 *Placopecten magellanicus*, sea scallop


Gemma gemma


Nucula proxima


Solemya velum


Placopecten magellanicus

0821 *Mercenaria mercenaria*, quahog
0941 *Corbicula fluminea*, Asian clam

Mercenaria mercenaria

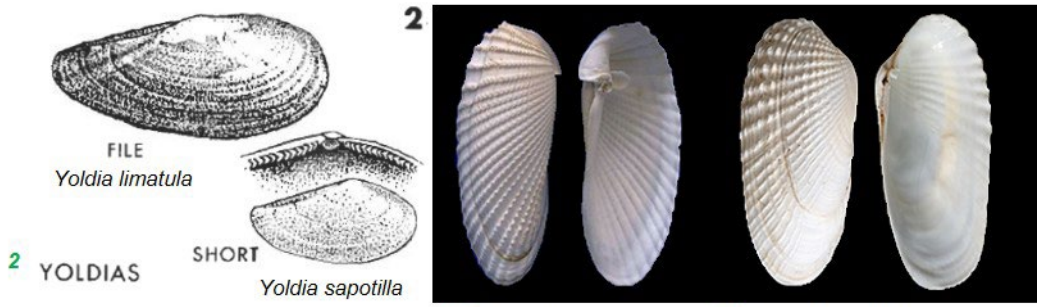
Mercenaria mercenaria juveniles have distinct concentric ridges

Phylum Mollusca (Bivalves continued)

0837 *Rangia cuneata*, wedge rangia - *distinct wedge shape, common in catfish diet*
0091 *Spisula solidissima*, Atlantic surf clam
0809 *Anomia simplex*, common jingle

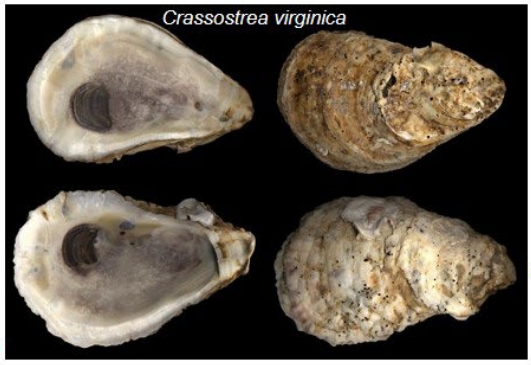
Rangia cuneata *Spisula solidissima* *Anomia simplex*

0836 *Yoldia spp.*, yoldia clam
0805 *Cyrtopleura costata*, angel wing
0885 *Petricolaria pholadiformes*, false angel wing



17 Cyrtopleura costata *18 Petricolaria pholadiformes*

0819 *Crassostrea virginica*, common oyster
1065 Amygdalum papyrium, Atlantic papermussel
0804 *Lyonsia hyalina*, glassy lyonsia



Fairly common tiny clam, recognizable with distinct shell pattern. Fragile/often broken.

Phylum Mollusca (continued)

SQUID, OCTOPUSES

Class Cephalopoda

0661 unidentified cephalopod

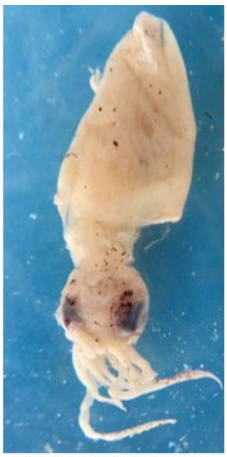
1110 unidentified squid

1028 *Doryteuthis pealeii*, longfin inshore squid

0879 *Illex illecebrosus*, northern shortfin squid

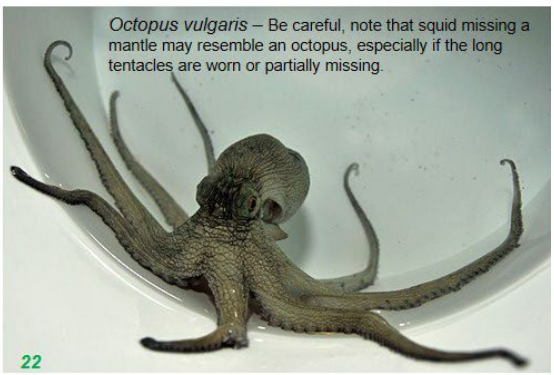
0725 *Lolliguncula brevis*, Atlantic brief squid

0854 *Octopus vulgaris*, common Atlantic shore octopus



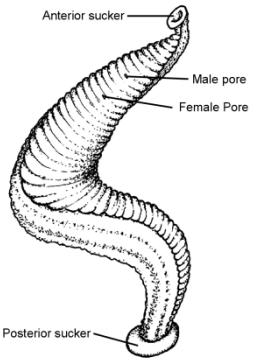
Doryteuthis pealeii

Loliguncula brevis



Phylum Annelida

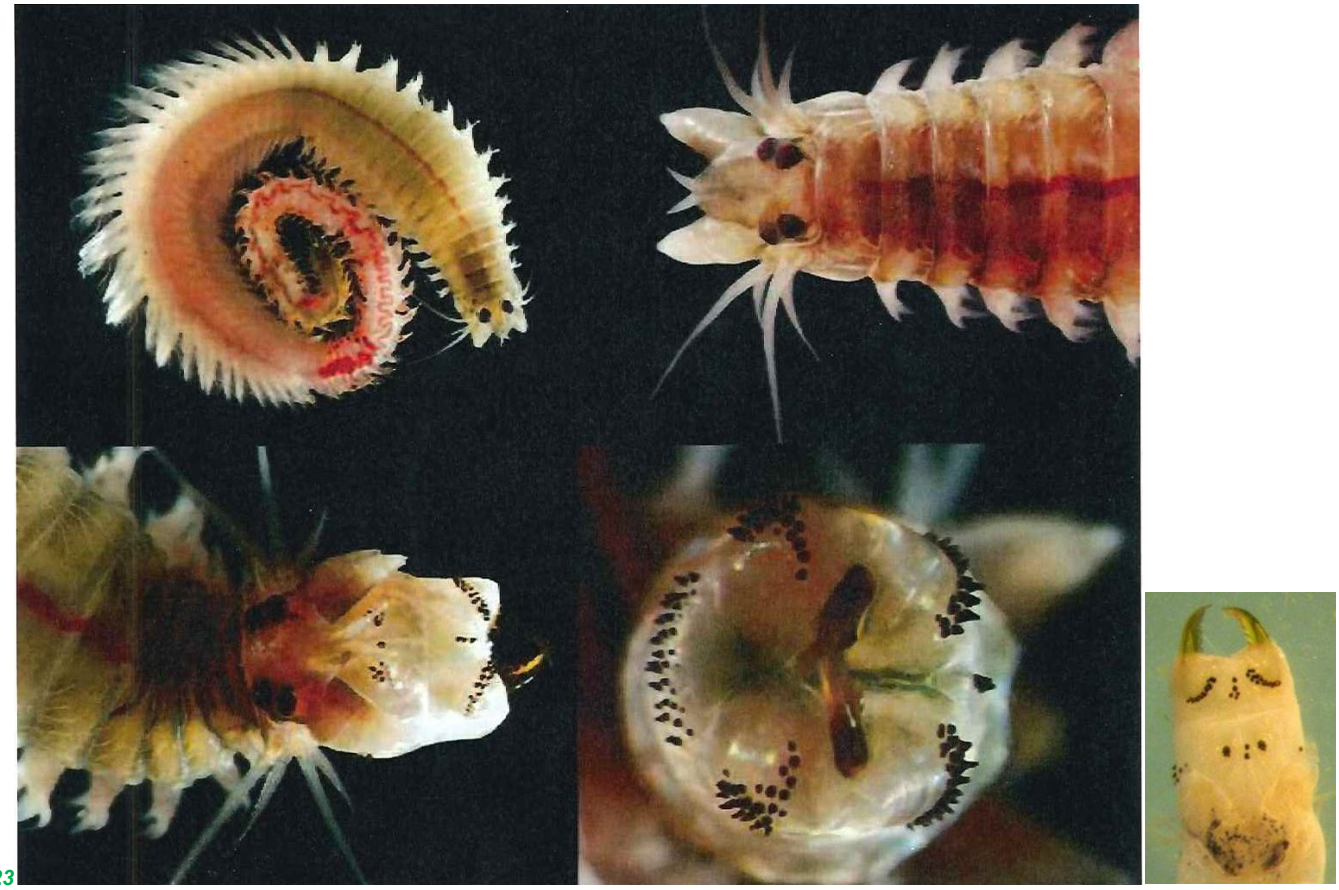
LEECHES
Class Clitellata
Subclass Hirudinea
0883 unidentified leech



24

OLIGOCHAETES
Class Clitellata
Subclass Oligochaeta
0532 unidentified oligochaete

POLYCHAETES
Class Polychaeta
0775 unidentified polychaete
0892 worm tubes
0510 *Nereididae*, clam worms
5010 *Alitta succinea*, clam worm

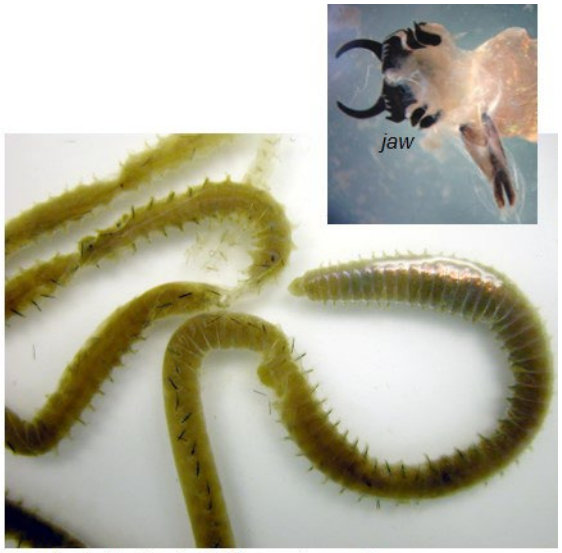

23

Alitta succinea

Phylum Annelida (polychaetes continued)

0645 *Aphrodita hastata*, sea mouse
1071 *Arabella iricolor*, opal worm

Aphrodita hastata,
found in black seabass stomachs



Arabella iricolor, iridescent smooth worm

0697 *Glycera spp.*, blood worms[3, 4]

26 *Glycera spp.,* very common, largest polycheate found in stomachs, can be huge

27 *Glycera spp.,* protruded mouthparts, 4 hook-like jaws

0682 *Drilonereis spp.*
1037 unidentified scale worm
1037 unidentified scale worm
1107 *Goniada maculata, chevron worm*
1111 *Diopatra cuprea*, fringed worm

Drilonereis spp.

2

15-SCALED WORMS

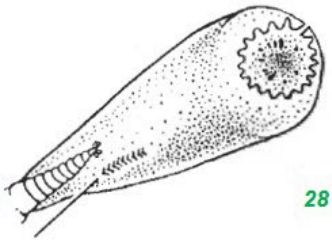
Harmothoe spp.

2

12-SCALED WORMS

Lepidonotus spp.

2

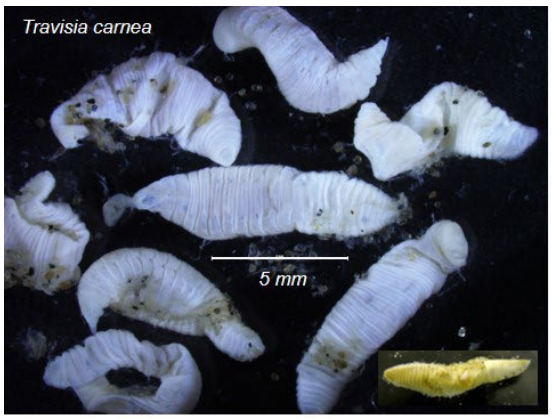


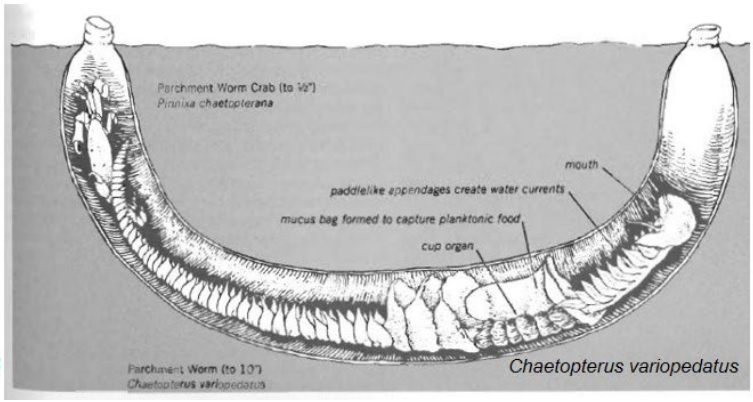
28 *Goniada maculata*

Diopatra cuprea

Phylum Annelida (polychaetes continued)

1103 *Travisia carnea*
0925 *Chaetopterus variopedatus*, parchment tube worm





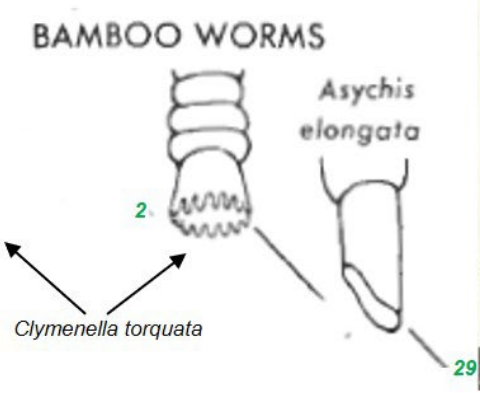
0667 *Pectinaria gouldi*, trumpet worm
0785 Sabellidae, feather-duster worms
0798 Ampharetidae, spaghetti mouth worms

Pectinaria gouldi

Sabellidae

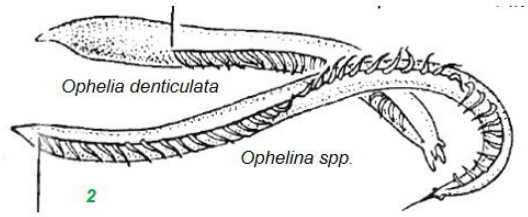
Ampharetidae

0764 *Pherusa affinis*, broomworm
0668 *Clymenella torquata*, bamboo worm
1036 *Asychis elongata*, bamboo worm
0731 Maldanidae, bamboo worms



Phylum Annelida (polychaetes continued)

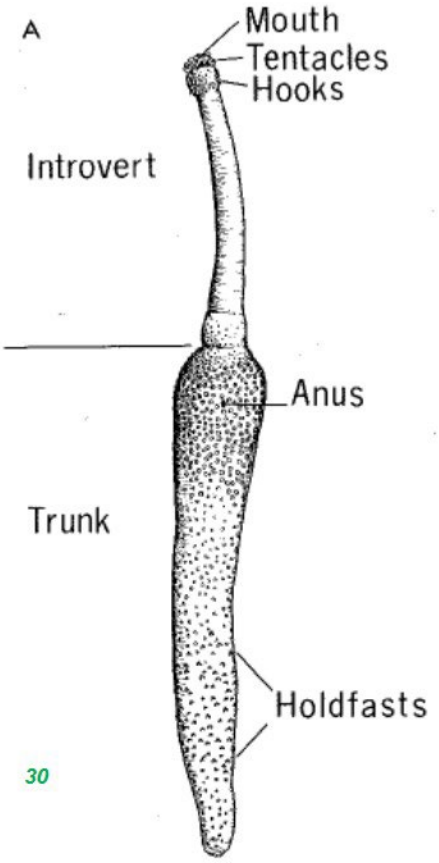
0754 *Ophelia denticulata* – has distinct striations on wrinkly body, legs sometimes red
1115 *Ophelina spp*



Phylum Sipuncula

PEANUT WORMS

1109 unidentified sipunculid – smooth, shiny, wrinkly, loose skin



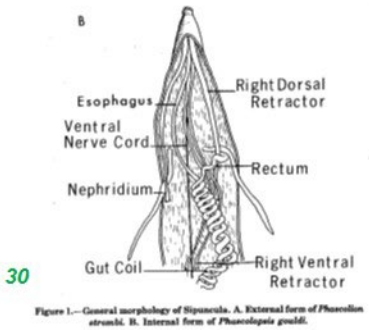
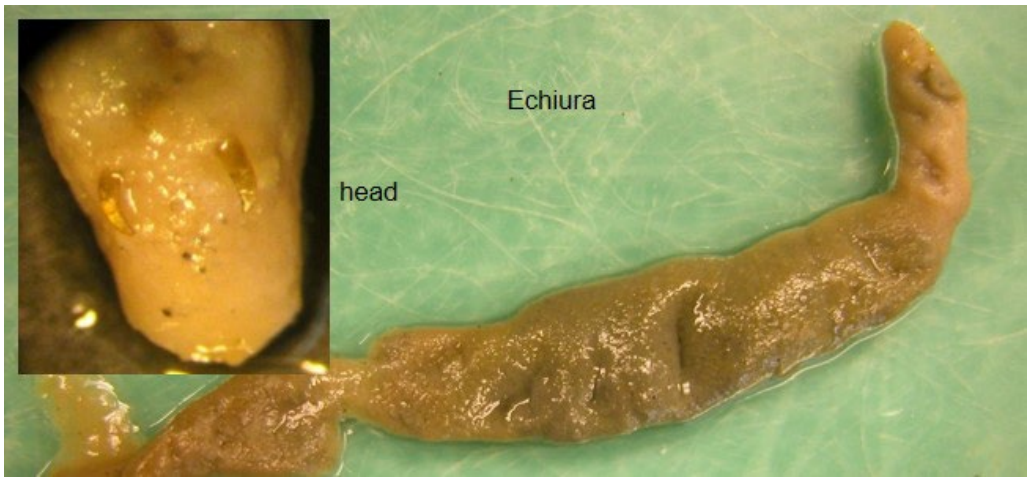


Figure 1.—General morphology of Sipuncula. A. External form of *Phascolion strombi*. B. Internal form of *Phascolopsis gouldi*.

Phylum Echiura

BURROW WORMS

1089 Echiura, burrow worms – bumpy, golden horns on head



Phylum Arthropoda

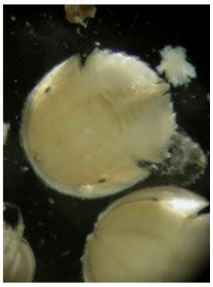
Pieces of horseshoe crab shell are very common and identified as dark and paper-like. Legs and claws are common, as well as the feathery book gills.

HORSESHOE CRABS
- Class Merostomata
- Order Xiphosura
- Family Limulidae
  - 0603 *Limulus polyphemus*

book gills

32 legs

31



3 mm juvenile

SPIDERS
- Class Arachnida
- Order Araneae
  - 0531 unidentified spider

Phylum Arthropoda (continued)

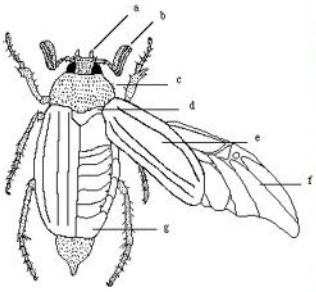
INSECTS

Class Insecta

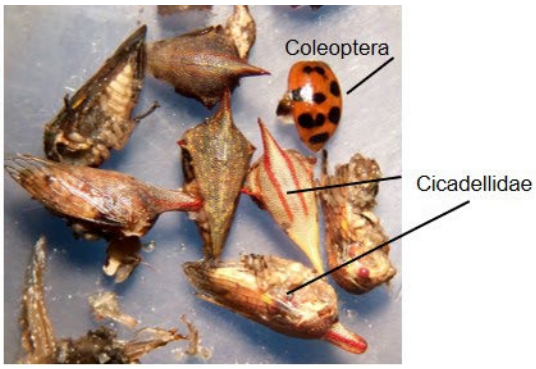
0505 unidentified insect

0898 Coleoptera, beetles (adult)

0913 Cicadellidae, leafhoppers



Coleoptera



0571 Hymenoptera, wasps/bees/ants

0564 Tricoptera, caddisflies

1014 Ephemeroptera, mayflies

Cicadellidae

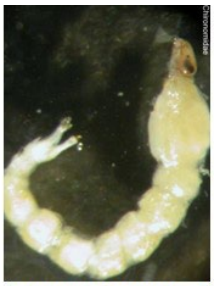
Hymenoptera

Ephemeroptera

0512 Chironomidae, midge flies

1013 *Chaoborus spp.*, phantom midges

0991 Formicidae, ants



Chironomidae larva

Chironomidae pupa

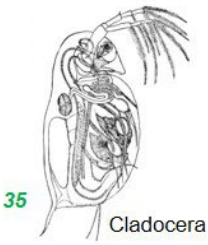
Chaoborus spp.

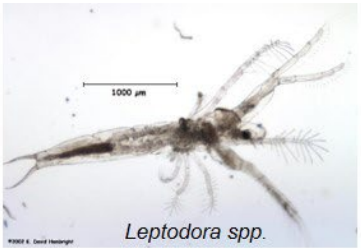
Formicidae

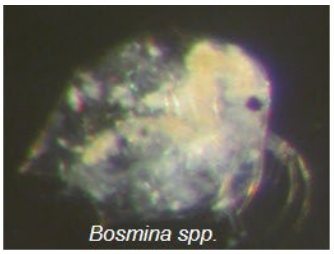
Phylum Arthropoda (Crustaceans)

CRUSTACEANS
Subphylum Crustacea
0673 unidentified crustaceans
1113 crustacean parts

CLADOCERANS – *Lower salinity zooplankton*
Class Branchiopoda
Order Diplostraca
1016 *Leptodora spp.*, cladocerans
0517 unidentified cladocerans
1015 *Bosmina spp.*, cladocerans



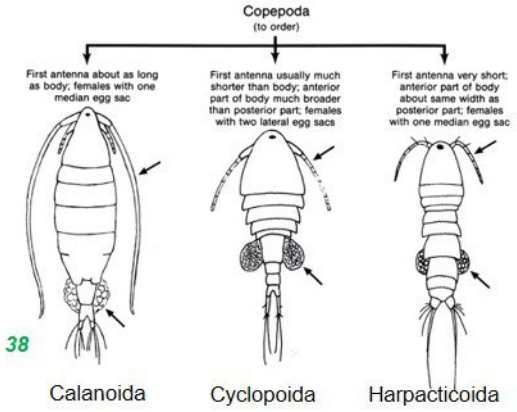


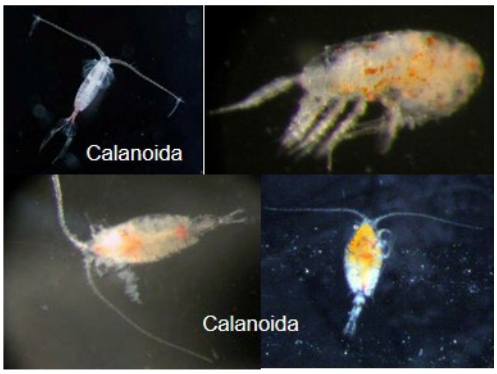


Phylum Arthropoda (Crustaceans continued)

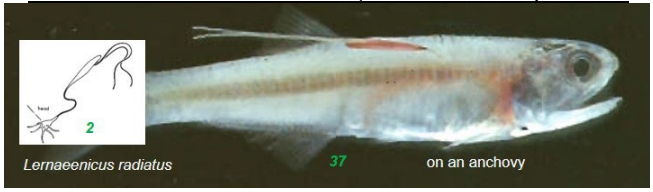
COPEPODS
Class Maxillopoda
Subclass Copepoda
Orders Calanoida, Harpacticoida, Cyclopoida

5038 unidentified copepod
0518 calanoid copepod – *herring guts commonly full of them*
0509 harpacticoid copepod
0565 cyclopoid copepod





0952 *Lernaeenicus radiatus*, anchor worm parasite



Phylum Arthropoda (Crustaceans continued)

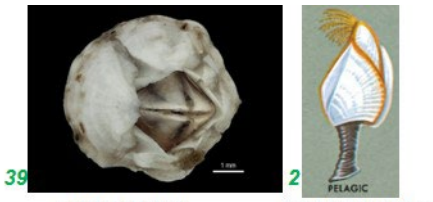
BARNACLES

Class Cirripedia

0808 sessile barnacles

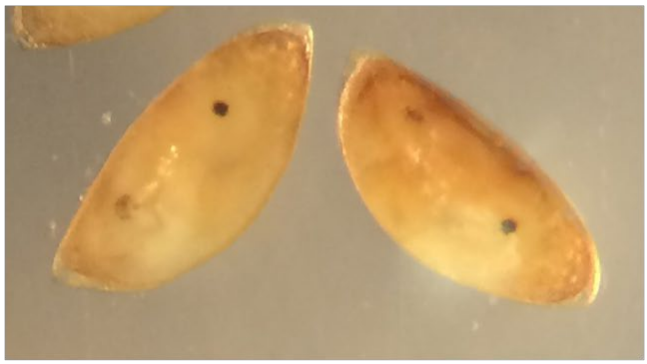
0556 *Balanus eburneus*

0537 *Lepas anatifera*



Balanus spp. *Lapas anatifera*

- Only about 1-2 mm long, barnacle larvae and ostracods look very similar.
- Both may have eyespots, but ostracods are more rounded and have long antennae.
- Barnacle larvae have pointy ends and may have frilly cirri exposed.



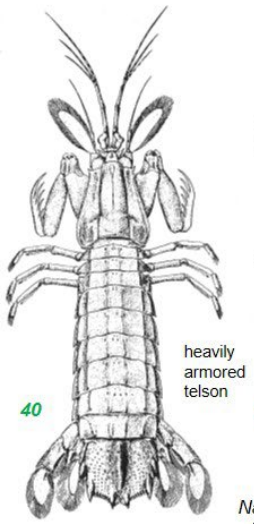
Barnacle cypris larvae
1163

Ostracod
0523

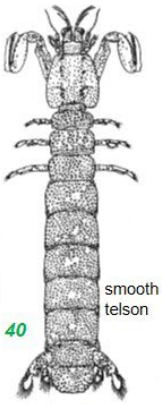
Phylum Arthropoda (Crustaceans continued)

MANTIS SHRIMP
Class Malacostraca
Order Stomatopoda

1094 unidentified mantis shrimps
0960 *Squilla spp.*
0621 *Squilla empusa*
1161 *Platysquilloides enodis*
1112 *Nannosquilla grayi*
1052 larval stomatopod
1207 *Lysiosquilla tredecimdentata*, lagoon mantis shrimp

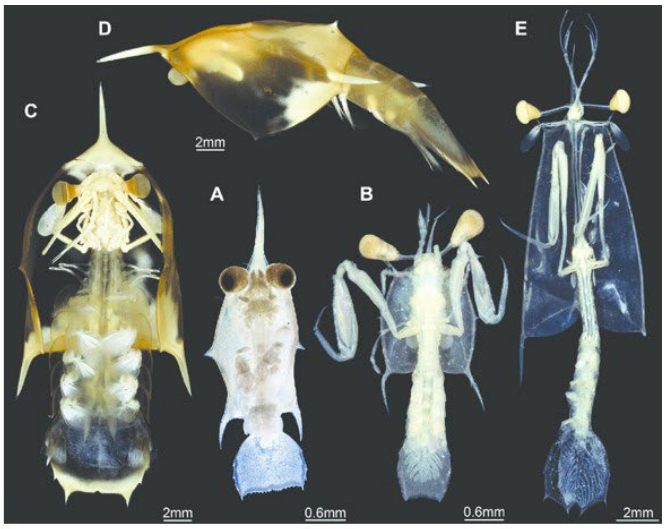


Squilla empusa



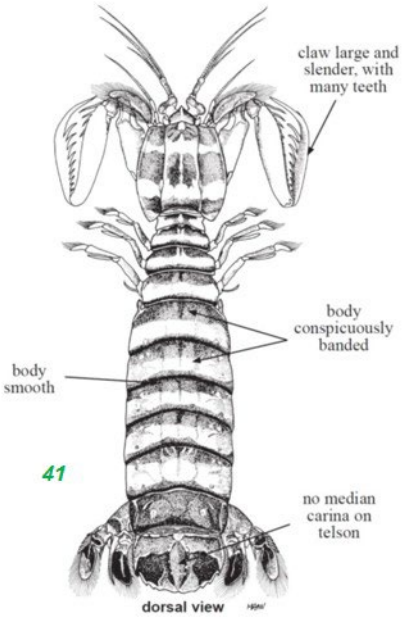
Nannosquilla grayi
Usually smaller specimens

Platysquilloides enodis
Usually smaller specimens



42

larval stomatopods

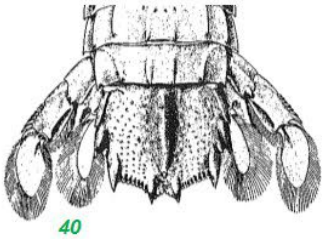


Banded mantis shrimps

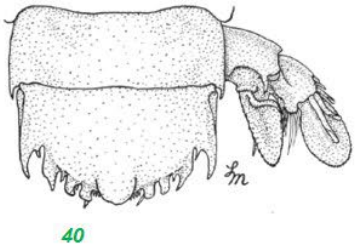
Lysiosquilla tredecimdentata

Phylum Arthropoda (Crustaceans continued)

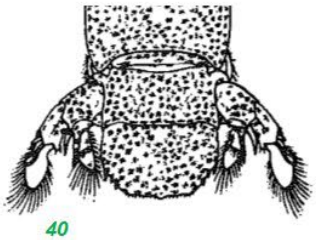
Mantis Shrimps (Stomatopods)



0621 ***Squilla empusa***



1161 ***Platysquilloides enodis***



1112 ***Nannosquilla grayi***

Phylum Arthropoda (Crustaceans continued)

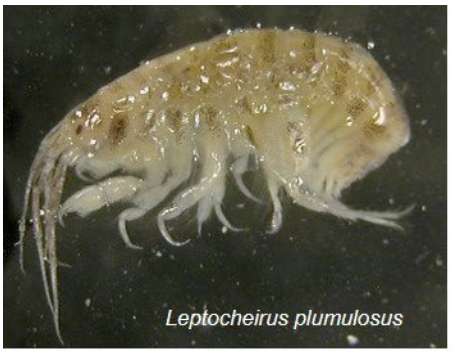
AMPHIPODS

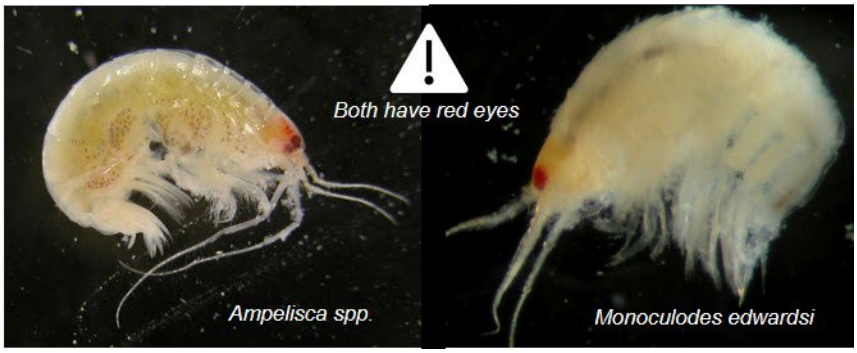
Class Malacostraca
Order Amphipoda

There are many amphipods. Some common ones are pictured here, but we have identified others in our fish diets using *Shallow-Water Gammaridean Amphipoda of New England*, by E. L. Bousfield

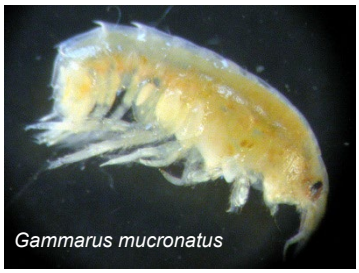
0841 unidentified amphipod

0507 *Leptocheirus plumulosus*, common burrower amphipod
0636 *Ampelisca spp.*, four-eyed amphipod – *look for distinct 4 eyes or eye pigment exploded*
0738 *Monoculodes edwardsi*, one-eyed amphipod – *look for single pointy triangular eye on top of head*





0694 *Gammarus spp.*, scud – *distinct bean-shaped eye and oval body*
5019 *Gammarus mucronatus*, spined-back scud
0919 *Listriella clymenellae*



0671 *Corophium spp.*, tube-builder amphipods, *usually more solitary*
5021 *Corophium lacustre*, slender tube-builder amphipod
0670 *Corophium crassicorne*

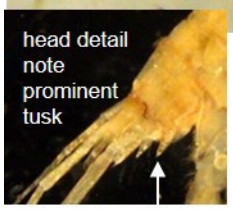
Phylum Arthropoda (amphipods continued)

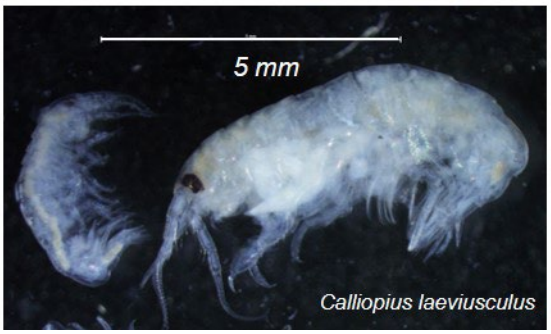
0579 *Erichthonius brasiliensis*
0722 Hyperiidae, big-eyed amphipods
0534 *Microprotopus raneyi*


Hyperiidae

0659 *Casco bigelowi* – *large solitary amphipod with prominent tusk under eye*
1008 Haustoriidae, digger amphipods
1012 *Amphiporeia virginiana* – *schnoz nozzle*
1206 *Calliopius laeviusculus*


Casco bigelowi – a large, usually solitary amphipod

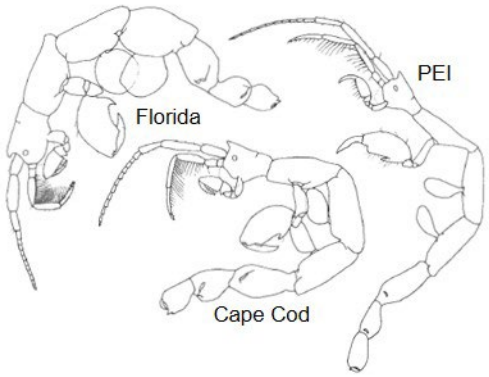




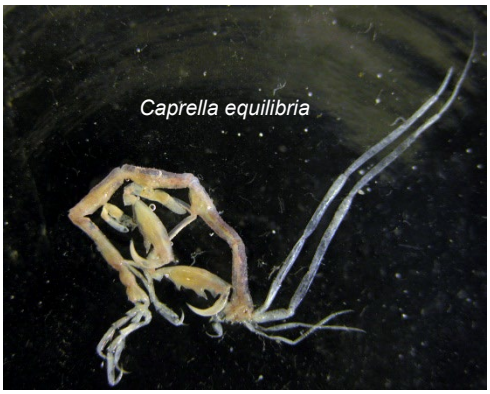
Phylum Arthropoda (amphipods continued)

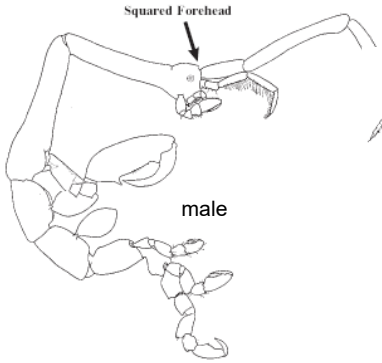
0658 unidentified skeleton shrimp

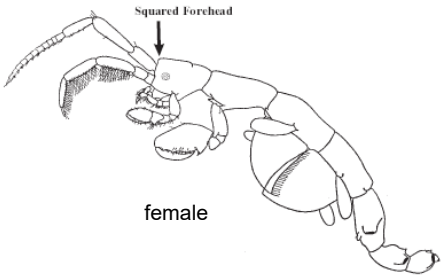
1009 *Caprella spp.*
0921 *Caprella penantis* (in ChesMMAP samples) – *distinct pointed forehead*



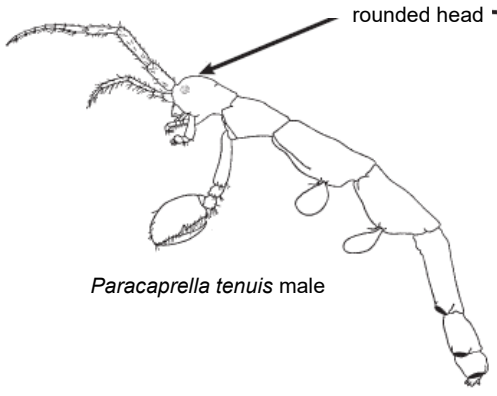
1106 *Caprella equilibria* (in NEAMAP samples) – *squared forehead*

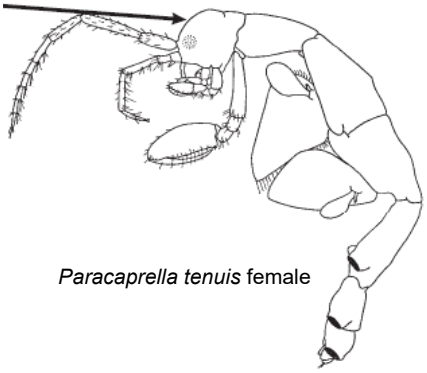


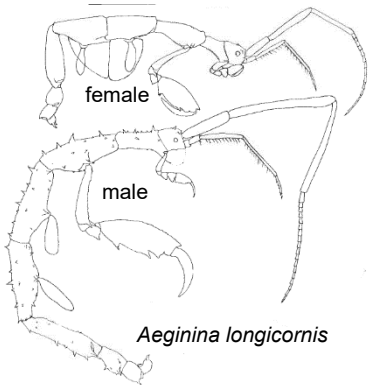




0923 *Paracaprella tenuis*
0630 *Aeginina longicornis*

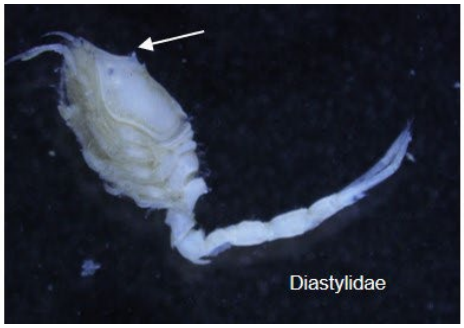




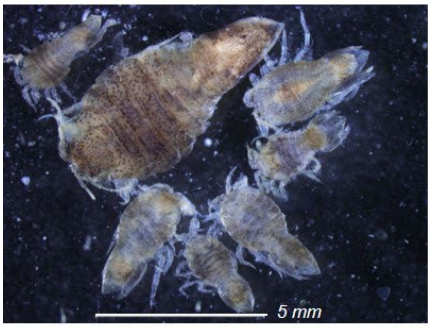


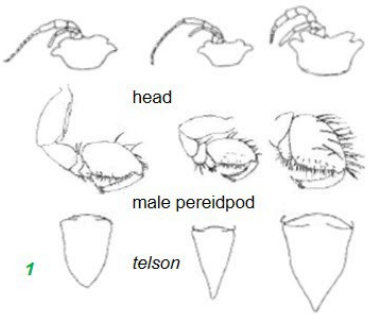
Phylum Arthropoda (Crustaceans continued)

CUMACEANS
Class Malacostraca
Order Cumacea
0674 unidentified cumacean
0676 *Diastylidae*



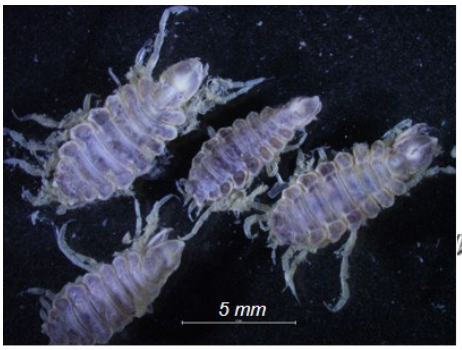
ISOPODS
Class Malacostraca
Order Isopoda
0657 unidentified isopoda
0526 *Chiridotea spp.*
0570 *Chiridotea almyra*, sand isopod
0663 *Chiridotea tuftsi*
0582 *Chiridotea coeca*

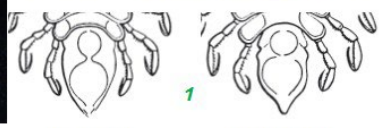


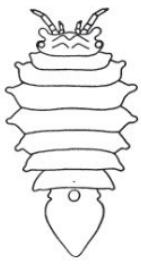



Chiridotea almyra *C. almyra* *C. tuftsi* *C. coeca* *Chiridotea almyra* *Chiridotea tufsi*

0918 *Edotia spp.*
5020 *Edotia triloba*, mound back isopod
0685 *Edotia montosa*
0684 *Edotia acuta*



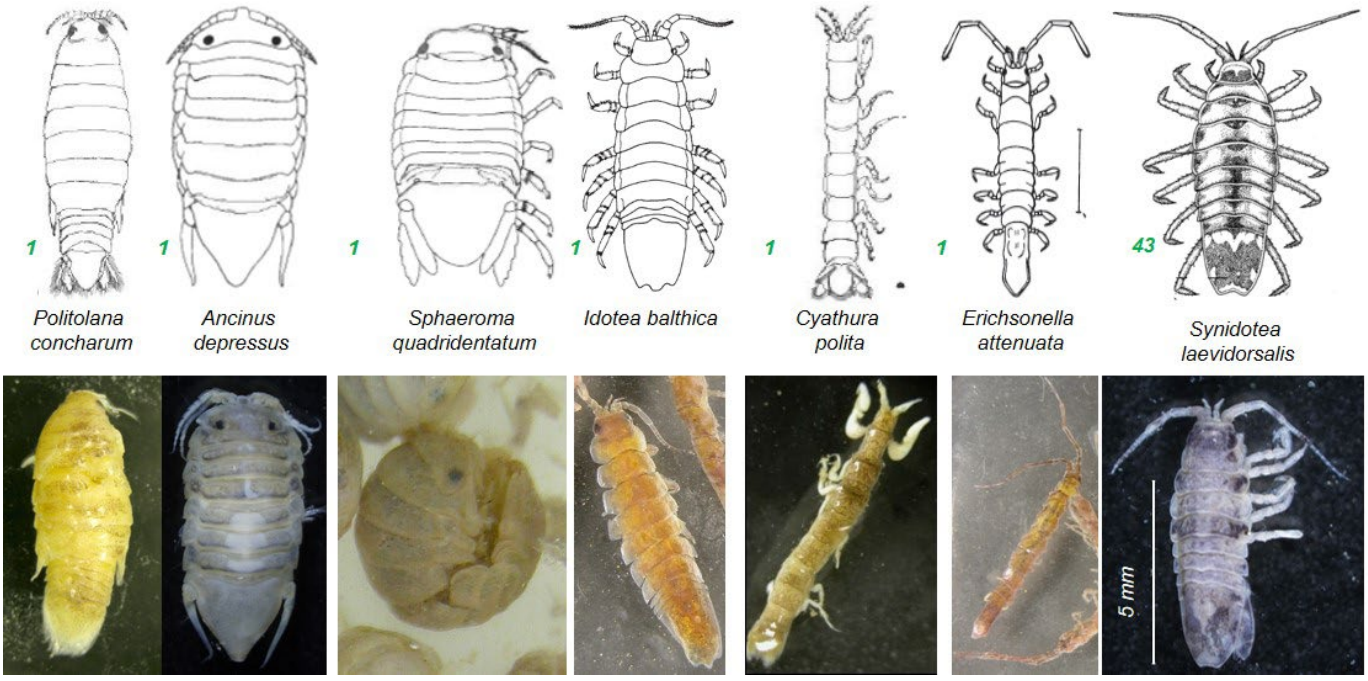




Edotia triloba *E. triloba* *E. montosa* *E. acuta*

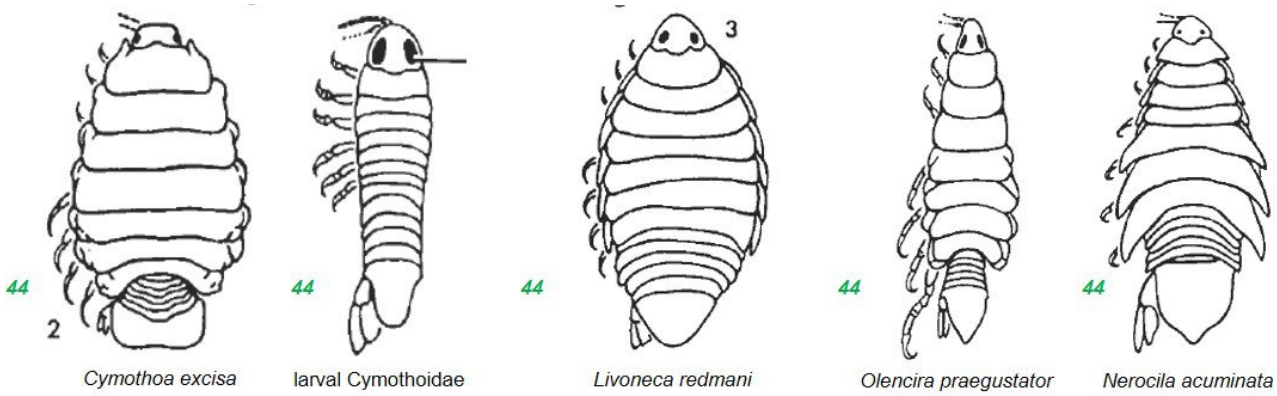
Phylum Arthropoda (isopods continued)

1025 *Politolana concharum*
0508 *Ancinus depressus*
0559 *Sphaeroma quadridentatum*
0655 *Idotea balthica*, sea slater
0513 *Cyathura polita*, slender isopod
0925 *Erichsonella attenuata*, seagrass isopod
0981 *Synidotea laevidorsalis* – *long antennae*



Phylum Arthropoda (isopods continued)

0929 Cymothoidae
0942 *Cymothoa spp.*
0683 *Livoneca redmanii*, fish lice/fish-gill isopod
0982 *Olencira praegustator*
1022 *Nerocila acuminata*



MAXILLOPODS

Class Maxillopoda

0959 *Argulus spp.*, lazy fish lice

Phylum Arthropoda (crustaceans continued)

MYSIDS

Class Malacostraca

Order Mysida

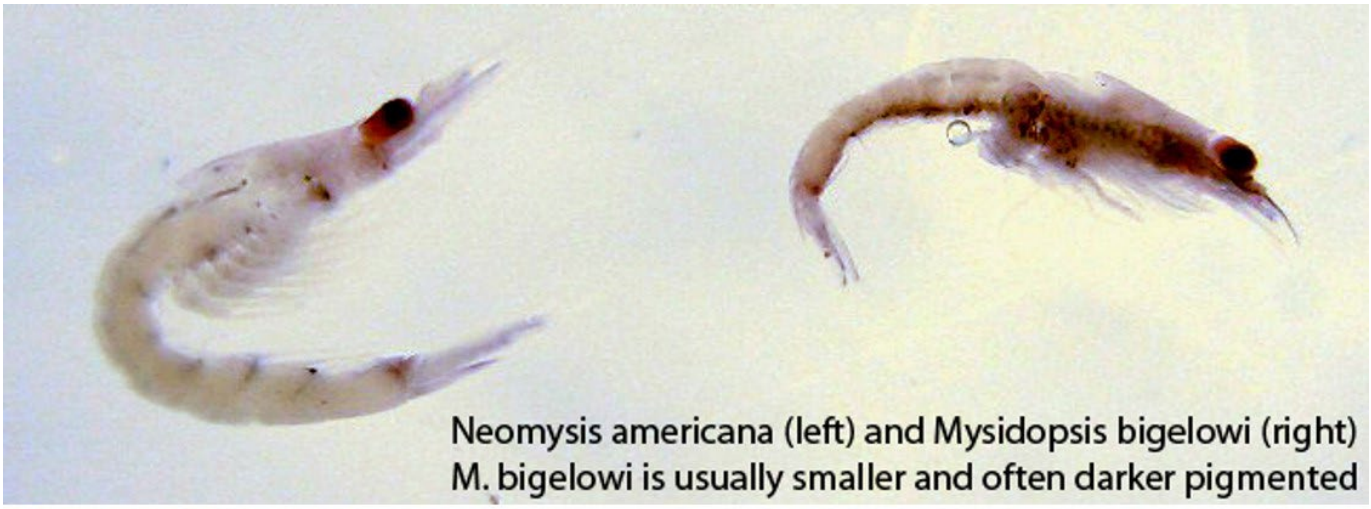
0574 unidentified mysid

0699 *Neomysis americana*

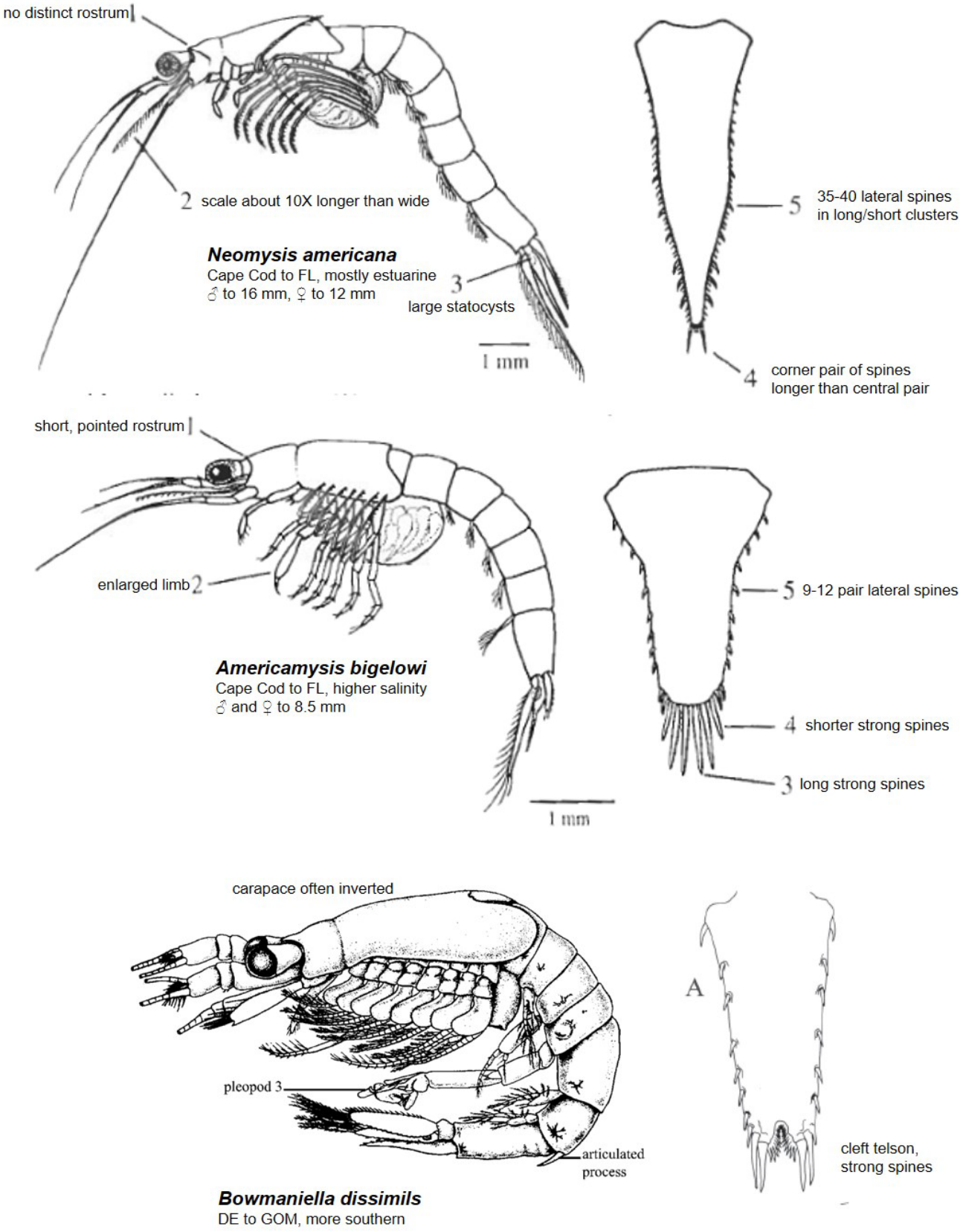
0740 *Americamysis (Mysidopsis) bigelowi*

1175 *Bowmaniella spp*

Bowmaniella dissimilis



Phylum Arthropoda (mysids continued)



All figures 45

Phylum Arthropoda (crustaceans continued)

TANAIDS
Class Malacostraca
Order Tanaidacea
0525 unidentified tanaid – lower salinity

OSTRACODS
Class Ostracoda
0523 unidentified ostracod

CRABS, SHRIMPS, LOBSTERS
Class Malacostraca
Order Decapoda

0675 unidentified decapod

0020 *Homarus americanus*, American lobster

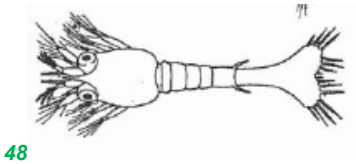
54

Homarus americanus

Phylum Arthropoda (decapods continued)

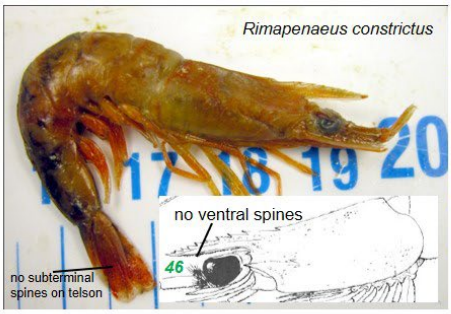
5001 unidentified shrimp

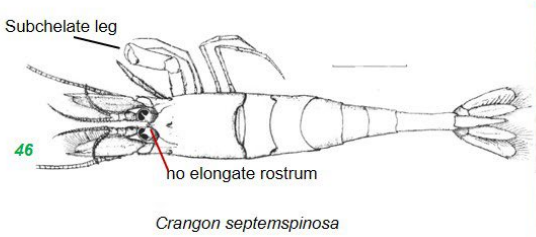
5011 unidentified shrimp zoea – *look for paddle-shaped tail as shown below (not present in crab zoea)*



48

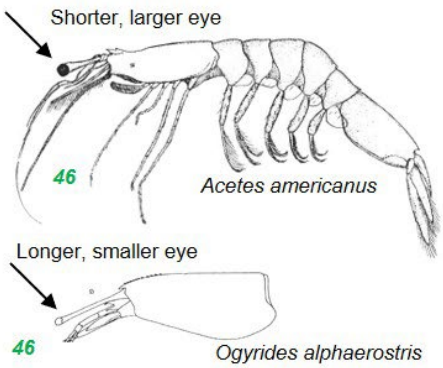
0595 *Rimapenaeus constrictus*, roughneck shrimp – *no ventral spines on rostrum*
0604 *Crangon septemspinosa*, sand shrimp – *no elongate rostrum, subchelate leg*
0679 *Dichelopandalus leptocerus*, bristled longbeak – *distinct swooping ventral spine on rostrum*





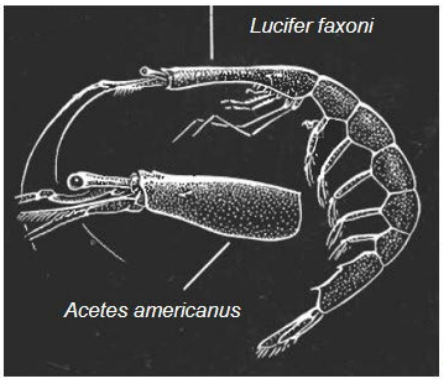
Crangon septemspinosa

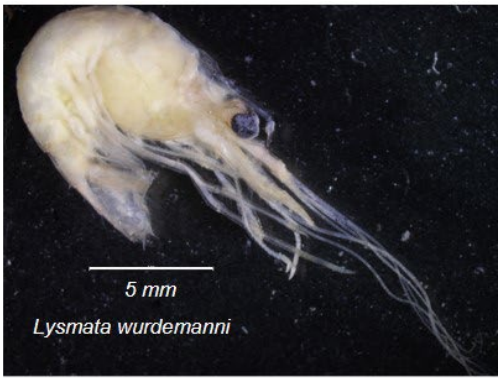
0623 *Acetes spp.*
0573 *Ogyrides alphaerostris*, estuarine long-eyed shrimp



Phylum Arthropoda (shrimp continued)

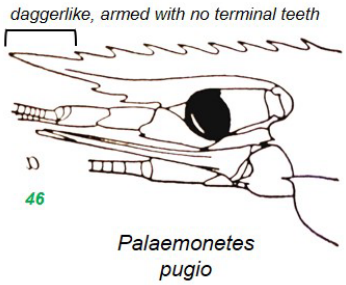
0546 *Lucifer spp.*
0550 *Lucifer faxoni*
0827 *Lysmata wurdemanni*, peppermint shrimp or red cleaning shrimp[6]

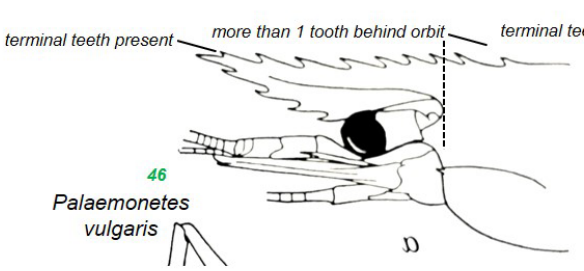


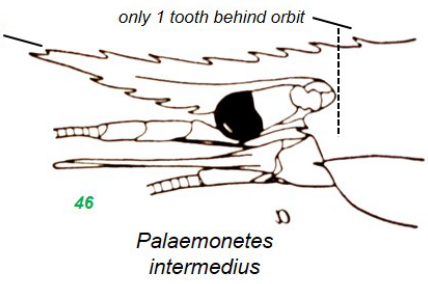


0620 *Palaemonetes spp.*, grass shrimp
1003 *Palaemonetes vulgaris*, common grass shrimp
1007 *Palaemonetes intermedius*, brackish grass shrimp
0569 *Palaemonetes pugio*, daggerblade grass shrimp

Palaemonetes are not common in our samples. Grass shrimp inhabit seagrass beds in shallower water, and may only be found in diets of fish foraging into these marginal habitats.

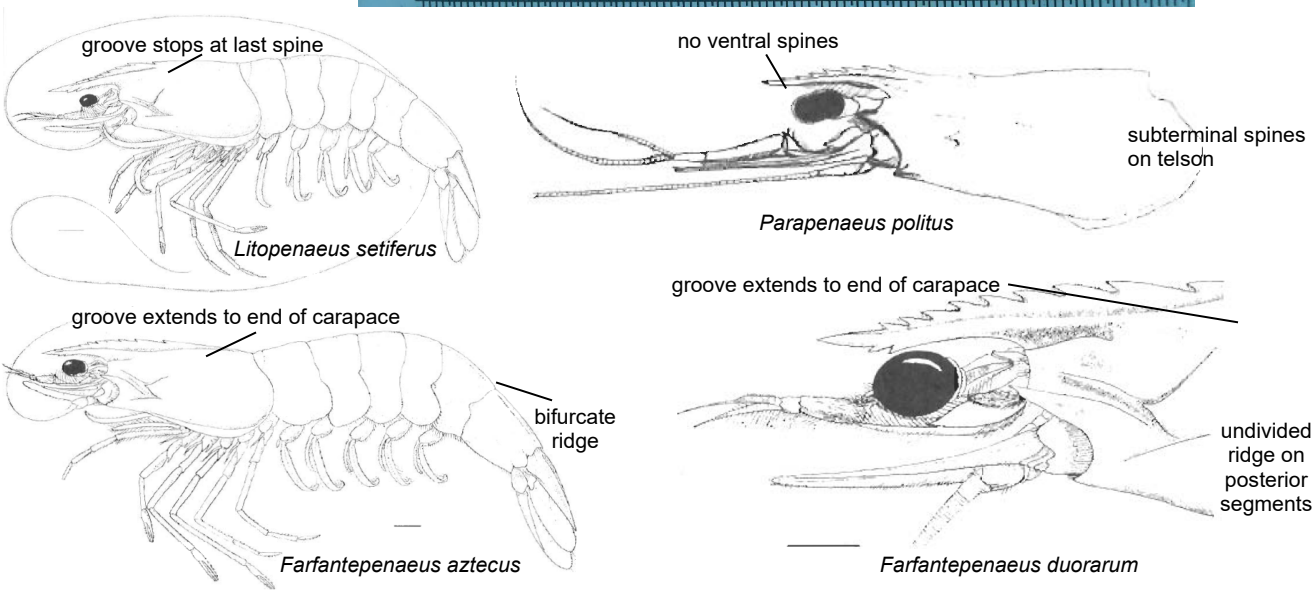






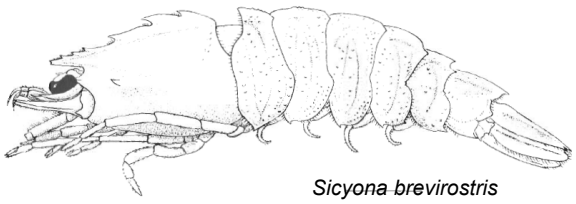
Phylum Arthropoda (shrimp continued)

6220 Penaeidae, unidentified penaeid
0597 *Litopenaeus setiferus*, white shrimp
0596 *Farfantepenaeus duorarum*, pink shrimp
0622 *Farfantepenaeus aztecus*, brown shrimp
1034 *Parapenaeus politus*, rose shrimp



46

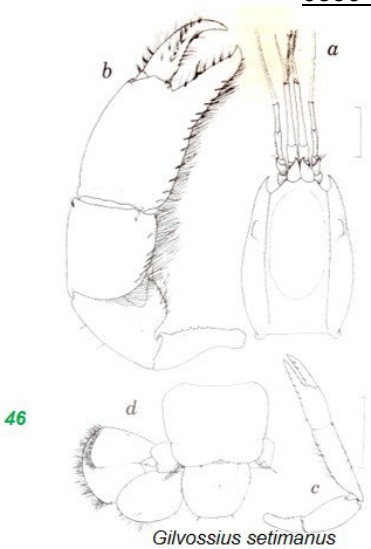
0844 *Sicyonia brevirostris*, rock shrimp



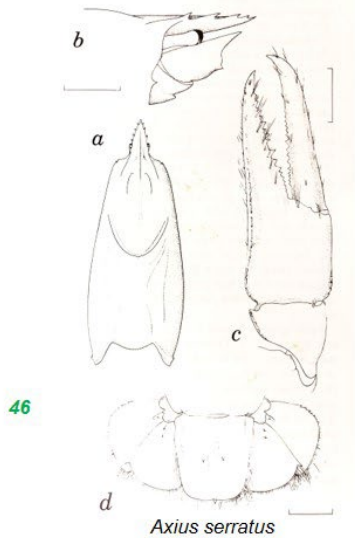
46

Phylum Arthropoda (shrimp continued)

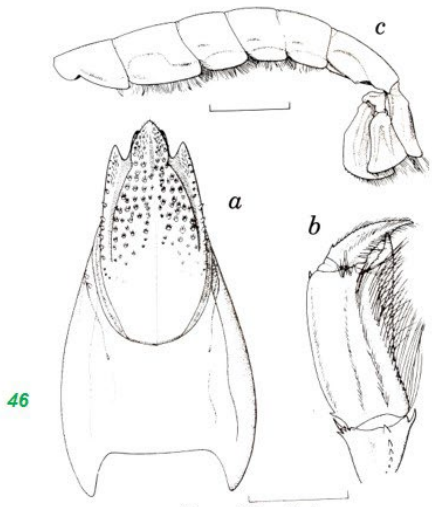
1010 Thalassinidea, unidentified mud shrimps
0500 *Gilvossius setimanus*, short-browed mud shrimp – *common, tear-shaped eyes*
0653 *Axius serratus*, burrowing shrimp – *common, flat smooth rostrum, long scissorlike claw*
0590 *Upogebia affinis*, flat-browed mud shrimp – *less common, flat bumpy rostrum*



Gilvossius setimanus

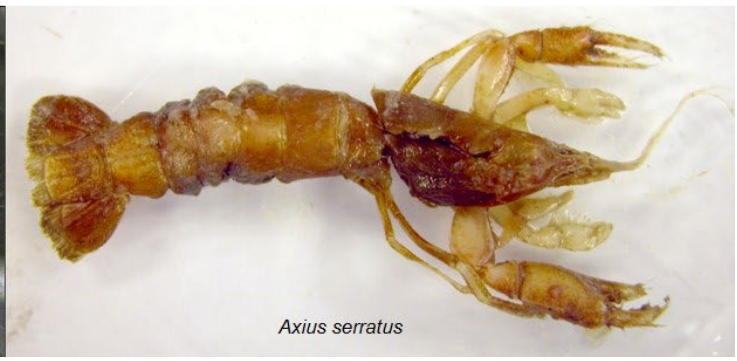


Axius serratus

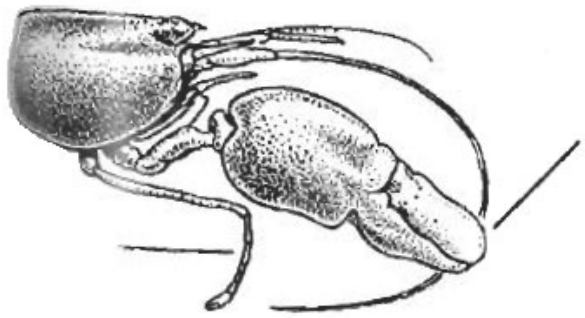


Upogebia affinis


Gilvossius setimanus

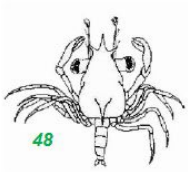

Axius serratus

1058 Alpheidae, unidentified snapping shrimps
0591 *Alpheus heterochaelis*, big-clawed snapping shrimp


Alpheus heterochelis
2

Phylum Arthropoda (crabs)

5035 unidentified crab
5012 crab parts
0973 unidentified crab zoea
1054 unidentified crab megalopa

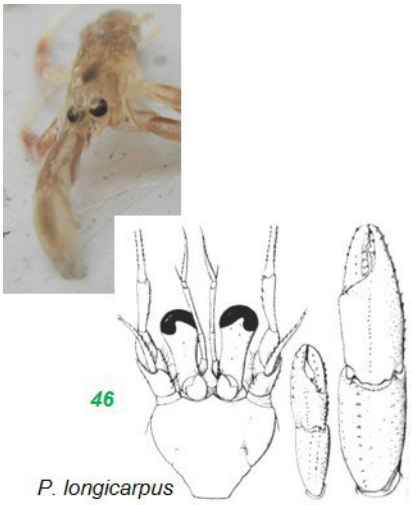


5016 *Cancer spp.*
0656 *Cancer irroratus*, Atlantic rock crab – *smooth serrations on margin of carapace, see pic below*
0600 *Cancer borealis*, Jonah crab - *jagged serrations on margin of carapace, see pic below*

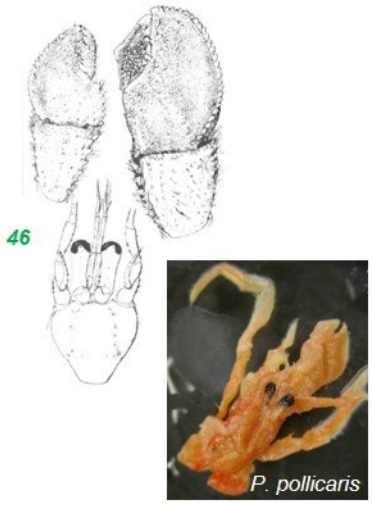
Jonah Crab internal organs

Phylum Arthropoda (crabs continued)

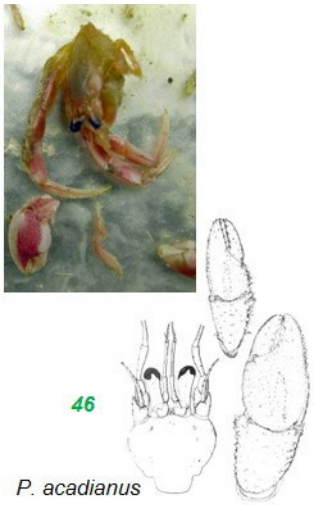
0917 unidentified hermit crab
0758 *Pagurus spp.*
7581 *Pagurus longicarpus*, long-clawed hermit crab – *very common*
7582 *Pagurus pollicaris*, flat-clawed hermit crab – *very common, larger*
0617 *Pagurus acadianus*, acadian hermit crab – *not common, very distinct red band on claw*



P. longicarpus



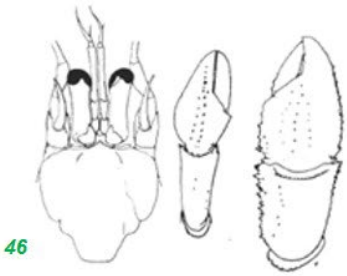
P. pollicaris



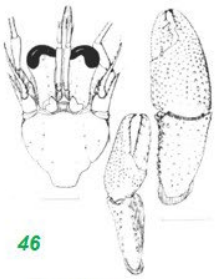
P. acadianus

There are many hermit crabs in our region. They are even more diverse south of Cape Hatteras. Pictured above are the most common species identified in our fish diets. Pictured below are species known to inhabit our sampling range, but we haven't yet commonly identified them.

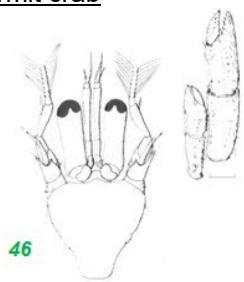
0757 *Pagurus arcuatus*, hairy hermit crab -
0618 *Pagurus annulipes*, banded hermit crab



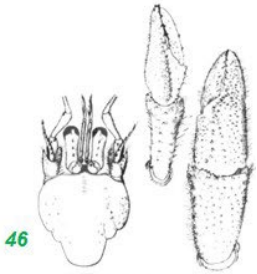
P. arcuatus



P. politus



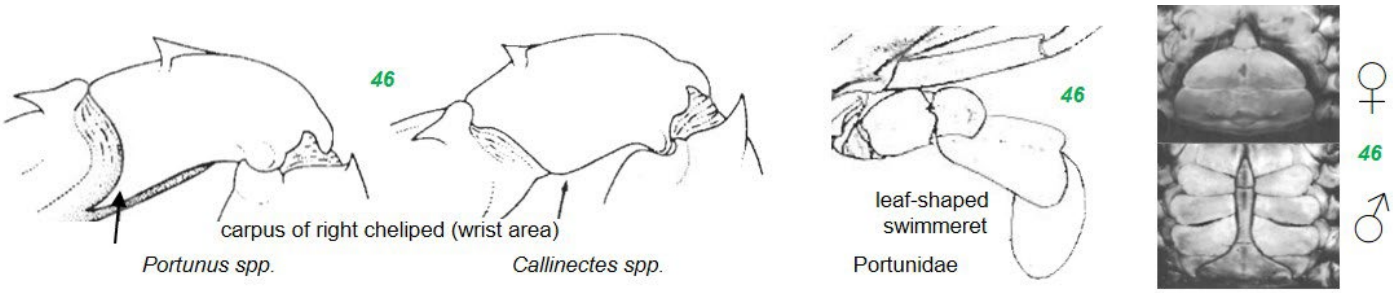
P. annulipes



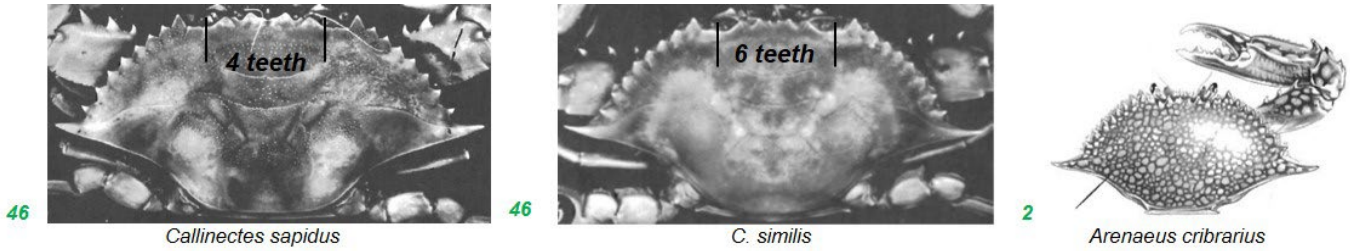
P. pubescens

Phylum Arthropoda (crabs continued)

0839 Portunidae, swimming crabs – distinguished by their leaf-shaped swimmeret
0578 *Portunus spp.*
0861 *Callinectes spp.*
1095 *Ovalipes spp.*



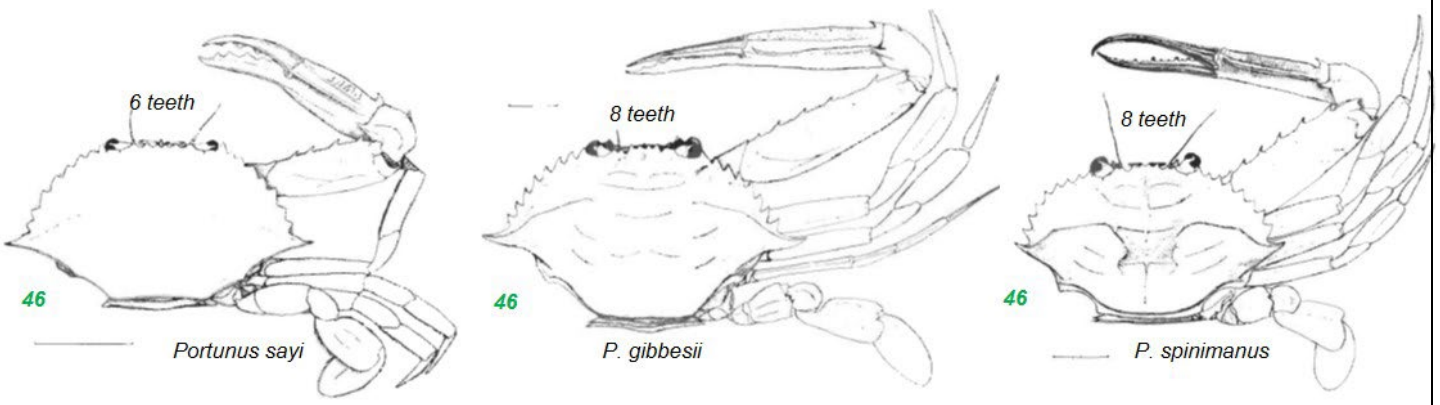
0614 *Callinectes sapidus*, blue crab (sex unknown)
6141 *Callinectes sapidus*, blue crab (male)
6142 *Callinectes sapidus*, blue crab (juvenile female)
6143 *Callinectes sapidus*, (adult female)
0835 *Callinectes similis*, lesser blue crab – *not common but known to be in our range*
0545 *Callinectes sapidus*, blue crab (megalopa)
0848 *Arenaeus cribrarius*, speckled crab – *not common but known to be in our range*



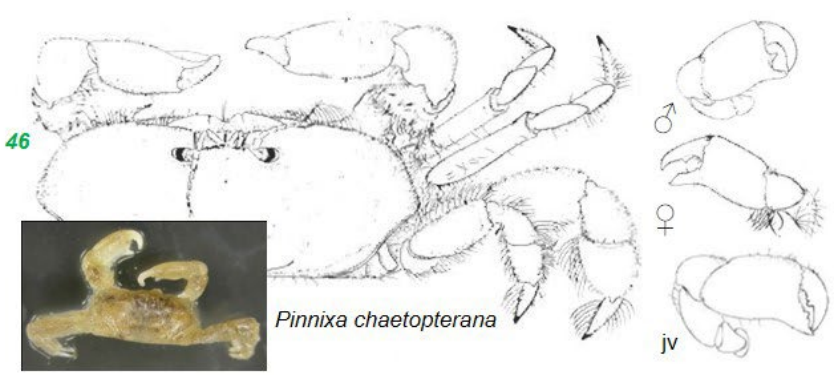
0612 *Ovalipes ocellatus*, lady crab
0611 *Ovalipes stephensoni*, course-hand lady crab – *range south of VA*

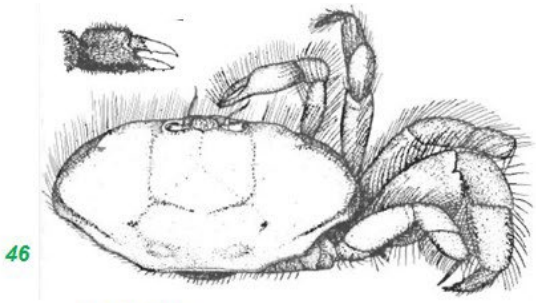
Phylum Arthropoda (crabs continued)

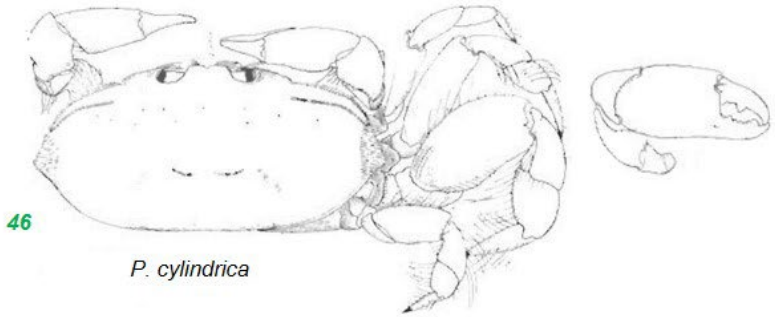
0875 *Portunus sayi*, sargassum swimming crab – *6 teeth between eyes*
0607 *Portunus gibbesii*, iridescent swimming crab – *8 teeth between eyes*
0608 *Portunus spinimanus*, blotched swimming crab – *8 teeth between eyes*

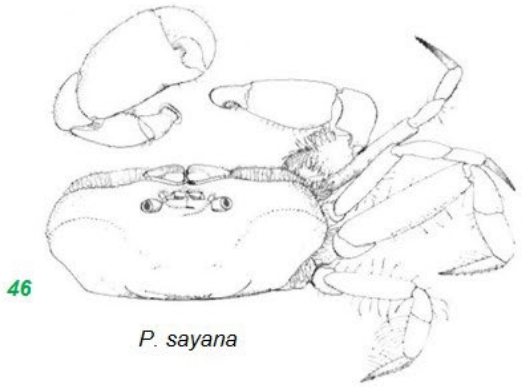


0833 *Pinnixa spp.*, unidentified pea crab – *very tiny crabs*
0547 *Pinnixa chaetopterana*, parchment worm tube crab – *chunky walking legs, males and juveniles have hooked claw*
5018 *Pinnixa retinens*, pea crab
5023 *Pinnixa cylindrica*, pea crab
0927 *Pinnixa sayana*, pea crab – *narrow walking legs, hooked claw*





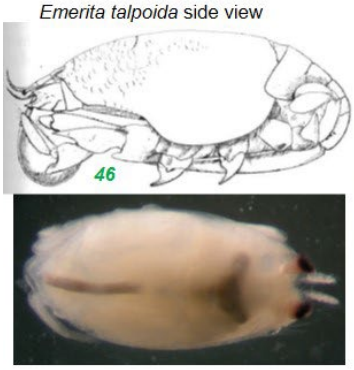




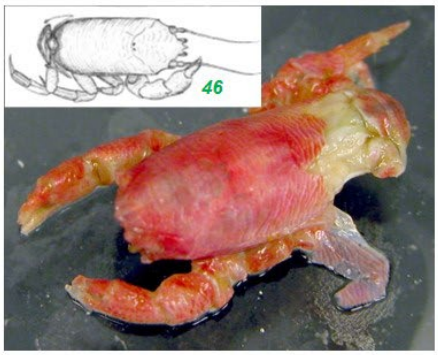
Phylum Arthropoda (crabs continued)

1043 unidentified mole crabs – *slightly iridescent sheen on shell*
0861 *Emerita talpoida*, Atlantic sand crab
0624 *Euceramus praelongus*, olivepit porcelain crab – *common, distinctly bright red and iridescent*
0625 *Lepidopa websteri*, square-eyed mole crab
1080 *Albunea paretii*, beach mole crab

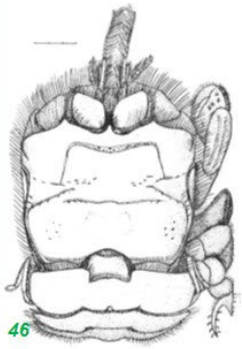
Emerita talpoida side view



E. talpoida dorsal view



Euceramus praelongus

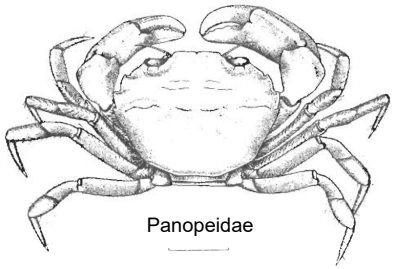


Lepidopa websteri

Albunea paretii

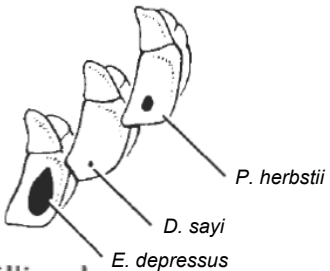
0594 Panopeidae, unidentified mud crabs
5943 *Rhithropanopeus harrisii*, white-fingered mud crab – *less saline habitats*
5942 *Panopeus herbstii*, Atlantic mud crab
0552 *Hexapanopeus angustifrons*, smooth mud crab – *most common*
5944 *Dyspanopeus sayi*, Say's mud crab
5941 *Eurypanopeus depressus*, flat-back mud crab

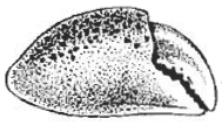
2



Panopeidae

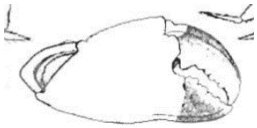
3rd maxilliped





Rhithropanopeus harrissii

Panopeus herbstii



Hexapanopeus angustifrons

Dyspanopeus sayi

Eurypanopeus depressus

H. angustrifrons

H. angustrifrons

Phylum Arthropoda (crabs continued)

Purse Crabs
Persephona mediterranea, while named based on an erroneous type-locality, is known to occur in our area. According to our Crabs, Shrimps, and Lobsters book, there is some confusion about subspecies and synonomy of *Persephona punctata*.

0870 *Persephona mediterranea*, mottled purse crab
0849 *Persephona punctata*, purse crab
0601 *Polyonyx gibbesi*, eastern tube crab – *tiny crab with distinct backwards-looking claw*
0873 *Porcellana sayana*, spotted porcelain crab
0609 *Porcellana sigsbeiana*, porcelain crab

Persephona mediterranea

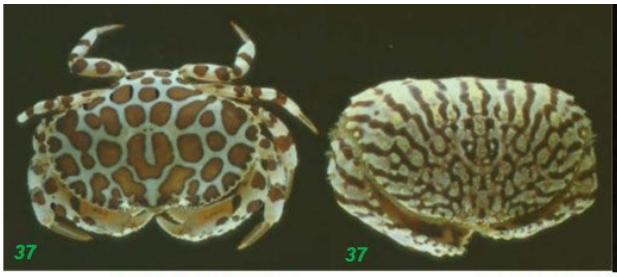
Persephona punctata


Polyonyx gibbesi

Porcellana sayana

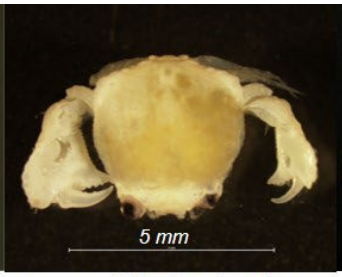
Porcellana sigsbeiana

1079 *Calappa flammea*, flame box crab – *aka shame-faced crab*
0865 *Hepatus epheliticus*, calico box crab

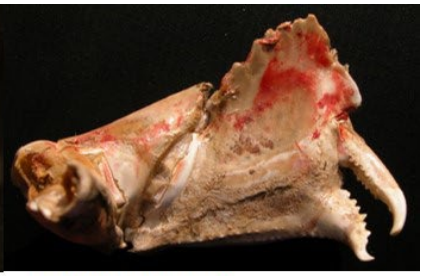


Hepatus epheliticus

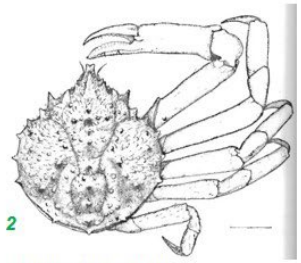
Calappa flammea



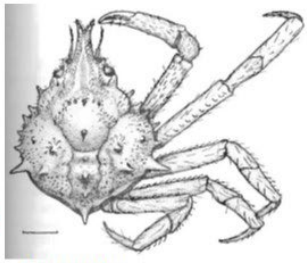
C. flammea juvenile


C. flammea adult claw

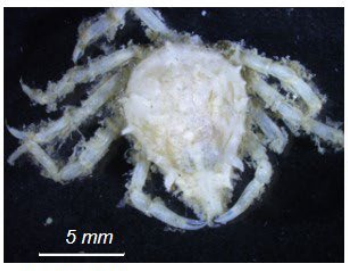
5026 *Libinia spp.*, unidentified spider crab – *the two species are hard to distinguish, especially juveniles*
0605 *Libinia emarginata*, common spider crab (9 spines)
0593 *Libinia dubia*, six-spine spider crab
1174 *Hyas coarctatus*, Arctic lyre crab – *not common*



Libinia emarginata



Libinia dubia

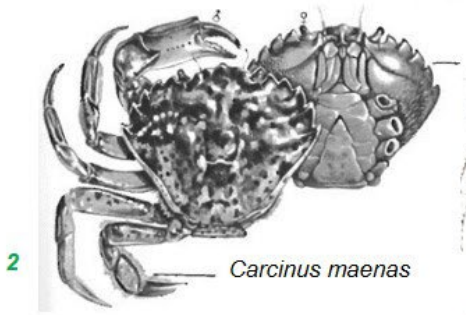


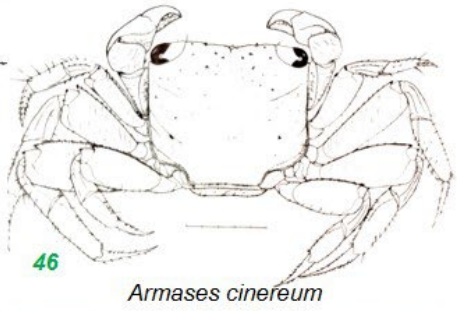
Libinia dubia


Hyas coarcticus

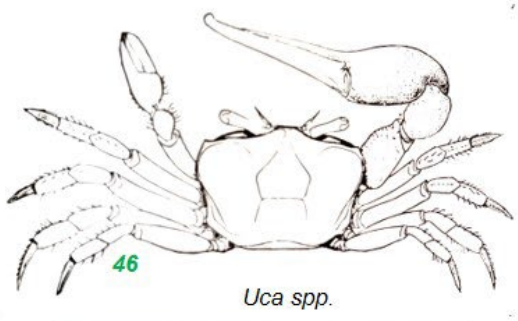
Phylum Arthropoda (crabs continued)

0626 *Carcinus maenas*, green crab – *not common*
1027 *Armases cinereum*, square-back marsh crab – *not common*
0966 *Uca spp.*, fiddler crabs – *not common*





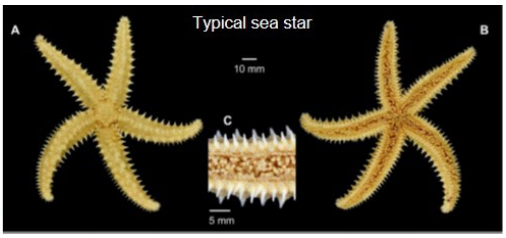
Armases cinereum



Uca spp.

Phylum Echinodermata

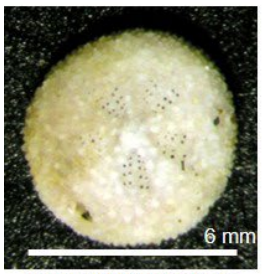
0496 unidentified echinoderm



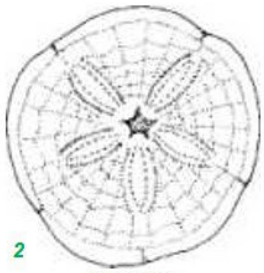
53

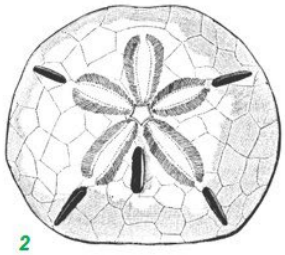
SEA STARS
Class Asteroidea
0650 Asteriidae
0651 unidentified sea star

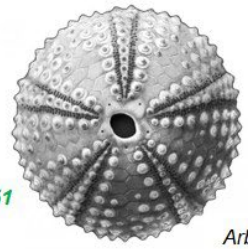
SEA URCHINS, SAND DOLLARS
Class Echinoidea
0702 *Echinarachnius parma*, sand dollar
0847 *Mellita quinquiesperforata*, keyhole urchin
0840 *Arbacia punctulata*, purple sea urchin



Echinarachnias parma

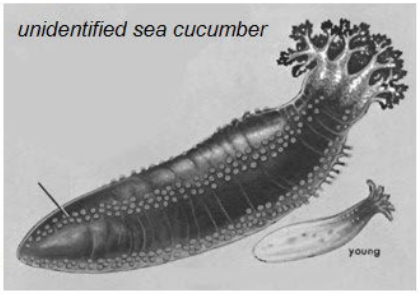

2 *E. parma*


2 *Mellita quinquiesperforata*


51

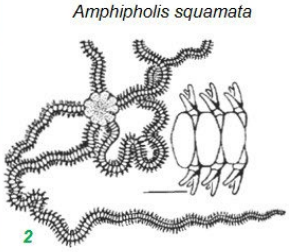

52 *Arbacia punctulata*

SEA CUCUMBERS
Class Holothuroidea
0828 unidentified sea cucumbers
1129 *Caudina arenata*, rat-tailed cucumber

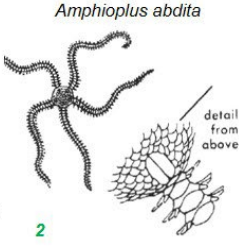


2

BRITTLE STARS
Class Ophiuroidea
0755 unidentified brittle stars – *common prey in bottom feeders, rarely found whole, arms look like polychaetes, but are crunchy. Not usually identifiable to species.*
0920 *Amphioplus abdita*
0652 *Amphipholis squamata*



2



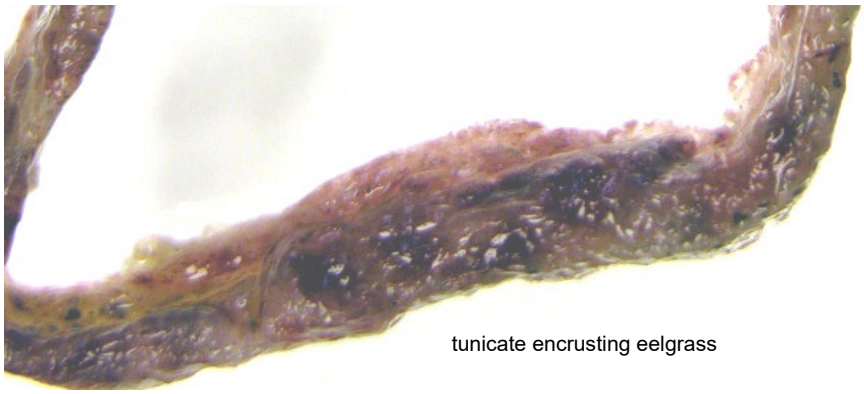
2

Phylum Chordata

SEA SQUIRTS

Class Ascidiacea

0648 unidentified sessile tunicates



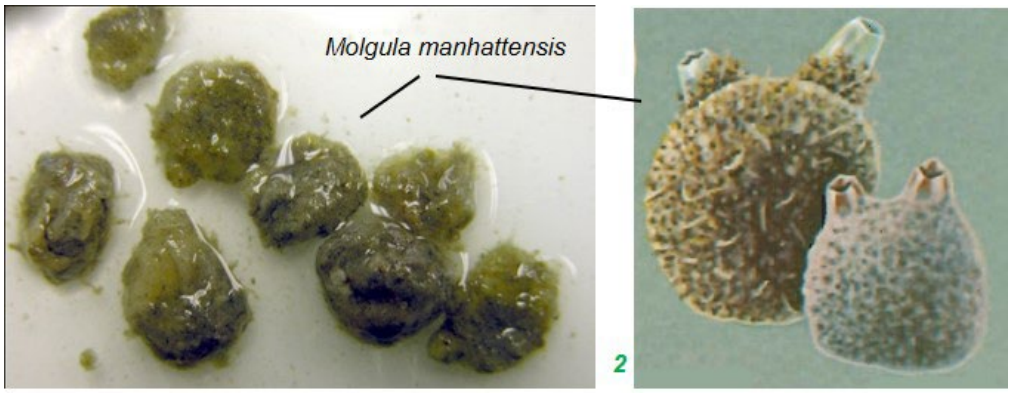
tunicate encrusting eelgrass

Order Pleurogona

Family Molgulidae

5007 *Molgula manhattensis*

0824 *Molgula spp.*



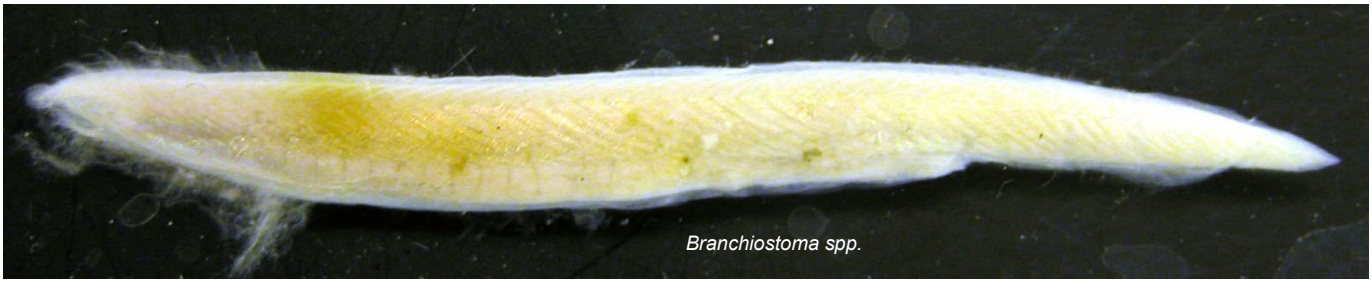
LANCELETS

Class Cephalochordata

Order Amphioxiformes

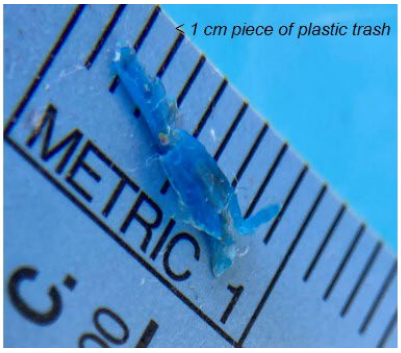
Family Branchiostomatidae

0495 *Branchiostoma spp.* – *common, worm-like*



Miscellaneous Materials

0708 unidentified material
0895 trash
0542 plastic trash
0554 cigarette butt
0930 fishing lure
5005 detritus



ANIMAL MATTER

0016 bait (scrap)
0705 shell
0970 eggs
1046 feather
5032 animal tubes
5033 unidentified meat
0892 worm tubes

PLANT MATTER

0504 wood
5006 vegetation
0478 macro algae
0503 red algae
0580 leaf
0957 plant seed
0965 diatoms
1002 unidentified seagrass
5029 *Zostera marina*
5030 corn

MINERAL MATTER

0585 mud
0706 sand tubes
0894 coal
5004 gravel
5037 sand
5031 rock

Plastics
We are frequently asked if we find a lot of trash or plastic in our fish stomachs. Fortunately, finding artificial materials such as plastic, monofilament and other trash is rare.

PHOTO CREDITS OUTSIDE OF MRG

1. Smith, R. I. (ed) 1964. Keys to Marine Invertebrates of the Woods Hole Region. Contribution No. 11. Systematics-Ecology Program, Marine Biological Laboratory, Woods Hole, MA.
2. Gosner, K. 1999. A Field Guide to the Atlantic Seashore from the Bay of Fundy to Cape Hatteras. Houghton Mifflin Company. New York.
3. Winder, J. 2012
4. *intentionally left blank*
5. Lippson, A. J. and R. L. Lippson. 2006. Life in the Chesapeake Bay (3ed). The Johns Hopkins University Press. Baltimore.
6. Aguilar, R. Smithsonian Environmental Research Center *on* Barcode of Life Data (BOLD) Systems.
7. Femorale *on* Alchetron.com, G. Mahajan (ed).
8. Kirsh, D. *on* jaxshells.org
9. eattheinvaders.org/the-common-periwinkle/blog
10. Schultes, F. W.
11. Sept, J. D. 2008. A Photographic Guide to Seashore Life in the North Atlantic: Canada to Cape Cod. Princeton University Press, Princeton.
12. Jacksonville Shell Club *on* Alchetron.com
13. Gulf Specimen Marine Laboratories, Inc
14. Van der Mije, S. Naturalis Biodiversity Center *on* InvertEBase.org
15. Lazo-Wasem, E. A. and L. Gall. 2019. Invertebrate Zoology Division, Yale University Peabody Museum.
16. Krisberg, M. F. May 2010.
17. Panova. Netherlands *on* shellauction.net.
18. Cymru, A. National Museum Wales.
19. jaxshells.org/crassost
20. Aguilar, R. Smithsonian Environmental Research Center
21. jaxshells.org/lysonia
22. DeJong Marinelife, Netherlands
23. Dreyer, J. Virginia Institute of Marine Science
24. Livingstone, BIODIDAC
25. Prairie Research Institute, Illinois Natural History Survey, University of Illinois-Urbana-Champaign.
26. Shiner, A. Marine Invertebrate Zoology Blog, University of Washington.
27. Cardiff Curator, @CardiffCurator *on* Twitter.com
28. Seitz, R. Virginia Institute of Marine Science
29. Centre for Biodiversity Genomics, University of Gelph, Canada.
30. Cutler, E. B. 1977. NOAA Technical Report, NMFS Circular 403. Marine Flora and Fauna of Northeast United States. Sipuncula.
31. Natural History Museum, London.
32. Delaware Bay Horseshoe Crab Survey.
33. Essig, E. O. 1942. College Entomology. The MacMillan Company, NY.
34. Howells, A. Australian Museum.
35. Basics of Aquaculture and Hydrobiotechnology - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Cladocera-A-Daphnia-magna-B-Moina-sp_fig5_322465390 [accessed 30 Mar, 2022]
36. Hambright, K. D. 2002.
37. Ruppert, E. E. and R. S. Fox. 1988. Seashore Animals of the Southeast: a guide to common shallow-water invertebrates of the southeastern Atlantic Coast. University of South Carolina Press.
38. FAO. 1999. *In* Training Manual on Live Feed for Marine Finfish and Shellfish Culture by Shubhadeep Ghosh, 2016.
39. d'Acoz, C. d'U. and F. Kerchof. Royal Belgian Institute of Natural Sciences.
40. Manning, R. 1969. Stomatopod Crustacea of the Western Atlantic. University of Miami Press, Coral Gables, FL.
41. FAO Species Identification Guide for Fishery Purposes: Western Central Atlantic.
42. Haug, Carolin & Ahyong, Shane & Wiethase, Joris & Olesen, Jørgen & Haug, Joachim. (2016). Extreme morphologies of mantis shrimp larvae. Nauplius. 24. 10.1590/2358-2936e2016020.
43. Coastal Resources Management Council, Guide to Marine Invaders in RI Coastal Waters. *http://www.crmc.ri.gov/invasives/invasives_refcards/S_laevidorsalis.pdf*
44. Richardson, H. 1905. Monograph on the Isopods of North American. Bulletin of the United States National Museum. Washington DC.

PHOTO CREDITS OUTSIDE OF MRG (CONTINUED)

45. Stuck, K. C., H. M. Perry, and R. W. Heard. 1979. An annotated key to the Mysidacea of the north central Gulf of Mexico. Gulf Res. Rep. 6: 225-238.
46. Williams, A. B. 1984. Shrimp, Lobsters, and Crabs of the Atlantic Coast of the Eastern United States, Maine to Florida. Smithsonian Institution Press. Washington DC.
47. Leonardo's Reef Laboratories, Netherlands.
48. Sir Alister Hardy Foundation for Ocean Science. Zooplankton.
49. Voigt. E. North Carolina SeaGrant. Coastwatch.
50. *intentionally left blank*
51. Sosa, C. R. *on* gulfbase.org

52. Martinez, L. O. based on photo by J. R. Molina *on* gulfbase.org
53. Madeira, P., A. Kroh, R. Cordeiro, A. M. DF. Martins, and S. P. Avila. 2019. The Echinoderm Fauna of the Azores (NE Atlantic Ocean). Zootaxa: 2019 July 19; 4639(1).
54. University of Maine Lobster Institute. umaine.edu/lobsterinstitute/educational-resources/life-of-the-american-lobster/
55. jaxshells.org/pursec5
56. Matbio *on* inaturalist.org/guide_taxa/255127

0671	amphipod (Corophium spp.)	*Corophium spp.*
0694	amphipod (Gammarus spp.)	*Gammarus spp.*
0841	amphipod, unidentified	*Amphipoda spp.*
0643	Anemones	*Anemones*
5032	animal tubes	*animal tubes*
0558	ark clams	*Anadara*
0037	atlantic menhaden	*Brevortia tyrannus*
0816	Atlantic razor clam	*Ensis directus*
0656	Atlantic rock crab	*Cancer irroratus*
0103	bay anchovy	*Anchoa mitchilli*
0697	bloodworm	*Glycera spp.*
0802	Blue mussel	*Mytilus edulis*
0755	brittle stars	*Ophiuroidea*
0764	Broomworm	*Pherusa affinis*
1089	burrow worms	*Echiura spp.*
0653	burrowing mud shrimp	*Axius serratus*
0004	butterfish	*Peprilus triacanthus*
0518	Calanoid copepod	*Calanoida*
5016	cancer crab, unidentified (rock or Jonah)	*Cancer spp.*
0510	Clam worm	*Nereis spp.*
5039	clam, unidentified	*Bivalvia*
0053	codlings (spotted and red hake)	*Urophycis spp.*
0399	common anchovies	*Anchoa spp.*
0507	common burrower amphipod	*Leptocheirus plumulosus*
1054	crab megalopa	*crab megalopa*
0973	crab zoea	*crab zoea*
5035	crab, unidentified	*Decapoda*
0963	croaker/drum, unidentified	*Sciaenidae*
1113	crustacean parts	*crustacean parts*
0673	crustacean, unidentified	*Crusteacea*
0882	Dwarf surf clam	*Mulinia lateralis*
0825	Fingers	*Alcyonidium spp.*
0529	fish scales	*fish scales*
5000	fish, unidentified	*Actinopterygii*
7582	flat-clawed hermit crab	*Pagurus pollicaris*
0636	four-eyed amphipods	*Ampelisca spp.*
0620	grass shrimp	*Palaemonetes spp.*
0758	hermit crabs, unidentified	*Pagurus spp.*
0703	hydroids	*Cnidaria*
1025	isopod	*Politolana concharum*
1103	isopod	*Travisia carnea*
0657	isopod, unidentified	*Isopoda spp.*
0790	jacknife (razor) clams	*Solenoidea spp.*
0600	Jonah crab	*Cancer borealis*
0495	Lancelets	*Branchiostoma spp.*
1092	larval fish	*larval fish*
7581	long-clawed hermit crab	*Pagurus longicarpus*
0573	long-eyed shrimp	*Ogyrides alphaerostris*
1028	Longfin inshore squid	*Loligo pealeii*
0820	Macoma clams	*Macoma spp.*
0478	macroalgae	*macroalgae*
0621	mantis shrimp	*Squilla empusa*
1161	Mantis shrimp	*Platysquilloides enodis*
0621	mantis shrimp, most common ChesMMAP	*Squilla empusa*
1112	mantis shrimp, small gray one	*Nannosquilla grayi*
0709	mollusc meat	*mollusca*
5020	Mound-back isopod	*Edotia triloba*
0594	mud crabs, unidentified	*xanthidae*
1010	mud shrimps, unidentified	*mud shrimps*
0699	Mysid	*Neomysis americana*
0740	Mysid	*Mysidopsis bigelowi*
0574	mysids, unidentified	*Mysidae*
0742	New England dog whelk	*Nassarius trivittatus*
0601	oyster pea crab	*Polyonyx gibbessi*
0624	parasitic isopod, the long one	*Euceramus praelongus*
0833	pea crabs	*Pinnixa spp*
1109	peanut worm	*Sipuncula*
0754	polychaete	*Ophelia denticulata*
0775	polychaete, unidentified	*Polychaeta*
0578	Portunus spp.	*Portunus spp.*
1109	rat-tailed cucumber	*Caudina arenata*
0738	red-eyed amphipod	*Monoculodes edwardsi*
0823	Ribbed mussel	*Geukensia demissa*
0595	roughneck shrimp	*Rimapeneus constrictus*
0702	sand dollar	*Echinarachnius parma*
0570	Sand isopod	*Chiridotea almyra*
0491	sand lances	*Ammodytes spp.*
0604	sand shrimp	*Crangon septemspinosa*
0824	sea squirts (Molgula)	*Molgula spp.*
0500	short-browed mud shrimp	*Gilvossium setimanus*
0623	shrimp	*Acetes*
0679	shrimp with swoopy rostrum	*Dichelopandalus leptocerus*
5011	shrimp zoea	*shrimp zoea*
5001	shrimp, unidentified	*Decapoda*
0658	skeleton shrimp	*Caprellidae spp.*
0921	skeleton shrimp	*Caprella penantis*
1106	skeleton shrimp	*Caprella equilibria*
0513	Slender isopod	*Cyathura polita*
0236	smallmouth flounder	*Etropus microstomus*
0552	smooth mud crab	*Hexapanopius angustifrons*
0806	solitary bubble	*Haminoea solitaria*
5026	spider crabs, unidentified	*Libinia spp.*
0102	striped anchovy	*Anchoa hepsetus*
0667	trumpet worm	*Pectinaria gouldi*
0708	Unid. Material	*unidentified material*
5006	vegetation	*vegetation*
0629	worm, unidentified (not polychaete)	*worm*
0971	zooplankton	*zooplankton*

0623	shrimp	*Acetes*
5000	fish, unidentified	*Actinopterygii*
0825	Fingers	*Alcyonidium spp.*
0491	sand lances	*Ammodytes spp.*
0636	four-eyed amphipods	*Ampelisca spp.*
0841	amphipod, unidentified	*Amphipoda spp.*
0558	ark clams	*Anadara*
0102	striped anchovy	*Anchoa hepsetus*
0103	bay anchovy	*Anchoa mitchilli*
0399	common anchovies	*Anchoa spp.*
0643	Anemones	*Anemones*
5032	animal tubes	*animal tubes*
0653	burrowing mud shrimp	*Axius serratus*
5039	clam, unidentified	*Bivalvia*
0495	Lancelets	*Branchiostoma spp.*
0037	atlantic menhaden	*Brevortia tyrannus*
0518	Calanoid copepod	*Calanoida*
0600	Jonah crab	*Cancer borealis*
0656	Atlantic rock crab	*Cancer irroratus*
5016	cancer crab, unidentified (rock or Jonah)	*Cancer spp.*
1106	skeleton shrimp	*Caprella equilibria*
0921	skeleton shrimp	*Caprella penantis*
0658	skeleton shrimp	*Caprellidae spp.*
1109	rat-tailed cucumber	*Caudina arenata*
0570	Sand isopod	*Chiridotea almyra*
0703	hydroids	*Cnidaria*
0671	amphipod (Corophium spp.)	*Corophium spp.*
1054	crab megalopa	*crab megalopa*
0973	crab zoea	*crab zoea*
0604	sand shrimp	*Crangon septemspinosa*
1113	crustacean parts	*crustacean parts*
0673	crustacean, unidentified	*Crusteacea*
0513	Slender isopod	*Cyathura polita*
5035	crab, unidentified	*Decapoda*
5001	shrimp, unidentified	*Decapoda*
0679	shrimp with swoopy rostrum	*Dichelopandalus leptocerus*
0702	sand dollar	*Echinarachnius parma*
1089	burrow worms	*Echiura spp.*
5020	Mound-back isopod	*Edotia triloba*
0816	Atlantic razor clam	*Ensis directus*
0236	smallmouth flounder	*Etropus microstomus*
0624	parasitic isopod, the long one	*Euceramus praelongus*
0529	fish scales	*fish scales*
0694	amphipod (Gammarus spp.)	*Gammarus spp.*
0823	Ribbed mussel	*Geukensia demissa*
0500	short-browed mud shrimp	*Gilvossium setimanus*
0697	bloodworm	*Glycera spp.*
0806	solitary bubble	*Haminoea solitaria*
0552	smooth mud crab	*Hexapanopius angustifrons*
0657	isopod, unidentified	*Isopoda spp.*
1092	larval fish	*larval fish*
0507	common burrower amphipod	*Leptocheirus plumulosus*
5026	spider crabs, unidentified	*Libinia spp.*
1028	Longfin inshore squid	*Loligo pealeii*
0820	Macoma clams	*Macoma spp.*
0478	macroalgae	*macroalgae*
0824	sea squirts (Molgula)	*Molgula spp.*
0709	mollusc meat	*mollusca*
0738	red-eyed amphipod	*Monoculodes edwardsi*
1010	mud shrimps, unidentified	*mud shrimps*
0882	Dwarf surf clam	*Mulinia lateralis*
0574	mysids, unidentified	*Mysidae*
0740	Mysid	*Mysidopsis bigelowi*
0802	Blue mussel	*Mytilus edulis*
1112	mantis shrimp, small gray one	*Nannosquilla grayi*
0742	New England dog whelk	*Nassarius trivittatus*
0699	Mysid	*Neomysis americana*
0510	Clam worm	*Nereis spp.*
0573	long-eyed shrimp	*Ogyrides alphaerostris*
0754	polychaete	*Ophelia denticulata*
0755	brittle stars	*Ophiuroidea*
7581	long-clawed hermit crab	*Pagurus longicarpus*
7582	flat-clawed hermit crab	*Pagurus pollicaris*
0758	hermit crabs, unidentified	*Pagurus spp.*
0620	grass shrimp	*Palaemonetes spp.*
0667	trumpet worm	*Pectinaria gouldi*
0004	butterfish	*Peprilus triacanthus*
0764	Broomworm	*Pherusa affinis*
0833	pea crabs	*Pinnixa spp*
1161	Mantis shrimp	*Platysquilloides enodis*
1025	isopod	*Politolana concharum*
0775	polychaete, unidentified	*Polychaeta*
0601	oyster pea crab	*Polyonyx gibbessi*
0578	Portunus spp.	*Portunus spp.*
0595	roughneck shrimp	*Rimapeneus constrictus*
0963	croaker/drum, unidentified	*Sciaenidae*
5011	shrimp zoea	*shrimp zoea*
1109	peanut worm	*Sipuncula*
0790	jacknife (razor) clams	*Solenoidea spp.*
0621	mantis shrimp	*Squilla empusa*
0621	mantis shrimp, most common ChesMMAP	*Squilla empusa*
1103	isopod	*Travisia carnea*
0708	Unid. Material	*unidentified material*
0053	codlings (spotted and red hake)	*Urophycis spp.*
5006	vegetation	*vegetation*
0629	worm, unidentified (not polychaete)	*worm*
0594	mud crabs, unidentified	*xanthidae*
0971	zooplankton	*zooplankton*