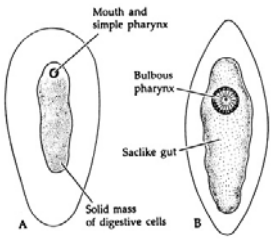
BIO 221
Invertebrate Zoology I
Spring 2010

Stephen M. Shuster
Northern Arizona University

http://www4.nau.edu/isopod

Lecture 15

Euplatyhelminthes



2. Superclass Rhabditophora - with rhabdites

a. Class Rhabdocoela

1. Rod shaped gut (hence the name)

2. Often endosymbiotic with Crustacea or other invertebrates.

Euplatyhelminthes

3. Example: *Syndesmis*

a. Lives in gut of sea urchins, entirely on protozoa.

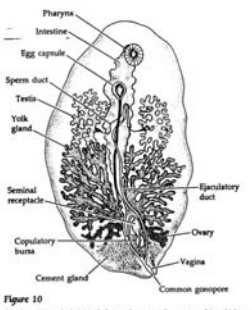


Figure 10
Syndesmis, a rhabdocoel from the gut of a sea urchin. (After Hyman 1951.)

Euplatyhelminthes

Class Temnocephalida

a. *Temnocephala*

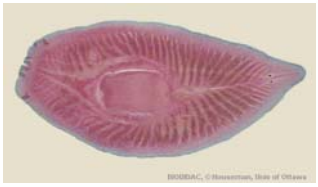
1. Ectoparasitic on crayfish

5. Class Tricladida

a. like planarians

b. *Bdelloura*

1. live in gills of *Limulus*

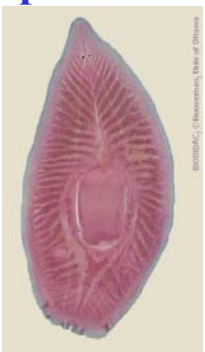


Class Temnocephalida

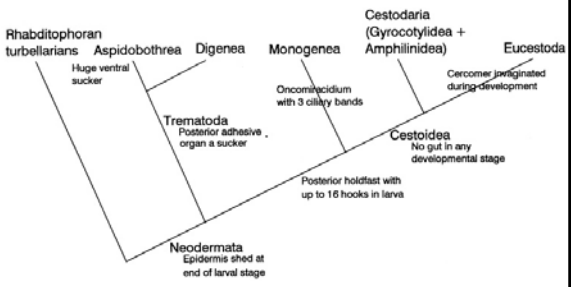
4. Life cycles are poorly known.

a. Seem to have slightly increased reproductive capacity.

b. Retain many morphological characters that permit free-living existence.



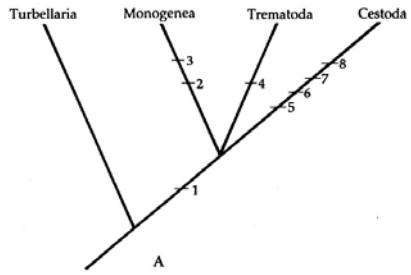
Euplatyhelminth Systematics



Parasitic Platyhelminthes

Characters:

4. Acetabulum
5. Microtriches
6. Scolex
7. Loss of gut
8. Strobilation



Superclass Neodermata

a. Loss of characters associated with free-living existence.

1. Ciliated larval epidermis, adult epidermis is ***syncitial.***

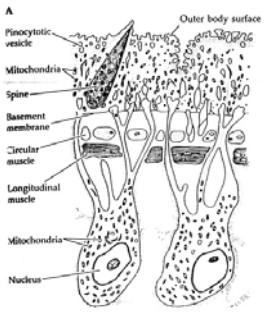


Figure 7

A, The tegument and underlying body wall of a digenetic fluke-*Fasciola hepatica*; longitudinal section). B, The tegument and body wall of a cestode (cross section). (A after L. T. Threadgold, 1963, Q. J. Microsc. Sci. 104; B after Barth and Broshears 1982.)

Superclass Neodermata

b. Major Classes - will consider each in detail:

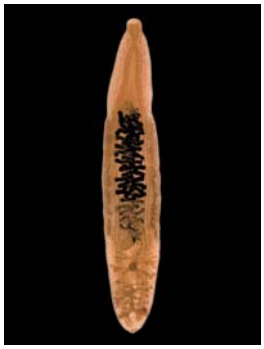
1. Class Trematoda

a. Subclass Aspidobothrea

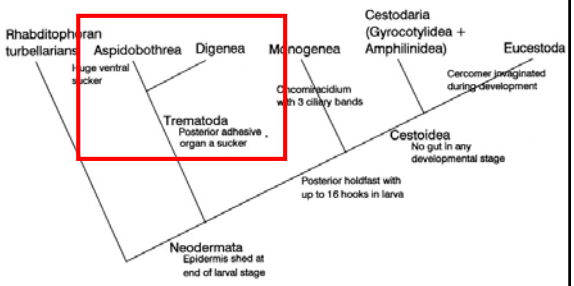
b. Subclass Digenea

2. Class Monogenea

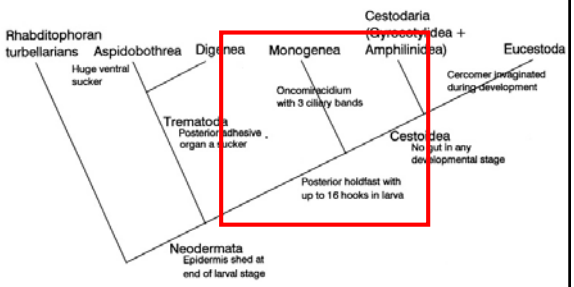
3. Class Cestoidea



Euplatyhelminth Systematics



Euplatyhelminth Systematics



Class Cestoidea

Two Subclasses:

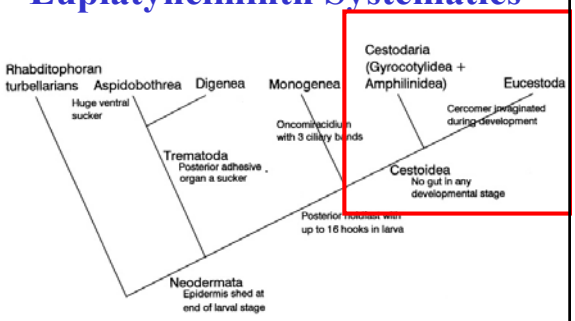
a. Subclass Cestodaria

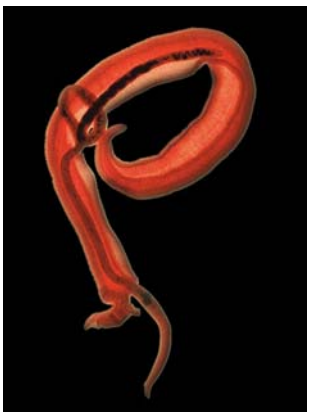
1. Order Gyrocotylidea

2. Order Amphilinidea

b. Subclass Eucestoda

Euplatyhelminth Systematics



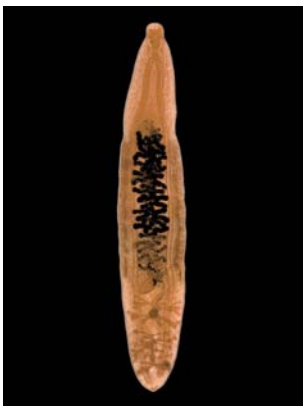


Importance of Parasitism to Speciation

1. Parasites are intimately linked to their hosts.
2. This association leads to:

a. Isolated populations.

b. Unique selective environments.



Importance of Parasitism to Evolutionary Biology

1. Parasites are excellent organisms for examination of:

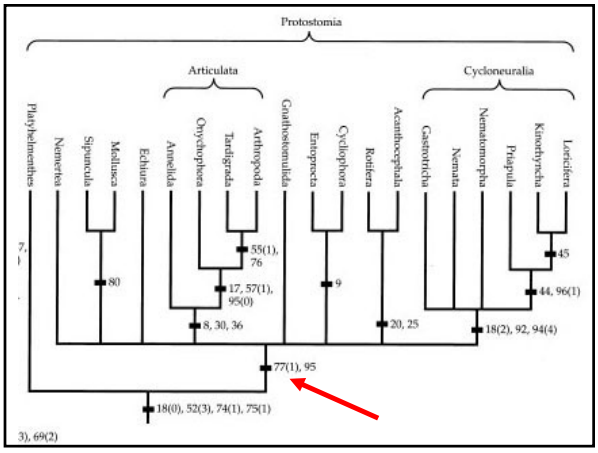
a. Complex life cycles, selection favoring them.

b. Epidemiology

c. Directional selection.

d. Parallel evolution.

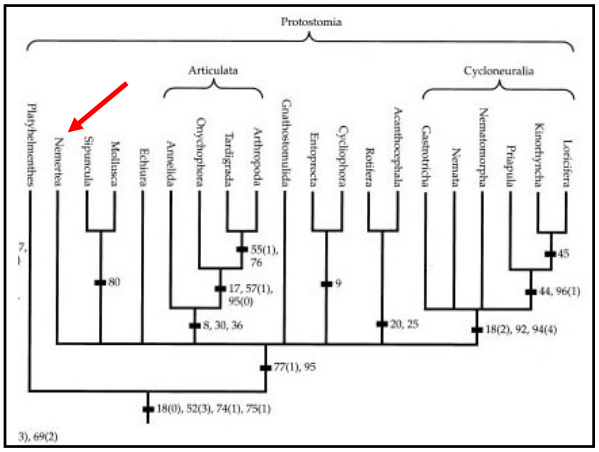
Phylum Nemertea



Protostome Synapomorphies

77(1): Adult body cavity; schizocoelous coelom (secondary body cavity lined with mesodermally derived epithelium.

95: With trochophore larvae.



Box One

Characteristics of the Phylum Nemertea

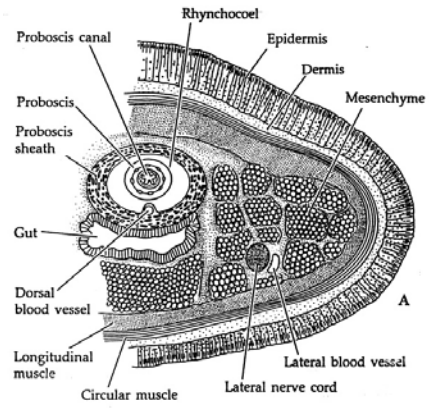
1. Triploblastic, acoelomate or coelomate, bilaterally symmetrical unsegmented worms
2. Digestive tract complete, with an anus
3. With protonephridia
4. With lobed, supraenteric cerebral ganglion, and two or more longitudinal nerve cords connected by transverse commissures
5. With two or three layers of body wall muscles arranged in various ways
6. With a unique proboscis apparatus lying dorsal to the gut and surrounded by a coelom-like hydrostatic chamber called the rhynchocoel
7. With a closed circulatory system
8. Most are gonochoristic; early development typically spiralian, either direct or indirect

Nemertean Characteristics

Box One

Characteristics of the Phylum Nemertea

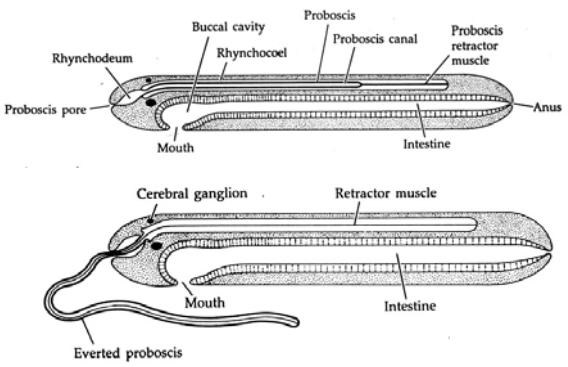
1. Triploblastic, acoelomate or coelomate, bilaterally symmetrical unsegmented worms
2. Digestive tract complete, with an anus
3. With protonephridia
4. With lobed, supraenteric cerebral ganglion, and two or more longitudinal nerve cords connected by transverse commissures
5. With two or three layers of body wall muscles arranged in various ways
6. With a unique proboscis apparatus lying dorsal to the gut and surrounded by a coelom-like hydrostatic chamber called the rhynchocoel
7. With a closed circulatory system
8. Most are gonochoristic; early development typically spiralian, either direct or indirect

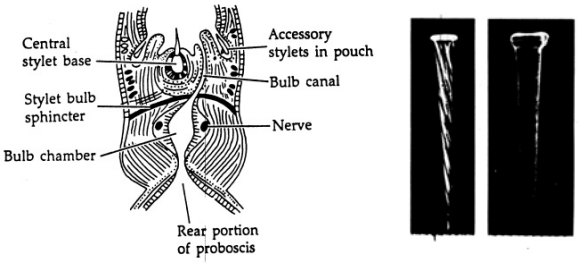


Box One

Characteristics of the Phylum Nemertea

1. Triploblastic, acoelomate or coelomate, bilaterally symmetrical unsegmented worms
2. Digestive tract complete, with an anus
3. With protonephridia
4. With lobed, supraenteric cerebral ganglion, and two or more longitudinal nerve cords connected by transverse commissures
5. With two or three layers of body wall muscles arranged in various ways
6. With a unique proboscis apparatus lying dorsal to the gut and surrounded by a coelom-like hydrostatic chamber called the rhynchocoel
7. With a closed circulatory system
8. Most are gonochoristic; early development typically spiralian, either direct or indirect

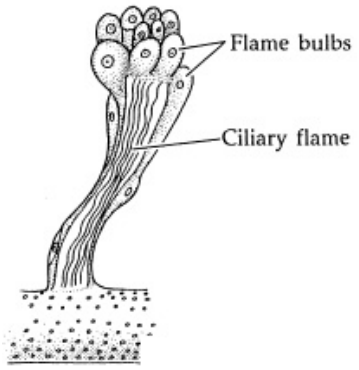


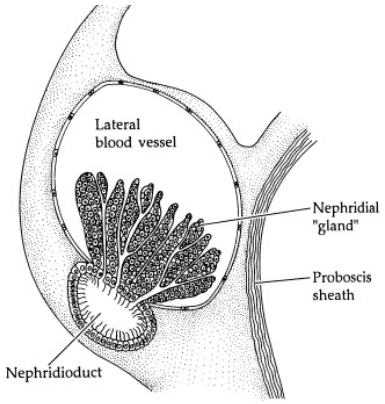


Box One

Characteristics of the Phylum Nemertea

1. Triploblastic, acoelomate or coelomate, bilaterally symmetrical unsegmented worms
2. Digestive tract complete, with an anus
3. With protonephridia
4. With lobed, supraenteric cerebral ganglion, and two or more longitudinal nerve cords connected by transverse commissures
5. With two or three layers of body wall muscles arranged in various ways
6. With a unique proboscis apparatus lying dorsal to the gut and surrounded by a coelom-like hydrostatic chamber called the rhynchocoel
7. With a closed circulatory system
8. Most are gonochoristic; early development typically spiralian, either direct or indirect

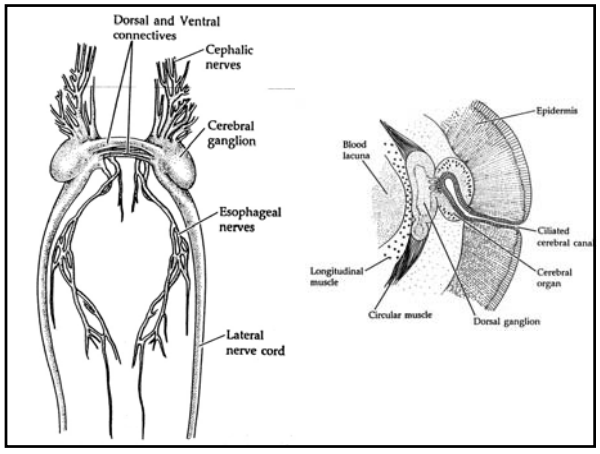


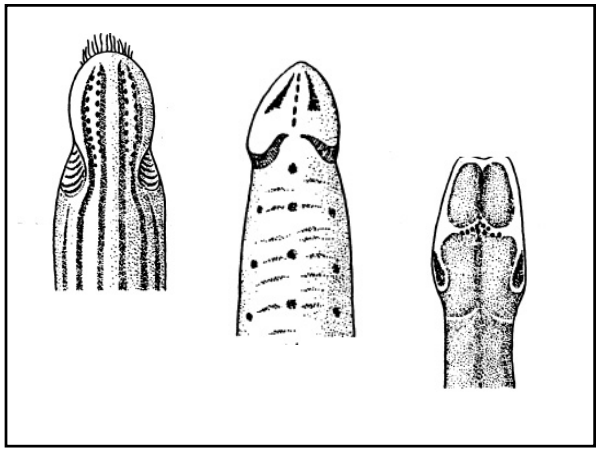


Box One

Characteristics of the Phylum Nemertea

1. Triploblastic, acoelomate or coelomate, bilaterally symmetrical unsegmented worms
2. Digestive tract complete, with an anus
3. With protonephridia
4. With lobed, supraenteric cerebral ganglion, and two or more longitudinal nerve cords connected by transverse commissures
5. With two or three layers of body wall muscles arranged in various ways
6. With a unique proboscis apparatus lying dorsal to the gut and surrounded by a coelom-like hydrostatic chamber called the rhynchocoel
7. With a closed circulatory system
8. Most are gonochoristic; early development typically spiralian, either direct or indirect

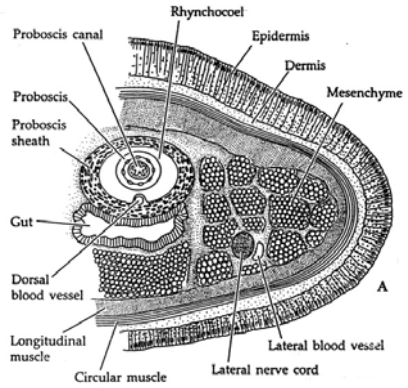

Dorsal and Ventral connectives
Cephalic nerves
Cerebral ganglion
Esophageal nerves
Lateral nerve cord
Epidermis
Blood lacuna
Ciliated cerebral cana
Longitudinal muscle
Cerebral organ
Circular muscle
Dorsal ganglion



Box One

Characteristics of the Phylum Nemertea

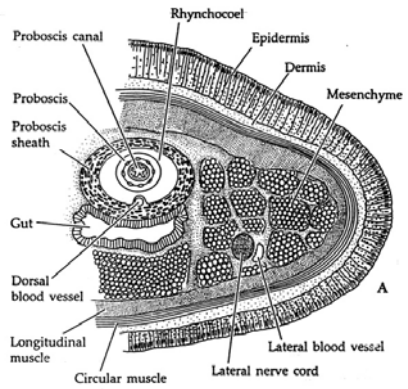
1. Triploblastic, acoelomate or coelomate, bilaterally symmetrical unsegmented worms
2. Digestive tract complete, with an anus
3. With protonephridia
4. With lobed, supraenteric cerebral ganglion, and two or more longitudinal nerve cords connected by transverse commissures
5. With two or three layers of body wall muscles arranged in various ways
6. With a unique proboscis apparatus lying dorsal to the gut and surrounded by a coelom-like hydrostatic chamber called the rhynchocoel
7. With a closed circulatory system
8. Most are gonochoristic; early development typically spiralian, either direct or indirect

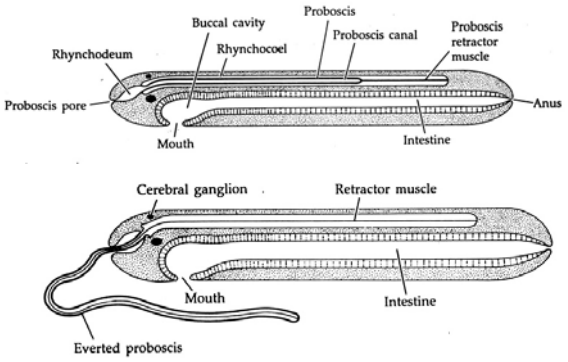


Box One

Characteristics of the Phylum Nemertea

1. Triploblastic, acoelomate or coelomate, bilaterally symmetrical unsegmented worms
2. Digestive tract complete, with an anus
3. With protonephridia
4. With lobed, supraenteric cerebral ganglion, and two or more longitudinal nerve cords connected by transverse commissures
5. With two or three layers of body wall muscles arranged in various ways
6. With a unique proboscis apparatus lying dorsal to the gut and surrounded by a coelom-like hydrostatic chamber called the rhynchocoel
7. With a closed circulatory system
8. Most are gonochoristic; early development typically spiralian, either direct or indirect

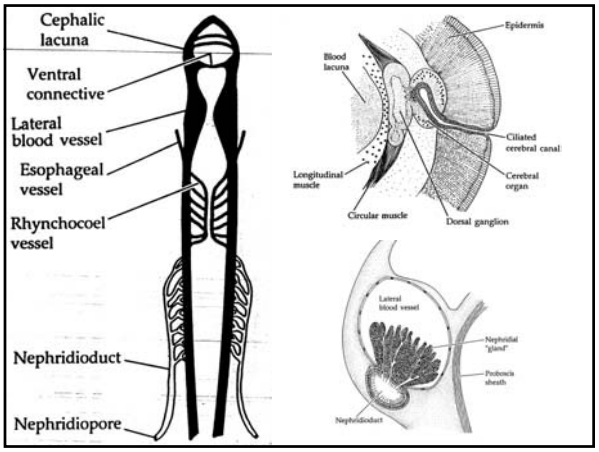




Box One

Characteristics of the Phylum Nemertea

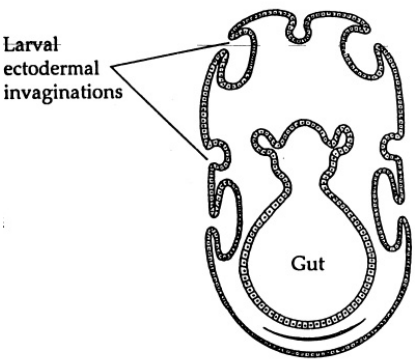
1. Triploblastic, acoelomate or coelomate, bilaterally symmetrical unsegmented worms
2. Digestive tract complete, with an anus
3. With protonephridia
4. With lobed, supraenteric cerebral ganglion, and two or more longitudinal nerve cords connected by transverse commissures
5. With two or three layers of body wall muscles arranged in various ways
6. With a unique proboscis apparatus lying dorsal to the gut and surrounded by a coelom-like hydrostatic chamber called the rhynchocoel
7. With a closed circulatory system
8. Most are gonochoristic; early development typically spiralian, either direct or indirect

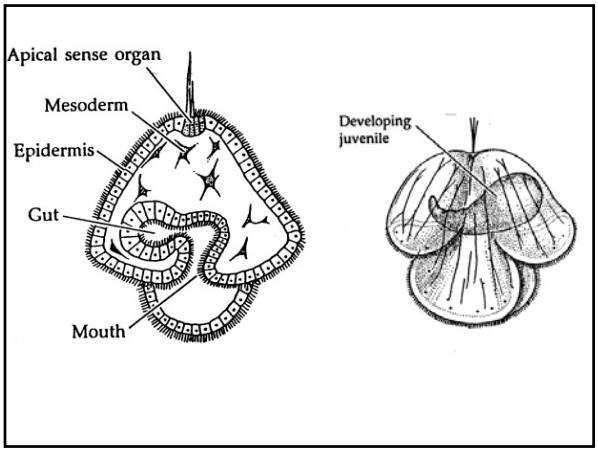


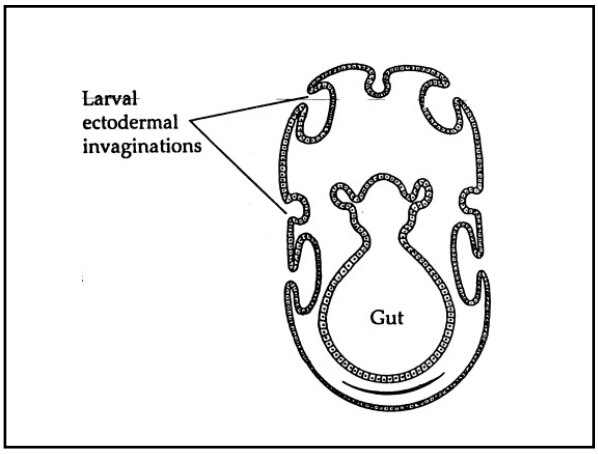
Box One

Characteristics of the Phylum Nemertea

1. Triploblastic, acoelomate or coelomate, bilaterally symmetrical unsegmented worms
2. Digestive tract complete, with an anus
3. With protonephridia
4. With lobed, supraenteric cerebral ganglion, and two or more longitudinal nerve cords connected by transverse commissures
5. With two or three layers of body wall muscles arranged in various ways
6. With a unique proboscis apparatus lying dorsal to the gut and surrounded by a coelom-like hydrostatic chamber called the rhynchocoel
7. With a closed circulatory system
8. Most are gonochoristic; early development typically spiralian, either direct or indirect







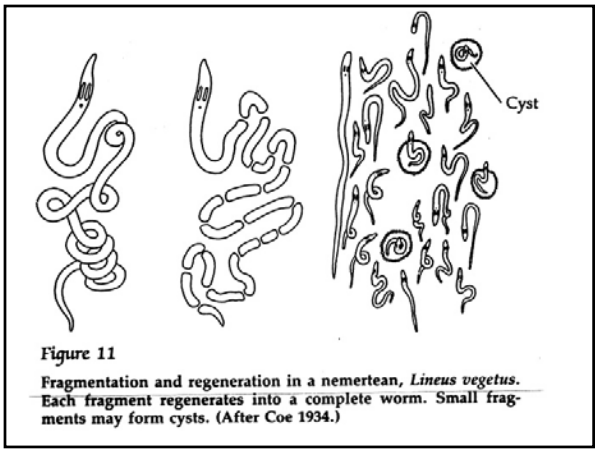


Figure 11

Fragmentation and regeneration in a nemertean, *Lineus vegetus*. Each fragment regenerates into a complete worm. Small fragments may form cysts. (After Coe 1934.)