PHYLUM PLATYHELMINTHES

1. DORSOVENTRALLY FLATTENED
2. USUALLY WITH LIMITED DIGESTIVE SYSTEM – usually a blind sac. Rarely has an anus.
   Cestodes have no digestive system
3. <1MM TO >60 METERS IN LENGTH
4. ACOELOMATE
5. BILATERALLY SYMMETRICAL
6. CILIATED EPITHELIAL TISSUE – Except in adult Cestoda and Digenea
7. CEPHALIZED – WITH WELL-DEVELOPED NERVOUS SYSTEM NERVOUS SYSTEM – ladder type
8. Osmoregulatory system – flame cells also called protonephridia.
   a. Arranged into a system of ducts with dorso ventral orientation.
   b. Variable kinds of flame cells that participate in osmoregulation.
9.

Phylogenetic relationships among the Plathyhelminthes.

Classification of the Platyhelminthes – emphasizing only those we will study in our course. Look at the book for a more complete classification, but note this is not a classification that was developed from intense study, but instead was taken from several sources.

Phylum Platyleminthes – with characters as noted above.

Class Trematoda

- Posterior adhesive organ modified into a muscular sucker.
- -Adults usually with an anterior oral sucker and a muscular pharynx posterior to the oral sucker.

Subclass Aspidobothrea

- Specialized microvilli and microtubules in neodermis.
- Posterior sucker compartmentalized

Order Aspidobothriiformes

Subclass Digenea

- First larval stage – Cilia Covered Miracidium

- Life cycle with sporocyst generation(s) and Cercaria
- Gut development paedomorphic (possession of characters in adult that were manifested in the developing young)

O. Paramphistomiformes

O. Echinostomatiformes

O. Hemiuriformes

O. Strigeiformes

O. Opisthorchiformes

O. Plagiorchiformes

Class Monogenoidea

Contains several groups that are not phylogenetically their closest relatives.

O. Dactylogyridae

O. Gyrodactylidae

O. Polystomatidea

O. Mazocraeidea

O. Diclybothriidea

O. Chimaericolidea

Class Cestoidea

No intestine, cercomer paedomorphic, oral sucker and pharynx either vestigial or non-existent.

Larval cercomer with varying numbers of hooks.

Sublcass Cestodaria

O. Cyrocotylidea

O. Amphilinidea

Subclass Cestoda

O. Pseudophyllidea

O. Caryophyllidea

O. Spathebothriidea

O. Cyclophyllidea

O. Proteocephalata

O. Rhinobothriidea

O. Tetraphyllidea

O. Trypanorhyncha

Turbellaria – a large group that should not be included with the flatworms based on both the morphology of the transitory stomach and digestive system that comes in to play and then is resorbed when the food is digested.

Many turbellarians are parasitic to various degrees of molluscs and crustaceans.

Common turbellarians like *Syndesmis* and *Syndisyrinx* spp. occur in and on sea urchins. Check the paper on the species of *Syndisyrinx* from urchins in the Caribbean – this was done by one of my great friends Lynn Hertel, who loved the sea and parasites.

We will investigate these groups more closely and we will follow the phylogeny and classification given in Parascript.

Class Trematoda – classification follows the book, but this is not a phylogenetically based classification as the Aspidobothreans are actually sister taxa to the Trematoda. See page 207.

Subclass Aspidobothrea (also know as Aspidogastrea)

Parasitic in and on molluscs and are either obligate or facultative parasites of turtles, ratfish, and others.

A monophyletic group that is sister taxon to the Digenea.

Species of interest.

1. *Aspidogaster conchicola* – common in the pericardial cavity of freshwater clams and in molluscs, fishes, turtles, Palearctic, Ethiopian, Nearctic regions.
2. *Rugogaster hydrolagi* – parasite of the ratfish (Holocephali). No data on the life-cycle.
3. *Stichocotyle nephropsis* – parasite of bile ducts of stingrays of the Atlantic ocean.

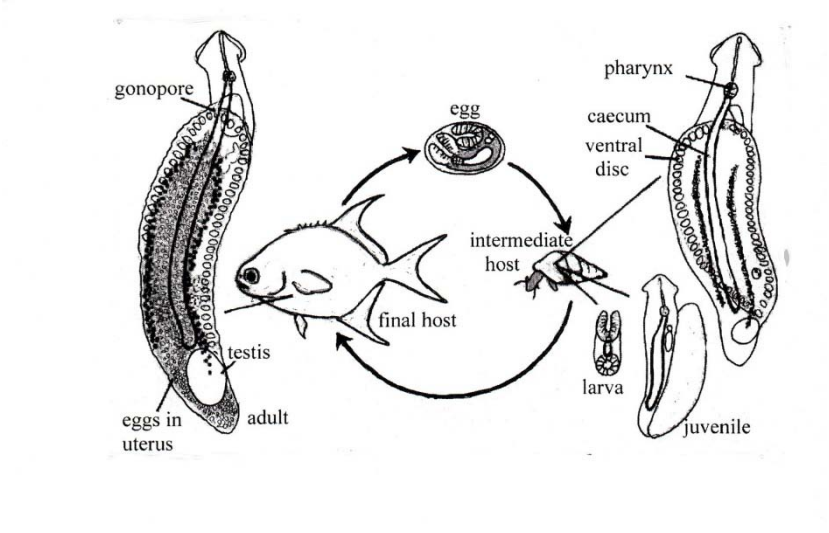


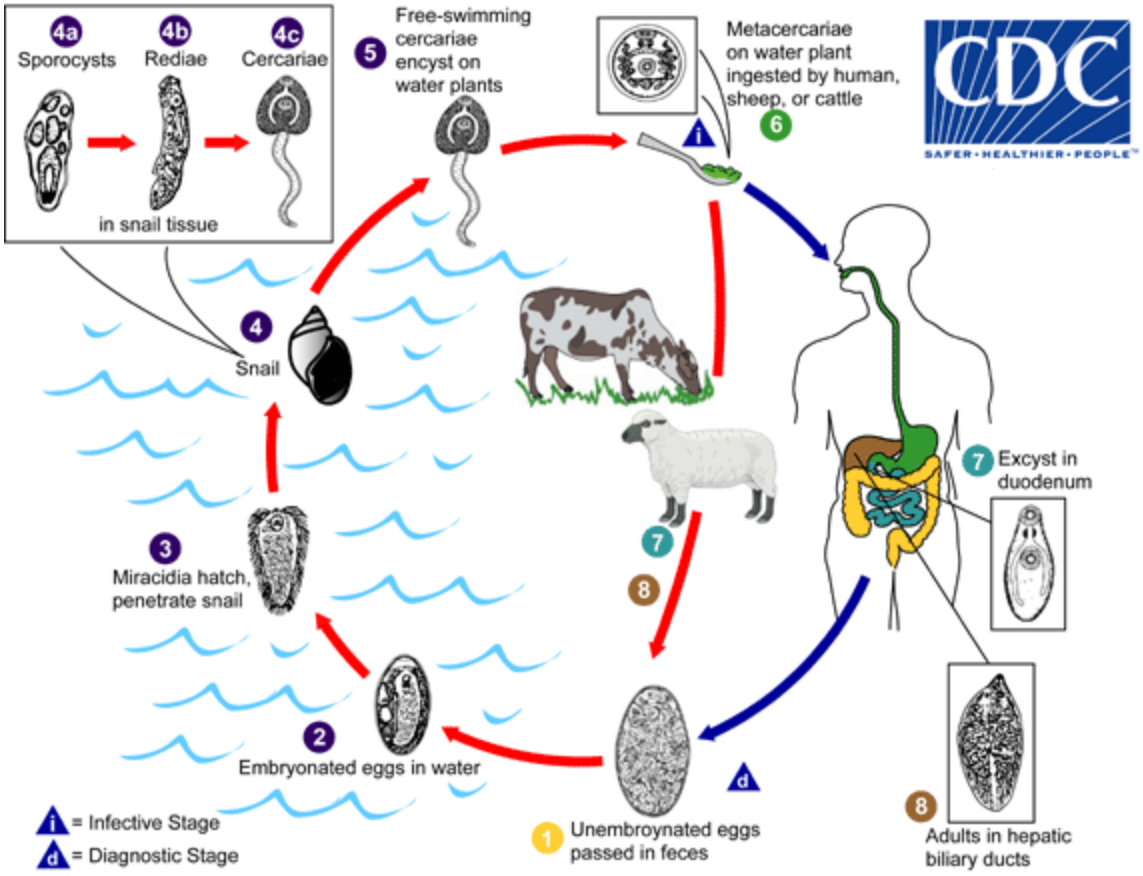
Figure 1 Figure 9. Life cycle of *Lobatostoma manteri*. Adults live in the small intestine of the marine teleost fish (bony fish) *Trachinotus blochi* (Carangidae).

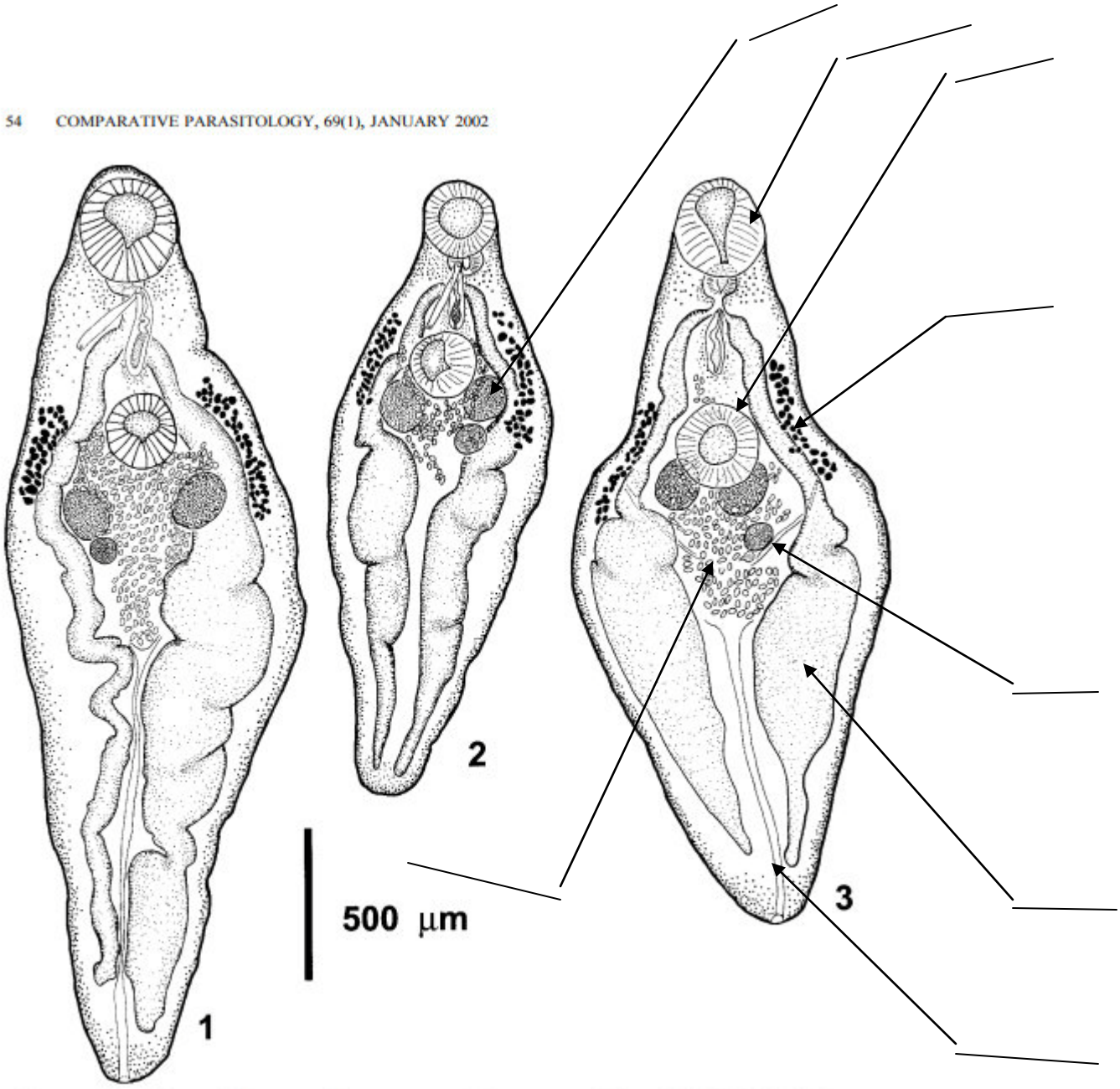
Subclass Digenea (the digenetic trematodes).

Structures.

Life cycle – general.

Various species. Here we see the intense parasite - *Fasciola hepatica*





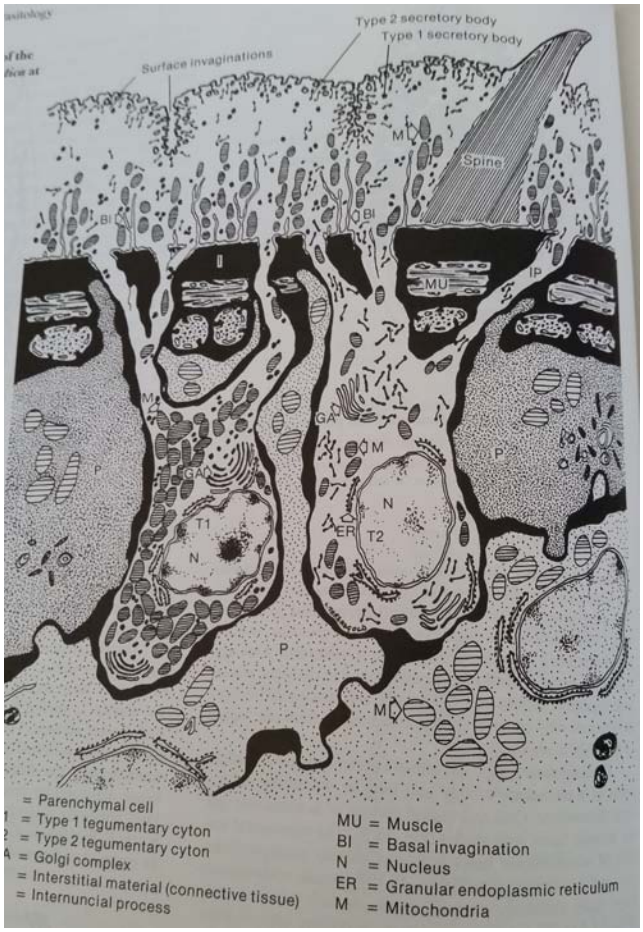
Figures 1–3. 1. *Yungasicola travassosi* gen. n., sp. n. Holotype, ventral view (HWML16400). 2. Paratype (CNHE4283) of *Yungasicola travassosi* gen. n., sp. n., ventral view. 3. Paratype (HWML16404) of *Yungasicola travassosi* gen. n., sp. n., ventral view.

S.L. Gardner

*An example of another kind of trematode that occurs only in the Yungas region of Bolivia. We collected many individuals of this species from a single locality in Bolivia at a place called Rio Aceromarca. While we were doing the collecting, we discovered that the mice in the area (*Akodon* sp. or grass mice) had these trematodes in their gall bladders. Very cool to find these. At the same time, I had seen slugs, small snail-like creatures that were common in the area. Unfortunately, I did not correlate the presence of slugs with the prevalence of the trematodes, and the next

time we went back to the same site, no slugs. This is because I was running the whole expedition and this small fact was lost on me while I was dealing with 15 field hands, two vehicles, food, tents, equipment, and personalities to go with it all.

Tegument. A syncytium.



Life cycle - in general for trematodes.

-Egg. Ovum is what is fertilized coming down the oviduct. After development of the shell, the egg passes into the uterus where inside develops a miracidium. The operculum pops open and out it swims.

-Miracidium. The miracidium is ciliated, sometimes with eyespots. After it hatches out of the egg it swims to a snail, or if it is a terrestrial form, stays in the egg in the feces to be eaten by a mollusc.

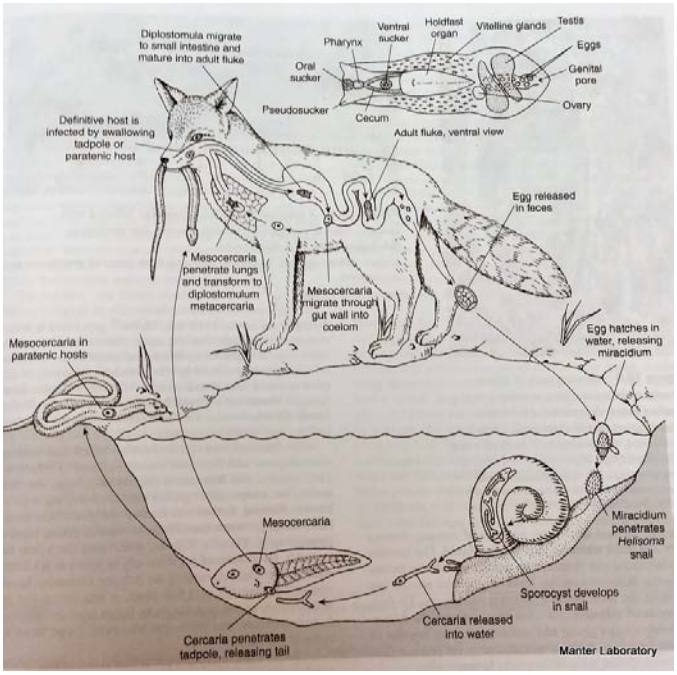
The probable life cycle of *Yungasicola* would be different from the known life-cycle of *Fasciola*.

Fasciola -→ Uses an aquatic intermediate host snail (*Helisoma*)

In snail → transformation into a sporocyst and then to rediae → cercariae.

-Cercaria exits the snail encysts on vegetation - Metacercaria - this is a resistant form that can survive on vegetation for a long time.

The life cycle of *Alaria* is shown below. The interesting part of this one is that there can be many paratenic hosts!



In the case of *Alaria* - - - the cercaria that may encyst in a tadpole, or pollywog, as a mesocercaria, and can then survive through metamorphosis, or transfer into another cold-blooded host, before finally getting into a carnivore definitive host. So we get: cercaria to fish or tadpole, to snake to frog to mammal to finish it off. Then we start all over again with miracidium into the aquatic snail. Don't eat raw tadpoles or frogs to avoid this one.

-Reports of people using frog poultice for some reason and the mesocercaria moved out into the eyes of the person using the frog. Sounds cool, but kind of strange.
