

Vertebrates and Parasites

- Parasites – indicators of biodiversity
 - Lots of parasites with complex life histories = area of high biodiversity with a good ecosystem
 - Provide deep phylogenetic and ecological checkpoints
- Data Collections: nothing known at the beginning. No predictions, no patterns → increased knowledge, patterns/processes, predictive capability
 - Data Stream: Snail/Mammal/Bird
 - →host and data – biogeographic data – specimens counted and cataloged in museums
- *Ctenomys* in Bolivia
- Collection Room
 - Can be stored in liquid or frozen
- Echinococcus in Mongolia
 - Microtus – many protoscolices that each turn into a new tapeworm.
 - Hooks of protoscoleces have blade, guard, and handle
 - Life Cycle: *Echinococcus multilocularis* - Carnivores are definitive host (sexual reproduction occurs)
 - → feces
 - →eaten by vole
 - →dog eats vole
 - → dog is infected and comes inside
 - → children are more often infected than adults
 - Left untreated – disease is usually fatal

Taeniidae Cont.

Echinococcus

- In Baltimore, a vole had *Echinococcus multilocularis*. Moved around by people

Echinococcus Species	Range (zoogeographic region)	Causative agent of Hydatid Disease	Intermediate Host	Definitive Host
<i>E. granulosus</i>	Holarctic	Cystic	Moose	Wolf
<i>E. multilocularis</i>	Cosmopolitan	Cystic	Ungulates	Canidae
<i>E. shiquicus</i>	Holarctic	Alveolar	Vole/Field Mouse	Fox (canidae)
<i>E. shiquicus</i>	Central Asian	Alveolar	Pika/Vole	Fox
<i>E. vogeli</i>	Neotropical	Unicystic	Spiny Rats	Felidae (cats)
<i>E. oligarthrus</i>	Neotropical	Polycystic	Cuniculus paca	Bush dog
<i>E. felidis</i>	Southern Ethiopian	Unknown	Lion	unknown

- Other Species

- Anlagen (anlage)

- F. Dipelididae

- *Dipylidium caninum* (cucumber seed tapworm)
- Definitive host: dogs
- → Adult cestode in small intestine
- → Segments fall off (anapolytic – segment comes off and crawls around), passes in feces and looks like cucumber seeds. Little packet of eggs in segment
- → flea larvae eats poop(eggs) or popcorn or peanut butter from off the rug
- → Flea adult. Dog nips flea
- → Cestode develops
- People can get this from ingesting larval flea or from the dog

- Story:
 - “Party at Greely, CO. Dog was there rubbed butt on ground, large tapeworm segments coming out. Person sat on grass and got tapeworms on pants”
- Pupa stays a pupa until there is a stimulus
- F. Mesocestoididae
 - Mesocestoides spp.
 - Raccoon → adult cestode produces eggs (comes out in strings of segments)
 - Central genital pore
 - → Eggs are eaten by? No one knows. Maybe ants, beetles, or (Scott thinks it is this one) moth larvae (caterpillars)
 - → mice back to raccoon
- F. Tachinidae

Fly larvae living in the cutworms killed the experiment. Tachinid flies.

Cestode Orders

- O. Caryophyllidea
 - Scolex without hooks
 - 1 testes, 1 ovary
 - 1 segment (monozoic)
 - Occurs in the genus *Teleostei*
- O. Proteocephalata
 - Occurs in reptiles/amphibians/fishes
 - Cosmopolitan distribution (occurs everywhere)
 - Life cycle: egg → water → crustacean → procercoid in crustacean → eaten by fish (paratenic) → pleurocercoid → definitive host

- O. Spathebothridea
 - Occurs in marine animals and fresh water Teleost fishes
 - No external segmentation
 - No hooks on rostellum
 - Distribution: circumboreal (occurs all around the northern regions of the world)
 - *Bothriionomus* common in North America in the Teleost fish
- O. Cyclophyllidea
 - Well developed scolex with hooks on rostellum
 - External segmentation
 - Neck
 - Can be apolytic
 - Cosmopolitan distribution
 - Found in all vertebrates
 - Insects, mice, and vertebrates as intermediates
 - Taenia, Echinococcus, Hymenolepis
- O. Trypanorhyncha
 - Occur in Chondrichthyes (sharks and rays)
 - Scolex is defining characteristic – very long
 - 4 eversible tentacles with spines. At base of tentacles are orange organs (enigmatic) and no one knows why they are there.
 - Eggs → Shrimp → shrimp gets eaten by stingray → Adult in spiral intestine
- O. Nippotaeniidea
 - Parasites of freshwater fishes (Gobiid fishes)
 - Japan and New Zealand

- Very small strobila
- O. Psuedophyllidea
 - Parasites of carnivores, cetaceans, and pinnepids
 - Scolex with bothridea
 - No hooks
 - Central genital pore
 - *Diphyllobothrium latum*
 - Occurs in bears (brown bears and polar bears are definitive hosts)
 - Life cycle: eggs → water → cyclopid crustacean (cyclops or other copepod) → egg hatches (coracidium) → develops into larvae in crustacean (proceroid) → small fish eats → develops into pleuroceroid → larger fish eats (paratenic host) (still pleuroceroid) → could continue to have bigger fish eat **OR** bear or Scott eats fish

Dance of the tiger by Bjorn Kurten

Also wrote singletusk

- O. Mesocestoidea
 - Only one genus in this order
 - We don't know the first intermediate host
 - Medially located genital pore
 - Don't put this on your face
- O. Lecanicephalidea
 - Only occurs in Rays – no sharks

- Scolex divided into 2 sections with no hooks
 - Discobothrium carabensis
- O. Aporidea
 - Parasites of Anseriformes (geese and ducks)
 - Strobila is cylindrical
 - No external or internal segmentation
 - Follicular testes and ovaries and vitellaria
- O. Tetraphyllidea – look in book
- O. Diphyllidea – look in book
- O. Litobothridea – look in book
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