**Order Plagiorchiformes**

*Dicrocoelium dendriticum*

a. interesting trematode of sheep livers
   1. worm with ancestral aquatic component to life history.
   2. becomes adapted to terrestrial environment.

---

**Dicrocoelium dendriticum**

b. Life cycle:
   1. eggs passed in sheep feces
   2. terrestrial snails feed on feces, ingest eggs
   3. eggs hatch, miracidia burrow into snail tissues
   4. two sporocyst generations, migrate to "lung"

---

**Dicrocoelium dendriticum**

5. cercaria shed in slime balls
6. ants eat slime balls
7. metacercaria encyst in subesophageal ganglion
   a. ganglion controls mandibular muscles
   b. also influences geotactic response

---

**Dicrocoelium dendriticum**

c. metacercaria's effect is temperature dependent
   1. warm temperature, ant behavior is normal
      a. ants climb grass
      b. mandibles clamp on to blade and hold
   2. when cold
      a. ants climb grass
      b. mandibles clamp on to blade and hold
8. grazing sheep (early morning) pick up ants.

---

**Cestodaria**

(Formerly Class Cestoda)

A. General characteristics
   1. highly specialized intestinal parasites
   2. usually characterized by
      a. anterior attachment organ
      b. digestive tract absent (adaptation to intestine)
   c. body divided into proglottids
      a. protandry
      b. terminal proglottids filled with eggs.
Order (Subcohort) Gyrocotylidea
1. Unusual parasite of cartilaginous fish, occasionally turtles
2. Short and lack proglotted specialization
   a. Instead have increased surface area along lateral body margin.
3. Some evidence that they are related to acanthocephalans.
4. Little known about their life cycle.

Cohort Cestoidea
1. A group identified as including as subcohorts, the Amphilinidea and the Eucestoda.
2. The “Cestodaria” used to include the Gyrocotylidea and the Amphilinidea.
   a. However, it now appears that Gyrocotylidea is ancestral to the Amphilinidea and Eucestoda.
   b. The primary character appears to be the relative development of the cercomer, a posterior enlargement that appears to various degrees in larval stages.

Order (Subcohort) Amphilinidea
a. Small, non-strobilated body cavity parasites of acipenseriform fish and turtles.
   b. Have a single segment, with "N" shaped uterus.

Order (Subcohort) Gyrocotylidea
1. Unusual parasite of cartilaginous fish, occasionally turtles
2. Short and lack proglotted specialization
   a. Instead have increased surface area along lateral body margin.
3. Some evidence that they are related to acanthocephalans.
4. Little known about their life cycle.
Life cycle of *Austramphilina elongata*

![Life cycle diagram](image)

Figure 1. *Nesolecithus africanus*. Note accessory seminal receptacle consisting of basal narrow and distal widened part. According to Dinges and Harder (1966), redrawn from Dubinina (1982).

**Order (Subcohort) Eucestoda**

1. The true tapeworms 5,000+ species
2. Often very large (10 m)
3. Complex life cycles
4. Highly adapted to intestinal parasitic existence:
   a. length
   b. flattened shape
   c. integument (syncitium)
   a. surface area

**Other Characters:**
- mitochondria, active transport in integument.
- anaerobic respiration
- attachment organs
  1. rostellum
  2. suckers (bothria)
  3. hooks
- prolific reproduction (sexual and asexual)

**Eucestoda: Body Regions**

- scolex (attachment organs)
- neck (germinal area)
- strobila (proglottids)
- Proglottids - self contained egg factories
  1. male structures mature 1st, mate with other worms
  2. female structures operate similar to those of trematodes
  3. mature proglottids are tissue surrounding full uterus.
Eucestoda: Representative Orders

Order Caryophyllidea
1. in fish and aquatic annelids
2. small, unsegmented worms
3. poorly developed scolex, no bothria

Order Caryophyllidea
Life cycle.
1. Small, unsegmented worms (often called monozoic).
2. Adult worm drops off, eggs are released
   a. eggs (oncospheres; operculated, nonembrionated).
   1. Ingested by annelids (usually oligochaetes)
      a. procercoids develop in coelom.

Order Caryophyllidea
Life cycle, continued
1. Fish eat annelids, develop pleurocercoid in gut which later develops into adult tapeworm.
   a. in Archigetes, procercoids may become gravid in Tubifex,

Order Proteocephala
1. Short worms, mostly parasitic on fish,
   a. A few in reptiles and amphibians.
3. Relatively ancestral looking worms:
   a. conspicuous neck
   b. lateral genital pore
   c. laterally distributed vitellaria
   d. 4-5 suckers, occasionally with 5th at scolex apex.

Order Proteocephala
e. Gravid proglottids with large sacklike uterus that fills the proglottid.
   1. leave the host with fully mature eggs
f. Eggs with fully developed hexacanth larvae
   1. usually eaten by copepod
   2. encyst in hemocoel
   g. Small fish as 2nd host; plerocercoids in coelom
   h. Small fish eaten by larger fish - definitive host