

Phylum Acanthocephala (spiny-headed worms)

1150 species

all are parasites in intestines of fish, birds & mammals

body wormlike, somewhat flattened

most are less than a couple inches long; up to 1 M long

especially common in the intestines of freshwater fishes

arthropods are intermediate hosts

one of the most completely parasitic organisms in the animal kingdom

→ the digestive tract is completely lost

→ only the reproductive system is well developed

Body Form

long, unsegmented, wormlike body with eversible **proboscis** at front end

look like roundworms but with retractable proboscis

proboscis with rows of **recurved hooks** is used to pierce the gut wall of the final host for attachment

the size and arrangement of these hooks and spines are used to identify species

proboscis can be retracted into a specialized pouch

show **eutely** (constant number of cells/species)

Body Wall

syncytial epidermis

secretes thin **cuticle** on outer surface

covered in **crypts** 4-6 microns deep

lacunar system of fluid filled canals in body wall

bands of **circular and longitudinal muscle fibers**

body wall muscles tube-like and filled with fluids

body cavity a large **pseudocoelom**

Digestion

no digestive system in larva or adult

exchange of gasses, nutrients and wastes across body

wall by diffusion

Respiration

no respiratory system

absorbs oxygen through tegument

Circulation

no heart or circulatory system

→ but muscle contractions pump fluids through canals and within body cavity

Excretion

if present, excretory system consists of 2 **protonephridia**

Nervous System

nervous system with central ganglion near saclike proboscis receptacle

but overall greatly reduced

Reproduction

dioecious; females larger than males

internal fertilization

gonads contained within thin walled sacs

males with pair of testes and penis

also contain a conspicuous **cement gland**

secretes 'cement' into the vagina after mating which hardens into a plug which prevents other males from copulating with her

sperm ejected into vagina and end up in pseudocoel

female has no well defined ovaries, instead the ovary fragments as she matures forming numerous "ovarian balls" that float freely in the fluid filled ovarian sac

fertilized egg develops in **pseudocoel** of female

mature eggs enter the uterus

shelled embryo is released in host's feces

up to 100,000's/day

eggs hatch when ingested by intermediate host

Life Cycle

requires two hosts to complete its life cycle:

Adult

endoparasite in vertebrates: especially fish, birds and mammals

also in amphibians and reptiles

only occasional, rare reports of infections in humans (children)

can be several 1000 in a single host

attach to intestine by spiny proboscis

a host may contain 1000's of worms

Juvenile

the juvenile cannot complete development and infect a vertebrate without first going through an intermediate host

in arthropods (crustaceans & insects)

usually an insect for a terrestrial host

usually a crustacean for an aquatic host

arthropods eat feces with eggs to get infected

in intermediate host the juvenile hatches and bores through the intestine and into the fluid

filled body cavity where it completes development

life cycle may include several "transport hosts" to complete its life cycle

eg. crustacean → snail → fish

juvenile can modify the insects behavior to make it more likely to be eaten by final host

eg. adult in birds (ducks); larva in amphipods

Amphipods (fw crustaceans) typically hide in dark vegetation during the day to avoid predation

when infected with acanthocephalan worm, amphipod becomes highly photophilic and conspicuous near water's surface

Evolution

recent molecular evidence indicates that acanthocephala are highly derived **rotifers** and should be placed in that phylum