

PARASITE and HOST

Among the partners in the parasitism, the one which benefits from the other is a **parasite**, while the one which harmed by the parasite is a **host**.

Results from reaction between parasite and host

1. Parasite will be eliminated from the host
2. Keep balance between parasite and host (suppressive infection, carrier)
3. Parasitosis (disease or death of the host)

Why Do Parasites Matter?

Disease
and Death

Production
Loss

Zoonotic
Potential

How do the parasites damage animals and humans?



There are more than one harmful effect of the parasite.

1. **Some parasites steal nutrients (depriving the host of essential substance).** Parasites utilize nutrient from host environment for their development and reproduction.

Flukes or **nematodes** (have gut and mouth) feed upon the surrounding tissues, product of host digestion, body fluids, host cell debris or blood.

Tapeworms (not gut or mouth) take from the host's daily intake by their own food.

- **Hookworm**.....suck blood.....haemorrhagic anemia (each worm removes about 100 μ l of blood daily)
- **Fasciola hepatica**..... suck blood.....anemia

- **Diphyllobothrium latum**...Vitamin B12 anti-anemic vitamin deficiency (due to its uptake of Vit B12 from intestine).....Pernicious anaemia (macrocytic).
Reduced RBC counts and hemoglobin level, increased eosinophil counts.
Clinical signs: anemia, fatigue, diarrhoea, neurological symptoms (dizziness, numbness of extremities)

- **Taenia saginata**.....steal host nutrients
.....may secrete some anti enzymes that neutralize the digestive enzymes of the host.
Clinical signs: diarrhoea, hunger pains, weight loss, loss appetite

- **Ostertagia sp.**.....developing parasites cause a reduction in the functional gastric gland (HCL). This result in a failure to activate pepsinogen to pepsin and so denature proteins.....Nutrient (grass, food) will not digested.
- - pH increases from 2 to 7 in the abomasal fluid
 - Pepsinogen don't turn into pepsin
 - Protein digestion is impaired
 - Chlorophyll is not denaturated

Clinical signs: diarrhoea with green color, weight loss, loss appetite, reduced feed consumption

2. Mechanical effects (damage) of parasites on host tissue and organs (may obstruct a normal passage)

Blockage effect

- **Ascaris lumbricoides**.....may cause intestinal perforation / obstruction or bile duct obstruction (biliary ascariasis). Intestinal lumen can be blocked by worms. According to the host species 6-50 cm.

Clinical signs: diarrhoea, hunger pain, vomiting, weight loss, worms in feces, icterus

- **Fasciola hepatica**.....bile duct obstruction, 3-8 cm

Clinical signs: anemia, asites, icterus, lack of appetite

- **Dictyocaulus filaria**.....bronchial obstruction, 4-10 cm

Clinical signs: dyspnea, emphysema, nasal discharge, pulmonary oedema, lack of appetite, weight loss

- **Wuchereria bancrofti (Elephantiasis)**.....lymphatic vessel obstruction-inguinal, scrotal or abdominal lymphatics. With the lymphatic ducts blocked, lymph fluid doesn't circulate well and causing swelling.

Clinical signs: swelling in extremities, thickening of tissue, hardening

- **Plasmodium falciparum** (Malaria).....brain/liver capillary obstruction. Infected red cells obstruct the blood vessels in the brain/liver. Often leading to the death of the patient.

Clinical signs: severe blood loss, fever, dizziness, headache, bone pains and clogged blood vessels.

Pressure effect

- **Hydatid cysts** develop in liver, lung, eye, kidney, bone, brain, spleen etc. Hydatid cyst in the liver may reach volumes 1-2 lt, it can cause severe damage to organ
- Initially, cyst is asymptomatic
- Growing cyst cause pressure

Clinical signs:

In lung....cough, chest pain, dyspnea, anorexia

In liver...abdominal pain, tenderness (sensitivity to palpation), abdominal mass, obstructive icterus

- **Coenurus cerebralis cysts** develop in brain and spinal cord, and can damage to organ e.g. central nervous system disorders. It can cause neurological signs.

Clinical signs: blindness, uncoordinated movements, paraplegia, anorexia nervosa, head to one side, turns in a circle to the affected side and finally death.

- **Dioctophyma renale....** atrophy in kidney. 40-60 cm. Usually, one kidney is affected. Most cases are asymptomatic. Parenchyma is destroyed, leaving only a capsule of the kidney.
- Clinical signs: dysuria, haematuria, lumbar pain

3. Traumatic effects (Migration or penetration through tissue or organ)

- **In ectoparasites:** The arthropod puncture the skin to feed mucozal fluid. This is a traumatic effect. Skin penetration cause tissue damage and skin reactions. e.g. Mosquito, flea, bed bug, louse, tick

Clinical signs: erythema, pruritus (itching).

Scabies species dig a tunnel in the epidermis layers with mouthparts for chewing type and cause skin reactions and tissue damaged.

Clinical signs: erythema, pruritis, (itching)

A **tick** will attach itself to its host by inserting its chelicerae (cutting mandibles) and hypostome (feeding tube) into the skin. The hypostome is covered with recurved teeth and serves as an anchor.

- **In endoparasites:**
- **Adult hookworm** attach to the intestinal mucosa by their buccal capsule (often contains teeth or cutting plates) and produce ulcer. Intestinal mucosa are damaged. Their feeding is generally by the ingestion of plugs of mucosa.
- **Infective larvae** penetrate skin and mucosa of host, and migrate from there to other site in the body.

Clinical signs: adults cause anemia, diarrhoea (contain blood and mucus), weight loss, loss of appetite

Hookworm larvae cause skin lesions (spirally migration trace, erythema, pruritus, (itching)).

- **Schistosoma eggs**' spinein mesenteric vein, hepatic vein, nasal vein
Eggs with spine pass into the urine, nasal discharge or feces
- **Schistosoma cercaria** is infective form.... skin penetration of host via skin
Symptoms may include fever, discomfort, myalgia, fatigue, non-productive cough, diarrhoea (with or without the presence of blood), haematuria (*S.haematobium*), hypogastric pain.
- **Acanthocephala** attach to the intestinal mucosa with proboscis armed with recurved hooks. Attachment of worms are injury to intestinal mucosa.
- Some protozoa (**Plasmodium falciparum=Malaria**) have to live in certain cells and reproduce. Finally result in the rupture of the host cells.

Clinical signs: severe blood loss, fever, dizziness, headache, bone pains and clogged blood vessels.