



# *Coccidiosis in Poultry*

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# *Economic importance of Parasitic disease*

- 1) Considerable mortalities (coccidiosis).
- 2) Anaemia (Lice).
- 3) Loss of weight (due to decrease feed intake).
- 4) Drop in egg production.
- 5) Transmission of some diseases as spirochetosis, leucosis and pox (Ticks and mites).
- 6) Transmit other parasites as Hetrakis egg transmit Histominus Parasite (black head disease).

# *Economic importance of parasitic disease*

- How the parasite can affect on production (Body weight and eggs)?
- 1-annoyance of the bird (Lice, red mite).
- 2-Direct disease condition (coccidiosis and ascaridiasis).
- Parasites may cause direct specific disease with serious loss (coccidiosis) or indirect disease conditions as fatal anaemia (Lice and mite).

## *Factors affecting the incidence and severity of parasitic diseases*

- Age: young birds are more susceptible due to previous exposure of old birds to mild or moderate infection develops immunity against this parasite.
- 2. Season: *Ectoparasites* are more active in summer (hot season), also parasites are common in raining seasons due to increasing of the RH which favor parasites occurrence.
- 3. System of housing: deep litter system show high incidence of parasitic diseases and vice versa for batteries.

## *Factors affecting the incidence and severity of parasitic diseases*

- Nutrition: Vit. K is used in severe coccidial infections, also vit. A and proteins are used to increase the resistance of the host against parasitic diseases. Some members of vit. B complex (B<sub>1</sub>, B<sub>6</sub> and biotin) have a role in the Eimeria life cycle, so deficiency of them increase the incidence of Eimeria infection.
- 5. Hygiene and management: good hygienic conditions decrease the incidence of parasitic disease, and the opposite is true.
- 6. Use of medicaments: Use of anticoccidial drugs decrease the incidence of coccidial infection

# *Classification of parasites*

- Metazoon Parasites
- I-Helminths
- 1-Nematodes
- A-Intestinal round worm (Ascaridia).
- B-Caecal worm (Hetrakis).
- C-Hair worm (Capillaria).
- D-Tracheal worm (Syngamus)
- 2-Cestodes
- A-Short B-Long
- 2-Ectoparasites    A-Permanent. B-Intermittent

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- Protozoon Parasites
  - Coccidia species.
  - Histomonus species
  - Trichomonus species
  - Hexamita species

# *Coccidiosis*

- Coccidiosis is an expensive and very common disease of poultry that cause significant economic loss with universal importance.
- The disease is caused by a protozoan parasite belonging to genus *Eimeria*, which multiplies in the intestinal tract causing damage to the tissue resulting in interruption of feeding and digestive process or nutrient absorption, blood loss, dehydration and death of chickens. Clinical manifestations of disease, caused by ingestion of large number of coccidian, is called ‘Coccidiosis’, while light infection that does not result in clinical effects (sub-clinical form) is referred to as ‘coccidiasis’. Sub-clinical infections have considerable economic impact due to impaired feed conversion in broiler chickens.

## *Etiology*

- (Nine species of *Eimeria* have been described in poultry)
- *E. acervulina* that affects duodenum and upper small intestine
- *E. praecox* that affects duodenum and upper small intestine
- *E. mivati* that affects duodenum and upper small intestine
- *E. hegani* that affects duodenum (not common)
- ***E. necatrix* that affects middle two-thirds of small intestine**
- *E. maxima* that affects middle and lower small intestine
- *E. mitis* that affects lower small intestine (not common)
- *E. brunetti* that affects lower small intestine and large intestine
- ***E. tenella* that affects caeca (most common)**

# *Transmission*

- Coccidiosis is transmitted by direct or indirect contact with droppings of infected birds.
- Ingestion of the infective form of oocysts (sporulated oocysts) is the only method of spread.
- Oocysts can be spread mechanically by animals, insects, contaminated equipment, wild birds, and dust. They are resistant to environmental extremes and to disinfection.
- Spread from one farm to another is facilitated by movement of people and equipment between farms, which may spread the oocysts mechanically.

# *Pathogenesis*

- Bird ingests coccidia, the organisms invade the lining of the intestine and produce tissue damage as they undergo reproduction.
- Within a week after infection, the coccidia shed immature descendants that are referred to as oocysts.
- The oocysts shed in the droppings are not capable of infecting another bird unless they pass through a maturation process (sporulation) in the litter.
- This sporulation occurs within a one to three day period if the litter is warm and damp but can take much longer if the conditions are cool and dry.
- After sporulation the coccidia are infective if consumed by a new host bird.

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- The number of infective coccidia consumed by the host is a primary factor as to the severity of the resulting infection.
  - An infection may be mild enough to go unnoticed while a large infective dose of coccidia may produce severe lesions that can cause death.
  - Coccidia survive for long periods outside the bird's body. They are easily transmitted from one house to another on contaminated boots, clothing, free-flying birds, equipment, feed sacks, insects and rodents.

## *Symptoms*

- Birds are pale, droopy, tend to huddle, consume less feed and water, have diarrhea, and may become emaciated and dehydrated. Laying hens will experience a reduction in rate of egg production.
- Cecal coccidiosis may produce bloody droppings and anemia that is often followed by death. Intestinal coccidiosis is not as acute and is more chronic in nature. It produces less mortality than the cecal form.

## *Postmortem Findings*

- In caecal coccidiosis, caeca may be greatly enlarged and distended with clotted blood

- *E. acervulina* and *E. mivati*: 1-2mm areas of hemorrhage interspersed with white foci visible through the serosa of the distal duodenum and proximal jejunum.
- *E. necatrix*: severe distention of the mid-jejunum with hemorrhages in the mucosa and red-stained fluid in the lumen.
- *E. maxima*: distention of the mid-jejunum with hemorrhages in the mucosa.
- *E. tenella*: hemorrhagic typhlitis (inflammation of the cecum).
- *E. brunetti*: hemorrhages of the mucosa of the distal jejunum and colon.
- Fibrinonecrotic enteritis may occur in chronic cases.

Chicken Suffering from Coccidiosis





Bird is emaciated and anaemic, as evidenced by the yellowish discoloration of its beak, comb, and legs.



*Liver is pale anaemic*



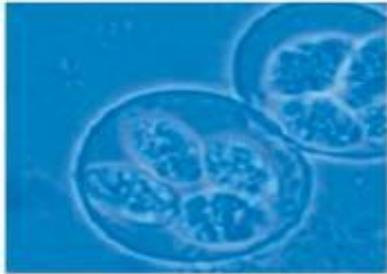
- It affects 2 blind caeca, where they appear as 2 bags filled with blood (sausage like appearance), petichael haemorrhages on the serosal surface, easily ruptured when opened, they contain either coagulated blood or grayish yellow caecal core. The caecal mucosa is inflamed and thick with reddish discolouration.





The intestine appeared very ballooned, petichael haemorrhages with fine grayish white spots (shizont aggregations) could be seen on the serosal surface, easily ruptured when opened, the content contains amount of mucous and blood or completely blood according to the infection's severity.

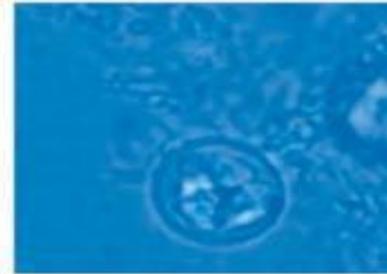
## *Eimeria* Oocyst



*E. maxima*



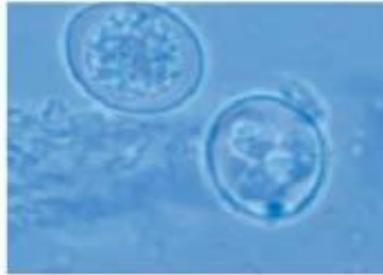
*E. brunetti*



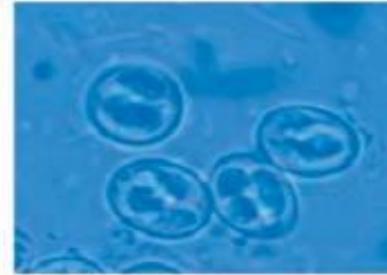
*E. necatrix*



*E. maxima*



*E. tenella*



*E. acervulina*

\*oocysts under identical magnification

## *Diagnosis*

- Gross lesions of *E. tenella*, *E. necatrix* and *E. brunetti* are diagnostic.
- Microscopic examination of intestinal and cecal scrapings reveals oocysts.
- To confirm a diagnosis in a commercial operation the following specimens should be submitted to a laboratory:
- Intestine from a sacrificed, affected bird preserved in 5% potassium dichromate for culture and identification of *Eimeria* sp.
- Intestine showing gross lesions in 10% formalin for histological examination.
- Representative feed samples for anticoccidial assay.
- Litter samples for oocyst counts.



## *Treatment*

Treatment can be provided by a class of drugs called coccidiostats. These drugs tend to slow down the disease rather than kill all the coccidia, and they will also help reduce the number of oocysts that are being passed into the environment.

## *Control*

- **Good hygiene and management:**
- Hygienic disposal of dead birds.
- Hygienic disposal of wet and infected litter and replaced by new one (dry and loose).
- Proper cleaning and disinfection of houses using Ammonium hydroxide 10%, Dekaseptol 6%, Lohmasept 5% or Sodium hydroxide 10%.
- Disposal and change the leakage drinkers to avoid increase the moisture of the litter.
- Decrease the RH and good ventilation.
- Application of general hygienic measures (biosecurity ones

- **Treatment (therapy):**
- By using coccidicidal anticoccidial (soluble) drugs for 3-5 days in the drinking water (as diseased bird not eat but drink).
- They are sulphonamides, amprolium, diclazuri, toltrazuril, ethpapatate, monensin, etc...
- Supportive treatment: supplementation of the birds with good balanced ration containing high protein contents, vit. A and K.