Aviapp®

Avian Performance Platform

SCORING GUIDE VERSION 3.6

HUVEPHARMA®

Aviapp®

Avian Performance Platform

SCORING GUIDE VERSION 3.5

HUVEPHARMA®

Congratulations with your Aviapp® account!

Now you can monitor and evaluate your poultry's health and performance over time!
The Avian Performance Platform has been developed by Huvepharma to offer its customers a user-friendly objective & modern data management system.

There are 2 types of Aviapp® user levels:

> **Company users** can log their farm data, draw reports & graphs within their own company dataset and exchange information between users.
>
> **Expert users** can compare their company's health and performance status with the sector's benchmarks.

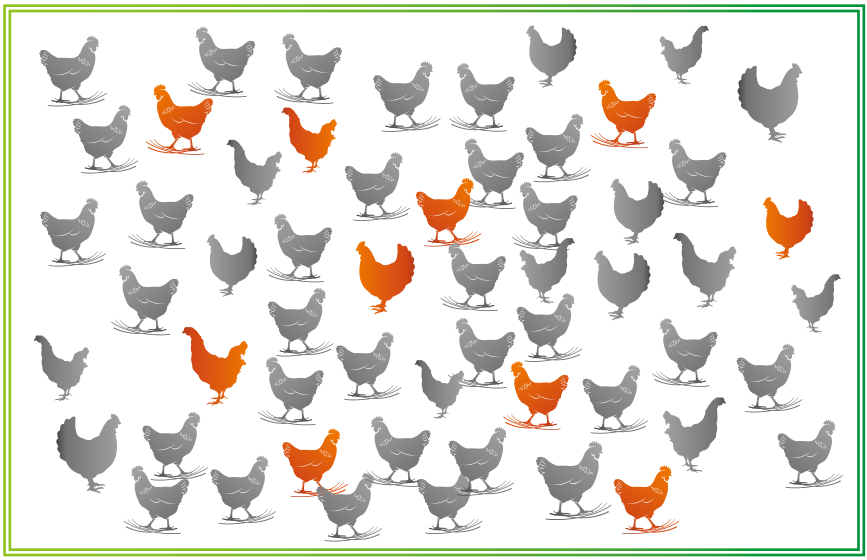
Aviapp® offers the opportunity to map out a whole set of health and performance parameters.
Depending on your preferences, you will be able to customize your modules of interest.
This booklet will guide you through the different scoring systems used and contains brief descriptions and pictures.
Aviapp® is designed to be dynamic and together with your help Aviapp® will offer a great value for the modern poultry industry.
Once more, we add performance to your business.
We wish you a great Aviapp® experience!

Sincerely yours.

Huvepharma's technical team

Selecting Birds for Necropsy

Select a minimum of 5 average birds from across the house/stable. Keep the time between selection and necropsy as short as possible to avoid any impact to the scores.
If transporting the birds ensure boxes are adequate to minimize stress
Aim for a maximum of 30 minutes between kill and finishing your necropsy to get the best results.
Select a sufficient number of healthy birds (5-10 per house) and take birds at random from across the house.



(red bird): selected bird for necropsy

Table of contents

Table of contents

Table of contents

Footpad Dermatitis (FPD)

Footpad dermatitis is characterized by skin alterations of the footpads, caused by an inflammatory reaction, evolving from redness to hard, scaly, swollen and necrotic lesions. Footpads are scored from **0 to 2**, according to the scoring described by Lotta Berg (1998).

Scores

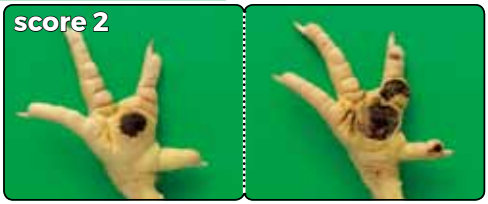
Evaluate both footpads and in case of different scores between
the two footpads, note down the highest score.

0 ⇨	No lesion or very small superficial lesions, slight discoloration on limited area of the footpad, mild hyperkeratosis or healed skin.
1 ⇨	Mild lesion. Substantial discolouration of the footpad, superficial lesion, dark papillae.
2 ⇨	Severe lesion. Ulcers or scabs of significant size, signs of haemorraghes or severely swollen foodpad.

IN ORDER TO CALCULATE THE FOOTPAD LESION SCORE:

Count scores 1 and 2
Multiply scores 1 with 0.5 and scores 2 with 2
Make a sum of the outcome
Multiply this number by 100 and divide by the number of footpads scored

Score below 80: GOOD
Scores between 80-120: MODERATE
Scores >120: BAD



Trachea (TRA)

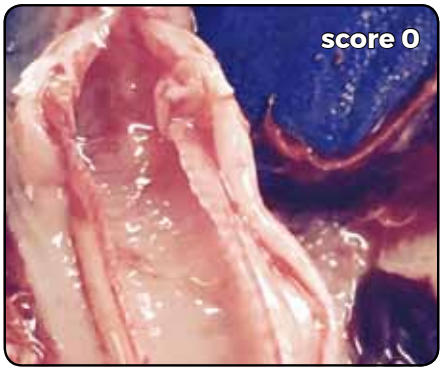
Respiratory pathogens may cause lesions in the trachea which can evolve from mild (redness or mild mucus) to severe (caseous/bloody). Depending on the severity of the lesions, etiology can be environmental (ammonia, low relative humidity, high dust concentration), viral (Infectious Laryngotracheitis, Newcastle Disease, Avian influenza, pox virus infections etc.), bacterial (*E.coli, Mycoplasma* etc.) or fungal (aspergillosis).

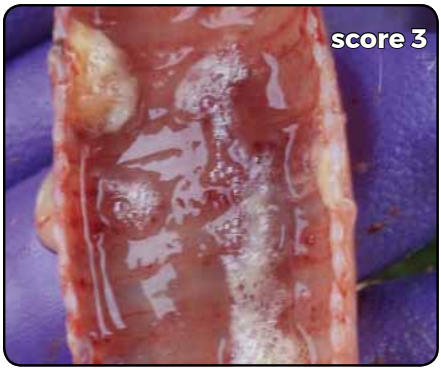
Scores

0 ⇨	Clear, no redness
1 ⇨	Redness and / or mild mucus
2 ⇨	Moderate thick mucus
3 ⇨	Caseous /bloody exudate

IN ORDER TO CALCULATE THE TRACHEA SCORE:

Count scores 1, 2 and 3.
Multiply scores 1 with 0.5, scores 2 with 2 and scores 3 with 3.
Make a sum of the outcome
Multiply this number by 100 and divide by the number of birds scored





Scratches (SC)

Skin scratches are a disruption of the integrity of the skin, caused by the nails of the companion chickens in the poultry house. This condition might indicate management or ventilation problems in the farm, increased nervousness of the birds due to external factors (noise, predators) or nutritional problems (deficiencies, imbalances). Increased frequency of skin scratches might also be observed when skin strength is impaired.

Scores

0 ⇨	Absence
1 ⇨	Superficial scratches
2 ⇨	Deep scratches

IN ORDER TO CALCULATE THE SCRATCHES SCORE:

Count scores 1, 2.
Multiply scores 1 with 0.5, scores 2 with 2. Make a sum of the outcome.
Multiply this number by 100 and divide by the number of birds scored.

Ammonia Burns (AB)

Ammonia burns refer to cornea lesions due to high concentrations of ammonia in the poultry house. Lesions consist of circular, grey-white, opaque, rough-looking areas in the centers of the corneas. The lesion can also be split-shaped. The typical appearance in combination with the presence in both eyes allows differentiation from other eye lesions.

Scores

0 ⇨	Absence
1 ⇨	Presence

IN ORDER TO CALCULATE THE AMMONIA BURNS SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Mouth lesions (MOU)

Mouth lesions can be present on the beak, the tongue or the angle of the mouth. Depending on the etiology (infectious, toxins or traumatic) lesions might differ in appearance (diphteric, plaque-like etc.).

Scores

0 ⇨	Absence
1 ⇨	Presence

IN ORDER TO CALCULATE THE MOUTH LESION SCORE:

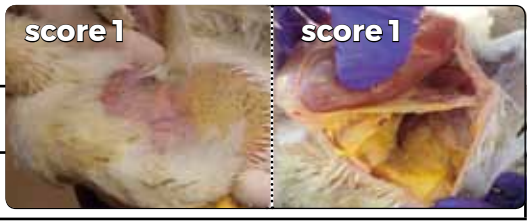
Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Infectious process (IP)

Skin scratches can introduce bacteria that can lead to inflammation (cellulitis) and yellow fibrinous material between skin and muscle.

Scores

0 ⇨	Absence
1 ⇨	Presence



IN ORDER TO CALCULATE THE INFECTIOUS PROCESS SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Leg Color (LC)

Skin pigmentation is affected by several parameters like genetics, health status of the birds and pigments added to the feed. Scoring of skin color mainly occurs for yellowskinned broilers.

Scores

0 ⇨	Normal color
1 ⇨	Mild discoloration (light yellow)
2 ⇨	Moderate discoloration (pale yellow)
3 ⇨	Severe discoloration (white)

IN ORDER TO CALCULATE THE LEG COLOR SCORE:

Count scores 1, 2 and 3.
Multiply scores 1 with 0.5, scores 2 with 2 and scores 3 with 3. Make a sum of the outcome.
Multiply this number by 100 and divide by the number of birds scored.

Hock burn (HOCKB)

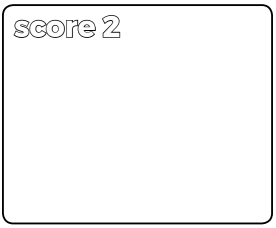
Hock burns is a contact dermatitis found on the skin of the caudal part of the hock joint. The skin is turned dark by contact with litter and consequently skin lesions can result. Hock burn is scored from 0 to 2 according to the scoring system described by Saraiva *et al.* (2016).

Scores

0 ⇨	No lesions
1 ⇨	Mild lesions (brown lesions up to 5 mm)
2 ⇨	Severe lesions (black lesions greater than 5 mm)

IN ORDER TO CALCULATE THE HOCK BURN SCORE:

Count scores 1, 2.
Multiply scores 1 with 0.5, scores 2 with 2. Make a sum of the outcome.
Multiply this number by 100 and divide by the number of birds scored.



Contact dermatitis (CD)

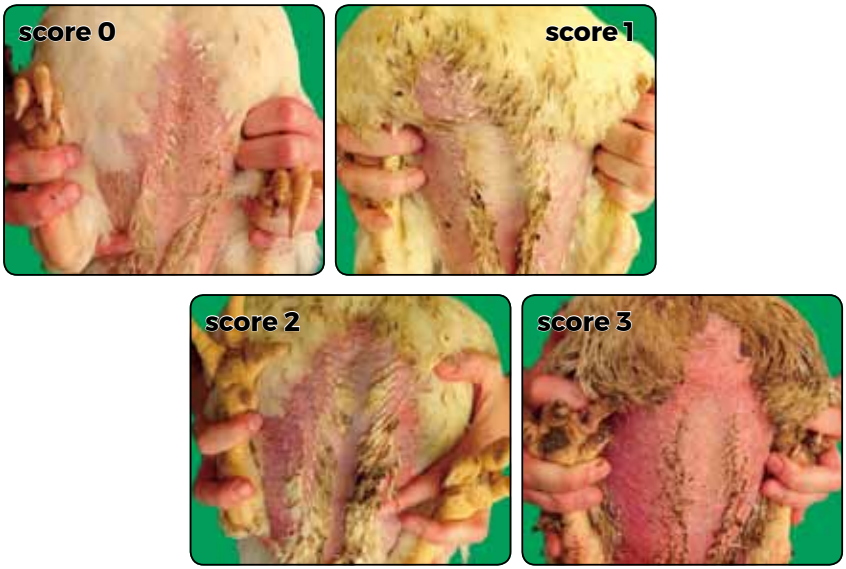
Contact dermatitis is an inflammation and irritation of the skin due to contact with an irritant or allergen and is a welfare issue for broilers chickens. In some markets, contact dermatitis can lead to downgrading of broiler carcasses. Contact dermatitis is scored from 0 to 3, according to the scoring system described by Souza *et al.* (2018).

Scores

0 ⇨	Skin without lesions, inflammation or erythema
1 ⇨	Light pink erythema or from dark pink to red coloured erythema up to 25 % of ventral body area
2 ⇨	Dark pink to red erythema from 25 – 50 % of ventral body area or presence of small brown spots
3 ⇨	Large area inflamed (>50% of ventral body area), dark pink or red color or large brown spots or breast blisters

IN ORDER TO CALCULATE THE CONTACT DERMATITIS SCORE:

Count scores 1, 2 and 3.
Multiply scores 1 with 0.5, scores 2 with 2 and scores 3 with 3. Make a sum of the outcome.
Multiply this number by 100 and divide by the number of birds scored.



Pictures kindly provided by Prof. Molento, Universidade Federal do Paraná, Brazil.

Feathering (FEA)

Plumage cleanliness is important for thermoregulation when the feathers are wet or soiled by litter they may lose their protective properties. Dirty feathers may suggest litter humidity is too high. Feathering is scored from 0 to 2, according to the scoring system described by Saraiva et al. (2016).

Scores

0 ⇨	Clean feathers
1 ⇨	Moderately dirty feathers (soiled feathers localized in the breast and abdominal areas without caked dirt)
2 ⇨	Very dirty feathers (brown feathers sometimes with dirt adhered or caked feathers)

IN ORDER TO CALCULATE THE FEATHERING SCORE:

Count scores 1, 2.
Multiply scores 1 with 0.5, scores 2 with 2. Make a sum of the outcome.
Multiply this number by 100 and divide by the number of birds scored.

Breast Blisters (BBL)

Breast blisters are caused by dermatitis of the skin overlying the keel (the central part of the breast area). The skin is softened and sometimes discoloured and may be infected and 'sticky', or show as a raised blister. Breast blisters are scored as in described in Welfare Quality assessment protocol for poultry Algers, B et al. (2009).

Scores

0 ⇨	Absence
1 ⇨	Presence of a breast blister

IN ORDER TO CALCULATE THE CBREAST BLISTER SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

score 1

White striping (WS)

White striping is a degenerating myopathy in broilers characterized by macroscopically visible white striations on breast fillets and thighs. The etiology is unknown but it is believed that it is linked to the high growth rate of broilers and calcium metabolism.

Scores

0 ⇨	No whites stripes present
1 ⇨	Few stripes across muscle
2 ⇨	Moderate stripping beginning to coalesce
3 ⇨	Severe striping with coalescence

IN ORDER TO CALCULATE THE WHITE STRIPING SCORE:

Count scores 1, 2 and 3.
Multiply scores 1 with 0.5, scores 2 with 2 and scores 3 with 3.
Make a sum of the outcome.
Multiply this number by 100 and divide by the number of birds scored

Wooden breast (WB)

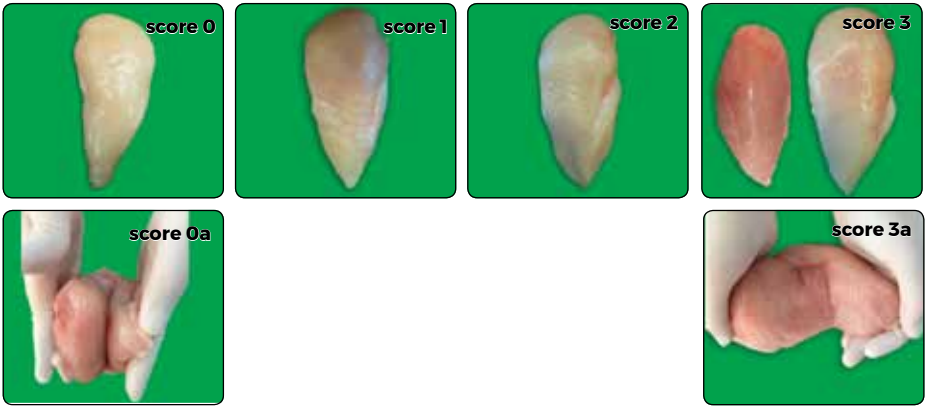
Wooden breast is a myopathy in broilers characterized by hardened muscle tissue that spreads through fillets. Affected meat can feel hard to touch. Wooden breast is scored according to the scoring system described by Petracci et al. (2019)

Scores

0 ⇨	Absence
1 ⇨	Mild (focally diffused and light firmness)
2 ⇨	Moderate (focally diffused with extensive firmness of the breast)
3 ⇨	Severe (>75% of the breast is extremely firm and with diffuse coverage)

IN ORDER TO CALCULATE THE WOODEN BREAST SCORE:

Count scores 1, 2 and 3.
Multiply scores 1 with 0.5, scores 2 with 2 and scores 3 with 3. Make a sum of the outcome.
Multiply this number by 100 and divide by the number of birds scored.



Picture kindly provided by Department of Agriculture and Food Sciences, University of Bologna, Italy.

Thymus (THY)

The thymus is a specialized primary lymphoid organ of the immune system and is located next to the trachea. Most common abnormal condition will consist of atrophy of the thymus which can occur after infection with immunosuppressive agents (like Chicken Anemia virus, Infectious Bursal Disease virus, Marek Disease virus etc.).

Scores

0 ⇨	Normal condition
1 ⇨	Abnormal condition

IN ORDER TO CALCULATE THE THYMUS SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Bursal damage (BD)

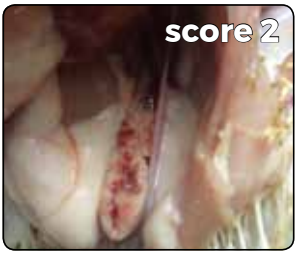
Bursal damage is most commonly linked to Infectious Bursal Disease (IBD) , a highly contagious viral disease, causing lesions to primary lymphoid tissue and especially to the Bursa of Fabricius in young birds. In the acute phase of infection the bursa will be swollen, oedematous and haemorhages may appear on the mucosal side.

Scores

0 ⇨	Normal appearance
1 ⇨	Swollen with gelatinous exterior appearance
2 ⇨	Swollen with mild haemorhage
3 ⇨	Swollen with extensive haemorhage

IN ORDER TO CALCULATE THE BURSAL DAMAGE SCORE:

Count scores 1, 2 and 3.
Multiply scores 1 with 0.5, scores 2 with 2 and scores 3 with 3.
Make a sum of the outcome
Multiply this number by 100 and divide by the number of birds scored



Bursa Ratio (BR)

IN ORDER TO CALCULATE THE BURSA RATIO SCORE:

Bursa weight (g) / Body weight (g) x 1000.

Spleen Ratio (SR)

IN ORDER TO CALCULATE THE SPLEEN RATIO SCORE:

Spleen weight (g) / body weight (g) x100

Bursa meter (BM)

A bursa meter is a ruler shaped tool with holes of different sizes numbered 1-8 used to measure the bursa size. IBDV and stressors will cause atrophy to the bursa. The age of the bird is noted to help determine when IBDV challenge or other stressor is occurring.

Scores

1 - 8 ⇨	Use a bursa meter to determine the size (score)

Bursa size (BS)

IBDV and stressors will cause atrophy to the bursa. The age of the bird is noted to help to determine when IBDV challenge or other stressor is occurring.

Scores

0 ⇨	Normal appearance
1 ⇨	Mild aberrant
2 ⇨	Moderate aberrant
3 ⇨	Severe aberrant

IN ORDER TO CALCULATE THE **BURSAL SIZE SCORE**:

Count scores 1, 2 and 3.
Multiply scores 1 with 0.5, scores 2 with 2 and scores 3 with 3.
Make a sum of the outcome
Multiply this number by 100 and divide by the number of birds scored

Femoral Head Necrosis (FHN)

Necrotic lesions on the femoral head of chickens and turkeys are described as Femoral Head Necrosis. This condition can be caused by osteochondrosis, dyschondroplasia or osteomyelitis. Most often lesions are due to focal bacterial infection. Evaluate both femoral heads and in case of different scores between the two footpads, note down the highest score.

Scores

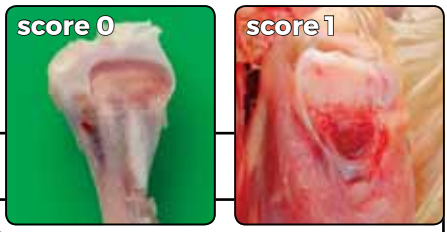
0 ⇨	Normal condition
1 ⇨	The epiphyseal cartilage is eroded down to and including an erosion of the periosteum
2 ⇨	The erosion is extending down into the medullary bone
3 ⇨	The most severe, the femoral head is completely eroded and absent

IN ORDER TO CALCULATE THE FEMORAL HEAD NECROSIS SCORE:

Count scores 1, 2 and 3.
Multiply scores 1 with 0.5, scores 2 with 2 and scores 3 with 3.
Make a sum of the outcome
Multiply this number by 100 and divide by the number of birds scored

Enlarged growth plate (EGP)

Widening of the epiphyseal growth plate is caused by an increased zone of proliferating prehypertrophic zone of epiphyseal cartilage. This condition is described in case of calcium/phosphorus imbalances and in some cases of hypervitaminose A.



Scores

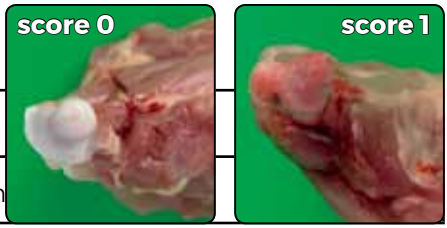
0 ⇨	Normal condition
1 ⇨	Abnormal condition

IN ORDER TO CALCULATE THE ENLARGED GROWTH PLATE SCORE THE FOLLOWING CALCULATION SYSTEM IS APPLIED:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Detached cartilage (CAR)

The condition detached cartilage refers to detachment of the femoral head cartilage during dislocation of the hip joints when performing necropsy. This condition is only scored when no necrotic lesions are present on the detached femoral head.



Scores

0 ⇨	Normal condition
1 ⇨	Abnormal condition

IN ORDER TO CALCULATE THE DETACHED CARTILAGE SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Tibial dyschondroplasia (TD)

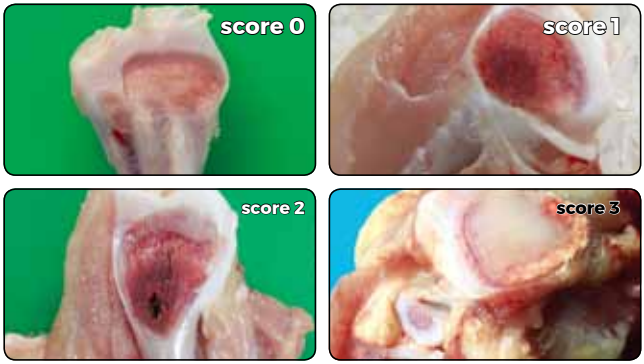
Tibial dyschondroplasia is a defect associated with the growth plates and is characterized by an avascular plug of abnormal cartilage in the growth plate of long bones.
Most commonly the defect will be diagnosed in the proximal tibiotarsus and is therefore referred to as "tibial dyschondroplasia". A score is given ranging from 0 to 3 according Edwards and Veltmann (1983).

Scores

0 ⇨	Normal condition.
1 ⇨	The avascular cartilage plug is a small deviation of the growth plate, barely invading the medullary bone. The plug is minor and is inconspicuous to a casual observer.
2 ⇨	The avascular cartilage plug is an obvious deviation from the growth plate into the medullary bone.
3 ⇨	Large avascular cartilage plug extending significantly into the medullary bone. The cartilage plug is obvious to a casual observer.

IN ORDER TO CALCULATE THE TIBIAL DYSCHONDROPLASIA SCORE:

Count scores 1, 2 and 3.
Multiply scores 1 with 0.5, scores 2 with 2 and scores 3 with 3.
Make a sum of the outcome
Multiply this number by 100 and divide by the number of birds scored



Gait Score (GS)

Lameness is the inability to use one or both limbs in a normal manner and is becoming a major animal welfare and economic concern.

Per flock, at random **10 groups** of birds are observed and evaluated for indicative gait sign as in described in Garner et al (2002).

Scores

0 ⇨	Smooth gait and well-balanced bird.
1 ⇨	Uneven gait. Foot does not curl when lifted.
2 ⇨	Uneven gait. The bird's stride is shortened and unbalanced. Wings are used for support.
3 ⇨	Remains lying down unless gently nudging. Prefers to use wings for balance and support. Bird lies down after a series of steps.
4 ⇨	Bird is reluctant to move upon approach and gets up very slowly. Uses wings likes crutches to walk.
5 ⇨	Bird is not able to take one step.

IN ORDER TO CALCULATE THE GAIT SCORE:

Count scores 1, 2, 3, 4 and 5
Multiply scores 1 with 0.5, scores 2 with 2, scores 3 with 3, score 4 with 4 and scores 5 with 5
Make a sum of the outcome. Multiply this number by 10

Rickets (RKT)

Rickets are characterized by severe fragility and bending of long bone and widened growth plate due to poor mineralization. Histopathology is necessary to differentiate between the different causes (vitamin D or calcium/phosphorus deficiency).

Scores

0 ⇨	Absence
1 ⇨	Presence

IN ORDER TO CALCULATE THE RICKETS SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Swollen hocks (HOC)

This condition is scored in case the hocks are swollen but no exudate is present. The swelling of the hocks can be caused by non-infectious stressors such as too much sitting.

Scores

0 ⇨	Absence
1 ⇨	Presence

IN ORDER TO CALCULATE THE SWOLLEN HOCKS SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Brittle bones (BRI)

Non-flexible bones which will easily break without much force are scored as brittle bones. Bone strength relies on a complex number of interfering structural, compositional, physiological and nutritional factors.

Scores

0 ⇨	Normal condition
1 ⇨	Abnormal condition

IN ORDER TO CALCULATE THE BRITTLE BONES SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Tenosynovitis (TEN)

Infection of the tendon (tendinitis) or inflammation of the fluid-filled sheath surrounding the tendon (tenosynovitis) can be caused by viral (reo, adeno) or bacterial infections (*Mycoplasma synoviae, E.coli*). In severe cases the tendon can be ruptured.

Scores

0 ⇨	Normal
1 ⇨	Swollen tendon with purulent or non-purulent exudate

IN ORDER TO CALCULATE THE TENOSYNOVITIS SCORE:

Count scores 1 and 2. Multiply scores 1 with 0.5 and scores 2 with 2
Make a sum of the outcome
Multiply this number by 100 and divide by the number of birds scored

Synovitis (SYN)

Infection of the synoviae is often accompanied by arthritis and can be diagnosed in the different joints of the birds. Most often the knee, hock joints and/or toes will be affected.

Scores

0 ⇨	Normal condition
1 ⇨	Abnormal condition

IN ORDER TO CALCULATE THE SYNOVITIS SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Osteomyelitis (OST)

Osteomyelitis is an infection of the bone or the bone marrow caused by bacterial infection.

Scores

0 ⇨	Normal condition
1 ⇨	Abnormal condition

IN ORDER TO CALCULATE THE OSTEOMYELITIS SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Airsacs (AIR)

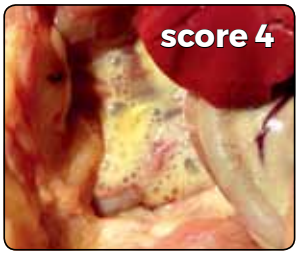
Airsacs are an important part of the avian respiratory system. They are extremely prone to infection and inflammation. Lesions in the airsacs are an indicator for respiratory infection with viral, bacterial or fungal agents.

Scores

0 ⇨	Normal condition
1 ⇨	few suds (light foam) typical of vaccine reaction
2 ⇨	Foamy airsac
3 ⇨	Purulent airsac, pericarditis or perihepatitis
4 ⇨	Cheesy airsac, pericarditis or perihepatitis

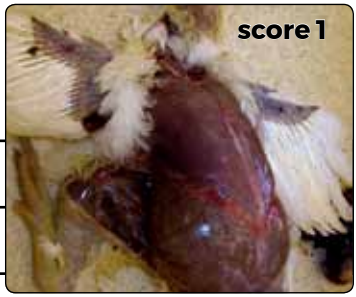
IN ORDER TO CALCULATE THE AIRSACS SCORE:

Count scores 1, 2, 3 and 4.
Multiply scores 1 with 0.5, scores 2 with 2, scores 3 with 3 and score 4 with 4.
Make a sum of the outcome
Multiply this number by 100 and divide by the number of birds scored



Ascites (ASC)

Ascites is characterized by the presence of excessive fluid in the abdominal cavity.
The etiology is complex and related to oxygen supply, ventilation, high altitude, respiratory diseases or rapid growth.



Scores

0 ⇨	Absence
1 ⇨	Presence

IN ORDER TO CALCULATE THE ASCITES SCORE:

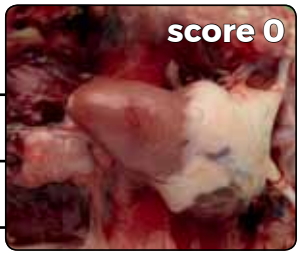
Count scores 1
Multiply this number by 100 and divide by the number of birds scored

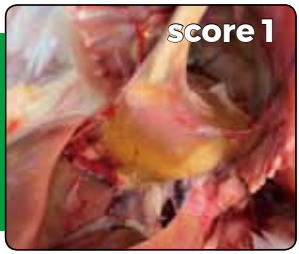
Cardiovascular (CDV)

Enlargement of the heart with or without fluid in the pericardium. High growth rates or other factors that reduce oxygen can lead to this condition.

Scores

0 ⇨	Normal condition
1 ⇨	Hydropericardium





IN ORDER TO CALCULATE THE CARDIOVASCULAR SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Aspergillosis (ASP)

Aspergillosis is a respiratory diseases caused by the fungi of the species *aspergillus*. Lesions may typically appear in the lower pulmonary system and consist of miliari foci, granulomas or noduli in lungs and airsacs.
Exposure to high concentrations of the fungus is often the reason for clinical outbreaks.

Scores

0 ⇨	Absence
1 ⇨	Presence

IN ORDER TO CALCULATE THE ASPERGILLOSIS SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Sepsis (SEP)

A general and severe inflammation is classified as sepsis. Etiology is bacteriological infection, which can be caused by primary bacterial agents or by secondary infections after predisposing conditions (viral infection, management, immunosuppression etc.).

Scores

0 ⇨	Absence
1 ⇨	Presence

IN ORDER TO CALCULATE THE SEPSIS SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Coccidiosis (COC)

Scoring for coccidiosis is performed according to the system described described by Johnson and Reid (1970). Severity of the lesions is linked to performance and will help to evaluate the anticoccidial program used.

Total Mean Lesion Score (TMLS)

Sum all the individual birds' scores for E. *acervulina*, E. *maxima* and E. *tenella*. Divide this sum by the number of chickens analyzed.

Scores

≤1 ⇨	Consider as Good
1-1.5 ⇨	Consider Species and review Farm condition for further actions
≥1.5 ⇨	Potential problem and should be investigated

Eimeria acervulina

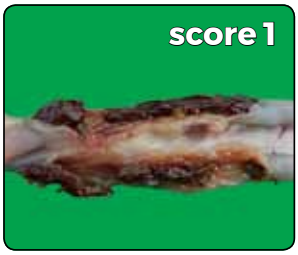
Scores

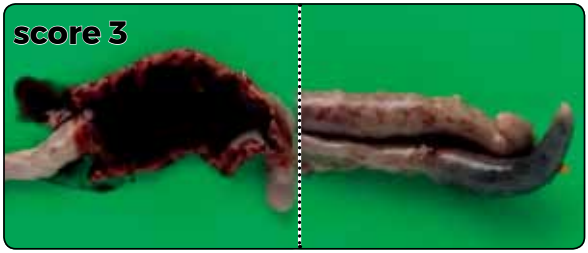
0 ⇨	No lesions.
1 ⇨	Scattered white plaque-like lesions containing developing oocysts confined to the duodenum. These lesions are elongated with the longer axis transversely oriented on the intestinal walls like the rungs of a ladder. They may be seen from either the serosal or mucosal intestinal surfaces. They may range up to a maximum of 5 lesions per square centimeter
2 ⇨	Lesions are much closer together, but not coalescent. They may extend as far posterior as 20 cm below the duodenum in 3-week-old birds. The intestinal wall shows no thickening. Digestive tract contents are normal.
3 ⇨	Lesions are numerous enough to cause coalescence in the lesion size, giving the intestine a coated appearance. The intestinal wall is thickened and the contents are watery. Lesions may extend as far posterior as the yolk sac diverticulum.
4 ⇨	Coalescing of the lesions is complete and no distinctive lesions may appear in the duodenal portion of the intestine. The intestinal wall is considerably thickened and the roughened intestinal wall will be loaded with oocysts. Diarrhea, severe weight loss, poor feed conversion and skin depigmentation accompany such an infection in non-medicated birds.

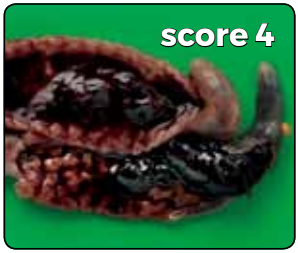
Eimeria tenella

Scores

0 ⇨	No lesions.
1 ⇨	There are very few scattered petechiae on the cecal wall. There is no thickening of the cecal wall. Normal cecal contents are present.
2 ⇨	Lesions are more numerous, with noticeable blood in the cecal contents. The cecal wall is somewhat thickened. Normal cecal contents are present.
3 ⇨	Large amounts of blood or cecal cores are present. Cecal walls are greatly thickened. Little, if any, fecal contents are present in the ceca. Deformation of the ceca.
4 ⇨	The unopened cecum is distended with blood at the distal end but contracted and shortened. Death may begin on the 5th day.







Eimeria maxima

Scores

0 ⇨	No lesions.
1 ⇨	Small red petechiae may appear on the serosal side of the mid intestine. There is no ballooning or thickening of the intestine, though small amounts of orange mucus may be present.*
2 ⇨	The serosal surface may be speckled with numerous red petechiae. The intestine may be filled with orange mucus. There is little or no ballooning of the intestine. The intestinal wall will be thickened.*
3 ⇨	The intestinal wall is ballooned and thickened. The mucosal surface is roughened and the intestinal contents are filled with pinpoint blood clots and mucus.
4 ⇨	Bloody intestinal contents may appear along with numerous petechiae Intestinal wall is ballooned for most of his length. Thickened intestinal wall.

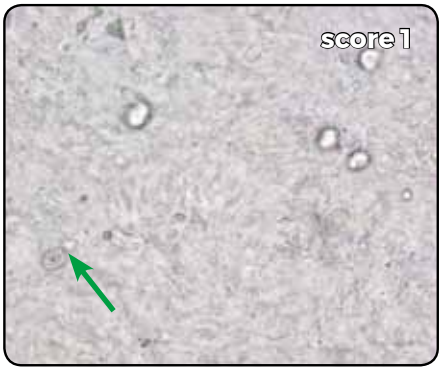
* microscopy of a mucosal scraping can confirm the diagnosis.

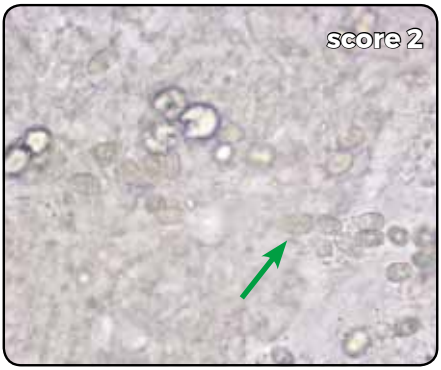
Eimeria maxima MICRO

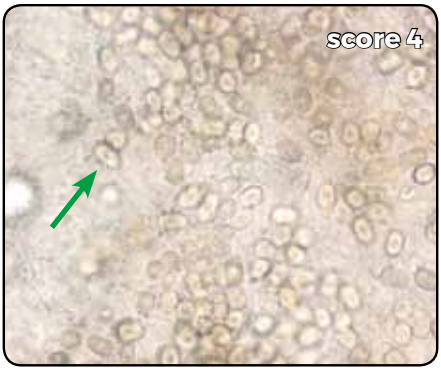
Several sections of the mucosal surface of the intestine at Meckel's diverticulum are scraped for microscopic examination for E. *maxima* oocysts. Several fields of each composite scrape from each bird are examined the average number of oocysts for the bird is determined.

Scores

0 ⇨	no oocysts	
1 ⇨	mild	(1-10 oocysts)
2 ⇨	moderate	(11-20)
3 ⇨	severe	(21-49)
4 ⇨	high	(>50)



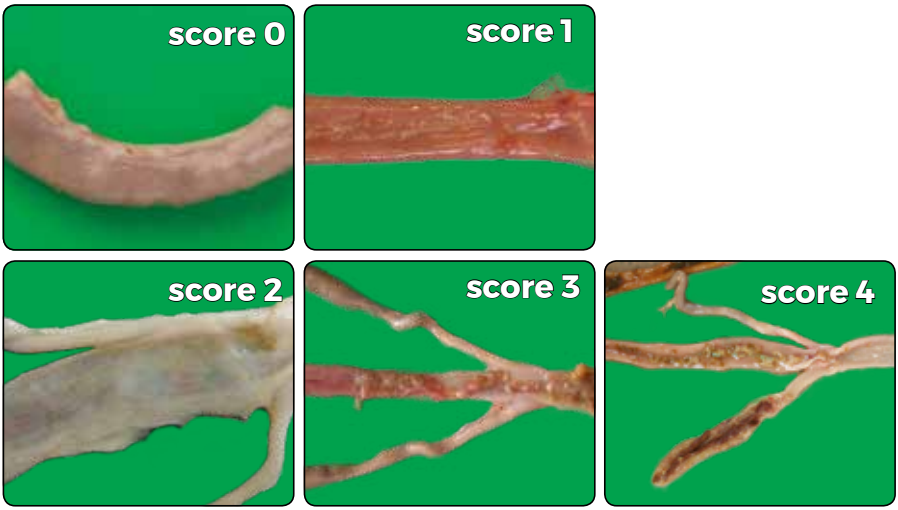




Cocci module: E. *brunetti*

Scores

0 ⇨	No lesions.
1 ⇨	No gross lesions but parasite is present in scrapings.
2 ⇨	Intestinal wall may appear greyish. The lower portion may be thickened. Salmon colored flecks, sloughed from the intestine are present.
3 ⇨	Intestinal wall thickened and a blood-tinged catarrhal exudate present. Transverse red streaks may be present in the lower rectum and lesions occur in the cecal tonsils. Soft mucus plugs may be present in this area.
4 ⇨	Extensive coagulation necrosis of the mucosal surface of the lower intestine may be present. In some birds a dry necrotic membrane may line the intestine and caseous cores may plug the caeca. Lesions may extend into middle/ upper intestine.



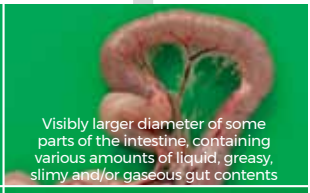
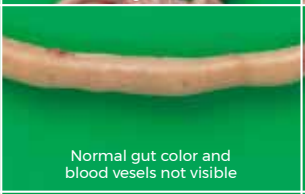
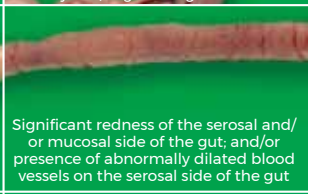
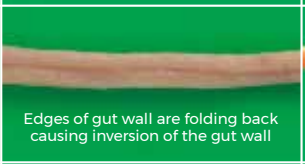
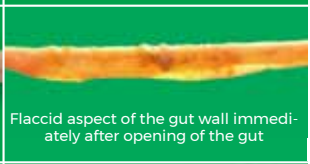
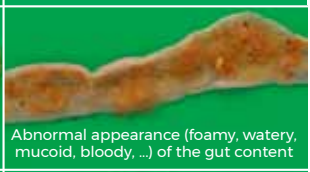
Cocci module: E. *necatrix*

Scores

0 ⇨	No lesions.
1 ⇨	Small scattered petechiae and white spots are easily seen from the serosal side. Little, if any, damage is apparent on the mucosal surface.
2 ⇨	Numerous petechiae and white spots are visible on the serosal surface. Slight ballooning confined to the mid gut area may be present.
3 ⇨	Extensive hemorrhages into lumen of intestine. The serosal surface is covered with red petechiae and/or white plaques. The serosa is rough and thickened with many pinpoint hemorrhages. No normal intestinal contents. Ballooning extends over lower half of the small intestine.
4 ⇨	Extensive hemorrhage giving the intestine a dark color. Intestinal content consists of red or brown mucus. Ballooning may extend throughout much of the length of the intestine.

Dysbacteriosis scoring in practice

- Scoring for dysbacteriosis is performed according to the system described by De Gussem M. (2010) and Teirlynch *et al.* (2011)
- The gut is evaluated for 10 individual parameters which are scored for present (1) or non-present (0).

		Score 0 Normal	Score 1 Abnormal
Gut Ballooning	Entire Gut	 Normal gut diameter	 Visibly larger diameter of some parts of the intestine, containing various amounts of liquid, greasy, slimy and/or gaseous gut contents
Inflammation	Cranial & Caudal	 Normal gut color and blood vesels not visible	 Significant redness of the serosal and/or mucosal side of the gut; and/or presence of abnormally dilated blood vessels on the serosal side of the gut
Flaccid	Cranial & Caudal	 Edges of gut wall are folding back causing inversion of the gut wall	 Flaccid aspect of the gut wall immediately after opening of the gut
Abnormal Contents	Cranial & Caudal	 Normal appearance of the gut content	 Abnormal appearance (foamy, watery, mucoid, bloody, ...) of the gut content
Thickness	Cranial & Caudal	 Normal appearance of the gut wall	 Macroscopically visible and/or tangible reduction of the gut wall thickness, and/or translucent guts in combination with increased fragility of the gut
Undigested Feed	Hind gut	 No undigested feed particles	 Presence of undigested feed particles

Scores All scores are added up and divided by the number of birds evaluated. Dividing this score by 2.5 gives a score on 4 (cfr Coccidiosis scoring).

≤ 1.2 ⇨	Consider as Good
> 1.2 ⇨	Further investigation should be considered

Proventriculus dilatation (PRO)

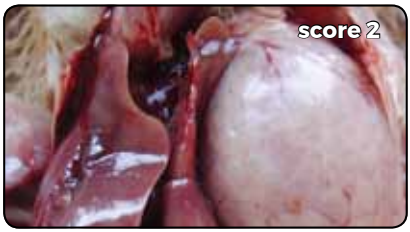
Dilatation of the proventriculus is characterized by an enlarged, flaccid, thin walled proventriculus. Proventriculus dilatation is often accompanied by a poorly developed gizzard and a fading demarcation between proventriculus and gizzard. Different etiologies have been associated with this condition; these can be feed related, idiopathic or viral (also known as Transmissable Viral Proventriculitis).

Scores

0 ⇨	Normal condition
1 ⇨	Flaccid with dilated junction at gizzard
2 ⇨	Swollen
3 ⇨	Enlarged, flaccid, and/or hemorrhage

IN ORDER TO CALCULATE THE PROVENTRICULUS DILATATION SCORE:

Count scores 1, 2 and 3.
Multiply scores 1 with 0.5, scores 2 with 2 and scores 3 with 3.
Make a sum of the outcome
Multiply this number by 100 and divide by the number of birds scored



Gizzard erosion (GIZ)

Gizzard erosions are characterized by macroscopic defects in the koilin layer and/or in the mucosa of the gizzard. Etiology can be related to the feed (structure, composition), toxins, infectious agents (Fowl adenovirus serotype I) or microbiological colonization.

Scores

0 ⇨	Normal condition
1 ⇨	Mild erosions
2 ⇨	Moderate ulcerations
3 ⇨	Severe ulcerations

IN ORDER TO CALCULATE THE **GIZZARD EROSION SCORE**:

Count scores 1, 2 and 3.
Multiply scores 1 with 0.5, scores 2 with 2 and scores 3 with 3.
Make a sum of the outcome
Multiply this number by 100 and divide by the number of birds scored

Litter eater (LE)

When the gizzard contains 50 % or more litter, the birds are scored as litter eaters. This condition can be related to different etiologies (management, feed, health status etc). Possible reasons for litter eaters are inadequate feed structure, toxins in feed, sudden feed or climate changes, intestinal problems, no access to feed or water, poor lightning etc.

Scores

0 ⇨	<50% of the gizzard content is litter
1 ⇨	>50% of the gizzard content is litter

IN ORDER TO CALCULATE THE LITTER EATER SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Litter Quality (LQ)

Poor litter quality may indicate poor litter management and can affect footpad and skin lesions.

Sampling instructions:

Select 5 different locations in each house to maximize the uniformity of the sampling: middle of the house, edges, under drinking lines, close to the doorway.

Use your foot and push gently on the litter.

Scores

0 ⇨	Completely dry and easy to move with foot
1 ⇨	Dry but not easy to move with foot
2 ⇨	Leaves imprint of foot, but not sticky
3 ⇨	Sticky in a ball
4 ⇨	Sticky with crust

IN ORDER TO CALCULATE THE **LITTER QUALITY SCORE**:

Count scores 1, 2, 3 and 4
Multiply scores 1 with 0.5 , scores 2 with 2, scores 3 with 3 and scores 4 with 4.
Make a sum of the outcome
Multiply this number by 100 and divide by the number of birds scored

Retained yolk (REY)

Uncompleted yolk sac resorption after hatch will result in a residual yolk located at the Meckel's diverticulum. This condition is classified as retained yolk and can be caused by management issues or infectious agents.

Scores

0 ⇨	Not present
1 ⇨	Present

IN ORDER TO CALCULATE THE **RETAINED YOLK SCORE**:
Count scores 1 – Multiply this number by 100 and divide by the number of birds scored

Intestinal Gas (IG)

Presence of small gas bubbles in duodenum, jejunum or ileum.

Scores

0 ⇨	Absence
1 ⇨	Presence of gas in the intestinal tract

IN ORDER TO CALCULATE THE INTESTINAL GAS SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Caecal scoring – Watery contents (CAEW)

The caecal content has a watery aspect.

Scores

0 ⇨	Absence
1 ⇨	Abnormal watery content

IN ORDER TO CALCULATE THE CAECAL SCORING – WATERY CONTENT SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Caecal Scoring - Foamy contents
(CAEF)

Caecum contains frothy content with bubbles

Scores

0 ⇨	Absence

IN ORDER TO CALCULATE THE CAECAL SCORING - FOAMY CONTENT SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Caecal Scoring - Wall (CW)

The caecal wall has an abnormal aspect (thin, thickened or inflamed)

Scores

0 ⇨	Absence
1 ⇨	Abnormal (Thin, thickened, inflamed)

IN ORDER TO CALCULATE THE CAECAL SCORING - WALL SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Feed passage (FE)

Poorly digestible feed ingredients or poor gastro intestinal absorption can cause feed passage.

Scores

0 ⇨	None or very small amount of undigested feed
1 ⇨	10% undigested feed
2 ⇨	20% undigested feed
3 ⇨	>50% undigested feed

IN ORDER TO CALCULATE THE FEED PASSAGE SCORE:

Count scores 1, 2 and 3.
Multiply scores 1 with 0.5, scores 2 with 2 and scores 3 with 3.
Make a sum of the outcome
Multiply this number by 100 and divide by the number of birds scored

Hyperemia (HY)

Normal digestion, infectious agents, toxins or irritants can cause hyperemia.

Scores

0 ⇨	Normal
1 ⇨	Rare focal areas of interstitial blood
2 ⇨	Multifocal areas of interstitial blood
3 ⇨	Multifocal to coalescing areas of interstitial blood

IN ORDER TO CALCULATE THE HYPEREMIA SCORE:

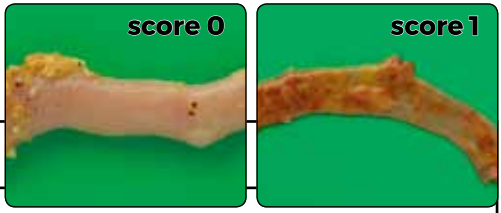
Count scores 1, 2 and 3.
Multiply scores 1 with 0.5, scores 2 with 2 and scores 3 with 3.
Make a sum of the outcome
Multiply this number by 100 and divide by the number of birds scored

Cellular sloughing (CS)

Sloughing of intestinal cells from the GI tract being empty or infectious or toxic agent.

Scores

0 ⇨	Absence
1 ⇨	Presence



IN ORDER TO CALCULATE THE CELLULAR SLOUGHING SCORE:

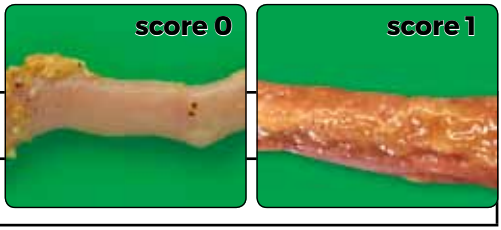
Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Excessive intestinal mucus (MC)

Infectious agents, toxins, and irritants can cause the gastro intestinal tract to produce excessive mucus.

Scores

0 ⇨	Absence
1 ⇨	Presence



IN ORDER TO CALCULATE THE EXCESSIVE MUCUS SCORE:

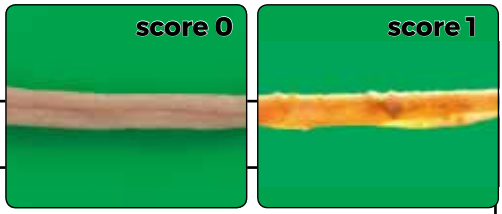
Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Intestinal tone (IT)

Poor muscular activity of the intestine, the intestine does not fold back on itself when cut longitudinally. This may be caused by coccidiosis infection, some viral infections or dysbacteriosis.

Scores

0 ⇨	Normal
1 ⇨	Abnormal



IN ORDER TO CALCULATE THE INTESTINAL TONE SCORE:

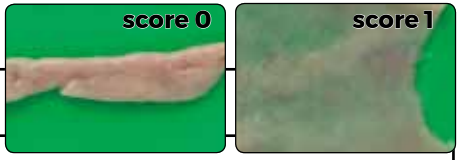
Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Thin intestines (THN)

The intestinal wall is thin and friable, breaking easily when handled. This can be caused by coccidiosis infection, some viral infections, mycotoxins, or other toxins and dysbacteriosis.

Scores

0 ⇨	Normal condition
1 ⇨	Abnormal condition



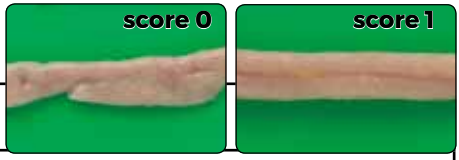
IN ORDER TO CALCULATE THE THIN INTESTINES SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Thick intestines (THK)

Increased thickness of the intestinal wall. This can be caused by nonspecific irritation such as ascariasis or anti-nutritive factors in the feed.

Scores



0 ⇨	Normal condition
1 ⇨	Abnormal condition

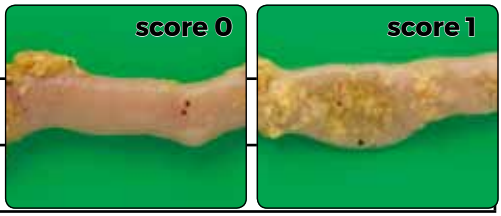
IN ORDER TO CALCULATE THE THICK INTESTINES SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Excessive intestinal fluid (EIF)

High sodium in the diet can cause excessive fluid as well as several viruses that affect the kidneys and intestinal cells.

Scores



0 ⇨	Absence
1 ⇨	Presence

IN ORDER TO CALCULATE THE EXCESSIVE FLUID SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Intestinal haemorraghes (IH)

Blood in the intestinal lumen. This can be caused by *Clostridium perfringens*, viral & coccidial infections, or some toxins.

Scores

0 ⇨	Absence
1 ⇨	Presence

IN ORDER TO CALCULATE THE **INTESTINAL HAEMORRAGHES SCORE**:

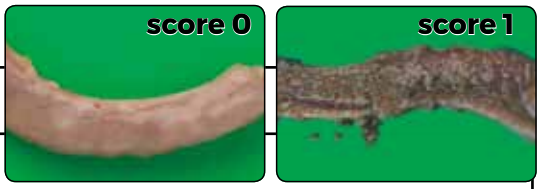
Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Necrotic enteritis (NEC)

Necrotic enteritis is an enterotoxaemia caused by *Clostridium perfringens* and characterized by severe necrosis of the intestinal mucosa. Predisposing factors include coccidiosis challenge, feed composition, immunity and management factors.

Scores

0 ⇨	Absence
1 ⇨	Presence



IN ORDER TO CALCULATE THE **NECROTIC ENTERITIS SCORE**:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Darkling beetles (BLT)

Darkling beetles (*Alphitobius diaperinus*) are the most common pest in poultry houses. They are an attractive food source for the birds. Most commonly they can be diagnosed in the crop, proventriculus or gizzard. The presence of the beetles in the intestinal tract suggests a poor control of the beetles in the poultry house. The beetles are known to be vectors of different important poultry diseases and food borne diseases like *Salmonella*.

Scores

0 ⇨	Absence
1 ⇨	Presence

IN ORDER TO CALCULATE THE DARKLING BEETLES SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Excessive bile (BL)

When birds have been off feed, bile will be present in the gizzard and the contents and/or lining will be green.

Scores

0 ⇨	Absence
1 ⇨	Presence

IN ORDER TO CALCULATE THE EXCESSIVE BILE SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Tapeworms (TW)

Presence of tapeworms in the intestinal tract.

Scores

0 ⇨	Absence
1 ⇨	Presence

IN ORDER TO CALCULATE THE TAPEWORMS SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Roundworms (RW)

Presence of roundworms in the intestinal tract.

Scores

0 ⇨	Absence
1 ⇨	Presence

IN ORDER TO CALCULATE THE ROUNDWORMS SCORE:

Count scores 1
Multiply this number by 100 and divide by the number of birds scored

Notes

Notes

Reference

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