COCCIDIOSIS LESION SCORING

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Coccidiosis is one of the most important parasitic diseases of poultry. The causative agents are Eimeria, which are single cell parasites. They have a complex life cycle partly in the intestines of poultry and also in the outside environment.

There is a strong host specificity and pathogenicity, and within the host a strong predilection for certain regions of the intestine.

Clinical signs are not always obvious, though still causing severe economic losses (subclinical coccidiosis).

Diagnosis can be done by different ways:
- postmortem
- litter oocyst counting
- sensitivity tests
- lesion scoring

Lesion scoring is one of the best methods to assess the coccidiosis situation of a flock. It was originally developed by Johnson & Reid (1970)

Advantages:
- rapid
- needs no preparation
- cheap
- with some practice quite reliable
- you can do it anywhere

Disadvantages:
- was developed when only synthetic anticoccidials were available on the market
- needs careful interpretation when ionophores used
- difficult to evaluate mixed infections
- better to evaluate trends over time

Best age:
28-35 days old broilers

Number of birds:
5 per house

Bird selection criteria:
- average size
- fit enough to walking and eat
PROCEDURE

1. Humanely kill the birds by cervical dislocation

2. Remove the guts

3. Make 4 segments

4. Judge the scores (see guidelines on the following pages)

   - 0 – healthy, no lesions
   - 1 – scattered lesions, low in number, gut wall still normal
   - 2 – more lesions, changes of gut wall
   - 3 – severe lesions, changes of gut wall
   - 4 – most severe lesions

5. Complete the formula (See example)

6. Evaluate the results

<table>
<thead>
<tr>
<th>Gut segment</th>
<th>I.</th>
<th>II.</th>
<th>III.</th>
<th>IV.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken 1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Chicken 3</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Chicken 4</td>
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<td>0</td>
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<tr>
<td>Chicken 5</td>
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<td>0</td>
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</tbody>
</table>

Main species: maxima Average 0.2
E. ACERVULINA

Score 0: No gross lesions.

Score 1: Scattered, white plaque-like lesions containing developing oocysts are 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.

Score 2: Lesions are much closer together, but not coalescent; lesions may extend as far posterior as 20 cm below the duodenum in 3-week-old birds. The intestinal walls show no thickening. Digestive tract contents are normal.

Score 3: Lesions are numerous enough to cause coalescence with reduction in lesion size and give the intestine a coated appearance. The intestinal wall is thickened and the contents are watery. Lesions may extend as far as the yolk sac diverticulum.

Score 4: The mucosal wall is greyish with colonies completely coalescent. Congestion may be confined to small petechiae or, in extremely heavy infections, the entire mucosa may be bright red in color. Individual lesions may be indistinguishable in the upper intestine. Typical ladder-like lesions appear in the middle part of the intestine. The intestinal wall is very much thickened, and the intestine is filled with a creamy exudate which may bear large numbers of oocysts.
E. MAXIMA

Score 0: No gross lesions.

Score 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.

Score 2: Serosal surface may be speckled with numerous red petechiae; intestine may be filled with orange mucus; little or no ballooning of the intestine; thickening of the wall.

Score 3: Intestinal wall is ballooned and thickened. The mucosal surface is roughened; intestinal contents filled with pinpoint blood clots and mucus.

Score 4: The intestinal wall may be ballooned for most of its length; contains numerous blood clots and digested red blood cells giving a characteristic color and putrid odor; the wall is greatly thickened; dead birds are recorded with this score.
E. NECATRIX

Score 0: No gross lesions

Score 1: Small scattered petechiae and white spots easily seen from the serosal side; little if any damage apparent on the mucosal surface.

Score 2: Numerous petechiae on the serosal surface; slight ballooning confined to the midgut area may be present.

Score 3: Extensive hemorrhage into the lumen of the intestine; serosal surface is covered with red petechiae and/or white plaques. The serosal surface is rough and thickened with many pinpoint hemorrhages. Normal intestinal contents are lacking; ballooning extends over lower half of small intestine.

Score 4: Extensive hemorrhage giving the intestine a dark color; intestinal contents consist of red or brown mucus. Ballooning may extend throughout much of the length of the intestine.

Score 2
Photo courtesy of the Archives of Central Veterinary Institute, Budapest, Hungary

Score 3
Photo courtesy dr Galina Kozusna
Score 0: no gross lesion.

Score 1: A few scattered petechiae are found on the caecal wall. There is no thickening of the caecal walls or blood present. Caecal contents appear normal.

Score 2: Lesions more numerous with noticeable blood in the caecal contents; caecal wall is somewhat thickened, normal caecal contents present.

Score 3: Large amounts of blood or caecal cores present; caecal walls greatly thickened; little if any fecal contents in the in the caeca.

Score 4: Caecal wall greatly distended with blood or large caseous cores; fecal debris lacking or included in cores.
EVALUATION OF THE RESULTS

5 broilers are taken from each house, and the results are recorded on the score sheet. The average score is calculated by adding all scores and the total is divided by 20. The 5 birds are the minimum for evaluation. This is the practical compromise between the needs for evaluating and the patience of the bird owner. In cases where the investigator notes a clear lack of homogeneity between individual bird results, an additional 5 broilers should be evaluated. These additional evaluations are important if the scoring results will serve as a basis for decisions on the anticoccidial programme.

This coccidiosis lesion scoring method was originally developed before the ionophores came on the market, when only synthetic anticoccidials were available. Synthetic products were usually very effective at first, so the lesion scoring results became quite low, near zero. When average scoring of a synthetic product increased to over 0.1-0.2 it was the sign of poor homogeneity of the anticoccidial mixing in the final feed, or a product failure.

Ionophores have a completely different mode of action, and allow a certain trickling of the Eimeria. A low infection level is therefore considered normal, and even necessary to keep the immune system alerted, which helps keeping the birds healthy. For the ionophore products, an average score level of 0.2-0.6 is regarded therefore as normal. Above 0.6 – 0.8 the results indicate higher coccidiosis challenge, and above 1.0 the situation is usually critical. All these data should however be considered in context of the management, hygiene situation and the anticoccidial product applied, including the duration of its use. In practical conditions the evaluation of the trend is the best approach.

The example graph above shows the results of a large chicken producing integration with large production units over a long period, when some different anticoccidial programmes were used. The different coloured lines show the production units. It is remarkable to see the differences in the score results between anticoccidial programmes, and the trend definitely goes down. This shows the importance of monitoring in improving the results.