Coccidiosis of Poultry

ROBERT GRAHAM and E. A. TUNNICLIFFE

A brief statement of the cause of this disease, how it may be recognized in a flock, and how it may be combated.

Chicks affected with coccidiosis are unthrifty and dull, move slowly and stay away from the rest of the flock.
Coccidiosis of Poultry
By ROBERT GRAHAM, Chief in Animal Pathology and Hygiene, and E. A. TUNNICLIFF, First Assistant in Animal Pathology

Coccidiosis is a fatal disease of chickens on many Illinois farms. The heaviest losses occur in chicks four to six weeks old, and in infected young flocks 25 to 50 percent and sometimes all of the chicks die. During the late summer and fall months a more slowly fatal type of the disease may affect pullets. However, in such cases it generally is a chronic disease and only a few of the flock may show symptoms of unthriftiness. Mature chickens are more resistant than pullets, although apparently healthy pullets that survive an attack may continue to harbor the causative factor of the disease. Coccidiosis also is referred to as coccidial enteritis, avian coccidiosis, and “bloody diarrhea” of chicks.

Mature chickens may harbor the microscopic parasite that causes...
coccidiosis without showing symptoms of it. Chickens affected in this manner may transmit the disease to young and more susceptible fowls on the premises. Furthermore, coccidiosis infection that remains in the soil of chicken lots and brooder pens may survive for many months and be responsible for new outbreaks.

The prevalence of coccidiosis in chicks or in pullets increases during rainy weather, owing to the fact that moisture and warm weather favor the development of the disease. Insanitary conditions and improperly drained premises favor the growth and development of the parasite. On the other hand sanitary, well-drained chicken lots and clean, dry houses retard the development and spread of coccidiosis.

Rabbits, wild birds, turkeys, goats, sheep, and cattle are susceptible to coccidial infections of the intestinal tract, altho each group of animals is affected by its own particular species of coccidium. The coccidium which causes the disease in poultry is not communicated to other species of farm animals as far as is known.

Parasite Causes Disease

The coccidium is a round or oval-shaped, single-celled animal parasite (protozoan) called *Eimeria avium*, or *Coccidium avium*. This parasite reproduces by asexual as well as sexual processes. Its development and multiplication take place in the epithelial cells of the intestinal wall (small intestine, blind pouches, or caeca) of the susceptible fowls. During this period of development the cells lining the intestine are damaged and the injury resulting from coccidiosis occurs. In affected chicks from four to eight weeks old the parasite is found in the caeca, or blind pouches, as well as the lining wall. When older chickens suffer from the disease, the lining of the small intestine rather than the caeca is involved.

Fertilized Cells of Parasite Discharged in Feces

A knowledge of the life history of the parasite which causes the disease is of practical importance to the poultryman in applying effective preventive measures. The egg stage, or first stage, of the parasite is found in the infected chick in the form of fertilized cells called oocysts (Fig. 1). Large numbers of these fertilized cells are discharged in the feces of affected fowls. The growth or transition of these cells after they leave the body of the fowl requires from two to sixteen days, during which time small crescent-shaped bodies, called sporozoites, are formed. As soon as these sporozoites develop in the egg of the parasite, they become capable of reproducing the disease in susceptible chickens. The infective parasite gains entrance to the chick with contaminated feed or water, and in the intestinal tube the covering or outer wall of the cell is dissolved and the sporozoites, the crescent-shaped bodies within, are released to pierce the epithelial cell lining of the small intestine and the caeca or blind pouches. Occasionally these sporozoites travel as far as the gall bladder or liver, altho in pullets the lining of the small intestine generally is attacked.

In the wall of the caeca these sporozoites grow and multiply by asexual development (schizogony) and as they migrate from cell to cell they cause an inflammation which enlarges or damages the walls of the caeca.
The lining wall becomes thickened and discolored and finally death or sloughing of the inner lining may be recognized by yellowish gray spots visible thru the outer covering (Figs. 2 and 3).

**Affected Chicks Unthrifty**

Chicks affected with coccidiosis have a full crop but appear unthrifty and have a tendency to move slowly or to isolate themselves from the remainder of the flock. Diarrhea is a common symptom. The feces may be tinged a reddish-brown or contain fresh blood which is easily recognized. Sometimes the blood in the feces appears dark or black in color and escapes the attention of the owner. Chicks in the advanced stages of coccidiosis are very weak and sit quietly with the eyes closed and the wings drooping to the ground (Fig. 4). Difficult and unsteady movement accompanied by leg weakness may develop.

In the chronic type affecting older pullets, the symptoms are more obscure and a specific disease is not always suspected as the cause of the slow death which accompanies this type of the disease. Unthriftiness due to coccidiosis may be followed by a loss in weight. Some affected chickens, although eating enough feed to promote growth, gain slowly or even lose weight. In chickens six to eight months old the outstanding symptoms are loss of appetite, unthriftiness accompanied by diarrhea, paleness of comb and wattles, leg weakness, or a slow and sluggish attitude in walking (Fig. 5). Symptoms of chronic coccidiosis may be confused with a low-grade bacterial disease, internal or external parasitism,

![Fig. 2.—Blind Pouches of Two-Months Old Chicks Affected with Coccidiosis](image)

As the parasite grows and develops in the walls of the caeca, or blind pouches, the lining wall becomes thickened and discolored. (a) Yellowish gray spots visible thru the outer covering indicate the death or sloughing of the inner lining of the wall. (b) The wall of the blind pouch becomes thickened and the inner lining inflamed as compared to (c) a normal appearing blind pouch with normal fecal content.
or dietary disturbances. Some chicks suffering from coccidiosis appear quite normal in a sitting posture but cannot stand or walk.

### Coccidiosis Causes Bloody Diarrhea

The presence of coccidiosis is suggested in young chicks by the appearance of a bloody diarrhea or feces of a reddish black color. The boxes in which chicks affected with coccidiosis have been sent to the Laboratory of Animal Pathology and Hygiene for examination have frequently upon arrival been smeared with bloody feces. In cases of this character the parasite causing the disease has been found with the aid of the microscope in the caecal contents or scrapings of the lining membrane of the caeca. At autopsy the caeca or blind pouches may be found to be enlarged, while the walls are thickened and discolored. The contents may be firm in consistency and of a reddish color, while the lining may appear swollen and spotted with small hemorrhages (Fig. 6). Occasionally hemorrhages are found on the outer covering of the intestine, anterior to the caeca.

In young chicks the liver is involved only occasionally (Fig. 7). The liver lesions, when present, consist of small white specks or easily recognized round yellowish circumscribed areas on the surface. In chickens more than six months old the caeca are seldom involved, but distinct inflammatory changes may be seen in the lining of the small intestine, accompanied by thickening of the intestinal wall (Fig. 8). An excessive amount of mucus, tinged with bile, adheres to the inner lining. Microscopic examination of inflammatory areas of the small intestine may show large numbers of the causative parasite, suggesting the underlying cause of certain obscure losses occurring in poultry.

Since the small intestine of chickens may be inflamed from different causes, inflammatory changes are not of specific diagnostic value. It often is necessary to determine whether the parasite is present in the
In chickens from six to eight months old the outstanding symptoms of coccidiosis are loss of appetite, unthriftiness accompanied by diarrhea, paleness of the comb and wattles, leg weakness, or a slow, sluggish attitude in walking.

Since laboratory facilities are not available in all communities, affected chicks or mature fowls may be submitted to the Laboratory of Animal Pathology and Hygiene, University of Illinois, for examination. A nominal diagnostic fee of $1.00 is charged to cover in part the cost of materials used in the examination.

Sanitation Protects Chicks

A thorough cleaning and disinfecting of brooders, houses, and incubators at regular intervals is the safest way to reduce the danger of coccidiosis and prevent its gaining a foothold before the nature of the disease can be recognized. The houses should be cleaned with hot lye water (one pound of lye to 40 gallons of water) and then sprayed with a 3-percent solution of cresol (U. S. P.) or some other reliable disinfectant. Permanent lots and runways should be abandoned and temporary lots plowed and cropped every other year. The ground around the houses which cannot be plowed should be spaded.

Since hens that apparently are healthy may discharge in the feces the parasite which causes the disease, young susceptible chicks should be protected from this source of infection by being kept in quarters not used for mature stock.

When an autopsy is made of affected chickens the contents of the blind pouch may be found firm in consistency and of a reddish color, while the lining may appear swollen and spotted with small hemorrhages.
Affected Chicks Should Be Isolated

All chicks showing symptoms of illness should be segregated and all dead chicks should be burned. Feeding and watering utensils should be thoroly cleaned each day. Sanitary utensils which limit or prevent contamination of feed and water are recommended. In case the flock is thoroly exposed before the character of the disease is recognized, the healthy chicks should be moved to fresh quarters, while the infected chicks should be quarantined in the pens known to be infected. It is important that mature chickens be segregated from young, infected stock, and removed from infected quarters, to avoid perpetuating the infection on the premises.

Daily Inspection of Flock

In exposed flocks it also is desirable to make a daily inspection. It often becomes advisable and practical to provide free range for the healthy stock, in case the housing equipment of the poultry plant is limited. Coccidiosis often occurs in flocks where the quarters are small and inadequate or where proper drainage and other sanitary measures have been disregarded. Old chicken yards improperly drained, or houses with dirt floors that cannot be properly disinfected, favor the spread of the disease.

Feeding Important

In the control of coccidiosis in young chicks sudden changes in the kind of grain and mash fed should be avoided, while the amount of

Fig. 7.—A Diseased Liver
The liver is only occasionally involved in coccidiosis of young chickens, but when it is, lesions consisting of small white specks or easily recognized round, yellowish, circumscribed areas may be found on the surface.

Fig. 8.—Small Intestine of an Affected Chicken
Distinct inflammatory changes may be seen in the lining of the small intestine of chickens more than six months old that are affected with coccidiosis.
grain fed night and morning, as well as the mash, should be reduced if the disease threatens. During this time a greater part of the ration should consist of sour milk or buttermilk, which may be kept before the chicks at all times.

**Medicines of Little Value**

Medicines are of little value in the treatment of coccidiosis, but in connection with general preventive measures, the use of saline laxatives is helpful. Epsom salts in purgative doses in the feed are recommended for exposed fowls. One pound of Epsom salts for each 300 to 400 chicks (four to six weeks old) may be mixed in a bran mash sufficient for one feeding.

Pullets require larger doses, which may be given in the feed or dissolved in the drinking water for the flock in the proportion of one pound to 125 pullets. Adult fowls treated individually should be given a half teaspoonful of Epsom salts dissolved in water. Chicks or older stock exposed to disease may be given purgative doses of Epsom salts in the feed or water at intervals of three or four days. In case the salts are given in the drinking water, the fowls should not be allowed access to any water except that containing the medicine.

In connection with medicinal treatment, it should be understood that little benefit may be expected unless sanitary measures are vigorously employed. The affected chicks should not be allowed to chill, and better results will follow if the brooder rooms and hover are kept a little warmer than is required for normal chicks. Valuable assistance in controlling this disease may be obtained from a competent veterinarian.