

# Department of Animal Science

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## COCCIDIOSIS IN BACKYARD POULTRY FLOCKS

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It is vital that backyard poultry keepers across Tennessee have a basic understanding of common poultry diseases because it gives small flock owners the ability and knowledge to recognize, treat and hopefully prevent future disease outbreaks. Perhaps the **most common disease affecting small poultry flocks is coccidiosis**, which causes loss of performance and, in severe cases, even mortality. Coccidiosis occurs worldwide. It is especially prevalent in high-density commercial poultry flocks raised on the ground and in flocks where birds have direct contact with their feces. Virtually every poultry flock raised on litter or on the ground is affected by coccidiosis to some extent. Coccidiosis is caused by protozoan parasites from the genus *Eimeria*. There are many species of these parasites, which are host-specific, and they occupy a specific segment of the intestinal tract. Birds love to scratch and peck at the litter or the ground, and, in doing so, they ingest oocysts (parasite eggs) that are present in the manure of infected birds. Birds in backyard flocks are often not provided with adequate bedding material to dilute the manure. The more contact the animals have with fecal material, the greater the chance for them to develop serious coccidiosis. The disease may be complicated by bacterial agents such as *Clostridium perfringens*, which can lead to necrotic enteritis, another devastating intestinal disease. Vaccination, preventative medication and good management practices are ways to help control the disease.

### Clinical signs and cause

Intestinal coccidiosis is a common protozoal gastrointestinal (GI) disease that primarily affects young chickens. Clinical signs of the disease include bloody diarrhea, dehydration, anemia, listlessness, ruffled feathers, poor growth and, in severe cases, possibly death. Body weight and feed conversion may also be affected in heavy infestations with more pathogenic strains of coccidia. In addition, coccidiosis in laying hens is often accompanied by a drop in egg production. There are hundreds of types of organisms in the class coccidia, but only nine affect chickens. In contrast, seven different forms affect turkeys. Coccidiosis is one of the **most devastating of all poultry diseases**.

## How coccidiosis works

Coccidia have specific hosts, and each species produces its own type of coccidiosis. The actual clinical disease is dependent on which species of coccidia are present and in what quantities they exist. Coccidia that are capable of infecting chickens are **all in the genus *Eimeria***. Coccidiosis is spread by unicellular bodies known as oocysts. These are shed in the fecal droppings but are not infectious when shed. To become infectious, the oocysts must first sporulate, a process that takes place when climate conditions of moisture, air and temperature are ideal in the environment. Sporulation requires 2 to 4 days to complete. After this time, if the sporulated oocyst is ingested by a chicken and finds its way to the intestinal tract, a complicated series of multiplications and divisions begin. This leads to more oocysts being produced, most of which are eventually expelled from the body in the feces, and the life cycle is complete. Depending on the coccidia species involved, time from ingestion to expulsion ranges from 4 to 7 days.

Interesting to note is that each coccidia species is unique both immunologically (i.e., exposure to one species does not offer protection against other species) and in its ability to infect a specific region of the GI tract. In addition, each species causes slightly different pathological and clinical signs; for example, *Eimeria maxima* causes bleeding in the middle of the small intestine and is considered moderately pathogenic. In contrast, *Eimeria tenella* causes severe inflammation of the cecum and is considered highly pathogenic. No anticoccidial medication is considered effective against all species of coccidia; therefore, species identification can be useful for treatment and control. However, this may require the assistance of the C. E. Kord Animal Health Diagnostic Laboratory in Nashville or another diagnostic laboratory to confirm the actual species affecting your flock.

Being protozoal parasites, **coccidia live in the epithelial tissues of the intestinal tract** where they damage the intestinal wall. One oocyst in the intestinal wall will only destroy a few epithelial cells. As a result, the extent of the damage to the intestinal wall is closely related to the number of oocysts present in the GI tract. Unfortunately, as the coccidia reproduce, there will eventually be millions of oocysts present at the height of the disease, although not all will be sporulated. However, as the chicken continues to peck the ground/litter and ingest more sporulated oocysts, increasing amounts of cell tissue will be destroyed.

Coccidial oocysts are found in fecal-contaminated environments. Chickens first become infected as they pick up and swallow the oocysts from the ground. Following ingestion, the parasite undergoes a very complex life cycle within the intestinal tract, during which time it replicates and ruptures the intestinal cells. As a result of the reproduction process, the ingestion of a single oocyst can eventually lead to the infection and destruction of millions of intestinal cells. As increasing numbers of intestinal cells are destroyed, clinical signs such as bloody diarrhea and decreased growth become more pronounced. Coccidia from infected chickens are shed in the feces and eventually sporulate in the soil, where they can remain viable for months. Once ingested by a chicken, the complex life cycle will again resume.

Coccidia are very common in any poultry environment. Their presence is not a reflection that you are a poor manager or exhibit poor animal husbandry practices. On the contrary, a little exposure to coccidiosis is not necessarily bad for your chickens. If chickens are exposed to no more than low or perhaps moderate numbers of oocysts in their environment, that can be a good thing long-term. Given time, **chickens will generally develop immunity** to the species of

coccidia to which they are exposed. You can help maintain low to moderate numbers of coccidia in your poultry environment by keeping the ground or litter material the birds are exposed to dry. Wet soil or litter is likely to have higher numbers of oocysts.

## Transmission

The **only method of transmission is for the chicken to ingest sporulated oocysts**. Chickens raised in cages with no contact with fecal material do not develop coccidiosis; however, if caged birds have access to manure (due to poor design or lack of cage maintenance), the disease will develop. In a situation with birds on the ground or birds on litter, consuming sporulated oocysts goes on constantly in a backyard pen or chicken coop, where birds have access to fecal material and are always consuming oocysts. In addition, transfer of oocysts from one location to another is possible by mechanical means. In the active stage, millions of oocysts will be present in a teaspoonful of fecal material. These oocysts can be easily transferred to a new site by boots and shoes, rodents, pets, wild animals, crates or pens and vehicles. After arrival at a new location and once sporulated, oocysts can then cause an outbreak of coccidiosis at that site.

Chickens, like their human caretakers, are more susceptible to disease if they have a compromised immune system resulting from stress or disease. Intestinal coccidiosis may predispose your birds to other intestinal infections such as necrotic enteritis or salmonellosis. Also, sexually immature chickens that have been exposed to immunosuppressive infectious bursal disease (IBD) are more likely to become infected after being exposed to coccidia. Therefore, it is important to maintain a dry, healthy, low-stress environment for your backyard flock.

## Diagnosis

Many **symptoms of one poultry disease are often similar to those of several other diseases**, making an accurate diagnosis more difficult. Appearance of the bird, along with intestinal lesions present upon necropsy, are sometimes enough to confirm coccidiosis in many outbreaks. However, many backyard producers may not be comfortable conducting a necropsy or may not recognize symptoms or lesions. In that case, a laboratory diagnosis is the only way to accurately confirm your suspicions. Fecal material can be taken to an animal diagnostic laboratory, and oocysts are easily seen under a light microscope. Properly preserved dead chickens can also be taken to the laboratory for necropsy. Scrapings can also be made of the infected area of the intestinal tract and a microscopic examination made for the presence of coccidia. An experienced poultry veterinarian can usually diagnose coccidiosis upon visual inspection of the intestines.

## Prevention and control

Disease **prevention is always better than treatment/control** after an outbreak. This is true with coccidiosis and certainly the case with backyard chickens. Certain chemicals, known as coccidiostats, suppress or disrupt the life cycle of protozoa. Coccidiostats are usually added to feed at a designated percentage. If you purchase medicated feed at the co-op or feed store, the feed tag on the sack of feed will list the coccidiostat included and at what level; however, not all coccidiostats have the same ability to suppress all *Eimeria* species. Coccidiostats reduce or eliminate the shedding of oocysts in the fecal material, thereby reducing or preventing oocyst contamination of the coop or pen area. Some coccidiostats are very specific for certain species of *Eimeria* and may completely suppress one species but have little or no effect on the others. As a

result, because there are nine different types of *Eimeria* that affect chickens, you might be using a coccidiostat against one type while an outbreak is developing from another type.

**Most coccidiosis outbreaks are produced by three *Eimeria* species:**

1. *E. tenella*
2. *E. necatrix*
3. *E. acervulina*

A good coccidiostat should be specific for these three *Eimeria* species and perhaps additionally for *E. maxima* and *E. brunetti*. Any good coccidiostat should:

- Prevent infection from as many species of *Eimeria* as possible.
- Make it possible to dilute the dosage in order to develop natural immunity.
- Not interfere with reproduction (egg production and fertility).
- Not be electrostatic or hygroscopic.
- Be nontoxic, palatable and stable.
- Be economically feasible to use.

One of the best ways to control coccidiosis is to **purchase vaccinated birds**. Vaccines are given at the hatchery on the day of hatch. Once the birds develop immunity, they will be resistant to the strains of coccidia used in the vaccine they received; however, most backyard chickens are not vaccinated for coccidiosis. In this case, the disease can be managed by modulating the level of exposure to the parasite. Fortunately, a reduction in parasite load is often all it takes to control coccidia in your birds. The ingestion of a few parasites helps the birds develop a strong immunity against the parasite. Preventing the birds from consuming a large number of parasites at once is key because this would result in disease.

There are a few simple preventive measures that should be used by all backyard poultry keepers to control coccidia in the environment and lessen the risk of infection to your chickens. Bird density and litter quality play an important role in determining parasite load in your chicken coop and pen. Ideal density depends on the type of chickens you have and on your particular setup and circumstances. If bedding tends to stay dry and fluffy, bird density is likely about where it should be. If bedding/litter deteriorates rapidly, your current bird density is likely too high. A low bird density ( $> 5 \text{ ft}^2/\text{bird}$ ) is recommended for non-vaccinated birds to minimize the buildup of parasites in the litter. Try to keep birds on a thick, dry layer of litter. This will dilute fecal material, resulting in a reduced number of coccidia ingested. If litter gets wet, it tends to cake, and caked litter will keep fecal material undiluted and in direct contact with the birds. Undiluted fecal material will increase the likelihood that whenever birds peck the ground or litter, they will be consuming large numbers of parasites.

Prevention measures should include these steps:

- **Control moisture** in the pen and coop area. Keeping things dry is critical to controlling many diseases, not only coccidiosis.
- **Move the pen and coop area periodically**, if possible. Any area that has manure on it for extended periods of time will eventually have a high load of bacteria, viruses and parasites such as coccidia. Moving chickens around and letting previously used areas rest for weeks or months at a time will be effective at reducing the pathogen load in your backyard environment.

- Using **medicated feed with a coccidiostat** should prevent clinical infections. This is extremely important during the first 4 to 6 weeks of a chick's life because the bird's immune system is not yet fully developed. Full immunity in chickens is not reached until approximately 7 weeks of age.
- **Practice good biosecurity!** This applies not only for coccidiosis control but any disease that may threaten your flock.

**Amprolium in the drinking water** for 3 to 5 days is a common treatment for coccidiosis. Amprolium is still effective as a treatment even though it has been around for many years. Understand, however, no anti-coccidial is effective against all the different strains of coccidia, and over time coccidia become resistant to anti-coccidial drugs. Therefore, do not abuse or overuse any anti-coccidial drug. Use anti-coccidials only to treat an affected flock and not as a periodic preventive measure.

**You are not at risk of catching coccidiosis from your chickens.** There are certain species of coccidia that can infect people, but the species that infect chickens are not the same species infective to people. Be aware, however, that there are diseases that chickens may carry that can make people sick, such as salmonella. Therefore, **always wash your hands** after working in or around your chickens

## Sources of help

- Your local county Extension agent
- Your local veterinarian
- Tennessee State University Extension Poultry Specialist (615-963-5823)
- University of Tennessee Extension Poultry Specialist (931-486-2129)
- C. E. Kord Animal Health Diagnostic Laboratory (615-837-5125)



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