

Coccidiosis in Chickens

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Understanding the basics of common poultry diseases are essential for poultry owners primarily because knowledge of common poultry diseases gives owners the tools to treat and prevent future outbreaks of disease. Avian intestinal coccidiosis is a ubiquitous protozoal gastrointestinal (GI) parasite (i.e. microscopic single celled organism) which primarily affects young chickens. Clinical signs include mucoid or bloody diarrhea, dehydration, anemia, listlessness, ruffled feathers, suboptimal growth and death. In addition, in laying hens coccidiosis is commonly associated with a drop in egg production.

In chickens there are nine different types of coccidia. It is important to realize that all coccidia are not created equally. Specifically, clinical disease is dependent on which species of coccidia are present and in what quantities they are present. Consequently, the presence of a few coccidial eggs or oocysts may not justify a diagnosis of clinical disease. These differences and subtleties can be difficult for poultry owners who may want to simply know if their chickens have coccidia. In addition, control of coccidia can be difficult in backyard flocks because of the presence of mixed aged flocks. In mixed aged flocks, older apparently 'healthy' chickens can shed coccidial oocysts in their feces and subsequently infect younger chicks. The following article is designed to educate backyard poultry owners about relevant aspects of the biology and epidemiology of coccidiosis in order to facilitate control and if necessary treatment of infections.

Bio 101 of Coccidiosis:

Coccidiosis refers to protozoa (i.e. single celled organisms) from the Genus *Eimeria*. Chickens have nine different and well characterizes species of coccidia. In contrast, there are seven different species of *Eimeria* that can infect turkeys. Interestingly, each species is unique both immunologically (i.e. exposure to one species of coccidia does not appear to afford protection to other species of coccidia) and in its ability to parasitizes a specific portion of the GI tract of chickens and causes slightly different pathological and clinical signs. For example, *Eimeria maxima* causes bleeding in the middle of the small intestines and is considered moderately pathogenic. In contrast, *Eimeria tenella* causes severe inflammation of the cecum and is considered highly pathogenic. Because no anticoccidial medication is considered effective against all species of coccidia, species identification can be useful for treatment and control.

Coccidial oocysts are found in fecal contaminated environments. Chickens become infected when they accidentally swallow the oocysts from the ground. Once in the intestine the eggs develop and eventually infect the cells of the chicken's GI tract. Once inside the chickens GI cells, the coccidia transform into a new sexual stage and reproduce; eventually lysing the GI cell. In this fashion, the ingestion of a single oocyst can eventually be responsible for the infection and destruction of thousands of intestinal cells. As more and more of the intestinal cells are infected and subsequently destroyed, clinical signs including diarrhea and decreased growth become more and more apparent. As coccidia are shed in the feces they eventually sporulate in the soil. They can remain viable for months in this form. Once ingested by another chicken the life cycle re-starts.

It is important to recognize that coccidia in the poultry environment are common and hence their presence is not necessarily a sign of poor husbandry. In fact, if chickens are exposed to moderate numbers of oocysts in their environment, they typically develop immunity to the species of coccidia they are exposed to. The primary way to maintain low to moderate amounts of coccidia in the poultry environment is by keeping the substrate or litter material that the chickens are raised on dry.

Transmission:

As noted, infection is via the fecal-oral route. Under the right environmental conditions (i.e. increased moisture), the oocysts can contaminate all areas of the poultry environment including feed, litter and soil and can be viable for months in the environment. Consequently, controlling substrate and/or litter moisture levels are essential. The substrate or litter material should be “friable” meaning if you pick it up it should clump in your hand but also crumble relatively easily. If the litter is too dry it can be a particulate that can be inhaled by the chickens and by ourselves. If it is too wet it will clump and not come apart. In addition, if the litter material is too wet it may have a strong ammonia smell which can cause coccidial overgrowth and other flock management problems. Make sure moisture is controlled during the rainy season and around leaking waterers.

Like us, birds are more susceptible to disease if they are immunosuppressed either by disease or stress. For example, sexually immature chickens that have the immunosuppressive disease Infectious Bursal Disease (IBD) are more likely to become infected after being exposed to coccidia. Likewise, intestinal coccidiosis may predispose birds to other concurrent intestinal infections such as necrotic enteritis, salmonellosis, and some intestinal viral infections. Therefore it is essential to create a healthy environment for your chickens.

Transmission of infectious diseases including coccidia can be facilitated by us. Coccidia can be spread by shoes, equipment. If we go to visit our neighbor’s chickens we can carry diseases including coccidia back and forth between the flocks. Therefore, limit access to your flock and be smart about visiting other flocks. In the commercial poultry industry it is standard practice to wear booties and hair nets, wash your car before and after leaving a farm, and wait at least 24 hours before visiting a new flock of birds.

Diagnosis

Many of us who have dogs and cats are familiar with detecting coccidia and other intestinal parasites on an annual visit to our small animal veterinarian. Typically a fresh stool sample will be collected and looked at under a microscope. However, because coccidia like many GI infectious diseases are intermittently shed in the feces, a negative test does not mean the animal is not infected. Due to the potential for ‘false negatives’ coupled with the potential for coccidial transmission to the remainder of the flock, birds with clinical signs are typically euthanized. Next a veterinarian will open up the GI tract and look for characteristic “lesions” consistent with coccidia (figure 1). Finally, the veterinarian will collect a scraping of the intestines and look at the material under the microscope. The final definitive diagnosis can be made from this examination. It is important to remember that due to the ubiquity of coccidia in the environment, coccidia are often found in the feces or intestines of chickens at necropsy. The significance of that finding is relevant based upon the visual and microscopic damage to the intestines.

Treatment:

If 1-2 of your chickens were euthanized and diagnosed with coccidia what should you do? Most likely if all the chickens share the same environment, the results from the euthanized chickens should be applied to the remaining birds in your flock. Hence, the remainder of the flock can be treated with the drug Amprolium (0.024% of the active ingredient in drinking water for 3 - 5 days). Sulfa drugs (e.g. sulfamethazines , 0.1% for 2 days) are also effective but should not be used in layers. For any drug it is important to contact the Food Animal Residue Avoidance Databank (www.farad.org) with respect to the most up to date information on withdrawal times for eggs and meat which may be different. Administration of water dispersable vitamin A and K supplements may enhance recovery.

It is important to recognize that no anti-coccidial is effective against all the different strains of coccidia and that over time coccidia can become resistant to anti-coccidial drugs. Consequently, use of the above mentioned drugs should only be used as a treatment of an affected flock and not used as a periodic preventative treatment. If for some reason anti-coccidials are commonly used rotation of different anti-coccidials should be considered.

Prevention:

Prevention of disease is always more desirable than treatment. This is especially true for backyard poultry! Commercial producers have several inherent advantages with respect to prevention including enhanced biosecurity and cleaning and disinfection practices and access to vaccines. That being said, there are several relatively simple prevention methods that should be utilized by all poultry owners to reduce coccidia in the environment and hence reduce the risk of coccidia infection in your chickens. Specifically, prevention measures include:

- Controlling moisture via the appropriate installation and management of watering systems. Specifically, nipple drinkers reduce spillage of water onto litter compared to bell and trough drinkers.
- If at all possible periodically move the location of your chickens. Any area that has manure on it consistently will eventually have a high load of bacteria, viruses, and parasites like coccidia. Leaving land fallow for weeks is one of the most effective ways of reducing the pathogen load in the environment.
- Inclusion of anticoccidials (i.e. medicated feed) in diets at recommended levels will prevent clinical infection. This is very important for the first month of the chick's life because the chicks immune system is not fully developed.
- Good biosecurity: coccidial oocysts are normally introduced into new facilities through contaminated equipment. Full immunity is not reached in chickens until approximately 7 weeks of age

Can I get sick from my chickens coccidia?

Coccidiosis is a ubiquitous parasitic problem for most mammalian species. Birds as we now know are no exception. However, while there are species of coccidia that can infect people the species of Coccidia that infect chickens are not infective to people. It is important to realize that there are several other diseases which chickens carry which we can get sick from including some

serotypes of the bacteria Salmonella as an example. Therefore, it is essential to always wash your hands after working with your chickens.

Conclusions:

Don't make perfect the enemy of good! What I mean by that is some practices that backyard owners use such as mixed aged flocks and lack of access to coccidial vaccines make coccidia control challenging. That being said, it is important to recognize those challenges and still make a maximum effort to mitigate the presence of coccidia in your chickens and their environment. Finally, it is important to continue your education about coccidia and other avian diseases. Reach out to private veterinarians with an interest in poultry. Track down your local state and USDA animal health veterinarians. Email or call your friendly cooperative extension university faculty member. Also, identify your states diagnostic laboratory service. Many times they offer heavily discounted or free diagnostic services for your backyard flock.

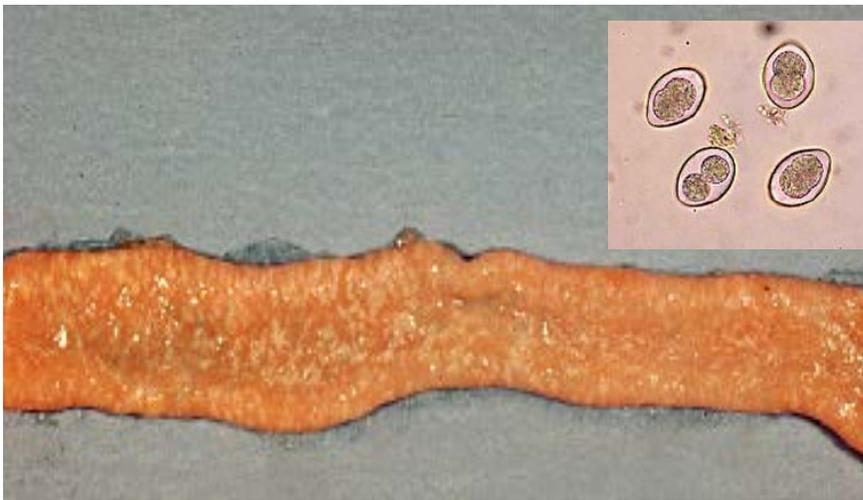


Figure 1: Gross image of the intestinal tract of a chicken infected with coccidia. Microscopic image of coccidia. Gross image courtesy of Dr. Gabriel Senties-Cué. Microscopic image from Mike the chicken vet (<http://mikethechickenvet.files.wordpress.com/2012/03/coccimicrograph.jpg>)