Coccidia is a protozoan, a microscopic (invisible to the naked eye), single cell organism that resembles an egg for the majority of its life cycle and is motile for a small part of its life. In its oocyst (egg-like) state, it is exceptionally resistant to chemicals, pH, temperature extremes, and degradation over time. Regular cleaning and disinfection, sunlight, or downtime will not eliminate it. In addition to its survivability, it has the ability to reproduce at substantial levels. A single oocyst can generate thousands of new oocysts in as short as three to seven days under optimal conditions. Being nearly impervious and highly prolific spells potential danger for bird health and growth. Infection with coccidia is called coccidiosis.

**Why is Coccidia a problem?**
In the wild, game birds travel vast domains, so exposure to coccidia is limited. If the bird is exposed, it will be to very small quantities. Infection usually results in immunity with no ill effects. The large amounts of excreted oocysts are left behind for the next bird. Coccidia need to produce large numbers of environmentally impervious oocysts to even potentially infect a single wild bird. So in the wild, it is a safe balance... just enough exposure for immunity in the bird and survival for the coccidian.

Fast forward to a confined operation. Large numbers of oocysts concentrate their levels in the brooders and pens. Fecal exposure to what would have been a single oocyst or two, has now become hundreds or even thousands. The massive exposure can override the immune system and literally destroy the lining of the intestine thus putting the bird at great risk of permanent scarring of the intestine, if not death. Excessive exposure is now the problem.

**Coccidia Basics:**
1. Most coccidia species are specific to their host (i.e. Ring-necked pheasant coccidia do not usually infect chukar partridge and vice versa. Game bird coccidia will not infect rabbits or vice versa either).
2. Coccidiosis in one bird species (i.e bobwhite quail)

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Find the feather to enter a product drawing! Carefully hidden in the text or advertising of the NAGA News is at least one pheasant tail feather. Send a note to the editor by November 24, 2013 either by email (editor@mynaga.org) or mail (4154 Klopfenstein Rd., Bucyrus, OH 44820) to enter the drawing, describing the page and placement of the feather(s). There were TWO in the last issue... on pages 8 and in the MacFarlane ad on page 20. The winner of last issue’s prize DVD of the Firearms Guide is Jay Sutherland, of Nephi, UT.

To help you identify this feather, here is a non-hidden copy. The product give-away this edition is a copy of the Pieced Pheasant square pattern described on page 19. Good luck!
may look very different than coccidiosis in other bird species (i.e. pheasants or chukars). Some strains of coccidia are highly resistant to drugs normally used in the poultry industry. Immunity of the bird is possible if the infection is not fatal. It generally requires two coccidian life cycles. Immunity does not pass on to the progeny.

Immunity to one species of coccidia does not protect against another species of coccidia (which is often the cause of repeated outbreaks following a treatment).

As a GENERAL rule, coccidia in bobwhite quail are usually controllable (not terribly pathogenic, nor terribly resistant). On the opposite extreme, coccidia in chukars can be very pathogenic and is often resistant to treatment. Ring-necked pheasants fall somewhere in between in both pathogenicity and resistance problems.

Transmission of Coccidia from one bird to another is by consumption of fecally contaminated material (litter, feed, water, insects). Fresh oocysts ‘incubate’ in the litter or other substrate to become infective. Warm moist situations are the best conditions. House/environment management is a key factor in the level of exposure to which a bird might be subject. While it might take days for oocysts to normally become infective, a single water line leak in a warm brooder house or sun-warmed flight pen can produce a situation where coccidial oocysts mature very rapidly, in less than an hour.

Clinical signs vary greatly depending on the species of bird and coccidia involved. You may only see some of the signs or none of the signs. These same signs may be present in other diseases as well, so careful diagnostics are needed.

1. Ruffled, depressed, non-mobile bird, often acting chilled and piling.
2. Decreased feed consumption
3. Decreased weight gain/Failure to gain
4. Diarrhea/Flushing/Pasty vent
5. Excessive sloughed mucus in feces
6. Blood tinged feces
7. Mortality

Diagnosis of coccidiosis can be made on clinical signs (if present) and history, but usually requires more intensive tests like fecal flotation, intestinal scrapings, or histologic exams. For assistance in diagnosis of coccidiosis, consult your veterinarian or bird health professional.

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new litter or replacement of the top layer of the floor soil has been used to reduce exposure. Where removal of the top layer of contaminated soil between flocks or seasons was not an option or the challenge still too severe, a floor covering (weed barrier like a heavy black canvas 4-6 ft wide x several hundred ft long over the ground, but under litter) has bought some time for immunity to develop before overexposure occurs. Plastic, non-biodegradable feeder guards restrict access of the young chicks to get into the feed pan, thus less feces get in the feed. Biodegradable feeder trays that break down in seven to ten days replace plastic ones that must be washed between uses, but can’t be sterilized. Insect control of beetles and flies where heavy populations of insects can result in problems reduces extra legs crawling through contaminated litter that are readily consumed by the birds.

Coccidiostats are used to keep coccidial levels under control allowing enough leakage of oocysts to help the bird to develop immunity. Problems can occur in getting correct doses or drug combinations, even with veterinary script. Many factors need to be considered in selection of the right product. Depending on bird or coccidial species differences, one can potentially end up with drug toxicities or coccidial resistances. Common coccidiostats include ionophores like lasolacid (Avatec), monensin (Coban), and salinomycin (Biocox). Ionophores need to stay at consistent drug levels in the intestine to prevent access of coccidial elements to the intestinal cells. Erratic consumption can lead to drug failure. Synthetic or Chemical coccidiostats (ie Clinacox, Deccox) may also be used with veterinary script. Chemical coccidiostats attack the coccidian already within the intestinal cell. The amount of exposure determines how successful the immunity development will be. For development of a coccidiostat program, contact your veterinarian.

Vaccination is a new area under investigation for reduction of coccidia. Like everything else, specie differences can adversely affect the results. Small numbers of Bobwhite quail oocysts seem effective in developing immunity. That same small amount of chukar strains can produce immunity in cage reared birds, but in floor pen birds, that small amount is lethal to chukars. To reduce the damage, researchers have tried to develop attenuated strains (infective but less pathogenic strains) to aid in the success of immunity development without creating lesions of disease.

Numerous variables come into play when dealing with coccidia, especially in different parts of the country and various management/growing styles and preferences. For development of a comprehensive coccidia program consult with your veterinarian and feed provider. ★

Dr Anderson has been involved with gamebirds since 1965. He currently manages three poultry diagnostic laboratories in Georgia (2) and Colorado. His current projects focus on posterior paresis problems in quail, gamebird coccidial vaccines, gamebird parenting genetics, and propagation of rare and endangered gamebird (galliforme) species.

Dr Larry McDougald reports, “Control of coccidiosis in chukars by vaccination was the focus of a study partly funded by NAGA and conducted at the University of Georgia. We first determined that Chukars in cages could become immune to coccidiosis after infection, provided the dosage was low enough to avoid severe illness. Other experiments demonstrated that E. dispersa (the only species of coccidia found in several related birds) appeared to offer some protection against the species causing problems in chukars. However, when we attempted to vaccinate the birds on litter with live coccidia (E. kofoidi and E. legionensis), the infection quickly spread through the entire study causing extensive death losses and morbidity. Based on these experiences, we determined that vaccination with a live product would be possible, as is widely practiced in chickens, but only if attenuated lines of coccidia were developed for use.”

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