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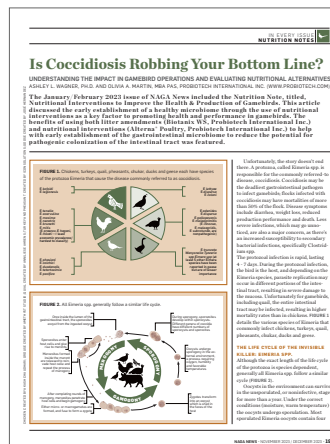


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Read an article by Ashley Wagner, PH.D., and Olivia Martin,
MBA PAS, from Probiotech International Inc., featured
in the November-December 2023 issue of NAGA News
Magazine, published by the North American Gamebird
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PROBIOTECH'S GAMEBIRD SOLUTIONS FEATURED IN NAGA NEWS MAGAZINE (NOV-DEC 2023)

"Understanding the Impact
in Gamebird Operations
and Evaluating Nutritional
Alternatives"



INNOVATIVE DEPENDABLE EFFECTIVE

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Is Coccidiosis Robbing Your Bottom Line?

UNDERSTANDING THE IMPACT IN GAMEBIRD OPERATIONS AND EVALUATING NUTRITIONAL ALTERNATIVES
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The January/February 2023 issue of NAGA News included the Nutrition Note, titled, **Nutritional Interventions to Improve the Health & Production of Gamebirds.** This article discussed the early establishment of a healthy microbiome through the use of nutritional interventions as a key factor to promoting health and performance in gamebirds. The benefits of using both litter amendments (Biotanix WS, Probiotech International Inc.) and nutritional interventions (Alterna® Poultry, Probiotech International Inc.) to help with early establishment of the gastrointestinal microbiome to reduce the potential for pathogenic colonization of the intestinal tract was featured.

FIGURE 1. Chickens, turkeys, quail, pheasants, chukar, ducks and geese each have species of the protozoa *Eimeria* that cause the disease commonly referred to as coccidiosis.

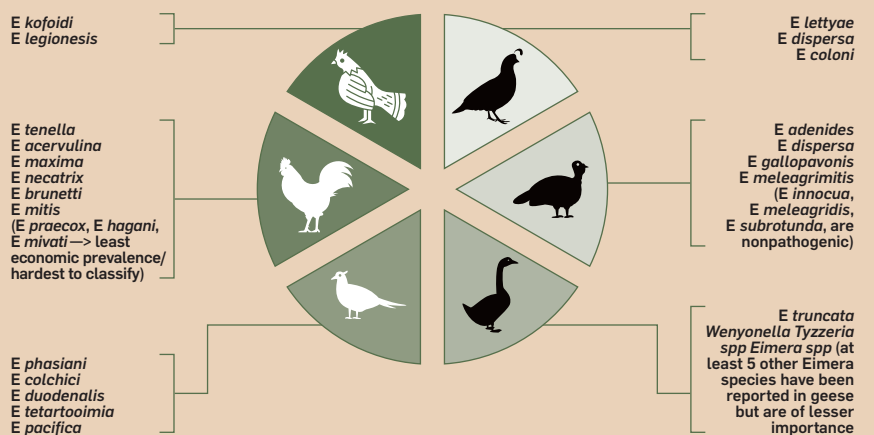
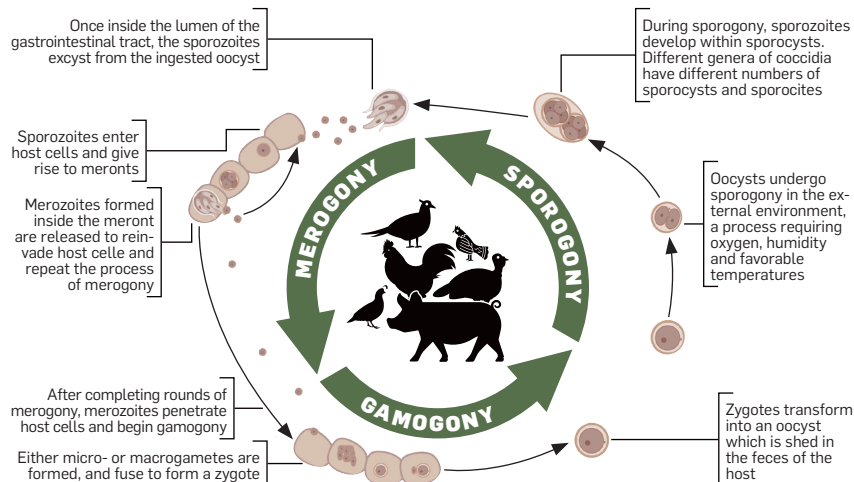


FIGURE 2. All *Eimeria* spp. generally follow a similar life cycle.



Unfortunately, the story doesn't end there. A protozoa, called *Eimeria* spp. is responsible for the commonly referred-to disease, coccidiosis. Coccidiosis may be the deadliest gastrointestinal pathogen to infect gamebirds; flocks infected with coccidiosis may have mortalities of more than 50% of the flock. Disease symptoms include diarrhea, weight loss, reduced production performance and death. Less severe infections, which may go unnoticed, are also a major concern, as there's an increased susceptibility to secondary bacterial infections, specifically *Clostridium* spp.

The protozoal infection is rapid, lasting 4 - 7 days. During the protozoal infection, the bird is the host, and depending on the *Eimeria* species, parasite replication may occur in different portions of the intestinal tract, resulting in severe damage to the mucosa. Unfortunately for gamebirds, including quail, the entire intestinal tract may be infected, resulting in higher mortality rates than in chickens. **FIGURE 1** details the various species of *Eimeria* that commonly infect chickens, turkeys, quail, pheasants, chukar, ducks and geese.

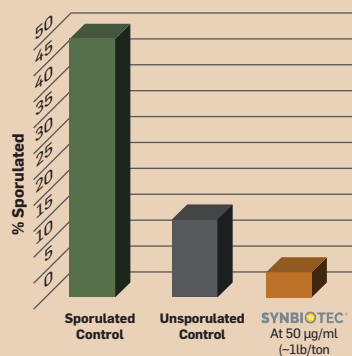
THE LIFE CYCLE OF THE INVISIBLE KILLER: *EIMERIA* SPP.

Although the exact length of the life cycle of the protozoa is species dependent, generally all *Eimeria* spp. follow a similar cycle (**FIGURE 2**).

Oocysts in the environment can survive in the unsporulated, or noninfective, stage for more than a year. Under the correct conditions (moisture, warm temperature) the oocysts undergo sporulation. Most sporulated *Eimeria* oocysts contain four



FIGURE 3. At a feeding rate of 1 pound/ton, was able to inhibit oocysts of *Eimeria acervulina* and *tenella* obtained from a contaminated chicken farm from sporulating in an in-vitro laboratory environment that naturally encourages sporulation. The purpose of this test is to determine where Synbiotec® is most effective at impacting the life cycle of *Eimeria* spp. (Pierron et al., 2022).



sporocysts with two sporozoites each; however, this is species dependent. Once sporulated, the oocysts enter the infective stage.

Birds ingest the sporulated oocysts from the environment. Once inside the gastrointestinal tract, the sporozoites exit

the oocysts and invade the intestinal cells of the bird. The protozoa undergo several rounds of reproduction within the intestinal cells of the host, further damaging, and ultimately destroying, the intestinal cells and the mucosa. After fertilization, the oocysts are shed in the feces of the birds for the cycle to repeat.

OPTIONS FOR CONTROL

Although there are several options for control of coccidiosis, full eradication is difficult. Some *Eimeria* spp. have shown signs of resistance to certain medications. As a result, many gamebird producers have found that adding a natural alternative to their medication program enhances success. When considering a medication program that's right for your flock, be sure to consult your veterinarian. Also, ask about rotation and shuttle programs, as these might enhance the efficacy of the medication that's used.

Rotation programs typically alter medication type or usage based on seasonality, whereas shuttle programs either mix in a natural alternative during the flock's grow period or will shuttle between natural alternatives or medication types from flock to flock. Commercial vaccines are also available, and contain a low dose of live sporulated oocysts, which by definition infect the birds. The goal of commercial vaccines is to create immunity via low-dose exposure.

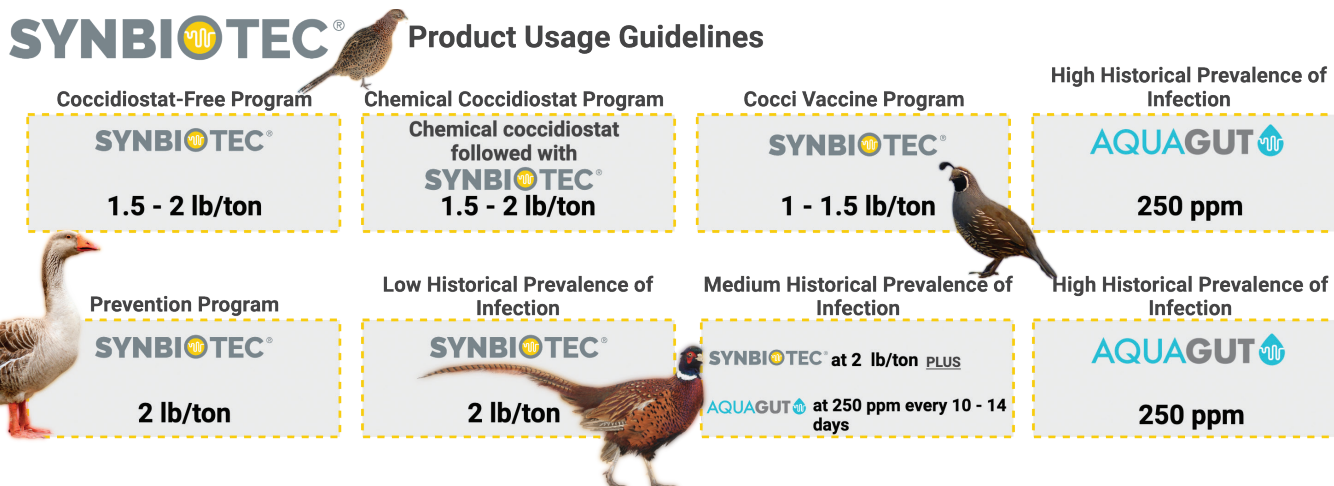
However, if the strain of *Eimeria* used in the vaccination isn't the same as the strain the bird is exposed to on the farm, the vaccines may not be effective. If you've tried vaccines without the success you were expecting, it may be because the strain of *Eimeria* used in the vaccine was tailored for chickens. Additionally, if you're using a vaccine alone without a medication program or natural alternatives, the oocysts will go through the life cycle described above and the birds will be reinfected from the oocysts they shed in the environment. This can lead to a subclinical coccidiosis challenge and increased susceptibility to bacterial infections. Because the vaccine is supplying a low dose of sporulated oocysts, many poultry producers will combine the use of natural alternatives with vaccination for added protection.

EVALUATING NATURAL ALTERNATIVES FOR MY FLOCK

Due to increased drug resistance to many anticoccidials, natural alternatives have emerged. Many of the commercially available products contain some blend of essential oils, botanical saponins and/or polyphenols. When evaluating these products for gamebirds, it's important to ask the following questions of the research performed on the product:

1. Has the product been tested on the *Eimeria* spp. that commonly infect gamebird flocks?

FIGURE 5. Potential usage programs to maximize the natural alternative approaches discussed in this article.





2. Has the product been tested in challenged gamebirds?

If the answer to the first two questions is No, all hope isn't yet lost. Follow up with:

3. Has the product been tested on a variety of *Eimeria* spp. or only on those that infect chickens?

The goal of these questions is to find out if the product is actually effective on a variety of *Eimeria* spp. since research in gamebirds is harder to come by. If the product has been evaluated in many *Eimeria* spp. that infect a variety of poultry, it's more likely to be effective in your flock.

EFFICACY THROUGH SYNERGY: SYNBIOTEC®

Synbiotec® (Probiotech International Inc.) is a line of products with anticoccidial properties that consists of a proprietary blend of:

PHENOLIC COMPOUNDS specifically chosen from botanicals for the oocysticidal benefits

BOTANICAL SAPONINS That cause *Eimeria* cell membranes to rupture, resulting in cell death

POLYPHENOLS that not only benefit host immunity and oxidative status, but also protect host cells by reducing invasion capacity of the sporozoites

Investigating the impact of Synbiotec® on the life cycles of various *Eimeria* spp. in a laboratory setting has provided insight into the efficacy of prevention and protection against coccidiosis for host animals. This research has been completed on a variety of *Eimeria* spp., including those that commonly infect chickens (*E. acervulina*, *E. tenella*, *E. maxima*) and turkeys (*E. adenoides*, *E. dispersa*, *E. gallopavonis*, *E. meleagridis*, *E. meleagritidis*; see Figure 1). At a feeding rate of 1 pound/ton, Synbiotec® was able to inhibit oocysts of *Eimeria* spp. that infect chickens from sporulating (FIGURE 3; PIERRON ET AL., 2022).

This is a key step to preventing infection in the *Eimeria* spp. life cycle (Figure 2). Once the sporozoites exit the oocysts within the gastrointestinal tract of the host bird, they enter the intestinal cells. Synbiotec® also prevented host cells from being invaded by the *Eimeria* spp. that infect chickens (Pierron et al., 2022). When these same trials were completed in the *Eimeria* spp. that infect turkeys it was demonstrated that Synbiotec® at 2 pounds/ton reduced livability of the

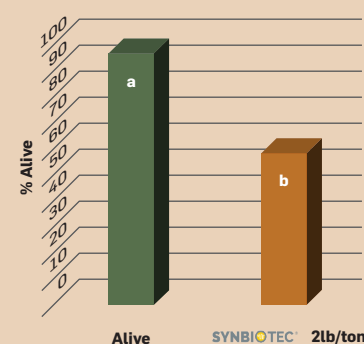
oocysts (FIGURE 4).

These trials collectively show the efficacy of Synbiotec® as a natural alternative to combat various *Eimeria* spp. at several points in the life cycle of the protozoa. During challenged trials in chickens, reductions in intestinal lesion scores and mortality with improved FCR have been reported with Synbiotec® (Pierron et al., 2021, 2022, 2023). The recommended rate of inclusion of Synbiotec® in gamebird flocks is 2 pounds/ton.

Because altering the feed isn't an option for all producers, Probiotech also has water treatments available. Aqua Gut Poultry is a liquid blend of bioactive metabolites from botanicals that have anticoccidial and antibacterial properties. Aqua Gut Poultry has been examined with the *Eimeria* spp. that commonly infect turkeys and has been shown to be more effective than anticoccidial medications at reducing oocyst livability and inhibiting sporulation (Julien et al., 2023). Various usage programs of Synbiotec® and Aqua Gut Poultry that gamebird producers have found successful are outlined in FIGURE 5.

The best way to protect your flock from coccidiosis is preparedness. Consult your veterinarian about potential medications and vaccinations that may be appropriate for your flock. If you're considering

FIGURE 4. At a feeding rate of 2 pounds/ton, Synbiotec® was able to reduce oocyst viability of *E. adenoides*, *E. dispersa*, *E. gallopavonis*, *E. meleagridis* and *E. meleagritidis* obtained from a contaminated turkey farm. The purpose of this test is to determine where Synbiotec® is most effective at impacting the life cycle of *Eimeria* spp. If the oocyst isn't viable, it can't sporulate and infect the bird (Julien et al., 2023).



natural alternatives, critically evaluate the research, and most importantly, consider whether the product is effective against many different *Eimeria* spp. 🐦

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