

Coccidiosis - Management and Control

Dr. John Radu
Worldwide Technical Services Manager
Schering-Plough Animal Health
Summit, NJ 07901
E-mail: John.radu@spcorp.com

Coccidiosis continues to be an insidious cause of economic loss especially in the intensive systems used by the poultry industry. It is an economically significant disease of poultry, costing the industry millions of dollars annually through lost productivity and mortality. Clinical coccidiosis is occasionally reflected in severe outbreaks but the insidious, sub clinical infections in stressed flocks under confinement rearing may be significant and often difficult to detect. In a rapidly growing bird, such as chicken and/or turkey, any factor interfering with the absorption of nutrients will cause economic losses.

Coccidiosis is an increasingly important problem in today's poultry production. It is extremely difficult to estimate the total impact of *Eimeria* – infections, because they are not always easy to detect due to their complex interactions with other organisms and management factors.

Coccidiosis in poultry is characterized by enteritis, watery or mucoid diarrhea, ruffled feathers and anorexia. Coccidia, a parasite of the digestive tract of poultry can interact with bacteria, viruses, and mycotoxins to increase the severity of the effects observed. Thus, coccidiosis must be considered as a multifactorial disease in which complex interactions of various factors will determine the outcome of the infection and the clinical damage. Acute outbreaks occurs when drug resistant *Eimeria* strains emerge rapidly as a result of selection pressure on anticoccidial drugs, or when formulation or milling errors result in inadequate drug levels. Any factor that compromises host resistance, such as poor chick/poult quality, concurrent other diseases, excessive litter moisture or even premature drug withdrawal can precipitate or contribute to coccidiosis.

Programs to prevent Coccidiosis

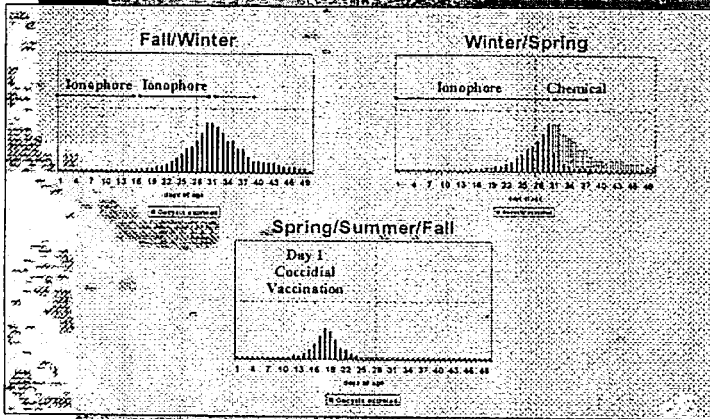
The rapid development of the broiler industry in the 1950 has required the urgent development of anticoccidial agents. Major discovery activities by several companies soon produced a range of products that were effective in the control of coccidia. Treatment of coccidiosis began about 60 years ago with sulphonamides while the poultry industry was still in its infancy stage as a direct response to major outbreaks of the disease agent. With efficacies against both bacterial and protozoal microorganisms, sulfa drugs were commonly used at the time to treat a wide range of disease agents in many species of animals including humans. By the late 1940s, poultry producers found that by far the most economical way to control the disease via preventing both mortality and morbidity was by continuously feeding Sulfaquinoxaline, and hence began what would soon be commonly referred to as an anticoccidial prevention program. Other products were soon to follow in

the 1950s including Nitrofurazone and 3-nitrooxarsona. Researchers began to realize the need for these compounds in the poultry industry, and the race was on for the “Holy Grail” of products. At this time, vaccines for coccidiosis control were starting to be seriously considered and research began to follow. By the early 1960s, various anticoccidials were developed some of which are still available and highly used today such as Amprol and Nicarbazin. Because of this rapid development of resistance, many of the earlier chemicals that were developed are no longer used today. A new class of anticoccidials was discovered in the 1970s called ionophores, which virtually replaced the earlier chemical compounds. Ionophores proved to be unique, as they showed both antimicrobial & anticoccidial properties. Ionophores also appeared to be different with respect to their chemical counterparts in their ability to be used for longer periods without developing resistance. By the late 1970s and early 1980s, a host of chemical and ionophore compounds was produced for chicken industry including but not limited to:

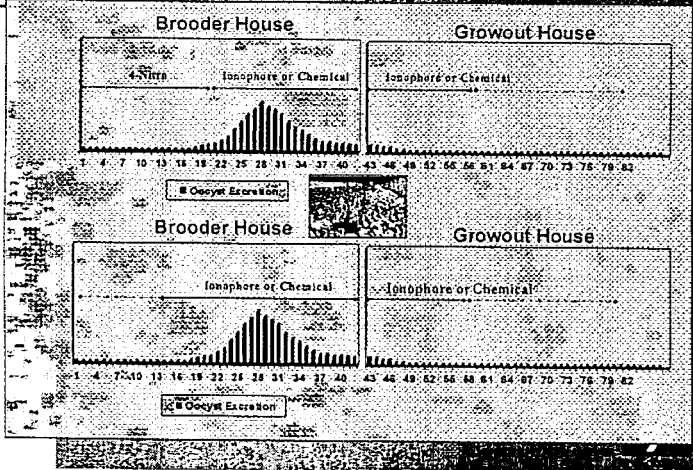
- ✓ Clopidol
- ✓ Robenidine
- ✓ Decoquinate
- ✓ Halofuginone
- ✓ Monensin
- ✓ Lasalosisid
- ✓ Salinomycin
- ✓ Narasin
- ✓ Maduramicin

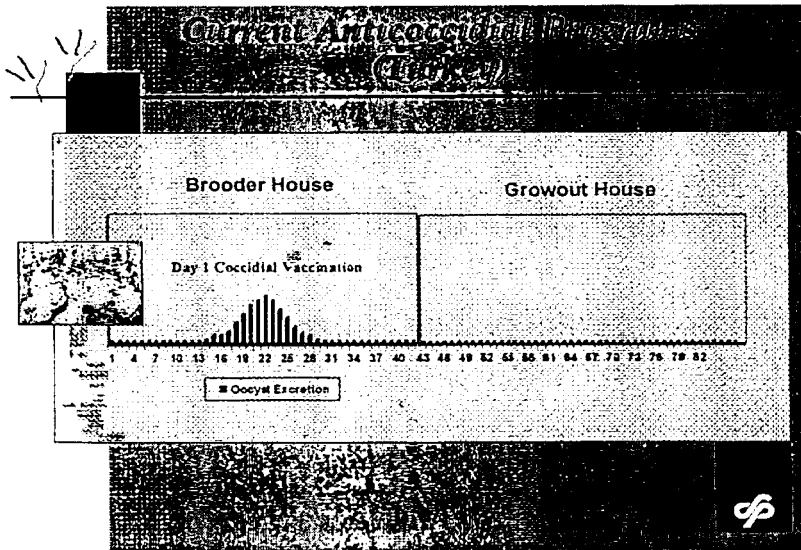
In an attempt to maximize coccidial control and to prevent rapid resistance development, the poultry and pharmaceutical industries developed and devised alternative control strategies that included annual product rotations and intermittent product shuttles. These programs proved effective until the mid 1990s as the pipeline for new product development began to wane. Over the past decade, specific requirements have significantly increased costs of discovery, development, and approval by the Food and Drug Administration for new products. In the past, coccidiosis has generally been eliminated in the US poultry industry by strategically using old and new anticoccidials in sound rotational and shuttle programs. With the recent significant reduction in the development of new in-feed coccidial control products, the industry has become accustomed to a variation in the incidence of coccidiosis (sub clinical) in poultry operations. In the US today, with occasional use of chemicals in annual shuttle programs, ionophores remain the corner stone for coccidiosis control in both broiler and turkey operations. The use of live coccidiosis vaccines have steadily increased over the past few years, and is rapidly gaining acceptance in both the broiler and turkey industry. Currently there are a couple USDA poultry licensed live coccidial vaccines in the US today and roughly, 2-3 in various corporate research pipelines scheduled for licensing over the next couple of years.

Current Anticoccidial Programs (Broilers)



Current Anticoccidial Programs (Turkey)





Adequate prevention of coccidiosis and other enteric diseases relies on biosecurity, adequate management, nutrition, and control of immunosuppressive infections.

Promising Research

Research in the area of immune modulation is also very promising. Major challenges include identifying unique parasite specific targets, which have little or no potential for resistance development, providing cross-species/strain efficacy, and, of course, producing a cost effective product that can be supplied to meet the demands of the broiler and turkey industries.