



# COCCI FORUM

NEW STRATEGIES FOR COCCIDIOSIS MANAGEMENT

## THE HEAT IS ON

SUMMER IS THE BEST TIME TO EXPLORE NEW  
OPTIONS FOR COCCIDIOSIS MANAGEMENT

THINKING GREEN

REMEMBERING JOYCE JOHNSON

DR. CÉSAR CARNICER GARCÍA: USING COCCIDIOSIS VACCINATION  
TO OPTIMIZE YOUR NUTRITION PROGRAM

# ***Shaping the Future***

## **Coccivac-B**



### Coccidiosis vaccination— a change for the better

- Easy hatchery spray application provides lifelong protection for broilers
- Changes coccidia population from pathogenic and drug resistant to mild and drug sensitive
- Results are improved under varied field coccidia challenge
- And the bottom line is...better

*From the coccidiosis experts*

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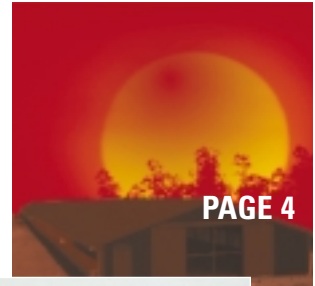


# COCCI FORUM

NUMBER 3

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### 'GOING MAINSTREAM'

*A few years ago coccidiosis vaccination was pretty much limited to breeders and layers, as well as a few "radical" broiler companies carving niches in the value-added natural bird market. But that's all changed.*

*Today coccidiosis vaccination is considered a mainstream practice for managing coccidiosis in broilers. As my colleague, Dr. Linnea Newman, reports in our cover story pp. 4-5, seven of the top 10 U.S. broiler integrators are using a summer vaccination program for coccidiosis in multiple complexes.*

*In the United States alone, sales of Coccivac-B have jumped 147% since the spray cabinet option became available in 1997. We expect usage to increase another 50% this year as more poultry companies appreciate the practicality and value of vaccination. The product is following a similar path in Asia, Latin America and Egypt, where the spray cabinet is also being used.*

*The same trend is emerging in Europe and the Middle East, where approval of Paracox-5 has prompted more poultry com-*

*panies to use vaccination for all or part of their coccidiosis-management programs. Usage is likely to increase even more now that the product is approved for spray cabinet administration.*

*We expect coccidiosis vaccination to grow significantly as poultry companies across the globe respond to growing consumer demand for meat products produced without in-feed medications. While not directly related to poultry, the BSE and FMD situations in Europe have also made consumers more concerned about what is being used in livestock and poultry feeds. We think this trend will fuel even greater interest in coccidiosis vaccination and other alternatives to feed additives.*

*It is our hope that this latest issue of **CocciForum** will give you the information you need to keep up with these exciting changes.*

*T. Michael Schwartz*

Michael Schwartz, DVM

Director, Worldwide Technical Service

# THE HEAT IS ON

## Summer is the best time to explore new options for coccidiosis management



*Chapman: 'I recommend that producers use an effective chemical drug to help clean up any Eimeria still present in the house.'*

“Summertime, and the livin’ is easy.” So goes the song from a Broadway musical. Coincidentally, that line sums up perfectly the seasonal significance of a major poultry protozoan disease.

Summer may be the easiest time to control coccidiosis, but astute management is required to optimize results. That starts with the most basic of chores, spring cleaning, says Dr. H. David Chapman, a parasitologist with the University of Arkansas.

What’s next after the annual litter change?

“I recommend that producers use an effective chemical drug to help clean up any *Eimeria* still present in the house,” Chapman says. “Diclazuril is particularly useful because it can be employed any time of year, but don’t use it for more than two consecutive flocks.”

After diclazuril, vaccinate two or three consecutive flocks with Coccivac-B, he advises. “The vaccine will repopulate the house with drug-sensitive strains and this will help improve subsequent efficacy of ionophores,” Chapman explains.

### **Vaccination Preferable**

Seasonal management of coccidiosis varies by company and geographic area. Since producers vary in their warm-weather management schemes, coccidiosis programs involving alternation of a chemical with vaccination should be tailored to those management practices. The overall goal should be to obtain long-term improvements

in performance and production. Another goal is to eliminate drug-resistant strains.

“Once the resistant strains are gone, the vaccine will repopulate broiler houses with drug-sensitive forms, and then the use of ionophores can resume,” Chapman says.

Since birds are generally released from the brooding area sooner during summer months, they spread oocysts from the initial shedding phase over a wider area. With a decreased concentration of oocysts and a more even spread, reactions and immunity development resulting from the coccidial vaccination will, in turn, be more uniform, adds Dr. Greg Mathis, president of Southern Poultry Research, Inc., Athens, Ga.

“In summer, increased airflow and dry weather reduce litter moisture,” Mathis points out. “Dry litter reduces oocyst sporulation, which directly relates to oocyst viability and numbers. With this reduced coccidial pressure, the effects of any errors in a coccidiosis control program, whether anti-coccidial or vaccination, will be minimized.

“That makes summer a good time to take advantage of nature’s help in this important area of litter management and coccidiosis control,” Mathis adds.

Management of Coccivac-B, a live-oocyst vaccine for coccidiosis, is



## Comfort Zone



Fogging systems are routinely implemented to keep birds cool during summer months, says Dr. Linnea Newman, a consulting veterinarian for Schering-Plough Animal Health. “Fogging is most common for birds four weeks of age and older,” she points out.

But frequent fogging wets the litter, and control of litter moisture is an important element of a coccidiosis control program, Newman emphasizes.

“With an ionophore program or if a long withdrawal feed is in use, wet litter conditions during the final weeks before processing will encourage late coccidial challenge and performance loss,” Newman warns.

“Proper house management will maximize summer performance,” concurs Dr. Charlie Broussard, a technical service veterinarian with the company.

During summer, it’s best to keep house air moving at 500 feet per minute, Broussard says, noting that evaporative cooling is becoming an increasingly popular way to keep broiler houses comfortable during summer months. It generally takes eight to 10 fans to properly service a 40’ X 500’ broiler house.

“Pull up the brood curtain as early as possible in the summer,” Broussard advises. “The ideal situation is to implement full-house brooding on day 1. Having more space will reduce competition for feed and water, and it will also reduce the birds’ reaction to vaccination.”

more difficult in winter broiler conditions, adds Dr. Linnea Newman, a consulting veterinarian for Schering-Plough Animal Health.

“Besides that, during winter producers can use many anti-coccidials with fewer negative reactions,” she

says. “And if you seed the house with sensitive oocysts via vaccine in summer, winter coccidiostats will work better.”

According to Newman, seven of the top 10 U.S. broiler integrators are using a summer vaccination program for coccidiosis in multiple complexes.

“Use of the vaccine in summer goes hand in hand with summer broiler house management,” Newman emphasizes. “Summer house conditions are ideal for minimal reactions and excellent performance, without any ionophore-like depression in feed intake during heat stress.”

*Mathis: ‘Since birds are generally released from the brooding area sooner during summer months, they spread oocysts from the initial bedding phase over a wider area.’*



## THINKING GREEN

### Brazil producer uses coccidiosis vaccine to ride hot wave in poultry production

These days, success in food production hinges in large part on creating marketing niches. In Brazil, one poultry producer is successfully creating a global niche with *Green Chicken*.

The *Green Chicken* concept was hatched in 1998 when a Brazilian poultry integrator called Osato Alimentos decided to target the rapidly expanding consumer segment that purchases “natural chicken,” meaning, birds raised without antibiotics and growth promotants.

Based in Atibaia in Brazil’s state of São Paulo, the firm faced a major challenge. Since “natural” poultry production practices weren’t widely implemented in Brazil at that time, little related husbandry information was available.

The new project got off to a great start when Osato formed an alliance with Coopers Brazil, a subsidiary of Schering-Plough Animal Health Corporation.

“Starting in June 1998, we conducted three trials to determine if the use of the Schering-Plough Animal Health’s coccidiosis vaccine was economically and technically feasible,” says Pedro Shingi, a technical assistant for Osato.

“All results were favorable, so we decided to replace in-feed coccidiostats with a vaccination program at our farms near company headquarters. Logistically, that would make monitoring and follow-up management easier.”

With positive trial results in hand, the first chickens bearing Osato’s *Green Chicken* trademark were bred.

Coopers personnel helped Osato develop a protocol to administer Coccivac-B on day-old chicks with the Spraycox spray cabinet, which showers

up to 100 day-old chicks at a time with the vaccine. This technology enabled Osato to vaccinate up to 80,000 birds per hour, dramatically reducing labor costs.

Anticoccidials, including nicarbazin and monensin, were eliminated from the feed, as were growth promotants such as zinc bacitracin and virginiamycin. Prebiotics and probiotics were added to the ration to help colonize beneficial intestinal bacteria and prevent the activity of pathogenic bacteria such as *Salmonella*, *E. coli*, and *Campylobacter* species.

#### More Positive Results

Since implementing this new management regime, Osato Alimentos has experienced a significant reduction in all diseases and mortality rate, according to Marcos Palotta, Osato’s technical manager.

“At 40 days of age, vaccinated birds normally start to show a compensatory weight gain, and at 50 days their weight surpasses 5.17 lb. (2.35 kg.),” Palotta says, referring to the fast weight gain vaccinated birds show after an initial setback.

Coopers continues to provide technical support for Osato’s *Green Chicken* production, including monthly coccidiosis lesion scoring.

In addition to increased production benefits with its *Green Chicken*, Osato is enjoying gains relative to the bottom line. With Coopers also providing marketing assistance, sales of *Green Chicken* have been increasing steadily since the product first hit the Brazilian marketplace in November 2000.

Currently, *Green Chicken* can be found in more than 400 retail outlets in the state of São Paulo. Butcher shops



According to Paulo Tsuyoshi Osato, president of Osato Alimentos, the relationship between the poultry integrator and the pharmaceutical firm coincides with global market trends to meet the increasing demand for natural and healthy foods.



and grocery stores currently account for 50% of Osato's total *Green Chicken* sales. Supermarkets and restaurants round out the remaining portion, with 30% and 20%, respectively.

Osato expects to process 2 million *Green Chicken* broilers this year, while total Brazilian production of the specialty is expected to reach 30 million birds. While it costs an average of 3% to 5% more to produce *Green Chicken* compared to standard chicken, the former brings about 20% more at the retail level, according to Vilson Simon, director of AviSui, the Poultry and Swine Division at Coopers Brazil.

"We feel these figures reflect product acceptance in specific consumer markets," says Maria Paula Yuko Osato, a marketing consultant for the firm. "Since *Green Chicken* is readily available in several types of retail venues, consumers can easily include the product in their daily routine, even when dining out."

According to Yuko Osato, Osato Alimentos is marketing *Green Chicken* as a product that is lower in fat content, more uniform in appearance, more palatable and emanating a more desirable aroma, compared to conventionally raised birds. Yuko Osato believes that, relative to the big picture and the long haul, *Green Chicken* offers several consumer benefits, including healthier food, greater quality of life and longevity.

### Global Player

Osato Alimentos has a 37-year tradition in the global poultry and food markets. The firm processed 18.5 million birds in 2000. This year, production is projected at 24 million birds.

For all of its products, Osato currently has over 3,000 customers worldwide, including restaurants, fast-food outlets, grocery stores, hypermarkets (large chain retailers similar to Wal-Mart), supermarkets, hospitals, and caterers. Total sales reached \$30 million in 2000 and are expected to hit \$40 million this year.

During the 1980s, Osato pioneered the development of differentiated poultry products and initially cultivated a strong export market with Japan. Today, Osato's export customers include Japan, Hong Kong and Europe. Major product offerings for these venues include filets of thigh, filets of breast, wings, and differentiated cuts. Osato's overseas sales reached \$6 million last year.

The forecast for 2001 exports is \$10 million.

In October 2000 Osato satisfied the licensing requirements of the European Union to sell drug-free meat in Europe.

### Teamwork Pays Off

The alliance between Osato and Coopers relative to *Green Chicken* is a win/win work in progress. Osato continues to develop a successful marketing niche. Coopers continues to build its database of technical information relative to coccidiosis control in a drug-free broiler production model.

According to Paulo Tsuyoshi Osato, president of Osato Alimentos, the relationship between the poultry integrator and the pharmaceutical firm coincides with global market trends to meet the increasing demand for natural and healthy foods.

"We are both committed to providing consumers throughout the world with healthy poultry products, so we believe *Green Chicken* and our partnership will continue to be successful," Tsuyoshi Osato says.



*The **Green Chicken** concept was hatched in 1998 Osato Alimentos decided to target the rapidly-expanding consumer segment that purchases 'natural chicken,' specifically, birds raised without antibiotics and growth promotants.*

## GIANT LEAPS

### Joyce Johnson forged new frontiers in coccidiosis control

Remember America in 1969? Joe Namath and the upstart New York Jets shocked the football establishment by guaranteeing a victory in Super Bowl III, *Midnight Cowboy* captured the Oscar for Best Picture, the Fifth Dimension took home a Grammy for *Aquarius/Let the Sunshine In* and the so-called Miracle Mets won baseball's World Series.

In the same year, astronaut Neil Armstrong stepped boldly on the moon while proclaiming "one small step for man, one giant leap for mankind." That event changed the world forever.

1969 was also a newsworthy year in the universe of poultry parasitology. The University of Georgia (UGA) Department of Poultry Science hosted the first-of-its-kind international Coccidiosis Symposium. A UGA research technician named Joyce Keener Johnson introduced a little program she developed for measuring gross intestinal lesions in chickens infected with this major protozoan disease.

While her protocol was enthusiastically received by the 150-some industry professionals who attended the conference, Johnson never dreamed her lesion scoring system would change the world of coccidiosis management forever.

#### Landmark System

This landmark lesion scoring scheme, complete with colored slides, came to be known not only as the Johnson-Reid Lesion Score System, named for the inventor and her mentor, W. Malcolm Reid, but also as an indispensable benchmark for all scientists working with coccidia throughout the world.

Lesion scoring had long been a commonly accepted criterion for determining the pathogenicity of coccidial species. However, no previous attempts had been made to standardize and describe the scoring scale to evaluate the severity of infection until Joyce Johnson tackled this challenging mission at Reid's suggestion.

"The biggest benefit of the Johnson-Reid Lesion Score System was that it provided an easily learned tool to measure the effects of anticoccidials and vaccines," says parasitologist Donal Conway, an Asbury, N.J.-based consultant in pharmaceutical product development.

"The system had a notable impact in the late 1960s and 1970s when ionophores were first being developed. It was still important in 2000 when the newest synthetic anticoccidial, diclazuril, was approved by the FDA," Conway asserts.

Coccidiosis lesion scoring according to the Johnson-Reid System is now the suggested methodology for all anticoccidial protocols submitted to the FDA for approval and for vaccine protocols submitted to the USDA.

"Even today, everyone who does a coccidiosis paper has to reference that Johnson and Reid work," says Dr. Greg Mathis, president of Southern Poultry Research, Inc. (SPR), based in Athens, Ga. The historic Johnson and Reid



*Joyce Johnson with a group of poultry technical specialists from Latin America and Asia during a training seminar in 1979.*

*Johnson examining a chicken intestine and scoring the coccidial lesions.*





paper titled “Anticoccidial Drugs: Lesion Scoring Techniques in Battery and Floor-Pen Experiments with Chickens” was published in 1970 in *Experimental Parasitology*.

### **A Wealth of Experience**

After Johnson completed her Masters degree under Reid’s tutelage in 1963, she remained in the UGA Poultry Science Department for 33 years. As a Research Technician III, the Alcoa, Tenn., native worked for Reid for 18 years, then for Peter L. Long for 12 years, and finally for Larry McDougald. Reid’s research focused on chemotherapy, Long’s centered on immunology, while McDougald’s is devoted to both chemotherapy and cellular immunology.

In 1994, Mathis hired Johnson to work for his firm, which conducts research for the poultry and pharmaceutical industries. Approximately one-third of SPR’s clients, including Schering-Plough Animal Health, are involved with some aspect of coccidiosis research.

“What’s amazing to me is that so many people having what they thought were new ideas for coccidiosis research would contact us, and Joyce would always tell them ‘we’ve already done that,’” Mathis adds. “Joyce was familiar with all the facets of coccidiosis and anyone who knew anything about coccidiosis knew Joyce.”

According to Conway, Johnson continually challenged her colleagues to hone in on the key questions associated with evaluating coccidiosis, anticoccidials and vaccines:

- *How severe is the infection?*
- *To what extent is the coccidial infection affecting feed consumption, feed conversion and weight gain?*
- *Is the product working? If so, how effective is the anticoccidial program?*
- *What is the cost to treat or vaccinate the flock?*



## **Celebrating the Contributions of a Cherished Colleague**

Tragically, Joyce Johnson was killed in an automobile accident on the morning of January 25 of this year, en route to her job at Southern Poultry Research, Inc. (SPR), Athens, Ga.

Everyone who knew Johnson had a great deal of respect for her, says UGA poultry scientist Larry McDougald.

“She was always the mainstay of the UGA Poultry Science laboratory, and made a tremendous positive impact on all of our graduate students,” McDougald says. “I will always remember Joyce standing over lab tables, cutting up chicken guts and conducting coccidiosis lesion scoring.”

Greg Mathis, SPR president, is quick to point out that Johnson’s professional reputation spanned the globe. During her enviable, exemplary career, she traveled to many countries, including Canada, Mexico, Venezuela, Peru, Brazil, England and France, to teach international colleagues her fine art of lesion scoring.

“In 1999 I visited a commercial poultry operation in Venezuela,” Mathis relates. “In the company’s dissecting room, I saw a photograph of Joyce hanging on the wall. She had been there about 15 years before that, teaching employees how to score lesions. After all those years, she was still in their minds and they were still under her influence.”

“Joyce was a patient, persevering person and very low key in her approach,” adds consulting parasitologist Donal Conway, Asbury, N.J. “She was an excellent teacher and a real leader. Those qualities were the outstanding part of her popularity and mystique. She always welcomed newcomers to her lab and took them under her wing, no pun intended.”

### **‘Walking Repository’**

Besides lesion scoring, Johnson was involved with other poultry health issues, including UGA gnotiobiotic research emphasizing *Histomonas* and nematodes of chickens. While working with Long, she helped to develop chicken coccidia for use in broiler vaccines. Johnson also attenuated strains of coccidia that lose some of their

*continued on page 15*



**Dr. César Carnicer García**  
Poultry Business Unit Manager  
Schering-Plough Animal  
Health, Spain

## USING COCCIDIOSIS VACCINATION TO OPTIMIZE YOUR NUTRITION PROGRAM

**A**cross the globe, vaccinating broilers for coccidiosis has become a more safe, sensible and cost-effective means of controlling this costly disease in poultry — and it's easy to understand why.

Not only does vaccination eliminate the need for residue-causing and resistance-prone in-feed coccidiostats, it provides life-long protection without the hassle or worry of withdrawal times. Vaccination has also proved to be an excellent way to minimize or even eliminate drugs from poultry disease-management programs — a benefit that brings added value to meat produced by vaccinated birds.

Perhaps the biggest benefit to coccidiosis vaccination still hasn't been realized, however. By eliminating the need for in-feed coccidiostats — products that must be fed for specific durations to be effective — vaccination also provides more flexibility in the feeding program and, as a result, enhances performance and profitability for poultry producers.

### Conflicting Goals

The goal of every poultry feed program is to obtain optimal bird performance, meat quality and processability for the cheapest cost per pound (or kilogram) of produced meat. The primary objective of an anticoccidial program is to prevent both acute and subclinical coccidiosis while preserving the gut's integrity, reducing secondary disease and obtaining good growth and performance.

Unfortunately, while it is convenient to administer coccidiostats through the feed, it is not always easy to meet both goals at the same time. This is because

the rigid protocol for using the in-feed anticoccidial might prevent producers from making changes in their ration to optimize nutrition.

An ideal coccidiosis-management program is therefore one that is free of side effects, allows optimum feed formulation for the type and weight of the birds, permits acceptable feed-mill management, and ensures the production of residue-free chicken meat.

How nutrition programs are formulated will vary from country to country and farm to farm, but there are a few standard practices that most operations tend to follow in their management of coccidiosis. For example:

- Starter: 0 to 21 days with a chemical anticoccidial
- Grower: 21 to 5 or 7 days before slaughter with an ionophore
- Finisher/withdrawal: Until the end of cycle with no anticoccidial.

For most anticoccidial drugs, the dosage range is a compromise between effectiveness and safety, especially with ionophores. To avoid toxicity, the drugs sometimes have to be recommended at sub-optimal dose. In addition, anticoccidial drugs are not equally effective against all *Eimeria* species, and coccidia can develop resistance to all anticoccidials.

For these reasons, nutritionists and veterinarians have to devise and implement complex shuttle and rotation programs to try and achieve optimal efficacy with minimal side effects. The design, implementation and monitoring of successful shuttle and rotation programs, however, has become quite complicated and fraught with obstacles and risks.

*Adapted and reprinted from the proceedings of Paracox-5: New Live Coccidiosis Vaccine, a seminar in Rhodes, Greece, October 2000. Paracox-5 is available in Europe and the Middle East. Its sister product, Coccivac-B, is available in North America, Latin America, Asia and part of the Middle East.*

**Table 1. Feed Program Comparison**

Feeding Program	Anticoccidial Regime	Days			
		0-10	10-21	21-42	42-49
Diet 1	C+	Starter 1		Grower	Withdrawal
Conventional	V	Starter 1		Grower	
	C-	Starter 1		Grower	
Diet 2	C+	Pre-starter	Starter 2	Grower	
Non-conventional	V	Pre-starter	Starter 2	Grower	
	C-	Pre-starter	Starter 2	Grower	

C+ = nicarbazin-monensin, V = vaccination (Paracox-5), C- = control (no medication or vaccination for coccidiosis.)

For instance, flocks cannot be treated with nicarbazin during early autumn or spring because sudden heat waves can result in high mortality, even in young birds. While valuable to the industry, ionophores can also present some problems. In northern Ireland, for example, detectable residual levels of the coccidiostat lasalocid were found in table eggs. The contaminated eggs were traced back to a feed mill that also produced broiler feed.

A problem that is relatively common and devastating in its consequences is the accidental feeding of rations containing coccidiostats to non-target animals. For example, turkeys fed salinomycin-containing feed will experience increased mortality. Broiler breeders fed nicarbazin can experience a drop in egg production and fertility.

Last but not least, producers need to consider the extra time and money spent by the feed mill for flushing systems of coccidiostat residues, planning and mixing batches of medicated feed, and avoiding cross contamination of drug-free withdrawal rations.

### Nutritional Trial

To obtain a better understanding of how in-feed coccidiostats can undermine a nutritional program, we performed a floor pen trial comparing

three anticoccidial programs (drugs, vaccination with Paracox-5 and a negative control), and two different feeding programs. See Table 1 to better understand the design.

While the trial was conducted in Spain, the results are applicable to virtually all major poultry markets.

**Diet 1**, or the “conventional diet,” is a standard in the Spanish market and is illustrated in Table 1. Withdrawal feed was fed for 7 days and the age of slaughter was 49 days, which is also common in the Spanish market for heavy birds.

**Diet 2** differs from the conventional diet in the starter phase; the pre-starter (0-10) is designed to have better digestibility and higher essential amino acid levels with “less aggressive” ingredients. The feed from 10 to 21 days had lower energy and protein levels than the standard starter, so we expected bird growth to be somewhat slower.

### Results

Live weight results are presented in Table 2, page 12.

There were no differences in body weights at the end of the fattening period (49 days) among medicated and vaccinated birds. Diet 2 gave significantly higher weight than Diet 1.

It is remarkable that control birds



**Table 2. Floor Pen Trial Results**

Treatment	Body Weight (Kg)		
	Days		
	10	21	49
Treatment C+1	217c	682d	3049bc
C+2	237b	756b	3098ab
C-1	210cd	705c	3037c
C-2	254a	826a	3095abc
V1	204d	694cd	3049bc
V2	251a	821a	3132a

C+ = nicarbazin-monensin, V = vaccination (Paracox-5), C- = control (no medication or vaccination for coccidiosis.) Different letters within the same column represent statistical significance ( $P > 0.0001$ )

had similar weight under any of the anticoccidial treatments, which reinforces the idea that no coccidiosis challenge occurred at the experimental farm, as expected. Despite that, the baseline performance of vaccinated birds did not differ from birds treated with anticoccidials. It was, in fact, numerically better if not significantly better.

#### **Period 0-10 days**

There appears to be an interaction between anticoccidial treatment and diet. With Diet 2, control birds are in line with vaccinated birds (no coccidial challenge).

Vaccinated birds performed much better than birds receiving an anticoccidial under Diet 2 (enriched starter) but do worse with Diet 1 (standard). This is consistent with the speculation that a specially tailored diet can be a big advantage when birds are vaccinated for coccidiosis.

In practice, assuming that untreated birds are not feasible in field conditions, the larger growth rate is obtained with vaccinated birds and Diet 2, where there is no growth depressor effect from nicarbazin and there is a good gut function due to the diet.

#### **Period 0-21 days**

The trend is maintained despite the fact that Diet 2 was lower in energy (6%) and protein (3%) than the conventional diet. This reinforces the idea that a starter is not really needed through 21 days.

#### **Other results**

There were no significant differences seen in the feed conversion ratio, final body weight, daily weight gain or mortality at 49 days among anticoccidial treatments.

Based on the literature and the experience of several nutritional consultants, it is fair to say that coccidiosis vaccination can do more than just protect birds from coccidiosis. The aim is to fit the typical curve of nutritional requirements under nutritional and economic criteria, without worrying about controlling coccidiosis via in-feed treatment.

#### **Conclusions**

Coccidiosis vaccination is the newest tool available for coccidiosis control.

Since it provides solid, life-lasting protection, it helps eliminate resistance and the need for complicated in-feed anticoccidial programs. It also eliminates the risks associated with anticoccidial drugs.

Coccidiosis vaccination allows feed mills to optimize their diets and provides for more flexible feeding programs. Moreover, birds can be removed at any time from the house, whether an antibiotic growth promotant has been used or not, since there is no worry about chemical residues. Birds can be sent at any time to the slaughterhouse after fasting just a few hours, which fosters more flexible planning and farm management.

Last but not least, coccidiosis vaccination represents a major new step toward more natural meat, which is increasingly in public demand.

# ANSWERS TO THE MOST FREQUENTLY ASKED QUESTIONS ABOUT COCCIDIOSIS VACCINATION

*Prepared in cooperation with Schering-Plough Animal Health's Technical Service Team*

**Q.** ARE POST-VACCINAL REACTIONS A CONCERN WITH COCCIDIOSIS VACCINATION?

**A.** Post-vaccinal reaction with Coccivac vaccines have not been a problem since the development of spray cabinet technology, which replaces application of the vaccine by other routes such as spraying it on feed or into the eyes.

Uniform coverage is important. If some birds are missed by initial vaccination, then other, unexposed birds receive an uncontrolled shedding dose of oocysts, which can result in insufficient protection for some birds or strong post-vaccinal reactions for others.

In the past, it was necessary to administer amprolium after vaccination to prevent excessive oocyst shedding and post-vaccinal reactions that might occur as a result of uneven coverage. In addition, birds that did not receive a full dose of the vaccine were exposed to sporulated oocysts from the litter and didn't always achieve their full weight or performance.

The spray cabinet has changed all that by providing more uniform vaccine coverage, which has led to better protection. With the spray cabinet, 100 chicks at a time are placed in a box and misted with vaccine solution. It is believed that after spraying, the chicks preen and ingest the vaccine orally, which results in more uniform administration throughout a flock.

With uniform application, complete protection is achieved within 28 days and there is no need to use amprolium after vaccination. Studies have shown

that weight gain and feed conversion in birds vaccinated against coccidiosis via spray cabinet administration is comparable to that among birds receiving conventional, in-feed ionophores.

**Q.** ARE BROILER CHICKS VACCINATED FOR COCCIDIOSIS MORE SUSCEPTIBLE TO COLONIZATION OF *SALMONELLA ENTERITIDIS*?

**A.** No. A recent study in Brazil by Instituto de Biociências – UNESP with 120 broiler chicks showed that vaccination with Coccivac-B has no bearing on the colonization or longevity of *Salmonella enteritidis* (*Se*) in the gut.

The birds were divided into six groups: Group 1 received the probiotic ACM (anaerobic cecal microflora) by spraying after vaccination against coccidiosis and challenge with *Se*; Group 2 received ACM by intra-esophageal inoculation after vaccination against coccidiosis and challenge with *Se*; Group 3 received ACM in drinking water after vaccination against coccidiosis and challenge with *Se*; Group 4 was not treated with ACM but vaccinated against coccidiosis and challenged with *Se*; Group 5 was not treated with ACM or vaccinated, but challenged with *Se*; and Group 6 was not treated or vaccinated and not challenged (negative control). The colonization of the digestive tract, the presence of *Se* in feces, and body weight were determined 2, 7 and 12 days after challenge.

*Se* count in feces and cecal colonization were reduced in the ACM-treated groups (1-3), mainly those receiving ACM by spraying and intra-esophageal inoculation. This indicates



*The spray cabinet provides more uniform administration, leading to better protection.*

*Have more questions about coccidiosis vaccination? Send yours to the editor at [prworks@netstep.net](mailto:prworks@netstep.net) or by fax to 845-758-2926. You'll get a personal reply from a Schering-Plough Animal Health representative and we may include it in our next issue of **CocciForum**. Name withheld from the printed version upon request.*

*continued on page 15*

## Label Rouge Group Bans Coccidiostats

SYNALAF — the official association and ruling board that regulates production of Label Rouge birds in France — has just released new guidelines banning the use of coccidiostats from production.

Label Rouge — so named because of the special red label that appears on all brands that meet this program's rigid criteria — are raised free range and receive diets that are rich in natural ingredients, whole grains and 100% vegetable proteins. They must also be fed to reach market weight over a specific peri-

od. Label Rouge birds account for 82 million of the country's 958 million broilers, or about 8%.

The availability of Paracox-5 has made vaccination of Label Rouge chickens more economical and appealing to French poultry producers.

Dr. Yannick Frémont, a veterinarian with Schering-Plough Animal Health's French subsidiary, thinks a new claim for spray cabinet administration, which has recently been granted, will make the product even more appealing.



Dr. Yannick Frémont examining a healthy bird with Label Rouge customer Hervé LaFitte.

## Paracox-5 Gets Hatchery Spray Claim

Schering-Plough Animal Health Corporation has obtained approval from European regulatory authorities for hatchery spray administration for Paracox-5, an attenuated vaccine that protects against the most economically significant species of *Eimeria* causing coccidiosis in broiler chickens.

"The hatchery spray application lets poultry operations vaccinate up to 100 day-old chicks for coccidiosis in about two seconds, while providing uniform coverage and development of immunity against coccidiosis," says Dr. Charlie Broussard, a technical service veterinarian with the company. "It's an exciting development for the product."

Paracox-5 also can be sprayed on feed of day-old chicks or added to drinking water at 3 days old.

When used in the hatchery, Paracox-5 should be administered with Schering-

Plough Animal Health's Spraycox® spray cabinet or other company-approved system that is capable of delivering the appropriate dose to all the chicks in each hatchery crate. The company also recommends adding the red food coloring agent cochineal E120 to the diluted vaccine to mark immunized birds and enhance uptake.

"The chicks, which are attracted to the red color, ingest the vaccine orally when preening," Broussard explains. "A significant reduction in efficacy may be observed if the food coloring is not added to the diluted vaccine before administration by hatchery spray."

Paracox-5 contains live, attenuated sporulated oocysts derived from *Eimeria acervulina*, *E. maxima* CP, *E. maxima* MFP, *E. mitis* HP and *E. tenella* HP. Immunity begins to develop within 14 days of vaccination and is complete by 28 days after vaccination.

## Australia to Host International Cocci Conference

The VIII International Coccidiosis Conference will be held July 9-13 in Cairns, Australia, which is in the country's tropical North Queensland region.

"The International Coccidiosis Conference has evolved from a meeting focused on the control of *Eimeria* in poultry to a major international conference that encompasses all aspects of the biology of a wide range of coccidian parasites," says Nick Smith, chair of the organizing committee.

The meeting, sponsored by the Australian Society of Parasitology and held in conjunction with the group's annual meeting, will feature lectures and roundtables on genomics, immunology, cell biology, drug resistance, vaccination, environment and other related factors.

For more information, go to [www.science.uts.edu.au/depts/cmb/mpu/conference.html](http://www.science.uts.edu.au/depts/cmb/mpu/conference.html).

*Editor's note: The fall issue of CocciForum will include coverage of this conference.*

## Coccivac-B Launched in China



Schering-Plough Animal Health has received government approval in China to begin marketing Coccivac®-B.

The licensing is a major milestone in coccidiosis vaccination usage because China is the biggest growth opportunity in the world for Coccivac-B after the United States and Brazil.

Vaccination for coccidiosis is expected to become more prevalent as Chinese poultry producers become "increasingly dissatisfied" with traditional coccidiostats due to parasitic resistance, withdrawal periods, negative side effects and other drug-related problems, says Dr. Zhang Yuankui of the company's China subsidiary.

*The Chinese character HO, or harmony, represents the relationship between the world of nature and the world of man.*



## Back to School on Coccidiosis



*Drs. Charlie Broussard (center) and John McCarty (right) provide lab instruction to international poultry veterinarians.*

More than 30 of Schering-Plough Animal Health's world-

wide staff and consulting veterinarians from around the

world gathered in Georgia recently for a hands-on look at coccidiosis lesions and their impact on the chicken.

The event, which included lecture and post-mortem diagnostic work, was held at the Poultry Diagnostic and Research Center of the University of Georgia, Athens.

"The seminar was part of our continuing effort to be world leaders in coccidiosis management and to make sure our veterinarians are the most knowledgeable in the

industry," says Dr. Michael Schwartz, director of poultry technical services.

"Our vets need to be able to recognize and differentiate between the harmless lesions caused by our vaccine while stimulating immunity and the lesions caused by naturally occurring disease," Schwartz says. "We need to help our customers see and understand the difference so they can better address the problems in the field."

### Coccivac-B Plant Expanding — Again

Growing worldwide demand for the Coccivac vaccines has prompted Schering-Plough Animal Health to expand its production facility in Millsboro, Del.

The \$2.2 million expansion project is expected to increase production about 35%, according to site manager Larry Manogue.

Construction is expected to be completed within the next few weeks and product from the expanded facility should be available by late summer or early fall.

This latest capital improvement project comes less than 18 months after the company invested \$17 million to consolidate and expand the poultry biologicals plants in Millsboro and

two plants in the United Kingdom.

"With this level of investment, it's clear that Schering-Plough Animal Health is committed to the world poultry industry," says Steve Collins, vice president—worldwide poultry.

He notes that worldwide sales of Coccivac, marketed in the United States, Latin America, Middle East and Asia, and its sister product, Paracox, available in Europe and the Middle East, continue to set new records as more and more commercial poultry operations reduce their dependence on traditional in-feed anticoccidials and seek other methods for controlling this costly parasitic disease.

### Joyce Johnson *continued from page 9*

pathogenicity when propagated in chicken eggs.

"She was a walking repository of all of the information on coccidiosis," McDougald emphasizes, noting that Johnson co-authored 44 research papers and four book chapters.

At SPR, Johnson helped design a number of important research protocols, including immunity studies that in 1997 led to the commercial introduction of

Coccivac-B via the hatchery spray method.

"So many advances in poultry epidemiology and the processing of new scientific ideas were dependent on the quality of work Joyce Johnson was able to sustain throughout her entire career," Conway emphasizes. "Her contributions to the poultry industry were immeasurable."

### Q&A *continued from page 13*

that the actions of ACM against cecal colonization and fecal excretion of *Se* are not affected by the use of a vaccine against coccidiosis in broiler chicks. Furthermore, it suggests that ACM and coccidiosis vaccine can be

used together without reducing the effectiveness of ACM.

An increase in cecal colonization and fecal excretion of *Se* was observed in the groups not receiving ACM, regardless of whether they received coccidiosis vaccine.

*Coccivac is a registered trademark of Schering-Plough Animal Health Corporation. Paracox is a trademark of Schering-Plough Animal Health Corporation.*

## COCCI FORUM

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# In the future, you will not depend on drugs to control coccidiosis.

If you want to start your future now, talk to us.

We are Schering-Plough Animal Health,  
the makers of **Paracox**<sup>™</sup> and **Coccivac**<sup>®</sup>  
brands of coccidiosis vaccines.



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