COCCI FORUM

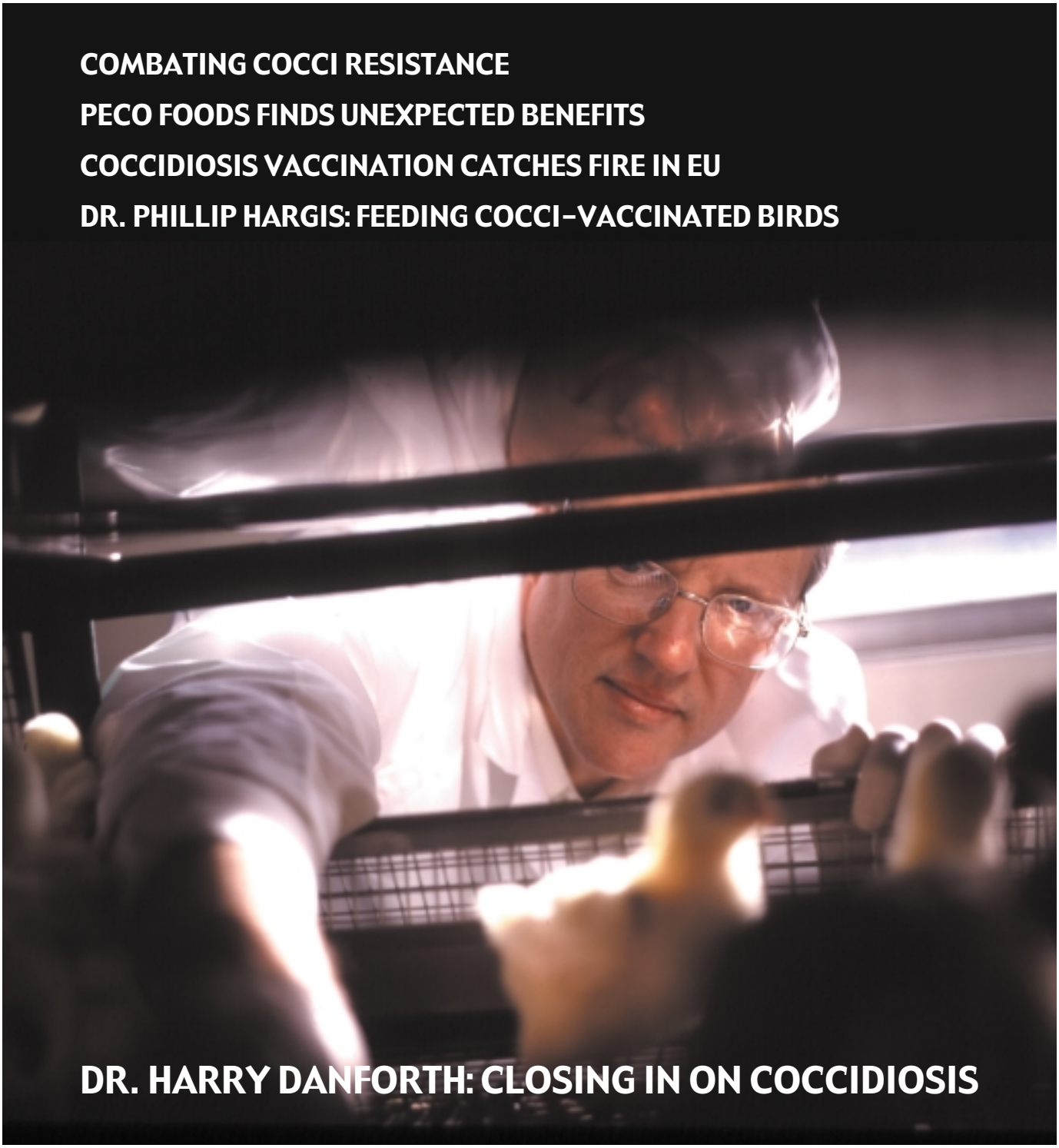
NEW STRATEGIES FOR COCCIDIOSIS MANAGEMENT

COMBATING COCCI RESISTANCE

PECO FOODS FINDS UNEXPECTED BENEFITS

COCCIDIOSIS VACCINATION CATCHES FIRE IN EU

DR. PHILLIP HARGIS: FEEDING COCCI-VACCINATED BIRDS



DR. HARRY DANFORTH: CLOSING IN ON COCCIDIOSIS

SPAH-PBU-184

Schering-Plough Animal Health

NUMBER 2

Shaping the Future

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Coccidiosis vaccination– a change for the better

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From the coccidiosis experts

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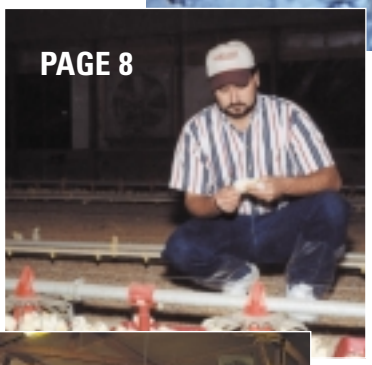
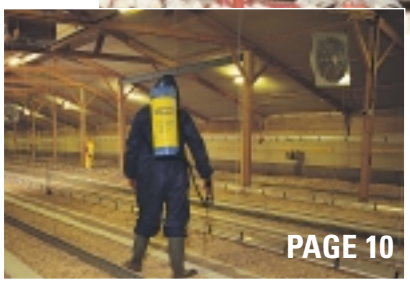
NUMBER 2

FEATURES





Cover: Dr. Harry Danforth, USDA. Photo by Lisa Helfert.
Pp. 6-7: Photos by Lisa Helfert.
Pp. 8-9: Photos by Wright Griffis.
Pp. 12-13: Photos by Dawn McInnish.

'IT'S A HIT!'

Before introducing ***CocciForum*** *last fall, we asked ourselves a lot of tough questions about its need and value. Producing a color magazine obviously requires a significant investment in time and money. There was also the question about whether it would get read. We are, after all, living in the Information Age.*

When the first issue rolled off the press, we were pleased with its look and content, but our *opinions really didn't matter. It was input from our readers — poultry veterinarians, nutritionists, producers and others in the industry — that would ultimately determine the value and future of* ***CocciForum****.*

Within a few short weeks of releasing the first issue, it was clear that it was a big hit. Hundreds of reply cards poured in from readers, many of them offering enthusiastic comments and even article suggestions. You can read a few excerpts on page 14.

After reviewing the cards, however, it is clear that our readers are also enthusiastic about the future of coccidiosis vaccination — a practice that has truly come of age in the face of resistance and residue issues. Worldwide demand for coccidiosis vaccines is at an all-time high.

On behalf of everyone at Schering-Plough Animal Health, I want to thank you for your support and wish you much success in the coming year.

Stephen P. Collins
Vice President, Worldwide Poultry

COMBATING RESISTANCE

Vaccination seeds houses with oocysts that are sensitive to commonly used in-feed coccidiostats

Poultry producers confronting resistance to in-feed coccidiostats can minimize the problem by incorporating coccidiosis vaccination into their management plan, says poultry veterinarian Dr. Linnea J. Newman.

Continuous and long-term use of in-feed ionophore coccidiostats has resulted in resistance and less effective control of coccidiosis, which is caused by protozoan parasites of the *Eimeria* genus, says Newman, a consulting veterinarian for Schering-Plough Animal Health. Resistance results in impaired performance, particularly poor weight gain.

However, rotating coccidiosis vaccination with the in-feed products "seeds" the houses with oocysts that are more sensitive to the in-feed treatment, she says.

Changes Oocyst Population

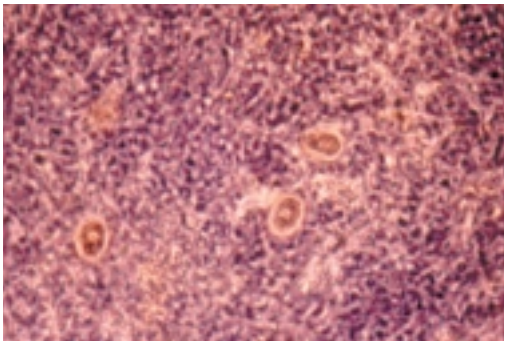
Coccivac-B, Newman explains, is a live vaccine produced with oocysts that were isolated before currently used coccidiostats were even developed. Consequently, birds that receive this vaccine shed oocysts that are sensitive to the in-feed coccidiostats widely used today by poultry producers.

"In other words, the vaccine can be used to change coccidiostat-resistant populations into coccidiostat-sensitive populations," she says. "The oocysts that result from vaccination, in fact, are extremely sensitive to both chemicals and ionophores, yet they are not as virulent as some of today's coccidiostat-resistant field isolates."

Clear Evidence

As evidence, Newman points to research by Dr. H. D. Chapman of the University of Arkansas, which demonstrates that vaccination of a single flock with Coccivac-B is sufficient to restore the sensitivity of field coccidia to monensin.

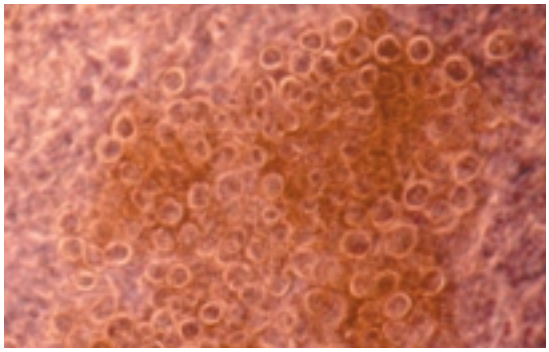
She also cites trials conducted by Dr. Harry D. Danforth of the USDA (see feature on page 6), which further demonstrate that vaccinating with Coccivac-B renews the sensitivity of an on-farm coccidial population to the ionophore salinomycin, the most widely used coccidiostat in the United States.



Eimeria maxima

In the trials, oocysts were isolated from litter samples taken in houses where broilers had been vaccinated for three or more flocks with Coccivac-B. Oocysts also were collected from litter samples taken in houses where birds were not vaccinated, but were treated with ionophore coccidiostats.

Next, sensitivity to salinomycin was tested. One group of specific-pathogen-free (SPF) birds was challenged with oocysts from the vaccinated houses, and another group of SPF birds was challenged with oocysts from the ionophore-treated houses. During the challenge, all birds received 60 ppm of salinomycin.

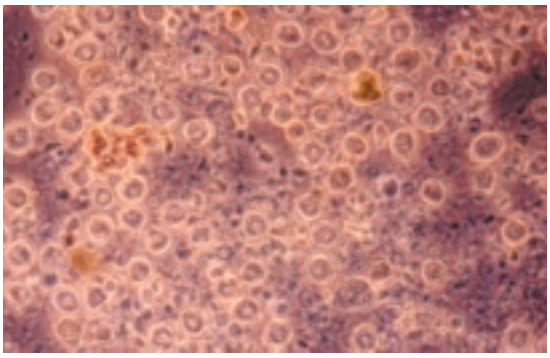


Eimeria acervulina

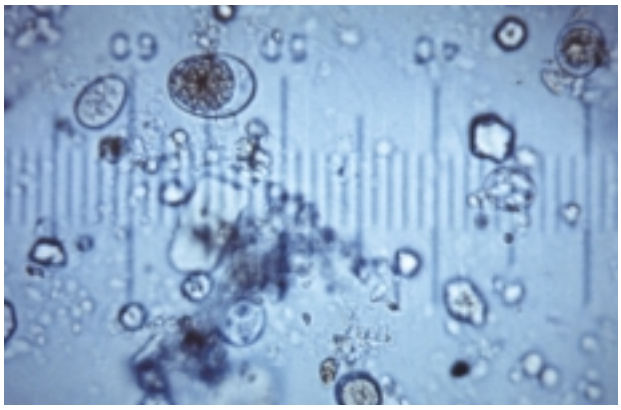
Weight Gain Improved

Comparison of the two groups revealed much better weight gain in the birds challenged with oocysts from the vaccinated houses; only an occasional field sample demonstrated comparable salinomycin sensitivity, Newman says.

More recent studies by Danforth



Eimeria tenella



Mixed-species oocysts

indicate that vaccination can not only restore the sensitivity of oocysts to coccidiostats, but that it changes the composition of mixed species oocysts in the field and their ability to cause intestinal damage, Newman says.

For instance, an aggressive strain of *Eimeria tenella* and a moderately pathogenic *E. maxima* were isolated from litter samples collected from a farm at a large broiler integrator. After the samples were collected, a new flock was vaccinated with Coccivac-B and placed in the same house. New litter samples were collected at the end of the growout period.

The mixed-species oocyst population from each sample was isolated and used to challenge 10-day-old SPF test birds fed nonmedicated or salinomycin-medicated feed. Six days after the challenge, the birds were weighed and intestinal lesions were recorded.

"Following vaccination with Coccivac-B, the aggressive *E. tenella* population had virtually disappeared," Newman says. Before vaccination, the *E. tenella* was considered very aggressive and created high lesion scores, even in salinomycin-medicated birds. It should also be noted that 3-Nitro (arsenelic acid) had to be used routinely to augment the ability of ionophore coccidiostats to control *E. tenella*, she says.

Lesion Scores Improve

After immunization, lesion scores for the middle and upper intestine due to *E. maxima* and *E. acervulina* had improved in salinomycin-medicated birds, which indicates that vaccination had an impact on these species of *Eimeria* and that each species had improved sensitivity to salinomycin after vaccination.

Coccidiosis vaccination can not only be rotated with coccidiostats, it can be an alternative to these in-feed products, Newman says.

Vaccine Fosters Natural Immunity

In-feed coccidiostats prevent coccidiosis by disrupting the parasite's life cycle, but vaccination enables chicks to develop natural immunity to coccidiosis infection, Dr. Linnea J. Newman explains.

Immunity develops when birds are exposed to infected oocysts passed in droppings. "It takes about two or three cycles of mild infection to provide immunity adequate enough to protect chicks from later field exposure to coccidia," she says.

Vaccination is more likely to be successful today than ever before because better methods of administration have been developed. For example, spray cabinet administration on hatching day helps ensure the vaccine is administered evenly to chicks, which in turn helps development of immunity in a flock and protect against coccidiosis outbreaks, she says.

CHANCE ENCOUNTERS

Dr. Harry Danforth has devoted his career to controlling coccidiosis in poultry

A satisfying life's work sometimes comes about by chance, and so it has been for Dr. Harry Danforth, a research microbiologist who has made invaluable contributions to the control of coccidiosis in poultry.

It started when he was a college undergraduate and found a course in parasitology to be particularly interesting. Danforth was fascinated by the interaction between parasites and their host.

Parasites in humans might have been just as interesting, but as he pursued his higher education, including a Ph.D. in biology, "I met people in the field of veterinary parasitology willing to take on a young kid," he recalls. "The veterinary part came about by chance."

Since 1980, Danforth has been with the United States Department of Agriculture. He currently works at the Parasite Biology and Epidemiology Laboratory in Beltsville, Md., outside Washington, D.C., and lives nearby with wife Charla.

Works Enabled Vaccine Development

Danforth's accomplishments as a scientist have been impressive. He has published over 200 peer-reviewed manuscripts, book chapters and abstracts and currently holds 13 cooperative research agreements with vaccine and pharmaceutical companies.

He has extensively researched monoclonal antibodies against avian coccidia and is credited with developing the first genetically engineered antigen that provides immunity against coccidiosis affecting poultry.

"It was the production of monoclonal antibodies against parasites that made it possible to produce antibodies that would trigger an immune response to coccidia in chickens," says Danforth.

'Down the road… the pendulum will swing and vaccination will be the primary way that poultry producers control coccidiosis.'

"Then we started to work with the delivery of live coccidia vaccines. We found that you could use drug-sensitive coccidia to vaccinate birds and change the sensitivity of the coccidia on the floor of growout houses," he says.

As far back as the 1970s, Danforth says he foresaw that the effectiveness of anticoccidials could be problematic. "Ionophores were emerging and they were effective, but coccidia had already shown resistance to all other drugs for coccidiosis. I figured it was a matter of time before resistance also occurred with the ionophores, and that immunology was the future of coccidiosis control," Danforth says.

Recent research by Danforth has demonstrated that vaccinating with a live oocyst vaccine renews the sensitivity of coccidia to the widely used ionophore salinomycin.

Vaccination also changes the composition of oocysts in the field and their ability to cause intestinal damage, his research shows. For example, after the use of Coccivac-B, a live-oocyst vaccine, an aggressive *Eimeria tenella* strain disappeared altogether, and lesions due to other species of *Eimeria* were minimized.

Predicts Change

Many poultry producers are not using coccidiosis vaccines, Danforth says, because they can still control coccidiosis with in-feed anticoccidials. But he believes that's going to change with time.

"In-feed anticoccidials have been good over the years and *are* simple to use. You just mix it into feed at the feed mill and treat flocks across the board.

"But resistance has become even more of a problem and there are no new anticoccidials being produced. Producers are going to look to vaccines to control coccidiosis. Vaccination is a good adjunct to anticoccidial treatment," he says.

Initially, producers may not depend entirely on vaccines, but more will at least incorporate vaccination into their coccidiosis control programs, he says. "In the immediate future, there will be more vaccination with live oocysts and, further into the future, other types of coccidiosis vaccines."

Consumer demand for birds raised without drugs will contribute to the trend to vaccinate and capitalize on natural immunity, although in the United States, that demand isn't as strong yet as it is in Europe, Danforth says.

Down the road, as there is a greater understanding of how vaccines work, he says, the pendulum will swing and vaccination will be the primary way that poultry producers control coccidiosis, he predicts.

Clear Mission

Today, Danforth is spending more time in an office directing research than he is in the lab. It's a far cry from the small farming community in Illinois where he grew up, but Danforth says he gets out as often as possible to visit with poultry producers, particularly in the nearby Delmarva Peninsula, and with veterinarians in charge of flock health.

'We found that you could use drug-sensitive coccidia to vaccinate birds and change the sensitivity of the coccidia on the floor of growout houses.'

Whether he's in the office or the lab, however, Danforth says he likes his work, and his mission to advance the science of coccidiosis management.

Coccidiosis research, he says, gives poultry producers new direction and possibilities for coccidiosis control. "It helps them take the technology we have and apply it so we will continue to have good flock performance and control of a potentially economically devastating disease."

One of the reasons further advancements in coccidiosis control can be expected, says Danforth, is due to the attitude of the poultry industry.

"I applaud the poultry industry for its willingness to try new things," he says. "People in the industry are highly progressive. They are always open to new ideas and are highly adaptable. I find that refreshing. I really want to thank them for their cooperative attitude."

Editor's note: This is the first in a series of features about professionals who are making important contributions in the field of coccidiosis control.

PEACE OF MIND

Switch to coccidiosis vaccination yields flexibility, performance for rapidly growing Peco Foods

Van Bowman remembers being concerned when he would switch his larger birds to coccidiostat-free withdrawal feed 7 to 10 days before marketing, hoping they wouldn't break with coccidiosis en route to their finish weight of 6.5 to 7 pounds.

The live operations manager at Peco Foods, Sebastopol, Miss., had good reason to be concerned.

Medications, even low-cost ones, can get expensive when fed to today's larger birds. Resistance buildup was another issue.

"We were at a point where only one ionophore, salinomycin, was getting the job done — and I was concerned about that one eventually running out of steam as well," he says. "And we never had much success rotating anticoccidials to improve performance. We'd use nicarbazin for a while, but we can't use it in the summer and there are also export concerns with birds fed that anticoccidial."

Pulling the Coccidiostat

In 1998, tired of resistance issues, export concerns and the looming threat of coccidiosis breaks, Bowman pulled traditional anticoccidials from the feed and tried managing the disease with a one-dose vaccine that protects against five species of *Eimeria* for the life of the bird.

"We were a little nervous about it at first," he admits. "But with the new spray cabinet technology, the vaccine, Coccivac-B, is distributed uniformly and we're getting excellent control — as good or better than what we've had with any in-feed product. In terms of cost, the vaccine broke even with salinomycin."

There was one additional benefit that Bowman hadn't anticipated: Peace of mind.

"Because the vaccine protects against coccidiosis for the lifetime of the bird, I don't have to worry about birds breaking with disease as they get older," he says. "Vaccination also gave us an opportunity to give one of the few coccidiostats we have left a much needed rest."

Bowman: 'It seems like we get a boost when we go off the ionophore and switch to the vaccine.'

Bowman also thinks vaccination has improved performance of his overall coccidiosis-management program. "It seems like we get a boost when we go off the ionophore and switch to the vaccine," he says. "Likewise, the ionophore works better after it's been given some time off."

In the field, broiler serviceman Rusty Thaggard says Peco's contract growers have also been pleased with the vaccine's performance.

"It's been very successful," says Thaggard, who supervises 21 of the company's 120 contract farms near Sebastopol. "The birds' performance is every bit as good or, in some cases, better than when they were fed an

Thaggard: 'The birds' performance is every bit as good or, in some cases, better…'

ionophore. In fact, when we went to rotate back to an ionophore, we had some producers who didn't want to go off the vaccine.

"Without the drug, there was one less hassle, one less worry."

Initially, Peco used the vaccine for three cycles beginning in spring, then followed with feed treatments for the next two to three. The company is now considering extending the vaccine to four cycles.

"The coccidiosis vaccine could be used year-round, but from a milling standpoint, it just happens to work best for us if we get it in the spring," Bowman explains. "On the small bird, for instance, we still like to use nicarbazin in the winter. The cycling just works best for us from a physical standpoint, but I don't think timing would matter in terms of performance."

Feeding for Performance

The switch to vaccination has also allowed Peco to remain more flexible with its nutrition program and feed birds for optimum efficiency and return on investment.

"The length of feeding a certain broiler feed or a regular coccidiostat and drug program is dependent on the coccidiostat being used, the dietary inclusion rate of the coccidiostat, and the growth-promoting drug being used in conjunction with the anticoccidial — plus the nutrient profile of the feed in relationship to the age of the bird," says Peco's consulting nutritionist Dr. Rex Bushong, San Angelo, Tex.

"The use of Coccivac-B allows changing feeds without regard for coccidiosis challenge, immunity and bird age, and FDA drug regulations."

Adds Bowman, "With the vaccine, we can build our nutrition program around the birds' needs, not some predetermined drug regimen," he says.

Peco keeps its feed costs confidential, but Bowman says the company's feed profile is "very competitive."

"The feed profile for our larger birds — that is, the dollars and cents we put into our feed vs. performance — is now among the best in the country in Agristats," he adds, referring to an independent industry survey comparing production costs and performance of U.S. poultry companies.

Aiming for Four Cycles

Looking to 2001, Peco expects to start using it in four consecutive cycles on farms linked to its Sebastopol operation, which places 660,000 birds per week. "We've been running some trials at one of our complexes and the num-

continued on page 15

Overcoming the Fear

Nelson: 'For the feed mill, it's not confusing…'

Afraid to try coccidiosis vaccination because of the confusion it might cause at the feed mill?

"That's a cop out," insists consulting nutritionist Dr. Rex Bushong. "Switching to a coccidiosis vaccination program should pose no problem to a feed mill, provided the mill has a competent manager and a good staff."

Bushong tells of one mill with limited finished feed storage — only 400 tons — but still manufactures some 5,000 tons of feed per week. "Through excellent mill management and scheduling, this facility has no problems with changing from a Coccivac program to a coccidiostat program," he says.

Gary Nelson, feed mill manager at Peco's operation in Sebastopol, agrees. "For the feed mill, it's not confusing — even though we work with more than 100 different growers. It's no problem."

Changing from a feed with an anticoccidial is not a big problem, Nelson explains. "You would have a problem if birds weren't vaccinated, you got them mixed up and sent them the wrong feed and didn't give them anticoccidial," he says. "That's about the only potential problem, but it can be avoided easily with good management."

Nelson says the feed dispatcher keeps close tabs on which farm gets what. "And once we get to 4 weeks of age and send out that finisher feed, you're through. The last 10 days are irrelevant. Believe me, it's not a big deal."

KEEPING IT SIMPLE

Like the U.S., Latin America and Asia, Europe is finding vaccination to be an effective — and convenient — method of managing coccidiosis in broilers

The European broiler market is discovering that vaccination is not only an effective way to manage coccidiosis, but that it simplifies logistics at the feed mill and processing plant.

"Extensive studies in the lab, on floor pens and in the field show that in standard broilers, just one dose of vaccine given to day-old chicks controls coccidiosis," says Dr. Luciano Gobbi, Verona, Italy, a veterinary consultant who has been involved with coccidiosis vaccine testing.

Vaccination against coccidiosis, he explains, prevents coccidial infection by initiating the development of immunity. In contrast, in-feed coccidiostats prevent coccidial infection by suppressing the parasite's life cycle, but resistance to in-feed products has been a worrisome and growing problem.

Vaccination Results

To illustrate the impressive results obtained with vaccination, Gobbi points to several carefully controlled commercial trials conducted in Spain with male and female broilers (Ross, Cobb, Hybro-G). The birds received either a coccidiosis vaccine or traditional in-feed coccidiostats (nicarbazin + monensin or nicarbazin + salinomycin) and were assessed for as long as 51 days.

"There were either no significant differences in live weight between birds in both treatment groups, or the vaccinated birds were significantly heavier than the coccidiostat-medicated chickens," he says.

Similar observations come from Dr. Michael Francis, director of biological research and development, Schering-Plough Animal Health, which manufactures the Coccivac and Paracox brands of coccidiosis vaccines.

In controlled field trials conducted in France, the U.K. and Italy, there were no reported coccidiosis outbreaks in birds that received coccidiosis vaccination, he says.

In addition, laboratory studies with vaccinated birds exposed to coccidial infection showed "significant protection" determined several ways, including oocyst output and lesion development, Francis says.

Applying Paracox-5 to feed in the UK. A spray cabinet option will be available in the near future.

Simplifies Management

In addition to effective coccidiosis control, vaccination has other important advantages, according to Gobbi. "It greatly simplifies feed-mill management," he says.

Currently, feed mills manage several in-feed coccidiostats and provide different diets for broilers of different ages. This is necessary because coccidiostats must be rotated periodically to help minimize the coccidiostat resistance problem, he says.

"Considering that one feed mill may

serve 200 to 300 farms, it can be difficult to be sure each farm gets the correct diet, with the correct coccidiostat," Gobbi says.

There is always a risk that the wrong diet will be sent to a farm, or a diet without an in-feed coccidiostat at all. Such errors can result in a coccidiosis outbreak in unvaccinated birds.

"The vaccine, however, eliminates these potential problems by eliminating the need for in-feed coccidiostats," he adds. "Feed mills also will have fewer regulatory worries since they will be managing fewer in-feed drugs."

Processing Flexibility

Dr. Charlie Broussard, a veterinarian with Schering-Plough Animal Health, cites other advantages of vaccination.

"It eliminates concerns about toxicity, residues and withdrawal times," he says. "This is particularly helpful at a time when there is increased consumer demand for more natural food."

Vaccination also gives producers more processing flexibility. Farmers often process birds based on market need. But if in-feed coccidiostats are used and a withdrawal period is necessary, they cannot always supply birds when supermarkets need them.

"The vaccine will better enable producers to process birds on short notice, meeting the demands of clients and the public," adds Broussard.

Growing Track Record

The coccidiosis vaccine now available for broilers in Europe is Paracox™-5, which is also marketed in Israel.

In the United States, Latin America and Asia, a coccidiosis vaccine for broilers called Coccivac-B is applied to chicks at the hatchery with a spray cabinet.

"These vaccinse are producing excellent results in studies and in the field. Their use has increased tremendously in light of growing coccidiostat resistance and the increased public demand for drug-free, natural birds," Broussard says.

Gobbi agrees and predicts that coccidiosis vaccination will provide an effective and easy way to manage coccidiosis in broilers far into the future.

"It is clear that vaccination can provide comparable or possibly better performance than traditional in-feed coccidiostats," he says.

"In fact, immunological prophylaxis with coccidiosis may provide broiler producers with a way to keep coccidiosis under real control for decades."

Boosting Vaccine Performance

Broiler producers can boost the effectiveness of coccidiosis vaccination by practicing "good management," say Drs. Charlie Broussard and Luciano Gobbi.

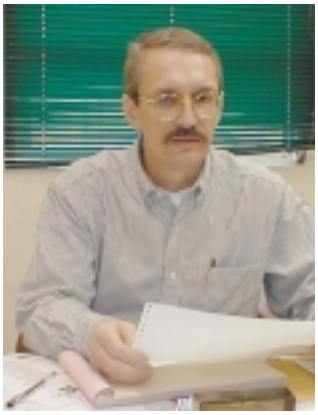
For instance, food and water provided before or after vaccination must not contain any anticoccidials or other drugs that have anticoccidial activity, which would destroy the oocysts provided in the vaccine and prevent the development of immunity, Broussard says.

Steps should be taken to reduce the chances of coccidial challenge to vaccinated flocks. "One way to do this is with good sanitation. Litter should be removed and the chicken houses thoroughly cleaned between rearing cycles," he says.

Gobbi says it is important to keep broiler houses dry through proper ventilation and with proper maintenance of watering systems, which will control the proliferation of coccidial oocysts in litter.

"Coccidial oocysts in broiler populations is impossible to eliminate because they are hardy organisms, and it is virtually impossible to raise completely coccidia-free broilers under commercial conditions," he says.

"But producers can effectively control coccidiosis by combining use of coccidiosis vaccination with these management strategies, as well as meet market demand for poultry meat free of chemical additive residues."



Phillip Hargis, Ph.D.
Nutritionist
Hargis & Associates
Batesville, Arkansas

FEED CONSIDERATIONS WHEN USING COCCIDIAL VACCINES IN BROILERS

Introduction

The goals of every poultry feed program are to provide the cheapest feed cost per pound of meat produced, improve corporate profits, and foster acceptable feed mill production and bird processing.

However, the introduction of coccidial vaccines, such as Coccivac-B, has created additional dietary goals necessary to support the new style of coccidiosis control and the trend toward larger bird size. These goals are to support gut integrity, control broiler growth and maintain the success of the overall anticoccidial program.

Five Key Points

For a successful Coccivac-B program, there are at least five points of nutritional consideration required. These do not constitute a complete list of considerations; these are not necessarily the top five, nor are they in any order of importance; they simply provide some sense of the nutritional effort needed for a successful broiler production cycle using Coccivac-B.

1. Total vitamin/trace mineral supplementation. Vitamin and trace mineral supplementation is a must since vitamin absorption is reduced due to gastrointestinal tract irritation. Vitamin D_3-related chronic skeletal problems are an example of reduced nutrient intake.

Trace mineral intake is challenged due to gut irritation, so stress-related minerals are needed. Zinc must be increased. Organic selenium is a plus.

A critical review of premix specifications is required. Premixes must be tailored for the coccidiosis control program and take into account feed performance capabilities, the mixing situation at the feed mill, broiler housing conditions and genetics. One example of a premix modification might be a 2X to 3X increase in Vitamin E.

2. Diet quality. The goal is to reduce gut irritation that may occur after coccidial vaccination. For birds to develop immunity to coccidia organisms after vaccination, the live oocysts they receive from the vaccine must invade the intestinal tract and reproduce. In the process, the gut may become stressed, increasing the risk for development of necrotic enteritis. The diet, however, can be designed to provide nutrients that enable the epithelial tissue to recover, minimizing the impact of enteritis.

A good-quality diet would include highly digestible animal proteins. Elevated initial peroxide value ingredients should be controlled and microbial-containing ingredients monitored. Abrasive or less digestible ingredients in the diet should be replaced with highly digestible ones.

For example, it is helpful to include fish meal and fish oil into analog proteins. A diet with corn rather than wheat may reduce the incidence of enteritis. Poultry fat may be preferable to blended fat in the diet.

Beware, however, that summer corn may be subject to mold and other damage and be of poor quality, whereas new fall and winter corn crops generally are of higher quality.

3. Pulling feed during heat. Pulling feed during heat reduces the intake of companion drugs so that the drug intake per bird per day is below effective levels. For the drugs to be effective, their dietary level must match daily feed intake. This can be accomplished by feeding 20 grams virginiamycin/ton of feed, for example, versus 10 to 15 grams/ton.

Reprinted from the proceedings of CocciForum, Durango, Colo. September 2000.

Birds coming out of the off-feed period tend to gorge on feed, which stresses the gastrointestinal system. Coupled with the reduced intake of companion drugs, the risk for enteritis is increased. Feed restriction programs on broilers in a coccidial vaccine program should be severely reduced if not eliminated.

4. Dietary profile of feeds must fit the situation. The broiler feed program for birds vaccinated with Coccivac-B must be tailored to meet the needs of the birds according to age and growth stage.

Between one and 16 to 21 days, birds should be provided a slow to moderate start with starter feed designed to help heal the gut and maintain gut health. Dietary changes should be avoided at ages 18 to 20 days of age. The dietary nutrient profile up to 21 days of age should support structural development.

From days 16 to 33 days of age, healing the gut and maintaining gut health remains an important goal in order to avoid enteritis problems. The dietary nutrient profile of this grower feed should support drastic bird growth over a short time. In other words, it's time to fill up the gas tank with high test fuel.

From 33 to 60 days of age, the goal is fast growth with withdrawal feed. There is no time for healing, so the healing process should be complete by this time.

5. Right companion drug for the situation. Companion drugs administered with Coccivac-B include virginiamycin, tylosin, bacitracin MD, zinc bacitracin, lincomycin and bambermycins. Companion drugs can be either growth promoters, bacterial control agents or both. It is important to match the drug capability with the time of year, with gastrointestinal tract challenges and the general bird health in the field at the time of Coccivac-B use.

Feed Mill Impact

Coccivac in broilers can produce the same feed cost per pound of meat that can be attained with an anticoccidial drug program. This can be accomplished by designing a feed program that promotes healing and nutrient absorption, thus supporting broilers during the challenge periods presented by use of the vaccine. In other words, an investment in the Coccivac feeding program enables birds to overcome intestinal challenges and perform up to expectations.

The Coccivac feeding program can be much simpler than a traditional feeding program utilizing in-feed coccidiostats. Milling costs can be reduced, there are fewer variations per ton of finished feed and feed delivery is less complicated. The result is a slightly cheaper feed cost per pound of meat produced.

Milling is reduced by decreasing the number of drugs in the microsystem, which streamlines the mixing process. The Coccivac feeding program allows you to feed the finisher/withdrawal feed for longer periods of time. This allows the feed mill to run its finisher/withdrawal production cycle for several shifts before changing the batch run. Milling costs are slightly reduced. Longer withdrawal feeding periods also can reduce the cost of hauling feed, increasing tons hauled per manhour worked.

'An investment in the Coccivac feeding program enables birds to overcome intestinal challenges and perform up to expectations.'

Conclusion

Coccivac-B can be successfully used in all larger bird situations if the feeds support the birds during the gastrointestinal tract challenges brought to the program by Coccivac-B. There may be some scares due to weight gain delay during the growing period, but the final results will compete with any drug program.

Spray Cabinet OK for Coccivac®-T

Coccivac-T, a live-oocyst vaccine used for many years to protect turkeys against coccidiosis, has been approved for convenient spray cabinet administration in the United States.

The spray cabinet results in more uniform protection against coccidiosis than other administration methods, as well as cost-savings for turkey producers, says Dr. Lanny Howell, technical services veterinarian for Schering-Plough Animal Health.

"The vaccine's sister product, Coccivac-B, grew significantly in the broiler market after it was approved for spray cabinet administration in 1997," he adds. "We expect to see a comparable rate of growth in the turkey industry as more producers discover the convenience and dependability of this method."

The efficacy of spray cabinet administration in turkeys was clearly demonstrated in a recent study by a private research facility. All birds in the study came from the same breeder flock. There were 30 birds per pen and 10 pens per treatment. One group was vaccinated with Coccivac-T in the hatchery at day 1 and the other received the in-feed coccidiostat monensin sodium from day 1 to completion of the trial at 14 weeks. The level of monensin varied with each feed change. Both groups received virginiamycin at 20 gms/ton of feed throughout the trial. All the birds were weighed by pen at 7, 8, 10, 12 and 14 weeks of age.

According to Howell, the group vaccinated with Coccivac-T had significantly higher average live weights compared with the hens receiving monensin. Feed conversion adjusted for mortality was not statistically different between the two treatment groups.

Furthermore, the total feed cost to produce a pound of bird was also significantly lower for hens receiving Coccivac-T, he says. The feed cost savings was calculated to be 0.7 cent (US) per pound of body weight, which equates to a savings of over 11 cents per hen (0.7 cent x 16 lbs).

Spray cabinet results in more uniform coverage and protection.

Field trials involving nearly 20,000 doses of Coccivac-T administered to day-old poults demonstrate that the vaccine is safe when administered by spray cabinet. In the trial, 19,382 birds in two barns received the vaccine via coarse spray administration at day one of age. The birds were then monitored for 28 days.

"There were no untoward effects caused by coarse spraying the vaccine in the hatchery," he says. "In fact, when compared with the history at the farm, mortality was lower and weight and weight uniformity was above average in Coccivac-T-vaccinated birds."

In case you missed it…

CocciForum isn't the only poultry trade magazine writing about the growing interest in coccidiosis vaccination. Be sure to read these articles:

- "Vaccination eliminates concern about coccidiostat residues," "Research indicates vaccine is effective and yields good performance," "Switch to vaccine no problem for feed mills," and "Coccidiosis vaccination gaining ground in US," *World Poultry*, No. 9, Vol. 16 2000.
- "Rotating feed medications with vaccination" and "Performance after coccidiosis vaccination," *Watt Poultry USA*, August 2000.
- "Specialists outline options, strategies for managing avian coccidiosis," *Feedstuffs*, Sept. 4, 2000.
- "Coccidiosis: The value of vaccination," *African Farming*, July/August 2000.

CocciForum Magazine Debuts to Rave Reviews

"This is a very good, high quality publication filled with timely information. Let this be the start of something big."

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Dr. James Tollett, Chair and Professor
Southern Arkansas University

"Great innovative idea. Could be a great asset to the cost and growth of broiler production."

Pete Martin, Complex Manager
Mar Jac Poultry, Inc.
Gainesville, Ga."

"*CocciForum* is really very informative and will definitely be of great help to me, with informative and logical advice on coccidiosis control to our customers and growers."

Nestor A. Adriatico
Tech Service Manager
American Selected Products
Milton, Penn.

CocciForum Symposium Provides New Ideas

Schering-Plough Animal Health continued its successful series of CocciForum symposia with a three-day meeting exclusively for poultry veterinarians.

More than 40 consultants came to the old silver mining town of Durango, Colo., to learn more about new strategies for coccidiosis management. Speakers included Dr. Harry Danforth of the USDA; Dr. David Chapman of the University of Arkansas; Dr. Greg Mathis of Athens, Ga.; Dr. Steve Roney of Sanderson Farms, Laurel, Miss.; and Dr. Phil Hargis of Bates, Ark. Schering-Plough Animal Health's Drs. Charlie Broussard and Linnea Newman also presented new information from field trials.

In addition, Schering-Plough Animal Health used the conference to brief veterinarians about "Georgia 98," a new infectious bronchitis serotype that has been reported in U.S. broilers. Dr. Mark Jackwood of the University of Georgia presented his latest work with the new strain, which demonstrated that Georgia 98 is a variant of 072, the serotype found in Shorbron®-D, which is currently the vaccine of choice.

A proceedings summarizing the Durango presentations is now available. For a free copy, contact your Schering-Plough Animal Health representative or email phyllis.middleton@spcorp.com.

Dr. Steve Roney
Sanderson Farms

Peco Foods *continued from page 9*

bers are looking pretty good," he says.

The company also plans to use the vaccine in its recently acquired 640,000/week operation in Philadelphia, Miss., where they produce smaller birds weighing 5 to 5.5 pounds. Bowman says he initially had some concerns about using the vaccine in birds fed to lighter weights because of the "knock down" in feed efficiency and growth that can happen the first week or two after coccidiosis vaccination, which introduces live oocysts into the birds. Larger birds have time to recover.

"But I talked to a vet at another poultry company who was using it successfully in birds fed to only 4 pounds, and they had good results with vaccination," he says.

This spring Bowman says they may back off salinomycin early and try Clinacox™ (diclazuril), a synthetic anticoccidial that recently received combination clearances in the United States with the growth enhancers bacitracin methylene disalicylate, bambermycin and virginiamycin.

"From the data we've seen, I'd be inclined to use Clinacox as a clean-up product for one or two cycles before going on the vaccine," Bowman says.

Vaccinated birds have also remained free of clostridial enteritis. Bowman thinks it's important to keep a growth promotant such as virginiamycin in the starter and grower rations to protect the gut and ward off enteric problems.

"But as time goes on, I think we'll also see less and less antibiotic usage in chickens," Bowman predicts. "We see what's happening in Europe, and the FDA is already talking about banning more antibiotics here. We're not trying to produce a drug-free bird at this time, but we're exploring our options so we'll be ready. Coccidiosis vaccination lets us meet that demand without com-

COCCI FORUM

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