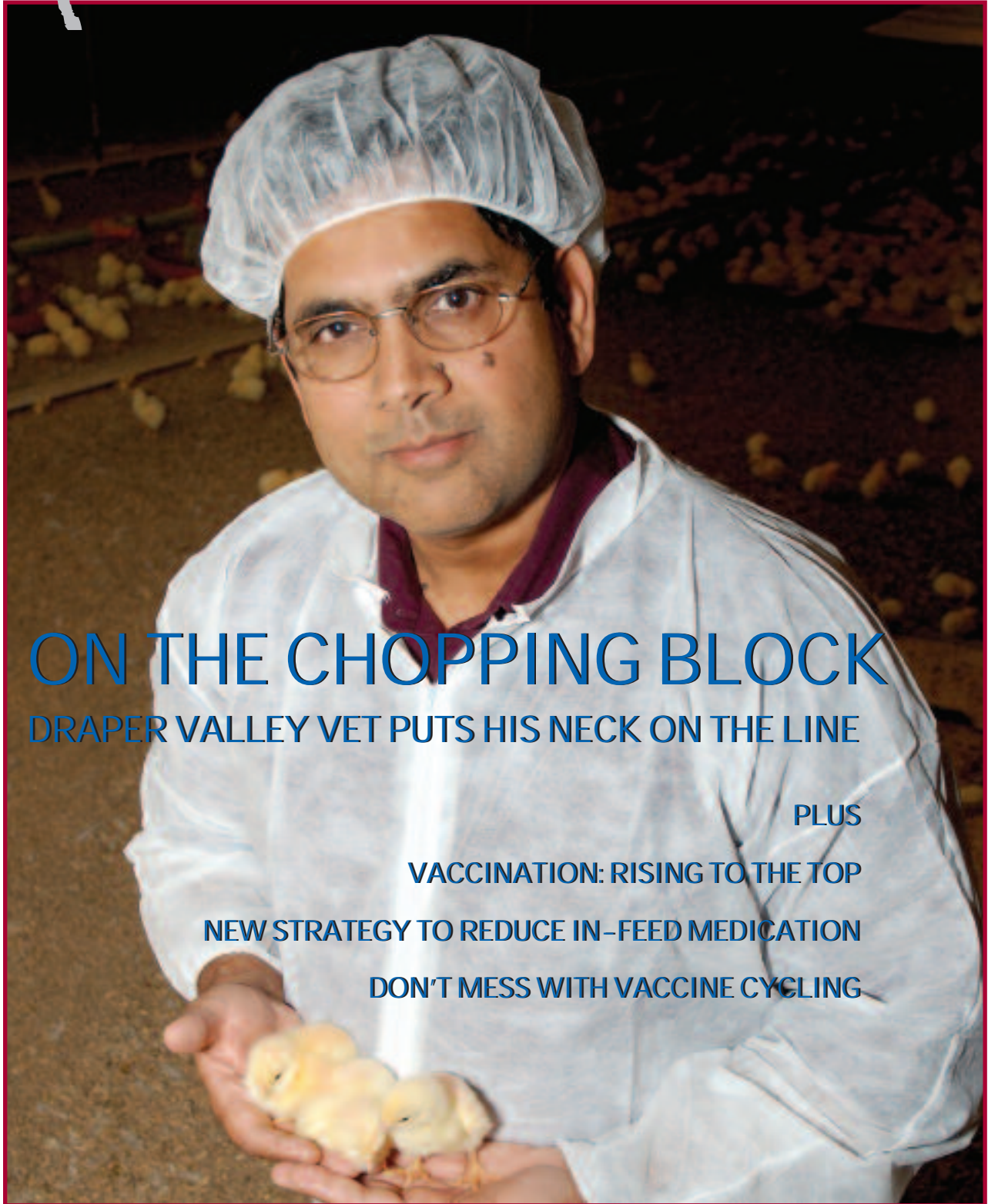


COCCI FORUM



ON THE CHOPPING BLOCK

DRAPER VALLEY VET PUTS HIS NECK ON THE LINE

PLUS

VACCINATION: RISING TO THE TOP

NEW STRATEGY TO REDUCE IN-FEED MEDICATION

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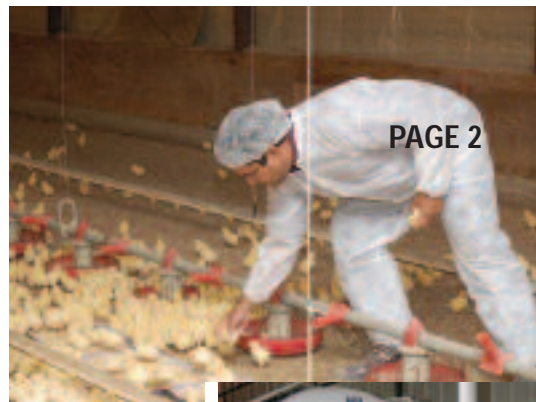
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Necrotic enteritis outbreaks stop after vaccination



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Cover: Dr. Mueez Ahmad of Draper Valley Farms with commercial chicks that no longer need an ionophore or in-feed antibiotics to ensure good intestinal health. Story begins on page 2. Photo by Joseph Feeks.

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ON THE CHOPPING BLOCK

After a revealing 'conversation' with his broilers, Dr. Mueez Ahmad put his neck on the line to benefit their intestinal health and performance

For as long as anyone can remember, it was always the chicken that put its head on the proverbial chopping block for the good of man.

Now, at least one production veterinarian for a US poultry company has shown that he's willing to make the same sacrifice for the good of his birds.



Ahmad: 'The birds are telling me this program isn't going to fail.'

After 5 years of success using a coccidiosis vaccine in the company's line of antibiotic-free birds, Dr. Mueez Ahmad of Draper Valley Farms, Mount Vernon, Washington, wanted to pull the in-feed anticoccidials used in the company's commercial broilers and start vaccinating all birds year round.

It wasn't a spontaneous decision. The company, which places about 600,000 birds a week from its farms in Washington State and Oregon, had

been vaccinating chicks in its antibiotic-free line — about 15% of total production — with Coccivac-B instead of medicating with a traditional ionophore antibiotic.

The program worked well, so in 2005 Draper Valley began using the vaccine in its commercial birds for three cycles, usually from April through September. For the other three cycles, Draper Valley kept the birds on an ionophore. All commercial birds received an antibiotic to keep necrotic enteritis in check.

Then they started asking questions.

Inquiring minds

Impressed with the excellent performance of the commercial broilers that had been on the vaccine, production manager Dave Wilson kicked off the inquisition by asking Ahmad why they stopped vaccinating after three cycles. Wilson also noted that the vaccinated birds didn't suffer from spiking mortality syndrome. He also thought that frequent changes in medications might be stressing the birds and making them more susceptible to this condition.

Ahmad initially defended the vaccine-ionophore rotation in the commercial birds, explaining to his inquiring production manager that a lot of poultry operations had used this regimen with good success. He also noted that using the vaccine for several cycles helped to restore the sensitivity of coccidial organisms to traditional ionophore antibiotics and chemicals.

In time, however, Ahmad started questioning his own rationale.

"Our strategy had been to put the birds on Coccivac-B for three cycles

and then switch to an ionophore for the next three,” he says. “But in reality, we were getting only one good cycle from the ionophore. Production dropped off in the second cycle and became even worse on the third. We got to talking about it further and concluded that if the birds were doing so well on the vaccine, maybe we should just leave it in there and go with it year-round.”

Besides thinking that this was the best approach for the birds, Ahmad and Wilson also felt that any efforts to reduce or even eliminate drug usage was consistent with the Draper Valley’s commitment and vision to distinguish its brand and add value to its product line.

‘Talking to the birds’

But not everyone at Draper Valley shared their enthusiasm for vaccinating commercial broilers all year long. Some thought it was fine to use the coccidiosis vaccine from spring through fall, when there was better air circulation and presumably less of a coccidiosis challenge. But the idea of dropping ionophores and chemicals in winter initially met some stiff resistance. In fact, one influential advisor was so convinced the plan would fail, he threatened to resign if the company took the plan forward.

Ahmad dug in his heels, too. Reflecting on the showdown, he says, “I almost lost my job over this decision to vaccinate the birds all year, but I was confident in our plan and felt it was the best way to go — for both the company and the birds.”

To support his case, Ahmad brought in a team of experts to speak objectively on the vaccination program’s behalf. It wasn’t a panel of veterinarians or nutritionists, however. Ahmad asked for input from the chickens themselves.

“I’m posting birds every month, and every month they’re telling me their gut is better when they’re on the coccidio-

sis vaccine,” he remembers telling the company’s management. “The birds are telling me this program isn’t going to fail.”

“The birds are telling you?” asked one company decision-maker in disbelief. “You’re actually talking to the birds?”

No secrets to Draper Valley’s success

Situated in the Pacific Northwest, about 75 miles north of Seattle, Draper Valley is a long way from the nearest field of corn or soybeans, most of which are grown in the Midwest.

This distance means higher feed costs, which makes it impractical for Draper Valley to go head-to-head with the much larger poultry companies based in the southeastern United States.

“That’s why we position our product as a local bird,” live-production manager Dave Wilson says. “We can’t compete against the big guys. Our market is strictly Washington State and Oregon.”

That hasn’t stopped Draper Valley from opening its doors to representatives from three major multinational integrators interested in coccidiosis vaccination and other practices that will help them meet the growing demand for birds raised without antibiotics.

“There’s certainly a lot of interest in antibiotic-free production, because that’s the way the industry is trending,” says production veterinarian Dr. Mueez Ahmad. “We don’t view the big integrators as competitors, so we’re happy to share with them what we have learned. I think it will benefit the poultry industry as a whole.”

Lesions don’t lie

At that point, Ahmad concedes with a smile, “some people thought I had some psychological problems.” He held firm to his position, though, and provided more tangible evidence — in this case, the results of post-mortem exams of birds taken randomly from all houses in Draper Valley’s system. The posted birds ranged from 14 days to market age.

The investigation showed that vaccinated birds had minor but manageable coccidiosis lesions early in the bird’s

life, before 21 days, versus the medicated birds, which showed had more serious lesions caused by wild strains of coccidiosis at 34 or 35 days.

Ahmad says that seeing lesions in

made it necessary to significantly limit the product's usage.

"Other than that, seeing some lesions in your birds is perfectly normal," he says. "It's just a matter of how bad they are and when they occur."

Hatchery: 'The process has become very streamlined'

Coccivac-B is administered to day-old chicks in the hatchery using the specially designed SprayCox II spray cabinet, which showers the birds with the vaccine.

Because the vaccine contains live oocysts that stimulate birds' natural immune system, good vaccine coverage is essential.

A red dye that is added to the vaccine helps hatchery workers do a quick visual check, but the dye also encourages preening and ingestion of the live oocysts.

"The process has become very streamlined," says Robin Visser, hatchery manager at Draper Valley, which maintains two hatcheries. "We have no additional labor, with the exception of just mixing the vaccine itself."



And even that has gotten easier. She says the addition of AirMix — a unique system that uses an air pump to keep the vaccine oocysts in suspension — has given her even more confidence that the vaccine is being properly administered.

On-site technical support from Schering-Plough Animal Health has also helped to train hatchery workers and keep the process moving efficiently.

birds is not unusual — or at least that was the accepted paradigm at the time. In his 15 years of commercial poultry production, he can't recall posting birds without lesions from *Eimeria tenella*, a major cause of coccidiosis. The one exception was the first time he used Clinacox (diclazuril), a synthetic anti-coccidial that initially provided outstanding control until resistance issues

'The birds will be fine'

After much debate, Draper Valley's management decided to try Ahmad's vaccination plan in October of 2005 — a time when the company normally would have rotated its commercial broilers back to the ionophore. But still, the high-stakes showdown wasn't over.

In late December — shortly after one advisor made good on his promise to quit — Ahmad stuck with his long-standing plans to take an extended vacation to visit his family in Pakistan. "They will be fine, nothing will happen," Ahmad confidently told his management before packing his bags and leaving Wilson in charge.

And apparently, Ahmad was right.

"It was the best winter we ever had since starting with this program," Wilson recalls. "And by March or April, everyone realized that our commercial broiler operation didn't collapse and that performance had, in fact, improved."

Now, after more than 24 months of using coccidiosis vaccination in all the commercial birds, Ahmad says he's hardly seeing any lesions. He thinks that continued use of the Coccivac-B, which provides a controlled, balanced dose of live oocysts that naturally stimulate immunity, has caused the population to shift away from tenacious wild strains to those that can be more easily managed.

"If we see lesions in the birds today, it's usually associated with another management problem or possibly clostridium, not coccidiosis," he says.

In its commercial birds, Draper Valley uses either BMD (bacitracin methylene disalicylate) or Stafac (virginiamycin) to help keep enteritis in

check. If there's an enteritis break, Ahmad will bring it under control by adding penicillin to the water for 2 or 3 days.

No gangrenous dermatitis

Ahmad says Draper Valley's use of Coccivac-B yielded two other unexpected benefits, both related to the vaccine's ability to halt late coccidial cycling.

First, Ahmad and Wilson have not seen a single incidence of gangrenous dermatitis, a clostridium-related health problem that results in high mortality, carcass condemnations and trimmed parts since birds are on cocci vaccine. Economic losses have been estimated to be as much as \$1.31 per affected bird.

Recent reports suggest that late coccidial cycling predisposes birds to this costly condition. Gangrenous dermatitis also tends to occur in flocks on chemical-to-ionophore and straight ionophore programs, which allow late coccidial cycling. In contrast, field experience shows that flocks vaccinated against coccidiosis have lifelong immunity against coccidiosis, do not experience late coccidial cycling and tend not to develop gangrenous dermatitis.

"Gangrenous dermatitis is a very expensive disease — one that hits birds close to market age, usually around 38 to 40 days — and it doesn't respond to treatment very well. Even if you do treat, you need to be very careful about withdrawal times at that age," Ahmad says.

"If your birds don't die from dermatitis, you can lose them on the processing line, where they'll be condemned," he continues. "Given the choice, I would much rather deal with the risk of necrotic enteritis than gangrenous dermatitis. Enteritis is definitely the lesser of two evils, and you can keep it under control with good management."

Ahmad also thinks that late coccidi-

al cycling suppresses birds' immunity to other diseases. "Immunity suppression is an expensive phenomenon," he says. "The way I see it, anytime you have a stressful environment for the birds, it compromises their immunity and makes them more susceptible to other disease problems. Gangrenous dermatitis is one good example of that, but there's also staphylococcus and Escherichia coli.

"There's a group of bacteria out there just sitting and waiting for another bacterium to create an insult in the skin," he continues. "It could be that our new program results in better intestinal health, which in turn suppresses these bacteria."

Flexible formulations

While coccidiosis vaccination has allowed them to reduce drug usage, it has also given them more flexibility in formulating rations — for the simple reason that they no longer have to work around a predetermined drug-rotation schedule. As a result, Draper Valley now invests more in its starter rations to ensure optimum intestinal health but saves on the back end because birds are moved to the low-cost finisher or withdrawal ration 7 to 10 days sooner.

"Our nutritionists can make changes in the needs of the birds, without having to work around the medication program," Ahmad says. "Having the anticoccidials out of the feed gives them a lot more freedom."

The feed mill enjoys the freedom, too, because it now has fewer medications to track and doesn't have to worry about flushing drug residues from the mill.

As for the economic side of the picture, Ahmad says Draper Valley's medication costs appear higher than the Agri Stats' national average, but that's because that category includes the vaccine, which Ahmad says is misleading.

"When you look at the cost variance of the different ionophores you'd have



Wilson: 'It was the best winter we ever had.'

to use throughout the year if we didn't vaccinate, the cost tends to even out," he says.

One other way to look at it: "If you divide the vaccine cost back into the cost of the feed given to those birds, you'd see that the cost of the vaccine isn't a big factor. The price of the vaccine is offset by its benefits. I think it's a wash."

USDA standard of 6% to 7% to about 2%."

Wilson thinks the lower salmonella numbers are a byproduct of the company's diligent efforts to control enteritis without drugs.

"We've made a lot of changes to our management, not just to the litter but also to ventilation, cleaning out our wells and water lines and so on. We knew clostridia were going to be our number one challenge as we reduced or eliminated drugs. Any time we fail it always goes back to an issue that occurred in the first 7 to 10 days. In our antibiotic-free program, we knew that if we made it to 21 days without an outbreak, it would be clear sailing."

Lighting also came into play. Ahmad and Wilson decided to give vaccinated chicks more light intensity in the first 7 days to help them develop a stronger immune system, more easily see the food and water, and get off to a fast start.

Once they're in what Ahmad calls "their comfort zone," usually around day 14, they reduce the light intensity to slow down the birds' growth — a practice recommended by Cobb, which provides their genetics. "It's a step-up/step-down program," Ahmad says. "Without that, they will continue to eat and grow their muscles, but at a faster pace than their skeletal and the cardiovascular systems."

Faster growth rate actually became a problem for Draper Valley after all of the company's birds were put on Coccivac-B. He fixed it by reducing light.

The future is now

The new emphasis on better nutrition, environment, management, and fewer drugs has also helped Draper Valley's production team better prepare for future market trends. In fact, in March 2007, Draper Valley also decided to drop the growth-promoting antibiotic from its commercial birds' rations in

Commercial broilers: Learning by example

Birds raised for Draper Valley's antibiotic-free line are on a proprietary corn-soybean formulation, with no added fat or other animal byproducts. The company also reduces stocking density by 20%.

According to veterinarian Dr. Mueez Ahmad, Draper Valley nutritionists spent about 7 to 8 years optimizing the vegetarian diet's protein-energy ratio.

"You can't get the growth rate if you don't have the energy there. And if you have too much protein, that can also hurt you," he continues. "A vegetarian diet is not an impossible phenomenon. Anybody can do that, but it takes some work and you can't do it overnight."

Ahmad says that many concepts that Draper Valley has developed for its antibiotic-free line can be easily adapted to commercial birds. And coccidiosis vaccination is only one example.

"I think we'll be introducing more of these concepts to our commercial birds in the future," says Dave Wilson, live-production manager. "That's the direction consumers and the industry are heading."

Managing litter and light

Managing the birds' environment also helps build immunity and reduce disease pressure. Wilson says they prefer raising birds on "built-up litter" for 3 or 4 years without a lot of cleanout. "We just go in and de-cake it for every grow-out," explains Wilson.

This strategy, adds Ahmad, helps to stimulate bird immunity at an early age. "Our salmonella numbers over the last 2 years are dropping very rapidly," he adds, pointing to the decline from an

favor of an experimental competitive-exclusive product that helps promote better intestinal health.

Reflecting on their recent changes, Ahmad says that raising some of the company's birds without antibiotics has forced them to become even better managers.

"When you go antibiotic-free, you can't use drugs and Band-Aids to cover up our mistakes," he says. "That experience, I think, has had a profound effect on the management of our commercial birds as well. The use of the coccidiosis vaccination, for example, has helped us develop a better understanding of how birds grow. I don't look at vaccination as a disease-management program. To me, it's more of an animal husbandry approach.

"When the company came to me and said it wanted all of our birds to be totally antibiotic-free, I told them we could do it with the next cycle of birds. Five years ago, I probably would have told them we needed 15 years," he adds, smiling.

Vaccination: 'Now it's a smooth ride'

What advice does Draper Valley share with other producers thinking about vaccinating for coccidiosis?

"I tell them it's like anything else that's new," says Ahmad. "You may hit a few bumps when you start out, and sometimes that causes people to give up. But once you get over the hump — say, once you're past the first two or three cycles — it's a smooth ride from there. More than anything, you have to be willing to become a better manager."

Wilson agrees. "I wanted to quit vaccinating several times because I wasn't comfortable with it after the first cycle. And besides, medications seemed so much easier.

"Then I had Dr. John McCarty (a consulting veterinarian for Schering-Plough) here and he said, 'Dave, you have to be patient and to stay on it a lit-



Day-old chicks are showered with vaccinal oocysts as they pass through the SprayCox cabinet.



A red dye added to Coccivac-B allows hatchery workers to monitor vaccine coverage. The red color also encourages preening, which helps to spread vaccinal oocysts.

tle longer.' I told him he was full of it," Wilson adds, smiling. "But you know what? Dr. McCarty was right, and I'm glad I listened to him. Change can be uncomfortable at first, but it's usually for the better."

VACCINATION: RISING TO THE TOP

US poultry complexes using Coccivac-B now among top performers

A national report shows that of 10 poultry complexes with the best results for “days to 5 pounds” in 2006, the top three were using Coccivac-B vaccine instead of a traditional in-feed anticoccidial for coccidiosis control.

The complex with the best result for calorie conversion was also using the vaccine instead of anticoccidials for two of four time periods in 2006, according to the survey (Table 1).

Overall, at least four complexes

among the top 10 industry performers for days to 5 pounds (2.27 kg) were using Coccivac-B at some time in 2006; between one and three of the top 10 performers for calorie conversion were using Coccivac-B.

In striking contrast, the same report in 2003 showed that none of the complexes using Coccivac-B were among the top 10 for days to 5 pounds (Table 2).

The report was prepared by Agri Stats, Inc., a statistical research and

Table 1. In 2006, the top three poultry complexes with the best results were using Coccivac-B for control of coccidiosis.

		JAN – MAR		APR – JUN		JUL – SEP		OCT – DEC	
		Days to 5.0 lbs	Calorie Conversion	Days to 5.0 lbs	Calorie Conversion	Days to 5.0 lbs	Calorie Conversion	Days to 5.0 lbs	Calorie Conversion
Best Company	Starter Grower	Coccivac-B	Coccivac-B	Coccivac-B	NIB COB	Coccivac-B	SCX SCX	Coccivac-B	Coccivac-B
2nd Company	Starter Grower	Coccivac-B	MAX MON	Coccivac-B	NIB COB	Coccivac-B	MAX MON	Coccivac-B	BCX BCX
3rd Company	Starter Grower	Coccivac-B	BCX BCX	Coccivac-B	NIB COB	Coccivac-B	MAX MON	Coccivac-B	MON BCX
4th Company	Starter Grower	SCX SCX	SCX COY	NIB BCX	Coccivac-B	SCX SCX	Coccivac-B	Coccivac-B	Coccivac-B
5th Company	Starter Grower	NIB COB	NIB BCX	SCX SCX	NIB BCX	SCX SCX	SCX SCX	COB COB	SCX MON
6th Company	Starter Grower	Coccivac-B	BCX BCX	Coccivac-B	COY SCX	Coccivac-B	CLI SCX	Coccivac-B	BCX BCX
7th Company	Starter Grower	MON MON	SCX SCX	SCX SCX	MAX MAX	MON MON	BCX BCX	Coccivac-B	MON BCX
8th Company	Starter Grower	MAX COB	NIB COB	COB COB	NIB COB	CLI SCX	BCX BCX	SCX SCX	BCX BCX
9th Company	Starter Grower	NIB COB	MON COB	COB COB	NIB MON	MON SCX	SCX MON	SCX BCX	Coccivac-B
10th Company	Starter Grower	NIB MAX	COB COB	MAX MAX	MAX BCX	BCX BCX	SCX MON	NIB BCX	BCX BCX

Source: Agri Stats, Inc.

analysis firm that receives data monthly from 160 poultry complexes owned by various poultry companies. Agri Stats annually compiles the figures and provides comparisons.

Agri Stats also found that for several months in 2006, many of the complexes using Coccivac-B were also in the top 10 for adjusted feed ingredient expense — the feed cost/pound of live weight, which quantifies feed conversion ratios by dollars and cents.

Analysis of specific results averaged out for all complexes and for birds by weight categories (Table 3) underscores the positive results — broilers vaccinated with Coccivac-B against coccidiosis had better adjusted calorie conversion and fewer days to 5 pounds

compared to those on in-feed anticoccidials. Average mortality was similar except for the over 6-pound (2.72-kg) category, where it was considerably lower among Coccivac-B vaccinated birds.

Enhances profits

“Good results for days to 5 pounds is important because this parameter reflects daily weight gain,” says Dr. Marcelo Lang, a veterinarian and poultry marketing director for Schering-Plough Animal Health. Fewer days to 5 pounds improves the utilization of poultry houses and helps growers reap better profits, which enhances grower relations, he says.

“It’s an overall sign of good health and an indication that the birds are

Table 2. In 2003, none of the top 10 poultry complexes with the best results were using Coccivac-B for control of coccidiosis.

		JAN – MAR		APR – JUN		JUL – SEP		OCT – DEC	
		Days to 5.0 lbs	Calorie Conversion	Days to 5.0 lbs	Calorie Conversion	Days to 5.0 lbs	Calorie Conversion	Days to 5.0 lbs	Calorie Conversion
Best Company	Starter	NIB	NIB	NIB	SCX	CLI	SCX	SCX	SCX
	Grower	DCX	DCX	DCX	SCX	DCX	SCX	SCX	SCX
2nd Company	Starter	NIB	SCX	NIB	NIB	DCX	BCX	BCX	SCX
	Grower	COB	SCX	SCX	AVI	CLI	BCX	BCX	SCX
3rd Company	Starter	NIB	SCX	SCX	NIB	SCX	BCX	SCX	SCX
	Grower	SCX	AVI	SCX	DCX	SCX	BCX	SCX	SCX
4th Company	Starter	MON	NIB	SCX	NIB	BCX	SCX	SCX	BCX
	Grower	COB	SCX	SCX	COB	BCX	SCX	SCX	BCX
5th Company	Starter	NIB	SCX	SCX	NIB	DCX	SCX	SCX	BCX
	Grower	COB	SCX	SCX	SCX	CLI	SCX	SCX	BCX
6th Company	Starter	COB	MON	SCX	BCX	DCX	CLI	SCX	SCX
	Grower	COB	MON	SCX	BCX	CLI	DCX	SCX	SCX
7th Company	Starter	NIB	MON	COB	COB	SCX	BCX	SCX	SCX
	Grower	COB	COB	COB	COB	SCX	BCX	SCX	SCX
8th Company	Starter	COB	CLI	BCX	MON	SCX	NIB	DCX	SCX
	Grower	COB	SCX	BCX	MON	SCX	SCX	DCX	SCX
9th Company	Starter	NIB	BCX	MON	NIB	DCX	SCX	DCX	DCX
	Grower	COB	BCX	COB	AVI	SCX	SCX	DCX	DCX
10th Company	Starter	MAX	NIB	COB	COB	DCX	DCX	MON	SCX
	Grower	MON	COB	COB	COB	SCX	CLI	SCX	SCX

Source: Agri Stats, Inc.

Rising to the top *Continued from page 9*

Table 3. Comparison of 2006 results for all complexes and by weight categories.

	Anticoccidial	Coccivac-B
Results for all complexes		
Adjusted calorie conversion	2,691	2,679
Days to 5 lbs	44.40	42.38
Average mortality	4.68%	4.72%
Feed meds \$/ton*	\$3.31	\$1.90
Results for birds between 5.2 to 6.0 lbs		
Adjusted calorie conversion	2,677	2,655
Days to 5 lbs	45.14	41.80
Average mortality	4.80%	5.05%
Feed meds \$/ton*	\$3.30	\$1.76
Results for birds over 6.0 lbs		
Adjusted calorie conversion	2,683	2,682
Days to 5 lbs	43.29	42.71
Average mortality	5.23%	4.61%
Feed meds \$/ton*	\$3.19	\$1.82

Source: Agri Stats, Inc.

**Feed meds \$/ton is a difficult comparison to make since feed costs are determined by ton and the cost of Coccivac-B is based on the number of birds. A fairer comparison would factor in the increased cost of chick vaccination for the same complexes, but data is not now available.*

growing to their full potential,” Lang adds.

Why are so many complexes using Coccivac-B now in the top 10 but were not just a few years ago? “We can only guess,” says Lang. “From these data, we cannot say that Coccivac-B is responsible for the good results at top-performing complexes, but we can surmise that Coccivac-B is contributing to their success.

“It could be management changes or that problems with traditional in-feed anticoccidials, such as resistance, have intensified. It could also reflect the improved advice we give to customers about how to get the best

results with the vaccine, or the fact that several companies that used Coccivac-B in 2006 were repeat users, and we’ve seen many times that performance with Coccivac-B tends to improve with repeat usage,” he says.

The new data should help dispel the notion that using Coccivac-B for coccidiosis control slows broiler growth. “Based on our experience in the field and this recent Agri Stats report, it is apparent that complexes using Coccivac-B coupled with good management can achieve weight gain and calorie conversion ratios that are among the best in the entire industry,” Lang says.

NEW STRATEGY TO REDUCE IN-FEED MEDICATION

Passive immunity a viable strategy for Canada's Dr. Neil Ambrose

Those who know Neil Ambrose know that he's passionate about chicken production. In addition to growing chicken on his own farm located nearby Abbotsford, BC, Dr. Ambrose is the Director of Veterinary Services for Sunrise Farms, BC and Alberta. This is why he's constantly looking for management practices that are effective and economical and that also meet the challenges of an evolving industry and new market standards.

Currently, Ambrose is conducting trials on his farm to identify an alternative program to Canadian in-feed medications. This follows European regulatory changes to eliminate all in-feed medications. "Canadian regulations often follow what happens in Europe, so I want to be proactive and develop a program that can successfully grow chickens on a non-medicated feed basis," explains Ambrose.

After initial trials with disappointing results, Ambrose was introduced to a new strategy based on using Coccivac-B vaccine plus maternal antibody induced by an experimental vaccine developed by Schering-Plough Animal Health in order to tackle both coccidiosis and necrotic enteritis. He then initiated a two-flock trial with this new passive antibody strategy and got encouraging results that are now inspiring him to evaluate the program without any backup from in-feed medication.

Off to a rough start

Ambrose's first trial attempts to reduce dependency on in-feed medications focused on controlling coccidiosis. He replaced in-feed anticoccidials with Coccivac-B vaccine, while continuing to use an in-feed antibacterial for necrotic enteritis control. This program

was applied for six consecutive trial flocks and achieved mixed results. Although clinical coccidiosis was controlled, each flock did experience outbreaks of mild necrotic enteritis that resulted in increased mortality and reduced daily weight gain. It's important to note that the traditional wheat-based ration given to birds during the trials probably had a negative impact on results because it usually predisposes birds to greater necrotic enteritis,



Ambrose: 'Higher gut viscosity creates an ideal environment for C. perfringens.'

and that each bout of necrotic enteritis coincided with a normal feed change.

Vaccine plus passive immunity: a new vaccine approach

After these six flocks, Ambrose returned to his regular in-feed antibacterial and anticoccidial program for three flocks. It was during this period that Schering-Plough Animal Health consulting veterinarian, Dr. Linnea J. Newman, learned of his trials and intro-

Editor's note: This article originally appeared in In Fine Feather, a Schering-Plough newsletter published in Canada. For more details about Ambrose's study, see the article beginning on page 22.



Sunrise Farms modified diets to ensure a good start and reduce the necrotic enteritis-causing bacterium in young chicks.

duced him to a new strategy, which included Coccivac-B plus passive immunity from a new vaccine to control necrotic enteritis.

Recently registered for use in the U.S., this new necrotic enteritis vaccine is administered to the breeder hen, which then passes the antibodies on to the broiler chick, potentially eliminating the need for in-feed antibacterials. Ambrose's interest in developing a production program for control of coccidiosis and necrotic enteritis without the use of medicated feed made his farm an ideal candidate for Schering-Plough Animal Health to test progeny from flocks vaccinated with the new vaccine in addition to Coccivac-B vaccine.

Getting chicks off on the right foot

After a three-flock break, Ambrose initiated a two-flock trial with Coccivac-B and passive immunity from the new

vaccine developed by Schering-Plough Animal Health. Broiler chicks from vaccinated parents and carrying antibodies against necrotic enteritis were placed on Ambrose's farm. In the first two trials, he eliminated all in-feed anticoccidials but maintained a reduced level of in-feed antibacterials as insurance. "We kept a low level of antibacterial in the feed because I wasn't ready to risk pulling the plug completely on the first two trials," explained Ambrose.

With the adoption of the new passive immunity program, Ambrose also wanted to ensure the chicks got off to the best start possible. This is where his nutritionist Dan Moody of Ritchie Smith Feeds stepped in. "When you go the vaccination route there are a lot of management factors you need to consider," explains Moody. "Vaccines work to improve the birds' immune system by challenging them with the disease. The outcome provides birds with antibodies and the ability to stand on their own and perform well. But, there are other factors that contribute to good performance, and feed is one of them."

This fit well with Ambrose's disease management philosophy, which says that in addition to appropriate use of medications and vaccines, beating coccidiosis and necrotic enteritis also requires strict attention to diet and barn management.

Ambrose had been feeding a traditional wheat-based ration with in-feed medication for both coccidiosis and necrotic enteritis. With the new vaccine trial, Ambrose, working with Moody, modified the diet to ensure a good start and to reduce the chance of creating a gut environment which would foster the proliferation of *Clostridium perfringens*, the necrotic enteritis-causing bacterium.

A specific starter ration was developed by Moody to include the best available ingredients. The ration was more expensive than other standard starters, but would help ensure the

broiler chicks got off to a healthier start, achieving a heavier seven-day weight.

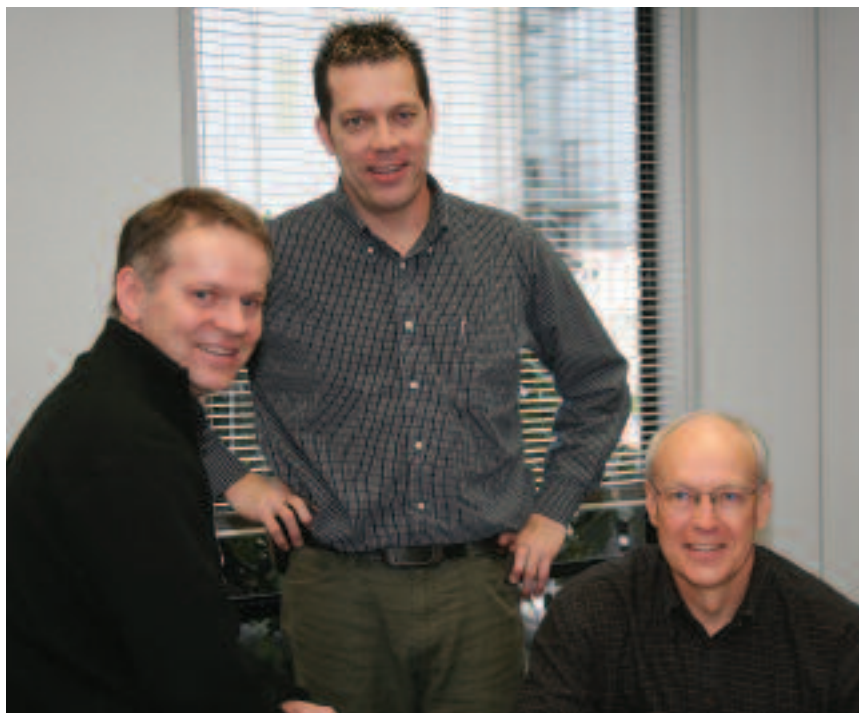
The grower ration was also modified from a 100% wheat base to a 70:30 wheat:corn mix. "Wheat has been shown to predispose birds to greater necrotic enteritis because it changes the gut pH, increasing gut viscosity," explains Ambrose. "Higher gut viscosity creates an ideal environment for *C. perfringens* to grow, and increases the potential of necrotic enteritis development. Corn doesn't have this impact on gut viscosity, so we decided to formulate it into the diet."

When reformulating the diet, the goal was to include more digestible products that are better utilized by the birds. Feed components, such as protein, that are not totally utilized in a ration often end up in the lower gut, creating an optimal food source to support the growth of *C. perfringens*.

Moody and Ambrose also formulated the new grower ration to replace part of the soybean meal with highly digestible soybean concentrates, in order to reduce indigestible sugars. They also opted for higher quality meals to lower the overall protein content and reduce protein passage to the lower gut. "This new diet, in combination with passive immunity from the new trial vaccine is how we were tackling necrotic enteritis," he says.

Ambrose also firmly believes that effective coccidiosis control makes necrotic enteritis management easier. To ensure he receives the best Coccivac-B vaccine performance, Ambrose also refined application methods at Fraser Valley Chick Sales, the Sunrise Farms hatchery which supplies his chicks, to help optimize vaccine application. Working with Schering-Plough Animal Health rep Lionel Gibbs, Ambrose replaced the hatchery's single nozzle vaccine applicator with the Spraycox double nozzle spray

continued on page 20



Ambrose (left) with Lionel Gibbs of Schering-Plough and Dan Moody of Ritchie Smith Feeds

Coccivac-B rotation boosts in-feed anticoccidial efficiency

Research has shown a consistent boost in feed conversion efficiency and weight gain when producers rotate back to in-feed medications after three flocks with Coccivac-B vaccine.

Ambrose's trials provide more proof of this rotation's success. His birds benefited from this rotation effect almost by accident. After completing his first six trials with Coccivac-B and an in-feed antibacterial, he took a break, rotating back into three in-feed medicated flocks. During this three flock break, he observed rewarding rotation results.

"The first two flocks back on medicated feed had extremely good feed efficiency," says Ambrose. "This is because the Coccivac-B vaccine used on the previous six flocks renewed the sensitivity of the oocyst strains in the barn to the in-feed coccidiostats. The first flock back on medicated feed in particular had a significant boost in weight gain and feed conversion, but we also noticed continued above-average performance in the second flock as well."

A rotation program using Coccivac-B vaccine can help producers 'clean-out' their barns and bring back the efficacy of the anticoccidials. This rotation is effective because Coccivac-B vaccine seeds the house with oocysts that were isolated in the 1950s, before the anticoccidials used by most producers today were developed. When producers rotate back to their in-feed anticoccidial, its efficacy is restored, improving chicken performance.

DON'T MESS WITH VACCINE CYCLING

Georgia producer learns a hard but valuable lesson about managing coccidiosis effectively in broiler breeders

For decades, poultry producers have used Coccivac-D live coccidiosis vaccine to manage coccidiosis in broiler breeders.



Mason: 'As fine a flock of chickens as this grower has ever had'

Sometimes, however, old practices that used to work well – such as medicating vaccinated pullet flocks with amprolium to “take the edge off” the vaccine’s reaction — can lead to unexpected problems. And that can be

especially true if amprolium is inappropriately paired with modern-day management and vaccination techniques for breeders.

As Chad Mason and his colleagues at Columbia Farms, Lavonia, Georgia, found out recently, such problems can be costly.

Luckily, there’s a happy ending to Columbia Farms’ story, though — one that’s allowing the northeastern Georgia operation to improve costs and save a substantial amount of money per flock.

Breaking old habits

Columbia Farms is a medium-sized diversified poultry operation that processes about 860,000 broilers each week. They place about 375,000 pullets annually and keep about 270,000 hens in the field. Mason, a Clemson graduate and a 15-year poultry industry veteran, is breeder and hatchery manager at Columbia Farms.

Problems at Columbia Farms began about 3.5 years ago and eventually spread to four of the company’s seven pullet farms. Columbia Farms was growing Ross 708s, which they received from their primary breeder pre-vaccinated with Coccivac-D, a live vaccine formulated to accommodate the longer life span of broiler breeders and layers. Coccivac-D is administered to day-old chicks in the hatchery with a specially designed spray cabinet.

Following a time-honored practice, Columbia Farms had been administering amprolium, diluted 10 ounces per gallon of water, on days 11 and 12. The amprolium treatment was intended to head off any problems that might appear.

Battling blackhead and tenella

“We began to have difficulties with blackhead (histomoniasis) and *Eimeria tenella* [a leading cause of coccidiosis].” says Mason. “I’m not sure if it was the blackhead causing the *E. tenella* or the *E. tenella* causing the blackhead, but we were definitely having problems.”

He was seeing livability percentages — normally in the mid-to-high 90% range — slip downward. Uniformity of his birds was also suffering, plunging to 50% to 60%.

Mason explains that when *E. tenella* and blackhead are ravishing a flock, they do more than kill birds. They also disrupt the growth and maturation of the birds that survive.

“That means that some of the breeders are late coming into production and some are early,” he says. “And you can’t fix that.”

In other words, continuing to feed helps the smaller birds grow faster but keeps the larger birds growing faster, too. “When the larger birds come into production that fast, you can’t maintain them because you’re not feeding them enough,” he explains. “Then the smaller birds come in late, so your overall peak isn’t going to be nearly as high as it should be. The bottom line is you’re losing money.”

Struggling to gain a footing, Mason doubled the dose of amprolium to 20 ounces/gallon. But that only made things worse. Livability fell to 91.53% in one of the farms — a new low — and uniformity dropped to 40%-50%. Mason knew he needed to take action quickly.

Disruption in vaccine cycling

Mason contacted the technical services group of Schering-Plough Animal Health, makers of Coccivac-D, to discuss the problem. He thought that perhaps the problems might somehow be related to the vaccine. It didn’t take long for Schering-Plough’s veterinarians to identify the problem.

“One of the problems Columbia

Farms was having — one that we’ve seen pretty often at other operations — had to do with inappropriately timed use of anticoccidials, which can disrupt the natural cycling of vaccinal oocysts in vaccinated birds,” says Dr. Matilde Alfonso, one of the Schering-Plough veterinarians involved with the discussions.

Alfonso explains that when coccidiosis vaccines were first used back in the 1950s and 60s, they were administered in the drinking water and so application of the vaccine wasn’t always completely uniform. That sometimes led to reactions in vaccinated flocks, and amprolium was routinely administered prophylactically to deal with such reactions.

“Since then, though, techniques for administering the coccidiosis vaccine have improved a lot,” she says.

While the vaccine can still be added to feed, most operations now opt for a newer application method — using the specially designed SprayCox spray cabinet to administer the vaccine to day-old birds as they move through the hatchery.

The cabinet showers the birds with live coccidial oocysts, which stimulate the bird’s immune system to build lifetime protection against coccidiosis. A red dye in the vaccine helps hatchery workers monitor vaccine coverage but it also encourages preening among chicks — a process that helps to spread the vaccinal oocysts to all birds.

Latest in vaccine administration

The latest method of vaccine administration involves a further refinement in the SprayCox cabinet. The SprayCox II is now fitted with 2 nozzles, which have been positioned to deliver uniform vaccine coverage without any wasted over-spray. A new AirMix system also provides improved suspension of vaccinal oocysts in the sprayer, and that, too, helps ensure better coverage.

“The result of those refinements in vaccine coverage is that *routine* follow-



Alfonso: ‘Amprolium is no longer necessary’

up of vaccination with amprolium is no longer necessary,” Alfonso says. “In fact, it can be detrimental to the whole vaccine strategy.”

When Coccivac-D is administered to chicks via the spray cabinet, it delivers a uniform and carefully balanced dose of oocysts from the eight species of *Eimeria* that are known to cause coccidiosis in chickens. Within days of the vaccine’s administration, a new generation of oocysts develops in the vaccinated birds and those oocysts are then excreted into the litter, allowing re-exposure of the birds to the *Eimeria* oocysts. This helps trigger natural, long-lasting immunity to coccidiosis. The process usually takes about 2 to 5 cycles of re-ingested oocysts for birds to develop full immunity to all *Eimeria* species in the vaccine.

When an anticoccidial such as amprolium is routinely added to this finely tuned process – especially added too early or in high dosage — it kills the vaccine-supplied oocysts and thus disrupts their natural cycling. The results can be devastating, such as was the case at Columbia Farms.

Says Mason, “Looking back on it, I think we were knocking down the oocysts that were cycling from the vaccine, and that just threw everything out of whack. We were having blackhead problems at 5 weeks. And on top of the blackhead, we were having outbreaks of *E. tenella*.”

Mason is reluctant to put an exact dollar figure on what the coccidiosis and blackhead episodes were costing him. He says the losses were substantial.

But, as mentioned earlier, this story has a happy ending.

First, Mason began a dialogue with Schering-Plough’s worldwide technical service director, Charlie Broussard and, working along with Alfonso and other tech service consultants from the company, Mason put a new plan into motion.

Check birds before giving amprolium

To start off, Mason pulled amprolium from the water on days 11 and 12, but continued with his vaccination program. He then monitored his birds closely.

“We suggested he go out to his houses on the 16th or 17th day and take a close look at the birds,” Alfonso says. “Look at their overall appearance, look at their droppings, review their mortality figures, and, if he felt the need, do some postings.”

Mason followed that advice. Once the vaccine was the only coccidiosis control strategy on board, “that’s when we started seeing what we were supposed to be seeing. We saw a little irritation in the gut, that sort of thing, and that showed us that the vaccine was helping the birds develop immunity just as it’s supposed to do,” Mason says.

There were other more tangible indications that the vaccine was working. Livability figures began edging back up into the mid-to-high 90s – and have stayed there. “We have improved, from down near 91% in some of the barns with the biggest problems, up to better than 97% in some cases,” Mason reports.

Other results were equally dramatic.

“We saved a lot of money on not having to buy the amprolium,” he says. “It was costing us about \$400 for each flock.” They have also cut down on antibiotics used to control secondary infections.

Gains in uniformity, egg production

Uniformity has also improved significantly, he says, up 15% to 20% over the past 6 months.

Egg production has also increased. “The latest flock we have, from one of our problem farms, is doing real well,” Mason says. “The way things are right now, it’s as fine a flock of chickens as this grower has ever had.”

Accounting for all production costs, Mason says Columbia Farms has improved cost greatly since the changes were made.

But he is quick to point out that besides pulling the amprolium, some other adjustments were made in the program.

“One of the farms we’d had trouble in was cold-house brooding their birds (not using air heaters),” he says. “In other words, we had brooders only. We were running about 700 birds per brooder, which is too many. When you’ve packed them in one spot like that, what happens? They’re going to peck more in that one spot and that’s where the oocysts are. So we fixed that.” Mason says they have now cut back density to 400 to 500 birds per brooder and it has made a noticeable difference in production. “Proper brooding is critical,” he adds.

Mason also says he now releases the birds to full house before 14 days of age, and that he feels that helps achieve uniform oocysts shedding on the litter.

He says he also makes sure heat and moisture conditions in the barns and in the litter remain within healthy limits. “Before, we were cleaning out after every flock,” Mason explains. “Now we’re cleaning out once a year, which was the recommendation from the vaccine people.”

Another step Mason’s taking to keep his program on track: Make sure birds have adequate feed available and are not pecking in the litter and ingesting extra oocysts. “A lot of people in the industry feed a full feed the first 2 weeks and then the third week they go to poundage,” referring to a specified volume of feed, measured in pounds of feed per 100 birds.

Mason says he found that when he used that approach he couldn’t maintain consistent feed volume from farm-to-farm. The first couple of weeks some of the farms would be feeding



Mason: ‘We know what they’re getting from day 1.’

more than others. And when, on the third week, they went to the specified amount of feed per 100 birds, some of the birds would, in effect, be having food taken away from them.

Maintaining adequate feed

“So now we know what they’re getting from day 1. The first week we feed them 3.5 pounds (1.59 kg) of feed per 100 chickens. The second week we’re feeding them 5.5 pounds (2.49 kg). The third week it’s 6.4 pounds (2.90 kg),” he says.

On that third week he goes to a skip-a-day feeding program — double the daily amount, then skipping feed the next day. So the birds are getting 13 pounds (5.90 kg) per 100 birds on even days, nothing on the odd days.

continued on page 24

New web site focuses on NE, other intestinal health topics

Looking for the latest information about managing clinical and subclinical necrotic enteritis (NE)?

Check the new web site developed by Schering-Plough Animal Health to support its new *Clostridium perfringens* type A toxoid: www.netvaxforpoultry.com.

Besides providing technical information about the industry's first NE vaccine, the site features a vast menu of articles, FAQs, presentations and podcasts that address the challenges of managing NE in antibiotic-free production.

Knowing that NE is linked to other intestinal health problems, the site's creators included special sections on coccidiosis, gangrenous dermatitis, nutrition, antibiotic resistance and other related topics.



Field trial results with new NE toxoid detailed in technical services bulletins

The results of field trials with the new *Clostridium perfringens* type A toxoid for control of necrotic enteritis (NE) in broilers are detailed in two new technical service bulletins from Schering-Plough Animal Health.

"*Clostridium perfringens* Type A Toxoid: Field Efficacy Without Sub-Therapeutic Antibiotics. Part I: Coccidiosis Vaccine Trials" is about the use of the new NE vaccine by a commercial, antibiotic-free broiler integrator.

The NE vaccine was administered to breeder pullets, which convey immunity against *C. perfringens* — the cause of NE — to their broiler progeny. The only protection against coccidiosis that all broilers in the trial had was the Coccivac-B vaccine. The trial results show that the NE vaccine provided significant protection against *C. perfringens* in antibiotic-free broilers.

In fact, broilers from hens that had not received the NE toxoid had 47% higher odds for mortality between 22 and 28 days compared to broilers from hens that received the NE

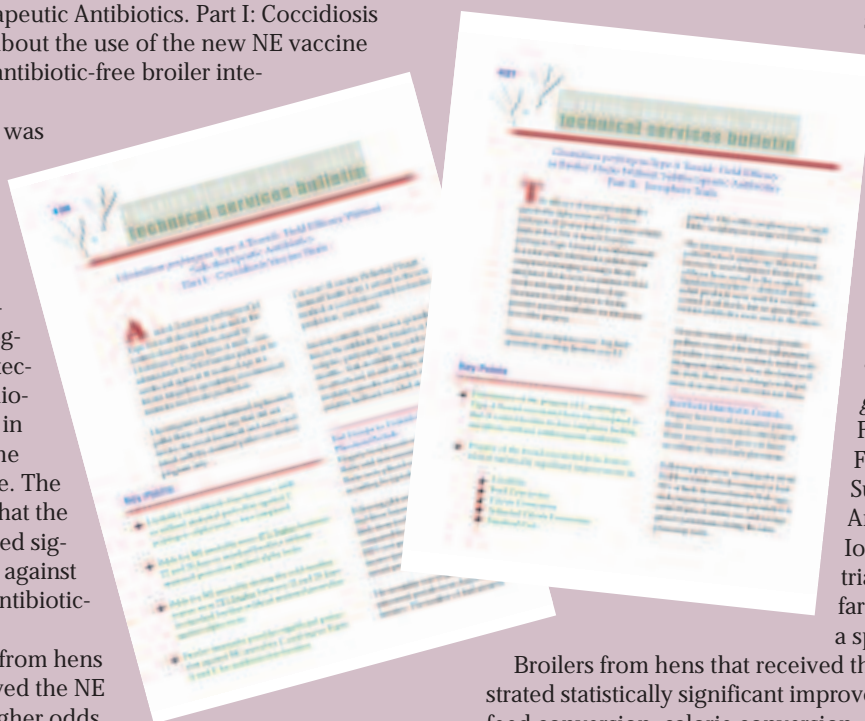
toxoid. The odds for mortality during cold weather were an astounding 73% higher during the same time period in broilers without maternal protection against the alpha toxin.

Both the odds ratio and the relative risk compare the relative likelihood of an event occurring between two distinct groups. The relative risk is easier to interpret and consistent with the general intuition, but some designs prevent the calculation of the relative risk. In addition, there is

some ambiguity about which relative risk is being compared. When reading research that summarizes data using odds ratios or relative risks, the limitations of these measures needs to be considered.

The second new bulletin is entitled "*Clostridium perfringens* Type A Toxoid: Field Efficacy in Broiler Flocks Without Subtherapeutic Antibiotics. Part II: Ionophore Trials." These trials were conducted at farms where NE had been a sporadic problem.

Broilers from hens that received the NE toxoid demonstrated statistically significant improvements in livability, feed conversion, calorie conversion, adjusted calorie conversion and standard cost compared to broilers from hens that did not receive the NE vaccine.



Informative booklet answers questions about new necrotic enteritis vaccine

An informative, 18-page booklet answers virtually everything producers and veterinarians may want to know about the new clostridial toxoid vaccine for control of necrotic enteritis (NE) in poultry.

Clostridium perfringens type A toxoid, the first vaccine for necrotic enteritis in poultry, is currently being used in the United States under a conditional license. The booklet about the vaccine is printed in an easy-to-read question and answer format. It provides a vast array of information including descriptions of the vaccine, how it works, as well as results from field trials that evaluated the efficacy and safety of the product.

Readers will learn how the vaccine can benefit antibiotic-free flocks and conventional flocks receiving ionophores or antibiotic growth promoters. Information on the cost-effectiveness of the vaccine is provided.

In addition, the booklet contains important information on necrotic enteritis and the economic consequences of the disease.



All of the items featured on pages 18-20 may be found at www.netvaxforpoultry.com. Copies are also available from your Schering-Plough representative.

Interactive calculator determines value of new toxoid for necrotic enteritis

An interactive online calculator has been designed to help individual poultry operations determine their return on investment when they use the new *Clostridium perfringens* type A toxoid for control of necrotic enteritis (NE) in broilers.

the number of eggs per hen, the average hatchability rate and the average live weight, number of broilers placed per week — and the calculator computes the anticipated weekly and annual return.

Marcelo Lang, poultry marketing director for Schering-Plough Animal Health, says the cost of subclinical NE alone has been estimated to be about US \$0.05 per bird, which far exceeds the investment in vaccinating breeder flocks with *Clostridium perfringens* type A toxoid.

One 500 mL bottle of the NE vaccine treats 500 pullets on a two-shot treatment schedule. If it is assumed that each hen will produce 156 fertile eggs — a common industry average — with an average hatchability rate of 84% or 131 chicks per hen, the cost of the vaccine is estimated to be about \$0.003 or a quarter of a penny per broiler chick.

At three large-bird complexes involving more than 26 million broilers, use of the NE vaccine resulted in improved livability and reduced production costs, yielding a return on investment determined to be 8:1, he says.

However, "Each poultry operation is going to have different factors affecting costs and outcome. The calculator will



The NE vaccine is administered to hens, which pass on immunity against *C. perfringens* to their broiler progeny.

Users simply punch in their own production numbers — things like vaccine cost per pullet, the labor cost per pullet,

help determine the vaccine's value for individual operations," Lang says.

CD with highlights of seminar on clostridial infections now available

Highlights from an intestinal health seminar on innovative solutions for clostridial infections is now available on CD.

The content of the 75-minute CD, which is presented as a radio news program, is based on interviews as well as presentations at the seminar. The listener-friendly CD is broken down into 11 tracks so the information can be absorbed in short segments — whether you're at home, the office or in a vehicle.

Listeners will hear essential information provided by renowned poultry intestinal health experts Drs. Chuck Hofacre and Steve Collet of the Poultry Diagnostic and Research Center in Athens, Georgia. Dr. Steve Roney, a poultry industry veterinarian, speaks about gangrenous dermatitis which, like NE, is caused by clostridium.

Dr. Joan Schrader, of Schering-Plough Animal Health's R&D division, describes the careful research that went into development of the *Clostridium perfringens* type A toxoid, the unique vaccine that is currently being used

in the United States under a conditional license. The toxoid is administered to broiler breeders, which in turn pass on immunity against *C. perfringens* — and protection against necrotic enteritis — to progeny broiler chicks.

Technical service veterinarians from Schering-Plough Animal Health present the results of field trials with the NE toxoid conducted under commercial condition. The trials demonstrate how the toxoid vaccine benefits antibiotic-free flocks by reducing

mortality due to acute NE and benefits conventional flocks by improving performance in broilers with subclinical NE.



New strategy *Continued from page 13*

cabinet. By applying Coccivac-B vaccine on an angle from two sides, the new double nozzle system achieves a more uniform application across a box of chicks compared to the single nozzle, which applies from directly above.

Results encouraged the next trials to be free of in-feed medication

The two trial flocks showed a definite improvement. Gaining confidence from the success of the first two trials, Ambrose has completed two more successive flocks on his farm without any in-feed medication. The first flock was grown in one house, while the other house used traditional in-feed anticoccidials and antibiotics. At the end of the day, the antibiotic-free flock finished at 0.03 kg ahead of the traditional flock and half a day earlier, with similar mortality in both flocks. The second ABF flock was also paired with a traditional flock and finished a full day ahead at 0.01kg (0.022046 lb) heavier than the traditional flock. Mortality after the first week remained normal in the ABF

flock in spite of high early chick mortality. The flock even experienced unusually severe weather during the growout period. Severe weather can often trigger necrotic enteritis outbreaks. The flocks were grown at the same density, but the ABF flocks had the advantage of the specially formulated feed.

According to Ambrose, "Incorporating passive antibody from the new experimental vaccine with Coccivac-B vaccine provides a promising solution for drug-reduced production in broiler chickens." In fact, Sunrise Farms has been so encouraged by the results on Ambrose's farm that they have challenged Ambrose to train Sunrise Farm managers and service personnel in the management techniques necessary to make drug-reduced broiler production economically feasible. Enhanced management, specially formulated feeds and a passive antibody from the new experimental vaccine may enable producers to produce economical antibiotic-free broilers in the near future.

Updated coccidiosis book addresses value of vaccination

A popular book on coccidiosis has been updated to include a new chapter on anticoccidial drugs and vaccines.

The 165-page book, *Poultry Coccidiosis: Diagnostic and Testing Procedures*, is authored by veterinary parasitologists Donal Conway and M. Elizabeth McKenzie. When it was first released in 1979 and a second edition was published in 1991, the book was found to be very useful for poultry scientists, disease diagnosticians and veterinarians.

The most recent edition reflects substantial progress in knowledge about coccidiosis in poultry and a growing body of critical information, Conway says.

The book includes an introduction to coccidiosis, reviews diagnostic procedures and collection and counting of oocysts. It also contains basic procedures and example protocols for testing anticoccidial drugs.

There is a tutorial on scoring gross lesions caused by major species of *Eimeria* infecting chickens. The review is based on the Johnson and Reid lesion scoring procedure.

For each species, lesions due to infections ranging from light to severe are illustrated by high-quality images.

"Over the years, these images have been of significant value in assessing the importance and severity of both controlled and naturally occurring coccidial infections, and it is a special delight to us to review these images once again," Conway comments.

Vaccines minimize resistance

In a chapter on the epidemiology and control of coccidiosis,

Conway and McKenzie state that the use of anticoccidial vaccines in a rotational program with anticoccidial drugs is recommended to minimize the risk of anticoccidial drug tolerance or resistance problems over the long term.

"The use of anticoccidial vaccines in breeders and replacement birds is probably the optimum course in most situations, and the current ability to vaccinate chicks at the hatchery by spray cabinet... has made a big difference in making anticoccidial vaccines a practical option for broiler chickens as well," say the authors, who also cover important topics such as environmental management and feed quality.

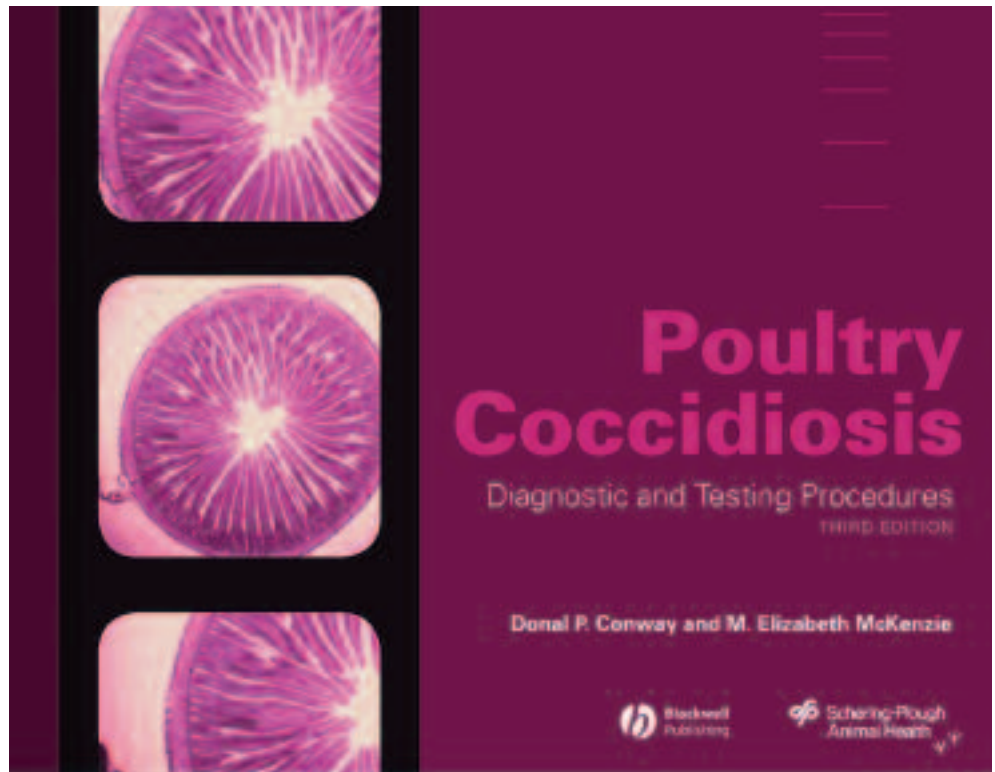
The book's new chapter on anticoccidial drugs and vaccines reviews various anticoccidials and provides a review of each drug's chemical structure, safety and efficacy. It contains an interesting history on the development of polyether ionophorous antibiotics, reviews the advantages of these drugs and includes concerns such as ionophore toxicity.

Vaccines a 'practical alternative'

Vaccines, the authors state, "provide a very practical and important alternative to the exclusive use of anticoccidial drugs for two excellent reasons."

A number of studies have demonstrated that vaccines give a comparable level of coccidiosis protection to growing broiler chickens compared to anticoccidial drug programs and most live vaccines replace indigenous coccidial populations in the broiler house with coccidia that are susceptible to anticoccidial drugs, extending the usefulness of anticoccidials, they say.

Although initial application of live vaccines was limited to layers and broiler breeders, there is currently a growing use of live anticoccidial vaccines in broiler chickens due in large part to the ability to apply vaccines in an economically effective way at the hatchery, the authors say.



In a section on Coccivac vaccines, Conway and McKenzie explain that the vaccines deliver a controlled dose of oocysts that induce sufficient infection to produce an appropriate immune response without causing a pathogenic effect after two or three life cycles of coccidia. Administration of the vaccine with the SprayCox cabinet has enhanced the uniformity of initial application, "vastly improving the vaccination response, and making other methods of vaccination such as feed spray, drinking water application, and eye spray methods much less efficient."

The updated book will be available through Blackwell Publishing Professional, 2121 State Avenue, Ames, IA 50014-8300, USA, or through its website: www.blackwellprofessional.com or www.blackwellvet.com.



Necrotic enteritis outbreaks in broilers stop after vaccination of hens with clostridium toxoid

Outbreaks of necrotic enteritis in conventional broiler flocks stopped after breeder hens were vaccinated with a new clostridium toxoid vaccine, Dr. Neil Ambrose said at the European Poultry Conference held last fall in Verona, Italy.

The initial experience with the vaccine indicates that “passive immunity to *Clostridium perfringens* type A alpha toxin appears to be a viable strategy for the control of necrotic enteritis in broiler chickens,” said Ambrose, director of veterinary services for Sunrise Farms of Surrey, British Columbia, Canada.

The vaccine, *Clostridium perfringens* type A toxoid, was developed by Schering-Plough Animal Health and is the first product of its kind for poultry, although clostridium toxoids have been used in other species for many years. Two doses of the vaccine are administered to hens, initiating immunity to the alpha toxin produced by *C. perfringens*, which is the most common cause of necrotic enteritis in chickens. The hens pass on the immunity to their broiler progeny.



Poultry specialists throughout the world met in Verona, Italy, last fall for the XII European Poultry Conference.

Necrotic enteritis, Ambrose said, can be devastating, resulting in high mortality and reduced feed intake, weight gain and flock profitability. The problem is espe-

cially difficult to control in birds on wheat-based rations, which are common in Canada.

With a trend in many parts of the world towards the production of broiler chicken meat without the aid of antibiotics, including ionophore anticoccidials, Ambrose started trials for Sunrise Farms by using a live coccidiosis vaccine instead of an in-feed anticoccidial in wheat-fed birds. However, in 2005, the company had six consecutive cycles of about 30,000 birds that experienced necrotic enteritis outbreaks. The birds had received Coccivac-B, a non-attenuated coccidiosis vaccine based on live *Eimeria* field strains, at day-of-age and the in-feed antibiotic-growth promoter bacitracin and/or virginiamycin. Three of the flocks also received the anticoccidial salinomycin, which was added to stem the necrotic enteritis outbreak, but did not.

For each flock, there were two peaks in mortality attributed to necrotic enteritis, which occurred at about 19 and 27 days of age. Both roughly corresponded to expected peaks in coccidial cycling from the non-attenuated vaccine, he said.

“It is likely that the combination of intestinal viscosity associated with the wheat ration and the mucosal disruption caused by the normal cycling of the coccidial vaccine allowed the overgrowth of *C. perfringens*, triggering the necrotic enteritis events,” he said. “There was no evidence of coccidial lesions outside of the normal expected levels for the coccidial vaccine, which appeared to be performing normally, with adequate development of immunity to coccidiosis.”

Trial flocks

Sunrise Farms wanted to determine if passive immunity provided by the new clostridium vaccine could replace or augment in-feed antibacterial medication given to broilers that are fed a wheat-based diet, which is common in Canada, he said.

The company grew two broiler flocks from hens that had received the toxoid vaccine. Both flocks were vaccinated with Coccivac-B at day-of-age and the broilers, which totaled about 24,000 in number, received only the growth promoter bacitracin in the starter, grower and finisher rations. No in-feed anticoccidial was provided (Table 1).

The results with these test birds were compared to the six flocks that had experienced necrotic enteritis outbreaks and were from hens not vaccinated with the clostridium toxoid. All the birds had received the same wheat-based diet.

Among birds in the test group, “there was no evidence of necrotic enteritis in random birds, culls or mortality upon post-mortem examination, which also verified continued cycling of the coccidiosis vaccine at acceptable levels,” Ambrose said.

Better growth after toxoid

Growth performance in the flocks from clostridium-vaccinated hens met breed standards and, in fact, surpassed growth in the control group, explained Ambrose. These results were achieved in the second flock despite severe



heat stress at 27 days of age due to unseasonably high environmental temperatures, he said.

“Passive immunity against the *C. perfringens* type A alpha toxin appeared to successfully augment in-feed medication to prevent lesions of necrotic enteritis when a non-attenuated coccidiosis vaccine was used in concert with a wheat-based ration,” Ambrose concluded.

Sunrise Farms, he added, was planning further testing to determine whether passive immunity provided by the clostridium vaccine could control necrotic enteritis when reduced levels of in-feed medication are given or in the complete absence of in-feed medication.

Editor’s note: For more information on the experiences of Sunrise Farms, see the article that begins on page 11.

Table 1. Medication regimens for flocks that did and did not experience necrotic enteritis outbreaks.

Medication Regimen	Coccivac-B vaccine at day-of-age	Salinomycin in grower ration	Ration			
			Starter	Grower	Finisher	Withdrawal
Flocks with necrotic enteritis outbreaks that were not from hens receiving the clostridium vaccine						
1	Yes	No	bacitracin	bacitracin	bacitracin	
2	Yes	No	bacitracin	virginiamycin	virginiamycin	virginiamycin
3	Yes	No	virginiamycin	virginiamycin	virginiamycin	virginiamycin
4	Yes	Yes	virginiamycin	virginiamycin/salinomycin	virginiamycin	virginiamycin
5	Yes	Yes	virginiamycin	virginiamycin/salinomycin	virginiamycin	virginiamycin
6	Yes	Yes	virginiamycin	virginiamycin/salinomycin	virginiamycin	virginiamycin
Flocks with no evidence of necrotic enteritis that were from hens that received the clostridium vaccine						
1	Yes	No	bacitracin	bacitracin	bacitracin	bacitracin
1	Yes	No	bacitracin	bacitracin	bacitracin	bacitracin

Vaccine cycling *Continued from page 17*

“It gives the birds more feeder space, reduces competition, and keeps them eating at the feeders instead of pecking in the litter,” he says. Again, the aim is to limit the birds’ excessive ingestion of oocysts.

Still another ration-related matter Mason has changed is that he is paying more attention to feed texture.



Mason: ‘Many issues that affect the livability of birds’

“We try to make sure we do nothing at all to irritate that bird’s gut,” Mason says. “Can I say we’re successful all the time? No. It’s not a perfect world. We do sometimes have milling issues that come up. But the majority of the time, the mill does an excellent job of getting our feed the way we want it.”

Not just one fix

Summing up, Mason says it is clear that

what happened at Columbia Farms was a complex situation that required action on a number of fronts. He kept Coccivac-D as a key part of his management program, while fixing the problems that were causing poor performance.

“I can’t say that pulling the amprolium fixed the whole problem,” he says. “You know, there are so many issues that affect the livability of birds and affect their uniformity — from feed texture, to litter conditions, to heat, to bird densities. But we’ve seen very good improvements over the past 6 months or so and I think it’s a combination of everything.”

For Mason, the experiences of the past couple of years underscore the importance of individualizing his approach to each flock of birds. “You’ve got to look at each one on its own. They’re all unique, a little bit different.” Mason does emphasize that he hasn’t completely pulled amprolium from his barns. He just doesn’t use it routinely, during early vaccine cycling. “There’s definitely a place for it, but now when we need it we use it on individual flocks, at low doses, and we use it late. That way, we don’t interfere with the vaccine,” he adds.

Dr. Alfonso agrees with him and emphasizes that every breeder/grower should expect consistent results from Coccivac-D coccidiosis vaccine. If that’s not happening, she says, Schering-Plough’s technical service team is standing by to help identify problems that might be affecting the flock — and to provide solutions.

In the meantime, Mason’s quest for perfection continues. “We’re a work in progress,” he says. “We might stub our toe next week, but it won’t be because we stopped trying.”



Free bird

For as long as I can remember, the word freedom has been associated with birds. There's the old expression "free as a bird." The bald eagle is, of course, a symbol of freedom. And who didn't spend time in college dancing to Lynyrd Skynyrd's "Free Bird"?

In today's poultry industry, the words "free" and "bird" are also being heard more often, but they're usually preceded by the word "antibiotic."

The practice of producing antibiotic-free birds used to be limited to niche marketers that were more concerned about meeting the needs of a certain consumer than feeding the masses with a low-cost, nutritious, healthy product that virtually everyone could afford.

But today's consumer is changing — and the statistics are difficult to ignore:

- Organic poultry in the United States, which must be raised without antibiotics to carry an "organic" label, saw an explosive 1,000% increase in production between 1997 and 2003.
- Poultry is the fastest growing meat product in the U.S. organic market, with a market size estimated to be around \$46 million and annual growth estimated to be 33% through 2008.
- Whole Foods Market, one of the world's largest organic foods retailers, found in a 2004 survey that more people are eating organic products primarily because organic foods are considered to be better for their health and for the environment.

Whether you support this trend or agree with consumers is not the issue. The fact is, this is the direction of the new poultry industry — and it's not only for niche marketers.

Draper Valley Farms is Washington State — a company that places 600,000 birds a week — recently decided to pull all in-feed antibiotics, including ionophores, from its commercial broilers after having outstanding success with a similar program in its "antibiotic-free" line. (See their story beginning on page 2.) They didn't do it overnight, but they say they learned valuable lessons about poultry production from their antibiotic-free line. As Draper Valley's production veterinarian, Dr. Mueez Ahmad tells us, "When you go antibiotic-free, you can't use drugs and Band-Aids to cover up our mistakes. That experience, I think, has had a profound effect on the management of our commercial birds as well."

Draper Valley's nutritionists are also enjoying their newfound freedom. Now they "can make changes in the needs of the birds, without having to work around the medication program," Ahmad says. Having fewer medications to track and flush from the system has also made life easier at the feed mill.

In the world of politics, we're frequently reminded that "freedom has its cost." In the world of poultry, freedom can also be good for business. We hope this issue of CocciForum will help you capitalize on this trend.

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