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WATT Poultry USA

The magazine for the integrated poultry industry

Bill Williams, Tegel Poultry

New Zealand's Tegel Poultry achieves world's best feed conversion

PLUS

4 keys to improving food safety in poultry

Deciphering drought: What poultry producers need to know

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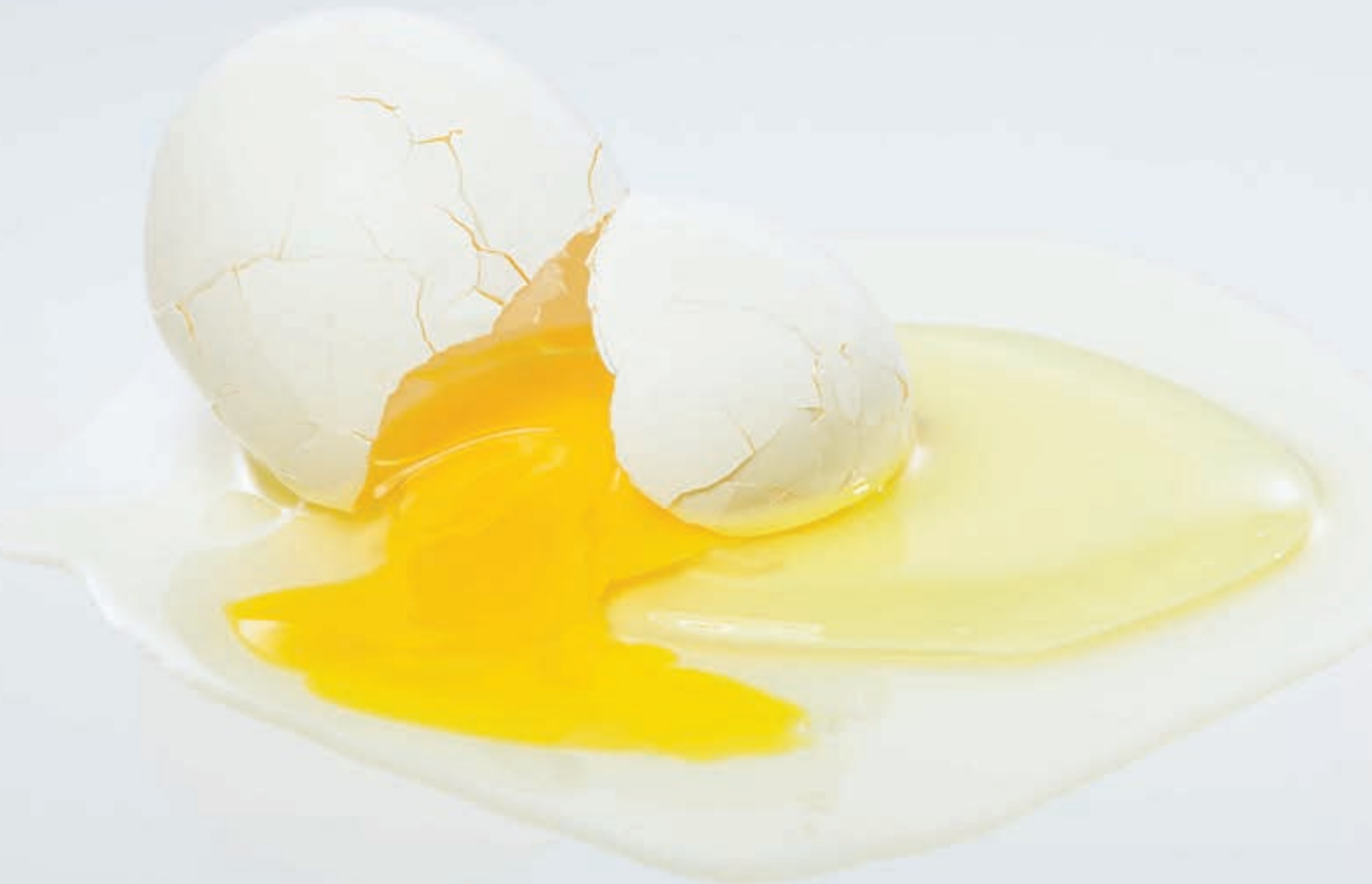

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WATT Poultry USA
VOLUME 13, NUMBER 10
The magazine for the integrated poultry industry

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Mycotoxin strategies for the 2012 corn harvest
Biomin and Romer Labs will discuss 2012 corn crop quality findings and possible effects to livestock and poultry.

Gangrenous dermatitis: The inside-out theory
Experts discuss what evidence there is for an "inside-out" origin (clostridia in the intestines) for Gangrenous dermatitis in broilers and what control strategies work.

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NEW AGRICULTURE EDITORS

WATT expands editorial staff in animal agribusiness markets

WATT is adding to its staff across its agricultural magazines, eNewsletters and website, www.WATTAgNet.com. This is a continuation of a company-wide effort to strengthen its content in agribusiness markets.

Mavromichalis

Ioannis Mavromichalis will join WATT November 1 as Nutrition Editor, providing scientific and commercial expertise on feed, poultry nutrition and swine nutrition.

Mavromichalis is an author with more than 1,000 articles, journal papers, abstracts, extension reports, newsletters, ghost manuscripts and book chapters. He is the author of the book "Applied Nutrition for Young Pigs" and has been a contributor to several internet sites, while holding columns in local and international magazines.

Mavromichalis earned an M.Sc. degree in 1997 at Kansas State University and his Ph.D in 2000 at the University of Illinois. Both degrees were on monogastric nutrition, with emphasis on swine. Following graduation, he worked for Provimi until 2004 and for Nutral until 2008.

In 2008, Mavromichalis established an independent consulting and nutrition service based in Spain. His work involves clients at the farm and corporate level, in the European Union, U.S., Argentina, Brazil, China, Australia, Ukraine, Romania, South Africa, Russia and Taiwan. Mavromichalis is headquartered in Madrid, Spain, and can be reached at nutrition@wattnet.net or ioannis@ariston-nutrition.com.

Terrence O'Keefe, editor of *Egg Industry* magazine since April 2011, now has the additional title of Food Safety/Processing Editor. O'Keefe has more than 20 years of experience in the poultry and publishing industries. Previously, he served as editor of *WATT PoultryUSA* and *Poultry Digest* and has contributed to other WATT publications.

O'Keefe

Before joining WATT as an editor, O'Keefe worked in the poultry industry in a wide range of jobs; everything from field service to production scheduler to processing plant manager. He has experience with turkey and broiler companies in live production and processing and egg layers in graduate school. O'Keefe has master's degrees in poultry science and business administration. He is based out of his Concord, N.C., office and can be reached at tokeefe@wattnet.net.

Both editors will report on their specific topics worldwide and across multiple species. Their reports will

appear in all WATT agribusiness titles, WATT eNewsletters, and on www.WATTAgNet.com. "They will work with our existing magazine editors to give in-depth coverage on the issues facing poultry, pig and feed producers," said Bruce Plantz, WATT's Director of Content. "Both of these editors combine hands-on industry experience with solid reporting skills to give us unequaled industry expertise and depth in our reporting. They will help us remain the leading source of information in print, eNewsletters and online."

SALE

Pilgrim's sells egg assets to Cal-Maine Foods

Pilgrim's Corporation has sold its commercial egg operations to egg producer and packer Cal-Maine Foods Inc.

The assets purchased by Cal-Maine Foods include two production complexes with capacity for approximately 1.4 million laying hens and adjacent land located near Pittsburg, Texas. "These production facilities will complement our existing operations in Texas and the additional capacity will enhance our ability to serve our customers in the Texas markets," said Dolph Baker, president and CEO of Cal-Maine Foods. "We welcome this opportunity for the continued growth of our business and the ability to provide greater value for our customers and shareholders."

EXPANSION IN ASIA

Cargill to open China broiler plant in 2013

Cargill Inc. plans to open a US$250 million broiler production plant in Anhui province, China, by the middle of 2013, according to reports. The integrated facility will include a feed mill, farms, hatchery and processing plants, said Christopher Langholz, business unit leader for Cargill Animal Protein.

"We are doing the construction right now and hope to start by June or July next year," said Langholz. "We will raise 65 million birds a year and it will be one of the biggest integrated plants in China." ■

» News updates available at WATTAgNet.com

Poultry's Perch

BY PAUL J. BREDWELL, III

EPA won't pursue rule to collect detailed information from CAFOs

One constant for close to a decade has been the Environmental Protection Agency's focus on expanding regulatory requirements for Confined Animal Feeding Operations. However, in a surprising move on July 13, EPA announced it would not pursue a rule that would allow it to collect information from CAFOs. So what's this about?

EPA's court settlement with environmental groups

Part of the backdrop is an earlier EPA court settlement with environmental groups, who had sued EPA for allowing CAFOs to self-determine their need for a permit in the National Pollutant Discharge Elimination System. A major component of the settlement was a requirement for EPA to collect information from CAFOs under authority outlined in Section 308 of the Clean Water Act. In short, it provides EPA the authority to require all dischargers to monitor, sample, keep records, provide reports, install equipment and provide other information.

Subsequently, in October 2011, EPA proposed a rule to collect information from every CAFO in the nation regardless of whether they discharged pollutants. The rule would have required CAFOs to provide detailed location information and farm demographics for virtually every family farm engaged in the production of commercial poultry and egg products in the U.S.

Information would have determined categories

EPA's rationale for collecting the information was to improve its ability to protect water quality by addressing water quality issues associated with the discharge of manure pollutants from CAFOs. However, EPA's fact sheet failed to explain a requirement outlined in the settlement agreement that stipulated the information collected may be used to establish "categories of operations" that occur on facilities. Presumably EPA would use these "categories of operations" to make a determination that a CAFO "proposes to discharge," wording used in the CAFO rule at that time which required a facility to obtain an NPDES permit.

It's clear the agency's intent was to use the Information Collection Rule as a mechanism to assign a "duty to apply" responsibility to CAFOs that do not hold a NPDES permit. Subsequently, this "duty to apply" was again rejected by a federal court. A ruling from the Fifth Circuit Court in March 2011 reiterated the fact that EPA lacked the statutory authority to regulate "proposed discharges."

Has EPA changed regulatory philosophy after court rulings?

EPA's decision on the Information Collection Rule makes one wonder: Have the last two court rulings that vacated the "duty to apply" requirement for anything other than an actual discharge introduced a philosophical change to EPA's regulatory mindset for CAFOs? Probably not, considering the agency that signaled it has the option to revisit the rule if efforts to collect information from existing sources are not successful. An account of the record suggests there is a better chance this is merely a timeout until November 6. ■

Paul J. Bredwell III, P.E., vice president environmental programs, U.S. Poultry & Egg Association, pbredwell@uspoultry.org

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PoultryPerspective

BY PAUL AHO

Deciphering droughts: What poultry producers need to know

The last major drought in the Corn Belt was in 1988. For the next 22 years there were no significant droughts. It had been so long that many professionals in agribusiness had no memory of a drought. Then, in June, under blistering temperatures, the yield of the U.S. corn crop started to melt away. A full-scale drought developed that is a rival to 1988. Instead of the 15 billion bushels of corn that seemed possible earlier this year only 10 billion may, in the end, be produced. This is a mean and ugly drought that will cause hardship to uninsured crop farmers as well as all animal industries worldwide that rely on grain not to mention the millions of people that will go hungry.

It should be no surprise that the Corn Belt was visited by a drought, the surprise was that it took so long. Between 1970 and 1988 there were four major droughts and then there were no serious droughts between 1989 and 2011. The chance of a drought in the Corn Belt any given year is approximately the same as coming up with seven when rolling two dice, 17 percent. The dice were rolled 22 times between 1989 and 2011 and never once did seven show up. In Vegas they would have suspected the dice were loaded.

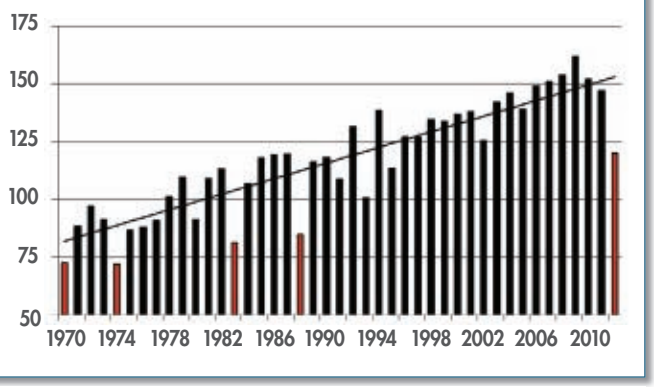
The analogy with dice is, of course, not completely accurate. Although there is a 17 percent historical probability that a randomly chosen year will have a drought in the Midwest, they do not occur randomly. There are periods of increased risk followed by periods of decreased risk. The challenge is to correctly identify the cycle to be able to make accurate predictions.

Identifying drought cycles

People have been trying to identify the cycle for as long as there has been agriculture in the Midwest. The Benner cycle developed in the 19th century from, of all things, the price of pig iron, seems to fit some of the drought data. The 20th century saw the intense study of El Niño. There is a correlation between the cold phase of El Niño Southern Oscillation and droughts but then there is the problem of predicting El Niño Southern Oscillation.

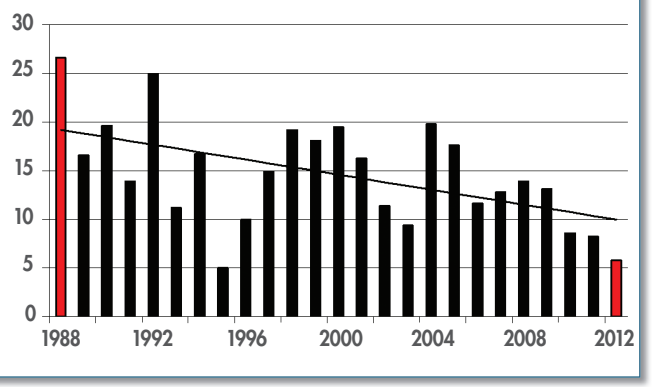
Although the ability to predict the cycle is still imperfect, the important point is that there are periods when drought is more

CHART 1: Corn yield 1970-2012
Bushels per acre – US – drought years in red



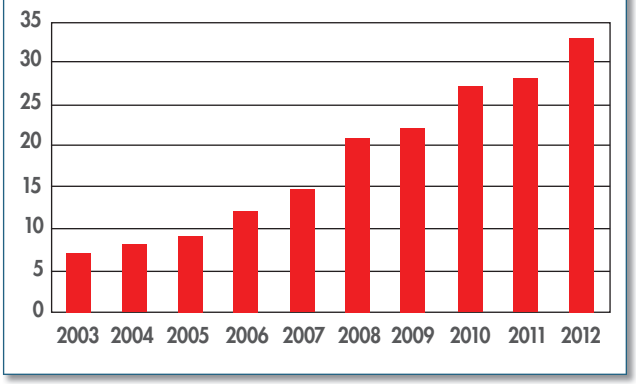
The recent era of good corn-growing weather is over, and another one may not return for decades.

CHART 2: Corn ending stock 1988-2012 As a percentage of total use – US – drought years in red



With ending stocks plummeting, there may be a legitimate and necessary role for government in subsidizing the storage of grain.

CHART 3: Ethanol minus by-product percent of the US corn crop



Ethanol production now takes 33 percent of the US corn crop.

common and periods when it is less common. After 22 years without a major drought, the Midwest may well be entering into a period of more frequent droughts.

Stretch of drought-less years over

In the graph of U.S. corn yield from 1970 to 2012, the long golden era between 1989 and 2011 is clearly shown. Yields shot upward, the weather was kind and billions of bushels of corn were lavished on ethanol production. The U.S. was asleep at the wheel during the last 22 years, lost in a dream. Now there has been a rude awakening to reality as the car veered off the road and smashed into a tree.

The reality is that 1) droughts happen, 2) extra supplies of grain need to be stored to cover the possibility of a drought and 3) the mandated use of corn for ethanol can be too rigid.

Droughts happen

The recent golden age of near perfect weather is over, and if it ever returns it may be decades from now. Even without considering the possible effects of global warming, just the historical record, the Midwest is likely to be entering into a period of more frequent droughts.

Storage must happen

At the time of the last drought the ending inventory of corn was equal to 20 percent of annual use. Since then, the average inventory has dropped to 10 percent. Every thoughtful publication from the Bible forward warns about the danger of not having enough grain reserves. Unfortunately, in a just-in-time economy nobody wants to pay for storage of grain just in case. Although free-market solutions are normally more efficient, there may be a legitimate and necessary role for government in subsidizing the storage of grain. One possible solution, subsidize the purchase of bins. With cheap bins farmers will naturally store more grain in years of low priced corn and sell more corn in years of high priced corn.

Smarter ethanol production policy needed

Back in 1988, very little corn was transformed into ethanol (gasohol back then). Now, the net effect of ethanol is to take possession of 33 percent of the current harvest. While corn use for ethanol is mandated by the government other grains users are left to fight over the shrinking remainder of the crop. A smart ethanol policy would find a way to decrease ethanol production in a time of drought and not rigidly continue production no matter what the consequences.

So what should be done? There are obviously many different possible solutions. One possible solution is a free market in ethanol. The ethanol industry says that eliminating the mandate will not affect the use of corn. OK, if it makes no difference then there is no reason to continue the mandate or any other government interference in the ethanol market. Move to a free market but provide ethanol producers the same bin subsidy offered to grain producers. With enough bins the ethanol industry will store more corn in the good years and empty the bins in a drought.

Conceptually, it is quite simple to lean against the worst effects of drought; store more grain and adjust the use of ethanol to fit the reality of grain supply. The devil is, of course, in the political details. ■

Droughts happen. Extra supplies of grain need to be stored to cover the possibility of a drought, and the mandated use of corn for ethanol should be flexible.

Paul Aho, Ph.D., Poultry Perspective, Storrs, CT 06268; email paulaho@paulaho.com

New Zealand's Tegel Poultry achieves world's best feed conversion

With an ideal growing climate and comparative freedom from poultry disease, Tegel Poultry focuses on the five pillars of agriculture performance to achieve the world's best broiler feed conversion. BY GARY THORNTON

Aiming to bring average FCR down to 1.38: Bill Williams, general manager agriculture, Tegel Poultry, at a poultry farm on New Zealand's North Island

» What does the broiler company with the world's best feed conversion say about its live production performance? "We can do better!" So says the manager in charge of live production at New Zealand's largest broiler company, Tegel Poultry.

The manager was speaking at the Alltech International Animal Health and Nutrition Symposium, where poultry producers and allied industry experts listened to learn how the company achieves exceptional performance.

Tegel Poultry's Bill Williams shared performance data that showed a company-wide average feed conversion ratio of 1.55. And it's no fluke! Tegel has steadfastly improved FCR by 1.5 points a year over the last 10 years. During the same period, the company's live weights have increased by 50 grams per year.

Goal is to continue improvements in feed conversion ratio

"At Tegel Poultry we do well in live production performance, but we could do so much better," said Williams, the veterinarian who is general manager of agriculture operations from feed milling and hatcheries to breeding and broiler grow-out operations. "We are averaging broiler FCR of 1.5 with a range on farms of between 1.4 and 1.6 and some sheds as low as 1.38."

Williams said the company's goal is to drive FCR down to 1.38. "If flocks could tolerate a higher spec diet without litter problems then we could get another 4 points on top of the results that you see in the data." The FCR being achieved is cost effective in New Zealand; however, the economics may be different in different countries. "Increasing the energy and/or protein levels in the feed could result in a better FCR, but we are only able to feed economically at about 2.95 of kilocalories and 1.1 percent available lysine due to the current cost of feed ingredients," he said.

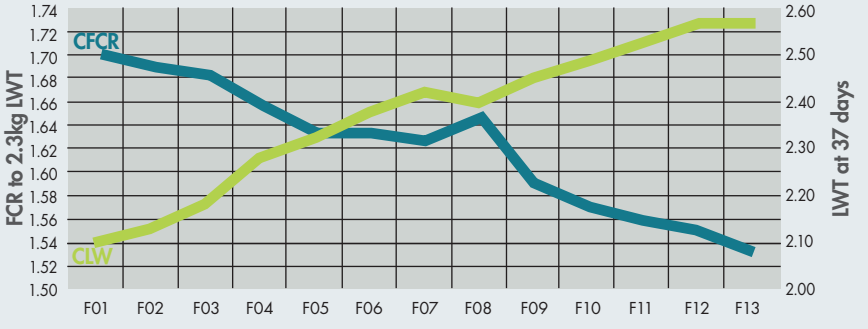
Tegel's poultry operations

Tegel Poultry, which is a fully integrated poultry producer with a staff of 1,900 people, processes over 40 million birds or 70,000 tons of dressed poultry annually. The company's operations are in three regions of New Zealand —Auckland, New Plymouth and Christchurch—to allow delivery of fresh chilled and frozen chicken to

more than 3,000 customers six days a week.

While Tegel is New Zealand's leading chicken producer with 52 percent market share, that market is small by world standards. Challenges of operational scale are overcome by using "multiple thinnings" and sex-separate growing to allow the company to harvest the needed quantities of broilers at the desired live weights. Broilers are harvested from any given flock in three stages as they reach the target weights needed for various markets.

FIGURE 1: Tegel Poultry long-term broiler performance



In the last 10 years, Tegel Poultry has improved average feed conversion by 1.5 points annually and increased live weights by 50 grams per year.

Five pillars of agricultural performance

Williams identified five agricultural pillars that drive Tegel's world-beating broiler performance:

1. Genetic selection
2. Animal nutrition and lowest-cost modeling
3. Strategic feed procurement and manufacturing
4. Disease control
5. Animal husbandry and planning

"While our broiler performance continues to improve over time, there are a lot of bumps along the way," he said. "For us, every one of these bumps represents a time when we haven't optimized the five pillars. Each one of them needs to be fine-tuned for us to continue to achieve performance improvements in the future."

Genetic progress continues but is difficult to realize

"The next five years' genetic potential is likely to be better than that of the last 10 years," Williams said. "However, it is becoming more difficult to realize those gains commercially."

Early nutrition and hatchery management will play increasingly important roles in flock performance, he said. "Our youngest processing weight of 1.7 kilos is being achieved as early as 27 days from males now. So if that weight continues to be reached half a day earlier every year, it will soon be achieved at 25 days. This makes the starter diet very important nowadays. Managing the chick's development in the egg is also becoming a critical thing in the hatchery."

Strategically positioned operations allow delivery of fresh chilled and frozen poultry throughout New Zealand to over 3,000 customers six days a week.

A typical poultry shed is around 1,400 square meters with a stocking density of 19 birds per meter for capacity of 27,000 broilers.

Animal nutrition: Modeling and testing play important role

Technical in-house and scientific expertise has enabled ongoing FCR enhancement for a given feed specification, Williams said.

"EFG modeling tools, laboratory and veterinary support, sophisticated trial facilities and animal husbandry knowledge of our livestock team are used continuously to improve nutrition to optimize cost, welfare and environmental performance outcomes," he said.

Strategic feed procurement and manufacturing

Three mills manufacture feed tailored to the requirements of the livestock to optimize FCRs. Feed is produced to specification with minimum variability to take the variability out of the livestock performance. Feed texture is designed to maximize feed intake by the chickens.

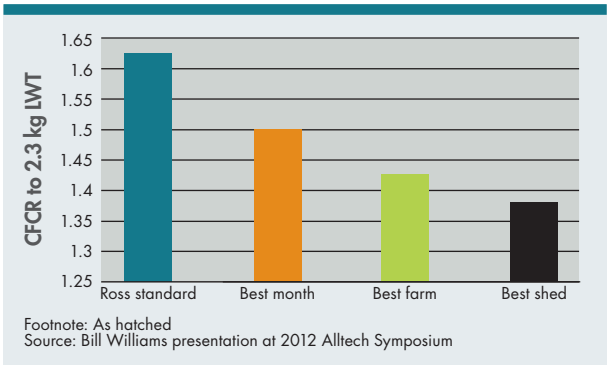
"In order to achieve the growth rates we experience, it is important that flocks consume their daily feed intake quickly and without undue competition so the format of the feed is very important. We achieve very high durability of diets—70 on a Holman test.

Disease control crucial for achieving low FCR

New Zealand has the best poultry disease status in the world and is the only country in the world with no Infectious Bursal Disease, according to Williams. There is no Newcastle disease or Avian Influenza in the country, he said. "Our broiler birds don't get any vaccination whatsoever," he noted.

However, potential nutritional and metabolic diseases continue to be a challenge. These include coccidiosis, dys-

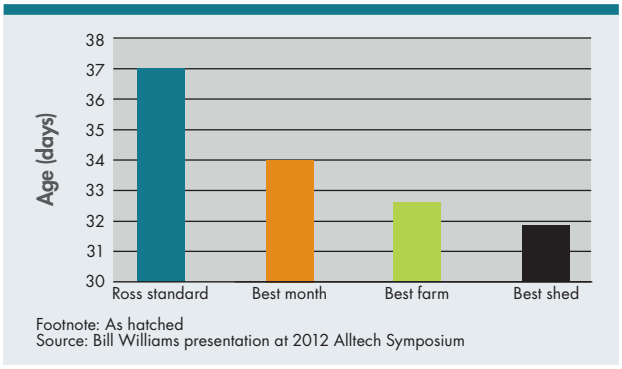
FIGURE 2: Tegel Poultry cumulative feed conversion ratio at 2.3 kilograms live weight



Footnote: As hatched
Source: Bill Williams presentation at 2012 Alltech Symposium

Cumulative feed conversion ratio to 2.3 kilograms live weight is 1.5, but the company is aiming to bring that down to 1.38.

FIGURE 3: Tegel Poultry broiler age in days at 2.3 kilograms live weight



Footnote: As hatched
Source: Bill Williams presentation at 2012 Alltech Symposium

Early diet is crucial: Broilers grow from around 40 grams to 200 grams in the first week and to around 550 grams in the second week.

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Broiler shed construction and bird density

Poultry sheds are of wood or metal-pole framing, and exteriors are clad with fibrous cement sheeting or steel sheeting with some expanded polystyrene panels. Interiors are lined with fibrous cement sheeting or fiberglass or steel panels. All sheds have concrete floors.

While sheds vary in size from 700 to 2,240 square meters, the typical size is around 1,400 square meters (around 15,000 square feet) with a stocking density of 19 birds per meter for capacity of 27,000 broilers.

Split-shed growing has males on one side of a movable barrier and females on the other. Males, due to their faster growth rates, get more space than females to keep kilograms per square meter uniform and always less than 38 kilograms per square meter.

bacteriosis, rickets and leg problems. "These conditions can be problematic if our processes or diets are not quite fine-tuned right for those fast-growing birds," he said.

Tegel has begun applying the "seed, feed and weed" gut health management concepts advocated by the University of Georgia's Dr. Steve Collett with good results in its flocks. The program cultivates the presence of good bacteria in the poultry gut and displaces harmful bacteria.

The company also maintains high standards of isolation and hygiene, including all-in, all-out farms. Its facilities are designed for cleaning (concrete floors and new litter every batch).

Animal husbandry includes move to management contracts

Smoothing out the bumps in performance between individual farms is one key to achieving future improvements in overall performance. "Our current best month for FCR is 1.5. Our current best farm is 1.4. And our current best shed is 1.38," Williams said. "So the varying performance of individual growers is an opportunity for us.

"Management is a wide term covering the placement and kill planning, stocking density, in-shed management approach, grower attitude and shed facility. We can identify a spread in performance due just to the grower's facility and their in-shed management approach of about 6 to 8 points of FCR.

"The contractual relationship between Tegel and its growers has changed over time. Sometime ago the payment system moved from the tra-

ditional owner-operator model, where the grower is paid a fee per bird processed, to a model where the grower is paid on a square meter basis, but now a further change is contemplated where the owner of the farm becomes a 'landlord' who leases his shed to Tegel on a rate per square meter basis, and then either operates the farm himself, under a management agreement with Tegel, or employs a manager to do this.

"As farms get larger in size this is opening up the options for a syndicate to own the farm as landlords (as the investment cost could be too large for a single investor) which may involve a separate entity operating the farm under a management agreement," Williams said.

"Management contracts will be offered to existing growers in the first instance but options exist whereby these could be passed on to other qualified operators by the existing growers who may want to retain the farm facility and lease income but not actually operate the farm. In some cases, Tegel may be the operator, with Tegel employees actually managing a leased farm.

"It's about peoples skills. An investor with the means to fund a farm purchase isn't necessarily the right person to run a large farm. They can employ a manager but they still remain liable for performance. A management agreement allows them to separate risk on the facility contract from risk associated with running the farm. The contracts are separately incentivized."

Achieving consistent flock performance

Williams offered this thought about the challenge of achieving consistently high flock performance: Wherever poultry are grown in the world, and however excellent the live-production programs, achieving high performance on a consistent basis is never easy.

Williams summed up: "As we know, chooks (New Zealand slang for chickens) are a constant challenge."

Cargill continues food safety progress after landmark turkey recalls

Mike Robach tells how Cargill Value Added Meats handled the largest poultry recall in history in 2011 and ways in which the poultry industry continues to work to improve food safety.

» QUESTION: What has changed since Cargill's August and September 2011 ground turkey recalls?

MIKE ROBACH: That covers a lot of ground. Initially, we tried to determine what happened, focusing on the "how" and the "why." In early August 2011, after piecing together information from the United Sates Department of Agriculture, the Centers for Disease Control and state health departments, it became clear to Cargill that our products were implicated in a potential outbreak of *Salmonella Heidelberg*-related illnesses. In less than 48 hours—the time it took to confirm this information and organize an action plan—we initiated a voluntary recall of ground turkey products produced at Springdale, [Ark.,] from February to August 2011.

Mike Robach, vice president of corporate food safety and regulatory affairs, Cargill

Question: What immediate action did Cargill take after learning that its turkey products were implicated in the human illnesses?

ROBACH: The August 3 recall turned out to be the largest poultry meat recall in U.S. history —36 million pounds— and we spared nothing to alert the consuming public, our customers, our employees and rapidly recover as much of the potentially impacted product as possible. We also took the additional step of publicly apologizing to anyone who may have become ill from eating one of our ground turkey products, although scientific evidence pointed to multiple

Food safety actions following the 2011 turkey recalls

Cargill took a number of tactical actions in an overall strategy aimed at ensuring food safety, including the following:

- ✔Disassembled and steam cleaned all of the equipment used for ground turkey processing at Springdale, Ark.
- ✔Enhanced the food safety program at the Springdale processing facility
- ✔Increased the number of antimicrobial interventions used
- ✔Mandated that third-party turkey meat suppliers include an antimicrobial intervention similar to ones used by Cargill
- ✔Created and implemented the most advanced and robust sampling and monitoring program in the industry, including more frequent testing

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*Compared to Bromadiolone

sources of *Salmonella Heidelberg* illnesses during the period of time associated with the outbreak.

QUESTION: What steps involving food safety did Cargill take following the turkey recalls?

ROBACH: Cargill took a number of tactical actions in an overall strategy aimed at addressing how to deal with such a daunting challenge (see sidebar, "Food safety action following the 2011 turkey recalls"). We formed an independent panel of food safety experts to review our processes and practices and make recommendations. We also reviewed those recommendations which validated our existing practices and processes, and we enhanced others. Additionally, we closely examined the entire supply chain to determine what, if any, additional steps could be taken to further reduce both the presence and prevalence of *Salmonella*.

Plus, we explored numerous technologies including high pressure processing, next generation vaccines, and emerging technologies such as biosensors developed by the Department of Homeland security, as well as revisiting irradiation. We're working with university, government and private researchers to accelerate the development of new technologies.

QUESTION: What else has changed since the recalls?

ROBACH: Communication among key stakeholders—including USDA, CDC, Cargill and industry peers, poultry trade associations, academics and universities and consumer groups—continues to evolve and improve as we all work toward a common goal of improving public health and food safety. We all understand that when there is a potential issue, the earlier information is shared, the opportunity to move quickly to identify a source and remove potentially impacted product from the marketplace should result in a better public health outcome.

Over the past year we have experienced an earlier exchange of information, which benefits everyone when attempting to mitigate the potential impact from foodborne illnesses. We believe this is only going to improve due to more open lines of communication that have been established.

Additionally, the industry has pulled together and assembled a team of experts to gather data and share information and processes aimed at improving the overall safety of ground meats, much as the ground beef industry did after *E. coli O157: H7* was declared an adulterant in 1994.

Read more: What the Salmonella Heidelberg recalls say about food safety: A year later, www.WATTAgNet.com/152072.html

The August 3 recall was the largest poultry meat recall in U.S. history—36 million pounds of ground turkey.

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Cargill created and implemented the most advanced and robust Salmonella sampling and monitoring program in the industry, including more frequent testing.

QUESTION: What was the biggest challenge in conducting the investigation to track down the source?

ROBACH: We found out how difficult it is to track down the source, which we have not yet been able to do. In examining the entire supply chain, it became apparent that we could not find a consistent correlation between the live side and the finished product.

We continue to work at a better understanding about how *Salmonella* gets into the supply chain and what can be done to mitigate bacteria that pose a human health risk. We've looked at both the presence and prevalence of *Salmonella* in turkey and are trying to also understand how *Salmonella* survives, multiplies and moves within the supply chain.

In many ways this is as big a challenge as anything encountered on TV by the CSI investigators. We've also learned more about the magnitude of the resources that must be deployed to deal with the complexities that exist in the natural world and the fact that bacteria don't read regulations and don't seem to have rules. We deployed many scientists, technicians, subject matter experts and other professionals and are leaving no stone unturned in our ongoing efforts to find solutions.

QUESTION: Is there one most significant lesson learned that makes a difference in the food safety of poultry?

ROBACH: The biggest lesson is to understand the process and make sure that the interventions in the plants are operating the way that they are intended to operate. It's keeping the focus on controlling the process and using the data that is developed to help

IN LESS THAN 48 HOURS—THE TIME IT TOOK TO CONFIRM THE INFORMATION AND ORGANIZE AN ACTION PLAN—CARGILL INITIATED A VOLUNTARY RECALL OF GROUND TURKEY PRODUCTS PRODUCED AT SPRINGDALE, ARK., FROM FEBRUARY TO AUGUST 2011.

do that. It is also taking a very systematic approach from the breeder to the hatchery to the feed mill to the grow-out houses to transportation to slaughter to chilling to cut-up and to grinding. That involves looking at the process holistically and understanding the dynamics at each step of the process.

QUESTION: Is there a silver bullet?

ROBACH: That's the $64,000 question. Everyone is looking. If there were an easy answer, we would all be using it. There's no upside to foodborne illnesses and recalls, and we would all sleep a lot easier if we had a silver bullet solution. The only certain answer at the moment is to ensure that ground products are properly cooked to 165F using a thermometer to confirm the interior temperature.

We've looked at irradiation, but for ground turkey it renders the product unsalable. We've looked at high pressure processing, which also alters the appearance and other attributes of the product, and we've looked at a number of technologies that are still in the development phase.

When a silver bullet is identified, we won't hesitate to begin testing it, but for now we continue to employ technologies that give us the best shot at minimizing foodborne illnesses. As daunting as dealing with naturally occurring bacteria can be, our resolve has been strengthened to identify and employ technologies and processes to further reduce the potential human health risk from harmful bacteria. Collectively, everyone from farm to fork plays a role that contributes to food safety. ■

Cargill Value Added Meats is the meat and poultry production and processing division of Cargill Inc. The company's US turkey operation was the third largest turkey producer in the US in 2011.

4 keys to improving food safety in poultry

Cargill's vice president of corporate food safety and regulatory affairs talks about new opportunities for poultry industry and government cooperation and regulatory reform.

» Ironically, the largest-ever food safety recall of poultry in 2011 has set the stage for improvements in collaboration in food safety among poultry companies and between governmental food safety agencies and the poultry industry. In the following interview, Mike Robach, vice president, corporate food safety and regulatory affairs at Cargill, discusses four keys to insuring continued improvements in the food safety of poultry.

1. Better communication is needed between the public health community and the poultry industry

QUESTION: The USDA Food Safety Inspection Service's statutory role as a regulatory enforcement agency poses something of a dilemma as it receives calls to be more proactive as a food safety agency. For example, where human illnesses associated with foodborne pathogens occur, should FSIS focus, first, on building a case for regulatory enforcement action or collaborate with the industry to identify sources and eliminate pathogens as quickly as possible from the food supply?

MIKE ROBACH: Yes, that's true, and we've had a number of conversations with the agency about this since Cargill's turkey product recalls due to *Salmonella Heidelberg* in 2011.

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Advantage of quantitative performance standards: Having 20 percent of carcasses positive with one cell is better than having 5 percent of carcasses contaminated with 1,000 cells each.

Cargill is working with several other poultry companies and the University of Georgia's Mike Doyle and the Centers for Disease Control in a group that we are calling a Safe Food Forum. FSIS

and FDA are participating in those meetings as well. The group is looking at ways of achieving better communication between the public health community and the poultry industry.

For example, when the public health community begins to see evidence of a cluster of human illnesses or potential outbreak, it would be helpful for them to be able to pull the industry into their discussions about potential sources. It would allow the industry to aid in an investigation as opposed to being subject to the investigation. This would be a big change.

The challenge is that FDA and USDA-FSIS have by statutory mandate a responsibility to take regulatory action once they are aware of something. That can often impede an effective investigation of root causes. We have to work through those issues, and that is the process that we are going through now.

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The USDA Food Safety and Inspection Service's statutory mandate as a regulatory enforcement agency can impede its ability to act proactively on food safety.

2. Performance standards need to be more directly related to public health outcomes

QUESTION: Performance standards are a pillar of FSIS policy. Do they benefit food safety?

ROBACH: Performance standards are a target or measuring tool for the industry to use in producing safer poultry. They can help drive outcomes, so I think that they are valuable. The performance standards being used today were probably the best available at the time that they were established. I would like to see performance standards changed to be more related to public health outcomes. That would drive industry performance in a positive way.

QUESTION: Is there an example of performance standards linked to public health outcomes?

ROBACH: The performance standard for *Listeria monocytogenes* in ready-to-eat foods has driven industry efforts towards a significant reduction of this pathogen in ready-to-eat meats. That has resulted in reduced illnesses from *Listeria* related to the consumption of ready-to-eat meats. That's a success story.

QUESTION: What about performance standards for raw poultry?

ROBACH: Qualitative performance standards for the incidence of *Salmonella* in raw poultry, in my opinion, have not had the desired effect of reducing human salmonellosis. Reducing the incidence of *Salmonella* on poultry carcasses, in fact, has not resulted in a reduction of human salmonellosis. That tells me we should be looking at different performance standards to gauge the effectiveness of our interventions in raw poultry.

QUESTION: Please give an example of a more effective performance standard.

ROBACH: In Iceland, it has been shown that if the number of *Campylobacter* cells on poultry are reduced to below 10^4 the incidence of campylobacteriosis in the human population is reduced. So, in that country, quantitative performance standards have resulted in positive public health outcomes. However, in the U.S., achieving reductions in *Salmonella* incidence levels with qualitative standards has not resulted in a reduction in human salmonellosis.

WHEN THE PUBLIC HEALTH COMMUNITY BEGINS TO SEE EVIDENCE OF FOODBORNE ILLNESS OUTBREAKS, IT WOULD BE HELPFUL FOR THEM TO BE ABLE TO PULL THE INDUSTRY INTO THEIR DISCUSSIONS ABOUT POTENTIAL PATHOGEN SOURCES.

Having 20 percent of carcasses positive with one pathogen cell is probably a better place to be than having 5 percent of carcasses contaminated with 1,000 cells each. Clearly, we want to have a reduction in incidence to the extent possible, but the focus needs to be on getting the number of cells down because of infectious dose considerations.

QUESTION: Should the focus be more on serotypes of public health significance?

ROBACH: I am a big believer in understanding and identifying virulence factors so that we can focus our efforts and resources on managing those organisms that are most capable of causing foodborne illness. If we can identify virulence factors that can be detected in a monitoring program, then we have a better chance of intervening and controlling those organisms. I think that is going to be an important technology to watch develop. A number of companies are working on identifying virulence factors and creating screens for those virulence factors.

3. Regulatory reform is needed to make FSIS oversight more science based

QUESTION: HACCP is used in the U.S. regulatory framework in a way not originally intended as a scientifically based framework. Should FSIS policies be changed to be more scientifically sound?

ROBACH: When HACCP was made part of the Pathogen Reduction Act in 1996, FSIS was in a bind in that it had a statutory framework in which it had to operate. As a result, regulatory HACCP was born. It wasn't based so much on risk assessment and hazard analysis as on existing regulations that had to be met. That is just an unfortunate reality.

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HACCP was designed to identify and eliminate hazards of foodborne pathogens with a kill step such as cooking – something not applicable in raw poultry.

QUESTION: It is a reality now, but can it be changed?

ROBACH: The way to address this is to reform meat and poultry inspection legislation in the same way that FDA oversight is currently being reformed through the Food Safety Modernization Act. We need regulatory

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reform based on science with a focus on positive public health outcomes. That would require a rewriting of the legislation.

QUESTION: What changes should be made in the regulatory framework?

ROBACH: When the Federal Meat Inspection Act was written in 1906 and when the Poultry Products Inspection Act was written in 1957, much of the focus was on diseased animals coming into the plant and not on microbiological food safety. I believe that the acts should be revised to focus more on identifying hazards, assessing risks, and having appropriate interventions in place to reduce risk to the extent possible. HACCP was originally designed to identify and eliminate hazards. Obviously, the risk of foodborne pathogens can't be entirely eliminated in raw poultry. So the task is to reduce the hazard to an acceptable level from a food safety standpoint.

4. Poultry industry collaboration in food safety must continue, and new food safety research is needed

QUESTION: How has Cargill been working with other companies on food safety?

ROBACH: One way is that Cargill has helped organize a group of meat and poultry companies and industry experts to share data about the risks involved in ground meat production and ground poultry production. Their purpose is to share data within the industry and develop hypotheses about the food safety risk in meat and poultry grinding operations. The group is also identifying the gaps in research and then taking an experimental approach to better understand how *Salmonella* moves through the system so that we can design more effective interventions.

Dr. David Acheson, who was formerly with FDA and USDA and now at Leavitt Partners, is facilitating and leading the group of industry experts. The first order of business has been to understand the dynamics of *Salmonella* in ground poultry. We have an extensive experience base with ground beef, and we are using our learning from the ground beef side to help shape the agenda for the ground poultry group.

IF WE CAN IDENTIFY VIRULENCE FACTORS THAT CAN BE DETECTED IN A MONITORING PROGRAM, THEN WE HAVE A BETTER CHANCE OF INTERVENING AND CONTROLLING THOSE ORGANISMS.

Food safety shouldn't be used as a competitive advantage. This kind of collaborative approach has been used on the ground beef side for some time. It is great to get the whole ground meat community working together on food safety. ■

Cargill helped form an industry group that shares data and develops hypotheses about the food safety risk in meat and poultry grinding operations.

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FSIS should release data on generic E. coli and Salmonella in poultry

The Food Safety and Inspection Service has a mountain of unreleased data on the supposed relationship between generic E. coli and Salmonella in poultry samples. FSIS should release the data immediately. BY JOHN CASON

» In January, the Food Safety and Inspection Service published a proposed rule, "Modernization of Poultry Slaughter Inspection," with important changes in the rules of processing, including the intention of FSIS to drop the requirement that plants test chilled carcasses for *E. coli*. Individual establishments will be allowed to use "other, more relevant" but unspecified indicators of process control, with individual HACCP plans identifying what bacterial monitoring is to be done. Dropping the *E. coli* testing requirement is a sharp departure from the dogma of poultry HACCP as mandated by FSIS in the last 15 years.

The 1996 HACCP Final Rule said that experts agreed that *E. coli* was the best indicator of fecal contamination, the source of pathogens such as *Salmonella*. "There is a strong association of *E. coli* with the presence of enteric pathogens," with "wide acceptance in the international scientific community of its use as an indicator of the potential presence of enteric pathogens." The Final Rule said that *E. coli* was "the most effective measure of process control for enteric pathogens," and thus plants were required to test for generic *E. coli*, with specified limits in a moving window of test results.

MOUNTAIN OF UNRELEASED DATA: FSIS STUDIES THAT INCLUDE DATA ON E. COLI COUNTS AND SALMONELLA IN POULTRY SAMPLES

Method	Study	Year	Samples	Sal MPN?*
Rinse	Chicken Baseline	94-95	1297	yes
	Chicken Baseline	99-00	1225	no
	Chicken Baseline	07-08	6550	yes
	Turkey Baseline	96-97	1221	yes
	HACCP vs. HIMP**	98	5025	no
Sponge	Turkey Baseline	97-98	1396	no
	Turkey Baseline	08-09	2884	yes
	Goose Baseline	97	102	no
Ground	Chicken Baseline	95	285	yes
	Turkey Baseline	95	296	yes

*Salmonella Most Probable Number
**HAACP-Based Inspection Models Project

FSIS has accumulated the best data available concerning E. coli as an indicator of Salmonella in different poultry samples. The data remains unreleased.

E. coli counts not seen as reliable indicator of Salmonella

Even before publication of the HACCP Final Rule in 1996, however, there were warnings that *E. coli* counts were not a reliable indicator of *Salmonella*, despite the endorsement by FSIS. At the scientific meeting sponsored by FSIS in Philadelphia in 1995, poultry mi-

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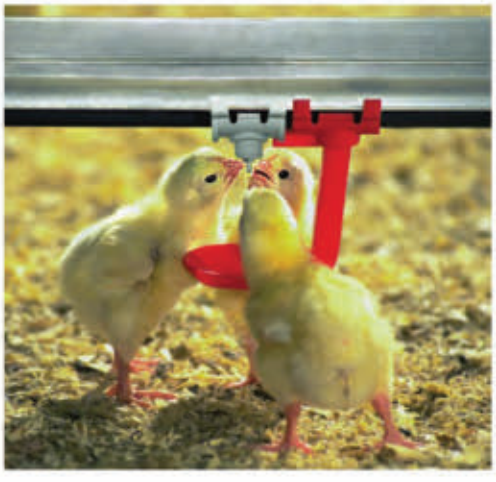

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crobiologist Dr. Amy Waldroup said that her work had not found any correlation between different groups of microorganisms. After reviewing FSIS's HACCP proposal before its final publication, USDA's Office of Risk Assessment and Cost Benefit Analysis commented, "There is an insufficient scientific basis to rely on *E. coli* for process control verification to ensure *Salmonella* reduction."

The office suggested that FSIS "conduct research to test the statistical limits of the hypothesis that *E. coli* process control verification will ensure pathogen reduction," and that samples intended for *Salmonella* testing be assayed by FSIS personnel for *E. coli* as well. In 2004, the National Advisory Committee on Microbiological Criteria for Foods reported, "There are no data that support the use of index organisms for *Salmonella* on broilers." The committee also recommended generation of data to relate indicators to pathogens and show that reductions in indicators lead to reductions in pathogens.

FSIS has shown great interest in whether *E. coli* can indicate the presence of pathogens such as *Salmonella*. In the "Risk-Based Inspection" documents published in 2008, there was extensive discussion of a joint research project conducted by FSIS and Agricultural Research Service to study the relationship between *E. coli* counts and the presence of *Salmonella*. The peer-reviewed publication that resulted from that study reported, however, that sorting groups of carcasses by *E. coli* counts did not produce statistically significant differences in *Salmonella* prevalence. The paper recommended additional surveys with more data than the 800 carcass rinses available in that study. Similarly, one of the goals of the 2012 Nationwide Raw Chicken Parts Microbiological Baseline Data Collection Program is to "compare prevalence and counts between pathogenic organisms and indicator organisms to determine relationships and associations."

DESPITE CALLS FROM SCIENTIFIC COMMITTEES TO INVESTIGATE INDICATOR-PATHOGEN RELATIONSHIPS, FSIS HAS NEVER RELEASED ITS DATA ON THE CORRELATION BETWEEN E. COLI AND SALMONELLA IN POULTRY PROCESSING.

FSIS silence about data on E. coli-Salmonella relationship

In fact, the further studies urged by the Office of Risk Assessment and Cost Benefit Analysis, the National Advisory Committee on Microbiological Criteria for Foods and FSIS have accumulated gradually since the FSIS version of HACCP has been the rule in poultry processing. Table 1 shows Baseline and other studies conducted by FSIS during the HACCP era, with a total of 14,097 chicken carcasses, 5,501 turkey carcasses, 102 goose carcasses, 285 ground chicken samples, and 296 ground turkey samples that have been collected by FSIS using various sampling methods for analysis of *E. coli* counts and *Salmonella* prevalence. In addition, Most Probable Number assays for *Salmonella* were carried out for almost 8,000 chicken carcasses and 4,000 turkey carcasses, allowing a more powerful analysis for those samples. The published Baseline studies and the HACCP/HIMP study are absolutely silent on the relationship between *E. coli* and *Salmonella* in this mountain of data.

FSIS should release the data to answer questions

What was the likelihood of

Salmonella presence when the *E. coli* count was above the 80th or 98th percentiles (control levels m and M in the *E. coli* criteria)? A single observation above 98th percentile was said to indicate that the plant was "out of control." What was the correlation between *E. coli* counts and *Salmonella* MPN in samples where numbers can be compared directly? Was there seasonal variation in *E. coli* results to match the seasonal variation in *Salmonella*?

The Data Collection and Reports section of the FSIS website says, "To ensure that FSIS maintains a science-based and data-driven approach to food safety, the Agency conducts a robust analysis of available data." FSIS should release the *E. coli*/*Salmonella* data immediately so that establishments can know whether it is worthwhile to continue using *E. coli* as an indicator of process control under the modernized rules. ■

John Cason retired from the Agricultural Research Service of USDA in December 2011 after 40 years in poultry-related jobs, including two years working with chickens as a Peace Corps volunteer. He spent the last 21 years investigating poultry processing and food safety issues as a research physiologist at the Russell Research Center in Athens, Ga. His PhD is from the University of Georgia.

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People&Companies

The International Poultry Expo has created a Spanish version of its website, www.ipe13.org/espanol, highlighting attendee and exhibitor information for the 2013 International Production & Processing Expo.

House of Raeford Farms associates in Rose Hill and Wallace, N.C., packed 20,000 meals for Stop Hunger Now, an international hunger relief organization that coordinates the distribution of food and other life-saving aid around the world.

Aviagen has promoted Jason Mack to vice president of operations for North America.

Gainesville, Ga., poultry processing sister companies Prime Pak Foods Inc. and Victory Processing LLC are expanding, with Prime Pak opening a $7 million, 30,000-square-foot fully cooked food line and Victory Processing hiring 300 employees.

Kristi Krafka, vice president of regulatory affairs and quality assurance for the animal nutrition and health division of Kemin in North America, will serve as the chair of the American Feed Industry Association Feed Regulatory Committee.

Animal Science Products Inc. has appointed Kevin Matter as its feed additives business manager and Clark Chandler as its operations manager.

Diamond V dedicated its new 17,000-square-foot high-tech global headquarters recently at its 77-acre campus in Cedar Rapids, Iowa.

ADM Alliance Nutrition Inc., has acquired certain assets of J&J Agri Services, a manufacturer of liquid animal feed supplements.

Datelines

Send trade show, meeting and technical symposium information to: Gary Thornton, *WATT PoultryUSA*, at gthornton@wattnet.net. For a comprehensive list of events plus detailed information go to Events at www.WATTAgNet.com.

2012

OCTOBER

National Poultry Waste Management Symposium
23-25» Sam's Town, Shreveport, LA, United States, www.alabamapoultry.org

North American Meat Association Outlook Conference
24-27» JW Marriott Hill Country, San Antonio, TX United States, www.meatassocation.com

NOVEMBER

2012 Equipment Manufacturers Conference
8-12» San Diego, CA, United States, www.afia.org

National Institute for Animal Agriculture annual symposium
13-15» Hilton Polaris Hotel, Columbus, OH, United States, www.animalagriculture.org

EuroTier 2012
13-16» Exhibition Grounds, Hanover, Germany, www.eurotier.com

Poultry India's Poultry Exhibition 2012 Knowledge Day
27-30» Novotel International Convention Centre, Hyderabad, Andhra Pradesh, India,+91.40241.42413, www.poultryindia.co.in

2013

JANUARY

International Production and Processing Expo 2013
29-31» Georgia World Congress Center, Atlanta, GA, United States, www.ippe13.org

MARCH

Midwest Poultry Federation Convention 2013
13-14» St. Paul RiverCentre, St. Paul, MN, United States, www.midwestpoultry.com

National Turkey Federation Annual Convention 2013
13-16» Loews Coronado Bay, Coronado, CA, United States, www.eatturkey.com

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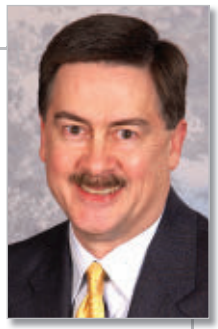
Editor's Comment BY GARY THORNTON

Will Africa's growing urban population have a taste for US poultry?



Will this become the African century? For decades, prognosticators have looked ahead to Africa's economic emergence as being just around the corner. It hasn't happened, but now a number of industry economists and consultants are saying that Africa might soon become an important destination for U.S. poultry products.

Africa's growth accelerated after 2000, making it the world's third-fastest growing region behind emerging Asia and the Middle East. Growing disposable incomes on the continent, as people begin to move upward on the economic ladder, make this region of the world a prime market for inexpensive poultry protein. By 2020 more than half of African households will have discretionary spending power.

Top 10 potential new markets for US poultry

The USA Poultry & Egg Export Council has compiled a list of the top 10 potential new markets for U.S. poultry exports. The markets, from all over the world, were ranked for their potential based on domestic poultry production and consumption and other factors. Five of the top 10 potential new country markets are in Africa: Tunisia, Egypt, Algeria, Mauritius and Botswana.

Africa's economic potential

Zelda Sharp, a USA Poultry & Egg Export Council consultant, presented other eye-opening facts from the McKinsey Global Institute about Africa's progress and economic potential:

- ✔ Africa has 60 percent of the world's uncultivated, arable land.
- ✔ Africa collective GDP at only $1.6 trillion in 2008 is forecast to grow to $2.6 trillion by 2020.
- ✔ Africa's consumer spending at only $860 billion in 2008 is expected to rise to $1.4 trillion by 2020.
- ✔ The number of Africans of working age in 2040 is forecast to be 1.1 billion.

Africa's urban population growth

Two other noteworthy statistics possibly foreshadow the nature of Africa's future demand for poultry:

- ✔ There are 52 African cities with more than 1 million people each
- ✔ The portion of Africans living in cities by 2030 is forecast to be 50 percent

Know these future destinations for US poultry?

The six fastest-growing major cities in Africa might become well-known to you as future destinations for U.S. poultry products:

- ✔ Dar es Salaam – Tanzania's largest urban area with a population over 3 million and projected to grow by over 80 percent by 2025
- ✔ Nairobi – Most populous urban area in East Africa with a population of 3.1 million, this Kenyan city is one of Africa's most prominent, financially and politically
- ✔ Kinshasa – The capital city of the Democratic Republic of the Congo is the second largest in Sub-Saharan Africa and the third largest in the whole continent after Lagos and Cairo
- ✔ Luanda – This Angolan city of over 5 million is the world's third-most-populous Portuguese-speaking city. It is forecast to grow by 70 percent by 2025
- ✔ Addis Abba – Capital city of Ethiopia has a population of over 3.4 million, which is expected to grow by over 60 percent by 2025
- ✔ Abidjan – With a population over 5 million in its metro area, the largest city of Ivory Coast is a cultural hub of West Africa

Where are the other five, non-African, markets with top 10 potential for U.S. poultry exports? According to the study, they are India, Iran, Indonesia, Maldives and Bhutan. ■

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*Effect of Celmanax® supplementation on the performance of broilers vaccinated with Coccivac®-B or fed a Coccidiostat. Dr. Greg Mathis Ph.D., Southern Poultry Research Inc., Athens, Georgia. Coccivac®-B is a registered trademark of Intervet Inc.

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