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JUNE 2021

WATTPoultry USA

The magazine for the integrated poultry industry

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VOLUME 22 NUMBER 6

JUNE 2021

WATTPoultry USA

The magazine for the integrated poultry industry

Cover Story

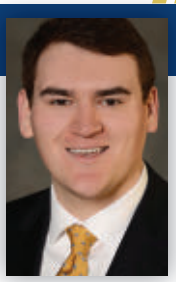
Features

Cover image: Courtesy Bell & Evans

Next on the Plate

»NEXT ON THE PLATE

Editor's Comment BY AUSTIN ALONZO



Americans will fly again in 2021

After a year of restrictions due to the COVID-19 pandemic, Americans are planning on flying this summer for business and pleasure.

A resumption of air travel

People are eager to leave their homes, reestablish connections or simply travel for the sake of traveling. Several states, such as Texas, already rolled back some COVID-19-related restrictions on public gatherings. As vaccination becomes more widespread, people will certainly feel more confident about returning to their previous social activities and habits.

One major economic and social metric to watch as 2021 unfolds will be domestic travel. With the injection of an economic stimulus earlier in 2021 and those with disposable income mostly grounded for the past year, it is no surprise people are looking to travel in 2021.

Americans are much more bullish on flying than they were last year. A report from the New York Times analyzing early data for bookings this summer indicates airline travel will fully recover by this summer with strong demand for leisure and business travel routes. This means people are feeling more confident aboard a plane and in an airport. This could signal a permanent return to domestic discretionary travel starting in 2021.

Impacts for the chicken industry

In 2021 and beyond, as the COVID-19 situation improves in the U.S., the poultry industry should see a widespread recovery as demand normalizes.

One major component of normalizing demand will be a resumption of demand from foodservice. If Americans are ready to resume flying, that means they are likely ready to stay at a hotel, attend a conference or live entertainment event and dine out of the home, too.

These are significant positives for the chicken and turkey industries and a welcome sign after a long and chaotic year dealing with the COVID-19 pandemic and its repercussions. ■

» Editor's comment for this month is from Austin Alonzo's blog: **www.WATTPoultry.com/blogs/47**

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Is the US experiencing a fried chicken shortage?

KFC and Wingstop have both reported challenges keeping up with demand.
www.WATTPoultry.com/articles/42782

Courtesy Yum

Courtesy University of Alberta

Nine methods for ag professionals to debunk myths

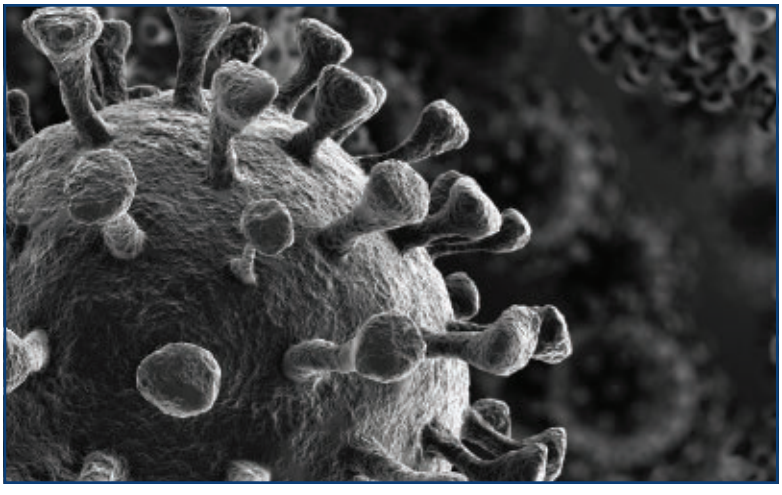
While a lot of misinformation is believed to be true, it is possible to set the record straight with many people.
www.WATTPoultry.com/articles/42792

NEXT ON THE PLATE

Poultry Future BY ELIZABETH DOUGHMAN

How COVID-19 changed the chicken plant of tomorrow

The poultry industry will need to adapt to meet shifting consumer demand.



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The COVID-19 global pandemic shocked and disrupted protein supply chains in 2020, leading the industry to rethink operations from start to finish to better meet consumer demand.

"The poultry industry worked through the extreme volatility that COVID-19 brought to producers and processors and consumers," Will Sawyer, lead animal protein economist, CoBank, Knowledge Exchange, said. "I think the industry will change because of COVID-19 — from technology and new products and expansion into new areas."

Sawyer will share insights and evaluate the status of the world's recovery from COVID-19 and how this will impact demand for chicken in the U.S. and around the globe at the 2021 Chicken Marketing Summit.

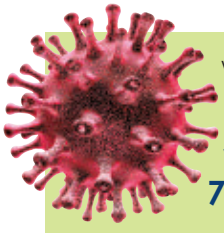
Make plans to attend the 2021 edition of Chicken Marketing Summit scheduled for July 18-20, 2021, at the Omni Amelia Island Resort in Fernandina Beach, Florida. Registration is now open with early savings available.

The chicken plant of tomorrow

The industry is rethinking operations post-pandemic, Sawyer explained, which could impact everything from the location of chicken production and processing operations, the size of the bird, how birds are processed and how poultry products can best be delivered to customers in domestic and international markets.

For example, COVID-19 forced several companies in the chicken industry to shift production from foodservice to retail to meet changing consumer demand.

The widespread closure of restaurant dining rooms, schools and conferences shrank foodservice activity, while retail stores experienced high demand as consumers



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toolbox

An interview with
Kalen Cookson, DVM
Director of Clinical Research
Zoetis

Latest breeder, broiler vaccines provide consistent IBDV immunity

> "The original Delaware E variant viruses...have been largely displaced by the AL2 variant family..."

Q: Zoetis introduced two new vaccines for managing infectious bursal disease virus (IBDV) during a 15-month period — Poulvac Maternavac® 4 and Poulvac® Procerta™ HVT-IBD. Why the focus on IBDV?

KC: IBDV remains a major threat to commercial flocks worldwide.[1] Most US broilers are at risk because they are raised on built-up litter. IBDV destroys the antibody-producing bursa of Fabricius, which can lead to severe immunosuppression,[2] especially in broilers under 3 weeks of age. That's a big concern now that more than 60% of broilers are raised without antibiotics.

In addition, the predominant IBDV variants circulating have changed a lot over the years. The original Delaware E variant viruses, for instance, have been largely displaced by the AL2 variant family, which is now predominant.[3] We recognized the need for vaccines that provide better protection against the IBDV challenges of today.

Q: Do Poulvac Maternavac 4 and Poulvac Procerta HVT-IBD protect against the newer IBDV variants?

KC: Yes. Both Poulvac Maternavac 4 and Poulvac Procerta HVT-IBD protect against the prevalent AL2 variant, for example.[4,5,6]

Q: Why have two vaccines if they both provide the same types of protection?

KC: Because they work in fundamentally different but critically important ways. Poulvac Maternavac 4, which we introduced in 2019, is an injectable, inactivated, four-way vaccine for breeders. Inactivated IBDV vaccines work by hyperimmunizing broiler breeders so they pass on high maternal antibodies to broiler offspring. Passive immunity is the single, most efficient way to prevent IBDV infections at a young age when birds are most vulnerable.

Poulvac Procerta HVT-IBD, which we more recently introduced, is a recombinant vector vaccine that is given to broilers for active immunity, usually by *in ovo* administration, although it is also given by subcutaneous injection to egg layers.

Q: Do Poulvac Maternavac 4 and Poulvac Procerta HVT-IBD compete with or complement each other?

KC: They actually complement each other because one picks up where the other leaves off. Maternal antibodies that broilers receive from vaccinated breeders start to wear off at around

continued

2 weeks of age. That's about the same time immunity from Poulvac Procerta HVT-IBD kicks in.[7,8,9,10] The sooner a recombinant vaccine initiates immunity, the less potential there is for a gap in protection and, thus, less risk of profound immunosuppression.

Q: If both vaccines are used, does that eliminate the need to vaccinate broilers with a live IBD vaccine either in the hatchery or in the field?

KC: Probably so, unless there are unusual circumstances. Broilers confronted with a very strong IBDV field challenge and/or having poor maternal immunity, for example, might also need vaccination with a live IBDV vaccine.

Q: Is it true that HVT-IBD recombinant vaccines shouldn't be used for more than 1 to 2 years and, if so, why?

KC: IBDV has a built-in ability to adjust to various conditions. It's also an RNA virus, so it makes mistakes when it replicates. Replication is fuel for change and the emergence of different IBDVs. It stands to reason that rotating vaccines might help keep IBDVs "on their toes," so to speak, and deter them from adjusting.

Q: How will veterinarians and producers know when it's time to bring in a different IBDV vaccine?

KC: I recommend routinely conducting bursal surveys every 1 to 2 years to keep tabs on the IBDV field challenge. Bursa samples need to be submitted to a lab for polymerase chain reaction +/- histological analysis. The surveys will help determine the field infection window as well as the types of IBDV circulating, which may indicate a need to change the IBDV-control plan. Zoetis can help with this. We like to get results from several flocks at around 18 to 30 days of age.

Q: So, if you're using a recombinant HVT-IBD vaccine and want to rotate to another vaccine, what type would you use?

KC: You could rotate to a live vaccine or an immune-complexed vaccine. Bursaplex® would be one example. It's a live, immune-complexed vaccine that can be given subcutaneously or *in ovo*. It's been shown to be as effective as a herpesvirus of turkey recombinant vector vaccine and can even limit field-challenge replication.[11]

Q: Do you have a take-home message for producers who need to improve IBDV control in their flocks?

KC: Between Poulvac Maternavac 4 and Poulvac Procerta HVT-IBD, producers now have two dependable, complementary tools to help them protect broilers against today's IBDV challenges.

For more information, contact Kalen Cookson (kalen.cookson@zoetis.com) or your Zoetis representative.

[1] Infectious bursal disease in poultry. Merck Manual. https://www.merckvetmanual.com/poultry/infectious-bursal-disease/infectious-bursal-disease-in-poultry

[2] Michel L, Jackwood D. Classification of infectious bursal disease virus into genogroups. Archives Virol. 2017;162:3661-3670.

[3] Cookson K, et al. A survey of wild type IBDV isolated from broiler flocks in the United States since 2014. 2020 International Poultry Scientific Forum, Atlanta, GA.

[4] Data on file. Study Report No. 040322-KC-70AQ0-KC-6121. Zoetis LLC.

[5] Cookson K, et al. A survey of wild type IBDV isolated from broiler flocks in the United States since 2014.

[6] Data on file. Study Report No. B815R-US-19-B80. Zoetis LLC.

[7] Ibid.

[8] Data on file. Study Report No. B815W-US-19-A92. Zoetis LLC.

[9] Data on file. Study Report No. B815R-US-19-B22. Zoetis LLC.

[10] Gelb J, et al. Efficacy of Recombinant HVT-IBD Vaccines Administered to Broiler Chicks from a Single Breeder Flock at 30 and 60 Weeks of Age. Avian Dis. 2016 Sep;60(3):603-12.

[11] Data on file. Study Report No. 014-14-70AQ0. Zoetis LLC.

Toolbox is a series of interviews with veterinarians and other technical specialists about their experiences managing antimicrobials, vaccines and other tools for poultry health. It is produced by the editors of *Poultry Health Today*® on behalf of the US Poultry Business of Zoetis.

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"It's been a stark dichotomy and profitability between those that have been that were retail focused prior to pandemic, versus those that were foodservice," said Sawyer.

One solution could be a permanent shift to a channel agnostic model, where chicken processors create products for both retail and foodservice needs. This approach is already used by the beef and pork industry.

Attend the 2021 Chicken Marketing Summit

The 2021 Chicken Marketing Summit will be held at the Omni Amelia Island Resort in Fernandina Beach, Florida on July 18-20. This year, the conference will shine a light on what consumers will be looking for in the post-pandemic world and how poultry marketers can find success in the marketplace.

For more information and to attend, visit: www.wattglobalmedia.com/chickenmarketingsummit/ ■

Fabio Sandri, CEO Pilgrim's Pride

Courtesy Pilgrim's Pride

PILGRIM'S CEO: FOODSERVICE-RETAIL BALANCE SHOULD RETURN

Like most poultry processors, Pilgrim's Pride had to shift some of its production that is ordinarily destined for the foodservice channel to the retail channel during the height of the COVID-19 pandemic.

But speaking during a quarterly earnings call on April 29, Pilgrim's Pride CEO Fabio Sandri spoke of a shift back to foodservice and its implications for the second largest poultry producer in the United States.

"We are split evenly between foodservice and retail. We have increased the retail exposure last year as the foodservice has been down, but we believe that that balance could come back in 2021 as the restrictions are eased and the foodservice continues to grow," Sandri said. "As a matter of fact, in March, the foodservice segment already exceeded March 2019 … and that is led mainly by the QSR (quick service restaurant) growth and the recovery of some of the full service segment."

Sandri noted that the foodservice segments that continue to lag are the recreational lodging and at educational institutions. However, he said that as more people receive COVID-19 vaccinations and their comfort levels of being out in the public increases, those, too, should return.

Impact of chicken sandwich wars

He also said he believes the timing of people returning to eat at QSRs is right, as more businesses are getting involved in the chicken sandwich wars.

"We have a survey … that showed that 27% of the customers are ordering chicken-oriented meals more frequently than before the pandemic," said Sandri. "What we are seeing is the significant increase in chicken due to what's called the chicken sandwich wars. We're seeing more and more QSRs launching new chicken sandwiches.

"In the recent data, it's showing that these new offerings are being very successful, faring better than their expectations and being a great delivery of traffic for the QSR. So as the QSR demand continues to grow, I think chicken demand inside that QSR also increased. We believe that retail

»NEXT ON THE PLATE

will moderate a little, but we think that the sum of both will continue to be very positive.

Quarterly financial results

Sandri, along with Pilgrim's Chief Financial Officer Matthew Galvanoni, on the call reviewed the financial results the first quarter of fiscal year 2021. The quarter ended on March 28.

Net sales were $3.27 billion for the quarter, an increase from the $3.07 billion for the same quarter of 2020. Sales in all three geographies where Pilgrim's operates — the U.S., Europe and Mexico — were also up on a year-over-year basis.

Net income was $100.5 million for the quarter, up from the $67.3 million for the same quarter from a year ago. ■

Courtesy Kraft Heinz

KRAFT HEINZ REPORTS IMPROVED FINANCIAL PERFORMANCE IN Q1

The Kraft Heinz Company reported financial results for the first quarter of the 2021 fiscal year, showing a year-over-year improvement in both net sales and net income.

The results, which were released on April 29, reflected the quarter that ended on March 27.

The diversified food company — which includes turkey production operations – reported $6.4 billion in net sales, which was a 3.9% increase when compared to the same period of the 2020 fiscal year. In terms of net sales within its United States operations, net sales increased 2.5%.

The company reported a net income attributable to common shareholders at $563 million, a 48.9% increase on a year-over-year basis.

Commenting on the quarterly performance, Kraft Heinz CEO Miguel Patricio said: "Our first quarter was better than expected, with our team delivering strong results on top of exceptional growth last year. Looking forward, we will continue to focus on leveraging our tremendous scale by investing to improve our capabilities and overall agility. As we do, we believe we will come out of this period much stronger, operationally and financially, than we entered."

While the Kraft Heinz Company's financial performance improved on a year-over-year basis, the company did scale back its turkey operations during the 2020 calendar year. According to the WATT PoultryUSA Top Companies survey, Kraft Heinz processed 308 million pounds of turkey in 2020, which reflected a 9.41% decrease in production when compared to the 2019 calendar year. The company, which includes the Oscar Mayer line, has projected to further decrease its turkey production in 2021 to about 300 million pounds.

The Kraft Heinz Company ranks sixth among turkey producers headquartered in the United States. It also is the fifth largest food and beverage company in the world. Kraft Heinz formed in 2015 with the merger of the Kraft Foods Group Inc. and the H.J. Heinz Company. ■

Courtesy Cargill

CARGILL INVESTS IN MEAT ALTERNATIVE STARTUP BFLIKE

Cargill is investing in Bflike, a startup in the Netherlands that has developed technology to create plant-based meat alternatives that look, feel and cook like its animal-based counterparts.

The partnership will make Bflike's vegan fat and blood platform technology and premix ingredient solutions available for licensing to food manufacturers and retailers looking to bring plant-based products to market. The technology improves the visual appearance, texture, mouthfeel, melting behavior and cooking performance of plant-based meat and seafood.

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"Together with Cargill as a development partner, we can help expand the possibilities with a new generation of nutritious products that will continue to revolutionize the plant-based marketplace," Koos van Haasteren, Chief Executive Officer of Bflike, said in a statement.

Cargill will provide support to these customers, enabling them to scale up quickly and move from pilot to commercialization.

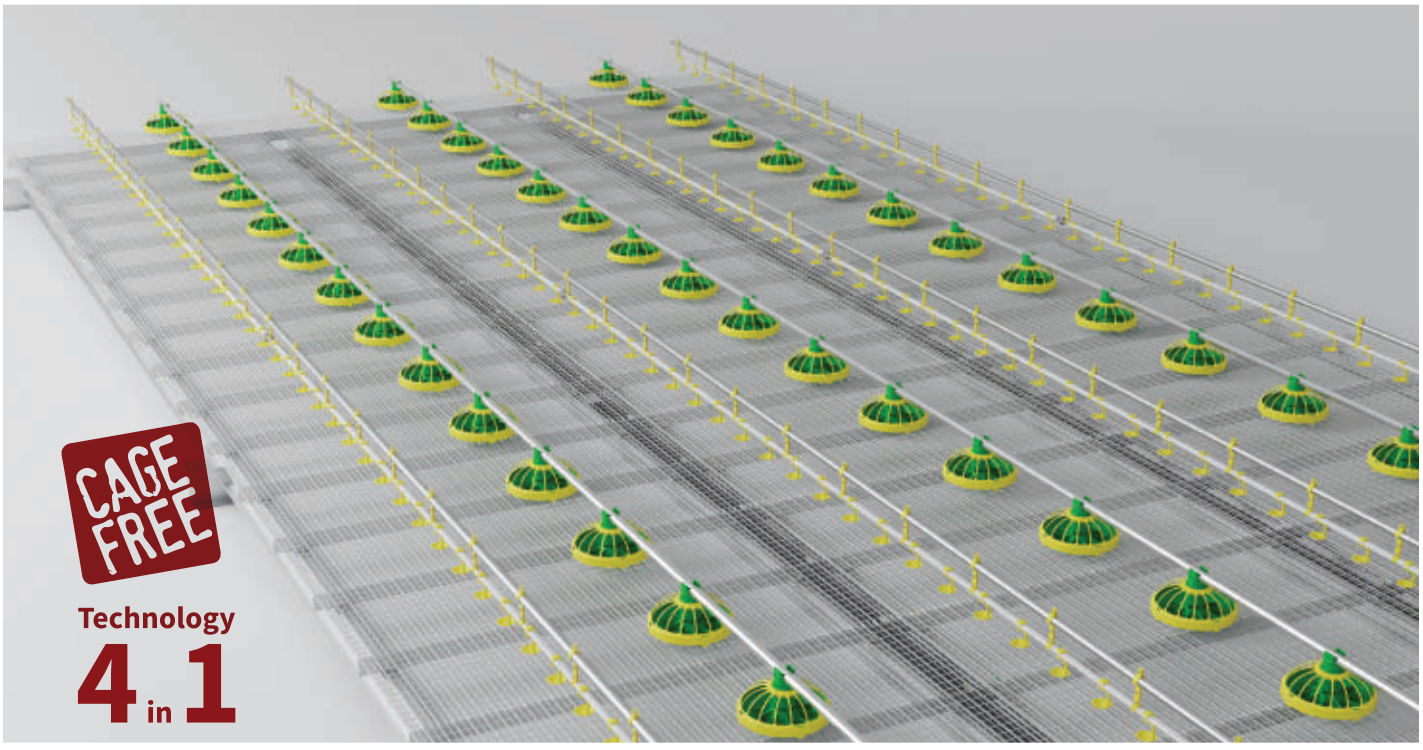
"Global volume consumption of protein is expected to nearly double by 2050. Plant-based protein, as a complement to animal protein, will help fulfill growing consumers' desire for more options as part of a balanced diet," said Belgin Köse, Segment Director Enrichment & Renewability for Cargill Starches, Sweeteners & Texturizers Europe.

Not the first investment in plant-based

Cargill, the largest feed company and third largest turkey company in the U.S., is one of the numerous meat processors that has dipped its toes into the plant-based market. In 2019, the company invested $75 million in Puris, the largest North American producer of pea protein.

In 2020, Cargill announced that they would begin selling plant-based patties and ground products to retail food and foodservice businesses. Later that year, the company partnered with quick service restaurant chain KFC to sell a plant-based fried chicken product in China.

"This joint venture [with Bflike] is another way in which Cargill is enabling plant-based alternatives that exceed consumer expectations and enrich consumer diets with responsible, sustainable and affordable options in various geographies," Köse said. ■



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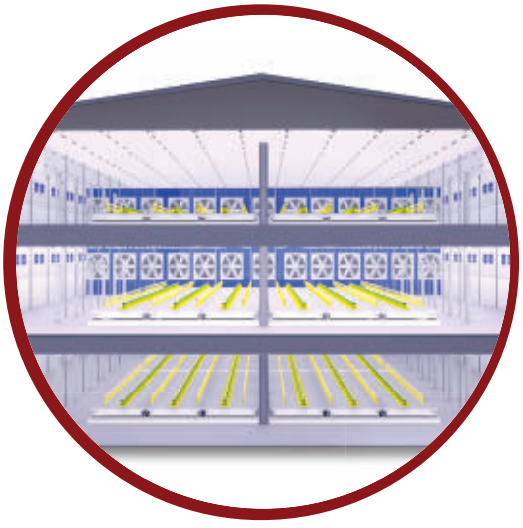

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US organic chicken production grows rapidly

Sales of organic chicken rose by 48% between 2016 and 2019. One producer forecasts double-digit sales growth annually in the 2020s.

AUSTIN ALONZO

The organic chicken market in the United States is growing quickly and is poised for further growth in the coming decade.

Powered by increased demand for organic chicken, sales in the segment are growing significantly. According to the U.S. Department of Agriculture's (USDA) National Agricultural Statistics Service's (NASS) 2017 Census of Agriculture, in 2019 total organic sales were $9.926 billion, a 31% increase from the $7.554 billion sold in 2016.

In 2019, sales of organic chicken were $1.115 billion, a 48% increase from the $750 million sold in 2016. For turkey, organic sales were $139 million in 2019, an increase of 67% from $83 million in 2016.

In 2020, 6.56 million pounds of ready-to-cook (RTC) organic chicken was produced on a weekly basis.

Courtesy Bell & Evans

Scott Sechler, president and owner of Bell & Evans, a leading producer of organic chicken in the U.S., said demand for organic poultry rose sharply during the COVID-19 pandemic. He projects demand will increase by more than 10% every year for the rest of the decade. This trend, he said, is driven by consumers demanding greater trust in the quality of their food.

Organic poultry production

Organic chicken is a specialty product certified by the USDA to follow certain practices that are not standard to the integrated poultry industry. They are marketed to consumers who want a premium product aligned with the organic food ethos. Organic poultry products cost consumers about twice as much as conventionally produced chicken and cost about twice as much to produce.

To be sold as organic, chicken and turkeys produced in the U.S. must align with the standards

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Inset photo: New Brown Out Kit

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US ORGANIC CHICKEN PRODUCTION

set by the USDA's National Organic Program (NOP) and bear the USDA Organic stamp on the packaging. Enforcement of the NOP began in 2000. This requires birds be raised with no antibiotics, fed only organic, vegetarian feed and supplements and provided access to the outdoors. The program specifically sets standards for land use, origin of livestock, feeding, health care, living conditions, soil erosion and water quality, egg and carcass washes, slaughter, marketing and labeling, and recordkeeping.

To be sold as organic, chicken must be raised to the standards of the U.S. Department of Agriculture's organic program and bear the organic product seal.

Courtesy Shenandoah Valley Organic LLC

Figures provided by the USDA Agricultural Marketing Service (AMS) on organic poultry slaughtered under federal inspection indicate organic poultry production grew steadily in the past decade. In 2020, 6.56 million pounds of ready-to-cook (RTC) organic chicken was produced on a weekly basis. That's a 202% increase from the 2.17 million pounds RTC organic chicken produced in 2010.

For turkeys, organic production has increased by more than 500% in the same period. In 2020, 108.1 million pounds of live organic turkeys were processed in the U.S. In 2010, 17.62 million pounds of live organic turkeys were produced.

By comparison, a total of 964.74 million pounds of ready-to-cook chicken was produced on a weekly basis in 2020 by the 32 integrated poultry companies forming the WATT PoultryUSA's Top Broiler Companies index. In 2020, a total of 2.247 billion pounds of live turkeys were slaughtered by the 22 companies in WATT PoultryUSA's Top Turkey Companies index. Cumulatively, organic production accounts for just 0.67% of that chicken production and 4.8% of that turkey production.

Total US organic chicken production, in millions of pounds

Production numbers based on average weekly, organic-certified slaughter in the U.S., measured in millions of pounds of ready-to-cook chicken.

2010	2.17
2011	2.34
2012	2.24
2013	2.13
2014	1.83
2015	5.99
2016	6.28
2017	6.23
2018	6.59
2019	6.54
2020	6.56
2021*	6.76

**Through the end of April 2021*
Source: U.S. Department of Agriculture Agricultural Marketing Service

The average weekly slaughter of organic chicken grew by 202% in a decade.

Organic economics

Organic chicken production generally costs twice as much as conventional production, largely due to the requirement for organic-certified grain to be fed to the birds. Organic-certified grain and feed ingredients are, compared with conventional products, in short supply. A vast majority of organic grain in the country is imported.

Farmers Pride Inc., doing business as Bell & Evans, is a leading producer of organic chicken. It started producing organic in 2009 and is the largest chicken supplier for Whole Foods Market. According to its response to the 2020 Top Broiler Companies survey, the company produces 4.8 million pounds of ready-to-cook chicken, by processing 1.25 million chickens, weekly. About half of its production is organic.

Sechler, a poultry entrepreneur who formed the Bell & Evans brand by purchasing the assets of local poultry companies in southeastern Pennsylvania in the 1980s, said

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From left: Margot Sechler, Scott Sechler and Scott Sechler Jr., Bell & Evans. *Courtesy Bell & Evans*

in the early days of organic chicken production it was not a profitable business due to often producing more organic meat than was sold and selling the remaining meat at a loss. Demand is now so great there is even a market for organic poultry byproducts. He also noted demand from retail has risen over the years, while foodservice demand dipped, due to stronger consumer demand through that channel.

Organic carries higher costs across the board — and costs are passed onto the consumer — but organic production is profitable now for Bell & Evans and, he suspects, for other organic producers, too.

"I wouldn't say there's a lot more money to be made in organic than something else. But I think it's a very consistent market," Sechler said. "The margins for us are consistent."

Largest integrators' organic programs

Three of the top five integrators included in the WATT PoultryUSA database — Tyson Foods Inc., Pilgrim's Pride Corp. and Perdue Foods — are producing organic chicken through assets they acquired in the past and through their own organic programs.

Tyson

Tyson, the largest integrated chicken company in the country, purchased an organic producer, Tecumseh Poultry LLC, in June 2018 for an undisclosed amount. At the time of the transaction, Tyson said Tecumseh, which sold products under the Smart Chicken brand, was a leading producer of organic chicken.

According to WATT Global Media research, Tecumseh was producing 2.62 million pounds RTC chicken on a weekly basis in 2017. It is unknown how much was organic production and how that figure has changed since the 2018 transaction.

Tyson declined to provide its organic production figures to WATT PoultryUSA. The publicly traded company does not publish organic production data in its U.S. Securities and Exchange Commission (SEC) documents.

Pilgrim's

Pilgrim's Pride, the second largest chicken company, sells organic products under its just BARE product line. The just BARE line was originally launched by GNP Co., which Pilgrim's agreed to purchase from The Maschhoffs for $350 million in 2016. According to WATT PoultryUSA data, GNP Co. processed 8.79 million pounds of ready-to-cook chicken on a weekly basis in 2015. GNP launched its organic production in 2014. It is unknown

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what portion of its production at that time was organic.

In May 2016, Pilgrim's then-CEO Bill Lovette said Pilgrim's intended to enter the organic chicken market and planned on converting one of its complexes to produce organic chicken due to forecasted increase in demand. At the time, he said once the conversion was completed Pilgrim's would produce about 20% of the organic chicken in the country.

It is unknown how much of Pilgrim's production is organic today. The publicly traded company does not publish organic production data in its SEC documents. Representatives of the company did not immediately respond to a request for comment on this article.

Perdue

Perdue, the fourth largest chicken company, says it is the largest producer of organic chicken in the U.S., but it declined to provide specific data on its organic production

US organic turkey production, 2010-21

Production numbers based on total live pounds of organic turkey processed, measured in millions.

2010	17.62
2011	17.57
2012	33.58
2013	22.7
2014	21.36
2015	23.47
2016	19.25
2017	12.91
2018	18.33
2019	19.33
2020	108.1
2021*	31.55

**Through the end of April 2021*
Source: U.S. Department of Agriculture Agricultural Marketing Service

Organic turkey production increased by more than 500% between 2010 and 2020.

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Perdue Farms says it's the largest producer of organic chicken in the U.S. *Courtesy Perdue Farms*

to WATT PoultryUSA, citing its policy to not typically release those figures.

In 2011, Perdue acquired Coleman Natural Foods, an organic poultry producer, for an undisclosed amount. Perdue sells organic products under its Perdue Simply Smart Organics, Coleman Organic, Petaluma Poultry's Rosie, and Draper Valley Farm's Roxy brands.

In a 2016 statement Perdue provided to the USDA's National Organic Program – signed by Mike Leventini, Perdue's general manager and vice president of live production and the vice president of Coleman Natural Foods – the company said it has sold organic broiler chickens since 2001 through the Petaluma Poultry, Draper Valley Farms and Perdue brands. It said it was the largest organic-certified broiler producer in the U.S. with operations in California, Washington and Delaware. According to the statement, in 2014, Perdue estimated it produced half of the organic chicken in the U.S.

In 2018, the company said in a press release that its Milford, Delaware, processing plant supplied 1.2 million organic and no-antibiotics-ever chickens per week for sale under Perdue, Perdue Harvestland, Coleman Organic and private label brands.

Also in 2018, Perdue announced two organic-related investments. In April 2018, it said it planned a $42 million expansion of its cook plant in Perry, Georgia, which would help meet growing demand for organic products. In November 2018, the company owned a $30 million organic grain receiving and storage facility in Baltimore County, Maryland, to meet demand for organic feed ingredients for Perdue and other companies in the region.

Leading organic chicken producers

Bell & Evans

Bell & Evans began organic production in 2009 and about half of its production is organic. The company is

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Bell & Evans plans on opening a new $330 million, 411,500-square-foot organic-certified processing plant in 2021. *Courtesy Bell & Evans*

known for higher than standard live production practices, including inclusion of natural light and concrete floors in all barns and changing litter between every flock. It discontinued use of antibiotics in 1998.

Bell & Evans says it is the only operator of an organic-certified hatchery. The facility can hatch as many as 2.8 million organic eggs weekly. The company is building a new $330 million, 411,500 square-foot, organic-certified processing plant. It will double its production capacity and should be operational by the end of 2021. Half of the plant's production will be organic. In the next decade, the company plans to build a second new plant with one dedicated to processing organic chicken going forward.

He said customers across the country are ordering more chicken every week and, to keep up with demand, Bell & Evans will need to keep growing capacity. Bell & Evans uses only organic grain grown in the U.S. and is supplied entirely by Cargill Inc.

Shenandoah Valley Organic

Shenandoah Valley Organic LLC (SVO) is a startup poultry processor based in Harrisonburg, Virginia, that processes only organic birds it purchases from farmers growing in the Shenandoah Valley region of Virginia. According to its 2020 WATT PoultryUSA Top Broiler Companies survey response, it produced 1.9 million pounds of RTC chicken on a weekly basis in 2020. It sells its products under the Farmer Focus brand.

The company was founded in 2012 by its CEO Corwin Heatwole. It processes birds out of a rehabilitated, 90,000 square-foot former turkey plant it purchased from investors in 2014. In 2019, it raised $15 million from private investors to grow the company. In November 2020, SVO announced its plans to build a new, 75,000-square-foot processing plant in Harrisonburg.

In a 2019 interview with WATT PoultryUSA, Heatwole said the next steps in growing the company include rolling out value-added and cooked products and expanding its retail presence.

Foster Farms

Foster Farms is a privately owned, vertically integrated chicken and turkey company producing organic chicken and organic turkey. According to WATT PoultryUSA's Top Poultry Companies data, it ranks as the 11th largest chicken company in the U.S. in terms of weekly RTC chicken production and the 13th largest turkey producer. It is based in California and operates in Oregon, Washington, Colorado, Arkansas, Alabama and Louisiana.

In its 2020 Top Broiler Company survey response, the company said it produces organic products but did

Corwin Heatwole, Shenandoah Valley Organic LLC

Lise Metzger

not say what percentage of its production is organic. The company launched its organic chicken and turkey lines in 2015 when also launching its antibiotic-free brand. In 2016, it was reportedly planning on building a $15.8 million feed mill to process organic feed. The company did not respond to a request for comment on this article.

Miller Poultry

Miller Poultry is a privately owned, integrated chicken producer based in Orland, Indiana. It processes vegetarian-fed, raised-without-antibiotics broilers raised on Amish family farms.

According to its 2020 Top Broiler Companies survey response, Miller Poultry produced 3.25 million pounds of RTC chicken on a weekly basis in 2020. It said 20% of its production, or about 650,000 pounds RTC on a weekly basis, is organic.

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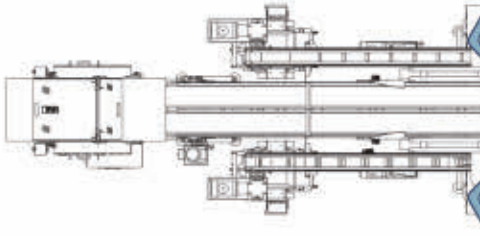

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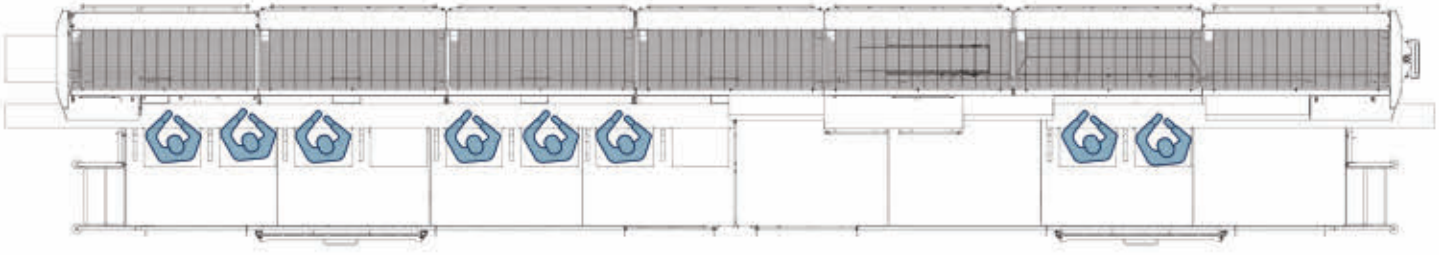

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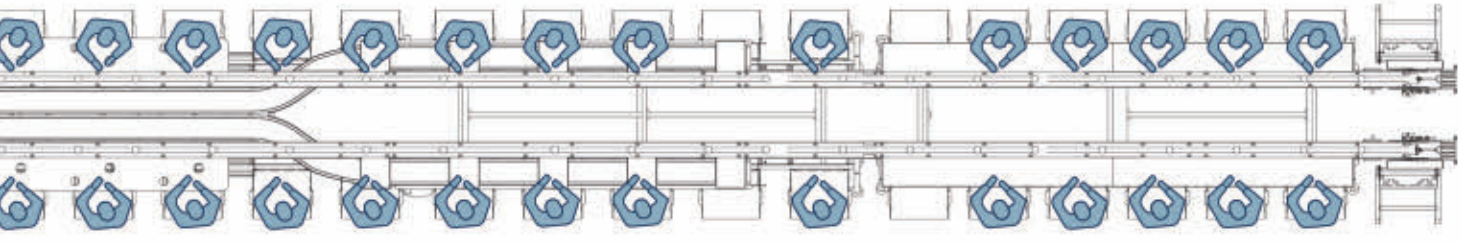

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How to manage feed costs amid high corn and soy prices

Experts: Managing feed costs with $14 soybeans is possible, but requires out-of-the-box solutions

Emma Penrod

The agricultural world had no shortage of economic turmoil when 2020 began. African swine fever continued to rage in Europe and Asia, and then COVID-19 cut a similar path across the globe, making its way to the Americas and shutting down factories, shipping lines and, eventually, meat processing plants. Yet in the midst of it all, one thing the world did not have a shortage of was soybeans.

For the first half of the year, soybeans sold for less than US$10 per bushel and seemed quite stable, recalls Fernando Caja Del Prado, a purchasing manager at Nutreco's Nanta Group. Farmers entered the year with a glut of unsold beans left over as a result of the U.S.-China trade war, and the weather seemed to foretell another year of high crop yields.

Fortunes began to change after the August derecho raised the specter of crop damage and, by September, prices began to climb. But the real game changer came when China suddenly began to buy corn and soybeans far in excess of any previous prediction.

"A lot of us didn't see this coming," says Hans Stein, a professor of animal science at the University of Illinois. "This is just bad luck and some circumstances we didn't know would come, and therefore things have turned out the way they have."

By early 2021, soybean prices exceeded US$14 per bushel and corn surpassed US$5.50, pushing many farmers, according to a February report, to seek out less expensive alternatives or even food-grade grains.

With high prices for critical ingredients across the board, there is little animal producers can do to avoid high feed prices entirely, according to Ester Vinyeta Punti, global nutrition manager for Nutreco. But there are strategies that can be employed — immediately and long term — to reduce some of the financial pain.

Ingredient swaps

When producers face abrupt increases in ingredient prices, the quickest solution, according to Stein, is often swapping the high-priced ingredient for something similar but affordable. The trick to this, he says, is that the best options will vary considerably based on one's location.

Rice bran, for example, might be a good alternative for producers in Missouri or Arkansas with ready access to a rice mill, but in Illinois or Iowa, hauling the rice bran north could prove cost prohibitive. In the Midwest, producers often turn to distillers' grains to replace soybeans, but with the decreased demand for ethanol due to the pandemic, distiller's grains are hard to come by. An alternative to the alternative, Stein says, might be corn germ meal or corn gluten feed from a wet milling facility.

The corn gluten recommendation comes with a caveat, Stein says: The quality can be highly variable.

For unreliable ingredients like corn gluten, or any unfamiliar

Willard | iStock.com

feed ingredient, Stein says, it's important to collect a sample and conduct a nutritional analysis. Without this, the nutritional content of the entire diet could be thrown off balance; you can't just take one ingredient out and swap it for another and assume everything will be fine, he says.

Another effective strategy, Stein says, is to look for waste products available from human food processing. Bakery meal, he says, is such a good ingredient that companies have sprung up to collect leftover bread and cereals, strip them of their packaging, and resell them to animal producers.

"Some people have even been able to buy dog food that is off spec and cannot be used for dogs," Stein says, "but can be used for pigs."

These kinds of opportunities tend to come and go, Stein says, so taking advantage of them requires developing long-term relationships with local mills or brokers who can flag, for example, a batch of dog food that got recalled because it was mislabeled.

A final option, if producers are really struggling to find suitable ingredients in their area, is to blend old, dirty or even contaminated grain with better-quality feedstuffs.

"If the mycotoxins are not too high and you can clean it very well," Stein says, "you may be able to blend it down and mix in clean corn."

Alternative ingredients

Alternative ingredients can help with short-term price hikes, but they're usually a temporary solution at best, according to Bart Borg of Standard Nutrition.

"Alternatives to soybean meal and corn travel in lockstep on price with soy and corn," Borg says. "Those selling those ingredients are aware that if they're a substitute to corn and corn has doubled in price, they can now double their price."

For most alternatives, Borg says, there is a brief window of opportunity where the alternative is truly a solution to high prices. But that window may last a month or less before alternative prices

catch up with conventional ingredients and, in the case of 2021, he says, the ship for most alternatives has already sailed.

There are, however, price coping strategies that do not rely on alternative ingredients, but on milling and husbandry practices.

With commodity prices rising, experts note that alternative ingredients aren't the only option for reducing costs.

Alfribeiro | iStock.com

One of the first solutions he employs, Borg says, is to check the particle size of his feed.

"The finer the grind, the better the digestibility, so every pound that you buy goes further and the animal is getting more out of it than if you have whole corn or very coarse particles," he says.

What's driving grain price volatility in 2021? **bit.ly/3jScvwl**

Unfortunately, no study has shown that grinding soybeans will improve the digestibility of the amino acids — the solution there, according to Borg, is probably crystalline amino acids. For improving energy efficiency, he says, the only downside to downsizing your particle size is that feed flow can become a problem in automatic feeders.

"If you're using an automated system, my suggestion is to keep trying to get your corn finer until you find that you need to tap on the bin to get it to start flowing," he says. "Then back off a bit. Make it a little more coarse so it will flow."

Particle size, Borg says, also matters for producers who use pelleted feeds, which means times of high ingredient prices are also good times to check your mill's processing standards.

Managing feed safety and quality is also especially important during times of high ingredient prices, according to Roland van Dalen, marketing manager for Selko Feed Additives. Pathogens that may enter feed products may consume nutrients, decreasing feed efficiency and, should an animal become sick, the illness may interfere with its ability to absorb nutrients.

In addition to good mill management, Stein says producers may find it worthwhile in the long term to expand their grain bin capacity. With more bins, he says, producers are better positioned to take advantage of opportunities to pick up cheap quality feedstuffs they can store away for times of economic uncertainty, even if those ingredients are outside the standard fare like corn and soybeans.

"Having more different bins is important," he says. "If you want to be able to take advantage of whatever opportunities come your way, you have to have those bins."

Another area Borg says he has experimented with in his own animals is optimizing diets for price performance, rather than maximum growth.

"In times of high feedstuff costs, you need to stand back and … realize, 'I'm going to lose a little bit of average daily gain and feed conversion may go up,'" Borg says, "but the savings on those ingredients may be greater than what your loss is."

The one production management strategy Stein does not recommend is culling or cutting herd numbers

to reduce feed consumption. There are signs this is happening, he says, but in the long run, it rarely works out for the producer who adopts this strategy because by the time they reap the imagined cost savings, prices have changed — including, often, the market price for pork or poultry.

"Usually trying to jump in and out of the market, you mistime it, has been my experience," he says. "I don't think I would advise that. It's a risky strategy, jumping in out of the market."

Long-term strategy

Forward contracting and staying on top of commodities markets is also an important long-term strategy for mitigating financial risk, according to Paul Bertels, principal economist for Farm Gate Insights. While this latest round of price increases may have caught many off guard, there were early signs of trouble with nations such as Ukraine and Russia taking steps to curb grain exports in early 2020. Producers who felt caught off guard shouldn't beat themselves up too badly, he said, because prices rose over a very short period of time. But it was possible to see this coming, he said, and highlights the need for producers to pay attention to international markets besides major producers like the U.S.

"To put it in economic terms, the U.S. is the residual supplier of grain," Bertels said. "We are the world's grain storage. As we saw dramatically this year, when everyone else is out [of grain], they come running to America because we're usually not out." ■

Emma Penrod has covered science and business, with an emphasis on health, the environment and agriculture, for more than a decade. Penrod covers the animal feed industry for FeedStrategy.com.

How plating media affects Salmonella serovar detection

Regulatory agencies should be cautious comparing or correlating Salmonella isolates detected from multiple sources, in multiple laboratories or using multiple methods.

NELSON COX ET AL.

The study compared plating media for cultivation of broiler carcass Salmonella and the detection of serotypes. *Eraxion | BigStock.com*

Much variation can occur when using different kinds of *Salmonella* plating methods.

Culturing for Salmonella

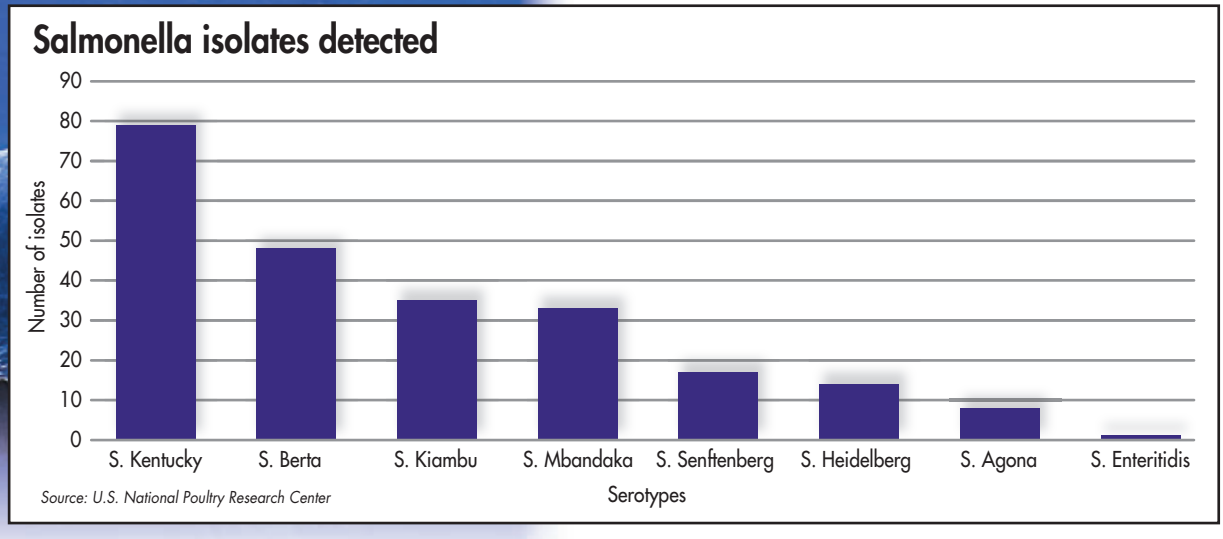
When culturing for naturally occurring *Salmonella*, food microbiology laboratories may use two or more selective enrichment broths and two or more selective plating media to reduce the likelihood of false negative results. Many laboratories are only interested in determining the absence or presence of *Salmonella* and may test as few as one typical isolate.

Comparing plating media

The objective of this study was to compare different plating media for cultivation of broiler carcass *Salmonella* and detection of serotypes.

We collected broiler carcasses just prior to chilling in a commercial processing plant, rinsed the carcasses and cultured for *Salmonella*. In total, 49 whole broiler carcass rinsates confirmed to be *Salmonella* positive were used to inoculate selective broths which were streaked onto selective agar plates after overnight incubation.

The two selective agar plating media used in this study were brilliant green sulfa (BGS) and Xylose Lysine Tergitol 4 (XLT-4). We picked as many as 12 isolated *Salmonella* suspect colonies from each carcass (six colonies per plating medium).



Four serotypes accounted for 80% of the 236 Salmonella isolates detected in the study.

All isolates were subjected to classical serotyping using *Salmonella* antisera. To limit variation, the laboratory work in this study was done by one technician with more than 20 years of experience in isolating *Salmonella* from poultry.

Experimental results

From the 49 carcass rinses, we confirmed a total of 236 *Salmonella* isolates. Four of the serotypes (*Kentucky, Berta, Kiambu* and *Mbandanka*) accounted for more than 80% of the *Salmonella* isolated with *Kentucky* being the predominant serovar.

It was not the intention of this study to show that one plating medium was better than the other, but rather to determine if the same or different assortment of serovars were detected on the two different plating media.

The chart shown here depicts the number of times the two plating media had the same or different assortment of serotypes. For these two plating media, significantly more *S. Kentucky* was recovered from XLT-4 than from BGS. Also *S. Kiambu* was detected 15 times on XLT-4 but went completely undetected on BGS.

In another study, we had observed a similar variability with these two plating media. In that study, *S. Lille* was isolated 34 times from BGS but only once from XLT-4

REGULATORY AGENCIES SHOULD PROCEED with caution when trying to compare or correlate Salmonella isolates detected from multiple sources.

plates. Therefore, we decided to take an in-depth look at why this was happening.

When *S. Lille* and *S. Kiambu* were streaked and studied on these two plating media, an explanation of this variation was determined. *S. Lille* was a weak hydrogen sulfide producer and therefore did not appear to be a typical, black-centered *Salmonella* colony on XLT-4 and was overlooked. *S. Kiambu* was a strong hydrogen sulfide producer so it appeared to be a typical colony on XLT-4 but formed a smaller than average *Salmonella* colony on BGS and hence went undetected on those plates.

Conclusion

If this much variation is seen with just two plating media, one can imagine how much variation could exist when considering the dozens of media combinations recommended by various domestic and international regulatory agencies. Other factors such as multiple rinsing of a carcass, use of neck skin sample instead of whole carcass rinse, and the possibility of encountering stressed *Salmonella* could affect *Salmonella* detection.

Therefore, regulatory agencies should proceed with caution when trying to compare or correlate *Salmonella* isolates detected from multiple sources, in multiple laboratories or using multiple methods. ■

N.A. Cox, M.E. Berrang, S.L. House, A. Hinton, Jr., J.E. Line, and L.T. Wiggins; U.S. National Poultry Research Center

Preparing the next generation of poultry science graduates

Integrators are looking for strong work ethic, communication skills and animal welfare knowledge.

KEVIN M. DOWNS, JOSEPH P. GULIZIA, JAMES D. SCOTT

With an ever-changing poultry industry and its unique challenges and opportunities, educators in poultry science seek to produce high-quality college graduates to fill high-quality, upwardly mobile positions in the poultry and allied industries.

This demands an understanding of characteristics, knowledge bases and skill sets deemed most important for employability and long-term career success.

The integrated poultry industry desires candidates with strong oral communication skills. *Konstantin Chagin | Dreamstime.com*

Surveying the poultry industry

We asked the poultry industry what it is seeking in college students through an online survey. The survey assessed how poultry industry personnel, predominantly those in management roles, viewed the importance of characteristics, skill sets, and knowledge bases that could lead to long-term success in a poultry industry career. With the invaluable help of state poultry associations, the survey was distributed to poultry industry management in 14 states. In total, 93 respondents completed the survey.

Respondents were asked to rank from 1, signifying no importance, to 5, signifying extreme importance, their perceived importance of certain traits. Some questions in the survey also assessed the perceived importance of certain student activities while in college, and university-industry engagement opportunities.

Personality traits

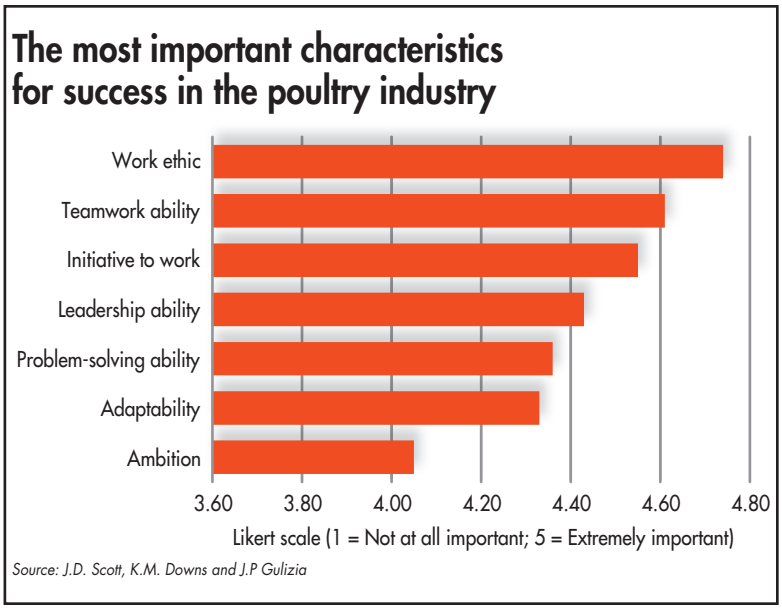
Among inherent personal traits, work ethic was clearly perceived as the most important (rated 4.74 out of 5). This result, combined

with solicited comments in the survey, shows a perceived concern by those in the poultry industry in identifying students with enough work ethic to achieve success in the industry. This is clearly a generational shift that should be addressed.

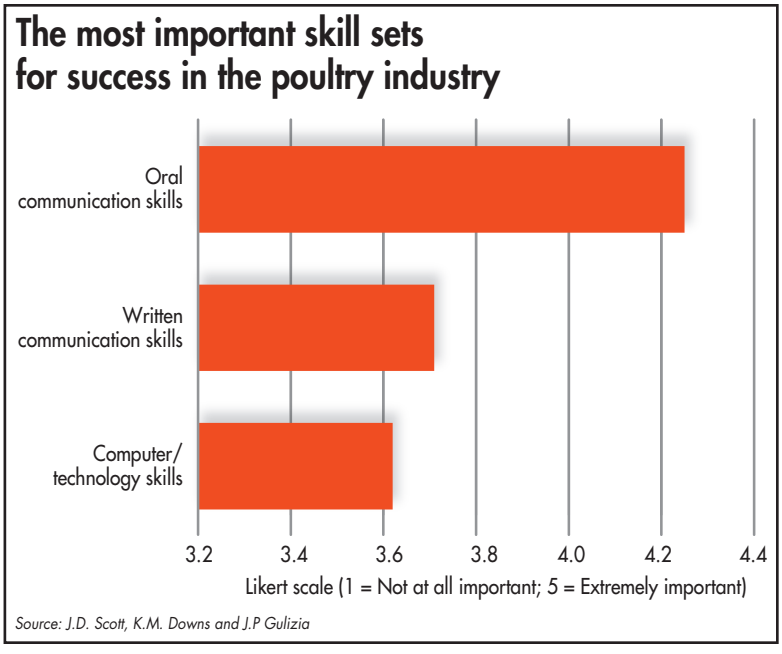
The challenge for those in education is the inability to "teach" work ethic. Educators, however, can play a role in disseminating the importance of work ethic for success in the poultry industry and beyond. Survey respondents also valued teamwork abilities (4.61) and initiative to work (4.55), but ranked ambition the least important personal trait (4.05).

Skills and knowledge

Survey respondents were also asked to rank perceived importance of certain skills and knowledge bases. To no surprise, the most important skill set is strong oral communication ability. (4.25). When taken together, respondents ranked oral communication skills far higher than any other skill or any of the seven knowledge bases. Interestingly, and a clear reflection of the evolution within the poultry industry, the



There is concern about finding candidates with enough work ethic to succeed in the poultry industry.



Oral communication skills were ranked higher than any other skill or knowledge base.

EMPHASIS ON CLASSROOM TEAM-BUILDING

exercises can unquestionably develop some level of positive teamwork skill improvement.

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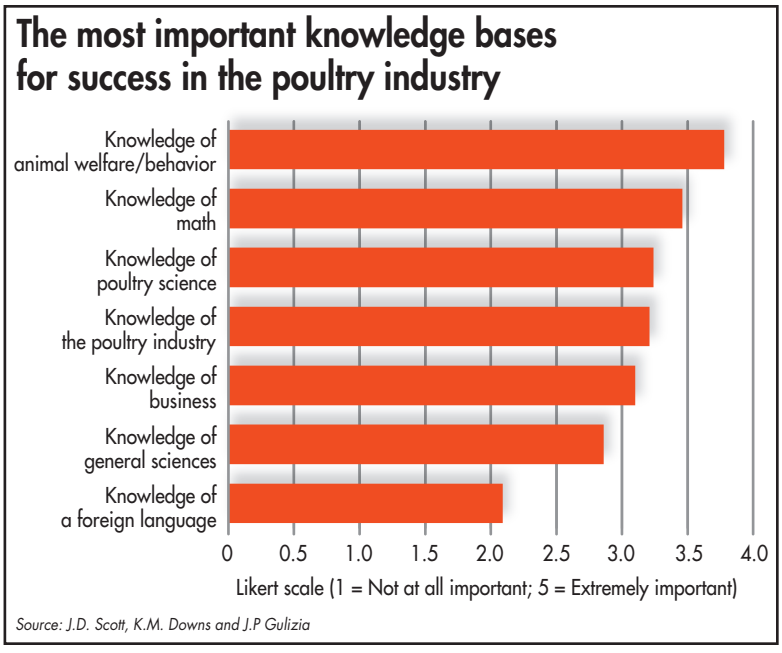
most important knowledge base is animal welfare and behavior (3.78), which rated substantially higher than even knowledge of poultry science. Moreover, and counter to what is normally perceived, knowledge of a foreign language was ranked the least important knowledge base (2.09).

Participants were also asked their opinions on certain college-associated experiences and activities. Not surprisingly, completion of a poultry industry internship ranked highest (2.73). Conversely, completion of undergraduate research was perceived as least important (1.84). However, based on the results of this survey, respondents did not appear to place a high value overall in any of these experiences.

Engagement

The last area assessed in this survey was the importance of certain university-industry engagement activities. Engaging with individual university contacts one on one clearly ranked as the most important (3.57). University-wide career fairs were perceived as the least important method for the poultry industry to engage at the university/college level (2.96).



Knowledge of animal welfare ranked above even poultry science.

Learning from the results

Little can be done in the educational environment to create inherent personal characteristics like work ethic. These are typically traits developed (or not developed) earlier in life.

However, there are actions that can be taken to foster positive improvements in personality traits. For example, emphasis on classroom team-building exercises can unquestionably develop some level of positive teamwork skill improvement. Further, the importance of oral communication skills for success in the poultry industry (and in other industries) is clear, and opportunities abound in the education sphere to afford students the chance to improve their communication abilities.

Not surprisingly, the two most important skill sets of oral and written communication are also the two biggest deficiency skills sets in the college student. However, efforts that focus on developing these skills can markedly improve workplace successes by contributing to a free-flowing information exchange, which is important in so many aspects of the industry. ■

Dr. Kevin M. Downs, Middle Tennessee State University; Joseph P. Gulizia, Auburn University; James D. Scott, University of Georgia

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6 consumer trend predictions for a post-pandemic world

COVID-19 is expected to have a lasting effect on purchasing behaviors.

ELIZABETH DOUGHMAN

Consumer habits and behavior changed dramatically in 2020. Which trends are expected to continue post-COVID-19?

"2020 will have a lasting effect on our behaviors," Joyce Neth, vice president, director of audience development and research, WATT Global Media, said.

"There were trends emerging pre-2020, like e-commerce for one. But in that year of change, trends accelerated five years. Things happened fast. Work at home made technology move faster and now everyone is doing more. This pace will continue. It will never be 2019 again."

Neth, alongside session co-presenter Chris DuBois, senior vice president, IRI, shared six post-COVID consumer trend predictions during The Poultry Federation's Food Safety Conference, held virtually on March 29-31.

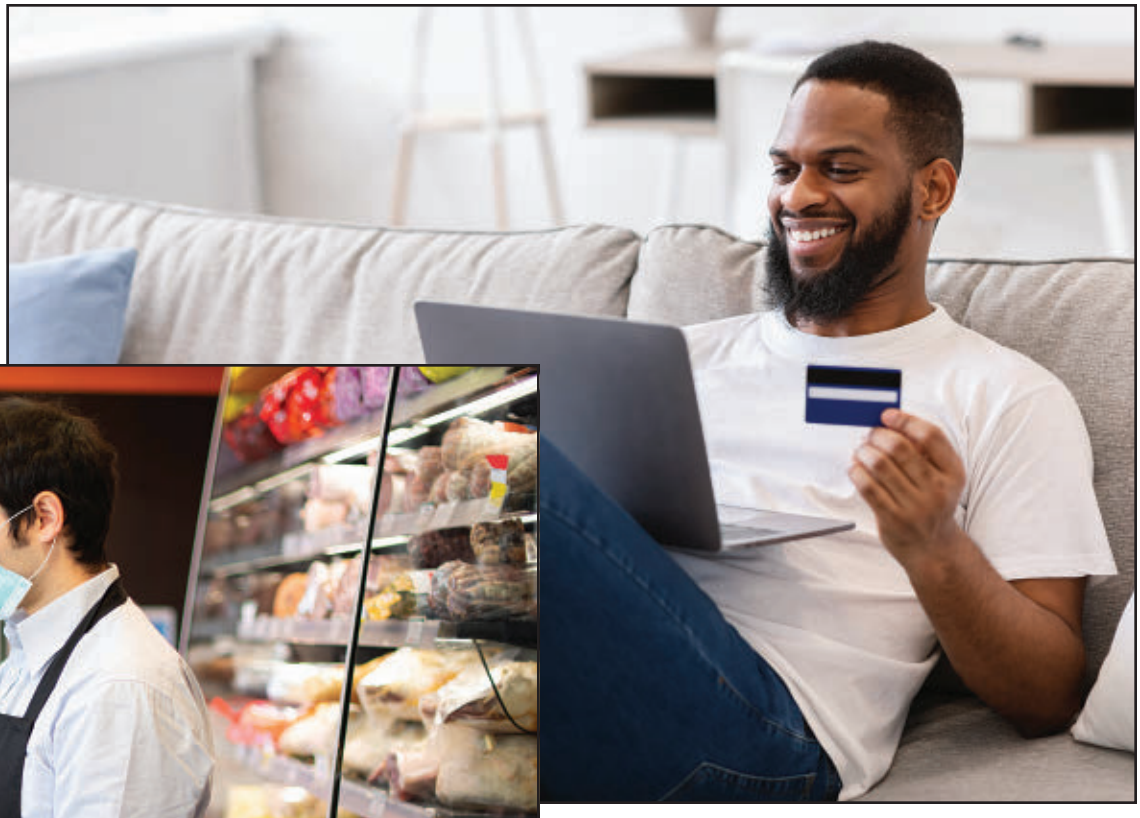
Lifestyle/consumption shifts

Shoppers spent more time at home than ever before, especially during the height of the pandemic. They went grocery shopping once a week, and in some cases, less than that, emptying shelves and filling pandemic pantries. Product shortages and supply chain challenges affected brand loyalty as customers were forced to buy what was available.

These behavioral changes could become permanent as consumers adjust to new routines.

E-commerce

E-commerce accelerated in a major way throughout the pandemic. Previously, shelf-stable goods were



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the products most likely to be purchased online. That changed in 2020 as consumers sought to maintain social distancing and turned to online options as a solution for meat and other grocery needs.

In many ways, e-commerce offers busy consumers a more convenient way to shop going forward.

Work from home

Working from home is a trend expected to continue post-pandemic, creating new markets for meal occasions. Breakfast and lunch are now big opportunities for meal retailers.

New occasions and locations

Prior to COVID-19, where and how consumers shopped had already begun to change as retailers began to experiment with new store formats, such as full-service dining in a furniture store or "grocerants," retail grocery stores featuring restaurant experiences. Retail stores will continue to evolve to meet changing consumer demand.

Sustainability

Consumers, led by Gen Z and millennials, are becoming increasingly thoughtful about what they consume. This means that values like sustainability now play a larger role in purchasing decisions and could continue to impact product sales going forward.

Premiumization

Bored by familiar recipes and looking to replace dining experiences, consumers treated themselves to new foods during COVID-19. Super premium and premium products, which include sustainably marketed claims, saw large sales gains in 2020. Interest in this category is expected to grow. ■

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Rethink how to reduce poultry litter moisture

Drier litter leads to better paw health, which improves the bottom line for poultry producers.

ROY GRABER

Courtesy Big Dutchman

THERE ARE THREE SOURCES of moisture in the house: Heaters, drinkers and the birds.

Investing in systems that ensure drier litter in poultry houses might seem expensive, but it should more than pay off in the end.

Connie Mou, technical services manager for Jones-Hamilton, stressed the importance of dry litter during The Poultry Federation Poultry Symposium for Production & Processing on April 14.

While it may be commonly known in the poultry industry that damp litter can lead to poor paw health, Mou pointed out that some people may not know how important good chicken paws are for a poultry integrator's bottom line.

According to Mou, paws account for about 3% of a bird's weight. For a complex that has 2 million nine-pound birds, that amounts to about 540,000 pounds of paws. At an average price of $1.25 per pound, paws can bring in as much as $675,000 in weekly revenue, or $35.1 million in annual revenue.

Sources of litter moisture

Mou said there are essentially three sources of

Andrea Gantz

moisture in poultry houses: Heaters, drinkers and the birds themselves.

Heaters are only a small contributor, but possibly more than many people realize. By converting that gas into heat in our house, we are actually producing water. Burning one gallon of propane could produce 0.81 gallons of water.

"Not a lot, but we are still bringing moisture into the house," Mou said.

Drinkers contribute as well. However, most of this is caused by either leaky drinkers, which can be easily fixed, or pressure settings that are too high and result in spillage. Drinker height also plays a role.

However, the birds themselves are the biggest contributor to litter moisture, Mou said.

"Roughly 80% or more of the water being consumed by our birds is actually being deposited right back into the house," said Mou. "So it's pretty much safe to assume that the moisture we need to remove from our houses is the amount that the birds are drinking each day."

DAMP LITTER CAN LEAD to poor paw health. Good chicken paws are important for a poultry integrator's bottom line.

Means of moisture control

Mou said it is important to track how much water is entering the house for the birds to drink, so having an accurate water meter is essential.

Producers should also have a reliable sensor to measure the relative humidity in the house. The ideal target humidity rate should be between 40% and 60%, she said, and managing humidity is a daily task.

However, the right fans to create appropriate air movement to dry the litter may be what's most important.

"Research has shown that the more air movement you have, the more water that you can potentially dry from the litter," she said. "Some other research has shown that higher air movement at floor level can achieve drier litter."

Mou cited one example in which one barn with air movement at less than 50 feet per minute had about 10% more litter moisture than another barn with air movement of around 150 feet per minute.

Many poultry houses ventilate through lower-volume fans that circulate air near the ceilings. However, Mou said the industry should think a little differently. By replacing low-volume fans with high-volume fans that can move air in the house a little differently, producers can get drier litter, and litter with a moisture content that is more consistent throughout the house, she said. ■

Terrence O'Keefe

Improve broiler litter quality with increased air circulation: **www.WATTPoultry.com/articles/33918**

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Phytase tips for formulating efficient broiler feeds

More education is needed on the use of phytase in broiler feed.

IOANNIS MAVROMICHALIS

There are several things to consider when formulating broiler feeds with phytase.

Millan | Dreamstime.com

Despite the fact that phytase has been around for more than 30 years, research and marketing continue apace. This was evidenced very clearly during the virtual International Production & Processing Expo (IPPE), where a whole session was devoted to phytase at the 2021 International Poultry Science Forum.

Clearly, education on how to use phytase in broiler feeds remains in demand as many products have flooded the market. Below is a brief list of points to consider when formulating feeds with phytase.

Correct dosage

Each product has a dosage guideline that is often expressed in various arbitrarily assigned units. It is best to know and formulate based on how many kilograms (pounds) are needed per metric ton (imperial ton) to make sure there is no error when switching from one product to the other.

Know bird requirements

A single dosage of most phytase products will release 0.08% to 0.15% available phosphorus. Before using any phytase, it is important to know the exact phosphorus requirements of the birds that will be fed with the feed being formulated. Adding phytase on top of already high margins of phosphorus specifications is not recommended.

Know ingredients

For the enzyme phytase to liberate bound phytin phosphorus, the ingredients in question must contain such phosphorus. Typical corn/wheat and soy/rapeseed diets contain about 0.3% total phytin phosphorus. So, adding phytase makes sense. Other ingredients contain less or no phytin phosphorus, making the work of phytase difficult to impossible.

Double dosage

A double dosage of phytase will not release double the available phosphorus. At best, you will release 50% of the original dosage. It is best to check with the supplier about the abilities of each product. Plus, for extra phytase to release extra phosphorus, the final feed must contain ample quantities of phytin phosphorus as explained above.

Available phytin phosphorus to break down

No system in this universe is 100% efficient, so do not expect 100% of phytin phosphorus to be released as phosphorus available to the animal, even with a super-dosage of any phytase. In most cases, the best return on investment is obtained during the first single dosage of phytase, at least with most commercial feeds.

Meal vs. pellet

Phytase is an enzyme, and enzymes are proteins. Proteins are sensitive to heat and, above 45 degrees Celsius, most start to lose their functionalities. So, heat-resistant phytase products are required when feeds are to be pelleted. These are more expensive, as is to be expected. So, when feeds are not pelleted, heat resistance should not be a required trait for the phytase to be used.

Energy, protein, amino acids

All phytase suppliers provide nutrient matrices for their products that support the notion of higher energy and amino acid availability by the use of their products. Most, but not all, nutritionists abide by this notion. In commercial nutritional supplements, such claims often are used for marketing purposes.

Interactions

Phytase works best under certain conditions as it interacts with other nutrients. For example, phytase interacts negatively with bentonite, an ingredient used often to control aflatoxins. It is best to check with your supplier of phytase about possible interactions with minerals and other additives in your feeds.

Cost vs. other considerations

From an environmental point of view, most would argue that it pays to use phytase in animal feed. When it comes to economics, however, it is only the scarcity of

phosphate salts during the past 20 years that has given such tremendous boost to phytase as an additive. Giving a matrix phosphorus specification to phytase as an ingredient will help the feed formulation program decide if it is less expensive to use phytase or phosphate salts.

Supra-nutritional effects

Some phytase suppliers have invested heavily on claims that go beyond nutritional effects. This notion has not been accepted, yet, by most nutritionists. Under this assumption, phytase is believed to act as an add-on additive and not merely as a phosphorus release agent. Dosages are 10 to 15 times higher than for phosphorus release, and the high cost associated with this proposal is unlikely to convince many to follow such logic.

Phytase remains an effective additive that is being used by most broiler nutritionists. The fact that research continues signifies the fact that new products continue to emerge, whereas older ones continue to evolve. That marketing of phytase remains so strong means that not all nutritionists are using phytase and its usage remains a matter of phosphate salt availability and pricing. It is indicative that research concerning the beneficial effects of phytase on the environment has subsided considerably in recent years. ■

@ Nutrition notes from International Poultry Science Forum: **bit.ly/3cX3oZ3**

Ioannis Mavromichalis, Ph.D., is an animal nutrition industry consultant.

»PRODUCT REVIEW

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www.dornerconveyors.com

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www.wipotec-ocs.com

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www.roxell.com

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