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AUGUST 2021

WATTPoultry International

Production, processing and marketing worldwide

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WATTPoultry International

Production, processing and marketing worldwide

Cover Story

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WATTPoultry® International

Editor's Comment by Mark Clements

Consuming passion for poultry

We open this issue with a look at global trade. For meat as a whole, the outlook is stagnant, but exports of poultry meat are forecast to rise by almost 1% in 2021, making poultry, along with beef, a bright spot in international markets as consumers demand ever more.

From the global to the local, we pay a second visit to our forward-looking webinar series, held earlier this year. This time we look at changing consumer behavior, offering insight into what consumers now want, how retailers are responding and what the poultry industry can do to take advantage of new shopping and cooking behaviors.

From Europe, we look at welfare in broiler production and offer a preview for the trade show SPACE, planned to be part face-to-face and part live for 2021. In Asia, we pay visits to both India and Japan, looking at how India's chicken producers may have a passion to invest but want more government support, while Japanese producers are looking at weak growth at best this year.

New interests

Staying in Asia, we also examine the rise of plant-based meat alternatives. From startups to well-established multinationals, ever more companies are entering the meat alternatives market. Their enthusiasm and approach to consumers may offer some valuable lessons for the poultry industry.

We make a double visit to Latin America this issue and, staying with consumers, we first examine Brazilian consumer habits before laying out the region's 10 largest egg-producing companies.

We also look twice at new technologies on farm, before going on to look at the application of new technologies in the poultry processing plant. While the intelligence may be artificial, the results could be far from it.

Feed and water management for broilers, focusing on value, and phytase tips for formulating efficient broiler feeds contribute to our nutrition section.

A full issue if ever there was one, consume at your leisure! ■

@ Follow Mark Clements in his blog
www.WATTPoultry.com/MarkClements.html

WATT GLOBAL MEDIA®

Corporate Headquarters
401 East State St., 3rd Floor
Rockford, IL 61104 USA
Tel: +1 815 966 5400
Contact us at
www.wattglobalmedia.com/contact-us

Subscripton questions:
+1 855 896-3491
poultryinternational@omeda.com

Publisher, International:
Greg Watt

Director of Content:
Terrence O'Keefe

Director of Global Agrifood Sales
Jeff Miller

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Courtesy Avara Foods

Poultry the bright spot in 2021 global meat trade

International trade in meat is forecast to be stagnant to the end of the year, but poultry meat and beef will be the exceptions.

MARK CLEMENTS

Global poultry meat exports are expected to end the year 2021 slightly higher compared to 2020. While the international market for meat is expected to end the year flat, shipments of poultry meat and beef will be the exception. The latest Food Outlook report from the United Nations Food and Agriculture Organization (FAO), suggests that exports of poultry meat will end 2021 at 15.6 million metric tons (MT), an increase of 0.9%.

The FAO believes that, in particular, demand will be driven by Saudi Arabia, the United Arab Emirates (UAE), Ukraine, Japan, Mexico and the European Union (EU). However, alongside these increases other markets will import less. China, South Africa, the Russian Federation and the U.K. are all expected to source less chicken meat from overseas this year.

A number of factors are behind these changes. For example, where Saudi Arabia and the UAE are concerned, the FAO notes that higher imports will be driven by the possible revival of tourism and the return of foreign workers. The hotel and restaurant sector, together with the two countries' migrant workforces, account for 60% of imported chicken consumption.

Imports of chicken by Japan are likely to recover from the contraction experienced last year, reflecting, on the one hand, rising consumer demand and, on the other, the rising costs of home-produced chicken meat.

In other markets, the report's authors note that lower household incomes, due to the ongoing impacts of COVID-19, may drive consumers to purchase more poultry meat due to affordability in comparison with alternatives, and so trigger more imports.

Not all countries, however, will see their imports rise. Those countries predicted to see lower imports this year include China, South Africa and the Russian Federation, which are seeing rising national production outpacing increases in consumer demand.

In China, for example, overall meat production is forecast to exceed 83 million MT, up 6.5% on 2020. Its meat imports across animal proteins will remain high, but below those recorded in 2020, while total meat production will still be below the levels achieved pre-pandemic. Eighty percent of the growth in China's meat output will be in the

@ 2021: Modest growth forecast for global poultry industry www.WATTPoultry.com/articles/41645

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swine sector, making consumer access to the country's favorite meat easier.

Where South Africa is concerned, the country is not only producing more chicken meat, but higher tariffs may depress imports.

In the U.K., still limited foodservice sales will limit the need to import.

Meeting demand

Brazil, Thailand and the European Union are likely to be the main beneficiaries of 2021's increase in demand for imported poultry meat.

Brazil is benefitting from a number of advantages in international markets. Not only does it export at highly competitive prices, but it also benefits from being free from highly pathogenic avian influenza (HPAI). Additionally, it is able to provide halal certified chicken required by some countries in the Middle East, East Asia and Africa.

Where Thailand is concerned, the country may benefit from expected rising demand for ready-to-eat poultry products as foodservice gradually returns to normal and restaurants are able to stay open for longer in the EU and Japan, for example.

Exports from the EU may recover slightly in response to growing demand from Ukraine and some African countries. Nevertheless, the outlook remains uncertain due to possible export bans due to HPAI and additional anti-dumping duties in South Africa.

In contrast, exports from the U.K., the U.S., Ukraine, the Republic of Korea and Belarus are expected to decline, the result of changes in the their target target markets, for example economic downturns or rising home production, or slimmer margins making exports less attractive.

Global poultry meat output

The FAO forecasts that global poultry meat output in 2021 will grow by 1.3% to 135 million MT, mainly driven by gains in China, Brazil and the EU, but with moderate expansion anticipated worldwide.

Global production increases are anticipated due to higher demand for affordable meat, especially in those countries where household incomes continue to be lower than prior to the COVID-19 pandemic.

China's high production stems from increased consumer demand, and significant investment has gone into the sector.

In Brazil, strong demand from overseas, especially from East Asia and the Middle East, is driving production growth, however, on its home market Brazil is seeing weak demand.

The gradual reopening of restaurants and foodservice as 2021 progresses is likely to increase demand for chicken meat and, in some markets, increase the need for imports. *Rouzes | iStock.com*

Long-hoped-for relaxations in travel restrictions and physical distancing in the EU may result in rising production there; however, producers will be constrained by higher feed costs and efforts to reduce excess use of nutrients.

Across all meat types, production is expected to grow by 2.2 percent this year to 346 million MT, with Brazil, Vietnam, the U.S. and EU witnessing the strongest growth. However, at a global level, this will be offset slightly by likely declines in Australia, the Philippines and Argentina. ■

The new consumer behaviors for poultry's watch list

Various changes in consumer behavior emerged during the pandemic, but which will last and how should the industry adapt?

MARK CLEMENTS

Anyone who follows consumer behavior, be it in regard to poultry meat or eggs or any other staple of the supermarket, cannot have failed to notice that significant changes have taken place since the emergence of COVID-19.

While the panic buying that took place at the start of the pandemic may now be consigned to history, some of the changes resulting from the emergence of the novel coronavirus will stay with us.

Earlier in 2021, WATTPoultry International organized a series of webinars looking at how COVID-19 has changed not only how producers produce but how consumers consume. In the second of the three-part series, industry experts gave their views on the latter of these two topics, examining how consumer behavior has changed and the directions in which it might further evolve.

According to Chris Dubois, senior vice president at IRI, there are now a number of new market drivers that producers need to pay particular attention to.

Dubois notes that consumers' cooking habits have altered over the last 18 months, offering poultry and egg producers numerous opportunities to address these changes.

Cooking behavior

The pandemic has changed cooking behavior. In the U.S., Dubois points to two new groups, which he calls the confident cooks and the cooking enthusiasts. The former group make up approximately 8% of the population and the latter 22%. Together, these two groups accounted for 97% of the increase in incremental growth of meat cut sales in 2020.

The confident cooks tend to be those consumers who are more affluent, have larger households and older

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children, and it is not simply that they are buying more, but what they are buying has changed, too. The types of purchases made by these groups, for example, seafood, suggest a greater confidence in food preparation.

Bringing the restaurant home

A theme consistently heard from consumers is that they want restaurant quality at home. As economies reopen, consumers will eat out again, but some of this changed behavior will last, particularly as consumers have learned that they can enjoy good food at home, but spend much less.

Premiumization

It is not simply that consumers are putting more effort into food preparation, they now increasingly want higher quality food — demand for premium products has grown.

This is happening in the U.S. and numerous other markets, across product categories and among low-, middle- and high-income consumers.

The trend, however, is particularly strong among blue collar families, and the idea that premium is simply for the wealthy no longer holds true. It is being driven by a desire to make lives better. Putting a better meal on the table, or a better brand, is what is increasingly appealing, and this appeal is universal, echoing the trend of bringing the restaurant home.

New locations

The pandemic has seen numerous employees working from home. In 2017, 7% of the U.S. working population did so from home. In 2020, this rose to 33%, and this change has created numerous new in-home meal occasions, shifting consumption away from outlets on the road or in town centers.

As economies return to normal, significant numbers of workers are expected to continue working from the home office, offering new opportunities for those companies that are able to innovate and target them.

As part of this trend to more home eating, consumers have invested in kitchen appliances, such as air fryers and pressure cookers, giving them new ways to cook. In the frozen category, there are now, for example, pressure cooker-ready meals.

Another trend proving to be increasingly popular is recipe websites offering click-through to purchase ingredients in-store for subsequent collection.

Buying beyond the store

E-commerce may have been expanding for some time, but 2020 was a fulcrum moment, pulling changes forward by four or five years. It now accounts for 11% of purchases across all channels.

This change means that food producers need to interact with consumers differently. Some big brands that have been successful in-store have not garnered the same loyalty online, while on-pack promotions, for example, may result in shelf-standout, but not be so successful on a webpage.

Discounting

The tends identified by Dubois were echoed by Professor David Hughes, emeritus professor of Food Marketing at the U.K.'s Imperial College London, and visiting professor at the Royal Agricultural University.

He noted that home working is leading to more home meal preparation and snacking, and to a rise in demand for frozen food, locally purchased food and a reliance on trusted brands.

Consumers goring interest in social issues will put ever more pressure on the poultry industry, which must be in a position to respond, argues Hughes.

However, COVID-19 is resulting in polarization of both income and markets.

The low wage, or gig, workers have fared particularly badly during the pandemic, while white collar workers who could work from home have done so and not had a hit to their income, in many cases.

To watch the webinar in full, go to:
www.WATTPoultry.com/events/2173

The impact on the poorer segment of society is worldwide. Numerous retailers have engaged in a price war to cater to this group and any price war puts pressure on retail margins and subsequently on producer margins.

Hughes, however, has also witnessed the change in demand to higher quality food, citing the Chinese market, which, he noted has moved over the last 15 years from being a huge, relatively low-priced mass market, to one with much more segmentation with premium prices at the top end.

Fragmentation and segmentation bring numerous opportunities for chicken and, to a lesser extent, also for eggs.

It will be where poultry producers are able to differentiate and where most profit growth will occur in the future. Standard chicken will simply attract a standard price, but those birds that are reared free range, or with provenance claims, for example, will be where producers will do well.

This demand for nonstandard birds is growing around the world with different markets having different preferences.

Social pressures

As consumers are favoring certain ways of producing foods, they are also rejecting others. There are a number of social issues that are increasingly linked to food products and, post-COVID, they will increasingly disrupt markets.

Take, for example, concern for the environment. While the chicken and egg industries may already be seen in a favorable light where environmental issues are concerned, producers need to be aware of change.

Hughes warns that eco- or enviro-labels may not be so very far away. These labels are already being used in some European supermarkets and they may become more widespread. If chicken and egg producers want to continue to be seen positively, they need to know how they will be judged.

Looking longer term, the future for chicken and eggs is undoubtedly bright. The global population continues to grow and it is growing fastest in those areas where *per capita* meat consumption is low — Africa and Asia. Income may be rising in these continents, but it will still act as a constraint, meaning that lower priced proteins, such as chicken, eggs and fish, will be the main beneficiaries. ■

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Welfare focus is changing broiler growing in Europe

Some European broiler producers are implementing changes in stocking density, lighting programs, breed selection and adding enrichments in the broiler house.

TERRENCE O'KEEFE

So-called higher welfare broiler rearing programs are a trend that is increasing in Northern Europe, according to leading researchers.

Dr. Ingrid de Jong, a senior scientific researcher at Wageningen University & Research, and Dr. Jerine van der Eijk, a researcher at Wageningen University & Research Livestock Research, gave a presentation on the characteristics of welfare-friendly broiler chicken production at 2021 Eurotier Digital on February 11, 2021.

Dr. Ingrid de Jong, Wageningen University & Research *Jeroen Bouman*

Dr. Jerine van der Eijk, Wageningen University & Research Livestock Research *Courtesy Wageningen University & Research*

Welfare inspired purchase commitments

There is a trend toward what de Jong called middle segment welfare systems: those that have standards somewhere between conventional and organic broiler growing programs. Current purchase commitments and future purchase commitments by large foodservice and food manufacturing companies to "enhance welfare" in production, like the Better Chicken Commitment, are driving interest in methods for improving broiler welfare.

Many of the schemes require breeds that grow at less than 50 grams per day. This is often accomplished

Earth Imaging

by crossing a modern strain of broilers with a slower-growing breed. Some schemes call for the genetics to be 100% slow growing. In any event, the birds will take longer than conventional broilers to reach slaughter weight, generally at 49 days of age or more.

In research comparing slower-growing breeds with fast growing breeds, raised under similar conditions, de Jong said that the slower-growing breeds had better gait scores, better scores for hock and footpad dermatitis and have cleaner feathers. Slower-growing breeds also exhibited reduced incidence of breast meat myopathies at slaughter.

So-called higher welfare rearing programs have restrictions on housing density. The Better Chicken Commitment restricts housing density to no more than 6.15 pounds per square foot (30 kilograms per square meter). Flock thinning, or removing some of the birds for early slaughter to give the rest of the flock room to be grown to a higher weight, is discouraged.

The use of environmental enrichments such as bales of hay or alfalfa, perches or raised platforms are required in these schemes. Providing birds an uninterrupted 6 hours or more of darkness per 24 hours is also usually required.

Even in existing houses, welfare can be significantly increased by use of slower-growing strains, reducing stocking density and providing environmental enrichments, according to de Jong.

Environmental enrichments

Van der Eijk provided an updated definition of environmental enrichments:

- Environmental enrichment should increase species-specific behavior.
- It should maintain or improve levels of health.
- It should improve the economics of the production system.
- It should be practical to employ.

WELFARE FOCUS IS CHANGING BROILER GROWING IN EUROPE

Enrichments are used to encourage broilers to exhibit species-specific behaviors in so-called "higher-welfare" rearing programs. *Jeroen Bouman*

- Environmental enrichment should be biologically relevant.
- Economics and practical issues should not be the first consideration.

Bales of hay, wood shavings, straw or alfalfa are some of the most popular enrichments for poultry. Birds can exhibit foraging behavior while pecking the bales and can also rest on top of, or shelter around, the bales. Bales are generally used by fast- and slow-growing broilers, they increase species-specific behavior, but use of bales is not without issue, according to van der Eijk.

Perches have been used in various shapes and sizes and materials. Round, square, plastic, metal and wood have all been used. Research shows unlike their frequent use by table egg laying hens, fast-growing broilers make limited use of perches and sometimes have difficulty perching.

Platforms can be simple raised structures made of plastic grates or metal plates. Platforms promote resting on an elevated structure, which is a species-specific behavior. Research shows platforms are well used by both fast- and slow-growing broilers and they increase bird activity while reducing fear, but they have not been shown to consistently improve leg health.

Of the objects that have been introduced to broiler houses for the birds to peck at, van der Eijk said that pecking stones are the most successful form of pecking enrichment. Overall, she said that length conditions, stocking density, number and distribution of enrichments in the house, combinations of enrichments and the breed of the bird all play a role in how much the flock interacts with the enrichments. ■

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SPACE 2021 will feature new format with more content

In-person event to return in September, along with more digital offerings

SPACE will have a new format in 2021, with a return to an in-person experience, plus an added "behind-the-screens digital day."

The event will be held September 14-16 at Parc-Expo in Rennes, France, and online on September 17. There will be more digital content this year, with virtual sessions offered on the first three days of the event and even more content available on the final day.

SPACE will bring together businesses and policymakers involved in all animal production sectors. More than 900 exhibitors are registered to attend, from the cattle, pig, poultry and animal feed sectors.

Courtesy SPACE

FAST FACTS:

WHAT: SPACE 2021

WHEN: September 14-16 at Parc-Expo in Rennes, France; September 17 online only

FOR MORE INFO: Go to www.space.fr

Espace for the Future

The Espace for the Future is the area where SPACE, thanks to the expertise of the Chambers of Agriculture and Technical Institutes, offers avenues of reflection and practical solutions for livestock farmers to address changes in livestock farming.

The Espace is also a showcase for livestock professionals, as its theme is usually also SPACE's theme of the year. This year's theme is "Animal Welfare and Farmer Well-being." The Espace will offer practical solutions to farmers, and will demonstrate how this issue can be approached specifically for each sector.

There will also be one debate per day and per type of livestock at the Espace, with the goal of addressing the subject of animal welfare, as well as farmer well-being.

Innov'Space

Innovation is one of the highlights that differentiates SPACE from other events. Innov'Space is the leading showcase for innovation in livestock farming. Innov'Space awards highlight the expertise of the prize-winning businesses and provide a major commercial benefit.

In 2020, even though the physical expo was canceled, Innov'Space awarded prizes to 26 winners. To allow the winners to benefit fully from the impact of their awards, they will be able to display the 2020 distinction on their stands.

For 2021, more than 100 businesses have submitted entries. All sectors are represented: cattle, pig and poultry production and, for the first time, the horse and aquaculture sectors. The winners will be announced in mid-July.

Health protocols

Expo participants will need to show a health pass, which must show either proof of vaccination against COVID-19 or a negative result from an RT-PCR or antigen test taken within 48 hours, or that they have immunity after recently being infected with and recovering from COVID-19 as shown by a positive RT-PCR or antigen test taken at least two weeks and less than six months previously. Infection control measures such as face masks, hand sanitizer, and cleaning and disinfection are likely to still be in force, but there are no capacity limits. ■

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India's poultry industry needs greater government support

While the Indian poultry industry may have overcome the pandemic's immediate difficulties, it still needs both short- and long-term support.

RICKY THAPER

Having dealt with the challenges posed by the COVID-19 pandemic, the Indian poultry industry is now focusing on modernization, including greater automation at farm level and the adoption of more stringent biosecurity measures, but it needs greater government support.

There is an urgent need for farmers to follow biosecurity norms and the industry, working with both central and local governments, should chart out and implement stringent biosecurity controls at farm level.

As the role of India's markets changes, there is a greater need for food safety and hygiene training.

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Multiple issues

Improving biosecurity, however, is not the only issue facing the industry.

With rising labor costs, there is now a greater need for farmers to adopt more automation. With the adoption of greater automation, issues such as staff shortages, or feed waste, for example, could be reduced.

Yet, implementing hygiene standards and adopting new food safety regulations in an industry that is not always making a profit, poses challenges and the government must step in to give greater support to farmers.

Its RS15,000 crore (US$2.1 billion) Animal Husbandry Infrastructure Fund, announced in June 2020, should be extended to help farmers adopt automation.

But it is not only structural support that needs to take place; more immediate support is needed as broiler and egg production is also becoming more expensive due to rising feed costs.

The government must ensure the availability of raw feed materials, either by suspending exports for a few months, or by allowing imports of feed ingredients at zero duty during the shortage to ensure that producers remain economically viable.

Training

There are various areas that need to change, from farm through to retail.

The industry wants to invest and is ready to do so from a position of optimism. The growing demand in online sales and home delivery due to local COVID-19

lockdowns are good indicators for future growth.

Greater food safety training for those engaged in online sales and for those working from wet markets and engaged in carry out and home delivery of meat products would contribute significantly to sustaining this growth.

Wet markets, which remain a significant channel for broiler meat distribution and sales, have witnessed a major shift as consumers opt for home delivery, and this is expected to continue over coming months, facilitating consumption.

However, wet markets must invest in training and equipment to ensure that broiler meat deliveries are safe and hygienic.

Around 50 million people are associated with and central to the poultry production value chain, including trade, feed manufacturing, agricultural corps, and logistics and farmers.

In realizing the government's aim of doubling farmers' income by 2022, livestock will play a key role and the government must provide support to the sector. The government must provide financial and technological support to the livestock sector, and to the poultry sector in particular. ■

Ricky Thaper is treasurer, Poultry Federation of India

India's poultry industry firmly on road to recovery
www.WATTPoultry.com/articles/41779

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Minimal 2021 growth at best for Japan's broiler industry

Avian influenza, COVID-19 and rising input prices have created a far-from-positive 2021 for Japanese poultry producers.

MARK CLEMENTS

JohnnyGreig | iStock.com

Japan's poultry production continues to grow
www.WATTPoultry.com/articles/38108

Poultry meat output in Japan is expected to end the year broadly flat. While estimates vary, with some slightly more positive than others, the sector is predicted to produce 1.77 million metric tons (MT) in 2021.

The Japanese economy shrank more than expected during the first quarter of 2021, with dining out among those areas hardest hit as the government introduced additional restrictions to control new COVID-19 infections.

For the year to March 2021, Reuters reports that Japan's economy shrank by 4.6% and, despite at a pick up in the last three months of 2020, the first quarter of 2021 witnessed a contraction of 5.1%. The decline is mainly attributed to shrinking private consumption and there are fears that it continued into the second quarter.

Production issues

While the Japanese poultry industry has had to contend with the impact and restrictions associated with COVID-19, the novel coronavirus has not been the only disease to impact it negatively. Highly pathogenic avian influenza has seen the industry forced to cull a record number of birds.

The latest outbreak hit in November 2020, spreading to 18 prefectures, including two major centers of poultry production. Nongovernmental organization Nippon Communications Foundation notes that, as of early May 2020, 9.87 million chickens and ducks had been culled, significantly up on the previous record of 1.83 million. A month earlier, the U.S. Department of Agriculture Foreign Agriculture Service (USDA FAS) reported that 0.7% of the country's broiler population had been culled between November 2020 and February 2021.

FAS also notes that both the broiler and layer industries are also having to cope with higher feed costs, which are likely to significantly impact production in 2021.

Consumption

Like much of the world, Japanese consumers have been cooking at home more. However, as the economy begins to recover, they are increasingly looking to prepared and takeout foods. FAS

notes that fried chicken sales in the country have increased, with KFC, the largest fried chicken chain in Japan, announcing a sales increase of 7.6% over the year to February 21. However, since then a third state emergency has been declared in the country.

Izakaya restaurants, which purchase significant amounts of chicken, have struggled since the spring of 2020; however, several chains are now altering their business models to include more take-out options and new products such as chicken burgers.

A similar picture has emerged in the country's convenience stores, which have also altered their product offerings to include more in-store cooked foods and snacks aimed at families eating at home. Convenience stores are major stockists of imported chicken.

Japan's vaccination rollout has been slow compared to many countries but as COVID-19 is brought under control foodservice demand should begin to recover. The government's hope is that by November, anyone who wants to be vaccinated will have been vaccinated.

The Olympic Games, due to take place in Japan in late July and early August 2021, may offer some uplift to consumption, but perhaps not as much as would normally be expected.

Imports

FAS forecasts that imports will reach 1.01 million metric tons (MT) in 2021, up by half a percent on 2020. The higher price of domestically produced chicken is expected to encourage processors to look for more imported inputs.

Weak foodservice demand during the pandemic pushed Japan's chicken imports sharply down, particularly those of prepared chicken from the country's two main suppliers Thailand and China. ■

Strong outlook for plant-based meat alternatives in Asia

From start ups to established players, more companies are entering the alternative meat space in Asia, responding to the demands of the region's younger consumers.

MARK CLEMENTS

Asia's demand for plant-based meat alternatives is expected to triple over the next five years.

As incomes rise across the region, *per capita* meat consumption, particularly of poultry and fish, will carry on growing. However, alongside these traditional proteins, demand for plant-based alternatives will also rise, particularly amongst young and urban dwellers, and at much faster rates than traditional protein sources.

According to 2020 research from Danisco Animal Nutrition (IFF) and ISPOS, Asia's demand for plant-based meat alternatives is forecast to grow by in excess of 200% over the next five years.

In 2020 alone, sales of plant-based meats in the region grew by 7.4%. Seventy-five percent of consumers have said that they would be willing to pay a similar price to real meat, while 78% believe that alternative meat is here to stay.

Within the next five years, the Asian market for plant based alternative meats is expected be worth in excess of US$1.7 billion.

CP Foods is aiming for leadership with its Meat Zero range of alternative meat products. *Courtesy CP Foods*

Strong interest

Asia, which accounts for more than half of the world's population, is the region where interest in plant-based meat alternatives would appear to be the strongest.

An IPSOS survey, conducted in late 2018, across 29 countries found that 43% of respondents

Karana's jackfruit alternative pork offering has launched in Singapore and Hong Kong and may be joined by other meat alternatives as the startup company grows. *Courtesy Karana*

would eat a plant-based substitute for meat, with the strongest responses coming from China (73%) and India (63%).

The region's various markets are evolving in different ways. In China, for example, the alternatives market remains small but this does not mean that it is not attracting new entrants.

In late 2020, the food industry adopted voluntary standards for meat-based products, responding to the growing number of products entering the space.

Quick-service restaurants have already trialed, or rolled out, plant-based offerings, and while the most visible alternatives in the market have come from multinational players, there are ever more local companies entering the space.

Those entering the Asian alternatives market range from well-established multinationals through to smalls start-ups, each with their own take on consumer preferences, but most skewed towards the concerns of the young.

Take, for example, Thailand's CP Foods, which launched Meat Zero in ready-to-cook and ready-to-eat ranges earlier in 2021. With an emphasis on health, and enjoying celebrity endorsement, Meat Zero is already available throughout Thailand and will be rolled out across Asia.

Within the next year or so, CP expects Meat Zero to become the leading meat alternative brand within Asia and to be a top three player in the sector worldwide within three to five years.

The company expects the range to generate over US$350 million the next couple of years.

Sustainability concerns

At the other end of the scale, Singapore start up Karana has launched its first product, "pork" made from young jackfruit, and its focus would appear to be on consumers' environmental concerns.

First experiences of the commercial usage of Monimax® in Europe

Ben Dehaeck, DVM
Global Product Manager Anticoccidials

Coccidiosis remains one of the most common and economically important diseases in poultry production. The ubiquitous nature of coccidiosis precludes eradication as a practical option for control, so coccidiosis is mainly controlled by applying anticoccidial products and/or by applying coccidiosis vaccines. Monimax® is a new product that combines the strengths of the synthetic compound nicarbazin with the ionophore monensin, resulting in a unique new product for coccidiosis control. Both components of Monimax® have a different mode of action (Figure 1) and interact with the parasite in a different stage of its lifecycle.

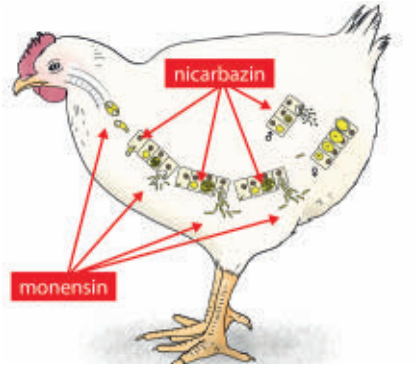


Figure 1: Effect of monensin and nicarbazin on the different stages of the parasite.

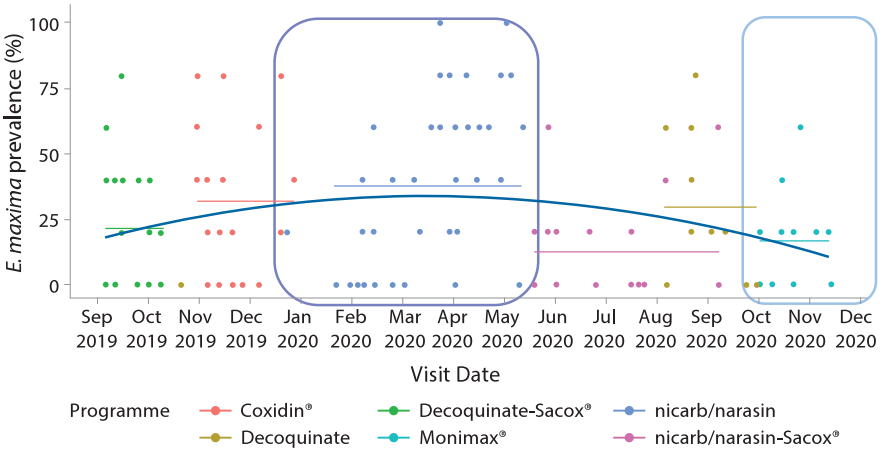
Since its launch in 2020, Monimax® has been used all over Europe and feedback has been very positive.

One Polish poultry integrator, producing about 50 million broilers per year, switched to Monimax® since they suspected that they were experiencing underlying coccidiosis issues. Feedback from the integrator was that when making the switch to Monimax®, they noticed an increase in EPEF (European Production Efficiency Factor) of 20 points (now reaching 405) and fewer problems were seen with *Clostridium perfringens*, so that fewer antimicrobial treatments were needed.

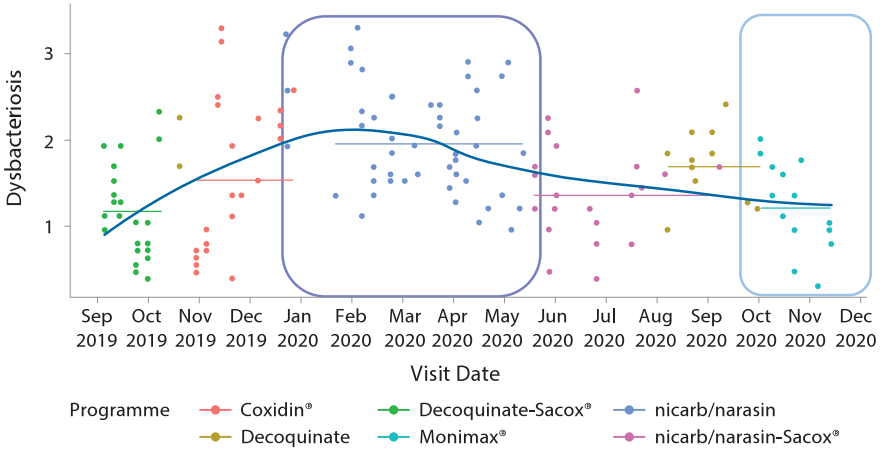
This integrator performed extensive monitoring using Aviapp®, the Huvepharma® broiler health platform, for data collection. The veterinary team of the integrator consistently performed intestinal health scoring which included coccidiosis scoring (Johnson & Reid, 1970) and dysbacteriosis scoring (Teirlynck et al., 2011).

The most frequently scored programmes, before the introduction of Monimax® in October 2020, were a full nicarbazin/narasin programme (39 flocks), a shuttle nicarbazin/narasin - Sacox® (24 flocks), a full Coxidin® programme (20 flocks), a decoquinate – Sacox® shuttle (17 flocks) and a full decoquinate programme (13 flocks).

Comparison of gut health data over time allowed the integrator to compare the different applied anticoccidial programmes. The most consistent finding during scoring over time was a decrease in *Eimeria maxima* prevalence (Graph 1) and decreased dysbacteriosis scores (Graph 2).



Graph 1: Evolution of E. maxima prevalence over time (September 2019 – December 2020). Blue line represents the trend line. Horizontal lines (in the same colour as the legend linked to programmes) indicates the average for each programme.

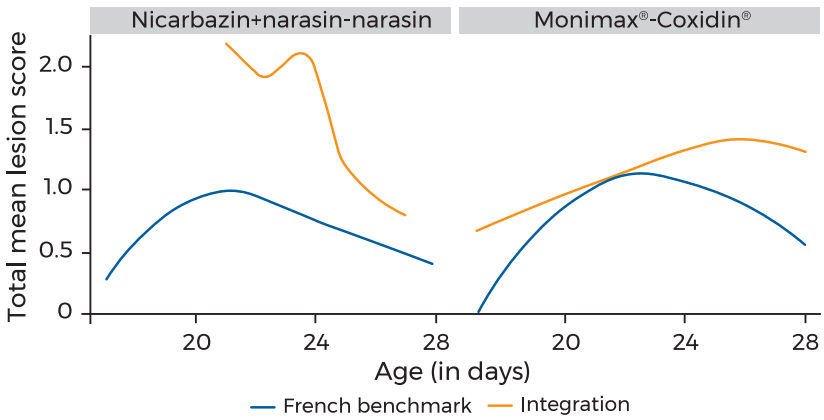


Graph 2: Evolution of dysbacteriosis score over time (September 2019 – December 2020). Blue line represents the trend line. Horizontal lines (in the same colour as the legend linked to programmes) indicates the average for each programme. Each dot represents a scoring of a flock performed on at least 5 birds.

E. maxima prevalence and dysbacteriosis scores followed a similar trend, i.e. a rise from September 2019 onwards with a peak in February-April 2020. After that, the values decreased again. *E. maxima*, is an often an underestimated *Eimeria* species. Lesions are not very spectacular and often go undetected, but because it causes damage in a critical area of the intestinal tract of chickens, it has a clear impact on performance and can be linked to higher dysbacteriosis scores and a higher incidence of antimicrobial treatments. The improved control of *E. maxima*, and consequently dysbacteriosis, by Monimax® resulted in an improved EPEF and fewer antibiotic treatments.

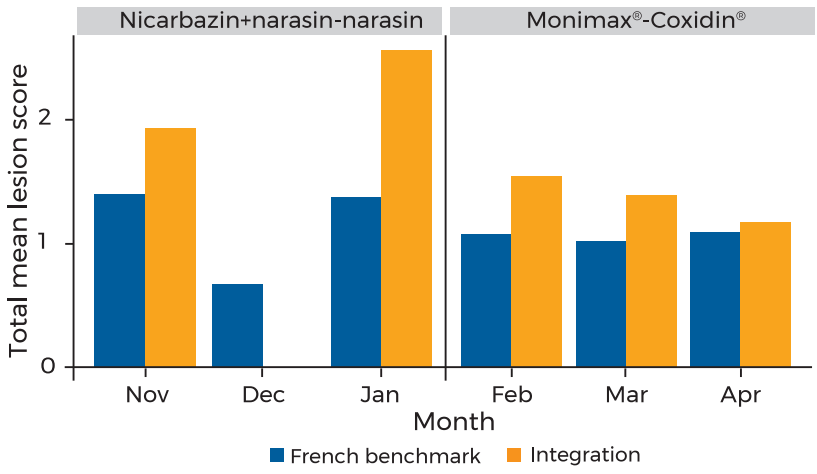
A French poultry integrator started using Monimax®-Coxidin® in February of 2021 and wanted to compare coccidiosis control during the winter period with the previously used programme (nicarbazin/narasin – narasin). For this reason, gut health scoring data from independent veterinarians was compared (Nov 2020 – Apr 2021). In total 130 flocks were scored (coccidiosis scoring according to Johnson and Reid scoring system, 1970; Dysbacteriosis scoring according to Teirlinck et al., 2011).

Although the number of data points on nicarbazin/narasin–narasin is smaller (16 flocks; Nov 2020-Jan 2021) compared to the data points on Monimax®-Coxidin® (114 flocks; Feb-April 2021), there is a clear difference. When comparing both programmes, taking into account the age of the birds, it is clear that the birds on nicarbazin/narasin–narasin had a high coccidiosis score between 20 and 24 days which decreased when they became older, suggesting poor coccidiosis control at a young age. The birds on Monimax®-Coxidin® had, in general, a lower coccidiosis score and a lower peak. In comparison with the country average (French benchmark), coccidiosis scores decreased after the introduction of Monimax®-Coxidin® and the gap with the benchmark was reduced (Graph 3).



Graph 3: Coccidiosis lesion scoring results (TMLS) of both shuttle programmes at different ages of the birds. *TMLS: total mean lesion score*

When the coccidiosis scores of both programmes are visualised per month, the reduction of the scores when changing to the Monimax®-Coxidin® programme (as from February) can clearly be seen (Graph 4).



Graph 4: Comparison between the coccidiosis lesion scoring results of the integration and the country's benchmark

The field data collected by independent veterinarians demonstrates that coccidiosis control improved when a shuttle programme Monimax® – Coxidin® was introduced after a programme of nicarbazin/narasin – narasin.

In conclusion, the first experiences with Monimax® in Europe show the benefit of having this new option available and demonstrates the efficacy of Monimax® in the field under European conditions.

The company notes that it sources its jackfruit responsibly from smallholder farms in Sri Lanka and processes it into a shredded or minced pork alternative. It uses no harsh chemicals, and no heavy processing, just innovative mechanical techniques that enhance the texture of the naturally meat-like ingredient.

Dan Riegler, Karana co-founder, says: "Sustainability has never been more important, especially when it comes to food, and our first base ingredient was carefully chosen with this in mind. Jackfruit is an extremely efficient crop with high yields and low water usage making it friendly to smallholder farmers. It is typically intercropped, promoting biodiversity."

Plant-based meat alternatives taking root in China
www.WATTPoultry.com/articles/42106

In its first phase, Karana launched in Singapore with six leading restaurant chains, before moving on to Hong Kong. In addition, products to add to Karana's range are being investigated.

Why move into plant?

Asia's *per capita* meat consumption of meat is low in comparison to many countries and is forecast to continue rising over the decades ahead, so why the rush to enter the meat alternatives market?

According to CP, the answer is obvious, demand has been "rocketing," and current consumer options are limited.

Tastes and social norms change. Meat, which may have been seen as a status symbol for one generation, may not be seen as such by the next, wealthier, generation.

Additionally, as societies become wealthier, they have more choice. Simply filling stomachs ceases to be the priority, rather, health, nutrition and a host of other influences come into play. Among younger generations concerns over health, the environment, animal welfare and saving the planet have come to the fore, and plant based alternative meats appear to satisfy these concerns.

Moving mainstream

The launch of a plant-based product rarely raises eyebrows these days, reflecting both the number of companies operating in the sector and broad acceptance, and if further evidence were needed that plant-based is in demand, in Asia, April 2021 saw the opening of the APAC Protein Innovation Centre in Singapore.

The 400-square-meter facility, operated by taste and welfare company Givaudan, and food processing solutions provider Buhler, works with food processing companies, start ups and researchers keen to co-create plant-based food experiences, its owners say.

Monica Kothari, APAC president, Givaudan Taste and Wellbeing, explained: "By bringing flavor solutions that are vegetarian, plant-based and natural, as well as technologies such as wet extrusion to Singapore and the region, we are helping to make plant-based food more delicious, authentic and accessible to businesses and consumers."

Rightly or wrongly, plant-based meat alternatives appear to resonate, particularly with younger consumers. While poultry meat is still expected to have a bright future in Asia, producers may want to look at how plant-based proteins are being marketed and perhaps take a leaf out of their book.

Earlier in 2021, Boston Consulting Group, together with Blue Horizon Group, released a report noting that the largest market for meat alternatives is in Asia-Pacific. The market will account for two-thirds of global consumption by 2035, the report noted. Reassuringly for poultry producers, it also noted that while the rate of growth in demand for poultry products would slow, there was no evidence that it would decline. ■

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How Brazilians consume their poultry meat and eggs

A major survey has revealed what Brazilians are looking for when buying poultry meat and eggs.

MARK CLEMENTS

Brazil may be known in international markets as a major poultry meat exporter, but how do Brazilians purchase and consume their chicken and eggs?

We now have the answer thanks to a study carried out by the Brazilian Association of Animal Protein (ABPA) and market research company Centro de Asssessoria e Pesquisa de Mercado (CEAP) between November 2020 and February 2021. Twentry-five hundred nterviews were conducted across 113 cities.

The focus of the interviews was the household member who made purchasing decisions and views were sought from across all social classes. Participants ranged from 18 years old through to 65.

Frequency of consumption

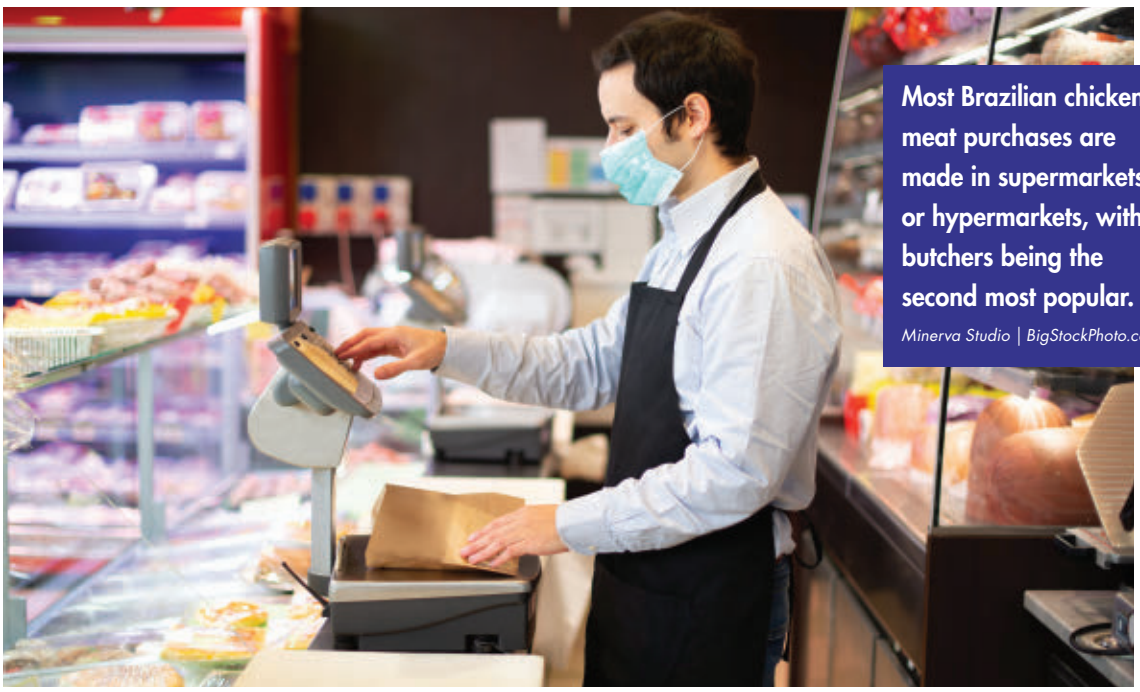
Forty-seven percent of those interviewed said that they ate eggs every day, while 54% said that they ate chicken three times a week.

When asked which was the animal protein most consumed in the home, eggs were the main source mentioned, accounting for 35% of responses, followed by chicken with 34% and pig meat at 4%.

The survey was carried out during the pandemic and found that most animal protein, unsurprisingly, was consumed in the home.

Frequency of purchases

The study revealed that most chicken meat and egg purchases are made in supermarkets or hypermarkets.



Most Brazilian chicken meat purchases are made in supermarkets or hypermarkets, with butchers being the second most popular.

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The butcher is the second most important port of call for purchases of chicken, while for eggs, local markets are in second place.

Among those interviewed, 24% said that they bought eggs weekly, while 21% said that they purchased eggs every two weeks.

Where chicken is concerned, 22% buy it every two weeks, with 21% saying that they made purchases two or three times a week.

Cuts of chicken are by far the most popular choice when it comes to buying chicken, with 69% stating cuts to be their preference. This was followed by whole birds, favored by 22%. Nine percent of respondents said that they bought both.

Chilled birds are more popular than frozen, 55% vs. 40%, with 5% of respondents saying that they bought both.

Where eggs are concerned, 92% opt for conventional eggs, although 36% said that they also bought eggs from higher welfare vegetable diet fed birds, or "caipira" eggs. While eggs are the most popular, bought by 57% of respondents, 15% said that they preferred brown, while 28% bought both.

Product characteristics

Eighty-two percent of respondents said that they thought that chicken was a healthy meat, and 68% deemed it easier to prepare than red meats.

Where eggs are concerned, 82% said that they were an excellent source of protein, with 74% saying that eggs are one of the most complete foods and of high nutritional value.

While Brazilian consumers may see both chicken and eggs in a positive light, the ABPA and CEAP note there are still myths about these foods that fail to go away. Fifty-nine percent of respondents still believe that chicken is reared with hormones; however, this figure has dropped from 72% in 2021. For eggs, the belief persists that brown eggs are healthier than white.

Impact of the pandemic

Twenty-two percent of those interviewed said that they had increased their purchases of both chicken meat and eggs as a result of the pandemic. The increase in demand for eggs was strongest, with 37% saying that their purchases increased during the pandemic. For chicken, purchases rose by 32%. Greater consumption of food at home was the main reason for the increase.

The pandemic also saw more chicken and egg purchases made online, with purchases of both chicken and eggs doubling.

Commenting on this shift, ABPA notes that it is too early to tell whether the change will be permanent or whether the increase simply reflects the circumstances in which the country's consumers currently find themselves.

Across animal protein types, eggs were eaten in 96% of households, chicken in 94%, pig meat in 80%, beef in 79% and fish in only 65%. ■

Almost a quarter of survey respondents said that they bought eggs on a weekly basis with 21% buying every two weeks.

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Brazilian poultry meat output to reach new high in 2021?
www.WATTPoultry.com/articles/41904

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Industria Avícola

Latin America's top 10 egg producers

Half of Latin America's leading egg producing companies are based in Mexico, with the remainder spread across Brazil, Colombia and Peru.

BENJAMÍN RUIZ

Latin America's 10 leading egg producers, with 125.5 million laying hens, account for almost a quarter of the entire Latin American layer flock.

For several years, the stage has been dominated by Mexico — home to five of the 10 leading companies. However, Brazil follows close by, with three companies. Colombia and Peru are also home to companies on the list.

The top three companies — two Mexican and one Brazilian — account for almost 50% of the top 10's combined layer flock. With 60.2 million laying hens, they illustrate the level of concentration among the leading producers.

Eight of the top 10 egg companies now have at least 10 million birds, up from seven in 2020.

All of the top 10 companies have grown over the last five years, with some achieving particularly strong growth rates. For example, Incubadora Santander doubled its flock over the period, while that of Granja Faria expanded by 43%, while Proan's layer flock increased by 20%.

Between this and the previous ranking of the region's leading egg companies, six companies have expanded their layer flocks, while one has seen its flock contract. For three companies no change is reported.

This has led to some changes in the ranking with Brazil's Mantiqueira moving up one place and pushing Mexcio's Guadalupe into fourth position, and Peru's Calera falling one place, overtaken by Colombia's Santander. Given the rapid rate of expansion by some the companies lower down the ranking, further movements may be expected in 2022, but overtaking the region's leader Proan remains some way off for any of the companies active in the region.

San Juan-branded eggs from Latin America's largest egg producer Proan.

Benjamín Ruiz

1 Proteína Animal (Proan)

Mexico's Proteína Animal, or Proan, with 36 million layers, is Latin America's largest

egg producer by far and the second-largest egg producer in the world. Production comes 100% from Bovans hens. The company, which sells its eggs under the brand name Huevo San Juan, is located in the state of Jalisco, home to more than 50% of Mexico's egg production.

In addition to its layer facilities, the company has a state of the art feed manufacturing plant, an egg processing plant and is also active in swine production. Since 2016, the company layer flocks have grown by 20%.

Bachoco is not only Latin America's second-largest egg producer, but also Mexico's largest broiler producer. | *Benjamín Ruiz*

2 Industrias Bachoco

Mexico's Bachoco, operating from Guanajuato, with 13 million layers has the double claim to fame of being the country's second-largest egg producer and its largest broiler producer, making it the only company to be ranked among Latin America's 10 largest egg producers and the region's 10 largest broiler producers. Its broiler business is among the 10 largest in the world.

Also active in the swine sector, the company has modern feed plants, farms and processing plants in various parts of the country. Its operations extend to the U.S., where it owns OK foods. Over the last five years, Bachoco has increased its layer hen population by 8%.

3 Granja Mantiqueira

Minas Gerais-based Granja Mantiqueira is Brazil's largest egg producer and, with 11.5 million layers, is ranked third in Latin America. The company was established in the 1980s, becoming a significant player with the opening of the country's first fully automated farm.

Another company highlight is the production unit in Primavera de Leste, in the state of Mato Grosso, which houses 6 million birds, making it the largest production site of its kind in the country. The remainders of the company's flock is spread across three farms and other farm complexes. In addition to conventional egg production, Mantiqueira also produces cage-free eggs under the Certified Humane label and is active in the egg products sector. In 2020, the company launched Clube de Ovos, a membership egg home delivery service. Mantiqueira's layer flock has grown by 4.5% since 2016.

4 Empresas Guadalupe

Mexico's Empresas Guadalupe, which now has 11 million layers, has been active in the local egg market for over 40 years. Ranked fourth in the region, the Jalisco-based company produces only white eggs from Hy-Line hens.

Additionally, the company produces its own packing materials and has its own distribution network, ensuring that, the same day that they are laid, Huevo Guadalupe eggs reach supermarket shelves. The company's layer flock is thought to have expanded by 10% over the last half decade.

5 El Calvario

The fifth-largest egg producer in Latin America with 10.5 million layers is Mexico's El Calvario, based in Puebla.

The 70-year-old-company has a hatchery plant, a feed plant and packing operations, where more than 50,000 cartons are produced and filled daily. The company produces both conventional and cage-free eggs. Its sales area stretches primarily from Mexico City to the south and southeast of the country. Its layer flock is thought to have expanded by 5% over the last five years.

6 Granja Yabuta

Granja Yabuta, founded in 1947, produces white, brown, quail and ecological eggs, along with omega-3 and vitamin E-enriched eggs. Its 10 million-strong layer flock ranks it sixth in the region.

Headquartered in São Paulo, the company has production units in nine locations across four states. Each production unit has its own feed and processing plants. The company's layer flock is thought to have been stable at 10 million birds over the last five years.

7 Gena Agropecuaria

Jalisco, Mexico, is home to the region's seventh largest egg company, Gena Agropecuaria. With its flock of 10 million layers, the company sits in seventh place in our ranking. Active for over 35 years, the company produces eggs, swine, beef cattle, sheep and meat cuts. It sells its eggs under four brand names: Gena, Crami, Perlas and Ener Huevo. Gena's flock comprises Hy-Line birds and is thought to have grown by 25% over the last five years.

8 Granja Faria

Granja Faria has 10 commercial egg production units, three processing plants and sells a wide range of products nationally. Founded as recently as 2006, the Santa Catarina-based company has grown to be one of Brazil's largest egg producers, in part through numerous acquisitions. It is now home to 10

million layers, making it the eighth-largest producer in the region.

The company's Ares do Campo branded eggs come from 1 million free-range birds with Certified Humane certification. All its packaging materials are recyclable and biodegradable, and the company runs a home delivery membership club. Since 2018, Granja Faria's layer flock has grown by 43%.

9 Incubadora Santander

Colombia's largest egg producer, Incubadora Santander, started as a hatchery 50 years ago, but has grown to be the owner of 7 million laying hens giving it ninth place in our ranking. Since the early 1990s, the company has been expanding and diversifying and now operates its own distribution system. Located in Santander, it has developed a wide portfolio of products, with Huevos Kikes its flagship brand.

Incubadora Santander is active in the egg processing market, for example producing powdered eggs and pasteurized whole shell eggs. It operates a home delivery service, markets spent hens and also produces biogas. Over the last five years, the company has doubled the size of its layer flock.

10 Avícola La Calera

In tenth place is Avícola La Calera. With 6.5 million layers Avícola La Calera is Peru's leading egg producer and marketer. Established for over 40 years, the company has both Lohmann and Hy-Line hens at two production complexes. It also has an egg product business offering over 100 different products. Avícola La Calera has countrywide distribution and has expanded its flock by 16% over the last five years. ■

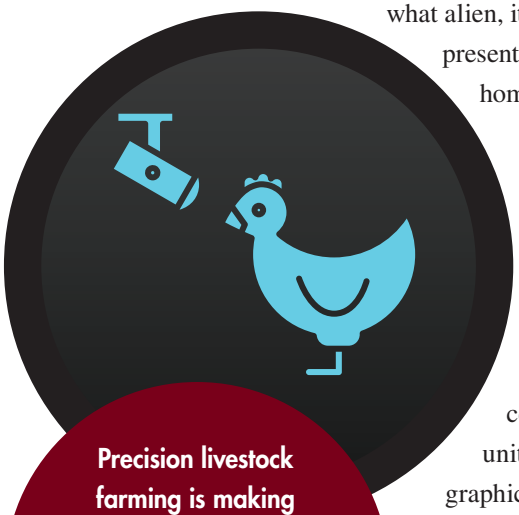
Benjamín Ruiz, former editor of Industria Avícola, is an international poultry and feed journalist and translator, focused on Latin America.

GUEST EDITORIAL BY VINCENT GUYONNET, DVM, PH.D.

New technology redefining understanding of layer behavior

Technology more commonly used in our homes is providing remarkable insights into layer hen behavior.

The rise of cage-free and free-range egg systems is giving hens greater opportunities to express their needs and behaviors, and new technologies are giving us the opportunity to better understand them. While some of this technology may, at first sight, seem somewhat alien, it is, in fact, already present in many of our homes.



Precision livestock farming is making the most of sensors and artificial visual systems to displace subjective human observations.

Valerii Minhirov | iStock.com

In video games, for example, the need for more realistic real-time action has led to the development of high performance central processing units (CPUs) and graphic processing units (GPUs). The CPU updates what happens in the game, such as the position and movements of objects and the sounds to play. Once the CPU has calculated everything, the GPU can play the game scenes, conducting massive parallel computations.

Why mention video games? Well, because the great power and instant computing performance derived from these new generations of GPUs is now being used for the good of laying hens.

Now that hens have free access to perches, nest boxes, feeding areas, water lines and the open range, evaluating their needs and behaviors has become more complex. We also know that direct human observation will affect bird behavior.

Radio-frequency identification devices (RFIDs) are now commonly used to monitor hen movement inside and outside the barn. When combined with 3D vision cameras, we can now analyze birds carrying out their various activities.

Finding the needle in the haystack

However, as may be expected, obtaining a clear view of one individual bird in a dimly lit barn full of housemates is extremely difficult.

Scientists have used optical flow analysis techniques or motion estimation algorithms to detect and delineate independently moving individuals. These techniques are rather complex from a calculation standpoint and require fast CPUs/GPUs and great software.

Researchers at Australia's University of New England recently used a wide range of these new techniques to analyze hen movements inside and outside free-range barns. The recording of every second of the lives of 9,375 hens from 16 to 72 weeks of age generated over 1.6 billion records. This is truly an example of Big Data!

Using the full computing power available, and artificial intelligence with deep learning models, the research team identified different hens clusters, some willing to go outside while

others preferred to stay inside. From the data, we will be able to optimize the location and use of resources, such as nest boxes and feeders, improving both production efficiency and overall hen welfare.

Using this recently available computing and analytical power, precision livestock farming is making the most of sensors and artificial visual systems to displace subjective human observations.

The use of digital twins is another application derived from big data generated by sensors, vision systems and other connected devices. A digital twin replicates a real-world entity, simulating its physical and, potentially, its biological status and behavior based on constant access to large amounts of real-time data.

Digital twin technology is already used in various fields, for instance in the automobile industry or fast moving consumer goods manufacture, to improve efficiencies, reduce costs or scale-up production.

In the egg sector, digital twins could replicate, in real time, the emotions and behaviors of hens in a barn, instantly predicting undesired behaviors such as feather pecking or cannibalism. Digital twin technology could also assist in genetic selection, balancing welfare traits and welfare. ■

Global egg production records a decade of strong growth
www.WATTPoultry.com/articles/42430

Top tips for feed and water management in broiler houses

Thorough management of feed and water provision in the broiler house is essential if flocks are to perform optimally.

MARY JO DAVIS

The height of drinker nipples and water pressure should be adjusted to reflect the age of the bird. *Milanvirijevic | iStock.com*

Feed and water are essential for broiler performance. Sufficient feed provides optimal nutrition and reduces excessive litter pecking, while sufficient water increases feed consumption and improves growth.

Controls, however, must be maintained, since excessive water and feed can create unhealthy conditions while being economically and environmentally draining. To provide adequate feed and water while minimizing wastage, consider the following:

Optimize accessibility

Birds should have uncrowded access to feed with minimal breaks in availability for optimal performance:

- Provide sufficient feeding locations widely distributed across the house;
- Monitor for uneven feed distribution, which can result in lower performance and increased scratching damage associated with competition at feeders;
- Pay extra attention if photoperiod duration or pattern is changed;
- To best manage feed, provide multiple external feed bins, preferably two bins for each house or three bins for two houses. Multiple bins allow for quicker feed changes to medicate sick birds or to satisfy withdrawal requirements.
- A clean, cool supply of water should be available to birds at all times.
- Evaluate the entire water system (wells, pumps, pipes, and valves) for the capacity to provide sufficient water to all houses filled with market-age broilers on the hottest day of the year;
- Provide sufficient drinking locations. As a baseline, supply a nipple for every 12 birds or six to eight bell drinkers (40 cm diameter) per 1,000 birds, depending on the age of the birds;
- Distribute water widely within the house to minimize crowding. Broilers will drink better when water is in close proximity, especially as they mature.

Table 1 Drinker line height

During brooding	Nipple at eye level
	Chick's back forms a 35–45° angle with the floor while drinking
As birds age	Nipple is slightly above bird's head
	Bird's back forms a 75–85° angle with the floor

Source: Mary Jo Davis

Use the above guidelines when setting nipple height.

Evaluate accessibility daily

Consult manufacturer's recommendations for feed and water station quantities, locations, and for proper adjustments.

Manage feed daily:

- Adjust feeder line height to minimize spillage and optimize access. Adjust feeder height so that the birds' backs are level with the base of the feeder;
- Allow birds to clear feeders daily to reduce waste and improve feed efficiency. Monitor carefully so that feeders can be quickly refilled after the clearing.

Manage water daily:

- Adjust drinker line height to below enough for birds to reach, yet high enough to minimize wet litter (see Table 1). Birds should never have to strain to reach the nipple;
- Maintain line pressure high enough to provide water to all drinking stations, yet low enough to minimize leakage. At placement, chicks require lower water pressure to easily activate the nipple. As birds age, increase pressure to meet water demand. Lower the pressure if the litter under the drinkers is too damp;
- Check water lines for high/low areas, which can lead to air locks and inconsistent drinking opportunities. Level water lines, install midline air vents/standpipes on lines longer than 150 feet (46 meters), and perform high-pressure flushes to remove trapped air.
- Clogged water filters can decrease water pressure. Inspect filters weekly, replace as needed, and confirm filters are sized to remove particulates but not restrict water flow.

Supplement feed and water for chicks

When chicks are placed in a broiler house, they need time to adjust to their new surroundings and learn how to use automated systems. Upon bird placement, cover at least 25% of the floor with flat trays or paper sheeting for feed and provide supplementary drinkers (6 per 1,000 chicks). As chicks start using the main feed and water systems (usually 2-4 days), gradually remove the supplemental supplies.

Pay special attention during excessively hot conditions

Sufficient water is especially important at high ambient temperatures. Prolonged high temperatures in tropical areas can double daily water consumption. Birds will not drink water that is too hot, so keep water supplies out of the direct sun and flush drinker lines regularly.

Sufficient water is particularly important when temperatures are high and supplies should be kept out of direct sunlight. *Mark Clements*

At high ambient temperatures, as water consumption goes up, feed consumption goes down. Since feed conversion is already being impacted, consider withholding feed at the hottest time of the day to prevent heat stress and resulting mortality.

Monitor consumption

Monitoring feed and water consumption provides information on bird health and performance, as well as feed and water system failures.

- When available, use the alarms attached to automated systems.

Mary Jo Davis is a consultant with over 25 years in the animal health industry.

How to control bacteria growth in poultry water systems
www.WATTPoultry.com/articles/42770

- Use meters to measure water consumption. A meter for each house allows for comparisons that will help identify disease and production problems. In large operations, consider multiple meters per house to evaluate within-house zoning differences; and
- Monitor the ratio of water to feed consumption to ensure that the flock is receiving sufficient water.

Use preventive maintenance

Strict adherence to a preventive maintenance program will keep equipment running efficiently, minimizing equipment malfunctions and costly downtime. As part of preventive maintenance.

- Walk through barns routinely to evaluate equipment condition
- Keep an inventory of spare parts on hand at all times.
- Develop a maintenance checklist based on the manufacturer's recommendations.
- Keep maintenance records.
- Between flocks, flush the entire water system and completely clean the feeding system.

Maintain emergency supplies

Especially in remote areas, have backup supplies in case normal operations fail. Keep sufficient feed for at least five days at maximum consumption and store it in strong watertight bins to protect it from pest damage and spoilage. Have sufficient water to provide 24 hours of water at maximum consumption. Store the water in a cool, shady area using enclosed containers. ■

Artificial intelligence automates poultry welfare monitoring

Pilot project hopes to identify trends in broiler behavior.

ELIZABETH DOUGHMAN

HKScan used a combination of artificial intelligence and smart cameras to identify and monitor broiler activity, welfare and behavior in a recent pilot project.

"As part of HKScan's responsibility, the Agrofood Ecosystem work develops animal welfare and its monitoring with artificial intelligence and cameras," said Leena Pohjola, a veterinarian at HKScan.

"Broiler behavior is an issue that has been challenging to monitor and evaluate. This HKScan pilot project tries to solve this issue."

Benefits of automated data collection

The pilot project began in January at the company's Kariniemen Kotitila farm.

Smart cameras were used to monitor broiler activity and welfare, even when the farmer was not present. Artificial intelligence quantified data collected by the cameras, identifying the forms of natural behavior displayed by broilers..

"Cameras will never replace producer's own eyes. However, through the cameras we are able to follow the activity and behaviors 24/7 during the production period," Pohjola explained.

"We hope that as we get more camera monitored batches and more behavioral data we start to see certain trends that can help us and farmers to better understand the differences between broiler batches."

Data collection has already been used on two flocks of birds and has revealed variations in behavior as the birds age.

Future projects involving artificial intelligence and smart cameras at the farm will study the effects of enrichment, which promote natural behaviors and are a key component of any animal welfare program.

"Data collection and modeling will continue on the Kariniemen Kotitila farm. The third flock of birds in the pilot project was given new enrichment (bales of cutter and moss and peat moss ramps) to the hall with the goal of further strengthening the natural behavior," said Pohjola. ■

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GUEST EDITORIAL BY LUIS ROMERO

For poultry to survive high feed costs, value must prevail

While few welcome rising feed costs, they can be viewed as a stimulus for efficiency gains and innovation.

As happens every so many years, the broiler and egg industries have entered a new cycle of relatively high feed ingredient prices and must review their operations to remain profitable. Leaving to one side that this increase follows on the heels of the COVID-19 pandemic, this is a situation that many nutritionists and production managers have seen before.

Nevertheless, a few things have changed since the last period of high prices. In developed markets, antibiotic growth promoter withdrawal is largely complete and animal production's sustainability is a key concern of consumers. The rest of the world is at various stages of change in these areas.

Genetics have continued to improve, nutrition and health technologies have advanced, and precision farming technologies are about to disrupt traditional ways of raising animals and managing supply chains.

Company leaders tend to react to high feed prices with divergent approaches. Some look mainly to cost control, while others take a more holistic view on cost and value. The reality is that, in a competitive industry such as poultry meat and egg production, cost minimization is a prerequisite for profitability and business viability.

There is no escaping that feed is the main production cost. When feed costs increase, the difference between disciplined companies and those that are less so is thrown into focus. However, a blunt approach to cost control is not, necessarily, the best solution.

Feed cost pressures offer opportunities to alter input allocation toward productivity enhancing technologies. *canjoena | BigStock.com*

Allocation is the issue

For integrated companies, the problem is not how to minimize feed costs. Rather, the problem is how to change input allocation — particularly capital and labor — relative to feed so that total production costs are minimized, and animal protein remains competitive.

Feed cost pressures offer opportunities to alter this allocation toward productivity enhancing technologies. We have seen how previous high feed prices accelerated the adoption of technologies such as feed enzymes and

@ Cutting antibiotics in poultry production fostering innovation
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near-infrared spectroscopy. Now may be the moment for greater adoption of innovative gut health technologies, or digital and big data applications.

For those companies that are already in a strong position, with evidence-based testing of these new technologies, successfully navigating higher feed costs is simply a matter of speed. For those that are yet to adopt new technologies, catching up become harder when profitability is tight. For companies that are spending excessively in overlapping additives, it is time for simplification.

The solution to high feed costs, however, is not simply new technologies. It is also about altering management practices to use feed less intensively and make greater use of other inputs. This could mean tighter health management systems, staff training, or better facilities to enhance productivity.

Growing the pie

To further overcome increased costs, a complementary and stronger solution is developing products and brands with higher consumer value. If feed costs are eating more of the pie, another option is to grow the pie!

This does not, however, happen overnight. Innovative companies relentlessly offer new choices to consumers and develop new systems and brands that address consumers' values, achieving loyalty and price premiums. For these companies, the times when others are afraid to invest and develop new markets are seen as an opportunity for leadership consolidation.

The last year has been utterly unique for the animal production industry, and remember that resilience beats cost. As the focus shifts back to cost, however, it will be useful to maintain perspective in decision-making and to consider the long game, in which, in my view, value also beats cost. ■

Luis Romero is the managing director of anh-innovation, a consultancy specializing in innovation strategy and new product development in animal nutrition and health

Where new technologies could benefit poultry processing

Integrating the latest technological developments into the poultry processing line could reap various rewards.

EDUARDO CERVANTES LÓPEZ

Poultry processing companies wanting to minimize waste and operating expenses, maximize output and lower costs, may want to consider how technological developments could be applied to their day to operations. Adopting new technologies can not only make operations more profitable but also improve the conditions of staff working in the plant.

There are various familiar and new technologies that could benefit operations, and a number of points along the line where, with creativity, they could be introduced.

Robots, either working solely or in conjunction with employees, could take on the most tiring tasks.

Take, for example, the hanging of carcasses on the drip line. This is a strenuous activity for workers who need to ensure that no shackles are left empty. Replacing workers with robots would not only free them from this tiring task but, given robots' consistent performance, would ensure that there are no delays.

Another example is packing after the aerial drip line deposits birds into various bins depending on weight. Workers take these birds and bag and seal them before placing them onto a conveyor belt. If the carcasses are heavy, and the number to be bagged per minute high, workers will again quickly tire. Once again, robots could do this work, reducing the risk of bottlenecks.

The question arises as to whether this task could be handed over to robots? *Eduardo Cervantes López*

Supplying carcasses to cut up cones

This is another tiring activity, depending on the weight of the birds being processed. Operators must take the carcasses out of their trays and lift them onto the cones ensuring that all cones are covered. Should workers be processing turkeys the effort needed to handle them is enormous. Additionally, those working at the cones are standing for most of the shift.

Cut op cones can be extremely tiring for plant personnel. Could this task be completed by robots?

Smart electric stunning

Birds sent to slaughter tend to be of a uniform size, however, those that are below the lower limit are a daily challenge in terms of height adjustment at stunning.

The manufacturers of stunning equipment have achieved high levels of effectiveness, approximately 95%. However, in a plant that processes around 100,000 broilers per hour, 500 birds can

Applying artificial intelligence to stunning could ensure that fewer birds exit the stun bath conscious, beneficial for operational and welfare reasons. *Eduardo Cervantes López*

still exit the stunner conscious. This is the equivalent of eight birds per hour.

In some countries, the animal health inspection service considers this number to be too high and may even suspend operations until the number is lowered.

While today's stunning equipment may do a good job, could it be improved further still through the use of artificial intelligence?

If 50 birds were monitored prior to entering the stun cabinet and artificial intelligence were used to make the necessary calculations to adjust the height of the stun cabinet, the number of unstunned birds could be reduced. Additionally, intelligent systems could also adjust the voltage and amperage for each batch of birds that enters the stun bath.

Intelligent plucking

This is another operation with significant challenges, particularly removing feathers without causing damage to the carcass skin and not wearing out the rubber fingers, and plucking machine manufacturers have developed techniques that allow the plucker's disk lines to be adjusted independently, achieving the most ergonomic contact possible.

Where there are two plucking machines in operation, it is recommended that machine one remove 70-80% of the feathers while machine two remove 20-30%. If more machines are used, the percentage of feathers removed can be reallocated, with the first machine always removing the greatest percentage of feathers.

In those plants that process a minimum of two bird weights drawn from small, medium, large and extra large in each shift, pluckers must be regularly adjusted. The machines have hydraulic or mechanical mechanisms to help workers operate them.

To help those workers who operate plucking machines and to improve the effectiveness of plucking, might this be another operation where new technologies could be applied?

When chickens exit the scalder, volume sensors directed to the birds' feathers could graduate the opening of the plucker. Subsequent sensors could recalculate carcass volume with fewer feathers and make adjustments in real time. After the birds pass the second group of disks, sensors could again be employed and any necessary adjustments made.

The use of sensors would help in subjecting the birds to the least pressure possible, reducing finger contact with the skin. Additionally, properly adjusted plucking machines would lead to less water being used.

3D printing

Poultry processors need to keep an inventory of spare parts if stoppages are to be prevented. Many of these parts are plastic.

If suppliers of these parts were to be able to offer them via 3D printing at a distributor, transport costs would be significantly reduced, inventory costs could be lowered and customs procedures eliminated. All of these factors would help to reduce a plant's operating costs and increase its competitiveness. ■

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Hans Theo Ten Elsen • GSM: +49.173 - 8 79 65 82