

# Poultry Digital



## Future-proofing

How is the poultry industry preparing for 2018?

Inside the Future-proofing issue | Can the US coordinate its effort to contain bird flu in 2018? • The next frontier in vaccinations • Reflections on the Fipronil scandal • Meet a poultry nutritionist • British goose producers prepare for Christmas • The role of light in poultry production



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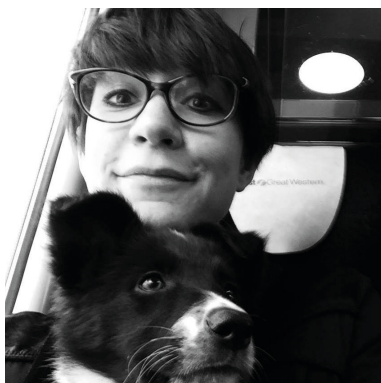
Glenn Ferriol - Area Manager Philippines, Indonesia & Malaysia



# FROM THE EDITOR

## “The poultry industry is always forging ahead”

Putting together the last 2017 issue of Poultry Digital inevitably leads to reflections on the year behind us, and the one ahead. Some of the questions that face the industry remain – how to manage the threat of bird flu, for instance, or how to keep on top of advances in nutrition (see pages 12 and 16). Meanwhile, the legacy of some of 2017’s particular challenges – like the Fipronil scandal in The Netherlands – is often not yet clear, as we examine on page 24.



The poultry industry as a whole is always forging ahead, pushing across frontiers in farm management, welfare, vaccines and technological innovation. The pieces in this issue reflect that global enthusiasm for investment in the future, supporting the sustainable growth and improvement of poultry farming everywhere. Innovation in highly seasonal goose farming (page 18) is just one example of farmers adapting to changing times, while the role of light in poultry production – as explored on page 8 – reflects the sophistication of the inputs analysis on established farms.

There’s lots more to enjoy in this issue, and we’ll be back with a bang in January for IPPE in Atlanta, the highlight of the commercial poultry calendar. See you then!

Ellen Hardy | Managing Editor

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### Looking ahead

Inside the special IPPE Global Markets issue, January 2018 | 2018 trends in US trade • Focus on Brazil • Brexit and poultry • Your essential guide to IPPE 2018 • Whatever happened to Zimbabwe’s ostrich industry? • A new year look at the welfare debate • Why does woody breast still have the industry stumped?

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## IFA says new report finds Brazil cannot guarantee standards on meat exports

EU 5 OCTOBER 2017

The latest EU FVO (Food and Veterinary Office) report covering the “Weak Flesh” meat scandal and corruption in Brazil confirms that the Brazilian authorities seriously misled the EU Commission, according to IFA President Joe Healy.



Mr Healy said this latest EU report completely undermines any credibility to the arguments being made in the Mercosur trade negotiations that Brazil will ever meet EU production standards on beef and other meat imports. The IFA President said the findings from this EU report back up previous IFA calls for a ban on Brazil meat imports following the Weak Flesh scandal.

The report states that “the Brazilian Competent Authority is not in a position to guarantee that the relevant export requirements are met.” In addition the reports states “the Competent Authorities are signing export reports certificates despite being unable to ascertain the veracity of certain statements therein.”

IFA National Livestock Chairman Angus Woods said the report highlights that commitments and guarantees given by the authorities in Brazil are considered as “not reliable” by the FVO. The report concludes that the Brazilians had not addressed previ-

ous issues the EU had uncovered in audits carried out in Brazil, despite the fact that the Brazilian authorities had provided “written guarantees” to the Commission that they had implemented all of the recommendations.

The EU report highlights that the “Competent authority has not ensured that appropriate official staff resources are available at establishments approved for EU exports and therefore cannot guarantee that products exported to the EU have been produced in accordance with EU requirements.”

The EU report concludes that the Competent Authorities’ systems in Brazil are not always properly implemented and therefore are not effective in detecting and acting on significant non-compliance. The report also highlights “evidence gathered during the audit demonstrates that the system does not offer sufficient guarantees concerning” avoiding conflict of interest of officials performing controls.

Click [here](#) to read the full story.

## 63 per cent of Western Cape layers culled

SOUTH AFRICA 20 OCTOBER 2017

Nearly two thirds of Western Cape egg-laying hens have been culled as bird flu cases continue to increase, says the Western Cape’s Economic Opportunities MEC Alan Winde.

According to the Independent Online (IOL), Mr Winde said there are now 56 confirmed cases of HPAI H5N8, or avian influenza or bird flu, in the province. He said 2.7 million birds have been culled – 2.6 million of which were layer hens.

“There are just over 4.2 million layer hens in the Western Cape, meaning we have lost 63 per cent of our egg laying poultry,” said Mr Winde.

“We have received reports that farms in Gauteng have started restocking, after their properties have shown to be 100 per cent free of the virus. We will be monitoring this process closely.”

Mr Winde said chicken houses are being disinfected across the province, but until all traces of the virus have been eliminated, the Western Cape could not start restocking.

It is estimated the province has lost close to R900 million as a result of the virus – R800 million in production and a R75-million loss is expected in the cull buyer market.

Mr Winde said there were 144 ostrich farmers under quarantine, but added that none of these birds have been culled due to bird flu thus far.

Click [here](#) to read the full story.



**OUTBREAK** | There are now 56 confirmed cases of HPAI H5N8, or avian influenza or bird flu, in Western Cape province

# FSA survey reveals reduction of campylobacter in retail chickens

UK 19 OCTOBER 2017

**The Food Standards Agency (FSA) yesterday published the last set of results from its survey of campylobacter contamination in fresh UK-produced supermarket chickens.**

The full year's (August 2016-July 2017) results have shown that on average, across the entire market, 6.5 per cent of chickens tested positive for the highest level of contamination, (over 1,000 colony forming units per gram – cfu/g). This is down from 19.7 per cent in 2014/15 when the survey began.

The last survey was based on 3,980 whole fresh retail chicken samples.

The FSA's survey revealed that the figure for high-level campylobacter prevalence (more than 1,000 cfu/g) among the top nine retailers (based on market share) was 5.6 per cent.

What the FSA refers to as the 'Others' group – comprising smaller retailers and butchers – had a significantly higher prevalence at 17.1 per cent compared to the top nine retailers.

The retailers with significantly lower prevalence than the average among all retailers were Morrisons (2.9 per cent), Tesco (4.2 per cent) and Waitrose (2.7 per cent).

A significant drop was noted in the 2016/17 survey at 54 per cent as compared with the previous survey (2014/15) which stood at 73.2 per cent.

In the last period of the third annual survey – ranging from April to July 2017 – based on a total of 1,437 chickens sampled, 5.9 per cent had high levels of campylobacter (over 1,000 cfu/g) down from 20.1 per cent for the same period in 2014.

## FSA announces changes to future campylobacter retail surveys

On 21 September, the FSA announced changes to its annual campylobacter retail survey. The top nine retailers (based on market share) will now publish their own campylobacter results on their consumer websites and not be included in the FSA's annual survey.

The sampling and analyses they carry out will be in accordance with



robust protocols laid down by the FSA, so all results will still be comparable. We will also have access to the raw data to verify samples and determine industry averages and we will have the right to comment publicly on the results.

The FSA's annual survey will in future concentrate on smaller retailers, independent traders and market stalls as these are more likely to be supplied by smaller processors.

Heather Hancock, Chair of the FSA, said: "The full year's results from our third annual survey show the significant progress the industry has made in reducing campylobacter levels in chicken, compared with their starting point. The major retailers are now taking on the responsibility to publish their own results, according to a protocol we have agreed. This is a welcome step towards greater transparency.

"Whilst we will keep a close eye on the performance of bigger retailers, it means the FSA can now focus our efforts on smaller establishments, where we haven't yet seen the same level of improvement and where more progress needs to be made."

Click [here](#) to read the full story.

FROM OUR SPONSORS

## Poultry industry's greatest veterinary minds meet at Aviagen Global Seminar

What do you get when more than 100 poultry veterinarians from  around the world gather in Edinburgh – the birthplace of Aviagen® Ross birds and home of the Aviagen U.K. breeding program? An explosion of knowledge, ideas and information-sharing on the latest hot topics affecting poultry health and biosecurity was the outcome during the Aviagen Global Veterinary Seminar on Sept. 4.

The seminar was organized by Aviagen to coincide with the 20th World Veterinary Poultry Association (WVPA) Congress, which was held this year in Edinburgh during Sept. 3-8. It was the perfect time to host an informative event when the world's most influential poultry veterinarians from far and wide would be gathered together for the Congress.

During the seminar, leading experts from Aviagen, academia and the broader poultry industry shared their insight on critical issues regarding the prevention, diagnosis and proper management of avian disease.

Another emphasis of the seminar was the responsibility of primary poultry breeders to safeguard an uninterrupted global supply of high-quality breeding stock to their customers – poultry growers who offer the world's growing population a nutritious and affordable food source. Aviagen has made a significant headway toward this goal by achieving compartment certification for key global operations. Compartmentalization is seeing a widening global interest, as more countries are beginning to view it as an answer to alleviate the threats to global poultry commerce imposed by diseases such as Avian Influenza.

Catch more detail on compartmentalization and other seminar topics, as well as the responses of attendees, in a short video summarizing this exciting meeting of veterinary minds.

# Nutriad combines solutions for mycotoxin management and gut health support



One of the most important changes in livestock production has been the recognition of gut health as a key driver of animal performance. This phenomenon has been accelerated by increasing awareness of the impact of animal health and disease prevention on livestock profitability. The number of recent animal studies have demonstrated that mycotoxins can compromise several key functions of the gastrointestinal tract. In that context use of feeding programmes targeting both the gut health support and mycotoxin stress management, have gained special attention from animal producers.

Dr. Olga Averkieva, Business Development Manager 'Mycotoxin

Management', comments: "Intestinal cells are the first cells exposed to mycotoxins at higher concentrations than other tissues. Several mycotoxins specifically target high protein turnover and activated-cells in the gut epithelium and can result in necrosis of oral, gastric and intestinal mucosa. Therefore, mycotoxins can be an important predisposing factor for Clostridium perfringens-related necrotic enteritis and other gastro-intestinal diseases".

Her colleague supporting the 'Digestive Performance' portfolio, Dr. Tim Goossens, adds to that: "It is therefore critical to consider integrating feed additives that reduce mycotoxin stress with those that support gut

health, in a comprehensive programme. With a strong portfolio addressing both these challenges, we believe that Nutriad is in an excellent position to offer practical solutions to prepare animals for any intestinal challenges that lies ahead of them". ADIMIX, APEX, TOXY-NIL and UNIKE brands complement each other in feeding programmes customized for each animal species, feeding phase and actual challenge.

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# The importance of lighting in poultry production

**When managing a healthy, productive flock, getting the lighting conditions right could be more important than you think. Melanie Epp checks in with the bright sparks who are putting a spotlight on the problem**

Words Melanie Epp

In caged housing, laying hens respond well to artificial lighting. But as producers transition from traditional cages to aviaries, enriched colonies and free-range systems, questions about lighting have surfaced. Why is lighting important for poultry? And how do you choose the right lighting for each system? Two poultry specialists, Dr Ian Rubinoff, European account manager and technical services veterinarian at Hy-Line International, and Karen Schwean-Lardner, professor at the University of Saskatchewan in the department of animal and poultry science, share their expertise.

## Why is lighting important for poultry?

In understanding why lighting is important in poultry production, it's necessary to look at the birds' biological make-up. In humans, light reaches the brain through the eyes. In chickens, light penetrates not only through the eyes, but also through the top of the skull, via the pineal gland, and through the pituitary gland next to the hypothalamus. Whereas in our eyes we have just three types of cones – specialised photo-receptor cells that are responsible for our perception of red,





blue and green light – chickens have four: red, blue and green cones, as well as a cone for ultraviolet light.

Like humans, poultry's lives revolve around a regular day-and-night cycle. When birds have a proper day and night cycle, they develop the proper diurnal rhythms – that is, a routine of typical activities during the day. This is important for functions like melatonin production. "It is a normal cycle that is so important for birds because it drives things like immune function and growth rate and reproductive hormones," explains Schwean-Lardner. "By giving that day-and-night cycle, you improve the health of the birds, you improve the immune status, you improve mobility and you improve alertness."

"Birds tend to be more active when they have a day-night cycle," she continues. "They'll actually grow better, which is really interesting and the total opposite of what was thought ten years ago."

Schwean-Lardner is currently conducting research on the importance of day-night cycles in birds. She's looking at factors such as the age at which lighting programmes should start, how that change should be made and how abrupt versus gradual changes in lighting regulation impacts poultry. Her main area of interest, though, is day-night cycles. "Birds have to have darkness in my opinion," said Schwean-Lardner. "How much will depend on a number of things."

Poultry researchers are interested in three segments of the spectrum, each of which can have an effect on birds' behaviour: ultraviolet light, visible light and infrared light. Ultraviolet light is towards the short end of the spectrum. The wavelength of visible light ranges from 400 nanometres (nm) to

**“By giving that day-and-night cycle, you improve the health of the birds, you improve the immune status, you improve mobility and you improve alertness”**

around 700 nm. Infrared light's wavelength is longer than the light we can see, measuring above 700 nm. While humans can see in the range of 400–750 nm, chickens can see in the range of 315–750 nm. Additionally, chickens can see higher peaks at the spectrums of around 480 and 630 nm, said Rubinoff.

Using a standard LED spectrometer – an instrument that measures the intensity of light at different wavelengths – we can have the ability to measure light in four different ways, Rubinoff explained during a talk at the International Egg Commission's Global Leadership Conference in Bruges earlier this month. We have CCT or 'correlated colour temperature', which is measured in Kelvin (K). "This is a great rough indicator for telling if a light is warm or cool," Rubinoff explained. "Under 3,000K gives an indication that it's a warm light, and above 4,000K gives an indication that it is a cool light."

"This doesn't give any indication as to the quality or composition of the light, but it gives a rough calculation," he said.



Standing for 'colour-rendering index', CRI is a scale from zero to 100 per cent that expresses how accurate a given light source is at rendering colour when compared to a reference light source.

Light is also measured in lux, the standard unit for illuminance, or the amount of light striking a surface over a given area. "It is important to remember that lux is measured at a point of space," said Rubinoff. "What I measure here for light intensity is very different than what I measure down here. A change in even as little as 10cm can change your lux and light intensity by quite a bit."

"This is something that is very difficult for us, especially as humans, to understand," he continued.

The last measurement is the peak wavelength, which simply describes the dominant colour from among all the wavelengths being emitted from a particular light source.

### How lighting is used in the different environments

On a typical sunny day we can see as much as 150,000 lux of light intensity, which means that chickens with access to the outdoors are exposed to a very high level of light intensity. As the sky gets cloudy, a little bit of the daylight's red spectrum is obscured and it becomes dominated by the blue spectrum. When the sun sets or rises, we see the opposite. We see an increase in the red spectrum and a decrease in the blue spectrum.

Incandescent light is more or less like a small fire inside a glass bowl, Rubinoff explained. Incandescent lights provide a nice spectrum for laying hens. Unfortunately, they're incredibly inefficient, which is why producers have started moving on to other sources of light, starting with fluorescent bulbs.

There are three peaks of light in fluorescent light – red, green and blue – and that combination gives us a really nice white light which humans can see. Chickens, however, most likely perceive this differently and are able to pick out the different colour spectrums because of their superior eyesight.

LED lights are what we would call full-spectrum light, very similar to what we see in sunlight. In a typical LED bulb, the peak wavelength within the blue spectrum reaches around 440nm. The distribution of light intensity across the rest of the spectrum varies from bulb to bulb.

### How to choose the right bulb for your housing system

When it comes to traditional stacked deck or belted houses, for both caged and colony, the goal, said Rubinoff, is even light distribution at all levels. This is often overlooked in housing, he said.

"In some houses we put lights in every four metres and see this huge change in light environment by cage or by colony, without any consideration for what impact it may have on the chicken," he said. "For anyone who's considering putting in a

new caged facility or colony facility, I would encourage trying to go for a consistent lighting profile where either you have a bulb that evenly lights all the levels or you have a linear light that gives no gaps in light intensity between the different areas."

"We've certainly seen a huge increase in production as we got lights that went all the way down to the bottom," he continued.

Conversely, when we have just two or three cages, we need a less directional light and a broader light.

One of the big challenges in devising optimum lighting conditions for the whole poultry industry has been working out how to manage an aviary system or a free-range system. Rubinoff believes that installing LED lighting in free-range and aviary systems provides more consistency than fluorescent light can provide. "There's greater compatibility between the full spectrum of an LED or incandescent versus the spikes of a fluorescent bulb," he said.

"In some internal research, we have noticed that when you move birds from an LED environment into a fluorescent environment there is a scare response in those birds," he continued. "They really are frightened by the difference and change in that light environment, so consistency is key."

For a long time now, we've used light to draw birds into aviaries. "The more we learn, the more we've found that with lighting aviaries you need flexibility," said Rubinoff. "You need lights on different dimmers. You need lights on different timers so you can turn the lights on and off in order to utilise

them to the best of your ability."

More importantly, poultry producers need to make sure there are no dark areas in the system, said Rubinoff. Using light as a way to deter birds from laying eggs in a certain area has also proven to be very effective. "Usually we try to have lighter areas in the corridors and a little bit darker areas where we want the birds to go and nest," he said.

Barn lighting is very similar to aviary lighting, except there aren't as many areas that you need to be lit, so it tends to be a little simpler.

### Transitioning to LED lowers energy costs

Rubinoff is always surprised when he meets farmers who continue to use incandescent bulbs. At an average cost of 10 US cents per kilowatt, replacing incandescent bulbs with a standard LED will provide return on investment in less than a month. Return on investment can change based on the variables, said Rubinoff.

"The fastest one I found was in 17 days your savings in energy paid for the LED bulb when you were using one of the less expensive LED bulbs," he said.

In this example the LED bulbs chosen sold for US \$2 each, while the incandescent bulbs cost US \$0.75.

"So this is something I would encourage you all to look at," concluded Rubinoff. "If you have any of the older style bulbs, look at the energy savings that you might be able to acquire." **PD**

**"At an average cost of 10 US cents per kilowatt, replacing incandescent bulbs with a standard LED will provide return on investment in less than a month"**

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# Future-proofing

## Can the US coordinate its efforts to stamp out future outbreaks?

Words Andrew Amelinckx

Across the globe, from Europe to China and from the Philippines to New Zealand, 2017 has seen a wave of highly pathogenic avian influenza (HPAI) devastate commercial operations and backyard flocks alike. Meanwhile, in the US, there were only two confirmed outbreaks of HPAI at a couple of Lincoln County, Tennessee poultry operations that supply Tyson Foods Inc, a stark difference from only two years ago when there were more than 200 cases across the US.

The US poultry industry learned a painful lesson about biosecurity and communication between its various stakeholders from the 2014 to 2015 HPAI outbreak that affected nearly 50 million birds and cost the industry \$3.3 billion (£2.53 billion). In contrast, the 2017 outbreak in Tennessee led to the deaths of a little more than 128,000 birds and didn't spread beyond the two affected poultry farms, which were in close proximity to one another.

According to Donna Karlsons, a spokesperson from the United States Department of Agriculture (USDA), the big difference between the outcomes in 2015 and 2017 has everything to do

with new procedures introduced by the agency in the intervening years – protocols that have led to “stronger communication among federal, state and local animal-health officials, along with a better understanding of how to manage confirmed cases”. Investment in both personnel and training to support multiple outbreaks has also helped, she says. The goal now during an outbreak is to depopulate an infected flock within 24 hours of a confirmed HPAI case.

“From the 2015 outbreak, we learned that faster response times can make a big difference in containing highly pathogenic avian influenza and minimising the spread,” she told The Poultry Site in an email. “The USDA now has response teams in place that can quickly mobilise throughout the country. We have improved our coordination between federal, state and local animal-health officials and identified our respective response roles and activities and invested in more depopulation equipment.”

Improved biosecurity at the farm level has also played a major role, she says.

In a report published by the University of Minnesota's Center for Infectious Dis-





**“Another big difference since the 2015 outbreak has been the widespread adoption by the poultry industry of the ‘Danish entry’ system, a low-cost preventative measure”**

ease Research and Policy, Steve Olson, the executive director of the Minnesota Turkey Growers Association says that the USDA has streamlined its response since 2015, which has made a huge difference in helping to avoid “a bottleneck” when HPAI strikes. Another big difference since the 2015 outbreak has been the widespread adoption by the poultry industry of the “Danish entry” system, a low-cost preventative measure. Under the procedure, each person entering a farm must change shoes and clothes before entering and exiting areas where they come in contact with poultry, among other precautions.

“Agricultural workers need to recognise the clinical signs faster, but everyone has a role in halting avian flu, whether it’s the UPS driver who comes on the farm or the worker taking care of the birds on a day-to-day basis,” says Olson.

The question remains whether the USDA and the poultry industry can prevent another HPAI outbreak. Karsons admits there’s no way to determine the probability of another outbreak in any given year, but says the agency is staying alert to the global avian influenza situation.

“Our best defence is to remain vigilant with biosecurity practices,” she says. “The United States has the strongest AI surveillance programme in the world, and USDA works with its partners to actively look for the disease in commercial poultry operations, live bird markets and in migratory wild bird populations.”

Even with the new measures put in place by the USDA, more still needs to be done, according to the United States Government Accountability Office (GAO). A report from that agency released in May found that while the USDA has done a good job with implementing procedures to reduce the risk of HPAI outbreaks, it “has not evaluated the extent to which completed corrective actions – such as encouraging states to form depopulation teams – have helped resolve the problems identified, and it does not have plans

## “During HPAI outbreaks the USDA can impose biosecurity measures, but doesn’t have the authority to force producers to employ biosecurity procedures at any other time”

for doing so”. According to the GAO, using evaluations to figure out the success of corrective actions could help the USDA make “effective programme and policy decisions” in regard to protecting the poultry industry from another HPAI outbreak. In response to the GAO report, a USDA spokesperson told the Washington Post in May that the agency agreed with the GAO’s recommendation to develop a plan for evaluating completed corrective actions.

The GAO also identified “ongoing challenges” in “mitigating the potential harmful effects of avian influenza”, including the fact that the USDA relies on the voluntary actions of poultry producers large and small for the national biosecurity of flocks. During HPAI outbreaks the USDA can impose biosecurity measures, but doesn’t have the authority to force producers to employ biosecurity procedures at any other time. After the devastating 2014 to 2015 HPAI outbreak, according to the GAO report, the USDA found there had been lapses in routine biosecurity measures that allowed for the introduction of HPAI at poultry facilities and helped the disease to spread from farm to farm.

The USDA has ongoing programmes in place to encourage

better biosecurity practices in the industry. One, introduced in January 2016, ties indemnity payments – government payouts to livestock producers for the deaths of their animals from HPAI outbreaks, among other causes – with producers’ ability to show they had a written biosecurity plan in place that they were following at the time the outbreak occurred. According to the USDA, this has helped greatly in getting large producers on board with tighter biosecurity.

A second initiative added biosecurity measures to the National Poultry Improvement Plan, a voluntary USDA programme in which participating commercial poultry flocks are tested for illnesses. In return for a clean bill of health, the producers receive certification to trading partners and others that the flock is free of disease. The biosecurity measures include things like taking steps to protect against disease incursions from wild birds, rodents and insects, and cleaning vehicles and equipment to reduce HPAI risk. The USDA believes these initiatives are helping to boost biosecurity across the poultry industry. In addition to these measures, the USDA continues its outreach and public education on biosecurity for both industry and backyard poultry farmers. **PD**



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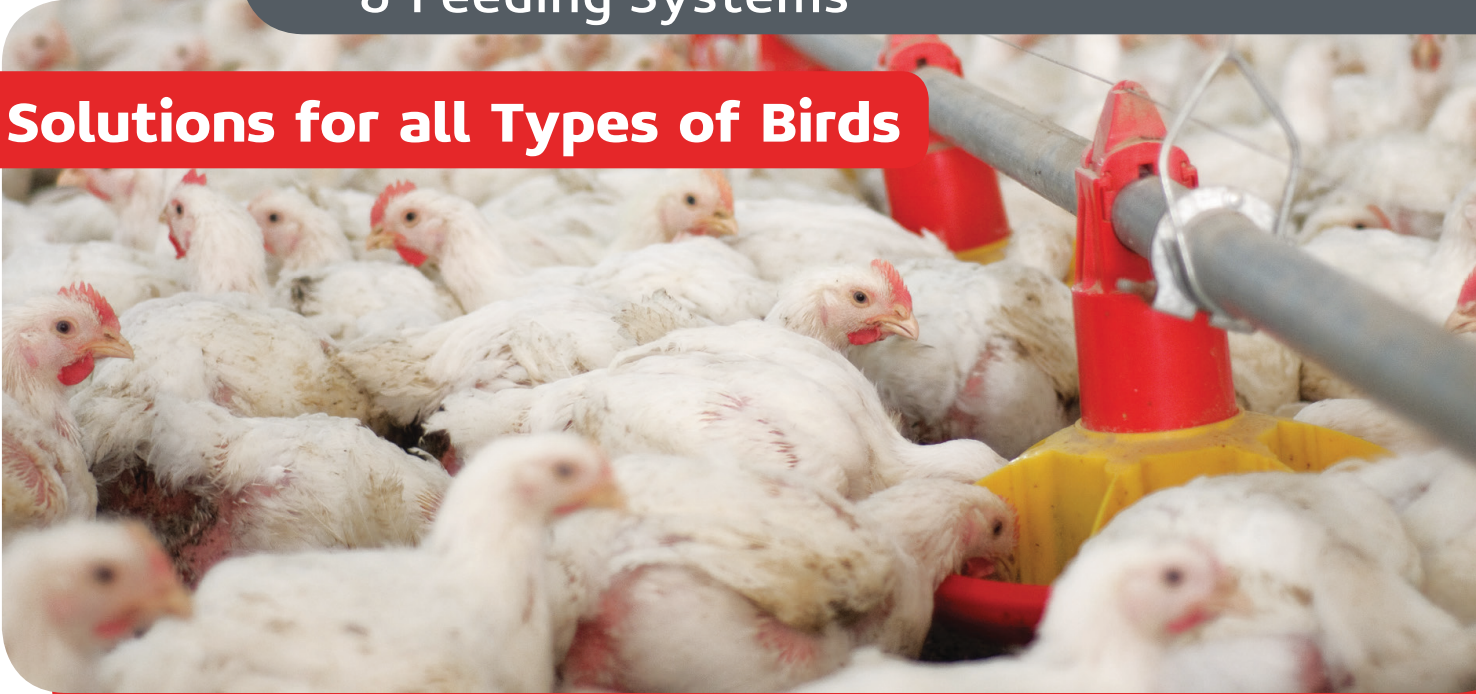


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# Farming in focus

## Meet the people driving change in their industry

Words Ellen Hardy

**Professor Julian Wiseman**  
BSC (Hons) PhD CBiol MSB  
Professor of Animal  
Production, School  
of Biosciences, University of  
Nottingham



The sophisticated science behind commercial poultry nutrition responds to requirements for the end product and the latest research in biotechnology. We asked Professor Wiseman, editor of many significant books on animal nutrition and author of 'The Pig – A British History' (2001), to give us some insights into his nutrition research and developments in the industry.

### **How accurately are nutritionists able to predict the influence of different cereals on the performance of commercial broilers?**

The main cereals used in broiler production (depending on country/region) are maize (corn) and wheat. Others – including barley, rye, triticale and rice – are rarely if ever employed, primarily because of lower nutritional value/higher fibre content or, in the case of rice, competition from the human food market. Maize and wheat do differ in apparent metabolisable energy (AME) value and protein/amino acid content and these differences would be reflected in diet data-base data and subsequent formulations. This data-base data would be regularly updated, particularly in terms of total protein and amino acid content. However the latter are becoming gradually replaced with digestible amino acid content (standardised ileal digestibility – SID – is commonly used) and this will improve the accuracy of diet formulation in terms of predicting responses in the bird.

It is often overlooked that cereals can supply a significant proportion of SID amino acids. In terms of AME values, differences both between and within the two cereals used are more difficult to predict.

### **How involved would an in-house nutritionist be in a company's wider decisions regarding management to optimise carcass quality?**

Carcass grading in the broiler sector is not as is found in other livestock, which are classified in terms of lean and fat content; broilers are marketed primarily on carcass weight and yield. There are perhaps two elements of broiler carcass quality that are of interest to nutritionists. The first concerns overall appearance. Downgrading can be a consequence of how birds were fed. Perhaps the best example would be litter conditions. The influence of nutrition in this respect can be very important. Thus unbalanced dietary protein, poor quality of dietary fat, inclusion of higher fibre cereals and high levels of potassium are all associated with 'wet and sticky' litter leading to downgrading (including pododermatitis and keel-bone abrasions). A further and more recent aspect of carcass quality is modifying the fatty acid profile. The background to this is to provide a 'healthier' meat that addresses human essential fatty acid requirements; it is comparatively easy to change broiler carcass fatty acid profiles with dietary modifications. However, there are quite fundamental problems with making carcass fat more unsaturated (i.e. increasing levels of carcass polyunsaturated fatty acids); these problems include a 'softer' carcass making it more difficult to process, and shorter shelf-life as unsaturated fatty acids oxidise. This is also a problem during cooking, with





off-odours being another negative issue.

**I understand you're working on an in vitro predictive model for nutritional quality of cereals – can you explain?**

Wheat is the dominant cereal in broiler diets in the UK and other countries where maize is not grown. We have undertaken a lot of work trying to understand the background to variable wheat nutritional quality, a problem that is of considerable interest. Another problem is that wheat offered to the poultry feed market is invariably that which has not been accepted by the human food market. The results of our work demonstrates that one key aspect of wheat breeding was the 1B1R translocation, when the short arm of wheat chromosome 1B replaced with short arm of 1R chromosome of rye. The agronomic advantages are resistance to powdery mildew, stripe/leaf/stem rust and making wheat more adaptable and environmentally less sensitive. However we have shown that this reduces digestibility and the 1B1R is now not being encouraged – a great example of the results of plant breeders talking to animal nutritionists! A second variable is 'hard vs soft' wheat – although this is a very basic differentiation, our work tends to show soft wheats are better digested.

We have assessed a number of predictive models in an attempt to predict nutritional value of wheat for broilers. These models include Near Infra-Red

Spectroscopy (NIRS), 1000 grain weight and bushel weight; unfortunately we are not really able to produce accurate data of interest. In vitro starch digestibility is a reasonably precise predictor of wheat nutritional value but it is a lengthy process that does not lend itself to rapid quality control in feed mills.

**How does the move to reduce antibiotics use in the poultry sector affect your research?**

The UK/EU have been at the forefront over global decisions to eliminate growth-promoting agents (antibiotic growth promoters have been banned in the EU); this has of course promoted research into alternative means to sustain broiler performance and health. There is an awful lot of research into alternatives; a particularly important areas is 'essential oils'; a very interesting subject but it is crucial that work is scientifically justified. Much work on essential oils is not!

**You also do some research into the use of co-products from feed production. Can the sector be made more sustainable?**

I am always very interested in what to do with what has been seen in the past as 'waste'; I view the dispatch of such 'waste' to power stations or landfill as a disgrace. Surely we should be able to consider more equitable/sustainable

**“We have undertaken a lot of work trying to understand the background to variable wheat nutritional quality, a problem that is of considerable interest”**

solutions? Using residues from bio-ethanol fermentation in feeding our livestock is well worth considering.

One of our current projects is an assessment of the residues from bioethanol fermentations; results on the nutritional value of such residues is more than positive, particularly for the ruminant sector (as they tend to be high in fibre). However we have also shown that, when diets are formulated on the basis of SID amino acids and net energy, then these residues are perfectly acceptable for finishing pigs (but not for broilers) – this is a very good example of the value of 'precision nutrition' in formulating diets. **PD**

# Christmas is coming

**Join the British Goose Producers Association on a visit to Lancashire farmers Johnson & Swarbrick as they prepare for peak season**

Words Ellen Hardy

Every year, goose farmers from across England gather together to celebrate their highly seasonal business and find out about best practice on other farms. In September 2017 they headed to Johnson & Swarbrick in Goosnargh near Preston, Lancashire, and The Poultry Site was there to learn more.

## The Goosnargh heritage

For over 30 years Reg Johnson and his step-brother Bud Swarbrick built a reputation for Goosnargh corn-fed ducks and chickens. They have supplied some of England's top restaurateurs, including Michel Roux Junior, Marco Pierre White, Gordon Ramsey and Raymond Blanc. As recently as 2006 they branched out into rearing geese, with around 1000 birds coming to the market in 2017. Reg sadly died suddenly in November 2015, but the family business continues to perfect and expand on his innovations, including an on-site feed mill and feather processing plant.



## The business behind the birds

Farm-reared rather than organic, Goosnargh birds are known for their quality and flavour, grown long and slow for taste and texture.

Here producers, vets and press gather in Johnson & Swarbrick's barn ahead of a walking tour of the farm operations. It's an invaluable opportunity to share knowledge and ideas around production and promotion, and to assess challenges of environment, labour supply and more. "Migrant labour makes up more than 60 percent of those employed in the poultry meat industry," said Shraddha Kaul, public affairs manager of British Poultry Council. "As an organisation, we are lobbying to clarify and protect the rights of these workers who play an important role in the productivity and efficiency of the industry. It will be quite a challenge for the future."



## Bagging up biomass

Never averse to experimentation, Johnson & Swarbrick have invested in making the entirety of their operation more efficient. They have planted around 40 acres of miscanthus or elephant grass, which is used for a biomass boiler that provides most of the heat needed for the young chicks, ducklings and goslings. The crop is gathered using a forage harvester and stored in a vast white 'ag bag', known on-site as 'the sausage'. This method is more efficient than baling, and in 2017/18 they aim to use only miscanthus for their bedding needs as well. Here Bud holds up some bedding being used for week-old chicks.



## Customised on-site processing

The farm can process around 1,100 birds a day on each of its two killing lines, with around six staff to a line. The birds are slaughtered in the afternoon and then hung overnight to add to the flavour, before being dry plucked and then waxed (ducks and geese only – chicken and turkeys have more delicate skin

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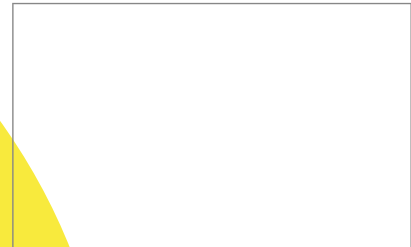
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**“Compared to hot plucking to remove the last feathers, the waxing process leaves the bird with a better skin quality and longer shelf life”**

strips the last of the feathers and conditions the birds’ skin. It can be re-used once or twice before it is recycled. Compared to hot plucking to remove the last feathers, the waxing process leaves the bird with a better skin quality and longer shelf life.

that would rip, so are wet plucked). The wax process is quite unusual outside large commercial operations, and some of the machinery had to be custom-designed to fit the smaller space. The wax is delivered in blocks and melted to make a hot bath, which



**Keeping the feathers flying**

Around three years ago the farm bought a second hand feather processing system and installed it themselves. Instead of wasting the duck and goose feathers, they now produce around 30 tons per year of duck and five tons of goose feather for the feather bedding market every year, mostly supplying factories in the UK and EU. Each load of approximately 70-80 kilos of feathers goes through a 25 minutes chemical wash, then a

centrifuge drier, then a sterilising drier. The final cooling box separates the down from waste wing and tail feather, which can then be used as sterile bedding.

The farm doesn’t produce enough feathers themselves to keep the machine running, so purchase feathers from other duck and goose farms (as long as they are dry plucked which gives a more robust feather). It’s an exciting extension to their main business – although they have seen feather prices fall 60% since they made the investment in the plant.



**ALL IN THE FAMILY** | L-R Adam Swarbrick, Kara Johnson and Bud Swarbrick. Founder Reg Johnson, Kara's father, died suddenly in 2015.

### All in the family

The Johnson & Swarbrick operation stands out for its innovation and investment in a holistic operation, including mixing the birds' feed on-site. Touring the farm you get a strong sense of the family working together in the best interests of the product, determined to maintain the standard that has made the Goosnargh name one to conjure with among UK restaurants.

Main image © Adobe Stock, Johnson & Swarbrick images © Roger Ranson, BHR Communications

**“The Johnson & Swarbrick operation stands out for its innovation and investment in a holistic operation”**

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# What's new in vaccination

**New innovation and technologies will result in vaccines becoming even more efficient and playing an even greater role in disease prevention**

Words Glennis Kriel

With demand for animal protein growing, and with rising concerns over animal welfare, microbial resistance and food safety, the focus in poultry health care has switched from treatment to prevention. This shift is specifically evident in changing attitudes towards the use of vaccines to prevent many infectious diseases – whereas most countries were against this practice only a few years ago, a growing number have started supporting the use of vaccines to alleviate the impact of these dreadful diseases.

One example is the strong support Boehringer Ingelheim is providing the industry in terms of the development, manufacturing and supply of vaccines to prevent avian influenza (AI). In 2016 the company sold more than three billion doses of vaccine viruses for the most common avian influenza strains in various parts of the world.

“Prevention is indeed the focus of Boehringer Ingelheim,” says Jérôme Baudon, head of the company’s Global Poultry Strategic Business Unit, “and the recent acquisition of Merial Animal Health last January is of big interest for the development of preventive solutions dedicated to the poultry industry. Together we can provide tailored and comprehensive programmes for poultry health care today and in the future.”

However Dr Taylor Barbosa, head of poultry at MSD Animal Health, says that regions such as the USA and Europe won’t use vaccines against AI unless the World Organisation for Animal Health (OIE) changes its stance on the use of vaccination to curb the disease. “Countries using vaccination to reduce their avian influenza disease risk are prohibited from exporting poultry products to various countries that closely follow OIE recommendations,” says Barbosa. “These countries will not alter their position as long as the OIE endorse prevention and the stamping out of the disease as best practices.”



## Vaccination in the hatchery

Whereas in the past the majority of vaccines were administered on the farm, the development of next-generation vaccines with the ability to provide lifelong protection against multiple diseases and evade maternal immunity interference, has resulted in hatcheries becoming the new focal point of vaccination (in the past maternal antibodies that were transferred from birds to their offspring and helped to protect the chicks from diseases, used to react with vaccines either neutralizing or diminishing the protection offered by a vaccine). According to Dr Sylvain Comte, poultry franchise director of Ceva, vaccination in the hatchery leads to better performance because there is less room for error and it is safer, more efficient and more convenient than having to vaccinate birds on a farm.

Dr Comte estimates that more than 65 percent of the global broiler population is receiving injections in hatcheries. While the picture differs significantly from region to region, the practice is generally picking up in all territories. In 2012, Ceva estimated that 100 percent of all broilers in North America were injected at the hatchery, compared to 97 percent of the broiler population in Latin America, 52 percent in Asia, 49 percent in Central and Eastern Europe, 41 percent in Western Europe and 20 percent in Africa and the Middle East.

He says the shift was spurred on by the development of new automated technologies that rendered vaccination at the hatchery more affordable for even smaller hatcheries as well as a growing realisation of the importance of protecting chicks as early as possible.

Dr Barbosa notes that the US, with its big commercial hatcheries, was the first country to adopt new technologies for vac-



ination at the hatchery, whether in ovo or for day-old chicks. Other regions saw the US's success and are now following suit: "Almost all the new hatcheries across the world, whether big or small, these days are equipped with technology that allows them to vaccinate the birds on the premises. Also, new products and technologies are now available to match the needs of different regions."

### Improved efficiency

Companies are also realising that innovative vaccines mean nothing unless they are administered properly. "Even the best vaccine can only work if it is administered correctly, inside the bird or egg, in the right place, at the right dose and in a clean environment," explains Carlos Gonzalez, director of Ceva's vaccination and equipment services.

Companies, in effect, are putting a lot of effort into research and technologies aimed at improving vaccination outcomes. Many questions, for example, surround the best embryonic age at which in ovo vaccination should be practised. Dr Christophe Cazaban from Ceva Veterinary Services has answered this question, by scientifically demonstrating the best time to be between days 18.5 and 19.

A lot of effort is also placed in removing human error through automated processes. Gonzalez points out that Ceva has not only developed in ovo vaccination machinery that helps to standardise the process, but the machines are able to improve biosecurity by removing non-viable eggs from the hatchery.

"The removal of non-viable eggs helps to reduce contamination risks as well as the bacterial load during hatching," says Gonzalez. "This translates into healthier, more resilient

chicks at the start of production, which in turn is becoming increasingly important in a world where there is mounting pressure for antibiotic-free production."

Another example of how Ceva is adding value to their services is their upside-down egg remover, which Gonzalez estimates can save an average hatchery with roughly 15 million birds up to €50,000 a year.

### New technological developments

The development of new technologies will spur the development of improved products. The London School of Hygiene and Tropical Medicine, for example, has developed a procedure that would render glycoconjugate vaccines available to the veterinary market.

"Glycoconjugate vaccines have only been available to the human market up until now, because they entail an expensive multi-step manufacturing procedure," explains Professor Brendan Wren, explained Prof Brendan Wren, dean of the school's Faculty of Infectious and Tropical Diseases. "We have however developed Protein Glycon Coupling Technology that allows E. coli to act as a mini factory cell that allows us to produce glycoconjugates in a single step procedure."

What's more, the technology can be used to develop vaccines that offer protection against more than one disease, by adding combinations of proteins (or glycans) from different disease-causing bacteria. "We are working on a poultry vaccine that would simultaneously offer protection against E. coli, Clostridia and Campylobacter, at the price of manufacturing one vaccine," says Wren.

MSD Animal Health has also recently used biotechnology to launch the world's first dual-construct HVT (herpes virus of turkeys) vaccine that simultaneously protects birds from infectious bursal, Marek's disease and Newcastle disease. The vaccine can be given in ovo or subcutaneously in the hatchery and provides lifelong protection against these devastating diseases. "By protecting against multiple diseases with a single injection, the vaccine also improves poultry welfare by reducing the stress associated with multiple vaccinations and speeds up the vaccination process, allowing for optimum performance," says Dr Barbosa.

The development of new technologies is also resulting in greater traceability and transparency from the hatchery to the market. HIRPA, for example, has digitalised the vaccination process by adding a chip into the label of their vaccines. This allows users to control, plan and analyse all stages of the vaccination process. In addition, the company is using its website to alert veterinarians and producers of disease outbreaks in their specific regions.

### Greater co-operation

There is also a general trend whereby companies partner with others and customers to improve their services and vaccination outcomes. "Industry players are generous in sharing information and best practices, as we realise that we are all part of the same industry and any improvements are for the greater good," says Dr Barbosa. **PD**

# Focus on the Netherlands

## Authorities continue to monitor fipronil scandal that rocked the worldwide poultry industry

Words Chris McCullough

**T**remors from the fipronil scandal that rocked the global poultry industry this summer are still being felt in some sectors as officials continue to withdraw more products from the food chain. It turned out to be the scandal of all scandals when it was discovered that fipronil had been used by a company in the Netherlands to treat parasites in chickens.

Fipronil is an insecticide more commonly used in veterinary products to get rid of fleas, lice and ticks. However, in Europe it is banned from being used to treat animals destined for human consumption, such as chickens.

At the centre of the scandal was a Dutch company, ChickFriend, that had used a mix of fipronil and another substance to treat red lice in chickens. As a result traces of the illegal substance were found in samples of eggs, meat and droppings, which in August 2017 triggered a massive recall of millions of eggs across Europe and beyond.

According to the World Health Organisation fipronil, in large quantities, can have dangerous effects on people's kidneys, liver and thyroid glands. In the end, arrests of those connected with the scandal were made, but the problems associated with using this banned substance are ongoing.

The UK's Food Standards Agency says it is continuing to work with the

**“At the centre of the scandal was a Dutch company, ChickFriend, that had used a mix of fipronil and another substance to treat red lice in chickens”**

European Commission and is being updated on investigations by other member states as further information comes to light. It added that 85 percent of eggs consumed in the UK are produced in the UK, and therefore the risk of contamination was low. In an update published on its website, the FSA said: “It remains very unlikely that there is any risk to public health, but as fipronil is not authorised for use in food producing animals, we continue to track down implicated food products and ensure that they are removed from sale where they breach the 15 percent limit. [Products are withdrawn if the amount of implicated egg within them is more than 15 percent of the product.] There is no need to change how you buy or consume eggs.

“As a precaution, eggs from a substantial proportion of the UK flock size have been tested for fipronil. No fipronil has been found, and testing will continue,” the FSA added.





Since the scandal started a number of other products that contained eggs have also been recalled, the latest of which included waffles with over 15 percent implicated egg content. Meanwhile, the British Free Range Egg Producers Association is calling on retailers to change their egg sourcing policies after 700,000 contaminated Dutch eggs made it into the UK food chain. The imported eggs were incorporated into products such as sandwiches and salads and are being withdrawn by the retailers. British Lion Code eggs, meanwhile, have been tested by the Food Standards Agency and have proven to be perfectly safe.

BFREPA chief executive Robert Gooch said: "British egg producers follow stringent production standards to ensure that what they produce is perfectly safe and nutritious for consumers to eat. Retailers have shown good commitment to British shell eggs but processed egg is often sourced from other countries.

"This incident should be a wake-up call for retailers. Consumers want safe, traceable food and we have a ready-made scheme which delivers that in the form of the British Lion Code. Consumers should be reminded that eggs stamped with the British Lion mark are perfectly safe to eat," Gooch added.

In an effort to try to contain the problem, Dutch authorities shut down 180 poultry farms and a huge hunt was initiated to trace the customers who had purchased eggs from these farms and others. In fact, over one million eggs were initially recalled from consumers in the Netherlands and neighbouring German consumers were warned not to eat eggs with a specific code on them which indicated that they might have contained fipronil.

In the end, the scandal spread to 40 countries and saw millions of eggs across Europe and further afield destroyed as a precautionary measure. Tests have since proven that very low levels of fipronil, seven to ten times below the maximum limit, were detected in eggs from the treated chickens. One test in Belgium, however, found levels that were above the European limit.

Regulatory authorities in Belgium, the Netherlands and Germany started to blame each other over the incident each alleging the other countries knew about the problem but failed to announce it promptly enough. However, it is the poultry farmers who have been hit the hardest, and are blaming the company responsible for mixing the chemicals. According to the European Commission, the EU's executive arm, contaminated eggs were found from producers in four countries:



**“In an effort to try to contain the problem, Dutch authorities shut down 180 poultry farms and a huge hunt was initiated to trace the customers who had purchased eggs from these farms and others”**

Belgium, France, Germany and the Netherlands.

Other countries who imported eggs or egg products from these producers include Austria, the UK, Denmark, Ireland, Italy, Luxembourg, Poland, Romania, Slovenia, Slovakia, Sweden, Switzerland and Hong Kong. In fact, Austria is now urging the European Commission, and other member states, to consider a labelling system across Europe to improve traceability of egg products in light of the fipronil scandal.

Two Dutch men arrested in connection to the scandal, 31-year-old Martin van de Braak, and 24-year-old Mathijs IJzerman, the owners of ChickFriend, appeared at a closed hearing at the Overijssel District Court in the Dutch city of Zwolle. A statement from the court read: "The public prosecution service suspects the two managers of a disinfection company of using fipronil at poultry farms in the Netherlands. Thereby they endangered public health, and there are suspicions they knew that the biocide was banned."

The two men were arrested following raids on eight premises in the Netherlands and in Belgium, which included a raid on their premises of ChickFriend. They reportedly told farmers that their secret recipe could get rid of poultry mites in hens for eight months. But what they failed to disclose was that this recipe contained the herbal compound Dega 16 mixed with large amounts of the banned fipronil.

The fipronil used by the men was apparently sourced at Poultry Vision, a Belgian business that had in turn sourced it from a chemical manufacturer in Romania.

The saga continues. **PD**



REAGAN | President Ronald Reagan receives the 40th White House Thanksgiving Turkey 1987 © Wikimedia Commons

# Introducing...

## The Broad Breasted White turkey

Words Ellen Hardy

For anyone who's ever eaten turkey products, the Broad Breasted White should need no introduction; it's the commercial breed of choice in the USA. As Americans loosen their belts ahead of the 2017 Thanksgiving celebrations, we take a look at the development of this distinctive bird.

Modern turkeys, *meleagris gallopavo*, are descended from wild Mexican birds that were exported to Europe by the Spanish. They also featured on the menu of colonies in Jamestown as early as 1584. The Broad Breasted White, like other commercial breeds, has been developed for its abundant breast meat (reaching over 40lbs) and the fact that when dressed its white pin feathers are less visible. Intensification of production systems has meant that large-scale turkey farming is now almost fully automated, though there are downsides to this industrial efficiency. These double-breasted whoppers are so top-heavy they often can't breed naturally, requiring artificial insemination to produce fertile eggs (for more on the challenges of storing and using turkey sperm, see Rachel Lane's article in the September issue of Poultry Digital). They are also prone to health problems associated with being overweight, and tend to have short lives plagued by heart disease and joint damage.

The Broad Breasted White gets a particular moment of national appreciation each year, when a representative of the breed is 'pardoned' by the President of the United States outside the White House. Originally a presentation from the National Turkey Federation for the President's table, the tradition of 'pardoning' the bird began with George H. W. Bush in 1989. **PD**



OBAMA | President Barack Obama and daughters Sasha and Malia participate in the annual National Thanksgiving Turkey pardon (Official White House Photo by Pete Souza)

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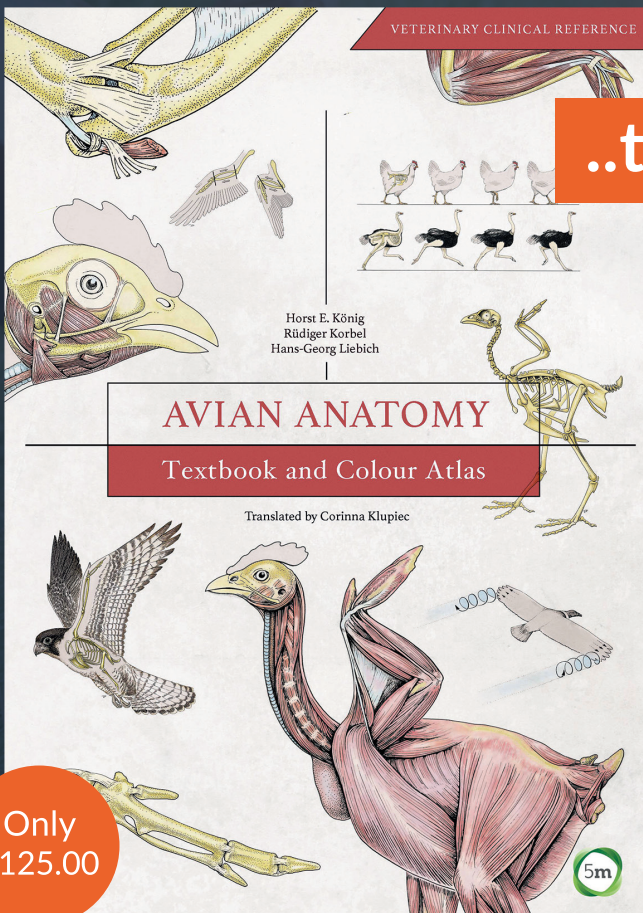
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# YOUR QUESTIONS

Poultry professional Mike Colley answers the best questions from The Poultry Site community.



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## Q: How do I stop my chickens eating their own eggs?

**A:** This is a really hard problem to crack, for the hobbyist and the commercial farmer alike. One thing we need to establish for certain is what is eating the eggs – it may not actually be your chickens. Look out for crows, jackdaws, magpies and some mammals such as rats, squirrels, stoats and mink. Once you have established that it is your chickens and not other critters, you could try and work out if it is a particular chicken. You could do this by watching their behaviour when eggs are present, or even putting an egg on the floor in front of your hens and see if a particular one tries to crack it. The issue then is what to do with the culprit – or what if it is several birds? The most effective way of preventing egg eating and leaving your flock intact is to get the eggs away from the birds as soon as possible. Commercially we use roll-away nests with AstroTurf instead of straw, so as soon as the hen stands up the egg rolls away out of sight – there are plenty of options available online. You could try some other tricks like putting artificial eggs in to act as decoys, or eggs filled with foul tasting or rotten contents to put hens off, but chickens have a very poor sense of taste.

**Q: I heard that hens can spontaneously reverse their sex and turn into roosters. Is this true? How? Why?**

**A:** You heard correctly, although it's not quite spontaneous. Essentially, the sex of any creature is determined by hormones. Higher proportions of oestrogen will create female characteristics, whereas more testosterone will create male characteristics. Some creatures also have a default sex whereby they require the continuous production of one of the sex hormones or they will revert back to the default, which in chickens is male. So yes, if a pullet or hen stops producing enough oestrogen it will develop male characteristics which could range from larger comb and wattles, male feather cover, right through to a fully functional fertile rooster, though this is very rare. The cause of this change is damaged ovaries, which could be a tumour or an injury. If it was a human they could have hormone treatment such as HRT but for a chicken your options are limited. When I have seen this peculiarity I have left the bird to enjoy life as a novelty and a point of learning for others interested in this phenomenon. One of the most amazing outcomes of this hormone conflict is that of gynandromorphy

whereby a creature is male on one side and female on the other. Funnily enough cockerels turning into hens does not appear to happen, though you may have heard of 'capons' – up until the 1980s cockerels were commonly injected with female hormones to create a plumper, better eating bird, and castration was also common.

**Q: Is it true chickens can't taste chillies and you can flavour their eggs this way? What other feed additives might flavour the eggs?**

**A:** Humans have around 10,000 taste buds, while chickens only have around 24 – so yes, their ability to taste is extremely limited. However, a chicken's sense of smell is likely to be at least as good as ours, so as taste and smell are closely related the chicken's is fit for purpose to distinguish fresh from rotten or certain toxins. Are chickens affected by the capsaicinoids in chillies that creates that sense of burning in our mouths? No, they simply don't have pain receptors that mammals have. The tainting of eggs is a very different matter but can definitely be a problem. Fish meal is a big culprit, but this is genetically dependent, so some chickens will transfer the taste to the eggs whereas others won't. Rapeseed is another culprit, but needless to say modern poultry diets are compounded to avoid any taint passing through to the egg, so if only feeding a proprietary meal or pellet there should be no worries. I am not aware of any specific plants that could taint your eggs, although 'Shepherd's Purse' is said to leave yolks blotchy. As a teenager I use to feed my chickens boiled potato peelings and was told my eggs tasted earthy. Whether there was really a link, to this day I still don't know.

### Mike Colley

*Mike has had an interest in all things chicken since he first asked his mum on the school bus "what colour eggs do different coloured chickens lay?" aged five. Over the next 45 years Mike developed his knowledge of poultry: in his backyard, breeding, hatching, showing and selling chickens, as well as in the commercial poultry industry as an Area Manager and, latterly, a Research Manager.*



# EVENTS

Poultry events from around the globe

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**UTRECHT, NETHERLANDS** | Home of VIV Europe 2018, 20-22 June 2018

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## National Poultry Show 2017

Date: 2-3 December  
Location: Telford, UK

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[www.farminguk.com](http://www.farminguk.com)

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## International Production & Processing Expo (IPPE)

Date: 30 Jan-1 Feb 2018  
Location: Atlanta, Georgia USA

The International Production & Processing Expo is the world's largest annual poultry, meat and feed industry event of its kind. A wide range of international decision-makers attend this annual event to network and become informed on the latest technological developments and issues facing the industry. The 2017 IPPE featured more than 8,018 international visitors from over 129 countries.

[ippexpo.com](http://ippexpo.com)

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## London Poultry Show 2018

Date: 4-5 April  
Location: London, UK

As one of North America's premier poultry trade fairs, the London Poultry Show brings together the best in the poultry industry each April.

[www.poultryindustrycouncil.ca/education-extension-events/london-poultry-show/](http://www.poultryindustrycouncil.ca/education-extension-events/london-poultry-show/)

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## British Pig & Poultry Fair 2018

Date: 15-16 May 2018  
Location: Kenilworth, UK

The UK's only dedicated pig and poultry industry event, with 350+ exhibitors and free entry for visitors. A great place to do business in 2018.

[www.pigandpoultry.org.uk](http://www.pigandpoultry.org.uk)

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## VIV Europe

Date: 20-22 June 2018  
Location: Utrecht, Netherlands

VIV Europe is a European trade show based on the 'Feed to Meat' principle. The event aims to become the a global leader in animal husbandry and processing events. The multi-species event includes the sectors of poultry meat, eggs, pork, beef, and dairy.

[www.viveurope.nl](http://www.viveurope.nl)

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## XVth European Poultry Conference

Date: 17-21 September 2018  
Location: Dubrovnik, Croatia

The conference will be structured around plenary meetings, workshops, a poster session and an exhibition, as well as technical tours giving an overview of various relevant developments in the area of poultry science. The scientific programme of the XV European Poultry Conference has been developed in collaboration with the Chairmen of the Working Groups of the European federation of WPSA. It will be focused on the main issues currently related to poultry research and production in order to add to and improve knowledge in a world where information and innovations spread rapidly.

[www.epc2018.com](http://www.epc2018.com)

# Premium Poultry News Channels

Global online poultry industry news and information resources

The Poultry Site | ElSitio Avícola | The Poultry Site.cn

## Targeted

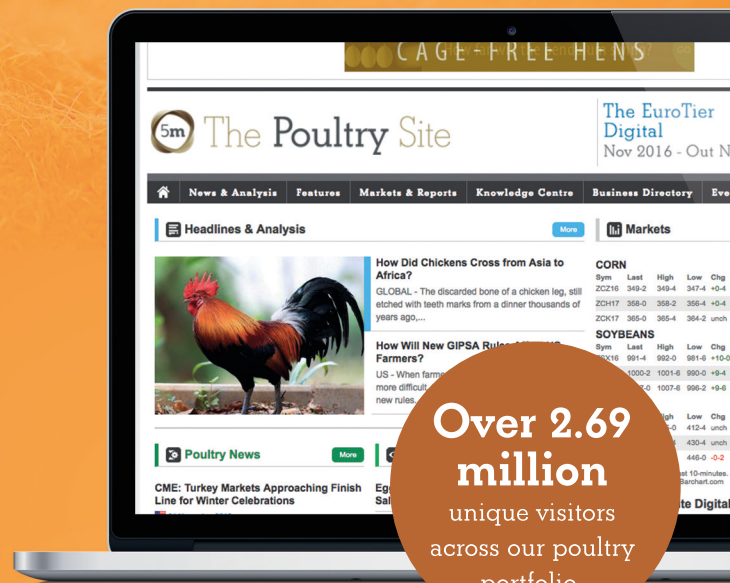
Our three websites target the key global poultry regions your company needs to speak to with targeted content written in English, Spanish and Mandarin.

## Communications

Our unique promotional opportunities allow communication with poultry producers, veterinarians, industry professionals, farmers and students.

## Online

Our in-depth news and information attracts over 3 million unique users per annum across our global online portfolio.



**Over 2.69 million**  
unique visitors  
across our poultry  
portfolio.

Our poultry portfolio reaches key global markets.

