



Department of Poultry Science
College of Agricultural & Environmental Sciences
UNIVERSITY OF GEORGIA

UGA POULTRY NUTRITION NEWSLETTER



Picture taken by Sean Chen

Chicken embryo stained with calcein (green indicates newly formed bone). This shows that mineral deposition in long bones typically proceeds from the center toward the ends.

So, let's talk about bones! What are the main differences between the bones of chickens (broilers or laying hens) and those of mammals?

[Click here](#) to submit your answers. The responses will be featured in the next issue.

June 2025

Editorial

This month, our comprehensive search captured 74 new publications in poultry nutrition from 61 journals (March 10th to April 10th, 2025, Web of Science), featuring top contributions from Poultry Science (6), Frontier in veterinary Science(6), Animals (5), Veterinary Medicine and Science (5), etc. ([Download the complete list here](#))

In this issue, we handpicked 15 studies focusing on broilers (7), layers (2), geese (1), meta-analysis (2), *in ovo* (1), and literature reviews (2). These studies span 15 research institutes across 11 countries. Additionally, we've updated the poultry events calendar to assist in your planning and curated the latest industry news to keep you informed.

Enjoy the reading!

Dr. Chongxiao (Sean) Chen
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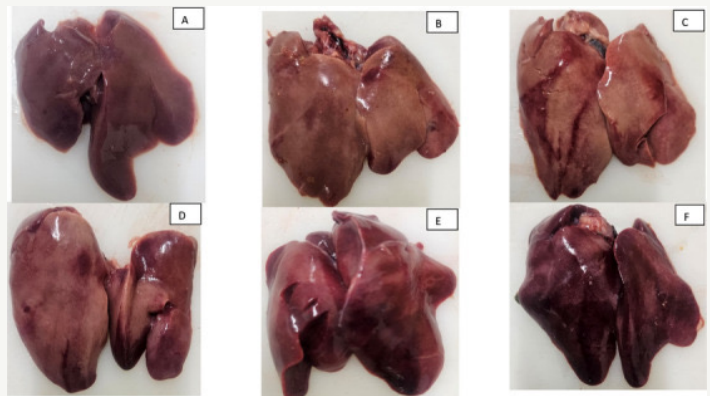




Broilers

Higher scores of **liver hemorrhagic syndrome** in broilers (scale: 0–5) were associated with increased lipid peroxidation (TBARS), protein oxidation (carbonyl/sulfhydryl content), and elevated levels of AST, GGT, and ALT, while decreased activities of SOD, GSH Px, and total antioxidant capacity.

Ankara University (Türkiye) / [Link](#)



(A) – (F) present scores from 0 (normal liver without any lesion) to 5 (severe hemorrhage)

In broilers, inclusion of 25 or 50 g/kg of **raw potato starch (RPS)** or 35 g/kg of **high amylose corn starch (HCS)** at three different feeding durations (21/14/7 days) did not affect growth performances. However, HCS improved DE, ME, and AMEn. Longer feeding duration (14 and 21 days) with 25 g/kg RPS or 35 g/kg HCS upregulated the expression of gut integrity markers (MUC-2 and PYY).

University of Georgia (USA) / [Link](#)

AA broilers were fed Low (L; 15 & 25%), medium (M; 30 & 40%), and high (H; 55.77 & 62.38%) **wheat diets** during the grower (11–21 d) and finisher (22–39 d). The high wheat diet increases tibia mechanical properties but also increases FI and FCR than L and M. Both H and M tended to reduce BW. The changes in growth performance might be due to the alteration of cecal microflora.

Henan Agricultural University (China) / [Link](#)

In broilers, a meta-analysis study showed that **dietary curcumin** improved BWG, FCR, intestinal morphology, carcass yield, meat quality, and antioxidant markers in blood including SOD and TAC.

Universidad Autónoma Chapingo (Mexico) / [Link](#)

In broilers, **liver growth** occurs through three distinct periods: D4–8 relying on stored nutrients; D10–14: transitioning to feed as the primary energy source, and D16–20: fully dependent on feed. liver grows faster proportionally to the body, primarily occurs during D4–8. The liver continues to grow throughout all three periods.

University of Delaware (USA) / [Link](#)



In broilers, high dietary **n-3 PUFA** and cycling **heat stress** (7h at 34°C ± 1°C) induced respiratory alkalosis and oxidative stress, which can be mitigated by supplementation with **antioxidants**: vitamin E (200 IU/kg), C (250 mg/kg), and Selenium (0.15 mg/kg).

University of Ljubljana (Slovenia) / [Link](#)

Antimicrobial peptides (200 g/ton) improved FI, BWG and FCR in necrotic enteritis broilers while reducing mortality. AMPs also improved duodenum and ileum morphology, carcass yield and quality.

University of Veterinary and Animal Sciences (Pakistan) / [Link](#)

A meta-analysis showed that the addition of **probiotics and prebiotics** reduced the growth and shed of *Salmonella*. Specifically, the prebiotic **mannan-oligosaccharides** had the greatest effect, reducing *Salmonella* colonization and shedding through immune modulation, altering the intestinal microbiome and preventing *Salmonella* binding to the intestinal wall.

King Saud Bin Abdulaziz University for Health Sciences (Saudi Arabia) / [Link](#)

This meta-analysis covers the 18 studies conducted from 2011 to 2024 to examine the effect of **probiotics** (multistrain and single-strain) on the broiler breeders' performance and reproductive traits. Multistrain probiotics (up to 1 g/kg) improved daily feed intake, eggshell quality, and FCR (Xuefeng black bone), egg production and hatchability (Ross-308), and reduced the dead sperm (Hubbard). While single-strain probiotics (*Bacillus subtilis*) increased fertility (Cobb 500 and Xuefeng black bone) and improved egg yolk in breeders.

Universitas Brawijaya (Indonesia) / [Link](#)

Layers

In layers, dietary 3.6% **calcium** (Ca) with 0.43% **non-phytate phosphorus** (NPP) results in best feed-to-egg ratio from 30 to 35 wks. At 41 wks., 0.43% NPP (main effect) increased the number of small yellow follicles, and serum MDA trended higher, suggesting a slight oxidative stress, but did not alter serum Ca or P levels.

Beijing Academy of Agriculture and Forestry Sciences (China) / [Link](#)

The addition of **pomegranate seed oil** (1.0 and 1.5%) in laying hen diets increased the foaming capacity of eggs while reducing foam density. However, eggs from hens fed 1.0% pomegranate seed oil led to reduced volumes of sponge cakes after baking and lower dry matter content.

University of Agriculture (Poland) / [Link](#)



Geese

14%, 15%, and 16% **crude protein (CP)** were fed to 1-year old laying Wanxi white geese. 15% CP improved the reproductive behavior and performance, serum ALT, uric acid, Leptin hormone, egg AA contents (Val, Met, and Tyr) without affecting laying performance and egg quality (except egg specific gravity), while 16% dietary CP increased reproductive hormones (E2, LH, P4, and GnRH), number of follicles, and crude fat content of eggs.

Anhui Science and Technology University (China) / [Link](#)

In ovo

In ovo supplementation (d 18) of AA (**L-met + L-cys + L-leu**) enriched metabolism pathways related to methionine and cysteine, glutathione, histidine, taurine, glycine, serine, threonine, and arginine in muscle and liver samples at 24 h post-hatch without any effect on hatchability%, body weight, and rectal temperature.

Université Laval (Canada) / [Link](#)

Reviews

Residual Feed Intake as a Behavioral, Nutritional and Economic Criterion in Poultry Production

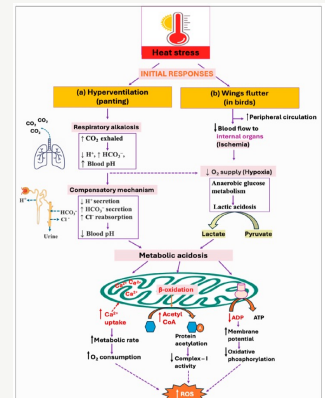
Residual feed intake (RFI) is a key indicator calculated using actual and predicted FI. Low RFI is associated with improved performance and reduced production costs. However, RFI varies across poultry, production (egg/meat), sex, and metabolic rate. This review highlights the importance of accurate, species-specific RFI calculation and proposes the use of tools such as AI to assess feeding behavior more precisely.

University of Life Sciences in Lublin (Poland) / [Link](#)

Major Oxidative and Antioxidant Mechanisms During Heat Stress-Induced Oxidative Stress in Chickens

As a defense mechanism against **heat stress-induced oxidative stress**, cells use enzymatic and non-enzymatic antioxidant systems to counteract free radicals. This review describes sources, pathways, and indicators of oxidative stress, its effects on immunity, and the antioxidant defense network. Continued research on nutritional mitigation strategies on the combination of antioxidants and molecular studies to identify unique pathways is essential to develop effective long-term nutritional interventions against HS oxidative stress.

The University of Georgia (USA) / [Link](#)





Meet our graduates

Catherine Fudge

Growing up, I always felt a deep connection to the land, animals, and agriculture. When I attended my first **Poultry Science** lecture at **NC State University**, I knew I had found my calling. What I didn't yet realize was just how much science is involved in poultry production.

As a freshman, I gained hands-on experience in a research lab studying parasites that affect turkey production. This work was so engaging that it inspired me to pursue a **Master of Science** in the same lab, where I had the privilege of collaborating closely with the turkey industry to identify factors that impact histomoniasis during production.

Following my Master's, I was fortunate to continue my passion for parasitology at the **University of Georgia**. For the past three years, I've been working toward my **Ph.D., focusing on histomoniasis in broiler breeders**. As an extension lab, we've had the opportunity to collaborate with integrators experiencing histomoniasis outbreaks and to conduct research aimed at early prevention and management strategies to improve flock livability.

As I near the completion of my Ph.D., **I'm excited to begin a new chapter as a parasitologist with CEVA**, where I'll contribute to improving coccidiosis vaccination across all poultry species. My time at UGA and in the Chen Lab has been incredibly rewarding, and I'm looking forward to the next step in my poultry science career.



Industry News

[May, 2025 Business Update \(Poultry World\)](#)

The summary of the latest business updates from the global poultry industry.

[Poultry Market Size, Share, Trends, Analysis, and Forecasts 2025-2034 \(Yahoo Finance\)](#)

The global poultry market, valued at USD 350.2 billion in 2025, is projected to reach USD 620.1 billion by 2034, growing at a 6.6% CAGR.

[China allows import of eligible pork, poultry products from 106 US plants \(WATT Poultry\)](#)

China has approved 106 new U.S. pork and poultry plants to export eligible products produced on or after June 12th, 2025.

[Wayne-Sanderson gifts \\$2 million to University of Georgia \(WATT Poultry\)](#)

With the donation, the University of Georgia Poultry Science building fund has gained \$4.1 million in contributions.



Trivia

Response to our previous trivia



Thank you for participating in the trivia! We received many interesting responses from Juan Taboada, Aditya Kishore Gupta and Dr. Anees, among other. All of them highlighted key factors involved when broilers shift from growth (body building) to higher maintenance costs.

As birds age, the energy concentration in their diet tends to increase regardless of increases in feed intake. This reflects the fact that larger birds require more energy to maintain normal activity. However, the decrease in dietary protein percentage doesn't necessarily mean the birds require less protein per day due to increases in feed intake. However, the inverse trend between protein and energy indicates that older birds need more energy relative to protein as the increasing costs on large body maintenance. Moreover, it's important to note that industrial poultry production does not always aim solely for maximizing growth performance. Factors such as efficiency, economic returns, customer preferences, etc. also influence nutrient formulation.



July

Hatchery Breeder Clinic | Nashville TN | **8-9** | [Link](#)
SC Poultry Federation Annual Conference | Charleston SC | **10-12** | [Link](#)
Poultry Science Association Annual Meeting | Raleigh NC | **14-17** | [Link](#)
Texas Poultry Federation Annual Convention | San Antonio TX | **17-19** | [Link](#)
State 4-H Congress | Atlanta GA | **22-25** | [Link](#)
Chicken Marketing Summit | Savannah GA | **28-30** | [Link](#)
AAAP 68th Annual Meeting | Portland OR | **29-31** | [Link](#)

August

Simpósio ACAV | Florianópolis Brazil | **5-7** | [Link](#)
National Safety Conference for the Poultry Industry | Destin FL | **18-20** | [Link](#)
International Seminar on Poultry Pathology and Production | Athens GA | **18-22** | [Link](#) 🐔
Women's Leadership Conference | Destin FL | **21-22** | [Link](#)

September

Liquid Feed Symposium | Fort Worth TX | **9-11** | [Link](#)
Shell Egg Academy | West Lafayette IN | **9-11** | [Link](#)
XXVII Congreso Centro Americano & del Caribe de Avicultura | Ciudad de Panama Panama | **10-12** | [Link](#)
California Poultry Federation Annual Conference | Monterey CA | **11-12** | [Link](#)
NTF Leadership Conference | Washington D.C. | **15-17** | [Link](#)
NPFDA 2025 Fall Meeting | Providence RI | **15-17** | [Link](#)
Pennsylvania Poultry Sales and Services | State College PA | **17-18** | [Link](#)
Environmental Management Seminar | Destin FL | **18-19** | [Link](#)
UGA Layers Conference | Virtual | **22** | [Link](#) 🐔
Arkansas Nutrition Conference | Rogers AR | **23-25** | [Link](#)
UGA Broiler Conference | Athens GA | **24** | [Link](#) 🐔
60th National Meeting on Poultry Health, Processing, and Live Production | Ocean City MD | **29-1** | [Link](#)

October

GA National Fair | Perry GA | **2-12** | [Link](#)
XXIIIrd WVPA Congress | Kuching Malaysia | **6-10** | [Link](#)
PSA Pacific Rim Scientific Conferences | Macau China | **13-16** | [Link](#)
Sunbelt Ag Expo | Moultrie GA | **14-16** | [Link](#)
Poultry Symposium for Production & Processing | Rogers AK | **14-15** | [Link](#)
Poultry Protein & Fat Seminar | Nashville TN | **15-16** | [Link](#)
Georgia Poultry Strong | Peachtree Pointe @ Lanier Islands GA | **18** | [Link](#)
Southern Feed & Grain Convection | Orange Beach AL | **26-29** | [Link](#)
International Conference on Poultry Science | Lisbon Portugal | **28-29** | [Link](#)
PSA Professional Development Conference | TBD | [TBD](#) | [Link](#)

November

Poultry Tech Summit | Atlanta GA | **3-6** | [Link](#)
Equipment Manufacturers Conference | Rancho Mirage CA | **5-7** | [Link](#)
Cold Weather Management Workshop | Athens GA | **11-13** | [Link](#) 🐔
VIV MEA | Abu Dhabi UAE | **25-27** | [Link](#)
Symposium on Gut Health in Production of Food Animals | TBD | [TBD](#) | [Link](#)
PS Open House (Pre-professional) | Athens GA | [TBD](#) | [Link](#) 🐔

2026 - January

NPFDA Annual Convention and Showcase | Atlanta GA | **26-29** | [Link](#)
International Production & Processing Expo | Atlanta GA | **27-29** | [Link](#)
AFIA Feed Education Program | Atlanta GA | **27-29** | [Link](#)
International Poultry Short Course | Athens GA | [TBD](#) | [Link](#) 🐔

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February

International Conference on Poultry Science | Lisbon Portugal | **8-9** | [Link](#)
Southeastern Grain & Feed Association Convention | Charleston SC | **18-20** | [Link](#)
NTF Annual Convection | Fort Lauderdale FL | **18-21** | [Link](#)

March

Annual Meat Conference | Oxon Hill MD | **2-4** | [Link](#)
Purchasing and Ingredient Suppliers Conference | Fort Worth TX | **9-11** | [Link](#)
VIV Health & Nutrition | Bangkok Thailand | **10-12** | [Link](#)
Western Poultry Disease Conference | San Diego CA | **16-18** | [Link](#)
Food Safety Conferences | TBD | [TBD](#) | [Link](#)
IPWA Annual Meeting | TBD | [TBD](#) | [Link](#)
NC Processing & Products Academy | TBD | [TBD](#) | [Link](#)
Feed Mill Management Seminar | TBD | [TBD](#) | [Link](#)
Deep South Poultry Conference | Tifton GA | [TBD](#) | [Link](#) 🐔

April

9th International Conference on Poultry Intestinal Health | Istanbul, Turkey | **22-24** | [Link](#)
AFGA Nutrition Seminar | TBD | **28-30** | [Link](#)
North Central Avian Disease Conferences | TBD | [TBD](#) | [Link](#)
PEAK | Minneapolis MN | [TBD](#) | [Link](#)
UGA Hot Weather Workshop | Athens GA | [TBD](#) | [Link](#) 🐔
Poultry Market Situation | TBD | [TBD](#) | [Link](#)
Workforce Success & Engagement Conference | TBD | [TBD](#) | [Link](#)
GPF Annual Meeting & Legacy Golf Tournament | TBD | [TBD](#) | [Link](#)

May

Stakeholders Summit | Kansas City MO | **5-7** | [Link](#)
MSU Layer Workshop | TBD | [TBD](#) | [Link](#)
Precision Poultry Seminar | Virtual | [TBD](#) | [Link](#) 🐔
Poultry Processor Workshop | TBD | [TBD](#) | [Link](#)
Texas Commercial Egg Clinic | TBD | [TBD](#) | [Link](#)
Poultry Health Management School | TBD | [TBD](#) | [Link](#)

June

Feed Industry Institute | Minneapolis MN | **June 15-18** | [Link](#)
FSPCA PCQI Training | TBD | [TBD](#) | [Link](#)
Avian Academy Teacher Education Program 2.0 | Athens GA | [TBD](#) | [Link](#) 🐔
Financial Management Seminar | TBD | [TBD](#) | [Link](#)
Southeast Egg Industry Regional Conference | TBD | [TBD](#) | [Link](#)
Avian Academy Teacher Education Program | Athens GA | [TBD](#) | [Link](#) 🐔
European Symposium on Poultry Nutrition | TBD | [TBD](#) | [Link](#)

TBD - Upcoming

World's Poultry Congress | Toronto Canada | **July 13-17 (2026)** | [Link](#)
SIAVS | Sao Paulo Brazil | **August 4-6 (2026)** | [Link](#)
Latin America Poultry Congress | Ciudad de Guatemala Guatemala | **November 11-13 (2026)** | [Link](#)
VIV Asia | Bangkok Thailand | **March 10-12 (2027)** | [Link](#)
Purchasing and Ingredient Suppliers Conferences | Orlando FL | **March 16-18 (2027)** | [Link](#)

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