2020 PSA Annual Meeting
July 20 - 22, 2020 • Online
# POULTRY SCIENCE ASSOCIATION

Virtual 2020 Annual Meeting Program

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PROGRAM COMMITTEE

Thank you to Brian Fairchild and his Program Committee for their selfless efforts on our behalf. Please take a minute to express your appreciation.

- Brian D. Fairchild, General Program Chair (2020)
- Jason L. Emmert, General Program Chair-Elect (2021)
- Douglas R. Korver, General Program Chair-Elect (2022)
- Shawna L. Weimer, Animal Well-Being and Behavior
- Dawn Koltes, Extension and Instruction
- Robert B. Beckstead, Genetics and Molecular Biology
- Audrey P. McElroy, Immunology, Health and Disease
- Jonathan Moyle, Management and Production
- Charles W. Starkey, Metabolism and Nutrition: General Nutrition
- Joshua Ryan Steed, Metabolism and Nutrition: Amino Acids
- Michael E. Persia, Metabolism and Nutrition: Enzymes
- John W. Boney, Metabolism and Nutrition: Feed Additives
- Duarte Neves, Metabolism and Nutrition: Vitamins and Minerals
- Kimberly M. Wilson, Microbiology and Food Safety
- Andrew P. Benson, Physiology and Reproduction
- Wayne D. Daley, Processing and Products
- Maci Oelschlager and Erin Ross, Student Workshop
- Douglas R. Korver and Roselina Angel, Informal Nutrition Symposium
- Sami Dridi, Bruce M. Rathgeber and Robert E. Buresh, WPSA Lectureship
- Elizabeth J. Kim, Bridging the Gap Symposium
- Steven C. Ricke, Bioinformatics Symposium
- Pierre-André Geraert and Robert B. Shirley, Layer Industry Symposium
- Darrin Karcher, Deana R. Jones and Robert B. Beckstead, Laying Hens and Eggs Symposium
- Elizabeth L. Karcher, Recruitment and Engagement Strategies Symposium
- Leonardo Linares and Marco A. Rebollo, Bone Health and Lameness Symposium
# PROGRAM GRID

**Virtual 2020 PSA Annual Meeting**

### Monday, July 20th

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<thead>
<tr>
<th>Time (CST)</th>
<th>Section</th>
<th>Session</th>
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<tr>
<td>7:00 am</td>
<td></td>
<td>Virtual Conference Login Opens</td>
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<tr>
<td>9:00 am – 10:00 am</td>
<td>WPSA Lecture</td>
<td>The 2050 Challenge: Feeding the World Without Wasting It</td>
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<tr>
<td>10:00 am – 11:40 am</td>
<td>Symposium</td>
<td>Bridging the Gap: Best Practices for Field &amp; Research Trials</td>
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<tr>
<td>12:00 pm – 2:30 pm</td>
<td>Informal Nutrition Symposium</td>
<td>Ingredient Quality Assessment for Old and New Ingredients</td>
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<tr>
<td>1:00 pm – 2:30 pm</td>
<td>Poster Chat Session</td>
<td>Animal Well-Being and Behavior</td>
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<td>2:30 pm – 5:20 pm</td>
<td>Symposium</td>
<td>Educating the Next Generation of Poultry Scientists on Bioinformatics</td>
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<td>3:00 pm – 4:30 pm</td>
<td>Poster Chat Session</td>
<td>Processing and Products</td>
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<tr>
<td>5:30 pm – 6:30 pm</td>
<td><strong>Social Event</strong></td>
<td><strong>Cheers to Our ‘Fellow’ Peers</strong> Enjoy your favorite beverage as we celebrate the accomplishments of the 2020 PSA Fellow recipients.</td>
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### Tuesday, July 21st

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<td>Student Workshop</td>
<td>How to Be a Better Reviewer</td>
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<td>PSA Student Hatchery Business Meeting</td>
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<td>PSA Business Meeting</td>
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*PSA student members are invited to participate.*

*PSA professional and graduate student members are invited to participate.*
ANNUAL MEETING & SYMPOSIUM SPONSORS

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World’s Poultry Science Association – Canada Branch
World’s Poultry Science Association – USA Branch
Zinpro Corporation
SYMPOSIA AND WORKSHOPS

Monday, July 20th

WPSA Lecture:
The Impact of the Current Climate Change Discussion on the Poultry Industry and How We Can Help Spread the Truth

The 2050 challenge is real: throughout our lifetime, the global human population will triple without a concurrent increase of natural resources to produce more food. As a result, agriculture will have to become much more efficient worldwide and engage in an efficient path similar to the one it has traveled down in U.S. livestock and poultry production in recent decades. It will take collaboration at all levels of the food system and sound science to meet this challenge.

Chairs: Sami Dridi, University of Arkansas; and Bruce M. Rathgeber, Dalhousie University

Virtual Ballroom

9:00 AM 305S  The 2050 Challenge: Feeding the World Without Wasting It.
Frank M. Mitloehner*, University of California, Davis, California, United States

Symposium:
Bridging the Gap: Best Practices for Field & Research Trials

"Bridging the Gap" will examine academic and industry perspectives on trials and decision-making around them by examining design & statistics, techniques & parameters to measure, impact of research vs. commercial conditions as well as considerations around mimicking the commercial setting in controlled tests.

Chair: Elizabeth J. Kim, Dupont Danisco Animal Nutrition

Virtual Ballroom

10:00 AM 306S  Introduction
Elizabeth J. Kim*, Dupont Danisco Animal Nutrition, Burford, Georgia, United States

10:00 AM 306S  From the Field to the Lab – Modeling the nutritional impacts of enteric challenges.
Samuel J. Rochell*, University of Arkansas, Fayetteville, Arkansas, United States

10:10 AM 307S  How can the Environment Impact Your Research & Field Trials?
Brian D. Fairchild*, University of Georgia, Athens, Georgia, United States

10:20 AM 308S  I want to be significant! Best practices to get the most from your field data.
Nickki Tillman*, Nutritional Solutions LLC, Buford, Georgia, United States

10:40 AM 309S  A field veterinarian’s perspective: What does all this data mean in decision making?
Elizabeth Dale*, Pilgrim’s, Greeley, Colorado, United States

11:00 AM 310S  A field nutritionist’s perspective: The role of research data in decision-making.
Jeffrey T. Pope*, David J. Bumham, House of Raeford, Rose Hill, North Carolina, United States

11:20 AM  Panel Discussion

*Presenter  All Times are CST
Informal Nutrition Symposium:
Ingredient Quality Assessment for Old and New Ingredients

Accurate feed ingredient evaluation is essential for precise formulation of poultry diets. However, many challenges remain in the process of transforming raw ingredients into a complete feed that meets the needs of modern poultry. Variation in nutrient content, effects of processing on nutrient content and the incorporation of novel or poorly characterized ingredients add to the challenges. The symposium will provide practical information on feed evaluation in poultry nutrition, as well as the opportunities and challenges associated with novel feed ingredients for the poultry industry. The speakers in the second session will also devote attention to the process of evaluating the novel feedstuffs as potential ingredients in poultry diets.

Chairs: Douglas R. Korver, University of Alberta; and Roselina Angel, University of Maryland

Virtual Ballroom

12:00 PM

Introduction
Roselina Angel*, University of Maryland, College Park, Maryland, United States

12:05 PM 311S

Feed evaluation: NIR technologies, quality system and utilization.
Alessandro Stercoli*, Cargill, Fiorenzuola d'Arda, Piacenza, Italy

12:30 PM 312S

Using near infrared spectroscopy results in commercial diet formulation.
Peter V. Chrystal*1, 2,1PRF, University of Sydney, Pendle Hill, New South Wales, Australia, 2Baiada Poultry, Pendle Hill, New South Wales, Australia

1:10 PM 313S

Applying feed evaluation results – accurate delivery of formulated nutrients.
Mike Blair*, United Animal Health Inc., Woodstock, Georgia, United States

1:35 PM 314S

Strategies to evaluate novel ingredients for poultry diets.
Rex W. Newkirk*, University of Saskatchewan, Saskatoon, Saskatchewan, Canada

1:55 PM 315S

Novel feed ingredients: Insect protein and chitin products.
Liz Koutsos*, EnviroFlight LLC, Maysville, Kentucky, United States

2:15 PM

Symposium summary, panel discussion and Life Mentors awards.
Douglas R. Korver*, University of Alberta, Edmonton, Alberta, Canada

Symposium:
Educating the Next Generation of Poultry Scientists on Bioinformatics

Bioinformatics is rapidly emerging as a tool to poultry scientists. Big data is a not only a significant buzz term, but the endless potential of such incredible data sets is rapidly emerging as a keystone piece of information that we must all have for the future of our fields. Unfortunately, there are numerous barriers to successfully implementing bioinformatics as a component of a research program. Issues like data security, bioinformatics options, and how to communicate data to both professional scientists and the public are all significant issues that new poultry scientists, professionals must grasp. Therefore, the purpose of this symposia is to fully discuss the use of big data from collection to final analysis.

Chair: Steven C. Ricke, University of Arkansas

Virtual Ballroom

2:30 PM

Introduction
Steven C. Ricke*, University of Arkansas, Fayetteville, Arkansas, United States

2:30 PM 316S

Standardizing microbiome analytics for the poultry grower.
Kristina M. Feye*, University of Arkansas, Fayetteville, Arkansas, United States
3:00 PM 317S  **Delivery of bioinformatics to poultry processing.**  
Steven C. Ricke*, University of Arkansas, Fayetteville, Arkansas, United States

3:30 PM 318S  **Communicating bioinformatics to small poultry producers.**  
Michael J. Rothrock*, USDA-ARS-USNPRC, Athens, Georgia, United States

4:00 PM 319S  **Communicating complex data sets to poultry nutritionists.**  
Joshua Jendza*, BASF Corporation, Basking Ridge, New Jersey, United States

4:30 PM 320S  **Combining microbiome, gene copy, and metabolic pathway in the analysis: A multi-omics case study.**  
Bill Shannon*, BioRankings, St. Louis, Missouri, United States

5:00 PM  **Roundtable discussion**

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**Tuesday, July 21st**

**Symposium:**

**Market, Welfare and Nutritional Dynamics of the Laying Industry:**
**How the Layer Industry has Changed, Where it is Today, and Where it May be Going**

*Through molecular biology, nutrition, management and market dynamics, this symposium will delve into what is needed to support different laying operation strategies and lengths of lay.*

**Chairs:** Pierre-André Geraert, Adisseo France SAS; and Robert B. Shirley, Adisseo USA Inc.

**Virtual Ballroom**

9:00 AM  **Introduction**  
Robert B. Shirley*, Adisseo USA Inc., Woodstock, Illinois, United States

9:00 AM 321S  **Worldwide egg market dynamics and its evolution with new generation of consumers.**  
Vincent Guyonnet*, FFI Consulting Ltd., Ottawa, Ontario, Canada

9:35 AM 322S  **New insights on eggshell mineralization and how they can contribute to maintain shell quality.**  
Joel Gautron*1, 2, Lilian Stapane1, Alejandro Rodriguez-Navarro1, Yves Nys1, M.T. Hincke4, 1INRAe, Nouzilly, France, 2Avian Biology & Poultry Research unit, Université de TOURS, Tours, France, 3University of Granada, Granada, Spain, 4University of Ottawa, Ottawa, Ontario, Canada

10:10 AM 323S  **Laying hen welfare: From threats to market opportunities.**  
Thea van Niekerk*, Wageningen UR Livestock Research, Lelystad, Netherlands

10:45 AM 324S  **A review on the amino acid nutrition of layers.**  
Michael T. Kidd**, Robert E. Loar*, 1University of Arkansas, Fayetteville, Arkansas, United States, 2Cal-Maine Foods, Inc., Jackson, Mississippi, United States

11:20 AM 325S  **The evolution of nutritional strategies for production that focuses on conventional, cage-free aviaries, free-range markets.**  
Michael A. Elliot*, A&E Nutrition Services, LLC, East Petersburg, Pennsylvania, United States

12:05 PM  **Roundtable discussion**
Student Workshop:
How to Be a Better Reviewer

The purpose of this workshop is to make the review process more transparent and guide young poultry scientists on how to be a successful reviewer of a manuscript. This workshop will also aim to establish an appreciation for what it means to be a good reviewer and how that impacts the success of a peer-reviewed journal, like Poultry Science® and The Journal of Applied Poultry Research.

Chair: Maci Oelschlager, University of Illinois

Virtual Ballroom

12:30 PM  Introduction
Maci Oelschlager*, University of Illinois, Urbana, Illinois, United States

12:30 PM  326S  How to be a better reviewer: Section Editor perspective.
Wei Zhai*, Mississippi State University, Starkville, Mississippi, United States

12:50 PM  Questions and Answers

1:05 PM  327S  How to be a better reviewer: Reviewer perspective.
Ryan Dilger*, University of Illinois, Urbana, Illinois, United States

1:25 PM  Questions and Answers

1:40 PM  328S  How to be a better reviewer: Publisher perspective.
Diana Jones*, Tom Fitzpatrick†, ‘Elsevier Inc., Sydney, New South Wales, Australia, ‡Elsevier Inc., San Diego, California, United States

2:00 PM  Questions and Answers

Symposium:
Laying Hens and Eggs: Where is Industry and Where is Academia?

There is a disconnect between industry, regulatory agencies and academia. This symposium will be a step toward establishing the annual Poultry Science meeting as the platform to engage on issues related to research and education needs. This translates to the opportunity to actively engage them regarding the science. The symposium will encourage people who do not typically come to Poultry Science from the regulatory agencies and industry commodity groups. Finally, this symposium will provide an opportunity to identify and tap donor that we have not engaged in the past.

Chairs: Darrin M. Karcher, Purdue University; Deana R. Jones, USDA-ARS-USNPRC; and Robert B. Beckstead, North Carolina State University

Virtual Ballroom

2:30 PM  Introduction
Deana R. Jones*, USDA-ARS-USNPRC, Athens, Georgia, United States

2:30 PM  329S  World perspective on egg regulations.
Mark Lobstein*, USDA-AMS, Washington, District of Columbia, United States

2:50 PM  330S  World perspective on egg production.
Tim Lambert*, Egg Farmers of Canada, Ottawa, Ontario, Canada

3:10 PM  331S  Overview of table egg industry: current issues/concerns.
Chad Gregory*, United Egg Producers, Johns Creek, Georgia, United States
There is an increasing number of students seeking baccalaureate degrees in Animal and Poultry Science majors with limited previous food animal experience. Although a large number of agricultural job openings exist, students are often unaware of the available careers and employment opportunities. The poultry industry is one area that is often overlooked. Therefore, it is essential that students are exposed to opportunities in the poultry industry early in their academic programming. Strategies to increase student engagement must be implemented in the classroom to foster subject-specific curiosity. Increasing student interest and curiosity may directly increase students’ motivation to start or continue studying poultry science. Topics that will be included in the symposia include the pedagogy of motivation and examples of ways to create interest. New methods of implementing active learning in the classroom to create interest will also be discussed. Finally, innovative recruitment and distant learning strategies will be discussed.

Chair: Elizabeth L. Karcher, Purdue University

Virtual Ballroom

9:00 AM
Introduction
Elizabeth L. Karcher*, Purdue University, West Lafayette, Indiana, United States

9:05 AM 339S
Recruitment Strategies for the Next Generation of Poultry Workers.
Jessica B. Wells*, Mississippi State University, Starkville, Mississippi, United States

9:20 AM 340S
Industry approaches to recruiting students and connecting with academia.
Stacy Webb*, Sanderson Farms, Laurel, Mississippi, United States

9:35 AM 341S
Engaging the Next Generation of Poultry Professionals.
Elizabeth L. Karcher*, Purdue University, West Lafayette, Indiana, United States
Symposium: Bone Health and Lameness, the Tip of the Iceberg

This symposium will link all the aspects that influence bone health, from a standpoint of generational nutrition and embryo development until market weight, and interactions with nutrition, gut health and environment challenges.

Chair: Marco A. Rebollo, Zinpro Corporation

Virtual Ballroom

11:30 AM
Introduction
Marco A. Rebollo*, Zinpro Corporation, Eden Prairie, Minnesota, United States

11:30 AM 343S
The development of osteochondrosis and tibial dyschondroplasia and the role of trace minerals and vitamins.
Laura Amundson*, 1 Zinpro Corporation, Eden Prairie, Minnesota, United States, 2 University of Wisconsin, Madison, Wisconsin, United States

11:50 AM
Questions and Answers

12:00 PM 344S
The influence of generational nutrition on bone development.
Sergio L. Vieira*, Federal University of Rio Grande do Sul, Porto Alegre, Brazil

12:20 PM
Questions and Answers

12:30 PM 345S
Linking gut health issues with lameness and food safety.
Charles L. Hofacre*, Southern Poultry Research Group, Watkinsville, Georgia

12:50 PM
Questions and Answers

1:00 PM 346S
Targeting Performance and Bone Health with Macro-Mineral Nutrition.
Roselina Angel*, University of Maryland, College Park, Maryland, United States

1:20 PM
Questions and Answers.

1:30 PM 347S
How feed additives influence lameness.
Adnan K. Alrubaye*, University of Arkansas, Fayetteville, Arkansas, United States

1:50 PM
Questions and Answers
SOCIAL EVENTS

Monday, July 20th

Cheers to Our ‘Fellow’ Peers

Enjoy your favorite beverage as we celebrate the accomplishments of this year’s Fellows.

Virtual Networking Lounge

5:30 PM  Kenneth E. Anderson, 2020 PSA Fellow
          North Carolina State University, Raleigh, North Carolina, United States

5:30 PM  Todd J. Applegate, 2020 PSA Fellow
          University of Georgia, Athens, Georgia, United States

5:30 PM  Jeanna L. Wilson, 2020 PSA Fellow
          University of Georgia, Athens, Georgia, United States

Tuesday, July 21st

PSA Trivia EGGstravaganza

Test your trivia knowledge on anything and everything! Join in on the fun and play for your chance to win a prize!

Virtual Networking Lounge

5:30 PM  PSA Trivia EGGstravaganza
BUSINESS MEETINGS

Wednesday, July 22nd

PSA Student Hatchery Business Meeting

All student members of the Poultry Science Association are invited to participate.

Virtual Ballroom

2:00 PM

Introduction
Maci Oelschlager, PSA Senior Student Director
Erin Ross, PSA Junior Student Director

PSA Student Hatchery Business

Outstanding Student Award

Student Video Competition

Student Director Election Results

Questions and Answers

PSA Business Meeting

All professional and graduate student members of the Poultry Science Association are invited to participate.

Virtual Ballroom

3:00 PM

Call to Order
Donald R. McIntyre, PSA President

Report of the Board of Directors
Donald R. McIntyre, PSA President

Report of the Secretary-Treasurer
Douglas F. Britton, PSA Secretary-Treasurer

Report of the Poultry Science® Editor-in-Chief
Robert L. Taylor, Jr., Editor-in-Chief

Report of The Journal of Applied Poultry Research Editor-in-Chief
John B. Carey, Editor-in-Chief

Report of the PSA Student Hatchery
Maci Oelschlager, PSA Senior Student Director

Report of the PSA Foundation
Christopher D. Knight, Chair, PSA Foundation Board of Trustees

Report of the Resolutions Committee
Mary M. Beck, Committee Chair
Announcement of Election Results
Donald R. McIntyre, PSA President

Recognition of Annual Meeting Program Chair
Brian D. Fairchild, 2020 Program Chair

Recognition of Retiring Board of Directors
Donald R. McIntyre, PSA President

Passing of the Gavel
Donald R. McIntyre, PSA President

Closing Comments
Christine Alvarado, PSA President-Elect
### ABSTRACT PRESENTATIONS

**Animal Well-Being and Behavior**  
Chair: Shawna L. Weimer, University of Maryland  
Virtual Session Room I

1. **The gut microbiota-brain axis: Modifications of injurious behaviors and physiological homeostasis in chickens through early postnatal cecal microbiota transplantation.**  
Yuechi Fu\(^ {\text{GS} \ast} \), Jiaying Hu\(^ {1} \), Heng-wei Cheng\(^ {1} \)  
\(^ {1}\)Purdue University, West Lafayette, Indiana, United States, \(^ {2}\)Livestock Behavior Research Unit, USDA-ARS, West Lafayette, Indiana, United States

2. **Omega-3 in maternal diet improves cognitive performance of broiler chicks in a T-maze test.**  
Rosemary Whittle\(^ {\text{GS} \ast} \), Elijah Kiarie, Tina Widowski  
University of Guelph, Guelph, Ontario, Canada

3. **Tryptophan metabolism, Stress and Feather Pecking in Pullets.**  
Claire Mindus\(^ {\text{GS} \ast} \), Nienke van Staaveren\(^ {1} \), Paul Forsythe\(^ {2} \), Simon Geisler\(^ {3} \), Johanna M. Gostner\(^ {4} \), Joergen B. Kjaer\(^ {4} \), Wolfgang Kunze\(^ {5} \), Anna Kate Shoveller\(^ {1} \), Dietmar Fuchs\(^ {1} \), Alexandra Harlander\(^ {1} \)  
\(^ {1}\)Ontario Agricultural College, University of Guelph, Guelph, Ontario, Canada, \(^ {2}\)McMaster Brain-Body Institute, St. Joseph's Healthcare, Hamilton, Ontario, Canada, \(^ {3}\)Institutes of Medical Biochemistry and Biological Chemistry, Biocenter, Innsbruck Medical University, Innsbruck, Austria, \(^ {4}\)Friedrich-Loeffler-Institut, Federal Research Institute for Animal Health, Institute of Animal Welfare and Animal Husbandry, Celle, Germany

4. **Effect of light intensity on calcium homeostasis in pullets.**  
Gula Sadvakassova\(^ {1,2} \), Jo Ann Chew\(^ {1} \), Kailyn Beaulac\(^ {1} \), Hossein Poorhemati\(^ {1,2,4} \), Karen Schwean-Lardner\(^ {1} \), Svetlana V. Komarova\(^ {1,2,4} \)  
\(^ {1}\)McGill University, Montreal, Quebec, Canada, \(^ {2}\)Shriners Hospital for Children, Montreal, Quebec, Canada, \(^ {3}\)University of Saskatchewan, Edmonton, Alberta, Canada, \(^ {4}\)McGill University, Montreal, Quebec, Canada

5. **The effects of rearing cage type and calcium particle size on keel bone characteristics of laying hens.**  
Madeleine Browne\(^ {\text{GS} \ast} \), Tanka Khanal\(^ {1} \), Tina Widowski\(^ {2} \), Elijah Kiarie\(^ {2} \)  
\(^ {1}\)Chicken Farmers of Ontario, Burlington, Ontario, Canada, \(^ {2}\)Animal Biosciences, University of Guelph, Guelph, Ontario, Canada

6. **The effect of light wavelengths on broilers: more than meets the eye.**  
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7. **Differences in feather corticosterone level between purebred turkey lines with different breeding objectives.**  
Emily M. Leishman\(^ {\text{GS} \ast} \), Nikole E. Freeman\(^ {1} \), Amy E. Newman\(^ {1} \), Nienke van Staaveren\(^ {1} \), Ben J. Wood\(^ {1,2,4} \), Alexandra Harlander\(^ {1} \), Christine F. Baes\(^ {1,5} \)  
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Maternal age and housing system of laying hens interact to affect measures of fear and stress in their offspring.
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Male familiarity and aggressive behavior: two modulators of female Japanese quail social preferences.
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Circadian Rhythm of Dust Bathing in 4 Strains of Laying Hen.
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Comparison of electrocardiogram parameters during two methods of euthanasia in white leghorn hens.
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Evaluation of two fill rates for CO2 euthanasia in turkeys.
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Are broiler chicks' substrate preferences altered by soiling or type of wood shavings?
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Spatial complexity during early life affects activity and navigation skills of laying hen pullets.
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Broiler laser enrichment stimulated laser-following behavior and indirectly increased proportion of birds moving.
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Impact of environmental enrichment and stocking density on affective states of broiler chickens.
Mallory G. Anderson1, Andrew M. Campbell, Alexa Johnson, Madi Casey, Leonie Jacobs
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Self- and conspecific-directed pecking behavior of commercial Pekin ducks.
Yiru Dong1, Darrin M. Karcher, Marisa Erasmus
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Similarity in movement patterns in chickens increases with time and social association.
Klara J. Grethen\textsuperscript{GS,1}, Yamenah Gómez\textsuperscript{1}, John Berezowski\textsuperscript{2}, Yandy Abreu Jorge\textsuperscript{3}, Sabine Gebhardt-Henrich\textsuperscript{1}, Sabine Vögeli\textsuperscript{4}, Ariane Stratmann\textsuperscript{5}, Michael J. Toscano\textsuperscript{6}, Bernhard Völkl\textsuperscript{4}
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What do farmers think about health and welfare issues in turkey production?
Nienke van Staaveren\textsuperscript{1,2,3}, Emily M. Leishman\textsuperscript{1}, Sarah Adams\textsuperscript{1}, Ben J. Wood\textsuperscript{1,4,5}, Alexandra Harlander\textsuperscript{1}, Christine F. Baes\textsuperscript{1,5}
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Impact of stocking density and environmental complexity on performance of male broiler chickens.
Andrew M. Campbell\textsuperscript{GS,*}, Mallory G. Anderson, Alexa Johnson, Madi Casey, Leonie Jacobs
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Attracting young turkey poults to feeders to avoid litter-eating.
Sameeha Jhetam\textsuperscript{GS,*}, Kailyn Beaulac, Karen Schwean-Lardner
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The impact of light intensity and strain on behavior and welfare of egg-strain pullets reared in perchery systems from 0 to 16 weeks of age.
Jo Ann Chew\textsuperscript{GS,*}, Tory Shynkaruk\textsuperscript{1}, Eugenia Herwig\textsuperscript{1}, Tina Widowski\textsuperscript{1}, Karen Schwean-Lardner\textsuperscript{1}
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Rearing enrichments, outdoor ranging and environmental stress impacted free-range hen welfare.
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Comparison of footpad dermatitis scores in market turkey hens.
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Prevalence and severity of footpad dermatitis in commercial turkeys flocks in the Midwestern United States.
Gabriella Furo\textsuperscript{GS,*1,2}, Darrin M. Karcher\textsuperscript{1}, Kailynn Scoles\textsuperscript{1}, Shawna L. Weimer\textsuperscript{1}, Sally L. Noll\textsuperscript{1}
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Use of Environmental Enrichments in colony caged Japanese Quail to reduce damaging behaviors.
Melissa Rudo, Chirantana Mathkari\textsuperscript{GS,*}, Rachel Dennis
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Are beak growth and pullet performance affected by natural beak smoothing feeders and outdoor vegetation density?
Xavier Averós1, Paul Patterson2, Nuket Acar2, Iván Pineda3, Inma Estevez1, 4
1Animal Production, Neiker, Arkaute, Spain, 2Penn State University, University Park, Pennsylvania, United States, 3Universidad Nacional Autónoma de México, Ciudad de México, Mexico, 4IKERBASQUE Basque Foundation for Science, Bilbao, Spain

Impact of Vegetation Density on Outdoor Paddock Utilization and Behavior by Growing Pullets.
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Effect of rearing aviary style and genetic strain on musculoskeletal characteristics of layer pullets.
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Comparison of in vivo and ex vivo three-dimensional keel bone models at two timepoints in brown laying hens.
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Using accelerometers to examine differences in inactivity between conventional and slower growing broiler chickens.
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Utilizing 3-dimensional models to assess keel bone damage in laying hens throughout the lay cycle.
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Automatic detection of reproductive behavior in male Japanese quail (Coturnix japonica) using accelerometers and neural networks.
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A machine vision-based method for monitoring broiler floor distribution in feeding and drinking zones.
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35  **Writing assignments in undergraduate poultry production curricula.**
Ruediger Hauck*1,2, Amit Morey1, Emefa A. Monu1, Christopher Basgier1, Amy N. Wright4
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36  **The Elementary E.G.G. Program: Impacting student interest through poultry science STEM- curriculum.**
Danielle MarksGS*, Elizabeth Karcher
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37  **Poultry Products: An on-line undergraduate course.**
Glenn Birrenkott*, Richelle Miller
Animal & Veterinary Sciences, Clemson University, Clemson, South Carolina, United States

38  **Transitioning an upper level poultry management course from in-person to online instruction during the COVID-19 outbreak.**
Jacqueline Jacob*, Anthony Pescatore, Sunday Adedokun
Animal and Food Sciences, University of Kentucky, Lexington, Kentucky, United States

39  **Measuring interest and engagement in Extension programming.**
Ashley RosenkransGS*, Danielle Marks, Darrin M. Karcher, Elizabeth Karcher
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40  **Promotion of small-scale poultry farming through university extension in northern Rio de Janeiro, Brazil.**
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41  **Evaluating the causes of arthritis condemnation in a Brazilian slaughterhouse.**
Thais R. Pereira1, Elisa P. FrancoisGS*, Ismael Franca3
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42  **Possibilities for formulating layer diets beyond the traditional least-cost model.**
Amy F. Moss*, Greg Parkinson1, T. M. Crowley1,2, Gene M. Pesti1
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43  **Smallholder farmer community-based breeding program of indigenous chickens key to in-situ genetic resource conservation and enhancing rural livelihoods in Zambia.**
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Comprehensive analysis of circular RNAs related to hypoxic adaptation in the Tibetan chicken.
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The genetic basis of the response of Tanzanian local chicken ecotypes to velogenic Newcastle disease virus.
Muhammed Walugembe\textsuperscript{*1}, Esther Mollel\textsuperscript{2}, James Mushi\textsuperscript{1}, Gaspar Chiwanga\textsuperscript{1}, Peter Msoffe\textsuperscript{1}, Ying Wang\textsuperscript{1}, Nadira Chouchia\textsuperscript{1}, Terra Kelly\textsuperscript{1}, Rodrigo Gallardo\textsuperscript{1}, Huaijun Zhou\textsuperscript{1}, Amandus Muhairwa\textsuperscript{1}, Susan Lamont\textsuperscript{1}, Jack Dekkers\textsuperscript{1}
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Discriminant and factor analysis of four strains of finisher broiler chickens.
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Sirtuin genes are dynamically regulate during adipose development in broiler chicks.
Heather Winter\textsuperscript{GS,1}, Robert Mihelic\textsuperscript{1}, Suchita Das\textsuperscript{1}, Kurt Lamour\textsuperscript{2}, Brynn H. Voy\textsuperscript{1}
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Developmental expression of genes within the insulin-like growth factor system suggests they play unique roles in regulating breast muscle myogenesis and growth.
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RNA sequencing identifies differential gene expression in broiler breeders managed on different feeding programs.
Chandler Keck\textsuperscript{GS*}, Martin J. Zuidhof\textsuperscript{1}, Nicole Zukiwsky\textsuperscript{1}, Mohammad Afrouziyeh\textsuperscript{1}, Chris Ashwell\textsuperscript{1}
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Effects of maternal immunization against myostatin on the post-hatch growth performance of their chicks.
Rajeev K. Mishra\textsuperscript{GS*}, Rajesh Jha, Birendra Mishra, Yong-Soo Kim
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Heat stress dysregulates intestinal mitochondrial function and dynamics in broilers.
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Profiling of miRNA:target pairings associated with metabolic and immunological processes in the adipose tissue in late-stage embryos and early post-hatch chicks.
Julie Hicks\textsuperscript{*}, Hsiao-Ching Liu
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Genetic relationship between perching and frequency of floor eggs in brown layers.
Anna Wolc\textsuperscript{*1,2}, Petek Settar\textsuperscript{2}, Janet Fulton\textsuperscript{1}, Jesus Arango\textsuperscript{3}, Kaylee Rowland\textsuperscript{2}, Danny Lubritz\textsuperscript{2}, Jack Dekkers\textsuperscript{1}
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Impacts of antibiotic reduction strategies on zootechnical performances, health control and *Eimeria* spp. oocysts excretion compared to conventional antibiotic programs in commercial broiler chicken flocks.
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A field study to evaluate the efficacy and safety of Panacur® AquaSol for use in drinking water for the treatment of chickens naturally infected with *Capillaria* spp.
Rafael Chiummo*1, Kevin Wilkinson1, Katharina Raue1, Christina Strube2, Emmanuel Thomas1
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Graded *Eimeria* infection regulates oxidative stress in broiler chickens and is strongly correlated with growth performance and gut health parameters.
Po-Yun Teng*1, Yuguo H. Tompkins, Sudhir Yadav, Fernanda Castro, Allberta L. Fuller, Woo Kim
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A temporal investigation of host defense peptide expression and intestinal homeostasis in broiler chickens following a single infection with *Eimeria acervulina*.
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Evaluation of coccidial lesions in the ceca of broilers challenged with *Eimeria* tenella using digital image analysis.
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Immunomodulation using a dried egg product during a severe *Eimeria* challenge in broiler chickens.
Muhammed Shameer Abdul Rasheed*1, Utsav Tiwari1, Maci L. Oelschlager1, Brooke N. Smith1, Juliana Jespersen1, Nannette Olmeda-Geniec1, Jeffery Escobar1, Ryan Dilger2
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Algae-based feed ingredient improves intestinal physiology and alters systemic immunity in broiler chickens during coccidiosis challenge.
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Effects of antibiotic and probiotic feed additives on growth performance of *Eimeria* infected broilers.
Linan Jia*1
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Changes in the ceca microbiota of broilers vaccinated for coccidiosis or supplemented with salinomycin.
Catiane Orso*1, Bruna S. Cony2, Jessica P. Silva2, Julio C. V. Furtado2, Bruna Schroeder2, Ana P. G. Frazzon1, Ines Andretta2, Andréa M. L. Ribeiro2
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Evaluation of the interaction between *Eimeria adenoeides* or *E. tenella* with *Histomonas meleagrisid* in pouls.

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The importance of an in vivo model to confirm *Clostridium perfringens* strains pathogenicity.

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Mammalian target of rapamycin signaling modulates chicken necrotic enteritis.

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Evaluation of plant polyphenols (Silvafeed® Nutri P Plant Bioactives) in the diet of broilers during a controlled necrotic enteritis challenge.

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Necrotic enteritis model to achieve mortality reflective of industry.

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Evaluation of bile acids against chicken necrotic enteritis.

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*Clostridium perfringens* vaccine prevents chicken necrotic enteritis.

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Mucosal immunity of broilers vaccinated with an oral polyanhydride-nanoparticle based *Clostridium perfringens* vaccine expressing *Salmonella enterica* flagella.

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Direct evidence for the production of an adhesive pilus by *Clostridium perfringens* that is required for the pathogenesis of necrotic enteritis in poultry.

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PilR/PilS two-component and Agr-like quorum sensing systems regulate pilin production and binding of *Clostridium perfringens* to collagen.

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Evaluation of protection of ND vaccination regimes against early challenge with Velogenic Newcastle virus-VII.1.

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Evaluation of protection of H5 vaccination regimes against early challenge with HPAI-H5N1 on commercial broiler chickens.

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Evaluating the infection potential of field prevailing Newcastle disease virus and Infectious Bronchitis virus along with associated microscopic changes in commercial poultry.

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The role of folic acid on the antiviral innate immune pathways’ in chicken B lymphocytes infected with IBDV.

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Environment affects the intestinal microbiota of broiler chicks.

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Effects of xylanase and xylooligosaccharides supplementation on productive performance and gut health variables of broilers.

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Effect of NSPase enzyme and residual fiber from digested feed on cecal short chain fatty acids production and cecal microbiota diversity in broilers, studied in vitro.

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Effects of in ovo inoculation of chicken embryos with chitooligosaccharide and chlorella polysaccharide on the gut health parameters of broiler chickens.

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Probiotic cocktail accelerates the succession of ileal microbiota and trajectory of intestinal development in broiler chickens.

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Effects of dietary supplementation of probiotics on immune function and ileal microorganisms in caged broiler chicks.

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Efficacy of Pleurotus ostreatus (oyster mushroom) extracts and isolated proteins in the production profile, oxidative stress and immunity of the broiler birds.

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Jill W. Skrobarczyk*, Cameron L. Martin, Mohammed Alabdali, Sohini Bhatia, Suresh Pillai1,2, Luc R. Bergman
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A survey of gastrointestinal microbiota on commercial poultry farms in 4 countries in Latin America.

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Characterizing the immune response of broilers to Campylobacter jejuni.

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The development of immune system and function of broiler chicks in laminated cages.

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Modeling broiler industry loss to estimate the value potential of tracking the global burden of animal diseases.

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Candidate Gene for Chicken Alloantigen A.

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Protective efficacy of chitosan nanoparticles loaded with C. perfringens extracellular proteins and Salmonella Enteritidis flagellar proteins.
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In-ovo administration of a Salmonella-chitosan nanoparticle vaccine on broilers challenged with Salmonella Enteritidis.
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Day of hatch exposure to Enterobacteriaceae and characterization of avian pathogenic E. coli inflammation.
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Enhancement of host defense peptide gene expression and disease resistance by butyrate, forskolin, and lactose in broiler chickens.
Qing Yang1*, Melanie Whitmore, Sydney Stewart, Kelsy Robinson, Glenn Zhang
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Effect of supplementation of a protected complex of biofactors and antioxidants in broiler chickens undergoing early life stress.
Cristiano Bortoluzzi1*, Ludovic Lahaye1, Krystel Marcil1, Catherine Chaput1, Michael H. Kogut1, Elizabeth Santin1
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Ulvans activates avian monocytes and neutrophils.
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1Olmix Group, Brehan, France, 2Brest University & Brest Medical School, Brest, France, 3R&D Breizh, Pluméliau, France

The use of a direct ELISA to identify Blackhead resistant turkeys.
Christina S. Sigmon1*, Alessandro Ferrarini, Robert Beckstead
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In ovo gamma-tocopherol vitamin E reduced the incidence of deep pectoral myopathy (green muscle disease) in broilers.
Lizza Macalintal1*, Anthony Pescatore1, Michael Ford1, Merlin Lindemann1, Tuoying Ao1
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The effects of a mixture of betaine, vitamin C, St John’s wort (Hypericum perforatum L.), lavender, and Melissa officinalis on some blood biochemical indices, triiodothyronine (T3), and corticosterone in broiler chickens exposed to heat stress.
Hamid Reza Behboodi1, Asghar Sedaghat1*, Atefeh Baradaran1
1Poultry Science, Tarbiat Modares University, Ahram, Bushehr, Iran (the Islamic Republic of), 2Department of Animal Physiology, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran (the Islamic Republic of)
A survey on sustainable development of the Chantecler chicken breed.
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Relationship among egg weight and live weight traits in Creole chickens of Mexico.
José G. Reyes-Bello*, Oliver J. Juárez-Beltrán, Leonardo Osio-Orihuela, Osvaldo Fernández-Ipiña, Diego Zárate-Contreras, Arturo Pro-Martínez, Juan M. Cuca-García, Leodán T. Rodríguez-Ortega, Fernando González-Cerón
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The effect of housing environment on commercial white egg layer performance.
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Changes in production parameters, egg qualities, fecal volatile fatty acids, and nutrient digestibility in laying hens exposed heat stress.
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The effect of housing environment and hen age on white shell egg solids and quality.
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The effect of housing environment on egg quality and solids of commercial brown egg layers.
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Prevalence of avian pathogenic Escherichia coli in cage-free W-36 pullets reared under monochromatic blue and normal LED lights.
Ishab Poudel*, Nikhil Nuthalapati, Anuraj Sukumaran, Li Zhang, Mary Beck, Aaron Kiess, Pratima Adhikari
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A northern fowl mite infestation impacts cage-free layer performance and welfare between 17 and 49 weeks of age.
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Quantifying sex and line differences in growth parameters in turkeys.
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Frequency of data collection on the estimation of parameters of the Gompertz model to describe the growth of Creole chickens of Mexico.
Diego Zárate-Contreras, Fernando González-Cerón, Juan M. Cuca-García, Arturo Pro-Martínez, Gustavo Ramírez-Valverde, Omar Hernández-Mendo, Jaime Gallegos-Sánchez, Josafhat Salinas-Ruiz, Rosalía Ordaz-Contreras, Miguel A. Matus-Aragón, Artemio J. Vargas-Galicia
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Effects of maternal growth pattern on broiler chicken performance and carcass traits.
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Comparison of a traditional female diet to a hen diet with organic zinc on rooster semen quality and reproductive performance.
Kelly M. Sweeney, Drew Benson, Carla Aranibar, Monique Franca, Benton Hudson, Duarte Neves, Santiago Garcia-Gomora, Jeanna Wilson
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Effect of heat treatment during storage on initial stages of duck embryo development.
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The preference of nest boxes on either raised slats or the floor in broiler breeders.
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Hatchability and embryo mortality of birds provided red, white, or blue LED light during incubation.
Janessa Henry, Bruce Rathgeber, Nancy McLean, Xujie Li, Janice MacIsaac
Dalhousie University, Truro, Nova Scotia, Canada

Effects of reduced incubation temperature starting at 12 days of incubation on post-hatch broiler performance.
Katie E. Elliott, Ethan Dehart, Saman Fatemi, Abdul Mohssem Alqhtani, Ayoub Mousstaid, Kayla Bannister, Wei Zhai, David Peebles
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The impacts of graded levels of stocking density on the performance, health, and welfare of turkey hens to 11 weeks of age.
Sameeha Jhetam, Kailyn Beaulac, Karen Schwean-Lardner
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Dietary additives, coccidiosis and Fenbendazole treatment alter fecal moisture to various degrees in turkey pouls.
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Comparing litter to partially slotted flooring materials on tom turkey performance and litter moisture.
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Mitigating disease and reducing potential for cross-contamination in commercial flocks using robotics.
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Aerospace Transportation Advanced Systems Lab Food Processing Technology Division, Georgia Tech Research Institute, Atlanta, Georgia, United States
Bedding and stocking density influenced the relationship of litter characteristics to footpad dermatitis in market turkey hens.
Gabriella Furo1, Carol Cardona2, Yuzhi Li1, Michael R. Hulet1, Kevin Janni3, Sally L. Noll1
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Examination of poultry litter as a potential source for airborne pathogens.
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Evaluation of pulsed application of a water-administered Bacillus sp. fermentation product (Gamaxine) with and without antibiotic administration on broiler production parameters.
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Improving broilers’ feed efficiency by dietary supplementation of a characterized natural citrus extract.
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Allometric intestinal development of broilers from breeders of different ages in the pre-starter phase.
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Prevalence and risk factors associated with breast fillets myopathies (spaghetti meat, woody breast, and white striping) in broiler chickens from Ontario, Canada.
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Intravenous T-61: an effective euthanasia method for poultry.
Bethany Baker1, Antonietta L. Mortiz2, Danielle Zwueste3, Karen Schwean-Lardner1, Karen L. Machin3
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**Low crude protein diets: Does the modern broiler adapt to diet composition through manipulation of nutrient metabolism or are macro nutrient utilization values flat data points?**
Craig W. MaynardGSS1, Amir E. Ghane1, Peter V. Chystal1, 3, Peter H. Selle1, Sonia Liu1
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**Impacts of dietary crude protein and electrolyte balance on production performance, carcass traits, litter quality and serum parameters of broiler chickens.**
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**Late vs. early planting/harvesting increased the energy and amino acid digestibility of faba bean cultivars fed to broiler chickens.**
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**Effect of lysine on transcriptome profile and expression of selected cationic amino acid transporters in broiler chickens.**
Collins KhwatengeGSS*, Samuel N. Nahashon
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**Suppressive effects of glutamate and glutamine co-supplementation on muscle proteolysis in heat-stressed broiler chickens.**
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1Graduate School of Agricultural Science, Tohoku University, Sendai, Japan, 2The University of Tokyo, Bunkyo-ku, Tokyo, Japan

**Composition of different feather tracts of broilers.**
Bruno Balbino LemeGSS*, Carolina Cardoso Nagib Nascimento1, Matheus D. Reis1, Larissa Vargas1, Rony Riveros Lizana1, Robert Mervyn Gous1, Nilva Sakomura1
1Animal Science, UNESP, Jaboticabal, São Paulo, Brazil, 2University of KwaZulu-Natal, KwaZulu-Natal, South Africa

**Wnt/β-catenin signaling pathway mediated methionine promotes feather follicle development in chick embryos.**
Meng-jie ChenGSS*, Xiu-qi Wang, Hui-chao Yan, Chun-qi Gao
College of Animal Science, South China Agricultural University/Guangdong Provincial Key Laboratory of Animal Nutrition Control, Guangzhou, Guangdong, China

**Influence of diet formulation technique on requirements and ideal profile of digestible Lys, Met+Cys and Thr for grower of Japanese quail.**
Tamires M. Silva FelixGSS*, Aliton N. Silva, Thalis Oliveira, Josê H. Vilar Da Silva
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**Determination of the 4th limiting amino acid for Ross 308 male broilers from 15 to 35 day in low crude protein wheat-based diets.**
Craig W. MaynardGSS1, 2, Michael T. Kidd1, Peter V. Chystal1, 3, Peter H. Selle1, Sonia Liu1
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Determination of standardized digestible amino acid requirements for broiler breeders.
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Determining the lysine requirement in broiler breeders using the indicator amino acid oxidation and nitrogen balance methods.
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Response of laying hens to the intake of digestible leucine.
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Meta-analysis of broiler response to dietary valine supply.
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Effect of feeding inositol or high phytase on laying hen performance and amino acid digestibility.
Eugenia Herwig, Carrie Walk, Mike Bedford, Henry Classen, Karen Schwean-Lardner

Phytase on leg health parameters and bone development under commercial conditions for Ross 708 broilers.
Maria C. Alfaro-Wisaquillo, Andres Ortiz, Yilmar Matta, Sebastian Hoyos, Gherly D. Buitrago, Juan D. Martinez, Jonathan Yanquen, Anel Atencio, Rocio Crespo, Edgar O. Oviedo-Rondon

Comparison of an intrinsically heat stable and a coated phytase on growth performance and tibia characteristics of broiler chicks.
Brooke Bodle, Cole Crumpacker, Trevor Lee, Mark Jackson, Sam Rochell

Ileal digestibility and myo-inositol plasma concentration of broiler chickens fed high phytase doses and different soybean meal protein content.
Leopoldo M. Almeida, Lucas S. Bassi, Rafael Sens, Vitor Augusto B. Zavelinski, Levy Teixeira, Alex Maiorka

Phytase doses and soybean meal protein content on growth performance, bone mineral composition and toe ash of broilers.
Vitor Augusto B. Zavelinski, Lucas S. Bassi, Rafael Sens, Gabriela d. Pilon, Kariny F. da Silva, Levy Teixeira, Simone G. de Oliveira

Comparative efficacy and dose effects of a novel consensus bacterial 6-phytase variant and a commercial 6-phytase on retention of phosphorus and calcium in egg laying hens fed inorganic P-free diet.
Abiodun Bello, Mick Roberts, Yueming Derjant-Li, Leon Marchal

Effect of a novel consensus bacterial 6-phytase variant on ileal nutrient digestibility, tibia ash, and growth performance in broilers through 48 days of age.
Eric B. Sobotik, Gabrielle M. House, Austin M. Stiewert, Abiodun Bello, Yueming Derjant-Li, Janet Remus, Ellie Shoesmith, Gregory S. Archer

Comparative efficacy of a novel consensus bacterial 6-phytase variant and a commercial 6-phytase at 2,000 FTU/kg on growth performance, tibia ash and economic benefit in broilers.
Abiodun Bello, Eric B. Sobotik, Gregory S. Archer, Yueming Derjant-Li, Leon Marchal
Effect of feed form and a novel consensus bacterial 6-phytase variant on performance, bone ash and phosphorus retention of broiler chickens fed diets without inorganic phosphate.
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A novel consensus bacterial 6-phytase variant increased phosphorus and calcium retention and productivity parameters in egg laying hens fed inorganic P-free diet.
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Effect of a novel consensus bacterial 6-phytase variant on apparent ileal digestibility of amino acids in broilers at 15 days of age.
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Effects of phytase supplementation and nutrient uplifts on growth performance, meat yield, hypothalamic gene expression, and catecholamine concentrations in broilers from 1 to 43 days of age.
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Nutrient digestibility and myo-inositol plasma concentration on turkeys fed high levels of phytase.
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Effect of phytase type and inclusion level on broiler performance and tibia ash from 1 to 21 d of age.
Martha Rueda Lastres, Oscar Machado, Danny Patino, Ronald Pivaral, Wilmer J. Pacheco, Mark Jackson, Omar Gutierrez
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Total inorganic phosphorus free and more economical broiler diets supplemented with a novel consensus bacterial 6-phytase variant maintained normal growth characteristics in all phases.
Leon Marchal, Yueming Derjant-Li, Abiodun Bello, Eric B. Sobotik, Gregory S. Archer
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In vitro set up to compare Phosphate (PO₃⁻) availability in feed diet formulations.
Diogo F. Rosso, Jacqueline C. de Souza, Levy Teixeira, Rafael Sens, Lucas S. Bassi, Alex Maiorka
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Xylanase and protease supplementation to diets with varying levels of fiber and protein influenced the jejunal digesta hexose and pentose oligosaccharides profiles and nutrient utilization in broiler chickens.
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Effects of an algae-clay complex with or without endogenous enzyme supplementation on the feed efficiency of broilers.
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An algae-derived feed ingredient positively impacted broiler growth performance in the grower phase but did not alter intestinal integrity.
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Chitosan oligosaccharides as potential antibiotic replacements in broiler diets.
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Evaluating the effects of a novel phyto-gentic feed additive on performance of broilers fed a low or standard protein diet.
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Sweet potato (Ipomoea batata) as natural additive: effect on productive performance of Creole chickens of Mexico in initiation phase.
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Effect of sweet potato (Ipomoea batata) on carcass yield of Creole chickens of Mexico.
Vanesa R. Lavastida, Luis Morales-Higuera, Diana A. Gutiérrez Arenas, Arturo Pro-Martínez, Leonardo Osio-Orihuela, Eliseo Sosa-Montes, Fernando Gonzalez-Ceron, Cesar A. Perez-Torres
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Effects of black soldier fly larvae oil on growth performance, gut physiology and fatty acid composition of broiler chickens.
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Evaluation of two different phytase sources when supplemented to broiler starter diets on growth performance, tibia bone ash, and tibia breaking strength.
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Yield of cuts and abdominal fat in broilers fed diets containing levels of pequi oil.
Animal Nutrition Department, School of Veterinary Medicine and Animal Science, Botucatu, Brazil
Effect of Crina Digest on growth performance and blood carotene concentrations of 42-day-old broilers.
Jorge L. Sandoval, Gerardo A. Abascal-Ponciano, Shelby P. Corray, Jessica D. Starkey, Charles W. Starkey
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Effect of the probiotic Escherichia coli strain nissle on Growth Performance of Broiler Chickens.
Angela Washington, Carla Larrieu, Jada Black, Thyneice Taylor-Bowden, Samuel N. Nahashon
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The effect of Viligen® on performance and intestinal morphology of the broiler birds exposed to heat stress during d21-d42 of the finishing period.
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1Poultry Science, KVAFSU, Bangalore, Karnataka, India, 2Center for animal Nutrigenomics & Applied Animal Nutrition, Alltech Inc., Nicholasville, Kentucky, United States

Dietary supplementation of alpha-lipoic acid mitigates the negative effects of heat stress in poultry.
Sanjeev Wasti, Nirvay Sah, Chin N. Lee, Rajesh Jha, Birendra Mishra
Department of Human Nutrition Food and Animal Sciences, University of Hawaii at Manoa, Honolulu, Hawaii, United States

Effect of two limestone sources (fine, coarse) and a novel consensus bacterial 6-phytase variant on ileal P and Ca absorption and tibia ash content of youngbroilers.
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Use of quantile regression model to evaluate the effects of hydroalcoholic extract of leaves and stems of Capparis spinosa on final weight of Ross broilers.
Pouyan Malekinezhad, Laura Ellestad, Moslem Bashtani, Seyed Homayoun Farhangfar, Hadi Sarir
1Poultry Science, University of Georgia, Athens, Georgia, United States, 2Animal Sciences, University of Birjand, Birjand, Iran (the Islamic Republic of)

Improved performance of turkey toms administered two phytogenic feed additive blends throughout grow-out.
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The effect of a synbiotic applied as a coarse spray at the hatchery versus early drinking water application on broiler chick performance and intestinal morphology.
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1Animal Science, University of Nebraska, Lincoln, Nebraska, United States, 2University of Nebraska, Lincoln, Nebraska, United States

Evaluation of a novel proprietary feed additive to strengthen or substitute avilamycin growth promoter in broiler standard program.
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The effects of yeast fermentate prebiotic feed additive on the lactic acid producing bacteria in an in vitro microaerophilic cecal culture model.
Lindsey A. Wythe, Kristina M. Feye, Dana K. Dittoe, Steven Ricke
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The impact of dietary Beta-Glucans on poultry health and performance.
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Effects of Bacillus subtilis on intestinal morphological structure of male broilers with or without coccidial challenge.
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Comparison between phytochemical pentadecylphenol and coccid vaccines on growth performance and serum parameters in broilers.
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Evaluation of anticoccidial activity of a phytoprogenic feed additive on growing broiler chickens.
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Fatty acid properties and breast myopathy occurrences in chickens fed Quantum Blueat increasing dietary inclusions.
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Comparison of dried egg product vs chemical anticoccidial drugs administered to chickens during an enteritis infection caused by Eimeria spp. and Clostridium perfringens.
Nannette Olmeda-Geniec1, Greg F. Mathis1, Brett Lumpkins1, Jeffery Escobar1, Jordan M. Sand1
1Nutritional Health, Elanco Animal Health, Aston, Pennsylvania, United States, 2Southern Poultry Research, Inc., Athens, Georgia, United States, 3ABE Discovery, Madison, Wisconsin, United States

Effects of Varium, an alternative to antibiotic growth promoters, on commercial broiler performance.
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Assessing the effect of feeding Bacillus subtilis and mannan oligosaccharide on immune responses and enteric Lactobacilli and Bifidobacteria loads in broiler birds.
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Beneficial effects of bacillus subtilis 29784 on performance and gut health status of broilers under necrotic enteritis conditions.
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Using yucca and/or phytolegens on alleviating negative effects of necrotic enteritis in broilers.
Lan Zheng1, Johel Bielke1, Shelby Ramirez1, Chasity M. Pender1, Antonia Tacconi1, G. R. Murugesan1, Lisa Bielke1
1BIOMIN North America, Overland Park, Kansas, United States, 2The Ohio State University, Wooster, Ohio, United States, 3BIOMIN Holding GmbH, Getzersdorf, Austria
Effects of Berberine on humoral immune response, hematological parameters, and lymphoid organ weights during aflatoxicosis and ochratoxicosis in broilers.
Pouyan Malekinezhad, Laura Ellestad, Nazar Afzali, Seyed Homayoun Farhangfar, Arash Omidi, Abbas Mohammadi

Effect of n-3 FA and Vit D3 in keel bone properties and Ca/P transporter profile in aviary Lohmann browns.
Dima L. White, Darrin M. Karcher, Prafulla Regmi, Woo Kim

Effect of dietary phosvitin on shell and bone quality in end-of-cycle laying hens.
Daniella Batres, Jiangping Wu, Douglas R. Korver

Production of omega-3 enriched eggs with dietary water-soluble flaxseed oil.
Sang Hyeok Lee, Yoo Bhin Kim, Da-Hye Kim, Dong won Lee, Hong-Gu Lee, Kyung-Woo Lee

Dietary substitution of processed yam peel meal for maize with multienzymes+yeast supplementation in Japanese quails (Coturnix coturnix japonica): Effect on laying performance and egg quality.
Paschal C. Aguihe, Abiodun S. Kehinde, Sulyman Abdulwahab, Deji A. Joshua, Priscillia L. Komolafe

The effects of Plantago psyllium seeds on performance of laying Japanese quail.
Asghar Sedaghat, Mohammad Amir Karimi Turshizi

Methionine activates JAK2/STAT5 by regulating prolactin to promote crop milk protein synthesis during lactation of domestic pigeons (Columba livia).
Meng-jie Chen, Xiu-qi Wang, Hui-chao Yan, Chun-qi Gao
Effect of split feeding system at late phase of laying period on egg production and egg quality of laying hens.
Mohamed N. Makled*, M Elkelawy†, A. E. Gala§, M. M. Abdel Razik¶
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Crude protein feed content on productive performance and characteristics of eggs from second-cycle laying hens in Mexico.
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Visceral mass and allometry of metabolic size in laying pullet.
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Effects of dietary supplementation with fermented feedstuffs on the performance, egg quality and intestinal health of laying hens.
Shi-guang Jiang*, Chen Zhong, Xiu-qi Wang, Chun-qi Gao
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The effect of partial replacement of limestone with gypsum in layer diets on hen productivity, egg quality, ammonia emissions and ammonia emission intensity of egg production.
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The effect of increasing digestible crude protein content in wheat-based hen diets on hen productivity, egg quality and ammonia emission intensity of egg production.
Matt Oryschak*, Eduardo Beltranena†, 2
1Alberta Agriculture and Forestry, Edmonton, Alberta, Canada, 2Department of Agricultural, Food and Nutritional Sciences, University of Alberta, Edmonton, Alberta, Canada

Inoculation in ovo of putrescine on egg characteristics and hatchability rate of eggs from broiler breeders.
Isabella C. Dias*, Katiucia C. Sonalio, Filipe A. Moreno, Rosiane Araujo, Marley C. Santos, Chayane Rocha, Alex Maiorka
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Effects of broiler breeder maternal age on gene and protein expression in the liver and abdominal fat of the hen and the liver and yolk sac membrane of the embryo.
Antonio Beitia*, Nirun Boonsinchai†, Justina V. Caldas§, Katie Hilton¶, Pramir Maharjan†, Jordan Weil‡, Navin Susutsattaj†, Diego Martinez§, Cole Umberson¶, Craig N. Coon†
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Feeding different cultivars and quality levels of faba bean to broiler chickens.
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Dietary supplemental full-fatted and defatted microalgae Desmodesmus sp. exerted similar impacts on growth performance and gut health of broiler chicks.
Tao SunG*, Benjamin Wyman†, Guanchen Liu†, Colin Beal†, Schonna Manning†, Zackary I. Johnson†, Xin Gen Lei†
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Effect of the inclusion of enzyme-treated soy protein in starter diets of two different amino acid density feeding programs on performance of broiler chickens.
Simone H. Rasmussen†, Alfred Blanch*, Adam J. Davis†, Christine Brøkner†
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Effects of cellulose and soybean hulls as sources of dietary fiber on the growth performance, nutrient digestibility, gut morphology, and intestinal gene expression of broiler chickens.
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Fermentation of soybean meal results in a net reduction of heat-labile and heat-stable antinutritional factors.
Nelson Ruiz*, Andrea Robles - Montes†, Jan E. van Eys†
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Effect of early posthatch supplementation of vitamin E and omega-3 fatty acids on the severity of wooden breast, breast muscle morphological structure, and gene expression in the broiler breast muscle.
Ji WangG*, Daniel Clark, Sheila Jacobi, Sandra Velleman
The Ohio State University, Wooster, Ohio, United States

The effects of maternal fish oil supplementation on offspring-broiler growth performance, body composition and bone microstructure at market age.
Yuguo H. TompkinsG*, Chongxiao Chen†, Jeanna Wilson†, Brynn H. Voy†, Woo Kim†
Poultry Science, University of Georgia, Athens, Georgia, United States, Department of Animal Science, University of Tennessee, Knoxville, Tennessee, United States

Growth performance and carcass characteristics of MV × Cobb 700 broilers fed diets varying in apparent metabolizable energy from 34 to 46 days of age.
Stephanie PhilpotG*, Justina V. Caldas†, William A. Dozier, III†
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Effect of putrescin inoculation in ovo on intestinal morphology at hatching and growth performance of broiler chickens in the initial phase.
Katiucia C. SonialoG*, Lucas S. Bassi, Gabriela d. Pilon, Leopoldo M. Almeida, Isabella C. Dias, Chayane Rocha, Alex Maiorka
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Maternal fish oil alters adipose development in the broiler chick embryo. Minjeong Kim1,Usuk Jung1, Kamille Piacquadio1, Suchita Das1, Liesel Schneider1, Jeanna Wilson2, Brynn H. Voy1
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Evaluation of Tasco (Ascophyllum nodosum) on the growth performance of mixed-sex broiler chickens. Robin Hilchie1, Bruce Rathgeber1, Stephanie Collins1, Joshua Gong1, Janice Maclsaac1
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Determination of daily dietary energy utilization for maximal protein deposition in fast-growing male broilers from 3 to 18 days of age. Nawin Suesuttajit1,2, Antonio Beitia, Jordan Weil, Pramir Maharanj, Diego Martinez, Craig N. Coon1
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Effects of supplementation of almond hulls on growth performance, lesion score and anti-oxidative enzyme activity in Eimeria-challenged broilers. Jinquan Wang1, Fanbin Kong1, Woo Kim1
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Application of NutriOpt® formulation strategies for economic performance enhancement in broiler chickens. Hugo Romero-Sanchez1,2, Yanming Han1, Greg Page2
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Ring test and validation of NutriOpt® NIR calibrations for ingredients and poultry feed in the USA. Hugo Romero-Sanchez1,2, Lennart Oosterbaan1
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Yellow mealworm larvae (Tenebrio molitor) grown on deoxynivalenol contaminated wheat as a feed ingredient for poultry. Dilshaan Duhra1, Rex Newkirk, Karen Schwean-Lardner, Fiona Buchanan
Animal and Poultry Science, University of Saskatchewan, Saskatoon, Saskatchewan, Canada

Growth response of dual purpose grower chickens fed diets containing graded levels of Black Soldier fly larvae meal. Oluremi A. Osinowo1,2, Adeboye Fafiolu1,2, Oluseyi O. Oluwatosin1,2, Oluwagbemiga O. Adeleye1, Adedotun A. Adegbenjo1, Joel O. Alabi1,2
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Effect of dietary supplementation with Corn Distillers Dried Grains with Solubles on production and egg characteristics of laying Japanese Quails.
Juliana F. Martinez, Isabelli D. Pereira, Caio S. Quirino, Tatiana M. Bittencourt, Elieverson F. Amaral, Nayara E. Silva, Alessandro B. Amorim, Heder José D. Lima
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Different Dietary Electrolyte Balance values on femur quality of Japanese Quail (Coturnix coturnix japonica) under a thermoneutral environment or heat stress.
Animal Breeding and Nutrition, São Paulo State University (UNESP), Botucatu, Brazil

Trends in Mycotoxin Contamination in the United States Corn Crop.
Chasity M. Pender, Erika G. Hendel, Paige N. Gott, Shelby Ramirez, Ursula Hofstetter-Schähs, G. R. Murugesan
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Assay of AMEn of soybean meal and canola meal using corn-soybean meal and corn-canolameal reference diets employing the difference and regression methods.
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The effect of added water, holding time or phytase analysis method on phytase stability and pellet quality.
Marut Saensukjaroenphon, Caitlin E. Evans, Chad B. Pauk, Joel McAtee, Charles R. Stark
1Grain Science and Industry, Kansas State, Manhattan, Kansas, United States, 2AB Vista Inc., Plantation, Florida, United States

Correlation between data on proximal composition and protein quality variables of commercial samples of heat processed soybeans analyzed by wet chemistry or estimated by NIRS technology.
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Intrinsic factors contribute to variation in the AMEn value of corn for broiler chickens.
Sibongiseni S. Nkabinde, Christine Jansen van Rensburg, Wiana Louw, Kyle M. Venter, Peter W. Plumstead
1Chemunique PTY LTD, Lanseria, South Africa, 2Animal and Wildlife Science, University Of Pretoria, Newcastle, Kwa-Zulu Natal, South Africa, 3South African Grains Laboratory, Pretoria, South Africa

Corn drying temperature, particle size, and amylase supplementation on live performance and nutrient utilization of Cobb 500 chickens.
Gustavo Quintana-Ospina, Hernan A. Cordova-Noboa, Andres Ortiz, Yilmar Matta, Sebastian Hoyos, Gherly D. Buitrago, Juan D. Martinez, Jonathan Yanquen, Lorena Castellanos, Jose O. Sorbara, Edgar O. Oviedo-Rondon
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Comparison of corn particle size utilizing different sieving methods.
Allan J. Calderon, Gerardo A. Abascal-Ponciano, Jorge L. Sandoval, Wilmer J. Pacheco, Charles W. Starkey
Poultry Science, Auburn University, Auburn, Alabama, United States
Assessment of the angle of repose as a method to measure the flowability of different particle sizes of ground corn using different sample amounts and box dimensions.
Henry J. Flowers, Moses E. Chilenje, Marc R. Presume, Jorge L. Sandoval, Gerardo A. Abascal-Ponciano, Wilmer J. Pacheco, Charles W. Starkey
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Comparison of the accuracy of different particle size field evaluation methods.
Gerardo A. Abascal-Ponciano, Wilmer J. Pacheco, Charles W. Starkey
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The impact of fines inclusion level and conditioning temperature on pellet quality and energy consumption.
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Improved pellet quality reduces on-farm nutrient segregation.
Courtney Poholsky, Dan Hofstetter, John W. Boney
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Improper handling, preparation, and calibration of samples for NIRS analysis increases variability and decreases accuracy of nutrient concentration results.
Samuel F. Leiva, Gerardo A. Abascal-Ponciano, Wilmer J. Pacheco, Charles W. Starkey
Poultry Science, Auburn University, Auburn, Alabama, United States
**Effect of combined maternal and post-hatch dietary 25-hydroxycholecalciferol supplementation on broiler chicken *Pectoralis major* muscle growth characteristics and Wooden Breast.**


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**Effects of the *in ovo* injection of vitamin D₃ and 25-hydroxyvitamin D₃ on the vitamin D₃ activity-related gene expression of broilers challenged with coccidiosis.**

Saman Fatemi*, Katie E. Elliott, Abdul Mohssen Alqhtani, Ayoub Mousstaaid, Li Zhang, E. David Peebles

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**Effects of the *in ovo* injection of vitamin D₃ and 25-hydroxyvitamin D₃ on the immune-related gene expression of broilers challenged with coccidiosis.**

Saman Fatemi*, Katie E. Elliott, Abdul Mohssen Alqhtani, Ayoub Mousstaaid, Li Zhang, E. David Peebles

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**The Effect of Dietary Cadmium on Production Performance of Laying Hens and Its Accumulation in Tissues.**

Cai m. Wu*, JUAN Zhang, GUANGMANG LIU

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**Effect of limestone particle size and potassium supplementation on live performance and blood physiology of male broiler chickens.**

Dinabandhu Joardar*, Kimberly Livingston, Frank Edens, Rasha Qudsieh, Matthew Livingston, John Brake

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**A coordinated dysregulation of candidate genes signs a deteriorated Ca/P balance in ageing laying hens.**

Audrey Gloux, Nathalie Le Roy, Nathalie Même, Marie-Liesse Piketty, Dominique Prie, Gaelle Benzoni, Joel Gautron, Yves Nys, Agnes Narcy, Michel J. Duclos

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**Effects of dietary Ca and microbial phytase on zinc utilization.**

Denise Cardoso*, Manon Castel, Nathalie Même, Arturo Piñon, Agnes Narcy

1Animine, Rumilly, France; 2UMR BOA, INRA, Nouzilly, France

**Dimensional profile of broiler tibias is affected by dietary zinc source.**

Marquisha Paul*, Anthony Pescatore, Michael Ford, Tuoying Ao, Karl Dawson

Alltech-University of Kentucky Nutrition Research Alliance, Lexington, Kentucky, United States

**The relative bioavailability of inorganic and organic zinc sources for weight gain in broiler chickens.**

Mohammad Pilevar*, Oluyinka Olukosi

Poultry Science, University of Georgia, Athens, Georgia, United States

**Effects of the *in ovo* injection of L-ascorbic acid (AA) on the serum AA concentrations and hatchability of broiler embryos.**

Ayoub Mousstaaid*, Saman Fatemi, Katie E. Elliott, Abdul Mohssen Alqhtani, David Peebles

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Horizontal transmission of *Salmonella Enteritidis* and *Salmonella Kentucky* in experimentally infected laying hens in indoor cage-free housing.

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The efficacy of the aflatoxin B₁-binder Mycofix® Secure demonstrated by serum and feces biomarkers of exposure.

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Gut-derived serotonin modulates *Campylobacter jejuni* colonization *in vitro*.

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Recovery of *Salmonella Enteritidis* and *Campylobacter Coli* from inoculated and incubated hatching eggs.

Caitlin Harris, L. N. Bartenfeld Josselson, R. J. Buhr

1Poultry Science, University of Georgia, Athens, Georgia, United States; 2USDA-ARS, Athens, Georgia, United States

Whole-genome sequence analysis of multidrug-resistant avian pathogenic *Escherichia coli* (APEC) MS1170 isolated from broiler.

Tianmin Li, Claudia Castañeda, Mark A. Arick II, Chuan-Yu Hsu, Aaron Kiess, Li Zhang

1Poultry Science, Mississippi State University, Starkville, Mississippi, United States; 2Institute for Genomics, Biocomputing and Biotechnology, Mississippi State University, Starkville, Mississippi, United States

A Microbial Diversity Survey of US Broilers.

Morouj Al-Ajeeli, Terry Lester, Brian Lee, Takashi Hamaasaki, Walter Blalock, Tia O'Brien, Tomohiro Hamaoka

Calpis America, Peachtree City, Georgia, Georgia, United States

Effects of conidial concentration and timing on quality index and deoxynivalenol accumulation in corn inoculated with *Fusarium graminearum*.

Cai m. Wu, GUANGMANG LIU

Institute of Animal Nutrition, Sichuan Agricultural University, Chendu, Sichuan, China

Effect of pH on PAA efficacy in reducing foodborne pathogens on chicken wings.

Sasikala Vaddu, Jasmine Kataria, Estefania Novoa, Amanda Elisa Moller, Avani Gouru, Manpreet Singh, Harshavardhan Thippareddi

Poultry Science, University of Georgia, Athens, Georgia, United States

Sodium butyrate as potential anti-inflammatory compound to reduce *Salmonella Enteritidis* colonization in chickens.

Anamika Gupta, Mohit Bansal, Abhinav Upadhyay, Narayan Rath, Rohana Liyanage, Xiaolun Sun, Annie M. Donoghue

1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States; 2University of Connecticut, Storrs, Connecticut, United States; 3USDA/ARS, Fayetteville, Arkansas, United States; 4Chemistry & Biochemistry, University of Arkansas, Fayetteville, Arkansas, United States
Effect of Windrow Composting on Salmonella Enteritidis Persistence in Poultry Litter.
Aidan A. Talorico1, James Krehling1, Luis R. Munoz1, Kaicie S. Chasteen1, Amrit Pal1, Matthew Bailey1, Dianna Bourassa2, Kenneth Macklin1
1Poultry Science, Auburn University, Auburn, Alabama, United States, 2Poultry Science, Auburn University, Auburn, Alabama, United States

Growth of Campylobacter spp. and Carbon Dioxide Production in Primary Containers Incubated Anaerobically
Arthur Hinton*1, Nelson Cox1, Arturo Levican2
1Poultry Microbiological Safety and Processing Unit, U. S. National Poultry Research Center, Athens, Georgia, 2Pontificia Universidad Catolica de Valparaiso, Valparaiso, Chile

Development of probe-based multiplex real-time PCR assays for the rapid and accurate detection of avian pathogenic Escherichia coli.
Reshma Ramachandran*1, Chuan-Yu Hsu2, Li Zhang1
1Poultry Science, Mississippi State University, Starkville, Mississippi, United States, 2Institute for Genomics, Biocomputing and Biotechnology, Mississippi State University, Starkville, Mississippi, United States

Broiler house particulate matter, aerobiome and antibiotic resistant E. coli under “raised without antibiotics” production.
Gregory Zock2*1, Lilong Chai1, Adelumola Oladeinde1,2, Samuel Aggrey1, Jasmine Johnson1, Yangyang Guo1
1Poultry Science, University of Georgia, Athens, Georgia, United States, 2U.S. National Poultry Research Center, USDA, Athens, Georgia, United States

New Avian Pathogenic Escherichia coli O Serogroup Epidemiology for Poultry Health in Georgia.
Nicolle Barbieri*1, Caleb Austin1, Robert Pasko1, Aline L. Oliveira1, Lisa Nolan2, Catherine M. Logue1
1Population Health, University of Georgia, Athens, Georgia, United States, 2Infectious Diseases, University of Georgia, Athens, Georgia, United States, 3Poultry Science, University of Georgia, Athens, Georgia, United States

Rapid Quantification Validation and Confirmation of Salmonella for Comminuted Turkey.
Savannah Forgey2*1, Tyler Stephens2, Marcos Sanchez1, April Englishbey2
1Animal and Food Science, Texas Tech University, Lubbock, Texas, United States, 2Hygiena, Camarillo, California, United States

Equivalency of peracetic acid to chlorine as a shell egg surface sanitizer.
Deana R. Jones*1, Javier S. Garcia1, Richard K. Gast1, Garrett E. Ward2
1US National Poultry Research Center, Egg Safety and Quality Research Unit, USDA Agricultural Research Service, Athens, Georgia, United States, 2Poultry Science, University of Georgia, Athens, Georgia, United States

Evaluating the efficacy of Peracetic acid on Salmonella and Campylobacter on chicken wings at various pH levels.
Jasmine Kataria1, Sasikala Vaddu1, Estafania Novoa1, Gaganpreet Sidhu1, Harshavardhan Thippareddi1, Manpreet Singh1
1Poultry Science, University of Georgia, Athens, Georgia, United States, 2Poultry Science, University of Georgia, Athens, Georgia, United States

The antibiotics resistant and biofilm forming Salmonella species isolated from poultry of tribal areas in Central India.
Smita Bordoloi2*Vet. Microbiology, college of veterinary science Jabalpur, NDVSU, Bhopal, Madhya Pradesh, India

Effect of Lactococcus lactis Cell-Free Extract and Bacitracin against Multidrug-Resistant Salmonella Heidelberg.
Brigitta P. Yaputri*1,2, Divek V. T. Nair1, Anup Kollanoor Johny2
1Food Science & Nutrition, University of Minnesota Twin Cities, Minneapolis, Minnesota, United States, 2Animal
Understanding possible contributing factors of embryonic mortality.
Claudia DeLeon1, Maddison Wiersema1, G. R. Murugesan2, Shelby Ramirez2, Bashar Syed3, Dawn Koltes1
1Animal Science, Iowa State University, Ames, Iowa, United States, 2Biomin America, Overland Park, Kansas, United States, 3Biomin, Getzersdorf, Austria

Salmonella and Campylobacter influence the microbiota response of skin-on, bone-in chicken thighs treated with different antimicrobials.
Dana K. Dittoe1, Kristina M. Feye, Steven Ricke
Food Science, University of Arkansas, Fayetteville, Arkansas, United States

Application of Amplon® in Combination with Peroxyacetic acid for the Reduction of Salmonella Typhimurium and S. Reading on Skin-on, Bone-in Tom Turkey Drumsticks.
Elena G. Olson1, Lindsey A. Wythe, Dana K. Dittoe, Kristina M. Feye, Steven Ricke
Food Science, University of Arkansas, Fayetteville, Arkansas, United States

In ovo Feeding of Clostridiale Strains Modulate Gut Microbiome.
Shaymaa M. Abousaad1, Ramon Malheiro1, Peter R. Ferket1
1Prestage Department of Poultry Science, North Carolina State University, Raleigh, North Carolina, United States, 2Biology, North Carolina A&T State University, Raleigh, North Carolina, United States

Application of cetylpyridinium chloride (CPC) on Poultry Skin for the Reduction of Nalidixic Resistant Salmonella Typhimurium and S. Infantis on Chicken Skin.
Elena G. Olson1, Lindsey A. Wythe, Dana K. Dittoe, Kristina M. Feye, Steven Ricke
Food Science, University of Arkansas, Fayetteville, Arkansas, United States

The Effects of Cetylpyridinium Chloride for the Reduction of Salmonella Infantis on Skin-on, Bone-in Chicken Thighs.
Lindsey A. Wythe1, Elena G. Olsen, Kristina M. Feye, Dana K. Dittoe, Steven Ricke
Food Science, University of Arkansas, Fayetteville, Arkansas, United States

Comparison of media for the detection of Campylobacter jejuni using a commercial RT-PCR system.
Aaron Bodie1, Peter Rubinelli1, April Englishbey1, Savannah Forgey1, Tyler Stephens1, Steven Ricke1
1Food Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Animal and Food Science, Texas Tech University, Lubbock, Texas, United States, 3Qualicon Diagnostics LLC, A Hygiena Company, New Castle, Delaware, United States

Effect of plant derived antimicrobials in disrupting horizontal transfer of antibiotic resistance gene between multidrug resistant Salmonella and commensal E.coli in broilerchicks ex vivo and in vivo.
Poonam Vinayamohan1, Abraham J. Pellissery1, Oliver R. Perrine1, Atacan Zeran1, Annie M. Donoghue2, Kumar Venkitanarayanan2
1Department of Animal science, University of Connecticut, Storrs, Connecticut, United States, 2Poultry Production and Product Safety Research Unit, ARS, USDA, Fayetteville, Arkansas, United States

Plant-derived compounds, eugenol, carvacrol, and beta-resorcylic acid reduce Salmonella on chicken wings at scalding and chilling conditions.
Divek V. T. Nair1, Shijinaraj Manjankattil1, Claire Peichel1, Annie M. Donoghue2, Kumar Venkitanarayanan1, Anup Kollanoor Johny1
1Department of Animal Science, University of Minnesota, Saint Paul, Minnesota, United States, 2Poultry Production and Product Safety Research, University of Arkansas, Fayetteville, Arkansas, United States, 3Department of Animal Science, University of Connecticut, Storrs, Connecticut, United States

Effect of plant-derived antimicrobials against drug-resistant Campylobacter jejuni in turkey poultets.
Shijinaraj Manjankattil1, Grace Dewi1, Claire Peichel1, Jonathan Frye1, Anup Kollanoor Johny1
1Animal Science, University of Minnesota, Saint Paul, Minnesota, United States, 2Bacterial Epidemiology and...
Efficacy of caproic acid, caprylic acid and cuminaldehyde in reducing *Salmonella* Heidelberg on chicken eggs.
Abraham J. Pellissery*1, Poonam Vinayamohan1, Oliver R. Perrine1, Atacan Zeran1, Abhinav Upadhyay1, Annie M. Donoghue1, Kumar Venkitanarayanan1
1Animal Science, University of Connecticut, Storrs, Connecticut, United States, 2Animal science, University of Connecticut, Storrs, Connecticut, United States, 3Poultry Production and Product Safety Unit, ARS-USDA, Fayetteville, Arkansas, United States

*Salmonella* spp. carried by flying insects in proximity of poultry farms.
Paul Dawson, Ahmet Buyukyavuz2
Food, Nutrition and Packaging Sciences, Clemson University, Clemson, South Carolina, United States
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The impact of the sound shock of the embryonic development and physiological traits in chicks embryo.
Salwan Abdulateef*, Ziyad T. Aldhanki, Thafer Mohammed
Animal Production, University of Anbar, Ramadi, Iraq

Delayed post-hatch feeding induces long-term alterations in intestinal barrier and nutrient transport function in broilers.
Sofia BialkowskiG*S, Liang-en Yu¹, Andrea Toschi², Yihang Li¹
¹Animal and Food Sciences, University of Delaware, Newark, Delaware, United States, ²University of Bologna, Bologna, Italy

The effect of short term feed restriction and refeeding on ghrelin, growth hormone, glucose, insulin, and corticosterone concentrations in male broiler chickens.
Nurudeen O. TaofeekG*S¹, Natalia Ceron-Romero, Katherine P. Sanmartin, Elisabeth Embden, Tameka Smith, Aulisea Thomas, Ostavia Cintron, Ethan Vroonland, Martha Verghese, Jorge Vizcarra
Food and Animal Sciences, Alabama A&M University, Huntsville, Alabama, United States

The Effect of a ghrelin receptor agonist (capromorelin) on Feed and Water Intake, Body Weight Gain and Animal Behavior in Female Broad Breasted White Turkeys (Meleagris gallopavo).
Katherine P. SanmartinG*S¹, Natalia Ceron-Romero¹, Nurudeen O. Taofeek¹, Ethan Vroonland¹, Logan Swanson¹, Martha Verghese¹, Ernst Heinen¹, Jorge Vizcarra¹
¹Food and Animal Sciences, Alabama A&M University, Huntsville, Alabama, United States, ELANCO, Greenfield, Indiana, United States

The effect of corticosterone infusion on the concentrations of insulin, ghrelin and glucose in full fed and feed restricted birds (Gallus gallus domesticus).
Nataša Ceron-RomeroG*S¹, Nurudeen O. Taofeek, Katherine P. Sanmartin, Aulisea Thomas, Ethan Vroonland, Martha Verghese, Jorge Vizcarra
Food and Animal Sciences, Alabama A&M University, Huntsville, Alabama, United States

Effect of hot and cold temperatures on the proliferation and differentiation of pectoralis major muscle satellite cells from a commercial turkey line.
Jiahui XuG*S¹, Gale M. Strasburg¹, Kent M. Reed¹, Sandra Velleman¹
¹Department of Animal Sciences, Ohio State University, Wooster, Ohio, United States, ²Department of Food Science and Human Nutrition, Michigan State University, East Lansing, Michigan, United States, ³Department of Veterinary and Biomedical Sciences, University of Minnesota, St. Paul, Minnesota, United States

Brain derived neurotrophic factor and extra-hypothalamic corticotropin releasing hormone neurons in the nucleus of hippocampal commissure play functional roles in the avian neuroendocrine regulation of stress.
Hakeem J. KadhimG*S², Seong W. Kang¹, Wayne J. Kuenzel¹
¹Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, ²Cell and Molecular biology program, University of Arkansas, Fayetteville, Arkansas, United States

Plasma metabolomics and muscle transcriptomics show potential involvement of vascularity issue for increased P. major mixed muscle degradation rate and myodegeneration in myopathy broilers.
Pramir MaharjanG*S¹, Jordan Weil¹, Antonio Beltaia¹, Katie Hilton¹, Nawin Suesuttajit¹, Cole Umberson¹, Diego Martinez¹, Justina V. Caldas², Casey Owens¹, Craig N. Coon¹
¹Center of Excellence for Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, ²Cobb Vantress, Siloam Springs, Arkansas, United States
Lipid and protein oxidation of eggs from hens at different ages stored in different environmental conditions.
Sarah Maria P. Camargo1, Deibity A. Cordeiro1, Frederico L. da Silva1, Karolyne M. Nascimento1, Vitor R. Mangerotti2, Leticia V. Chagas3, Juliana M. Fonseca3, Italo d. Faria1, Alcione M. Rancanici3, Jose H. Stringhini1, 3
1Zootecnia, Universidade Federal de Goias, Goiania, Goias, Brazil, 2Faculdade de Agronomia e Veterinaria, Universidade de Brasilia, Brasilia, Distrito Federal, Brazil, 3researcher-part-time, CNPq, Goiania, Goias, Brazil

Egg quality in hens housed in two different production systems, conventional cage and cage-free: a commercial study.
Roy R. Hernandez1, Edgar O. Oviedo-Rondon1, Ramiro D. Franco1, Edgar R. Aya1, Iang Schuronitgen R. Barragan1
1Poultry Research Group, University of Tolima, Ibagué, Tolima, Colombia

Effect of freezing condition and wooden breast severity on cooked chicken quality.
Caroline R. Gregg1, Dawn Koltes2, Rodrigo Tarte2
1Iowa State University, Ames, Iowa, United States, 2Animal Science, Iowa State University, Ames, Iowa, United States

Myowater properties during the first 24 h postmortem and their relationship to final moisture content.
Giulia Tasoniero*, Hong Zhuang, Brian Bowker
USDA, Agricultural Research Service, Athens, Georgia, United States

A Comparative study on carcass and meat quality traits of three Sri Lankan indigenous chicken strains reared under semi-intensive system.
Madushika K. Ranasinghe*1, D.D. Jayasena
Department of Animal Science, Uva Wellassa University, Badulla, Sri Lanka

Analysis of color variations over time of raw pet treats made from co-products of broiler chicken processing.
Moses E. Chilenje1, Marc R. Presume1, Lindsey F. Spencer1, Catherine M. Odom1, Laura J. Garner1, Amit Morey1, Robert P. Mason1, Eric K. Altom2, Charles W. Starkey1
1Poultry Science, Auburn University, Auburn, Alabama, United States, 2Animal Nutrition and Health, Balchem Corp., New Hampton, New York, United States

Evaluation of the textural characteristics of pet treats generated from mixtures of broiler processing co-products.
Marc R. Presume1, Lindsey F. Spencer1, Catherine M. Odom1, Laura J. Garner1, Amit Morey1, Robert P. Mason1,
300 Immersion Chiller Conditions that Affect Peracetic Acid Half-Life Rates.
Daniel Sabo*, Stephanie Richter, Marc Zanghi
Georgia Tech Research Institute, Atlanta, Georgia, United States

301 Alternative Approaches to Broiler Transport: On-Farm Processing System (FPaT).
Alex V. Samoylov*
Georgia Tech Research Institute ATAS, Georgia Tech, Atlanta, Georgia, United States

302 Predicting Anatomical Structures to Improve Automated Deboning.
Louise L. Zhuang*, Wayne Daley
Food Processing Technology Division, Georgia Tech Research Institute, Atlanta, Georgia, United States

303 Virtual Reality Robotic Cutting Design Framework.
Sim Harbert*, Konrad Ahlin, Walker Byrnes, Nadun Ranawaka, Louise Zhuang, Stephanie Richter
Food Processing Technology Division, Georgia Tech Research Institute, Atlanta, Georgia, United States

304 Differences in bioelectrical properties of breast meat affected with woody breast, whitestriping and spaghetti breast meat between three fast-growing big broiler flocks.
Jaroslav Valenta*, Aftab Siddiqui, Laura J. Garner, Amit Morey
Poultry Science, Auburn University, Auburn, Alabama, United States; Animal Science, Czech University of Life Sciences, Prague, Czechia
POSTER SESSIONS

All presenters with posters will be available online during their designated session to chat and answer questions related to their virtual poster.

Poster Session Room

Monday, July 20th

Times are CST
1:00 PM – 2:30 PM Animal Well-Being and Behavior
2:00 PM – 3:30 PM Extension and Instruction
2:30 PM – 4:00 PM Physiology and Reproduction
3:00 PM – 4:30 PM Processing and Products

Tuesday, July 21st

Times are CST
9:00 AM – 10:30 AM Metabolism and Nutrition: General Nutrition
10:00 AM – 11:30 AM Metabolism and Nutrition: Vitamins and Minerals
11:00 AM – 12:30 PM Genetics and Molecular Biology
2:30 PM – 4:00 PM Metabolism and Nutrition: Amino Acids
3:00 PM – 4:30 PM Metabolism and Nutrition: Enzymes
3:30 PM – 5:00 PM Metabolism and Nutrition: Feed Additives

Wednesday, July 22nd

Times are CST
9:00 AM – 10:30 AM Immunology, Health and Disease
10:00 AM – 11:30 AM Management and Production
11:00 AM – 12:30 PM Microbiology and Food Safety
FUTURE MEETINGS

Poultry Science Association

2021 PSA Annual Meeting
CenturyLink Center
Omaha, Nebraska
July 19-22, 2021

2021 Latin American Scientific Conference
Hotel Bourbon de Foz do Iguaçu
Iguazú Falls, Paraná, Brazil
October 5-7, 2021

2022 PSA Annual Meeting
San Antonio Marriott Rivercenter
San Antonio, Texas
July 11-14, 2022

2023 PSA Annual Meeting
Philadelphia Marriott Downtown
Philadelphia, Pennsylvania
July 10-13, 2023

2024 PSA Annual Meeting
The Galt House Hotel
Louisville, Kentucky
July 15-18, 2024