

## CONTENTS

### ANIMAL WELL-BEING AND BEHAVIOR

- Distribution of particulate matter and ammonia and physicochemical properties of fine particulate matter in a layer house  
**D. Shen, S. Wu, P. Y. Dai, Y. S. Li, and C. M. Li** ..... 4137
- Chronic heat stress affects muscle hypertrophy, muscle protein synthesis and uptake of amino acid in broilers via insulin like growth factor-mammalian target of rapamycin signal pathway  
**Bingbing Ma, Xiaofang He, Zhuang Lu, Lin Zhang, Jiaolong Li, Yun Jiang, Guanghong Zhou, and Feng Gao** ..... 4150
- Consumer preferences for and beliefs about slow growth chicken  
**Jayson L. Lusk** ..... 4159

### GENETICS AND GENOMICS

- Colonization of a commercial broiler line by *Campylobacter* is under limited genetic control and does not significantly impair performance or intestinal health  
**Richard A. Bailey, Andreas Kranis, Androniki Psifidi, Kellie A. Watson, Lisa Rothwell, Paul M. Hocking, Pete Kaiser, Mark P. Stevens, and Santiago Avendano** ..... 4167
- Genetic approach to select against embryo mortality caused by *Enterococcus faecalis* infection in laying hens  
**A. E. Blanco, D. Cavero, W. Icken, M. Voss, M. Schmutz, R. Preisinger, and A. R. Sharifi** ..... 4177
- The high conserved cellular receptors of avian leukosis virus subgroup J in Chinese local chickens contributes to its wide host range  
**Yao Zhang, Xiaolu Guan, Zhiwu Chen, Dingguo Cao, Zhaofeng Kang, Qiancheng Shen, Qiuxia Lei, Fuwei Li, Haiqin Li, Muhammad Farooque Leghari, Yongqiang Wang, Xiaole Qi, Xiaomei Wang, and Yulong Gao** ..... 4187

### IMMUNOLOGY, HEALTH, AND DISEASE

- The resistance of *Eimeria* spp. to toltrazuril in black grouse (*Lyrurus tetrix*) kept in an aviary  
**Rajmund Sokół and Remigiusz Gałęcki** ..... 4193
- Effect of embryonic thermal manipulation on heat shock protein 70 expression and immune system development in Pekin duck embryos  
**Revathi Shanmugasundaram, Macdonald Wick, and Michael S. Lilburn** ..... 4200
- Effect of fungal gamma-linolenic acid and beta-carotene containing prefermented feed on immunity and gut of broiler chicken  
**D. Mudroňová, V. Karaffová, J. Koščová, M. Bartkovský, D. Marcinčáková, P. Popelka, T. Klemková, M. Čertík, J. Mačanga, and S. Marcinčák** ..... 4211
- Immune efficacy of DNA vaccines based on *oprL* and *oprF* genes of *Pseudomonas aeruginosa* in chickens  
**Q. Gong, M. D. Ruan, M. F. Niu, C. L. Qin, Y. Hou, and J. Z. Guo** ..... 4219
- Effects of prior cold stimulation on inflammatory and immune regulation in ileum of cold-stressed broilers  
**Yingying Su, Xin Zhang, Hongwei Xin, Shuang Li, Jiafang Li, Runxiang Zhang, Xiang Li, Jianhong Li, and Jun Bao** ..... 4228
- Safety and efficacy of attenuated classic and variant 2 infectious bronchitis virus candidate vaccines  
**Ahmed Ali, Walid H. Kilany, Mohamed A. Zain El-Abideen, Magdy El Sayed, and Magdy Elkady** ..... 4238
- Enhanced Th1/Th2 mixed immune responses elicited by polyethyleneimine adjuvanted influenza A (H7N9) antigen HA1-2 in chickens  
**Li Song, Dan Xiong, Maozhi Hu, Xinan Jiao, and Zhiming Pan** ..... 4245

## MANAGEMENT AND PRODUCTION

- Fumigating broiler hatching eggs with lysozyme product (Inovapure) to reduce eggshell microbial load  
Xujie Li, Derek Anderson, Bruce Rathgeber, Nancy McLean, and Janice MacIsaac ..... 4252
- Low light intensity in Pekin duck breeder barns has a greater impact on the fertility of drakes than hens  
L. Porter, A. Porter, H. Potter, E. Alenciks, S. M. Fraley, and G. S. Fraley ..... 4262
- Diagnostic of guinea fowl (*Numida meleagris*) farming in Ivory Coast  
G. A. Koné, G. F. Kouassi, N. D. V. Kouakou, and M. Kouba ..... 4272

## METABOLISM AND NUTRITION

- Energy partitioning by broiler breeder pullets in skip-a-day and precision feeding systems  
S. H. Hadinia, P. R. O. Carneiro, C. A. Ouellette, and M. J. Zuidhof ..... 4279
- True ileal digestibility of calcium in limestone and dicalcium phosphate are additive in diets of broiler chickens  
F. Zhang and O. Adeola ..... 4290
- Betaine improves the growth performance and muscle growth of partridge shank broiler chickens via altering myogenic gene expression and insulin-like growth factor-1 signaling pathway  
R. Chen, S. Zhuang, Y. P. Chen, Y. F. Cheng, C. Wen, and Y. M. Zhou ..... 4297
- Effects of limestone particle size and dietary Ca concentration on apparent P and Ca digestibility in the presence or absence of phytase  
S.-W. Kim, W. Li, R. Angel, and M. Proszkowiec-Weglarz ..... 4306
- Methionine deficiency decreases hepatic lipid exportation and induces liver lipid accumulation in broilers  
J. L. Peng, S. P. Bai, J. P. Wang, X. M. Ding, Q. F. Zeng, and K. Y. Zhang ..... 4315
- Phosphorus retention in corn, spray dried plasma protein, soybean meal, meat and bone meal, and canola meal using a precision-fed rooster assay  
J. A. Munoz, C. D. Hanna, P. L. Utterback, and C. M. Parsons ..... 4324
- Xylo-oligosaccharides display a prebiotic activity when used to supplement wheat or corn-based diets for broilers  
T. Ribeiro, V. Cardoso, L. M. A. Ferreira, M. M. S. Lordelo, E. Coelho, A. S. P. Moreira, M. R. M. Domingues, M. A. Coimbra, M. R. Bedford, and C. M. G. A. Fontes ..... 4330
- Supplemental boric acid does not prevent the development of footpad dermatitis in broilers subjected to high stocking density  
Özcan Cengiz, Bekir Hakan Köksal, Onur Tatlı, Eren Kuter, Umair Ahsan, Gülşen Güven, Ömer Sevim, Sacit F. Bilgili, and Ahmet Gökhan Önel ..... 4342
- Evaluation of the blend of organic acids and medium-chain fatty acids in matrix coating as antibiotic growth promoter alternative on growth performance, nutrient digestibility, blood profiles, excreta microflora, and carcass quality in broilers  
D. H. Nguyen, K. Y. Lee, M. Mohammadigheisar, and I. H. Kim ..... 4351
- A meta-analysis to predict the concentration of standardized ileal digestible amino acids in distillers dried grains with solubles for poultry  
J. L. Zhu, Z. K. Zeng, G. C. Shurson, and P. E. Urriola ..... 4359

## MICROBIOLOGY AND FOOD SAFETY

- Autophagy as a control measure for *Salmonella* in laying hens  
S. Sevilla-Navarro, C. Marín, V. Cortés, C. García, S. Vega, and P. Catalá-Gregori ..... 4367
- Analyses of prevalence and molecular typing reveal the spread of antimicrobial-resistant *Salmonella* infection across 2 breeder chicken farms  
Xiao Fei, Kequan Yin, Chao Yin, Yachen Hu, Jingwen Li, Zihao Zhou, Yuqi Tian, Shizhong Geng, Xiang Chen, Zhiming Pan, Qiuchun Li, and Xinan Jiao ..... 4374
- Kinetic modeling impacts of relative humidity, storage temperature, and air flow velocity on various indices of hen egg freshness  
Samuel Mezemir Yimenu, Junemo Koo, Ji-Young Kim, Jong-Hoon Kim, and Byeong-Sam Kim ..... 4384

## MOLECULAR AND CELLULAR BIOLOGY

- Differential expression of intestinal nutrient transporters and host defense peptides in *Eimeria maxima*-infected Fayoumi and Ross chickens  
S. Su, K. B. Miska, R. H. Fetterer, M. C. Jenkins, S. J. Lamont, and E. A. Wong ..... 4392
- Skeletal muscle growth characteristics and myogenic stem cell activity in broiler chickens affected by wooden breast  
K. J. Meloche, W. A. Dozier, III, T. D. Brandebourg, and J. D. Starkey ..... 4401
- Trans10, cis12-conjugated linoleic acid exhibits a stronger antioxidant capacity than cis9, trans11-conjugated linoleic acid in primary cultures of laying hen hepatocytes  
Xiao-long Qi, Jing Wang, Hong-yuan Yue, Shu-geng Wu, Ya-nan Zhang, He-min Ni, Yong Guo, Hai-jun Zhang, and Guang-hai Qi ..... 4415

## PHYSIOLOGY AND REPRODUCTION

- The phenomenon of the monovular twinning in the endangered zatorska goose  
Krzysztof Andres, Joanna Orel, and Marcin W. Lis ..... 4425
- Access to pasture in an outdoor housing system affects welfare indicators and improves rooster sperm quality in two native Mediterranean breeds  
J. Santiago-Moreno, M. G. Gil, S. G. Dávila, J. L. Campo, C. Castaño, A. Toledano-Díaz, M. T. Prieto, and E. Blesbois ..... 4433

## PROCESSING AND PRODUCTS

- Effect of hydrocolloids on the quality of restructured hams with duck skin  
Tae-Kyung Kim, Jae-Yun Shim, Ko-Eun Hwang, Young-Boong Kim, Jung-Min Sung, Hyun-Dong Paik, and Yun-Sang Choi ..... 4442
- The effect of structural change on the digestibility of sarcoplasmic proteins in Nanjing dry-cured duck during processing  
X. J. Du, Y. Y. Sun, D. D. Pan, Y. Wang, C. R. Ou, and J. X. Cao ..... 4450
- The wooden breast condition results in surface discoloration of cooked broiler pectoralis major  
H. Zhuang and B. Bowker ..... 4458
- Water absorption and dripping of chicken breast and carcasses during pre-cooling in an industrial system  
Elidiane Lorenzetti, Bruna Maria Saorin Puton, Ilizandra Aparecida Fernandes, Naimara Vieira do Prado, Rudson Frigotto, Silvane Souza Roman, Alexander Junges, Clarice Steffens, Jamile Zeni, Juliana Steffens, Geciane Toniazco Backes, Rogério Luis Cansian, and Eunice Valduga ..... 4462

## ASSOCIATION NOTES

- Annual Meeting, July 23–26, 2018 ..... 4470