

# ANIMAL PRODUCTION SCIENCE

**CONTENTS** Volume 59, Issue 7, 2019, 1201–1400

## Genetics and Genomics

Genetic parameters for faecal worm egg count at different ages in Australian sheep under natural challenge

*L. Li, D. J. Brown, A. A. Swan and J. H. J. van der Werf* 1201–1208

Genetic associations between mature size and condition score of Nelore cows, and weight, subjective scores and carcass traits as yearlings

*Viviane V. de Lacerda, Gabriel S. Campos, Daniel D. Silveira, Vanerlei M. Roso, Mario L. Santana Junior, Fabio R. P. Souza and Arione A. Boligon* 1209–1217

## Physiology, Endocrinology and Reproduction

Strategies for improvement of cloning by somatic cell nuclear transfer

*Xiaoyan Qiu, Xiong Xiao, Graeme B. Martin, Nan Li, Wenhui Ling, Mingyu Wang and Yuemin Li* 1218–1227

## Nutrition and Metabolism

Estimation of desired feed intake for growth and reproductive organ development in pre-laying hens

*Hilda Palma Bendezu, Nilva Kazue Sakomura, Euclides Braga Malheiros, Juliano Cesar De Paula Dorigam, Edney Pereira Da Silva and Matheus De Paula Reis* 1228–1234

Effects of changing omega-6 to omega-3 fatty acid ratios in corn–soybean meal-based diet on performance, serum lipid profile and colostrum and milk composition of sows and performance of piglets

*Santi Devi Upadhaya, Jiao Yang, Kwang Yong Lee and In Ho Kim* 1235–1243

Performance and metabolic status of grazing beef heifers receiving increasing protein supplementation pre- and postpartum

*Deilen Sotelo, Mário Fonseca Paulino, Luciana Navajas Rennó, Edenio Detmann, Roman Maza Ortega, David Contreras Marquez, Leandro Soares Martins, Daniel Mageste de Almeida, Josilaine Aparecida da Costa Lima and Felipe Henrique de Moura* 1244–1252

Energy partition, nutritional energy requirements and methane production in F1 Holstein × Gyr bulls, using the respirometric technique

*A. L. Ferreira, A. L. C. C. Borges, R. C. Mourão, R. R. Silva, A. C. A. Duque, J. S. Silva, A. S. Souza, L. C. Gonçalves and P. H. A. Carvalho* 1253–1260

Digestion and nitrogen excretion by Holstein–Friesian cows in late lactation offered ryegrass-based pasture supplemented with fodder beet

*G. C. Waghorn, N. Law, M. Bryant, D. Pacheco and D. Dalley* 1261–1270

## Feed Quality, Nutritional Value and Toxicology

*In vitro* fermentation and *in situ* rumen degradation kinetics of summer forage brassica plants

*Juan P. Keim, Jaime Cabanilla, Oscar A. Balocchi, Rubén G. Pulido and Annick Bertrand* 1271–1280

Ruminal protein digestibility of Australian produced oilseed meals

*Rebecca A. L. Heim and Gaye L. Krebs* 1281–1287

Nitrate is safe to feed *ad libitum* in molasses roller drums as a source of non-protein nitrogen

*J. P. Goopy and R. S. Hegarty* 1288–1292

Replacement of lucerne by *Enterolobium cyclocarpum* leaves in the diet of growing goats

*A. Ortiz-Rodea, M. González-Ronquillo, N. López-Villalobos, A. García-Martínez, R. Rojo-Rubio, F. Avilés-Nova, José F. Vázquez-Armijo and B. Albarrán-Portillo* 1293–1298

Mineral supplements improve the calcium status of pregnant ewes grazing vegetative cereals

*David G. Masters, Serina Hancock, Gordon Refshauge, Susan M. Robertson, Shawn McGrath, Marie Bhanugopan, Michael A. Friend and Andrew N. Thompson* 1299–1309

*Continued on next page*

Porcine bile powder supplementation of a high fat broiler diet in relation to growth performance and nutrient digestion

*Kanokporn Lammasak, Suwanna Kijparkorn and Kris Angkanaporn* 1310–1317

Impact of dietary supplementation with a synbiotic, organic acids or their combination on growth performance, carcass traits, economic efficiency, jejunum histomorphometry and some blood indices of broiler chickens

*Ayman S. Salah, Mahmoud S. El-Tarabany and Mohamed A. Ali* 1318–1326

### **Behaviour, Well-being and Health**

Biometric measurement of static space required by weaned piglets kept in groups of eight during 6 weeks

*M. Fels, K. Konen, E. Hessel and N. Kemper* 1327–1335

Determination of range enrichment for improved hen welfare on commercial fixed-range free-range layer farms

*Carolyn de Koning, Soressa M. Kitessa, Reza Barekatain and Kelly Drake* 1336–1348

### **Meat Science and Product Quality**

Effect of Merino sheep age on consumer sensory scores, carcass and instrumental meat quality measurements

*L. Pannier, G. E. Gardner and D. W. Pethick* 1349–1359

Fatty acid composition of young dairy bull beef as affected by breed type, production treatment, and relationship to sensory characteristics

*Yingqun Nian, Paul Allen, Sabine M. Harrison, Nigel P. Brunton, Robert Prendiville and Joseph P. Kerry* 1360–1372

Physicochemical characteristics and fatty acid composition of the meat of lambs fed cassava silage and dry tamarind (*Tamarindus indica*)

*N. J. A. dos Santos, A. M. Barbosa, T. V. Voltoloni, D. R. Menezes, C. M. Souza, L. R. Bezerra, D. P. D. Lanna, C. V. D. M. Ribeiro and R. L. Oliveira* 1373–1381

Relationships between pre-slaughter rump flatness of Nelore cows and subsequent measures of carcass fatness

*Luiz F. M. Pfeifer and Paulo M. A. Neves* 1382–1386

### **Technology and Education**

Enzyme systems for effective dag removal from cattle hides

*Laura Navone and Robert E. Speight* 1387–1398

### **Corrigenda**

*Corrigendum to:* Porcine bile powder supplementation of a high fat broiler diet in relation to growth performance and nutrient digestion

*Kanokporn Lammasak, Suwanna Kijparkorn and Kris Angkanaporn*

[Vol. 59, No. 7 (2019) pp. 1310–1317] 1399

*Corrigendum to:* Physicochemical characteristics and fatty acid composition of the meat of lambs fed cassava silage and dry tamarind (*Tamarindus indica*)

*N. J. A. dos Santos, A. M. Barbosa, T. V. Voltoloni, D. R. Menezes, C. M. Souza, L. R. Bezerra, D. P. D. Lanna, C. V. D. M. Ribeiro and R. L. Oliveira*

[Vol. 59, No. 7 (2019) pp. 1373–1381] 1400