

ANIMAL PRODUCTION SCIENCE

CONTENTS Volume 61, Issue 4, 2021, 345–443

Genetics and Genomics

Substantial genetic gains in reducing breech flystrike and in improving productivity traits are achievable in Merino sheep by using index selection

F. D. Brien, S. F. Walkom, A. A. Swan and D. J. Brown 345–362

Analysis of X chromosome and autosomal genetic effects on growth and efficiency-related traits in sheep

Milad Noorian, Sahereh Joezy-Shekalgorabi and Nasser Emam Jomeh Kashan 363–370

Reproduction, Development and Nutrition

Effects of protein supplementation on Nellore cows' reproductive performance, growth, myogenesis, lipogenesis and intestine development of the progeny

Liziana Maria Rodrigues, Jon Patrick Schoonmaker, Flavio Dutra Resende, Gustavo Rezende Siqueira, Otavio Rodrigues Machado Neto, Mateus Pies Gionbelli, Tathyane Ramalho Santos Gionbelli and Marcio Machado Ladeira 371–380

Feed Quality and Metabolism

Predicting metabolisable energy intake by free-ranging cattle using multiple short-term breath samples and applied to a pasture case-study

R. M. Herd, P. F. Arthur, R. S. Hegarty, T. Bird-Gardiner, K. A. Donoghue and J. I. Velazco 381–389

Effects of *Spirulina* (*Arthrospira*) *platensis* and *Bacillus subtilis* PB6 on growth performance, intestinal microbiota and morphology, and serum parameters in broiler chickens

Mahboobullah Joya, Omid Ashayerizadeh and Behrouz Dastar 390–398

Acid hydrolysis of gelatin extracted from cow skin: properties and potential for use as a source of small peptides and free amino acids for broiler chickens

K. Nouri, S. Khalaji, A. Zamani and A. Saki 399–411

Behaviour, Well-being and Health

Welfare indicators associated with feed conversion ratio and daily feed intake of growing-finishing pigs

C. R. Pierozan, C. P. Dias, D. Temple, X. Manteca and C. A. da Silva 412–422

Provision of straw and the presence of undocked lambs reduce the behavioural and physiological expressions of pain and stress associated with tail docking in lambs: a preliminary study

Cristian Larrondo, Agustín Orihuela, Ana Strappini, Gerardo Acosta-Jamett, Daniel Mota-Rojas and Carmen Gallo 423–431

Meat Science and Product Quality

Collagen, intramuscular fat and proteolysis affect Warner-Bratzler shear-force of muscles from

Bos taurus breed types differently at weaning, after backgrounding on pasture, and after feedlotting

Margrethe Therkildsen, Paul L. Greenwood, Colin P. Starkey, Malcolm McPhee, Brad Walmsley, Jason Siddell and Geert Geesink 432–443