

TABLE OF CONTENTS

Epigenetics	1
Imprinted genes in man and mouse are model systems in comparative epigenomics <i>Martina Paulsen</i>	1
Animal Genetics	7
The influence of animal breeding on The Origin of Species by Charles Darwin <i>O. Mayo</i>	7
Charles Darwin in Australia: his zoological observations <i>F.W. Nicholas</i>	11
The genetics of sexual dimorphism in sheep <i>B.W. Gudex, C. Gondro, K. Marshall and J.H.J. van der Werf</i>	14
Sexual dimorphism of genes regulating skeletal muscle growth in Bali cattle <i>G.S. Natrass, Dahlanuddin, D.P. Poppi and S.P. Quigley</i>	18
Delivery of Genomics to Industry	22
Progress in development and implementation of a strategy for commercialisation of DNA marker technology for the Australian beef industry <i>R.G. Banks, H. Burrow and H.-U. Graser</i>	22
Genomic selection based on dense genotypes inferred from sparse genotypes <i>M.E. Goddard and B.J. Hayes</i>	26
Integration of DNA markers into BREEDPLAN EBVS <i>D.J. Johnston, B. Tier and H.-U. Graser</i>	30
Accuracy of genomic selection: comparing theory and results <i>B.J. Hayes, H.D. Daetwyler, P. Bowman, G. Moser, B. Tier, R. Crump, M. Khatkar, H.W. Raadsma and M.E. Goddard</i>	34
Potential benefit of genomic selection in sheep <i>J.H.J. van der Werf</i>	38
Genotype by Environment Interactions	42
Genotype x Environment interactions and Merino breeding programmes for wool production <i>B.J. McGuirk</i>	42
Sire by flock-year interactions for body weight in Poll Dorset sheep <i>D.J. Brown, A.A. Swan, D.J. Johnston and H.-U. Graser</i>	48

Contents

Classifying sheep grazing environments using satellite data to quantify genotype by environment interactions	52
<i>M.B. Whelan, D.J. Cottle, K.G. Geenty and D.J. Brown</i>	
Genotype by environment interaction between registered and commercial herds for dairy traits in Australia	56
<i>M. Haile-Mariam and M.E. Goddard</i>	
Genotype by environmental interaction for live weight between two production environments in the GIFT strain (<i>Oreochromis niloticus</i>)	60
<i>H.L. Khaw, R.W. Ponzoni, A. Hamzah and N. Kamaruzzaman</i>	
Genomic Selection	64
Variability in the distributions of single nucleotide polymorphism effects in livestock populations	64
<i>E.J. Smith and J.M. Henshall</i>	
Use of genotype probabilities and selective genotyping for estimation of marker effects	68
<i>M.L.A.N.R. Deepani and B.P. Kinghorn</i>	
Phasing of SNP data by combined recursive long range phasing and long range haplotype imputation	72
<i>J.M. Hickey, B.P. Kinghorn, B. Tier and J.H.J. van der Werf</i>	
A recursive algorithm for long range phasing of SNP genotypes	76
<i>B.P. Kinghorn, J.M. Hickey and J.H.J. van der Werf</i>	
Genomic selection using a fast EM algorithm 1. Understanding the methodology	80
<i>R.K. Shepherd and J.A. Woolliams</i>	
Genomic selection using a fast EM algorithm 2. Analysis of simulated data	84
<i>R.K. Shepherd, T.H.E. Meuwissen and J.A. Woolliams</i>	
Behaviour and Welfare	88
Mapping the Horns Locus in Sheep	88
<i>N. Pickering, T. Johnson, B. Auvray, K.G. Dodds and J.C. McEwan</i>	
Genetic markers for polled condition in cattle - the current status and the future plans	92
<i>K.C. Prayaga, M. Mariasegaram, B. Harrison, B. Tier, J.M. Henshall and W. Barendse</i>	
The genetics of temperament traits in Merino sheep	96
<i>K.L. Lennon, M.L. Hebart, F.D. Brien and P.I. Hynd</i>	
The role of cytochrome P450 17-alpha-hydroxylase/17,20-lyase (CYP17) in the stress coping ability in a divergently selected Merino sheep population	100
<i>D. van der Walt, S.W.P. Cloete, K. Storbeck and P. Swart</i>	
The improvement of lamb survival of Merino sheep as a correlated response to direct selection for rearing ability	104
<i>S.W.P. Cloete, I. Misztal and J.J. Olivier</i>	

Genetics of lamb survival: preliminary studies of the Information Nucleus Flock <i>F.D. Brien, M.L. Hebart, J.E. Hocking Edwards, J.C. Greeff, K.W. Hart, G. Refshauge, G. Gaunt, R. Behrend, K. Thomson, G.N. Hinch, K.G. Geenty and J.H.J. van der Werf</i>	108
Gene Mapping 1	112
<i>The John Vercoe memorial Lecture</i>	112
Interbreed evaluation of productivity under low and moderate dry matter availabilities <i>T.G. Jenkins</i>	113
Maternal productivity in industry herds: Preliminary results <i>K.A. Donoghue and P.F. Parnell</i>	117
Genetic variation in growth, hormonal and seminal traits of young tropically adapted bulls <i>N.J. Corbet, B.M. Burns, D.H. Corbet, D.J. Johnston, J.M. Crisp, M.R. McGowan, K.C. Prayaga, B.K. Venus and R.G. Holroyd</i>	121
Genome wide association studies for net feed intake, body weight and hip height in beef cattle <i>S. Bolormaa and M.E. Goddard</i>	125
Validation and estimation of additive genetic variation associated with DNA tests for quantitative beef cattle traits <i>A.L. Van Eenennaam, R.M. Thallman, R.L. Quaas, K. Hanford and E.J. Pollak</i>	129
Dairy Cattle	133
Genotype by environment interactions in international genetic evaluations of dairy bulls <i>J.H. Jakobsen, J.W. Durr, H. Jorjani, F. Forabosco, A. Loberg and J. Philipsson</i>	133
Updated index weights for the Australian Profit Ranking in dairy cattle <i>J.E. Pryce, J.H.J. van der Werf, M. Haile-Mariam, B. Malcolm and M.E. Goddard</i>	143
Genetic markers for lactation persistency in Australian dairy cows <i>J.E. Pryce, M. Haile-Mariam, K. Verbyla, P.J. Bowman, M.E. Goddard and B.J. Hayes</i>	147
Genome wide association studies in dairy cattle using high density SNP scans <i>H.W. Raadsma, M.S. Khatkar, G. Moser, M. Hobbs, R. Crump, J.A.L. Cavanagh, and B.Tier</i>	151
Criteria for selecting and predicting herd life in dairy cattle <i>M. Haile-Mariam and M.E. Goddard</i>	155
Beef Cattle II	159
The impact of genetic markers for tenderness on steer carcass and feedlot exit and heifer puberty traits in Brahman cattle <i>M.L. Wolcott and D.J. Johnston</i>	159

Contents

Association between Myostatin DNA markers and muscularity in Angus cattle <i>B.A. O'Rourke, P.L. Greenwood, P.F. Arthur and M.E. Goddard</i>	163
Muscle specific expression of regulatory factors in cattle selected for high and low muscling <i>G. Parnell, Y. Chen, G.S. Nattrass and P.L. Greenwood</i>	167
Global gene expression profiling of angus cattle selected for low and high net feed intake <i>Y. Chen, C. Gondro, K. Quinn, B. Vanselow, P.F. Parnell and R.M. Herd</i>	171
Expression of mitochondrial respiratory complex genes in liver tissue of cattle with different feed efficiency phenotypes <i>K.J. Kochan, R.N. Vaughn, T.S. Amen, C.A. Abbey, J.O. Sanders, D.K. Lunt, A.D. Herring, J.E. Sawyer, C.A. Gill and P.K. Riggs</i>	175
Identification of differentially expressed transcripts in m. longissimus dorsi with divergent marbling phenotypes in Hanwoo (Korean native cattle) <i>S.H. Lee, C. Gondro, J.H.J. van der Werf, N.K. Kim, D.J. Lim, Y.H. Shin, J.P. Gibson and J. M. Thompson</i>	179
Pigs	183
QTL mapping for feed conversion efficiency on porcine chromosome 10 in an Australian commercial population <i>Y. Chen, Y. Zhang, I. MacLeod, R. Kerr, K.L. Bunter, B. Hayes, B. Tier, H.-U. Graser, B.G. Luxford, M. Goddard and C. Moran</i>	183
A genome-wide association analysis identifying SNPS for PRRS tolerance on a commercial pig farm <i>C.R.G. Lewis, M. Torremorell, L. Galina-Pantoja, N. Deeb, M.A. Mellencamp, A.L. Archibald and S.C. Bishop</i>	187
Effect of halothane genotype on growth parameters, carcass and meat quality traits in the Pietrain Breed of the French National Pig Breeding Program <i>I. Merour, S. Hermesch, S. Schwob and T. Tribut</i>	191
Genetic correlations between carcass length, fat and muscle depths and primal cut weights in the French Large White Sire line <i>I. Merour, S. Hermesch, R.M. Jones and T. Tribut</i>	195
Evaluation of pig flight time, average daily gain and backfat using random effect models including grower group <i>R.M. Jones, S. Hermesch and R.E. Crump</i>	199
Associations between sow body composition, feed intake during lactation and early piglet growth <i>K.L. Bunter, B.G. Luxford, R. Smits and S. Hermesch</i>	203
Breeding Program Design Including MAS	207
Breeding objectives for seasonal production systems: an example from New Zealand venison system <i>J.A. Archer and P.R. Amer</i>	207

Trans-Tasman genetic evaluations of sheep	212
<i>M.J. Young, S-A.N. Newman, R. Apps, A.J. Ball and D.J. Brown</i>	
Combining estimates of SNP effects when they are subpopulation specific	216
<i>P.R. Amer and G.M. Payne</i>	
SNP predictors to accelerate the rate of genetic progress in sheep	220
<i>J.A. Sise and P.R. Amer</i>	
Association of polymorphisms in candidate genes with carcass and taste panel assessed meat quality traits in a commercial population of Angus-sired beef cattle	224
<i>J.L. Gill, S.C. Bishop, C. McCorquodale, J.L. Williams and P. Wiener</i>	
The effect of the inclusion of pedigree data on estimates of carrier status at the agouti locus in sheep	228
<i>J.M. Henshall, J. McNally and B.J. Norris</i>	
Animal Genomes	232
I have a draft genome for my species ... what now?	232
<i>Claire M. Wade</i>	
SNP origin bias on population structure analysis: an Australian beef cattle case study	239
<i>L.R. Porto Neto and W. Barendse</i>	
Population stratification, not genotype error, causes some SNPs to depart from Hardy-Weinberg Equilibrium	243
<i>Y.D. Zhang and B. Tier</i>	
Genome structure in Australian Holstein Friesian cattle revealed by combined analysis of three high density SNP panels	247
<i>M.S. Khatkar, B. Tier, M. Hobbs, D. Khatkar, J.A.L. Cavanagh, R. Crump, G. Moser and H. W. Raadsma</i>	
A peculiarity of gene frequency estimation	251
<i>J.W. James, V.A. Whan and B.J. Norris</i>	
Disease Resistance	255
Interpretation and prediction in disease genetics	255
<i>S.C. Bishop</i>	
Review of genetic parameters for disease resistance in sheep in New Zealand and Australia	263
<i>C.A. Morris</i>	
Opportunities to breed for resistance to breech strike in Merino sheep in a Mediterranean environment	272
<i>J.C. Greeff and L.J.E. Karlsson</i>	
Systems genetics analysis reveals gene modules and heritable biomarkers for sheep intestinal parasite resistance	279
<i>H.N. Kadarmideen, N. Andronicos and N.S. Watson-Haigh</i>	

Contents

On the expression profile of candidate genes conferring resistance to gastro-intestinal nematodes in sheep <i>Shivashankar H. Nagaraj, Antonio Reverter, Moira Menzies, Nick Andronicos, and Aaron Ingham</i>	283
Biotechnology Tools and Challenges	287
Current status and future prospects for reproductive technologies in small ruminants <i>W.M.C. Maxwell and G. Evan</i>	287
Quality Control For Ovine SNP50 Beadchip Genotypes <i>K.G. Dodds, B. Auvray, N. Pickering and J.C. McEwan</i>	296
Building a deer SNP chip <i>M.J. Bixley, J.F. Ward, R. Brauning, J.A. Archer and P.J. Fishe</i>	300
Summarization methods and quality problems in Affymetrix microarrays <i>C. Gondro</i>	304
A new strategy to identify the disease causing mutation for neuronal ceroid lipofuscinosis in South Hamsphire sheep <i>I.F. Mohd Ismail, J.A.L. Cavanagh, N.L. Mitchell, P.J. Houweling, D.N. Palmer and I. Tammen</i>	308
Sheep – Wool I	312
An integrated genomics approach to improving wool productivity and quality <i>P. I. Hynd, C.S. Bawden, N.W. Rufaut, B.J. Norris, M. McDowall, A.J. Nixon, Z. Yu, A.J. Pearson, G.S. Natrass, C. Gordon-Thompson, G.P. Moore, S.M. Dunn, N.M. Edwards, D.H. Smith and C.J. McLaughlan</i>	312
Weighted co-expression networks shed light on the molecular mechanism of action of metyrapone on wool follicle development <i>N.S. Watson-Haigh, H.N. Kadarmideen, M. McDowall, G.S. Natrass, H.A. McGrice and P.I. Hynd</i>	322
Genetic progress in the Australian Sheep Industry <i>A.A. Swan, D.J. Brown and R.G. Banks</i>	326
Breeding plain-bodied fine wools - No problem! <i>S. Hatcher, K.D. Atkins and K.J. Thornberry</i>	330
Heritability and phenotypic correlations for breech strike and breech strike resistance indicators in Merinos <i>J.L. Smith, H.G. Brewer and T. Dyll</i>	334
The relationship between crutch cover score and production and easy care traits in Merino sheep <i>D.H. Smith, E. Safari, F.D. Brien, K.S. Jaensch and R.J. Grimson</i>	338

Aquaculture	342
Genetic improvement programs for Aquaculture species in developing countries: Prospects and challenges	342
<i>R.W. Ponzoni, N.H. Nguyen and H.L. Khaw</i>	
Development of a breeding strategy for hybrid abalone	350
<i>M. G. Hamilton, P. D. Kube, N. G. Elliott, L. J. McPherson and A. Krsinich</i>	
Assessment of the level of heterozygosity in the Tasmanian Atlantic salmon (Salmon salar) population using single nucleotide polymorphism markers	354
<i>S. Dominik, J.M. Henshall, P.D. Kube, H. King, S. Lien, M. Kent and N.G. Elliott</i>	
Heterosis, direct and maternal genetic effects on body traits in a complete diallel cross involving four strains of red Tilapia <i>Oreochromis</i> spp	358
<i>N.H. Nguyen, N. Pongthana and R.W. Ponzoni</i>	
Development and early results of the Tasmanian Atlantic salmon breeding program	362
<i>N.G. Elliott and P.D. Kube</i>	
Sheep – Wool II	366
Fibre production and sheep breeding in South America	366
<i>R.C. Cardellino and J.P. Mueller</i>	
Effects on lifetime reproductive performance of phenotypic selection for fleece weight, fibre diameter, body weight and related selection indexes	374
<i>L.R. Piper, A.A. Swan, and H.G. Brewer</i>	
Variation in the lifetime reproductive performance of Merino ewes	378
<i>G.J. Lee, K.D. Atkins and M.A. Sladek</i>	
Genetic parameters for lifetime reproductive performance of Merino ewes	382
<i>G.J. Lee, K.D. Atkins and M.A. Sladek</i>	
Levels of post-weaning loss in the Trangie D-flock (1975-83)	386
<i>C.E. Pope and K.D. Atkins</i>	
Genetic variation in clean wool colour in fine wool Merinos	390
<i>J.L. Smith and I.W. Purvis</i>	
Statistical methods I	394
Mixed models in animal breeding: where to now?	394
<i>A.R. Gilmour</i>	
Latent mixed models	398
<i>Robin Thompson</i>	
Statistical genetics to improve robustness of dairy cows	406
<i>R.F. Veerkamp, H.A. Mulder, M.P.L. Calus, J.J. Windig, and J. ten Napel</i>	

Contents

Sheep - Meat	414
Meat sheep breeding - where we are at and future challenges <i>N.M. Fogarty</i>	414
Rates of Genetic Gain in New Zealand Sheep <i>M.J. Young and P.R. Amer</i>	422
The Information Nucleus - Genetically Improving Australian Lamb Production <i>S.I. Mortimer, K.L. Pearce, R.H. Jacobs, D.L. Hopkins, R.D. Warner, G.H. Geesink, J.E. Hocking Edwards, D.W. Pethick, L.H.J. van der Werf and A.J. Ball</i>	426
Economic evaluation of whole genome selection using meat sheep as a case study <i>R.G. Banks and J.H.J. van der Werf</i>	430
Progress in the development of breeding schemes for the Irish sheep industry: the maternal lamb producer groups <i>T.J. Byrne, P.R. Amer, P.F. Fennessy, R.M. Rohloff, A. Cromie, P. Donnellan, G. Potterton, J.P. Hanrahan, and B. Wickham</i>	434
Statistical Methods II	438
Cheverud revisited: Scope for joint modelling of genetic and environmental covariance matrices <i>Karin Meyer and Mark Kirkpatrick</i>	438
Factor-analytic models to reduce computational requirements in international genetic evaluation for beef cattle <i>Karin Meyer</i>	442
Application of random regression techniques to dissect age-dependent quantitative trait loci for growth in lambs <i>S.G. Hadjipavlou and S.C. Bishop</i>	446
Comparison of genetic parameters obtained from an ordinal canine hip phenotype data set by linear and ordinal analyses <i>B.J. Wilson, F.W. Nicholas, J.W. James and P.C. Thomson</i>	450
A framework to link whole genome SNP association studies to systems genetics <i>S.J. Goodswen, H.N. Kadarmideen, C. Gondro and J.H.J. van der Werf</i>	454
Statistical considerations in the analysis of gene expression data from heterogeneous sources <i>P.C. Thomson, M. Singh and H.W. Raadsma</i>	458
AAABG	462
Thirty years of AAABG <i>Ian Franklin</i>	462

Posters	468
Association of microsatellite markers and NRAMP1 gene with bovine tuberculosis traits in Zebu cattle	468
<i>A. Ali, H.N. Kadarmideen, P. C. Thomson, C. Flury, B. Müller and J. Zinsstag</i>	
The role of animal genetic improvement in reducing greenhouse gas emissions from beef cattle	472
<i>P.F. Arthur, K.A. Donoghue, R.M. Herd and R.S. Hegarty</i>	
Benefits of genetic superiority in residual feed intake in a large commercial feedlot	476
<i>R.M. Herd, S. Piper, J.M. Thompson, P.F. Arthur, B. McCorkell and K.C.P. Dibley</i>	
Meta-analysis of cross-bred progeny data for Australian terminal sire sheep	480
<i>R.G. Banks, D.J. Brown and S.R. Field</i>	
Evaluation of the Angus BREEDPLAN IMF% EBV in 100d-fed Angus x Hereford steer progeny	484
<i>S.A. Barwick, D.J. Johnston, M.L. Wolcott, J.F. Wilkins and W.A. McKiernan</i>	
Genetic parameters for feather weights of breeding ostriches	488
<i>Z. Brand and S.W.P. Cloete</i>	
Genetics of lamb survival: a study of Merino resource flocks in South Australia	492
<i>F.D. Brien, M.L. Hebart, K.S. Jaensch, D.H. Smith and R.J. Grimson</i>	
Meat quality in Merino ram hoggets	496
<i>S.F. Walkom, F.D. Brien, M.L. Hebart, J.C. Greeff, D.L. Hopkins and W.S. Pitchford</i>	
Genetics of wool colour in the South Australian selection demonstration flocks	500
<i>M.L. Hebart and F.D. Brien</i>	
Variation in sow health affects the information provided by lactation feed intake data	504
<i>K.L. Bunter, C.R.G. Lewis and B.G. Luxford</i>	
Complexities and strategies to identify the causative mutation responsible for single locus inherited diseases in livestock.	508
<i>J.A.L. Cavanagh, I. Tammen and H.W. Raadsma</i>	
IGF-1 genotypes affect growth not tenderness in cattle	512
<i>Lei Yao Chang, W.S. Pitchford and C.D.K. Bottema</i>	
Is methane production likely to be a future Merino selection criterion?	516
<i>D.J. Cottle, J.H.J. van der Werf and R.G. Banks</i>	
Polymorphisms detected in the tyrosinase and matp (slc45a2) genes did not explain coat colour dilution in a sample of Alpaca (<i>Vicugna pacos</i>)	520
<i>R. Cransberg and K.A. Munyard</i>	
QTL analyses of beef muscle fibre type	524
<i>N.G. Cullen, C.A. Morris, P.M. Dobbie, D.L. Hyndman and B.C. Thomson</i>	
Leptin gene polymorphisms had no effects on open days and calving interval	528
<i>H. Yazdani, H.R. Rahmani, M.A. Edris and E. Dirandeh</i>	
Potential to double the number of cattle tested for residual feed intake	532
<i>K.A. Donoghue, P.F. Arthur and R.M. Herd</i>	

Contents

Fat distribution in Angus steers is related to residual feed intake estimated breeding value <i>A.R. Egarr, W.S. Pitchford, M.J. Bottema, R.M. Herd, J.P. Siddell, J.M. Thompson and C.D.K. Bottema</i>	536
Characterization of a human performance gene in the horse <i>N.A. Ellis, P.C. Thomson, R.R. Coomer, A.J. Forhead, M.J. Head, I. Tammen and H.W. Raadsma</i>	540
Targeted mapping of QTL on chromosomes 1 and 3 for parasite resistance in sheep <i>N.A. Ellis, S.A. Keyis, K.J. Fullard, D. Townley, D. Khatkar, G. Attard, K. Beh, D. Piedrafita and H.W. Raadsma</i>	544
Estimating heritability of subjectively assessed ostrich leather quality traits using threshold models <i>A. Engelbrecht, S.W.P. Cloete, K.L. Bunter and J.B. van Wyk</i>	548
Identification of a potential marker for absence of dark fibre in <i>Vicugna pacos</i> (Alpaca) <i>Natasha L. Feeley and Kylie A. Munyard</i>	552
Association of fibre diameter with wool colour in a South Australian selection flock <i>M.R. Fleet, K.R. Millington, D.H. Smith and R.J. Grimson</i>	556
A new system for collecting and processing phenotypic and genetic information from sheep for improved selection tools <i>K.G. Geenty, J.H.J. van der Werf, K.P. Gore, A.J. Ball and S. Gill</i>	560
Effect of the accuracy of an estimated QTL effect on response to Marker-Assisted Selection <i>N. Moghaddar and J.H.J. van der Werf</i>	564
A comparison of methods for genomic selection in Austrian dual purpose Simmental cattle <i>B. Gredler, K.G. Nirea, T.R. Solberg, C. Egger-Danner, T. Meuwissen and J. Soelkner</i>	568
Identification of sex specific DNA regions in the snake genome using a subtractive hybridization technique <i>R.P. Harris, D.M. Groth, J. Ledger and C.Y. Lee</i>	572
Merino ewes divergently selected for calm temperament have a greater concentration of immunoglobulin G in their colostrum than nervous ewes <i>K.W. Hart, C. Contou, M. Blackberry and D. Blache</i>	576
Survival of adult sheep is driven by longevity genes <i>S. Hatcher, K.D. Atkins and K.J. Thornberry</i>	580
Genetic association of net feed intake measured at two stages with insulin-like Growth Factor-I, growth and ultrasound scanned traits in Angus cattle <i>M.G. Jeyaruban, D.J. Johnston and H.-U. Graser</i>	584
Predicting energy balance in growing wethers and estimation of heritability for derived parameters <i>E. Jonas, P.C. Thomson, K. Fullard, C.A. Cavanagh and H.W. Raadsma</i>	588
Predicting energy balance in lactating ewes as a basis for QTL analysis <i>E. Jonas, P.C. Thomson, K. Fullard, D. McGill and H.W. Raadsma</i>	592

A comparison between sheep bred for worm resistance and unselected controls when exposed to low larval challenge during summer <i>K.E. Kemper, J.W.A. Larsen, S.C. Bishop, N. Anderson, M.E. Goddard, J.C. Greeff, R. Woodgate and L.J.E. Karlsson</i>	596
Breeder perspectives on fat and female management <i>S.J. Lee, I.K. Nuberg and W.S. Pitchford</i>	600
Some consequences of selection for residual feed intake in beef cattle <i>D.S. Lines, M.L. Wolcott, W.S. Pitchford, C.D.K. Bottema, R.M. Herd and V.H. Oddy</i>	604
Survival analyses for length of productive life of Angus cows <i>Karin Meyer</i>	608
Imputation of missing genotypes in high density SNP data <i>G. Moser, M.S. Khatkar and H.W. Raadsma</i>	612
Preliminary results on the comparative performance of Holstein and Fleckvieh x Holstein dairy cows <i>C.J.C. Muller, J.A. Botha, S.W.P. Cloete and J.P. Potgieter</i>	616
Isolation and characterisation of alpaca tetranucleotide microsatellite markers <i>K.A. Munyard, J.M. Ledger, C.Y. Lee, C. Babra and D.M. Groth</i>	620
A decade of Sheep Improvement Limited (SIL) <i>S-A.N. Newman, J.C. McMcEwan and M.J. Young</i>	624
Mapping of quantitative trait loci (QTL) for muscularity in beef cattle <i>I. Novianti, W.S. Pitchford and C.D.K. Bottema</i>	628
Genetic relationships among lamb survival, birth coat score, birth weight and 42-day body weight in a South African fine wool Merino stud <i>W.J. Olivier, S.W.P. Cloete and A.C. Greyling</i>	632
Sheep selected for resistance to facial eczema disease also show higher tolerance to acetaminophen challenge <i>S.H. Phua, P. Johnstone, H. Henry, A. Findlay and C.A. Morris</i>	636
Mapping QTL for early growth and maternal performance in sheep <i>H.W. Raadsma, E. Jonas, K.R. Zenger, C.A. Cavanagh, M.K. Lam and P.C. Thomson</i>	640
Improving the accuracy of selecting animals for reduced methane emissions <i>D.L. Robinson</i>	644
Heritability of plasma concentrations of IGF-1 and its correlation with reproductive performance in Holstein cows in Victorian herds <i>T.E. Stirling, C.R. Stockdale and K.L. Macmillan</i>	648
Bioethics and DNA diagnostics in animals - are there lessons to be learned from genetic testing in humans? <i>I. Tammen and H.W. Raadsma</i>	652
QTL analysis of beef fat colour and the effect of BCDO2 <i>R. Tian, W.S. Pitchford and C.D.K. Bottema</i>	656
Genotype x Environment Interactions identified in Southern Australian Beef Production <i>S.L. Truran, M.P.B. Deland, M.L. Hebart, A.P. Verbyla and W.S. Pitchford</i>	660

Contents

QTL mapping in multiple families using logistic regression <i>Y.D. Zhang and B. Tier</i>	664
Cattle residual feed intake candidate genes <i>N.A. Zulkifli, M. Naik, W.S. Pitchford and C.D.K. Bottema</i>	668
Author index	672