

ANIMAL PRODUCTION SCIENCE

CONTENTS Volume 55, Issue 11–12, 2015, 1347–1575

MANIPULATING PIG PRODUCTION XV

PROCEEDINGS OF THE 15th BIENNIAL CONFERENCE OF THE AUSTRALASIAN PIG SCIENCE ASSOCIATION (APSA)

Preliminary Material i–xxix

Chapter 1: The A. C. Dunkin Memorial Address

Entire male pig production in Europe

G. Bee, P. Chevillon and M. Bonneau 1347–1359

Chapter 2: Symposia – Functional carbohydrates

Feed non-starch polysaccharides for monogastric animals: classification and function

M. Choct 1360–1366

Dietary fibre and crude protein: impact on gastrointestinal microbial fermentation characteristics and host response

R. Pieper, W. Vahjen and J. Zentek 1367–1375

Functional short-chain carbohydrates (prebiotics) in the diet to improve the microbiome and health of the gastrointestinal tract

J. G. Muir, C. K. Yao and P. G. Gibson 1376–1380

Chapter 3: Symposia – The impact of heat stress on performance and health of pigs

Physiological consequences of heat stress in pigs

J. W. Ross, B. J. Hale, N. K. Gabler, R. P. Rhoads, A. F. Keating and L. H. Baumgard 1381–1390

Nutritional strategies to alleviate heat stress in pigs

J. J. Cottrell, F. Liu, A. T. Hung, K. DiGiacomo, S. S. Chauhan, B. J. Leury, J. B. Furness, P. Celi and F. R. Dunshea 1391–1402

The impact of heat stress on intestinal function and productivity in grow-finish pigs

N. K. Gabler and S. C. Pearce 1403–1410

Chapter 4: Reviews

An opportunity to revolutionise sow management

J. A. Downing 1411–1423

Under what conditions is it possible to produce pigs without using antimicrobials?

B. L. Gleeson and A. M. Collins 1424–1431

Antimicrobial stewardship: what is it, and how does it work?

J. Turnidge 1432–1436

Selection for productivity and robustness traits in pigs

S. Hermes, L. Li, A. B. Doeschl-Wilson and H. Gilbert 1437–1447

Chapter 5: Contributed papers – Microbiota, health and environment

Scouring weaner pigs have a lower abundance of butyrate-producing bacteria

B. G. Bowring, S. N. Jenkins and A. M. Collins 1448–1448

A comparison of inflammation models in weaner pigs

R. L. Wilson, R. E. Doyle, G. M. Cronin and P. K. Holyoake 1449–1449

Investigation into the occurrence of newly recognised agents of swine dysentery in Australian pig herds

T. La, N. D. Phillips and D. J. Hampson 1450–1450

continued on next page

Relationships between diets different in fibre type and content with growth, *Escherichia coli* shedding, and faecal microbial diversity after weaning

S. N. Jenkins, I. S. Waite, J. Mansfield, J. C. Kim and J. R. Pluske 1451–1451

Aeration of anaerobic pig slurry for ammonia oxidation

M. C. Hawley, I. Svoboda and H. J. Fallowfield 1452–1452

Bioprospecting microalgae for growth on undiluted anaerobic digestate of piggery effluent

J. Ayre, N. Moheimani and M. Borowitzka 1453–1453

Co-digestion of pig slurry with an algae-rich municipal wastewater sludge

N. N. Cheng and H. J. Fallowfield 1454–1454

A novel separation system removes solids from pig effluent more effectively than other systems in common use

S. Tait, H. Payne, B. Cole and R. H. Wilson 1455–1455

Spatial modelling to estimate the risk of feral pigs to pig farm biosecurity in south-eastern Australia

J. G. Froese, J. V. Murray, J. J. Perry and R. D. van Klinken 1456–1456

Porcine haptoglobin levels measured at 7–14 days after weaning were independent of age, weight or gender

N. Sales, D. Collins, A. M. Collins, T. McKenna, M. M. Bauer, C. R. Parke and S. Hermes 1457–1457

Multiple treatments targeting the immune system of commercially-reared weanling pigs

J. L. Black, C. L. Collins, D. J. Henman and S. Diffey 1458–1458

Application of sorbers to mitigate greenhouse gas emissions from land-applied pig litter

C. Pratt, M. Redding and J. Hill 1459–1459

Greenhouse gas emission abatement in Australian piggeries

I. R. Kruger, G. W. Mills and R. H. Wilson 1460–1460

Alternative low-cost solid media for scrubbing of hydrogen sulphide from piggery biogas

A. G. Skerman, S. Heubeck, D. J. Batstone and S. Tait 1461–1461

Inhibition resilience of microbes in pig effluent lagoons

R. Liaquat, S. Astals, P. D. Jensen, D. J. Batstone and S. Tait 1462–1462

Breakdown of electrical energy use during summer and winter at six piggeries

E. J. McGahan, B. R. Warren and R. J. Davis 1463–1463

Soil nitrate and phosphorus accumulates rapidly with a non-uniform distribution in two outdoor pig areas

S. G. Wiedemann 1464–1464

Effectiveness of different mitigation strategies to reduce nitrous oxide emissions from pig manure amended soils

S. N. Jenkins, I. S. Waite, B. Mikan and L. K. Abbott 1465–1465

Economic implications of environmental variation observed in a pig nucleus farm in Australia

S. Hermes, R. Sokolinski, R. Johnston and S. Newman 1466–1466

Chapter 6: Contributed papers – Meat eating quality and characteristics

Vitamin E does not counteract the shortened shelf life of long-stored pork with increasing levels of intramuscular fat

C. G. Jose and J. C. Kim 1467–1467

Pork eating quality was not improved by extended ageing for 14 days

H. A. Channon, D. N. D'Souza and F. R. Dunshea 1468–1468

Immunisation against gonadotrophin releasing factor reduces pork eating quality fail rates

K. L. Moore, B. P. Mullan, J. C. Kim, M. Trezona and F. R. Dunshea 1469–1469

Prescription of energy-restricted diets with higher and lower pork protein content achieves weight loss and improved glycaemic control in adults with type 2 diabetes

N. A. Watson, K. A. Dyer, J. D. Buckley, G. D. Brinkworth, A. M. Coates, G. Parfitt, P. R. C. Howe, M. Noakes and K. J. Murphy 1470–1470

Selenohomocysteine improves muscle selenium deposition in pigs

D. J. Henman, S. L. Beer, J. Lockhart and D. D. Moore 1471–1471

Immunisation against gonadotrophin releasing factor increases fat deposition in finisher pigs

K. L. Moore, B. P. Mullan, J. C. Kim and F. R. Dunshea 1472–1472

continued on next page

Response to different pathway interventions to improve pork eating quality consistency

H. A. Channon, D. N. D'Souza and F. R. Dunshea 1473–1473

Aitchbone hanging or moisture infusion, but not ageing, influenced eating quality of pork cuts

H. A. Channon, D. N. D'Souza and F. R. Dunshea 1474–1474

Chapter 7: Contributed papers – Lactation, group housing, behaviour and welfare

Piglets born with a high degree of meconium staining display altered behaviour throughout lactation

C. R. Ralph, L. M. Staveley, C. L. Burnard and K. J. Plush 1475–1475

Inclusion of MgSO_4 in the diet of sows before farrowing improves measures of piglet colostrum ingestion

K. J. Plush, L. M. Staveley, A. C. Weaver and W. H. E. J. van Wettere 1476–1476

Neonatal split suckling improves survival of small piglets

J. S. Huser, K. J. Plush, W. S. Pitchford, T. E. Kennett and D. S. Lines 1477–1477

A 'two-stage' farrowing and lactation system: piglet survival and growth performance

R. S. Morrison, E. J. McDonald, R. Z. Athorn, E. M. Baxter and A. J. Norval 1478–1478

Sows with high milk production had a high feed intake and high body mobilisation

A. V. Strathe, T. S. Bruun and C. F. Hansen 1479–1479

Intermittent suckling causes a stress response in piglets that is attenuated over time

D. L. Turpin, P. Langendijk, T.-Y. Chen, D. S. Lines and J. R. Pluske 1480–1480

Teat order influences piglet performance after weaning

D. S. Lines, E. M. de Ruyter, W. E. H. van Wettere and K. J. Plush 1481–1481

Neonatal split suckling has no impact on pre- and post-weaning piglet growth

J. S. Huser, T. E. Kennett, K. J. Plush, W. S. Pitchford and D. S. Lines 1482–1482

Evaluation of sow and litter performance with addition of a bio-surfactant to lactation diets

K. S. O'Halloran, R. R. Carter, D. J. Henman and C. L. Collins 1483–1483

Saliva cortisol and heart rate measurements of nurse sows during lactation compared to control sows

C. Amdi, V. A. Moustsen, G. Sørensen and C. F. Hansen 1484–1484

Nitrous oxide for piglet gas euthanasia

J.-L. Rault, N. Kells, C. Johnson, M. Sutherland, R. Dennis and D. Lay Jr 1485–1485

Two different strategies for housing gilts after mating did not affect the proportion of gilts culled

L. U. Hansen 1486–1486

Validity of modified methods to assess three welfare indices for use in on-farm pig welfare monitoring

L. M. Hemsworth, E. C. Jongman and J. Skuse 1487–1487

A study of agonistic strategies after mixing in group housed sows

C. Munoz, P. H. Hemsworth and E. Jongman 1488–1488

Potential for use of physiological and physical measurements to monitor sow muscle catabolism during lactation

T. L. Muller, R. J. E. Hewitt and R. J. van Barneveld 1489–1489

A 'two-stage' farrowing and lactation system: assessing the impacts of group lactation on the incidence of lactational oestrus and reproductive performance

E. J. McDonald, R. S. Morrison, R. Z. Athorn, A. J. Norval, J. A. Downing and J. A. Lievaart 1490–1490

Increasing dietary valine-to-lysine ratio for lactating sows had no effect on litter performance or sow tissue mobilisation

A. V. Strathe, T. S. Bruun and C. F. Hansen 1491–1491

A 'two-stage' farrowing and lactation system: sow behaviour and injuries

R. S. Morrison, E. J. McDonald, R. Z. Athorn, E. M. Baxter and A. J. Norval 1492–1492

Ranking for fight lesion scores is not consistent over time

K. L. Bunter and K. M. Boardman 1493–1493

Provision of novel materials reduced knocks and injuries and increased play in sows following mixing

E. C. Greenwood, J. R. Rayner, K. J. Plush, W. H. E. J. van Wettere and P. E. Hughes 1494–1494

continued on next page

Feeding behaviour, aggression and dominance in group-housed sows

J.-L. Rault, H. Ho, M. Verdon and P. Hemsworth 1495–1495

Inducing satiety in sows through nutritional manipulation of gastrointestinal tract volume and volatile fatty acid production

T. L. Muller, R. J. E. Hewitt and R. J. van Barneveld 1496–1496

The response of group-housed sows to dietary inclusion of magnesium oxide and sugar beet pulp

T. L. Muller, R. J. E. Hewitt and R. J. van Barneveld 1497–1497

Use of a nutritional lick block and higher feeding levels to reduce aggression and provide enrichment for sows in groups

T. L. Muller, M. J. Callaghan, R. J. E. Hewitt and R. J. van Barneveld 1498–1498

The key indicators of stockpersonship and their relationship with independent behavioural observations and supervisor assessments of stockpeople

L. J. Roberts and G. J. Coleman 1499–1499

Chapter 8: Contributed papers – Reproduction and sow management

Boar contact and seven hours of interrupted suckling improved sow performance

W. H. E. J. van Wetters, T. E. Kennett and D. S. Lines 1500–1500

Effect of different feed density during gestation for group housed and fed sows on litter size and farrowing rate

G. Sørensen 1501–1501

A comparison of suckling reduction strategies along with boar exposure to induce oestrus in lactating sows

H. L. Frobose, M. D. Tokach, J. M. DeRouchey, S. S. Dritz, R. D. Goodband, J. L. Nelssen and D. L. Davis 1502–1502

Split suckling versus intermittent suckling with primiparous sows: skip-a-heat effects on oestrus during lactation and reproductive performance

R. Z. Athorn, J. R. Craig, E. J. McDonald, J. A. Downing and P. Langendijk 1503–1503

Sow aggression in early gestation is decreased by greater space allowance in the first four days following mixing

E. C. Greenwood, K. J. Plush, W. H. E. J. van Wetters and P. E. Hughes 1504–1504

Maternal dietary energy rather than lysine intake during late gestation positively influences piglet birth weight

M. A. D. Goncalves, K. Gourley, S. S. Dritz, M. D. Tokach, N. M. Bello, J. M. DeRouchey, J. C. Woodworth and R. D. Goodband 1505–1505

Oocyte quality and embryo survival are impaired when sows mated in lactation lose more than five percent of their body weight

A. C. Weaver, K. L. Kind, J. M. Kelly and W. H. E. J. van Wetters 1506–1506

The influence of cumulus cells on porcine oocyte maturation in the presence of L-carnitine

A. N. Steel, J. L. Lowe, T. Somjai and C. G. Grupen 1507–1507

Administration of human chorionic gonadotropin in early pregnancy increases ovarian activity in sows

J. Seyfang, T. Y. Chen, P. Langendijk and R. N. Kirkwood 1508–1508

Fighting of gilts after mixing is associated with early removals, altered litter sex ratio and lower piglet survival

K. L. Bunter 1509–1509

Locomotion scores in early gestation of younger parity sows are associated with fight lesions and body condition

J. C. Lumby, K. L. Bunter and P. C. Wynn 1510–1510

Temporary confinement of sows for four days after farrowing has little influence on postural changes

J. Hales, V. A. Moustsen, M. B. F. Nielsen and C. F. Hansen 1511–1511

Short and long-term repeatability of individual sow aggressiveness

M. Verdon, R. S. Morrison and P. H. Hemsworth 1512–1512

Effect of sow confinement and non-confinement during parturition on piglet viability

P. C. Condous, K. J. Plush, A. J. Tilbrook and W. H. E. J. van Wetters 1513–1513

Pre-partum straw-directed behaviour by sows in farrowing pens is positively associated with piglet survival

G. M. Cronin, G. F. Macnamara, B. L. F. Macnamara, M. A. Cronin, K. E. Bøe and I. L. Andersen 1514–1514

continued on next page

Prenatal and neonatal gilt management and anti-müllerian hormone: effects on the ovary and response to the boar
W. H. E. J. van Wetters, A. C. Weaver, L. M. Staveley, T. L. Muller, R. J. E. Hewitt, P. E. Hughes and R. N. Kirkwood 1515–1515

A specific carbohydrate diet fed in late lactation to enhance post-weaning fertility in primiparous sows
T. Y. Chen, C. Dickson, D. Lines, R. Kirkwood and P. Langendijk 1516–1516

The relationship between mitochondrial DNA haplotype and litter size in commercial pigs
T. Tsai, S. Rajasekar and J. C. St John 1517–1517

Multi-suckling and sow-piglet separation: effects on lactation oestrus
W. H. E. J. van Wetters and L. M. Staveley 1518–1518

Intermittent suckling with primiparous sows: skip-a-heat effects on oestrus during lactation, reproductive performance and embryo survival
R. Z. Athorn, M. Blanes, J. L. Patterson, M. K. Dyck, G. R. Foxcroft and P. Langendijk 1519–1519

Chapter 9: Contributed papers – Antibiotic resistance, health and disease

Predictive modelling of *Salmonella* spp. inactivation in pork burger patties of varying fat contents
P. M. Gurman, C. G. Holds, R. G. Jarrett, T. Ross and A. Kiermeier 1520–1520

Antibiotic resistance in *Escherichia coli* isolated from pre- and post-weaned piglets: a snapshot survey of Australia
L. K. van Breda, A. N. Ginn, O. Dhungyel, J. R. Iredell and M. P. Ward 1521–1521

Preliminary verification of molecular techniques to more accurately assess the risk from *Toxoplasma gondii* in pork
D. Hamilton, K. Hodgson, A. Kiermeier and M. McAllister 1522–1522

Dietary lactulose supplementation improves grower-finisher pig performance and indices of gastrointestinal tract function
M. Begum, M. M. Hossain, P. Y. Zhao, J. W. Park and I. H. Kim 1523–1523

Piglet growth performance is improved using a low protein starter feed or by fortifying conventional starter feed with spray dried porcine plasma and (or) functional fibre
C. J. Brewster, J. Craig, C. L. Collins and D. J. Henman 1524–1524

Additional dietary tryptophan and methionine improves feed conversion efficiency and markers of inflammation in weaner pigs infected with *Escherichia coli*
M. M. Capozzalo, J. C. Kim, J. K. Htoo, C. F. M. de Lange, B. P. Mullan, J. W. Resink, C. F. Hansen and J. R. Pluske 1525–1525

A preliminary survey examining the effect of oral health on feeding behaviour and efficiency in culled sows
M. Sacco and P. L. Cakebread 1526–1526

Numbers of selected bacterial species in pig faeces do not accurately represent their numbers in the ileum
B. G. Bowring and A. M. Collins 1527–1527

Mycoplasma vaccination responses in immunodepressed weanling pigs supplemented with *S. cerevisiae boulardii*
I. P. Oswald, A. P. F. L. Bracarense and N. Schwerin 1528–1528

A comparison of three anti-inflammatory drugs in weaner pigs using Improvac® as an inflammation model
R. L. Wilson, R. E. Doyle, G. M. Cronin and P. K. Holyoake 1529–1529

Aerosol disinfection from weaning: a pilot study to assess the impacts on clinical signs of *Actinobacillus pleuropneumoniae*
C. L. Collins, P. McKenzie, S. Beer, K. S. O'Halloran and A. Woeckel 1530–1530

A preliminary study of the molecular epidemiology of *Brachyspira hyodysenteriae* isolates in Australia
P. K. Holyoake, T. La, N. D. Phillips and D. J. Hampson 1531–1531

Detection of methicillin-resistant and methicillin-susceptible *Staphylococcus aureus* among pigs in different stages of production
S. Shafullah, M. Hernandez-Jover, D. Jordan, M. Groves and J. Heller 1532–1532

Haemophilus parasuis – virulence genes and serovars
C. Turni, C. R. Singh, D. Dayao, J. Gibson and P. Blackall 1533–1533

Clinical signs of a European highly-pathogenic strain of China/US porcine epidemic diarrhoea 2a
J. Carr 1534–1534

China's village pig industry: training influences handling of sick pigs and awareness of medication withdrawal periods
B. J. Lohmar, D. Wang, J. Huang and M. P. Boddington 1535–1535

Chapter 10: Contributed papers – Nutrition, growth, gastrointestinal tract and general production

Vitamin E but not selenium alleviates heat stress compromised metabolism in growing pigs

F. Liu, J. J. Cottrell, P. Celi, B. J. Leury and F. R. Dunshea 1536–1536

Pig feed ingredients affect enzyme diffusion coefficients

G. T. Nguyen, W. L. Bryden, M. J. Gidley and P. A. Sopade 1537–1537

Subtilisin protease increases digestible energy content but not protein digestibility in sorghum- and wheat-based diets

D. J. Cadogan and F. R. Dunshea 1538–1538

Increased growth performance in weaned pigs fed a diet supplemented with graded amounts of two phytases

P. Guggenbuhl, E. Perez Calvo and F. Fru 1539–1539

Comparative efficacy of a blend of multiple enzymes and an in-feed antibiotic on growth performance and apparent digestibility of energy and protein in nursery pigs

E. Kiarie, M. C. Walsh, L. Romero, X. Yang and S. Baidoo 1540–1540

Feeding caffeine to sows in gestation reduced stillbirths

B. A. Dearlove, K. E. Kind and W. H. E. J. van Wettere 1541–1541

Combined supplementation of boron, vitamin E and omega-3 fatty acids increases tight junction protein mRNA expression in the colon of E. coli-infected weaner pigs

J. C. Kim, K. L. Moore, M. Trezona, M. D. Langridge, B. P. Mullan and J. R. Pluske 1542–1542

Some bitter compounds show potential for decreasing feed intake and fat deposition while others improve growth and feed conversion ratio in finishing pigs

M. Fu, C. L. Collins, D. J. Henman and E. Roura 1543–1543

Spray-dried porcine and bovine plasma are equally efficacious and superior than ovine plasma when fed to newly weaned pigs

J. J. Cottrell, A. J. Gabler, S. C. Grimshaw, D. J. Cadogan and F. R. Dunshea 1544–1544

Improving weaner pig performance through the inclusion of activated medium chain fatty acids

R. J. E. Hewitt, D. Isaac, J. Vande Ginste and R. J. van Barneveld 1545–1545

Suppressing the feed intake of finisher pigs: a preliminary study

J. R. Pluske, J. L. Black, J. C. Kim and F. R. Dunshea 1546–1546

Use of trace mineral analysis to quantify the efficacy of mineral supplementation

T. L. Muller, R. J. E. Hewitt and R. J. van Barneveld 1547–1547

Growth performance of nursery pigs fed pelleted wheat-based diets containing graded levels of supplemental xylanase

E. Kiarie and R. Petracek 1548–1548

Cellulase supplementation benefits performance and apparent faecal digestibility of dietary components in lactating sows and their piglets

P. Y. Zhao, J. W. Park, J. M. Heo, J. H. Yoo, S. D. Upadhaya and I. H. Kim 1549–1549

Effect of dietary anise flavour on performance of sows and their litter at different weaning ages

Y. Lei, H. L. Li, P. Y. Zhao, J. W. Park and I. H. Kim 1550–1550

Partial fish meal replacement with fermented or enzymatically prepared soybean meal in weaned pig diets

P. Y. Zhao, J. W. Park, J. M. Heo, J. H. Yoo, J. S. Jeong and I. H. Kim 1551–1551

Positive effects of protected organic acids on nutrient digestibility and faecal microflora in lactating sows

P. Y. Zhao, J. W. Park, S. Mohana Devi, K. Y. Lee and I. H. Kim 1552–1552

Effect of Spanish sweet yacca residue pellet as a replacement for corn on growth performance, nutrient digestibility and haematological profiles in growing pigs

J. W. Park, P. Y. Zhao, M. Begum, M. M. Hossain and I. H. Kim 1553–1553

Low to moderate dietary n-6:n-3 PUFA ratios do not affect performance of grower-finisher pigs

S. J. Wilkinson, B. P. Mullan, J. C. Kim and J. A. Downing 1554–1554

Increasing zinc via an inorganic source (ZnO) in high calcium finisher diets improves growth performance

J. R. Craig, T. McDonald, C. J. Brewster and D. J. Henman 1555–1555

Creatine monohydrate supplementation of sow diets pre-partum improved neonatal piglet characteristics

W. H. E. J. van Wettere, L. M. Staveley, A. C. Weaver and K. J. Plush 1556–1556

continued on next page

- Maintaining finisher pig performance without dietary organic copper with a mannan-rich fraction of *Saccharomyces cerevisiae*
S. L. Beer, C. L. Collins, D. J. Henman and A. Naylor 1557–1557
- Composition of enzyme mixtures influences the faecal digestion of a weaner pig feed
D. W. Zheng, L. Kang, N. Dong and B. J. Hosking 1558–1558
- Enzyme mixtures differentially influence the digestion of nutritional components of a pig grower diet
D. W. Zheng, L. Kang, A. Wang, N. Dong and B. J. Hosking 1559–1559
- Improved mineral utilisation in grower-finisher pigs fed a diet supplemented with graded amounts of two phytases
P. Guggenbuhl, E. Perez Calvo and F. Fru 1560–1560
- Improved mineral utilisation in weaned pigs fed a diet supplemented with graded amounts of two phytases
P. Guggenbuhl, E. Perez Calvo and F. Fru 1561–1561
- Assessment of the effects of a serine protease on commercial grower-finisher pig performance in Brazil
R. S. Toledo, A. G. Rocha and C. Schaefer 1562–1562
- Lysine requirements of modern genotype finisher pigs
K. L. Moore, B. P. Mullan and J. C. Kim 1563–1563
- Sulphur amino acid requirements of commercially-grown finisher pigs
J. C. Kim, C. L. Collins, J. L. Black, K. L. Moore, M. Trezona, B. P. Mullan and J. R. Pluske 1564–1564
- Variation in particle sizes of commercial pig feeds in Vietnam
G. T. Nguyen, W. L. Bryden, M. J. Gidley and P. A. Sopade 1565–1565
- Growth performance of weaner pigs fed diets containing grains milled to different particle sizes. I. Sorghum
G. T. Nguyen, C. Collins, D. Henman, S. Diffey, A. M. Tredrea, J. L. Black, W. L. Bryden, M. J. Gidley and P. A. Sopade 1566–1566
- Growth performance of weaner pigs fed diets containing grains milled to different particle sizes. II. Field pea
G. T. Nguyen, C. Collins, D. Henman, S. Diffey, A. M. Tredrea, J. L. Black, W. L. Bryden, M. J. Gidley and P. A. Sopade 1567–1567
- Rapid changes occur in feed efficiency after infection with *Mycoplasma hyopneumoniae* and *Pasteurella multocida*
G. L. Wyburn, G. J. Eamens, D. Collins and A. M. Collins 1568–1568
- Postprandial kinetics of bacterial ecology in the terminal ileum of pigs fed soybean meal or differentially processed blue sweet lupins
R. Pieper, W. Vahjen, M. Taciak, E. Świąch, M. Barszcz, J. Skomial and J. Zentek 1569–1569
- A study of nucleotides in weaning pigs challenged with *Escherichia coli* K88
J. W. Park, P. Y. Zhao, R. A. Valientes and I. H. Kim 1570–1570
- Differential effects of zinc oxide and a preparation of organic acids and an essential oil on post-weaning diarrhoea
I. Stensland, J. C. Kim, J. Mansfield and J. R. Pluske 1571–1571
- Blend feeding or feeding a single diet has no impact on growth performance or carcase value
K. L. Moore, J. C. Kim and B. P. Mullan 1572–1572
- Reducing variation in finisher growth performance through early post-weaning dietary intervention
R. J. E. Hewitt, A. Corso and R. J. van Barneveld 1573–1573

Chapter 11: Index of Authors 1574–1575