

52nd American Association of Swine Veterinarians Annual Meeting 2021

Navigating the Future...Together

Online
27 February – 2 March 2021

ISBN: 978-1-7138-2952-2

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2021) by American Association of Swine Veterinarians
All rights reserved.

Printed with permission by Curran Associates, Inc. (2021)

For permission requests, please contact American Association of Swine Veterinarians
at the address below.

American Association of Swine Veterinarians
830 26th Street
Perry, IA 50220-2328
USA

Phone: 515-465-5255
Fax: 515-465-3832

aasv@aasv.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Table of Contents

Howard Dunne Memorial Lecture

Navigating the future, together	1
<i>Jerome O. Geiger, DVM, MS</i>	

Alex Hogg Memorial Lecture

Enhancing your brand: the value of lifelong learning, continuing education, and teaching to the swine industry	8
<i>J.S. Pittman, DVM, MS, DABVP</i>	

Sunday: Research Topics

Detection and diagnostic trends of five swine endemic bacterial pathogens (2010-2019)	15
<i>A. P. Poeta Silva, DVM, MS; K. Schwartz, DVM, PhD; B. Arruda, DVM, PhD; E. Burrough, DVM, PhD; J. Santos, DVM; N. Macedo, DVM; O. Sahin, DVM, PhD; K. Harmon, PhD; P. Gauger, DVM PhD; C. Sieper, DVM, PhD; P. Sitthicharoenchai, DVM, PhD; M. Rahe, DVM, PhD; D. Magstadt, DVM, PhD; A. Michael, DVM, PhD; P. Pineyro, DVM, PhD; R. Main, DVM, PhD; R. Derscheid, DVM, PhD; E. Fano, DVM, PhD; M. Clavijo, DVM, PhD</i>	
Replication of clinical <i>Streptococcus equi</i> subspecies <i>zooepidemicus</i> disease in sows and feeder pigs	20
<i>Samantha J. Hau; Kristina Lantz; Keira L. Stuart; Panchan Sitthicharoenchai; Nubia Macedo; Rachel Derscheid; Eric Burrough; Suelee Robbe-Austerman; Susan L. Brockmeier</i>	
Antibiotic susceptibility testing of <i>Mycoplasma hyopneumoniae</i> and <i>Mycoplasma hyorhinis</i> field isolates from the United States	22
<i>F. M. A. Leal Zimmer, BVSc; B. Garcia-Morante, DVM, MS, PhD; A. Betlach, DVM; M. Pieters, DVM, PhD</i>	
Effect of tulathromycin treatment on <i>Mycoplasma hyopneumoniae</i> detection and infectious potential	24
<i>A. M. Betlach, DVM; D. Baumert, DVM; V. Utrera, DVM; L. Galina Pantoja, DVM, PhD; M. Pieters, DVM, PhD</i>	
Estimation of pool sensitivity for detection of <i>Mycoplasma hyopneumoniae</i> by PCR using deep tracheal catheter field samples	25
<i>Amanda Sponheim, DVM; Claudia Munoz-Zanzi, DVM, PhD; Eduardo Fano, DVM, MS, PhD; Maria Pieters, DVM, PhD</i>	
Distribution of viremic piglets in farrowing rooms violates the homogeneous population assumption – implications for PRRSV detection?	27
<i>M. N. Almeida; M. Zhang; W. Lopez; C. Vilalta; J. Sanhueza; C. Corzo; J. Zimmerman; D. Linhares</i>	
Determining the source of <i>Serratia</i> and other bacteria in boar semen	30
<i>Darwin L. Reicks, BS, DVM</i>	
Active environmental surveillance of SARS-CoV-2 in midwestern meatpacking plants	33
<i>S. Storms, DVM; J. Lowe, DVM, MS</i>	
Experimental intravenous, intratracheal, and intranasal inoculation of swine with SARS-CoV-2	35
<i>A. Buckley; S. Falkenberg; M. Martins; M. Palmer; K. Lager; D. Diel</i>	
National and Iowa impacts of African swine fever in the United States	38
<i>Miguel Carriquiry; Amani Elobeid; David Swenson; Dermot Hayes</i>	
A comparison of active surveillance protocols to support pre-movement guidelines for African swine fever	49
<i>M. Farr, DVM; S. Malladi, PhD; O. Beemer, DVM, MS; M. Rotolo, DVM, PhD; A. Ssematimba, PhD; M. Culhane, DVM, PhD; M. Remmenga, PhD</i>	
Active regional surveillance for early detection of exotic/emerging pathogens of swine: a comparison of statistical approaches for selecting farms to be sampled	51
<i>D. Hu, BS; T.-Y. Cheng, DVM, MS; P. Morris, BS, MS; J. Zimmerman, DVM, PhD; C. Wang, PhD</i>	
Use of two demonstration projects to evaluate viral survival in feed	53
<i>S. Dee; A. Shah; R. Cochrane; T. Clement; A. Singrey; R. Edler; G. Spronk; M. Niederwerder; E. Nelson</i>	

Use of a demonstration project to test the effect of extended storage on viral survival in feed	54
<i>S. Dee, DVM, MS, PhD; A. Shah; R. Cochrane, PhD; F. Wu, PhD; T. Clement; A. Singrey; R. Edler, MS; G. Spronk, DVM; M. Niederwerder, DVM, PhD; E. Nelson, PhD</i>	

Sunday Concurrent Session #1: Student Seminar

A novel objective quantifiable measure of lameness in gestating sows	55
<i>A. Shulman, BS; M. Boulanger, BS; T. D. Parsons, VMD, PhD, DACAW</i>	
Evaluation of the finishing mortality removal process and factors that contribute to contamination spread	58
<i>Kris Kovach; Lynn Pavlovic, VMD</i>	
Case study evaluating sow farm natural planned exposure on farms using intensive rotavirus feedback with varying levels of porcine circovirus type 3	60
<i>Brian Johnson, BS; Amy Maschhoff, DVM; Melissa Hensch, DVM; Corrine Stoffel-Frugé, DVM</i>	
Evaluation of different fogging methods to disinfect supplies prior to entering into farms using a cardboard box model contaminated with porcine epidemic diarrhea virus and a swine bioassay	63
<i>Z. Talbert, BS; J. Connor, DVM, MS; A. Lower, DVM; G. Silva, DVM, PhD, MS</i>	
Drinking water flow rates and usage in nursery pigs with various water pressures and nipple orifice sizes	67
<i>H. Everett, BS; S. McCallister, BS; J. Pittman, DVM, MS DABVP</i>	
The effects of oral antibiotic administration on vaccine-induced H1N1 influenza immune responses in weanling pigs	69
<i>P. Haenig; S. Storms, DVM; J. Lowe, MS, DVM</i>	
Effect of particle size and H ₂ O ₂ /PAA concentration on the efficacy of an aerosol decontamination system for items entering swine farms	71
<i>Erin Kettelkamp; Suzanna Storms, DVM; Benjamin Blair, DVM; James Lowe, DVM, MS</i>	
Investigation of <i>Lawsonia intracellularis</i> shedding by peri-parturient sows	74
<i>R. Patton, BS; C. LeFevre, DVM; F. Leite, DVM, MS, PhD; J. Waddell, DVM, MBA</i>	
Significant gaps exist in the current cull sow surveillance stream for the detection of foreign animal diseases in the US	75
<i>Selena Clark; James Lowe, DVM, MS; Benjamin Blair, DVM</i>	
Examining the relationship between hemoglobin concentration in nursery, growing and finishing gilts to be used for breeding replacement	77
<i>H. Lathom, BS; G. W. Almond, DVM, PhD</i>	
Comparing anesthetic combinations for vasectomizing boars	78
<i>E. Pratt, BS; E. Spronk, DVM; J. Steckelberg, DVM; N. Garbes, DVM; D. Amodie, MS</i>	
Risk factors for umbilical defects in commercial pigs	80
<i>M. Bracy, BS; K. Blake, DVM, M.Ag; M. Wensley, MS; D. Madson, DVM, PhD, DACVP; K. Coble, PhD; J. Davenport, DVM; K. Baker, DVM, MS</i>	
Impact of coccidiosis and treatment with ponazuril on piglet performance	83
<i>S. McCallister, BS; H. Everett, BS; L. Britton; C. Phillips, PhD; J. Pittman, DVM, MS, DABVP</i>	
The use of an audio-based monitoring technology to detect clinical respiratory distress episodes in growing pigs	85
<i>A. Witt, BS; J. Rudy, BS MS; C. Alonso, DVM, MS, PhD; A. Fernández-Fontelo, MS, PhD; K. Hogan, PhD; C. Goodell, DVM, MS, PhD, Dipl ACVPM; D. Polson, DVM, MS, PhD</i>	
Lack of efficacy of routine and enhanced hygiene practices in removing environmental rotavirus A from rubber piglet comfort mats	88
<i>Sarah Botkin; James Lowe; MS, DVM; Benjamin W. Blair, DVM</i>	

Sunday Concurrent Session #2: Industrial Partners

Development, benefits, and uses of flow cytometry in swine genetics	90
<i>K. L. Willenburg; B. Belstra; D. Grossi</i>	
Recent trends in vitamin D serum status in swine	92
<i>S. Hough, DVM; J. Bergstrom, PhD; J. Hahn, PhD</i>	

Digital transformation in the swine industry	96
<i>M. Hansen</i>	
Preliminary findings of digital farm entry logs	97
<i>J. Ryken</i>	
One-year commercial demonstration of methionine hydroxy analogue chelated zinc, copper, and manganese (MINTREX® trace minerals) on sow productivity and longevity	100
<i>B. V. Lawrence, PhD; A. Hintz, DVM; B. Buresh, PhD; W. Mills; M. Ritter, PhD; C. Pilcher, PhD; M. Warsco</i>	
Equisul-SDT® dose variance study in nursery pigs	104
<i>N. Winkelman, DVM; A. Mueller, DVM; R. Winscher, CVT; G. Weaver, DVM</i>	
Tiamulin (Vetmulin®): The proven standard in <i>Mycoplasma hyopneumoniae</i> control	108
<i>Lieven Claerhout; Thomas Fangman; David Nolan</i>	
The <i>in vivo</i> and <i>in vitro</i> effectiveness of tylvalosin (Aivlosin® Water Soluble Granules 62.5% w/w tylvalosin) at 50 ppm in water for the control of <i>Mycoplasma hyopneumoniae</i> following experimental challenge and under field conditions	110
<i>C. Eliopoulos, DVM; E. M. Abbott, BVMS, PhD; P. Arruda, DVM, MS, PhD; R. Saltzman, DVM; K. Rooney, MS, DVM; R. Domangue, PhD; C. Smith, DVM</i>	
Development and validation of a reverse transcription real-time PCR assay for detection of PRRSGard®-like vaccine virus	114
<i>Gaurav Rawal, DVM, MS; Wannarat Yim-im, MS; Chad Smith, DVM; Fabian Chamba, DVM, MS, PhD; Charles Francisco, DVM, MS; Jeff Okones, DVM; Jianqiang Zhang, MD, MS, PhD</i>	
Swine employee survey shows flies and gnats negatively affect employee performance	116
<i>Gene Spellman, BS</i>	
LeeO™ individual animal data system implementation in a commercial sow farm	118
<i>Brandi Burton, DVM; Amber Stricker, MS, DVM; Jeff Ley, BA; Tyler Holck, DVM, MS, MBA</i>	
Trends of mycotoxin contamination and mitigation strategies in the US swine industry	121
<i>L. Zheng, PhD; V. Wilson, S. Ramirez, PhD; U. Hofstetter; G. R. Murugesan, DVM, PhD, B. J. Kerr, PhD</i>	
Utilization of a fiber technology to agglutinate pathogenic bacteria associated with post weaning diarrhea in nursery pigs	125
<i>Stacie Crowder, PhD candidate; Dr. Kobe Lannoo; Dr. Dari Brown</i>	
Robustness advantage of TN Tempo progeny validated using a natural PRRS challenge model	126
<i>J. R. Dunkelberger, PhD; D. Boler, PhD; J. M. Eggert, PhD; R. Edler, MSc; E. Little, MSc; D. Hanson, BA; S. Dee, DVM, PhD; E. F. Knol, PhD</i>	
Used filter test results and influencing factors across 10 farms	128
<i>Darwin L. Reicks</i>	

Sunday Concurrent Session #3: Industrial Partners

A case study of reproductive failure associated with porcine circovirus type 3 in an endemically infected commercial sow farm	131
<i>Channing Sebo, DVM; Allison Knox, DVM; Grant Allison, DVM; Bailey Arruda, DVM, PhD; Kelly Greiner, DVM; Derald Holtkamp, DVM, MS; Brad Thacker, DVM, PhD; Chong Wang, PhD</i>	
Efficacy of commercial PCV2 vaccine using a PCV2d and PRRSV co-infection model	135
<i>Brett O'Brien, VMD, MS; Keith DeDonder, DVM; Kelly Lechtenberg, DVM, PhD; Kimberly Crawford, DVM; Brad Thacker, DVM, PhD, Dipl AVBP; Eric Burrough, DVM, PhD, DACVP</i>	
Efficacy of a two dose Porcilis™ Ileitis regimen against experimental <i>Lawsonia intracellularis</i> challenge	138
<i>Brad Thacker, DVM, PhD; Greg Armbruster, DVM, MBA; Brett O'Brien, VMD, MS; Robyn Fleck, DVM; Kimberly Crawford, DVM, MS; Nathan Winkelman, DVM; Adam Mueller, DVM</i>	
Optimizing gut health in the face of enteric endemics	140
<i>M. Hensch, DVM; J. Miller, DVM; J. Spencer, PhD; J. Lee, MS</i>	
The power of big data analytics to generate data-driven production decisions	146
<i>G. Krahn, PhD; C. Eden, BS; B. Altman, BS; J. Spencer, PhD; J. Lee, MS</i>	

Same-day surveillance diagnostics for critical same-day decisions	149
<i>C. Kunas; T. Goode</i>	
Tracking individual pigs for genetic nucleus-multiplication and GDU performance	151
<i>Tom Stein, DVM, MS, PhD</i>	
Comparative efficacy evaluation of two modified-live PRRS vaccines against a heterologous PRRSV 1-7-4 challenge	154
<i>R. Philips, DVM; G. Haiwick, BS; D. Whiteman, MS; J. Hermann, DVM, PhD; B. Fergen, MS, PhD</i>	
Enterisol® Ileitis, what we have learned in twenty years controlling <i>Lawsonia intracellularis</i>	157
<i>Fernando Leite, DVM, MS, PhD; Greg Cline, DVM; John Waddell, DVM, MBA; Jeremy Kroll, PhD; Jeff Husa, DVM; Edgar Diaz, DVM; Oliver Gomez-Duran, DVM, PhD</i>	
<i>Salmonella enterica</i> serovar I 4,[5],12:i:- update on risk factors and control	161
<i>Fernando Leite, DVM, MS, PhD</i>	
Field applicable technology in the swine industry: SoundTalks® cough monitoring and Remote Insights® movement analysis in a PRRS and IAV-S co-challenge study	164
<i>K. Hogan, PhD; A. Sponheim, DVM; E. Fano, DVM, MS, PhD; Dale Polson, DVM, MS, PhD, J. Cairns; Michael C. Keyes</i>	
Easier autogenous vaccine management through GVL	168
<i>Paul Yeske, DVM</i>	
Efficacy of <i>Bacillus subtilis</i> and <i>Bacillus licheniformis</i> (BioPlus 2B®) on sow lactation performance, litter growth, nursery performance and health of pigs challenged with PRRS virus post-wean	171
<i>Steven P. Lerner; Sage R. Becker; Scott A. Dee; Steve J. Kitt; Mark J. Bertram; Todd E. Williams; Brent J. Pepin; Dan B. Hanson; Erin A. Little; Paul F. Frahm; Roy Edler</i>	
How to enhance biosecurity and save money at the same time!	174
<i>Jeff Odle</i>	

Sunday Concurrent Session #4: Industrial Partners

Targeted development of rotavirus vaccines using Medgene's experimental prescription platform (RxP) against current circulating strains	176
<i>A. Young, PhD; A. Petersen, MS</i>	
A new weapon for decontamination of surfaces and premises from African swine fever virus: accelerated hydrogen peroxide	179
<i>Jose A. Ramirez, MS., PhD, EVP & Lead Science Advisor</i>	
The relationship between early life measures and finishing performance	184
<i>C. Bruns, PhD; B. McNeil; J. Sonderman, PhD; T. Rathje, PhD</i>	
Culture of care longevity measurements post training	189
<i>Sarah Probst Miller, DVM; Seth Krantz, DVM</i>	
Evaluation of the effect of tracheal sample pooling on <i>Mycoplasma hyopneumoniae</i> PCR detection	191
<i>R. Mugabi; A. P. Poeta Silva; M. L. Rotolo; S. Krantz; P. Harms, M. J. Clavijo</i>	
QuickTip® semen bag: sperm safety through design	193
<i>R. Grossfeld, PhD; Monika Esch, DVM; R. Koepf; C. Simmet, DVM</i>	
Boar Better® stimulates gilt puberty with or without live boar exposure	196
<i>John J. McGlone, BS, MS, PhD, PAS, ACAWS; Steve Stitzlein, BS</i>	
Evaluation of Prevacent® PRRS in a commercial environment using a seeder pig challenge model	199
<i>S. Dee, DVM, MS, PhD, Dipl. ACVM; D. Hanson; R. Edler, MS; J. Nerem, DVM; R. Evelsizer, DVM; P. Hoffmann, DVM; C. L. Puls, PhD</i>	
Evaluation of shedding and effect on pig performance of Prevacent® PRRS vaccine in commercial conditions	203
<i>Paul E. Yeske; Alyssa Betlach; Robert W. Evelsizer; James M. Hammer</i>	
Effects of a single-phase feeding program on growth performance of nursery pigs	208
<i>H. Cemin, PhD; L. Swalla, MS; J. Pietig, MS; S. Hansen, MS; E. Hansen, MS</i>	

Tetracore ASFV indirect ELISA	210
<i>Luis G. Gimenez Lirola</i>	
Impact of a diformate-monolaurate agglomerate in the lactation diet of sows on the performance of suckling piglets	211
<i>C. Lückstädt; J. Paulsrud</i>	
Effects of vaccination protocols on influenza A virus genetic diversity in co-challenged pigs	214
<i>C. Li, DVM, MS; M. Culhane, DVM, PhD; M. Cheeran, MVSc, PhD; D. Schroeder, PhD; L. Galina-Pantoja, DVM, PhD; M. Jansen, DVM; D. Amodie, MS; M. Mellencamp, PhD; M. Torremorell, DVM, PhD</i>	
Effects of heterologous prime-boost vaccination against influenza A virus on piglet maternally derived antibodies	217
<i>C. Mainquist-Whigham, DVM, MS; M. Jansen, DVM; T. Painter, DVM; M. Mellencamp, PhD; D. Amodie, MS; L. Galina-Pantoja, DVM, PhD</i>	
Poster Session: Veterinary Students	
The efficacy of two detergents for sanitizing swine farrowing stalls	219
<i>K. Nisley, BS; S. Tousignant, DVM, PhD; M. Schleper, DVM</i>	
Quantifying sow lameness with a time-of-flight camera	221
<i>Matthew Boulanger; Thomas Parsons, VMD, PhD</i>	
Pilot study to validate passive transfer in piglets	223
<i>Lucas Buehler; Roy Edler, MS; Scott Dee, DVM, PhD, MS</i>	
A comparison of two different trailer styles on stress and meat quality in commercial finishing hog transport	224
<i>M. Boucher; C. Templeton, DVM; C. Werth, MS; L. Wormsbecher, MS</i>	
Shiga toxin-producing <i>Escherichia coli</i> (STEC) detection and characterization among US swine herds	225
<i>K. Hewitt, BS; J. Brown, DVM; K. Skoland, BS; M. Nickel, DVM; C. Ruston, DVM; M. Breuer, BFA; E. Burrough, DVM, PhD, DACVP; D. Sperling, DVM, PhD; L. Karriker, DVM, MS, DACVPM</i>	
Evaluation of initial pig weight and weaning age as indicators of nursery mortality and growth	227
<i>B. Kitting, BS; M. Valles; J. Flohr, PhD; R. Robbins, DVM, PhD; D. Drebes, DVM; M. de Souza, MS; F. Zarate, MS; R. Schmitt, PhD; R. Moreno, PhD</i>	
Developing a disease outbreak strategy: a survey of swine slaughterhouse location, capacity and limitations	229
<i>Ashley Hallowell, MS; Meghann Pierdon VMD, DACAW</i>	
Phylogenetic analysis of spillover events between swine and human influenza A virus subtype H3N2 between 2014 and 2019 in the United States	231
<i>D. Kinkade; Suzanna Storms, DVM; Benjamin Blair, DVM; James Lowe, DVM, MS</i>	
A comparison of time, product usage and dose validation features between automed [®] and conventional dosing syringes during wean pig shots	232
<i>N. Benge; L. Glowzanski, MsED, VMD; J. Morgan, DVM; L. Magyar; Thad Hinkle; D. Polson, DVM, PhD</i>	
Determining incidence and developing a case definition for muscle necrosis and lameness found in high health flow	234
<i>R. Weidmayer; D. Murray; L. Johnson; A. Sponheim; T. Michels</i>	
Investigating intermittent PRRSV detection in a breeding herd following PRRSV elimination	236
<i>Katyann Graham; Kate Dion, DVM; Kylie Glisson, DVM; Marcelo Nunes-De-Almeida, DVM, MS; Amanda Sponheim, DVM; Jianqiang Zhang, MD, MS, PhD</i>	
Determining feasibility of a serum rinse method to detect PRRSV via PCR	238
<i>K. Edmunds, MS; M. Hensch, DVM; A. Maschhoff, DVM; K. Henness, DVM; R. Philips, DVM; J. Waddell, DVM, MBA</i>	
Effect of <i>Saccharomyces cerevisiae boulardii</i> on mummies, stillborns, and wean-to-service interval on a commercial breed-to-wean farm	240
<i>Isaac N. Goldner, BS; Clayton Johnson, DVM; Claire Lefevre, DVM; Jessica Risser, DVM; Gustavo Silva, PhD; Michael Shields, PhD; Jon Jordon, BS</i>	
Comparison of disinfectant coverage between traditional and electrostatic fogging methods for supply entry into sow farms	241
<i>S. Simmons, BS; H. Johnson, DVM; A. M. Betlach, DVM</i>	

Use of computer-aided design to optimize swine facility airflow	243
<i>Lucas T. Daniels; Benjamin W. Blair</i>	
Determination of porcine sapovirus prevalence and clinical correlation in suckling pigs	245
<i>Amanda Anderson, BS; Brandi Burton, DVM; Channing Sebo, DVM</i>	
Alternative therapies and their impact on productivity of PRRSV challenged pigs	246
<i>S. Baker; M. Wagner, DVM</i>	
Evaluation of porcine rotavirus prevalence and distribution within southwestern Ontario	248
<i>J. Buchan, BSc; H. Jansen, BNSc; A. Surmak, BSc; K. Vilaca, DVM MSc; G. Moser, BSc; K. Marenger, Dip.Ag.; L. Moser, BSc</i>	
The effects of ivermectin on commercial wean pig performance when challenged with porcine epidemic diarrhea virus	249
<i>C. Burgart, MS; M. Hoogland, DVM; W. Lincoln, DVM; N. Lauterbach, DVM</i>	
Efficacy of a surface-bonded quaternary ammonium chloride on the inactivation of porcine reproductive and respiratory syndrome virus (PRRSV) when organic matter is present	250
<i>Madison Durlinger, BS; Derald Holtkamp, DVM, MS</i>	
Effects of fecal microbiota transplant on performance and fecal microbiota in weaned pigs when administered through a water medicator	251
<i>A. Holowka, BS; B. Burton, DVM; R. Merica, PhD; B. Evelsizer, DVM</i>	
A pilot study to measure failure of passive transfer in suckling piglets	253
<i>S. Melson, BS; S. Dee, DVM, MS, PhD ; Roy Edler, MS</i>	
Using oral fluids to determine the prevalence of porcine circovirus type 2 in growing pigs	254
<i>T. Pieper, BS; D. Boykin, DVM; C. Smith, DVM; J. Okones, DVM</i>	
The effect of isotonic protein supplementation on pre-weaning pig growth and mortality within a commercial sow farm	256
<i>J. Ramirez, BS; A. Ornelas; F. Zarate, MS; R. Robbins, DVM, PhD; D. Drebes, DVM; J. Flohr, PhD; R. Schmitt, PhD</i>	
Modeling avian influenza virus transmission dynamics in migratory waterfowl to assess risk to pig populations in Ohio	258
<i>H. L. Walker; A. S. Bowman, MS, DVM, PhD, DACVPM; A. G. Arruda, DVM, MS, PhD; L. W. Pomeroy, PhD</i>	
Understanding endemic pathogen and mortality patterns in a commercial wean-to-finish swine production system	260
<i>Siyu Xiao; Samantha Mehling; Alexandra Henao-Diaz; Jeremy Maurer; Ed Kluber; Rachel Stika; Christopher Rademacher; Jeff Zimmerman; Luis Giménez-Lirola; Chong Wang; Derald J. Holtkamp; Rodger Main; Locke Karriker; Daniel C. L. Linhares; Mary Breuer; Christa Goodell; David Baum</i>	
Early detection of lipopolysaccharide-induced sickness behavior in boars utilizing precision agriculture	262
<i>J. Zimmerman, MS; T. Parsons, VMD, PhD</i>	

Poster Session: Research Topics

Two-stage sampling and risk-based sampling are more efficient than simple random sampling for detection of PRRSV-viremic piglets in farrowing rooms	264
<i>M. N. Almeida; M. Zhang; W. Lopez; C. Vilalta; J. Sanzueza; C. Corzo; J. J. Zimmerman; D. C. L. Linhares</i>	
Influence of number of parturitions on hematological parameters in multiparous sows of intensive production between two consecutive weaning in Chile.....	266
<i>Alejandra Jiménez; Joaquín Álvarez-Norambuena; Carolina Baeza; Álvaro Ruiz</i>	
Influence of sampling time on hematological parameters of multiparous sows of Chilean swine intensive production systems	268
<i>Alejandra Jiménez; Joaquín Álvarez-Norambuena; Carolina Baeza; Álvaro Ruiz</i>	
Retrospective study of the serological behavior of <i>Lawsonia intracellularis</i> in swine intensive production system from Chile	270
<i>Joaquín Álvarez-Norambuena; Paula Gädicke; Álvaro Ruiz</i>	

Serological behavior of influenza A virus in Chilean swine intensive production systems	272
<i>Joaquín Álvarez-Norambuena; Constanza Villarroel; Álvaro Ruiz</i>	
Time to first wild-type PRRS virus detection and risk factor analysis in wean to finish pigs	274
<i>Jose Angulo; Samantha Jansen; My Yang; Albert Rovira; Peter Davies; Jeff Zimmerman; Montserrat Torremorell</i>	
A longitudinal study on PRRSV detection in swine herds with differing demographics and PRRSV management strategies	275
<i>Tariku J. Beyene; Andreia G. Arruda</i>	
Investigation of Enterisol® Ileitis given intramuscularly and with the presence of feed-grade antimicrobials	276
<i>Dana Beckler, DVM, MS</i>	
Turnover events of animal caretakers and productivity in Ohio swine farms	277
<i>N. J. Black, MPH-VPH; A. G. Arruda, DVM, MS, PhD</i>	
Inactivating multiple coronavirus interferon antagonists attenuates pathogenesis of porcine epidemic diarrhea virus	278
<i>A. C. Buckley; X. Deng; A. E. Pillatzki; K. M. Lager; K. S. Faaberg; S. C. Baker</i>	
Determining the minimum infectious dose of <i>Mycoplasma hyopneumoniae</i> using diluted pooled tracheal sample fluid as an inoculum administered intratracheally	279
<i>B. Burton, DVM; R. Merica, PhD</i>	
Metabolomic and biochemical profile of piglet serum and processing fluids	281
<i>Albert Canturri; Fernanda Leal; Qingqing Mao; Carles Vilalta; Chi Chen; Maria Pieters</i>	
The impact of vaccination strategy on between-farm PRRSV transmission	282
<i>Jason A. Galvis; Joaquin M. Prada; Cesar Corzo; Gustavo Machado</i>	
A comprehensive investigation of pig lameness associated to <i>Mycoplasma hyosynoviae</i>	284
<i>M. Surendran Nair; B. Garcia-Morante, DVM, MS, PhD; David Pillman; Cathy Carlson; Chi Chen; Maria Pieters, DVM, PhD</i>	
Detection and characterization of microbial flora and host metabolites in synovial fluids of pigs with clinical signs of lameness	285
<i>M. Surendran Nair, BVSc, MS, MSCTR, PhD; B. Garcia-Morante, DVM, MS, PhD; C. Carlson, DVM, PhD, DACVP; C. Chen, BVSc, PhD; M. Pieters, DVM, PhD</i>	
Effects of early-life antibiotic administration on porcine respiratory microbiota	286
<i>M. Surendran Nair, BVSc, MS, MSCTR, PhD; B. Garcia-Morante, DVM, MS, PhD; A. Betlach, DVM; Mark Schwartz, DVM; Maria Pieters, DVM, PhD</i>	
Comparative study on the production parameters, animal health status and drug usage of Hungarian swine farms	287
<i>László Gombos; László Ózsvari</i>	
Assessing survival chances of neonatal piglets in field conditions	289
<i>Jan Jourquin, DVM; Frederic Vangroenweghe, DVM, MSc, PhD, Dipl. ECPHM; Dries Donkers, DVM; Joaquin Morales, DVM, PhD; Kodore Camara, MSc</i>	
Timing of Draxxin® administration in a PRRSV outbreak may result in positive reproductive outcomes	291
<i>R. Kiehne, DVM</i>	
PRRS viral diversity in piglets born during an outbreak.....	292
<i>M. Kikuti, DVM, MPH, PhD; C. Vilalta, DVM, PhD; J. Sanhueza, DVM, MS, PhD; N. Pamornchainavakul, DVM; J. L. Kevill, PhD; I. A. D. Paploski, DVM, MS, PhD; R. Kienhe, DVM; K. VanderWaal, BS, PhD; D. Schroeder, BS, PhD; C.A. Corzo, DVM, MS, PhD</i>	
Detection of influenza A virus in pig farm workers	293
<i>Gustavo Lopez, DVM; Peter Davies, BVSc, PhD; Cesar Corzo, DVM, MS, PhD; My Yang; Marie Culhane DVM, PhD; Montserrat Torremorell, DVM, PhD</i>	
Evaluation of parity, personnel, and cross-fostering in influenza virus infection during the pre-weaning period	295
<i>Gustavo Lopez, DVM; Peter Davies, BVSc, PhD; Marie Culhane, DVM, PhD; Emily McDowell, DVM; Eduardo Fano, DVM, MSc, PhD; Christa Goodell, DVM, MS, Dipl ACVMP, PhD; Montserrat Torremorell, DVM, PhD</i>	
Modeling pig movement data to improve targeted disease surveillance and control plans of infectious diseases.....	297
<i>Nicolás C. Cárdenas; Jason A. Galvis; Francisco P. N. Lopes; Joana Voges; Antônio A. R. Medeiros; Gustavo Machado</i>	

Measuring the effect of disease diagnostic information on the mortality of growing pigs raised under field conditions	299
<i>Edison S. Magalhães; Pete Thomas; Giovanni Trevisan; Derald J. Holtkamp; Christopher J. Rademacher; Jeffrey Zimmerman; Kent J. Schwartz; Eric R. Burrough; Daniel C. L. Linhares</i>	
Feeder pig movements as a potential driver of the spread of PRRS lineage 1 viruses in the US	301
<i>D. Makau, BVetMed, PhD; M. Alkhamis, DVM, MPVM, PhD; I. Paploski, DVM, MSc, DrPH; C. Corzo, DVM, MSc, PhD; K. VanderWaal, PhD</i>	
Investigation of <i>Actinobacillus suis</i> genomes obtained from clinical cases reveals the emergence of a novel strain	303
<i>M. Meneguzzi; M. O. Costa</i>	
Persistent infection and protection against Senecavirus A in pigs previously infected with a homologous and a heterologous isolate	305
<i>G. Preis; A. Buckley; W. Wiese, F. Vannucci</i>	
Herd prevalence of PRRSV, PEDV, PDCoV and TGEV in pig farm manure pits	306
<i>J. Montoya Lopez; C. Vilalta; J. Sanhueza; C. A. Corzo</i>	
PRRSV farm prevalence in near-to-market-pigs in the United States	307
<i>J. Montoya Lopez; M. Kikuti; C. Vilalta; J. Sanhueza; C. A. Corzo</i>	
Characterization of <i>Glaesserella parasuis</i> strains circulating in US swine herds using whole genome sequencing	308
<i>R. Mugabi; G. Li; N. Macedo; B. Arruda; O. Sahin; R. Main; M. Gottschalk; D. Tucker; M. J. Clavijo</i>	
Comparison of highly pathogenic porcine reproductive and respiratory syndrome virus 2 (HP-PRRSV-2) transmission between conventional needles and a needle-free vaccinator in experimental pigs	309
<i>A. Madapong, PhD; K. Saeng-chuto, PhD; A. Tantituvanont, PhD; D. Nilubol, DVM, PhD</i>	
Immune response and protective efficacy of concurrent vaccination with porcine reproductive and respiratory syndrome virus 2 (PRRSV-2) modified live vaccine and porcine circovirus 2 (PCV2) in a co-challenge of HP-PRRSV-2 and PCV2	311
<i>A. Madapong, PhD; K. Saeng-chuto, PhD; A. Tantituvanont, PhD; D. Nilubol, DVM, PhD</i>	
Estimating farm-level reproduction numbers for PRRSV using sequence-based transmission tree analysis	313
<i>N. Pamornchainavakul, DVM; I. Paploski, DVM, MSc, PhD; D. Makau, BVetMed, PhD; C. Corzo, DVM, MS, PhD; K. VanderWaal, PhD</i>	
Estimating viral population size of PRRSV sublineages based on genetic diversity	315
<i>I. Paploski, DVM, MSc, DrPH; D. Makau, DVM, MSc, PhD; N. Pamornchainavakul, DVM; D. Schroeder, BSc, PhD; A. Rovira, DVM, MSc, PhD; K. VanderWaal, BS, PhD</i>	
Prevalence of postweaning diarrhea caused by <i>Escherichia coli</i> in Spain	317
<i>L. Pérez, DVM, MSc; M. Claver, DVM, BSc; P. J. Sánchez, DVM, MSc; J. A. González, DVM, BSc</i>	
Comparison of methods for <i>Mycoplasma hyopneumoniae</i> DNA detection in oral fluids	318
<i>A. P. Poeta Silva, DVM, MS; G. Storino, DVM; F. Matias Ferreyra, DVM, MS; J. Miller; K. Harmon, PhD; P. Gauger, DVM PhD; W. Witbeck; K. Doolittle; S. Zimmerman, DVM, MS MBA; R. Derscheid, DVM, PhD; M. Clavijo, DVM, PhD; B. Arruda, DVM, PhD; J. Zimmerman, DVM, PhD</i>	
Determining infectivity of pork from PEDV positive pigs of different ages	319
<i>Loni Schumacher, DVM, MS; Rawal Gaurav, DVM, MS; Ethan Aljets; Deaglan Riordan; Jianfeng Zhang, PhD; Jinhui Zhu, MS, PhD; Wannarat Yim-Im, MS; Drew Magstadt, DVM, MS; Phillip Gauger, DVM, MS, PhD; Jianqiang Zhang, MD, MS, PhD</i>	
On the ability to predict the farm-level risk of PRRSV outbreaks by ensemble machine learning modeling and biosecurity practices	320
<i>Abagael Sykes; Derald J. Holtkamp; Broc Mauch; Daniel Linhares; Gustavo S. Silva; Gustavo Machado</i>	
Use of aggregated diagnostic data to monitor pathogen detection and alert swine stakeholders about relevant changes	322
<i>G. Trevisan, DVM, MBA; E. Magalhães, DVM; R. Main, BS, DVM, PhD; J. Torrion, DVM, MS, PhD; J. Christopher-Hennings, DVM, MS; J. Henningson, DVM, PhD; D. C. L. Linhares, DVM, MBA, PhD</i>	
How to coach the swine farmers to omit antibiotic treatment in piglets vaccinated against post-weaning diarrhea: the example of the fecal scorecard	323
<i>F. Vangroenweghe, DVM, MSc, PhD, PhD, Dipl. ECPHM</i>	

Using neonatal rectal temperature for evaluation of farrowing room management: a practical approach.....	325
<i>F. Vangroenweghe, DVM, MSc, PhD, PhD, Dipl. ECPHM; J. Jourquin, DVM</i>	
Characterization and comparison of PRRSV ORF5 sequences between clinical samples and isolates obtained in MARC-145 or/and ZMAC cell lines	327
<i>Wannarat Yim-im, MS; Haiyan Huang, BS; Phillip Gauger, DVM, MS, PhD; Karen Harmon, PhD; Jianqiang Zhang, MD, MS, PhD</i>	

Poster Session: Industrial Partners

Effects of Bioplex® organic trace minerals in gestating and lactating sow diets: a review	328
<i>S. A. Elliott, MS</i>	
Dietary sodium diformate in sows during late gestation and lactation: performance improvements in suckling piglets under European conditions	330
<i>C. Lückstädt; J. Paulsrud</i>	
Sodium salicylate vs. 12.5% liquid aspirin pharmacokinetics study	331
<i>N. Winkelman, DVM; A. Mueller, DVM; R. Winscher, CVT; G. Weaver, DVM</i>	
Comparison of efficacy between two PCV2 vaccines under PCV2d experimental exposure	332
<i>Eduardo Fano, DVM MC PhD; Jana Morgan, DVM; Tyler Bates, BS; Lauren Glowzenski, DVM</i>	
Development of <i>Streptococcus suis</i> challenge models and their use in identifying adjuvants that can increase the protective efficacy of autogenous vaccines.....	334
<i>E. Bumgardner, MS; D. McKeown, BS; D. Stine, DVM PhD</i>	
Labor-free fly control ClariFly 267 (diflubenzuron) achieves 99% reduction in housefly (<i>Musca domestica</i>) populations in both deep pit and shallow pit swine facilities	336
<i>Kirk Dailey, BS; Gene Spellman, BS</i>	
Evaluation of a combination of benzoic acid and nature-identical flavorings to reduce the ASF viral contamination of complete feed	338
<i>H-X. Zhai, PhD; M. C. Walsh, PhD; S. Hough, DVM; J. R. Bergstrom, PhD</i>	
Validation of mRNA quantification of tight junction proteins and cytokines in fecal samples as intestinal integrity biomarkers in swine: a preliminary experience	340
<i>G. Ramis, DVM PhD Dip ECPHM; C. Cabrera-Gómez, DVM; C. Sanmartin, DVM; G. Cano, DVM; I. Riu, DVM; J. Sanmartin, DVM; P. J. Sánchez-Urbe, DVM</i>	
Software integrations provide easy access to data	342
<i>J. Tyler Holck, DVM, MS, MBA</i>	
Understanding IAV-S diversity over time using the SEQUIVITY® Dashboard	344
<i>Channing Sebo, DVM; Jeremy Maurer, VMD</i>	
Monitoring operational efficiency of boar semen production systems with the new Prism10 software package	346
<i>M. Barros, DVM; T. Langer, BS; S. Trulen, BS; J. Quackenbush, BS; R. Grossfeld, PhD, Dr.; Dr. C. Simmet, DVM</i>	
Evaluation of the effect of a <i>Salmonella</i> vaccine on production performance in a herd with salmonellosis	348
<i>Fernando Leite, DVM, MS, PhD; Steve Tousignant, DVM, PhD; Greg Cline, DVM; Tyler Bates, BS; Amy Jacobs, BS; Adam Mueller, DVM</i>	
Continual improvement - the case of the PRRS oral fluid ELISA	349
<i>A. Henao-Diaz, DVM, PhD; M. Zhang, MS; L. Giménez-Lirola, PhD; P. Gauger, DVM, PhD; D. Baum, DVM, PhD; M. J. Clavijo, DVM, PhD; M. Rotolo, DVM, PhD; E. Ramirez, DVM, PhD; R. Main, DVM, PhD; J. Zimmerman, DVM, PhD</i>	
The use of medium chain fatty acids to reduce porcine reproductive and respiratory syndrome virus replication in MARC-145 cells.....	351
<i>S. A. Crowder, PhD candidate; R. M. Pogranichniy, DVM; B. De Rodas, PhD; T. P. Karnezos, PhD; J. S. Radcliffe, PhD</i>	
LeeO™ individual animal data system to track and analyze birth to harvest information	352
<i>Annie Lerner, PhD; Alyssa Betlach, DVM; Mark Schwartz, BS, Jeff Ley, BA; Tyler Holck, DVM, MS, MBA</i>	

Effects of genetic capacity for protein deposition on N-efficiency in growing pigs.....	354
<i>L. M. G. Verschuren, MSc; G. P. Binnendijk, BSc; R. Bergsma, PhD; J. R. Dunkelberger, PhD;</i>	
<i>C. M. C. van der Peet-Schwering, PhD; A. J. M. Jansman, PhD</i>	
Surveillance of microbial virulence genes in over 5000 pigs reveals associations between gene abundance, health status and production stage.....	356
<i>E. Galbraith, MS; K. Leistikow, BS; S. Son, BS, MBA; J. Lee, MS; M. King, PhD</i>	
Evaluation of the effect of a Sequivity® porcine circovirus 3 vaccine on sow farrowing performance and piglet survivability.....	357
<i>T. Specht, DVM; A. Johnson, DVM; E. Guzman, MS; K. Vonnahme, PhD; D. Amodie, MS; L. Galina-Pantoja, DVM, PhD</i>	

Monday General Session: Navigating the Future ... Together

Farmers under fire	359
<i>Kay Johnson Smith, President and CEO</i>	
Sustainable intensification: how to produce more animal protein without depleting natural resources	363
<i>Frank Mitloehner, PhD</i>	
Your right and responsibility to be well	364
<i>Elizabeth B. Strand, Ph.D., LCSW Endowed All Creatures Great and Small Clinical Associate Professor, Founding Director, Veterinary Social Work</i>	

Monday Concurrent Session #1: The Same Old Bugs; Not the Same Old Toolkit

Preparing for a low-zinc world.....	366
<i>Mike Tokach; Jordan Gebhardt; Jason Woodworth; Joel DeRouchey; Bob Goodband</i>	
PRRS CLAMP: molecular diagnostic tools to distinguish wild-type and vaccine strains of PRRSV	371
<i>Phillip Gauger, DVM, PhD; Karen Harmon, PhD</i>	
What can we learn from a PRRS whole genome sequence?	375
<i>Albert Rovira</i>	
Friend or foe: what next generation sequencing can tell you about the endemic agents in your herd	376
<i>Maria J. Clavijo, DVM, PhD; Robert Mugabi, DVM, MS, PhD; Ganwu Li, MS, PhD</i>	

Monday Concurrent Session #2: Welfare and the Swine Veterinarian

Time back to market comparison of different approaches of addressing undercover videos released by activists.....	378
<i>Sarah Probst Miller, DVM</i>	
California Proposition 12: What are the specifics and how can producers manage?	383
<i>T. D. Parsons, VMD, PhD, DACAW</i>	
Pain, longevity and lameness	386
<i>J. Deen, DVM, MSc, PhD, DACAW</i>	
Emotion and cognition in pigs: what does the science tell us?.....	387
<i>Kristina Horback</i>	
Practical solutions for enrichment.....	389
<i>Meghann K. Pierdon; VMD, DACAW</i>	
Validating the effectiveness of alternative euthanasia techniques using penetrating captive bolt guns in mature swine	392
<i>Scott A. Kramer; Brooklyn K. Wagner; Ivelisse Robles; Steve Moeller; Andrew Bowman; Justin Kieffer;</i>	
<i>Andréia Gonçalves Arruda; Michael Cressman; Monique Pairis-García</i>	

Monday Concurrent Session #3: African Swine Fever

Federal efforts to reduce the risk of African swine fever (ASF) introduction into the United States	396
<i>Jack Shere, DVM, PhD</i>	

Producer and veterinary-led initiatives to prevent ASF introduction on US pig farms	399
<i>Wesley Lyons, DVM</i>	
Gaps that exist to prevent African swine fever introduction into the United States	400
<i>Emily Byers, DVM; Lisa Becton, DVM, MS; Rebecca Robbins, DVM, PhD</i>	
What the state veterinarians' African swine fever working group has done to help improve preparedness	404
<i>Mike Neault</i>	
Industry-led efforts to develop better tools to detect and respond to an ASF outbreak	405
<i>Paul Sundberg, DVM, PhD, DACVPM</i>	
Veterinary perspective on managing herds within a control area	408
<i>Marisa Rotolo</i>	
Packer response to an FAD outbreak	409
<i>T. L. Lee, DVM, PhD</i>	
What it will take to get back into business and trade: industry perspective	411
<i>Russell A. Nugent III, PhD</i>	
What happens in the US if we have to learn to live with African swine fever?	414
<i>Keith Erlandson, MS, MBA, DVM, DABVP (SHM)</i>	

Tuesday General Session: COVID-19 Lessons Learned

Economic impact of COVID-19 on macro and swine economies.....	416
<i>L. Schulz, MS, PhD</i>	
Lessons learned from plant closures, testing employees, and modeling outbreaks.....	417
<i>Kimberly VanderWaal, PhD; Lora Black, MSc; Judy Hodge, DVM, MPH, Dipl ACVPM; Sasidhar Malladi, MS, PhD; Addisalem Bedada, DVM, MS; Scott Dee, DVM, MS, PhD, Dipl ACVM</i>	
What could veterinarians do to help human medical doctors in response to COVID-19	419
<i>T. Loula, DVM; D. Bomgaars, DVM; P. Yeske, DVM, MS</i>	
How to handle COVID-19 down on the farm	422
<i>Larry Coleman, DVM</i>	
US Department of Agriculture (USDA) response to COVID-19: What did we learn to be better prepared?	424
<i>Jack Shere, DVM, PhD</i>	