

Presenter Abstracts and Biographies (in alphabetical order)

Alborali — Surveillance and Control of PED Coronavirus in Pigs in Italy

G. Loris Alborali, Boniotti Beatrice, Lavazza Antonio
Istituto Zooprofilattico Sperimentale Lombardia Emilia Romagna Brescia Italy

Abstract: In Italy, Porcine Epidemic Diarrhea (PED) is present since the early 90s. Its diffusion increased with the simultaneous decline of Transmissible Gastroenteritis (TGE), another coronavirus pig enteritis widespread in the 70-80s. A severe epidemic wave of PED outbreaks occurred in the early 90s and then it became endemic with sporadic outbreaks occurring between cyclic epidemic peaks; the last of which on 2005-2006 in pigs densely populated areas of North Italy. The clinical signs involved pigs of all ages, but mortality was registered only in piglets and lasted 3-4 weeks. On farms with only finisher pigs, diarrhea was acute, watery, without evidence of mucus and blood and on farrow-to-weaner herds, vomiting, diarrhea and death from dehydration were prominent in suckling pigs. MAb-based (anti-PEDV strain CV777) diagnostic tools were developed at IZSLER. They were set up for both antigen (immuno-electron-microscopy-IEM and double antibody sandwich-DAS-ELISA) and antibodies (antigen capture ELISA and immune-peroxidase monolayer assay-IPMA) detection. Virological identifications were also confirmed by RT-PCR. From 2008 to 2014 only sporadic outbreaks were observed in growers and finishers herds: 71 PEDs, from 58 different farms, out of 1563 cases of enteritis (4.54%). The genetic variability of 26 strains identified during six-year period was analyzed by partial sequencing of 3 genes. During 2014, a serosurvey (antibodies were found in 11 out of 21 farms in 7% to 52% tested animals) confirmed the still active circulation of PEDV. IZSLER is carrying out a targeting surveillance on pig enteritis to detect old (as PEDV) and potentially new enteric pathogens.

Biography: G. Loris Alborali was born on August 29, 1963 in Italy. He graduated in Veterinary Medicine in 1988 at Milan University. He obtained a degree in Legal Medicine Veterinary Public Health in 1993 at the same faculty in 1995 and in Public Health at the Faculty of Veterinary Medicine 'University of Parma. He is a diplomated at European College Porcine Health and Management (ECPHM) and President of Italian Association of Swine Pathology and Breeding (SIPAS). Since 1989 to 1991 he had worked as veterinary practitioner. Since 1991 he is working at Istituto Zooprofilattico Sperimentale Lombardia and Emilia Romagna (IZSLER) as veterinary officer, than as director of Unit and as Animal Health Diagnostic Department since 1999. He has participated in national and international research projects and has authored and co-authored more than 150 publications in national and international journals. He is working in veterinary service and research, mainly in pathological diagnostic activity in swine. The area of interest is biosecurity programs and health management in enteric and respiratory swine diseases.



Loris Alborali

Araujo — Porcine Epidemic Diarrhea Situation in Colombia

Alfonso Jose Araujo, Technical Director of Animal Health

Arora — Porcine Epidemic Diarrhea in Canada: Impact, Control, and Response

Rajiv Arora, Senior Staff Veterinarian
Canadian Food Inspection Agency (CFIA), Ottawa, Ontario, Canada

Abstract: The first case of Porcine Epidemic Diarrhea (PED) in Canada in a swine farm was confirmed by the CFIA on Jan 24, 2014. As of September 05, 2014, there are 67 confirmed cases of PED in Canada. These cases have been detected in only four Canadian provinces which includes Ontario

(n=63), Manitoba (n=2), Quebec (n=1) and Prince Edward Island (n=1). There have been no cases reported in the other six provinces and three territories. The number of new cases being reported per month has diminished significantly after April 2014. All new confirmed cases in June (n=4) and July (n=1) have been in the province of Ontario. No new case has been detected in Canada in the month of August. PED is not a federally reportable disease in Canada. The provincial governments, along with the swine industry, have been leading the response to PED in each of the affected provinces. The CFIA has engaged and worked collaboratively with provincial and industry stakeholders to provide technical, diagnostic, and scientific support. The main components of the PED control and management strategy are based on biosecurity and biocontainment, disease monitoring and surveillance, herd management, border controls and vaccine availability. Most of the affected farms in the four provinces are working their way through elimination strategies while undergoing significant management and biosecurity changes with the support of their veterinarians, industry, and provincial governments.

Biography: Dr. Rajiv Arora holds a Master's degree in Veterinary Medicine. He joined the Canadian Food Inspection Agency (CFIA) in 2007 and has worked at various levels of veterinary positions within the federal government and has extensive experience in animal health and food safety programs. He is presently working in the position of Senior Staff Veterinarian within the Foreign Animal Disease Programs. He is responsible for foreign animal diseases and emerging diseases of swine and is leading the PED file from policy and program perspective. Dr. Arora also provides his expertise in support of the international trade and overall Canadian National Animal Health Program of the CFIA and regulatory policy development in Canada. Dr. Arora has an international experience of handling and leading various disease outbreaks like Foot and Mouth Disease, Classical Swine fever etc. prior to moving to Canada.



Rajiv Arora

Aubry — Epidemiological Investigation into Pelleted Swine Feed Containing Spray-Dried Porcine Plasma as a Possible Source of Porcine Epidemic Diarrhea (PED) in Canadian Swine Herds

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^d Public Health Agency of Canada, Ottawa, Ontario, Canada

Abstract: Porcine epidemic diarrhea virus (PEDV) was first detected in Canada in January 2014. A feed investigation was initiated by the Canadian Food Inspection Agency after preliminary testing revealed that a lot of imported spray-dried porcine plasma (plasma) used in the manufacture of feed pellets in Canada contained PEDV genetic material. The attack rate amongst the farms which received piglet feed containing the implicated lot of plasma was 21.4% (18/84). During the same period, only 16 other cases were reported amongst the approximately 7,000 hog farms in Canada. The feed did not contain any other ingredient of porcine origin. The attack rate was significantly higher on farms that received feed containing higher concentration of plasma. The plasma and the feed contained PEDV genetic material similar to the strain seen in the USA, and bioassay studies demonstrated that the plasma did contain PED virus capable of infecting and causing disease in pigs. While there is little known regarding the importance of transmission via feed in the epidemiology of PED, the epidemiological evidence gathered during this outbreak investigation supports that this first Canadian outbreak of PEDV was associated with a contaminated lot of pelleted swine feed.

Biography: Dr. Aubry joined the Canadian Food Inspection Agency (CFIA) in 2009 as a Risk Assessor and Scientific Advisor within the Animal Health Science Division. Dr. Aubry provides scientific information and expert advice in support of the Canadian National Animal Health Program of the CFIA and regulatory policy development in Canada. She also collaborates with

partners for the provision of animal health epidemiological expertise. In collaboration with CFIA and provincial colleagues, she completed the epidemiological investigation during the outbreak of PED in Canada in the spring of 2014. Dr. Aubry is a veterinarian and holds a master degree in Veterinary Epidemiology from the Université de Montréal. She also completed graduate studies in Ambulatory and Production Medicine at Cornell University. Prior to joining the CFIA, Dr. Aubry worked in a private practice in New York and Pennsylvania, and was a professor of dairy and beef population medicine at the Université de Montréal, where she initiated veterinary students to epidemiology and population medicine.

Barcos — The OIE Position on PED

Luis Barcos

Barr — PED: The Canadian Experience and Perspective

Debbie Barr, Canadian Food Inspection Agency (CFIA), Ottawa, Ontario, Canada

Abstract: Canadian Food Inspection Agency (CFIA) in collaboration with other stakeholders has adopted a proactive risk management approach to deal with the emergence of Porcine Epidemic Diarrhea. CFIA was notified by the United States Department of Agriculture (USDA) about the outbreak of PED in the U.S on May 22, 2013. Canada was able to prevent the introduction of this disease for almost 8 months. The first case of PED in Canada (Ontario) in a swine farm was confirmed by the CFIA on Jan 24, 2014. The provincial governments, along with the swine industry, have been leading the response to PED in each of the affected provinces. CFIA led a feed investigation to address the concerns that feed could cause the transmission of the virus. The weight of the epidemiological evidence (which includes the bioassay results) supports that the early cases in Ontario and for the single case in PEI in January 2014 was associated with swine pelleted feed containing a specific lot of spray-dried porcine plasma. CFIA through the office of the Chief Veterinary Officer, Canada, organized a PED forum in March 2014 to provide a platform for the stakeholder community to engage in an all-day, face-to-face open dialogue on the Canadian and U.S. experience with PED. The number of new confirmed cases in Canada has decreased significantly with the bulk of cases confined to only one province. While sporadic cases may continue to occur, we don't feel that PED is continuing to affect the greater pig population in Canada. Canada has taken extra mitigation measures as per the requests of our trading partners and has been able to minimize any trade interruptions.

Biography: Dr. Debbie Barr holds a Doctorate in Veterinary Medicine from the University of Guelph. She has worked at the Canadian Food Inspection Agency for the past 28 years. Prior to joining CFIA, Dr. Barr worked for three years in private practice. She has worked at all levels of veterinary positions within the federal government and has extensive experience in international trade. She is currently Acting Director of Animal Health, Welfare and Biosecurity in the Animal Health Directorate of the CFIA and provides professional leadership and managerial direction for the development and implementation of federal policies and programs aimed at managing domestic and foreign animal diseases and zoonotic risks to terrestrial and aquatic animal stocks and their products in Canada. This position engages domestic and international partners and stakeholders in representing the position of the Agency and Canada on public health, terrestrial and aquatic animal health, welfare, and biosecurity matters.



Debbie Barr

Becton — Review of Porcine Epidemic Diarrhea Virus (PEDV) Biosecurity Measures

Lisa Becton, DVM, MS, DACVPM

Director of Swine Health Information and Research
National Pork Board

Abstract: The diagnosis of Porcine Epidemic Diarrhea virus (PEDV) in the United States in 2013 highlighted the need for additional focus on biosecurity protocols. The presentation will focus on research findings, lessons learned, and outreach efforts for biosecurity on-farm.

Biography: Dr. Becton has been with the National Pork Board since April of 2008. Areas of responsibility include swine health issues management, oversight and administration of swine health research, farm biosecurity and security, comprehensive disease surveillance, PRRS elimination, meeting coordination, development of producer and veterinary materials and oversight of the Swine Health Committee. Prior to working at the National Pork Board, Dr. Becton worked fifteen years for two different large integrated swine operations as staff veterinarian. Dr. Becton completed her degree as a Doctor of Veterinary Medicine from North Carolina State University in 1994; and in 2010 completed a Masters in Food Safety from Michigan State University, College of Veterinary Medicine. Other activities included completion of the Swine Executive Veterinary Program from the College of Veterinary Medicine at the University of Illinois, Champaign, IL. Dr. Becton attended the two week training for Foreign Animal Disease Diagnosticians at the USDA APHIS Foreign Animal Disease School at Plum Island, NY. As July of 2013, Dr. Becton wrote and passed the exam to become a Diplomat in the American College of Veterinary Preventive Medicine.



Lisa Becton

Bedford — On Guard: CaribVET and the Caribbean Prepare for PED

Patricia D Bedford DVM MPH

Abstract: The regional strategy that is implemented since several years in the region to contribute to strengthen veterinary services and improve preparedness planning in each Caribbean country / territory. She will also highlight the interactions between science, surveillance, policy/decision making and capacity building which is key in the development and continuous improvement of the network.

Biography: Patricia 'Pattie' D Bedford obtained her Doctor of Veterinary Medicine degree in Trinidad from The University of the West Indies. After obtaining her degree Dr. Bedford remained in Trinidad and worked at a small animal clinic. In 2003 she returned to her native island Barbados and opened a mobile mixed animal practice which she owned and operated for 5 years. Pursuing her passion for Veterinary Public Health, Dr. Bedford moved to Minnesota USA in 2008 to attend the University of Minnesota where she obtained a Master of Public Health in Public Practice and a Residency/Post-Doctoral Fellowship in Veterinary Public Health. During her time in the US she was trained and worked in Food Safety and Security, Transboundary Disease preparedness and response, risk communication, global health and One Health. In 2010, Dr. Bedford returned to the Caribbean where she has worked for the Barbados Ministry of Agriculture as a Veterinary Public Health Specialist and acted as the CaribVet Coordinator in the island of Guadeloupe. Dr. Bedford is currently a Veterinary Public Health Consultant in Barbados and the chairperson of the CaribVET Communications Working Group.

Boniotti — Genetic Variability of Italian PEDV Strains

Maria Beatrice Boniotti

BS, Managing Biologist, IZSLER

Biography: Beatrice Boniotti studied Biology at the University of Milan (Italy) and obtained her specialization degree in Applied Genetics in 1995, studying the viral protease and capsid protein of the rabbit hemorrhagic disease virus. She undertook post-doctoral training in Madrid (Spain) investigating plant cell cycle; in particular she was interested in the G1 to S transition in the *A. thaliana* model. Since 2002 she has worked at IZSLER (Brescia, Italy), an animal health and food security government Institute. She is involved in the development, standardization, and validation of molecular diagnostic methods, aimed to detection, identification and characterization of etiological agents. Her current main interests are genotyping of bacteria and sequencing of viral genomes, for epidemiological purposes and/or for studying the molecular basis for viral and bacterial pathogenesis. Key Publications:

<http://www.ncbi.nlm.nih.gov/pubmed/?term=Boniotti+MB>



Maria Beatrice Boniotti

Boyle — Emerging Risks to Animal Health

Theresa Boyle, Veterinary Medical Officer
USDA, APHIS, IS, CEAH, Fort Collins, Colorado

Abstract: APHIS-VS is expanding on efforts to identify and report on potential emerging risks to animal health (such as disease, pests, climate change). The emergence of animal diseases is an important global issue that has become increasingly significant over the past several decades as the number of emerging diseases identified has rapidly increased and the realization that a majority of human emerging infectious diseases are zoonotic. It is increasingly important to monitor for emerging risks to animal health internationally, due to the uncertain consequences of a new disease; it may affect agriculture, the environment and ecosystem, human health and local and national economies. There are many opportunities, nationally and internationally, to develop collaborative efforts and networks to achieve our goals together.

Biography: Dr. Boyle received her Doctor of Veterinary Medicine degree from the University of Minnesota in 1989. After serving as a volunteer for 2 years with the US Peace Corps in Honduras she began working for the US Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services in New Mexico. In 1995 she began working with USDA, APHIS, International Services, first in Costa Rica with the Screwworm Eradication Program, then in Mexico City as the Animal Health Trade Specialist. From February of 2002 through June of 2005, Dr. Boyle was stationed in Montevideo, Uruguay as the Area Director working on Animal and Plant Health Trade Issues for Uruguay, Paraguay, and Argentina. From 2005-2008, Dr. Boyle was posted in Beijing, China. As Area Director she was responsible for the economies of China, Mongolia, Hong Kong and Macau. Her duties included trade negotiations (related to sanitary and phytosanitary issues), disease updates, technology transfer, and Safeguarding American Agriculture. From 2008- 2012 she was stationed in Riverdale, Maryland as the Lead Technical Director for Animal Health Policy and then promoted to the position of IS Associate Deputy Administrator for Animal and Plant Health Programs. Following one year in Bangkok, Thailand as the Assistant Regional Manager covering South and Southeast Asia for animal and plant health issues, trade, and capacity building initiatives, she transferred to CEAH in Fort Collins to work with international collaboration and emerging risks to U.S. animal health.



Theresa Boyle

Castro — Measures Adopted in Uruguay after the Detection of Novel Swine Enteric Coronavirus Diseases (nSECD) in America

Gustavo Castro, Directorate General of Livestock Services, Uruguay

Abstract: Uruguay is located in South America, bordering Argentina and Brazil. It has an area of 176,215 km² and 3: 286 314 inhabitants. Meat production (cattle and sheep), milk and wool are the main agricultural and export items. Pork production is a secondary agricultural product. There are 194,639 pigs, concentrated south of the country. More than 50% of the animals are raised in large-scale establishments (average 1,500 animals), although small farms (average 5 animals) are predominant. Meat production is for domestic consumption, and meat and fat is imported (mostly from Brazil and Chile). Epidemiological surveillance of major diseases of pigs is conducted by the Directorate General of Livestock Services and based on visits to producers (according to risk), monitoring of urban waste landfills (according to risk), sampling and serological surveys of wild boars. Measures taken in Uruguay upon detection of nSECD in America are: 1: Regional communication: maintain a permanent exchange of information with the Official Veterinary Services of neighboring countries (Argentina and Brazil). 2: Additional health measures for entry of breeding pigs from affected countries. 3. Outreach: designing an information flyer about the disease. 4. Visits to producers: prioritizing producers and areas of risk. 5. Diagnosis: implementation (in collaboration with Faculty of Science) of a PCR multivariate test.

Biography: Gustavo Castro was born on July 14, 1969 in the city of Juan Lacaze, Colonia, Uruguay. He made his Univ studies at the Faculty of Veterinary Science (University of the Republic) in Montevideo (Uruguay), where he obtained the degree of Doctor of Medicine and Veterinary Technology in 1999. Enters Veterinary Faculty Fellow as R&D in 1994, later moving to Swine Area, first as Assistant (in 1997) and currently as Assistant Professor and Head. He is also the Head of the Department of Farm Animals. In 2002 he graduated as a Specialist in conservation of domestic animals in traditional production systems at the Faculty of Veterinary Medicine, University of Cordoba (Spain). In 2009 joined the Ministry of Livestock, Agriculture and Fisheries, where he serves as Technical Advisor for Animal Health Division and coordinates surveillance activities in domestic and wild swine. He has written scientific and outreach papers in national and international publications about diseases of pigs and boars, backyard production systems and conservation of local genetic resources items. He lives in Montevideo, is married and has 2 children.



Gustavo Castro

Clifford — U.S. Response to Novel Swine Enteric Coronavirus Disease Viruses

John R. Clifford, Deputy Administrator and Chief Veterinary Officer, Veterinary Services (VS), Animal and Plant Health Inspection Service, U.S. Department of Agriculture

Abstract: Following confirmation of SECDs in the United States in May 2013, the U.S. Department of Agriculture has focused on preventing the spread of these diseases through the U.S. pig population. As the chief veterinary authority for the United States, VS has led the Nation's response effort to combat SECDs, with close cooperation from State governments, industry associations, and veterinary diagnostic laboratories. In addition to releasing a Federal Order on June 5, 2014, requiring reporting of SECDs, VS has worked to provide funding to combat these diseases and has taken additional steps to ensure the health of U.S. animal agriculture. This includes working with industry to expedite the licensure of vaccines, conducting a pathways analysis, and establishing a team of epidemiologists to conduct an investigation into the introduction of these diseases into the United States. Through continued cooperation and collaboration with our domestic and international partners, VS will work to eradicate SECDs and promote the health of our agriculture and Nation's food supply.

Biography: Dr. John R. Clifford is the Deputy Administrator and Chief Veterinary Officer for APHIS' Veterinary Services' (VS) program. In this position, he provides leadership for safeguarding U.S. animal health. Prior to becoming Deputy Administrator in May 2004, Dr. Clifford was the Associate Deputy Administrator, National Animal Health and Policy program, where he led VS' efforts to protect, sustain, and improve productivity, marketability, and health of the nation's animals, animal products, and biologics. Dr. Clifford served as VS' Assistant Deputy Administrator from 1997-2002. He also has extensive field experience, having served as area veterinarian in charge for several Areas; the National Health Monitoring System coordinator for one State; and the brucellosis epidemiologist and veterinary medical officer in another State. Before beginning his work with APHIS, Dr. Clifford was a private veterinarian in a mixed practice. He received his DVM and BS degrees in animal science from the University of Missouri. A native of Kentucky, Dr. Clifford currently resides in Virginia with his wife, Sara.



John Clifford

Cobb — PEDV: How Does New Zealand Detect and Respond to Emerging Risks?

Stephen Cobb BSc (VetSci) BVM&S MRCVS

Manager, Biosecurity Risk Analysis (Animals and Aquatic), Biosecurity Science, Food Science & Risk Assessment, Ministry for Primary Industries-Manatū Ahu Matua

Abstract: Risk goods may be imported into New Zealand only under the terms of an Import Health Standard (IHS), which specifies required risk management measures. Import risk analyses (IRAs) provide the scientific basis for these measures. However, IRA development requires considerable time and resources. In order to prioritise available resources, since 2012 the Ministry for Primary Industries (MPI) has developed a system to rapidly filter and assess emerging risk information. Between August 2012 and April 2014 this system has processed 1066 'alerts', including information generated by the incursion of PEDV into North America. Our initial assessment of this outbreak (June 2013) concluded that there was no evidence that the international trade in pig semen or pig meat would transmit infection. Subsequently, the spread of PEDV was reported to be associated with the use of spray-dried porcine plasma (SDPP) in pelleted pig feed. Although studies failed to establish a link between SDPP and disease outbreaks, voluntary recalls of SDPP were initiated. Annually circa. 95,000 tonnes of SDPP are imported although all of this is used in cat food manufacture and is subject to rendering. Until further information becomes available, imports of SDPP and lard are subject to post clearance conditions and a call in of powers has been applied to all other pig by-products.

Biography: Stephen Cobb manages the Biosecurity Risk Analysis (Animals and Aquatic) Team of New Zealand's Ministry for Primary Industries (MPI). After graduating from Edinburgh University in 1995, Stephen spent six years in private veterinary practice in the United Kingdom before joining the Veterinary Laboratories Agency (VLA) as a Veterinary Investigation Officer, later becoming a Senior Veterinary Investigation Officer. Whilst there he was the Project Leader for the Scrapie Monitoring Scheme and Deputy Project Leader for the antimicrobial sensitivity sub-programme (England and Wales). Stephen was also a member of the VLA Bovine Species Group, a knowledge hub for investigation of emerging diseases of cattle. He joined MPI as a Senior Adviser in 2006, and became the Principal Adviser with responsibilities for animal health import risk analysis in 2010. Since joining MPI he has been responsible for import risk analyses for a variety of commodities including live cattle and bovine germplasm, poultry meat and hatching eggs, hides and skins, and squamata (lizards). He is the lead author of the Animal Health Risk Analysis Chapter of the recently published second edition of Encyclopedia of Meat Sciences and is the Vice-Chair of the European Food Safety Authority's External Review Working Group. For further details, see <https://www.linkedin.com/pub/stephen-cobb/61/273/971>



Stephen Cobb

Cordova — Share What You Know: A Collective Approach to Combating Swine Enteric Coronavirus Diseases (SECD)

Elvis Cordova

Deputy Under Secretary for MRP

Biography: Mr. Cordova is the Deputy Under Secretary for the Marketing and Regulatory Programs Mission Area at the U.S. Department of Agriculture where he helps to oversee the Agricultural Marketing Service, the Animal and Plant Health Inspection Service, and the Grain Inspection, Packers and Stockyards Administration. He previously served as the Chief of Staff for the Research, Education & Economics Mission Area at USDA where he helped to oversee the Agricultural Research Service, the Economic Research Service, the National Agricultural Statistical Service, and the National Institute of Food and Agriculture. Before joining USDA, he served as a Presidential Management Fellow at the Farm Credit Administration and the U.S. Department of Energy where he worked on issues encompassing alternative energy, economic development, financial services, and international & public affairs. Mr. Cordova has also held the position of Vice President of Public Relations at Tzolkin Media Inc., a D.C. based start-up company that developed online entertainment content for the Latino youth market. Prior to joining Tzolkin Media, he was the Director for Latin American programs at the Self Reliance Foundation where he managed the organization's civil society building projects, which focused on teaching social media technology to journalists and radio producers throughout Latin America. Before relocating to Washington D.C., he lived in Argentina and Brazil where he conducted research on economic and trade development. During his time in New York City, he worked at the United Nations as a consultant where he researched state capacity building strategies aimed at enhancing trade development in emerging markets. He also worked as a management planning analyst for the New York City Department of Parks and Recreation. Mr. Cordova began his career as a financial analyst at the Harvard Management Company in Boston, Massachusetts. Mr. Cordova, a recipient of the Woodrow Wilson Graduate Fellowship, holds a Master's Degree in Public Administration from the Wagner Graduate School of Public Service at New York University and a Bachelor's Degree in Criminal Justice from Northeastern University. He also holds various professional and academic certificates from Georgetown University, Harvard University, University of California at Berkeley, Universidad de Sevilla in Spain, Universidad de Buenos Aires in Argentina, Ecole Nationale des Travaux Publics de l'Etat in France, and Pontificia Universidade Catolica in Brazil. His languages include Spanish, Portuguese, and French. Mr. Cordova recently served as a member of the Executive Board of the Washington D.C. Chapter of the National Society of Hispanic MBAs.



Elvis Cordova

Feng — Summary of Porcine Epidemic Diarrhea in China

Li Feng

Harbin veterinary research institute, Chinese Academy of Agricultural Sciences, Harbin, Heilongjiang province, P.R.China

Abstract: Porcine epidemic diarrhea (PED) now spread throughout the whole China since its first detection in 1978. It is not a reportable disease in China. But it causes a big economic loss to pig industry. The positive rate of pig farms varies 71.43% - 83.47% base on the samples from diarrhea pig farms from 2011. PEDV could be detected in more than 29 provinces in recent years, the mortality of suckling piglets are from 10~100% base on pandemic and endemic or immunization situation. Two genotypes (G1 and G2) of PEDV are present in China based on the sequence of Spike gene. The sequence analysis of S genes indicated that G1 subtype strains have nucleotide deletion, insertion, generous point mutations compare with G2 subtype. It is very popular that PEDV Co-infected with Transmissible gastroenteritis virus (TGEV) and porcine rotavirus in pig farms, and some acute diarrhea disease cases are not caused by PEDV. Diagnosis of PED cannot be made solely based

on clinical signs because PED cannot be clinically differentiated from TGE. Various laboratory diagnostic methods including FA, RT-PCR, and real-time RT-PCR are developed. Furthermore, we established a RT-PCR, LAMP assay to distinguish the PEDV wild strain from vaccine strain CV777 (125 passages) based on ORF3 gene (49 nt deletion in vaccine strain). Vaccination is still an economical and effective measure to control PEDV. We have developed two kinds of vaccine against PEDV and TGEV: the killed bi-combined vaccine (licensed from MOA in 1996), and the bi-combined attenuated live vaccine (2002). It can be vaccinated for the active immunization or passive immunization. The prevention and controls of PEDV requires combining the risk management with vaccination.

Feng — The Update of Epidemic and Controls of SECD in China

Li Feng, Hongyan Shi, Jianfei Chen, Xing Zhang, Pinghuang Liu

Division of Swine Digestive System Infectious Diseases, State Key Laboratory of Veterinary Biotechnology, Harbin Veterinary Research Institute (HVRI) of Chinese Academy of Agricultural Sciences (CAAS), Harbin, Heilongjiang, P.R.China 150001

Abstract: PEDV is widespread throughout China since first report in 1978, and was responsible for 2011.2-2013 major breakout of pig diarrhea. PEDV was detected in 797 samples (feces and intestines) from 276 pig farms in 29 provinces in China. The positive rate ranges from 62.10% to 78.49% for detected samples, from 71.43 to 83.47% for pig farms. We also found that the concurrent infection of PEDV and TGEV or Rotavirus account for approximately 20% positive samples. Furthermore, we analyzed the sequence of the spike gene of field strains, and found that two genotypes (G1 and G2) are present in China. There are 3 sites of nucleotides insertion and 2 sites of nucleotides deletion in Spike gene of G1 PEDV compared to G2. Recently we detected PDCoV by RT-PCR in feces and intestines, the positive rate is 12.2% and PDCoV are detected in 5 provinces in China, and the virus isolation is under way. The prevention and control of PEDV need combining biosecurity with vaccinations. Based on killed and attenuated live vaccine against PEDV and TGEV are developed and applied in China. Acupuncture point (Houhai point, located between tail and anus) are the route of vaccination. The protective rate of active and passive immunity are more than 90% and 85%. The whole herd vaccination, including weaned piglets, finishing pigs, especially gilts is a key rules for PEDV prevention, and passive immunization is very important for the suckling piglets. And biosecurity (All-in/all-out, Do disinfection and keep house empty) should be done. For reduce the death of neonatal piglets, we could keep the farrowing house warm in winter, promote the whole herd of pigs the immunity, have free access to water to diminish dehydration.

Biography: Dr. Li Feng, Head of Division of Swine Digestive System Infectious Diseases, Head of Division of Scientific Research Management and International Cooperation in Harbin Veterinary Research Institute (HVRI) of Chinese Academy of Agricultural Sciences (CAAS). Dr. Feng joined HVRI since 1991. Dr. Li laboratory has a long-standing interest in studying in vaccine, diagnosis, molecular biology and molecular immunity against swine Coronavirus and porcine rotavirus A group. His team had developed the TGEV /PEDV bivalent killed vaccine and attenuated live in 1995 and 2002 in China respectively, which have been widely applied in pig farms, and also developing the trivalent modified live vaccine against TGEV, PEDV and PoRV(G5). His team established the PEDV /TGEV/PoRV diagnostic methods (ELISA, FA,RT-PCR,REAL-TIME PCR, LAMP,FA,VN),. His laboratory also studies the molecular epidemiology of PEDV, TGEV and PoRV, and found two genotypes (G1 and G2) of PEDV and more than 6 serum type of PoRV currently present in pig farms in China. And confirm the PDCoV in China, and also works on some basic research. He has published 23 peer-reviewed SCI papers and been awarded many honors likes the 2nd National Technology Advancement Award of China in 2004.



Li Feng

Fuentes — Measures to Prevent the Entry of Porcine Epidemic Diarrhea (PED) in Chile

Mauricio Fuentes A. (DMV, MSc)

Animal Health Division, Agriculture and Livestock Service (SAG), Chile.

Abstract: Due to Porcine epidemic diarrhea (PED) is an exotic disease to Chile, the Agriculture and Livestock Service (SAG) has been working in the implementation of a range of the measures that are being carried out in order to prevent the entry of the disease into the national territory. These actions include a range of tasks related to the import process, the current import regulations, passive surveillance, diagnostic techniques carried out by the official laboratory and contingency plans for the possible entry of the disease. Additionally, it also involves a close labour with the industry, in order to act in a coordinated way for the implementation of all the measures that are necessary to avoid the entry of the disease into the country.

Biography: Dr. Mauricio Fuentes A. DMV, Facultad de Ciencias Veterinarias, Universidad de Chile, 2002. MSc Veterinary Science, Veterinary Infection and Disease Control pathway (VIDC), University of Liverpool, UK, 2012. Head of SAG Office and veterinarian in charge of surveillance and animal disease control programs, Province of Parinacota, Chile. (2005-2011). National swine health manager and member of the team responsible for the Official Plan for the Control and Eradication of PRRS in Chile, Animal Health Division, Agricultural and Livestock Service (SAG), 2014.



Mauricio Fuentes

Gauthier — Pathways Assessment: Entry Assessment for Exotic Viral Pathogens of Swine

Julie Gauthier, DVM, MPH, DACVPM

Import Risk Analyst, USDA APHIS VS National Import and Export Services

Abstract: An entry assessment was conducted as the first step towards determining whether significant gaps exist in current import regulations that may result in infections of U.S. domestic swine with exotic viral pathogens of swine. The scope of the analysis was defined as the risk of entry of any exotic viral pathogen of domestic swine (*Sus scrofa domestica*) into the United States as a result of any type of import activity. We defined pathways based on categories of import movement to which animal health import risk mitigations are typically applied. For each entry pathway, we based our likelihood estimation on: (1) the quantity of the commodity imported via the pathway; (2) the likelihood that a hazard is associated with the pathway; and (3) the likelihood that a hazard is not prevented from entering and survives any import mitigation procedures. We rated several pathways as posing non-negligible risk of introducing exotic viral pathogens of swine into the United States, including dietary supplements and traditional medicines, commercial swine meat for human consumption, human travelers, and several other pathways. The non-negligible pathways will be examined further in future work through an exposure assessment, a consequence assessment, and finally, an overall risk estimation for introducing exotic viral pathogens of swine into the United States. From the overall risk estimation, applicable risk management strategies can be prioritized, developed, and implemented to reduce the risks to an appropriate level of protection.

Biography: Julie Gauthier received a DVM degree from Michigan State University College of Veterinary Medicine in 1993. After working in mixed animal practice in Florida and Connecticut, she earned a Master of Public Health degree from Yale University School of Public Health in 2002. Julie joined USDA APHIS Veterinary Services in 2002 as a field Veterinary Medical Officer in southeastern Florida. In 2008, she took a position as an Import Risk Analyst in the VS Regionalization Services unit in Raleigh, NC. In this role, she evaluates foreign countries' requests for recognition of disease freedom and conducts animal and animal product import risk assessments.

Gomez Rodriguez — Porcine Epidemic Diarrhea (PED) in Dominican Republic

Nimia Lissette Gómez Rodríguez

Animal Health Director, Livestock General Directorate
OIE Delegate, Dominican Republic

Abstract: In November 2013, the health authorities of Dominican Republic detected a case of acute diarrhea and high mortality in piglets in the area of the country with the largest swine production. Despite the similarity to other diseases that present with clinical signs of gastroenteritis, authorities immediately suspected the possibility that porcine epidemic diarrhea (PED) had entered the country, as the disease had been confirmed in the US. The PED appeared in an area of the country with great production pigs (over 50%). The lack of biosecurity measures and proximity between farms favored the spread of the disease throughout much of the country with swine production.

Biography: Doctor in Veterinary Medicine. Nineteen years of experience working in the livestock sector performing management and technical tasks at the Livestock General Directorate, Ministry of Agriculture. Experience in the areas of quarantine and risk analysis contributing to the development of import regulations for animals and animal products

Haas — Porcine Epidemic Diarrhea (PED) in Europe

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Abstract: Porcine epidemic diarrhea (PED) occurred and became endemic in a number of European and Asian countries after its first recognition in England in 1971. The first isolation and identification of the etiological agent as a coronavirus PEDV was carried out in Belgium in 1977. In 1984 PEDV infections were confirmed in China, but the disease was probably present there as early as in 1973. In Europe, PEDV is still present, albeit at a low level, but routine surveillance is not carried out. A table on the occurrence of PED in European countries since the 1990s will be presented. However, for most of these viruses the degree of relatedness to the strains currently circulating in North America is unknown. Unfortunately, there also is no information on the genetic determinants of the severity of clinical signs. The overall economic impact in Europe has been low, thus no vaccines have been licensed. The disease was first reported in Germany in 1980. A recent German PED isolate was fully sequenced and found to be closely related to variants causing mild clinic in the US in 2014. Regarding the import of live pigs from the USA and Canada, the European Commission issued the Implementing Regulation No 750/2014 in July 2014. The risk of PEDV entry connected with the legal import of live pigs from the USA into Germany is considered to be low. However, there are possible alternative pathways of introduction, which urgently need to be studied. If spray-dried porcine plasma (SDPP) containing infectious PEDV is imported from the USA to Germany and fed to pigs, the risk of exposure of susceptible animals to the virus is estimated as high.

Biography: Dr. Bernd Haas studied veterinary science in Giessen, Germany, and joined the German Federal Research Institute for Animal Health (Friedrich-Loeffler-Institut, FLI) in 1986, where he now holds a permanent position as a senior scientist and head of the national reference laboratory for foot-and-mouth disease. His responsibilities include the diagnosis of several viral diseases of animals, including import/export testing and the development and validation of diagnostic tests. He worked on the correlation of serology and protection against FMD and has been responsible for FMD vaccine testing in Germany for many years. He is responsible for biosafety matters of the "BSL3+" (FMDV/ASFV) containment of the FLI Riems and is involved in the drafting of animal disease control and laboratory bio-risk management regulations.



Bernd Haas

Hendriksen — Disease Prevention in Denmark, with Focus on PEDV

Birgit Hendriksen, DVM, MSc Vet. Epi, MSc Public Governance.

Head of Veterinary Control Office, Danish Veterinary and Food Administration.

Abstract: Despite to the small size of our country, Denmark has an annual production on 29 million pigs. We export live pigs and pork meat to the whole world. This is only possible due to a good animal health status, without outbreaks of diseases such as FMD, ASF and CSF. To maintain the animal health status, we are, constantly focusing on preventing exotic diseases to spread into Denmark. The key to this success is a long tradition of co-operating closely with the agricultural industry which is organized in cooperatives. The collaboration is well established in such areas as disease eradication, surveillance, and biosecurity on the farm level. The industry has established a system with compulsory washing and disinfection of animal transport vehicles before entering Danish farms. According to our legislation we are having 7 day – 30-day quarantine rules; holdings with more than 1400 sows and piglets on the same property must have a full biosecurity plan that outlines how the herd is protected against infectious diseases; by legislation, pig farmers are required to contract a veterinary practitioner for animal health surveillance and biosecurity advice. We appreciate this initiative to understand how these viruses are introduced and transmitted in countries with a high health status

Biography: I graduated as a veterinarian in 1983 from the Royal Danish Veterinary and Agriculture University. The next 9 years I was working 2 years within the area of food safety and the following years as a private practitioner in large and small animal practice. From 1992 I have been working in the Danish Veterinary and Food Administration, always in the field with live animals: veterinary preparedness, contingency planning, disease eradication and prevention, monitoring of diseases, import and export of live animals and animal byproducts. In 2000 I became head of the division of Animal Health; in that function I have been doing international work within the EU and in EUFMD – always in the area with disease prevention and eradication. From summer 2013 I am working as head of Veterinary Control Office in the Eastern part of Denmark. In 2002 I acquired a Master degree in Veterinary Epidemiology from University of London. In 2012 I acquired a Master degree in Public Governance from Copenhagen Business School..



Birgit Hendriksen

Hickam — A State's View of the Impact of SECD

Linda Hickam

Biography: Dr. Linda Hickam, State Veterinarian and Animal Health Division Director, has been with the Missouri Department of Agriculture since 2007. She has served as State Epidemiologist, Deputy State Veterinarian and, since 2011, has served as State Veterinarian. Dr. Hickam is a native of Columbia, Missouri, and a graduate of the University of Missouri College of Veterinary Medicine. She has a diverse background in animal health including small and large animal practice, commercial livestock production and livestock markets, as well as regulation and policy development.



Linda Hickam

Huang — The Epidemiology and Pathogenesis of Novel Porcine Epidemic Diarrhea Virus in Taiwan

Yu-Liang Huang

Animal Health Research Institute, Council of Agriculture, Taiwan

Abstract: During January 20-July 30 of 2014, a total of 119 samples from 54 swine farms in 13 counties were submitted to the Animal Health Research Institute. In 20 of the 25 farms had detail histories, including severe diarrhea and vomiting affecting all ages, with approximately 100%

mortality in suckling pigs. The samples were tested for transmissible gastroenteritis virus, porcine epidemic diarrhea virus (PEDV), and porcine group A rotavirus using RT-PCR. The RT-PCR of PEDV was positive in 86 samples of 39 farms. Attempts to isolate PEDV in Vero cells revealed that only 7 specimens from 7 farms showed the cytopathic effects (CPEs) of fusion and syncytia. They were confirmed as positive for PEDV by RT-PCR, sequencing, and electron microscopy. These PEDV isolates were aligned and analyzed with MEGA 5.2 software. The newly-isolated PEDV/Taiwan/2014 strains were clustered in group 2 as novel PEDV, together with strains PEDV/USA/2013, PEDV/China/2011-2013, PEDV/Korea/2014, whereas the classical CV777 strain was placed in a separate group 1. Further, the virulence of novel PEDV was examined in the suckling pigs with 7 days old. The diarrhea and vomiting were shown in all pigs inoculated with 107 TCID50 PEDV. The mortality reached to 50%. These results indicated that a novel PEDV was responsible for the recent PEDV outbreak in Taiwan and was high virulence.

Biography: Yu-Liang Huang comes from Taiwan and serves in the Animal Health Research Institute (AHRI) after 2005. The mission of AHRI is to study and diagnose the animal infectious diseases, examine the quality of animal drugs, and improve the efficiency of livestock production system. At AHRI, he works the diagnosis of swine virus diseases and studied the interaction between PCV2 and CSFV before 2012 and demonstrates that PCV2 can decrease the efficiency of attenuated CSFV vaccine and the associated pathways of PCV2-derived interference. In recent years, he starts to research the PRRSV and PEDV and focuses the pathogenesis and vaccine development of both two viruses.



Yu-Liang Huang

Jordre — Feed Safety Regulation in the United States

Shannon Jordre

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Abstract: The Federal Food, Drug and Cosmetic Act require animal feed in the United States to be safe and properly labeled. The US Food and Drug Administration (FDA) is the federal agency that regulates animal feed. Further, the FDA has a long history of cooperating with the state agencies to regulate the feed industry. Inspections are conducted at domestic manufacturing sites, and imports are monitored through the ports-of-entry. Samples are collected for a variety of purposes. Some regulations apply to a broad range of manufacturing and distribution facilities, including farms that manufacture their own feed, and others apply to a more limited range of facilities. The feed industry in the United States is large and diverse – even more so when you include farms that manufacture their own feed, using the same ingredients used and supplied by the commercial feed industry. Ingredients come from all over the world, but historically most feeds and feed ingredients have not been viewed or regulated as potential sources of animal disease.

Biography: Shannon Jordre is a Consumer Safety Officer in the Division of Compliance at FDA's Center for Veterinary Medicine (CVM) in Rockville, Maryland. He specializes in feed regulation, the inspection of feed manufacturing facilities, and he manages FDA's bovine spongiform encephalopathy (BSE) feed inspection program. He is also working on the groups developing the regulations to go along with the Food Safety Modernization Act (FSMA) and the Sanitary Food Transportation Act (SFTA). Prior to that, Shannon spent 12 years as a state feed control official, working for the South Dakota Department of Agriculture. He spent five years in the lab, first as a research lab tech at the US Meat Animal Research Center (MARC) in Clay Center, Nebraska, and then as a feed chemist at Olson Biochemistry Laboratories at South Dakota State University. Shannon holds B.S.



Shannon Jordre

degrees in Microbiology and Biology from South Dakota State University, graduating in 1985. He served five years on the Board of Directors of the Association of American Feed Control Officials (AAFCO), having served as AAFCO President in 2001.

Kawashima — Porcine Epidemic Diarrhea (PED) in Japan

Toshiro Kawashima

Ministry of Agriculture, Forestry and Fisheries

Abstract: In October 2013, Porcine Epidemic Diarrhea (PED) occurred for the first time in 7 years in Japan. Sequencing indicated that the isolates were closely related to the strains prevalent in the U.S. and some Asian countries in recent years. PED has been a nationally notifiable disease since 1996 and there are approved vaccines for PED in Japan. Experimental data with the circulating field strains indicates that PED vaccination reduces the mortality rates from 80% to 30% however, the vaccination coverage remained low at around 10% in the previous year. PED has spread to over 800 farms in 38 prefectures where 1.2 million pigs have been infected and 3.7 hundred thousand piglets have died. The Ministry of Agriculture, Forestry and Fisheries (MAFF) is working with prefectural authorities as well as pig producers and providing technical assistance and financial support to get the disease under control: (i) strengthening biosecurity practices to prevent introduction and spread of the virus, (ii) ensuring a stable supply of PED vaccines and (iii) conducting epidemiological investigations to identify any risk factors for introduction and transmission of the virus. The MAFF will continue to engage collaboratively with the National Institute of Animal Health (NIAH) in further actions including providing comprehensive guidelines, conducting active surveillance for PED virus circulation and investigations for introduction of porcine deltacoronavirus (PDCoV), studying molecular epidemiology with full genome sequencing and researching for more effective PED vaccine in response to this disease.

Biography: Dr. Kawashima is the director of Animal Health Division, Food Safety and Consumer Affairs Bureau, Ministry of Agriculture, Forestry and Fisheries (MAFF) and the Chief Veterinary Officer of Japan. He is currently a member of the Council of the OIE. Since 1983, he has had a long and successful career in Japanese government and the OIE working in different strategic areas including; the first secretary of Japanese Embassy in Denmark, the deputy director of Meat and Egg Division of MAFF, the Chair of the Regional Steering Committee of GF-TADs for Asia and the Pacific, the president of the OIE Regional Commission for Asia, the Far East and Oceania. He holds a master's degree in Veterinary Medicine from Hokkaido University of Japan.



Toshiro Kawashima

Lager — Transmission of PEDV in growing pigs

Kelly Lager, Kimberly Crawford, Laura Miller
NADC, USDA-ARS, Ames, IA USA

Abstract: Control of porcine epidemic diarrhea virus (PEDV) disease is dependent upon inducing a protective PEDV immune response and understanding the ecology and pathogenesis of the virus. The focus of this presentation will be comparing field practices to experimental findings, and evaluation of real-time PCR for the detection of PEDV. Induction of protective immunity in the field has involved the practice of “feedback” which involves the planned exposure of naïve sows to biological materials from clinically affected animals. Ideally, this produces a wild-type virus infection that would induce immunity and confer protection to piglets through colostrum. A spectrum of success has been reported from this practice that is probably dependent on many variables. Based on experimental results, such practices should be successful in the short term, but the duration of immunity is not known. In the US, two PEDV vaccines have recently received conditional licenses for use in swine which may improve the situation in the field. One outcome from the rapid spread of

PEDV in the US was identifying the potential role of fomites in the transmission of the virus although real-time PCR technology is used extensively to test fomites for virus, the relationship between PCR-positive samples and infectious virus is not clear. Currently, we are evaluating the sensitivity of the real-time PCR assay for the detection of PEDV and testing if PCR-positive samples contain infectious virus.

Biography: Dr. Lager is a Research Veterinary Medical Officer in the Virus and Prion Diseases of Livestock Research Unit at the National Animal Disease Center, USDA-ARS, Ames, Iowa. From the beginning of his career with the USDA in 1989, Dr. Lager has worked in the swine virology project at NADC. His scientific interests are in the areas of pathogenesis of virus-induced reproductive failure and respiratory diseases of swine, vaccine development, and virus discovery. He has worked with encephalomyocarditis virus, pseudorabies virus, influenza virus, porcine circovirus, porcine reproductive and respiratory syndrome virus, porcine circovirus, porcine parvovirus, porcine epidemic diarrhea virus, and several yet to be classified circular DNA viruses.

Lin — Presentation on the Swine Enteric Coronavirus Diseases PED Diagnosis and Prevention

Lin Zhixiong, Professor

Director of Animal Quarantine Lab.

Inspection & Quarantine Technology Centre

Guangdong Entry & Exit Inspection and Quarantine Bureau

Abstract: 1. PEDV isolation and culture in the cell lines. Intestine tissue samples were inoculated in Vero cell lines. The medium for the cells contains 30ug to 60ug trypsin. Culture in Vero cell line for 12 passages with trypsin. Culture Without trypsin for 19 passage. The cells appear CPE, such as fusion, syncytia formation etc. in 24-30 passages. Culture in vero cell line for 31 passages, transfer to PK15 for 2 passages, More distinctive CPE occurs. Culture in PK15 for 22 passages, transfer to ST cell for 4 passages. The titer of PEDV-G1 is 105.37-6 TCID₅₀/0.05ml. Ready for inactivated for the vaccine. Attenuated for live vaccine after 83 passages. 2. The character analysis of PEDV variants. The phylogenetic analysis of spike protein gene of 10 Guangdong isolates. 9 are highly homology (97.8%-99.9%; 97.9 % -99.8 % aa). 1 is highly homology with vaccine strains (96.8 % -99.8 % nt; 95 % -99.6 % aa). 3. Epidemiological investigation of PEDV from 2010 to 2014. RT-PCR and Colloidal Gold Strip tested 205 samples in 2010 to 2014 for PEDV, which from Guangdong, Fujian, Hainan, Jiangxi, Shanxi, Sichuan. 180 are positive. PEDV in fecal excretions was high concentration. Shedding time lasted more than 56 days. Semen from boars without PED clinical symptom and air samples were positive for PEDV RNA.

Biography: Lin Zhixiong, Graduated from South China Agriculture University in China. Master of veterinary science. Professor. Working for animal quarantine for more than 30 years. He is the counselor of Guangdong Pig Industry Association, the expert of the 16th Asian Games Equestrian Events Equine Quarantine Task Force. He is the director of the Animal Quarantine Lab., which is responsible for the inspection and quarantine of animals and animal products entering and exiting Guangdong port. Mainly working for the livestock and poultry supplied to Hong Kong and Macau, breeding stock importation from other countries, etc. There are 800,000 pigs supplied to Hongkong and Macao from more than 60 approved farms each year. He is working well with the pig farmers. There are about 2000 breeding pigs imported from USA, UK, etc. which were quarantined in Guangdong. He is responsible for the tests for the pigs in accordance of health requirement which signed by both government. He works with local veterinary authority for the animal disease control. He does animal diseases research projects with experts from Agriculture University, Veterinary Research Institute, Academy of Agriculture Sciences.



Lin Zhixiong

Marsh — SECD in Indiana: A State Perspective

Bret D. Marsh, DVM, Indiana State Veterinarian
Indiana State Board of Animal Health

Abstract: With one of the first diagnosed cases of porcine epidemic diarrhea in the United States, Indiana has been dealing with SECD for many months now. The diversity and strength of the state's pork industry has motivated the Indiana State Board of Animal Health (BOAH) to address the situation in pro-active and innovative ways to provide value and service to producers and veterinarians statewide. In the process, BOAH has assumed a central role to managing this disease.

Biography: Dr. Marsh serves as the Indiana State Veterinarian. He is responsible for all statewide animal health programs, as well as providing inspection services for the meat, poultry and dairy products industries. He is also an advisor to the Indiana State Board of Veterinary Medical Examiners. Dr. Marsh previously served as the Special Detail to the U.S. Secretary of Agriculture's Homeland Security Staff. In that role, he represented the views of the country's state veterinarians on issues affecting the nation's ability to preserve and protect its agricultural assets. Dr. Marsh was Treasurer to the American Veterinary Medical Association (AVMA) for six years, and served in the AVMA House of Delegates for nearly a decade. Dr. Marsh is a past President of the Indiana Veterinary Medical Association and Executive Committee member of the United States Animal Health Association. He has received the Distinguished Alumnus Award from both the Purdue College of Veterinary Medicine and the Purdue College of Agriculture. He received his BS degree in Animal Sciences, and his DVM from Purdue University.



Bret Marsh

Marthaler — Swine Enteric Coronavirus Evolution: Learning from the Past to Understand the Future

Douglas Marthaler,¹ Anastasia N. Vlasova,² Qihong Wang,² Marie R. Culhane,¹ Kurt D. Rossow,¹ Albert Rovira,¹ James Collins,¹ and Linda J. Saif²

¹University of Minnesota Veterinary Diagnostic Laboratory, St. Paul, Minnesota, USA and The Ohio State University, Wooster, Ohio, USA

Abstract: The three known swine enteric coronaviruses, Transmissible Gastroenteritis Virus (TGEV), Porcine Epidemic Diarrhea Virus (PEDV), and Porcine Deltacoronavirus (PDCoV) have caused severe problems for pork producers. However, the genetic diversity of these pathogens has yet to be understood on a global level. Due to the limited PEDV complete genomes worldwide, our understanding of PEDV introduction into the US is hindered. In North America, PEDV strains cluster within 2 distinct phylogenetic clades while the INDEL strains, which contain a spike gene deletion similar to the prototype strain CV777, form a distant cluster within North American clade II. In addition, another PEDV strain has been identified with spike gene nucleotide deletion at position 164–169 (TTGGTG), which has yet to be described. Additionally, PDCoV was identified in January 2014 within the US. PDCoV was first discovered during surveillance for new Deltacoronaviruses in Hong Kong. Two strains porcine strain were sequenced, HKU15-55 and HKU15-144. Thus far, 23 US PDCoV strains have been sequenced and share a 99.5-100% nucleic identity, clustering separately from the Hong Kong strains. Due to control measure, TGEV prevalence in the US has greatly reduced. However, TGEV continues to circulate in the US swine population. Lack of sequence data impedes our understanding of the evolution and diversity of TGEV. Can we learn from our circulating TGEV strain to shed light on the evolution of PEDV and PDCoV?

Biography: Douglas Marthaler is a PhD graduate from the College of Veterinary Medicine, University of Minnesota. His PhD title "Ecology of Porcine Rotaviruses" focused on the co-infection and molecular phylogenetics of Rotavirus A, B, C and H. Currently, his primary research interest is to understand the emergence, evolution and epidemiology of animal viruses including

enteric and respiratory viruses. His recent PEDV and PDCoV publications highlighted the phylogenetic variation of PEDV and PDCoV within the US. Currently, he is investigating the global variations of PEDV to understand its emergence in the United States.

McOrist — PED – Epidemiology and Risk Factors for Transmission in East Asia

Steven McOrist, BVSc MVSc PhD DipECVP DipECPHM

Consultant pig veterinarian (Asia)

Diplomate, European College of Pig Health and Management

Diplomate, European College of Veterinary Pathology

Abstract: Considerations regarding PED virus epidemiology involve its being an enveloped ssRNA virus, allowing frequent mutations and reassortments. Fecal shedding peaks at 6 days p.i., with some pigs (10 %) still shedding at 28 days p.i. Its environmental survival in feces and water is *ca.* 7 days, but is longer on feedstuffs, fomites, slurry etc, with survival times of 14 to 28 days. Sequencing studies of the novel PED virus groups in PR China by several groups suggests at least two major geno-groups occur in central and southern China. It is speculated that these new strains may have an enhanced ability to spread in the pig industry. Cross-border PED transmission in Asia can be mainly explained via regional pig movements in cross-border trade in pigs and pig products. For example, the Yunan area in PR China may have led to related outbreaks and spread across Burma, Laos, and Thailand. Regarding these local epidemiological factors, the exact main routes of spread are trucks used for live/dead pig and piglet collection and transport, and fomites moving between farms and pigs and the application of injectable vaccines. There are numerous local vaccine companies, Government subsidised vaccine programs and lots of pig injections, without single use needles. Artificial insemination is rarely used in south-east Asia and infected local boars and other materials may move around between farms. The role of feed, if any, is not clear. Home mixing operations occur in *ca.* 30 % of farms, with use of animal by-products and ingredients. One distinct event was the outbreak of PED in the Philippines in 2004. The Philippines has no land border with other infected countries and the suspect portal of entry was breeding pig entry from an infected country (South Korea). Filipino farmers import pure lines from pedigree breeders for "in-house" genetic programs, usually at 30-50 kg without PED testing protocols. This outbreak was initially linked to TGE, but the more severe disease, particularly in combination with US strains of PRRS and recurring outbreaks with poor herd immunity led to clarification of the new PED strains. In response to PED, Asia farmer use feed-back of intestinal materials to breeding pigs but problems in harvesting sufficient piglet intestinal material occur. Recurrences of novel PED are common – usually every 4 to 12 months. This may also be partly an effect of the common occurrence of CSF and PRRS. PED vaccine strategies in east Asia include the use of attenuated strains of cell adapted virus, such as the Japanese vaccine J-vac. Various local companies produce killed PED virus vaccines for injections. All current PED vaccines are generally not considered successful.

Biography: Steven McOrist graduated as a veterinary surgeon from Melbourne University in 1978. He worked for several years as a veterinary pathologist at diagnostic laboratories for farm animals in Australia, and then obtained a Commonwealth University Scholarship to transfer to Edinburgh University in Scotland, where he completed a PhD and continued as the senior researcher and team leader in the porcine proliferative enteropathy research program. This team was the first to successfully culture the aetiological agent, to name the causative agent *Lawsonia intracellularis*, the first to fulfill Koch's postulates for this disease in pigs and was also the first to develop useful therapies and a vaccine. He later served as the director of veterinary and technical services for the Asian-Australian agribusiness group, QAF (Bunge) Industries for over 3 years, focusing on swine production. He has worked in academia with Associate Professorship roles in the USA



Steven McOrist

and UK, where he taught microbiology, enteric diseases, and swine medicine. He has returned to full-time pig and consultancy work in Asia, based in Hong Kong. He performs technical management roles and consultancies with Chinese, Thai, Filipino, and European pig agribusiness groups. He has published extensively on enteric disease in pigs, including an illustrated guidebook on pig disease and a chapter in the standard textbook, Diseases of Swine.

Middlemiss — Porcine Epidemic Diarrhoea Virus in Great Britain

Christine Middlemiss BVMS MRCVS
Portfolio Manager Animal Disease Risk

Abstract: Porcine Epidemic Diarrhoea (PED) is a gastrointestinal disease of pigs which was first reported in England in the 1970s (Wood, 1977). Cases in the UK have tended to be relatively mild, presenting with watery diarrhoea and mild systemic signs such as fever, anorexia and lethargy. Piglets are most often affected although disease can be seen in finishers and adults. No diagnosis have been made by Animal Health and Veterinary Laboratories Agency (AHVLA) or Scotland's Rural College (SRUC), both the main Government funded testing laboratories, in GB pigs since 2002 although little virological or serological testing has been performed in recent years. Between 2007 and 2012, 94 of 206 sera tested for antibody at the AHVLA mainly for monitoring purposes were found to be antibody positive. This included eight positive sera in 2012 suggesting that the virus remains endemic in British pigs. Using data collected at abattoirs for a national prevalence study for food-borne pathogens in 2013, a survey detected evidence of exposure to PED in GB. The results suggest that endemic strain(s) of PED virus are still present at a low level in GB but that only a small proportion of the GB pigs sampled were exposed to infection before they reached slaughter, although uncertainties exist regarding the performance of the serological test. There have been no reports in GB pigs of clinical outbreaks of PED resembling virulent PED and testing of diarrhoeic submissions for PEDV by PCR has not detected virus. The survey results support other evidence that OEDV is not circulating widely in the GB national herd and suggest that there is a high degree of naivety to infection with PED virus. Through our horizon scanning and international disease monitoring we have been watching the spread on the new variant PED with concern. We are supportive of evidenced and risk based measures to prevent entry of the virus into the EU, and we await the EFSA report with interest. The GB pig industry has developed voluntary protocols to further help protect themselves and Government and industry are working together at present to understand if the virus does enter the UK herd how we can prevent it becoming established.

Monterubbianesi — Sanitary Situation and Adopted Measures in Argentina after its Introduction in America

Mariela Monterubbianesi (*) – Nicolás Winter (*) - Ximena Melón (**).

(*) Sanitary Programs Direction, National Direction of Animal Health of the National Service for Agrifood Health and Quality (SENASA)

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Abstract: Argentina is a country free of classical swine fever (CSF) Porcine Reproductive and Respiratory Syndrome (PRRS) and National Direction of Animal Health of the National Service for Agrifood Health and Quality (SENASA) implements a notification system for early warning for these diseases. After the detection of virus Porcine Epidemic Diarrhea (PEDv) in the United States, SENASA implemented activities to prevent entry of the disease into the country by incorporating it into its surveillance system. So far there have been no reported or diagnosed of suspicions cases of disease

in the country. With the information available in Argentina and the info provided by the neighboring official veterinary services, in the framework of the Permanent Veterinary Committee of the Southern Cone (CVP), and the private sector together the risk and possible routes of entry were evaluated. The experience in some of the affected countries identified deficiencies in biosecurity as a possible route of entry and subsequent spread. The importance of respecting biosecurity measures when returning from visits to infected farms in other countries was highlighted. The preventive measures taken by Argentina are: a) increase outreach activities for producers, veterinarians and other stakeholders in the productive sector about the disease and the need for strengthening all biosecurity measures; b) incorporation of additional health requirements for authorization of entry pigs into the country; c) start to develop a diagnostic technique; d) stimulation for immediate notification of suspicious cases or compatible clinical signs to the local office of SENASA.

Biography: DVM Monterubbianesi Mariela graduated from the Faculty of Veterinary Science, University of Buenos Aires in 2001. For six years she worked as Program Manager for Swine Diseases at the National Health Service and Food Quality (SENASA), designing and coordinating prevention, control and eradication of swine diseases, i.e. Classical Swine Fever, Porcine Reproductive and Respiratory Syndrome, Aujeszky's disease and Trichinosis. She has participated and presented representing SENASA in congresses and meetings related to the above mentioned activities. She is currently working on her thesis for the Master degree in Animal Health on Aujeszky's disease.

Neumann — An Epidemiological Investigation of Porcine-Origin Feed Ingredients and the Occurrence of Porcine Epidemic Diarrhea on Midwestern United States Pork Farms

EJ Neumann,¹ MA Ackerman,² C Troxel,³ R Moser³

¹Epi-Insight Limited, Palmerston North, NZ; ²Swine Veterinary Services PC, Greensburg, IN, USA; ³JBS United Incorporated, Sheridan, IN, USA

Abstract: During the 2013-14 epidemic of porcine epidemic diarrhea (PED) in North America, concerns were raised over the potential for porcine-origin feed ingredients contaminated with PED virus to act as a vector for introducing the infection onto farms. To investigate the strength of association between exposure to these ingredients and the occurrence of PED, a study of Midwestern U.S. pork farms was undertaken in May 2014. Feed delivery data from confirmed PED case farms and non-infected control farms were obtained from a commercial feed manufacturer's information system. All deliveries of feed in the two-weeks prior to each PED outbreak that contained either spray dried plasma protein (SDPP), granulated red-blood cells (RBC), choice white grease (CWG), or hydrolyzed porcine proteins (HPP) were identified at a 'lot' number and then traced to the control farms. The strength of association between specific lots of these feed ingredients and occurrence of PED was then determined by estimating the odds ratio (OR) for each lot. Thirty-five cases and 417 controls were included in the study. No ingredients were positively associated (OR > 1 and p < 0.05) with PED case farms; their inclusion in diets did not appear to be strongly associated with the occurrence of PED in this study.

Biography: Dr Eric Neumann is the owner of Epi-Insight Limited, a New Zealand based epidemiology consulting business that works for international clients in the areas of biosecurity, animal health, livestock production, public policy aspects of animal disease management, and global trade in animals or animal products. He has over 20 years of experience helping clients manage complex problems that require an evidentiary approach to problem identification, structured collection of data, and analysis in order to make business decisions or craft effective public policy. Dr Neumann has been



Eric Neumann

involved in livestock production, aid and development projects, infectious disease management and research, controlled experimental trials, international project management and collaboration, government-sector biosecurity policy development, and one-health training in locations around the world and is currently working on projects in Afghanistan, South Asia, the United States, and Australasia. Dr Neumann has been on the faculty of the veterinary school at Massey University in New Zealand since 2005 and remains as an Adjunct Associate Professor of Medicine and Epidemiology at Massey in addition to his full-time consulting business. He has an undergraduate degree, Masters and Doctor of Veterinary Medicine from the University of Illinois, and completed a PhD in Veterinary Epidemiology at Massey University.

Nguyen — Swine Influenza Viruses, a Zoonotic Threat with Pandemic potential - Viet Nam, 2013

T.N. Nguyen¹, N.V. Long¹

Co-Author: C.T. Nguyen¹, Vu.T. Le¹, Ken Inui², L.T. Ngo¹, L. Loth², D.V. Pham¹, T. T. Nguyen¹, S. Newman²

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Abstract: Greater genetic diversity of influenza viruses exists in low biosecurity, open semi-intensive swine production systems where contact among birds, people and pigs is possible (multiple introductions). Large numbers of swine will be exposed, amplify, and spread the virus. High proportion of pigs with sero-conversion to SIVs in Viet Nam (26.76% sero-positive) indicates that many pigs exposed to SIVs which circulated previously on the pig farms. But lower proportion of pigs shedding the SIVs (6.9% RRT-PCR positive with type A) would be explained that those pigs might get a new infection in the farm and they would continue to shed the SIVs to others and pose a risk to infect humans, especially those in close contact with pigs. Possible concurrent infection with seasonal influenza viruses or Highly Pathogenic Avian Influenza (H5N1, H5N6) may result in new virulent strains with human pandemic potential. Swine influenza virus monitoring should continue to timely detect emerging viruses with potential pandemic potential and prevent such events.

Biography: Tien Ngoc Nguyen was born on November 2, 1973 in Quang Ninh province. His nationality is Vietnamese. He has a background in Veterinary Science, Veterinary Epidemiology. His education includes: 1992 - 1997: Hanoi Agricultural University No 1, Ha Noi, Viet Nam; Field study: Veterinary Science (Doctor of Veterinary Medicine); 1999: Chiangmai University, Chiangmai, Thailand, Veterinary Epidemiology and Diagnostics; 2002: Free University, Berlin, Germany, Veterinary Epidemiology and Safety Global Trade; 2003: Nordic Agricultural Academy, Odense, Denmark, Agricultural Extension and Methodology of Training; 2006: Chiangmai University, Chiangmai, Thailand, Veterinary Epidemiology and Zoonotic Diseases; 2008: Hanoi University of Agriculture, Hanoi, Viet Nam, Master of Veterinary Science (Vet. Epidemiology). His career includes: 1997- 2003: The National Center for Veterinary Diagnostics (NCVD) of Vietnam Department of Animal Health (DAH) – MARD, Serology Division of NCVD, responsible for zoonotic diseases; 2004- 2014: Epidemiology Division - Vietnam Department of Animal Health, Epidemiology Specialist - Vice Head of the Epidemiology Division, responsible for avian influenza prevention and control. Recent activities including National Coordinator for: Transboundary Animal Diseases Campaign for South-east Asia countries (TAD's control supported by FAO/ADB), HPAI Vaccination Program in Viet Nam (2005 - 2012), and the National Program for HPAI prevention and control in Viet Nam from 2014-2018. Emerging Pandemic Threats Program (2013 - 2014). National program on H7N9 surveillance in Viet Nam (2013 - 2014).



Tien Ngoc Nguyen

Ohashi — Isolation and Genetic Characterization of a Novel Porcine Epidemic Diarrhea Virus Obtained from an Outbreak in 2013-2014 in Japan

Seiichi Ohashi, Tohru Suzuki, Ayako Miyazaki, Yusuke Goto, Sakie Itoh, Makoto Yamakawa, Toshiyuki Tsutsui, and Tomoyuki Tsuda.

National Institute of Animal Health, National Agriculture and Food Research Organization. Tsukuba, Ibaraki, 305-0856, Japan

Abstract: Porcine epidemic diarrhea (PED) is a highly contagious disease characterized by severe diarrhea and dehydration in suckling piglets. In October 2013, PED outbreak was found in Okinawa after an interval of 7 years. During the next 10 months, PEDV has rapidly spread throughout Japan. By August, 2014, more than 800 infected farms were detected all over the country. Virus isolation was attempted by inoculating intestinal homogenates obtained from affected piglets into Vero cells. Consequently, a CPE characterized by syncytium formation was observed. The isolated viruses were confirmed by IFA using a PEDV-specific polyclonal antibody. The entire spike genes of PEDV in 25 field samples were sequenced and analyzed to identify the mutual genetic relationship as well as the relationship with the Japanese classical (the PEDV isolated until 2000) and global PEDV strains. Recent field PEDV isolates were genetically closely related to not only each other but PEDV circulating in the US, China and South Korea, and were distinguished from Japanese classical field and vaccine strains. In conclusion, the recent Japanese PEDV isolate is a newly emerging virus which has a similar genetic profile to those of circulating US and East Asia recently.

Biography: Seiichi Ohashi is a senior researcher in Viral Diseases and Epidemiology Research Division at National Institute of Animal Health in Japan. He qualified as a DVM from the Nihon University. He received his PhD in Veterinary Science from the University of Tokyo.

Quevedo Valle — Porcine Epidemic Diarrhea Outbreak in Peru

M Quevedo-Valle¹, R Gamarra-Madueño¹, K Portilla-Jarufe¹, H Rivera-Gerónimo²

¹National Agrarian Health Service – SENASA, ²Faculty of Veterinary Medicine from National University of San Marcos

Abstract: Porcine epidemic diarrhea (PED) is an enteric disease caused by the porcine epidemic diarrhea virus (PEDV) a member of Coronaviridae family. PED is an acute, highly contagious enteric disease, characterized for aqueous diarrhea, vomiting and severe dehydration, the mortality can reach 100% in piglets under 7 days old (1,2,3). PEDV has been considered an exotic disease for Peru, because there was no evidence of its presence until July 2013. During the outbreak period, the piglets from several pig farms from Lima suffered watery diarrhea, vomiting and severe dehydration affecting mainly piglets of under twenty-one days old, where it caused almost 100% of morbidity and mortality. The diagnosis was negative to the TGE virus, so it was suspected of PEDV. The first evidence of PEDV was notified by Dra. Hermelinda Rivera of Faculty of Veterinary Medicine from National University of San Marcos and officially confirmed by National Agrarian Health Service - SENASA in October 2013. To date, the outbreak has been reported around the province of Lima in well managed pig farms and backyard pigs. The way how the virus was introduced to Peru is unknown; however, we have four hypotheses: by fomites, pork offal, pig plasma and swine imported from PED positive countries. The PEDV strain isolated in Peru has 99% and 97% of molecular identity with the American and China strain respectively. We recommended to keep extreme biosecurity, disinfecting farms facilities, vehicles, and slaughterhouses. There is no vaccination for control. Acknowledgements: National Agrarian Health Service – SENASA, and Faculty of Veterinary Medicine from National University of San Marcos.



Miguel Quevedo-Valle

Biography: Miguel Quevedo was born on november 13, 1973 in Perú. He graduated in Veterinary Medicine in 1999 at San Marcos University. He obtained a degree in Animal Health in 2012 in San Marcos University. Since 2000 he is working at *National Agrarian Health Service – SENASA*. Since 2010 to 2013 he had worked as Director Animal Quarantine of SENASA. Since 2013 he is Chief Veterinary Service of Perú.

Raizman — The Food and Agriculture Organisation of the United Nation Ensuring Food Security Through Minimizing the Impact of Animal Diseases

Eran Raizman

EMPRES Animal Health – Food and Agriculture Organisation of the United Nation.

Abstract: The food and Agriculture Organization of the United Nation (FAO) mandates is to help developing countries and countries in transition modernize and improve agriculture, forestry and fisheries practices aiming at poverty alleviation through improving food security. FAO's Animal Production and Health Division (AGA) is frequently involved in emergency responses triggered either by the incursion of severe animal diseases, which have the ability to rapidly spread over large geographical areas ('transboundary animal diseases', TADs) into previously unaffected countries or regions, or by natural and man-made disasters such as droughts, floods, earthquakes, civil strife etc. Both types of emergency have in common that they can severely affect livestock-related food security and livelihoods. AGA's Animal Health Service (AGAH) is FAO's source of technical expertise required for the control and prevention of TADs. AGAH activities combine early disease detection with early warning and early response. Early warning is based on disease intelligence and surveillance carried out jointly with the World Organisation for Animal Health (OIE). Through this platform and its comprehensive database EMPRES-i and variety of publications, AGAH is also ready to detect and alert on new emergencies including porcine epidemic diarrhea. The Crisis Management Centre (CMC-AH), is the operational arm of FAO's Emergency Prevention System for TADs (EMPRES-AH). EMPRES monitors global animal disease situation, and release alerts member countries to act fast to preventing or mitigating the impact of disease incursion. FAO has developed a Global Platform for African swine fever to help increase knowledge on the disease and its ramifications. FAO and OIE developed the global foot-and-mouth disease control strategy supported by its measurable tool 'Progressive Control Pathway (PCP)', which can be adapted to other major TADs with significant economic impact.

Biography: Eran Raizman joined FAO as the Head of the Emergency Prevention System (EMPRES) in September 2013 after working for nongovernmental organizations (NGOs) funded by the United States Agency for International Development (USAID) on animal production and health development projects in Africa, Central Asia and Latin America. He obtained his veterinary medicine degree from Universidad Austral de Chile. While in Chile, Eran was also involved in technology transfer and clinical work for small dairy holders and indigenous groups. In 2000, he moved to the United States of America to specialize in dairy production medicine at the University of California, Davis where he completed his Master's degree in preventive veterinary medicine (MPVM). Eran then completed his Ph.D. in veterinary epidemiology at the University of Minnesota after which he conducted epidemiological research and taught epidemiology at the College of Veterinary Medicine at Purdue University, Indiana.



Eran Raizman

Reviriego Gordejo — New Porcine Epidemic Diarrhoea: the EU position

Francisco Javier Reviriego Gordejo. European Commission. Health & Consumers Directorate-General. - Animal Health. Head of Sector Disease Control and identification.

Abstract: Porcine Epidemic Diarrhoea (PED) in North America and Asia was reported to be the cause of a serious epidemic and major losses to the pig industry, in particular in the USA. A Novel Swine Enteric Coronavirus Disease caused by emerging porcine alphacoronaviruses including PED virus and a new porcine deltacoronavirus emerged in North America. There are scientific uncertainties on this epidemic diarrhoea affecting the Americas and the information available concerning the possible role of new virus in the epidemic of diarrhoea in the epidemic is preliminary. The absence of clear clinical evidence of disease in Europe could be related either to the absence of the agent(s) causing the epidemic, or due to the immunity of the EU pig population or due to the adoption of good hygienic measures in the EU pig industry. The European Commission (EC), facing an emerging risk, took a precautionary approach in line with the WTO and OIE international standards and adopted provisional minimum, proportionate, protective measures establishing safe heating and processing standards for the introduction into the EU of spray dried blood and blood plasma of porcine origin intended for the production of feed for farmed porcine animals. In addition, the animal health requirements for the import of live pigs from affected areas into the EU were revised and further risk mitigating, proportionate requirements were adopted. On request of the EC, the European Food Safety Authority is developing an assessment of the risks posed by the PED strains circulating in certain countries to evaluate their possible impact on the health status and production of pig holdings in Europe and on possible introduction pathways for these viruses (including the new porcine Deltacoronavirus). The EC and the EU Member States are ready to revise the risk mitigation measures for these Swine Enteric Coronavirus once more knowledge is available.

Biography: Dr Francisco Javier REVIRIEGO GORDEJO obtained his PhD (1999) in Veterinary Epidemiology from the Universidad Complutense de Madrid and his degree (1988) in Veterinary Science from the same university. He worked as Official vet for the Autonomous Region of Castilla y Leon where he was responsible for implementing eradication programmes, BSE regional surveillance programme and from 1991 to 1996, he was Head of the Animal Health Laboratory of Avila and before worked as a veterinarian with the Pig Farmers' Association from 1990 to 1991. He joined the European Commission (DG SANCO) in 2001 as a Legislative Veterinary Officer. In 2005 was Head of Sector Epidemiology and Eradication, and since 2008 is as Head of the Sector Disease Control and Identification. In addition to his work at DG SANCO, Dr Reviriego Gordejo participated in a number of World Organisation for Animal Health (OIE) ad hoc groups on brucellosis, tuberculosis, bluetongue, Schmallenberg, epidemiology and modelling. He is founding member of the Spanish Veterinary Laboratory Diagnosticians Association and the Spanish Veterinary Epidemiologists Association. He holds a postgraduate diploma (2000) in Statistics and Design in Health Sciences.



Francisco Javier
Reviriego Gordejo

Rippke — General Licensing Requirements in the United States

Byron Rippke, Policy, Evaluation, and Licensing Unit Director
Center for Veterinary Biologics

Abstract: This presentation will provide an overview of the various types of licenses and permits issued by the USDA Center for Veterinary Biologics and the basic data requirements that support their issuance.

Biography: Dr. Byron Rippke received his D.V.M. degree from Iowa State University in 1983. Following graduation, he was engaged in clinical veterinary practice both in Texas and Iowa. For the past 25+ years, Dr. Rippke has worked in a variety of positions as a regulatory veterinarian for the USDA, first with the Food Safety and Inspection Service, and later with APHIS. For the past ten years, Dr. Rippke has served as the Center for Veterinary Biologics – Policy, Evaluation, and Licensing Unit Director.



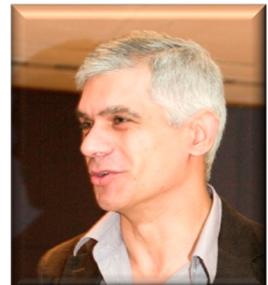
Byron Rippke

Romero — PEDV Situation in Spain

Luis J. Romero González, DVM
Chief of Epidemiology, MAGRAMA, Madrid, Spain

Abstract: Porcine Epidemic Diarrhea virus (PEDV) was identified for the first time in Europe in the UK in 1972. It showed as diarrhea outbreaks clinically similar to transmissible gastroenteritis cases. Similar outbreaks were reported later in other countries and, during the eighties, the disease spread through Europe. In Spain, the disease spread a bit later than in other European countries and the virus was demonstrated for the first time in 1985. Several serological and virological surveys carried out in Spain in the 80's, 90's and in 2001 will be presented during the intervention. The detection of new PEDV strains showing high mortality in piglets in different countries in the Asian and American continent has been considered as a risk for the European pig production, so protective measures have been adopted by European Union on pig movements. Several measures and studies are being also implemented in Spain: strengthen biosecurity at the farms; biosecurity protocol design and implementation for pig farms to prevent the disease entry and to control the disease once the farm has been affected; enforcing cleansing and disinfection on livestock vehicles; improve laboratory diagnostic capability; in vivo experimental studies including possible cross-protection between American and European PEDV strains; evaluation of the direct and indirect economical impacts for the pig sector in case the American strain reaches Spain.

Biography: Mr. Luis Romero is the Head of the Epidemiology Department in the Spanish Ministry of Agriculture, Food and Environmental Affairs. He got the Veterinary Degree from the Veterinary School in the University Complutense of Madrid (1989) with the specialties of Clinical Medicine and Bromatology. From 1992 to 2003 he joined the Research Animal Health Center in Valdeolmos, Madrid (CISA-INIA), where he was involved in Development and Research Programmes on diagnosis and prophylaxis of animal emergence diseases, as well as Head of the Department of Diagnosis. In 2003, he joined the Subdirectorate of Animal Health, as Head of the Epidemiology Department in charge of the epidemiological reports on the Animal Health in Spain and other countries as well as the co-ordination of control measures to be adopted in case of declaration of a animal sanitary alert in Spain. He is a Member of the Community Veterinary Emergency Team of the EU since 1999, and he has participated as International Consultant to FAO, IAEA and OIE in different countries. He was also a Member of the OIE ad hoc Group on the evaluation of Foot and Mouth Disease Status of Member countries in 2012 and of Classical Swine Fever in 2014. He is authored more than 100 scientific papers in books, international or national scientific journals, and conference proceedings."



Luis J. Romero

Romero — Sanitary situation of PED in Mexico

Igor Francisco Romero Sosa

Abstract: Mexico will have a presentation about the sanitary situation of PED in this country from August of 2013 to August 2014, with information about the states that are affected, number of samples and processed analysis; an analysis on the epidemic measures taken will be made . Likewise, it will be described the collaboration mechanisms between authorities and producers , reinforcement strategies of biosecurity measures and the implementation of best management practices and prevention.

Biography: Graduated from the Faculty of Veterinary Medicine and Zootechnics of the National Autonomous University of Mexico in 1966. In the current Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food began as an analyst and subsequently served as Chief Department of Economic Studies and Programming; for several periods he served as Chief of Technical Advisors of the Minister of Livestock, Livestock Planning Director, Livestock Marketing Director, Livestock Development Director, Private Secretary in different presidential administrations of the Ministry of Livestock, Director of Livestock Development, Director of the National Center for Verification Services in Animal Health, and currently Director of the Exotic Animal Diseases Commission. He has participated on national and international representations in multiple events of livestock production and animal health, highlighting: Official Representation of Mexican Delegation in the World Congress of Dairy, Montreal, Canada 1992; Group chair of livestock development on the XI Ministerial Meeting Mexico-Canada (1995), Binational Meeting Mexico-United States about Animal Health. Through the International Organization of Agricultural Health (OIRSA) he has participated in technical support activities and strategic approach on animal health. Assistance and participation in general and specific sessions convened by the World Organization of Animal Health (OIE) Partnership for the Prosperity and Security of North America (ASPAN) and Asia-Pacific Economic Cooperation (APEC)



Igor F. Romero Sosa

Rose— Porcine Epidemic Diarrhea: Assessment of the Risk of Introduction and Spread in France

Béatrice Grasland¹, Lionel Bigault¹, Cécilia Bernard¹, Mathieu Andraud¹, Yannick Blanchard¹, **Nicolas Rose¹**
¹Anses – Ploufragan-Plouzané Laboratory

Abstract: In the last decade, only few European countries reported porcine epidemic diarrhea virus (PEDV) clinical cases whereas many outbreaks have been reported in Asia. The virus was first reported in April-May 2013 in the US and subsequently spread to several countries in North, Central and South America. Differences in nucleotide sequence have been identified in PEDV isolated in Europe, the Americas and Asia but their effect on phenotypic characteristics (e.g. virulence, antigenicity) is currently not known. Porcine deltacoronavirus (PDCoV) was first described in 2012 in Korea and detection of PDCoV has only been reported in the US and Canada from cases of diarrhea, however frequently in association with PEDV. In France, only sporadic cases of PED have been described in the 80's with no further report from the 90's. Because PEDV immunity of the French swine population is expected to be weak, an action plan has been built with the National veterinary services and will be presented. This global plan is based on (1) the listing of PED as a notifiable emerging disease; (2) a risk assessment and ranking of the different routes of introduction of the disease in the country; (3) the development of diagnostic tools and their evaluation; (4) the development of a spatio-temporal disease spread model to assess the consequences in case of introduction and evaluate the efficacy of control strategies.

Biography: Nicolas Rose, DVM, PhD graduated at the Veterinary Faculty of Nantes (France) in 1994 and passed his PhD in 2002 at Rennes University. In year 2007, he graduated at the European College of Porcine Health and Management (ECPHM). He has been working as researcher in Epidemiology at the Anses - Ploufragan laboratory (<http://www.anses.fr/en/content/ploufragan-plouzan%C3%A9-laboratory>), since 1995 and is currently the director of the *Swine Epidemiology and Welfare research unit*. Dr. Rose has taken part in several research projects, at both national and European levels. He is especially skilled in epidemiology and mathematical modelling of infectious diseases with a particular interest in viral infections in swine populations. Of the many lines of research that he has participated in, the most important are the Porcine Reproductive and Respiratory Syndrome Virus (PRRSV), the Hepatitis E Virus (HEV), Swine Influenza viruses and diseases associated with Porcine Circovirus type 2 (PCV2). As a result of these investigations he is the co-author of more than 60 articles published in peer-reviewed international scientific journals. He has been involved recently in expert working groups both at National and European levels to assess the risk of introduction and spread of Porcine Epidemic Diarrhea in Europe and France.



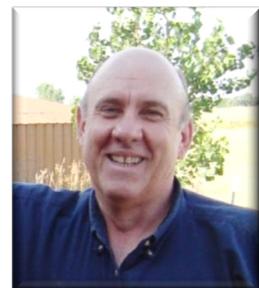
Nicolas Rose

Scott — Root Cause Investigation: Entry of novel Porcine Enteric Corona Viruses into United States

Aaron Scott, DVM, PhD, Diplomate ACVPM (epidemiology)
USDA-APHIS-Veterinary Services

Abstract: In spring of 2013, a novel enteric corona virus was identified in the United States and rapidly spread across the country. Stakeholders in the swine industry responded including industry veterinarians, universities, laboratories, as well as State, and Federal government. Multiple investigations were conducted on farms, research studies initiated, and surveillance activities commenced, but a clear conclusion of the means of entry into the US was not achieved. In 2014, USDA-APHIS initiated a “root cause” investigation to revisit the question and to build on the information accumulated and published over the prior year. The investigation proceeded by first collating various sources of data and evaluating basic epidemiology factors: host, agent, environment, epidemiology curves, and timeline. From this basic characterization of the national outbreak and accumulated information, several scenarios were identified and evaluated. Early farms were revisited in light of acquired data, industry experts provided insight from their experiences, other federal agencies were consulted, and further studies initiated. The investigation has identified a small number of scenarios that could explain the introduction of these viruses. Status of the investigation and updates on the most probable scenarios are reported in this presentation.

Biography: After 17 years in private veterinary practice, Dr. Scott completed a Ph.D. in environmental health with emphasis in toxicology, and research in immunology and mechanisms of carcinogenesis. He is Board Certified by the American College of Veterinary Preventative Medicine (ACVPM) with specialization in Epidemiology. He joined USDA APHIS Veterinary Services as an animal health risk analyst in 2002 and has since served as an analytic epidemiologist and Center Director for the National Surveillance Unit. Currently he serves within USDA APHIS Veterinary Services in the Science Technology and Analysis Services as the Senior Advisor for Epidemiology and Environmental Sciences.



Aaron Scott

Sellers — U. S. Feed Industry Perspectives and Logistics on Possible Pathways and Risks of Feed Introduction and Transmission of PEDv

Richard Sellers, PAS

Sr. Vice President, Legislative & Regulatory Affairs
American Feed Industry Association

Biography: Richard Sellers is senior vice president for Legislative and Regulatory Affairs of the American Feed Industry Association in Arlington, VA. He joined AFIA in 1991 and was promoted to his current position in 2013. He holds a B.S. from the University of Memphis and M.S. from the University of Arkansas in animal sciences. He is a professional animal scientist registered with the American Registry of Professional Animal Scientists.

Snelson — Transboundary Swine Diseases of Concern

Abstract: The purpose of this exercise is to acknowledge and understand those viruses that are known to infect swine globally. The AASV Swine Health Committee reviewed the list and assigned a ranking to each virus relative to their potential impact on the U.S. swine industry considering several factors; trade impact, economic impact, zoonotic, and chance of US introduction/emergence/re-emergence. Our mission is to delve into each virus and define what we know about each one. What tools we would need to have in place to recognize the clinical disease as early as possible, diagnose the virus, determine virulence and viability, what effective disinfectants and vaccines are available, where is it currently known to exist, how is the virus transmitted, what products or mechanisms might pose a possible route of introduction into the U.S., etc. An expert working group was formed to further evaluate the list. This virus list will be used to direct possible resources towards addressing the gaps identified by the working group. It will also be used to engage USDA regarding monitoring for these diseases globally and help us understand the potential threats to our industry. The current system did not work with PED. It evaded our established safeguards and took us way too long to diagnose and implement a response. Can we be better next time if we know what to look for and are monitoring internationally and domestically? This is a first step at trying to answer those questions.

Biography: Dr. Snelson received his DVM from the NC State University College of Veterinary Medicine. Following graduation, he spent 10 years as the swine veterinarian for Carroll's Foods in Warsaw, NC. He has since served as Manager of Swine Technical Services for Schering-Plough Animal Health and as Director of Science and Technology for the National Pork Producers Council in Washington, DC. He currently serves as Director of Communications for the American Association of Swine Veterinarians. Dr. Snelson was trained as a Foreign Animal Disease Diagnostician in 2000 at Plum Island and spent a month in Wales during the 2001 FMD outbreak. In addition, he participated in eradicating CSF from a commercial swine herd in Mexico and has represented the interests of swine producers and veterinarians at the state and federal level on farm and food security issues. He currently chairs the Swine Health committee of the National Institute of Animal Agriculture (NIAA) and the US Animal Health Association's (USAHA) Transmissible Diseases of Swine committee and co-chairs the USAHA/AAVLD Joint National Animal Health Laboratory Network committee. In addition, he is active on a number of national committees addressing exotic and emerging diseases and emergency response.



Harry Snelson

Songkasupa — Porcine Epidemic Diarrhea situation, control and prevention measures in Thailand

Tapanut Songkasupa

Verdonck — Gathering Scientific Evidence to Assess Possible Consequences of PEDV Re-emergence or PDCoV Detection in Europe

Verdonck F., Carjaval A., Gauger P., Martelli P., Rose N. and Bøtner A.

Abstract The PED virus (PEDV) appeared in Europe in the early 1970s, when the disease was detected for the first time in the United Kingdom in a pig holding affected by acute diarrhea in fattening pigs and sows. Afterwards, the disease has been detected in several countries in Europe causing outbreaks of watery diarrhea in swine. In the 1980's and 1990's outbreaks of PED became less frequent in Europe, whereas the disease has become increasingly problematic in many Asian countries. The fast spread of PEDV in the United States and the detection of animals infected with the new porcine *Deltacoronavirus* (PDCoV), raised the need to better determine the extent of the problem in order to be prepared if Europe would face a re-emergence of PED or identification of animals infected with PDCoV. The European Commission asked the Panel on Animal Health and Welfare (AHAW Panel) from the European Food Safety Authority (EFSA) to deliver a scientific opinion. Gathering of the available scientific evidence and identification of data gaps is ongoing in relation to the evaluation of a possible impact of PDCoV detection or a re-emerging of PED on the health status of pig holdings in Europe and on their production. A review of the presence and survival of both viruses in different matrices is carried out to identify possible pathways of virus introduction into the EU.

Biography: Frank Verdonck is trained as a molecular biologist. He started his scientific career at the Laboratory of Veterinary Immunology (Ghent University, Belgium) where his research focus was the interaction of intestinal *Escherichia coli* infections with the immune system of its host. He obtained his PhD in 2004 and remained a few years as post-doc in the same lab. In 2007, he joined the biotech company Ablynx where he was senior scientist team leader of the 'cell based screening' unit. Since May 2012, he is working in the Animal and Plant Health unit of the European Food Safety Authority (EFSA) where he is coordinating risk assessments mainly in the field of animal health.



Frank Verdonck