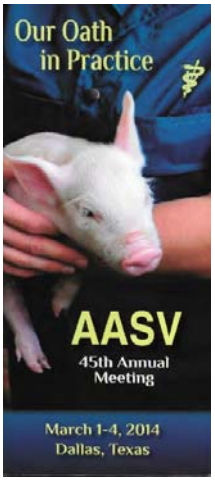
THE 45th MEETING OF THE AMERICAN ASSOCIATION OF SWINE VETERINARIANS (AASV)



Before starting…

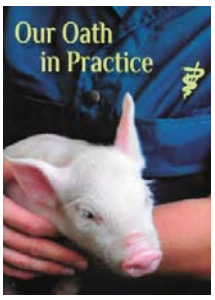
- My deep apology
  - if the topics may sound outdated to you
  - if I did not cover all the topics
  - If this presentation will end early
- Proceedings/CD are available for those who wish to read more.
  - Secured pdf files !

Veterinarian's Oath

Being admitted to the profession of veterinary medicine, I solemnly swear to use my scientific knowledge and skills for the benefit of society through the protection of animal health and welfare, the prevention and relief of animal suffering, the conservation of animal resources, the promotion of public health, and the advancement of medical knowledge.

I will practice my profession conscientiously, with dignity, and in keeping with the principles of veterinary medical ethics.

I accept as a lifelong obligation the continual improvement of my professional knowledge and competence.



Meeting structures

- Pre-meeting seminars
- Keynote lectures
- Research Topics
- Concurrent sessions
  - Student seminar
  - Industrial partners
  - PRRSV/SIV
  - Mycoplasma and enteric management
  - Animal welfare
- General session:
  - Loos Tales and loose stools *(PED, PED, PED)*

Pre-meeting seminars

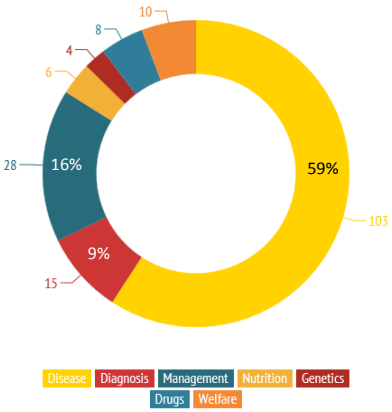
- Practical tips: It's our sworn duty to share!
- Grow-Finish Biosecurity: reality or oxymoron?
- Data management
- Swine Reproductive Technology
- Avoiding black helicopters
- Operation main street training
- Pathogen transmission: from around the world to your backyard
- Effective communication
- Diagnostic laboratory synergism for best outcomes
- Swine medicine for students

Key Note Lectures

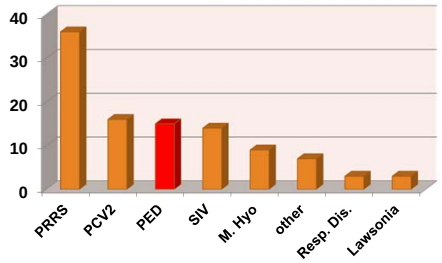
- Howard Dunne Memorial Lecture
  - The pig always wins (Daryl Olsen)
- Alex Hogg Memorial Lecture
  - The PED challenge: Application of our veterinary oath to represent the pig (Mark J. Engle)

AASV 2014

Disease	103
Diagnosis	15
Management	28
Nutrition	6
Genetics	4
Drugs	8
Welfare	10
Total	**174**



Articles by disease topics



Hot stuff: Oral fluid !!

- 13 articles
- Detections & Surveillance:
  - PRRSV, SIV, PCV2, PEDV, ASFV
  - Enteric pathogens (*Lawsonia, Salmonella, Brachyspira*)
  - *Ascasis suum*
- Drug detection
  - Ceftiofur residues
  - Chlortetracycline

Development of a new IDEXX ELISA for the detection of PRRS antibodies in swine oral fluids

Sergio Lizano, et al. (pg.467)

- IDEXX PRRS OF Ab Test (newly improved, same-day detection protocol)
- Specificity 98.7%, Sensitivity 100%

Oral fluids work from Thai colleagues

- Using litter oral fluids from weanling pigs to monitor PRRS status in commercial sow farms-field study (Apisit Kittawornrat et al., pg. 241-242)
- Influenza A virus (IAV) surveillance using pre-weaning oral fluid samples (Yaowalak Panyasing at al., pg. 421-422)

PEDV

- First confirmed May 2013, spreading rapidly across the US
- Presented topics
  - Keynote / General session
  - Viral evolution
  - Diagnosis (oral fluid)
  - Virology / Pathology studies
  - Epidemiology / Economic impact
  - Research program (NPB)
  - Industrial aspect

National Pork Board research summary

(Paul Sundberg, pg. 601-602)

- Research fund (1.1M+ U$) within 6 months following first identification
- Priority Topics:
  - Viral pathogenesis
  - Diagnostic testing development and validation
  - Environmental survivability
  - Epidemiology
  - Developed protocols to assess and optimized sow herd immunity utilizing traditional feedback methods
- 2014 Priority
  - Evaluation of interventions for PED control, management and elimination
  - Diagnostic testing and surveillance for PED

PED Pathogenesis and diagnosis

(Yoon, pg. 603-604)

- First recognized April 2013
- Mortality 30-50% > up to 100%
- 2-4 weeks of production loss
- 1-2 week delay in time to market

- Prolonged shedding up to 24 dpi
- PCR based assays are much more sensitive then Ag-captured ELISA
- PCR testing showed good correlation on paired fecal and oral fluid samples
- Serology test: IFA, SN, (ELISA being developed)

Epidemiology and economic impact of PED

(Morrison and Goede, pg. 605-613)

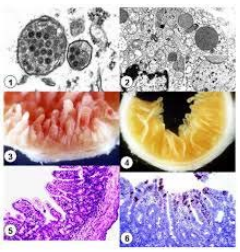
- Oro-fecal route, highly infectious
- Very stable in the environment
- Colostral IgA is a better protective marker than SN titer.
- Contamination via transportation trailers

- Site classification guideline for PED virus
- Protocol and procedure for PEDV elimination provided in annex.

PEDV

- Isolation and characterization of US porcine epidemic diarrhea viruses (Chen et al., pg. 59-60)
  - The closet genetic similarity to some PEDV strain reported in China during 2011-12.
  - S gene (S1) is appropriate for sequencing as routine diagnosis to demonstrate genetic relateness among PEDV.
  - PEDV-specific IFA assay was developed and offered since Sept 2013
- Pathogenesis of porcine epidemic diarrhea virus in post-weaned pigs (Magstadt et al., pg. 57-58)
  - Viral shedding for up to 17 days following infection (longer than the observed lesions and clinical signs)..up to 35 dpi in other study (Bower et al., pg. 61-62)

PED vaccines ?

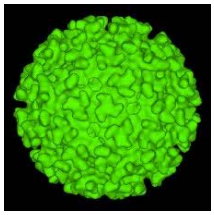


www.aasv.org

- Dynamic evolution with antigenic variation
- Ineffective MLV (+ evidence of reversion)
- Mucosal immunity is required for protective immunity.
  - Colostrum IgA concentration is a better marker of protection from PEDV infection than serum neutralising (SN) titre.

Alphavirus Replicon system
A replication-deficient viral particle

- Arbovirus (a positive sense single stranded RNA genome)
- Examples: Sinbis virus, Chikungunya virus, Semliki Forest virus, EEE, WEE, VEE etc.
- An expression vector carrying the nonstructural genes and the gene of interest and a helper vector with the structural genes are subjected to *in vitro* RNA preparation followed by cotransfection into mammalian cells where recombinant virus particles are assembled.



Alphavirus Replicon

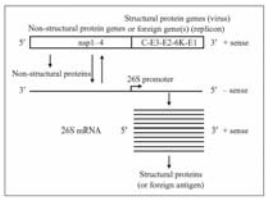


Fig. 1. Alphavirus genome organization and replication strategy.

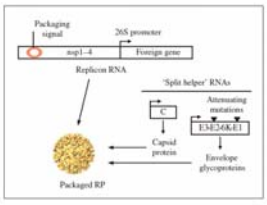
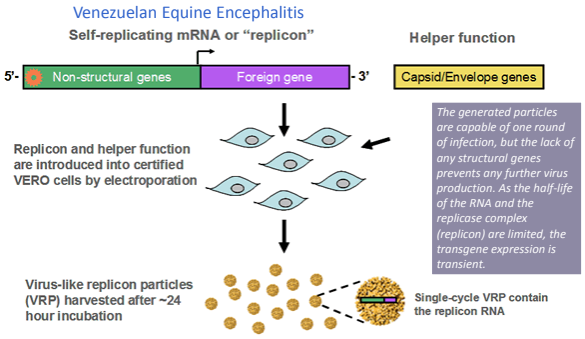


Fig. 2. Alphavirus RP vaccine and packaging system. Portions of this image courtesy of AlphVax Inc. (Research Triangle Park, NC, USA).

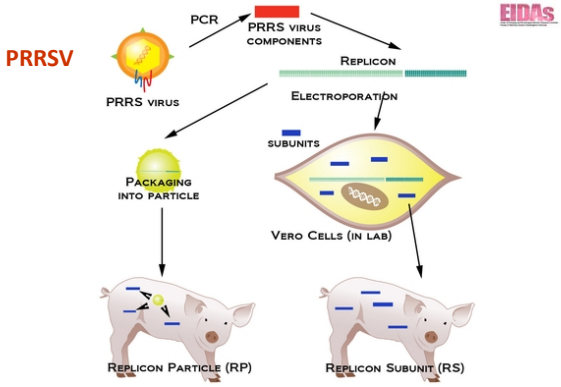
Vander Veen et al., 2012

Alphavirus Replicon system



http://www.alphavax.com/images/system.gif

PRRSV



http://www.harrisvaccines.com/en/technology/alphavax_platform/

PRDV Vaccine

- Development of an alphavirus RNA particle-based vaccine against porcine epidemic diarrhea virus (Mogler et al., pg. 63-64)
  - Harrisvaccines
  - Defective single cycle expression vector expressing PEDV spike gene
- Vaccinate-Challenge trial
  - 8 weaned pigs
  - 2 doses (D0, 21), i.m., challenged D42
  - reduced clinical signs, reduced shedding in challenged pigs

Need more studies in gilts?

Replicons in this meeting

- PEDV: Development of an alphavirus RNA particle-based vaccine against porcine epidemic diarrhea virus
  - PEDV-Spike
- ASFV: RNA particles: A novel application for efficient development of FAD serologic assays
  - ASFV-VP30, VP54, VP72
- iFLU-PRRVENT: Monitoring mortality rates for the evaluation of alphavirus RNA particle vaccines
  - Flu-HN / PRRS-ORF5
- SirraVAX RNA platform: Tailor-made, herd specific RNA vaccine, produced within 4-6 weeks
  - PRRSV-ORF5

PCV2

- A commercial PCV2a vaccine and an experimental PCV2b vaccine both protect against challenge with a 2013 variant mPCV2b (Opriessnig et al., pg.65)
- A PCV2a based ORF2 subunit vaccine cross protects against challenge with a recent PCV2b strain (Rodier et al., pg. 453-454)
- Evaluation of age dependent vaccination on piglet antibody response to Fostera™ PCV (Kryzer et al., pg. 85-86)
  - At 9 week post weaning, pigs vaccinated at 3 and 18 days old (off-labeled) had significantly lower level of anti-PCV2 Ab, compared to pigs vaccinated at 18 and 39 days old.

SIV

- Maternally derived antibodies induce vaccine-associated enhanced respiratory disease in weaned pigs challenged with heterologous virus (Rajao et al., pg. 51-52)

Porcine Bocaviruses

- High prevalence and genetic diversity of porcine bocaviruses (PBoV) in US pigs and identification of multiple novel PBoV species (Opriessnig et al., pg. 415)
  - May associated with respiratory signs
  - ISU-VDL (2011-2012)
  - High prevalence rate (21.3-50.8%), often mixed PBoV infection
  - Genetically diversed

Vaccination procedures

Monitoring the compliance of the vaccination procedures of 30,535 pigs (Crozier et al., pg. 325-326): **Result from periodic vaccination QA audits**

Top 5 Best Practices

- Appropriate needle change
- Picking every pigs up to give injections
- Correct dosages of vaccines
- Correct needle guage and length
- Good methods to determine vaccinated from unvaccinated pigs

Top 5 Areas that need improvement

- Better needle placement for injections
- Less tissue trauma to decrease needle site bleeding
- More humane handling of the pigs
- Placing thermometers in the refrigerators
- Warming of vaccines that are to be warmed

Watching the Eastern Horizon

(Jerome O. Geiger, pg. 485-488)

- There are monsters out there !
- Do you recognize the enemy ?
- *…Biosecurity is only half of a prevention program. The other half is preventing agents from leaving infected premises, and this is often call "Biocontainment"...*
- Case Analysis: Japan/Korea FMD outbreaks and Russia-ASFV

Watching the Eastern Horizon: FMD in Asia

(Jerome O. Geiger, pg. 485-488)

JAPAN **Winner**

- April-July 2010
- Culling (300k) + Vac-Cull
- Affected 300 farms
- **Re-instate FMD-free status by Oct 2010**
- Loss: 724M U$
- Speed, Accuracy, Coordination and Appropriate resources

KOREA **Defeated**

- Nov 2010 – lost in less than 4 months
- Culling (3.6M + 150k cattle) & Vaccination
- Affected 2,000 farms (1/3 pig pop)
- Disease never been contained
- Loss: 3.8B U$ and still
- Incorrect dx, delayed initial confirmation by 2 mons
- Delayed disease control program
- Poor biocontainment (pig feces > fuel)
- Cold season > longer viability
- Concentrated farm location

Watching the Eastern Horizon

(Jerome O. Geiger, pg. 485-488)

- Russia-ASF
  - Since 2007 and may circulate forever
  - Outdated and ambiguous legislation and lack of clarity on course or leadership

SPEED, ACCURACY, COORDINATION AND APPROPRIATE RESOURCES ARE THE KEYS

My impressions

- Pre-congress seminar: well all-around topics
- Funding assistance for students
- DVM/graduate student presentations and participation
- Active meeting (on time, full house from the beginning to the end of the conference)

- **Science leads practice**
- **Big picture agenda (General sessions)**
- The American's way