THREE CASES OF ACUTE BACTERIAL SEPSIS IN PYGMY HIPPOPOTAMUS (CHOEROPSIS LIBERIENSIS) CALVE SIBLINGS

Thomas W. deMaar, DVM, Benjamin R. LaFrentz, PhD, and Michael M. Garner, DVM, DACVP

Abstract: A multiparous pygmy hippopotamus (Choeropsis liberiensis) dam produced three consecutive calves that died acutely at 13–15 wk of age from bacterial sepsis, for which diagnostic and therapeutic intervention was not possible. Streptococcus iniae (Cases 1 and 3), Escherichia coli (Case 2), and an unidentified member of the family Pasteurellaceae (Case 1) were identified in postmortem tissues through bacterial culture followed by standard and

molecular identification methods. After the loss of two calves, a series of vaccinations were administered to the dam during the third pregnancy to enhance transplacental and colostral transfer of antibodies to the calf. The third calf did not survive, and the source of the bacterial infection in these three calves was undetermined. Prior to and after the birth of the fourth calf, nutritional and nutraceutical supplements were provided to the dam and calf. Additionally, pest control around the barn was enhanced. The fourth calf survived. Pygmy hippopotamus calves at the age of 13–15 wk may have increased susceptibility to bacterial infection, possibly due to waning maternally derived immunity. The findings in these cases, combined with a previous association of S. iniae in pygmy hippopotamus deaths, suggest that this bacterium is an especially important pathogen of the endangered pygmy hippopotamus.

* Calf 1= died at 15 wk, found, histo found acute overwhelming bacterial septicemia with brain and lungs targeted; *Streptococcus iniae*
* Calf 2= livestock mineral mix was added because review of serum mineral levels indicated low zinc and iron. Died at 13 wk, found, found lesions in kidney, lung and liver- culture was *E. coli*
* Calf 3= mom was given gestational vaccines; died at 13 wk, also found; petechiae was found in this calf (skin and lymph nodes)- lesions of toxin in heart, liver, kidney; *S. iniae* was confirmed
* Calf 4= at 5 weeks dam received additional nutritional and nutraceutical support; calf also ate this new mix as well once it started to wean; calf lived to 1 year od age and was continuing to do well
* Three consecutive calves died of endotoxemia and sepsis due to *S. iniae* or *E.coli*; similar lesions: pneumonia, hepatic necrosis and tubulointerstitial nephritis were found
* The *S. iniae* was susceptible to all but gentamicin and amikacin; and the *E.coli* was mostly resistant in Case 2
* *S. inaie* can cause large losses of fish in farming operations (tilapia is greatly impacted); mammalian manifestation was first seen in Amazon River dolphins
* Zoonotic: people consuming raw or undercooked fish
* Pygmy hippos around 3-5 months of age may have increased susceptibility to bacterial infections
* Supplementation with nutraceuticals and probiotics may be helpful but unknown
* The hippo isolates are genetically distinct from the fish isolates

**KOBUVIRUS DETECTION IN THE CRITICALLY ENDANGERED PYGMY HOG (PORCULA SALVANIA), INDIA.** Journal of Zoo and Wildlife Medicine. 2021. Yashpal Singh Malik, Sudipta Bhat, Shubhankar Sircar, Atul Kumar Verma, Nagendra Nath Barman, Parag Jyoti Deka, Souvik Ghosh, Gábor Reuter, Kuldeep Dhama.

Abstract: Pygmy hogs (Porcula salvania) are the smallest and rarest wild suid. It is categorized as a Critically Endangered species as per the Red List of the International Union for Conservation of Nature. This study reports the first detection of a single-stranded RNA virus species, Aichivirus C, belonging to the genus Kobuvirus (KobV) and the family Picornaviridae, in pygmy hogs. KobV species are identified as a cause of acute gastroenteritis among children in India. As of now, there exists no report on the detection of KobV in animals from India. We used a detection assay based on reverse transcription–polymerase chain reaction for KobV screening in pygmy hogs from a conservation center in India. The 3D polymerase gene–based molecular analysis revealed KobV presence in the Indian wild suid, pygmy hogs. Of the 15 samples tested, three were found positive for picornaviruses and were negative for rotavirus A, rotavirus C, astrovirus, picobirnavirus and caliciviruses. Nucleotide based sequence analysis of the partial 3D polymerase gene revealed close identity with porcine KobV from the Czech Republic (JX232619, 90.6% 91.6%) and Hungary (NC\_011829, 89.8%–91.6%), wherein one of the current study strains clustered with the Czech Republic JX232619 strain in the phylogenetic tree. Further investigation of the role of KobV in health and disease of pygmy hogs is warranted.

Background:

* Genus *Kobuvirus* (KobV); family Picornaviridae
  + Nonenveloped, positive-sense single-stranded RNA genome
  + Six species: *Aichivirus* A-F
  + Zoonotic - reported to cause GI and respiratory infections in human
    - Detected in few wild carnivores i.e. wolves, red fox, jackel, spotted hyena
  + Tropism for GI/found in fecal samples of diarrheic and nondiarrheic piglets
  + Other picornaviruses: human polio, hepatitis A, Simian hepatitis A, Seneca valley virus
* Pygmy Hogs (*Porcula salvania*) - smallest and rarest wild suid
  + Critically endangered; few hundred left in wild in India
  + Vulnerable to: salmonella, clostridium, classical swine fever

Methods: analyzed fecal samples from 15 clinically healthy pygmy hogs for KobV via rtPCR

Key Points:

* 3/15 fecal samples positive for picornavirus on gel electrophoresis and KobV on rtPCR
  + Cell cultures negative for cytopathic effects and negative for KobV via rtPCR
* Shared >90% nucleotides with porcine KobV Aichivirus C from Czech Rep and Germany
  + Phlyogenetic analysis found two clades: one bat KobV and one animal/human KobV
    - Suggests porcine KobV is evolving
* Wild animal can act as potential reservoirs for emerging disease
  + Lateral transmission possible between domestic pigs and FR pygmy hogs
* All negative for rotavirus (A and C), astrovirus, picobirnavirus, enteric calicivirus

TLDR:

* First detection of KobV (*Aichivirus C*) in pygmy hogs - feces by rt-PCR, all clinically healthy
* Wild animals can act as reservoirs for emerging diseases such as KobV

Hayley Stratton

CBS 817

8-31-23

**EVALUATION OF THE EFFECT OF HYDRATED LIME ON THE SCAVENGING OF FERAL SWINE (SUS SCROFA) CARCASSES AND IMPLICATIONS FOR MANAGING CARCASS-BASED TRANSMISSION OF AFRICAN SWINE FEVER VIRUS**Courtney F. Bowden, James Grinolds, Gregory Franckowiak, Lorna McCallister, Joseph  
Halseth, Matthew Cleland, Travis Guerrant, Michael Bodenchuk, Robert Miknis, Michael C. Marlow, and Vienna R. Brown. Journal of Wildlife Diseases, 59(1), 2023, pp. 49–60. DOI: 10.7589/JWD-D-22-00061

**Abstract:**

African swine fever (ASF) is a devastating hemorrhagic disease marked by extensive morbidity and mortality in infected swine. The recent global movement of African swine fever virus (ASFV) in domestic and wild swine (Sus scrofa) populations has initiated preparedness and response planning activities within many ASF-free countries. Within the US, feral swine are of utmost concern because they are susceptible to infection, are wide-spread, and are known to interact with domestic swine populations. African swine fever virus is particularly hardy and can remain viable in contaminated carcasses for weeks to months; therefore, carcass-based transmission plays an important role in the epidemiology of ASF. Proper disposal of ASF-infected carcasses has been demonstrated to be paramount to curbing an ASF outbreak in wild boar in Europe; preparedness efforts in the US anticipate carcass management being an essential component of control if an introduction were to occur. Due to environmental conditions, geographic features, or limited personnel, immediately removing every carcass from the landscape may not be viable. Hydrated lime converts to calcium carbonate, forming a sterile crust that may be used to minimize pathogen amplification. Any disturbance by scavenging animals to the sterile crust would nullify the effect of the hydrated lime; therefore, this pilot project aimed to evaluate the behavior of scavenging animals relative to hydrated lime-covered feral swine carcasses on the landscape. At two of the three study sites, hydrated lime-treated carcasses were scavenged less frequently compared to the control carcasses. Additionally, the median time to scavenging was 1 d and 6 d for control versus hydrated lime-treated carcasses, respectively. While results of this study are preliminary, hydrated lime may be used to deter carcass disruption via scavenging in the event that the carcass cannot be immediately removed from the landscape.

*Key words:* African swine fever virus, carcass management, feral swine, foreign animal disease,

hydrated lime, scavenging.

**Background:**

* African swine fever (ASF) is one of the most deleterious diseases at the domestic livestock-wildlife interface with a case fatality rate of nearly 100%
  + Large, double-stranded DNA virus; genus *Asfivirus,* family *Asfarviridae*
  + Highly stable in the environment
  + Infects domestic and wild members of the Suidae family
* 2018, ASFV began to spread through central and western Europe, Asia, and the Caribbean. Prior to this outbreak, virus was limited to Africa and Eastern Europe.
* US does not have native wild boar but has populations of invasive feral swine in most states (est. > 6 million animals). Feral swine are known to interact with domestic livestock.
* Carcass-based ASFV transmission is known to be an important source for new infections; removing infected carcasses is an important means of control
* Hydrated lime (calcium hydroxide) creates a sterile “crust” on the surface of carcasses; when exposed to air it absorbs carbon dioxide and releases water, hardening to form a crust of calcium carbonate
  + Lime has been applied to human remains, animal carcasses, and abattoir waste to reduce pathogen load and dispersal.

**Key points:**

* Study design: 3 study sites (Louisiana, Missouri, Texas), 5 paired hydrated lime-treated carcasses and control carcasses at each site, trail cameras used to monitor carcass scavenging for 10 days
* No difference in frequency in which paired carcasses were scavenged in Louisiana; however, control carcasses were scavenged at a higher frequency than hydrated lime-treated carcasses in Missouri and Texas (P < 0.05)
* No difference in survival probabilities between two treatments; however, the median survival time for control carcasses was 1d compared to 6d for hydrated lime-treated carcasses (P = 0.06)
* Feral swine were not observed making direct contact with carcasses, but they were observed at all three study sites; this could result in spread of ASFV through contaminated environment if disease were introduced into the US
* Scavenging could help to reduce pathogen burden by contributing to carcass breakdown; if feral swine carcasses were left on the landscape indefinitely, the use of hydrated lime may negate the benefits of scavenging
* Use of hydrated lime may prevent translocation of ASFV-contaminated carcass materials by scavengers in the interim between carcass detection and carcass removal

**Takeaway:**

Applying hydrated lime (calcium hydroxide) to feral swine carcasses may reduce scavenging behavior and delay onset of scavenging, which may prevent spread of ASFV by scavengers in the interim between carcass detection and carcass removal.

**Evaluation of a combination of tiletamine-zolazepam, medetomidine, and azaperone with nasal oxygen supplementation for the immobilization of captive Chacoan peccaries (*Catagonus wagneri*) in the Chaco region of Paraguay.** J Wildl Dis. 2023. 59(2): 281-287. Laura Martinelli.

**Abstract**

A combination of tiletamine–zolazepam, medetomidine, and azaperone was used to immobilize captive Chacoan peccaries (*Catagonus wagneri*) for health assessments and biological sample collection at the Centro Chaquen ̃o para la Conservacio ́n e Investigacio ́n (CCCI) in the Paraguayan Chaco during July in 2017 and 2018. In total, 83 peccaries kept in 0.25–1.50 hectare enclosures were immobilized via dart-administered anesthetic. Mean animal weight was 33.89±3.74 kg (standard deviation; n=77). The mean intramuscular (IM) anesthetic drug and dosages were 0.03±0.00 mg/kg of medetomidine, 0.91±0.10 mg/kg of Zoletil 50 (tiletamine–zolazepam), and 0.30±0.03 mg/kg azaperone. The mean time to recumbency after darting was 6.07±2.65 min. The mean time to reach the anesthetic plane post darting was 10.00±2.00 min. Muscle relaxation was adequate to allow minor veterinary procedures. A mean dosage of 0.15±0.02 mg/kg of atipamezole was given IM to reverse the medetomidine. Recoveries were smooth and animals were standing by 59.17±30.18 min post reversal. Full recovery and release back to enclosures occurred 90±30 min post reversal. **A single dose of this drug combination provided adequate anesthesia for 88% of adult Chacoan peccaries; 12% needed a supplemental dose of tiletamine–zolazepam because of failure to receive the full dose from the anesthetic dart.** Sex and age did not impact the dosage required to achieve immobilization. **Confinement during recovery from anesthesia is required with this protocol. Aside from mild hypoxemia, no adverse effects from anesthesia were observed.** However, oxygen supplementation as a part of this protocol is recommended to support circulatory and respiratory capacity.

Key Points

* Telazol commonly used in Chacoan peccaries, reliable anesthesia, wide safety margin, and minimal depression of cardiovascular and respiratory systems, but can see prolonged recoveries
* Azaperone is neuroleptic, short-acting sedative 🡪 butyrophenone class, not controlled, works on central dopamine and peripheral adrenergic blockage mechanisms to create strong anticholinergic effect
* PaO2 increased from 54 mmHg to 205 mmHg (means) after 10 minutes oxygen supplementation, and SpO2 increased from 92% to 96%. Recommend oxygen supplementation (2 L/min in this study used). Otherwise, vitals were relatively normal with this protocol.

**Take Home Point:** A combination of tiletamine–zolazepam, medetomidine, and azaperone safely immobilizes captive Chacoan peccaries (*Catagonus wagneri*) and reversal with atipamezole provided recovery within ~60-90 minutes (an improvement on previous protocols).

*JWD* 2021 57(3):543-552

[**Aujeszky's Disease In Hunted Wild Boar (*Sus scrofa*) In The Iberian Peninsula**](https://doi.org/10.7589/jwd-d-20-00197)

Müller A, Melo N, González-Barrio D, Pinto MV, Ruiz-Fons F

**ABSTRACT:** Aujeszky's disease (AD, pseudorabies) eradication programs in domestic pigs are implemented in several European countries where AD virus (ADV) circulates in local wild boar (Sus scrofa), making studies on ADV infection dynamics in wild boar increasingly relevant. The objective of our study was to characterize ADV dynamics in wild boar at a site in central Portugal and compare this site to three enzootic sites in central Spain. A total of 235 wild boar were sampled during the hunting season 2014-15. We collected serum, tissues (oropharyngeal tonsils and trigeminal and sacral ganglia), and swabs (oral, nasal, and genital) and analyzed these samples to detect ADV antibodies (enzyme-linked immunosorbent assay) and DNA (PCR). An overall seroprevalence of 42.6% was found (range 12.7-57.7%), being highest in adults (54.1%; 72/133). Overall, 2.8% (3/108) oral, 6.4% (7/109) nasal, and 12.8% (12/94) genital swabs were PCR positive. We found 20.4% (20/98) of the wild boar had at least one positive swab and were considered shedders. We found ADV in tissues of five animals; of 111 tonsils, three (2.7%) were PCR positive. Trigeminal (2/48; 4%) and sacral (2/53; 4%) ganglia collected in central Portugal, pertaining to three animals, were positive for ADV DNA. Logistic regression models showed that seroprevalence was influenced by site and age, whereas ADV shedding was influenced by site. Our study describes patterns of ADV infection in wild boar in Portugal and shows that wild boar also pose a risk, albeit lower than that in central Spain, for the eradication of AD from extensively managed domestic pigs in Portugal.

**Background:**

* Aujeszky’s disease (aka pseudorabies) is caused by Suid herpesvirus 1
  + Acute, often fatal, viral disease with a worldwide distribution
  + Reportable, successfully eradicated from commercial swine in the USA

**Key Points**

* Sampled wild boar during the hunting season of 2014-2015 in central Spain and Portugal
  + Study confirmed circulation of ADV among wild boar in central Portugal
* Seroprevalence higher at the sites in Spain vs Portugal, higher in adults vs younger animals
  + Cumulative exposure -> increasing seropositivity w/ age, consistent with previous studies
* Highest proportion of ADV positivity in genital swabs vs oronasal swabs
  + Emphasizes importance of genital route in transmission
* Four ADV infection categories established:
  + Non-shedding seronegative animals (not infected)
  + Seropositive non-shedding (latent infection)
  + Seronegative shedders (recent infection)
  + Seropositive shedders (reactivated latent infections)
* Majority of boars tested were not infected followed by latent infection in Spain
* In Portugal, vast majority was seropositive, shedders, or both, with only ~30% being not infected
* Potential pig-wild boar interactions should be considered in the eradication of AD in Portugal