





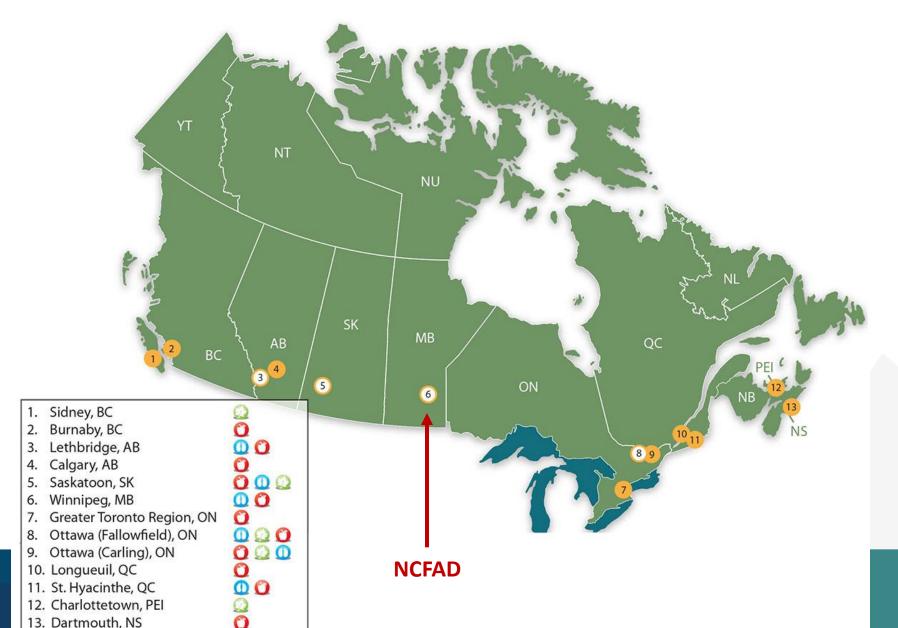
Enhancing ASF/CSF Surveillance through Laboratory Diagnostics: Advances, Best Practices, and the Role of Reference Laboratories







Canadian Food Inspection Agency (CFIA)'s 13 Reference & Research Laboratories Across Canada



National Centre for Foreign Animal Disease (NCFAD)







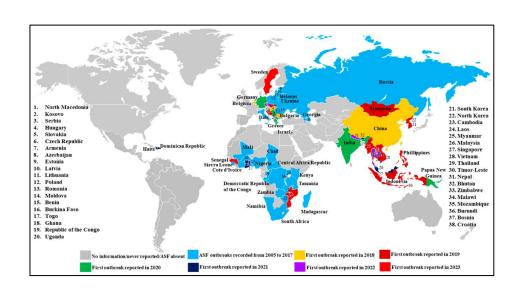
- The Canadian National Ref. Laboratory for FADs Diagnostic Services to the CFIA National Animal Health Program
- High containment BSL3 & BSL4 Laboratory with large animal facilities
- ISO/IEC 17025:2017 accredited for diagnostics & research
- WOAH/OIE Reference Laboratories for <u>CSF, ASF</u>, High Path. Avian Influenza & FMD
- FAO Reference Centers for FMD & Zoonotic & Emerging Pathogens
- Other Functions: Technology Development & Research, Training, Scientific Advice & International Consultation

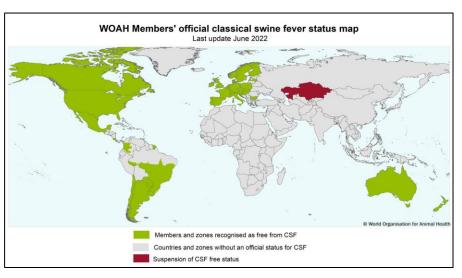
African swine fever (ASF) & classical swine fever (CSF)



- ASF and CSF are contagious <u>hemorrhagic fevers</u> affecting pigs
- CSF caused by a <u>small RNA</u> virus and ASF by a <u>large DNA</u> virus
- Spreads rapidly across national borders threatening swine health, food security & international trade
- Clinical signs and pathological lesions <u>similar & non-specific</u> <u>Laboratory diagnosis essential</u>
- Both viruses survive in meat and meat products for several months Anthropogenic spread

African swine fever (ASF) & classical swine fever (CSF)





- ASF continues to spread in Africa, Asia & Europe In 2021 spread to Dominican Republic & Haiti
- CSF endemic in Asia, some countries in Central and South America. Recent outbreaks in Japan (2018, genotype 2.1), Colombia (2013, genotype 2.6) & Brazil (2018, genotype 1.5)
- ASF and CSF free countries are highly concerned about the increasing risk of an incursion
- Considerable efforts & resources are allocated to <u>prevent an introduction and early detection</u>

 Early detection is critical for rapid disease control to minimize devastating economic losses and to regain freedom

Early detection depends on:

- 1. Identification of the first suspected case triggering sample submission Could take up to several months
 - 1997 CSF outbreak in Netherlands: Introduction to first report ~ 6 weeks. 39 undetected outbreaks
 - 2021 ASF outbreak in Dominican Republic: Introduction ~ April 2021,
 Confirmed in July 2021

2. Laboratory diagnosis & confirmation - Within hours to few days after submission

Enhanced Surveillance

Proper Diagnostics

CSF & ASF Surveillance via Laboratory Diagnostics - Current Diagnostics

Recommended Samples: Whole blood (EDTA), Serum and Tissues - Mainly spleen (ASF) and tonsils (CSF), lymph nodes, bone marrow, lung and kidney

For virus:

Detection - Real-time quantitative PCR (RT-qPCR) or conventional PCR **Confirmation -** Sanger/whole genome sequencing & virus isolation

For antibodies:

Detection - Enzyme Linked Immunosorbent Assay (ELISA)

Confirmation - Neutralization assay (CSF), Immunoblotting test (IBT) or Immuoperxidase test (IPT)

Advances - Nucleic acid-based methods for virus detection

Improved RT-qPCR assays: Remains the gold standard for early, rapid, & sensitive detection.
Have developed assays with improved sensitivity and those that can differentiate
genotypes, and attenuated vaccine strains



Development and inter-laboratory validation study of an improved new realtime PCR assay with internal control for detection and laboratory diagnosis of African swine fever virus







frontiers Frontiers in Veterinary Science

ORIGINAL RESEARCH published: 01 June 2022 doi: 10.3389/fvets.2022.882824



Establishment of a Dual Real-Time PCR Assay for the Identification of African Swine Fever Virus Genotypes I and II in China

Qi Gao ^{1,2,3†}, Yongzhi Feng ^{1,2†}, Yunlong Yang ^{1,3}, Yizhuo Luo ^{1,4}, Ting Gong ^{1,4}, Heng Wang ^{1,2,3}, Lang Gong ^{1,2,3}, Guihong Zhang ^{1,2,3*} and Zezhong Zheng ^{1,2,3*}

1 Key Laboratory of Zoonosis Prevention and Control of Guangdong Province, College of Veterinary Medicine, South China Agricultral University, Guangchou, China, ² African Swine Fewer Regional Laboratory of China, Guangchou, China, ² Research Center for African Swine Fewer Prevention and Control, South China Agricultural University, Guangchou, China, ³ Maoming Branch, Guangchong Laboratory for Linguan Modern Agriculture, Maoming, China

OPEN ACCESS

Edited by: Shao-Lun Zhai, Guangdong Academy of Agricultural Sciences, China Since the first outbreak of ASFV genotype II in China in 2018, ASF has posed a significant threat to the swine industry. After the emergence of genotype I in China in 2020, the epidemic prevention and control have become more difficult. No effective commercial vaccine is currently available, and the disease is difficult to eradicate; therefore, the identification of the ASFV genotype is critical to getablish bioseful control massures.



ORIGINAL RESEARCH published: 27 October 2021 doi: 10.3389/fvets.2021.768869



Development Real-Time PCR Assays to Genetically Differentiate Vaccinated Pigs From Infected Pigs With the Eurasian Strain of African Swine Fever Virus

Lauro Velazquez-Salinas ^{1,2*}, Elizabeth Ramirez-Medina ¹, Ayushi Rai ^{1,3}, Sarah Pruitt ¹, Elizabeth A. Vuono ^{1,4}, Nallely Espinoza ¹, Douglas P. Gladue ^{1*} and Manuel V. Borca ^{1*}

OPEN ACCESS

Edited by:

¹ Agricultural Piesearch Service, United States Department of Agriculture, Plum Island Animal Disease Center, Greenport, NY, United States, ² Department of Anatomy and Physiology, Kansas State University, Manhattan, KS, United States, ³ Dak Ridge Institute for Science and Education (ORISE), Oak Ridge, TN, United States, ⁴ Department of Pathobiology and Population Medicine, Mississippi State University, Mississippi, NIS, United States Duplex & multiplex qPCR assays: Simultaneous detection and differentiation of ASFV and CSFV in a single reaction. Relevant for areas where both diseases are present and for differential diagnosis





Establishment of a Direct PCR Assay for Simultaneous Differential Diagnosis of African Swine Fever and Classical Swine Fever Using Crude Tissue Samples

Tatsuya Nishi ¹, Kota Okadera ¹, Katsuhiko Fukai ¹, Miwa Yoshizaki ², Ai Nakasuji ², Syuji Yoneyama ³ and Takehiro Kokuho 1,*

- Exotic Disease Research Station, National Institute of Animal Health, National Agriculture and Food Research Organization, 6-20-1 Josui-honcho, Kodaira 187-0022, Tokyo, Japan; ultra1124@affrc.go.jp (T.N.); sry46-s5y492602@city.saitama.lg.jp (K.O.); fukai@affrc.go.jp (K.F.)
- Takara Bio Inc., Nojihigashi 7-4-38, Kusatsu 525-0058, Shiga, Japan; yoshizakim@takara-bio.co.jp (M.Y.); nakasujia@takara-bio.co.jp (A.N.)
- Tochigi Prefectural Central District Animal Hygiene Service Centre, Hiraideko-gyo-danchi 6-8, Utsunomiya 321-0905, Tchigi, Japan; yoneyamas01@pref.tochigi.lg.jp
- * Correspondence: takehiro@affrc.go.jp; Tel.: +81-42-321-1466

Abstract: African swine fever (ASF) and classical swine fever (CSF) are contagious swine diseases that are clinically indistinguishable from each other; hence, reliable test methods for accurate diagnosis and differentiation are highly demanded. By employing a buffer system suitable for crude extraction of nucleic acids together with an impurity-tolerant enzyme, we established a multiplex assay of real-time reverse-transcription polymerase chain reaction (rRT-PCR) for simultaneous detection of ASF virus (ASFV), CSF virus (CSFV) and swine internal control derived genes in a sample without the need for prior purification of viral nucleic acids. We applied this method to test serum and tissue





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ORIGINAL RESEARCH published: 24 June 2022 doi: 10.3389/fvets.2022.926881



A Multiplex Crystal Digital PCR for **Detection of African Swine Fever** Virus, Classical Swine Fever Virus, and Porcine Reproductive and **Respiratory Syndrome Virus**

Kaichuang Shi 1,2*t, Yating Chen 1t, Yanwen Yin Feng Long, Shuping Feng, Huixin Liu 1, Sujie Qu² and Hongbin Si 1*

OPEN ACCESS

Edited by: Enric M. Mateu, Universitat Autònoma de Barcelona, Spain

Reviewed by: Zaheer Ahmed United States Department of Ollege of Animal Science and Technology, Guangxi University, Nanning, China, 2 Guangxi Center for Animal Disease Control and Prevention, Nanning, China

African swine fever (ASF), classical swine fever (CSF), and porcine reproductive and respiratory syndrome (PRRS) are highly infectious diseases of domestic pigs and wild boars. The co-infections of ASF virus (ASFV), CSF virus (CSFV), and PRRS virus (PRRSV) have been reported in different pig farms. Farly differential detection and **CRISPR-based diagnostics**: For rapid & highly-specific ASFV detection. Can be integrated with isothermal amplification for "all-in-one" methods & offer superior sensitivity



frontiers Frontiers in Veterinary Science

OPEN ACCESS

Sciences (JAAS), China

Jiangsu Academy of Agricultural

Edited by:

ORIGINAL RESEARCH published: 18 July 2022



International Journal of Biological Macromolecules

Volume 321, Part 2, September 2025, 146109

Xiaowei Gao ¹, Xinying Dong ¹, Hao Song, Yanhui Fu, Jing Li, Gaocheng Fan, Tao Wang, Yuan Sun,

A one-pot CRISPR-Cas12a-based assay for rapid, on-site detection of African swine



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ARTICLE

CRISPR/Cas12a technology combined with immunochromatographic strips for portable detection of African swine fever virus

Xinjie Wang^{1,8}, Pinpin Ji^{2,8}, Huiying Fan^{3,8}, Lu Dang^{4,8}, Wenwei Wan⁵, Siyuan Liu⁵, Yanhua Li⁶, Wenxia Yu⁵, Xiangyang Li⁵, Xiaodong Ma o ¹, Xu Ma⁷, Qin Zhao^{2 ⋈}, Xingxu Huang^{5 ⋈} & Ming Liao^{3 ⋈}

African swine fever virus (ASFV), the aetiological agent of African swine fever (ASF), causes lethal haemorrhagic fever in domestic pigs with high mortality and morbidity and has devastating consequences on the global swine industry. On-site rapid and sensitive detection of ASFV is key to the timely implementation of control. In this study, we developed a rapid, sensitive and instrument-free ASFV detection method based on CRISPR/Cas12a technology and lateral flow detection (named CRISPR/Cas12a-LFD). The limit of detection of CRISPR/ Cas12a-LFD is 20 copies of ASFV genomic DNA per reaction, and the detection process can be completed in an hour. The assay showed no cross-reactivity with other swine DNA viruses, and has 100% agreement with real-time PCR detection of ASEV in 149 clinical samples. Overall, the CRISPR/Cas12a-LFD method provides a novel alternative for the portable, simple, sensitive, and specific detection of ASFV and may contribute to the prevention and control of ASF outbreaks



Swine Fever Virus Using CRISPR-Cas12a

Chao Qin¹, Jiaiia Liu¹, Wengi Zhu¹, Muchu Zeng², Ke Xu¹, Jinmei Ding¹, Hao Zhou¹, Jianshen Zhu¹, Yuging Ke², Lai Yan Li², Gaoyuan Sheng², Zhuoru Li², Huaixi Luo¹, Shenayao Jiang¹, Kanachun Chen¹, Xiantina Ding^{2*} and He Mena^{1*}

Shandhai Jiaotong University, Shandhai, China. 2 State Key Laboratory of Oncogenes and Related Genes, School of

African swine fever virus (ASFV) is a leading cause of worldwide agricultural loss. ASFV is a highly contagious and lethal disease for both domestic and wild pigs, which has brought enormous economic losses to a number of countries. Conventional methods, such as general polymerase chain reaction and isothermal amplification, are time-consuming, instrument-dependent, and unsatisfactorily accurate. Therefore, rapid, sensitive, and field-deployable detection of ASFV is important for disease surveillance and control. Herein, we created a one-pot visual detection system for ASFV with CRISPR/Cas12a technology combined with LAMP or RPA. A mineral oil sealing strategy was adopted

One-Pot Visual Detection of African

Shanghai Key Laboratory of Veterinary Biotechnology, Department of Animal Science, School of Agriculture and Biology, Biomedical Engineering, Institute for Personalized Medicine, Shanghai Jiaotong University, Shanghai, China

Highlights

 $(R^2 = 0.9423)$

fever virus

Show more V

Yanjin Wang, Hua-Ji Qiu 🖰 🖾 , Yuzi Luo 🗸 🖾

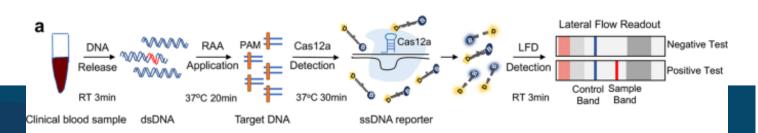
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https://doi.org/10.1016/j.ijbiomac.2025.146109 7

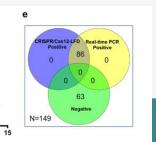
- · A novel one-pot RPA-CRISPR-Cas12a assay was developed for contamination-free detection of ASFV.
- · The optimized assay demonstrated excellent diagnostic performance.
- Rapid ASFV detection was accomplished within 35 minutes at 40°C

4000

2000

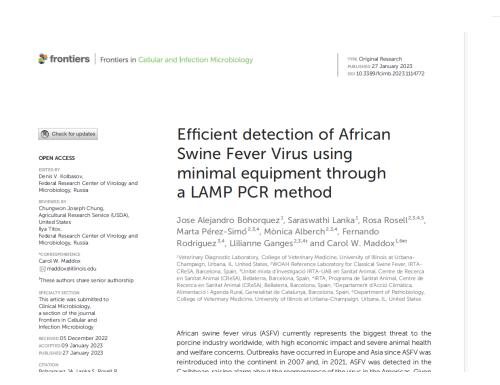


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10

• Isothermal amplification (LAMP and RPA): Eliminates expensive thermal cyclers, ideal for point-of-care (POC) testing and field diagnostics. Provide <u>rapid results</u> (15–40 minutes) with high sensitivity & various read-out options, including lateral flow devices.





METHODS published: 21 July 2020 doi: 10.3389/fmicb.2020.01696



Clinical Validation of Two Recombinase-Based Isothermal Amplification Assays (RPA/RAA) for the Rapid Detection of African Swine Fever Virus

OPEN ACCESS

Edited by:

Douglas Paul Gladue, Plum Island Animal Disease Center (USDA-ARS), United States

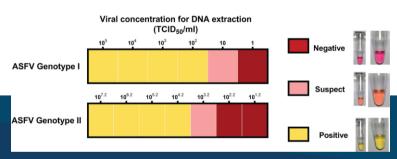
Reviewed by: Denis V. Kolbasov, Research Center of Virology

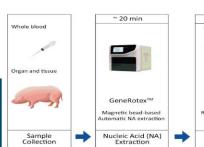
Federal Research Center of Virology and Microbiology, Russia Charles Masembe, Makerere University, Uganda

Correspondence: Xiaodong Wu Xiaoxu Fan^{1†}, Lin Li^{1†}, Yonggang Zhao¹, Yutian Liu¹, Chunju Liu¹, Qinghua Wang¹, Yaqin Dong², Shujuan Wang¹, Tianying Chi¹, Fangfang Song¹, Chengyou Sun¹, Yingli Wang¹, Dengchuriya Ha³, Yang Zhao^{1,4}, Jingyue Bao¹, Xiaodong Wu^{1} and Zhiliang Wang^{1*}

¹ National Reference Laboratory for African Swine Fever, National Surveillance and Research Center for Exotic Animal Diseases, National Surveillance and Research Center for Exotic Animal Diseases, National Surveillance and Research Center for Exotic Animal Diseases, National Health and Epidemiology Center, Cingdao, China, ² Uvestock Disease Surveillance Laboratory, China Animal Health and Epidemiology Center, Cingdao, China, ³ Vocational and Technical College, Inner Mongolia Agricultural University, Hohhot, China, ⁴ College of Veterinary Medicine, Inner Mongolia Agricultural University, Hohhot, China

African swine fever (ASF), caused by African swine fever virus (ASFV), is a devastating infectious disease of domestic pigs and wild boars, and has tremendous negative socioeconomic impact on the swine industry and food security worldwide. It is characterized as a notifiable disease by World Organisation for Animal Health (OIE). No





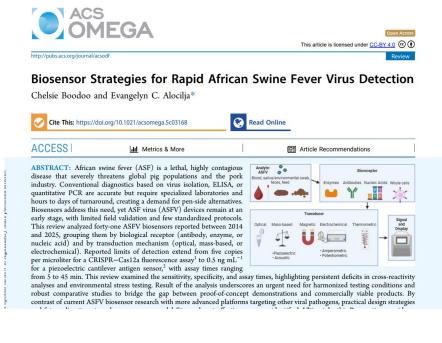


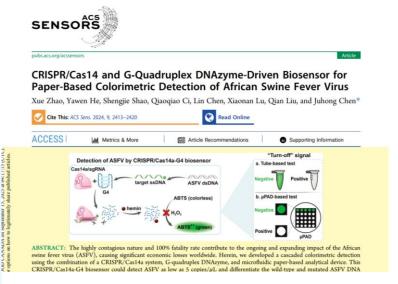
Preparation

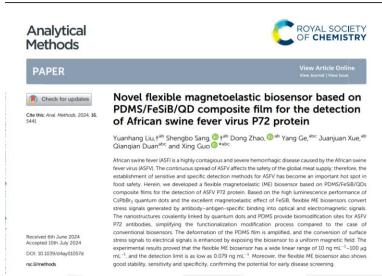


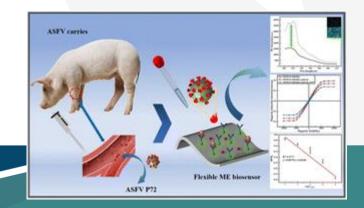


 Biosensors and microfluidics: Offer the potential for <u>portable</u>, <u>high-throughput</u>, <u>and sensitive</u> <u>detection</u> of ASFV and CSFV. Can integrate all steps of the diagnostic process onto a single chip, moving toward automated POC diagnostics









 Whole-genome sequencing (WGS): High-throughput sequencing technologies, including portable Nanopore devices, for rapid and detailed genomic and epidemiological analysis of outbreaks





Articl

Generation of High-Quality African Swine Fever Virus Complete Genome from Field Samples by Next-Generation Sequencing

Chuan Shi ^{1,2,3,†} Qinghua Wang ^{1,†}, Yutian Liu ¹, Shujuan Wang ¹, Yongqiang Zhang ¹, Chunju Liu ¹, Yongxia Zheng ¹, Chengyou Sun ¹, Fangfang Song ¹, Xiaojing Yu ¹, Yunling Zhao ¹, Jingyue Bao ^{1,*} and Zhiliang Wang ^{1,*}

- 1 China Animal Health and Epidemiology Center, Qingdao 266032, China; liuyutian@cahec.cn (Y.L.); liuchuniu@cahec.cn (C.L.); zhengdongxia@cahec.cn (D.Z.); sunchengyou@cahec.cn (C.S.)
- ² BGI-Qingdao, BGI-Shenzhen, Qingdao 266555, China
- College of Life Sciences, University of Chinese Academy of Sciences, Beijing 518083, China
- * Correspondence: baojingyue88@163.com (J.B.); wangzhiliang@cahec.cn (Z.W.)
- † These authors contributed equally to this work.

Abstract: African swine fever (ASF) is a lethal contagious viral disease of domestic pigs and wild boars caused by the African swine fever virus (ASFV). The pandemic spread of ASF has caused severe effects on the global pig industry. Whole-genome sequencing provides crucial information for virus strain characterization, epidemiology analysis and vaccine development. Here, we evaluated the performance of next-generation sequencing (NGS) in generating ASFV genome sequences from clinical samples. Thirty-four ASFV-positive field samples including spleen, lymph node, lung, liver and blood with a range of Ct values from 14.73 to 25.95 were sequenced. For different tissue samples collected from the same sick pigs, the proportion of ASFV reads obtained from the spleen samples was 3.699–9.86 times higher than other tissues. For the high-viral-load spleen samples (Ct < 20), a



Targeted Whole Genome Sequencing of African Swine Fever Virus and Classical Swine Fever Virus on the MinION Portable Sequencing Platform

Chester D. McDowell ¹, Taeyong Kwon ¹, Patricia Assato ¹, Emily Mantlo ¹, Jessie D. Trujillo ¹, Natasha N. Gaudreault ¹, Leonardo C. Caserla ², Igor Morozov ¹, Jayme A. Souza-Neto ^{1,3}, Roman M. Pogranichniy ^{1,3}, Djego G. Diel ², and Juergen A. Richt ^{1,4}.

- Department of Diagnostic Medicine/Pathobiology, College of Veterinary Medicine, Kansas State University, Manhattan, KS 66506, USA
- Department of Population Medicine and Diagnostic Sciences, College of Veterinary Medicine, Cornell University, Ithaca, NY 14853, USA
- Veterinary Diagnostic Laboratory, College of Veterinary Medicine, Kansas State University,
- Manhattan, KS 66506, USA

 * Correspondence: jricht@vet.k-state.edu

Abstract

check for

African swine fever virus (ASFV) and classical swine fever virus (CSFV) are important transboundary animal diseases (TADs) affecting swine. ASFV is a large DNA virus with a genome size of 170-190+ kilobases (kB) belonging to the family Asfarviridae, genus Asfivirus. CSFV is a single-stranded RNA virus with a genome size of approximately 12 kB, belonging to the family Flaviviridae, genus Pestivirus. Outbreaks involving either one of these viruses result in similar disease syndromes and significant economic impacts from: (i) high morbidity and mortality events; (ii) control measures which include culling and quarantine; and (iii) export restrictions of swine and pork products. Current detection methods during an outbreak provide minimal genetic information on the circulating

MICROBIAL GENOMICS

RESEARCH ARTICLE

MICROBIOLOGY
SOCIETY

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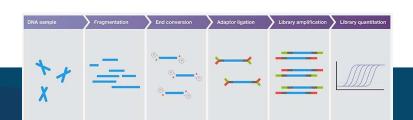
Li et al., Microbial Genomics 2025;11:001455 DOI 10:1099/mgen.0.001455

ANASFV: a workflow for African swine fever virus wholegenome analysis

Ke Li^{1,†}, Xu Han^{2,†}, Yanwen Shao¹, Xinyao Wu¹, Xiaomin Zhao³, Edgar Wayne Johnson‡⁴ and Runsheng Li^{1,5,6,*}

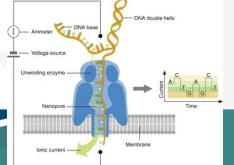
Abstract

African swine fever virus (ASFV) is highly transmissible and can cause up to 100% mortality in pigs. The virus has spread across most regions of Asia and Europe, resulting in the deaths of millions of pigs. A deep understanding of the genetic diversity and evolutionary dynamics of ASFV is necessary to effectively manage outbreaks. Genetic analysis of the ASFV requires sequencing and assembling its genome. Nanopore sequencing is increasingly used for ASFV analysis due to advantages such as long reads and portability. However, applying nanopore sequencing to ASFV genomes faces challenges, notably a higher error rate. Additionally, there is a lack of standardized methods for evaluating genome guality. Furthermore, an increasing number of recombinant isolates between genotypes I and II have been observed, complicating phylogenetic analysis. To overcome these obstacles, we developed ANASFV (analysis of an ASFV whole genome), a comprehensive pipeline that accomplishes four main tasks. First, the pipeline introduces an amplicon sequencing approach that significantly improves genomic coverage, enabling reliable genome assembly, and employs reference-aided polishing techniques to correct small indels caused by nanopore sequencing errors. Second, it establishes a system to provide a relative reference for assessing genome quality in terms of both completeness and accuracy of the assembled genomes. We found that almost all ASFV genomes based solely on nanopore sequencing in the NCBI were of poor quality, which improved significantly after reference-aided polishing. Third, the pipeline introduces a method to rapidly analyse whether an isolate is a recombinant between genotypes I and II, as well as to determine the pattern of recombination based on gene similarity. We identified 11 recombinant ASFV genotypes I and II in the NCBI. Lastly, a comprehensive phylogenetic analysis based on coding sequences was conducted, allowing researchers to generate a refined phylogenetic tree that includes all







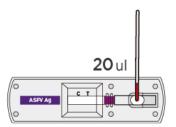


13

Advances - Serological methods for antigen & antibody detection

Lateral flow devices:

• Antigen detection: Poor sensitivity. Fluorescent LFAs to improve sensitivity



- Antibody detection: Comparable sensitivity to ELISA
- LFAs with combined antigen & antibody detection
- LFAS that can detect antibodies to ASFV and CSFV

Negative LSFV+ ASFV- CSFV+ CSFV- ASFV+ CSFV+

Improved ELISAs:

Multiple antigens to improve accuracy

 Fluorescent/chemiluminescent assays for confirming ELISA positive results. Higher sensitivity but require specialized lab

equipment







Articl

Improving African Swine Fever Surveillance Using Fluorescent Rapid Tests

Cristina Aira ^{1,*}, Alejandro Monedero ¹, Sonia Hernández-Antón ¹, Juan Martínez-Cano ¹, Ana Camuñas ¹, Nadia Casado ², Raquel Nieto ², Carmina Gallardo ², Marga García-Durán ¹, Paloma Rueda ¹ and Alba Fresco-Taboada ¹

Gold Standard Diagnostics Madrid (GSD Madrid), Calle de los Hermanos García Noblejas 39,





Artic

Indirect ELISA Using Multi-Antigenic Dominants of p30, p54 and p72 Recombinant Proteins to Detect Antibodies against African Swine Fever Virus in Pigs

Dexin Li ^{1,2,†}, Qin Zhang ^{1,2,†}, Yutian Liu ³, Miaoli Wang ⁴, Lei Zhang ^{1,2}, Liyuan Han ^{1,2}, Xuefei Chu ^{1,2}, Guofei Ding ^{1,2}, Yingchao Li ^{1,2}, Yanmeng Hou ^{1,2}, Sidang Liu ^{1,2}, Zhiliang Wang ^{3,*} and Yihong Xiao ^{1,2,*}

- Department of Fundamental Veterinary Medicine, College of Animal Science and Veterinary Medicine, Shandong Agricultural University, 61 Daizong Street, Tai'an 271018, China
- Shandong Agricultural University, 61 Daizong Street, 1ai an 2/1018, China
 Shandong Provincial Key Laboratory of Animal Biotechnology and Disease Control and Prevention,
- Shandong Agricultural University, Tai'an 271018, China

 China Animal Health and Enidemiology Center Oinedea 266032, China
- ³ China Animal Health and Epidemiology Center, Qingdao 266032, China
- Shandong Center Animal Disease Prevention and Control, Jinan 250100, China
 Correspondence: wangzhiliang@cahec.cn (Z.W.); xiaoyihong01@163.com (Y.X.)
- † These authors contributed equally to this work.

14

Best practices for ASF/CSF surveillance

 Strategic sampling: Passive <u>sick and dead pig</u> surveillance remains the <u>best approach for</u> early detection, as these animals have high viral loads. In endemic regions, both domestic pigs and wild boar surveillance is critical

2. Proper Samples:

- · Live animals Whole blood
- Dead animals Spleen, Tonsils (CSF), lymph nodes, bone marrow, lung and kidney
 - When full necropsy is not possible **Superficial Inguinal lymph nodes**





Communicatio

Superficial Inguinal Lymph Nodes for Screening Dead Pigs for African Swine Fever

Kalhari Bandara Goonewardene ¹, Chukwunonso Onyilagha ¹, Melissa Goolia ¹, Van Phan Le ², Sandra Blome ³ and Aruna Ambagala ^{1,4,*}

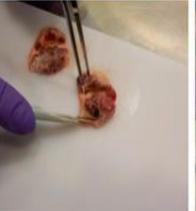
- Canadian Food Inspection Agency, National Center for Foreign Animal Disease, Winnipeg, MB R3E 3M4, Canada; kalhari.goonewardene@inspection.gc.ca (K.B.G.);
- chuckwunonso.onyilagha@inspection.gc.ca (C.O.); melissa.goolia@inspection.gc.ca (M.G.)

 Department of Microbiology and Infectious Disease, College of Veterinary Medicine, Vietnam National
 University of Aericulture, Hanoi 100000, Vietnam: letranphan@vnua.edu.vn
- Institute of Diagnostic Virology, Friedrich-Loeffler-Institut, 17493 Greifswald, Germany; Sandra.Blome@fli.de
 Department of Comparative Biology, Faculty of Veterinary Medicine, University of Calgary,
- Calgary, AB T2N 1N4, Canada

 * Correspondence: aruna.ambagala@inspection.gc.ca; Tel.: +1-204-789-2013

Abstract: African swine fever (ASF) has spread across the globe and has reached closer to North America since being reported in the Dominican Republic and Haiti. As a result, surveillance measures have been heightened and the utility of alternative samples for herd-level monitoring and dead pig sampling have been investigated. Passive surveillance based on the investigation of dead pigs, both domestic and wild, plays a pivotal role in the early detection of an ASF incursion. The World









- When no organs are available – **Meat Exudate**



https://www.ilri.org/news/deep-dive-inside-vietnams-pork-foodshed-determine-food-safety-issues-and-their-practical

- A useful surveillance tool to obtain epi. information related to low and moderately virulent strains circulating - facilitate ASF control and business continuity
- Abattoir-based meat exudate testing program in Asia
- <u>Diaphragm samples</u> that can be easily obtained and scaled up, and will have no negative effect on carcass quality





Article

Meat Exudate for Detection of African Swine Fever Virus Genomic Material and Anti-ASFV Antibodies

Chukwunonso Onyilagha ¹, Mikyla Nash ¹, Orlando Perez ¹, Melissa Goolia ¹, Alfonso Clavijo ^{1,2}, Juergen A. Richt ³ ond Aruna Ambagala ^{1,4,*} o

- National Centre for Foreign Animal Disease, Canadian Food Inspection Agency, Winnipeg, MB R3E 3M4, Canada; chukwunonso.onyilagha@inspection.gc.ca (C.O.); nashm3@myumanitoba.ca (M.N.); orlando.perez@canada.ca (O.P.); Melissa.Goolia@inspection.gc.ca (M.G.); Alfonso.Clavijo@usda.gov (A.C.)
- National Bio and Agro-Defense Facility, Agricultural Research Service, United States Department of Agriculture, Manhattan, KS 66506, USA
- ³ Center of Excellence for Emerging and Zoonotic Animal Diseases, Department of Diagnostic Medicine/Pathobiology, College of Veterinary Medicine, Kansas State University, Manhattan, KS 66506, USA; jricht@vet.k-state.edu
- Department of Comparative Biology, Faculty of Veterinary Medicine, University of Calgary, Calgary, AB T2N 1N4, Canada
- * Correspondence: aruna.ambagala@inspection.gc.ca

Full Scientific Report



Comparison of diaphragm meat juice and muscle swab samples to spleen and spleen swab samples for the detection of African swine fever viral nucleic acid

Journal of Veterinary Diagnostic Investigat 2023, Vol. 35(2) 145–152 © 2023 The Author(s) Article reuse guidelines: sagepub.com/journals-permissions DOI: 10.1177/10406387231151663 jvdi.sagepub.com

Rodney Okwasiimire, Aisha Nassali, Dickson Ndoboli, John E. Ekakoro, Bonto Faburay, Edward Wampande, Karyn A. Havas¹

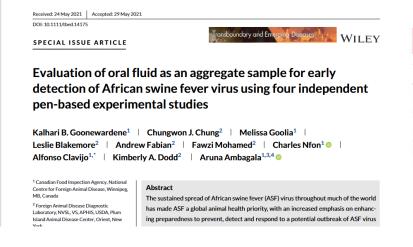
Abstract. Use of meat juice and muscle swabs at slaughterhouses may provide an easy-to-collect sample for African swine fever (ASF) surveillance. Meat juice has been experimentally shown to be a reliable sample for the detection of ASF virus (ASFV). We compared the detection of ASFV nucleic acid from diaphragm meat juice, diaphragm muscle swab, spleen, and spleen swabs from pigs with signs of ASFV infection at slaughterhouses around Kampala, Uganda. Pigs with ≥ 2 clinical or pathology signs at the time of slaughter had a spleen sample, spleen swab, diaphragm muscle sample, and diaphragm muscle swab collected. Meat juice was collected from muscle samples through a freeze—thaw cycle. Each sample was tested individually, and 72 spleen, meat juice, and muscle swab sample pools of 4 negative and 1 positive sample were tested, as well. Standard operating procedures from the USDA—Foreign Animal Disease Diagnostic Laboratory for viral DNA extraction and real-time PCR (rtPCR) were used. Of the 493 pigs evaluated, we classified as positive 357 (72.4%) diaphragm meat juice samples, 218 (44.2%) diaphragm muscle swabs, 247 (50.1%) spleen samples, and 241 (48.9%) spleen swabs. All spleen sample pools were positive (72 of 72; 100%), as were 71 of 72 (98.6%) meat juice pools and 67 of 72 (93.1%) muscle swab pools. Meat juice samples provided a reliable sample type for the detection by rtPCR of ASFV in pigs with natural infections.

Best practices for ASF/CSF surveillance contd.

Non-invasive novel sample types for active surveillance

A. Oral fluids

- A non-invasive alternative group sample
- Requires less resources and less stress on pigs
- Can supplement the traditional samples during ASF & CSF surveillance











† These authors contributed equally to this work.

Abstract: The early detection of classical swine fever (CSF) remains a key challenge, est

B. Processing fluid

- Serosanguineous fluid from piglet castration and tail docking
- Industry byproduct free sample
- Can be used to detect both ASFV & CSFV circulating in breeding herds (manuscripts in preparation)

Best practices for ASF/CSF surveillance contd.

3. Biosafety: All personnel involved in sample collection & processing must adhere to strict biosafety protocols, as ASFV is highly stable in organic material

4. Proper sample handling, packaging, and shipping. Essential to maintain sample integrity

and prevent potential cross-contamination.





- **5. Testing and result interpretation:** Use the most sensitive and specific assays & proper controls. Use of both nucleic acid & serological tests low virulent ASFV and CSFV strains
- **6. Confirmatory testing:** The initial positive results should be confirmed by a reference laboratory
- **7. DIVA diagnostic assays:** To differentiate vaccinated and naturally infected animals. Critical if vaccines are used: *Molecular and Serological DIVA assays*

Best practices for ASF/CSF surveillance contd.

ASF •

CSF •

8. Foster collaboration with the WOAH Reference Laboratories





The State of the World's Animal Health

Animal Diseases

Q SEARCH

WHO WE ARE Y WHAT WE DO Y WHAT WE OFFER Y

WAHIS 7

Home » What we offer » Expertise Network » Reference Laboratories



Reference Laboratories

Reference Laboratories are designated to carry out scientific and technical activities related to a specific disease. They also provide scientific and technical training for personnel from our Members, and coordinate scientific studies in collaboration with other laboratories or organisations. The Expert, responsible to WOAH and its Members with regard to a specific disease, is the leading and active researcher supporting the Reference Laboratory to provide scientific assistance and expert advice on topics linked to diagnosis and control of the disease.

Role of WOAH Reference Laboratories

WOAH Ref. Laboratories are global centers of excellence that play a critical, multi-faceted role in supporting prevention, diagnostics, surveillance, disease control and eradication of transboundary diseases

- Confirmatory diagnostics Samples from outbreaks or suspect cases to ensure definitive diagnosis, which is crucial for triggering official disease control measures
- 2. Set international standards for diagnostic tests and share their expertise with national laboratories, ensuring consistency and reliability across different countries.
- 3. Develop and store reference material according to WOAH Standards. Distribute reference material and any other reagents used in the diagnosis and control to the national laboratories
- 4. Provide training to veterinary professionals in disease diagnosis and surveillance

- African Swine Fever
 Reference Laboratory Network

 World Organisatio
 for Animal Health
- 5. To establish and maintain a network with other WOAH Reference Laboratories designated for the same pathogen
- 6. Coordinate international proficiency testing programs to evaluate the performance of diagnostic tests and laboratories, ensuring the quality and accuracy of results
- 7. Research and development As scientific leaders, conduct applied research to develop and validate novel diagnostic techniques and stay ahead of viral evolution new rapid field tests, improving serological assays, and investigating emerging viral variants
- 8. Recommend the prescribed and alternative tests or vaccines as WOAH Standards
- 9. To collect, process, analyze, publish and disseminate epizootiological data relevant to the designated pathogen
- 10. To carry out and/or coordinate scientific and technical studies in collaboration with other laboratories, centers or organizations
- 11. To place expert consultants at the disposal of the WOAH

Training

LARRSA-NCFAD WOAH Twinning Project for CSF (2017- 2022)















Global Affairs Canada Technology Transfer Project Building Sustainable Diagnostic Capability for Eradication of ASF in Ghana













Diagnostic Support/Research

Transboundary and Emerging Diseases



Transboundary and Emerging Diseases

ORIGINAL ARTICLE

Phylogenetic Analysis of Classical Swine Fever Virus Isolates from Peru

M. Araínga¹, T. Hisanaga², K. Hills², K. Handel², H. Rivera¹ and J. Pasick²

- ¹ Laboratory of Virology, Faculty of Veterinary Medicine, Universidad Nacional Mayor de San Marcos (UNMSM), Lima, Perú
- ² Canadian Food Inspection Agency, National Centre for Foreign Animal Disease, Winnipeg, Manitoba, Canada

Keywords:

classical swine fever virus; Peru; phylogenetics

Correspondence:

J. Pasick. Canadian Food Inspection Agency,

Summary

Classical swine fever (CSF) is considered to be endemic in Peru with outbreaks reported to the World Organization for Animal Health as recently as 2008 and 2009. Nevertheless, little is known regarding the genetic subgroup(s) of CSF





Article

Molecular and Pathological Characterization of Classical Swine Fever Virus Genotype 2 Strains Responsible for the 2013–2018 Outbreak in Colombia

Erin Robert ¹, Kalhari Goonewardene ¹, Lindsey Lamboo ¹, Orlando Perez ¹, Melissa Goolia ¹, Charles Lewis ¹, Cassidy N. G. Erdelyan ¹, Oliver Lung ¹, Katherine Handel ¹, Estella Moffat ¹, Carissa Embury-Hyatt ¹, Nancy Naranjo Amaya ², Claudia Patricia Calderón Parra ², Diana Cristina Gómez Rueda ², Maria Antonia Rincón Monroy ², Alfonso Clavijo ¹ and Aruna Ambagala ^{1,3,4,*}

- 1 Canadian Food Inspection Agency, National Centre for Foreign Animal Disease, Winnipeg, MB R3E 3R2, Canada; erin.robert@inspection.gc.ca (E.K.); kalhari.gonewardene@inspection.gc.ca (K.G.); lindsey.lamboo@phac-aspc.gc.ca (L.L.); orlando.perez@phac-aspc.gc.ca (O.P.); melissa.goolia@inspection.gc.ca (M.G.); charles.lewis@usda.gov (C.L.); cass.erdelyan@inspection.gc.ca (C.N.G.E.); oliver.lung@inspection.gc.ca (C.L.); katherine.handel@inspection.gc.ca (C.H.); estella.moffat@inspection.gc.ca (E.M.); carissa.emburyhvatt@inspection.gc.ca (C.E.-H.); alfonso.davijo@usda.gov (A.C.)
- National Veterinary Laboratory, Instituto Colombiano Agropecurio, Bogota 110911, DC, Colombia; nancy.naranjo@ica.gov.co (N.N.A.); claudia.calderon@ica.gov.co (C.P.C.P.); diana.gomez@ica.gov.co (D.C.G.R.): maria.rincon@ica.gov.co (M.A.R.M.)
- ³ Department of Animal Science, University of Manitoba, Winnipeg, MB R3T 2N2, Canada
- Department of Comparative Biology and Experimental Medicine, Faculty of Veterinary Medicine, University of Calgary, Calgary, AB T2N 1N4, Canada

Ongoing collaborations with Brazil and Ecuador

Vaccine Evaluation

Archives of Virology (2025) 170:22 https://doi.org/10.1007/s00705-024-06198-x

BRIEF REPORT



Porvac subunit vaccine induces neutralizing antibodies against all three main classical swine fever virus genotypes

Yusmel Sordo-Puga ¹ Elaine Santana-Rodríguez ¹ O Danny Pérez-Pérez ¹ Mary Karla Méndez-Orta ¹ O Talía Sardina-González ¹ O Milagros Vargas-Hernández ¹ O Carlos A. Duarte ¹ O María Pilar Rodríguez-Moltó ¹ O Mario P. Estrada ¹ O Aruna Ambagala ² O Marisela Suárez-Pedroso ¹

Received: 5 June 2024 / Accepted: 20 October 2024 / Published online: 17 December 2024 © Crown 2024

Abstract

Classical swine fever (CSF) is endemic in Cuba and is one of the major health problems of the Cuban swine industry. The current efforts to control the disease in Cuba include vaccination with Porvac[®], a subunit marker vaccine. Although the efficacy of Porvac against CSF virus (CSFV) subgenotype 1.4 has been extensively documented, little is known about the ability of the antibodies induced by this vaccine to neutralize other CSFV genotypes. In this study, sera collected from three pigs vaccinated with Porvac were able to efficiently neutralize CSFV strains belonging to genotypes 1, 2, and 3. The findings from this study indicate that additional in vivo studies are warranted to confirm the ability of this vaccine to protect pigs against CSFV genotypes 2 and 3.

23

Africa

Diagnostic Support/Research





Articl

The 2022 Outbreaks of African Swine Fever Virus Demonstrate the First Report of Genotype II in Ghana

Edward Spinard ^{1,2,3,†}, Ayushi Rai ^{1,2,†}, Jehadi Osei-Bonsu ^{4,5}, Vivian O'Donnell ⁶, Patrick T. Ababio ⁴, Daniel Tawiah-Yingar ⁴, Daniel Arthur ⁴, Daniel Baah ⁴, Elizabeth Ramirez-Medina ^{1,2}, Nallely Espinoza ^{1,2}, Alyssa Valladares ^{1,2}, Bonto Faburay ^{3,5}, Aruna Ambagala ^{3,5}, Theophlius Odoom ^{3,6}, Manuel V. Borca ^{1,2,3,*} and Douglas P. Gladue ^{1,2,3,*}

RESEARCH LETTERS

EMERGING INFECTIOUS DISEASES

Outbreak of Rabbit Hemorrhagic Disease Virus 2 Infection, Ghana

Aruna Ambagala, Patrick Ababio, Lindsey Lamboo, Melissa Goolia, Oliver Lung, Yohannes Berhane, Theophilus Odoom

Author affiliations: National Centre for Foreign Animal Disease, Canadian Food Inspection Agency, Winnipeg, Manitoba, Canada (A. Ambagala, L. Lamboo, M. Goolia, O. Lung, Y. Berhane); Veterinary Services Directorate, Accra Laboratory, Accra, Ghana (P. Ababio, T. Odoom)

DOI: https://doi.org/10.3201/eid2707.210005

In September 2019, high mortality in commercial rabbits was reported in the Greater Accra Region of Ghana. Rabbit hemorrhagic disease virus 2 phylogenetically related to isolates from 2015–2017 outbreaks in the Netherlands was confirmed as the causative agent. The virus has not yet been detected in native rabbits in Ghana.





Article

Characterization of a Novel African Swine Fever Virus p72 Genotype II from Nigeria

Aruna Ambagala ^{1,2,*}, Kalhari Goonewardene ¹, Lindsey Lamboo ¹, Melissa Goolia ¹, Cassidy Erdelyan ¹, Mathew Fisher ¹, Katherine Handel ¹, Oliver Lung ¹, Sandra Blome ³, Jacqueline King ³, Jan Hendrik Forth ³, Sten Calvelage ³, Edward Spinard ⁴, Douglas P. Gladue ⁴, Charles Masembe ⁵, Adeyinka J. Adedeji ⁶, Toyin Olubade ⁶, Nanven A. Maurice ⁶, Hussaini G. Ularamu ⁶ and Pam D. Luka ⁶, ⁸

Vietnam

2021

Archives of Virology (2021) 166:885-890 https://doi.org/10.1007/s00705-020-04936-5

BRIEF REPORT



Molecular profile of African swine fever virus (ASFV) circulating in Vietnam during 2019-2020 outbreaks

Nguyen Tuan Anh Mai¹ · Xuan Dang Vu¹ · Thi Thu Huyen Nguyen¹ · Van Tam Nguyen¹ · Thi Bich Ngoc Trinh¹ · Yong Joo Kim² · Hyun-Joo Kim² · Ki-Hyun Cho² · Thi Lan Nguyen¹ · Thi To Nga Bui¹ · Dae Gwin Jeong³ · Sun-Woo Yoon³ · Thang Truong⁴ · Aruna Ambagala⁴ · Daesub Song⁵ · Van Phan Le¹

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Diagnostic Support/Research

2022

Archives of Virology (2022) 167:1137-1140 https://doi.org/10.1007/s00705-022-05363-4

BRIEF REPORT



Multiple variants of African swine fever virus circulating in Vietnam

Van Tam Nguyen¹ · Ki-hyun Cho² · Nguyen Tuan Anh Mai¹ · Jee-Yong Park² · Thi Bich Ngoc Trinh¹ · Min-Kyung Jang² · Thi Thu Huyen Nguyen $^{1,3}\cdot$ Xuan Dang Vu $^1\cdot$ Thi Lan Nguyen $^1\cdot$ Van Diep Nguyen $^1\cdot$ Aruna Ambagala $^4\cdot$ Yong-Joo Kim² · Van Phan Le¹

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frontiers Frontiers in Veterinary Science

TYPE Brief Research Report PUBLISHED 29 September 2022 DOI 10.3389/fvets.2022.918438



OPEN ACCESS

Francisco Ruiz-Fons, Spanish National Research Council (CSIC), Spain

Mo Salman, Colorado State University, United States Helen Roberts Food and Rural Affairs, United Kingdom

Van Phan Le letranphan@vnua.edu.vn ddluc@vnua.edu.vn

†These authors have contributed equally to this work

This article was submitted to

Estimation of basic reproduction number (R_0) of African swine fever (ASF) in mid-size commercial pig farms in Vietnam

Nguyen Tuan Anh Mai^{1†}, Thi Bich Ngoc Trinh^{1†}, Van Tam Nguyen¹, Thi Ngoc Ha Lai¹, Nam Phuong Le¹, Thi Thu Huyen Nguyen^{1,2}, Thi Lan Nguyen¹, Aruna Ambagala³, Duc Luc Do4* and Van Phan Le1*

¹College of Veterinary Medicine, Vietnam National University of Agriculture, Hanoi, Vietnam, ²Animal Science and Veterinary Medicine Faculty, Bac Giang Agriculture and Forestry University, Bac Giang, Vietnam, ³National Centre for Foreign Animal Disease, Canadian Food Inspection Agency, Winnipeg, MB, Canada, ⁴College of Animal Sciences, Vietnam National University of Agriculture,

2023

Veterinary Research Communications (2023) 47:1773-1776 https://doi.org/10.1007/s11259-022-10068-9

BRIEF REPORT



Emergence of a novel intergenic region (IGR) IV variant of african swine fever virus genotype II in domestic pigs in Vietnam

Nguyen Tuan Anh Mai¹ · Van Phai Dam¹ · Ki-Hyun Cho² · Van Tam Nguyen³ · Nguyen Van Tuyen⁴ · Thi Lan Nguyen¹ Aruna Ambagala⁵ · Jee-Yong Park² · Van Phan Le^{1,3}

Received: 31 October 2022 / Accepted: 30 December 2022 / Published online: 24 February 2023 © The Author(s), under exclusive licence to Springer Nature B.V. 2023





Pathological Characteristics of Domestic Pigs Orally Infected with the Virus Strain Causing the First Reported African Swine Fever Outbreaks in Vietnam

Thi Thu Huyen Nguyen 1,2, Van Tam Nguyen 3, Phuong Nam Le 3, Nguyen Tuan Anh Mai 30, Van Hieu Dong 1, Tran Anh Dao Bui 1, Thi Lan Nguyen 1, Aruna Ambagala 40 and Van Phan Le 1,3,*0

- College of Veterinary Medicine, Vietnam National University of Agriculture, Hanoi 100000, Vietnam
- Faculty of Animal Science and Veterinary Medicine, Bac Giang Agriculture and Forestry University, Bac Giang 230000, Vietnam
- Institute of Veterinary Science and Technology (IVST), Hanoi 100000, Vietnam
- National Centre for Foreign Animal Disease, Canadian Food Inspection Agency,
- Winnipeg, MB R3E 3M4, Canada
- Correspondence: letranphan@vnua.edu.vn

Vietnam

2024

Diagnostic Support/Research

DISPATCHES

Detection of Recombinant African Swine Fever Virus Strains of p72 Genotypes I and II in Domestic Pigs, Vietnam, 2023

Van Phan Le, Van Tam Nguyen, Tran Bac Le, Nguyen Tuan Anh Mai, Viet Dung Nguyen, Thi Tam Than, Thi Ngoc Ha Lai, Ki Hyun Cho, Seong-Keun Hong, Yeon Hee Kim, Tran Anh Dao Bui, Thi Lan Nguyen, Daesub Song, Aruna Ambagala

African swine fever virus (ASFV) genotype II is endemic to Vietnam. We detected recombinant ASFV genotypes I and II (rASFV JIII) strains in domestic pigs from 6 north-ern provinces in Vietnam. The introduction of rASFV I/II strains could complicate ongoing ASFV control measures in the recion.

ZZ-PI/2021 and Pig/SD/DY-I/2021) with high genetic similarity to the nonhemadsorbing strains NH/P86, isolated in 1968, and OURT88/3, isolated in 1988, both from Portugal (5). Several attenuated, low-virulence p72 isolates of genotype II have also been reported from China (6).



Emerging Microbes & Infections



MDPI

Molecular characterization of emerging

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/temi20

Molecular characterization of emerging recombinant African swine fever virus of genotype I and II in Vietnam, 2023

Kyungmoon Lee, Thi Thu Hang Vu, Minjoo Yeom, Viet Dung Nguyen, Thi Tam Than, Van Tam Nguyen, Dae Gwin Jeong, Aruna Ambagala, Van Phan Le & Daesub Song

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To link to this article: https://doi.org/10.1080/22221751.2024.2404156





Characterization of an African Swine Fever Virus Field Isolate from Vietnam with Deletions in the Left Variable Multigene Family Region

Aruna Ambagala ^{1,2,3,4}, Kalhari Goonewardene ¹, Ian El Kanoa ¹, Thi Tam Than ⁴, Van Tam Nguyen ⁵, Thi Ngoc Ha Lai ⁴, Thi Lan Nguyen ⁴, Cassidy N. G. Erdelyan ¹, Erin Robert ^{1,2}, Nikesh Tailor ¹, Chukwunonso Onyilagha ¹, Lindsey Lamboo ¹, Katherine Handel ¹, Michelle Nebroski ¹, Oksana Vernygora ¹, Oliver Lung ¹ and Van Phan Le ^{4,4}

National Centre for Foreign Animal Disease, Canadian Food Inspection Agency, Winnipeg, MB R3E 3M4, Canada; kalhari.goonewardene@inspection.gc.ca (K.G.);





Genotype II Live-Attenuated ASFV Vaccine Strains Unable to Completely Protect Pigs against the Emerging Recombinant ASFV Genotype I/II Strain in Vietnam

Nguyen Van Diep ¹, Nguyen Van Duc ¹, Nguyen Thi Ngoc ¹, Vu Xuan Dang ¹, Tran Ngoc Tiep ¹, Viet Dung Nguyen ², Thi Tam Than ³, Dustin Maydaniuk ⁴, Kalhari Goonewardene ⁴, Aruna Ambagala ^{4,*} and Van Phan La ^{3,5,4}

- AVAC Vietnam Joint Stock Company, Ngoc Lich Village, Trung Trac Commune, Van Lam District, Hung Yen 160000, Vietnam; diep-ngr@gmail.com (N.V.D.); ducm@avac.com.vn (N.V.D.); ngocnt@avac.com.vn (N.T.N.); vxdang.vet@gmail.com (V.X.D.); tieptr@avac.com.vn (T.N.T.)
- Faculty of Animal Science and Veterinary Medicine. Bac Giang Agriculture and Forestry University

2025

Veterinary Research Communications (2025) 49:307 https://doi.org/10.1007/s11259-025-10884-9

REVIEW



ASF outbreaks in Vietnam (2019–2024): insights and lessons learned

Nhat Huy Bui¹ · Thi Trang Vy¹ · Ngoc Bao Anh Ngo¹ · Quoc Khanh Dam¹ · The Viet Hoang Nguyen¹ Thi Chau Giang Tran¹ · Aruna Ambagala² · Van Phan Le¹

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Abstract

African swine fever (ASF) is a contagious viral disease that affects domestic pigs and Eurasian wild boars, causing significant economic losses to the global pig industry. Since its first outbreak in February 2019, ASF has had a profound impact on the Vietnamese pig sector. This review presents a comprehensive analysis of ASF outbreaks in Vietnam from 2019 to 2024, focusing on outbreak dynamics, control strategies, economic impact, and key lessons learned. By summarizing findings from various studies and official reports, this review provides key insights and practical recommendations to improve ASF management and prevention in Vietnam and across the region.

Keywords African swine fever · Vietnam · Outbreak dynamics · Economic impact · Molecular characterization Diagnostics · Vaccine development · Control measures





rticle

Pathological Characteristics of the Emerging Recombinant African Swine Fever Virus Genotypes I and II in Vietnam

Viet Dung Nguyen ^{1,2}, The Viet Hoang Nguyen ^{1,3}, Ngoc Duong Vu ³, Thi Tam Than ³, Thi Chau Giang Tran ³, Thi Thu Hang Vu ⁴, Thi Lan Nguyen ¹, Yeon Hee Kim ⁵, Aruna Ambagala ^{6,7,4} and Van Phan Le ^{1,3,4}

- Department of Microbiology and Infectious Disease, College of Veterinary Medicine, Vietnam National University of Agriculture, Hanoi 100000, Vietnam; nguyendungdinh@gmail.com (V.D.N.); hoangyietnguven1ymu@gmail.com (T.V.H.N.); nguyenlam@mua.edu. vn (T.L.N.)
- Faculty of Animal Science and Veterinary Medicine, Bac Giang Agriculture and Forestry University, Bac Giang 230000, Vietnam
- 3 Laboratory of Viral Infectious Diseases, Center for Research Excellence and Innovation, Vietnam National University of Aericulture. Hanoi 100000. Vietnam: duonevnd99@email.com (N.D.V.):

Assay Development and Validation

Received: 15 February 2020 Revised: 30 July 2020 Accepted: 1 August 2020

DOI: 10.1111/tbed.13770

SHORT COMMUNICATION



Rapid and highly sensitive portable detection of African swine fever virus

Jade Daigle¹ | Chukwunonso Onyilagha¹ | Thang Truong² | Van Phan Le³ Bui Thi To Nga³ | Thi Lan Nguyen³ | Alfonso Clavijo^{1,4} | Aruna Ambagala^{1,5}





DOI: 10.1002/vms3.605

ORIGINAL ARTICLE

WILEY

Development of a novel real-time PCR assay targeting p54 gene for rapid detection of African swine fever virus (ASFV) strains circulating in Vietnam





Article

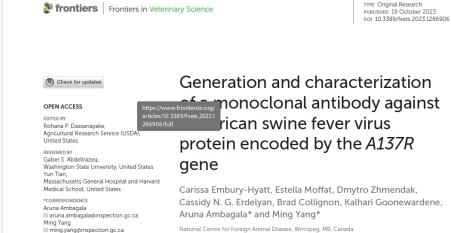
Development and Validation of an Indirect and Blocking ELISA for the Serological Diagnosis of African Swine Fever

Chukwunonso Onyilagha ^{1,*,†} ⁰, Kaye Quizon ^{2,†}, Dmytro Zhmendak ¹, Ian El Kanoa ¹, Thang Truong ² ⁰, Thanuja Ambagala ¹, Alfonso Clavijo ³, Van Phan Le ⁴ ⁰, Shawn Babiuk ^{1,5} ⁰ and Aruna Ambagala ^{1,6,*} ⁰

- National Centre for Foreign Animal Disease, Canadian Food Inspection Agency, Winnipeg, MB R3E 3M4, Canada
- National Microbiology Laboratory, Public Health Agency of Canada, Winnipeg, MB R3E 3M4, Canada; thang.truong@phac-aspc.gc.ca (T.T.)
- ³ National Bio and Agro-Defense Facility, Agricultural Research Service, United States Department of Agriculture, Manhattan, KS 66506, USA
- Department of Microbiology and Infectious Disease, College of Veterinary Medicine, Vietnam National University of Agriculture, Hanoi 100000, Vietnam
- Department of Immunology, University of Manitoba, Winnipeg, MB R3E 0T5, Canada
- Department of Comparative Biology, Faculty of Veterinary Medicine, University of Calgary, Calgary, AB T2N 1N4, Canada
- * Correspondence: chukwunonso.onyilagha@inspection.gc.ca (C.O.); aruna.ambagala@inspection.gc.ca (A.A.)
- † These authors contributed equally to this work.

Abstract: African swine fever (ASF) is an economically devastating viral disease of pigs caused by

The ongoing African swine fever (ASF) pandemic continues to have a major



ming.yang@inspection.gc.ca
 RECEIVED 31 August 2023
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27





February 21, 2024

AFRICAN AND CLASSICAL SWINE FEVER PROFICIENCY PANEL TESTING 2024

Dear Colleagues

Warm greetings to you from the WOAH Reference Laboratory for African and classical swine fever at the National Centre for Foreign Animal Disease (NCFAD), Winnipeg, Canada. We are making new proficiency panels for African and classical swine fever testing among invited reference and expert laboratories.

The proficiency panels include heat-inactivated and gamma-irradiated cell culture-amplified viruses in transport media for ASFV and CSFV genome detection) and tyophilized sera (for ASF and CSF antibody detection). The samples were prepared in these conditions to maintain stability during transit, which eliminates the cost associated with using dry ice.

Please note that participation in this exercise is voluntary. Ensuring you have an appropriate import permit and laboratory space of a suitable containment level is important for this exercise. We expect to ship the samples in July 2024, and there will be no charge for these panels; however, you will be responsible for the associated shipping cost.

Please confirm your interest in participating in this proficiency testing exercise by indicating the panel (serum, inactivated virus, or both) of interest by April 30, 2024.

You may send your response through email (aruna ambagala@inspection.gc.ca) by replying to the email this letter was attached to and please do not hestalk to reach out if you have any questions. Should you need an import permit New NCFAD will provide you with a document containing the sample information and other details relevant to obtaining an import permit. Please be sure that your import permit covers a minimum of three months from the antiqued shipping date of July 2024. Once we receive your response confirming your participation, we will contact you with further information.

Sincerely



Aruna Ambagala, BVSc, PhD
Head-Mammalian Diseases Unit
WOAH Reference Laboratory for CSF and ASF
CFIA-National Centre for Foreign Animal Disease
1015 Arlington Street, Winnipeg, MB R3E 3M4, Canada
Tel. 204-789-2013 (Office); 204-789-2089 (Lab)
Email: aruna, ambagala@inspection, gc. ca



ASF+CSF Proficiency Panel Testing – 2024

Distribution of Panels (ELISA)

ID	Sample Description	Sample Dilution
Sample 1	Domestic pig experimentally infected with ASFV Georgia 2007/1; P110, DPI 16.	1/20
Sample 2	Domestic pig experimentally infected with ASFV OURT88-3/Malta'78; P2, DPI 56-27-8.	1/20
Sample 3	Domestic pig experimentally infected with ASFV OURT88-3/Malta'78; P1, DPI 56-27-8.	1/20
Sample 4	Domestic pig experimentally infected with CSFV Suvaxyn; P10, DPI 31.	1/20
Sample 5	Domestic pig experimentally infected with ASFV GUS Vietnam/Georgia 2007/1; P3, DPC 21.	1/20
Sample 6	Domestic pig experimentally infected with CSFV Kanagawa; P1, DPI 52.	1/20
Sample 7	Normal Pig Serum (commercial source, GIBCO)	Undiluted
Sample 8	Domestic pig experimentally infected with CSFV Parma; P19-S-5, DPI 26.	1/20
Sample 9	Domestic pig experimentally infected with ASFV GUS Vietnam/Georgia 2007/; P4, DPC 21.	1/20
Sample 10	CSF Hyperimmune serum generated from domestic pig experimentally infected with several strains of CSFV; P-03-04.	1/20
Sample 11	Domestic pig experimentally infected with	Sample [

Distribution of Panels (Real-time PCR)

Sample 10	with several strains of CSFV; P-03-04.
Sample 11	Domestic pig experimentally infected with
Sample 12	Domestic pig experimentally infected with
Sample 13	Domestic pig experimentally infected with
Sample 14	Domestic pig experimentally infected with 56-27-8.
Sample 15	Domestic pig experimentally infected with
Sample 16	Domestic pig experimentally infected with P2, DPC 21.
Sample 17	Domestic pig experimentally infected with
Sample 18	Domestic pig experimentally infected with 56-27-8.
Sample 19	Domestic pig experimentally infected with
Sample 20	Domestic pig experimentally infected with

ID	Sample Description	Sample Dilution
Sample 1	Cell culture amplified ASFV Georgia 2007/1	1/10
Sample 2	Cell culture amplified CSFV Kanagawa	Undiluted
Sample 3	Cell culture amplified CSFV Diepholz	Undiluted
Sample 4	Cell culture amplified CSFV Diepholz	1/10
Sample 5	Molecular Transport Media (MTM) in cell culture media	Undiluted
Sample 6	Cell culture amplified CSFV Alfort/187	1/10
Sample 7	Cell culture amplified ASFV Malawi	1/10
Sample 8	Cell culture amplified CSFV Kanagawa	1/10
Sample 9	Cell culture amplified ASFV Malawi	Undiluted
Sample 10	Cell culture amplified CSFV Alfort/187	1/100
Sample 11	Cell culture amplified ASFV Lillie	1/10
Sample 12	Cell culture amplified ASFV Georgia 2007/1	Undiluted
Sample 13	Cell culture amplified ASFV Lillie	Undiluted
Sample 14	Molecular Transport Media (MTM)	Undiluted
Sample 15	Cell culture amplified CSFV Alfort/187	Undiluted

Setting international standards for ASF and CSF diagnostic tests

Addressing African Swine Fever

Protocols and Guidelines for Laboratory Diagnosis

The World Organisation for Animal Health (WOAH), the Food and Agriculture

Organization of the United Nations (FAO) and other partners have been actively

working in countries affected or at risk of incursion by African swine fever (ASF).

2020 following the emergence of ASF in China, other Asian countries, and countries

This manual is an updated and expanded version of guidance first published in

SUIDAE

CHAPTER 3.9.1.

AFRICAN SWINE FEVER (INFECTION WITH AFRICAN SWINE FEVER VIRUS)

SUMMARY

African swine fever (ASF) is an infectious disease of domestic and wild pigs of all breeds and ages, caused by ASF virus (ASFV). The clinical syndromes vary from peracute, acute, subacute to chronic, depending on the virulence of the virus. Acute disease is characterised by high fever, haemorrhages in the reticuloendothelial system, and a high mortality rate. Soft ticks of the Ornithodoros genus, especially O. moubata and O. erraticus, have been shown to be both reservoirs and transmission vectors of ASFV. The virus is present in tick salivary glands and passed to new hosts (domestic or wild suids) when feeding. It can be transmitted sexually between ticks, transovarially to the eggs, or transtadially throughout the tick's life.

ASFV is the only member of the Asfarviridae family, genus Asfivirus.

tory diagnostic procedures for ASE fall into two groups; detection of the virus and carology. The

CHAPTER 3.9.3.

CLASSICAL SWINE FEVER (INFECTION WITH **CLASSICAL SWINE FEVER VIRUS)**

SUMMARY

Classical swine fever (CSF) is a contagious viral disease of domestic and wild pigs. The causative virus is a member of the genus Pestivirus of the family Flaviviridae, and is closely related to the viruses of bovine viral diarrhoea and border disease. There is only one serotype of CSF virus (CSFV).

The disease may run an acute, subacute, chronic, late-onset, inapparent course or persistent infection, depending on a variety of viral and host factors of which the age of the animals, the virulence and load of the virus and the time of infection (pre- or post-natal) are of greatest importance. Adult pigs usually display less severe signs of disease than young animals and stand a better chance of survival. In pregnant sows, the virus may cross the placental barrier and reach the fetuses. In-utero infection with strains of the virus of moderate or low virulence can result in what is referred to as the 'carrier sow' syndrome followed by prenatal or early post-natal death, the birth of diseased piglets or an apparently healthy but persistently infected litter. The virus has also the ability to induce persistent infection following post-natal infection and may be transmitted to the sows through boar semen. An outbreak of CSF in domestic pigs has serious consequences for trade in pigs and pig products.

The highly variable clinical picture of CSF precludes a diagnosis on clinical and pathological grounds alone. Laboratory methods are therefore essential for an unambiguous diagnosis. Detection of virus or viral nucleic acid in anticoagulated whole blood, tonsil and of antibodies in serum are the methods of choice for diagnosing CSF in live pigs, whereas detection of the virus, viral nucleic acid or antigen in organ samples is most suitable when the pig is dead.

SECTION 3.9.



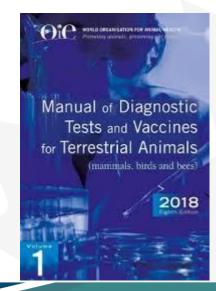


The State of the World's Animal Health

cine standards aim to control its global sprea

and wild boars worldwide. The highly contagious, haemorrhagic disease can have a mortality rate as high as 100%, making its spread a concern for animal health, local

Since January 2022, at least 12 countries have reported a first occurrence of ASF and







www.woah.org/en/disease/african-swine-fever/







Mammalian Diseases Unit – NCFAD WOAH Reference Laboratory for ASF and CSF

Questions??? <u>aruna.ambagala@inspection.gc.ca</u>

African Swine Fever Reference Laboratory Network

