



China Animal Health and Epidemiology Center

Diagnosis of ASF Recombinant strain

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National Reference Laboratory

ASF | BSE



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ASF | PPR



FAO Reference Center

PPR

01

Current situation of ASF in Asia Pacific Region



ASF in Asia-Pacific

- As of May 2024, a total of **19** countries in Asia-Pacific officially reported ASF:

- China (Aug 2018)
- Mongolia (Jan 2019)
- Vietnam (Feb 2019)
- Cambodia (Apr 2019)
- DPRK (May 2019)
- Lao PDR (Jun 2019)
- Myanmar (Aug 2019)
- Philippines (Sep 2019)
- ROK (Sep 2019)
- Timor-Leste (Sep 2019)
- Indonesia (Dec 2019)
- Papua New Guinea (Mar 2020)
- India (May 2020)
- Malaysia (Feb 2021)
- Bhutan (May 2021)
- Thailand (Jan 2022)
- Nepal (Mar 2022)
- Singapore (Feb 2023)
- Bangladesh (Dec 2023)



Food and Agriculture
Organization of the
United Nations

African swine fever situation in Asia & Pacific update

30 May 2024, 08:30, Rome

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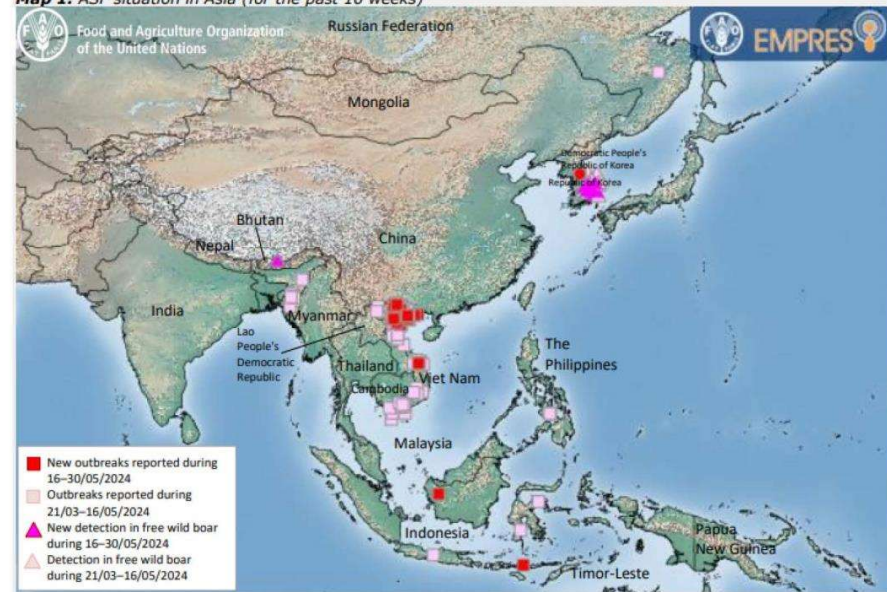
Information provided herein is current as of the date of issue. Information added since the last ASF Asia & Pacific situation update appears in **red**. For cases with unknown onset date, reporting date was used instead. FAO compiles information drawn from multiple national (Ministries of Agriculture or Livestock, Local governments, and international sources (World Organisation for Animal Health [WOAH])), as well as peer-reviewed scientific articles. FAO makes every effort to ensure, but does not guarantee, accuracy, completeness, or authenticity of the information. The designation employed and the presentation of material on the map do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal or constitutional status of any country, territory, or sea area, or concerning the delimitation of frontiers.

Overview

Hazard: African swine fever (ASF) is a viral disease affecting pigs and wild boar with up to 100% case fatality rate.

ASF reported countries since August 2018: China, Mongolia, Viet Nam, Cambodia, Democratic People's Republic of Korea, Lao People's Democratic Republic, Myanmar, The Philippines, Republic of Korea, Timor-Leste, Indonesia, Papua New Guinea, India, Malaysia, Bhutan, Thailand, Nepal, Singapore, and Bangladesh.

Map 1. ASF situation in Asia (for the past 10 weeks)



Source: Republic of Korea, Viet Nam: WAHIS & media information, India & the Philippines: WAHIS & government websites, Indonesia: official database 'Isikhnas', Other: WAHIS

	China	Vietnam	Other Country
 OUTBREAK ALERTS Emergence of African Swine Fever in China, 2018 2018.8	Genotype II-High pathogenic strains	Detected	Detected
 Emerging Microbes & Infections 2021.3 Emerg Microbes Infect. 2021; 10(1): 2183-2193. Published online 2021 Nov 22. doi: 10.1080/22221781.2021.1999779 PMCID: PMC8635679 PMID: 34709128 Genotype I African swine fever viruses emerged in domestic pigs in China and caused chronic infection	Genotype I-Low pathogenic strains	Not yet Detected	Not yet Detected
 Nature Communications 2021.12 Nat Commun. 2023; 14: 3096. Published online 2023 May 29. doi: 10.1038/s41467-023-38868-w PMCID: PMC10226439 PMID: 37248233 Highly lethal genotype I and II recombinant African swine fever viruses detected in pigs	Recombinant Genotype I/II	Detected	Not yet Detected
 Frontiers in Veterinary Science 2019.1-2020.12 Front Vet Sci. 2022; 9: 912224. Published online 2022 Jun 15. doi: 10.3389 Molecular Characterization of African Swine Fever Virus From 2019-2020 Outbreaks in Guangxi Province, Southern China	Genotype II deleted strains-Low pathogenic	Detected	Discovered, but not sequenced for analysis
 Pathogens 2019.7 Pathogens. 2022 Jan; 11(1): 97. Published online 2022 Jan 14. doi: 10.3390/pathogens11010097 Genetic Characterization and Variation of African Swine Fever Virus China/GD/2019 Strain in Domestic Pigs			



02

Characteristic of ASF Genotype I and II Recombinant strain



Source article

nature communications



Article

<https://doi.org/10.1038/s41467-023-38868-w>

Highly lethal genotype I and II recombinant African swine fever viruses detected in pigs

Received: 19 October 2022

Accepted: 11 May 2023

Published online: 29 May 2023

Check for updates

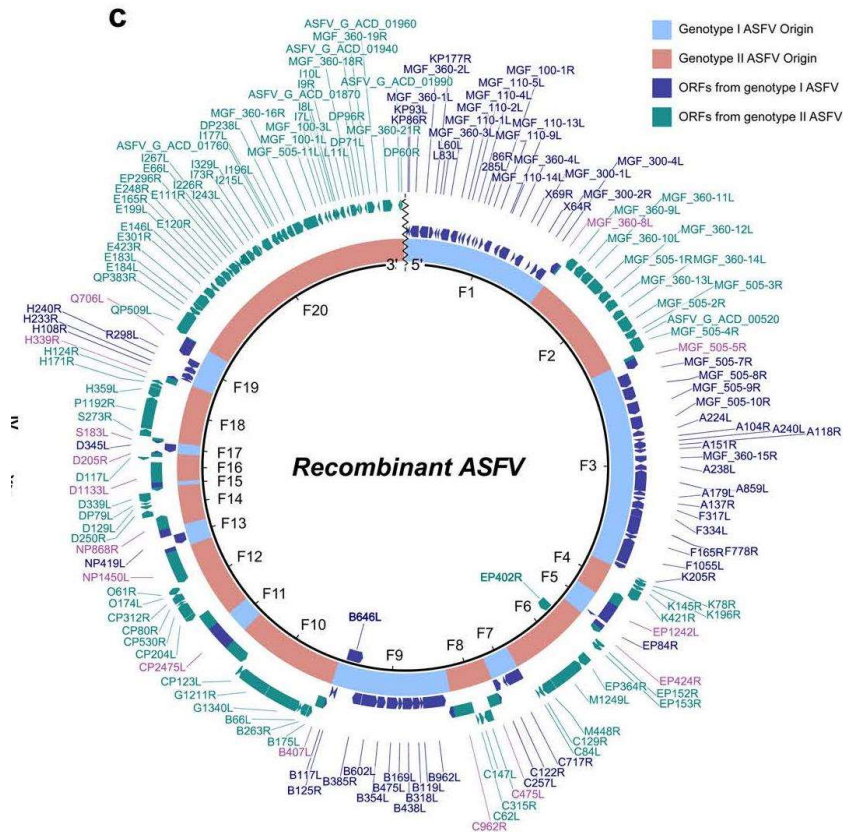
Dongming Zhao^{1,3}, Encheng Sun^{1,3}, Lianyu Huang^{1,3}, Leilei Ding^{1,3}, Yuanmao Zhu^{1,3}, Jiwen Zhang¹, Dongdong Shen¹, Xianfeng Zhang¹, Zhenjiang Zhang¹, Tao Ren¹, Wan Wang¹, Fang Li¹, Xijun He¹ & Zhigao Bu^{1,2}✉

African swine fever virus (ASFV) poses a great threat to the global pig industry and food security. Currently, 24 ASFV genotypes have been reported but it is unclear whether recombination of different genotype viruses occurs in nature. In this study, we detect three recombinants of genotype I and II ASFVs in pigs in China. These recombinants are genetically similar and classified as genotype I according to their *B646L* gene, yet 10 discrete fragments accounting for over 56% of their genomes are derived from genotype II virus. Animal studies with one of the recombinant viruses indicate high lethality and transmissibility in pigs, and deletion of the virulence-related genes MGF_505/360 and EP402R

- Time: 2021-2022
- Location: Jiangsu province
Henan province
Inner Mongolia
- Genotype: I (B646L, P72)
- Virulence: Highly lethal



Significance one

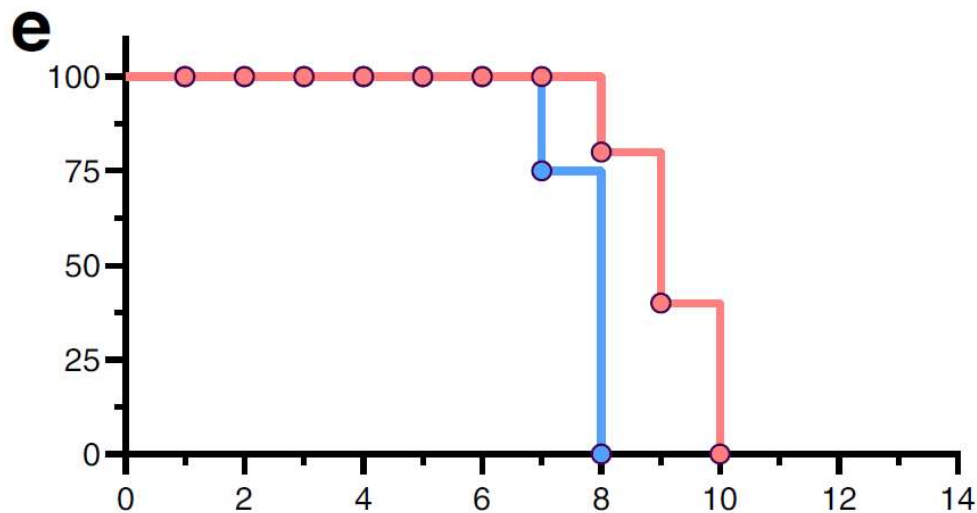


- The 10 discontinuous fragments from NH/P68-like genotype I virus accounted for 44%;
- The 10 fragments from Georgia07-like genotype II virus accounted for 56%;



“Fried Dough Twists” Virus “Chimeric” virus

Significance two



- The live attenuated vaccine derived from genotype II ASFV is **not protective** against challenge of the recombinant virus.
- These naturally occurring recombinants of genotype I and II ASFVs have the potential to pose a challenge to the global pig industry.



Significance three

EMERGING INFECTIOUS DISEASES®

ISSN: 1080-6059

EID Journal > Volume 30 > Number 5—May 2024 > Main Article

Volume 30, Number 5—May 2024

Dispatch

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

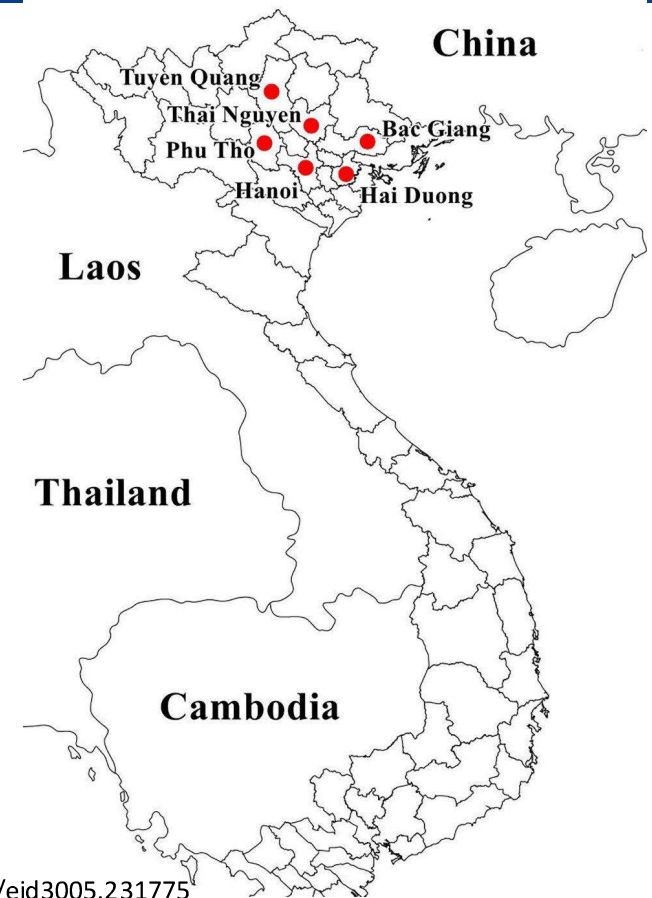
Van Phan Le¹, Van Tam Nguyen, Tran Bac Le, Nguyen Tuan Anh Mai, Viet Dung Nguyen, Thi Tam Than, Thi Ngoc Ha Lai, Ki Hyun Cho, Seong-Keun Hong, Yeon Hee Kim, Tran Anh Dao Bui, Thi Lan Nguyen, Daesub Song, and Aruna Ambagala

On This Page

[The Study](#)

- Time: 2023.09-10
- Location: northern provinces of Vietnam
- Positive rate: 23.08% (6/26)

Van Phan Le, et al. doi:10.3201/eid3005.231775



03

Diagnosis



It is still the ASFVs

SECTION 3.9.

SUIDAE

CHAPTER 3.9.1.

AFRICAN SWINE FEVER

(INFECTION WITH AFRICAN SWINE FEVER VIRUS)

Conventional sample
collection and
diagnosis of ASF are
still effective

https://www.woah.org/fileadmin/Home/eng/Health_standards/tahm/3.09.01 ASF.pdf

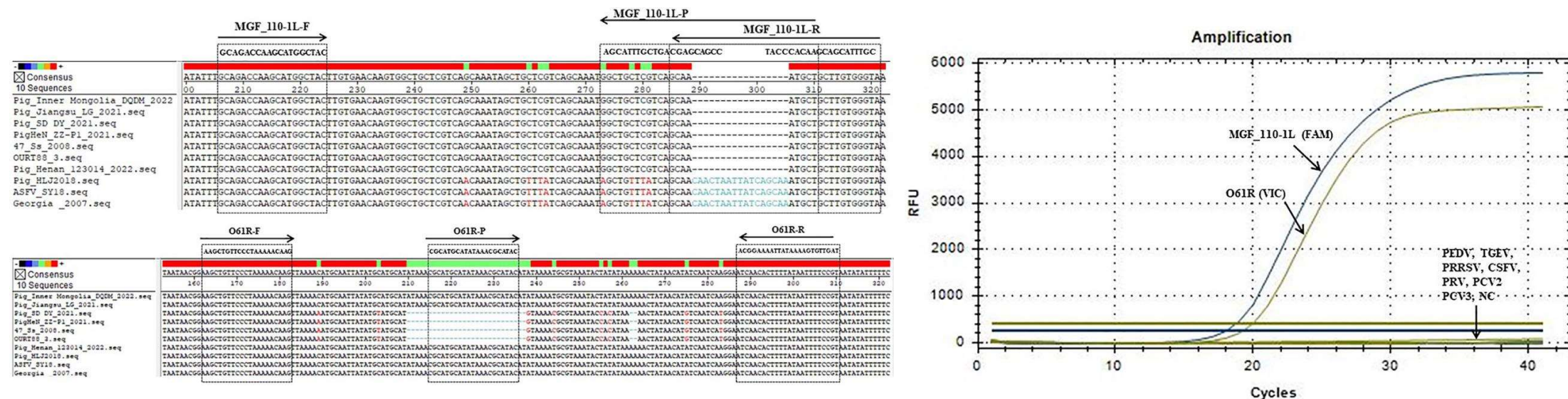


The rapid classification diagnosis method has usage scenarios

1. If the incidence process of ASF infection is different from before.
2. Especially when still infected with ASF after using the ASF vaccine (legal vaccine from Vietnam or illegal vaccine from other countries).
3. ASF Epidemic investigation at the national level.



Multiple Real time PCR have good advantages based on genomic sequence differences

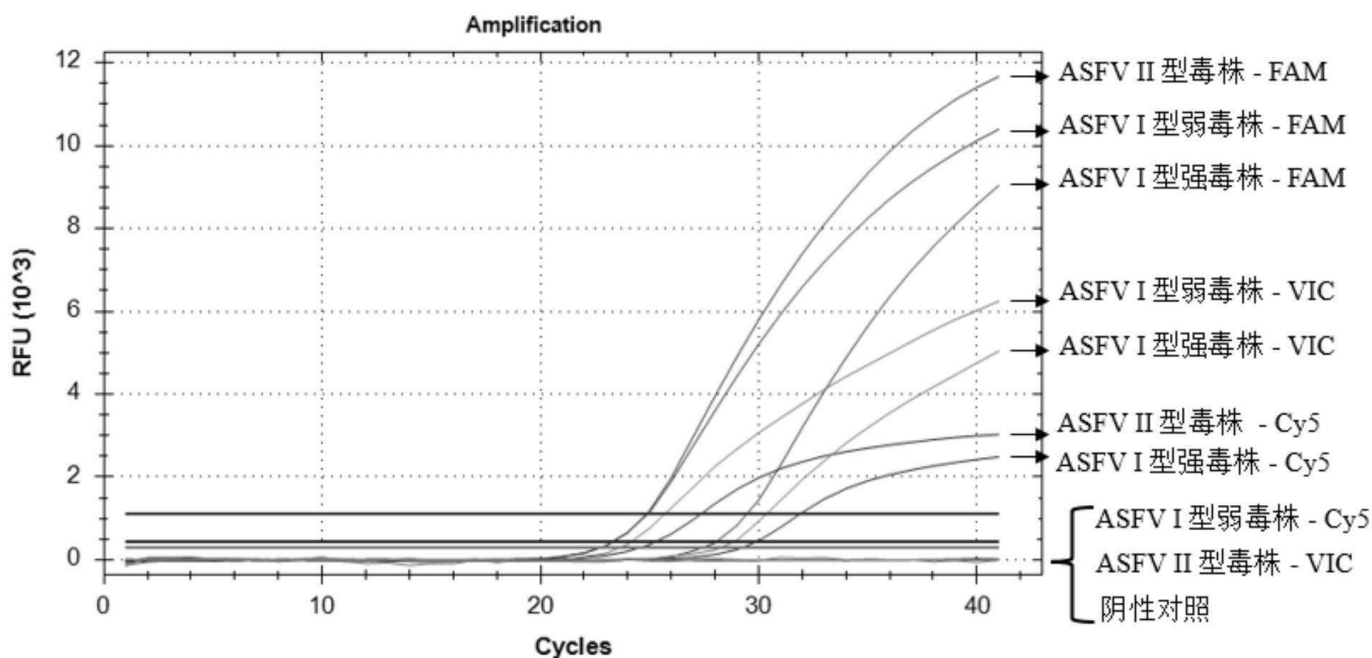


	MGF110-1L	O61R
Genotype I	+	-
Genotype II	-	+
Genotype I and II recombinant	+	+

Zhiqiang Hu, et al.
doi: 10.3389/fvets.2024.1422757



Classification diagnosis methods already patented in China



	X64R	MGF 360-14L	B646L
Genotype I	+	+	+
Genotype II	+	-	+
Genotype I and II recombinant	-	+	+

Patent application number: 202310994600.3



Impact

1. Genotype I and II Recombinant strain is **highly lethal and transmissible** in pigs and that the genotype II virus-based live attenuated vaccine cannot provide protection against these recombinant viruses.
2. The newly discovered Recombinant strain in Vietnam are likely resistant to the immunity induced by the current live ASFV vaccines and could replace the ASFV p72 genotype II strains circulating in the region. This possibility poses a major challenge for disease control **and vaccine development** and emphasizes the need for increased vigilance in the global control of ASFV.



Thank you!

