RISK ASSESSMENT OF ASFV TRANSMISSION IN PORK PRODUCTS AND MOLECULAR DETECTION IN VISAYAN WARTY PIGS IN THE PHILIPPINES

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1 Introduction

- ✓ African swine fever (ASF) is a contagious hemorrhagic disease affecting pigs with high mortality rate and severe socio-economic losses. As an archipelago, the Philippines has a geographic advantage in reducing ASF transmission risk. However, control efforts remain challenging due to the disease's complex epidemiology, lack of effective treatment, and vaccine availability.
- ✓ Due to the virus' potential ability to remain infectious in suitable conditions and environments, it is important to identify risk factors that may contribute to its transmission.
- ✓ Currently, ASF surveillance in the Philippines relies on pig blood samples, providing limited data on transmission risks from contaminated pork and potential wildlife reservoirs.
- ✓ In addition, ASF transmission risk evaluation currently includes positive cases, population density, and pork production volume, but the potential roles of contaminated pork commodities and wild pigs remain unexplored.

Summary:
- ✓ASF virus can survive in certain environments and products, increasing the risk of indirect transmission.
- ✓Limited surveillance strategies may overlook non-traditional transmission routes, particularly through contaminated pork and wild pigs.

2 Methods/Approach

Risk Assessment in Pork Products

PREVALENCE DETERMINATION

MEAT SAMPLE COLLECTION → DNA EXTRACTION → REAL-TIME PCR FOR ASF VIRUS → POSITIVITY RATE PER PROVINCE → SEQUENCING OF SAMPLES

RISK ASSESSMENT

I. RISK QUESTION	II. IDENTIFIED 11 RISK INDICATORS	III. RISK SCORING	IV. RISK CLASSIFICATION
Probability of ASF transmission in a specific province.	Data, with respect to the time of sampling, were retrieved from published resources.	Scores per indicator range from 0-1 or 0-3, depending on the nature of the data.	The sum of the score per indicator was used to categorize the risk of the provinces.

Table 1. Scale and interpretation of the total risk score per province.

Risk Level	Value	Interpretation
High	13.82-17.71	There is a high likelihood of ASF occurrence.
Moderate	9.92-13.81	ASF may potentially occur.
Low	6.00-9.91	ASF is unlikely to occur.

Molecular Detection in Wild Pigs

FECAL SAMPLE COLLECTION → DNA EXTRACTION → CONVENTIONAL PCR → REAL-TIME PCR FOR ASF VIRUS

3 Results

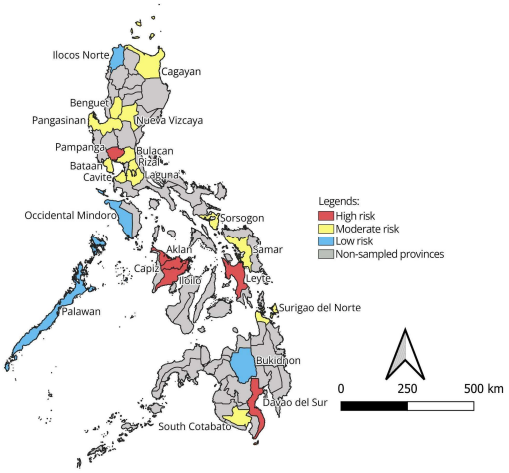

Figure 1. Geographical distribution map of the African swine fever transmission risk classification of the African swine fever transmission. Map was created in Quantum Geographic Information System (QGIS) version 3.32.3.

Table 1. Risk scores and classifications for the African swine fever transmission of 23 selected provinces in the Philippines.

Region	Province	% Positivity of meat samples	% Pigs in backyard farms	Swine population density	Importation of frozen pork	% Growth rate of pig population	Zoning status	Human population density	Pork consumption	Tourism	Shared border with infected area	Space-time clustering	Total	Risk level
I	Ilocos Norte	0	2	1	1	0	2.20	0	1	0	1	1	9.20	Low
	Pangasinan	1	2	1	1	0	2.00	1	1	1	1	1	12.00	Moderate
II	Cagayan	1	3	1	1	1	2.80	0	1	0	1	1	12.80	Moderate
	Nueva Vizcaya	1	3	1	1	1	2.88	0	1	0	1	1	12.88	Moderate
III	Bataan	1	3	1	3	1	2.71	1	0	0	1	0	13.71	Moderate
	Bulacan	1	1	1	3	0	3.00	1	1	0	1	1	13.00	Moderate
	Pampanga	1	1	3	3	0	2.71	0	1	1	1	1	14.71	High
IV-A	Cavite	1	1	1	2	1	2.63	1	1	1	1	0	12.63	Moderate
	Laguna	1	1	1	3	0	2.67	1	0	0	1	0	10.67	Moderate
	Rizal	0	1	1	3	1	2.75	1	1	1	1	1	13.75	Moderate
IV-B	Occidental Mindoro	0	3	1	ND	1	0.00	0	1	0	0	0	6.00	Low
	Palawan	0	3	1	1	1	0.00	0	0	1	0	0	7.00	Low
V	Sorsogon	1	3	1	1	1	3.00	1	0	1	0	1	13.00	Moderate
CAR	Benguet	0	3	1	ND	1	2.50	0	1	1	1	1	11.50	Moderate
VI	Iloilo	3	3	1	1	2	2.40	1	1	1	0	1	16.40	High
	Capiz	3	3	1	1	2	2.80	0	0	0	1	1	14.80	High
	Aklan	3	3	1	1	3	2.71	1	0	1	1	1	17.71	High
VIII	Leyte	2	3	1	1	1	2.43	0	1	1	1	1	14.43	High
	Samar	0	3	1	1	1	2.17	0	0	0	1	1	10.17	Moderate
X	Bukidnon	0	2	2	1	0	0.00	0	0	0	1	1	7.00	Low
XI	Davao del Sur	2	2	2	1	1	2.20	0	1	1	1	1	14.20	High
XII	South Cotabato	1	1	2	1	0	2.33	1	0	1	1	0	10.33	Moderate
XIII	Surigao del Norte	1	3	1	ND	2	2.80	0	0	0	1	1	11.80	Moderate

ND, no data.

Table 2. Positivity rates of detection of African swine fever virus (ASFV) in fecal samples used for the study.

N	Positivity rate of ASFV (+) of Samples	Positivity rate of ASFV (-) of Samples
15	5 (33.33%)	10 (66.67%)

4 Discussion

- ✓ Based on the regression analysis employed, positive samples were associated with factors like zoning status, season, Longganisa preparation, selling different meat types, pork batch duration, and market practices like cleaning and disinfection.
- ✓ The high-risk areas consisted of Aklan, Iloilo, Capiz, Pampanga, Leyte, and Davao del Sur, while Occidental Mindoro, Palawan, Bukidnon, and Ilocos Norte were classified under the low-risk category.
- ✓ Furthermore, the findings in this study also suggest that wild pigs may serve as additional reservoirs for ASFV, posing a risk for further spread to domestic swine and pork commodities and vice versa.
- ✓ There is an ASF threat in endangered species of wild pigs and a risk of ASF transmission/spillover which poses a significant biosecurity challenge.

5 Conclusion

- ✓ ASFV poses a major threat to global swine populations→ requires multisectoral and multi-level cooperation.
- ✓ Understanding reservoirs and transmission pathways is key to controlling outbreaks.
- ✓ Include other possible risk factors contributing to the spread/transmission of ASFV.
- ✓ A high-risk classification suggests an urgent need for strict biosecurity measures, enhanced surveillance, and immediate intervention to prevent further outbreaks.

6 References & Aknowledgements

1. European Food Safety Authority (EFSA) Panel on Animal Health and Welfare (AHAW), Nielsen SS, Alvarez J, Bicout D, Calistri P, Depner K, et al. Scientific opinion on the risk assessment of African swine fever in the south-eastern countries of Europe. EFSA J . 2019;17(11):5861.
2. Fernandez-Colorado CP, Kim WH, Flores RA, Min W. African swine fever in the Philippines: a review on surveillance, prevention, and control strategies. Animals (Basel) . 2024;14(12):1816.
3. Hsu CH, Schambow R, Montenegro M, Miclat-Sonaco R, Perez A. Factors affecting the spread, diagnosis, and control of African swine fever in the Philippines. Pathogens. 2023;12(8):1068.
4. Hsu CH, Montenegro M, Perez A. Space–time dynamics of African swine fever spread in the Philippines. Microorganisms. 2023;11(6):1492.

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