

Analysis of the drivers of ASF introduction into the officially approved pig compartments in South Africa and implications for the revision of biosecurity standards

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Background

African Swine Fever (ASF) is a major economic and food security threat that challenges the pig industries globally due to the direct losses of animals (died or culled), reduced production and due to the trade restriction following an outbreak. In large epidemics, the resulting inflations of prices for pigs and pork products may disrupt the sector's economy and consumers demands. In countries where backyard and family farming is widespread, circulation of ASF also represents an important threat to the livelihood of those small holders and on food security.

South Africa's swine industry is dualistic, with about 25% of the pigs belonging to emerging or smallholder pig farmers. While African Swine Fever (ASF) virus has historically circulated in wild pigs and in *Ornithodoros* ticks in parts of South Africa, the virus has spread among domestic pigs throughout the country since 2019. South Africa's officially approved compartment system has been used as a mainstay approach to protecting the swine industry in the face of ASF. However, since this incursion through 2021, ASF spread to domestic pigs in five other provinces. In 2020, three units of two official pig compartments broke down with ASF.

The objectives of this study were to investigate the drivers for ASF introduction into the compartments, to categorize compartments by risk of ASF introduction, and to make corresponding recommendations.

Materials and Methods

The approach to the study included four sequential steps. First, an online questionnaire was developed and shared with compartment veterinarians and farm managers to investigate their perception with regard to the relevance of risk factors for ASF introduction for each unit. Afterwards, an expert elicitation with local and international experts was conducted to assign weights to the categories of risk factors. This was done with the view of contextualizing the risk factors according to the local ASF situation, and thus producing more accurate variables. The weighted risk factors were used to categorize units into risk-levels based on quartiles. These categorizations were confirmed through principal component analysis (PCA) and hierarchical clustering on the principal components identified.

Results

Drivers of disease related to human behaviours and to domestic pig management are perceived by farm managers and veterinarians of the compartments to be critical for ASF introduction into compartments in South Africa. Twenty-four units were categorized as high risk, forty-seven as medium risk, and twenty-four as low risk. A number of factors were identified as particularly critical and consistently present in high-risk farms. There is a need for revision of the compartment standards and training of compartment personnel on the

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standards. The major gaps identified in the standards were absence of a monitoring programme to assess biosecurity implementation and suboptimal surveillance testing and audit strategies.

Conclusions

The results of our study confirm that ASF is increasingly an anthropogenic problem. Updating the compartment standards and addressing gaps in the knowledge of compartment personnel on ASF are most critical. To enhance compliance with biosecurity measures and thus control the disease, close engagement with all stakeholders linked to the compartments is needed. These improvements are necessary to protect the compartments from an introduction of ASF and to ensure the security of supply of pork and pork products.