Defend

Working together to tackle emerging livestock diseases

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MITIGATING THE IMPACT OF LSDV & ASFV

African swine fever (ASF) and lumpy skin disease (LSD) are both internationally spreading, transboundary animal diseases that pose ongoing threats for European livestock and wildlife. These diseases damage pig and cattle production, and the communities whose livelihoods depend on these industries. It is difficult to pinpoint one particular element to target when trying to control these diseases since the "risk factors" which promote disease occurrence and spread are unknown and/or vary in different areas. This is a low knowledge and high uncertainty disease situation. The DEFEND project has systematically studied the risk factors which help ASF and LSD to emerge and spread in pig and cattle populations, and in parallel developed a risk framework to handle low knowledge and high uncertainty disease situations.
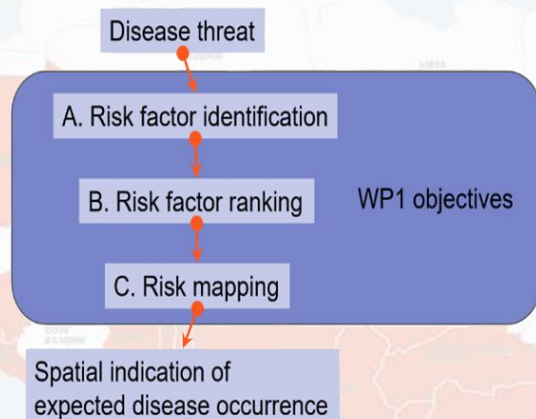
Key Achievements

Figure1: Framework for risk-based transboundary disease management, illustrating the steps for which DEFEND developed or refined risk assessment methods.

With a focus on ASF and LSD, risk assessment methods were refined or newly developed to (A) identify potential disease risk factors, (B) rank risks according to their relevance, and (C) map the risk to derive a spatial indication of expected disease occurrence. Each of these three steps can be undertaken in multiple ways depending on the given disease situation, available data, resources and time, allowing for adaptable selection of tools from the framework.

Ideally, evidence regarding the effect of specific risk factors for disease occurrence is available from scientific studies or experiments. For emerging transboundary diseases this knowledge is often limited. DEFEND developed complementary methods harnessing human decision-making processes for disease prediction and risk assessment.

Most risk information found was related to factors in the environment or to the movement of livestock and inanimate items able to carry the pathogen from A to B.

Ranking of identified potential risk factors is the most valuable, but also the most difficult information to get for a given disease situation. Ideally, evidence regarding the effect of specific risk factors for disease occurrence is available from scientific studies or experiments. For emerging transboundary diseases this knowledge is often limited. DEFEND developed complementary methods.

Recommendations

Disease management is resource hungry, further exacerbating its impact. Allocating available resources wisely helps to sustaining control efforts for longer, as most transboundary diseases unfortunately do not go away quickly. Using the risk-based approach and tools such as the ones developed by DEFEND will help predict where disease is likely to spread to next, and prioritise which risk factors in that area will contribute to this spread. This information can then be used to inform effective allocation of resources for disease management and thus improve the control and prevention of transboundary animal disease.
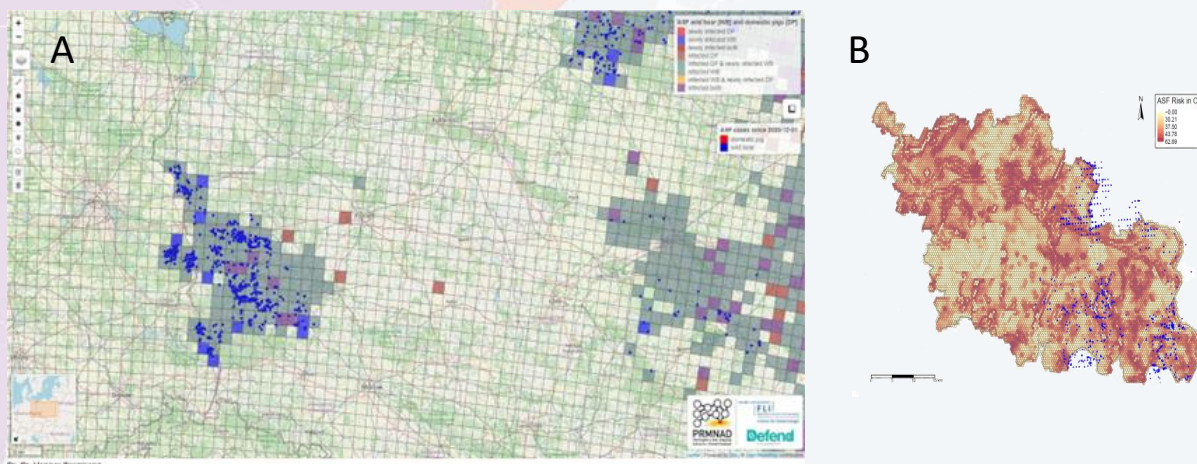

Figure 2: Screenshot of interactive risk mapping interface developed by DEFEND to elicit spatio-temporally explicit expert opinion regarding the spread of ASF (A). Example of a risk map for ASF occurrence in wild boar based on risk factors derived through systematic literature review conducted as part of DEFEND (B). Darker areas indicate higher risk. Blue dots show locations of reported ASF cases in wild boar.

References

https://www.youtube.com/watch?v=_Ssw19oi5Gw Bergmann et al., Animals, 2021: https://www.mdpi.com/2076-2615/11/9/2692 DEFEND (2023). Deliverable 1.2 – Risk assessment framework for ASF and LSD

Background map indicates Global spread of ASFV. In orange are the countries which had ASF in 2018, and in purple are the countries which have reported their first outbreak since 2018.