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A strategic approach to disease mapping based on insights from the African swine fever outbreak in Sweden

African swine fever (ASF) in Sweden AS

• September 2023: First case of ASF confirmed in Sweden.

GARA 2025

ROME, ITALY

- Geographical isolation: No direct contact with infected wild boar populations. Human activities suspected.
- Municipal waste collection centre nearby: Lacks wild boar-proof fence and potential contribution to virus spread.
- ASF Introduction-Release-Spread Risk Calculation
- Risk data were converted to rasters at 1km² resolution and weighted based on expert opinion.
- Risks include: Introduction road traffic and international trade volume; Release – human activities and infrastructure; Spread – wild boar population, landscape, and environmental factors.
- Risk values are not defined probabilistically but on a relative scale.

$$Risk_{i} = \begin{cases} 0, & \text{if } P_{WB_{i}} = 0\\ \sum_{k=1}^{K} (r_{IN_{k}i} \cdot w_{IN_{k}}) + \sum_{m=1}^{M} (r_{RE_{m}i} \cdot w_{RE_{m}}) + \sum_{n=1}^{N} (r_{SP_{n}i} \cdot w_{SP_{n}}), & \text{if } P_{WB_{i}} > 0 \end{cases}$$

 r_{IN} = Risk factors related to human-mediated virus introduction

 r_{RE} = Risk factors associated with virus release into the environment

 r_{SP} = Risk factors influencing virus spread in wild boar populations and habitats

w = Weights assigned by experts to each risk factor

i = Cell index

m = Index for release-related risk factors



Impact of risk factor selection

- ✓ Local hotspots varies depending on the specific risk factors included in the analysis.
- ✓ In the outbreak area, all positive cases occurred in higher-risk zones when <u>municipal waste collection centres</u> were included.
- ✓ Identification of influential risk factors is crucial for targeted prevention and mitigation strategies.



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