

Simulation of spread of African swine fever in wild boar in Denmark

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Background

African swine fever (ASF) is an infectious disease of suids caused by ASF virus (ASFV). The disease is currently spreading in many regions of the world, paralysing swine production. Wild boar is an important element in ASFV persistence, and it is important to understand ASF spread in areas with both high and low density of wild boar. Denmark has a low density of wild boar localised in southern Jutland.

Objective

To study the transmission and persistency of ASF in wild boar in southern Denmark.



Methods

The Model:

A spatio-temporal agent-based model of wild boar including:

- Demographic module: reproduction, mortality, group splitting and boar migration.
- Infection module: nose-to-nose contact within a group and carcass-to-individual for both within and between groups.

The landcover data:

- Includes Denmark and northern Germany (border area).
- Group home range size: 2x2 km².
- Group home range land cover composition: at least 10% forest cover and natural vegetation
- Other land cover: can be either accessible (e.g. agricultural areas), or inaccessible (e.g. cities).

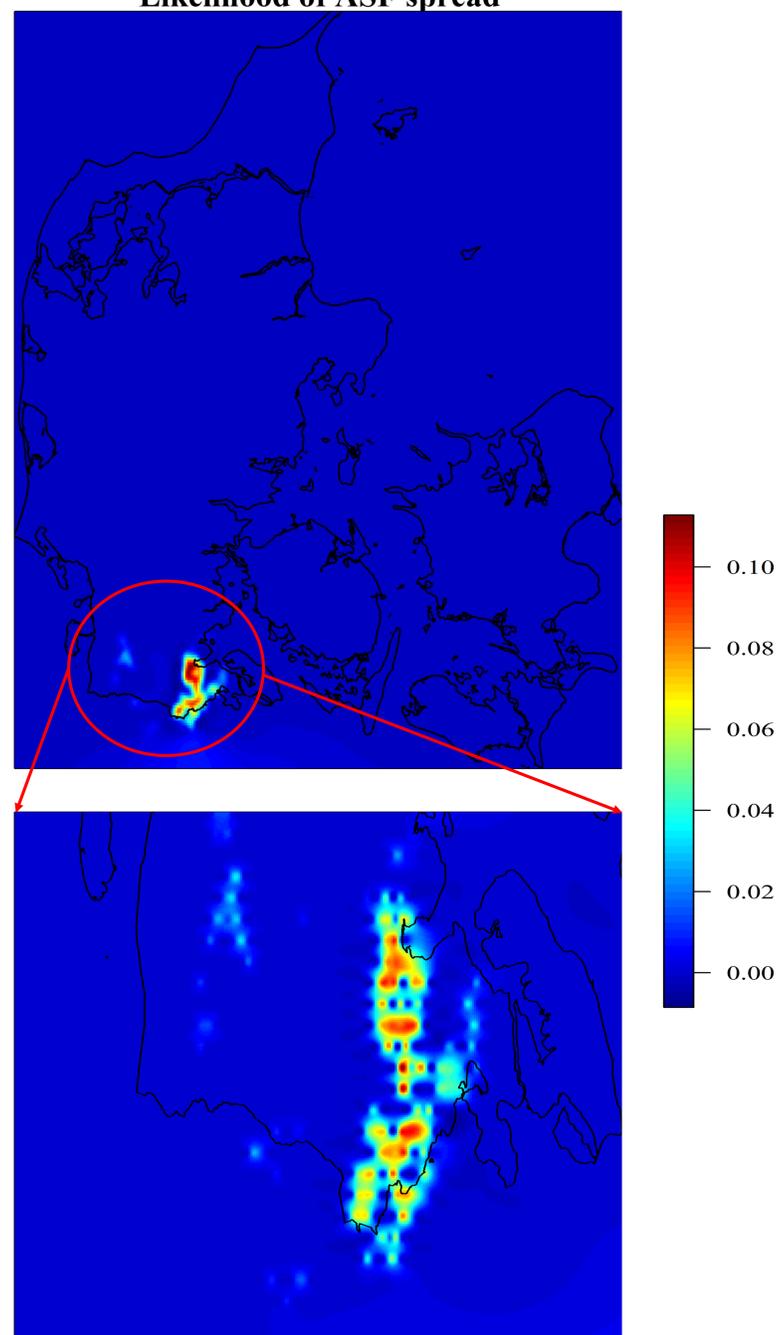
Model run:

- Initialisation: 50 groups of wild boars in southern Jutland distributed in habitat areas according to observed data.
- Infection initialisation: 1 individual in 1 group was selected at random to be infected.
- Simulation duration: max. 5 years or to disease faded out.
- Number of iterations: 1000.

Results

- On average, the disease is predicted to be localized, self-limiting and have a low probability to persist and spread to other areas (see figures below).
- In extreme situations, the disease may persist for several months.

Likelihood of ASF spread



Conclusion

The model predicts ASF epidemics in a low density wild boar area to be of limited size and duration. This suggests that an ASF outbreak in wild boar in Denmark would only persist for a short amount of time, given no changes in densities of wild boars.

