[O39] IDENTIFICATION OF PREDILECTION SITES FOR DETECTING ASF-INFECTED WILD BOAR CARCASSES

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Summary
To decrease the spread of African swine fever (ASF) within wild boar populations, the search for and removal of wild boar carcasses is essential. By analysing data of wild boar found in Latvia, as entered into the EURL CSF/ASF database, predilection sites were identified to adjust the implementation of control strategies.
Manual and automated analyses of GPS locations from Latvia indicated that ASF-positive animals were more frequently found in forest and forest edge areas than ASF-negative animals. These were found close to forest edges, often near clearings or forest-to-scrub transition zones.
In addition, the study shows limitations in the use of GPS locations as entered into the database for retrospective case studies and provides hints for optimizing the documentation.

Introduction / Background
African swine fever (ASF) constitutes a threat for wild boar and domestic pigs worldwide. Its spread over Europe continues and sets a challenge for veterinary authorities, hunters and farmers.
Currently, different measures are applied to control the spread of ASF in the wild boar population. One essential strategy is the quick search for and removal of wild boar carcasses, which requires a huge amount of financial and personal resources.
Aiming to identify predilection sites for the search of wild boar carcases to optimize the searches and save resources, a data set of wild boar found dead in Latvia has been analysed.

Materials and Methods
The data: The data originates from the EURL CSF / ASF wild boar surveillance database and contains a random sample of 599 wild boar carcasses with exact GPS locations from Latvia from the years 2017-2020. Three different groups of animals have been analysed: 249 ASF-infected boar found dead, 175 ASF-negative boar found dead and 175 ASF-negative animals shot apparently healthy. Additionally, a sample of 10,000 random GPS locations was created and analysed to put the results in proportion to the landscape structure of Latvia.

Manual measurements: By using orthophotos the landscape type of the GPS locations as entered into the database was classified by “forest”, “field”, “forest-field-transition zones” and “other landscape type” according to defined criteria. In addition, the type of the forest edge was analysed and classified by “forest to field”, “forest to clearing”, “forest to scrub” and “other types”.
Afterwards, the distances of the animals to the next waterbody, road, settlement and forest edge were measured with a measurement tool.

Automated measurements: Using a combination of various map data and the geographic information systems “ArcGIS” and “QGIS”, automated analyses of the locations as well as distance measurements were performed. Results of the manual analysis were used to establish and validate the automated method.

Evaluation: Results were evaluated with the statistics software “R”, calculating descriptive statistics, chi-squared tests as well as non-parametric Mann-Whitney-U tests adjusted with Bonferroni correction for pairwise testing.

Results
Landscape type of GPS locations: In the manual categorization, ASF-positive animals were significantly more frequently found in forest (59%) and forest-field transition areas (22%) than ASF-negative animals (40%, 15% resp.). In contrast, animals were shot more frequently in fields (43%). Similar results have been generated by the automated categorization.

Distance measuring: Results of the automated distance measuring showed that ASF-negative carcasses were found statistically significantly closer to roads, waterbodies and settlements than ASF-positive carcasses. No statistically significant differences between ASF-positive carcasses found dead and animals shot apparently healthy were detected. However, animals of all groups were found close to forest edges. In case of ASF-infected animals, the carcasses were found close to clearings respectively forest-to-scrub transition zones.

Random points: The majority of random points were in fields (40%) and in forests (38%); a smaller amount was in forest-field-transition zones (16%). The animals found dead were significantly closer to waterbodies and forest edges than the random points. ASF-negative animals were found significantly closer to roads and settlements than the random points. In contrast to that, random points were significantly closer to roads and settlements than ASF-positive animals.

Discussion

The use of surveillance data allowed a retrospective analysis of findings of wild boar carcasses. The results of the study partly differ from former studies, which indicate that ASF infected animals tend to stay close to water in cold and moist areas (1). However, the nearness of carcasses to forest edges and areas of forest-to-field transitions covered with bushes and scrub, has also been detected in the past (2).

Nevertheless, the accuracy of the used GPS data in this study may be a limitation, as in any other study too. The transmission of coordinates is strongly dependent on the availability of GPS signal close to the findings. The number of animals found relatively close to or directly on roads furthermore indicate that the dataset might as well include animals killed in road traffic accidents. Additionally, the bias in the search for carcasses has to be taken into account. As a matter of course, only easily accessible areas (e.g. regions close to forest edges, roads and settlements) can be searched for carcasses, which might have influenced the results of our study. Further, the landscape structure of Latvia might have an impact on the chance to find carcasses, since 53% of the country are covered with forests. Nevertheless, the ASF-positive animals were more frequently found in forests than the random points.

Establishing an automated method aimed at reducing bias and human failure that must be expected in manual measurements. The comparison of the results of both methods showed the limitations of map data, since the landscape in some cases was not exactly represented in the maps as expected according to orthophotos. Nevertheless, the automated method generates reliable results and may be used for the analysis of larger samples.

In conclusion, the usability of GPS data from the surveillance database is limited. It should be documented, if the coordinates are exact locations or only based on community. Furthermore, additional information should be documented, e.g. the condition of carcasses and its surroundings.

References

1. Morelle *et al.* (2019), Transbound Emerg Dis. 66(5), S: 1821-1826.
2. Cukor *et al*. (2020), Prev Vet Med. 177, S. 104943.