Re-emergency of ASF virus positive wild boar in Estonia – undetected circulation or new release of the virus?

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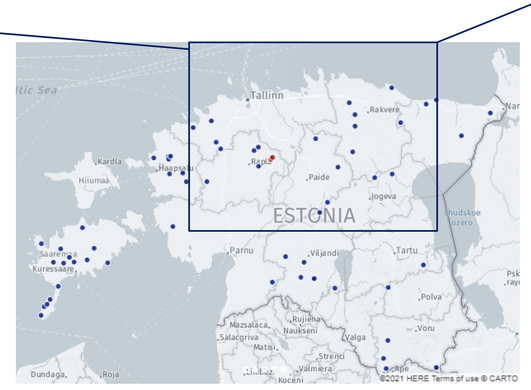
Background

- African swine fever first detected in EE in September 2014 in wild boar
- Last outbreaks in domestic pigs in summer 2017
- From February 2019 until August 2020 (~18 months) no virus (PCR) positive findings
  - 28 Aug 2020 ASFV in found dead wild boar in Rapla county
    - ✓ ~30 months since last finding in the county (Feb 2018)
  - 15 Dec 2020 ASFV in hunted wild boar in Lääne-Viru county
    - ✓ ~ 40 months since last finding in the county (Aug 2017)
- ✓ Rapla county: 15 cases from Aug 20 to Jan 21
  area ~10 km radius
- ✓ Lääne-Viru county: 3 cases from Dec 2020 to Feb 2021
  area ~4km radius



Question: **Is it an undetected virus circulation or new release of the virus?**

Analysis: Calculating the sensitivity of the surveillance system on county level (risk-based surveillance with single risk factor) and estimating the confidence of population freedom for multiple time periods in Epitools (Sergeant 2018)

Assumptions for:

SS sensitivity analysis

- Relative risk (found dead vs hunted): 60
- Population proportion in high risk group (found dead): 0.02
- Design prevalence: 0.021 (0.01 in hunted; 0.6 in found dead)
- Test sensitivity: 0.95
- Prior confidence of freedom: 0.5

Confidence of freedom for multiple time periods

- Probability of introduction: 0.1

Table 2. Cumulative conf of freedom for multiple time periods

Period	System Sensitivity	Posterior confidence of freedom	Prior confidence of freedom	Equilibrium confidence of freedom
Rapla county				
1	0.808	0.8099	0.45	0.9736
2	0.977	0.9915	0.7289	0.9974
3	0.968	0.9962	0.8924	**0.9963**
Lääne Viru county				
1	0.993	0.9915	0.45	0.9992
2	0.963	0.9956	0.8924	0.9957
3	0.987	0.9985	0.896	**0.9985**

Results

Table 1. SS Se and Conf of freedom for single time periods

Rapla county				
Time period	# tested		Surveillance sensitivity	Confidence of freedom
	Hunted	Found dead		
1 Mar - 31 Dec 2018	81	1	80.8%	83.9%
2019	151	3	97.7%	97.8%
1 Jan - 31 Jul 2020	171	0	96.8%	96.9%
Lääne-Viru county				
Time period	# tested		Surveillance sensitivity	Confidence of freedom
	Hunted	Found dead		
2018	196	4	99.3%	99.3%
2019	163	1	96.3%	96.5%
1 Jan - 30 Nov 2020	216	0	98.7%	98.7%

Conclusion

Undetected virus circulation unlikely assuming the normal wild boar habitat infection cycle (Chenais et al., 2018) and no carrier state in recovered animals

References:

Sergeant, ESG, 2018. Epitools Epidemiological Calculators. Ausvet. Available at: http://epitools.ausvet.com.au.

Chenais, E., Ståhl, K., Guberti, V., and Depner, K. (2018). Identification of wild boar-habitat epidemiologic cycle in African swine fever epizootic. Emerg. Infect. Dis. 24, 810–812. doi: 10.3201/eid2404.172127

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