Velocity of the spatial spread of African swine fever amongst wild boar in Estonia during 2014-2017

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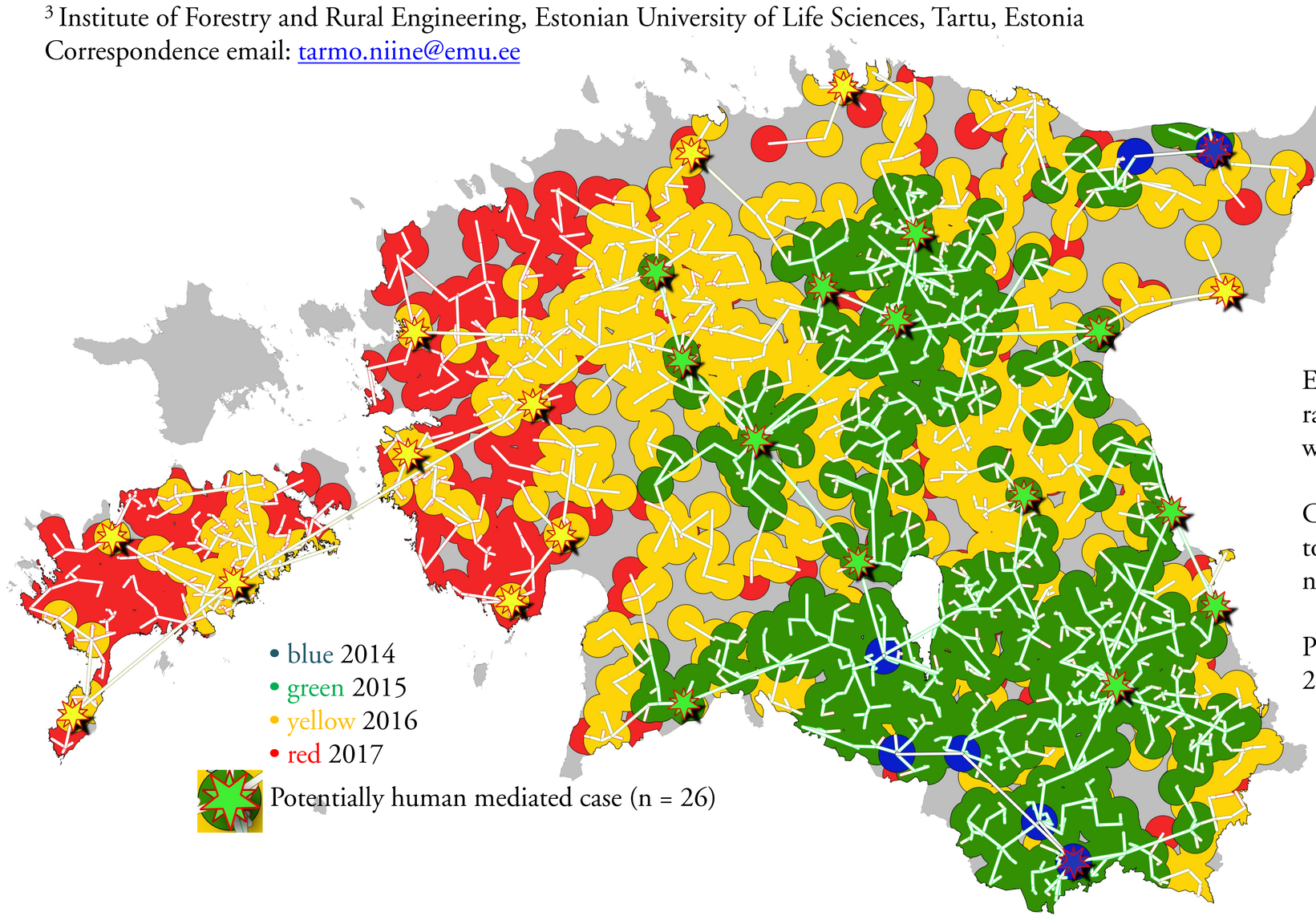


African swine fever (ASF) outbreaks recorded in wild boards in Estonia from 2014 September to 2017 December.

Each detected ASF case (n = 2414) is surrounded by 5km radius buffer (**presumed infected area**), excluding waterbodies and state borders.

Cases were summarized by week (n = 169; September 2014 to December 2017) and each outbreaks distance to nearest new one was measured (marked as white lines).

Potentially human mediated case – a case detected at least 20 km from previously reported one

Calculating the velocity of ASF spread:

Sum of surface areas of 5 km radius infected areas around each confirmed ASF case in wild boars for each week (m^2).

↓

Radius (m) of the circle made of surface area of total infected area calculated as:

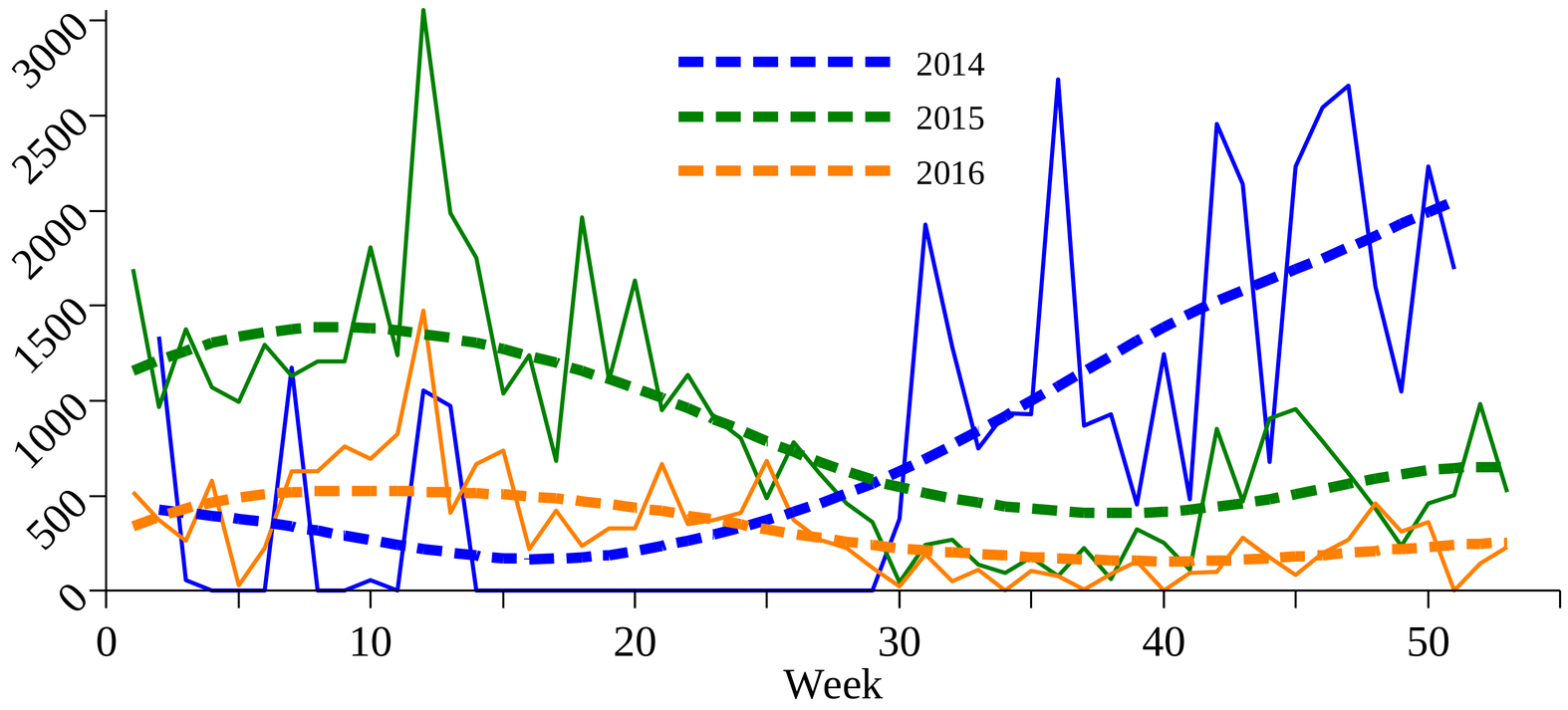
$$r = \sqrt{\frac{area}{\pi}}$$

↓

Velocity of the ASF spatial spread per week = difference in radiuses of the two consecutive weeks (m).

Key points

- Infection velocity increased in 2014-2015 season being highest in summer 2015.
- The seasonal variation pattern in velocity was similar through whole three observation periods, whereas the average velocity decreased sharply since spring 2016 being lowest in 2017.
- 26 out of 2414 ASF cases were defined as potentially human mediated.
- Potential factors influencing infection velocity: hunting intensity and weather conditions can be incorporated in future analysis.



Changes in spatial spread velocity in different seasons. Thin lines correspond to seasonal changes of speed (2014-2015 – blue; 2015-2016 – green; 2016-2017 – yellow). Dashed lines were calculated using lowess function to better illustrate velocity changes over time. Week 0 = first week of September in each season.

Velocity of the ASF spatial spread (meters/week)

Season*	Average	SD	Min	Max
2014-2015	736	879	0	2692
2015-2016	843	609	44	3056
2016-2017	327	278	0	1475

*Seasons started from first week of September and ended in next years last week of August.

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