Resistance of the ASF virus in environment – implications for disease transmission

Arvo Viltrop

Professor

Estonian University of Life Sciences

Background

- Questions still open
  - How the virus transmits between wild boars?
    - between groups contacts limited
    - feeding on carcasses not so frequent (exceptional)

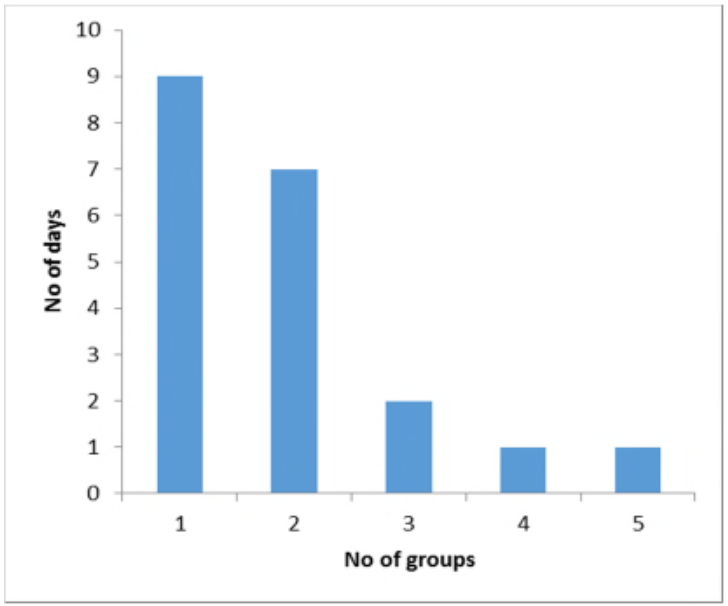
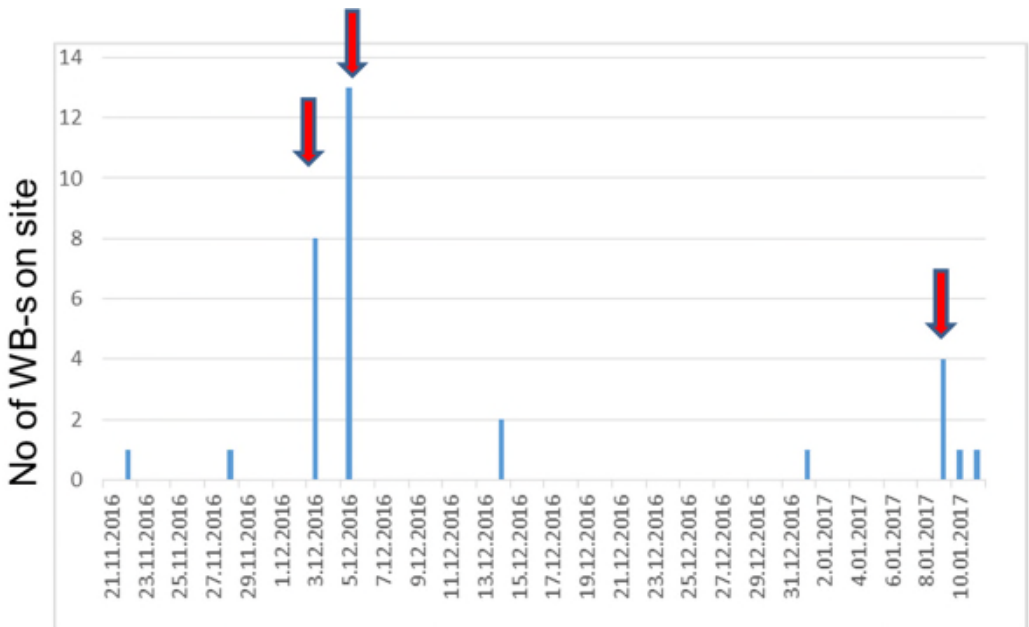


Figure 1. Number of WB groups visiting the feeding site per day

Background

- Questions still open
  - How the virus transmits between wild boars?
    - between groups contacts limited
    - feeding on carcasses not so frequent (exceptional)

- No of wild boar visits to the site with a WB carcass 10
- Contacts with the carcass: 3



Eesti Maaülikool
Estonian University of Life Sciences

Background

- Questions still open
  - How the virus can persist in wild boar populations?
    - carrier animals role uncertain

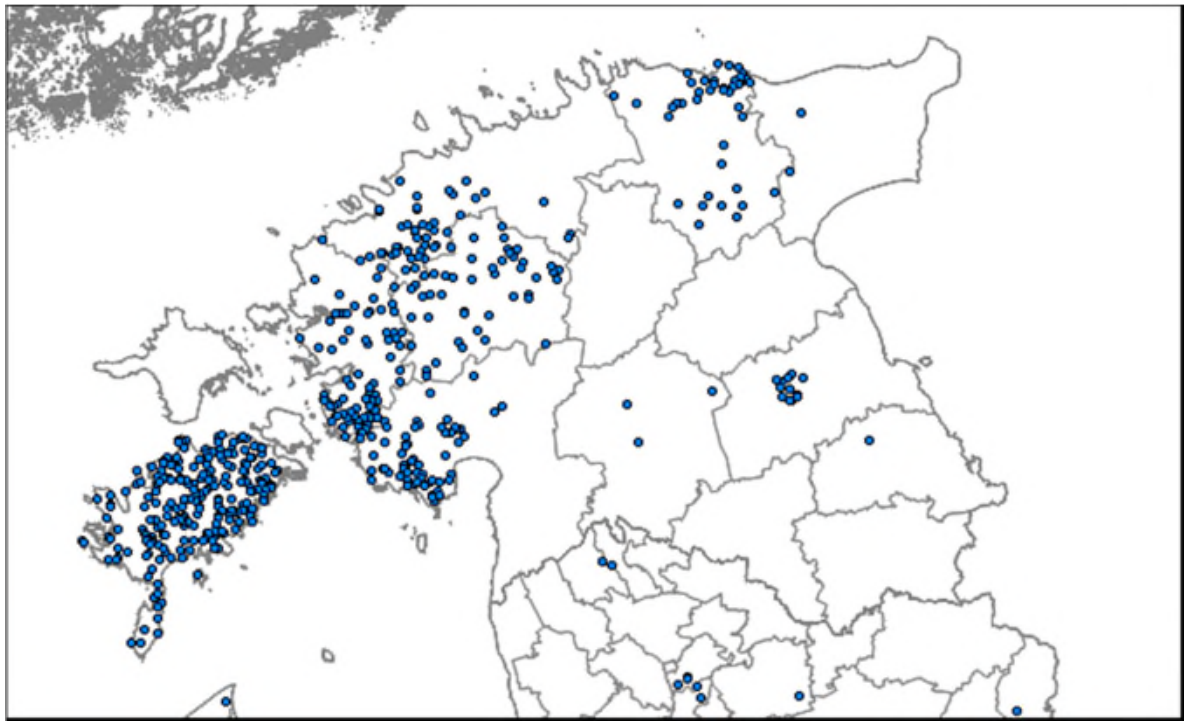


Figure 3. ASFV PCR positive WB cases 01.01-30.09.2017

Background

- Questions still open
  - How the virus is introduced into domestic pig herds, when swill feeding, animal contacts and contaminated bedding/fodder can be excluded?
    - indirect transmission with fomites

Previous common knowledge

- ASF virus highly resistant in environment
  - **Infectious in liquid manure**:
    - 17 °C 84 days Haas et al. (1995)
    - 4 °C 112 days Haas et al. (1995)
      15 days K. Davies et al 2015 (in cell cultures)
    - 37 °C 3 days K. Davies et al 2015 (in cell cultures)

ASFV - highly resistant

- **In feces:**
  - 60-100 days — Strauch (1991) Haas, Ahl et al. (1995)
  - 155 days (burried in glass flask) — Kovalenko et al. 1972
  - 4-6 °C: 159 days — Kovalenko et al. 1972
  - 4 °C 8 days — K. Davies et al 2015 (in cell cultures)
  - 37°C 4 days — K. Davies et al 2015 (in cell cultures)
- **In blood**:
  - On bricks – 112 days (burried)
  - **In soil – 81 days** — Kovalenko et al. (1972)

Resistance of the ASFV in the soil contaminated by excretions from carcasses

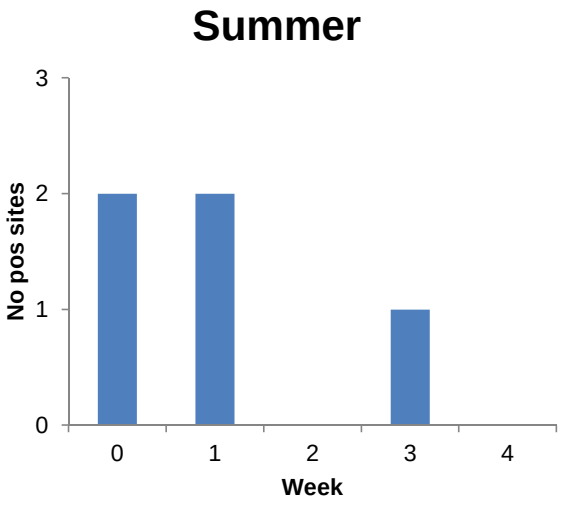
- Study setup
  - Samples collected repetedly from the soil under the infected carcasses
    - Follow up: 1 month after removal of the carcass
  - DNA detection RT-PCR (at Estonian VFL)
  - Virus isolation (FLI Germany)

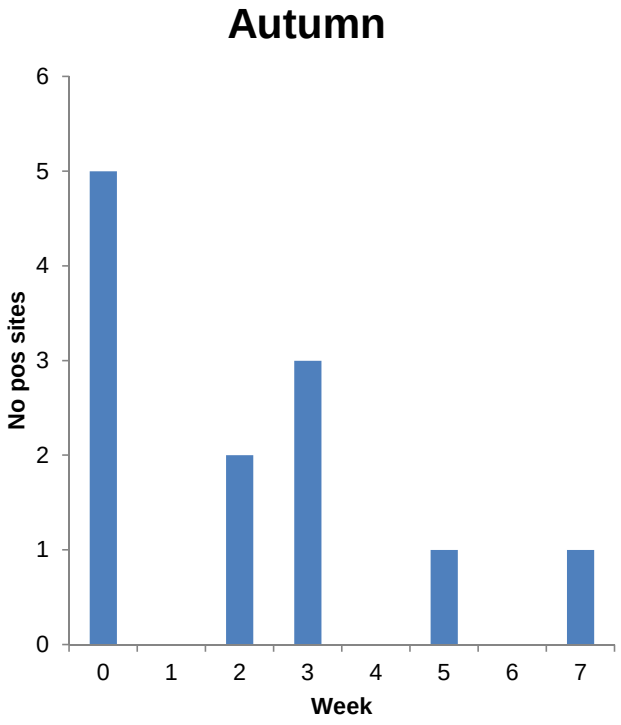
Resistance of the ASFV in the soil

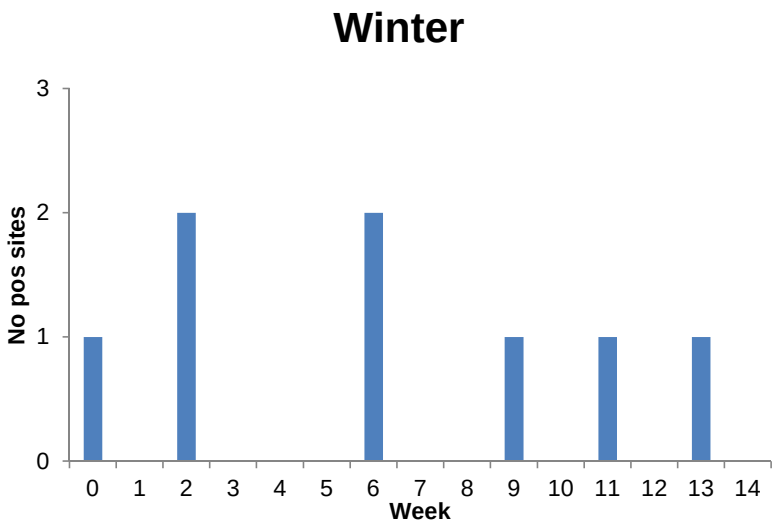
- Study setup

Resistance of the ASFV in the soil

- Results







Resistance of the ASFV in the soil

- Results
  - Virus isolation has not been successful

- Conclusions
  - Contaminated soil may serv as a source of infection for wild boar for extended time periods
    - Potentially also for domestic pigs

Resistance of the ASFV in the soil

- Davis et al (2017) – *in vitro* experiment
  - DNA in faeces detectable 98 days at 4 and 12 ^{0}C
  - Feces remains infectious for 8.5 days and 6.5 days respectively
    - NB! Is dependent on initial virus titer in feces

References

– Davies, K., et al. (2017). "Survival of African Swine Fever Virus in Excretions from Pigs Experimentally Infected with the Georgia 2007/1 Isolate." Transboundary and Emerging Diseases 64(2): 425-431.

– Scientific Opinion on African swine fever, EFSA Panel on Animal Health and Welfare (AHAW) European Food Safety Authority (EFSA), EFSA Journal 2014;12(4):3628

Thank you!