Epidemiology of African swine fever in wild boar in Poland

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Wild boar – an important vector and source of infection for pigs
Wild boar population (WB) in Poland

- current estimations: 264,000 individuals

- WB population has increased in the past decade (prior to detection of ASF) for the following reasons:
  a) global warming resulting in:
     - lower mortality in winter
     - increased frequency of acorn production of oak and beech trees (> nutritional base)
  b) increased cropland related to maize cultivation
  c) winter feeding
  d) varying hunting effectiveness (e.g. avoidance of hog hunting)
  e) species-specific factors: high plasticity to adapt to changing habitats
Wild boar density distribution in Poland (2016 census)
Hypotheses created by EU experts at the beginning of the epidemic

- after the emergence of ASF in Poland (February 2014) two hypotheses were formulated:

  - **ASF will spark an epidemic and spread West quickly affecting susceptible populations**
  
  - **ASF will fade out due to high virulence of the virus**

- 30 months later neither hypothesis proved to be true: ASF is entrenched in a small area of eastern Poland and the infected area is expanding very slowly and is density-dependent
2014 – 30 cases
2015 – 53 cases
2016 – 28 cases
Tendency to spread within areas with wild boar density > 1 individual/km²

2014 – 30 cases  
2015 – 53 cases  
2016 – 28 cases
ASF in wild boar in Poland — lessons learned
1. Very slow spread of ASF in the population of wild boar

Why?

- Behavior of wild boar: highly territorial animals, few WB migrate over distances > 5 km
- High virulence of the virus leads to very fast development of clinical signs (high fever, depression etc.) – sick wild boar do not move

Conclusion: long distance spread of ASF via wild boar highly unlikely (human involvement necessary)
## 2. Passive surveillance

<table>
<thead>
<tr>
<th>Period</th>
<th>Part I („buffer“)</th>
<th>Part II+III („infected“)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dead (excluding roadkill)</td>
<td>Killed by vehicles</td>
</tr>
<tr>
<td></td>
<td>tested</td>
<td>+</td>
</tr>
<tr>
<td>2014</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>2015</td>
<td>55</td>
<td>0</td>
</tr>
<tr>
<td>2016 (January – July)</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>
### 3. Active surveillance

<table>
<thead>
<tr>
<th>Period</th>
<th>Part I (&quot;buffer&quot;)</th>
<th>Part II+III (&quot;infected&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>tested</td>
<td>positive</td>
</tr>
<tr>
<td>2015</td>
<td>2054</td>
<td>0</td>
</tr>
<tr>
<td>2016 (January – July)</td>
<td>2531</td>
<td>0</td>
</tr>
</tbody>
</table>
Detection of ASF in wild boar

<table>
<thead>
<tr>
<th>Year</th>
<th>Shot wild boar</th>
<th>Found dead wild boar</th>
<th>Total number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>9</td>
<td>21</td>
<td>30</td>
</tr>
<tr>
<td>2015</td>
<td>13*</td>
<td>41*</td>
<td>53</td>
</tr>
<tr>
<td>2016</td>
<td>9</td>
<td>19</td>
<td>28</td>
</tr>
</tbody>
</table>

(* in one case both shot and fallen positive wild boar were identified)
4. Active and passive surveillance in clusters of outbreaks in pigs

„Northern cluster” of outbreaks – spread due to illegal activities

„Southern cluster” of outbreaks – spread connected with ASF in wild boar population and due to illegal activities
Surveillance performed in the districts of the „northern cluster” of outbreaks:
• In 2016 in total 7 dead wild boar and 645 shot wild boar were tested for ASF (all with negative results)
• Since 1 August until 2 September 2016 5 dead wild boar and 49 shot wild boar were tested for ASF (all with negative results)

Surveillance performed in the districts of the „southern cluster” of outbreaks:
• In 2016 in total 81 dead wild boar and 216 shot wild boar were tested for ASF (with 2 positive results from August)
• Since 1 August until 2 September 2016 32 dead wild boar and 69 shot wild boar were tested for ASF (with 2 positive results)
<table>
<thead>
<tr>
<th>Cluster</th>
<th>District</th>
<th>Area [km²]</th>
<th>Number of wild boar (as of III.2016)</th>
<th>Density</th>
<th>Number of tested wild boar</th>
<th>Target (from decision 2003/422 proportionally to number of months)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>bielski</td>
<td>1385</td>
<td>589</td>
<td>0,43</td>
<td>273</td>
<td>259</td>
<td>*density is so low that defining areas in which sampling should take place is impossible - fewer wild boar live in those areas than the minimal sample size; obtaining proper sample size impossible without depopulation forbidden by the EU strategy for ASF</td>
</tr>
<tr>
<td></td>
<td>wysokomazowiecki</td>
<td>1288</td>
<td>216</td>
<td>0,17*</td>
<td>174</td>
<td>37</td>
<td>**restrictions applied only 1 month ago; number of wild boar shot/found dead is lower than in the Podlaskie region due to need to adapt the local infrastructure and procedures (cold stores, training of hunters etc.)</td>
</tr>
<tr>
<td></td>
<td>zambrowski</td>
<td>733,1</td>
<td>128</td>
<td>0,17*</td>
<td>24</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>łomżyński</td>
<td>1354</td>
<td>228</td>
<td>0,17*</td>
<td>3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>moniecki</td>
<td>1382</td>
<td>241</td>
<td>0,17*</td>
<td>172</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>South</td>
<td>bialski</td>
<td>2754</td>
<td>2073</td>
<td>0,75</td>
<td>117</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td></td>
<td>łosicki</td>
<td>771,8</td>
<td>370</td>
<td>0,48</td>
<td>18</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td></td>
<td>siemiatycki</td>
<td>1460</td>
<td>645</td>
<td>0,44</td>
<td>180</td>
<td>136</td>
<td></td>
</tr>
</tbody>
</table>
5. Seasonality: higher prevalence in Summer months (June-August)

**Hypothesis**: eating of maggots multiplying in tissues of dead wild boar and accidental contact of healthy animals with infected blood/body fluids.

<table>
<thead>
<tr>
<th>Season</th>
<th>Active surveillance</th>
<th>Passive surveillance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>positive</td>
<td>negative</td>
</tr>
<tr>
<td>Spring</td>
<td>0</td>
<td>446</td>
</tr>
<tr>
<td>Summer</td>
<td>0</td>
<td>988</td>
</tr>
<tr>
<td>Autumn</td>
<td>3</td>
<td>3270</td>
</tr>
<tr>
<td>Winter</td>
<td>7</td>
<td>3453</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>8157</td>
</tr>
</tbody>
</table>

- Increased surveillance activity (search for dead wild boar) in the summer is recommended to identify potentially new areas of ASF occurrence
Summer peak in incidence already occurred in 2016 (data as of 12.IX.16)
Control measures
Control of ASF in wild boar

Objective:
- Reliability of assessment of ASF occurrence
- Elimination of a long-lasting source of the virus from the environment

Intensive hunting

Objective: Achievement of density threshold that will significantly reduce the spread and therefore risk for spill-over from wild to domestic population (based on the current knowledge: 0.5 heads/km²)

Collection, testing and disposal of wild boar carcasses

Objective:
- Reliable assessment of ASF occurrence
- Elimination of a long-lasting source of the virus from environment
Reduction of wild boar population can reduce (=slow down) the spread of ASF in the population and significantly reduce the risk of virus spill-over to domestic population.
In the areas indicated in Annex to decision 2014/709/EU (mostly Parts II and III) there are several measures aimed to control the wild boar population:
- Intensified hunting (although no depopulation attempts are made)
- Only hunts that do not lead to dispersal of wild boar are allowed
- Hunters get a financial incentive for the shot wild boar
- Additional incentive is given for shooting female wild boar
- Feed ban

= reproductive capacity of wild boar is decreased
Additionally, WAMTA (Wider Area for Medium Term Actions – WAMTA) has been established with the aim to reduce the risk of transmission of ASF from areas where the disease currently occurs (affected areas and third countries).

The measures apply to app. 30K wild boar present in the area.
Main goal is to decrease number of wild boar. This is achieved by combination of normal hunting and additional „sanitary shooting“. The latter measures aim is to achieve density of 0.5 wild boar per sq. km. App. 8K wild boar will be shot in addition to the normal hunts. Currently 64% of the target has been met. Recently a decision has been made to reach the target as soon as possible.

In that area a feed ban was also introduced.
Hunters receive a financial incentive for a wild boar shot in the „sanitary” hunts (but not the normal hunts).

Also, in order to increase the number of female wild boar shot financial incentives were added for shooting any female wild boar.

Recently payment has been introduced for finding dead wild boar (for hunters and forest rangers).
Recently a discussion was started to assess the possibility to enlarge that area to the biggest river in Poland (Vistula).

Additional 40-50K wild boar should be present in the new area (app. 80K in total). Additional 10K wild boar will be subject to the reduction efforts (18K in total).
Conclusions

• ASF spread is slow in wild boar population; human involvement is necessary to transfer the virus over long distances

• Passive surveillance – method of choice for early disease detection and for providing evidence for disease freedom

• ASF shows a tendency for increased incidence in the summer months

• Control measures must be two-fold:
  - reduction of the population
  - removal of dead carcasses
Thank you!