ASF in the Czech Republic: management experience and lessons learnt

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Content

Part I. Management experience and lessons learnt

1) Story of one outbreak – way of introduction?
2) Current epidemiological situation
3) Strategy and measures applied
4) Selected important measures (demarcation, fences, hunting regulation, biosecurity etc.)
5) Conclusions

PART II. Sampling and laboratory diagnostics of ASF in the Czech Republic
Localization of the infected area

- 30 km from the Slovak border
- 80 km from the Austrian border
- 80 km from the Polish border

Infection areas:
- Red zone: Infected area
- Green zone: Infected area
- Orange zone: Intensive hunting area
- Blue line: Highway

Pig industry in the Czech Republic

Density of domestic pigs in the Czech Republic (per 100 km²)

<table>
<thead>
<tr>
<th></th>
<th>farms</th>
<th>pigs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Republic</td>
<td>2 160</td>
<td>1 490 775</td>
</tr>
<tr>
<td>Zlín region</td>
<td>83</td>
<td>74 088</td>
</tr>
<tr>
<td>Infected area</td>
<td>23</td>
<td>16 301</td>
</tr>
</tbody>
</table>

The Czech pig industry:
- Low frequency of backyard farms
- Only about 1,5 mil pigs (92 thousand of sows)
- Country is not self-sufficient in pork even 45%
Wild boar density in Europe (FAO/ASFORCE, May 2015)

The density of wild boar population in the Czech Republic (per 100 km²)

<table>
<thead>
<tr>
<th>Hunting year</th>
<th>Game bags</th>
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<tbody>
<tr>
<td>2010</td>
<td>144 305</td>
</tr>
<tr>
<td>2011</td>
<td>109 563</td>
</tr>
<tr>
<td>2012</td>
<td>185 381</td>
</tr>
<tr>
<td>2013</td>
<td>152 468</td>
</tr>
<tr>
<td>2014</td>
<td>169 483</td>
</tr>
<tr>
<td>2015</td>
<td>186 148</td>
</tr>
<tr>
<td>2016</td>
<td>160 164</td>
</tr>
<tr>
<td>2017</td>
<td>229 182</td>
</tr>
<tr>
<td>2018</td>
<td>?</td>
</tr>
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</table>

• hunted animals: 1-4 / km²
• real WB density?? = 1,5-2x higher
• the population doubles every 10 years

ASF outbreak

2x higher population in 10 years
Motivated hunting in the whole country autumn 2017 (10-12/2017)

- reward of 38 EURO per hunted animal
- this measure resulted in about 20% increasing in the numbers of game bags
- this campaign did not meet the initial expectations

![Graph showing comparison between Autumn 2016 and Autumn 2017]

Passive surveillance of WB found dead

Since 2014, all found dead pigs have been tested for ASFV in the Czech Republic

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<tbody>
<tr>
<td>Tested/positive</td>
<td>243/0</td>
<td>348/0</td>
<td>404/0</td>
<td>1622/192</td>
<td>1404/19</td>
<td>275/0</td>
</tr>
</tbody>
</table>

The nation-wide passive monitoring was the KEY FACTOR in the EARLY DETECTION of ASF and enabled the immediate and effective response.

Afterwards: tool to monitor the epidemic (progress, prevalence in time and in space) and finally to demonstrate the absence of the virus.
How to increase the passive surveillance of WB?

- **financial compensation** for carcass detection (for hunters) = crucial
- defining some **baselines** (on hunting ground level)
- **involvement of general public** (reporting of carcasses)
- making „public“ reporting simple = mobile apps

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First occurrence of ASF virus in wild boar in the Czech Republic

First ASF positive carcass location: Příluky, Zlín district
Date: 26th June 2017

Way of ASF introduction?

GPS 49° 13' 44.303'' N, 17° 42' 1.996'' E
First ASF case in the Czech Republic
• Zlín city - inhabited area
• 1st WB carcasses found nearby the local hospital

Way of ASF introduction?

Autor: Michal Klíma, MAFRA
Zoological garden inside the high risk infected (fenced) area

- natural hosts and reservoir of the ASF virus: warthogs (*Phacochoerus africanus*) in the infected area

First ASF case in the Czech Republic
The real source of infection?

- HOSPITAL
- LOGISTIC DEPO – terminal for container transport
- Cadaver with oldest estimated time of death
The rate of disease expansion

DIAMETER 11 KM (final size) / 6 MONTHS = SLOW speed of spread = Ø 0.5 km / 1 month
despite the high WB density (8-10 WB / km2)

Based on the estimated date of death of WB found

SLOW SPREAD = „slowly but surely“

NO explosion / NO implosion (no fading out) but ENDEMICITY

August 2017

August 2018
ASF in Czech Republic: current epidemiological situation
from 26 June 2017 to December 2018:

In total 250 cases of ASF in wild boar population
• the total number of positive cases in found dead WB: 214 (virus and/or antibodies)
• the total number of positive cases in hunted WB: 36 (virus and/or antibodies)

Total number of ASF tested wild boar
Part II: found dead 399 / 214 positive (53.6%)
    hunted 2445 / 36 positive (1.5%)
Part I: found dead 185/ no positive
    hunted 11641 / no positive

NO OUTBREAK IN DOMESTIC PIGS !

Current situation: last (PCR) positive cases

❖ last ASF positive case in HUNTED wild boar
   8th February 2018

❖ 2 last ASF positive CARCASSES
   were found on 15th April 2018
   • scull and bones
   • estimated death is about
     4-5 months prior to the finding

Weekly number of ASF positive cases in wild boars 1.1. - 31.12.2018

2018
Current situation: summer and autumn 2018

- 2 last SEROLOGICALLY positive cases in WB
- both hunted WBs in the fenced area

- ASF Ab pozit. (ELISA + IPT)
- ASF DNA negat. (PCR)

PART I.

PART II.

18th July 2018
17th October 2018

Current situation in the Czech Republic

Although the last ASF positive case was detected in the Czech Republic a year ago:
- searching of wild boar cadavers continues
- individual hunting of wild boars in the infected area continues
- intensive hunting of wild boars continues in the area with intensive hunting around the infected area
- official controls in pig farms continue – biosecurity, health checks of pigs, laboratory tests, movement control etc.

- NO CASE IN DOMESTIC PIGS
- MEASURES ARE BEING GRADUALLY CANCELLED NOW
- OUTBREAK HAS BEEN ERADICATED SUCCESSFULLY

The Czech Republic is the first EU country officially declared free of ASF after the outbreak of infection in recent years.
Strategy and measures applied

Strategy

1. **STOP** of **hunting** - keep calm the area (min. disturbance)
2. **SEARCH** and test **cadavers** - increasing passive surveillance
3. **THINK** - trying to **understand** epidemiological situation, demarcation of the infected area + think about following measures
4. **to DO** – systematically apply **measures**
   - to keep animal at one place (virus works - epidemic phase)
   - to depopulate infected area (at the final stage)
Motto:

*Hunting is not a method for eradication of ASF in wild boar population*

because:

- the main source of infection are cadavers that remain infectious for a long time
- the stock of wild boar in the infected area is not precisely known, however relatively high
- lethality of the virus 95%
- low contagiositity of the virus
- persistence of the virus in the environment is very long

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**General measures for DOMESTIC PIGS in the infected area (part II)**

**TARGET: INCREASE BIOSECURITY AND AVOID CONTACT BETWEEN WILD BOAR AND DOMESTIC PIGS**

- enhanced passive surveillance in pig farms - farmers must report all sick/dead pigs in the infected area (all cases are tested for ASF)
- movement of pigs only with authorisation issued by the RVA for Region Zlín
- a ban on the use of cereals as feed for pigs when harvested in 2017 in the infected area; for at least 6 weeks after harvest ("cereal quarantine")
- ban on feeding with fresh grass
- ban on straw bedding
Ban on feeding with fresh grass
ban on straw bending

General measures for DOMESTIC PIGS
in the infected area (part II)

- ban on entry into a pig farm for all persons who have come into contact with WB in the previous 48 hours or have participated in hunting WB in the infected area
- ban on keeping of pigs in backyard farms and in non-registered holdings in the infected area (2017-2018)
- from 1st November 2018 - registration of farms with 1 pig for home slaughter
- official controls in pig farms in accordance with Commission Implementing Decision 2014/709/EU. Targeted for BIOSECURITY.
- information campaign
General measures applied in the infected area (part II)

**WILD BOARS**

- **enhanced passive surveillance of WB found dead** (motivated searching of carcases - each found dead wild boar is rewarded)

- **ban on hunting** (any species, any hunting system) and later hunting of WB was allowed but **only by individual hunting and trapping** (selected and trained hunters)

- **ban on WB feeding** (only baiting allowed) BUT unharvest fields left to provide food and shelter for wild boars

- **ban of entrance for the general public** into the infected area

- **all hunted and found dead WB must be disposed of in the rendering plant** (+ sampling and testing for ASF)

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Some selected important measures

- demarcation of zones
- fencing in the infected area
- hunting policy/strategy
- biosecurity during hunting
- intensive organised carcass-searching
- carcass removal and disposal
- financial rewards and compensations
Demarcation of the infected area in accordance with the Council Directive 2002/60/EC

- the whole District Zlín has been declared as an infected area (1,034 km²), 37 municipalities, 89 hunting grounds

Parts according to the EU regionalisation

Demarcation of different wild boar management zones

Need to determine:
- **core** (defined by a polygon that encompasses all ASF positive WB)
- **buffer area** (based on yearlong home range)
- **intensive hunting area**

Approaches (and measures) used during the outbreak differed depending on the **RISK of INFECTION**.
Buffer area = HIGH RISK SUB-AREA

- zone around the HIGHEST RISK SUB-AREA (fenced area, core zone)
- size of the area - 159 km²
- it had been calculated considering the maximum annual home ranges of these sounders of wild boars living in the fenced area
- home ranges were discussed WITH SOME EXPERTS AND LOCAL HUNTERS

The HIGHEST RISK AREA (red grit, fenced area, core) surrounded by the perimeter of the wild boar maximum home range size. The LOW-RISK SUB-AREA (green part - 874 km²) and HIGH RISK (buffer) and HIGHER RISK (fenced, core) area (red part – 159 km²)

Demarcation of the intensive hunting area

defined/demarcated by the layout of highways
ASF measures in 4 (5) levels in the Czech Republic

1. Infected area:
   1a. Zone with low risk
   1b. Zone with high risk
2. Intensive hunting area
3. Rest of the CZ

Czech Republic = 78 886 km²
Intensive hunting area: 8 500 km²
Infected area with low risk: 874 km²
Infected area with high risk: 159 km²
Infected area with the highest risk (fenced): 57 km²

EFSA Journal 2018;16(7):5344 – Scientific opinion – ASF in wild boar
Electric fences around the infected area

Scented fences around the infected area

- synthetic foam with 3-Methylbutanoic acid (isovaleric acid)
- imitation of typical predators smell /odour
- strong pungent cheesy or sweaty smell
- it is a major component of the cause of unpleasant foot odour
- most durable product chosen – resistant against weather conditions (+ with slow evaporation)
- 5 m distance / 4 weeks period
- product: Pacholek koncentrát B, Ekoplant, s.r.o.
Fences around the highest risk sub-area to prevent or complicate the WB migration both OUT and INTO

Area: 57 km²
Perimeter: cca 30 km

scent fence
electric fence (voltage 6500 – 11 000 V)

Photo: RITZAU SCANPIX/Reuters
Photo: Morris MacMatzen/Getty Images
All positive cases were in PART II.
Only once disease spread out of the fenced area (December 2017) – 11 cases

<table>
<thead>
<tr>
<th>Fenced area</th>
<th>total</th>
<th>negat. (PCR)</th>
<th>posit. (virus/PCR)</th>
<th>prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>in</td>
<td>280</td>
<td>79</td>
<td>201</td>
<td>71.7%</td>
</tr>
<tr>
<td>out</td>
<td>134</td>
<td>123</td>
<td>11</td>
<td>-</td>
</tr>
</tbody>
</table>

WB density in the fenced area:
more than 520 (found dead+hunted)
WB / 57 km² = 9.1 WB per 1 km²

REASON? Rut season? Homerainge? Hunting?

How to estimate the number of WB

Guidance on estimation of wild boar population abundance and density: methods, challenges, possibilities

ENETWILD consortium, Oliver Keuling, Marie Sange, Pelayo Acevedo, Tomasz Podgorski, Graham Smith, Massimo Scandura, Marco Apollonio, Ezio Ferroglio and Joaquin Vicente

EXTERNAL SCIENTIFIC REPORT

APPROVED: 3 July 2018
How to estimate the number of WB in the highest-risk area (fenced area) and current situation

- INITIAL ESTIMATE (July 2017) was 150 – 200 (250 max) wild boars only
- TOTAL NUMBER of hunted or found dead wild boars was 582 as of 17/9/2018 (299 hunted; 283 found dead)
- last estimates were made in July - August 2018 using trail cameras (game cameras), infrared thermal visions, and also by watching by hunters. The total estimated number of pigs was 15-20 (August 2018), only individual wild boars were observed.

Highest risk area (fenced area) - unharvested fields left

115 hectares of unharvested fields (rape, maize and wheat) were left for wild boars providing both food and shelter
To hunt, or not to hunt, that is not the question.

Evolution of hunting in the core nad buffer area:
banner hunting → sit-and-wait hunting → intensive hunting

- in September 2017 individual hunting by local hunters allowed in the high-risk sub-area including the fenced sub-area (driven hunts still forbidden)
- under strict biosecurity measures
- only trained hunters - more than 1300 hunters trained by SVA

RESULT: the hunting by local hobby hunters and gamekeepers was too slow to have any immediate effect on the size of the population

Timeline of hunting regulations

- 26 June 2017 ASF confirmation
- 27 June 2017 Ban on hunting in the infected area
- 24 August 2017 Trapping of wild boar in the high risk zone in infected area
- 11 September 2017 Individual hunting in the high risk zone in the infected area
- 16 October 2017 Hunting in collaboration with Police
Trapping of wild boars

- 32 traps in the area
- Cage traps with sensors and cameras
- Subsidies for traps = 315 € - 730 €

<table>
<thead>
<tr>
<th>Fenced area</th>
<th>total trapped</th>
<th>negat.</th>
<th>posit.</th>
<th>prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>in</td>
<td>40</td>
<td>36</td>
<td>4</td>
<td>10%</td>
</tr>
<tr>
<td>out</td>
<td>66</td>
<td>66</td>
<td>0</td>
<td>-</td>
</tr>
</tbody>
</table>

Weekly incidence in relation to hunting measures

- Number of WB found dead
- Number of ASF PCR positive found dead WB

- Week 34: Hunting by trapping
- Week 37: Individual hunting in high risk zone by local trained hunters
- Hunting by Police snipers - week 42-52/2017 and week 4-5/2018
- Week 51: First positive WB cases outside fenced area

HUNTING ALLOWED IN THE END OF EPIDEMIC PHASE
Timing of hunting regarding to phases of the infection dynamics in a population of WB

Time to hunt
The end of epidemic could be determined by analysing of epidemiological data.

Hunting by police snipers in the infected area
Target was to depopulate the fenced off area as quickly, silently and efficiently as possible + with high biosecurity

- individual hunting by Police snipers (Elite Squad, Police Special Unit, Airport snipers)
- started from 16 October 2017 (3 days a week during 10 weeks)
- in total 157 WB hunted - 8 positive for ASF
- snipers trained for hunting biosecurity
- organization and coordination by RVA and by local hunters

- over night hunting (18:00 – 6:00)
- mobile thermovision used
- snipers with silencers
ALL hunted WB collected and rendered !!!
Training of snipers
on a moving target

Hunting by police snipers in the infected area
Weekly incidence: 3 peaks in the Czech Republic

Epidemic

Snipers

Motivated and Organised

Intensive searching of cadavers

2017

2018

Last ASF positive case in hunted wild boars (8.2.2018)

Last ASF positive case in found dead wild boar (15.4.2018)

Biosecurity during hunting

- e.g training of hunters on ASF preventive and biosecurity measures
- Wild boar transportation from the hunting spot to the dressing facility (ban on transporting hunted animals in private cars)
- Dressing room / area requirements and equipment
- Proper disposal of biosafety containers
- Safe on-site storage of wild boar until tested ASF negative
- Procedures for the disposal of ASF virus positive wild boar
- Procedures for cleansing and disinfecting facilities, etc.
Carcass detection and removal

• Organised by SVA and LOCAL HUNTERS (searching)
• carcass detection is the most important tool to detect geographical spread in WB
• carcass removal (including sampling and safe destruction) is essential to reduce transmission in the infected areas

TARGET:
- enhanced passive surveillance
- minimize risk of local ASFV persistence
- minimize risk of indirect transmission

Enhanced passive surveillance of WB found dead

Motivated or/and organised searching of carcasses
• very inaccessible terrain
• dense vegetation
Carcass removal and disposal

ALL found dead and hunted animals were collected under STRICT BIOSECURITY MEASURES

- marked with hunting seals number
- transported into specific wild boar collection centres
- dispatched with authorized vehicles to a rendering plant
- sampled by an official veterinarian and then disposed
Collection and disposal of hunted wild boars

Collection of hunted WB during hunting by POLICE
Disposal of hunted wild boars from the infected area in selected rendering plant

Secure boxes for the collection of material for rendering

Positive BIOSECURITY measure, BUT influence the sample quality = LAB RESULT

Sampling of WB from the infected area

NOT in the field!! But ONLY in the rendering plant or in the lab.

- IMPORTANT BIOSECURITY MEASURE!!!
- both found carcasses and hunted WB transported into the rendering plant
- samples collection - authorized veterinarian samples carcasses
- DISPOSAL OF CARCASSES IN A RENDERING PLANT
Financial rewards and compensations

Financial rewards for infected area:
- each finding of dead wild boar – 117,156,194 €
- each hunted young wild boar (up to 50 kg) – 117,155 €
- each hunted adult wild boar (over to 50 kg) - 117,156,310 €

Financial rewards for intensive hunting area:
- each finding of dead wild boar – 39,117 €
- each hunted wild boar – 39,78 €

Rest of the country:
- each finding of dead wild boar – 39,78 €

+ Compensation for hunted wild boar disposed of in the rendering plant - piglet 39 €, one-year old 78 €, adult saw 125 € for

Summary: What did we learn from our small outbreak?

The best rated measures (effectiveness and practicality):
- demarcation of management zones - based on risk of the infection
- motivated passive surveillance – fast systematic searching and removal of carcasses
- ban on driven hunting (despite public/hunters opposition and political pressure)
- high hunting biosecurity + biosecurity of sampling (lab + rendering plant)
- disposal of hunted wild boars from the infected area – (rendering plant)
- motivation for hunters (financial rewards and compensations)
- effective hunting in the infected area (depopulation by snipers)
- awareness + training + education (hunters, veterinary service, public)
Recommendations

- passive surveillance plays the key role for early detection
- hunting is not a method for eradication of the disease
- hunting is applicable at the final stage of the epidemic phase
- hunting in infected area is possible only under biosecurity conditions
- to minimize the migration of pigs from infected areas, it is possible to use electric and/or scent fencing, restriction in entrance for the public, leaving some crops unharvested

Conclusions

- by implementing of strict measures (in the small isolated area of the outbreak) the HUMAN FACTOR HAS BEEN SUBSTANTIALLY REDUCED in the Czech Republic.
- responsible authorities took both PIONEERING AND ALTERNATIVE MEASURES
- the COMBINATION of measures applied resulted in very LIMITED SPREAD
- possibility to apply some of measures due to the small size of infected area
- MEASURES WERE CONTINUOUSLY BEING ADJUSTED to the epidemiological situation

Key point is collaboration of all stakeholders !!!!
Thank you for your attention.