Outbreak investigation and relevant data collection – initiative in Baltic States and Bulgaria

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1. The competent authority shall carry out an epidemiological enquiry in the event of the confirmation of a listed disease.

2. The epidemiological enquiry shall aim to:

   a) identify the likely origin of the disease and the means of its spread;

   b) calculate the likely length of time that the disease has been present \textit{(High Risk Period)};

   c) identify establishments and epidemiological units therein, food and feed businesses or animal by-products establishments, or other locations….;

   d) obtain information on the movements of animals, persons, products, vehicles, etc. which could have spread the disease agent during the relevant period preceding the notification \textit{(High Risk Period)};

   e) obtain information on the likely spread of the disease in the surrounding environment, including the presence and distribution of disease vectors.
Epidemiological farm investigations

A) Postulate different hypothesis
B) Address each hypothesis separately
C) Exclude hypothesis one by one

Hypothesis for:

- **Way of entrance**: HOW did the pathogen enter the holding?
  → CHECK BIOSECURITY

- **HRP**: WHEN did the pathogen enter the holding
  → LAB RESULTS, MORTALITY DATA
Epidemiological road map

Likely origin - way of entrance

H1: Trade of pigs
H2: Contact with wild boar environment
H3: Swill, contaminated food
H4: Others (people, vehicles, instruments…)
H5: Vectors (ticks, insects, ???)
H6 …

Date of entrance

H1: <50: 1w
H2: <150: 2-3w
H3: >150: >4w
H4 …

Biosecurity check

• Hardware
  - Buildings
  - Filters
  - Fences
  - …
• Software
  - Management
  - Awareness
  - …

Toolbox

• Map of farm (village)
• Laboratory results
• Timeline of clinical events (Vet activities)
• Mortality /morbidity data
• Record of movements (animal, persons, vehicles, equipment…)
• Etc…

Likely escape (secondary infections)
Mortality data

→ Cut-off for suspicious mortality 3%

A: 50 pigs  
(M: <2)

B: 150 pigs  
(M: <4)

C: 1000 pigs  
(M: <30)

The larger the epidemiological unit, the longer the HRP!
2.1.5. Sampling for laboratory investigations will be performed

- in the case of clinical signs (such as fever or haemorrhagic lesions).
- Each week, virological testing of at least the first two death (post weaning pigs or pigs older than 2 months) in each production unit. All dead pigs to be sampled and tested.
- Ante or post-mortem signs raising suspicion at home slaughtering at least within the area covered by Commission Decision 2014/709/EU.
ASF - CSF - FMD

**FMD**
- Prevalence: 100%
- Mortality: 2%
- Lethality: 2%
- Contagiousity: +++

**ASF**
- P: 10%
- M: 9%
- L: 90%
- Contagiousity: +

**CSF**
- P: 50%
- M: 25%
- L: 50%
- Contagiousity: ++

100 infected; 2 dead

10 infected; 9 dead

50 infected; 25 dead
Epi-investigations in industrial farms in Bulgaria

- **Scope**: investigations in 5 ASF affected industrial farms
- **Period of events**: 19/07 – 01/08 2019
- **Period of investigations**: Aug 2019
- **Location**: Ruse, Silistra, V.Tarnovo regions, North Bulgaria (farms in AFS high-risk areas)
- **Background**: ASF outbreaks and WB cases confirmed in backyard farms in North Bulgaria
Farm BILIANA, Balgarsko Slivovo, Svishtov

- 18,000 pigs, closed production cycle, own slaughterhouse + meat processing, feed mill, medium biosecurity level, 120 employees
- ASF cases in wild boar and backyards around the farm → high viral load of the environment
- ASF confirmed July 31 after suspicious clinical signs and lesions in 2 fattener sections
Working hypothesis:

- Human factor/biosecurity breaches - high probability
- Feed/water - moderate probability of secondary contamination (heat treatment during processing of the feed; own well)
- Transport vehicles - moderate probability (own vehicles used inside the farm)
- Animal movement - ruled out (no movements to the farm in the past months)
- WB contacts - ruled out

Introducing hypothesis of the owner: contaminated dust from feed processing, biting insects
Farm BILIANA, Balgarsko Slivovo, Svishtov

- Assesment of unit mortality data
- Passive surveillance samples collected on weekly basis
- Estimated high-risk period: 6 weeks
Farms Popina (A) and Vetren (B), Silistra

- Two farm facilities, 22,000 (A) + 8,000 (B) pigs, not technologically linked - closed production cycles, own slaughterhouse + meat processing + selling, high biosecurity level
- ASF confirmed simultaneously on both farms:
  → 27 July (A) sows affected then weaners
  → 30 July (B) fattener section affected
• Assessment of unit mortality data (in two affected farms)
• Estimated high-risk period: 6 weeks
• Passive surveillance sampling on weekly basis
Farms Popina and Vetren, Silistra

**Working hypothesis:**

- **Feed/water** - secondary contamination of feed - high probability
- **Transport vehicles** - high probability (common feed trucks and live animals trucks)
- **Human factor/biosecurity breaches** - moderate probability
- **Animal movement** - ruled out (no movements to the farm in the past months)
- **WB contacts** - ruled out
- **Introduction hypothesis from our side:** secondary contamination of feed
Farm Nikolovo, Ruse

- 18,000 pigs, closed production cycle, poor biosecurity level, on-farm production of semen
- ASF confirmed July 13 after sampling of dead sows/boar and weaners
• Sow section was most probable already affected in May/June
• Passive surveillance sampling each week
• Estimated high-risk period: 8 weeks
**Working hypothesis:**

- **Biosecurity breaches - high probability** -
  → old facilities with poor biosecurity that require a lot of manual work (feeding/cleaning)

- **Transport vehicles - moderate probability** (own vehicles used inside the farm, dedicated feed truck for the farm, common slaughterhouse vehicles)

- **Feed/water - moderate probability of secondary contamination** (heat treatment during processing of the feed; own well)

- **Animal movement - ruled out** (no movements to the farm in the past months)

- **WB contacts - ruled out**
Farm Golyamo Vranovo, Ruse

- 30,000 pigs, closed production cycle, own slaughterhouse + meat processing + selling, since winter in surveillance area (regionalisation)
- ASF confirmed July 26 by passive surveillance (targeted sampling of dead pigs)
Farm Golyamo Vranovo, Ruse

- Estimated high-risk period: 2 weeks
- Farm inspection impossible due to living pigs on the farm (ongoing culling process currently)

- Introduction hypothesis from our side: breaks in biosecurity (ASF started in the single unrenovated stable section) + human factor
Farm Brashlen, Ruse

- 38,000 pigs, closed production cycle
- ASF confirmed on July 22 after suspicious clinical signs and lesions
- Farmer did not allow farm inspection
- Estimated high-risk period: 6 weeks
- Introduction hypothesis from our side: human factor, feed related
- Introduction hypothesis of the owner: wild boar related
Conclusions

• Breaks in biosecurity together with human factors are the most common hypothetical introduction routes

• Targeted and regular sampling of dead pigs reduced the high-risk period
  → But still quite long HRP in large-scale pig farms

• Very limited spreading within farms
  → In most cases only one or two sections were affected
  → leads to low acceptance of culling procedure
THANK YOU!