IMPORTANCE OF IMPROVING BIOSECURITY LEVEL ON PIG FARMS IN ERADICATION OF CLASSICAL SWINE FEVER (CSF): Experience in SERBIA

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Introduction

- Classical swine fever (CSF) is a contagious viral disease of pigs and wild boar with a widespread worldwide distribution.
Introduction

- Scientific data related to CSF prove that effective vaccines against CSF exist and their inclusion in measures to control CSF can reduce costs and limit spread (Van Oirschot, 2003).

- However, vaccination as a control measure is not acceptable for many countries, mainly those with significant potential to export pig meat, including EU, because trade partners refuse to import animals from areas where vaccination is used, on the basis that it is not possible to distinguish between vaccinated and naturally infected serologically positive animals.

Introduction

SERBIA:

- The pigs production in Serbia is mostly limited to small, family owned farms (Plavsic, 2012).

- During last two decades, a number of commercial farms have been established, with increased capacities to produce live pigs much above the average national level.
Introduction

Serbia

Swill feeding is not allowed by national legislation, except for pigs living on backyard holdings if heat-treated properly. (Došen 2012).

Wild boar and domestic pigs are equally susceptible to CSF virus infection (Oepner et al., 1995; Laddomada, 2000).

The occurrence, density and behavior of wild boar populations are important for the epidemiology of CSF.

Preventive vaccination against CSF has been implemented Serbia for years.

From 2006, Serbia is conducting intensive eradication strategy giving significant results in terms of new outbreaks reduction.

Introduction

The recent EU directives relating to food safety, identify a specific role for each actor of the production chain that is called to have a primary responsibility to provide guarantees of health to the product that reaches the consumer’s table.

Farmers are therefore obliged to review and improve their production system in order to optimize the quality, security and safety of product.

Farmers need to establish appropriate level to biosecurity... defined as: “The implementation of measures that reduce the risk of the introduction and spread of disease agents; it requires the adoption of a set of attitudes and behaviors by people to reduce risk in all activities involving domestic, captive/exotic and wild animals and their products” (FAO/OIE/World Bank, 2008).
Introduction
Biosecurity

- **Biosecurity**: technical managerial procedures adoption, act to:
  - prevent infective disease introduction inside the pig farms or the Territory
    - **Precaution**
      (prevention is better then care)
  - reduce to minimal levels any possibility to spread infective diseases within pig farms and/or territory
    - **Reason of life**
  - prevent infective disease spreading from farm to farm (and then from territory to territory)
    - **Social Duty** (Biocontainment)

Introduction
Biorisks

- Identifying potential biorisk is a complex and responsible task (Stankovic et al., 2007).
- In SERBIA the analysis of procedures applied in pig breeding has indicated the following factors as biorisks:
  - uncontrolled trade of pigs;
  - uncontrolled entrance of humans into the buildings for pigs;
  - free entrance of vehicles and humans, as well as introduction of equipment and tools in the premises for growing pigs, without previous sanitizing;
  - pigs are not separated according to categories, so in the same premises pigs are raised with other animals;
  - dogs, cats, rodents, insects and birds have free access.
The aim

The aim of our work is to demonstrate:

- results of categorization and classification of pig holdings in Serbia
- risk analysis of pig farms, based on
  - capacity and production goal of pig breeding
  - relations between pig production and market
  - level of hygiene
- defined criteria on application of biosecurity measures through usage of especially designed questionnaires.

Material & Methods

A. Categorization of holdings in the Republic of Serbia is performed as follows:

1. **Commercial farm**: is a holding where pigs are held in the facility that meets all regulated conditions for pig breeding, it is enlisted in the Farm Register, and where all measures of health protection are implemented, with the highest level of biosecurity measures and hygiene;

2. **Family farm type A**: is a holding where there is a large number of animals (in any case more than 11), which delivers live pigs to the market and where all animal health protection measures with highest level of biosecurity and hygiene are implemented;

3. **Family farm type B**: is a holding where there is a large number of animals (more than 11), which delivers live pigs to the market, but where only some hygienic and health protection measures are only partially implemented, or not implemented, with insufficient level of biosecurity;

4. **Backyard holding**: is a holding where there is a small number of animals (up to 10) and kept for owner's purposes (consumption), and where the level of animal health protection, biosecurity and hygiene is low and inefficient;

5. **Holding where pigs are kept in open space**: is a holding where pigs are kept in open space, partially open, in space partially fenced or without fence, where pigs may get into contact with other animals, especially wild boar, with very low level of health protection and/or biosecurity.
## Results

### Categorization

*Categorization of holdings based on capacity and application of biosecurity measures*

<table>
<thead>
<tr>
<th>No.</th>
<th>Holding categorization</th>
<th>Number of holdings</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Commercial farm</td>
<td>401</td>
<td>0,27</td>
</tr>
<tr>
<td>2</td>
<td>Family farm type A</td>
<td>305</td>
<td>0,21</td>
</tr>
<tr>
<td>3</td>
<td>Family farm type B</td>
<td>33,828</td>
<td>22,71</td>
</tr>
<tr>
<td>4</td>
<td>Rural (backyard)</td>
<td>114,256</td>
<td>76,72</td>
</tr>
<tr>
<td>5</td>
<td>Holding where pigs are kept in open space</td>
<td>137</td>
<td>0,09</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>148,927</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

Data refers to period until October 12 2012

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## Material & Methods

### B. Classification

Following parameters were evaluated:

1. informing (notification) veterinary stations on necessity to implement program of such measures,
2. regular implementation of animal health program measures,
3. veterinary surveillance of the holding,
4. pig vaccination,
5. records on treatments and deaths,
6. pig identification and registration,
7. issuance of certifications on health condition,
8. notification on suspect of disease,
9. analysis of deaths and miscarriages,
10. fencing of holding and sanitary measures,
11. distance from waste depot (drop off),
12. slop usage,
13. holding animals in contained space,
14. records of diseases and deaths, hygienic and biosecurity measures and
15. contact with wild boars.
Results

Classification

Based on these parameters three classes of holdings are established, as follows:

1. **class I**: holdings where all parameters were positive;
2. **class II**: holdings where all parameters were positive, except for one or more questions under 5., 9., 10. 13., and 14., where answers were negative (so called "softer" criterion);
3. **class III**: holdings where all parameters were positive except for one or more questions under 1., 2., 3., 4., 6., 7., 8., 11., 12. and 15., where answers were negative ("stricter" criterion);

**Classification of holdings based on parameter of health and biosecurity measures application**

<table>
<thead>
<tr>
<th>Year</th>
<th>Class I</th>
<th>Class II</th>
<th>Class III</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Total</td>
<td>893</td>
<td><strong>0,78</strong></td>
<td>20.300</td>
<td><strong>17,56</strong></td>
</tr>
</tbody>
</table>

* Data refer to time period until October 12 2012.

Results

General evaluation of health condition

**C. General evaluation of health condition:**

general evaluation on implementing program of health protection measures was also performed (including vaccinations, treatment, identification and traceability of pig movement and general level of hygiene measures)

1. **unsatisfying holding conditions** (mark in the table as **US**),
2. **partially satisfying holding conditions** (some measures were not met; mark in the table as **PS**),
3. **satisfying holding conditions** (most of the measures are met; mark in the table as **SA**) and
4. **good holding conditions** (all measures are met; mark in the table as **GO**)

**General evaluation of implementing program of measures for health protection, pig labeling and biosecurity measures**

<table>
<thead>
<tr>
<th>Year</th>
<th>GO</th>
<th>SA</th>
<th>PS</th>
<th>US</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Total</td>
<td>2.131</td>
<td><strong>1,84</strong></td>
<td>43.298</td>
<td><strong>37,47</strong></td>
<td>60.632</td>
</tr>
</tbody>
</table>

* Data refer to time period until October 12, 2012
Material & Methods

D. Risk Analysis:
From April 1, 2012, effective application of risk analysis with specially designed check-
list and detail instructions has started to be used for risk assessment on commercial
and family farms type A and B in the throughout country.

The checklist is organized in 6 distinct items:

- **Classic swine Fever Profile** (score points = max. 27)
- **Farm Typology and Size** (score points = max. 59)
- **Location** (score points = max. 42)
- **Herd Facilities** (score points = max. 45)
- **Movements** (score points = max. 48)
- **Management** (score points = max. 103)

Material & Methods

*Score index system*

<table>
<thead>
<tr>
<th>ITEM</th>
<th>&quot;Checklist&quot; score max</th>
<th>weight in the formula %</th>
<th>FARM SCORE (adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  CSF</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>2  Farm Typology</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>3  Location</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>4  Herd facilities</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>5  Movements</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>6  Management</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td><strong>FARM SCORE</strong></td>
<td>324</td>
<td><strong>100</strong></td>
<td><strong>56,0</strong></td>
</tr>
</tbody>
</table>
### Material & Methods

#### Final assessment of farm

<table>
<thead>
<tr>
<th>RISK LEVEL</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW</td>
<td>up to 25</td>
</tr>
<tr>
<td>MEDIUM</td>
<td>26 – 35</td>
</tr>
<tr>
<td>HIGH</td>
<td>36 - 56</td>
</tr>
</tbody>
</table>

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### Results

#### Results of risk analysis of pig farms (summary)

<table>
<thead>
<tr>
<th></th>
<th>Low risk farm</th>
<th>Middle risk farm</th>
<th>High risk</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>2.127</td>
<td>20.649</td>
<td>1.135</td>
<td>23.911</td>
</tr>
<tr>
<td>%</td>
<td><strong>8,90</strong></td>
<td>86,35</td>
<td><strong>4,75</strong></td>
<td>100</td>
</tr>
</tbody>
</table>

* Data refer to time period until October 12 2012.*
Further activities

Regionalization of risk analysis:
- Map of the risk

Parameters
- Land AREA (surface)
- N.s of holdings
- Categorization
- Animal population
- Pig density
- Hunting ground
- Movement of animals
- Livestock markets
- Carcass disposal management

Discussion
- Results of categorization, classification, evaluation and particularly risk analysis will be used for:
  - general improvement of biosecurity measures in Serbia.

- Particularly, advanced farms could be motivated and stimulated for:
  - development of compartmentalization, as described by OIE (World Animal Health Organization, Terrestrial Animal Health Code) or
  - channeling system, recognized by European Commission in some countries.

- Veterinary services would support such endeavor with strict implementation of:
  - disease surveillance and
  - animal health control.

- In addition, risk assessment would be used for
  - zoning, based on general level of biosecurity in specific region,
  - level of performance of veterinary activities (e.g., vaccination, active and passive surveillance),
  - number and structure of pig holdings,
  - pig density,
  - wild boar population,
  - habits in movement and trade of animals etc.
Conclusion...1/2

- To become highly competitive, producers in Serbia will be constantly looking for ways to improve their activities, including activities to protect the health of pigs.

- Farmers need to be aware that many of the biosecurity measures are simple and do not impose significant costs.

- Need to create detailed written biosecurity plans (as well as GMP guidelines)

Conclusion...2/2

The ”score index” system offers several advantages:

- objectivity of assessment (score index);

- easier appreciation of the risk level of each pig farm;

- consequent objective assessment of the Territory (Municipality, District, Region, Country, ..)

- the model can be exported to other livestock species;

- the model can also be shared with other countries, in the logic of globalization and unification of assessment systems procedures.