Herd level and serological indicators associated with the growing-finishing performances of swine herds

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30th August 2018 – EAAP meeting
Swine farm profitability & efficiency
Introduction

Technical performances

Swine farm profitability & efficiency
Introduction

Pig health & welfare

➢ Herd health status

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➢ Main respiratory and digestive infectious pathogens

??

➢ Non infectious factors

Diet, climatic conditions

Management, husbandry, biosecurity, housing...

Technical performances

Swine farm profitability & efficiency

Disease outcome
Identify & quantify the effects of infectious & non-infectious factors associated with the growing & finishing performances of swine herds
Involved in a study on the course of PCV2 infection (subclinically PCV2-infected herds)

- **Questionnaire**
  - Management
  - Biosecurity measures
  - Husbandry
  - Main technical performances (2014)

- **Blood samples**
  - 20 pigs, 2 batches (10/batch)
    - 10 to 12 weeks old
    - ≥ 22 weeks old

- **Laboratory analyses**
  - Antibodies
    - PRRSV (ELISA, IDEXX PRRS X3 Ab Test)
    - PCV2 (SERELISA® PCV2 Ab Mono Blocking)
    - swIAV (ELISA, ID Screen® Influenza A antibody competition)
    - M. hyopneumoniae (ELISA, OXOID)
    - Lawsonia intracellularis (ELISA, SVANOVIR L.intracellularis /Ileitis-Ab)

41 farms in western France

Data collection
Material & Methods

Statistical analysis

➢ Outcome: the level of herd growing-finishing performances

• Clustering analysis
  - Average daily weight gain (ADG)
  - Feed conversion ratio (FCR)
  - Mortality (MORT)
  - Carcass slaughter weight (CSW)

  ➔ 2 groups of herds

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (24 herds)</th>
<th>Group 2 (17 herds)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADG (g/day)</td>
<td>781.08 ± 26.28</td>
<td>715.76 ± 26.50</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>FCR (kg/kg)</td>
<td>2.48 ± 0.08</td>
<td>2.60 ± 0.14</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>MORT (%)</td>
<td>4.09 ± 0.93</td>
<td>6.79 ± 2.03</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>CSW (kg)</td>
<td>121.22 ± 5.21</td>
<td>117.75 ± 3.58</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

➢ Explanatory variables

• Questionnaire
  - Management
  - Biosecurity measures
  - Husbandry

• Serological results
  - + or -
  - % of pigs with high antibodies titers

Univariable analysis (p<0.15)

Multicolinearity analysis (p<0.05)

Multivariate analysis

➢ Multiple correspondence analysis

➢ Logistic regression model (p<0.05)
Multiple correspondence analysis

Factors associated with the level of growing-finishing performance

GROUP 1: high performers
- Wean to finish herd
- >3 weeks in between batches
- Consistency between building management
- PRRSV -

GROUP 2: low performers
- PRRSV +
- Building management inconsistency
- Batch mixing
- >10% of pigs with high PCV2 titers
- Interval in between batches ≤ 3 weeks
- F To F system
- No batch mixing
Results

Factors associated with low growing-finishing performance

Logistic regression model

<table>
<thead>
<tr>
<th>% of herds identified as low performers (Group 2)</th>
<th>OR</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herd type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farrow-to-finish</td>
<td>65.0</td>
<td>5.1</td>
<td>1.1-23.8</td>
</tr>
<tr>
<td>Wean-to-finish</td>
<td>19.1</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>PRRSV serological status of growers &amp; finishers</td>
<td></td>
<td></td>
<td>0.04</td>
</tr>
<tr>
<td>Negative</td>
<td>26.1</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>61.1</td>
<td>8.8</td>
<td>1.8-41.7</td>
</tr>
</tbody>
</table>
**Reduced growing-finishing performance**

Herds without obvious clinical signs of PCVD and without PCV2 vaccination of piglets

**Viral infections**

- **PRRSV** Stronger impact
- **PCV2**

Holtkamp et al., 2013; Alarcon et al., 2013

**Non infectious factors**

- **Farrow-to-finish herd type**
  - Close contact between sows and offspring
  - Continuous flow management: increased probability of contacts of pigs of ≠ immune & infectious statuses

- **Farm characteristics**
  - Short interval in between batches
  - Mixing pigs from different batches
  - Inconsistency in building management between nursery and finishing steps

**Areas for improvement**

Management practices

- ↓ occurrence of viral infections
- ↓ spread of pathogens within a herd

- Risk factor for pneumonia: Fablet et al., 2012
  - High animal movement frequency
  - ↑ mixing of pigs with ≠ immune & infectious statuses
  - ↓ direct contacts between pigs with ≠ immune & infectious statuses
  - Regrouping pigs → fights → stress

** ↑ pathogen transmission**

**Immune responses**

Health & welfare levels
Thanks for your attention

Thanks to the farmers