Importance of herd management and building design on respiratory diseases in pig herds

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**Introduction**

Medication, vaccination (Christensen, 1995; Pagot et al., 2007; Ostanello et al., 2007)

- Growth performance
- Feed efficiency

**Health & Pig Welfare**

(Sorensen et al., 2006)

- € losses
  - Madec et al., 1992; Bouwkamp et al., 2006

**Veterinary Public Health**

- Medication, vaccination
  - Christensen, 1995; Pagot et al., 2007; Ostanello et al., 2007

**Pneumonia**

**Pleuritis**
Identify and quantify the effects of noninfectious factors associated with pneumonia and pleuritis in slaughter-aged pigs
143 farrow-to-finish herds in western France

- Sampling base of 494 herds (18 pig producer organisations)
- Herd size > 100 sows
- Knowledge of the respiratory status
  - Level of clinical signs and former lung lesion scores

Stratified random sample

- presumed respiratory status group (3 levels)
- pig producer organisation size
Material & Methods
Data collection

Farm

• Questionnaire
  . Herd characteristics
  . Biosecurity measures
  . Management and housing conditions

• Measurements
  ▪ Climatic conditions
    . T°C, humidity
    . Gazes: CO₂, NH₃
    . Respirable dust (<5 µm)

  ➤ 1 batch of nursery pigs

  ➤ 1 batch of finishing pigs

Slaughterhouse

• Pneumonia-like gross lesions (0 → 28 points)
• Pleuritis (0 → 4 points)

Random sample of 30 pigs

Madec et Kobisch, 1982
**Logistic regression: 2 outcomes**

- **Pneumonia median score**
  - $\text{MedP neu} \leq 0.5$
  - $0.5 < \text{MedP neu} \leq 3.75$
  - $\text{MedP neu} > 3.75$

- **Extended pleuritis** (score $>2$; scoring $0 \rightarrow 4$)
  - $0$ pig with a score $>2$
  - $\geq 1$ pig with a score $>2$

**Explanatory variables**

- **Climatic parameters**
  - $T^\circ$, humidity
  - Gazes: $\text{CO}_2$, $\text{NH}_3$
  - Dust

- **Questionnaire**
  - Management & housing conditions
  - Herd characteristics, biosecurity measures

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**Univariable analysis** ($p<0.25$)

**Multicolinearity analysis** ($p<0.05$)

**Multivariate analysis**

- **Multinomial model** ($p<0.05$)
  - Reference category: median score $\leq 0.5$

- **Binary model** ($p<0.05$)
Results

Noninfectious factors - Pneumonia

- Pneumonia-like gross lesions
  - Median score: [0.5; 3.75]

Factors with OR > 4.0:

- Interval between successive batches <4 weeks
  - OR = 4.5
  - 95% CI: 1.5-13.6

- Finishing room size >90 pigs
  - OR = 4.3
  - 95% CI: 1.6-11.6

- Mean CO₂ concentration in the finishing room >1600 ppm
  - OR = 4.2
  - 95% CI: 1.6-11.3
Multinomial model

Pneumonia-like gross lesions median score

Interval between successive batches <4 weeks

OR = 5.9
95% CI: 1.5-23.3

Finishing room size > 90 pigs

OR = 3.9
95% CI: 1.2-12.5

A direct fresh air inlet from outside or from the corridor in the post-weaning room

OR = 5.1
95% CI: 1.4-18.8

Mean CO₂ concentration in the finishing room >1600 ppm

OR = 4.9
95% CI: 1.6-15.2

Noninfectious factors - Pneumonia

Results
Results

Noninfectious factors - Pleuritis

Binary model

- No disinsection of the farrowing room
  - OR = 2.7
  - 95% CI: 1.2-5.8

- Tail docking >1.5 days old
  - OR = 2.6
  - 95% CI: 1.2-5.7

- Castration >14 days old
  - OR = 2.7
  - 95% CI: 1.1-6.8

- Herd size >200 sows
  - OR = 3.1
  - 95% CI: 1.4-6.9

- Range of temperature values for the ventilation control rate in the farrowing room d 5°C
  - OR = 2.7
  - 95% CI: 1.2-5.9

- Mean temperature in the finishing room d 23°C
  - OR = 3.0
  - 95% CI: 1.3-6.8

≥ 1 pig with a score >2
Conclusion

- Identification of critical control points / herd management
- Practical preventive action-levers

- Housing conditions
- Hygiene
- Surgical procedures
- Climatic conditions inside the room
- Correcting husbandry practices
- Housing & ventilation modifications

Transversal approach

- Fit-out of the buildings
- Long term investments

Zootechnics

Building engineering

Veterinary medicine
Thanks for your attention

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