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Excretion patterns in ASF: a quantitative approach

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Introduction

ASF (African swine fever) can have a massive economic impact:

- no vaccine available
- control: animal quarantine and slaughter

Outside Africa, transmission occurs mostly through direct or indirect contact.
Therefore, transmission may be highly dependent on virus excretion.
Previous studies have reported that ASF virus is present in infected animals up to more than one year post infection.
Little quantitative data regarding excretion parameters is available, particularly when recovered pigs can become unapparent virus shedders (after 30 days post infection).

Objectives

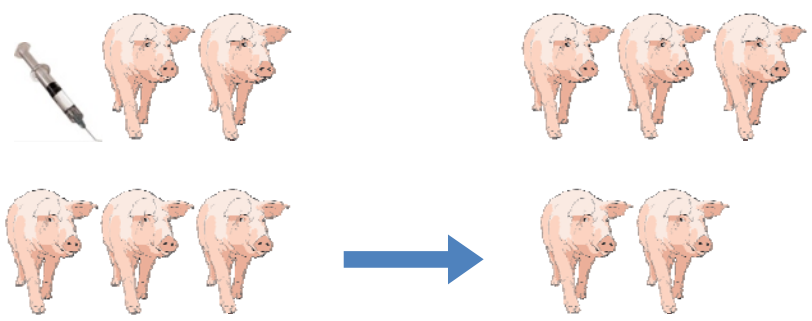
Investigate excretion dynamics:

- of different strains
- after inoculation with different doses
- after natural infection (in contact animals)

Materials and methods

3 groups with 10 pigs were used. In each group, 5 pigs were inoculated with ASF virus while the other 5 pigs served as naïve contact pigs.

Strains and doses used for inoculation in each group:
Malta´78 - 3.0 $\log_{10}$TCID$_{50}$
Malta´78 - 4.0 $\log_{10}$TCID$_{50}$
Netherlands´86 - 3.5 $\log_{10}$TCID$_{50}$



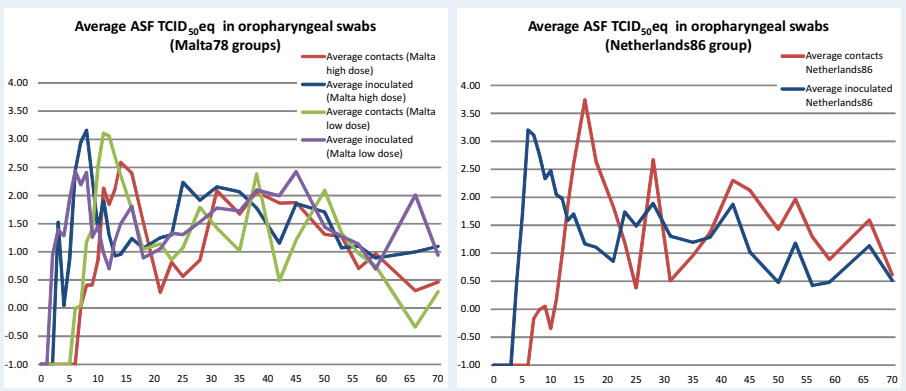
Sampling (regular intervals): oropharyngeal swabs, faeces, blood and serum
Laboratory testing: Quantitative PCR and serology (ELISA)

Results

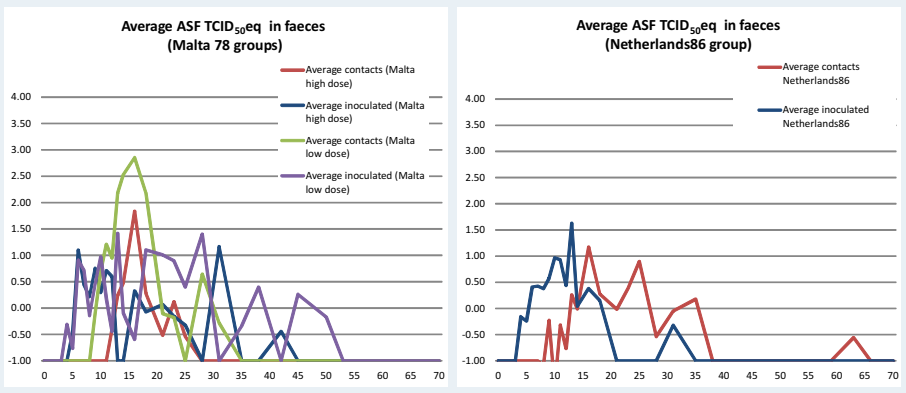
Table 1: Mortality among contacts and inoculated in different groups

	Malta´78 (3.0 $\log_{10}$TCID$_{50}$)	Malta´78 (4.0 $\log_{10}$TCID$_{50}$)	Netherlands´86 (3.5 $\log_{10}$TCID$_{50}$)
Successful inoculations	3 out of 5	5 out of 5	3 out of 5
Real number of contacts	2+5	5	2+5
Infections in contacts	7 out of 7	5 out of 5	7 out of 7
Mortality* in inoculated	0 out of 3	1 out of 3	0 out of 3
Mortality* in contacts	5 out of 7	0 out of 5	6 out of 7

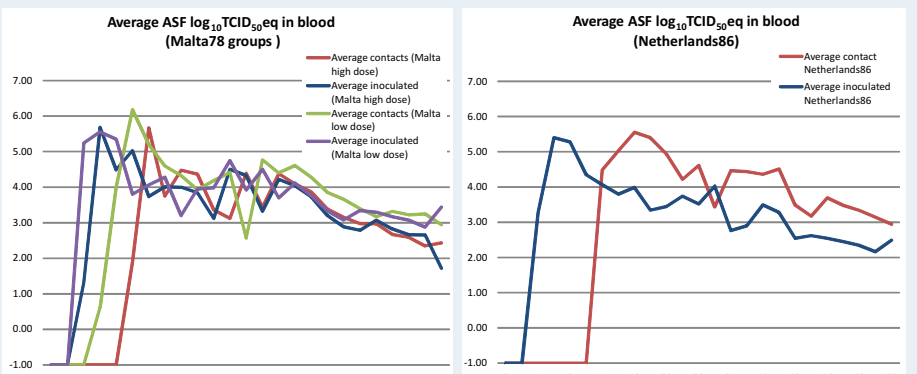
** included pigs that were euthanized for welfare reasons*



Figures 1 and 2: ASF virus titers ($\log_{10}$TCID$_{50}$eq) in oropharyngeal samples (negative results set to -1). Virus excretion had a peak between dpi 4 and 28 (in both strains), followed by prolonged shedding at lower levels (below 2.5 $\log_{10}$ TCID$_{50}$eq) until the end of the experiment.



Figures 3 and 4: ASF virus titers ($\log_{10}$TCID$_{50}$eq) in faeces samples (negative results set to -1). Virus titres were low, particularly for the Netherlands group (average below 1.8 $\log_{10}$ TCID$_{50}$eq). Contacts in Malta groups shed higher titres. After day 38, faecal excretion stopped in most animals.



Figures 5 and 6: ASF virus titers ($\log_{10}$TCID$_{50}$eq) in blood samples (negative results set to -1). Animals were viraemic until the end of the experiment (day 70 pi.)

Conclusions and discussion

18 out of 30 pigs survived the ASF infection (either through inoculation, or through contact infection) until day 70 p.i.. They remained viraemic (by PCR) until the end of the experiment. Whether they were also infectious during this whole period remains to be investigated further. Virus was mainly excreted through orophryngeal fluid, and far less through faeces. Inoculated and contacts had similar ASF excretion patterns. Mortality in contact animals was higher than in inoculated animals (except for Malta high dose).

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