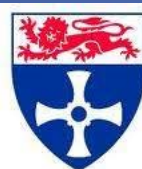


The use of oral fluid from pig populations for the diagnosis and monitoring of infectious disease



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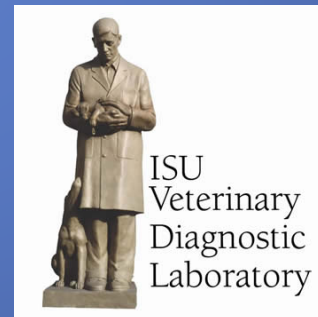


Introduction

Current disease surveillance in UK pigs involves individual blood sampling by vets for subsequent laboratory diagnostics

Pen-based oral fluid sampling may provide a more cost effective alternative by allowing farmers to collect their own samples for widespread testing at a fixed cost

In the US, oral fluids are now being used for routine monitoring of PRRSv, PCV-2 and *M. hyo* infection



Today's talk

AIM : Development & optimisation of oral fluid diagnostics in UK pig populations

- 1) Handling and storage of oral fluids (OF) for safe shipment to the testing facility whilst maintaining diagnostic viability
- 2) Collection of representative samples from large groups of pigs kept in diverse housing conditions
- 3) Comparison of oral fluid diagnostics with current methods (blood serum) to fully validate OF use

Storage of porcine OF at ambient temperatures for RT-PCR detection of PRRS virus



Background

Flinders Technology Associates (FTA) cards: bind & store nucleic acids at ambient temperatures

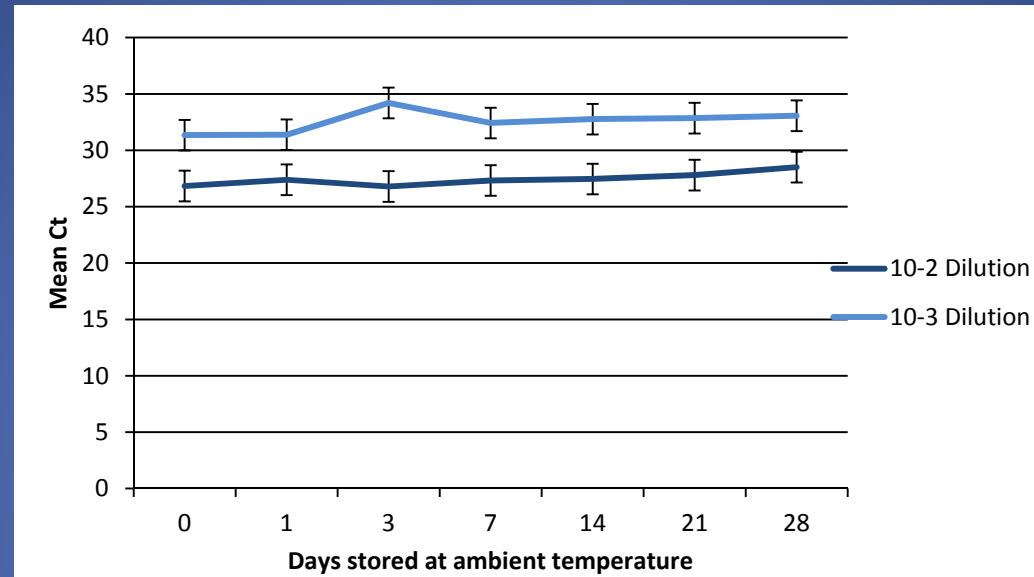
Method

PRRS-naïve OF spiked with PRRSv & inoculated onto FTA cards

Cards stored at ambient temperature & removed at 0, 1, 3, 7, 14, 21 & 28 days post-inoculation for PRRSv RNA extraction

All samples tested by RT-PCR

Storage of porcine OF at ambient temperatures for RT-PCR detection of PRRS virus



Detection limit: $1 \times 10^{1.2}$ TCID₅₀ /ml
UK OF estimate: $1 \times 10^{-0.6}$ to $1 \times 10^{2.1}$ TCID₅₀ /ml

Conclusion

PRRSv RNA can be recovered by RT-PCR in OF stored at ambient temperatures using FTA cards

Detection limit suggests the method could be used for UK field samples

Does the provision of multiple ropes to large pig populations in straw-based accommodation lead to better group representation?



Background

Rope OF sampling protocols validated in the US for conventional indoor slatted systems with small pen numbers (<30)

Outdoor / straw-based systems widely used in the UK

Method

4 x weaned, 4 x finishing pens of commercial pigs in straw bedded housing

Weaned pen size: 150-200 Finishing pen size: 80-100

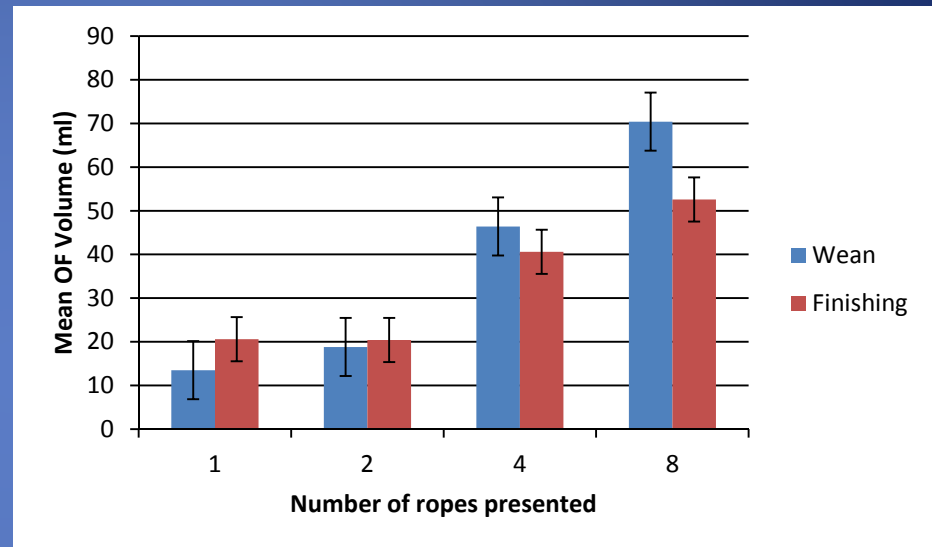
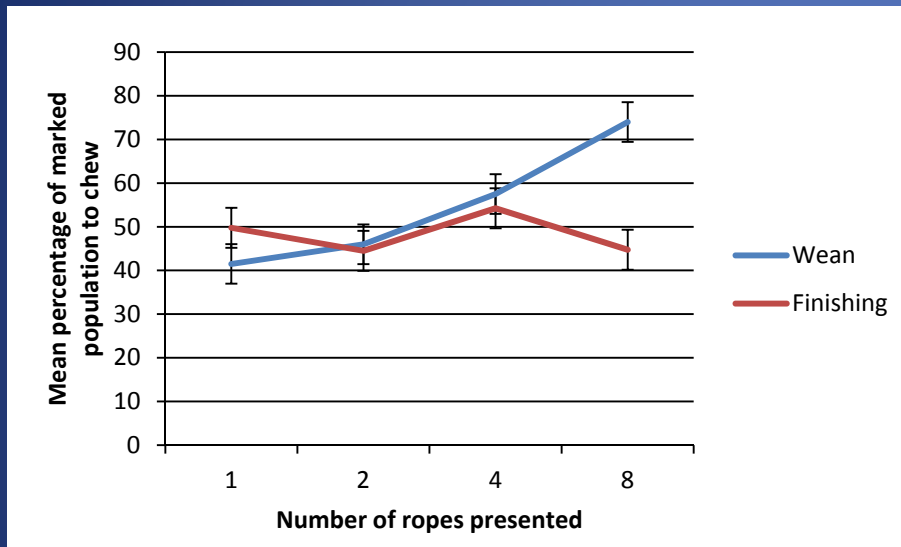
25% each pen population individually spray marked

30 min presentation

1, 2, 4 or 8 ropes

Live observations – identify all marked pigs that engage in rope chewing

Does the provision of multiple ropes to large pig populations in straw-based accommodation lead to better group representation?



Conclusions

Provision of multiple cotton ropes may improve representation of pen-based OF samples in weaned, but not finishing pigs in straw-based systems

Provision of a single cotton rope can result in a pen sample representative of 40% of the total population (typical bleed: <10%)

Validation of oral fluid against the current Gold Standard for PRRS antibody testing in UK commercial pigs



One-time farm visits
Individual bloods
Pen-based OF's
30+ sites

Preliminary analysis by pen:

Serum → OF ↓	Positive	Negative	Totals
Positive	49	20	69
Negative	3	48	51
Totals	52	68	120

94% sensitivity, 70% specificity

And by farm:

Serum → OF ↓	Positive	Negative	Totals
Positive	10	2	12
Negative	1	5	6
Totals	11	7	18

90% sensitivity, 71% specificity

Industry Focus

Successful validation of OF diagnostics could facilitate farmer-driven investigation of disease dynamics on farm



Cost of PRRS Testing
(based on conventional system, pen size <30)

Using blood: 86p/pig for Ab
£1.60/pig for RT-PCR
plus labour & vet cost

Using OF: 17p/pig for Ab
65p/pig for RT-PCR
plus labour

Potential for application across the range of UK pig husbandry systems for routine disease surveillance

↓ stress, ↑ welfare = ↑ productivity/profitability

What's next ?

- Serial OF collection following weaned pens through growth for anti-PRRSv antibody detection
- RT-PCR testing of dry stored field OF to validate FTA card method for PRRSv monitoring
- Writing up of experimental chapters / thesis submission



Summary

FTA cards may provide a simple & safe means of storing/shipping porcine OF for PRRSv testing without the need for chilling

It is possible to improve pen-based OF sample representation in larger populations of young growing pigs by offering more ropes to chew

Single rope sample represents approx. 4x more of the population than current blood testing recommendations

Porcine OF shows good, but not total agreement with blood serum for anti-PRRS antibody testing

Acknowledgements

Prof. Sandra Edwards, Dr. Georg Lietz & student helpers



Mr. Ben Strugnell, Dr. Jean-Pierre Frossard, Dr. Catherine Fearnley



The British Pig Executive



Prof. Jeff Zimmerman & colleagues



Dr. Montserrat Torremorell & colleagues



Christa Goodell & colleagues



Allan Whiteford, Will Barker



Richard Evans, Liz Van Hee



Mark Howells, Matt Barden

