

Association between serology for four respiratory pathogens and pig carcass traits

Rose Fitzgerald¹, Julia A. Calderón Díaz², Maria Rodrigues da Costa^{2,3}, Edgar G. Manzanilla², John P. Moriarty⁴, Hugh McGlynn¹, Helen O'Shea¹

¹Bio-Explore, Cork Institute of Technology, Bishopstown, Co. Cork;

²Pig Development, Teagasc, Moorpark, Fermoy, Co. Cork, Ireland;

³Departament de Ciència Animal i dels Aliments, Facultat de Veterinària, Universitat Autònoma de Barcelona, Spain;

⁴CVRL, Department of Agriculture, Food and Marine Laboratories, Backweston, Co. Kildare, Ireland;



*69th Annual Meeting of the European Federation of Animal Science
Dubrovnik, Croatia, 27th/31st August, 2018*



Introduction

- **Respiratory disease is a major production disease of slaughter age pigs¹**
- **Resulting in substantial financial losses^{2,3}**
- **On Irish farms, there is no information on the association between pathogen prevalence and carcass traits**
- **Compared to European counterparts, Irish pig herds tend to be**
 - **larger**
 - **more intensive production**
- **Analysis on respiratory disease tends to be based on a positive/negative interpretations**

¹Meriardi *et al.*, 2012 *The Veterinary Journal* 193, 234-239

²Fraile *et al.*, 2010 *The Veterinary Journal* 184, 326-333

³Maes *et al.*, 1999 *Vaccine*. 1999 Mar 5;17(9-10):1024-34

Objective

To investigate the associations
between serology for four respiratory pathogens
and pig carcass traits

Materials

Farm

- 5 farrow-to-finish units
- Weekly farrowing batch



- Herd size 808 - 2354

Pig

- 40 pigs tagged following farrowing
- Selected 24-48 hours after birth
- Selected by gender & dam parity
- 67 females / 61 males

Serum

SERUM

- Collected preslaughter
- 128 samples
- Jugular vein puncture
- Serum was processed

CARCASS TRAITS

- Cold Carcase Weight (CCW)
- Lean Meat Percentage (LM %)

Serology

BACTERIAL

- *A. pleuropneumoniae* (APP)
- *M. hyopneumoniae* (Mhyo)

VIRAL

- Swine Influenza Virus (SIV)
- PRRSv
- Analysed using pathogen specific ELISA kits
- Sample-to-positive (S/P) ratio value calculated
- Positive Interpretation determined

Statistical Analysis

MODEL

- Mixed models in SAS v9.3

FIXED EFFECT

- Gender

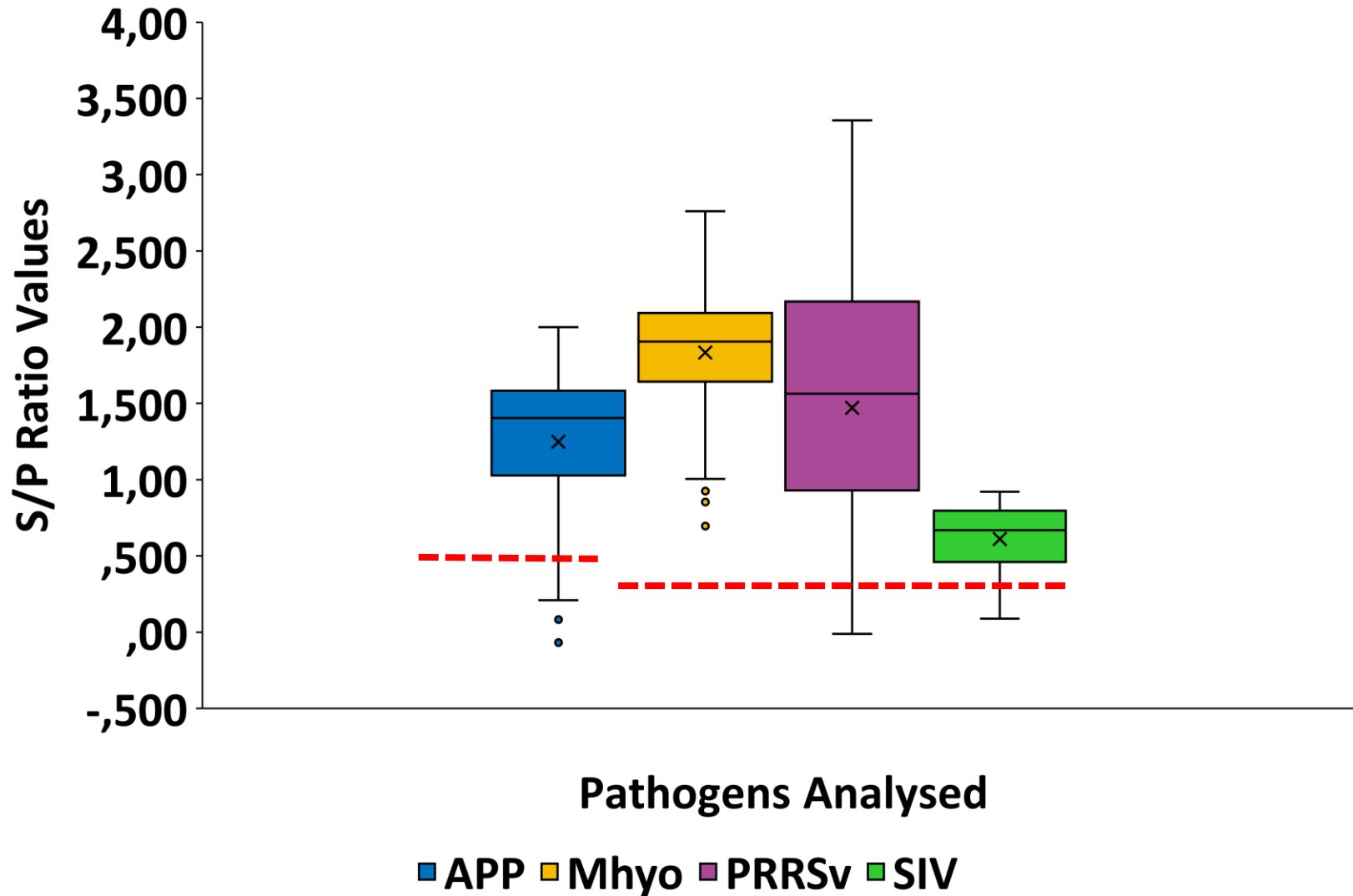
RANDOM EFFECT

- Pig within each farm

COVARIATES

- Age
- S/P value

Results – Pathogen S/P Ratio Value Response



Positive Interpretation

APP – 91%

Mhyo – 100%

PRRSv – 82%

SIV – 78%

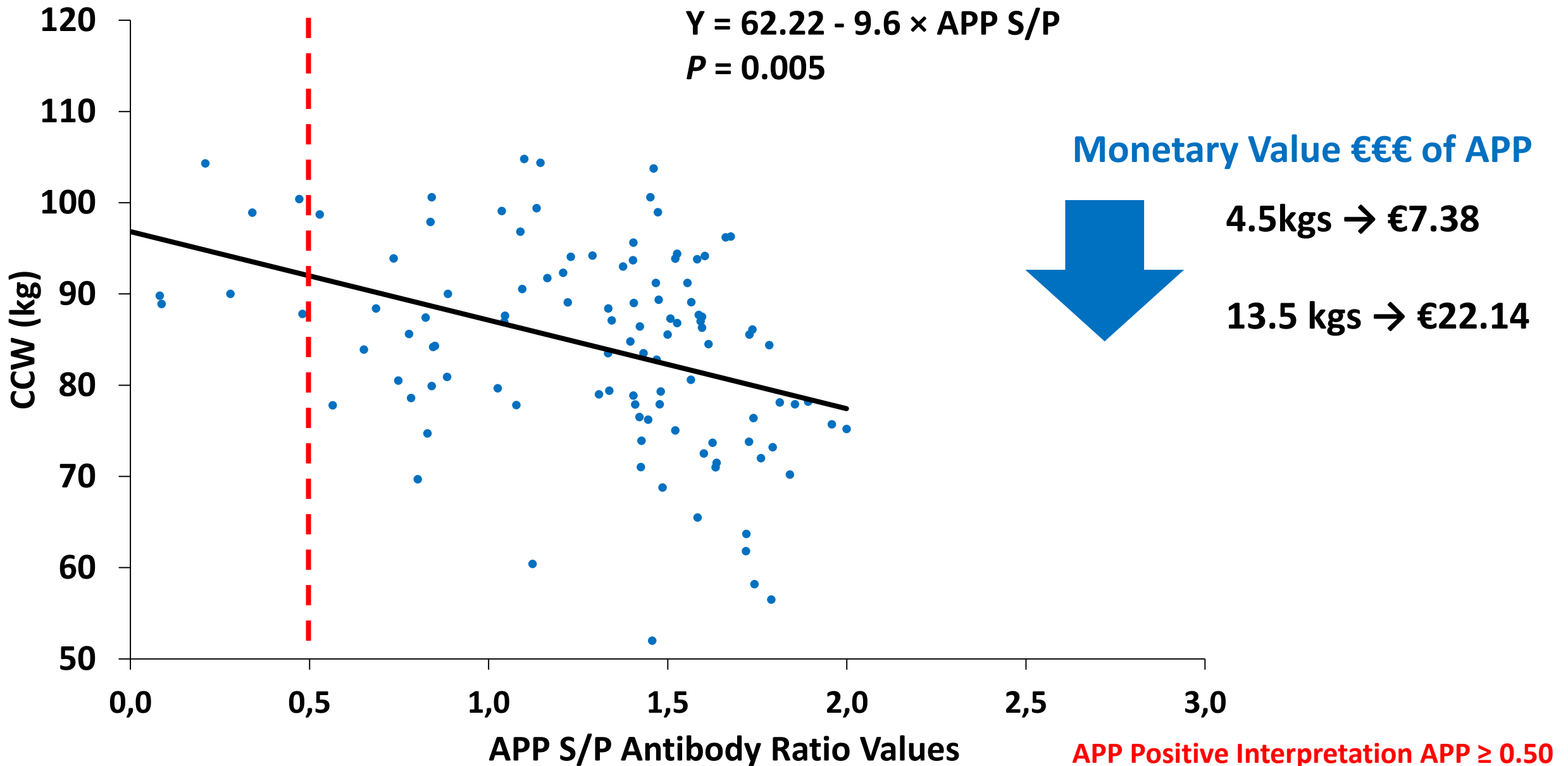
**67% of samples
positive
for all pathogens**

Positive Interpretation APP ≥ 0.50 , Mhyo > 0.40 , PRRSv ≥ 0.40 , SIV > 0.40

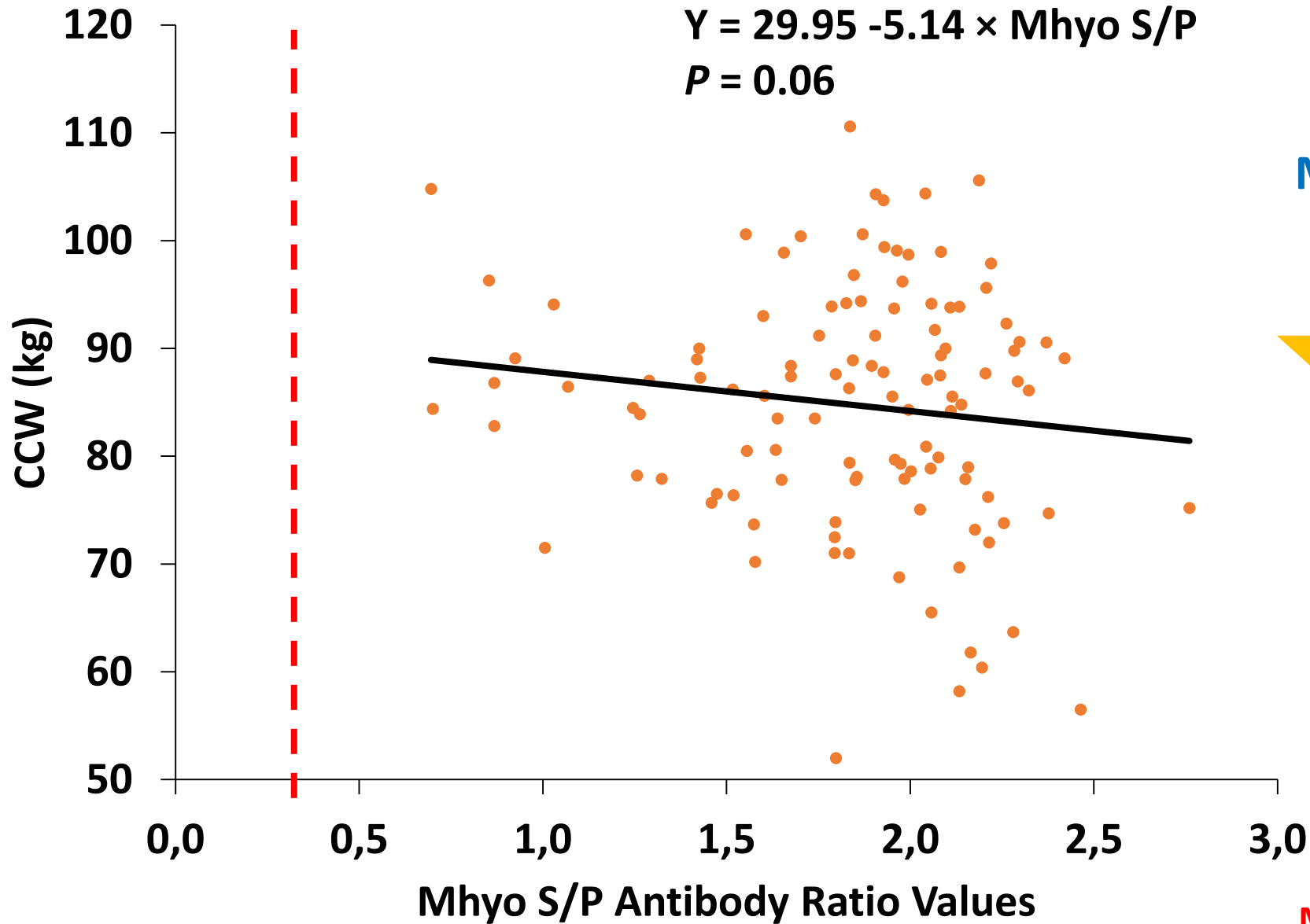
Results

- **No association between**
 - **gender and carcass traits ($P > 0.05$)**
 - **slaughter age and CCW ($P > 0.05$)**
 - **LM% and any of the pathogens investigated ($P > 0.05$)**
 - **CCW and SIV ($P > 0.05$)**

Results – Association of CCW and APP S/P values



Results – Association of CCW and Mhyo S/P values



Monetary Value €€€ of Mhyo

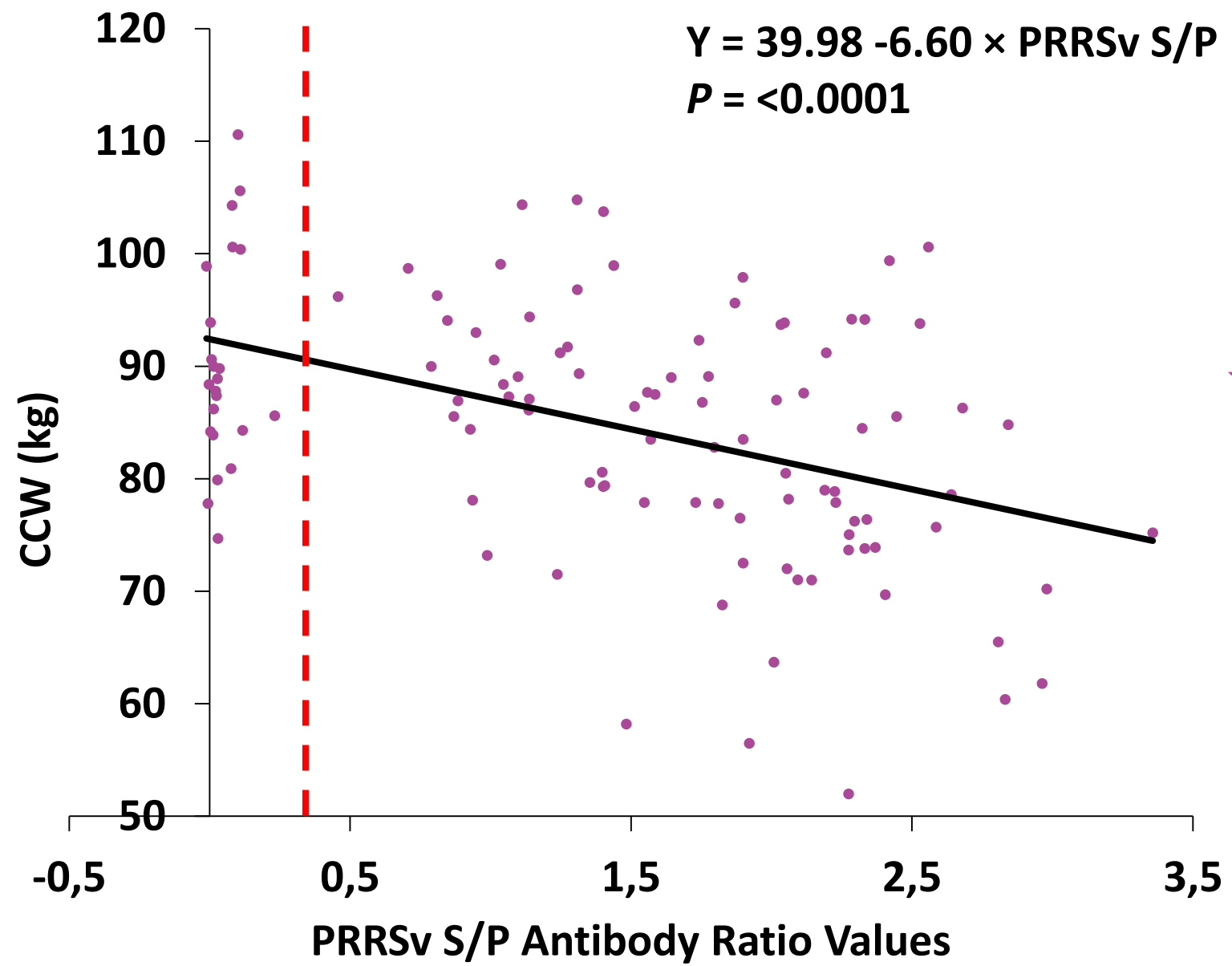


1.95 kgs → €3.20

5.86 kgs → €9.61

Mhyo Positive Interpretation S/P > 0.40

Results - Association of CCW and PRRSv S/P values



Monetary Value €€€ of PRRSv

5.74 kgs → €9.41

17.23 kgs → €28.25

PRRSv Positive Interpretation S/P ≥ 0.40

Discussion

- **High Disease Prevalence**
- **APP & PRRSv reduce carcass performance**
- **Not all “positive” are the same!**
 - **As S/P values increase by 1 SD, performance is more affected**
 - **Possible threshold?**
- **No association between lean meat% and pathogens**
 - **Fat-to-lean deposition rate not affected?**

What's next

- **PCR, sequencing and phylogenetic analysis**
- **Study co-infection patterns**
 - **Between diseases**
 - **Across time**
- **Identify possible thresholds for the S/P values where performance starts to be affected**
- **Study association between S/P values and lung lesions**

Conclusion

- **Results indicate that exposure to three of the respiratory pathogens analysed contributed negatively towards the growth performance traits**
- **Recognition of poor CCW in slaughter age animals indicates that respiratory disease management strategies require review and intervention**
- **Data will assist in improved farm profitability and animal welfare**

Acknowledgements



An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine

Research Stimulus Fund 14/S/832

Producers

Abattoirs

Kate O’Keeffe, Andrew Byrne and Staff at Blood Testing Laboratory, Cork

Oliver Clear, RVN, BSc

