



Australasian Pork Research Institute Ltd APRIL

PROJECT SUMMARY

Project Number and Title: 5A:118 Understanding the impact of climate on the boar and progeny through sperm non-coding RNA.

Project Leader: A/Prof Jeremy Cottrell (University of Melbourne)

Project Participants: A/Prof Mark Green (University of Melbourne), Prof Anthony Hannan (University of Melbourne), Dr Darryl D'Souza (Sunpork).

Aims and Objectives:

1. Improved understanding of the basis for paternal non-genomic contribution to progeny phenotype and industry performance measures, as well as how these are affected by season.
2. Quantify the effect of heat-stress on boar sperm parameters and investigate management practices that could negate any detrimental effects to maximise the genetic heritable gains to manifest in progeny phenotype.
3. A tool to aid the selection of GP pure lines and increased rates of genetic gain, due to the ability to test sperm before artificial insemination for fitness by sncRNA transcripts profiles for appropriate lines/stock for summer production.

Key Findings:

- Sperm quality was significantly reduced in ejaculates collected over summer when compared with winter, with reduced sperm counts, progressive motility and increased deformities evident
- Ultimately a number of challenges prohibited collection of a data set of sufficient size to perform meaningful analysis against the project aims.
- Regardless a reduced data set of 11 paired boars showed differences in their non coding RNA profiles between seasons associated with spermatogenesis. This corresponded to alterations in sperm morphology, with ejaculates collected over summer displaying reduced maturation and impaired motility.

Applications to Industry:

Matings need to be increased over the summer months to achieve the same pregnancy rates (Liu et al. 2022), with changes in sperm morphology a likely contributor. Ejaculates are combined within breeder units before distribution to farms, and this competition between boars is viewed as a strategy to minimise the impact of abnormal sperm. However, a better strategy would be to adopt higher thresholds such as progressive motility as this will increase the prevalence of sperm from heat resilient boars. Although the number of samples analysed in this experiment were too low to make firm conclusions, it was notable that boars with low sperm motility and therefore less heat resilient, were statistical outliers from the other boars in this experiment.