

5A-103: *Determining the effects of season on timing of ovulation and luteal function*

Project Leader: Dr William van Wettere

Project Participants: The University of Adelaide

Aims and Objectives:

1. To determine the effect of season (summer / early autumn versus winter) and moderate nutritional restriction on the developmental competence of peri-ovulatory oocytes collected from cycling gilts. The effect of moderate nutritional restriction was included in the trial to mimic the effect of elevated temperatures on feed intake in group housed gilts.
2. To extend our to extend our previous data demonstrating that progesterone release during early gestation differs between summer and winter by determining the effect of season (summer / autumn versus winter) on the timing of ovulation and peri-ovulatory profiles of luteinising hormone (LH) and progesterone (P4) in weaned sows.

Key Findings

1. There was no effect of season or reducing feed intake from 2.5 to 1.5 times maintenance on oocyte developmental competence (as measured by capacity to reach metaphase II). However, the dynamics of the peri-ovulatory follicle pool did differ between summer/autumn and winter, with fewer follicles growing beyond 6 mm in summer. Interestingly, no effect of moderate nutritional restriction on oocyte competence was observed. When combined with previous studies, this finding suggests a severe restriction in nutrition (feeding at maintenance levels) must occur before the ability of oocytes to reach metaphase II is impaired.
2. The second study confirmed the negative effect of summer/early autumn on basal LH release, and confirmed our previous finding that P4 levels were significantly higher in summer compared to winter, with levels increasing more rapidly from 72 hours post-oestrus detection onwards.
3. Sows weaned during summer ovulated approximately 10 hours earlier during oestrus than those weaned in winter, resulting in alterations in the interval from insemination to ovulation (there was no difference in WOI). Assuming oestrus detection occurs every 24 hours, and sows are inseminated at first detection of oestrus and again 24 hours later, the first insemination would, therefore, occur 18 hours prior to ovulation, with the second one occurring after ovulation. It could, therefore, be suggested that this alteration in the timing of ovulation and hence inseminations occurring outside the optimal period relative to ovulation (i.e. 0 - 12 hours pre-ovulation) could be partly responsible for the reduced fertility and fecundity of sows mated during summer.

Application to Industry

Gilt reproduction appears unaffected by moderate reductions in feed intake, and seasonal effects on oocyte competence (which determines litter size) appear to be subtle in gilts

During summer, producers which experience a summer/early autumn depression in fertility should consider modifying their insemination protocols to account for the earlier ovulation relative to first oestrus detection.