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SEASONAL INFERTILITY IN PIGS



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What is it?

Seasonal infertility is a reduction in fertility & fecundity in breeding pigs at a particular period of the year – usually summer & early autumn. It shows up mainly as two problems:

- more difficulty coming on heat – seen as delayed puberty attainment in gilts, extended weaning-to-oestrus intervals in sows & higher anoestrus rates (stales) in both gilts & sows
- higher rates of early pregnancy failure (see Table 1) – most usually detected as more irregular returns to service twenty-five to thirty-five days after breeding, although some herds may not detect these failures until later in pregnancy (see Table 2).

In addition, a few herds also see lower litter size in gilts & sows bred during the seasonal infertility period.

Table 1 - Typical seasonal infertility pattern for pregnancy losses

	Spring	Summer/Autumn
No. sows	135	175
3 week returns	5	14
Negative Pregnancy Test	5	22
Abortions	1	4
Adjusted farrowing rate	91.9%	77.1%

(O'Leary, Final Report to Pork CRC, 2010)

What is interesting is to take a second look at these apparent pregnancy losses, using blood hormone levels that can establish if a pregnancy started &, if it did, when it failed. When this was done an interesting pattern emerged (Table 2). Essentially, the vast majority of NIPs (*Not-In-Pig*), as identified on farm were actually conception failures (three week returns), or early pregnancy failures (returns around twenty-five to thirty-five days). In the case of misdiagnosed three week returns they are classified as NIPs due to inaccurate heat checking around three weeks post-insemination. Early pregnancy failures recorded on farm as NIPs are usually a result of variable ultrasound technique or, more likely, testing too early (less than twenty-eight to thirty days after breeding).

Thus care should be taken, particularly during the seasonal infertility period, to ensure adequate and accurate oestrus detection and ultrasound pregnancy diagnosis procedures.

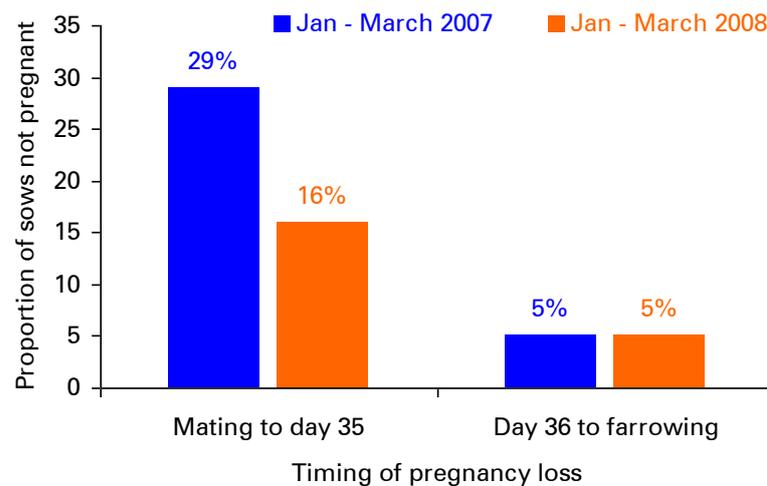
Table 2 - What really happens to Summer pregnancies – an analysis of 25 Summer pregnancy failures

	On-farm observations	What the hormones tell us
3 week returns	6	12
Early pregnancy failure	9	12
NIPs	10	1

(van Wettere et al, Report to Pork CRC 2008)

Despite more than forty years of research on this topic around the world, we still don't fully understand what causes seasonal infertility, mainly due to its unpredictability. In some years it is hardly seen, while in other years it has a major impact on farrowing rates & herd fertility (see Figure 1). Worryingly, it can be occurring on some farms in a region, or even in some sheds within the same farm, but not others.

Figure 1 - Proportion of sows in the same herd losing their pregnancies in the summer/autumn period in 2007 & 2008



(van Wettere et al - Report to Pork CRC, 2008)

What we do know is that seasonal infertility must be due to either the long daylight hours of summer and early autumn and/or the higher environmental temperatures associated with this time of year. In fact, it seems to be due to both these factors as it is experienced in Scotland (extremely long daylight hours in summer but low temperatures) & Australia (relatively short summer days but much higher temperatures).

What are the major risk factors?

Pork CRC funded research at the University of Sydney by Drs. Michael Bertoldo, Chris Grupen & Trish Holyoake has been identifying the key risk factors for seasonal infertility in sows.

The take-home messages from their studies are that sows are at greatest risk of displaying seasonal infertility if they:

1. are at parity 6 or more
2. take longer than 5 days to return to heat after weaning
3. are early weaned
4. wean less than 8 piglets.

Interestingly, these are also factors that contribute to reduced sow fertility & fecundity for the rest of the year, suggesting that seasonal infertility is most likely to be shown by sows that are of questionable fertility, or have been subjected to sub-optimal management, regardless of season.

This is almost certainly true in gilts as well. Those gilts that are most resistant to puberty stimulation, are also the most prone to delayed puberty in the summer & early autumn. What's more, increasing a gilt's stimulation by providing regular boar contact from around twenty-five weeks of age will reduce, but not eliminate, the seasonal delay in puberty attainment.

It seems clear that individual gilts & sows appearing to be at greatest risk of showing a seasonal infertility problem, are those that are low ranking & group housed, where competition for feed is high.

What's New?

Recent Pork CRC research at Roseworthy (Dr. William van Wettere & Professor Paul Hughes) suggests that two key elements of seasonal infertility are that:

1. sows may ovulate earlier in the heat period during the summer/early autumn
2. hormonal support of the pregnancy may be reduced in weeks three to four after breeding.

In other Pork CRC-funded research at the University of Sydney (Drs. Bertoldo, Grupen & Holyoake), evidence has emerged that the eggs shed in the seasonal infertility period are of poorer quality than those ovulated over the rest of the year. This could result in poorer fertilisation, failure of fertilised eggs to develop through the embryonic growth stages and/or poorer corpus luteum formation, causing reduced/inadequate release of progesterone (the key hormone required for pregnancy support).



How to minimise it?

Realistically we don't adequately understand the causes of seasonal infertility to eliminate it – the best we can do is to take those steps that research & practical experience tell us will lessen its impact. Thus, for example, we should attend to the key risk factors outlined earlier.

We should also consider:

- maximising nutrient intake by lactating & weaned sows
- provisioning cooling for lactating & weaned sows
- providing additional boar stimulation for oestrus after weaning
- group housing sows between weaning & mating/insemination
- when grouping gilts or sows, ensuring you match them closely for size/weight
- ensuring gilts & weaned sows aren't crowded
- mating/inseminating during the cooler parts of the day
- increasing the frequency of heat checking to twice daily in the seasonal infertility period, & mating/inseminating sows at first heat detection regardless of when they return after weaning, given the recent finding that sows appear to ovulate earlier in the heat period during the summer/autumn period. Once the first mating/insemination has occurred further matings/inseminations can be provided at twenty-four hour intervals as normal.
- including betaine at 2kg/tonne in the gestation diet if the litter size is relatively low
- housing mated/inseminated gilts & sows individually, or maintaining them in stable groups from before mating/insemination until at least four to five weeks post mating/insemination (mixing gilts in early pregnancy is risky, especially if it occurs after day four post mating/insemination)
- individually feeding mated gilts & sows, at least for the first four to five weeks of gestation
- low (up to 2.3 kg/day) feeding gilts for the first three to four days after mating/insemination
- high (3+kg/day) feeding gilts & parity I sows for four to five weeks from day four post mating/insemination (N.B. this doesn't seem to have any benefit in older sows and can reduce performance in all sows if applied at other times of the year)
- conducting more frequent and rigorous checks for gilts/sows returning to oestrus between days eighteen and thirty-two post-mating/inseminating
- applying a good pregnancy diagnosis procedure at four weeks post mating/insemination, & again three to four weeks later

Alongside these changes, improve planning to help anticipate the seasonal infertility period & have enough additional gilts on hand to cover for the anticipated drop in farrowing rate (N.B. this **must** be achieved without crowding the gilts – i.e. they must have at least 1.8m² each regardless of the number involved).

Lastly, as the period of seasonal infertility tends to coincide with the peak in staff holiday absences, it's worth carefully organising staffing schedules through this period to ensure some of the staff more experienced in this area, are on hand each week.

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