Anestrus in breeding sows

Anestrus can account for up to 25% of reproductive failures and are the main reason for **culling** sows.

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Reproductive failure is the main **reason for the elimination** of sows from farms and can reach 25% to 40% annually. Anestrus can account for up to 25% of these reproductive failures.

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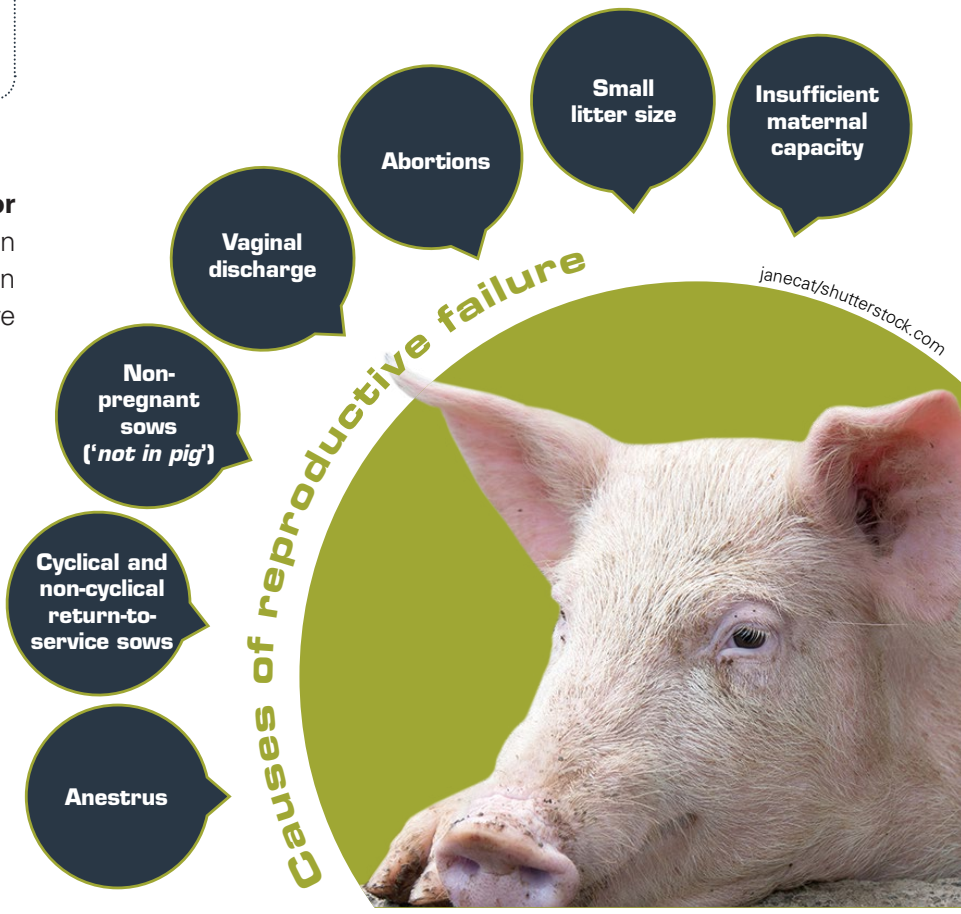
What is anestrus?

Conceptually, we understand anestrus as the absence of oestrus; these sows may have inactive, cystic, or active ovaries.

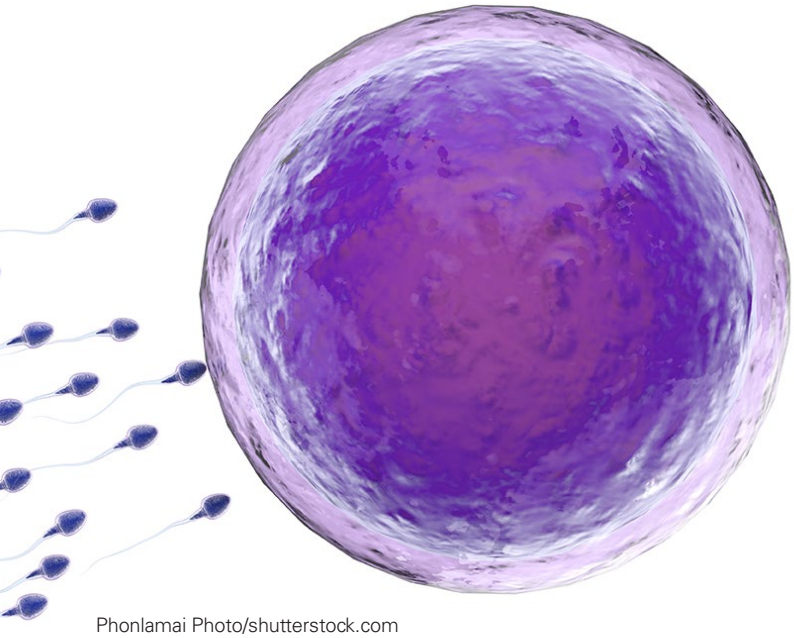
There may be a **total or partial** absence of heat, and we must be able to distinguish between these two situations because their aetiology may be different. In a normal situation, the number of sows that have ovulated without showing detectable symptoms of heat should, logically, be low (2–3%). On the contrary, the percentage of ovulating sows showing mild symptoms of heat and without a standing reflex may, in practice, be higher (10–15%). Presentation of the signs of heat in sows is conditioned by many factors that vary substantially according to different genetics.



Consequences of anestrus

- From a productive point of view, this is a **major problem for planning** the weekly groups (for covers/farrowings) of both the nulliparous gilts to be included in production and of the multiparous sows that will later return to production after weaning.
- Of course, this problem also implies direct **economic losses** of approximately 2 to 3 €/day/sow associated with non-productive days.

For detecting heat, both proper management and training of those responsible for the procedure is essential.



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Observation of culled sows in a slaughterhouse

It is always helpful to go to the slaughterhouse to check the sows culled due to reproductive problems in order to pinpoint the origin of the anestrus. In the case of anestrus, the main findings in slaughterhouses are usually:

- The presence of **inactive ovaries**: this is more frequent in young pigs and is always linked to anestrus.
- **Ovarian cysts**: these occur in all reproductive cycles. Not all ovarian cysts cause anestrus because this problem depends on the number of cysts and their type. When a large number (> 7) of persistent cysts are found in the follicular theca, the presence of anestrus is assured.

Figure 1 shows the different structures of the ovary and the follicular stages corresponding to the ovarian cycle.

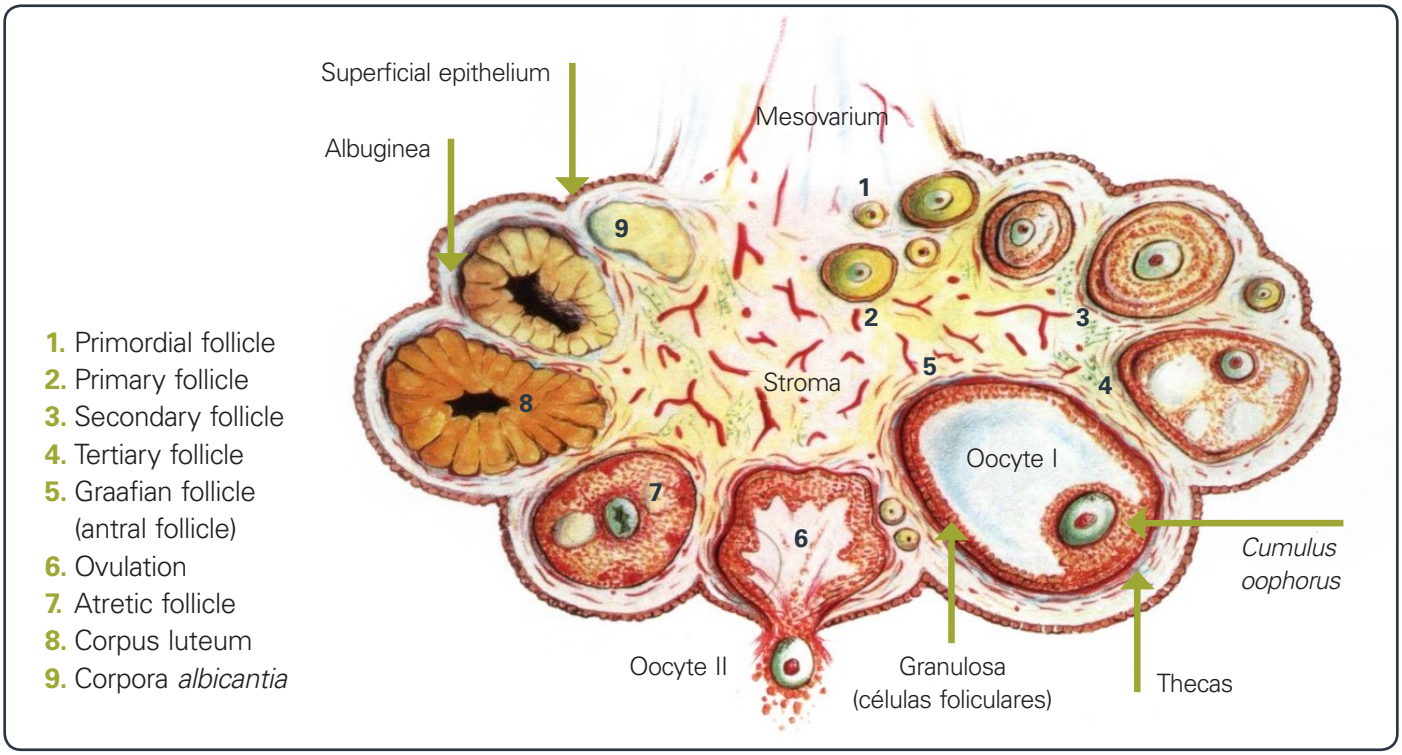

Figure 1. Section of the ovary at different follicular stages.

Nutrition and anestrus

One of the main factors that influences the appearance of anestruses is the nutrition of sows, both during their reproductive development (nulliparous) as well as throughout their lactation phases and in the period between weaning and the time they come into heat.

We must bear in mind that the main source of energy for the ovary is glucose and not lipids. Incorrect body condition, such as excessive weight loss during lactation (> 20–25%) and, especially, **being too fat**, are the two main causes of anestrus with a nutritional aetiology. Insufficient consumption of carbohydrates and amino

acids during lactation and after weaning reduces insulin and IGF-1 levels, increases cortisone levels, and reduces FSH and LH.

The impact of micronutrition (minerals—molybdenum deficiency—and vitamins—riboflavin and biotin, B_2 and B_8) in the reproductive cyclicity of sows is well known.

Table 1 summarises the role of the main nutrients in ovarian activity and oocyte quality. In *table 2*, the high metabolic effort required by sows during lactation stands out.

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	Ovary	Oocyte (weight = 161 ng)
Amino acids	Glutamine	Glycine increases the volume of oocytes
Carbohydrates (mainly glucose)	Increased progesterone production	High levels delay meiosis
Lipids	Follicular growth	These improve cytoplasmic maturation
	Long-chain fatty acids increase medium-size follicles	Rich in fatty acids: stearic, oleic, and palmitic acid
	Polyunsaturated fatty acids increase follicular apoptosis and reduce fertility	

Rabiee, 2001

Table 1. Effect of the main nutrients on ovarian activity and oocyte quality.

	Gestation (days)	Lactation (days)	Lactation time (%)	PL* end of gestation	PL* maximum lactation	ΔPL*
Sow	114	20–28	15–19	1.2	3.5	**2.3**
Milk cow	270	305	> 80	1.2	5.0	3.8
Beef cow	270	> 90	> 25	1.2	1.7	0.5
Sheep	147	> 30	17–50	1.3	Up to 2.7	1.4
Female goat	150	> 30	17–50	1.3	Up to 3.0	1.7
Female dog	60–65	> 40	> 40	1.1	¿2.1?	1.0
Female rabbit	31	> 20	> 40	1.2	¿3.0?	1.8
Human female	270	> 90	> 25	1.1	2.0	0.9

**PL: production level; total EN consumption/EN maintenance needs. INRA-IFIP, 2015.*

Table 2. Quantification of digestive and metabolic effort during lactation.

Diagnosis of anestrus

Figure 2 shows hormonal physiology after farrowing. Postweaning anestrus may be mild or severe depending on whether more or less than 90% of the sows have come into heat 9 days after weaning. If there is **serious anestrus** we must differentiate whether it is true anestrus or whether it corresponds to a heat during lactation. To discover if we have a **lactation heat** problem derived from a decrease in milk production, a reduction in prolactin and oxytocin, and an increase in FSH and LH levels, we must:

- Analyse **progesterone** in the blood on the day of weaning; this hormone will be present in some sows. The hormonal solution is to administer 400–200 IU serum chorionic gonadotropins for 15 days after weaning.
- Study **if the delayed sows come into heat**: heat will appear in many of them 14–22 days after weaning.
- The sows still do not come into heat in the 9 days following **injection of 400–200 IU serum and chorionic gonadotropin** on the day of weaning. To resolve this problem, in this case we must:
  - give a double dose of $PgF_{2\alpha}$ on day 13 after weaning.
  - A dose of serum and chorionic gonadotropins 15 days after weaning.

One of the most effective preventive measures for avoiding the summer anestruses that can affect gilts the most is the administration of 400–200 IU serum and chorionic gonadotropins on the same day as weaning during months with high temperatures.

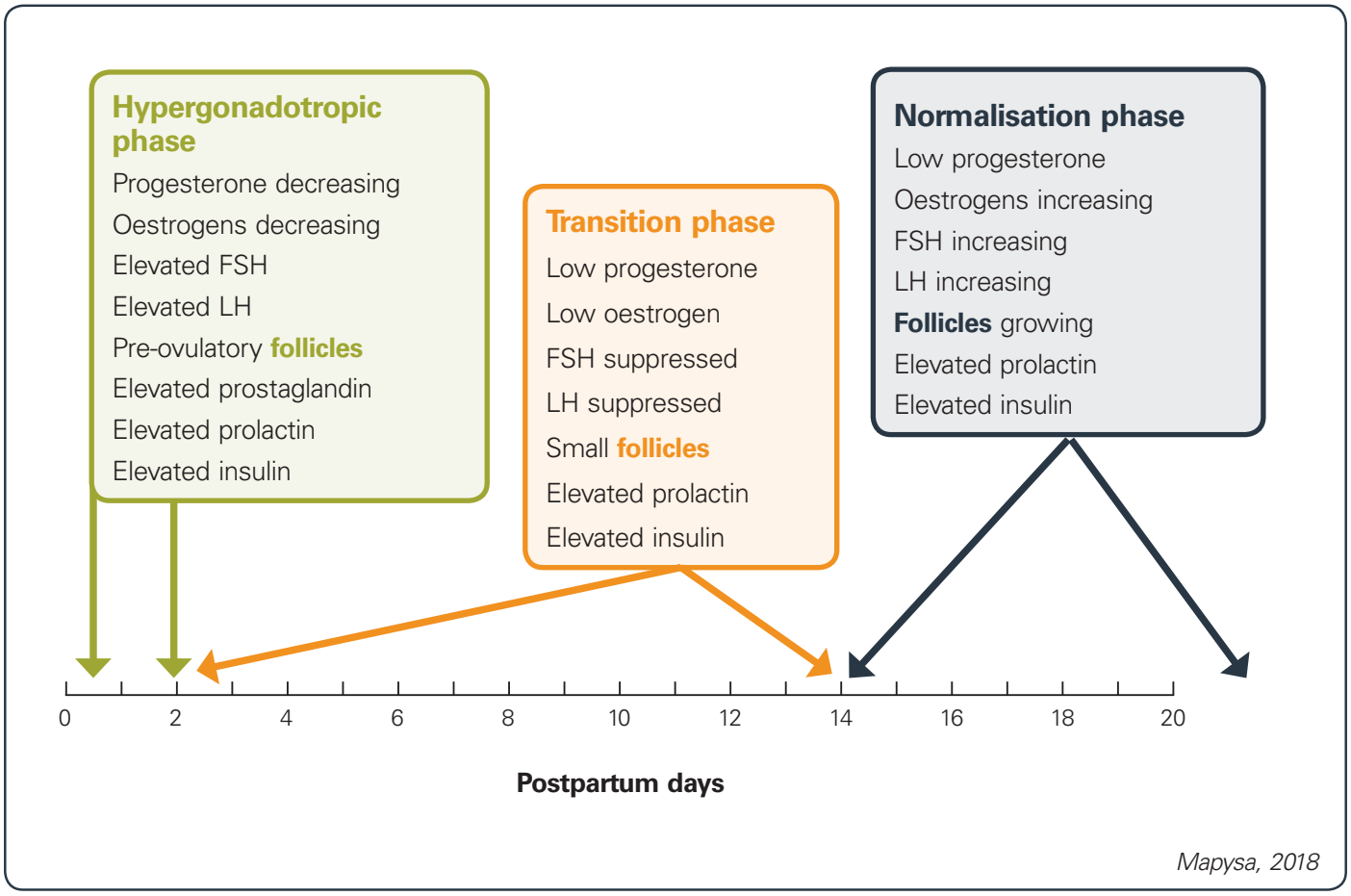

Figure 2. Hormone physiology after farrowing.

Prevention and control

The main measures used to avoid anestrus on farms are summarised in the following **10 points**:

1. Adequate **accommodation** and environmental conditions for future breeders.
2. **Diet** specifically for future breeders.
3. Correct **heat detection** program. Staff training.
4. Proper use of the **'boar effect'** (***figure 3***). Twice a day for 20–30 min, with different adult boars and with an observer performing heat control.
5. **Avoid overfeeding** sows at any stage of reproductive development or during pregnancy (to avoid fat sow syndrome).
6. **Maximise the consumption of water and nutrients** during the lactation phase to avoid excessive weight loss.
7. Environmental control of the farrowing rooms during **summer months**: cooling.
8. **Environmental control** of post-weaning areas in summer periods or implementation of cooling measures.
9. **Avoid sows coming into heat during lactation** because of the incorrect management of foster piglets: assignments, partial weaning, feed restrictions, etc.
10. Application of the most suitable **hormonal treatments** depending on each specific case.

Figure 3. Boar effect.