Reproductive failure:
two very frequent clinical cases

This article presents two very frequent clinical cases of reproductive failure on farms: nulliparas that do not come into heat and an increase in anestrus in summer months.

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Reproductive failure is understood not only as the percentage of unsuccessful covers (that is, that do not end in a farrowing), but also as increases in the number of non-productive days (NPDs) on the farm. However, insufficient attention and economic weight is devoted to the latter because it often remains hidden. This is because the effect of NPDs is not as evident as other processes on the farm that can cause alarm, even though they may have a lower economic impact.

Figures 1 and *2* show the events that affect reproductive efficiency and non-productive days, respectively, on farms.

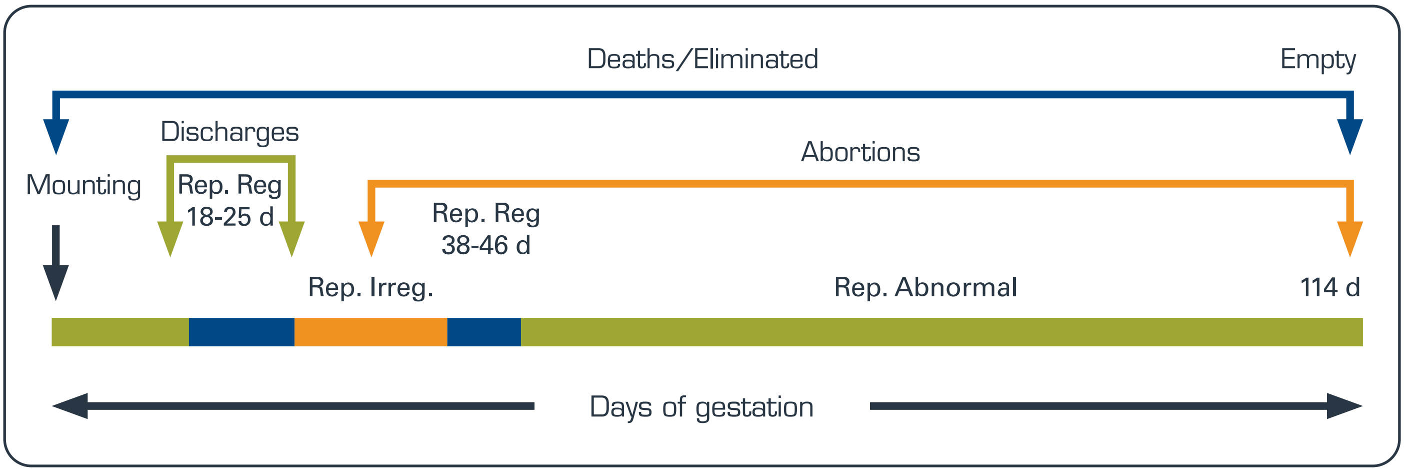

Figure 1. Events that affect reproductive efficiency.

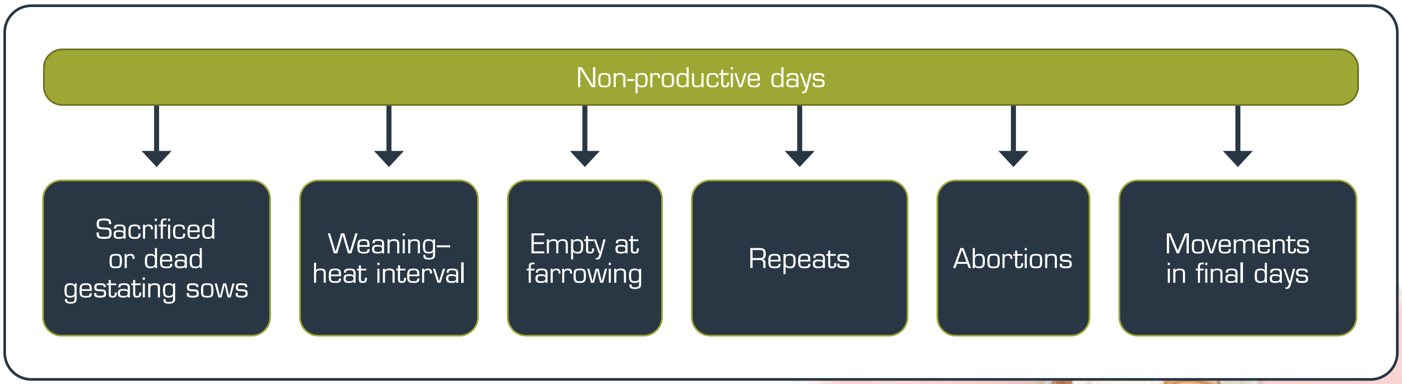

Figure 2. Non-productive days.

Calculation of the economic cost of non-productive days

A very intuitive calculation of the economic cost of lost days might be as follows:

> Sow numerical productivity/365 days
>
> 28 piglets sow year/365 days = 0.076 piglets per day. If we multiply this figure by the cost per piglet, for example €22, per non-productive day per breeding sow, we obtain: 0.076×22 = € 1.68 per day.

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Before starting to deal with possible reproductive failures, the following should also be addressed:

1. Dedicate the necessary time to train and inform the farm personnel about the use and dose of treatments, and that they are specific tools for specific cases.
2. Verify that the correct use of medications at farm visits because the dose and administration route are sometimes varied and can lead to treatment failures.
3. Monitor the results obtained by using products and understand the cost of the treatments versus the profits obtained by using them on the farm.
4. These tools help to correct the problem, but every possible corrective measure related to handling and environmental conditions must also be applied because, without doing so, hormonal treatments will not work correctly.

This example offers a practical approach to understanding the cost of reproductive failure and therefore, also to understanding its economic scope. Likewise, on a practical level, it can help explain the high economic repercussions of NPDs on the farm.

First clinical case: gilts that do not come into heat

This happens too often and has a dual economic cost; on the one hand, gilts must be eliminated without entering the productive nucleus of the exploitation, and on the other,

- they represent an investment in future breeders which are instead sold at slaughterhouse prices, therefore incurring a high economic loss to farms.
- Because these animals do not enter the reproductive nucleus of the farm, their cover objective will not be reached and therefore, the farm's goal for the number of weaned piglets will not be accomplished.
- Sows that have completed more cycles will have to be left on the farm to try to compensate for the cover failure, which will mean that some sows will have completed more than 7 cycles. This can cause problems because the quality of the piglets at birth will be poorer in terms of weight variability, increased stillbirths, and lower weaning weight as the farrowing capacity of sows declines with age.

Figure 3 shows the distribution of the population on the farm, as well as the differences between the ideal and real production censuses.

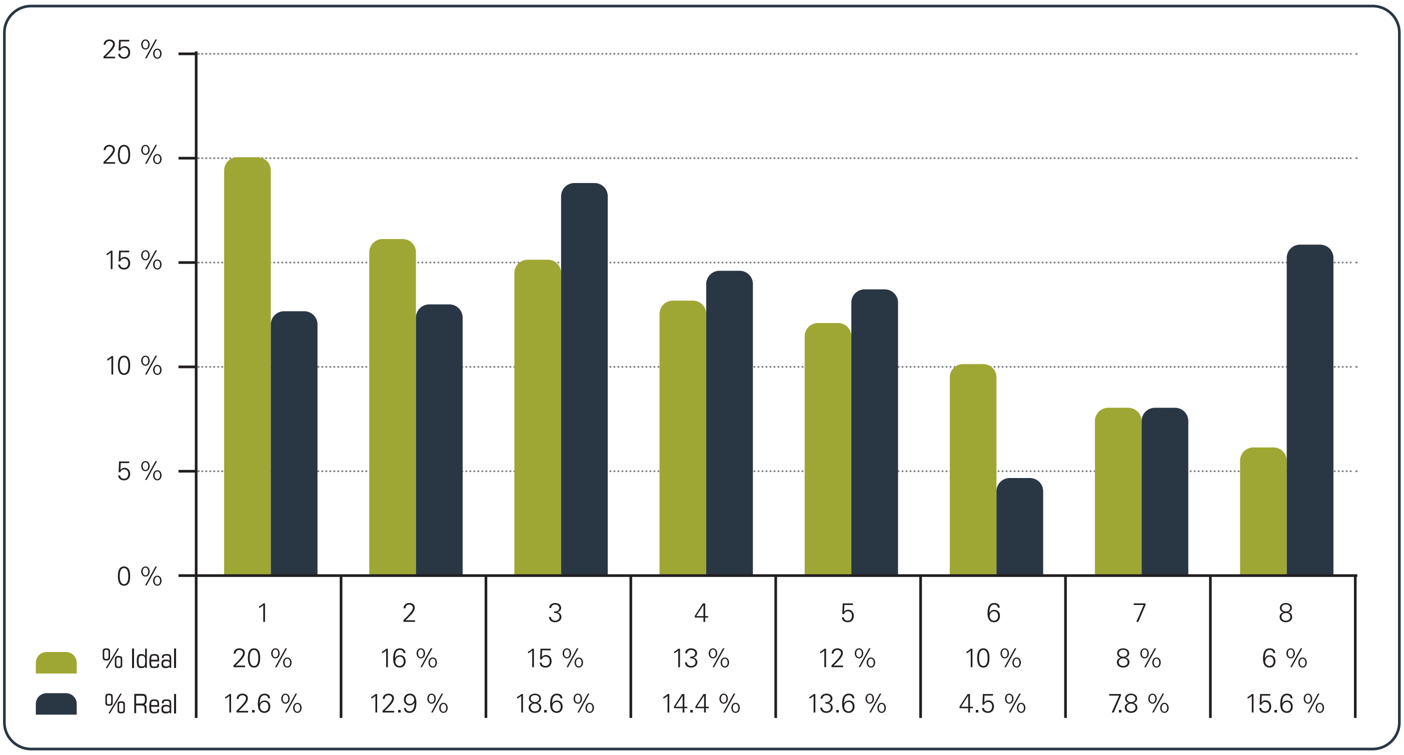


Figure 3. Census distribution of the population on the farm.

This population distribution leads to productivity losses because sows that have completed more cycles have more stillbirths, a lower milk production capacity during lactation, and greater variability in piglet weight both at birth and at weaning.

The most important parameters in the maintenance of the production of weaned piglets

As shown in *table 1*, the most important parameter to reach the goal of weaned piglets per week is the number of covers carried out.

The three key productivity factors of farms are:

1. Keep the number of piglets weaned per week constant. This is not only important for phase 1, but also for the management of phase 2 and fattening.

2. The weaned piglets should be a good quality (understood as having the potential for good productive performance in the following phases). It is evident that weaning a large number of piglets that cannot express their potential is not a good choice.

3. Do not exceed 50% replacements on the farm. It also has a health component because increasing the number of piglets gilts have, worsens the results of fattening.

As shown in *figure 4*, the most frequent cause was nulliparas that do not come into heat.

Parameters	Relative importance (%)
Nº covered sows	60
Farrowing rate	30
Nº live births	5
Mortalidad lechones	5

Case 1. Parameters that most affect the constant production of weaned piglets on farms.

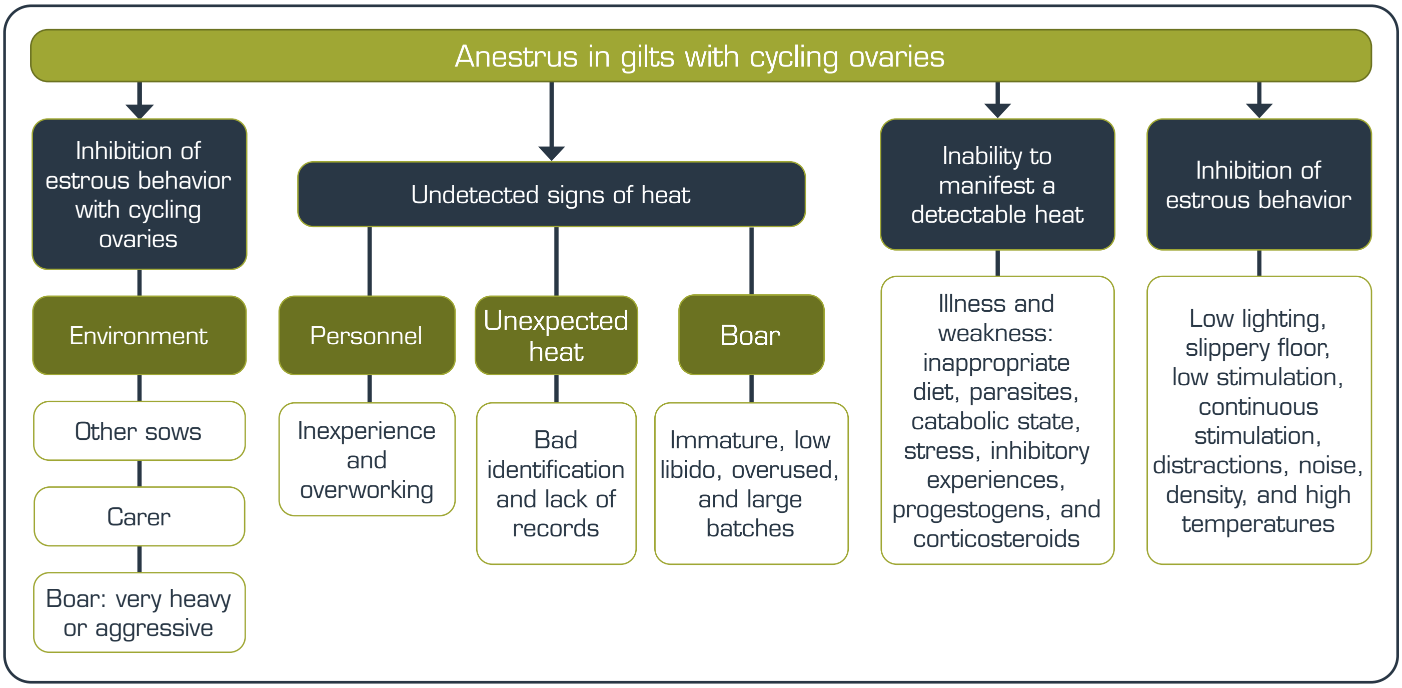


Figure 4. Causes preventing gilts from going into heat.

Once the management and environmental conditions that cause gilts not to show heat have been checked, an action protocol to reduce the impact of having insufficient covers should be drawn up to maintain the objective number of weekly piglets.

Figure 5 shows that once treatments were carried out in the population of gilts, a sufficient number could be obtained for the covers. This prevented their age and weight from increasing too much before the first successful cover, which has an especially important effect

Application protocol

1. Improve management and fix facility deficiencies. The most frequent problems are the density of the animals, lack of light, and low stimulation. Another common cause that is rarely recognized is the reduced amount of time spent on this population on the farm.
2. Application of different protocols in animals to solve the problem:
   - Application of prostaglandins to verify that no persistent corpora lutea are present which would prevent nulliparas from coming into heat. Corpora lutea are refractory to prostaglandins until day 12 of the cycle and so this treatment should be applied twice, about 12 days apart.
   - After the application of synthetic prostaglandin (luteolytic effect), gonadotropins in the form of a combination of pregnant mare serum gonadotropin (PMSG) and human chorionic gonadotropin (HCG) should be administered because these stimulate both the recruitment of eggs and ovulation so that fertile heats will occur.
   - Subject them to grouping stress (change their housing and batch allocation). Eating stress remains very controversial.
   - Carry out a good heat induction protocol so the gilts reach puberty at 180 days of life.

This will mean that sufficient gilts will be available to achieve the cover objective established on the farm.

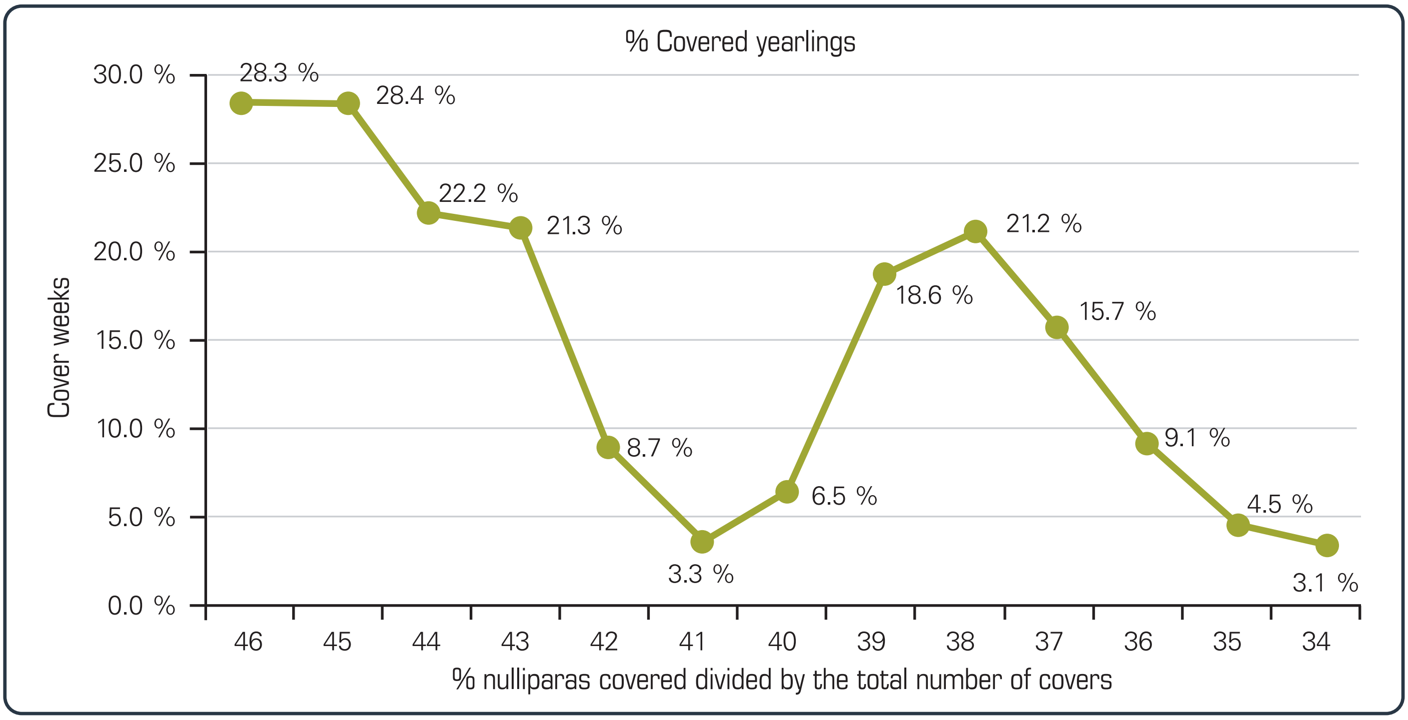


Figure 5. Nulliparas that come into heat after hormonal treatment.

on another productive parameter of the farm by increasing the sow retention rate (meaning fewer sows were eliminated before they reached their third parturition). A goal should be set for 70% of covered gilts to reach their third farrowing.

Figure 6 shows the non-voluntary eliminations of covered sows that were older and heavier at the first cover. Future breeders must not be covered at a high weight because they will be eliminated before reaching the third farrowing meaning that the replacement rate of the herd will have to be increased.

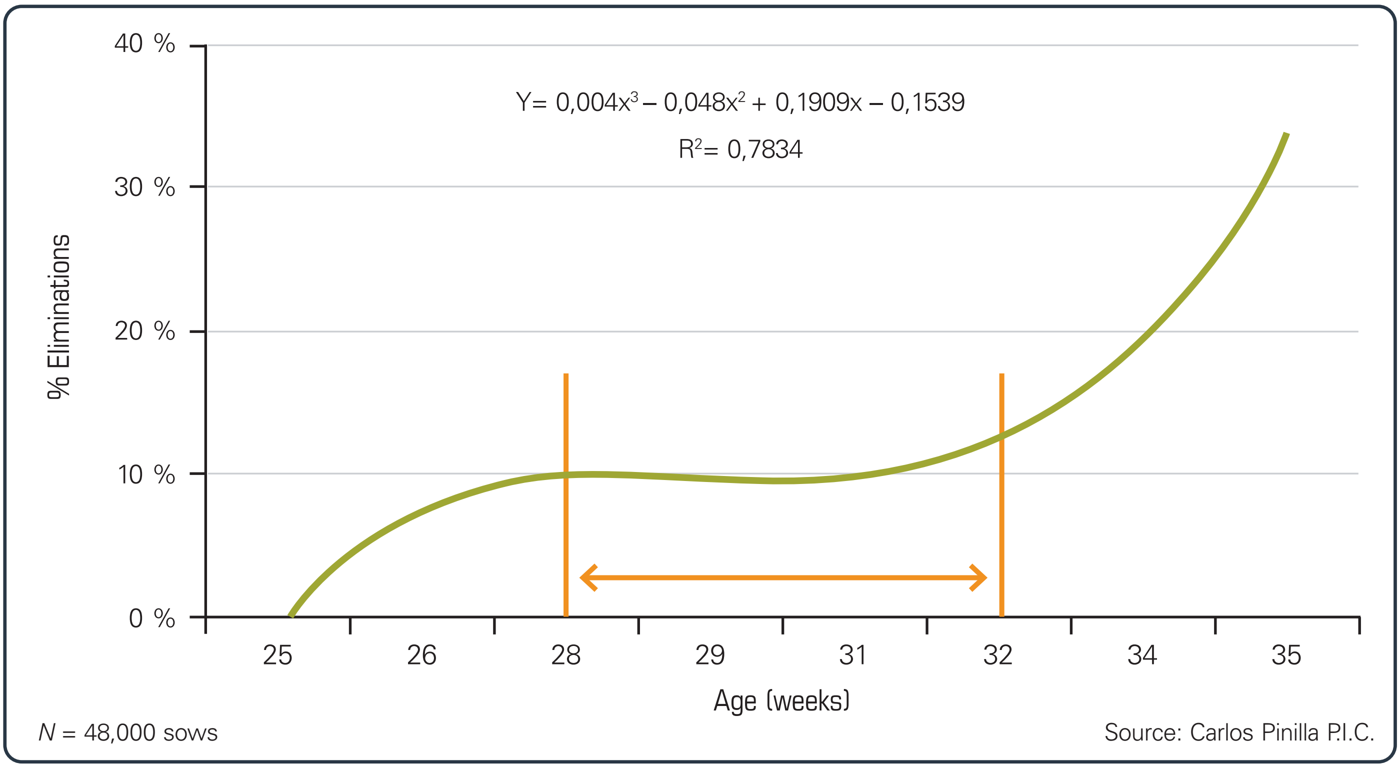


Figure 6. Non-voluntary eliminations of covered sows with a higher age and weight at the first cover.

Conclusions from the first case

- Improvement of housing conditions (light, density, and temperature) and handling (boar stimulation) which is intense and intermittent (while heat is not detected in the gilts, the boars should be kept more than 5 meters from the females).
- Regarding density, gilts are not animals destined for fattening and so, from 100 kg they should be offered 1 meter of space each because when their density in each block is too high, they do not go into heat and there are notable increases in lameness problems.
- Application of hormonal treatment with a combination of synthetic prostaglandins and gonadotropins so that the nulliparas go into heat (to reduce the number of NPDs and reach the farm's cover targets).
- Gilts are the future of the farm; however, the least time and attention is usually dedicated to them by staff on farms. Adequate time must be spent on this group because the better their prolificacy at their first birth, the better their productive development in the following cycles.
- In these cases, the treatment has a very high return on investment (not only in terms of NPDs, but also as a result of a reduced replacement rate).
- Sow prolificacy increases by an average of 0.8 piglets if they are covered in the first heat compared to the second one, and by 0.4 more piglets between the second and third heat.

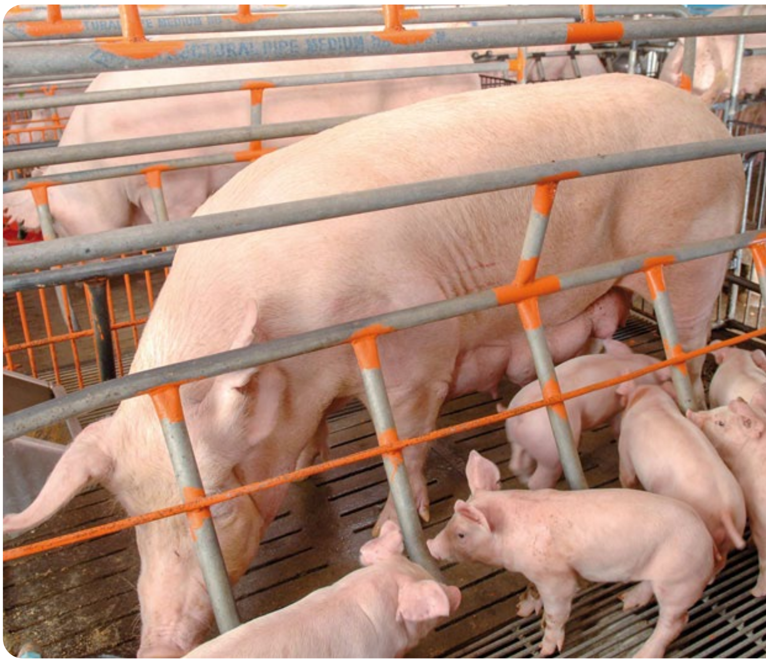
Second clinical case: increase in anestrus during summer months

In summer, the increase in temperatures in almost all of Spain leads to increased anestrus in sows (understood as the percentage of sows that do not go into heat 7 days after weaning) and above all, causes a wide range in the percentages of sows that go into heat 4 to 10 days after weaning.

Delays in sows coming into heat cause many problems on farms:

- The cover objective is not reached and, therefore, the expected number of piglets is not obtained.
- There is no room to house the delayed sows and what is referred to as a "farm plug" forms, which causes problem with space management and the time staff can dedicate to these sows.
- Sows normally move to stables after heat induction in the box, but in these conditions, the number of sows per block usually increases and they still do not go into heat. After 20 days have passed, these animals are sent to the slaughterhouse.
- This increases NPDs which, as mentioned above, has a high economic cost, and is sometimes not assigned the importance it deserves.
- There is also an increase in the replacement rate resulting from the increased number of sows sent to the slaughterhouse because of anestrus and to maintain the farm's population structure.

The first step is to monitor the risk factors that influence the increase in the weaning-to-service interval on the farm. The most common cause is usually an excessive loss of body weight caused by low feed intake during lactation. *Table* shows the importance of feed consumption on lactation and the observed increase in the weaning-to-service interval.



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We must increase the number of meals so that breeders do not lose more than 12 kg during the lactation period, which is not only important for increased milk production in the sow, but also strongly influences their productive behavior in the following cycle (the prolificacy of sows significantly decreases if their feed consumption is low).

Factors influencing the increase in the weaning-to-service interval

- Lactation: short lactations (uterine involution).
- Body condition: excessive thinness.
- Parity: yearlings.
- Temperature: high.
- Food: low-energy diets.
- Exposure to males: improper handling.

	Feed/day (kg)		
Day 1–21	4.1	4.1	2.1
Day 22–28	5.3	2.0	5.2
Weight loss in the sow (kg)	11.0	21.0	25.0
Ovulation rate	19.9	15.4	15.4
Embryo survival (%)	87.5	64.4	86.5
Weaning–heat interval (days)	3.7	5.1	5.6

Source: University of Alberta, 1995.

Influence of feed consumption during lactation on the next cycle of sows

How to tackle this problem?

The approach to this problem includes addressing the following factors:

- First, the environmental conditions must be corrected because sows kept at high temperatures during lactation eat less feed and therefore, their reproductive performance in the following cycle is diminished.
- Gonadotropins should then be applied on the day of weaning so that the sows return to estrus in the following 7 days. This practice also applies to sows that have not come into heat in the 10 days after weaning.
- An increase in the weaning-to-service interval also has an economic impact because it increases the NPDs on the farm, with the consequent economic costs explained above.
- If the lactations last fewer than 21 days, a synthetic prostaglandin should be applied two days prior to weaning because short lactations increase the weaning-to-cover interval. The injection of prostaglandins 24–48 hours postpartum is recommended to lyse any possible corpora lutea that may remain and reduce the concentration of progesterone,

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allowing the levels of prolactin to rise. This is the hormone that most strongly influences milk production in sows.

- Make sure that the light intensity is sufficient in the cover area (about 200 lux in the cover and gestation monitoring areas) because this factor also influences the weaning-to-service interval of breeders (*figures 7* and *8*).
- In the 12 days prior to and 10 days after covering, high temperatures affect both the return to estrus and embryo mortality. Thermal stress 21 to 14 days before covering has the greatest impact on the farrowing rate (especially in gilts), while in terms of the number of piglets born, the most critical period is from 7 days before to 12 days after covering. The latter coincide with embryo implantation, therefore, keeping the cover and gestation monitoring areas cool in hot seasons will lead to higher piglet production in the first quarter of the following year.
- It is also essential to train staff so that they know how to implement a good feeding protocol for gestating sows (*figure 9*).

Figure 7. Light in the cover area.

Figure 8. Light in the rearing area.

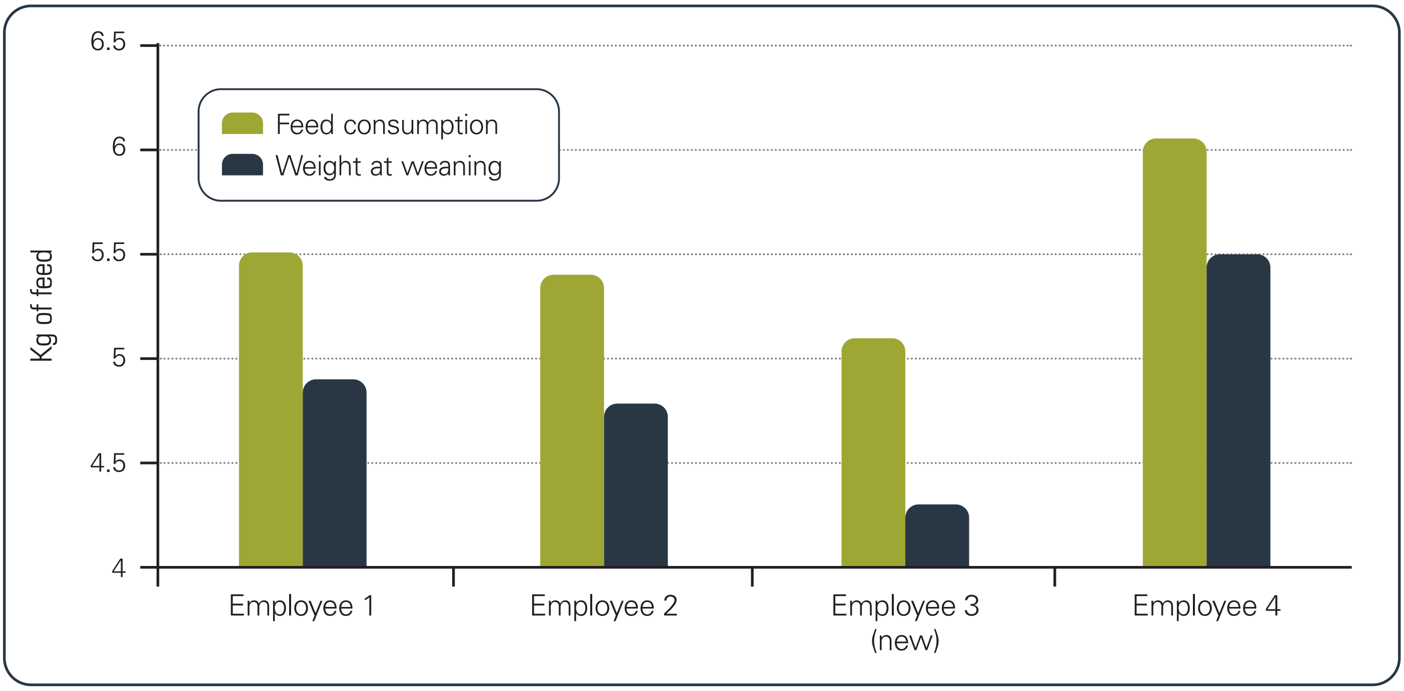

Figure 9. Importance of staff training in terms of the consumption of feed during lactation and piglet weight at weaning.

Conclusions from the second case

- Staff training is one of the measures that will provide the best results in reproductive management.
- Feeding levels and the length of lactation should be adjusted appropriately to maximize feed intake by sows.
- The use of hormones such as prostaglandins help reduce progesterone levels and therefore increase prolactin levels.
- The use of gonadotropins (PMSG and HCG) during weaning helps reduce the percentage of anestrus, thereby avoiding the generation of delayed sows that must be sent to the slaughterhouse. The administration of these hormones 10 days after weaning sows in anestrus helps to induce their return to estrus, allowing them to be covered and preventing an increase in NPDs.
- Always follow the instructions of the manufacturer of the products to be used, both in terms of dosage and the application timing.