The use of **altrenogest** in gilts

One of the most important aspects of swine reproduction is achieving an adequate replacement rate on breeding and genetic producing sow farms.

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On production farms, the optimal annual replacement rate is between 40 and 50% of the farm population to ensure that the correct demographic structure is attained, and the production parameters of the farm are not compromised. Gilts represent 20% of the total population of farms. However, this number is higher on selection farms and can exceed 70%, depending on the type of genetic improvement they carry out and according to the guidelines set by the genetics companies.

Regardless of the origin of these females, a health program and feeding plan that meets their nutritional requirements must be developed to correctly acclimatize them to the farm before they begin their productive life.

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The origins of replacement animals

Replacement animals can have two origins:

- Self-replacement: females are produced on the same farm from a small group of genetically selected animals.
- External replacement: future females are acquired from an external farm or a genetics company and join the stock on the farm several times a year.

Incoming replacements

Once the future breeding sows reach the optimal age for reproduction, we must establish the timing of their introduction so that it coincides with the mating bands (weekly or 3-weekly batches), allowing the correct elimination of the old sows and thereby meeting the cover objectives set on each farm.

The advancement and growth the pig sector in recent years, and the larger size of current farms, means that the industry has resorted to the use of external tools for the grouping these animals, simplifying their handling, increasing efficiency, and maximizing the space on farms (covering places, maternity places, etc.).

Among these tools, the oral administration of altrenogest to create groups of sows with a synchronized heat period, is particularly noteworthy.

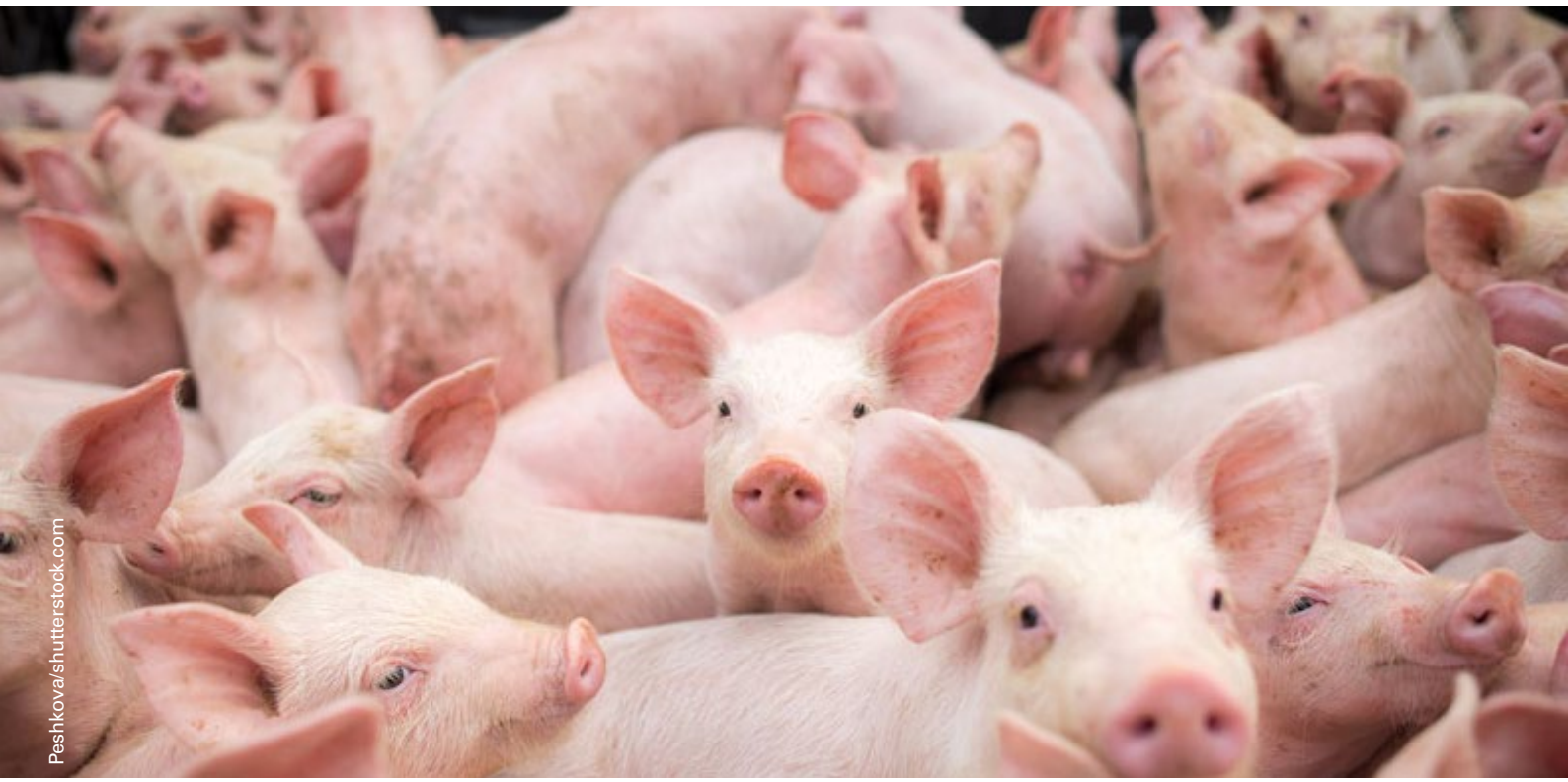
It is important to emphasize that altrenogest is a heat synchronizer only, and so it does not cause the onset of estrus in animals. The sexual cycle will start after the end of the treatment and the return to heat will depend on each animal.

A paradigm shift on pig farms

A few years ago, when farms were mostly still family-owned, the use of hormones to synchronize heat was not considered (or was unknown) because the management of the animals was totally different: there was natural mounting and heat detection with boars, and fewer replacement females (a limiting factor) were available. Sows were usually inseminated every day of the week because, being family farms, the owners spent most of their days on the farm to make their livelihood.

What is altrenogest?

It is an exogenous progestogen that is administered orally and simulates the action of natural progesterone on ovarian activity, thus preventing females from going into heat. Once altrenogest is no longer administered, other natural hormones are released from the hypothalamus (GnRH) and pituitary gland (FSH and LH) and the females start to go into heat in groups.



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How can we identify what point in the estrous cycle future breeders are at?

The 21-day estrous cycle presents a follicular phase lasting 5 days, which is divided into proestrus and estrus, and a luteal phase that lasts approximately 16 days which includes the metaestrus and diestrus. During the follicular phase, the follicles grow and mature and then ovulate. After this, the corpora lutea initiate the luteal phase, during which natural progesterone is present, which prevents females from going back into heat.

On a practical level, if the last heat date of the animals is known, the use of altrenogest can be planned and should always be started while natural progesterone is present (luteal phase). This treatment allows the treatment time to be shortened or lengthened by 3 and 18 days, depending on when the gilts will be introduced into the farm.

However, the reality is that many farms so not know the heat day of all the animals. By administering altrenogest for 18 days, even though the phase of the cycle is unknown, when the treatment is stopped, no natural progesterone (that would otherwise prevent the replacement females from coming into heat) will be present in any of the animals.

Before starting a treatment with altrenogest, we must identify what point in the estrous cycle future breeders are at.


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How is altrenogest used?

It is especially important to make good use of this product and correctly follow the instructions on the package insert. To do this, 20 mg of altrenogest should be administered per day per sow for 18 days (see ***video***).

Of note, any setback in the administration of the product, such as altered doses or omission of a dose, can cause it not to work as expected and therefore, the treated gilts might not go into heat as expected, which will generate extra costs or could even cause an ovarian pathology in these animals.

The 21-day estrous cycle

Factors to consider with the use of altrenogest

There are several factors to consider when using this product, regardless of seasonal or nutritional factors.

1. Administration time

Ideally, altrenogest should be administered at the same time of the day for all 18 days of the treatment.

2. Form of administration

The most common indication is oral administration directly into the mouth of the sows with the 5 ml applicator provided (see ***video***). It is important not to double the dose in order to avoid negative effects on the ovaries (such as cystic degeneration) of future breeders.

It is also possible to administer altrenogest in a small portion of food, before giving the animals their daily feed ration and while the feeder contains nearly no water. However, this way may result in insufficient ingestion of the product by gilts that do not eat well, are poorly adapted to the boxes, or if the water from the feeders carries the product to adjacent animals. It may be useful to feed these animals with more palatable products such as sugar water or apple juice a few days beforehand, then these products can be applied before releasing the medicated food so that the animals will be more likely to crave and eat the food.

It is important to maintain a continuous flow and availability of well identified gilts with known ages.

3. Adaptation to boxes and heat control

It is advisable to start adapting the gilts to the boxes at around 26–27 weeks of age so that they will begin eating gilt feed suitable to meet their nutritional requirements and promote their growth. This stage can be stressful for the animals, and so the use of light reinforcements and exposure to boars to stimulate them to start showing heat is recommended. During this stage, it is vitally important to monitor the cycling animals so that when the batch is ready to start treatment with altrenogest, animals that have previously cycled can be chosen. However, even if some of the gilts have not yet shown heat, to avoid discarding too many of them, treatment with altrenogest can still be started based on the assumption that some may not have gone into heat or that their onset of estrus is later than the desired date.

4. The age and optimal body condition of nulliparas

The gilts should ideally be around 30 weeks old when they start the altrenogest treatment and should present an adequate body condition (back fat thickness, live weight exceeding 135 kg, correct hock position, etc.). This allows us to guarantee that all the animals will have had at least one heat and that their productive parameters, such as fertility and prolificacy, will not be compromised.

Their age at first cover should be a minimum of 32–33 weeks to avoid the use of animals that are too small in which a pregnancy could compromise their growth. They should not be aged more than 38–39 weeks, because these animals tend to be too fat, and among other potential problems may have had several past cycles, problematic heats, or cystic ovaries.

What can be done if the gilts do not go into heat as expected after the synchronization treatment?

If your expectations were not met after the synchronization treatment, you should:

- Review the administration protocol, including the time, administration route, and operator, to identify possible oversights.
- Check the ages of the females, their body condition, and the heat control of these animals.
- Appraise the environmental control of the facilities, including the cooling and heating, and consider seasonality.
- The latter can influence heat patterns, the presence of silent estrus, and prepubescent pigs. It is advisable to reinforce the stimuli, daylight hours, boar effect, *flushing*, and control of stressful situations.
- Assess the use of other hormones that promote the onset of estrus in these animals, such as pregnant mare serum gonadotropin (PMSG) and human chorionic gonadotropin (hCG), at the end of the treatment with altrenogest.
- A progesterone test can be performed, especially in problem animals that do not go into heat, to determine if they have blood progesterone levels above 5 ng/ml, which would indicate that they are cycling.

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- A *postmortem* study of the genital tract can be performed in animals selected for slaughter because of infertility to verify if they had really presented anestrus or if some type of ovarian pathology had been at play.
- Performing an abdominal ultrasound will provide information on the presence of follicles in the ovaries and even on the state of the uterus.

Under normal conditions, about 90% of treated animals should go into heat successfully.

Progesterone test

The analytical results can help to determine if the treatment was implemented well by sampling the treated animals, which should not show increased progesterone in their blood. They can also indicate the presence of animals in anestrus (without progesterone production) when tested several days after treatment with altrenogest, as shown in *tables 1* and *2*. In addition, progesterone tests are useful to determine the use of other hormones such as PMSG and HCG, to establish the indication for a second treatment with altrenogest, and even to determine whether these infertile animals should be eliminated from the reproductive cycle.

Sample reference		Progesterone (ng/ml)
11	SR	0.25
12	SR	0.39
13	SR	0.32
14	SR	0.39
15	SR	0.61
16	SR	0.67
17	SR	0.27
18	SR	0.25
19	SR	0.33
20	SR	2.97

Table 1. Blood progesterone levels in sows delayed by one week after altrenogest administration.

Sample reference		Progesterone (ng/ml)
1	SR	< 0.21
2	SR	0.3
3	SR	0.26
4	SR	< 0.21
5	SR	0.27
6	SR	0.41
7	SR	0.26
8	SR	0.25
9	SR	0.27
10	SR	0.31

Table 2. Blood progesterone levels in sows delayed by 17 days after the administration of altrenogest (35 weeks).

Use of altrenogest for synchronization versus heat-induction and insemination without treatment

There are many advantages to using altrenogest, including:

1. Gilt optimization

Gilts can be organized according to their age, body condition, previous controlled cycles, and availability on the farm.

2. Homogeneity of the batches

The gilts required to complete the different mating batches can be appropriately prepared to guarantee an adequate elimination rate for old sows. Thus, all-in/all-out (AI-AO) systems can be guaranteed.

3. Centralized management and planning

- The box adaptation period can be used until the animals eat the desired feed, to identify gilts with ear tags and/or tattoos, and place their electronic chips (on farms with these machines) for use in managing confirmed gestations.
- Stimulation by walking boars in front of the gilts and providing extra light will favor the onset of estrus.
- After the treatment *flushing* can be used as a tool for boosting calorie intake.
- Planning the replacement animal vaccination program based on their age and expected cover date.
- Scheduling semen orders (important on selection farms or those where post-cervical insemination is performed on the remaining animals).
- This allows farmers to choose the most appropriate time to inseminate their gilts and, therefore, improves farrowing and weaning care.
- It allows farmers to establish protocols for the use of other products used for programming ovulation in animals (e.g., buserelin).

4. Design of new facilities/farms

It allows farms to be organized according to the places required for adaptation, covering, and monitoring the gilts, heated rooms with a controlled environment, etc.

Some farms still do not have enough places for rearing and replacement and must use externally reared gilts. This makes it difficult to use this product because less time and space is available to adapt and acclimatize the gilts.

5. Homogeneous fillings on new farms

The use of altrenogest makes it possible to prepare more homogeneous batches, according to the desired cover objectives, on new farms. In these situations, it allows better ordering of the farms, cover bands, vaccination protocols, and work of the operators.

6. Completion of lactation from days 21 to 28

If the farm is sufficiently sized to allow weaning at 28 days, with the help of altrenogest, a complete batch of uncovered gilts or sows (delayed and confirmed empty by ultrasound) can be prepared, which will be covered in the week they are not weaned.

7. Management of bands with gilts and multiparous sows

Gilt-only covers can be planned on selection farms or where there are problems with diarrhea in the farrowing areas which can be minimized when, for example, a gilt-only band is established every 3 or 5 weeks.

In addition, altrenogest allows farmers to (1) homogenize batches of multiparous sows; (2) wean and administer the treatment in multiparous sows from very complete batches and transfer them to other batches which have not met their objectives; (3) leave sows in the farrowing pen with a few piglets or weaned sows without piglets to prevent them from going into heat and avoiding batch changes or insemination too early, in order to aid the recovery of body condition in sows that are too thin.

8. Personnel training

The management of these batches allows operators to be trained in the planning of farms and their operation as well as particular features such as dedicating sufficient time to heat induction and detection (because it is usually more difficult to detect the signs of heat in these animals).

Several studies (Knight *et al.,* 1996; Martinnant-Botté *et al.,* 1995; Soede, 2004 and Meissonier *et al.,* 2006) have compared the production results of farms that use altrenogest compared to others that do not use it, observing significant improvements in the ovulation rates, litter sizes, farrowing rates, prolificacy, and productivity of treated animals.

However, like any treatment, altrenogest has an economic cost that must be balanced by considering all the aforementioned advantages in comparison with the production results of a planned system that does not use this drug.

Table 3 shows a comparison of different breeder farms (with around 18,000 sows) which used altrenogest, deducting the average cost per weaned piglet for each one. Every 3 weeks, these farms received gilts from a genetic producing sow farm. At the time of farrowing, they were 9 weeks old and weighed 20 kg, thus allowing them sufficient time to acclimatize to the pathogens on the farm. These farms had been in operation for more than 3 years, had a stable population, and they received the same number of gilts each week.

Based on the results obtained on these farms, the use of altrenogest results in an average cost reduction of €0.099/piglet.


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Conclusion

Altrenogest is an extremely useful, affordable tool that simplifies the handling and inclusion of replacement animals as they start their productive life, optimizing facilities and providing homogeneity in cover batches. In addition, in combination with other products, it can improve productive parameters and solve fertility problems on farms by reducing the number of non-productive days, establishing optimal cover guidelines, reducing unnecessary extra costs, and avoiding an excessive sow elimination rate, thereby maximizing the use of replacement animals.

Year 2019	Productivity (weaned/sows/year)	Mean incoming gilts/ week	Rate of replacement (%)	Cost/weaned piglet (€/piglet)
Farm 1	34.34	30	45.9	0.100
Farm 2	37.36	30	47.9	0.081
Farm 3	35.20	33	41.6	0.095
Farm 4	35.61	25	47.9	0.090
Farm 5	35.79	35	45	0.098
Farm 6	35.55	30	49.1	0.120

Table 3. Comparison between different breeder farms where altrenogest is used.