

Altresyn[®] Technical Information



by the Ceva Swine Team



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Age and
bodyweight
matter!



The importance of optimal age and bodyweight of gilts for their first mating in modern swine production

Introduction

Gilts are probably the most important and yet sensitive component of any healthy swine production system, thus the introduction of gilts has a major impact on breeding herd efficiency. **Any management practice that affects gilt performance will have an impact on the overall herd reproductive performance and economic viability of the farm.** A vital factor in farm survival is having a sufficient number of eligible gilts of an optimal age and weight that are ready to be bred. The impact is significant, as annual replacement rates nowadays can reach 40–60%. The bodyweight of the gilt at first service, together with an optimal age, are generally accepted as the most important and credible indicators of physiological maturity. Both parameters should be part of your standard operating procedure for gilt pool management. At the same time, these parameters are also crucial in determining maximal lifetime reproductive performance, and consequently for the economic efficiency of production. In the past 5-10 years there is a growing emphasis on the importance of backfat parameters as being key to ensuring lifetime reproductive success, and the current recommendation is 15-16 mm at the first service (Rozeboom, 2015). Lifetime reproductive efficiency can be measured by the number of weaners produced and sum of total non-productive days.

Bodyweight

Bodyweight at first service is a widely recognised parameter. In gilts, proper age selection together with implementation of specific nutrition development programmes is crucial. Optimal bodyweight is recognised as the single most important indicator of eligibility for entry into the breeding pool, as the gilt's weight reflects its growth and body maturity. Optimal weight during first mating is generally accepted to be over 120 kg. The most well accepted and recognised target in modern swine production is based on recommendations published by Foxcroft 2002 and Williams, *et al.*, 2005, which showed the maximal number of pigs born in three parities for the breeding of gilts within the weight interval of 135 to 150 kg. Overweight at first breeding should be avoided, as there is no advantage in breeding gilts heavier than 150 kg (Bortolozzo *et al.*, 2009). There is also a significant effect of excessive bodyweight during first-parity gestation on long-term reproduction efficiency through second-parity sow failure, referred to as "second parity syndrome", resulting in a reduction in the expected reproductive parameters with a long wean-to-oestrus interval, lower farrowing rates, lower total litter size, and subsequent higher culling rates.

Economic impact of suboptimal bodyweight in gilts

In addition to other negative impacts from gilts which are not at their optimal weight and age at mating, there is an increase in the cost of production because the animals are consuming extra feed and increasing the fixed costs of production. The extra cost of feed consumed is not only related to the time before first insemination, but is also associated with the larger maintenance feed cost during the production lifetime in the case of heavier breeding animals. If gilts are first bred at 160 kg, they can consume more gestation feed (0.15 kg/day) in comparison with animals inseminated at 135 kg. In a Danish study, a reduction in the average mating age of gilts by 18 days (from 259 days to 240 days) delivered savings of about 40 kg of feed, corresponding to approximately €10 in feed costs per gilt per year.

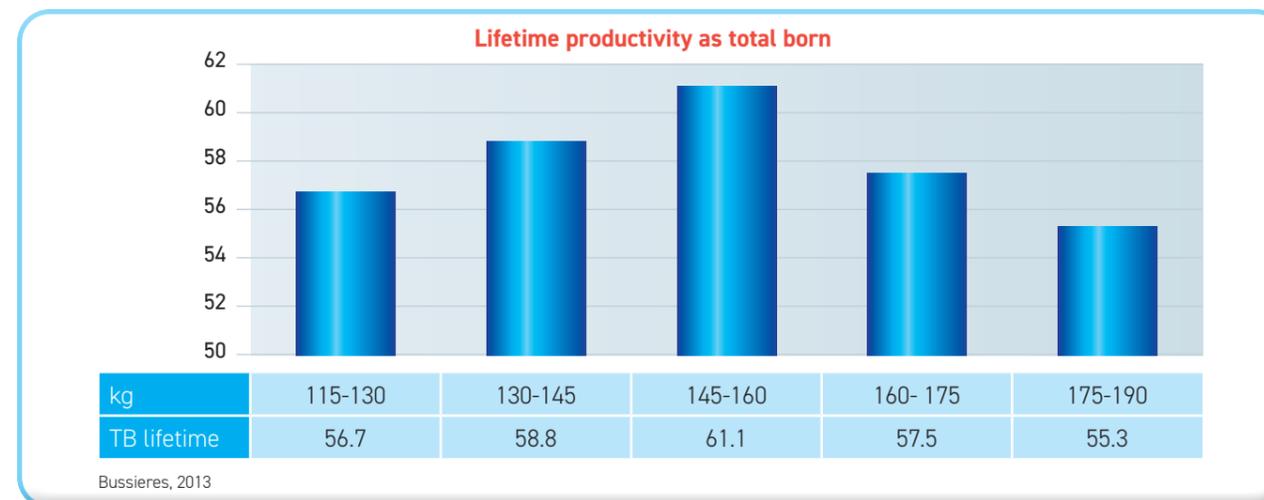
From this we can conclude that heavier gilts and poor gilt management at breeding may shorten the productive life of the breeding animals, which affects the parity structure of the farm and has a negative impact on economical return.

Influence of bodyweight on reproduction, lactation and lifetime productivity

Females which are heavier at first breeding remain heavier for their entire production life. Heavier gilts are exposed to increased risk during farrowing. There is a higher incidence of farrowing difficulties, a higher percentage of animals needing manual intervention, and an increased incidence of mastitis, metritis and agalactia (MMA syndrome) (Rozeboom, *et al.*, 1996). Gilts which are overweight at first service tend to be proportionally heavier at farrowing, with more feed demands for maintenance during lactation, which reduces the feed available for milk production (Quesnel, *et al.*, 2005). Gilts which are too heavy at breeding may also have a longer wean-to-oestrus interval, which results in a failure of the expected increase in the size of 2nd litter. With 2nd litter failure, the sow farrows a similar or even lower total litter size (Pinilla, *et al.*, 2013). The failure of the 2nd litter is then reflected also in the 3rd and subsequent litters, resulting in a serious lifetime performance reduction (Figure 1).



Figure 1 shows how the weight of a gilt at breeding can effect lifetime productivity in terms of total number of pigs born.



The incidence of locomotive failure increases in gilts WITH BODYWEIGHTS HIGHER THAN 150 Kg

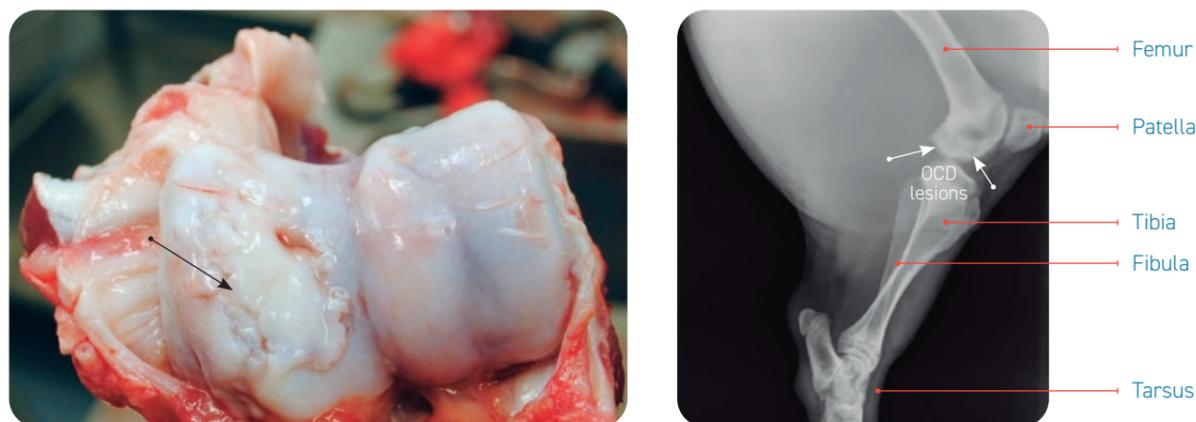
Influence of bodyweight on the locomotor system

Gilt bodyweight and physical condition during at the first insemination has important effects on lifetime productivity, and overweight is one of the most important risk factors for poor sow retention and sow longevity. A major reason for poor sow retention is associated with poor general skeletal soundness and osteochondrosis (Sorenson, *et al.*, 1993). Lesions associated with osteochondrosis can be seen in figure 2. The culling rates for locomotion problems in sows with excess bodyweight at first breeding or gestation are statistically higher than for gilts with optimal bodyweight (Table 1).

Table 1. Relationship between bodyweight at first mating on the culling reason and culling rate. (Amaral Filha *et al.*, 2008).

Bodyweight at first mating		130-150 kg	151-170 kg	170-200 kg
Number of animals		298	1007	421
Culling reason (%)	Locomotion	18 (6%)	104 (10%)	64 (15%)
	Reproduction	37 (12%)	104 (10%)	52 (12%)

Figure 2. Osteochondrosis (OCD) of the condyles (arrow) of the humerus associated with excessive growth and high bodyweight during the first insemination. Lateromedial projection of the femur with radiolucent condyle lesions.



Age of first mating

Age, together with physical condition, are the key crucial parameters to be monitored in successful gilt management. A combination of monitoring bodyweight and recorded heat no service is a cost effective strategy. An age of first farrowing of about 355 days provides the best reproductive results (Le-Cozler *et al.*, 1998). Therefore, the recommended age at first mating is around 240 days. Optimal age at first insemination has direct association with high performance and longevity in sows (Saito, *et al.*, 2011). The high-performing farms had an increase in lifetime performance of 5.4 pigs born alive, and a 0.8 higher parity at removal in gilts which were bred at an average of 27.5 days younger age at first mating.

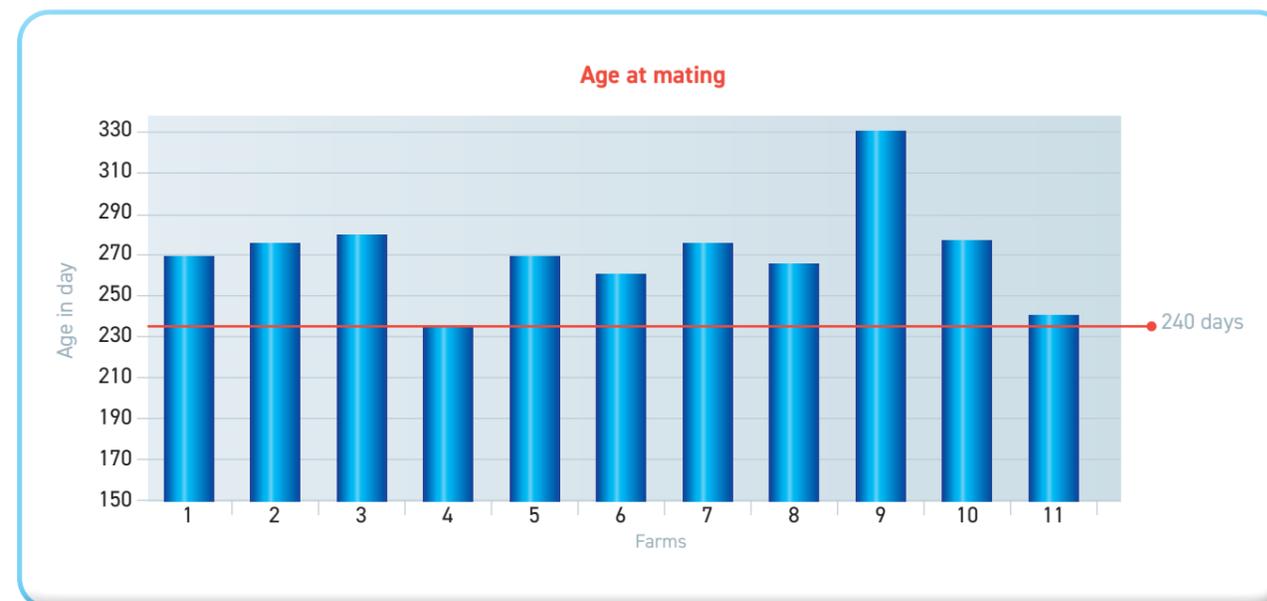
Influence on lifetime productivity

Sow longevity is a parameter with major economic relevance. Gilts are expensive and must be retained beyond their third parity to cover replacement costs (Diaz, *et al.*, 2015). Gilts that were 221 to 240 days of age at the first mating survived on the farm longer than gilts inseminated at a younger or older age (Babot, *et al.*, 2003). In addition to economic relevance, sow longevity is important from an animal welfare perspective.

Effective method of controlling age and weight at first insemination by using altrenogest (Altresyn®)

Under actual farm conditions, it may be difficult to optimise the age and weight of gilts prior to their first insemination. The main target of a successful breeding management is to have gilts available at the right time, and yet to minimise the size of the gilt pool. Delay and sub-optimal age all have negative consequences. In addition to the issues mentioned above, there are clear economic impacts connected to non-productive days, costs of extra feed, and lifetime productivity. Gilts that are managed without synchronising oestrus are mated on average at a higher age. For example, herds in Denmark show significant variability in the average age at first mating of gilts, ranging from 230 to 330 days. It is estimated that more than 90% of farms are not able to control the recommended optimal age of gilts at first mating (Figure 3) (Ceva internal data).

Figure 3. Average age of gilts at first mating on 11 farms in Denmark without synchronisation of gilts by Altresyn® (Ceva file).



Batch management requirements can be accomplished and **SIMPLIFIED BY SYNCHRONISATION WITH ALTRESYN®**, so that the gilts are bred at their optimal second oestrus



Conclusions

- The bodyweight and age of gilts at first service are generally accepted as the most important and credible indicators of physiological maturity and economic efficiency. Maximal lifetime reproductive performance, longevity of breeding animals and thus economic efficiency are driven by optimal gilt pool management.
- The age at first mating has a direct impact on the reduction of non-productive days by reducing the period prior to first service, the interval between weaning to mating, and between the last weaning and culling.
- Optimal control of age and bodyweight at first mating is an essential method to improve sow productivity. Altrenogest (Altresyn®) synchronisation of gilts is a proven, effective method to control gilt flow and at the same time to utilise the gilts at the optimal age and weight.

Please note that recommendations could vary depending on the specific breeding programmes and type of genetics applied on your farm.

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Synchronisation of gilts every week

Developing gilts



Management of developing gilts

Optimal use of the gilt pool has a major impact on reproductive efficiency of the breeding herd and the farm economy. To be able to fully use the outstanding genetic potential of reproductive performance in hyper-prolific breeds, careful and sophisticated gilt management techniques must be applied. Periodically, replacement gilts in proper numbers must be introduced to each weaned batch to maintain fluent production and meet next batch breeding targets. Several factors are important for successful gilt development and introduction to the breeding herd. It is important to take into consideration that each production system and specific breed have specific production targets for incoming gilts, which might be slightly different.

Feeding management

The target of the feeding strategy for gilts is to achieve full reproductive potential. Feeding techniques should include the use of special gilt developer diets which concentrate on good development of bone, leg and foot structure, with attention to biotin, and mineral bone strength with a focus on calcium, phosphorus, and zinc.

Gilt acclimatisation

Acclimatisation of new incoming gilts is a crucial step which allows gilts to adjust to the specific housing and management system, including feed, enzootic pathogens and other factors, that are specific to your herd, and consequent to develop specific immunity. The aim is to minimise the difference between the new incoming gilts and the sow inventory pathogen difference. Isolation/acclimatisation is important whether animals are purchased or internally produced. If possible, the incoming gilts and acclimatisation area should be segregated from the main herd for the acclimatisation period (minimum distance is 500 to 800 m from herd). These isolation standard operating procedures should be farm specific and reflect the actual pathogen situation and pathogen history. In general, isolation consists of 30 days, during which the replacements are observed for clinical signs of illness and vaccinated for specific pathogens. In exceptional cases, there may be a need to carry out testing for specific pathogen. The actual isolation period might be significantly longer (up to 12 weeks) depending upon the known incubation periods for different pathogens. Another 30 days is used for acclimatisation during which gilts are exposed to cull animals or biofeedback to expose them to farm-specific pathogens. This allows the gilts to develop sufficient immunity to herd-specific pathogen strains, and then to recover before they enter the breeding facility. At the end of this specific period, animals should have enough time to develop immunity and stop shedding pathogens during 'cool down' period.

The key to gilt or boar acclimatisation is **TIME AND WHAT TIME DEMANDS IS PLANNING**



Figure 1. Optimum body condition is important for future production.

The bodyweight is a very important parameter which reflects growth and body maturity, so the optimum weight at first service is a basic parameter. Together with other parameters, for example body condition score, backfat depth and optimal age at first insemination, bodyweight is a crucial factor in sow longevity (Figure 1). For early appearance of puberty and optimal body development, it is important to follow recommended bodyweight gain per day. To avoid excessive body mass and consequently mainly locomotory problems, ADG of gilts from birth to breeding needs to be controlled regularly. Increased feed intake (known as the "flushing effect") approximately 2 weeks before insemination will help to maximise the ovulation rate and the strength of oestrus behaviour.

The bodyweight is a **CRUCIAL FACTOR FOR SOW LONGEVITY**

Early onset of puberty provides good evidence of future **REPRODUCTIVE PERFORMANCE**

The optimal age for a boar is considered to be **12 MONTHS AND OLDER**

Heat detection management

Early stimulation of puberty by boar exposure is very important, and it is well recognised that an early onset of puberty provides good evidence of future reproductive performance (larger litters and lifetime productivity). Daily exposure to a mature boar is an efficient way to achieve early puberty. Daily exposure with mature boar with developed sexual behaviour should start around 23-24 weeks of age. The recommended timing is 20 minutes per group of gilts. The limiting age for exposure is 20 weeks, as younger gilts will not respond. At least 70% gilts within the optimal age range would have one heat-no service after 3 weeks of boar exposure with this programme.

The selection of an **optimal boar**, in particular the correct age (no younger than 10 months), is very important for a successful reproduction. Start boar exposure to 24 weeks old gilts. The optimal age for a boar is considered to be 12 months and older, at which a strong sexual libido with salivation is evident. The most frequently used method nowadays is fence boar stimulation of gilts with the pheromones in his saliva via nose-to-nose contact, and the female stands to the back-pressure test (solid heat). It is very important to mark her according to the farm protocol to ensure that the gilt pool is ready for synchronisation and the gilt therefore prepared for insemination on her second observed heat. The boar should not be placed next to gilts all the time or the gilts become accustomed to the boar's presence and will not demonstrated strong signs of oestrus in the presence of the stockperson.

Different modules and stations equipped by an identification antenna for heat detection are available and have become increasingly popular. Duration and frequency of gilt visits to the boar are registered and precisely evaluated (Figures 2 and 3).

Other management tools to manipulate the onset of puberty are mainly housing changes, forming new groups by mixing gilts from different pens of similar health status, and the movement of gilts around the farm. Especially "transport phenomenon" - mixing and transporting unfamiliar gilts and exposure to new environments has been known to trigger a synchronous 1st oestrus in up to 30% of gilts. Relocation seems to be the most important component of this phenomenon. An optimal culling strategy that is specific for the farm should be established for the gilt pool. Gilts in which the first visible oestrus does not occur by the time they reach 140 kg of bodyweight and/or 220 days of age should be culled.

Optimal environment

Several external factors like housing, optimal light intensity and proper placement is important for the successful management of gilts. In general, the gilt service area should have at least 250 lux of light intensity (adequate to read a newspaper) for 14-16 hours per day, followed by 8-10 hours of darkness (>20 lux) (Figure 4). Gilts should be housed preferably in small groups with a maximum of 10 animals, and the gilts should be allowed 1.64 m² floor area per head. The pens should be clean, dry, and with optimal floor material.

Figure 2. Fence-line contact with a mature boar during exposure of gilts



Figure 3. Automatic heat detection station

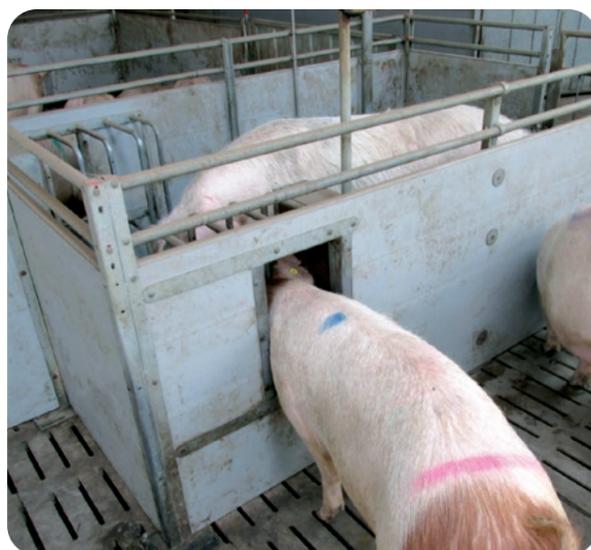
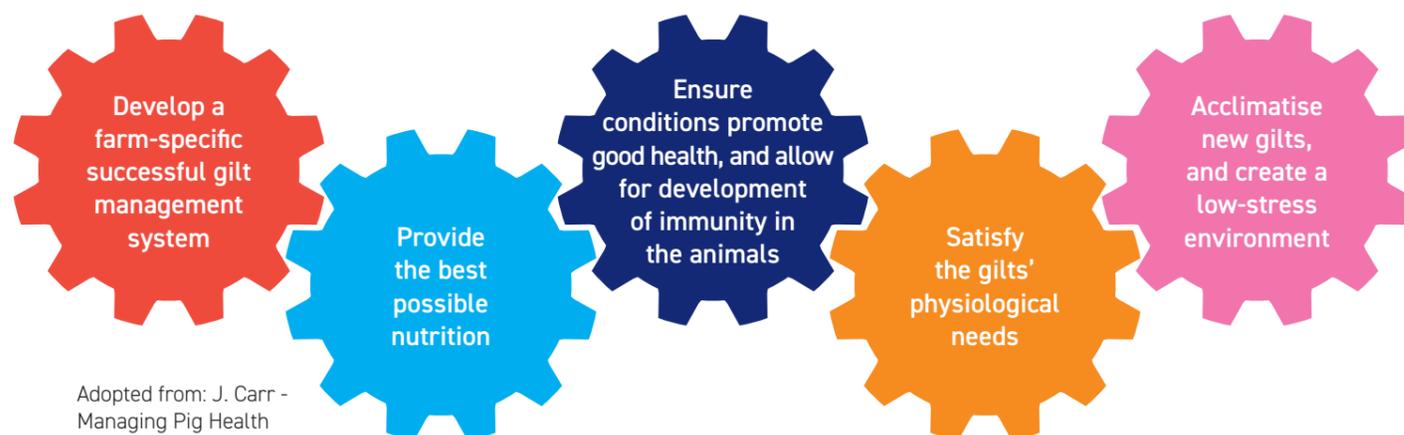


Figure 4. Optimal light management in the service area

Key points to stimulating oestrus in the gilts

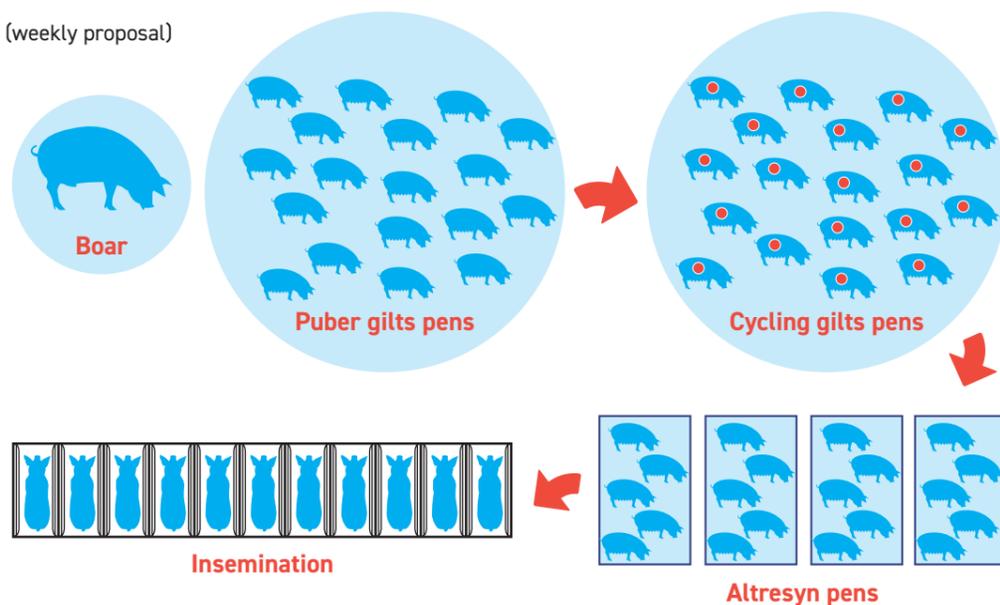


Adopted from: J. Carr - Managing Pig Health

Gilt pool management and synchronisation of the gilts

Organisation of the gilt pool is crucial to having a sufficient number of gilts to replace the culled sows and meet farm breeding targets. Missed batch targets result in empty batch farrowing places, with the numbers of weaned and finished pigs being zero. Each empty farrowing place will cost the profit of an entire litter. The gathering of proper and accurate records are focused on the detection of first oestrus, and subsequent organisation into groups according to the oestrus number. The gilts' oestrus can be easily synchronised through the use of Altresyn® to obtain an optimal gilt flow and minimise variability. Synchronisation with Altresyn® is also an optimal method to control the age at first mating, and to manage non-productive days on farm. Thus, the preparation of gilts is recommended to take place over several steps. A first step is the preparation of a puberty pen where the animals are checked every day to detect the first heat (**the gilts need to be cycling to enable the synchronisation of heat with Altresyn®**). Once the animals have experienced their first heat, they should be moved to a pen of cycling gilts where they will be later selected for synchronisation with Altresyn® (Figure 4).

Figure 4. Altresyn® protocol (weekly proposal)



Practical guide for the optimal weekly management of gilts - the Altresyn® protocol

- ✓ Every Tuesday, transfer of the correct number of gilts from pens with cycling gilts to the pens labelled "Altresyn® pens".
- ✓ Friday starts the training with apple juice, through to Sunday (three-day training is optimal)
- ✓ Starting Monday, and for the next 18 days, Altresyn® is given individually to gilts at 8:30 a.m. every morning.
- ✓ The last day of treatment is a Thursday (weaning day of corresponding sow batch), and five or six days later on Wednesday, the first gilts undergo artificial insemination together with the rest of the corresponding batch.

- Transfer to Altresyn® pen
- Apple/Orange juice treatment
- Altresyn treatment
- Gilts on heat > insemination

Week 1	M	T	W	TH	F	S	Su
Week 2	M	T	W	TH	F	S	Su
Week 3	M	T	W	TH	F	S	Su
Week 4	M	T	W	TH	F	S	Su
Week 5	M	T	W	TH	F	S	Su

Conclusions

Gilts are the most important and yet sensitive component of any healthy swine production system, and together with parity one sows make up half the farrowing group. Thus, gilt introduction has a major impact on breeding herd efficiency. Any management practice that affects gilt performance will have an effect on the overall herd reproductive performance and the economic viability of the farm. Optimal feeding strategy, acclimatisation, stimulation of puberty, and the detection of heat are crucial. Organisation of the gilt pool and synchronisation of the gilts using altrenogest (Altresyn®) is a proven effective protocol for controlling gilt flow, reducing the gilt pool to the necessary number of eligible gilts at any one time, and managing the farm economy mainly via controlling the cost of feed and non-productive days.

Please note that recommendations could vary depending on the specific breeding programmes and type of genetics applied on your farm.

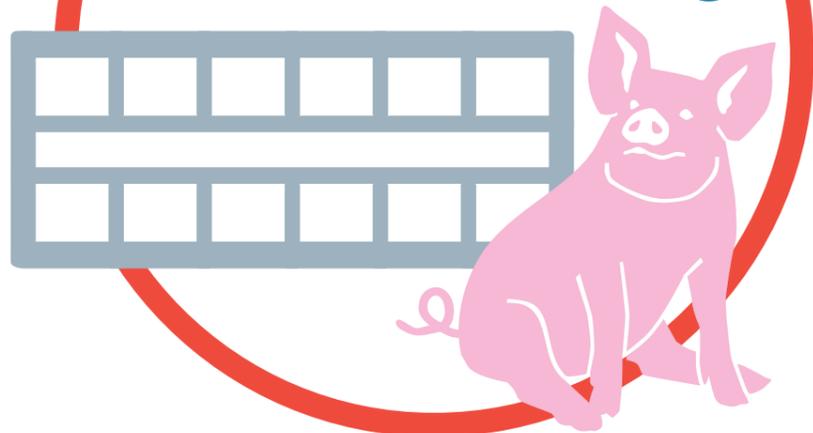
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Synchronisation of gilts every week

The principles of batch farrowing



Definition of terminology

A batch is a homogeneous group of females — sows and introduced (incoming) gilts, all at a similar production (reproduction) stage. This means that they will be inseminated within a very narrow 7- day time window.

Where the gilts are synchronised with altrenogest, 95% of the animals are inseminated within 3 consecutive days of the treatment application.



3 consecutive days



Day one of the batch is defined as the day after weaning. It is impossible to achieve 'all-in/all-out' farming without the discipline of batching.



Weaning



1st day of the batch

When day 1 of the batch is the day after weaning, the gilts and sows in the first batch will farrow in a clean farrowing room and so, **AT WEANING THE PIGLETS ARE OLDER AND STRONGER** than if the gilts had farrowed at the end of their batch cycle



Figure 1. Breeding in weaned sows and gilts can be synchronised by using altrenogest.

Day post-weaning	1	2	3	4	5	6	7	8	9	10	11	12
Days of the week	F	S	S	M	T	W	T	F	S	S	M	T
Weaned sows cycle day				WS	WS	WS					WS	WS
Gilts	G	G	G	G	G	G	G	G	G	G	G	G

Breeding starts day after weaning

Female group	G	G	G	WS/G	WS/G	WS/G	G
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WS = Weaned Sow
G = Gilt

Breeding starts beginning of the calendar week as in Monday

Female group	WS/G	WS/G	WS/G	G	G	G	G
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To understand batch management and the organisation of the animals within the system, it is important to define (and set up) three basic parameters:

- 1 The number of batches (groups of breeding animals) within the operation.
- 2 The rotation of the farrowing rooms (number and organisation of the farrowing house).
- 3 The structure—arrangement of the farm and the size and capacity of all its connecting parts: the breeding and gestation area, nursery house, and finishing capacity. All these segments need to be considered before arranging a specific production system with the aim of producing an excellent flow through it, with no areas that compromise the welfare, legal requirements, or efficiency of the system.

Number of production batches (N° of groups which are rotated)

This number is principally defined by the average length of pregnancy and the interval between batches, i.e., the weaning age (duration of lactation), interval for cleaning the outgoing batch ('all out'), implementing a proper disinfection and drying period, and the interval for acclimatising the incoming batch ('all in') animals (Table 1).

Formula for calculating the number of production batches:

$$\text{No. of groups (batches)} = \frac{\text{Cycle duration}}{\text{Interval between two batches (weeks)}}$$

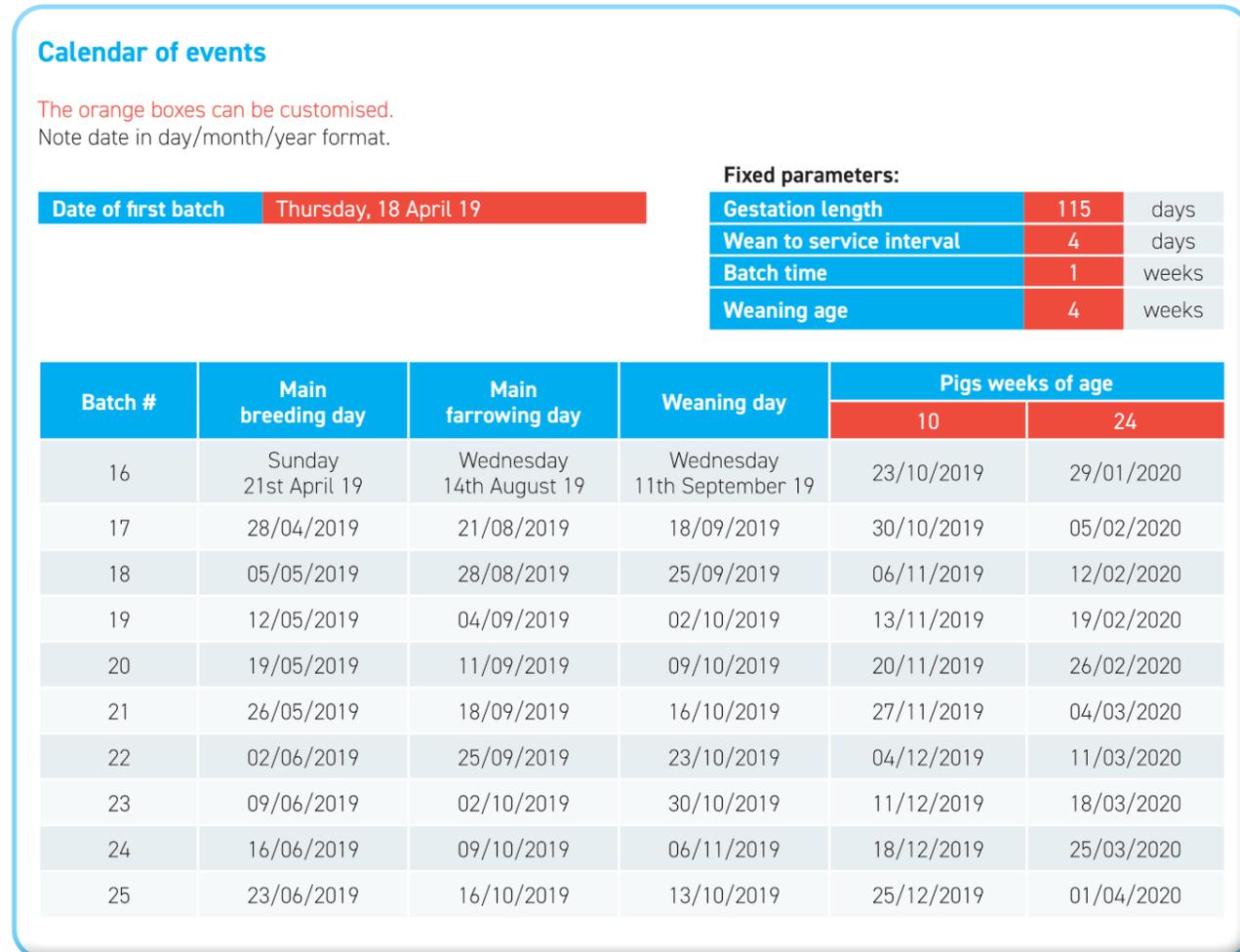
Table 1. Cycle duration

Duration of cycle	Time in days
Duration of gestation	115 days
Duration of lactation	28 days
TOTAL	147 days
	21 weeks per rotation



This can result in a very simple and useful calendar of events (Figure 2):

Figure 2. Example of a batch management using altrenogest.



Interval between batches

The interval between two consecutive batches will be determined by the time interval (in weeks) between the weaning of two consecutive batches of piglets. Essentially, it is determined by the interval between all the standard operations in any two consecutive batches rotated within the system.

Based on this parameter, the commonly applied batching systems allow weaning to be divided into a twice-a-week, once-a-week, or two, three, four, or five-week batch-management systems. Even so, other options, such as weaning every 10 days are also possible. However, the batching program eventually decided upon and applied must be biologically possible: for example, sows need to farrow into an empty farrowing space. In addition, the realities of cleaning and pre-room occupancy, especially in the farrowing area must also be respected.

Number of farrowing sections required

Occupation of the farrowing house (rotation) is defined by the time (in weeks) spent between one group entering a farrowing room and the arrival (and entry) of the subsequent group of sows into the same room. This parameter defines how many sections will be necessary in each of the respective farrowing areas (Table 2).

Table 2. The important time-interval parameters.

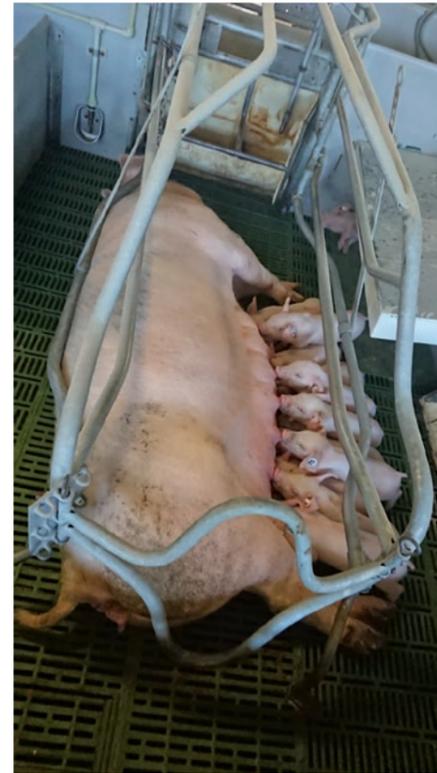
Weaning	Occurs on a fixed day in the week so the farrowing room occupancy in days must be a multiple of 7
Cleaning	After weaning, two days are required for cleaning (although this is variable)
Lactation length	The normal average lactation length of commercial sows is 28 days

This plan results in 30 days of occupancy; obtaining a number divisible by 7 results in 35 days. Thus, weekly systems allow sows to have 5 days' pre-farrowing occupancy:

- With a **1-week batch** combined with 28-day lactations, 5 weeks of occupancy required – thus, 5 farrowing sections will be required.

As the interval between batch weanings increases to 2, 3, 4, or 5 weeks, this impacts the farrowing sections required and the biological reality of the systems:

- With **3-week batching** the model becomes more complex as neither 4 nor 5 is divisible by 3.
- With **5-week batching** the easiest model is to have 1 farrowing section and to allow 28 days for lactation. However, the biological realities impact breeding and so, the breeding will be delayed by one week every 4th batch.



How big should a farm with batching be?

Many farms describe themselves based on the number of sows they farm. With batching this does not matter. **The number of females on a farm at any one point is determined by the batch farrowing rate and the number of batch farrowing places.** During hotter times of the year, which creates seasonal infertility, the farm needs to be larger to ensure all the farrowing places are filled 115 days later (Figure 3).

Figure 3. Herd size calendar.

Rate of change	1									
Batch farrowing per week	40	41	42	43	44	45	46	47	48	
Weaning age	4	weeks								
Lowest farrowing rate	82	%								
Approximate herd size	964	985	1019	1040	1061	1082	1116	1137	1158	
Farrowing house	200	205	210	215	220	225	230	235	240	
Breeding area	294	300	312	318	324	330	342	348	354	
Gestation area	400	410	420	430	440	450	460	470	480	
Gilt pool	70	70	77	77	77	77	84	84	84	

How do I use altrenogest to optimise my batching?

Altrenogest (Altresyn) can be used in three possible (proven) scenarios to improve batch management on the farm:

1 The gilt is about to come into oestrus

The signs of oestrus may be subdued by ovulation and the natural development of the corpus luteum. After 14 days the corpus luteum will regress, but oestrus is suppressed by the presence of altrenogest. When the altrenogest is removed, the natural oestrus cycle starts again.

2 The gilt is in mid cycle

The gilts are producing natural progestogens from the corpus luteum which will continue to produce progestogens until around day 14 of the natural cycle. After day 14, the corpus luteum will regress, but oestrus is suppressed by the presence of the altrenogest. When the altrenogest is removed, the natural oestrus cycle starts again.

3 The gilt is in the pre-ovulation follicular phase

The corpus luteum is regressing and the development of the next wave of follicles is starting. Following the administration of altrenogest, the production of Luteinising hormone (LH) reduces. Once the altrenogest is removed, the LH high/low cycle starts again, and oestrus occurs 4 to 5 days afterwards.



Conclusions

Knowing how altrenogest affects the cycle of gilts, we can assure that animals put into synchronisation will be ready to mate on the right day, and in sufficient numbers to be able to complete a batch. Therefore, among its many effects, the main benefit of altrenogest is that it allows the cost of production to be controlled by minimising the number of empty farrowing batch places. **It's simple: an empty farrowing batch place represents the loss of 12 piglets from the finished batch!**

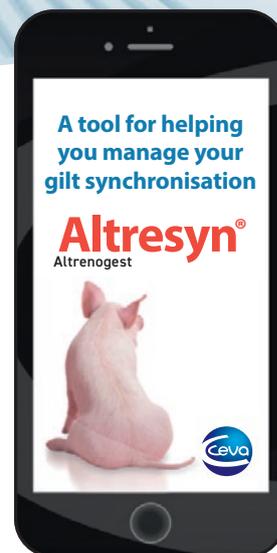
Altrenogest allows the production team to take control based on the synchronisation possibilities described above. Once producers realise the true value of reaching their batch breeding targets, they can (and must) take control of their gilt pools to reach their batch breeding targets. Therefore, it is vital to know how many gilts will cycle and on which day.

Please note that recommendations could vary depending on the specific breeding programmes and type of genetics applied on your farm.





Download the new
Altresyn app here



Altresyn 4 mg/ml Oral Solution for Pigs: Active Ingredient: Altresyn® contains Altrenogest for the synchronisation of oestrus in sexually mature gilts. Please refer to the product packaging and leaflets for information about side effects, precautions and warnings. Legal Category: UK POM-V. IE: POM. Further information is available on the SPC.

Use medicines responsibly (www.noah.co.uk/responsible). Advice should be sought from your prescribing veterinary surgeon.

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