

Pig Production

Sow: a female pig that has had a litter of bonhams

Gilt: a female pig that has not had a litter of bonhams

Boar: an uncastrated male pig

Bonham: a baby pig or piglet

Farrow: give birth

Key points (points to remember):

- Length of oestrus: 21 days
- Duration of oestrus (standing heat): 2-3 days
- Length of gestation: 115 days (3 months, 3 weeks and 3 days)
- Average litter size: 11
- Weight of bonhams at birth: 1-1.5kg
- Bacon slaughter weight: 80-90kg (6 months)
- Reach puberty at 5-6 months
- Mature pigs (sows, boars) 140-200kgs

Pig Breeds

- The Landrace breed:
 - The Landrace breed are large, long, white pigs that were originally imported from Denmark.

- The Large White Breed
 - The Large White breed (also known as the yorkshire breed) originated in England.
 - They have erect ears in contrast to the floppy ears of the Landrace breed.

Landrace :	Large white :
Danish breed	British breed
Good conformation	Highly prolific
Long body, good carcass length.	Fast Growth rate
Small shoulders	Good meat quality

Floppy ears	Good food conversion ratio
Large horns	Upright ears

Duroc:

- American breed
- Crossed with Landrace and large white to maximise hybrid vigour.
- Suitable for outdoors less prone to sunburn
- Terminal sire. (is used in a crossbreeding system to produce progeny with high growth rates and good carcass quality)

Characteristics:

- ❖ Pigs have no sweat glands to act as a cooling system so they wallow in mud to keep themselves cool and keep flies off.
- ❖ They have very small eyes so a keen sense of smell helps them locate food.
- ❖ Their tails are like a corkscrew and their voice takes the form of a grunt or a squeal.

Criss-Cross Breeding:

- The ideal sow in pig production is a crossbred Landrace- large white.
- Criss-Cross breeding is employed in pig production to roughly maintain the best characteristics from both breeds in a cost effective manner without any loss in hybrid vigour.
- Purebred Large White and Landrace boars are employed in this criss-cross breeding strategy.
- First generation crossbred gilts from two purebred pigs (LR x LW) are used to start the breeding program. These crossbred gilts have 50% of their genes from the Landrace and 50% from the Large White; thus they exhibit hybrid vigour.
- Best females from litter are kept for breeding.
- The breed of boar is alternated at each mating to maintain hybrid vigour.
- Some hybrid vigour is lost with each generation.
- Boars must be replaced every two years to prevent inbreeding.
- Less expensive to replace boars than the whole breeding herd.

Establishment of criss-cross breeding:

- **First generation:** A crossbred gilt is mated with either a LW or LR boar. In the example below, a Landrace boar is crossed with the crossbred gilts. The best females from this litter are kept as replacements for breeding purposes.

- **Second generation:** The replacements from the above cross are mated with a Large White. This maintain hybrid vigour.
- **Third generation:** The best gilts from the cross in the second generation are kept for breeding purposes and will be bred by a Landrace boar. This continuous switching of boars is maintained with every successive generation. However, there is some hybrid vigour lost along the way. Under this system the boars must be changed every two years to prevent inbreeding. Many pig production units in Ireland use AI (artificial insemination) but still have to maintain a boar.

Table 40.1 Criss-cross breeding in pigs

Sire	Crossed with	Dam	Progeny/offspring
(1) LR	×	LW-LR (F1)	LR -LW-LR
(2) LW	×	LR-LW-LR	LW -LR-LW-LR
(3) LR	×	LR-LW-LR-LW	LR -LW-LR-LW-LR

Bacon Production:

The majority of pig production in Ireland takes place in integrated pig production units. Here the pigs are born and reared for slaughter. This reduces the movement of pigs between farms and decreases the risk of diseases entering the farm. The rearing of pigs on these farms primarily takes place indoors. For LC purposes, all of the following sections deal specifically with pigs raised in an integrated pig production unit.

Overview of a sow's production year



Criteria for the selection of replacement gilts

- ❑ Gilts that come from mother who are good milkers.
- ❑ Correct body weight and BCS
- ❑ Good conformation
- ❑ Good feet and legs: animals with abnormal toes or legs are more prone to lameness
- ❑ Gilts that have 12 or more evenly spaced, well developed teats
- ❑ Gilts have reached puberty and have started to oestrous cycling
- ❑ Gilts are healthy.

Dry sow house

- Sows and gilts are housed in the dry sow house
- The boars are also housed in the dry sow house. The boars must be in sight and smell of the sows, as pheromones released by the boars encouraged both the gilts and the sows to come into oestrus (heat).
- A sow that has previously had a litter and has been moved to the dry sow house after this litter was weaned will come back into heat 5-7 days later.
- The boars will detect a sow or gilt that is in heat.
- Increases conception rates and litter sizes.
- Sows and gilts should be loosed housed (kept in groups) from 4 weeks after service to one week before service.
- When a boar detects a sow or gilt in heat, that sow is double served within 24 hours, using either the boar or AI. Double serving helps to increase the litter size. If a sow comes back into oestrus repeatedly, she is culled from the herd.
- Pregnant sows and gilts are kept in the dry sow house until one week before farrowing. They are fed 2.5kg of dry sow ration per day. In the final 3-4 weeks prior to farrowing, the sows are fed 0.5kg extra ration per day. Steaming up the sows at this stage ensures that the sows have good milk production and produce healthy bonhams. Dry sow ration contains 17.5% crude protein, 4% fibre and 1% lysine.

The following must be ensured in all houses:

- Fresh water supply
 - Hygiene
- Suitable temperature
- Good insulation/ low roof
- Ventilated and draught free
 - Adequate space
- Adequate removal of waste
- Access to clean feeding area

Housing:

1. Farrowing house
2. Dry sow house
3. Weaner house
4. Fattener house

Farrowing house

- Before the pregnant sows and gilts are moved into the farrowing house, they are washed and disinfected. They are deloused and dosed for endoparasites (roundworms and tapeworms). The sows should also be vaccinated.
- The farrowing house should be cleaned and disinfected and maintained at a temperature of 20 degrees C. The pregnant sow or gilt is placed into a farrowing crate.
- The farrowing unit has a creep area with an infrared lamp. The temperature of this area is approximately 30 degrees C. This creep area keeps the bonhams warm, as their small bodies lose heat easily. In addition, the infrared lamp attracts the bonhams away from the sow when they are not suckling, preventing them from being crushed. Bonhams are provided with additional feed (creep feed) in this area.
- The farrowing crate prevents the sow from crushing the bonhams. The farrowing crate allows movement of the sow and also allows the bonhams access to the sow for suckling.
- Heat pads under the piglets keep them warm.

Birth, suckling and weaning

- ❖ Bonhams have their teeth and tails clipped and will be given an injection of iron (to prevent anaemia).
- ❖ Potential replacement gilts will have their ears notched.
- ❖ The sows will suckle the bonhams for 4-5 weeks
- ❖ Sows are fed 1.8kg of suckling ration daily with 0.5kg of ration per bonham.
- ❖ After one week, creep feed containing 21% protein and 1.5% lysine is introduced to bonhams.
- ❖ Bonhams are weaned by removing them from the sow after 4-5 week.
- ❖ The sow is returned to the dry sow house.
- ❖ Sows return to dry sow house when bonhams are weaned at 4-5 weeks.
- ❖ The males are castrated.
- ❖ The piglets suckle colostrum the milk.
- ❖ The sow is fed a ration of 2kg per day which rises to 6kg per day.
- ❖ When they are sold at 6 months they weigh about 82kg.
- ❖ Sows can be mothers when they are less than a year old.

Factors that contribute to morality in bonhams

- Not vaccinating the sow
- Not giving an iron injection to the bonhams
- Having the farrowing house at the incorrect temperature
- Not using a farrowing crate
- Incorrect feeding of the sow
- Feed not containing lysine (an essential amino acid required by pigs).

Weaner management and feeding

- ❖ Weaner pigs are moved to the first-stage weaner house.
- ❖ They weigh 9kg on entering the house and are grouped according to size.
- ❖ They are fed link ration (21% protein and 1.45% lysine ad lib (first two weeks)) followed by weaner ration (18-20% protein and 1.3% lysine)
- ❖ After one month in the first weaner house they are moved to the second stage weaner house for another month.
- ❖ Weaners are grouped by size and remain here until they weigh 32 kg.

A sow is culled at 4-5 years old when health and litter size is declining.

Fattener House (finishing unit)

- ❑ Fatteners are grouped according to size and weight.
- ❑ They are fed a fattener ration (14-16% protein and 1.1% lysine)
- ❑ They are 6 months old
- ❑ Temperature of the fattener house is 22 degrees C.
- ❑ Fatteners remain here for 3 months until they reach a slaughter weight of 80-82 kg.
- ❑ Female that are selected for breeding purposes (replacement gilts) are house for a further 4-6 weeks, until they a weight of 100-140 kg. They are then moved to the dry sow house.

Pig Food

- Although pigs can eat all kinds of things (grass, weeds, snails and meat) they do best if they are fed on special mixtures of cereals (barley, wheat and maize) with some protein food such as fishmeal.
- Because pigs have a monogastric stomach all grains should be ground into meal for easier digestion (as opposed to rolled)

Carcass Grading for bacon pigs

- Quality control process for pig production is very strict.
- Profit margins are very small therefore achieving high carcass grade increases profits.
- Quality of carcass influenced by:
 - i) Breed ii) Diet
- Grades are assessed as follows:
 1. Depth of fat over shoulder
 2. Depth of fat over loin
 3. Lenght of carcass.
- Pigs are graded according to estimated lean meat percentage content.
- They are classified according to the scale on the table below
- The thickness of the back fat and muscle depth are measured and used to estimate the lean meat percentage
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Lean meat as percentage of carcass weight	Letter grade
60 or more	S
55 or more but less than 60	E
50 or more but less than 55	U

45 or more but less than 50	R
40 or more but less than 45	O
Less than 40	P

Integrated Production unit

An integrated pig production unit consists of:

- A breeding and rearing unit housing sows and bonhams
- And fattening unit bringing pigs from weaning to fattening all on the one farm.

Advantages:

- Lessens risk of disease entry
- Eliminates transports stress
- More profitable
- These unit demand good management skills from the farmer.

Two other types of Production

1. Some producers concentration on breeding only
2. Some concentrate on fattening only.

Need to know terms

1. A **breeding unit** involves sows giving birth to bonhams in a farrowing house. These bonhams remain with the sow until they are weaned at 5 weeks old and weigh 32 kg. Boars are kept in these units for breeding.
2. A **finishing unit** is also known as a fattening unit. The pigs in this system weigh more than 32 kg. They are raised until they reach slaughter weight at 82 kg. The age of the pigs in these unit ranges from 3-6 months

Pig Management

Feeding Management

- 70% of pig production costs are associated with feeding. Efficient feeding strategies are essential to make a pig production unit cost effective.
- Food conversion ratio (FCR/ Feed Conversion Efficiency (FCE)):
 - This is a measure of an animals efficiency in converting a mass of food into body mass or live weight.
 - E.g. A FCR/FCE value of 3.0 would indicate that an animal must consume 3 kg of food to gain 1 kg of weight
 - FCE target values for pigs production units:
 - Weaners: 1.75
 - Fatteners: 3.25

Food conversion ratio FCR

The lower the FCR the better the food efficiency i.e. The less food required the greater the profit.

Factors affecting FCR:

1. Diet
 2. Breed
 3. Health
 4. Housing
 5. Management
1. **Diet:** Food is used for-> i) Maintenance ii) Heat production iii) LWG. In pig production, the rations are specially formulated for the various stages of the stages of the pig's growth (creep feed, weaner ration, fatterer ration, dry sow, etc.). These feeds contain the correct protein, vitamins, minerals, etc. for the pig at its various growth stages.
 2. **Breed:** the ability of the boar to pass on low FCR values to offsprings. LW confers good FCR on its offspring. As a result, the offspring reach slaughter weight much faster and cost less to feed compared to a breed with a higher FCR.
 3. **Health:** Only healthy animals achieve potential to utilise feed efficiently. Health is dependant on management i.e. feeding, housing, disease control (husbandry). Healthy, disease free animals will have a low FCR. Pigs are regularly vaccinated against common diseases and dosed for parasites. The farrowing house, weaner and fatterer houses are regularly cleaned and disinfected.

All houses are well ventilated to minimise airborne diseases. The movement of pigs is in one direction. Fatteners are never moved back to the weaner house. This one-way movement reduces the risk of disease.

4. **Housing:** Housing reduces the body heat loss of animal therefore, food can be used for maintenance and LWG instead of heat production. In pig production, the various houses used are well insulated, with low roofs. This is to maintain the temperature of the house. Pigs will use energy from feed to generate heat to keep warm, thus increasing their FCR if they are cold.
5. **Management:** the skills of the farmer influence health and conditions of the animal which affect FCR. A farmer who maintains an efficient feeding regime and proper disease control will have a healthy herd with good FCR.

Target FCR values in pig production units

Stage of production	FCR value
Weaners	1.75 : 1
Fatteners	3.25 : 1

Housing temperature for pig production

House	Temperature (in degrees)
Creep area	30°C
Dry Sow house	20°C
Farrowing house	20°C
Weaner house	24°C
Fattener House	22°C

Housing

- Guidelines for housing management and disease control:

- Maintain units at appropriate temperatures
- Insulated housing to maintain temperature and keep well ventilated to minimise airborne disease
- Make available isolation units with comfortable bedding for sick pigs. Each unit should have water and should be washed and disinfected when the pig returns to the herd.
 - Power wash and disinfect all units between batches.
 - Pigs should only move in one direction to reduce the risk of infection. Pigs should never return to a house they have left.

Diet deficiencies

- ❑ Because pigs are reared indoors, there are some nutrients that they can be deficient in and these must be part of a balanced diet.
- ❑ Iron: (from soil) not available to indoor pigs
- ❑ Vitamin D: (from sunlight) as above
- ❑ Lysine: Essential amino acid acts as a growth stimulant, essential amino acid cannot be made in the body so must be supplied in the diet.

Enteroviruses (SMEDI)

- Gut borne viruses specific to pigs.
- Bonhams are protected from viruses by antibodies in colostrum.
- Viruses travel across the placenta in the absence of antibodies.
- Symptoms: Stillbirth, Mummification of embryos, Embryonic, Death and Infertility.
- There is no form of treatment for the disease.

Porcine Reproductive and Respiratory Syndrome (PRRS)

- A virus that kills macrophages that exist to remove invading bacteria and viruses. Lowers the pigs ability to fight disease.
- Symptoms: weight loss, emaciation, slow growth rate, bacterial infection.
- Treatment and control: no effective treatment, but strict hygiene policies, low stocking densities and prevention of cross- contamination between batches can control the spread of the virus.

Disease in pigs

- ★ Anaemia: cause by a lack of iron as pigs cannot get iron from soil indoors.
- Symptoms- pale skin, listless, scour, poor growth
- Prevention- a soluble iron injection given to 2-3 day old bonhams.

→ Treatment- iron injection but treatment is uncommon as iron injections are standard for newborn bonhams.

disease	cause	symptoms	treatment	prevention
Anaemia in bonhams	Lack of the mineral iron	Pale skin, weakness and scour and poor growth in first 2-3 weeks of life	An iron injection	An iron injection is given when bonhams are 2-3 days old.
SMEDI	Enteroviruses Gut-borne viruses	Stillborn bonhams, mummification of embryos and infertility.	No treatment	Routine vaccination of sows
Internal parasites	Roundworms and tapeworms	Coughing, vomiting, diarrhoea and loss of condition	Dose pigs	Dose every 6 months
Porcine reproductive and Respiratory syndrome (PRRS)	Cause by a virus	Respiratory problems, loss of appetite, early farrowing, stillbirths and weak bonhams.	No treatment	Maintain biosecurity (avoid buying in stock) and vaccinate all animals.
Coliform scour	E. Coli bacteria Lack of hygiene in housing units	Scour, dehydration and weight loss in weaners.	Antibiotics and rehydrate with fluid replacement solutions	Maintain high standards of hygiene and avoid sudden changes in diet.
Erysipelas	Bacteria	1.Fever. Abortion of bonhams. 2.Mummified piglets 3. Stillborn piglets 4.Raised red lumps on skin of the sow	Treated with antibiotics	1.Clean water supplies 2.Clean housing: bedding, dung, fed and water can harbour the bacteria 3.Vaccinate sows 4.Bonhams

				under 8-12 weeks are protected by the antibodies in the sow's colostrum
Leptospirosis	Bacteria	<ol style="list-style-type: none"> 1. Poor conception rates in sows 2. Stillborn bonhams 3. Weak newborn bonhams (that often die later) 4. Abortion of bonhams in late gestation. 	<p>Antibiotics</p> <p>Good hygiene; removal of urine: bacteria is spread in the urine of infected pigs.</p>	<ol style="list-style-type: none"> 1. Vaccinate 2. Control of rodents: if leptospirosis is transmitted to humans, it causes Weil's disease. 3. Ensure all brought-in-stock (replacement gilts and boars) are vaccinated.
Post-Weaning multisystemic wasting syndrome (PMWS)	Associated with porcine circovirus (virus)	<ol style="list-style-type: none"> 1. Disease seen in weaners 2. Symptoms usually seen between 6-8 weeks of age. 3. Weaners start to lose weight 4. Emaciated 5. Slow growth rate 6. Secondary bacterial infections 	No effective treatment	<p>Strict hygiene</p> <p>Low stocking densities</p> <p>Prevention of cross-contamination between pig batches</p>