

PRODUCTION



THE UNIVERSITY of EDINBURGH
The Royal (Dick) School
of Veterinary Studies

The Jeanne Marchig International Centre
for Animal Welfare Education

What you will learn: How different production systems impact on welfare of pigs

The differences in the life cycle of wild pigs in nature and pigs in commercial farms.

How most commercial farms for pigs are structured and managed.

Main welfare issues to look for in the pig industry and opportunities to promote positive animal welfare.

Life cycle of pigs

and common

production systems

This brief introduction to the production cycle of pigs aims to help you understand the broader welfare issues as they relate to the different age/developmental stage of pigs. It will also help you to understand the different housing systems used in pig farms, since they are normally structured based on the animals' sex, age and weight.



Life cycle of wild pigs (*Sus scrofa*)



Wild pigs, also known as wild boars, live in a small group made up of related females and her offspring. Female wild pigs reach sexual maturity at around 10 months and male wild pigs at around 5 to 7 months.

Once male pigs become sexually mature they leave their family group and form smaller bachelor groups. Adult males usually live in pairs or are solitary and only join the female group during the mating season, but may also continue to live in small bachelor groups.

Pigs are capable of breeding throughout the year, but mating is usually dependent on the climate and food availability. The oestrous cycle of a wild pig lasts 21-23 days. The gestation period of the sow is 3 months, 3 weeks and 3 days, or 115 days. It is common in the wild for female wild boars to separate from the group 1 to 2 days before farrowing, searching for a suitable nest site. Wild boar females construct an elaborate nest of branches, grass and leaves in the day before farrowing in which they then give birth. The need to nest build remains a behaviour domesticated sows are highly motivated to perform.

Wild boar litter sizes can vary from 4 to 6 piglets per female in most populations, but a maximum of 10 piglets per litter has also been reported. The lactation period lasts for 60 to 137 days. After weaning, mothers resume the reproduction cycle to produce another litter. The family group stays connected during the post-weaning period, and young female pigs often remain in the maternal group. The typical longevity of wild pigs is thought to be 9 to 10 years, but this depends on predator existence and human activities in their home range. The oldest captive-raised pig on record is 27 years. The average lifespan of wild boars in hunted populations in Europe is very low; around 50% are younger than 2 years old and 50% older than 2 years old, rarely being older than 4 years old.

Prior to domestication, wild pigs were found across large parts of Asia, Europe and North Africa. Since domestication, feral pigs are now found across North America, South America and Oceania as well.

Life cycle of pigs in typical commercial production

The duration of the life cycle of pigs presented here is an average of the most reported in commercial farms. The duration of each segment of the cycle may differ depending on the genetics and management system adopted.

Parents/grandparents stock

Pig breeding programmes are formed by a three-step pyramid system (see image) consisting of nucleus herds, multiplier herds, and production herds (breeding stock).

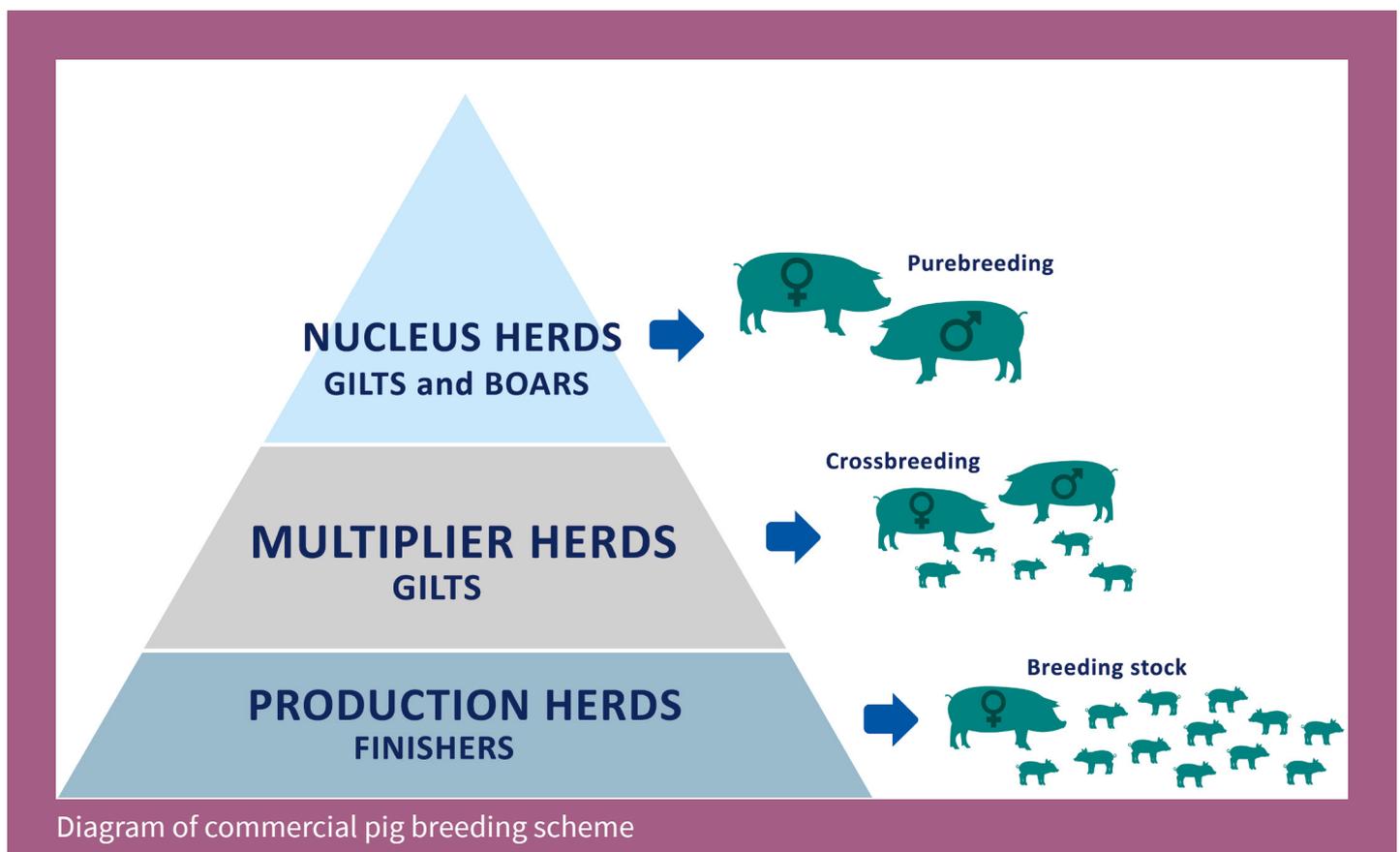
Nucleus herds – Purebred sows and boars are kept at high health and management level and are sold or provide semen to multiplier herds. The purebred animals are owned by breeding companies to protect the characteristics of their lines and the genetic improvement in these lines.

Multiplier herds – Purebred animals from different lines (which came from the nucleus herds) are crossed to produce crossbred animals (parent stock) that are sold to commercial farms to form production herds. Crossbreeds are used here to take advantage of heterosis and breed complementarity. Sows and sires are selected for desired traits and bred according to a specific selection criterion

defined by the company's strategy. For instance, a company may want to select lines for growth rate and back fat thickness and select another line for litter size or for carcass characteristics.

The traits selected will depend on the environment/system in which the production pigs will be reared and the desirable characteristics in the carcass. This also depends on the consumers preferences and will vary among different countries and cultures. More recently, genetic selection traits for pig industry have focused on robustness, which involves selection of animals that have an ability to adapt to different stressors, such as diseases, extremely hot or cold temperatures, low quality feed or transition from individual to group housing, becoming less stressed and performing better.

Production herds (breeding stock) – Commercial pig farms buy crossbred sows/gilts (female breeding stock) and sires (or semen of purebred sires for insemination) to produce the final crossbred animals (finishers), which will grow and be fattened in the farms. Some farms may not produce the finishers in their farms, they may buy piglets from other farms.



Biosecurity

There is a high probability of introducing new pathogens into the farm by introducing new animals into a herd. Therefore, some biosecurity practices should be in place, such as purchasing of new breeding animals from reliable sources and isolation of new animals (quarantine) before the introduction into the new herd. This can be complemented by selecting replacement sows/gilts or boars from a single source that has documented genetic improvement and programs of disease control.

Sows/gilts (female breeding stock)

Gilts normally come from maternal genetic lines bred for large litter sizes. They reach their sexual maturity at around 5 to 6 months and the breeding female pig is selected to enter the breeding herd at around this timing, or 135 to 150 kg in weight. At their second or third oestrus cycle, when they are around 6 to 8 months old, they are artificially inseminated or mated with a boar, called “served”. They have the same gestation period as their wild counterparts, approximately 115 days, and farrow a litter of 14-18 live-born piglets. The lactation period lasts for about 4 weeks with piglets artificially weaned with a typical range between 2 and 5 weeks. Around 4 to 7 days after piglets are weaned from the sow, she will return to oestrus and be served again to re-enter the breeding herd. The oestrus lasts for 2 to 3 days, and the reproduction cycle is 18 to 24 days long. The sow will be checked after this period to determine if she is pregnant, called “held serve”. In commercial farms, domestic pigs can produce 2.2 to 2.4 litters per year, and sows are commonly culled after 4 to 6 litters, or at about ~3.5 years of age. Sows are not kept for more than 10 litters commercially. After that, sows will be replaced by new gilts. Some farms will cull sows at a set parity to make room for new breeding stock.



Piglets, weaners and finisher pigs (slaughter generation)

New-born piglets compete to access functional teats and eventually establish individual attachment to their specific teat and maintain this attachment until weaning (known as teat order). Piglets are assembled by the sow (or signalled to assemble by grunting or squealing of the sow) and suckle together. A litter of piglets stay with their mother until weaning, or in some cases are artificially reared by humans, are cross-fostered to another sow or placed with a ‘nurse’ sow. Weaning age can vary among farms but is usually an abrupt event at around 4 weeks of age. At weaning, piglets are moved and regrouped across litters in a new pen, according to the size of the pen and their body weight, until they reach target weights for respective markets (e.g. ham or bacon). Strategies of genetic selection promote a continual increase in growth rate and feed efficiency in rearing pigs.

Finisher pigs are transported for slaughter at approximately 5 to 9 months old. This is usually when they reach the target live weight or age. Common target live weights may be between 110 to 123 kg depending on the production system, country and use. Meat processors will have different upper carcass weight limits and may have penalty structures if these are exceeded. Different suppliers may also negotiate different upper carcass weight limits.

Boar (male breeding stock)

The breeding male is selected at a similar stage to gilts. Boars may be used for natural mating with gilts/sows. On larger scale commercial farms, most females are artificially inseminated but boars are still kept and used for encouraging females into heat since they can influence sexual behaviour in female pigs through their visual, auditory, tactile and olfactory clues. Young boars may be kept together but will eventually be housed individually. They leave farms when they are too old for mating or when they have health or reproductive problems. When keeping boars for natural mating, it is important to avoid inbreeding, which is breeding of closely related animals. Increased inbreeding in a herd causes reduction in fertility, litter size and general viability, and leads to higher incidence of genetic abnormalities. Inbreeding can also cause loss of genetic variation.

Pig production

systems

A variety of different pig production systems exist worldwide, from the simplest with minimal investment, to large-scale market-oriented businesses. The Food and Agriculture Organization of the United Nations (FAO)/ World Organisation for Animal Health (WOAH)/ World Bank divided pig production systems into five categories, based on the size of herds, the production goals, feed sources and husbandry management.



Type A: Scavenging pigs

- The most basic traditional system of keeping pigs. Common in urban and rural areas of low- and middle-income countries.
- Pigs raised in this system are resilient for low-quality diet and poor hygiene conditions.
- Mostly reared for subsistence reasons, and are not a source of regular income for the household.
- Pigs may be housed during the rainy season or at night in a small shelter to protect them from severe weather conditions, predators or theft, but otherwise move freely.
- Minimal to no inputs on feed, labour or health care.
- High piglet mortality and poor food conversion rates.
- Painful husbandry practices are less common in these systems compared to other systems.

Type B: Semi-intensive system (backyard production)

- Small-scale farms producing pork for home consumption, local markets, restaurants, or retail chains. These can be common in rural and urban areas.
- The pigs are confined in simple pens, with separate pens for fatteners, boars, gestating sows and sows with litters. The floors of the pens are generally dirt, but they may be made of mud bricks, thatch or timber.
- Feeding sources include tree branches, leaves, crop residues, agricultural by-products or prepared feed (swill), and commercial feeds.
- Farms are family run, using family labour, and the pigs are raised primarily for commercial purposes.
- Feed conversion rate and daily weight gain are generally lower than in intensive production systems.
- Painful husbandry practices are less common in these systems compared to other systems.

Type C: Small- and medium-scale intensive systems

- Pigs are confined throughout their lives in a variety of housing types from simple pens to confinement in sheds with separate pens for fatteners, boars, gestating sows and sows with litters. Pigs may be kept in outdoor fenced units in regions with no severe cold seasons.
- Pigs may be kept alongside other animal, crop or horticultural species.
- Pig keepers need to provide feeding sources. This could include tree branches, leaves, crop residues, agricultural by-products or swill. Locally-sourced feeds constitute 30-50% of the pigs' diet.
- These systems often lack support from organizations and professional bodies for technical contributions or services. Therefore, the financial risks for the producer within this system can be high.
- Piglets may undergo several painful and stressful procedures such as resection of corner teeth, tail-docking and, for males, castration.



Type D: Large-scale intensive systems

- Farms are generally significantly larger than Type A, B or C systems, but they still vary in size.
- Farmers are more specialized raising only pigs in the premises. These more specialized farms can be farrow-to-finish type, where sows, piglets and fattening pigs coexist at one location, or raise only one production step at one property. For example: one farm for farrowing, another for nurseries, and/or separate farms for finishing.
- Pigs are normally housed indoors, in facilities that vary in structure, location, space allowance, floor type, ventilation, and manure storage. There are also some intensive outdoor systems.
- Most pig genetics in large scale pig production come from breeding pyramids (see Parents/grandparents stock.)
- The animals are kept together in groups according to age and weight, and groups are usually not mixed during their stay on the farm. When a group moves forward, the facility is completely emptied. This type of system is known as “all-in-all-out”.
- These large-scale pig farms may be family-owned, affiliated to companies or corporately owned. Labour is mostly hired.
- Piglets may undergo several painful and stressful procedures such as resection of corner teeth, tail-docking and, for males, castration.



Type E: Extensive systems

- Small- to medium-scale systems, with a combination of family and hired labour
- Pigs are reared in outdoor enclosures with shelter; however, housing varies according to the production phase. It is common to use individual shelters for sows with piglets (arcs) during breeding phase, with straw to build a nest.
- Compared to Type B, pigs are normally grass fed during fattening phase, and fed concentrate diets with grass during other production phases.
- Breeds used are often local, but may still be selected for production traits.
- These farms can brand and sell pork for higher prices, since this production system have more added value, and can also have a larger range of other activities, including agro-tourism or hunting for example.
- Pigs may undergo some painful and stressful procedures such as nose ring placement (in adults), tail docking in piglets and, for males, castration¹.



¹ While painful husbandry practices do occur, they are often not permitted in production systems labelled 'organic' (restrictions are often based on assurance or labelling schemes, rather than legislation).

Production Units

Pig farms using the confinement systems, such as Types C and D cited above and some Type E systems too, often separate pigs into different units depending on their production stages. Common examples of these units are:

- Mating unit – Where sows are placed after weaning of the previous litter and stay for 4 weeks or until next pregnancy.
- Gestation unit – Where pregnant sows are kept until about a week before giving birth.
- Farrowing unit – Where farrowing sows are placed to give birth to the litter. They stay in this unit until artificial weaning of the litter and move back to the mating unit or may be culled.
- Weaner unit – At weaning, the litter of piglets, now called weaners, will be moved to a weaner unit and stay until reaching approximately 25 to 30 kg in weight.

- Rearing unit – Where weaners are moved to and stay until slaughter. Pigs in this unit are called rearing pigs, growers, fattening pigs, finishers or slaughter pigs.

Combinations of these production units can also be found in pig farms, such as contract rearing systems (also known as “bed-and-breakfast” arrangement). Contract rearing farms will raise newly weaned piglets until they are moved to other accommodation for finishing or until they are taken to slaughter.



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