RSPCA APPROVED FARMING SCHEME
INFORMATION NOTES

PIGS

NOVEMBER 2018

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for all creatures **great** & **small**

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INFORMATION NOTES

PIGS

The RSPCA Approved Farming Scheme is part of the RSPCA's effort to improve the lives of Australia's farm animals. The RSPCA's animal welfare standards for pigs provide the requirements for housing, management, handling, transport and slaughter that must be met under the Scheme. The RSPCA encourages producers to exceed these Standards as the opportunity arises, commit to a pathway of continuous improvement in the welfare of their pigs and provide opportunity for enhanced welfare. These notes provide information about a range of aspects relating to the Standards and to pig production generally.

Pigs – production cycle

Pigs raised in Australia to produce meat may be reared under different housing systems. The vast majority of pigs are born and raised in indoor systems, a smaller number may be born outdoors and raised indoors, while some may be born outdoors and remain outdoors for their entire life. Some pig farms breed and raise pigs for meat, while others may focus on breeding only or specialise in raising pigs once they have been weaned.

The production cycle starts with the breeding herd which consists of gilts (female pigs that have not yet had a litter of piglets), sows (female pigs that have given birth to a litter of piglets) and boars (entire male pigs). Most female pigs are artificially inseminated. Boars are used for the collection of semen as well as to bring the female pig onto heat, to determine if the female pig is on heat, and/or to mate naturally when artificial insemination hasn't been successful or isn't used. Artificial mating in indoor systems may occur within a pen or in a mating stall (similar to a sow stall), where the gilt/sow may be kept in the mating stall for up to five days after insemination. In outdoor systems, the gilt/sow may be brought into a larger mating pen for natural mating, or be artificially inseminated in a smaller pen or stall after which she is released.

Boars are usually housed individually, whereas pregnant gilts and sows are mostly housed in groups. The use of individual sow stalls for entire gestation has been phased out in Australia in favour of group housing of pregnant gilts/sows. Group sizes may vary from small groups (up to 10 sows) to large groups (100 or more sows). Pregnancy lasts around 116 days.

In indoor systems, pregnant gilts/sows are moved to a farrowing crate (also known as a 'piglet protection pen') a few days to a week before they are due to give birth. Farrowing crates restrict the female pig's movements and do not allow her to turn around. Some indoor systems may have farrowing pens which provide freedom of movement but which may also allow the sow to be confined, particularly during the farrowing (birthing) process and the days immediately post-farrowing (when the risk of crushing piglets is highest) or to carry out husbandry procedures. In outdoor systems, pregnant gilts/sows are moved to farrowing huts located within an outdoor area or paddock. Usually, farrowing huts are bedded with straw and are big enough to allow the female pig to turn around easily.

After giving birth, the gilt/sow will remain in the farrowing crate/hut for 3-4 weeks, at which time her piglets are weaned and moved to weaner accommodation. Farrowing crates confine the sow but give piglets room to access the udder as well as a separate creep area away from the sow which keeps them warm and protected. Farrowing huts, on the other hand, allow the sow and her piglets (from around 2 weeks of age) to access the outdoor area. While in the farrowing environment, piglets in indoor systems will normally have their tails docked and some may have their sharp needle teeth clipped. Surgical castration, although uncommon, may also be carried out on male piglets in all systems.

Once weaned, the sow is returned to group housing and, shortly after, inseminated again and the cycle starts over. In indoor systems, the weaned piglets are grown out in group pens with concrete floors or slats with or without bedding or in large, deep-bedded shelters (also known as ecoshelters) with bedding made up of straw or rice hulls or the like. In outdoor systems, weaned piglets may be raised in similar bedded shelters with an outdoor area attached, or in outdoor areas with smaller shelters.

The weaned piglets are grown out for 5-6 months after which they are transported to an abattoir for slaughter. The meat from these pigs is used in the production of fresh pork products as well as bacon and ham (although the vast majority of bacon, ham and other cured pork products in Australia are imported). When sows and boars reach the end of their productive breeding life, their meat may be used for cured pork products such as salami. Other pork products include offal, blood products for human use, and ears, snouts and trotters for pet food, and pig hair for brushes.

The RSPCA Approved Farming Scheme standards aim to provide pigs with an environment that allows freedom of movement, the ability to meet natural behavioural needs and provide opportunity for enhanced welfare. Sow stalls and farrowing crates are not permitted under the Scheme and farrowing pens must provide materials and space to allow the sow to carry out nesting and other maternal behaviours as well as provide adequate protection for piglets. Mating stalls must not confine sows for any longer than required to carry out the insemination procedure. Boars must be given the opportunity to exercise and have contact with other pigs. All pigs must be provided with a dry, bedded lying area. Also, painful husbandry procedures such as tail docking, teeth clipping, and surgical castration are not permitted.

Aggression

Aggression includes a series of behaviours consisting of threats, attacks (e.g. biting and head knocking), escapes, defensive behaviours and usually conciliation. Aggression between unfamiliar pigs may occur between different classes of pig but may be particularly prevalent among sows when mixed post-weaning or post-insemination as well as among growing pigs when they are regrouped to weight/size/sex/age throughout the growing period or during transport and prior to slaughter

Aggression usually occurs when sows are establishing a dominance hierarchy within a social group whether these be dynamic or static groups, and, in order to reduce aggression, sows should be able to maintain stable social groups. Boars will also establish dominance hierarchies when grouped. Aggression among boars housed in groups can be reduced by only housing familiar boars together.

Lack of space and a barren environment can lead to redirected behaviours and stress in sows and growing pigs which, in turn, may develop into aggression. Providing more space so that subordinate pigs are able to avoid the dominant pigs, providing escape areas (e.g. visual barriers) and providing environmental enrichment can help reduce stress levels and associated behavioural problems. A strategy to reduce aggression among growing pigs is to co-mingle piglets prior to weaning. By allowing two or more litters to mix prior to weaning (at about two weeks of age) and to remain together after weaning, aggression is less prolonged.

Aggression may also occur once the dominance hierarchy has been formed, e.g. when dominant sows guard a valuable resource such as feed or foraging material, or drinkers. Aggression at feeding can be reduced if sows are fed to satiety, i.e. are not hungry, otherwise aggression may persist. The *Model Code of Practice for the Welfare of Animals: Pigs* requires remedial action to be taken if persistent bullying means that a pig is being deprived of food.

Aggression is a heritable trait, so selecting against aggression in gilts may help reduce overall aggression in the herd. However, selection against aggression needs to be better understood in terms of its impact on other traits and selection for reduced aggression should not replace due consideration of the pig's physical environment to address aggression issues.

Also see 'Group housing (static and dynamic groups)', 'Mixing'.

Animal welfare

The welfare of an animal includes both physical and mental states. Ensuring good animal welfare goes beyond preventing pain, suffering or distress and minimising negative experiences, to providing opportunities for animals to have healthy positive experiences and enhance their quality of life. Thus good animal welfare means providing animals with all the elements required to ensure their health and a sense of positive individual wellbeing.

RSPCA Australia encourages participation in independent certification schemes that improve animal welfare along the supply chain, i.e. on farm, during transport, and at the abattoir, and allow participants to demonstrate compliance with relevant codes/standards and legal requirements. Regular as well as unscheduled on-site assessments (including animal-based assessments) are important in ensuring farm animal welfare along with benchmarking and improving animal welfare along the supply chain, identifying and resolving animal welfare issues, and improving animal welfare standards. On-site assessments must include inspections by the relevant government authority as well as third-party audits.

Also see 'Five Freedoms'.

Animal Welfare Officer

The importance of good animal handling, stunning and slaughter at abattoirs cannot be overstated. Persons responsible for the handling (including stunning and killing) of animals must be appropriately trained and competent in their required tasks. An understanding of animal welfare is essential as is an understanding of animal behaviour and the ability to recognise abnormal behaviour and signs of distress. To ensure that animal welfare is monitored, abattoirs should appoint a designated Animal Welfare Officer, trained and certified by a recognised training organisation, who is present at all times when animals are being handled and who ensures that the required animal handling and management procedures are adhered to. The RSPCA Approved Farming Scheme requires that the abattoir nominates a designated person who fulfils this role.

Animal-based welfare assessment

The assessment of animal-based and resource-based indicators of animal welfare is an important part of continuously improving the welfare of animals, be that on farm, at the abattoir, or any other part of the production process. Assessing animal welfare based on animal characteristics is one way in which the extent to which an animal is thriving in the environment within which they have been placed can be determined. The RSPCA Approved Farming Scheme requires daily observations to be carried out in which the pig's appearance, vocalisations and behaviour are watched. These observations aim to reflect the areas on which a stockperson would subconsciously focus every time they look at an individual pig or walk through a herd of pigs. The welfare indicators are largely based on the AssureWel assessment protocol for pigs which RSPCA Australia strongly recommend pig producers implement.

See also 'Behaviour', 'Stockpersonship'.

Animal-based welfare assessment at the abattoir

The principle of continuous improvement in animal welfare also extends to the welfare of animals at abattoirs where, through regular internal self-assessments using measurable and objective criteria, a benchmark can be established. As such, the RSPCA Approved Farming Scheme Standards require a target to be set for each of the criteria to be assessed. The self-assessments should quickly allow a trend to be identified and thus any deviations from that trend to be recognised and acted upon. The aim for each criteria should be to achieve an 'excellent' rating as indicated in Temple Grandin's *Recommended Animal Handling Guidelines Audit Guide*, where there are no animals falling, there is very little vocalisation, and there is no ineffective stunning. Every effort should be made to improve animal handling beyond what Grandin's audit guide considers 'acceptable':

≤1% falls at unloading (a fall is defined as when any part of the body other than the legs touch the ground)

≤1% falls in plant (from lairage through to stunning)

≤5% vocalising (due to handling, restrainer, pig interaction)

≤1% vocalising due to hot wanding (at electrical stunning) (hot wanding is defined as the electrical stunning device being activated before it is in full contact with the pig)

≤1% inaccurate wand placement

≤4% overloaded gondolas

100% insensible on bleed rail (anything less is considered an audit fail).

Antimicrobials

An antimicrobial is an agent that kills or stops the growth of microorganisms such as bacteria, viruses, fungi, and parasites. The World Organisation for Animal Health does not include anthelmintics, disinfectants or antiseptics in their definition of antimicrobial agents. Antimicrobials may be used

therapeutically for treatment of a diagnosed disease or injury, or they may be used prophylactically to prevent the occurrence or spread of disease. Ionophores (compounds containing antimicrobials not used in human medicine) and non-ionophores are classed as antibacterial agents. In other words, they are a category of antimicrobial.

Where antimicrobials are administered preventatively (e.g. through the use of ionophore or non-ionophore coccidiostats to improve gut health), this may mask the impact on animals of poor housing and management conditions as well as contribute to antimicrobial resistance which occurs when microorganisms continue to grow in the presence of levels of antimicrobial agents that would normally stop their growth or kill them.

The RSPCA supports the responsible use of antimicrobials. Preventative use of antimicrobials (including coccidiostats) is strongly discouraged under the RSPCA Approved Farming Scheme standards for pigs. Where antimicrobials are used, an Antimicrobial Stewardship Plan is required to be in place and updated yearly in order to demonstrate responsible antimicrobial use. Some strategies to implement in disease prevention include good shed hygiene and farm biosecurity, reducing stocking density, avoiding preventative use of antimicrobials, vaccination, effective shed ventilation, appropriate feeding and the use of effective antibiotic alternatives. The aim is to see greater focus placed on optimising the animal's environment, on good animal handling and appropriate management practices to reduce reliance on antimicrobials (particularly where they are used preventatively).

Public reporting of antimicrobial use (including coccidiostats) in every livestock sector would provide transparency to consumers while allowing industry to demonstrate commitment to their responsible and prudent use. At the same time, surveillance and public reporting of antimicrobial resistance is needed to monitor the effect of antimicrobial reduction on prevalence of antimicrobial resistance.

See also – 'Biosecurity', 'Health and disease'.

Bedding

Bedding provides physical comfort and aids in thermal regulation and comfort in pigs. Pigs may spend around 80% of their time lying down and have been shown to prefer soft flooring over concrete. Thick, dry bedding may be useful for helping to avoid heat loss, thereby preventing cold stress. On the other hand, bare floors are preferred when temperatures are high and pigs need to cool off. Bedding can come in many different forms e.g. straw, rice hulls, wood shavings, recycled paper etc.

Bedding may have different uses and effects for different classes of pig. For example, for piglets in farrowing pens, straw is less abrasive than rubber mats or concrete, thereby reducing skin injuries, and straw provides a cushioning effect, reducing bruising of the soles of the feet. Generally, lack of bedding is associated with foot damage, leg injuries and movement disorders (lameness) in pigs. For sows about to farrow, straw bedding allows her to carry out innate nest-building behaviour. Sows have also been shown to have a preference for farrowing in a bedded area and maternal behaviour is improved when straw is available. Thick straw bedding also provides protection from crushing for piglets in the farrowing environment. This may be less of a concern in indoor farrowing pens where, for example, roll bars may provide protection from overlays. Similarly, in indoor farrowing pens, straw may be less important for thermal comfort as, depending on the system, different parts of the pen are usually heated to suit the differing needs of the sow and the needs of the piglets.

Providing bedding can have a marked impact on pig behaviours compared to barren housing. Pigs provided with straw are more active, show play behaviour and explore and forage (sniffing and rooting behaviour) more. Straw could therefore be one factor in influencing negative behaviours such as aggression and tail biting. Oral stereotypies such as bar biting or sham chewing may be seen in sows that are feed-restricted and housed in barren environments where there is no opportunity to forage. The provision of straw may help increase satiety and reduce the occurrence of these oral stereotypies.

See also 'Environmental enrichment'.

Behaviour

The behaviour of the domestic pig still very much resembles that of its ancestor the wild boar. When given the opportunity, domestic pigs will interact with other pigs and carry out a range of behaviours including rooting, exploring, grazing, dunging away from a nesting site, and wallowing. Failure to provide for the innate behavioural needs of pigs is a key welfare concern in commercial pig farming systems. In their natural habitat, pigs live in reasonably stable social groups with several sows and their offspring. Boars tend to be solitary except in the mating season when they join the group. The social hierarchy is maintained through dominant and submissive relationships within the group.

Soon after birth, piglets establish a teat order through intense competition among littermates, with the dominant piglet (usually the heaviest, healthiest piglet) firmly placed at the front teats. This teat order is maintained throughout lactation and post-weaning if the piglets are able to stay together as a group. In the wild, piglets are weaned at up to 5 months of age, where the sow begins to terminate sucklings from about 10 weeks of age, whereas in commercial pig farming, piglets are weaned from 3 to 4 weeks of age.

Introducing new pigs into an established group may result in aggression (including nosing and biting) over a period of several days until a dominant and subordinate relationships are established. Sows will also be aggressive but much of the aggression among pigs is based around access to food and other resources as well as limited space allowance and preferred lying areas.

In their natural habitat, pregnant sows will separate themselves from the group a day or two prior to giving birth and seek a site to build a nest. The sow will lie on her side while giving birth, and the piglets make their own way to one of the sow's teats without any assistance from the sow. A sow will nurse her piglets about once every hour with milk letdown lasting 20 to 30 seconds. After a few weeks, the sow and her piglets re-join the group.

Pigs are mainly active in the early morning and in the evening, and much of the behaviour (e.g. resting and feeding) carried out by pigs is synchronised. In commercial pig farming, feed is a standardised ration and consumed quickly. In the wild, pigs spend a lot of time foraging for feed and will eat a varied diet high in fibre. Pigs will use trees and wallows to keep their skin in good condition but also to provide shade and keep cool in warm weather. In cooler weather, pigs will huddle together, lying on their sternum with their legs tucked in; to keep cool in warmer weather, pigs lie on their side with their legs outstretched.

See also 'Aggression', 'Environmental enrichment', 'Farrowing crate', 'Mixing', 'Stocking density', 'Wallowing'.

Boar management

In pig farming systems, boars may be used for the collection of semen as well as to bring the female pig onto heat, to determine if the female pig is on heat, and/or to mate naturally when artificial insemination hasn't been successful or isn't used. The boar's ability to mate is not affected by season however, heat stress (e.g. as may be experienced in summer) or fluctuations in day/night temperatures of more than 10ºC do affect semen quality, in particular sperm motility. However, boars reared in groups (either all male or mixed) rather than individually have higher levels of courting and sexual behaviour. To avoid a failed first mating and a boar's potential future reluctance to mate, a small quiet gilt or sow should be used initially.

Sexual behaviour and the boar's ability to mate is also determined by management factors. Good management aims to avoid injury to the boar, including appropriate housing, appropriate mating or semen collection areas, and supervision at mating or semen collection. Patient and careful handling of boars has been shown to result in better boar performance and improved welfare.

A boar's ability to mate will also depend on its fitness level; fit mature boars can perform 6 to 10 services per week which is similar to their sexual activity in the wild. Boars, like other pigs, will establish dominance hierarchies when grouped. Aggression among boars housed in groups can be reduced by raising boars together when they are young and by only housing familiar boars together.

In the wild, mixing of unfamiliar pigs would occur gradually if at all. Where mixing is required, there should be space and barriers to allow boars to avoid or escape aggression or threats. Selection through breeding for reduced aggression may be a feasible option, although a full understanding of the effect of the social environment on boar behaviour and how selection for reduced aggression may affect other behaviours is needed. Selection for reduced aggression should not replace due consideration of the pig's physical environment to address aggression issues.

Biosecurity

The key objective of biosecurity and quarantine measures is to prevent or control the introduction and spread of disease regardless of whether pigs are housed indoors or have access to an outdoor area or pasture. Appropriate and effective biosecurity measures include hygiene, sanitation and disinfection procedures relating to the movement of all possible disease vectors including staff, visitors, equipment, supplies, and vehicles onto and between different sites and work areas. Further information on biosecurity practices in the pig industry can be found at www.farmbiosecurity.com.au and in the *National Farm Biosecurity Manual for Pork Production*. On quarantine measures, the national farm biosecurity manual for pigs states: "All introduced breeding stock with an unknown health status must be isolated from other pigs and observed for signs of disease for a minimum of 21 days."

See also 'Health and disease'.

Boar taint – see **Castration**

Body condition score

Body condition scoring is a useful tool for assessing pig health. A pig's body condition can give an indication of its general health which is affected by feed intake, stress, disease, housing, thermal comfort, and environmental conditions. If a pig is receiving adequate feed but is losing weight, then its health, or environmental conditions such as handling, heating or ventilation should be investigated. In pigs, body condition scores range from 1 (emaciated) to 5 (overweight). A body condition score of 3 is generally considered ideal for a sow during lactation and at weaning, allowing her to have adequate body reserves to nurse her piglets. A sow with a body condition score of 5 may have difficulty giving birth or suffer from leg weakness. Body condition should be observed in combination with other physical features of the pig (e.g. signs of lameness or disease) and the pig's environment, as well as individual pig behaviour and their interactions with other pigs. The *Model Code of Practice for the Welfare of Animals: Pigs* requires that action must be taken to improve body condition if the pig's body conditions falls below a score of 2.

Castration

As male pigs reach puberty, they start producing andosterone, a male sex hormone, and skatole, a digestive by-product formed in the intestines. The production of andosterone and skatole is responsible for boar taint, an unpleasant odour and taste found in meat from some (not all) entire male pigs. The risk of boar taint cannot be completely eliminated by slaughtering entire male pigs before they reach puberty. Overseas, boar taint prevention has consisted of physically castrating all male pigs whereas in Australia early slaughter and, more recently, immunological castration are more common, with physical castrates only making up a very small percentage of castrated pigs. Physical/surgical castration causes significant pain and is not permitted under the RSPCA Approved Farming Scheme standards for pigs whether carried out with or without pain relief.

Where it is considered necessary to castrate male pigs to prevent boar taint, the RSPCA supports immunological castration. 'Immunocastration' requires two doses of vaccine at least 4 weeks apart with the second vaccination administered 4 to 5 weeks before slaughter. The active ingredient in the vaccine is a protein that delays the onset of puberty by stimulating the pig's natural immune system to produce antibodies that inhibit testes function. By delaying the onset of puberty, male pigs cannot produce andosterone and skatole, which in turn significantly reduces the risk of boar taint being present in the pork product. Immunocastration significantly decreases the sexual and aggressive behaviour normally associated with testosterone production such as fighting, pushing, head butting and mounting which may result in stress, injuries and skin lesions. Therefore, the animal welfare benefits of immunocastration not only include the elimination of painful surgical castration methods but also significantly less aggression and other sexual behaviours relating to the onset of puberty. In some pigs, the effect of the vaccine will wear off within 8 weeks of the last vaccination and sexual behaviours will gradually return along with boar taint in the pork product.

Closed Circuit Television (CCTV)

The RSPCA Approved Farming Scheme standards for pigs require that CCTV be used to monitor those areas of the slaughtering facility where live animals are handled. CCTV should not replace the employment of people with the right attitude towards animals, comprehensive staff training and good stockpersonship. CCTV, however, is an excellent means by which facility management and auditors can monitor compliance with standards and regulations relating to animal welfare. CCTV allows problem areas to be identified and promptly addressed. It is important that a protocol is in place to determine the use of CCTV. Such protocols should include information about the positioning of the camera to allow a clear view of pig handling, stunning and slaughtering processes; the period for which the footage should be retained (3 months is considered good practice); the review of the footage and who should be responsible; and how the footage should be kept safe and secure. These protocols are well-described in the UK Farm Animal Welfare Committee's *Opinion on CCTV in slaughterhouses*.

See 'Handling', 'Stockpersonship'.

Cross fostering

Cross fostering is a common management practice which involves the transfer of piglets between sows in order to match the number of piglets to the sow's ability to nurse them. Cross fostering may be necessary where the number of piglets born exceeds the number of functional teats available to the piglets on the birth sow. For cross fostering to be successful, piglets should be with their birth sow for at least 12 hours following birth to ensure adequate uptake of colostrum thus providing the piglet with antibodies that help protect it from infectious diseases. The number of piglets transferred to a sow should depend on the number of functional teats that the sow has available i.e. number of teats that produce enough milk to raise a piglet.

Cross fostering also occurs to create a more uniform litter in terms of piglet size and weight. In this case, it is recommended to transfer smaller piglets to a sow that has a litter of smaller piglets and, preferably, also small litter size to reduce competition for teats. Cross fostering heavier piglets to a sow with her own heavier piglets has been shown to be less advantageous, with increased competition and subsequent disputes and missed suckling bouts resulting in overall reduced piglet weight at weaning compared to heavier pigs in mixed litters. Cross fostering should occur within 24 hours of birth to facilitate acceptance by the sow as well as reduced interference with the establishment of the teat hierarchy - piglets choose a preferred teat in early lactation and will drink from that teat at each milk let down.

See also 'Foster sow'.

Environmental enrichment

Providing environmental enrichment may be an effective strategy to improve animal welfare by enabling positive affective states and improving biological functioning, particularly where animals are confined indoors. Poor animal welfare occurs where there is a mismatch between the animal's needs and aspects of animal management and/or the animal's environment. However, environmental enrichment alone will not address this mismatch. Good animal welfare relies on meeting an animal's physiological needs (e.g. good health, good nutrition, comfortable housing), on good stockpersonship (e.g. low-stress animal handling, positive interactions), on providing for innate behavioural needs (e.g. in pigs, the ability to carry out foraging behaviours such as nosing, rooting and chewing), and on providing the opportunity to have positive experiences (e.g. through the ability to express play and social behaviour, to forage and explore, and, for sows, to express nesting behaviour and interact with their young).

In order to satisfy a pig's innate need to forage, enrichment needs to have certain properties, e.g. be ingestible, destructible, have a smell, and/or be chewable. For a pig to be interested in an enrichment material or object, it should be novel. Renewing and replacing objects and materials when they are no longer being used is essential to ensure pigs maintain interest and receive the benefits of the enrichment. Examples of enrichment objects include cotton cords, rubber strips, rope, wood, long branched chains, metal pipe, balls, edible enrichment block.

Providing substrate in which pigs can express foraging behaviour (exploratory activity directed at the ground involving rooting, grazing and exploring with the snout) is particularly important in indoor systems where tail biting and belly nosing can be reduced by providing preferred substrates such as hay, peat, mushroom compost, silage, sawdust and straw. Straw serves multiple purposes - bedding, nutrition, and enrichment. Straw may also reduce the frequency of undesirable behaviours such as aggression and tail biting. Long straw, rather than chopped straw, is more effective at reducing such behaviours as pigs are able to pick up and manipulate the long straw in their mouths. To maximise the positive impact of straw on exploratory behaviour, a minimum of around 250g of straw per pig per day is required.

Long straw elicits nest-building behaviour (consisting of pawing, rooting, pushing, carrying and arranging straw) in sows about to farrow as well as increases time spent lying down and reduces time spent performing stereotypic behaviours in barren environments. Nest building is affected by the amount of straw provided to the sow. At least 2kg of long straw is recommended to satisfy the sow's need to carry and manipulate materials for nest building. More straw as well as branches are required for a sow to be satisfied that she has built a 'complete nest'. Housing systems should be designed to manage the beneficial impact of environmental enrichment on pigs, including the ability to manage provision of straw as bedding and manipulable material.

Euthanasia

Euthanasia is defined in the RSPCA Approved Farming Scheme standards for pigs as humanely ending the life of an animal when it is in the interest of the animal's welfare (e.g. because they are weak, sick, injured, and/or unable to walk, and will not recover) and using a technique that avoids further pain, suffering or distress. Euthanasia should result in rapid brain death and the pig must always be immediately checked to ensure it is dead. Signs of death include no breathing (no chest movement), no corneal reflex (eye does not blink when touched), no muscle tone, no heartbeat, and no vocalisation. A minimum of three of these criteria should be met to confirm the pig is dead. Repeat the euthanasia method if there are any doubts.

Euthanasing piglets by blunt force trauma must result in immediate unconsciousness through destruction of brain tissue and relies on correct and effective application each and every time for it to be humane. Persons carrying out blunt force trauma can find it unpleasant, and operator fatigue and unreliability are potentially serious welfare risks for the animal concerned. The RSPCA Approved Farming Scheme standards only permit blunt force trauma for suckling piglets. It is strongly

recommended that alternative euthanasia methods, e.g. captive bolt, are adopted and that further development of non-aversive gas mixtures for the purpose of on-farm euthanasia is carried out.

The use of a firearm in the frontal or temporal position (or from behind the ear towards the opposite eye) or penetrating captive bolt in the frontal position are humane methods to euthanase pigs. Ensure that the correct cartridge and a sufficient calibre rifle is used, resulting in immediate death of the pig.

Persons carrying out euthanasia should be aware of the pig industry's guide on *Care of the Compromised Pig* and attend accredited training to ensure competency.

See also 'Training and competency'.

Farrowing crate (or Piglet Protection Pen)

A farrowing crate is a metal-barred pen that is similar in size to a sow stall but slightly narrower. The sow is moved into the farrowing crate a few days to a week before giving birth and is kept there until the piglets are weaned at 3–4 weeks of age. The crate has an area around it that the piglets can move into to avoid being crushed by the sow. The reason for using farrowing crates in pig farming systems is to protect piglets and maximise survival of piglets by preventing them from unintentionally being overlain (crushed) by their mother.

Welfare issues associated with the use of sow stalls and farrowing crates arise from the fact that pigs are intelligent, social animals, with a complex range of behaviours and needs. Pregnant sows are highly motivated to engage in nesting behaviours (nest seeking and nest building) prior to farrowing, but they are frustrated from carrying out this behaviour in farrowing crates, which do not provide bedding or nesting material or room to move freely.

The RSPCA Approved Farming Scheme standards do not permit the use of farrowing crates, but instead support the use of farrowing systems (e.g. farrowing pens) that provide freedom of movement and meet the sows' and piglets' behavioural and physiological needs; this includes the provision of a suitable enclosure with materials and space to allow nesting behaviour in the sow, and warmth and protection from crushing for the piglets.

See also 'Sow stall'.

Feeding

In commercial farming systems, pigs are fed a concentrated grain-based ration. The composition of the ration changes depending on the life stage of the pig. Lactating sows, particularly first parity sows (first-time mothers), may not eat enough to maintain body weight and meet the physiological requirements to produce milk. Consequently, these animals will mobilise body reserves and suffer from weight loss. Management of lactating sows should aim to maximise feed intake, and feed should be formulated to prevent such weight loss occurring. Piglets will usually have access to 'creep feed' while still suckling (pre-weaned piglets will also drink water if given the opportunity). Growing pigs are normally fed *ad libitum* whereas breeding animals (pregnant sows and boars) receive a limited ration usually fed once a day.

Restricted feeding is practiced to prevent breeding animals becoming too fat which, in turn, risks locomotion issues as well as problems at farrowing. Limited rations are eaten very quickly and chronic hunger is a real concern if these rations are not complemented by other feeds containing sufficient fibre that will allow the animal to feel satiated until the next feeding. Adding fibre to increase bulk increases feeding time (because fibrous foods take longer to eat and chew), reduces feeding rate and, importantly, can help reduce stereotypic behaviours. Examples of fibre-containing feedstuffs include corn, wheat middlings, sunflower meal, wheat and rice bran, citrus pulp, sugar beet pulp, soybean and oat hulls, wheat and barley straw, pectin, lucerne, and potato pulp. Of

these, it is actually the soluble fibres that are most effective at inducing satiety as their capacity to absorb and bind to water means they increase the volume of the gut contents. Examples of soluble fibres include sugar beet pulp, sugar beet pulp silage, soybean hulls, and potato pulp. In late gestation, sows should be fed at least three daily meals in order to have sufficient energy to complete the farrowing process and reduce the odds of stillbirths and the sow requiring assistance as well as the length of time required to give birth to all her piglets.

When hungry, breeding animals are strongly motivated to forage and when there is no suitable material or substrate available (e.g. straw or vegetation in an outdoor area), then this foraging behaviour and the need to chew may be redirected and instead be exhibited as aggression, stereotypies or restlessness. For sows in group housing, aggression at feeding time is related to competition for limited feed. So, in addition to ensuring access to feed, feeding systems should provide protection for each sow. In floor feeding systems, where feed is dropped across the floor of the pen, more dominant sows will defend their feed, and then eat the food of younger females who don't eat as quickly. Electronic sow feeders and full or partial feeding stalls aim to reduce bullying and competition for feed but do not fully eliminate aggression or the risk of injury among group-housed sows.

See also 'Feeding – electronic sow feeder'.

Feeding - electronic sow feeder

Electronic sow feeders (ESF) allow one sow to access a protected feeder at any one time, with the aim of reducing bullying and competition for feed. A computer identifies a sow from her individual radio frequency identification (RFID) tag and allows access to a pre-determined allocation of feed inside the protected feeder. Once a sow has had her daily ration, then the ESF will allow her access, but will not provide any additional feed. ESF therefore allow control of feed intake for a large number of individuals (groups of 40-60 sows per feeder) and can also track which sows may not have eaten.

There are a number of factors that need to be considered in regard to the management of ESF to ensure a good level of animal welfare is maintained. The feeding order for ESF systems is highly correlated to dominance hierarchy and remains relatively stable, even with dynamic groups, meaning that the same sows will visit the feeder at around the same time every day with more dominant sows tending to feed early in the cycle. The highest feeding activity occurs during the first half of the feeding cycle.

Sows are at risk of attack when queuing at the ESF, when entering the system and when exiting the system. Vulva biting may occur when a sow is chased though the system or when another sow is able to enter the system whilst a sow is already feeding. The ability for multiple sows to enter the system may contribute to higher incidences of injuries and bites.

Pen design is important for promoting movement through ESF systems that confine the sow. The design should encourage movement from the entrance to the exit and loafing area. The system should also reduce "recycling" of sows, i.e. sows entering the feeding station after their ration has been consumed. This can be reduced by preventing feed from being dropped/closing off the feed bowl, preventing entry to the feeder once the ration has been consumed or having a 'one pass' pen design.

Gilt training is vital to the success of the system. Gilts should be trained in smaller groups over about a week, ensuring that each gilt passes through the system each day. Once trained, gilts can be moved to a moderate size group before being moved to a large group. Systems must be in place to ensure lost or defective ear tags are quickly replaced and that back up feed is available in the event of mechanical failure. This is typically provided via floor feeding.

See also 'Feeding'.

Five Freedoms / Five Domains

The Five Freedoms were first mentioned in 1965 in a UK report on the Welfare of Animals kept under Intensive Livestock Husbandry Systems which stated that "farm animals should have freedom to stand up, lie down, turn around, groom themselves and stretch their limbs". Following the establishment of the UK Farm Animal Welfare Council shortly after, the concept was further refined into the Five Freedoms we know today. Criteria for assessing the welfare of pigs against the Five Freedoms include:

- Freedom from hunger and thirst — by ready access to fresh water and a diet to maintain full health and vigour
- Freedom from discomfort — by providing an appropriate environment including shelter and a comfortable resting area
- Freedom from pain, injury or disease — by prevention or rapid diagnosis and treatment
- Freedom to express normal behaviour — by providing sufficient space, proper facilities and company of the animal's own kind
- Freedom from fear and distress — by ensuring conditions and care which avoid mental suffering.

An overall welfare assessment can be made by looking at the pig's physical environment, its biological functioning and by observing pig behaviour in response to challenges in their environment. The latter, in particular, requires an understanding of normal behaviour and the ability to identify behaviour indicative of good and poor welfare. More recently, a new framework for assessing animal welfare has been developed called the Five Domains which emphasises the need to consider the mental as well as physical wellbeing of animals. Thus, animals are able to be assessed on the basis of whether aspects of their nutrition, their health, their housing and/or their behaviour affects their mental state either positively or negatively. For example, an animal housed in a barren pen may exhibit signs of frustration.

See also 'Animal welfare', 'Animal-based welfare assessment'.

Flight zone

The flight zone is effectively the animal's 'personal space' and is indicated by the distance an animal will allow a human to approach before moving away. An awareness of the flight zone allows a handler to move animals in a low-stress manner. A pig will move forward if the person stands on the edge of the flight zone at a point behind the pig's shoulder blades (this is referred to as the point of balance). A pig will move backwards if a person stands on the edge of the flight zone at a point in front of the pig's shoulder blades. Animals quickly learn that, if they move in the desired direction, a handler will move out of their flight zone.

See also 'Handling', 'Stockpersonship'.

Flooring

Flooring in all housing systems should provide a comfortable, non-slip surface that gives adequate support to the pig's feet without causing foot damage, entrapment, or injury. Floors that are abrasive (e.g. rough concrete) can cause abrasions or cuts and result in infection, and slippery floors can cause muscle and joint injury resulting in lameness. Inappropriate flooring can also result in injury or pressure swellings to the shoulders, teats, and hocks. Perforated or slatted flooring is a common feature of commercial pig production systems, however is often unsuitable for bedding due to the slurry system present underneath the flooring. Foot and leg injuries are generally lower

when pigs are provided with bedding or housed on soil. Flooring should also provide thermal comfort. Cold, wet surfaces may offer relief when temperatures rise, and bedded areas (e.g. straw) provide warmth when pigs get cold in cooler temperatures. Pigs prefer to defecate outside their lying/resting area and this should be taken into consideration when designing flooring systems. Sows have different temperature preferences during nest building, farrowing and lactation which also should be considered. Flooring with bedding or other substrate is important for farrowing sows in order to carry out nest building behaviours such as digging, rooting and hollowing out an area for a nest.

See also 'Bedding'.

Foraging

In the wild, pigs spend about 75% of their time foraging, including rooting, grazing, and exploring behaviours with their snout at floor level. Pigs in commercial housing systems continue to express such behaviours by exploring novel objects and environments even when feed is provided and easily accessible. In other words, foraging behaviour is not just related to feeding behaviour and feed requirements. Without sufficient space as well as material that they can use for rooting or manipulation, pigs' exploratory behaviours are often directed towards pen mates with poor animal welfare outcomes as a consequence including tail biting and stereotypies. Pigs raised outdoors or in deep-litter systems tend to show more exploratory behaviour and less re-directed behaviours than pigs raised indoors without enrichment.

See also 'Environmental enrichment', 'Feeding', 'Tail biting'.

Foster sow

A foster sow or nurse sow is a sow that is required to wean another litter of piglets after her own piglets have been weaned or removed. A foster sow thus experiences an extended lactation period and an extended period of confinement in the farrowing pen. If the number of piglets born exceeds the number of functional milk-producing teats on a sow (not uncommon with increasing litter sizes), then fostering piglets to sows that have fewer piglets or to sows that have weaned their own litter is one strategy to ensure that these piglets are adequately fed. If not carefully managed, i.e. selecting only foster sows that are in good body condition, the foster sow can lose body condition as a result of extended lactation. In addition, poor body condition can make the sow more prone to shoulder lesions. Wounds on legs and udders may also be observed. The extended period of confinement coupled with lack of space to walk freely may also be stressful for the sow. Foster sows should be monitored closely and additional feed provided and daily exercise to ensure that welfare is not compromised.

See also 'Cross fostering'.

Gestation stall – see **Sow stall**

Group housing (static & dynamic groups)

Pigs are intelligent, social animals, with a complex range of behaviours and needs. Group housing of gestating gilts and sows allows them to engage in exploratory and foraging behaviour, or to interact socially with other pigs. In commercial systems, sows are managed in either static or dynamic groups. A static group is a group in which gilts/sows remain together for the entire gestation period with no gilts/sows added once the group has been formed. A dynamic group is a group of gilts/sows whose composition frequently changes throughout the gestation period.

The composition of static and dynamic groups must take into account gilt/sow familiarity (mixing familiar animals may reduce aggression at mixing), size (uniformity), gestation stage (aggression, stress and injuries appear to be greatest if mixing early after insemination), parity, age (older

sows tend to be more aggressive and fight for dominance at mixing), number of gilts/sows, and temperament.

Group size, i.e. the number of animals within a pen or enclosure, may impact on the number of injuries (larger groups generally result in more injuries) but also needs to take into account the type of feeding system. For example, too many gilts/sows in an electronic sow feeder system will result in increasing frustration and aggression as animals have to wait to access the feeder. Key to successful group housing is careful management, particularly of low-ranking or smaller gilts/sows.

See also 'Aggression', 'Feeding – electronic sow feeder', 'Mixing', 'Sow stall'.

Growth promotion

In Australia, pigs may be fed ractopamine in the four to six weeks prior to slaughter to increase lean muscle deposition and improve growth. Ractopamine is a beta adrenergic agonist and is given to finishing pigs as a feed additive. An increased risk of downer or fatigued pig syndrome in pigs fed ractopamine, especially at a higher body weight, has been reported. Aggressive behaviours of pigs fed ractopamine have been found to be inconsistent in terms of prevalence and intensity, but pigs may be more stressed, have elevated heart rates, are more difficult to handle and may become unable to walk as a result of physiological responses to poor handling, particularly when given high doses. Pigs that had been on ractopamine for 5 to 6 weeks, have also been reported to spend less time walking and more time lying down. However, pigs in the earlier weeks of ractopamine administration were found to be more active. Pigs that are more difficult to handle are likely to be subjected to rough handling whether that be on farm or during transport or at the abattoir.

The RSPCA Approved Farming Scheme standards for pigs do not permit the use of ractopamine due to concerns for pig welfare.

In Australia, some pig producers may use porcine somatotropin (pST) to improve weight gain and feed conversion ratio (the amount of feed required to produce 1kg of pork) and to decrease fat deposition. pST is naturally produced in pigs, and producers use a synthetically-produced analogue of the hormone to treat growing pigs during the last four weeks prior to slaughter. Treatment with pST involves injections (daily or every other day) which are moderately painful to pigs. pST has to be injected because it becomes inactive when eaten and digested. In addition to the pain of the injection, risk of infection at the injection site (the muscle immediately behind the ear) is a potential concern.

Handling

People handling animals should have an understanding of pig behaviour and, when moving animals, understand the principle of using the pig's flight zone and point of balance to move the animal in the intended direction. Pigs must be handled competently and humanely at all times by people who have a positive attitude and behaviour towards the animals in their care – whether it is on farm, during transport or at the abattoir.

Pigs must not be subjected to rough handling, prodding, or use of dogs or electric goads. Pigs experience electric goads as aversive, evidenced, for example, by prodded pigs having a higher heart rate than those moved by a board; an increase in downer pigs when pigs are prodded multiple times; and, increased body temperature and blood lactate (an indicator of stress). When pigs are prodded with an electric goad, their response is to scream, or move away from the person using the prodder, or they may stop moving altogether. Instead, gentle handling aids such as plastic paddles and backing boards should be used. Alternatives to electric prodders, for example compressed air 'prods', should be investigated. In comparison to electric prodders, compressed air prodders do not result in the same increase in slips and falls, vocalisation, heart rate and blood lactate levels.

Transport is recognised as a stressful experience for animals and poor handling at this time can compound the effect of stress on welfare and on meat quality. At loading, for example, a pig's heart rate and blood lactate levels increase significantly compared to a pig at rest. Allowing pigs to walk side by side along walkways and up/down ramps, as well as moving pigs in small groups that don't fill up the races and ramps will reduce aggression and improve animal flow. Pigs are easily distracted by such things as shadows, moving objects, reflections, protrusions into raceways, people up ahead, etc., and all such distractions should be removed to facilitate smooth handling and animal flow.

Pig behaviour during handling is also influenced by pig-specific factors. For example, pigs raised outdoors that have never experienced concrete, may baulk when they are required to walk up a concrete raceway. Simply allowing pigs some time to explore the new flooring (or the unfamiliar environment), will reduce their fear and make it easier to walk animals along. Changes in light level may also cause pigs to baulk e.g. from a bright loading ramp onto a dark truck. Regular handling and contact with people during the rearing phase will also facilitate handling in novel situations, e.g. at loading for transport. Good facility design, including appropriate ramp slopes and ramp flooring, and gentle handling should allow for the loading process to progress without delay. In addition to the welfare considerations, pigs that have experienced stressful conditions prior to slaughter are likely to produce poor quality pork. The aim should be for pigs to have positive interactions with those handling them and it is well recognised that positive handling results in less fearful, more productive pigs.

See also 'Flight zone', 'Stockpersonship'.

Health and disease

Pigs must be protected from pain, injury and disease, through good management and husbandry practice, and by rapid detection and treatment of disease. Disease is a major cause of poor welfare and mortality in pigs. Therefore, it is essential to take all reasonable steps to minimise the likelihood of disease outbreaks. Ongoing adherence to established biosecurity protocols can help reduce the incidence of disease. Preventative treatment such as vaccination should be implemented where available in addition to ongoing monitoring by stockpersons who should be able to recognise early signs of disease including seeking veterinary or expert advice.

Newborn piglets are predisposed to anaemia as they are born with limited iron supplies and the sow's milk is deficient in iron. A lack of iron results in a lack of red blood cells which are responsible for carrying oxygen around the body. This anaemia, in turn, makes piglets susceptible to disease. To prevent health issues resulting from a lack of iron, piglets are commonly given iron via intramuscular injection (oral provision is less common) at 3-5 days of age.

Generally, the key risk factors for disease include stress, immunosuppression, overcrowding, overheating, poor hygiene and biosecurity, flooring type (and lack of a clean, dry lying area), manure system, poor nutrition, diet change (or insufficient feed and water), housing system, mixing of unfamiliar animals, group size, temperature variation, and poor air quality. Optimising the animal's environment and ensuring appropriate handling and management practices (including regular inspection of animals) will go a long way towards preventing disease. Some steps to consider include reducing stocking density, avoiding prophylactic use of antimicrobials, implementing an all-in all-out system, vaccination, effective shed ventilation, appropriate feeding, avoiding mixing, and breeding for robustness. The pig industry's guide on *Care of the Compromised Pig* is a good resource for helping stock people to identify and assess sick pigs and ensure they receive appropriate treatment.

See also 'Antimicrobials', 'Biosecurity'.

Identification (ear notching, ear tagging)

Ear notching is a practice used for the permanent identification of pigs, particularly (future) breeding pigs. V-shaped notches are placed on the outside of the pig's ear using notching pliers. The position

of the notch in the ear corresponds to a number, which in turn may correspond to the number of the pig's dam, the litter number, or a combination of the two.

Ear notching is an acutely painful procedure carried out without pain relief. Ear notching causes distress and pain as shown by intense vocalisation when the piglet is picked up, as well as head shaking and ear scratching following the procedure. Piglets that have been ear notched show greater pain-related behaviour (head shaking and ear scratching) than piglets that were only restrained, and piglets that received an intraperitoneal transponder injection (the transponder being an alternative identification method). Ear notched pigs vocalised louder than pigs that were ear tagged or had an intraperitoneal injection. One study found that within the first three hours following application of one notch, there is a significant reduction in pain related behaviour compared to ear tagged pigs which show no significant reduction. Head shaking and ear scratching behaviours have also been found to be more frequent in ear tagged versus ear notched (one notch only) pigs. Although painful, performing ear notching earlier is preferred.

Both ear notching and ear tagging are acutely painful. However, in practice, ear notching is carried out multiple times along both ears whereas ear tagging is carried out once (and legally required for identification and traceability when transported off farm) and is therefore preferable from an animal welfare perspective. For piglets that are ear notched, pain relief should be provided where available while, at the same time, options for alternative, pain-free identification methods must be investigated. The RSPCA Approved Farming Scheme standards require ear notching to be phased out on farms where it is still conducted.

Immunocastration – see **Castration**

Induction

In commercial pig production systems, gilts/sows may be induced (by stimulating uterine contractions) to farrow to synchronise the farrowing dates of pregnant gilts/sows. Synchronisation means monitoring by stockpersons can be conducted over a shorter time, reducing labour costs and increasing piglet survival rate, but also allows for 'all in all out' management systems. Induction may also occur to ensure sows farrow at a time when staff are present to assist both sow and piglets. However, even if sows are induced, the proportion of sows farrowing at the expected time can still vary significantly meaning that some sows will farrow when no or few staff are present. The most common hormone used to induce farrowing is prostaglandin. However, oxytocin, another hormone, may also be given following a prostaglandin injection to stimulate contractions and better control the time of farrowing. Oxytocin also stimulates milk let down.

Farrowing induction has been reported to decrease stillbirth incidences, but this can probably be attributed to increased monitoring at the time of birth as well as low piglet birth weight. Prostaglandins also increase piglet blood immunoglobulin retention and decrease malnutrition, probably by stimulating colostrum production. Prostaglandins induce natural behaviours such as nest building (adequate space and nest-building material should be provided to allow the sow to fulfil these behaviours) and have been reported to cause abdominal discomfort, and sometimes vomiting. Prostaglandins make little difference to the duration of farrowing. The use of oxytocin in addition to prostaglandins may result in an increased risk of dystocia, most likely due to the cervix not being fully dilated at farrowing. Dystocia is painful and may compromise welfare of sow and piglet and may increase risk of and sow and piglet mortality. Overuse or routine use of oxytocin has also been linked to reduced blood flow to the placenta risking hypoxia in piglets yet to be born. If induction occurs too early, i.e. not close to the expected farrowing date, then there is a risk of piglets being unviable due to premature birth.

Where induction is considered necessary, action must be taken to reduce the risks associated with the procedure. Where sows are induced to farrow, their breeding date should be known, they should be induced no earlier than two days before expected farrowing date, and they should be supervised closely at farrowing to ensure there are no piglets lodged in the birth canal. Pain management should be considered where farrowing is prolonged or difficult (e.g. dystocia).

Intermittent suckling

Under natural conditions, the lactating sow will spend increasing amounts of time away from her piglets. At around 3 weeks of age, the piglets will start trying solid foods before the sow and her piglets return to the family group. When the piglets are introduced to the family group, they mingle and socialise with piglets from other litters. This interaction with other piglets and sows reduces the distress experienced during weaning.

Intermittent suckling is a strategy used in commercial pig production that aims to mimic the periods of separation that a piglet would experience under natural conditions. Periods of separation from the mother encourage solid food intake in the piglets. Periods of separation from the mother and mingling with other litters also encourages exploratory and social behaviours. Intermittent suckling, where piglets are repeatedly removed from their mother e.g. in the week prior to weaning for 8 hours per day, has been shown to result in an increase in blood cortisol corresponding with an increase in activity among the piglets during the short separation period and no belly nosing or aggression. Weaning itself is still stressful, regardless of whether intermittent suckling is practiced. However, piglets that have been abruptly weaned tended to gain less weight in the week after weaning than piglets that had been more gradually weaned through intermittent suckling (and therefore increased solid feed intake) prior to weaning. This growth reduction post-weaning has been shown to be more pronounced in litters from primiparous (first time) sows. Research has also shown that intermittent suckling in the week before weaning combined with weaning at an older age (35 days rather than 28) can increase solid feed intake both before and after weaning compared to abrupt weaning at 28 days.

Piglet feed intake and daily weight gain can be improved by combining intermittent suckling with co-mingling of piglets from other litters prior to weaning. There is still further work to be done with regard to best practice intermittent suckling, however, as a guide, piglets should not be away from the sow for more than 8 hours in every 24-hour period, the total time of absence from the sow should be a continuous period and piglets should be born to multiparous sows.

See also ‘Weaning’.

Lameness

Sow longevity can be affected by lameness (difficulty walking) which is often a reason to euthanase sows. There are a number of factors that influence the prevalence and severity of lameness, including the type of housing, the type of flooring (e.g. slatted floors), management of the sow’s feet/toes, nutrition, as well as genetics. Lameness can also be caused by group dynamics, e.g. when frequently mixing group-housed sows. Lameness is painful with lame sows tending to lie down more, stand less and be more passive than non-lame sows. Staff should be trained to recognise early signs of lameness so that treatment can be initiated early.

Lighting

Light intensity and the provision of light and dark periods and areas should be based on the needs of the pig. A pig’s vision is wide-angled but the colour spectrum visible to pigs and the impact of coloured lighting on pig behaviour is not well understood. Pigs prefer to be in well-lit areas compared to darkness. By providing light of sufficient intensity, pigs are able to distinguish between familiar and unfamiliar pen mates which is important for maintaining social stability within groups. Well-lit areas are preferred for dunging. When resting or sleeping, pigs prefer to be in darker areas. Newborn piglets prefer dim or dark areas and piglets appear to prefer to sleep in the dark so light in the creep area should be switched off. A radiant heat source without light is therefore more appropriate for heating the creep area.

Light intensity may increase aggression and it is recommended that the light intensity is at least 80 lux during the light period to reduce aggression. It has been suggested that, in artificially-lit sheds,

pigs should be provided with a minimum light period of 14 hours per day. Flickering lights and non-functional lights in sheds should be replaced as soon as possible.

Lighting should provide the full visible light spectrum as close to daylight (white light) as possible and lighting systems that emit only select colours should not be used. Piglets raised in natural lighting have been shown to have lower blood cortisol levels at weaning compared to piglets raised in artificial lighting.

In artificially-lit sheds, consideration should be given to providing a gradual transition between dawn and dusk (e.g. by using dimmable lights) which would reduce competition for food and not all pigs are active at once when lights are suddenly turned on. Consideration should be given to providing pigs with lighting of varying intensity (e.g. dark, dim, daylight) to allow pigs to carry out activities in their preferred light environment.

Mating stall

A mating stall is a crate used to hold a sow for artificial insemination. A mating stall allows the gilt/sow to stand up or lie down but prevents her from turning around. In conventional indoor systems where pregnant pigs are group housed, sows may be placed in a mating stall immediately after her piglets are weaned. The sow will come into heat within days of her piglets being weaned, then be artificially inseminated, and remain in the mating stall for up to five days. The sow is then released into the group housing environment with other pregnant sows. Mating stalls provide sows with protection from aggressive encounters with other sows – which may occur when sows are mixed into groups after weaning or immediately after insemination. In recently inseminated sows, such aggression may lead to pregnancy loss. This is because aggression induces stress which can affect the hormones secreted at the time that the embryo is attaching to the uterine wall (called 'implantation') potentially resulting in pregnancy failure. The RSPCA Approved Farming Scheme standards allow the use of mating stalls only for the minimum time period required to carry out the artificial insemination procedure.

See also 'Aggression', 'Mixing'.

Mixing

Mixing of sows into groups following weaning or immediately after insemination disturbs the established dominance hierarchy. As the group re-establishes this hierarchy, aggression and sexual behaviours occur. The less space that sows have available, particularly in the days immediately after mixing, the greater the aggression and stress. By providing more space at mixing, aggression can be reduced. Sows may need up to 20m to escape aggression from a chasing sow.

In general, where mixing is required, there should be space and barriers to allow pigs to avoid or escape aggression or threats. Other provisions that can reduce aggression at mixing include sufficient feed, foraging material, bedding, and visual barriers, as well as mixing pigs as young as possible and avoiding introducing only one or two unfamiliar pigs into an already established group. Aggression at mixing is usually resolved within 2-3 days.

Allowing piglets to co-mingle before weaning reduces weaning stress but also results in pigs being able to resolve dominance relationships more quickly which, in turn, reduces aggression over the longer term. With gilts being at the bottom of the dominance hierarchy as they are smaller in size than mature sows, consideration should be given to grouping gilts separately. Mature boars that are not familiar with each other should not be mixed as they will fight. During transport, mixing of unfamiliar pigs should similarly be avoided.

See also 'Aggression', 'Group housing'.

Outdoor area

Pigs that have access to an outdoor area have the opportunity to fully express rooting, foraging, grazing and exploratory behaviours. When outdoors, pigs spend many hours every day exploring their environments and foraging. They are able to avoid aggressive behaviours from other pigs by moving away from each other. Where pigs are provided with an outdoor area or paddock, this area should be managed to optimise the health and welfare of the pigs as well as reduce any environmental impact resulting from nutrient deposition (pigs defecating and urinating) and land degradation (pigs rooting and foraging). Pigs given access to pasture or other area with vegetative cover will quickly remove any vegetation through their rooting and foraging, and this vegetation is unlikely to regrow while pigs are present.

Pigs will usually defecate and urinate in a localised area between the shed and the feeding/watering systems and, where available, the wallow. These nutrients may run off or leach into the soil and affect surface and ground water quality. Lack of ground cover exacerbates nutrient leaching and run off, but, in combination with pig rooting and foraging as well as vehicle movements across the outdoor area, can result in soil erosion and compaction. The extent of the environmental impact will depend on a range of factors, including soil type, climate, distance from water sources, the number of pigs with access to the outdoor area, and the extent to which outdoor areas are rested and able to recover. It is generally recommended that outdoor areas are rested every six months for breeders and every three months for growers, to allow for remediation work and removal of excess nutrients, e.g. through a cropping phase. The *National Environmental Guidelines for Rotational Outdoor Piggeries* and the *Nutrient Balance Calculator for Outdoor Rotational Piggeries* available on the Australian Pork Limited website are recommended for further reading. RSPCA Australia encourages participation in independent certification schemes that promote best environmental practice.

See also ‘Behaviour’, ‘Wallowing’.

Pest control

There are a wide range of pest control methods available. The methods vary greatly in their impact on animal welfare, with many causing significant pain, suffering or distress. Humane pest control is the development and selection of feasible control programs that avoid or minimise pain, suffering and distress to target and non-target animals. The preferred pest control method is one where the animal experiences no pain, suffering or distress. The pest control methods employed should be the most humane method available. Further, deterrents such as physical exclusion methods and the absence of elements that may encourage the presence of pest animals should be considered first.

Piglet protection pen – see ‘Farrowing crate’

Slaughter

For an animal to be killed humanely, they must be either killed instantly or rendered insensible to pain until death supervenes. When killing animals for food (termed slaughter), they must be stunned so they are unconscious and insensible to pain prior to bleeding out. All methods of humane killing, including slaughter and on-farm euthanasia, must meet the same criteria: death of an animal without panic, pain or distress; instant unconsciousness followed by rapid death without regaining consciousness; reliability; simplicity; and with equipment that is easy to maintain. A high level of operator skill is essential for the humane killing of animals. Operators must be trained in: animal handling; correct application of the killing method; and proper maintenance of equipment. At the very least, abattoirs should meet the Australian meat industry’s *National Animal Welfare Standards for Livestock Processing Establishments*.

See also ‘Animal Welfare Officer’, ‘Animal-based welfare assessment at the abattoir’.

Sow body size and litter size

The size of breeding sows has increased over the last decades due to genetic selection for fast growth, efficiency and leanness in their offspring. Sow body size has implications for a number of factors related to animal welfare, including space allowance provided in pens and farrowing huts, space in electronic feeders, design of races and laneways, space provided on transport vehicles, and for appropriate equipment at abattoirs.

Sows have also been selected for larger litters. The average litter size for Danish sows (Yorkshire x Landrace) was 14.6 in 2004 and 18.0 in 2016. In Australia, the main pig breeds are Large White, Duroc and Landrace which all produce large litters. The average litter size in Australian pig herds is around 11 piglets born alive, and the industry aim is to increase this number. Large litter sizes (total piglets born and total born alive) are a potential welfare concern for both sow and piglets due to increased piglet mortality, increased competition for viable teats, low birth weight in piglets, higher nutrient demands on the sow, and prolonged farrowing. Further, the larger body size of the sows and increasing number of piglets means there can be a higher risk of overlay, where the sow accidentally crushes piglets by lying on them. Consideration should be given to breeding for a smaller number of more robust and viable piglets as well as implementation of management strategies to care for the larger litters (e.g. colostrum collection, alternative milk provision methods, specialised creep feed, etc). Increasing the number of piglets born (and weaned) per sow may have economic benefits but breeding for production traits must not come at the expense of sow or piglet welfare.

Sow stall

A sow stall is a metal-barred crate that houses a single sow for all or part of her 16-week pregnancy. The floor of the stall is usually concrete, with a slat-covered trench for manure at the rear. A standard sow stall is just 2 metres long and 60 cm wide. This is just enough space for the sow to stand up in — she cannot turn around and can only take a small step forward or back. The Australian pig industry has committed to voluntarily phasing out sow stalls in favour of group housing for gestating sows. Where sow stalls are still in place, regulation requires that they not be used for more than six weeks in any gestation (pregnancy) period.

Most indoor pig producers currently house pregnant sows in groups until a week prior to farrowing when the sow is moved to a farrowing crate to give birth. After farrowing, the sow may be placed in a mating stall up to five days (for artificial insemination) and then return to group housing. Only a small proportion of pig producers use extensive systems, such as group housing in paddocks or in large semi-outdoor shelters. Sow stalls and farrowing crates are not used in extensive systems; rather, pregnant sows are housed in groups and farrowing sows are housed in huts where they remain until their piglets are weaned.

Welfare issues associated with the use of sow stalls arise from the fact that pigs are intelligent, social animals, with a complex range of instinctive behaviours and needs. Pigs that are confined in sow stalls have no opportunity to engage in exploratory and foraging behaviour, or to interact socially with other pigs. As a result, they show high levels of abnormal behaviours (stereotypic behaviours) where they perform an action repetitively (such as biting the bars of the stall and swaying their heads) and have unresolved aggression as they are unable to establish a dominance hierarchy.

Sow stalls can also cause physical problems for the sows. Because sows in stalls are unable to exercise, their muscles and bones deteriorate and they can have great difficulty in standing up or lying down. The RSPCA is opposed to the use of sow stalls because of the physical restrictions and adverse effects on movement, behaviour and health, and a lack of social interactions. Sow stalls are not permitted under the RSPCA Approved Farming Scheme standards for pigs. Pregnant sows can be successfully housed in groups, provided that they are properly managed and have sufficient space to avoid aggressive encounters.

See also ‘Farrowing crate’, ‘Group housing’, ‘Mating stall’.

Split suckling

Split suckling is the practice of temporarily separating heavier piglets from the sow within the first day of birth, while leaving lighter piglets in the litter to suckle with less competition at the udder. Split suckling is carried out within 24 hours of birth to maximise colostrum intake and improve the chances of survival for smaller piglets, particularly in large litters. Antibodies in colostrum, which are important for the piglet's immune function, are best absorbed within 6 hours of the piglet's first feed. After 24 hours, the ability of the piglet's gut to absorb these antibodies is negligible. An effective strategy is to remove heavier piglets for two hours and allow the smaller piglets two to three milk let down events to suckle. Smaller piglets may need assistance to find the front teats where milk let down is likely to be greatest.

See also 'Cross fostering', 'Foster sow', 'Intermittent suckling'.

Stocking density

Animals need enough space to ensure they remain physically healthy and can carry out normal behaviours. Space allowance should enable animals to exercise, explore and express social behaviours. Growing pigs with sufficient space to all lie down in lateral recumbency (on their sides with legs outstretched) at the same time in their pens have been shown to have better average daily weight gains and improved feed conversion ratio compared to pigs with less space. The ability for pigs to have sufficient space to all lie down in lateral recumbency is particularly important when temperatures exceed 25ºC.

When determining the appropriate stocking density for animals, consideration needs to be given to a range of factors, including: ventilation, temperature, humidity age, size and sex of the animal; health status; the group size and composition; weather conditions; bedding management; and quality and management of the outdoor area and/or paddock. In other words, it is not only the quantity of space provided to each animal, but also the quality of the space provided that influences animal welfare.

Stocking density should be reviewed regularly and where animals are ill, injured, aggressive or behaving abnormally, space allowance should be increased to ensure the welfare of the animals.

Stockpersonship

The attitudes and competence of stockpersons and staff are vital in determining whether high standards of animal welfare can be achieved. It is the responsibility of management to ensure there is a culture among staff that prioritises animal welfare . It is essential that stockpersons are suitably trained (e.g. using ProHand Pigs or similar) and experienced (or directly supervised by experienced staff), and are able to recognise indicators of poor and good welfare. In addition to observing and responding to pig behaviour and physical needs, the stockperson is responsible for optimising the environment that pigs rely on for survival and must maintain the highest environmental quality at all times. They must have a good working knowledge of the husbandry system and the animals under their care. It is widely acknowledged that good stockpersonship and reduced stress levels in animals are also key factors in meat quality.

See also 'Handling', 'Training and competency'.

Stress

The mechanism that allows animals to cope with negative challenges in their environment is called a stress response and it allows the animal to overcome or avoid such challenges (referred to as 'stressors'). However, where the animal is not able to escape the stressor or where stressors persist beyond the short term, chronic stress can result. Chronic stress compromises animal welfare and can usually be observed through physical and behavioural changes in the animal (e.g. loss of appetite and weight, compromised immune and reproductive systems, impaired mental function and coping ability).

Stunning – carbon dioxide

Stunning is intended to cause unconsciousness so that slaughter may be carried out without avoidable pain, suffering, or distress. The most common methods to stun pigs are electrical stunning and exposure to high concentrations of carbon dioxide (CO_2) gas. Stunning with CO_2 gas offers benefits over electrical stunning including the ability to stun animals in groups, with minimal restraint and less handling, and therefore potentially less stress before stunning.

However, there are several welfare issues with CO_2 stunning including that the gas is very unpleasant for pigs, there is variability between pigs' responses to CO_2, pigs are not rendered unconscious immediately, and high concentrations of CO_2 gas can cause significant pain and distress to pigs when inhaled. Studies of pigs' behaviour have found that most pigs will avoid high concentrations of CO_2 gas if possible, and that almost 90% of pigs preferred to go without water for 72 hours than experience exposure to CO_2 gas. CO_2 is also used as a method of on-farm killing of neonatal piglets.

Further research is urgently needed to develop stunning systems which retain the benefits of CO_2 stunning without the disadvantages. Evidence suggests that potential alternatives to be investigated may include: non-aversive (not unpleasant and do not cause pain) gas mixtures such as argon, nitrogen, or nitrous oxide; a combination of argon with CO_2; anaesthesia with non-aversive gases followed by killing by CO_2 or electrical methods; or genetic selection for pigs which do not find CO_2 to be aversive.

Swill feeding

Swill is any animal food that contains animal matter such as meat, meat products or meat by-products. Swill is a Prohibited Pig Feed which means it is illegal to feed it to pigs in all states and territories in Australia.

Swill includes any of the following: all meat, meat scraps, meat trimmings including chicken; offal such as liver, kidney, tongue, intestines, etc.; blood, bones and mammalian and chicken carcasses; any food cooked with, or that has been in contact with, meat, meat products or meat by-products; food scraps from food processors, homes, any food outlet and rubbish dumps; vegetable oils used to cook meat; and any food of unknown origin.

Swill feeding is illegal because swill can carry exotic diseases that could devastate our livestock industries. If such viruses entered Australia's livestock industries, devastating results could follow both economically but also in terms of animal suffering. Many of these viruses are extremely resistant and survive boiling, freezing and curing processes. Feeding swill to pigs, allowing swill to be fed and not preventing access to swill are all considered serious offenses and carry fines. If you suspect pigs are being fed Prohibited Pig Feed, call your state/territory Department of Primary Industries or the Emergency Disease Watch Hotline on 1800 675 888.

Tail biting

Tail biting, is an abnormal behaviour whereby pigs use their teeth to bite and chew other pigs' tails. Tail biting can lead to injuries in the victim, and the victim can experience pain and fear, which can be exacerbated in an outbreak where pigs performing the biting can target victims with persistency. Tail biting can be associated with a variety of conditions including spinal abscesses, septicaemia, and a reduced growth rate. The behaviour can spread socially throughout a group of pigs quite rapidly and is therefore a significant welfare problem in commercial pig production. Since tail biting can cause very poor welfare and tail docking is painful both in the short and long term, measures other than tail docking should be implemented to control tail biting. Intact tails that are unbitten are probably the best indicator of a well-managed pig production system.

Although multifactorial, one of the main factors which contribute to the incidence of tail biting is a barren environment and the inability for pigs to perform exploration and foraging behaviour.

In order to reduce the incidence of tail biting, pigs should be provided with an environment that offers appropriate stimulation and satisfies their motivation to explore and chew e.g. provision of straw or other enrichment types. Good stockpersonship (positive handling) and a good pig-to-stockperson ratio (allowing close monitoring) are essential to abate tail biting to identify changes in pig behaviour early and to allow time for intervention. Hazards for tail biting behaviour include an absence of straw bedding and enrichment, high stocking density, inadequate or sudden change in diet, competition for resources, poor health status, the season, air quality and speed, and stress. In addition to this, the heritability of tail biting has been found to be high enough for genetic selection against the behaviour. Genetic selection may therefore be a promising route to addressing tail biting, in addition to optimising the environment and management.

See also 'Bedding', 'Environmental enrichment', 'Stockpersonship', 'Tail docking'.

Tail docking

Tail biting on commercial farms has led to the widespread adoption of tail docking. While it is a common management practice to prevent tail biting, it causes acute trauma and pain since the tail has abundant nerves. Tail docking causes piglets to struggle, squeal, and clamp their tails between their hind limbs and lower their head indicating that it is likely highly painful. Further, pigs which have had their tails docked may experience long-term pain and be susceptible to infection. Tail docking reduces the frequency of tail biting but does not completely eliminate it and does not address the underlying causes.

In the European Union, tail docking on a routine basis has been prohibited, and there is further legislation limiting its use in countries including Denmark, Sweden, and Finland. In Australia, the Model Code of Practice for the Welfare of Animals: Pigs suggests that where tail docking is performed as a routine preventative measure, it should be carried out before pigs are 7 days of age. The RSPCA is opposed to the docking of the tails of any species of animal unless under veterinary advice to improve an individual animal's health. Since tail docking is painful in the short and potentially in the long term, measures other than tail docking should be implemented to control tail biting. Tail docking is not permitted under the RSPCA Approved Farming Scheme standards for pigs.

See also 'Environmental enrichment', 'Tail biting',

Teeth clipping

Teeth clipping of a piglet's needle teeth is routinely carried out to reduce the risk of piglets causing injury to littermates and the sow's udder. The procedure is carried out in the piglet's first week of life along with tail docking, castration (where performed) and an iron injection. Needle teeth are usually cut off with special pliers. Teeth clipping is a painful procedure that can expose the pulp cavity and result in long-term bleeding, abscesses and other mouth lesions indicative of chronic pain. Teeth clipping is not permitted under the RSPCA Approved Farming Scheme standards for pigs. Teeth clipping is different to tusk trimming where the tusks of mature boars are trimmed above the non-innervated part of the tusk.

Temperature, ventilation and air quality

In indoor systems, shed temperature should provide a comfortable environment for pigs that allows pigs to maintain core body temperature within the normal range (38.5-39°C) at all stages of production and at all times of the year. Temperature extremes (heat or cold) require additional monitoring of the pigs (e.g. for signs of panting or huddling,), especially during high risk time of farrowing. Environmental control systems and ventilation systems may need to be adjusted to minimise any negative impacts on the animals. Adequate air exchange is essential for managing heat, moisture, dust and harmful gases, including ammonia. If ammonia can be smelled by humans (10–15ppm) or dust levels are noticeably unpleasant to humans, corrective action, such as increasing ventilation, must be taken. In outdoor systems, cooling systems should be provided (e.g. wallows) and additional bedding provided in winter to ensure pigs can stay warm.

Time off water and feed

Transport legislation in Australia requires that pigs are not deprived of water for more than 24 hours (12 hours for weaners, lactating sows and piglets) during the transport process. Pigs must then be rested with access to feed and water for 12 hours before commencing another journey. Water should be available at all times prior to loading and immediately after unloading. The longer the journey (and time off water), the more pigs will drink when unloaded.

On farm, pigs will drink between 3 and 17 litres of water each per day (depending on the class of pig) with lactating sows drinking the most. However, pigs will only spend a short time drinking. Pigs will drink more when air temperatures are high. Taking into account the pig's drinking habits as well as ambient temperature when planning a transport journey will assist in mitigating the negative impacts of time off water including thirst and dehydration.

Pigs should be fasted before transport (e.g. 2.5 - 4 hours) as a feed curfew may prevent vomiting as a result of motion sickness caused by the vehicle's vibration. Inhaled vomit may cause pigs to choke and die during transport. Pigs that are off feed for long periods will start using body reserves to compensate for the lack of feed. For example, pigs off feed for 12 and 18 hours were shown to have completely depleted liver glycogen levels. The lower the liver glycogen, the lower the meat quality, and the poorer the welfare of the animal.

See also 'Transport'.

Training and competency

Good stockpersonship includes the knowledge, skill, attitude and behaviour necessary to handle animals, and is an essential component of any farming system. Stockpersons must always interact with animals in a caring and compassionate manner that ensures good animal welfare and enhances the human-animal relationship. Stockpersons must be appropriately trained and competent in their required tasks. Stockpersons should successfully complete recognised training and accreditation programs where they exist (e.g. Certificate III in Agriculture – Pig Production or equivalent), and on-the-job training in all aspects of pig husbandry and care relevant to their role, including euthanasia.

Stockpersons must have an understanding of normal and abnormal animal behaviour. They should be able to optimise the environment and animal welfare, as well as recognise conditions in which animal welfare may be compromised, and take appropriate action to rectify the situation if observed. The development of a positive culture to support the humane treatment of farm animals is strongly encouraged.

See also 'Handling', 'Stockpersonship'.

Transport

Transport is stressful for animals and can cause suffering and deaths. Aspects of transport that can cause distress include separation of the animals from their familiar environments and social groups, forced interaction with unfamiliar animals, unfamiliar handling by unfamiliar people, overcrowding, water and food deprivation, exposure to extremes of temperature and humidity, loud noises, and new experiences and situations. Animals should be transported in a way that avoids injury and minimises suffering or distress. Journey times should be as short as possible, and slaughter should occur as near to the farm as possible. The *Australian Animal Welfare Standards & Guidelines: Land transport of livestock* refer to long-duration travel as >12 hours for pigs and >8 hours for weaners.

The transport time, the motion of the truck, the weather, and the time off feed and water, and design of the transport vehicle are all factors to consider when transporting pigs. During hot weather, stocking density on the vehicle should be reduced, pigs should be transported during the cooler parts of the day for the shortest possible time, and any unnecessary stops of the vehicle

should be avoided. Reducing stocking density on the vehicle by 10-20% will help with airflow. Pigs should be given sufficient space on the transport vehicle to move unhindered from a lying position to a standing position and vice versa. At the very least, preparation for transport should meet the recommendations set out in the '*Is it fit to load*' guide to the selection of animals fit to transport published by Meat & Livestock Australia. Loading and unloading is stressful to pigs, and the importance of appropriate facilities, including ramps, cannot be understated (see '*Guide for Safe Design of Livestock Loading Ramps and Forcing Yards*' for more information on good ramp design). It is recommended that transport vehicles and drivers participate in independent audit schemes that include animal welfare (e.g. TruckSafe or equivalent).

Prior to transport, every pig must be identified, e.g. using a slap brand (tattoo), and this information recorded on the PigPass National Vendor Declaration which allows traceability of pigs from their destination back to the farm of origin.

See also 'Time off water and feed'.

Wallowing

Wallowing is a natural behaviour which pigs are motivated to perform and, when given the opportunity, pigs will make their own wallows. A wallow is a shallow depression containing muddy water in which a pig will often dig and root before entering to cover themselves in mud. Ideally, a wallow is large enough to accommodate all the pigs in a group. When observed in a semi-wild environment, commercially bred pigs were seen to be grazing, rooting, and nosing, as well as wallowing in mud. In the wild, pig habitats will always have wallows which they use both during hot and cold weather. Pigs may enter a wallow and completely submerge themselves (if this is possible) while at other times, they will only immerse themselves partially. Pigs may wallow passively – by just standing or lying in the mud – or actively, when they may root in the wallow, and stretch, roll and kick in the muddy water. Where wallows are sufficiently large, pigs may wallow for longer periods a few times a day (e.g. up to 3 hours average in the morning), whereas in a situation with more pigs and less wallowing space, the bouts may be shorter but more frequent.

Wallowing performs a social function as most pigs will wallow in groups, and facilitates comfort behaviours. Behaviours associated with wallowing include feeding (before and after wallowing), drinking (from the wallow), defecating (after wallowing but sometimes in the wallow), and urinating (before and after wallowing). Wallowing may also be related to scent rubbing and scent marking, the purpose of which may include comfort behaviour or social/sexual attraction. Although pigs will wallow at temperatures of around 12 degrees, adult pigs' will typically use a wallow at temperatures of 17-21ºC and growing pigs increase rooting in the wallowing area at around 20ºC. Wallowing (duration and bouts) generally increases with increasing ambient temperature and is used for thermoregulation as pigs have little hair and little ability to sweat. Without a wallow, pigs will seek out other wet surfaces or attempt to lie in their own faeces or urine. Wallowing – and applying a protective coating of mud – also serves to protect pigs from sunburn, flies and external parasites. Once the mud has dried, pigs will use a scratching post to remove the mud from the sides of their body. Although pigs seem to be primarily motivated to wallow for thermoregulation and parasite control, other reasons may include skin care, smell, comfort, play or pleasure and contribute to a pig's positive affective state. The opportunity to provide wallowing facilities for all classes of pig in both outdoor and indoor production systems should be investigated. RSPCA Australia encourages participation in independent certification schemes that promote best environmental practice in regard to wallow management.

Weaning

Weaning is the removal of suckling piglets from the sow and involves the gradual or abrupt removal of milk from the piglet's diet. A piglet is considered 'weaned' when milk is no longer provided. Weaning is stressful for piglets. In commercial pig production systems, piglets are weaned at 3 to 4 weeks of age. Natural weaning would occur gradually over a period of up to 5 months. In commercial

pig production, ‘early weaning’ refers to the removal of pigs before 28 days of age. However, piglets that are weaned later have been shown to have better health and improved growth following weaning. Early weaning can also cause pigs to develop abnormal behaviours such as belly nosing, navel sucking, and chewing body parts (ears, tails, limbs) of pen mates as well as increased levels of aggression. Abruptly weaned piglets also have elevated blood cortisol, a physiological indicator of stress.

At weaning, piglets experience several stressors in addition to separation from their mother, including a change of diet and mixing with unfamiliar pigs in a new environment. Because their gastro-intestinal tract is still immature at this early age, low feed intake following weaning contributes to poor intestinal function resulting in diarrhoea and reduced growth. Preventing this can be achieved by reducing stress at weaning, including by increasing the age at weaning making the piglet more robust and resilient, and by introducing a more gradual weaning process.

Adopting a weaning process that more closely resembles natural weaning by slowly decreasing milk intake while increasing solid feed intake, will allow the gastro-intestinal tract to better adapt to solid feed. Gradual weaning can be achieved by introducing intermittent suckling or in group lactation systems where the sow is able to remove herself from her piglets or in a combination of the two. In systems where the sow is able to leave her piglets, the piglets consume more solid feed to compensate for the decrease in milk; they also gain more weight and consume more feed after weaning than piglets weaned abruptly. Allowing sows and her piglets to interact, such as in loose-housed systems and providing environmental enrichment, has a positive effect on piglet behavioural development post-weaning, e.g. less belly nosing, less aggression, more chewing, more play and exploratory behaviour.

Once the sow is weaned she may be at risk of injury from aggression or sexual behaviour from other sows as her udder may be enlarged and she may be coming back in to natural heat. Management of the sow in the post-weaning period is critical to ensure that *ad libitum* feed is provide to regain body condition and that the sows are protected from injury from other sows at mixing (especially when being moved into group weaning pens and not individual mating stalls).

See also ‘Intermittent suckling’.

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