The big challenge: Keeping sows healthy and productive – Part 1 General aspects to be observed

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Sow mortality critically impacts herd performance and efficiency in modern pig production. Keeping the sows healthy is, therefore, the best strategy to keep them alive and productive and the farm's profitability high.

Rising mortality rates are alarming

In recent years, sow mortality has increased across pig-raising regions in many countries. Eckberg's (2022) findings from the MetaFarms Ag Platform (including farms across the United States, Canada, Australia, and the Philippines) determined an increase of 66.2% between 2012 and 2021.

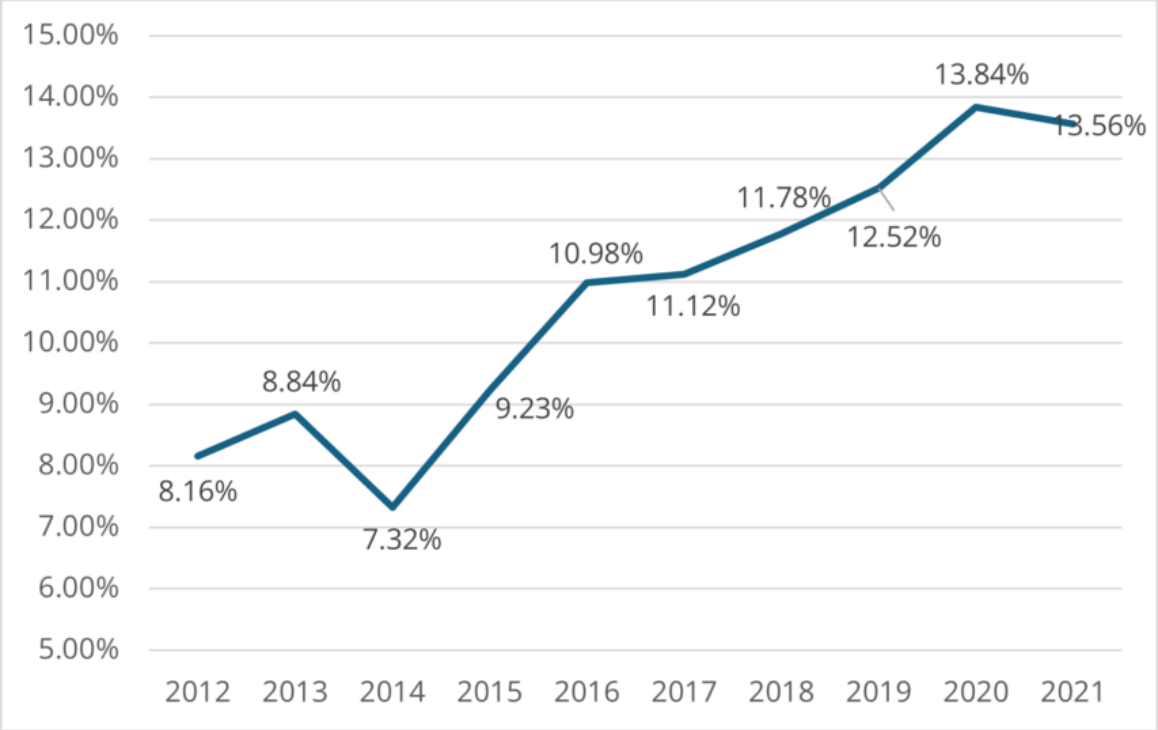

Figure 1: Sow mortality rates from 2012 to 2021 (Eckberg, 2022)

What can be done to decrease mortality rates?

Several measures can be taken to reach a particular stock of healthy and high-performing sows. In the following, the main remedial actions will be explained.

1. Determination of the cause of death

If a sow is dead, it must first be clarified why it has died. If the sow is culled, the reason for this decision is usually apparent. If the sow suddenly dies, investigations, including a thorough postmortem, are extremely valuable to determine the cause of death. Kikuti et al. (2022) provided a collection of the most-occurring causes of death in the years 2009 to 2018. As often, no necropsy is conducted, and the causes of death remain unclear, as shown by the high numbers of “other”. Locomotory (e.g., lameness) and reproductive (e.g., prolapse, endotoxemic shock from retained fetuses) incidents account for approximately half of the recorded sow mortalities (Kikuti et al., 2022), especially during the first three parities. (Marco, 2024).

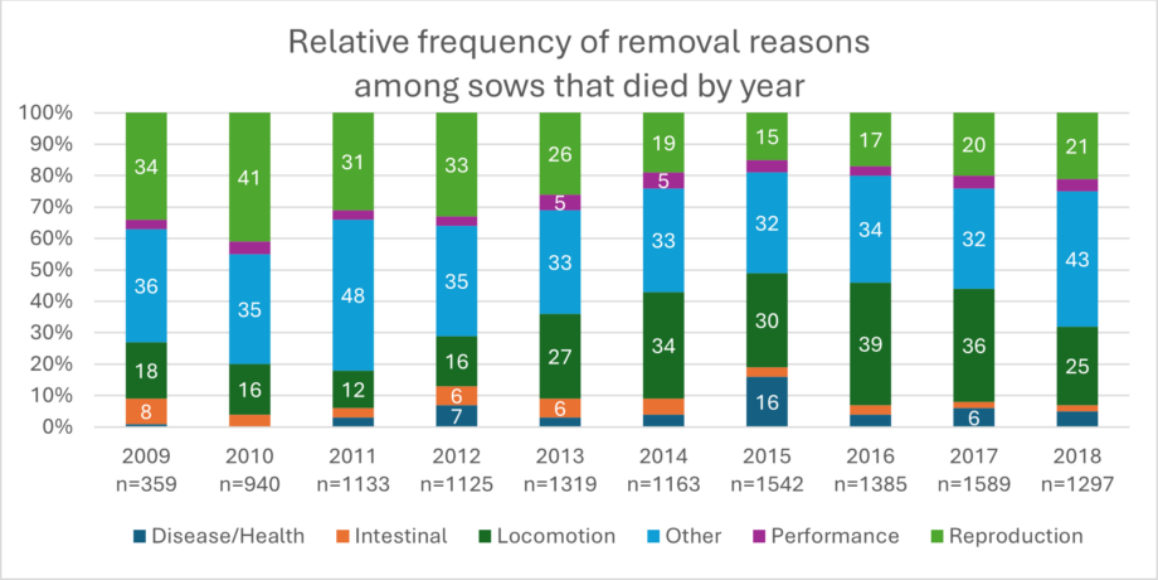

Figure 2: Removal reasons and their frequency from 2009 to 2018 (Kikuti et al., 2022)

Evaluating detailed breeding history together with the cause of death will provide perspective and assist veterinary, nutritionist, and husbandry teams with interventions to prevent similar events and early sow mortality.

Selection of the gilts

After selecting the best genetics and rearing the gilts under the best conditions, further selection must focus on physical traits such as structure, weight, height, leg, and hoof integrity.

Additionally, as we have more and more group housing for sows, the **selection for stress resilience** can positively impact piglet performance (Luttmann and Ernst, 2024). The following table compares stress-resilient and stress-vulnerable sows concerning piglet performance and shows the piglets of the vulnerable sows with worse performance.

Table 1: Influence of stress resilience on performance (Luttmann and Ernst, 2024)

Trait	SR	SV	p-Value
Birth weight (kg)	1.350 ± 0.039	1.246 ± 0.041	0.083
Wean weight(kg)	6.299 ± 0.185	5.639 ± 0.202	0.033*
Suckling ADG (kg/d)	0.191 ± 0.005	0.165 ± 0.005	0.004**

Least square means and standard error of stress resilient (SR) and stress vulnerable (SV) for each trait; significance threshold of $p<0.05$ with * indicating $0.01<p<0.05$, ** indicating $0.001<p<0.01$

How to manage the gilts best

The management of the gilts must consider the following:

1. Age at first estrus should be <195 days:
   Gilts having their first estrus earlier show higher daily gain and usually higher lifetime productivity. In a study conducted by Roongsitthichai et al. (2013), sows culled at parity 0 or 1 exhibited first estrus at 204.4±0.7 days of age, while those culled at parity ≥5 exhibited first estrus at 198.9±2.1 days of age (P=0.015).
2. Age at first breeding should lay between 200 and 225 days:
   If the sows are bred at a higher age, they have the risk of being overweight, leading to smaller second-parity litters, longer wean-to-service intervals, and shorter production life.
3. The body weight at first mating should be between 135 and 160 kg:
   To reach this target within 200-225 days, the gilts must have 600-800 g of average daily gain.

Breeding underweight gilts reduces first-litter size and lactation performance. Overweight gilts (>160 kg) face higher maintenance costs and locomotion issues.

4. The number of estruses at first mating should be 2 or 3:
   Accurately track estrus and breed on the second estrus. Research shows that delaying breeding to the second estrus positively affects litter size. Only delay breeding to the third estrus to meet minimum weight targets.

Housing

Gestating sows are more and more held in groups. Understanding the process of group housing is essential for success. The following graphic shows factors impacting successful grouping.

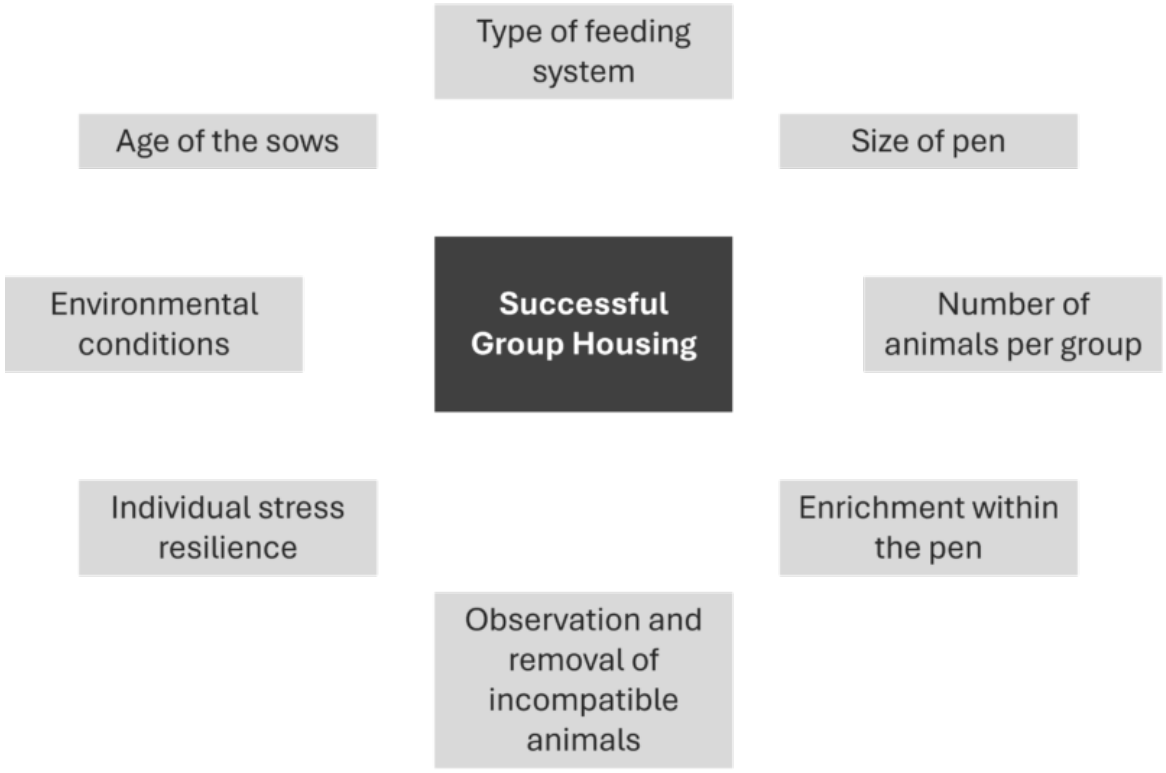

Figure 3: Factors influencing group housing

If the groups are not well-established yet, the stress levels among sows are higher, leading to

- More leg injuries due to aggressive behavior or fighting for resources
- Higher rates of abortions and returns to service
- Reduced sow performance, including decreased productivity, lower milk yield, and poor piglet growth due to compromised immune function and overall health

To mitigate stress in group housing, it is crucial to implement proper group management practices, which

include gradual introductions, maintaining stable social structures, and ensuring adequate space and resources. This helps promote a calmer environment, improving animal welfare and herd performance.

Responsible on-farm pig care

Caregivers must be well-trained and equipped to provide high-quality care. Insufficient or unskilled pig caregivers can significantly affect the growth and development of prospective replacement gilts, ultimately influencing their suitability for the breeding herd:

- **Growth Rates**: Suboptimal nutrition and health management result in slower growth rates and poor body condition.
- **Health Issues**: Unskilled handling may increase the risk of disease transmission, injuries, and stress, all of which can adversely affect growth and overall development.
- **Behavioral Problems**: Poorly managed environments can increase aggression and competition among animals, hindering growth and health.
- **Selection Criteria**: Ineffective growth and health monitoring can result in misjudging the potential of gilts, leading to the selection of less suitable candidates for the breeding herd.

Table 2: Influence of handling on growth performance and corticosteroid concentration of female grower pigs from 7-13 weeks of age (Hemsworth et al., 1987)

	Unpleasant	Pleasant	Inconsistent	Minimal
ADG (g)	404^{a}	455^{b}	420^{ab}	4.58^{b}
FCR (F:G)	2.62^{b}	2.46^{a}	2.56^{b}	2.42^{a}
Corticosteroid conc (ng/mL)	2.5a	1.6b	2.6a	1.7b

Responsible on-farm pig care is crucial to keep sows healthy and performing. Poor sow observations (e.g., failure to identify stressed, anorexic, or heat-stressed sows) or inappropriate farrowing interventions can directly influence sow health and potentially reduce subsequent performance or mortality. On the contrary, rapid and proactive identification of sows needing intervention can save many animals that would otherwise die or need to be culled.

Keeping sows healthy and performing is manageable

The maintenance of sows' health is a challenge but manageable. Observing all the points mentioned, from selecting the right genetics over rearing the piglets under the best conditions to managing the young gilts, can help prevent disease and performance drops. For all these tasks, farmers and farm workers who do their jobs responsibly and passionately are needed. The following article will show nutritional interventions supporting the sow's gut and overall health.

References:

Eckberg, Bradley. "2021 Sow Mortality Analysis." National Hog Farmer, February 3, 2022. https://www.nationalhogfarmer.com/hog-health/2021-sow-mortality-analysis.

Hemsworth, P.H., J.L. Barnett, and C. Hansen. "The Influence of Inconsistent Handling by Humans on the Behaviour, Growth and Corticosteroids of Young Pigs." Applied Animal Behaviour Science 17, no. 3–4 (June 1987): 245–52. https://doi.org/10.1016/0168-1591(87)90149-3.

Kikuti, Mariana, Guilherme Milanez Preis, John Deen, Juan Carlos Pinilla, and Cesar A. Corzo. "Sow Mortality in a Pig Production System in the Midwestern USA: Reasons for Removal and Factors Associated with Increased Mortality." Veterinary Record 192, no. 7 (December 22, 2022). https://doi.org/10.1002/vetr.2539.

Marco, E. “Sow Mortality: How and Who? (1/2).” Pig333.com Professional Pig Community, March 18, 2024. https://www.pig333.com/articles/sow-mortality-how-are-sows-dying-which-sows-are-dying_20105/.

Luttmann, A. M., and C. W. Ernst. “Classifying Maternal Resilience for Improved Sow Welfare, Offspring Performance.” National Hog Farmer, September 2024. https://informamarkets.turtl.co/story/national-hog-farmer-septemberoctober-2024/page/5.

Roongsitthichai, A., P. Cheuchuchart, S. Chatwijitkul, O. Chantarothai, and P. Tummaruk. “Influence of Age at First Estrus, Body Weight, and Average Daily Gain of Replacement Gilts on Their Subsequent Reproductive Performance as Sows.” Livestock Science 151, no. 2–3 (February 2013): 238–45. https://doi.org/10.1016/j.livsci.2012.11.004.

Managing heat stress in pigs in Asia

Conference Report

Heat stress poses a significant challenge to pig production, particularly in Asia, due to the region’s warm and humid climate. In the following, Dr. Merideth Parke, Global Application Manager Swine at EW Nutrition, discusses effective management strategies to mitigate the adverse effects of heat stress on pig health and productivity.

Understanding Heat Stress

Pigs are particularly vulnerable to heat stress due to their limited ability to dissipate heat. “This is because they lack functional sweat glands, have relatively small lungs, a thick subcutaneous fat layer, and a narrow thermoneutral zone. The pigs’ thermoneutral or ‘comfort’ zone varies by age and weight. For instance, sows require 18-22°C, grow-finish pigs less than 25°C, while newborn piglets need a much warmer 35°C,” she explained.

Furthermore, today’s lean and efficient pigs have higher metabolic demands and produce more body heat, making them more susceptible to heat stress than pigs from the 1980s.

Symptoms of heat stress include:

- Increased respiration rates (>50/minute)
- Elevated rectal temperature (>39.5 oC)
- Decreased feed intake
- Reduced growth rates
- Lower reproductive performance
- Lower reproductive performance

Pigs naturally reduce their feed intake as a response to heat stress, which is a mechanism to decrease metabolic heat production from digestion. For example, research on sows has shown that for each 10°C increase between 25-27°C at 50-60% relative humidity, they reduce their feed intake by 214 g/day.

Managing Heat Stress

Managing heat stress is complex. It requires a combination of solutions specific to each production system. Additionally, it must be considered that heat stress is not only about temperature. Its impact can be exacerbated by relative humidity, which hinders heat dissipation through evaporation. The heat index chart below demonstrates the relationship between temperature, humidity, and comfort levels for a grow-finish pig. Pigs require an environment where the heat index is within the thermoneutral zone, enabling them to shed heat and maintain efficient feed utilization and growth.

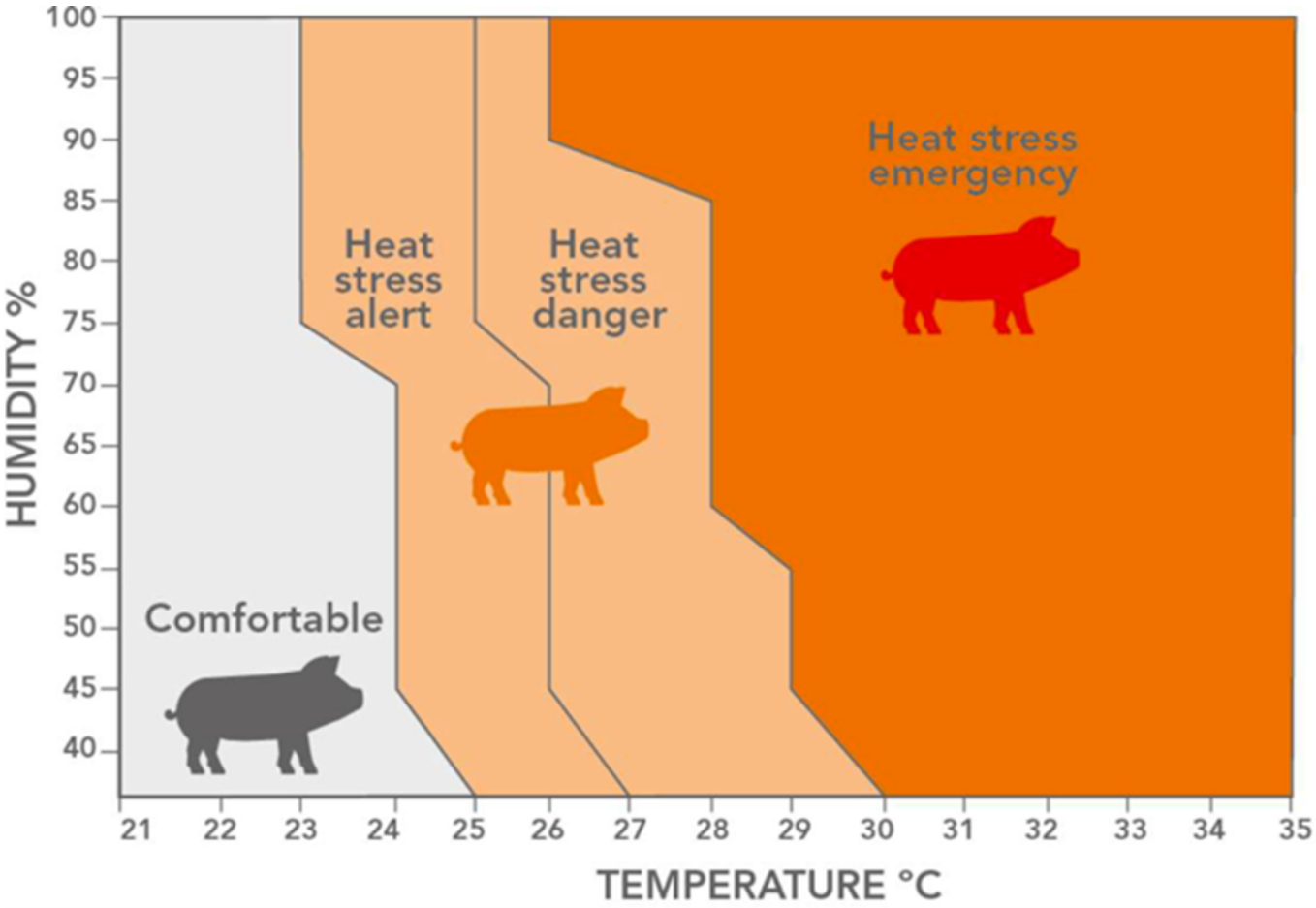

Figure 1: Heat stress index chart *(kepro.nl)*

While we often initially look to nutritional interventions, such as reducing dietary crude protein levels, increasing fats, or adding feed additives such as betaine, the effectiveness of these heat mitigation strategies is limited if the pigs are not eating well. Therefore, we must first focus on environmental management to reduce external heat absorption and increase heat load shedding. Pigs with the highest metabolic demands – lactating and gestating sows and finisher pigs – are especially susceptible to heat stress and should be given priority.

Several strategies to effectively manage heat stress can be used:

1. ## Misters and sprinklers

   Misters or sprinklers can help cool pigs through evaporation. However, these should be used strategically – running them for short periods followed by breaks – to maximize cooling effects without creating excessive moisture and wet conditions that could lead to other health issues, such as skin lesions or respiratory problems.

   However, water-based cooling systems can inadvertently raise the heat index in humid environments. When water is sprayed into a humid environment, it will further increase the moisture levels in the air, exacerbating the heat stress situation. If humidity is too high, alternative cooling methods, such as evaporative cooling pads or high-pressure fogging systems, may be more effective.

   Snout and flank drip systems deliver water directly onto the pig's body, mainly targeting areas more sensitive to heat. This localized approach enables heat dissipation without excessively increasing humidity in the surrounding environment.

2. ## Ventilation and airflow

   Increased air movement, combined with misting or sprinkling (in low-humidity environments), can enhance the cooling effect by enhancing evaporative and convective heat loss. This

combination helps reduce the temperature the pigs ‘feel’, making them more comfortable.

Producers should assess their ventilation systems and consider modifications to improve air circulation. This can be achieved by installing additional fans. However, the fans must be maintained – clean fan blades and louvers can increase efficiency by 30%. Furthermore, it must be evaluated if there are dead spots and drafts at the pig level, not along the walkways.

Using suspended ceilings can effectively reduce the airspace that needs cooling and can lead to lower energy costs for cooling systems.

3. Housing and surroundings

Adding insulation to roofs and walls can help reduce heat transfer inside the pig housing. Applying reflective coatings (such as white paint) to rooves and walls can help deflect solar radiation, reducing heat accumulation inside the shed by several degrees.

Dense vegetation surrounding a piggery can provide shade and reduce reflective heat. However, it can also obstruct airflow and trap moisture, increasing local humidity and exacerbating the pigs’ heat index and heat stress.

4. Drinking water

Providing fresh, chilled drinking water (10°C) is a highly effective method for mitigating heat stress in pigs and increasing feed intake to improve overall performance. Insulating header tanks and water pipes can help to maintain cool temperatures.

Regular checks on water supply systems are essential to ensure they function correctly and provide adequate flow rates to the end of the line. For example, lactating sows need a flow rate of 4 L/minute.

5. Stocking density and body condition

Higher stocking densities can exacerbate heat stress in pigs. Increased animal density leads to higher ambient temperatures due to the combined metabolic heat produced by the animals and reduced airflow at the pig level. Lower stocking densities can allow pigs to manage their body temperature better.

Pigs with higher body condition scores (more body fat) may be more susceptible to heat stress. Excess fat can hinder effective heat dissipation, making it more difficult for these pigs to regulate their body temperature during hot weather.

6. Monitoring and evaluation

Continuous monitoring of temperature, humidity levels, and airflow is vital to adjust cooling strategies as necessary. A common mistake when monitoring the pigs’ thermal environment is placing sensors in walkways at head height for workers because they are easier to read than at pig level in the pens. Sensors should be positioned in several locations throughout the shed. Regardless of sensor readings, stockpersons need to observe behavioral changes that provide immediate insights into the welfare and comfort of pigs during high-temperature periods.

7. Husbandry

Pigs must be regularly observed for signs of heat stress, such as rapid breathing, reduced activity and feeding, lateral recumbency, and changes in vocalization. Aggressive behaviors may increase among pigs during heat stress as they compete for cooler spaces and water. Early detection of behavioral changes allows for timely interventions.

“Schedule feeding during cooler parts of the day, such as early mornings or late evenings. This practice helps minimize additional heat production from digestion during peak temperatures”, according to Dr. Parke.

> “When moving pigs, especially pregnant sows, to the farrowing room, do so during the coolest times of the day and allow them to walk at their own pace.”

Conclusion

In conclusion, in the first run, each aspect of a production system must be critically evaluated, and existing housing or husbandry procedures must be modified to reduce the severity of the adverse effects of high temperatures on pig health and performance.

EW Nutrition’s Swine Academies took place in Ho Chi Minh City and Bangkok in October 2024. Dr. Merideth Parke, Global Application Manager, Swine, was one of the highly experienced speakers of EW Nutrition. She is a veterinarian who strongly focuses on swine health and preventive medicine.