



SWINE EXTENSION

Providing educational resources and applied research to assist Minnesota's pork producers and allied industry.

How can heat stress affect your production?

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As warmer weather approaches, producers must be prepared and start thinking about the critical points in the production system to avoid the consequences of higher environmental temperatures on productivity. Although most swine herds are managed in controlled confinement facilities, it is not always possible to avoid negative effects of high temperatures (above 73.5-77.0 °F) on pig performance. Heat stress is one of the major concerns in pork production during summer because pigs do not have functional sweat glands like other livestock species to assist them in efficiently removing body heat. Animals respond to elevated temperature by reducing feed intake, increasing respiratory rate and water consumption, and decreasing activity in an attempt to improve heat loss and minimize the heat generation in the body. As a result, pigs exhibit poor growth rate and feed conversion, reduced milk production during lactation, impaired fertility, and increased mortality rates. These events occur over a range of temperatures in which the pig can increase heat loss and decrease heat production, and are of great impact in the productivity because many times they are not noticed until impacts have already occurred.

Feed intake. Reduction in feed consumption is the primary response of animals to control internal body temperature when exposed to heat, because the digestion process involves an increase in heat production known as heat increment. One of the best nutritional practices to minimize the negative effects of heat stress on feed intake is to add supplemental fat to the diet and increase the concentration of other nutrients. The addition of supplemental fat to the diet minimizes the heat increment, and increasing the concentration of other nutrients helps insure that the daily requirements are met when feed consumption decreases. Other feeding program changes that can help alleviate the negative effects of reduced feed intake include: reducing the crude protein content by using synthetic amino acids, addition of water to the dry feed (which may require more labor), and the use of liquid feeding systems. When *ad libitum* access to feed is not provided, the ration should be furnished during the coolest periods of day (early morning and late afternoon, or at night).

Respiratory rate. Increased respiration rate is the first and one of the most evident signals of heat stress, a mechanism that allows heat loss through evaporation from the lungs, being influenced by both temperature and diurnal effects (physical activity and hormones). The frequency of respiration will be raised exponentially when temperatures rise above the animal's comfort zone, so respiratory rate is a good indicator of heat stress. When pigs are under rest condition, rates above 50 respiration movements per minute are indicative of heat stress.

Water consumption. Animals under heat stress increase their daily water intake as much as 6 times the level they would consume under optimal temperatures. Increased water consumption increases urinary excretion and leads to increased excretion of important minerals that are involved in metabolism and electrolyte balance. It may be necessary to make dietary adjustments in the electrolyte balance to replace those losses and obtain the best equilibrium in the metabolism possible. However, this area of nutrition is poorly understood. It is always good to remember that fresh, good quality water needs to be supplied *ad libitum*, and a laboratorial analysis for coli forms and mineral content is encouraged.

Activity. Any movement demands muscular contraction, resulting in an increase in energy utilization and heat production. So, it is natural for animals in a hot temperature environment to reduce their activity in order to minimize body

heat production. In some cases, the reduction in the frequency of standing up for urination can cause or aggravate urinary infections, leading to fertility problems in sows.

Some factors are easily modified to improve the physical welfare of pigs without great impact on the production costs:

Equipment. Before summer temperatures arrive, it is important to check equipment related to cooling systems to make sure they are working properly. Some of these components include: thermostats, fans, air inlets, drip coolers, and sprinklers. The cleaning of all air inlets and fans must be done to make sure they are working properly and to avoid the spread of dust and microorganisms into the barns. Special attention should be given to leaking sprinklers, since it is necessary to reduce water wastage and excess of humidity in the barn.

Transportation. Transportation of pigs from the farm to packing plant is the main critical point at the end of the production process when heat stress is involved. There appears to be a relationship between number of panting pigs and deaths in the trucks. In vehicles with more panting pigs, it is likely to have more deaths due to heat stress and heart failure. A recent report indicated that most of the deaths prior to unloading the truck occurred in different locations of the trailer: 46%, 21%, and 15% of the pigs were found dead in the bottom, center, and back middle decks, respectively. So, these parts of the truck must be under special surveillance, and cooling mechanisms must be kept in working order. Pig transportation must be done at the coolest times of the day, and adequate animal space inside the truck trailer must be observed.

In summary, we must be aware of weather forecast, planning strategies to protect the herd against higher temperatures, and recognize the clinical signs of heat stress in order to take the best actions to prevent the situation.