Importance of Body Temperature on Piglet's Success

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Take home messages:

-Piglets are born with low body fat reserves and lose heat easily after birth. Cold piglets are less active, consume less colostrum and have increased likelihood of mortality.

-Management strategies, such as drying piglets or the use of heat sources, help to buffer the loss of temperature in newborn piglets.

-Warm and active piglets are able to compete for a place in the sow's udder and consume more colostrum to increase and maintain body temperature.

INTRODUCTION:

Most piglet mortality occurs during the first 3 days after birth. The majority of this mortality occurs on day 1 after birth partially due to piglets suffering from hypothermia, or low body temperature. All newborn piglets tend to lie close to the sow to warm themselves, however, chilled piglets are lethargic which increases their likelihood of being crushed by the sow. Here, management practices aiming at maintaining body temperature in piglets during the first hours after birth are discussed.

BODY TEMPERATURE IN PIGLETS:

Just prior to birth, piglets' body temperatures are the same as the sow at approximately 101-103°F (38-39°C). Piglets are born wet and enter the environmental temperature of the farrowing barn and farrowing crate. The temperature in the farrowing barn is kept under the critical temperature for piglets, resulting in their body temperature decreasing dramatically during the first hours after birth. Therefore, the piglets need energy to try and increase their body temperature into their comfort zone. Piglet's store energy mainly as glycogen in the muscle and liver to use for thermogenesis during the first hours after birth. However, at birth, piglets have very little of this stored energy, only enough to allow piglets to reach the sow's teats and ingest colostrum, which will provide them additional energy to further increase and maintain their body temperature.

Small piglets (<1 kg of birth weight) are at a greater risk of hypothermia because they have less energy stored at birth and they are less able to fight for access to the teats to get access to milk. These light birth weight piglets tend to spend more time warming their bodies up than they do drinking milk from their mother. In the first 30 minutes after birth, without any drying, the piglet's body temperature can drop to ~96°F (35°C), or even more extreme for some pigs creating a ~10 degree decrease in body temperature. 96°F is the lower critical temperature for newborn pigs, or the temperature at which a piglet's need to produce heat to increase their body temperature. Over the first few days of life, this lower critical temperature increases and the piglets can tolerate lower environmental temperatures. This means that newborn piglets are extremely sensitive to changes in temperature compared to older piglets. Piglets that access the sow's teats and consume colostrum or those that are exposed to a source of supplemental heat (i.e. a heat lamp) have a less severe drop in temperature, and they can easily recover temperature over the following 24 hours. Piglets that are cold will have their hair stand up and appear "fluffy" and they will shiver to try and generate heat, allowing these piglets to be easily identified by caretakers.

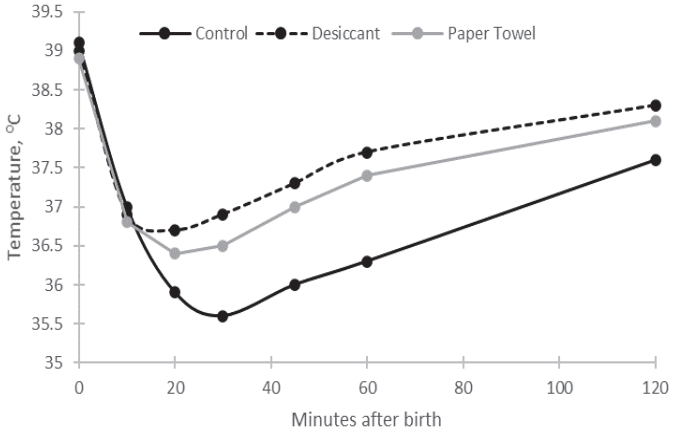

Figure 1. Variation in body temperature during the first 2 hours after birth in piglets. At birth, piglets were either left wet (solid black line), dried with desiccant (dashed black line) or dried with paper towels (gray solid line) and temperature was measured multiple times over the first 120 minutes after birth. Data adapted from Van de Pol et al., 2020.

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MANAGEMENT PRACTICES TO REDUCE TEMPERATURE LOSS IN PIGLETS:

While it may seem like the easiest management practice to keep piglets warm would be to increase the barn temperature, to meet the needs of the newborn piglets, this practice would be detrimental to the sow. The environmental temperature in the farrowing house is normally kept between 71 and 77°F (22-25°C) for the sow's thermal comfort. At temperatures greater than 77°F (25°C), the sow will be uncomfortable and will reduce feed intake, which in turn will decrease milk production and affect piglet's growth, as well as increase the likelihood of farrowing complications. Obviously, temperatures lower than 71°F (22°C) would be perceived as too cold for the piglet, negatively impacting piglet survival.

SOURCE OF HEAT:

Newborn piglets spend between 60 and 70% of the time during the first day after birth either nursing or lying against the sow's udder to stay warm, increasing its risk of crushing or injury by the sow. The use of supplemental sources of heat inside the farrowing crate are intended to create a microclimate of greater temperature that help piglets reduce temperature loss, and in addition, helps to keep piglets separated from the sow to decrease crushing. Heat lamps, heated mats, localized heated flooring or covered creep areas are some of the most used heat sources. In general, providing supplemental heat to piglets can decrease mortality by as much as 50%, however, there are different opinions about the type of supplemental heat, location of heat sources within the crate, and amount of heat sources. Some studies have shown no differences in piglet survival when the heat lamp is located on the side of sow or in front of the sow's head. Heated floors are recommended to be placed adjacent to the sow to provide piglets with two of the main needs, warmth, and easy access to colostrum. Placing recently born piglets on heated floors on the back side of the sow resulted in piglets spending more time in that area of the crate before moving to access to the udder and consume colostrum.

Success of the use of covered creep areas is highly variable mainly due to the low interest of piglets to these are during the first days after birth. Piglets were found to be stimulated to use these covered creep areas more when radiated heat was used inside compared to a light-bulb heat lamp. Overall, supplemental heat can increase piglet survival with small variations in type and location of heat sources.

DRYING PIGLETS AT BIRTH:

Drying piglets at birth has become one of the most utilized management practices for newborn care. Drying can be performed with towels (paper or cloth), straw or with powdered desiccants. Piglets dried at birth have greater body temperature at 1h after birth than non-dried piglets and reached the udder to start drinking colostrum faster (Figure 1). However, the effects of drying on piglet survival is not very clear as it seems like birth weight may have a greater impact on mortality than drying. In the specific case of light birth weight piglets, the use of practices that prevent the loss of heat (i.e. supplemental heat sources or desiccants) are more effective to increase their survival than assisting piglets to suckle or placing them by the udder. Drying piglets and placing them in a heat box for 30 min after birth decreased pre-weaning mortality by 2.4% only when the farrowing pen temperature was <77°F (25°C).

In conclusion, loss of temperature is a common event in piglets and several practices are available to increase or preserve body temperature. The use of drying agents and supplemental heat sources in the farrowing house have the potential to reduce mortality in newborn piglets. Current research is focused on providing the swine industry with the best management strategies to increase piglet survival.

REVIEWER: Dr. Mike Ellis, University of Illinois

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