

Characterization of Bedded Pack Temperatures in Swine Hoop Structures

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In naturally ventilated livestock housing systems the thermal comfort of the animals is highly dependent on the interactions of animals with the biological activity of the bedding. This study investigates this interaction, with the hope that better understanding can provide insights into improved design. Pigs were bedded with corn stalks during two finishing periods, one in late spring and summer and one during fall and early winter. Temperatures were monitored bi-weekly at 20 cm depth, with measurements taken at 36 grid locations across the bedded pack. Under summer conditions the average bedded pack increased to over 46 C between days 30 and 40, with a maximum measured temperature of 63 C. Toward the end of the finishing cycle temperatures dropped to average about 35 C as large dunging areas dominated the bedded pack. During the fall/winter cycle large areas of the bedded pack maintained temperatures of 30 to 35 C, even during periods when the ambient temperatures remained below freezing.

Swine dunging patterns have a strong impact on the microenvironment of the pigs. These dunging patterns are typically defined within the first two weeks that a group of pigs are in the structure. Aerobic decomposition in the sleeping/resting area maximized heat generation, providing a thermally stable environment for the pigs during the winter months. However, this heat can be detrimental in the summer, and additional management may be required. Misting, reduced bedding rates, and other low-cost management strategies should be evaluated for their ability to minimize heat stress in hoops.