

Minimizing Heat Stress in Pigs During the Summer

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Introduction

Although more common in tropical and subtropical regions, heat stress in pigs can and does occur in the upper Midwest at certain times during the summer. Extreme warm conditions can result in death losses if attention is not given to providing supplemental cooling to animals, but more commonly losses are realized in reduced growth performance in nursery, growing, and finishing pigs, along with decreased reproduction in the breeding herd. Heat stress can affect pigs of all ages, but becomes more pronounced and occurs at lower temperatures in heavier pigs, due to lower optimum temperatures for these animals.

Animal Age, Weight	Optimum Temperature (°F)	Desireable Temperature Limits (°F)
Lactating sow	60	50-70
Litter, newborn	95	90-100
Litter, 3 weeks old	80	75-85
Prenursery, 12-30 lbs	80	75-85
Nursery, 30-50 lbs	75	70-80
Nursery, 50-75 lbs	65	60-70
Growing-finishing	60	50-70
Gestating sows	60	50-70
Boars	60	50-70

Pork Industry Handbook, Extension Bulletin E-2574

There are two major methods pigs will use to minimize the effects of heat stress: increased heat dissipation and reduced production of body heat. Pigs will attempt to increase heat dissipation by increasing contact of their body with a cooler surface (floor) by sprawling out. Increased respiration, or panting, increases air flow and evaporation of water from the lungs, releasing additional heat. Pigs do not sweat like humans, and therefore cannot sweat or utilize evaporative cooling off their skin to cool off. Pigs also reduce the amount of body heat generated by reducing feed intake. Digestion of components in the feed releases heat, which must then be dissipated, so reduced feed consumption reduces the amount of heat generated from digestion.

Minimizing Heat Stress

There are a number of methods and areas producers can evaluate and utilize to minimize heat stress in their pigs.

Water Supply – Ensuring adequate quantities of quality water are available is extremely important to ensure pigs to not become dehydrated. Cool drinking water provides the most heat relief. A large amount of the water consumed during hot weather is utilized to dissipate heat via evaporative heat loss from respiration. Waterers need to be adjusted and functioning properly, with enough waterers available to allow adequate access.

Type of Pig	Water / Head / Day, gallons	Pigs/ Nipple	Minimum Nipple Flow Rate, gal/min
Sow and litter	8	---	1.0
Starting pig (10–45 lbs)	1	10	0.3
Growing pig (45–120 lbs)	3	12-15	0.5
Finishing pig (120–250 lbs)	5	12-15	0.67
Gestation sow	6	12-15	1.0

Adapted from Pork Industry Handbook, PIH-87

Wet Skin Cooling – Pigs, under natural conditions outdoors, wallow in mud to cool themselves. The mud itself does not provide significant cooling directly, but instead evaporative cooling occurs as the mud dries, while it also provides a protective barrier against the sun. In confinement systems, water sprinkler systems and drip coolers can also provide effective supplemental evaporative cooling. In group pens, sprinkling water in 1 to 2 minute intervals every 20 – 30 minutes allows moisture to evaporate off the pig's skin before wetting and starting the cooling process over again, and is more effective than leaving waterers on continuously. Larger water droplets are the most effective, as fogging increases the humidity of the surrounding air and therefore indirectly reduces the evaporative rate for heat loss on the pig. For sows individually housed in gestation or farrowing stalls, dripping water on the necks and shoulders combined with air movement also provides direct evaporative cooling. Water drips should be set such that water is nearly or completely evaporated before reaching the flooring.

Nutrition – Pigs will reduce voluntary feed consumption at temperatures above their ideal range in order to reduce the amount of heat being generated due to digestion. Therefore, diets should be reformulated in the summer to be more nutrient dense, ensuring nutrient needs (amount/day) are still being met. Including higher levels of fat, such as beef tallow, choice white grease, or vegetable oil, will increase caloric density while also reducing the amount of heat generated during digestion. Fat is typically added at levels of 2 – 6% of the diet. Fibrous ingredients, such as soybean hulls, wheat midds, alfalfa, etc... should not be fed during hot weather, since caloric density is much lower and will also contribute towards higher heat liberation during digestion.

Adequate Ventilation – Rapid air movement over pigs increases the rate of evaporative and convective heat loss, and is particularly important in confinement buildings. Providing and operating supplemental fans over pens to increase air velocity to at least 3 mph is very effective in warm conditions. Additionally, air exchange in mechanically ventilated buildings should be increased in hot weather to increase the removal of humid air from barns.

Type of Pig	Cold weather rate, cfm/hd	Mild weather rate, cfm/hd	Hot weather rate, cfm/hd
Sow and litter	20	80	500
Prenursery pig, 12-30 lbs	2	10	25
Nursery pig, 30-75 lbs	3	15	35
Growing pig, 75-150 lbs	7	24	75
Finishing pig, 150-220 lbs	10	35	120
Gestating sow	12	40	150
Boar	14	50	300

Midwest Plan Service, MWPS-8

Floor Space – Under conditions of heat stress, it is encouraged to increase the minimum floor space allowed per pig when possible. Increased floor space improves the ability of each pig to dissipate heat, and is particularly important in larger pigs that are more vulnerable to increased temperatures.

Type of Pig	Weight, lbs	Area, ft ²
Prenursery	12-30	2-2.5
Nursery	30-75	3-4
Growing	75-150	6
Finishing	150-220	8

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Adequate Insulation – Properly designed and maintained buildings should contain ample levels of insulation to not only prevent excessive heat loss during the winter, but also help minimize solar heat build-up during the summer. Buildings that were originally designed and built with adequate levels of insulation can have reduced effectiveness later on. Age and rodent infestation can greatly reduce the insulating value, or R-value, of the insulating material, and therefore needs to be evaluated at least annually.

Shade – Pigs that are reared outdoors must have areas shaded either naturally via trees or have structures built to provide relief from the sun. Shade provides relief by blocking a significant proportion of the radiant heat load from the sun. If constructing artificial sources of shade, excellent roof materials include uninsulated aluminum or bright galvanized steel. The reflective surface helps deflect radiant rays from the sun.