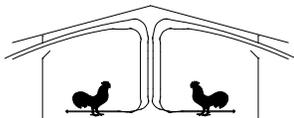




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Poultry Housing Tips

Using Pads Without High Air Speeds Results in Elevated Body Temperatures

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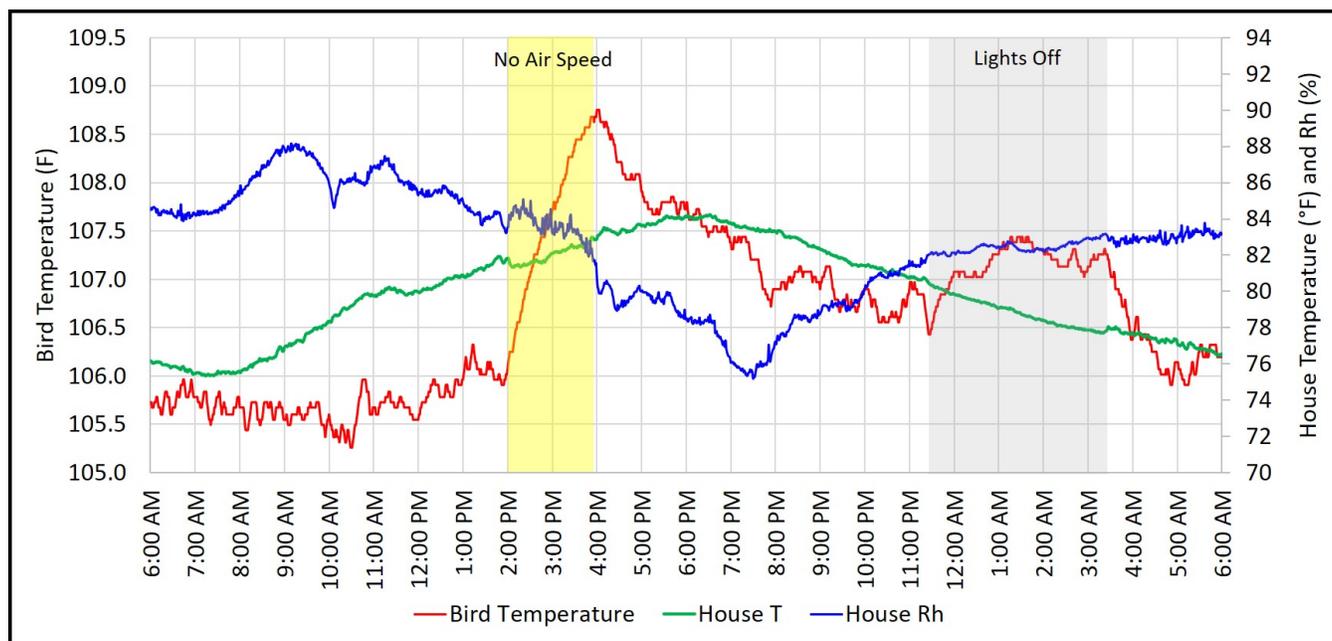


Figure 1. The effect of air movement on bird body temperatures during hot weather.

During the summertime most broiler producers would not consider a house temperature in the low 80's of particular concern, even with a house full of near-market-age birds. But in truth they should be. Because without sufficient air speed, the use of evaporative cooling pads to keep house temperature to a minimum can cause bird body temperatures to quickly rise even if the house temperature is relatively low.

Too often, evaporative cooling is thought of as an “air conditioning” system. Turn it on as soon as possible and hopefully it will keep a few tunnel fans from operating. The truth of the matter is that evaporative cooling pads by themselves do not actually reduce bird heat stress. In fact, they can make it much harder for a bird to cool itself because, though they lower house temperature, they do so at the expense of increased humidity. For every one degree an evaporative cooling pad system lowers house temperature it increases the humidity in a house by approximately 2.5%. So when your pads are decreasing the incoming air temperature from 95°F to 85°F, they are raising the humidity in the house by 25%. Since 50% or more of a bird’s ability to rid itself of excess heat is tied to the evaporation of water off of its respiratory system, a 25% higher house humidity can have significant detrimental effect on the bird’s ability to cool itself. The only reason that pads can be successfully used to keep birds cool in humid climates is that they are coupled with the high level of air speed produced in tunnel-ventilated houses. Without air speeds of at least 500 ft/min, evaporative cooling pads can cause body temperatures of large broilers to reach near lethal levels in just a few hours.

Research is currently being conducted on near-market-age broilers exploring the relationship between air velocity and bird body temperature under typical summertime conditions. Twenty, approximately 7 lb. birds, were placed in a 4' X 5' pen in a room where the air was being exchanged once per minute. A "fan box" was positioned in front of the pen capable of blowing air over the top of the birds at speed of approximately 500 ft/min. When the fan box was not operating, air speeds within the pen was less than 100 ft/min.

Bird body temperatures were monitored on a minute-to-minute basis through the use of implanted temperature loggers. Figure 1 illustrates the body temperature of one of the birds in the pen as well as environmental conditions over the course of a day. The daytime high was 94°F and the low was 74°F. Evaporative cooling pads operated from 10 am to 10 pm. The fan box blowing air over the birds was turned off between the hours of 2 pm and 4 pm.

At 2 pm, just prior to the fan box being turned off, the body temperature of the bird shown in Figure 1 was 106°F, which is considered normal. The bird was not panting and was sitting comfortably, occasionally eating and drinking. Within minutes of the fan box being turned off, bird body temperature started to rapidly increase and most of the birds in the pen started to pant. Over the two hours when there was no air moving over the birds, the temperature of the bird with the implanted logger increased over 2.5°F to 108.7°F, despite no significant change in room temperature or humidity (Figure 2). Of potentially greater concern was the fact that there was no indication that the rate at which body temperature was increasing was going to change had the fan box not been turned back on. It is fairly clear that had the air movement over the birds not been reinstated, mortality would have likely occurred within a couple of hours.

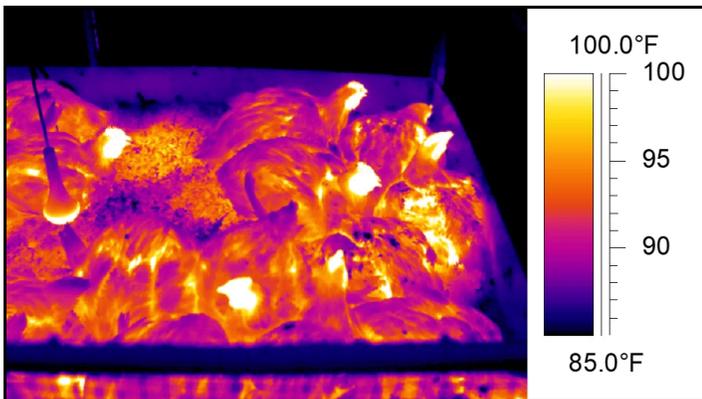


Figure 2. 3:59 PM - Fan box off for 2 hours

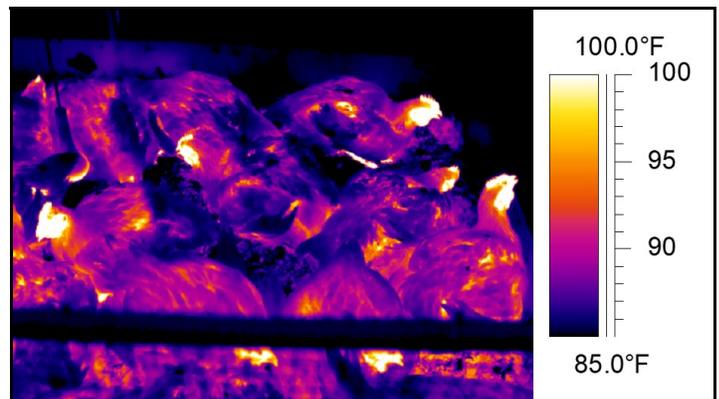


Figure 3. 4:05 pm - Fan box on for 5 minutes

When the fan box was turned back on, the bird's body temperature decreased over the next seven hours to 106.5°F (Figure 3). The rate at which the bird body temperature decreased was much slower than the rate at which it increased when the fan box was turned off. This possibly indicates that once a bird has an elevated body temperature it can take a considerable amount of time for air movement to bring the body temperature back to normal, but more research needs to be conducted to confirm this hypothesis. The bird's body temperature would have likely continued to decrease to 105.5°F - 106°F over the remainder of the night had the lights not shut off at 11:30 pm. When lights shut off at night, a bird will sit down essentially motionless for hours. The reduction in surface area exposed to air movement results in the bird's body temperature increasing, in this case approximately 1°F to 107.5°F. The bird's body temperature remained elevated until 3:30 am when the house lights came back on. Over the next hour and a half, the bird's body temperature decreased 2.5°F to approximately 106°F.

Of course a study such as this generates more questions than answers. For example, precisely how much air speed is required under different environmental conditions, bird sizes, and densities to keep birds from becoming heat stressed. But what it does clearly illustrate is how crucial of a role air speed plays in keeping birds cool during hot weather. Though pads do have their role in keeping birds comfortable, it is the air speed that producers must concentrate on. Because without sufficient air speed, evaporative cooling systems can do more harm to our birds than good.

Michael Czarick
Extension Engineer
(706) 542-9041
mczarick@uga.edu
www.poultryventilation.com

Brian Fairchild
Extension Poultry Scientist
(706) 542-9133
brianf@uga.edu

Larry Leu
Graduate Student (MS)
tl85591@uga.edu