Issue 1

NICHOLAS TECHBULLETIN

CONTROLLING DRAFTS DURING BROODING

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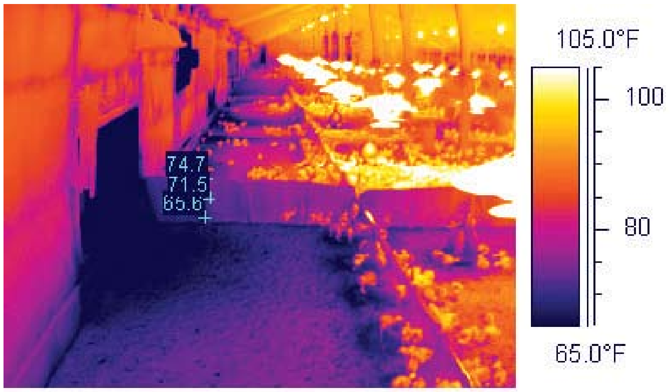

Figure 1. Draft from loose-fitting door

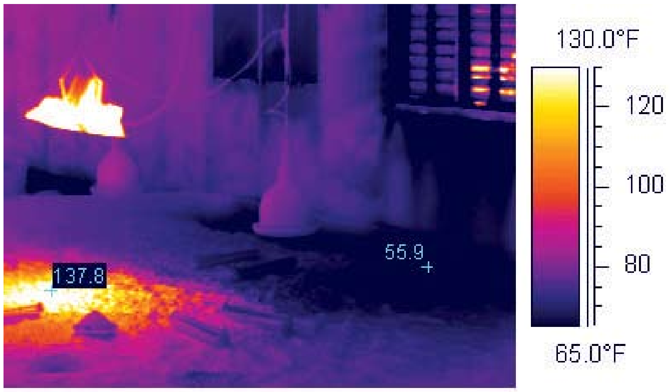

Figure 2. Draft from loose fan shutter

Getting a poult off to a good start in the brooding barn is essential to a producer's bottom line. At no time does a turkey grow faster than during the first few weeks of its life. A seven-day-old poult will ideally weigh nearly three times as much as it did the day it was placed. Not only is it growing quickly, it is converting feed extremely efficiently, nearly a pound of gain for each pound of feed eaten.

The second week, the growth is nearly as high with the young poult nearly doubling its weight once again, with only a slight drop in feed efficiency. Even though the rate of growth decreases over the next few weeks, it is important to keep in mind that even the last week a poult is in a brooding barn it is still growing approximately six times faster than it will the last week it is in the grow-out barn.

These high growth rates and low feed conversions are only possible if optimal environmental conditions are maintained within the brooding barn. For the first couple of weeks of a poult's life, it cannot properly regulate its body temperature. In many ways it is more like a reptile than a bird. Low floor temperatures result in low body temperatures and reduced performance.

A seven-day-old poult that has been chilled can easily weigh 20% less and convert feed 30% less efficiently than one brooded under proper conditions.

The most common cause of poult chilling is the presence of drafts. Cold air seeping through cracks in the sidewall and loose fitting curtains quickly falls to the floor due to the simple fact that cold air is heavier than the warm air within the house. The cold air often goes unnoticed because it tends to hang a foot or less off the floor.

It is not uncommon to find the floor temperature ten degrees or more cooler than the air just a foot above the floor and twenty degrees cooler than six feet off the floor.

EFFECT OF DRAFTS

Figures 1 and **2**, taken with a thermal imaging camera, provide an excellent illustration of the dramatic effect cold drafts can have on floor temperatures within a brooding barn. Although the air temperature a few feet above the floor was in the mid-eighties, floor temperatures in the vicinity of the drafty sidewalls were well below 70°F (21°C). In fact, in both images there was a dramatic difference between floor temperatures and the air just inches above the floor.

Figure 3. Brooder ring acting as thermal barrier

In **Figure 1** there is a six-degree difference between the floor and the air temperature six inches above the floor. In **Figure 2** you can see that although the temperature of the bell drinker a few inches above the floor was in the seventies, the floor near the loose shutter was in the mid-fifties. From these images it is easy to see why drafts often go unnoticed by farm managers.

Though it is true that if a poult stays close to a brooder stove, the negative effect of a draft can be minimized. Drafty conditions can still lead to reduced poult performance. Poults just a couple of feet from the brooder stove can quickly become chilled which can lead to huddling and piling. Furthermore, poults may avoid leaving the immediate vicinity of the brooder stove for feed and water. In either case, performance will likely suffer. ***Keep in mind that priority one for young poults is to maintain body temperature, not to grow quickly.***

BROODER RINGS

Though brooder rings do help to keep young poults near feed, water, and the radiant heat produced by brooders, their most important function during cold weather is to act as a thermal barrier against drafts.

One of the best tools to protect poults from drafts is a properly constructed brooder ring.

Figure 3 provides a good illustration of a brooder ring in action. The cold air leaking in from loose-fitting sidewall curtains drops to the floor, leading to floor temperatures near the sidewall in the low to mid-seventies. The cold air is prevented from getting to the young poults by the cardboard brooder ring.

Figure 4 is another good example of how a properly installed brooding ring can protect young poults from harmful drafts. The dark blue streaks on the sidewall are evidence of cold air leaking into the brooding barn. This leakage leads to an average floor temperature just outside the ring of approximately 64ºF (18ºC), though there were spots where the floor temperature was well below 60ºF (15ºC). The brooder ring is doing its job keeping the draft out as evidenced by the fact that floor temperatures are over ten degrees warmer just inside the ring.

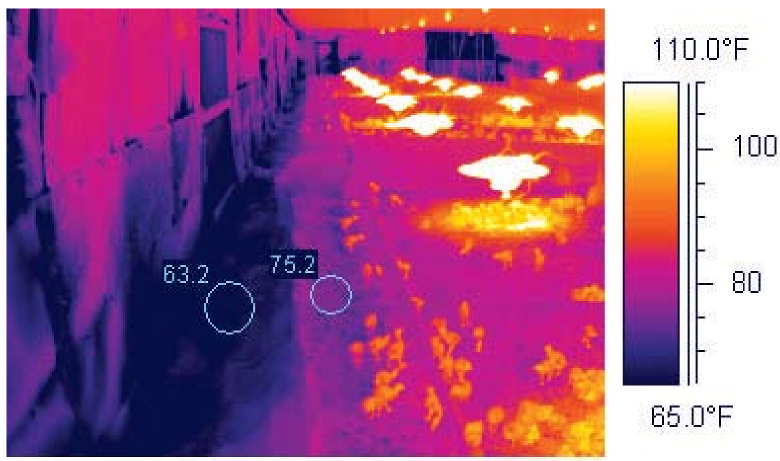

Figure 4.
Brooder ring acting as thermal barrier

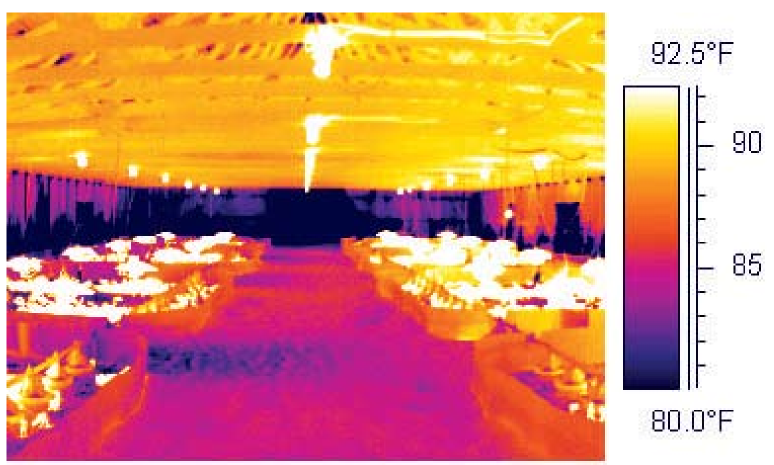

Figure 5.
Draft moving towards the center of the barn from between brooder rings

Figure 5 shows the conditions in the center of the same house shown in **Figure 4**. The dark blue areas in the center of the house are a result of cold air from the outside wall being funneled between the brooder rings into the center of the house. Even in the center of the house leakage from the sidewall is resulting in a six-degree or more drop in floor temperature.

BROODER RING SETUP

Two Feet from the Wall

To prevent drafts from entering the brooding ring, it is very important that there is at least a two-foot space between the brooder ring and the wall. If the ring is up against the sidewall, all the leakage from loose-fitting curtains, inlets, fan shutters, and the like, can drop into the brooder ring, preventing it from acting as a thermal barrier (**Figure 6**).

15- to 18-Inches Tall

Brooder rings should be 15″ to 18″ tall to prevent cold air from entering them. Rings that are 12″ tall can allow the cool air to slip over the top. In the summertime, when the likelihood of drafts is minimal, it is possible to use a 12″ tall brooder ring or possibly one made of wire mesh.

Non-conducting Material

Brooder rings should be constructed of a non-conducting material. One of the best materials is cardboard.

Though the insulating value of cardboard is relatively minimal, it is superior to plastic or metal. A cardboard brooder ring actually absorbs a little radiant heat from the brooder stove, making it slightly warmer than air temperature and further increasing its effectiveness as a thermal barrier against drafts (**Figure 7**).

ABOUT THE AUTHOR

Michael Czarick III is an extension biological and agricultural engineer at The University of Georgia. He is considered by the poultry industry and the academic community as a leading authority on the design and operation of poultry house environmental control systems. Mr. Czarick has given presentations on poultry house environmental control and energy conservation in 35 countries and has authored numerous publications, including scholarly journals and industry-related pieces. His unique ability to explain relatively complex ventilation concepts in an easy-to-understand way has made him a highly sought-after speaker around the world.

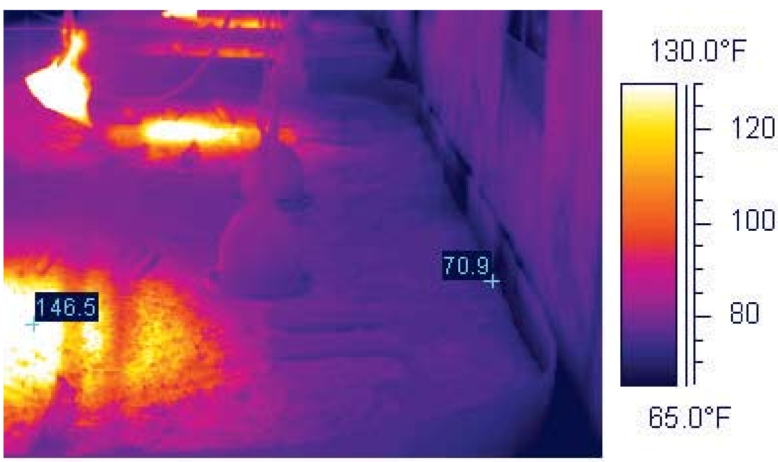

Figure 6. Brooder ring up against sidewall

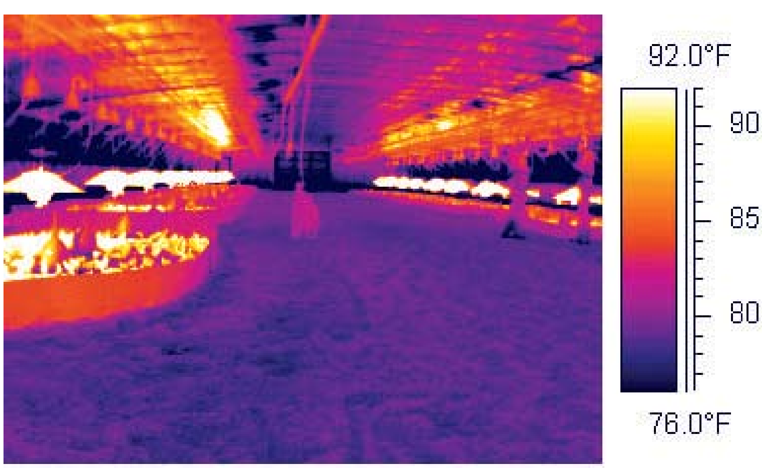

Figure 7. Brooder ring "glowing" due to radiant heating from pancake brooder stove

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