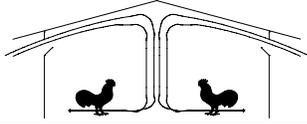




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Poultry Housing Tips

Fresh Bedding...Cool Chicks

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There is a common misconception that one of the reasons that it is sometimes harder to brood on fresh bedding than built-up litter is that there is a significant amount of heat produced by built-up litter making the floors warmer than houses with new bedding. The fact of the matter is that though built-up litter can produce a little heat through composting (which by the way has the negative effect of producing ammonia) the real reason why it is sometimes easier to brood birds on built-up litter is not that built-up litter is producing heat, it is that the fresh bedding can actually remove heat from a house.

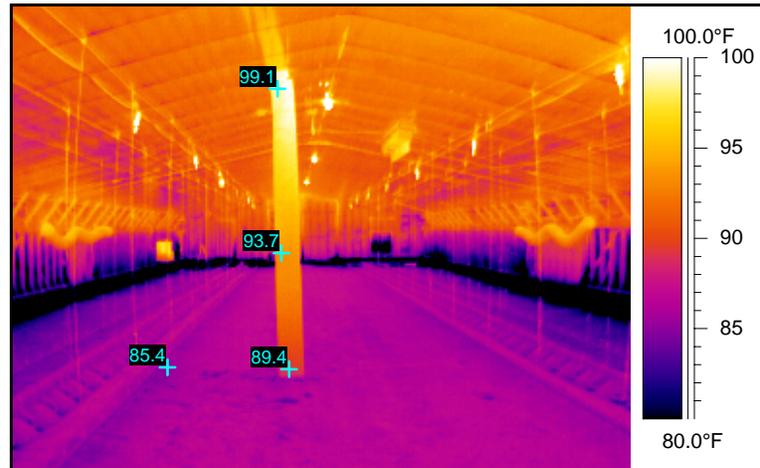


Figure 1. Low floor temperatures due to damp bedding

Placing fresh, damp bedding in a house results in significant cooling because heat is removed from a house as the bedding dries. In fact, to evaporate one gallon of moisture from damp bedding requires 8,400 Btu's of heat, which is equivalent to the heat produced by burning 1/10th of a gallon of propane. This may not seem like much until you consider the fact that if you put damp bedding in a house you could be potentially bringing in hundreds of gallons of water.

The cooling produced by the evaporation of moisture from the bedding has a number of detrimental effects. First, you can think of damp bedding as a giant evaporative cooling pad that the young chicks are sitting on. As the air moves across the floor, heat is removed from the floor as well as the air next to the floor. Though dry bedding is an excellent insulator which tends to help a chick conserve its body heat, damp bedding tends to conduct heat away from a chick which results in a decrease in body temperature. The good news is the heat the chicks are losing to the bedding tends to dry the bedding; the bad news is that they are being harmed in the process. Decreased chick body temperatures do not only adversely affect weight gains and feed conversions but also may impair a chick's immune system and make it more susceptible to viral or bacterial infections.

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The thermal image in Figure 1 was taken in a house with damp pine shavings just prior to chick placement. A roll of paper towels was hung from the ceiling to provide a visual indication of air temperature from ceiling to floor. Along with the obvious stratification of air in the house, it can be seen that even though the temperature of the air next to the floor is 89°F, the floor temperature in the center of the house was 85°F and 80°F near the side walls which is five to ten degrees cooler than ideal. Making matters worse is the fact that though the surface of the bedding was showing some signs of drying, the bedding just under the surface was still cool and damp. A thermal image taken in one of the warmer, drier locations in the house showed that even though surface bedding temperature was nearly 88°F, the temperature of the bedding just a fraction of an inch below the surface was 83°F (Figure 2). This is common in houses with fresh bedding. Though the surface temperature may be in the low to mid eighties, bedding temperatures just beneath the surface can be in the low to mid seventies and just the slightest disturbance of the bedding by the chicks or people walking around in a house can expose the young chicks to very low floor temperatures (Figure 3).

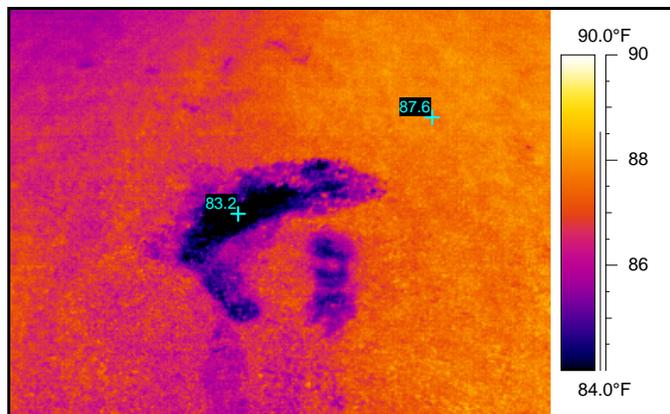


Figure 2. Footprints in house where bedding is damp just below the surface.

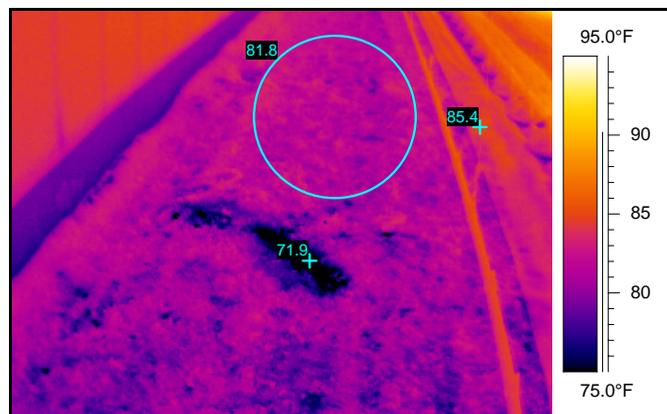


Figure 3. Cool floor temperatures and damp bedding just below the surface.

It is important to keep in mind that when brooding chicks, floor temperature is more important to chick health and performance than air temperature. If the floor temperature is 80°F, the birds are being brooded at 80°F regardless of what the air temperature is in the house. As a result, whenever damp bedding is placed in a house and is not thoroughly dried before the chicks arrive, chicks are typically being brooded five to ten degrees cooler than the house's controller or thermometers are indicating. This was exactly the case for the house in Figure 1. Though the controller was set to maintain a temperature of 90°F, the chicks were essentially being brooded at an air temperature closer to 80°F.

As you might suspect in addition to being harmful to chicks placing damp fresh bedding in a house can result in increased fuel usage. To make sure the bedding is dried sufficiently before the chicks arrive a house typically has to be preheated to proper brooding temperatures for at least 48 hours. The increased preheat time along with the evaporation of water from the bedding will tend to result in higher fuel usage than in a house with dry bedding.

It is important to keep in mind that in order to dry damp bedding that you will need to ventilate. One of the problems with fresh bedding is that with little or no ammonia in a house producers often feel little need to ventilate which often leads to humid conditions within a house. The higher the relative humidity the less moisture that is pulled from the bedding and the longer the bedding stays damp and the chicks chilled. Furthermore, over time as the chicks begin to add more moisture to the bedding the likelihood that the bedding will cake is increased. To minimize these problems producers should try to ventilate sufficiently to maintain a relative humidity of around 50 to 60%.

Damp bedding is not just a potential problem during cold weather. The fact of the matter is that even during hot weather young chicks can actually be cold stressed if the bedding is damp. The thermal images in Figures 3 and 4 were taken in a house during the month of June when outside air temperatures were in the mid eighties. Though the controller sensor just 12" off the floor was indicating an air temperature of nearly 88°F, the temperature of the damp bedding was only 82°F (Figure 4). In other areas of the house where the bedding was even damper, floor temperatures were in the mid seventies (Figure 5).

One of the best tools to aid bedding drying is brooding with some type of radiant brooder/heater. Radiant heaters transfer heat to the floor directly which tends to lead to quicker bedding drying in the vicinity of the brooder/heater. When floors are heated to 95°F or better by a radiant brooder/heater the bedding dries fairly quickly. And unlike hot air radiant heat tends to dry the bedding not only at the surface but below the surface as well. As you might suspect the larger floor area covered by the radiant brooder/heater the greater the floor air which will be dried quickly. For this reason bedding drying is generally greater in houses with radiant brooders and radiant tube heaters than with most conventional brooders. It is important to keep in mind that areas outside the radiant heat zone of the brooder/heater will tend to dry significantly slower than those areas near the brooder so preheating a house 48 hours before the chicks arrive is still advised (Figure 6.)

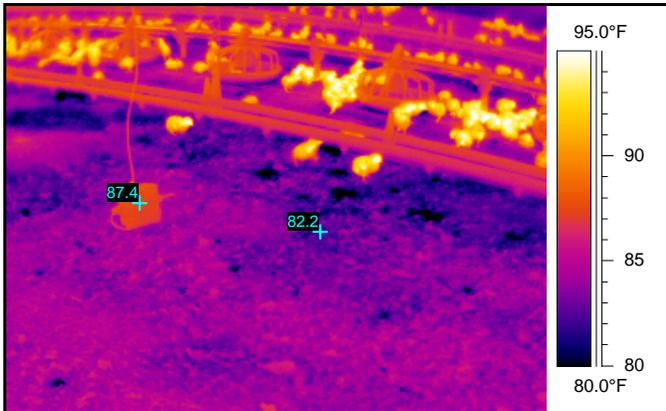


Figure 4. Warm sensor, cool floor.

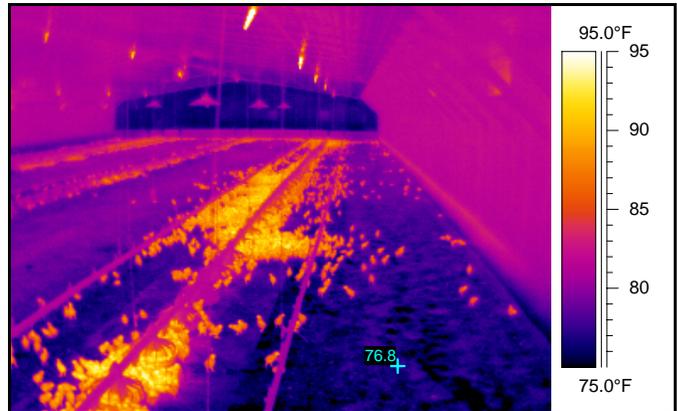


Figure 5. Cool floor due to damp bedding.



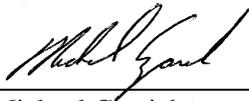
Figure 6. Floor heating/drying by radiant brooder.

Another useful method of accelerating the drying of damp bedding is the use of circulation fans. Without circulation fans air next to the floor tends to stagnate, slowing the drying process. By gently moving warm air, even if it is on the humid side, over the bedding a significant amount of bedding drying can take place.

The following are some tips to help minimize problems associated with damp bedding:

- 1) If at all possible keep shavings dry before placing them in a house. It is true that a producer has little control over how dry the bedding is before arriving on a farm but at least storing bedding in a dry place can keep from adding even more moisture to the bedding.

- 2) If you are adding fresh shavings during moderate or warm weather try to place them in the house at least a few days before the chicks are scheduled to arrive. During the warmer parts of the day put the house in tunnel ventilation mode and run ½ of your tunnel fans to help promote drying of the bedding.
- 3) If you have circulation fans make sure you run them when you are preheating the house. This will help not only to move the hottest driest air off the ceiling but the added air movement will increase moisture removal from the bedding. If possible you may want to direct the circulation fans downward toward the bedding to increase the rate of drying. Don't forget to ventilate a little to keep the relative humidity down.
- 4) If you clean out a house and wash it down it is very important that you try to dry the pad as much as possible before putting fresh bedding down. If at all possible run a few tunnel fans during the day, for a few days, to remove some of the moisture you added to the house before adding fresh bedding.



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