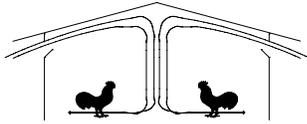




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Poultry Housing Tips

The Importance of Nighttime Wind Speed During Hot Weather

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It is a hot, humid summer afternoon and you have older birds. All the tunnel fans are running as are the evaporative cooling pads. You cleaned your fan shutters and the belts were recently replaced. You have checked your pads and they are wetting evenly and appear fairly clean. Your migration barriers are up and the birds are fairly well distributed throughout the house. Even with all your efforts house temperatures are still in the mid to high eighties and most of the birds are panting. You wonder if there is anything else you could be doing to cool your birds. The fact is that despite producers' best efforts birds in tunnel houses will get hot from time to time. Though this of course is frustrating, it need not adversely affect performance if you keep in mind that bird cooling is a 24 hour a day job.

Many times producers spend too much time concerned with what is happening in their houses during the day and not enough on what is happening at night. The truth is that most producers are probably doing everything they can do to keep their birds comfortable during the daylight hours. Where producers typically need to focus more attention on is nighttime bird cooling. A significant amount of performance is lost every summer when the number of tunnel fans operating during the late night hours is reduced either intentionally or unintentionally resulting in a lost cooling opportunity.



The benefits of running fans at night have been known for some time. Some of the first work was done in naturally-ventilated houses where thermostats on circulation fans were lowered five to ten degrees below the normal setting allowing them to run longer at night (Bottcher et al., 1994). In the houses where the circulation fan thermostats were

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set ten degrees lower average weight gain was 0.02 to 0.18 pounds greater and a feed conversion of one to three points better than the houses operated on normal ventilation guidelines. Mortality was 0.2 to 1.2 % lower and the net benefit to the grower varied from \$25 to \$275 per house during summer flocks. When circulation fan thermostat settings were reduced by five degrees no differences in bird performance were observed indicating that there was little difference in nighttime cooling.

In a more recent study researchers at the USDA Poultry Lab located in Starkville, Mississippi examined the potential benefits of maintaining high wind speeds at night during hot weather. The study was done in pens located within tunnel-ventilated chambers. Male broilers were assigned to one of three treatments: still air, 550 ft/min during the day and 300 ft/min at night, or 550 ft/min, 24 hours per day. Air temperatures were on a cyclic regimen with a high day time temperature of 86°F (65% Rh) and a low nighttime of 77°F (87% Rh). Body weight gain and feed conversion were determined for two different time periods: 37 to 44 and 44 to 51 days of age.

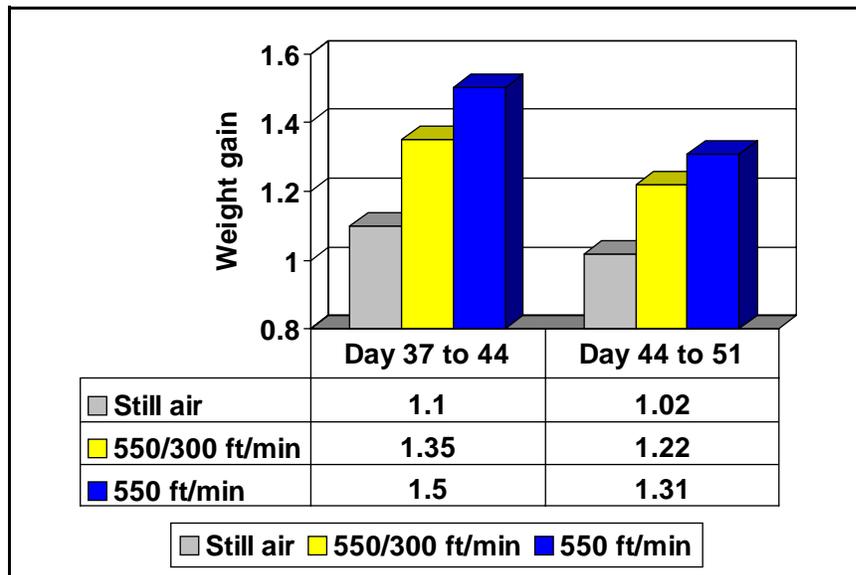


Figure 1. Weekly Weight Gains For Different Daytime/Nighttime Wind Speeds.

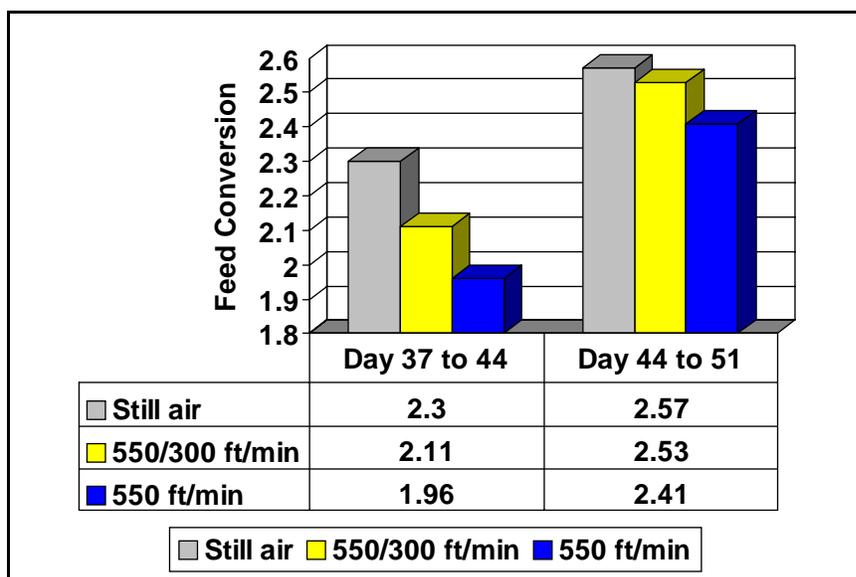


Figure 2. Weekly Feed Conversions for Different Daytime/Nighttime Wind Speeds

Weekly body weight gains and feed conversions for the two different study time periods are illustrated in Figures 1 and 2. Both weight gain and feed conversions were significantly higher for the birds in the test chamber where an air speed of 550 ft/min was maintained 24 hours a day. Over the two week study weight gains were increased 0.15 lbs while feed conversions were reduced 0.15 lbs feed/lbs gain by increasing nighttime air speed from 300 to 550 ft/min.

Of particular interest was the fact that though there were benefits for increased air movement at night for both weeks of the study, there were actually larger differences in bird performance for running fans at night during the first week of the study than for the second. Many times we think of the most need for cooling being the last week that the birds are in the house where this study indicates that we may need to concentrate on daytime/nighttime cooling the last couple of weeks of the growout.

Why does running fans at night have such a big effect on bird performance? Primarily for two reasons. First, during the night there is a larger temperature difference between a bird's body and the air making it easier to pull heat from the bird thus lowering its body temperature. It is important to keep in mind that even in a tunnel house with all its cooling potential many times the bird temperatures will rise during the day. As a bird's temperature rises, feed consumption decreases leading to reduced weight gains and panting will increase resulting in reduced feed conversions. At night when air temperatures begin to fall it is crucial that air movement over the bird is maintained for a long enough time to insure that the bird's body temperature is brought back down to normal levels which can take six hours or more depending on a variety of factors. Furthermore, keep in mind that once a bird's body temperature is brought back down it will begin to eat again in earnest. This of course will lead to increased heat production and increased body temperatures, thus maintaining the need for increased air movement to keep the birds cool late into the night.

The second reason for the increased need for air movement at night is the fact that in most poultry growing areas that the relative humidity at night is between 80 and 95%. Birds rely heavily on the evaporation of water off their respiratory system to cool themselves regardless of air temperature. So even though the air temperature at night may be lower, the birds do not benefit as much as you may think because of the detrimental effect the high humidity has on evaporative heat loss from the birds respiratory system. By increasing air movement at night the amount of heat loss due to air movement is increased thus reducing the bird's need to cool itself through the evaporation of water off its respiratory system.

It is important to note that the study was conducted with relatively high nighttime temperatures. Had the nighttime temperatures in the study been in the mid to high sixties it is questionable that the additional air speeds would have produced such striking differences in performance. In Dr. Bottcher's study when circulation fan thermostat settings were lowered in the spring and fall, when one would expect lower nighttime temperatures, no difference in bird performance was found. The point is that nighttime bird cooling is most beneficial when they have been heat stressed during the day. Birds without elevated body temperatures do not need extra cooling at night.

During the last two weeks of growout is a critical time for both the birds and the growers. Research studies demonstrate the positive impact that running fans at night can have on bird performance and the grower's bottom line. Considering running additional fans in most tunnel houses at night would cost in the neighborhood of \$25 a week. The gains in performance could easily pay for the additional power used.



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



Michael Czarick
Extension Engineer
(706) 542-9041
mczarick@engr.uga.edu

Provided to you by:

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