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Poultry Housing Tips

Monitoring Broiler Distribution Through Water Consumption

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One of the keys in obtaining maximum bird performance in a tunnel-ventilated house is making sure the birds are uniformly distributed throughout the house. Most producers are very good at installing migration fences to insure that the birds will not migrate toward the inlet end of the house during the growout. But, it is important to realize that just because migration fences are installed doesn't necessarily mean that bird uniformity problems are eliminated. In order to get the most out of a tunnel-ventilated house, it is crucial that migration fences are installed soon after the birds are turned out into the full house, and the birds are evenly distributed between the fenced off sections.

Uneven bird distribution affects both broiler performance and energy usage. Studies conducted at Auburn University found that increasing bird density from 0.9 to 0.8 ft^2/bird, decreased birds weights from 5.88 to 5.77 lbs and feed conversions increased from 1.85 to 1.88 lbs feed/lb of gain. In the case of poorly distributed birds in a broiler house there are far more birds being hurt by the higher densities than being helped by lower densities in less crowded areas of a house.

There are a number of different reasons for the decrease in performance. First, as density increases feed intake decreases. This is due to increased competition for feeder space reducing the time that birds can spend at feed pans. Furthermore, when birds are crowded it simply becomes more difficult for the birds to make the trip to feed and water. Decreased feed consumption may also be due in part to increased floor temperatures. As birds crowd, the amount of air moving around the bird decreases resulting in warmer air around the bird. It is not uncommon to find that air temperature at bird level in a crowded area of a house five degrees warmer than in other less crowded areas of a house. The higher air temperatures result in elevated bird body temperatures thereby, decreasing feed consumption.

Another problem with overly crowded birds at one end of a house is that condemnation levels are likely to increase as birds climb over one another to get to feeders and drinkers, resulting in scratching and bruising. In the Auburn study, a densities difference as little as 1.0 to 0.9 ft^2/bird increased sores and scabs from 17.1% to 26.8% indicating the importance of keeping the birds uniformly distributed throughout the house.

Increased bird densities at the tunnel curtain end of a house can aggravate poor litter conditions often occurring due to the high moisture level of the air entering through evaporative cooling pads because of the difficulty in getting air down to floor level. Damp litter conditions can result in foot and hock burns, and breast blisters that will also affect carcass grading. The damp litter will also provide a better environment for microbial growth that could lead to increased infection and/or increased ammonia production. This in turn has its own implications that could have a secondary effect on bird health.

Not only does improper bird distribution affect bird performance, but it can also have an effect on net return. Fuel and electricity costs increase when there are more birds on one end of the house than the other because there is a surplus of heat on one end of the house and a deficit on the other. During cold weather we use the heat produced by the birds to help maintain the proper house air temperature. When there are more birds on one end of the house than the other, a producer can easily create a situation where exhaust fans are coming on at one end of the house to cool it off while furnaces or brooders on the opposite end are coming on because there is not enough bird heat to maintain the proper temperature.

But, how does one know if their birds are uniformly distributed? When the fences are first installed when the birds are young it can be extremely difficult to determine if the birds are uniform. After all, the Auburn studied showed that a density difference as little as 10% can reduce the weight of a seven-week-old bird by 10 points. Determining a 10% density difference can be a challenge. As birds get older it becomes easier to determine if there are more birds on one end of a house than another. The problem is that by the time you can easily see density differences the birds are too big to "herd" from one area of the house to another.

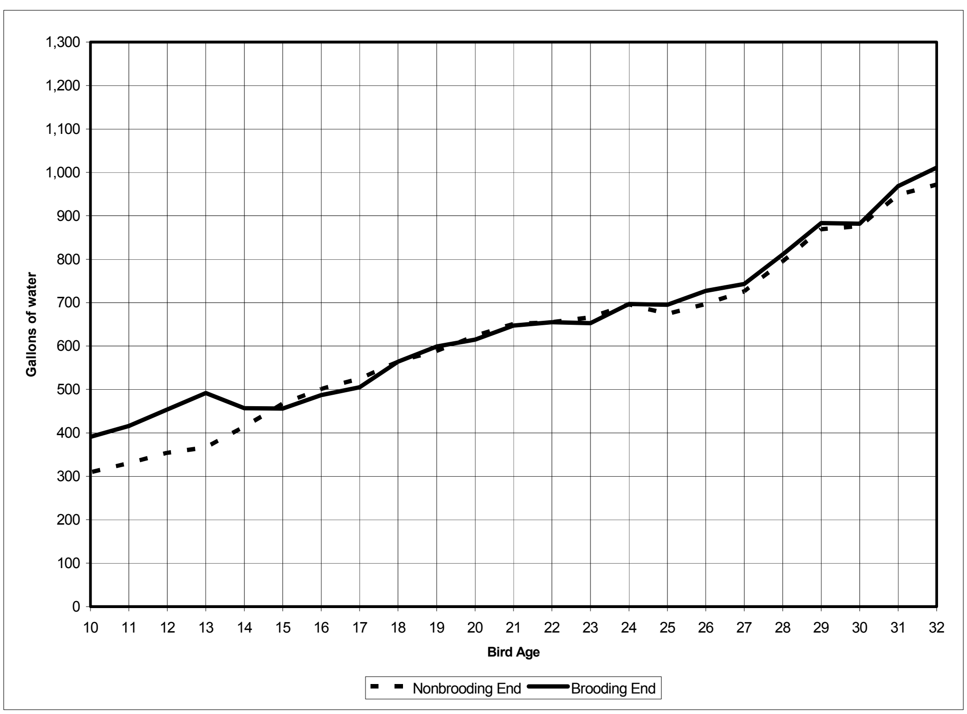

Figure 1. Water consumption on brooding and non-brooding end (Farm 1)

Probably the best way to evaluate bird density uniformity is to simply install a water meter on each end of your houses. If the house temperature is uniform, daily water consumption is an excellent and relatively inexpensive measure of bird uniformity. A producer can let his birds migrate to the non-brooding end of the house for a couple of days. Once he sees that water consumption is uniform then he knows he can install his fences. Or if the producer sees that there is 20% less water consumption on the non-brooding end he can "herd" some birds to the rear, put up the fences, and check the water consumption over the next couple of days. If the birds are still not uniform, the fences can be temporarily dropped and the birds moved while they are still young and move freely.

Recently a trial was conducted where water meters were installed on the brooding and non-brooding ends of two broiler farms in West Georgia. The birds were placed on the same day on both farms and the water meters were connected to data loggers so that daily water usage could be monitored. Both farms had electronic environmental controllers connected to a PC so house temperatures could also be monitored.

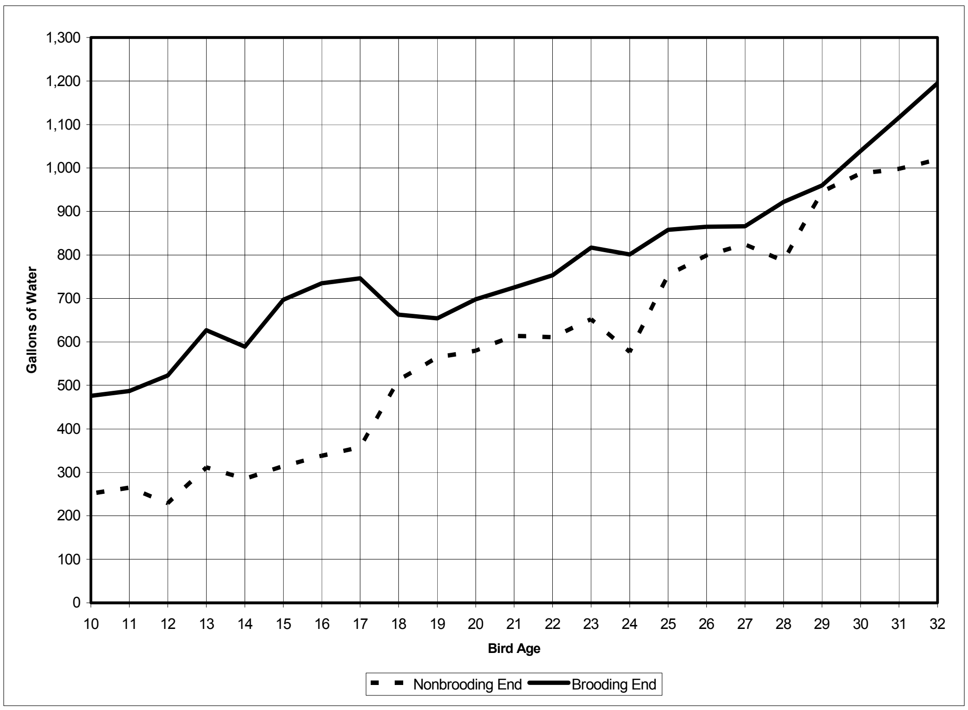

Figure 2. Water consumption brooding and non-brooding end (Farm 2)

Figures 1 and 2 show the daily water consumption for both ends of one house on each farm. Due to very warm weather, birds on both farms were allowed access to the non-brooding end of the houses at approximately eight days of age. On Farm 1 the producer redistributed his birds and installed three fences when the birds were two weeks of age. After the producer turned out there were approximately 20% more birds on the brooding end than the non-brooding end as evidenced by the fact that water usage was 20% higher on the brooding end. As the producer installed his fences he moved a few birds towards the rear of the house to get them more even. After the fences were installed there was less than a 2% difference in water consumption between the two ends indicating the birds were very uniformly distributed. Visual observations made on the farm confirmed the fact that the birds were very uniform from end to end.

On Farm 2 though, the birds were turned out into the entire house at the same time, but the producer did not install their fences until the birds were about 19 days of age. The birds did not spread out on their own like they did on Farm 1. This may have been due to differences in light intensities on the two farms. Prior to fence installation there were approximately twice the number of birds on the brooding end as indicated by the fact that the water usage on the brooding end was twice that of the non-brooding end. Though the producer attempted to get the birds more uniform prior to installing the fences, water consumption indicated that there were still approximately 15% to 20% more birds on the brooding end than the non-brooding end. This again was confirmed by visual observations on the farm.

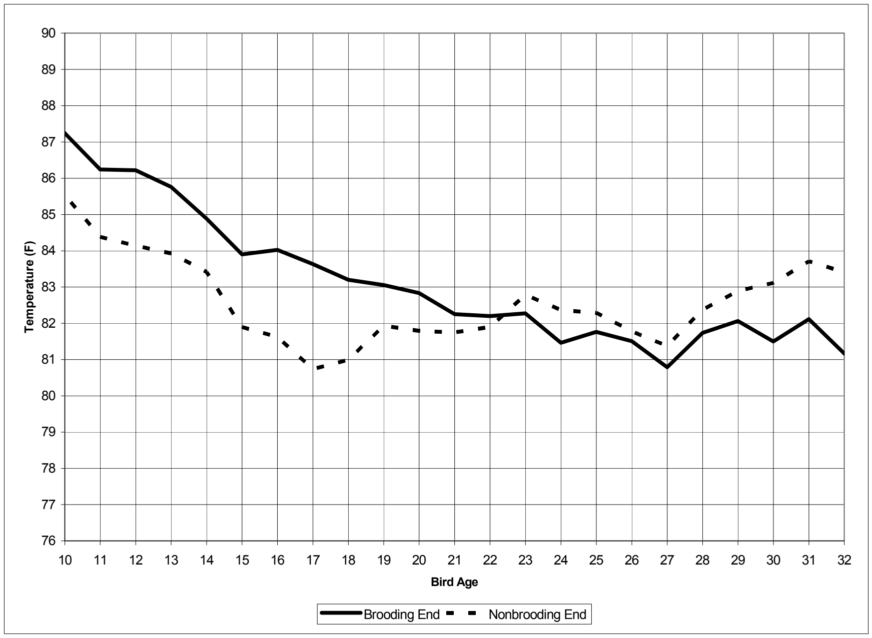

Figure 3. Average air temperatures (Farm 2)

The fact that there were twice the number of birds on the brooding end prior to the installation of fences can also be seen in the average daily air temperature on each end of the house during the same time period (Figures 3). Prior to fences being installed, the brooding end was approximately two degrees warmer than the non-brooding end. When the producer moved more birds to the rear of the house the difference between the two ends dropped to less than a degree. A two-degree average difference may not seem like much until you take a closer look at the actual house temperatures just prior to and after the installation of the migration fences (Figure 4).

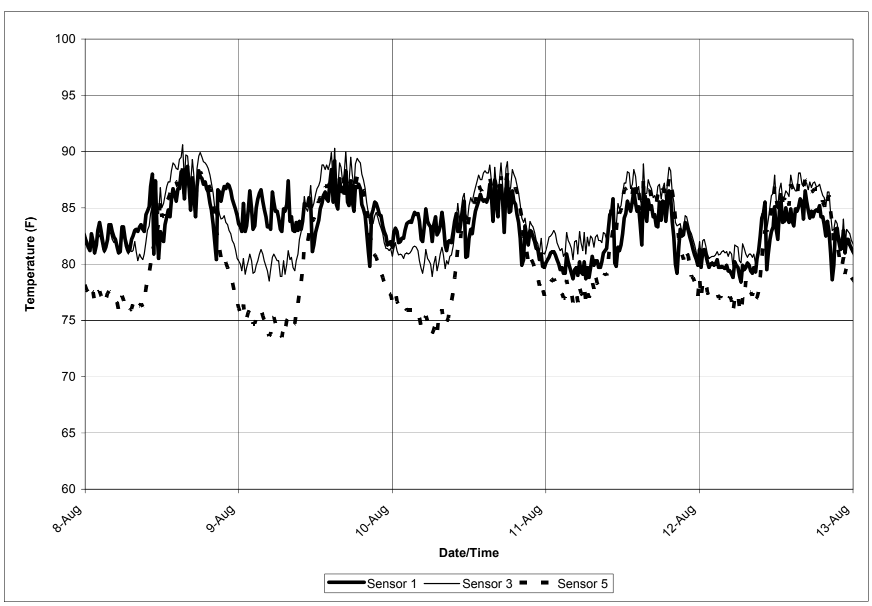

Figure 4. House temperatures (Farm 2)

Figure 2. Water consumption brooding and non-brooding end (Farm 2)

During the day the difference was not very large between the two ends of the house because of the warm weather and the large number of fans operating. But, at night when the number of operating fans dropped the effect of the large difference in bird density becomes very apparent. On August 10, the day before the fences were installed, there was nearly a 10°F difference between Sensor 1 (located 50' from the brooding end wall) and Sensor 5 (located 75' from the tunnel fan end wall) even though the houses were operating in side wall inlet mode at night. On August 11 after the producer moved additional birds, and the heat they produce, to the non-brooding end and installed the migration fences the temperature difference dropped to less than 5°F at night.

It is interesting to note that the difference in water consumption between the brooding and non-brooding ends of the house on Farm 2 was not constant 20% after the birds were turned out (Figure 2). Though it is difficult to fully explain all of the variation, house temperature clearly played a role. On many of the days when the difference between the two ends of the house lessened, corresponded with hotter days when the nonbrooding end of the house was significantly warmer than the brooding end. The higher air temperatures on the nonbrooding end increased water consumption 10 to 15%, bringing the amount of water the birds on the nonbrooding end drank close to what those did on the brooding end even though there were far fewer birds on the nonbrooding end.

Overall, Farm 2 finished up well below average and Farm 1 finished above average. Although multiple factors can influence grower returns at the end of grow-out, density did have an effect in this case. Timing of migration fence placement and the subsequent effect on bird density will be monitored in future flocks. Additional work is needed to determine the influence these practices have on growth and livability. Even though more work is needed to fine tune these results, this trial demonstrates the importance of timely installation of migration fences and ensuring that broilers are distributed uniformly throughout the house.

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