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Poultry Housing Tips

Water Usage and Broiler Performance

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One of the biggest frustrations facing broiler producers is not knowing how the flock is doing until after the birds have sold, by which time it is too late to do anything about it. Of course keeping up with daily mortality can provide a general idea of how well a flock is doing but, just because the mortality is "normal" doesn't necessarily ensure a flock will end up at the top of the settlement sheet, let alone settle above average. Another rough measure is for a producer to "watch" their birds to see if they are "acting healthy" or their weights "look good", which is not a bad thing to do but is hardly a precise measure of performance. Of course, if someone was really ambitious he/she could catch 100 birds each day and weigh them. The problem with this is that it is a rather serious time commitment, and making sure that a representative sample of birds are caught each day can be a challenge to say the least.

As we all well know, the ultimate solution is to install bird and bin scales. With bird and bin scales, a producer could keep up with daily feed consumption, bird weights and with a little math could even figure daily feed conversions. Then they would know every day whether the birds are gaining weight at the proper rate and whether or not feed conversions were in line. With this information, modifications to house temperature, lighting program, the number of fans running or possibly minimum ventilation settings could be made to insure optimal growing conditions are maintained. There is only one problem...cost. Bird and bin scales could set a producer back $10,000 or more per house.

If feed and bird scales are out of the question, what is a producer to do to get timely feedback on how their birds are performing? One option is to monitor water consumption. Water consumption has been shown to be a good measure of broiler performance that is fairly reliable and inexpensive to measure.

Feed and water consumption are very closely related, and as a result, if you do a good job of keeping up with water consumption, you can have a pretty good idea of how much feed your birds are eating. Figure 1 shows daily feed and water consumption on a contract broiler farm equipped with bin scales and water meters. Water and feed consumption are both graphed in terms of pounds consumed so the relationship between the two can be seen more clearly. It should be no great surprise that feed and water consumption increase over the course of a growout. But, what is interesting is how similar the two graphs appear. When there is a rise in one...there is a rise in the other. A dip in one, corresponds to a dip in the other. Though this tendency holds true throughout the course of the growout it is very clear from days 25 - 35. There is a rise in feed and water consumption around day 30 followed by slight decrease. The two measurements correlate almost perfectly.

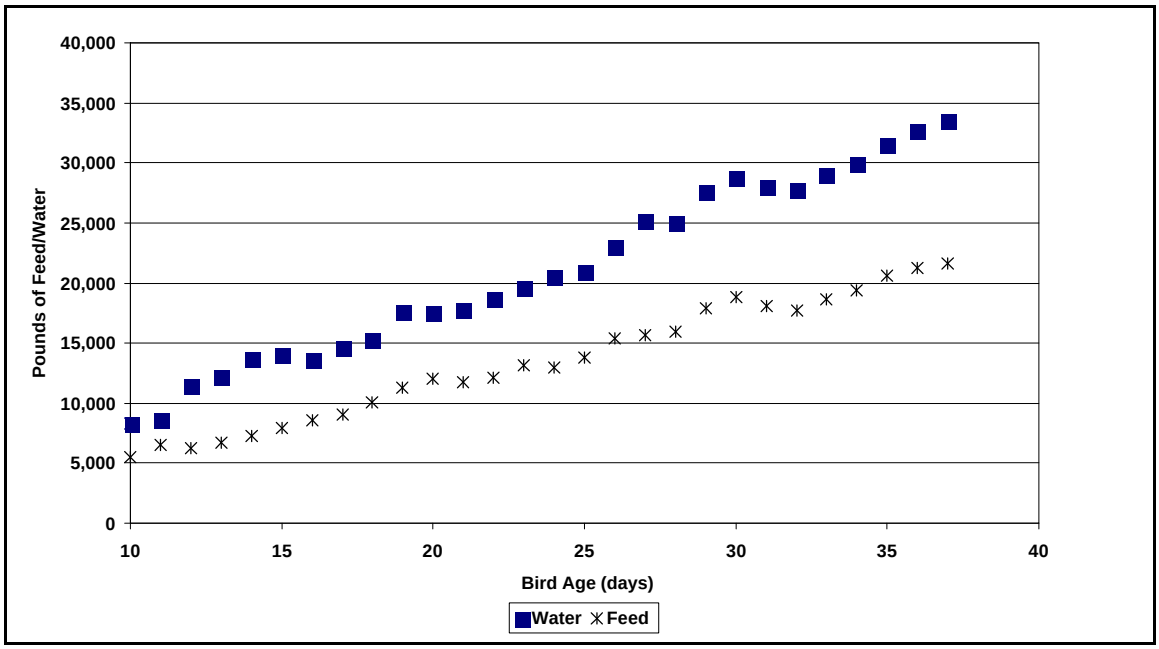

Figure 1. Daily feed and water consumption (lbs.) during a cold weather growout.

The close relationship between feed and water consumption can be seen even clearer when we look at feed and water consumption over the course of a day. The graph below shows how many pounds of feed and water the birds consumed every 15 minutes when they were approximately seven weeks of age.

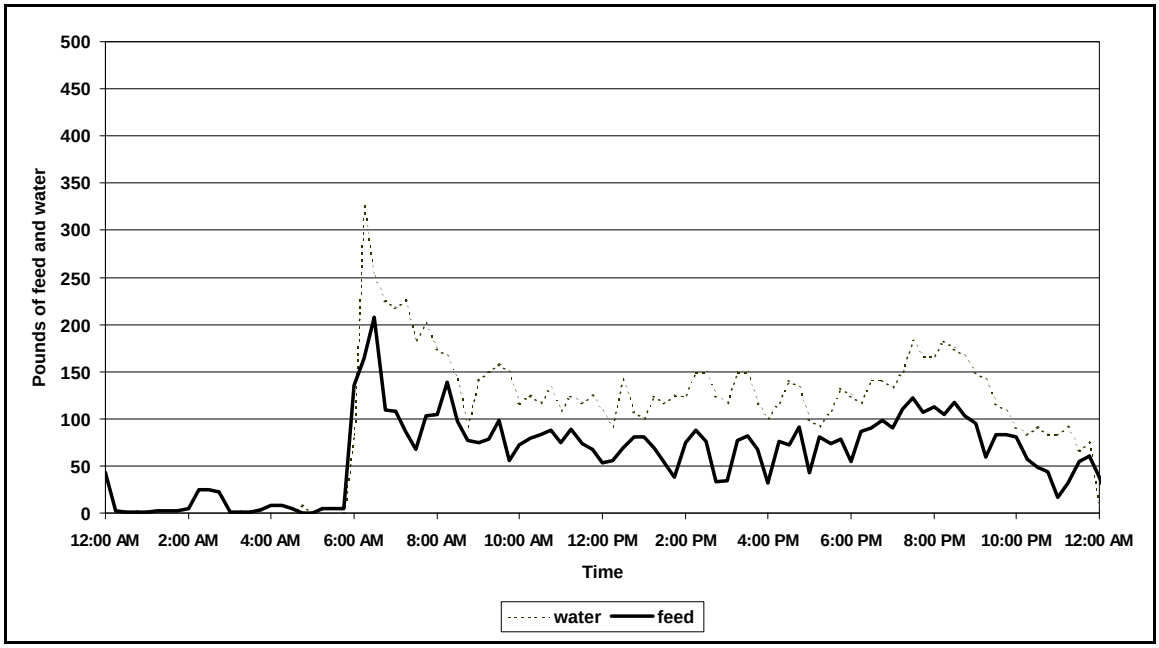

Figure 2. 15 minute feed and water consumption (lbs.) for a house of seven-week-old broilers.

As you might expect, birds do not eat or drink at night when the lights are off. As soon as the lights come on in the morning (this was a black curtain broiler house), there is an immediate rise in both feed and water consumption. Feed and water consumption decrease to a low in the mid afternoon, then rise again a few hours before the lights go off. The feed consumption shows a little more variation because water flow is constant whereas feed leaving the bins is more sporadic.

When Figure 1 is examined in more detail a second fact becomes evident. The ratio of feed to water consumption is fairly constant over the life of the flock. This can be seen more clearly if we graph daily feed consumption versus daily water consumption (Figure 3). For this particular growout the ratio of pounds of water to pounds of feed was 1.5 pounds of water per pound of feed consumed. So whether a bird was a week old or seven weeks old, for every pound of feed eaten, 1.5 pounds of water were consumed (0.18 gallons of water).

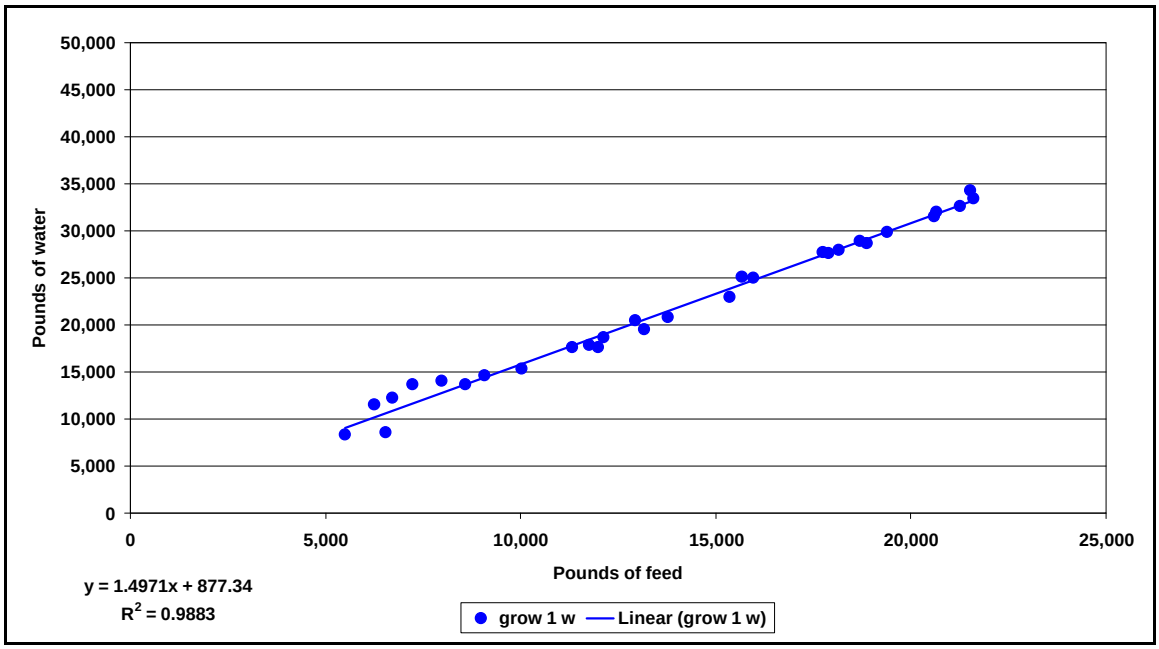

Figure 3. Feed consumption Vs. Water consumption.

Does this relationship hold true throughout the year? For the most part yes, but as you might expect during the summer months when keeping birds cool is more of a challenge, the ratio of water to feed increases slightly due to the fact that birds drink more water to cool themselves. On this particular farm, which is equipped with a fogging pad system, the ratio increased to 1.77 pounds of water per pound of feed (0.21 gallons of water per pound of feed). It is probably fair to say that the better a producer does maintaining the proper house temperature, the more consistent the water to feed ratio will be throughout the year.

It is important to note that even though the close relationship between feed and water consumption is a well documented fact, it is difficult to say that birds on all farms will drink exactly 1.5 pounds of water per pound of feed consumed during cold weather and 1.7 pounds of water per pound of feed during hot weather. The ratio could change a bit with size of bird grown, breed, density or other factors. More research still has to be done.

Another interesting, and potentially very useful fact about water consumption patterns in broiler houses is how very similar two houses can be if the conditions are the same. Figure 4 shows water consumption over a three day period in side by side houses in which the environment and breeds were identical. As you can see the peaks and valleys on each day were virtually identical. Same environment (temperature, relative humidity, air movement, light), the same water consumption pattern.

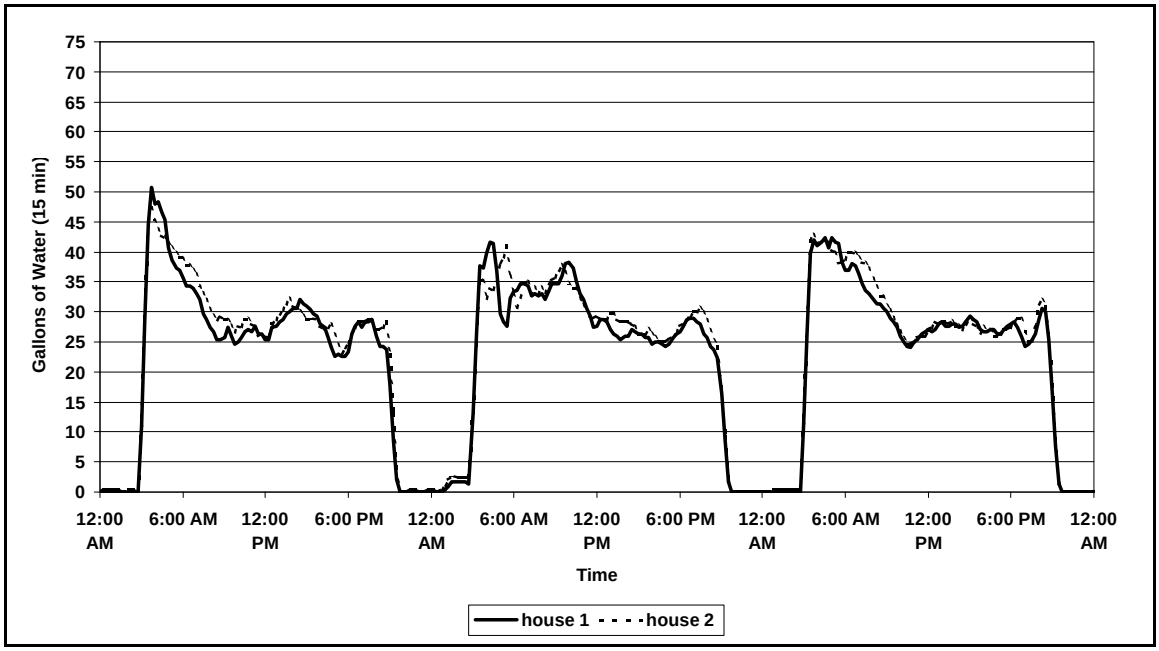

Figure 4. Water consumption for side by side broiler houses (same breeder flocks)

So, what is the best way for a producer to use water consumption as a gauge of broiler performance? First, in order to use water consumption as a management tool you need to be keeping an accurate daily record of consumption. One important aspect of having accurate water consumption data is making sure it is written down at exactly the same time each day, ideally when the lights are off. If you change the time when the data is recorded by an hour or two, it is very difficult to pick up changes in water consumption, and therefore feed consumption, from day to day. This brings up one of the big advantages of the new modern environmental controllers. Most modern controllers can be equipped and programmed (for little more than $100) to record water usage. So you don't have to be on the farm at midnight, and you don't have to subtract today's meter reading from yesterday's.

One of the most important things to look for when monitoring water consumption is sudden increases or decreases. Sudden rises are typically related with a heat stress situation while decreases could a be sign of a disease situation or feed, water, or lighting problem. A good example of this can be seen in the graph below depicting daily water consumption and average house temperature during a particularly hot weather growout.

From day 7 to 29 there was a fairly steady decrease in average air temperature, and a steady increase in water consumption. On day 30 of the growout there was sudden heat wave, and as a result, average house temperature increased about three degrees. This sudden increase in house temperature resulted in an 18 percent increase in water consumption. Water consumption did not return to "normal" levels until three days later when temperatures moderated. The advantage of monitoring water consumption is that producers have another indicator that the birds are heat stressed and that actions should be taken to increase bird cooling. These actions could include cleaning fan shutters, tightening or replacing fan belts, cleaning fogging nozzles, cleaning evaporative cooling pads and making sure the fans run all night to reduce bird body temperature.

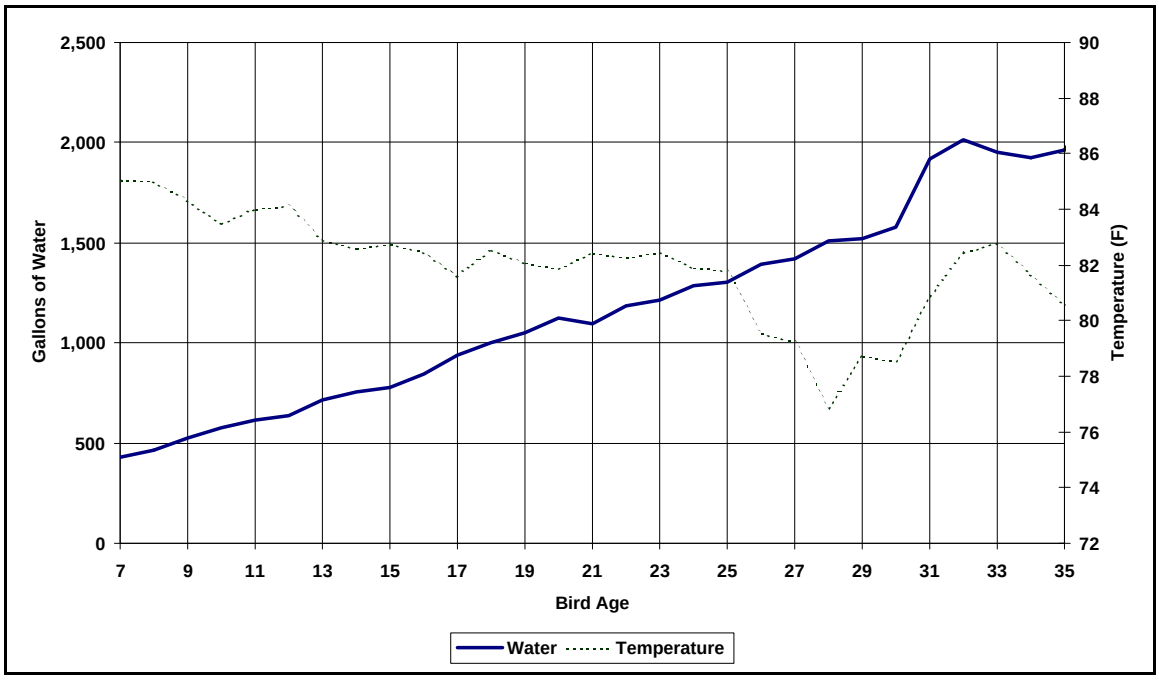

Figure 5. Daily feed and water consumption (lbs.) during a hot weather growout.

Another example of how monitoring water consumption can help a producer keep up with how birds are doing is illustrated in Figure 6. On the 15th of November there was a sudden decrease in water consumption of 10%. This was followed the next day by a decrease of 30%. The grower, obviously concerned, contacted his field representative to see if he knew what could be causing the drop. After a brief discussion, it occurred to them that the drop in water consumption corresponded with the initiation of running bleach through the house's medicator to help treat a bird health issue. They turned the medicator off and water consumption immediately increased. Afterwards they realized that the bleach solution was mixed improperly and was about three times as strong than it should have been.

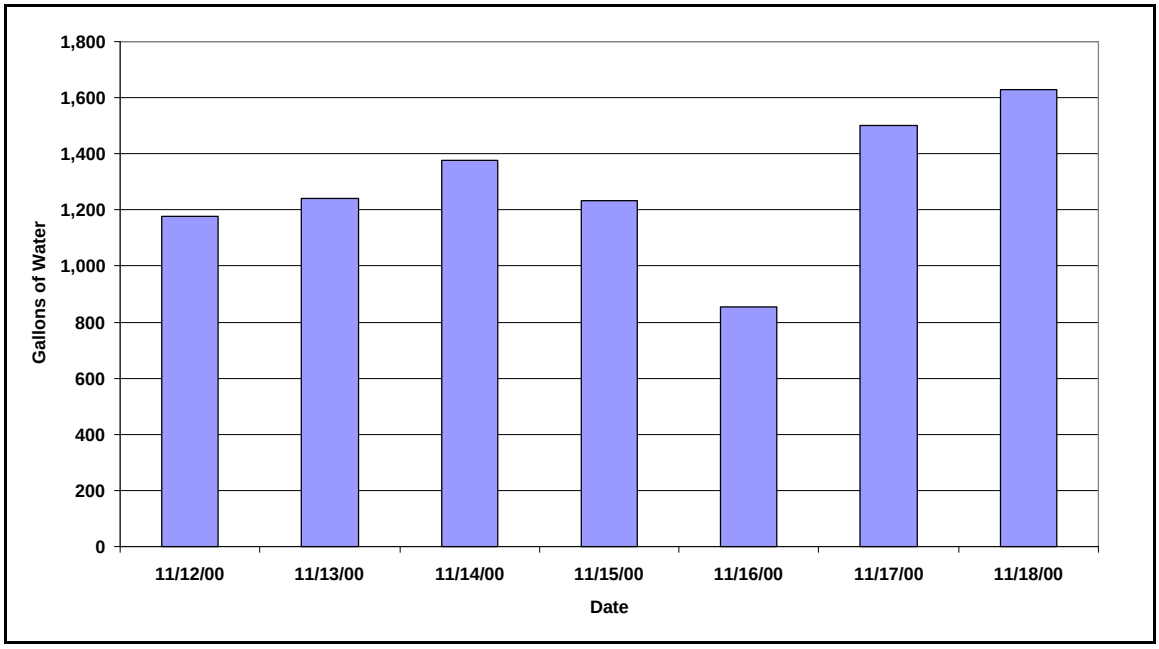

Figure 6. Daily water consumption in gallons.

A more detailed picture of the effect that the high concentration of chlorine had on water consumption can be seen in Figure 7. The first day shown on the graph, water consumption was normal for a 26 day old bird on a lighting program. On the second day, instead of a gradual increase in water consumption around 5 p.m., there was a sudden decrease which corresponded with the activation of the medicator. The next day consumption was severely reduced. On the fourth day at 11:00 a.m., there is a sudden increase in water consumption when the medicator was turned off, and use of the chlorine solution was ended.

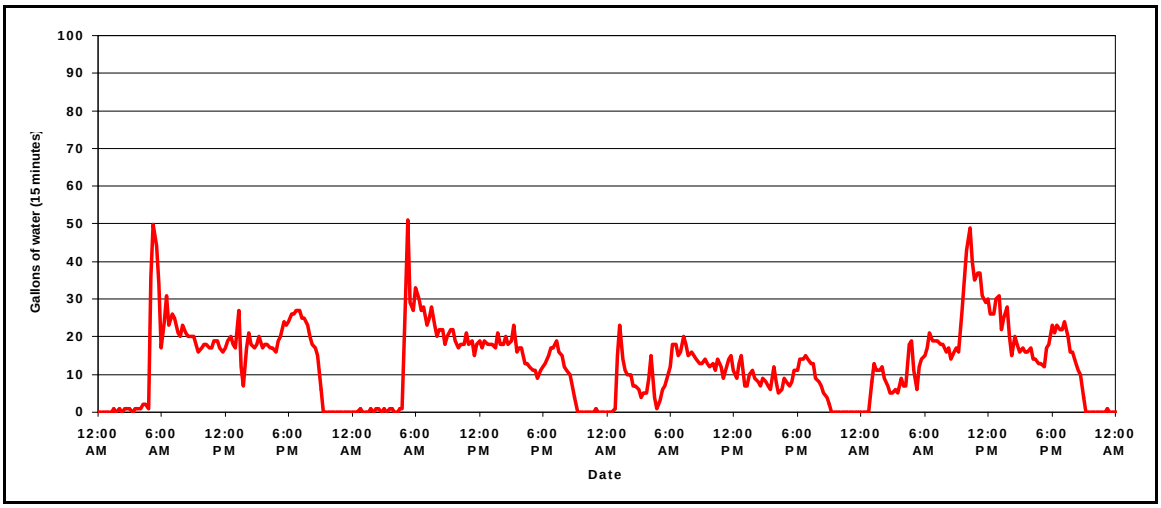

Figure 7. 15 minute water consumption on a farm with improperly chlorine stock solution.

Though by no means will closely monitoring water consumption answer all a producers questions about how their birds are doing, it will provide another significant piece to the puzzle. More research obviously still needs to be done to clarify the relationship between water consumption and broiler performance.

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