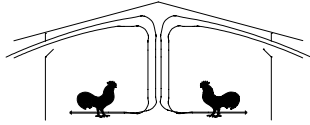




The University of Georgia

Cooperative Extension Service

College of Agricultural and Environmental Science/Athens, Georgia 30602-4356



Poultry Housing Tips

Controlling Litter Moisture and Ammonia

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Why is it that new or recently cleaned out houses tend to have more litter caking problems than houses with built-up litter? Is it because the floor is not quite as dry in a new or recently cleaned out house? Or, could it be that the litter is deeper in a house with built-up litter, and therefore capable of holding more moisture? Or, maybe it's a combination of the two? The answer to this mystery could lie in observations made on a new broiler farm last winter.

The farm consisted of four, 40' X 500' dropped ceiling broiler houses. Two of the houses were on their second growout and two were on their first. The birds in all of the houses were 14 days old, and it was approximately 25°F outside. In the "newer" houses, the curtains were sweating so much that the boards below the curtain opening were soaking wet. Condensation running off the curtains was freezing between the bottom curtain rod and the side of the house pushing the bottom of the curtain off the side wall and allowing cold air to drift in. The litter beneath the drinker lines was just beginning to cake over. In contrast, litter in the "older" houses was dry and there was no condensation whatsoever on the curtains or side walls.

What was the difference? Strange as this may sound, the difference was ammonia. In the newer houses there was essentially no ammonia so the grower set his timer fans to operate just 30 seconds out of five. In the older houses, the ammonia produced by built-up litter was forcing the grower to ventilate these houses a little over a minute out of five to keep ammonia under control. Though ammonia levels were relatively low in the newer houses, a major ammonia and caking problem was just around the corner.

Yes, it is true, when you clean out your houses, you do not have to operate your timer fans as much as when you have built-up litter, but it is a mistake to wait until you have a problem to start to ventilate. As the saying goes "an ounce of prevention is worth a pound of cure". For instance, it is not uncommon on three to four-week-old birds to have to run your timer fans two to three minutes out of five and add heat to get rid of serious litter caking problems. If you slowly increase your timer settings before you have an ammonia problem you will find that later on in the growout your ammonia levels will be much lower and you will not have to turn on your heat and run your fans to get rid of caked litter.

Another problem associated with growers using ammonia levels to judge when minimum ventilation rates should be increased is that they are using their nose to measure ammonia levels. After a couple of years of growing chickens most producers' ability to determine when ammonia levels are too high is questionable. A high ammonia level to a new grower may be 30 ppm, while an older grower may not be able to detect 60 ppm. Though a house with 60 ppm ammonia will typically have lower fuel costs, bird performance will also be lower.

The fact of the matter is that if you can control house humidity not only will ammonia and caking problems be minimized but carbon dioxide, dust and oxygen levels problems will be eliminated as well. This is because humidity reaches critical levels faster than any other air quality variable. For instance, did you know that if you shut off the fans in a house with five-week-old birds the relative humidity would increase to 100% in less than 15 minutes. A relative humidity of 100% makes it very difficult for a bird to lose any heat through evaporative cooling and results in severe

heat stress and possible death at temperatures as low as 85°F. During that same 15 minute time period, ammonia and carbon dioxide levels would triple, neither of which is life threatening. Oxygen on the other hand, levels of which are often perceived as a major problem, would only decrease from 20.5% to 20%, far from life threatening. The key is controlling humidity--keep relative humidity at proper levels and the other air quality variables will typically be fine.

Ideally, house relative humidity should be kept between 50 and 70%. Higher levels will result in poor litter quality and ammonia problems. If relative humidity is too low, the houses can become dusty which also can cause health problems.

How do you keep moisture under control? Basically, by diluting the moist air in the house with fresh outside air. The problem of course is knowing how much fresh air you need to bring in. If too much air is brought in, fuel costs could soar, and if not enough air is drawn in, the litter can cake over. To be honest, it is very difficult to determine exactly how much fresh air is needed. As you might expect, the temperature and relative humidity of the outside air has a lot to do with how much fresh air is needed. If it is cold and dry, less fresh air is needed to dry out a house. On the other hand if it is relatively warm and humid more fresh air is needed to dry out a house.

The tables below provide timer settings for the average 40' X 500' broiler houses with either small (42 days old) or large birds (56 days old). Houses with smaller birds tend to need longer timer settings than larger birds during any given week due to the fact that there are usually significantly more birds in the house. The timer settings in the tables are based on bird moisture production and how much fresh air is required to remove this moisture under average outside conditions. It may seem strange to increase timer fan settings each week when there is no ammonia but that is the point of using the tables. Increasing ventilation to control moisture before air quality and caking becomes a problem is essential if you are interested in really "preventing" ammonia and wet litter.

Small Birds (30,000)		
Bird Age (weeks)	Seconds On (Five minute timer)	Number of 36" Fans
1	30	2
2	60	2
3	90	3
4	120	3
5	150	4
6	180	4

The timer settings for younger birds should be considered minimum. Timer settings for older birds may be adjusted down slightly during extremely cold weather. One way of knowing if you can reduce your timer setting is by checking the relative humidity. Relative humidity meters are inexpensive and easy to use. For instance, you could spend \$1,500 or more on an accurate ammonia meter which requires frequent calibration and would probably only last a year or two in a poultry house. On the other hand you can buy a relative humidity/temperature gauge for less than \$30.

Big Birds (24,000)		
Bird Age (weeks)	Seconds On (five minute timer)	Number of 36" Fans
1	30	2
2	60	2
3	60	3
4	90	3
5	120	3
6	120	4
7	150	4
8	180	4

It is important to note that the timer setting described in the tables assumes very little water is being added to the house due to improper drinker line height or pressure. Did you know that if just an additional 5 gals/hr ends up in the litter on the average winter day (40°F, 40% humidity), ventilation rates have to be increased by 1,000 cfm? In other words it takes about 12,000 cubic feet of air to get rid of just one gallon of water. This additional fresh air has to be heated of course to maintain the proper house temperature. This means if you were trying to maintain a house temperature of 75°F, you would have to burn an additional half gallon of propane per hour because of the extra fresh air you are forced to bring in. When you are having caked litter problems you must check to be sure your drinker line height and pressure are set properly.

Michael Czarick
 Extension Engineer
 (706) 542-3086
 (706) 542-1886 (FAX)
 mczarick@enr.uga.edu

Michael P. Lacy
 Extension Poultry Scientist

Provided to you by:
