



The University of Georgia
Cooperative Extension Service

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*VENTILATING POULTRY HOUSES ON
COLD, RAINY DAYS*

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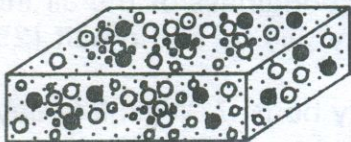


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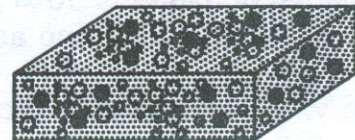
Can you dry out a house by running your exhaust fans on a cold, rainy day? Many producers believe that the answer to this question is no. They believe that it is best to turn fan timers down to minimize the amount of moisture they bring into the house. After all, the humidity is 100% outside. The truth of the matter is that even on cold, rainy days running your exhaust fans will decrease moisture in the house.

The key to understanding why is understanding humidity. The term humidity is really an abbreviation of the term relative humidity. Relative humidity (Rh) is a measure of how saturated the air is at specific air temperature. What does this mean?

Well, it is probably best to think of air as a type of sponge. The amount of water in a sponge can vary. We use the term humidity to describe how full of water our sponge (the air) is. If it is holding 20% of its capacity, then the humidity would be 20%. If it is holding all the water it can, then it would be 100%. How much water are we talking about? Well, if it is 70°F and 50% Rh in your poultry house, there are about 12 gallons of water floating about.



20% of capacity



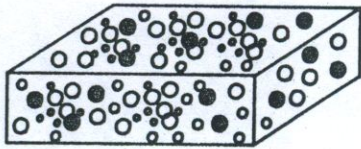
100 % of capacity

PUTTING KNOWLEDGE TO WORK

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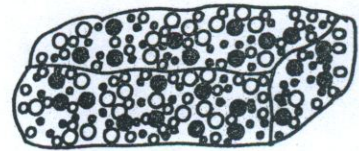
We use the term relative humidity because the sponginess of air changes relative to air temperature. The warmer it is, the more spongy the air becomes and the more water it can hold. As a result, we have to describe the level of humidity relative to the type of sponge we are talking about. Is it a 50°F sponge or a 80°F sponge, because an 80°F sponge will hold much more water at 50% humidity than a 50°F sponge.

Poor Sponge



50 F

Good Sponge



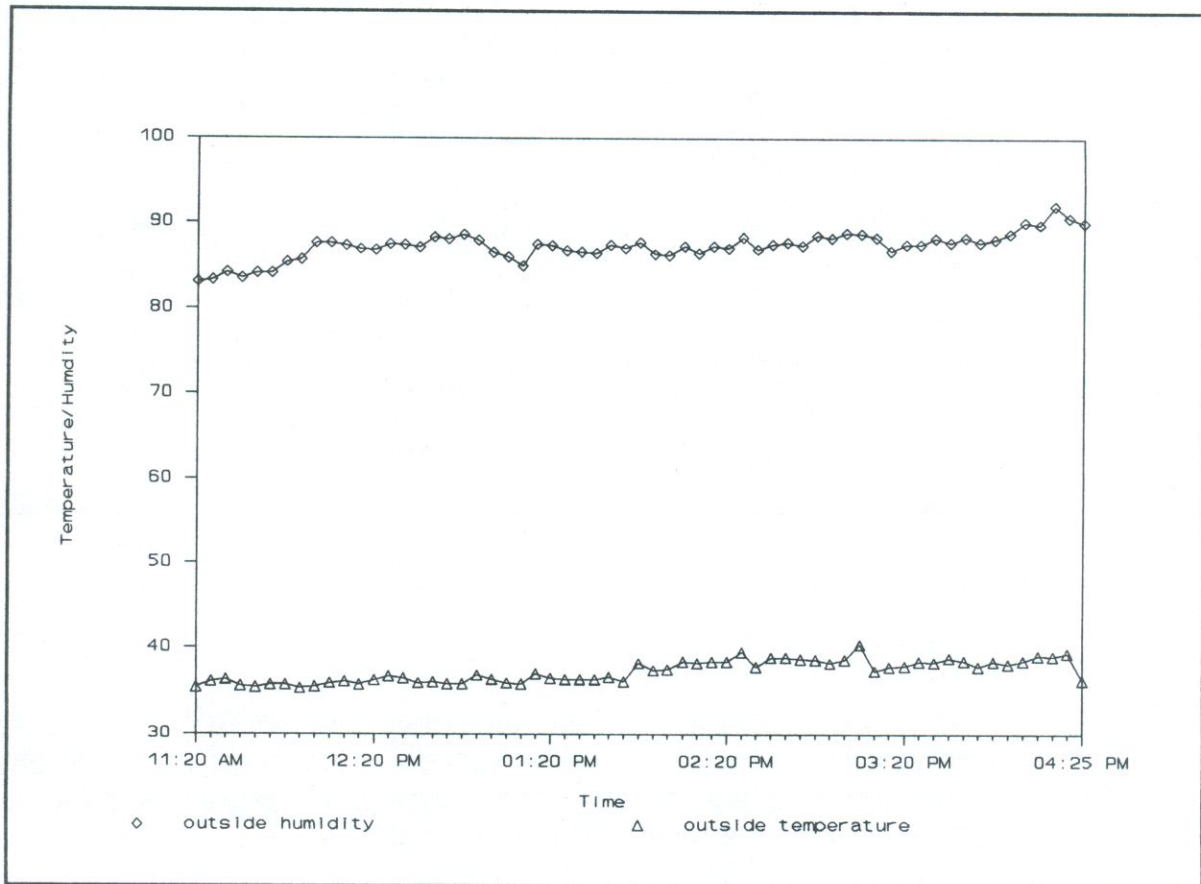
80 F

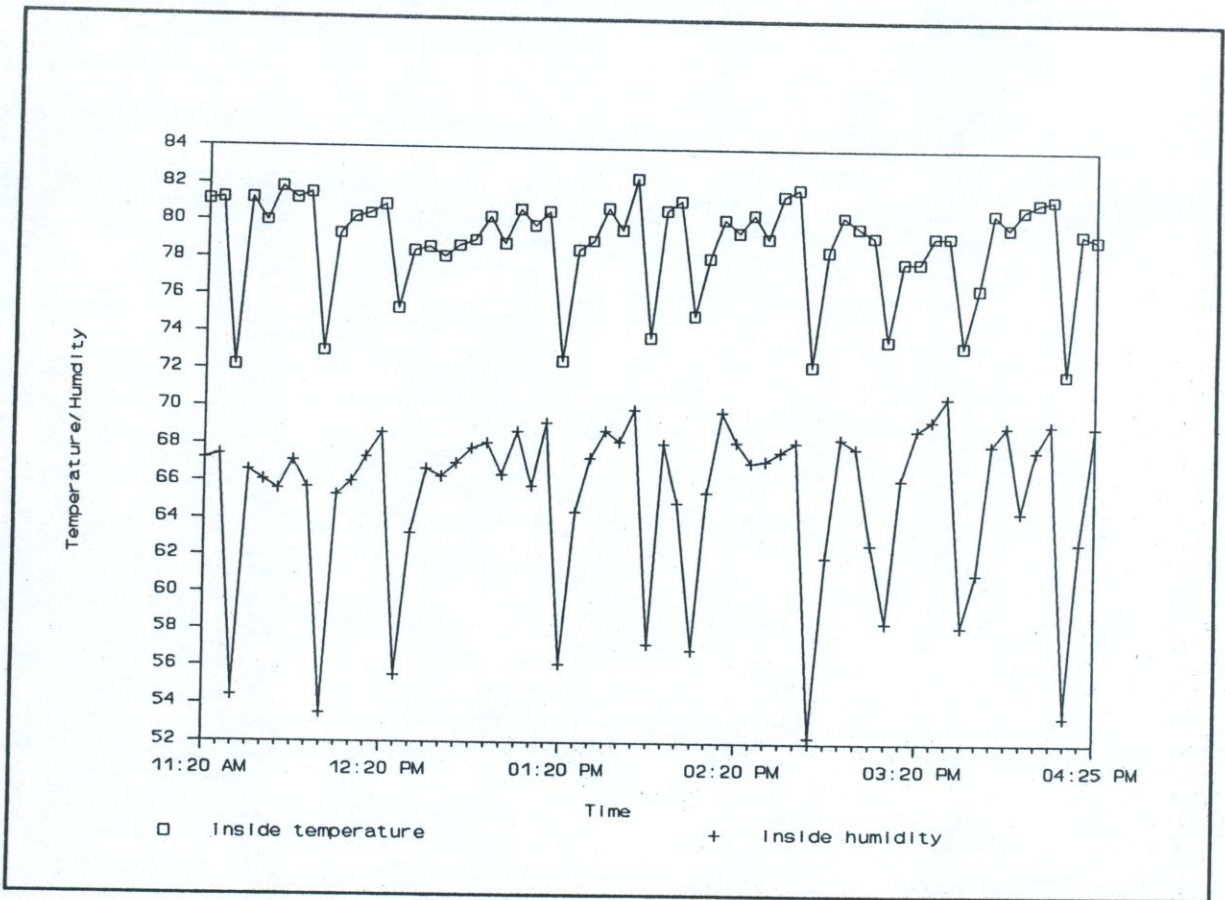
Let's look at an example. We have a box which holds 100 cubic feet of air. The temperature of the air in the box is 40°F. At 40°F, the maximum amount of water this 100 cubic feet of air can hold is 7 ounces. So we add 7 ounces of water, and the humidity of the air in the box increases to 100%. But, if we were to increase the temperature of the air to 80°F, this 100 cubic feet of air could hold about 28 ounces of water. There are still only 7 ounces of water in the box. But, it could hold 28. Air is a better sponge at 80°F. The relative humidity of the air is now only 25% (7 ounces/28 ounces).

As you can see by this example, the water holding capacity of air changes dramatically with temperature. In fact, for every 20°F rise in air temperature, the sponginess of air increases by a factor of 2. If the air temperature is 40°F and the relative humidity is 50% and we heat it up 20°F the sponginess of the air increases by a factor of two and as a result our relative humidity will be cut in half (25%).

So what does this have to do with ventilating a poultry house? Well, let's say that it is 40°F outside and rainy. We turn on a fan to bring some fresh air into the house. As the air enters the house, it begins to warm up. As it warms, the sponginess of the air increases, which in turn means the relative humidity of the air actually drops. By the time the air has heated up to 60°F, the humidity has dropped in half to 50%. This relatively dry air picks up moisture from the litter and then is exhausted, resulting in a dryer house.

The drying process can be seen in the following temperature/humidity graphs. The graphs are the result of data collected in a commercial broiler house last winter. The sudden drops in house humidity are a result of a pair of exhaust fans coming on. As the fans bring in fresh air, inside house humidity drops even though outside relative humidity is nearly 100%. When the fans shut off, the inside relative humidity begins to rise back to its previous level. House temperature does decrease slightly during this period, but not so much as to create problems.





The key to ventilating poultry houses on cold, rainy days is to ignore the rain. Outside humidity is not very important when it is cold outside. Just remember that air is a type of sponge, the more you heat it up, the more spongy it becomes, and the better the job it does of soaking up the moisture in your poultry house.