

Entomology

Food Science

Penn State Poultry Pointers



WINTER VENTILATION: WHAT IS THE OBJECTIVE?

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Maintaining desirable air quality in the poultry house during the winter months can challenge the most experienced producers.

On the one hand, they are

required to tighten up their houses to eliminate drafts and reduce heat lost. However, on the other, they are asked to run their ventilation fans, which brings in cold outside air, in order to reduce moisture and control ammonia.

This almost seems paradoxical—a producer is expected to seal up his house but then run his fans to bring in cold outside air.

Is the objective to minimize fuel usage, or is it to completely rid the house of ammonia? Most growers would agree that it is neither of

these, but rather it is to create an environment that will allow for the efficient and economical production of meat and eggs.

In order to accomplish this, growers must bring in adequate quantities of outside air, which in the case of growing birds will increase fuel consumption, in order to remove moisture and control ammonia. The keys to creating the proper environmental conditions are to:

- Provide adequate insulation (at least R19 in ceiling and R 12 in sidewalls).
- Eliminate all locations where outside air can infiltrate.
- Allow outside air to enter only through properly designed air inlets located at the eaves on both sides of the house.
- Direct the incoming air across the ceiling, allowing it to mix with the warmer inside air before it reaches the birds and the litter.
- Ensure that outside air is brought in at the proper velocity (minimum of 600 feet per minute

or from .08 inch to .10 inch static pressure), allowing it to move across the ceiling.

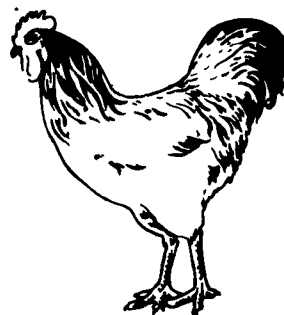
Even though the outside air maybe cold and possibly high in relative humidity, it can be used to ventilate the poultry house during the winter months. The goal is to control ammonia by removing moisture. This is accomplished by bringing in cold outside air, increasing its temperature by mixing it with warmer inside air, allowing it to pick up moisture from the litter, and then exhausting the moisture laden air from the house.

A rule to remember is that the moisture-holding capacity of air approximately doubles for each 20 degree Fahrenheit (F) increase in temperature. For example: outside air at 32 F and 100 percent RH (raining) can be brought into the house and warmed to 72 F, representing a 40 F increase in temperature. During the warming process, the relative humidity of the air is

reduced from 100 to 25 percent, which, when moved across the litter, has tremendous ability to take up and remove large quantities of moisture.

Blindness among birds, ascites (excess fluid in the body cavity), skin irritations (ammonia burns), breast blisters, leg abnormalities, and severe respiratory infections are all directly attributed to increases in ammonia and litter moisture during the colder months. Properly designed and operated ventilation systems that bring in and exhaust the correct amount of air will minimize both ammonia and moisture, creating desirable environmental conditions. Ammonia should not be allowed to increase above 25 ppm (about the level most people start smelling the gas) and litter moisture above 30 percent (slightly moist with no caking).

Therefore, the objective is to maintain desirable air quality in the poultry house by controlling ammonia and moisture through bringing in small quantities of outside air. This can be done most efficiently in adequately insulated houses with properly designed and operated negative pressure ventilation systems.

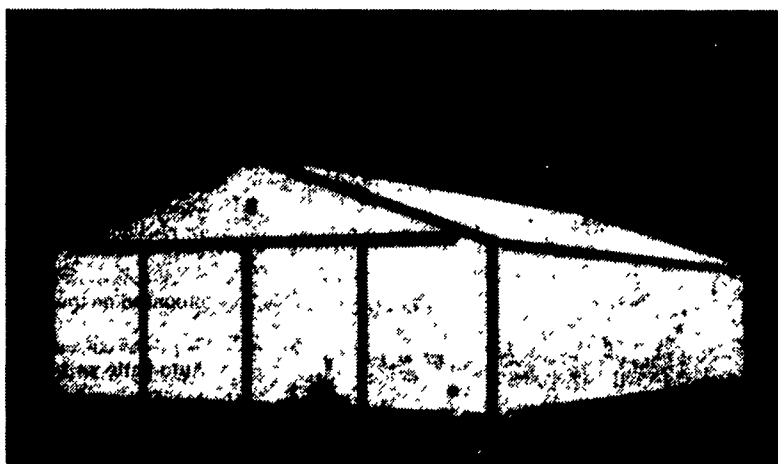


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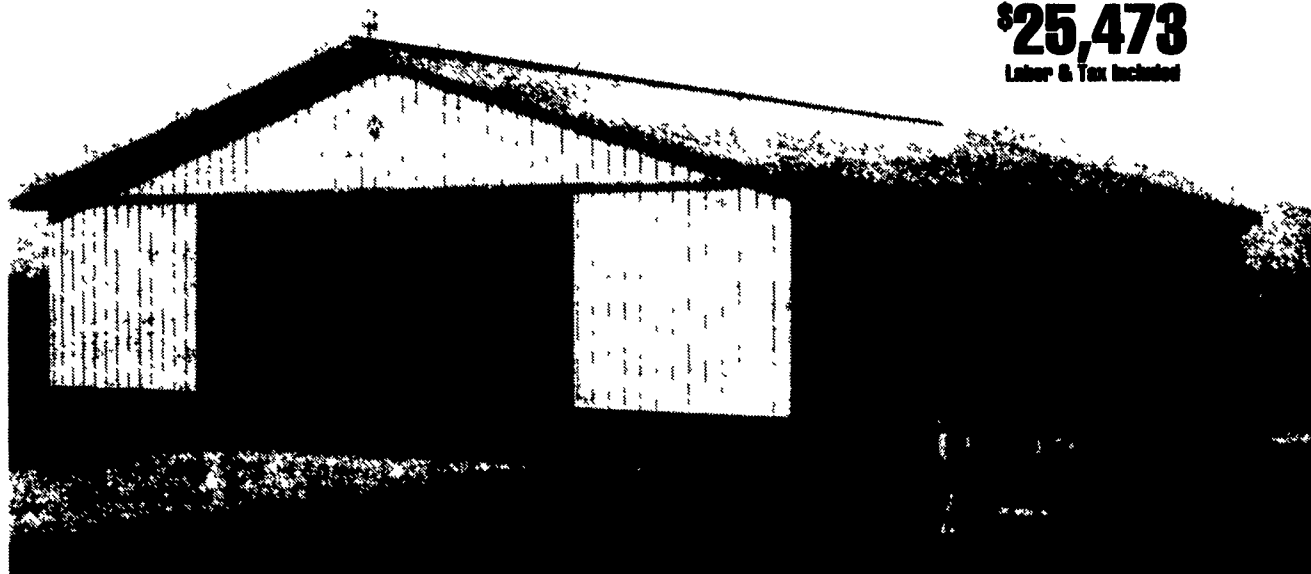


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