

PENN STATE

## POULTRY POINTERS

POULTRY SCIENCE • CAPITAL REGION • VETERINARY SCIENCE  
FOOD SCIENCE • AGRICULTURAL ECONOMICS • AGRICULTURAL  
& BIOLOGICAL ENGINEERING • ENTOMOLOGYBIRD HEALTH  
VS. GOOD PAWS!Dr. Michael Hulet  
Associate Professor  
Department Of  
Poultry Science

Winter is well under way and efforts to optimize ventilation and minimize heat losses are meeting head-on.

At this time of year, ventilation rates are minimized to a level of around 0.4 CFMs (cubic feet per minute) per pound of bird. The ventilation rate is contrasted with the desire to maintain a temperature consistent with the age of the bird.

The equalizer in the system is the heating source. While after a certain age the grower usually relies on bird-generated heat, the younger birds must be supplemented with propane gas-generated heat. Therefore as the outside temperature decreases, the tendency for the grower is to tighten up and reduce air flow in order to decrease the cost of supplying extra propane heat.

If adequate heat is not supplied,

two possible results can happen: 1) the older birds are given lower than optimum temperatures and extra feed is consumed by them to meet the body's increased need for heat; or 2) the younger birds who still can't maintain body heat with added feed consumption are cold stressed.

Stressing the bird lowers immunity and results in susceptibility to disease organisms present in the environment. However, if adequate heat is not supplied and desired temperature is maintained by reducing ventilation rates, the following can occur: increased humidity, dust, and ammonia can also stress birds and make them very susceptible to respiratory disease and the possibility of secondary infections. Further, secondary

disease organisms such as *e. coli* can attack respiratory or digestive systems and cause increased mortality (airsacculitis, coli septicemia, enteritis, etc.).

Ammonia is a particularly noxious gas that is associated with the bacterial breakdown of poultry litter. Heat, water, and poultry litter is combined with bacterial action to produce ammonia.

Ammonia has been shown to reduce both bird performance and increase susceptibility to disease. The effects of ammonia are particularly critical for producers who grow birds on built-up litter. For chicks brooded on built-up litter, all the circumstances of heat, moisture, and manure are combined to increase ammonia concentrations. Without increased ventilation or use of litter additives to reduce bacterial release of ammonia, birds can be stunted, blinded and left susceptible to disease organisms. Levels of ammonia in the house can easily approach 90 to 100 ppm on built-up litter unless action is taken to eliminate the volatilization of ammonia.

An ammonia concentration of 5 ppm is the least detectable level by smell for a human. Twenty-five ppm is a compromise level; between one which may damage bird performance in some instances, but economically a level that can be practically tolerated. At concentrations above 50 ppm, ammonia can cause reductions in animal performance (weight and feed conversion) and health.

The first 3 to 4 weeks of growth for commercial poultry are thought to be most critical in maintaining levels of ammonia below 25 ppm. Peoples' ability to detect ammonia can be affected by colds, allergies, or smoking.

Relatively inexpensive equipment is available to detect concentrations of ammonia in the poultry house and can be used by growers to help "calibrate" their noses. After 4 weeks of age, the optimal temperature required for commercial poultry is around 68 to 70 degrees Fahrenheit and increased ventilation rates can be more easily

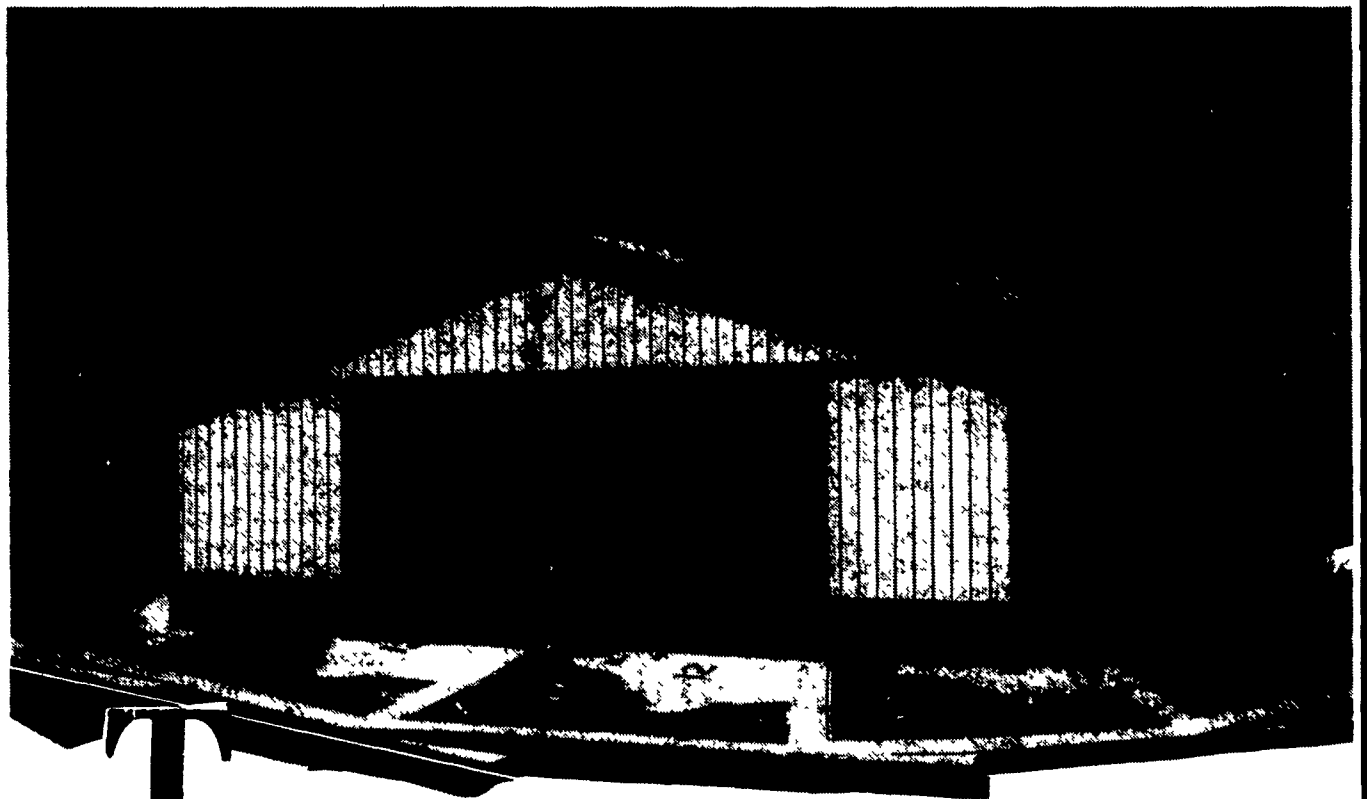
used at this time to reduce ammonia concentrations in the house.

Ventilation during wintertime is also used to reduce moisture levels in the litter. Low litter moisture to reduce ammonia generation is always stressed by ventilation experts. The ability to reduce litter moisture is based on maintaining a differential between the outside and the inside house temperature — that is, a 20-degree increase in air temperature doubles its water holding capacity.

Emphasis on proper ventilation never seemed to be stressed to my satisfaction, however, until the market for chicken paws became an economic reality. So whether your desire is to increase performance (a less apparent economic reason) or to increase production of high quality, non-ammonia-burned chicken feet (paws), adequate ventilation rates, desirable temperature, and decreased ammonia concentrations should be maintained during the winter production of commercial poultry.

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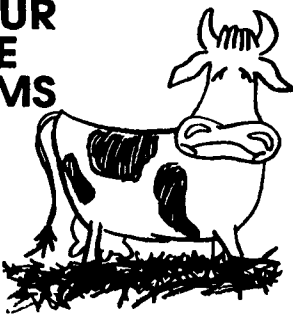
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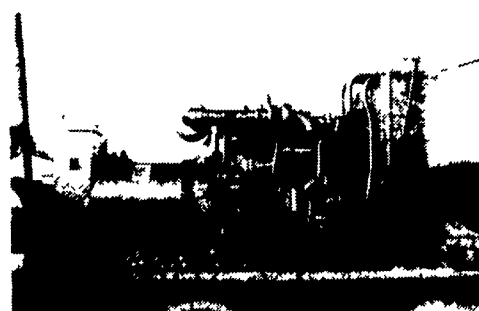
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