Why ventilate animal buildings?

Proper ventilation of buildings is often the most overlooked and misunderstood management practice of the livestock producer.

You select genetically sound stock, purchase good quality feed, supply a well-balanced ration, and provide shelter. What else is there to raising livestock?

Many factors influence the health and productivity of the animals on your farm. Too often the weak link in the program is improper housing. Unfortunately, this publication cannot tell you about the best livestock housing system because there is no “best” system. There is a wide variety of systems in use, and some work better than others. Some systems are easier to manage than others, but the good ones have some common characteristics. Primarily, they provide your animals with the proper environment.

Proper environment is required for all ages and classes of livestock. However, the greatest neglect of these requirements occurs when people house newborn and young stock. These animals have greater demands for proper care, and more attention is usually given to them. Unfortunately, it is this concern that gets most people in trouble.

Problems begin with the misconception that all young stock must be kept very warm. While the young do have additional heat requirements, these are generally overprovided by the concerned manager. In an attempt to increase the temperature, the ventilation is generally reduced to save heat and that is when troubles begin.

Does that sound strange? Baby chickens and turkeys need quite a bit of supplemental heat for several weeks. Baby pigs are the next most demanding, with an immediate need for temperatures of 90 to 95°F for the first 3 days, dropping to 85 to 90°F over a 3-week period. This heat usually can be provided with a heat lamp or light bulb in a hutch.

Lambs also can use supplemental heat beneficially for the first day or two, depending on the outside temperature. But this is necessary only if the lamb is chilled or very cold.

Calves are the hardest; they need no additional heat once they are dried and get a feeding or two of colostrum. As an example of their hardiness, 2-day-old dairy calves do quite nicely in individual outdoor calf hutches in upper Midwestern and Canadian winters, with no supplemental heat.

What is the proper environment for raising calves, lambs, pigs, or chickens? First, the structure should provide the animal with a dry bed. Standing in the rain or sleeping on wet bedding will rob the young animal of valuable body heat.

A virtually open front calf housing unit prevents drafts on the bed area while allowing plenty of air movement in the structure. A continuous open slot high on the back wall allows air to move through and across the building while preventing a direct flow to the animal.

A mature animal is capable of converting enough of the feed it eats to body heat to keep warm, even when wet. A newborn animal does not possess that capacity; this additional heating load adds stress, weakens the animal, and reduces its ability to resist disease.

It is relatively easy to understand the need for a dry bed. It is also easy to check and see if that need is being satisfied. A much more difficult requirement to satisfy is adequate ventilation. If we move too much air, we may create drafts, while too little air movement is also unhealthy for the animal.

Adequate ventilation satisfies four basic needs.

Moisture

The most important is the removal of moisture. In the breathing process, a calf (for example) gives off almost 2 gallons of water each day in the form of water vapor. If allowed to accumulate around the calf, this water vapor will raise the relative humidity, and this moisture will condense on the walls and bedding and...
on the animal’s hair coat. The same process occurs with all baby animals. Warm air can carry and remove more moisture than cool air. Therefore, moisture removal is most critical in the winter when temperatures are lowest and relative humidities are highest.

Organisms

Veterinarians and microbiologists tell us that pathogens (disease-producing organisms) are all about us. Usually they are not present in large enough numbers to cause illness. However, without adequate ventilation, the concentration of pathogens increases — and also the likelihood of developing pneumonia, scours, etc.

Proper ventilation provides fresh air to dilute the organism concentration and remove organisms from the environment. In addition to removing organisms, the ventilation removes moisture, which results in a lower relative humidity. This reduction in relative humidity provides a drier, less desirable climate for the remaining organisms and speeds up their die-off rate.

Gases

Calves, chickens, ewes and lambs, and sows with pigs in pens usually are bedded in straw, wood chips, or other porous material that absorbs some of the urine and moisture from the feces. Until the bedding is changed, and that may not be until the animals are moved, the feces and urine lay in the stall or pen and undergo chemical and biological breakdown.

This breakdown releases ammonia, hydrogen sulfide, and other undesirable gases. The amount of gas produced increases as volume of waste, temperature, and storage time increase. While these gases usually will not collect in large enough concentrations to cause death, they will increase the stress on all stock and are most undesirable on young animals. The irritation to the respiratory system increases the chances of pneumonia and other infections.

When you can smell ammonia, it’s time to change the bedding. Increase the ventilation rate or both. The concentration of ammonia for the animal sleeping in that urine-soaked bedding is at a high. It is not more irritating than you standing in the middle of the room.

Heat

The fourth reason for ventilation is to remove excess heat during the summer. In the summer, climate, wind patterns, structure type, insulation levels, and number of animals affect heat production and the need to remove excess heat. The required rate of air flow in the structure can be five times that necessary as a minimum if the winter animals do not sweat. Their systems are made to withstand the cold weather much better than if they don’t in hot weather.

Summary

When livestock operators discuss housing facilities, they repeatedly mention ventilation problems. Most of the time, the facility is underventilated. Many producers provide the animals with the same surroundings that a human would demand. In the attempt to save heat and raise the temperature, the rate of air movement is reduced.

Calves, older lambs, and weaned pigs do not need a lot of heat. By opening the structure and increasing the ventilation rate, you remove more moisture, reduce the relative humidity, and dilute the organisms. The resulting cooler temperature also slows the production of undesirable gases.

Death is not the only—or necessarily the best—way to measure the success of your young animal rearing program! A veterinarian once said to a dairy operator that the ones that died were the cheapest ones. In this case, many of the surviving calves had so much pneumonia and so many other infections that their lungs were permanently damaged.

Without a set of healthy lungs, a heifer will be unable to progress to her genetic potential to move into the milking herd. Body functions and first use of oxygen-rich blood for all animals with scarred and damaged lungs, there may never be enough oxygen to satisfy the desired function of producing milk or meat. A calf with damaged lungs may continue to live, but it will be susceptible to disease, a slow gainer, a poor producer, and will cost you more money. This is true for all domestic animals.

Providing a dry, well-ventilated livestock structure to your next-born heifer, farrowed sow, brood of chickens, or on ewe and ewes, does not cost—it pays!