Calves in Naturally Ventilated Barns: Why do we have problems; what can we do? *(adapted from papers and presentations from Ken Nordlund, DVM)*

Recently we have seen a number of dairy producers and calf raisers go to naturally ventilated barns. Generally this shift has occurred to increase labor efficiency and increase human comfort. At times, calf performance has suffered despite capable managers and employees. Dr. Nordlund from the School of Veterinary Medicine at the University of Wisconsin-Madison has been investigating these naturally ventilated facilties and discovered some surprising results and has suggested some novel solutions.

The first part of an investigation is ti define the problem. When looking at the calves in naturally ventilated barns, it was noted that many of these calves (up to 55% in some barns) had respiratory problems. It has been thought that there is plenty of fresh air in these barns and the calves should have plenty of fresh clean air in their pens. When the air was sampled in alleyways of these barns the bacteria counts were less than 15,000 cfu/m3 which is quite acceptable. However, when the air was sampled around the calves it was found to have bacteria counts in excess of 300,000 cfu/m3 (which is extremely high). This points to the fact that despite great air exchange in the barn as a whole there can be micro-environments that may lead to respiratory problems.

This has lead to the following conclusions on winter ventilation in calf barns:

1. Calves do not generate enough heat to move air by convection toward an open ridge in a cold, naturally ventilated barn.

2. Mixing and dilution of contaminated air in cold calf housing requires either a) open sidewalls to allow prevailing winds to traverse the space, b) mechanical systems to force a minimal amount of fresh air through the barn, or c) the addition of heat to create thermal buoyancy and mixing.

3. Mechanical ventilation of winter calf barns should be done with positive-pressure distribution ducts because the required small inlet areas for negative pressure systems cannot be reliably achieved or maintained in most barn situations. See Figure 1, 2, & 3.

4. Solid panels between each calf will reduce the transmission of respiratory disease. The solid panels should be limited to a **maximum** of three sides. See Figure 4.

5. Deep, fluffy straw bedding is required during cold weather for either approach that does not use added heat. See Figure 5.

Figure 1

One tube system with air exiting from both sides at proper speeds will mix air about 15-18 feet on each side of the tube, so one system is needed for approximately every 35 feet of building width. For example, the 52 ft wide building above has two tube systems.

Figure 2

The stainless steel fans are typically mounted in an exterior wall to force exclusively exterior air into the tube. The system should NOT recirculate air within the room. A hood should be placed over the fan to protect it from rain and snow.

Figure 3

The system is most satisfactory if the first 2 to 5 feet of the duct is made of solid material. Various devices such as plastic barrels or pails with both ends removed have been used to provide a rigid duct for the first feet and also to provide a convenient place to mount the plastic tube.