

CALVING EASE

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PATHOGEN MANAGEMENT

We all have experience with pathogens. Bacteria, viruses, and parasites seem to be everywhere. They are always ready to undo our hard work in raising healthy calves.

What do we know about pathogens? First, we know that they are always present. Calf managers don't work in sterile settings. Second, we know that pathogen density is usually related to stocking density - that is, the number of heifers in a given area. For example, tether-style hutches set on 16 foot spacing have about 4 calves per 1000 square feet. In contrast, calves in 4 by 8 foot pens typical of greenhouses represent 31 calves per 1000 square feet. We know the potential for pathogen build-up is roughly eight times greater with the 31/1000 than the housing with 4/1000 square feet.

Third, we know that natural processes act to destroy pathogens. Extremes in temperature and moisture as well as ultra-violet light, for example, can destroy some pathogens. Fourth, we know that some, not all, pathogens require a calf in order to increase in numbers. Viruses grow only in living cells. Parasites such as coccidia and cryptosporidia require a host (calf) in order to multiply.

Who, me worry?

Why should I be concerned about pathogens? Especially, why be concerned about pathogen density? We know that when a calf's environment has a high level of pathogens she has to fight them off or get sick. But, if the exposure level gets high enough, her immune response just can't deal with so many bacteria, viruses and parasites. Then, she gets sick. Our dual challenge, then, is (1) to encourage the rapid development of her immune system and (2) to reduce her exposure to pathogens to a level where she doesn't get sick. Foster the positive and beat back the negative.

How much time for Pathogen Management?

How much time should I spend on pathogen management? The lower the animal density you have, usually you will need to spend less time on pathogen control. The bacteria from manure, for example, are spread out more at 4 calves per 1000 square feet than 31 calves per 1000 square feet.

The more you can get natural forces to work for you, the less time you will need to spend controlling pathogens. Outdoor housing is always exposed to ultra-violet light; especially helpful is exposing the insides of hutches to sunlight between calves. Cryptosporidia oocysts are destroyed by repeated freezing and thawing. If your housing is exposed to these forces you will have to spend less time fighting crypto.

Feeding arrangements that allow you to leave the same pail constantly with the same calf for liquid feeding require less pathogen-control labor than ones where pails are moved from calf to calf. Choosing the correct chemicals and cleaning temperatures also decreases the amount of labor required to effectively reduce pathogen densities. For example, keeping wash water above 145 degrees F. will kill cryptosporidia oocysts. Chlorine disinfectants are effective against E.coli bacteria.

We are up against some tough enemies. Some of them endure heat. Others withstand dry conditions. Tiny ones lodge in the smallest cracks and pores in housing (scratches in fiberglass hutches, wooden gates and panels). We do know that these pathogens tend to build up over time in a fixed location regardless of the stocking density. We should expect to spend an increasing amount of time on pathogen management the longer we have animals in a fixed facility. High density housing is probably going to experience a more rapid build-up of pathogens than low density housing arrangements.

Something to think about.

Calf managers try to raise baby calves - born with weak immune systems - in non-sterile pathogen-filled environments. Low density housing systems require more labor for routine calf care than high density systems (compare tether-style hutch housing with a greenhouse). Low density systems require less labor for pathogen management than high density ones. Isn't this a situation where you can't have your cake and eat it, too? Won't we always be balancing the demands of routine care with those of pathogen management?

CALF FEEDERS' TIP

When we feed colostrum is important. We already know that! But, recently reported research now puts a number on how important timing is for antibody transfer from colostrum to calf's blood. The researchers estimate that for every 30 minute delay in feeding colostrum the antibody concentration in the calf's blood serum went down 2 milligrams per milliliter (2mg/ml). What's this mean? When a calf has less than 10mg/ml we call this passive transfer failure - these are the calves that usually get sick. Between 8 and 16mg/ml has been called partial passive transfer failure - these are the ones that still are likely to get sick. Levels of 35 to 45 mg/ml represent effective transfer and healthy calves. Do the math - if you lose 2mg/ml per half-hour, how much do you lose if the calf born at 9pm doesn't get fed colostrum until 9am? $2\text{mg/ml/hour} \times 12\text{ hours} = 24\text{mg/ml}$! If the potential for 40 mg/ml was there at 9pm, where are you at 9am? $40 - 24 = 16$ - that's partial transfer failure level (16mg/ml) by 9am! That assumes you feed

lots of good quality mature cow colostrum. Another way of using these research data to roughly estimate the effect of time? Every half hour delay cuts a calf's chances of being healthy by 5 percent! Minutes make a difference.

Reference: P. Rajala and H. Castren, "Serum Immunoglobulin Concentrations and Health of Dairy Calves in Two Management Systems from Birth to 12 Weeks of Age," in Journal of Dairy Science, 78:2737-2744 (December, 1995).

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