

What every practitioner should know about calf barn ventilation

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Abstract

Bovine respiratory disease (BRD) is financially significant to a dairy operation due to treatment costs, veterinary costs, loss of replacements, and reduced future production potential. High air bacterial counts have been shown to increase incidence of respiratory disease. Positive pressure tube ventilation systems aim to reduce air bacterial counts and noxious agents by driving fresh, outside air to the micro-environment of the calf. It is important for dairy practitioners to understand the basics of these systems so that they can make recommendations or troubleshoot problems.

Key words: BRD, tube, ventilation, calves

Résumé

Le syndrome respiratoire bovin a un impact économique important dans une ferme laitière en raison des coûts de traitement, des dépenses pour les soins vétérinaires, des pertes de remplacement et d'un potentiel moindre de production future. Un nombre élevé de bactéries dans l'air a été associé à une augmentation de l'incidence des maladies respiratoires. Les systèmes de ventilation en pression positive ont comme but de réduire le nombre de bactéries et de produits nocifs dans l'air en poussant l'air frais de l'extérieur vers le micro-environnement du veau. Il est important que le praticien dans une ferme laitière comprenne les rudiments de ces systèmes de ventilation afin de pouvoir faire des recommandations ou de résoudre les problèmes.

Introduction

Bovine respiratory disease is a common cause of financial loss on a dairy operation. BRD incidence can change, depending on management and environmental factors. Veterinary practitioners focus tremendous effort on improving immune function through vaccination programs and effective colostrum management. While these efforts are critically important, ventilation in calf and heifer facilities deserves evaluation to determine if air quality is causing either clinical BRD or subclinical lung lesions.

BRD causes increases in direct costs (treatment costs, veterinary costs, death), but it also causes increases in indirect costs such as reduced future performance. It is well established that calves treated for respiratory disease tend

to produce less first-lactation milk and have an increased age at first calving.²

High air bacterial counts have been shown to increase incidence of respiratory disease.² Positive pressure tube ventilation (PPTV) systems aim to reduce air bacterial counts and noxious gases, thereby decreasing respiratory disease. These systems are designed to maintain 4 air exchanges per hour to remove moisture and airborne bacteria and contaminants.¹ When properly designed, PPTV systems aim to provide a uniform distribution of air throughout the barn, without creating a draft on the calf.^{3,4} Mathematical formulas factoring in several variables were used to develop a spreadsheet for designing and analyzing PPTV systems in calf facilities. This Excel spreadsheet was developed by the University of Wisconsin Dairyland Initiative and is available for use by trained consultants. The spreadsheet ensures that the fan's static pressure and tube's discharge coefficient and aperture ratio are at the desired levels to ensure that air volume and velocity are similar at every hole on the tube and the fan is performing as expected while under the load of the tube.³

Veterinary practitioners need to be aware that housing calves and heifers in a barn, particularly in larger groups, is a risk factor for BRD at least partially due to an increase in bacterial air counts and other noxious agents. Even if the practitioner is not proficient in designing PPTV systems, they need to be able to recommend in what situations a system will improve respiratory health and to identify when existing systems are not functioning properly.

Most indoor calf and heifer facilities benefit from the installation of a PPTV system. Producers need to be convinced of the economic benefit. Practitioners provide the expertise to examine the direct and indirect costs of BRD based on the morbidity and mortality and convince the producer of the benefit. Practitioners also need to steer the producer in the right direction in regards to design of the system. The University of Wisconsin Dairyland Initiative spreadsheet for trained consultants is used to design a PPTV system for each individual barn. Producers may choose to save money by purchasing a "cookie cutter" system that is not designed specifically for their facility. This situation invariably leads to disappointment in the performance of the system.

Lastly, practitioners need to be able to evaluate current PPTV systems that are in place to determine if they are effective at reducing air bacterial counts. While not all practitioners have access to equipment to directly test air bacterial counts, simple observations are often very helpful

to determine the effectiveness of the system. Evaluate the fan to determine if dust build-up or other objects are impeding air output. Check the tube for tears or ripped holes. Tears most commonly occur as the tube exits the fan shroud. Location of the fan and holes is also a simple observation that practitioners can make. If the tube is not located over the pens where calves are located or the hole location appears to be directing air to walkways, walls, etc., the system deserves some further analysis.

Conclusion

Veterinary practitioners can make recommendations on the installation or troubleshooting of PPTV systems and can have a significant positive impact on the reduction of BRD in calf and heifer facilities. These recommendations also

help the producer realize that the practitioner is genuinely concerned about calf health and not only interested in selling drugs or vaccines.

References

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