VEAL Farmers of Ontario

THE DRY COW

Insights into calf development: the effects of dam management

Interest and research in calf health and management strategies continue to grow in the dairy industry. However, much of this work relates to the calving event itself, or colostrum management and how early calf health affects long-term growth and productivity.

Calves are not only a product of genetic selection and early growth, but their experiences as a developing calf. The last trimester, typically coinciding with the dry period, is the time of greatest growth for an unborn calf. However, early gestation represents a time of critical development with greater risk for future effects if this development is compromised. The long-term effects of calf management, both in early life but predominantly in the prenatal period, can be easily overlooked since there is a significant separation in time between cause and effect, especially if effects are seen later in life.

KEEPING COWS in the appropriate body condition as they approach lactation and gestation, and transition to the next lactation, will ensure the best future production and reproductive success.

EARLY FACTORS

What are the factors that determine early calf health and survival? Calving ease, colostrum management, nutrition, optimal environmental conditions and other best management practices all come to mind. These are all imperative but there are other calf health issues that can occur before the calf hits the ground. It has been well established in scientific literature maternal stress during gestation can have long-term effects on a young calf.

What are the sources of maternal stress? They can be heat stress, disease and overcrowding, among others. Each of these situations can cause stress to the dam, or affect her nutrient supply, which is a major factor in fetal and placental development during gestation. Research in human medicine, as well as in sheep and beef production, has shown the fetus makes adjustments in response to this stress, which can result in negative effects later in life. It is important to meet a dam's high nutritional demands during early lactation, and minimize the level of negative energy balance that can occur. Overfeeding and underfeeding can negatively affect offspring. Insufficient nutrition of the dam has been found to reduce weaning weights and other production measures in beef calves, despite normal birth weights.

Changes in maternal nutrition appear to alter the offspring's future metabolism by possibly altering the way nutrients are used for growth. This has been shown in several studies in beef production, with calves exhibiting different growth rates depending upon maternal nutrition. Nutrient restriction to the dam during gestation may affect immunoglobulin absorption through other processes. For instance, while certain studies have not found changes in dam nutrition to affect the immunoglobulin content of colostrum, the level of immunoglobulins in the calf was negatively affected. It is believed other components of colostrum involved in the absorption of immunoglobulins in the colostrum may be affected by the nutritional program of the dam.

FEEDING ROUTINES

Feeding management is also an important

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determinant since major changes in pen sizes and stocking density can alter access to feed depending on bunk space availability. It is critical for cows to maintain their body condition during the dry period rather than experience any gains or losses. It is also imperative to monitor body condition score (BCS) within your herd, and avoid any changes in condition greater than 0.5 BCS during the dry period.

While maternal nutrition is the most important factor for fetal development, other sources of maternal stress can yield long-term negative effects on a developing calf. A Swedish study found factors, such as disease in a dam during pregnancy, increases the risk of respiratory disease in its offspring. Dry cow vaccination can also be considered to increase the level of antibody protection in young calves. However, research is now showing dam management—not just in the dry period but throughout gestation and even in the period leading up to breeding—may affect the developing calf, which can significantly affect health due to long-term changes in tissue and organ functions.

COMFORT

The management practices that minimize maternal stress on a developing calf also benefit the cow. Keeping cows in the appropriate body condition as they approach lactation and gestation, and transition to the next lactation, will ensure the best future production and reproductive success. All periods of gestation, either during lactation or the dry period, deserve focus and consideration for the developing calf. Providing optimal maternal care by minimizing stress and ensuring energy needs are met will improve the calf's overall health, as well as provide many benefits for the dam. Continued investigation into the effects of concurrent lactation and gestation, as well as the role of the transition period and general metabolic health of dairy cattle, will create significant insight into the mechanisms and determinants of subsequent calf health.

Consult your management advisory team regarding the possible benefits of implementing or updating your monitoring and dry cow programs. Keep in mind the effects of the cow on her calf at all stages. These calves are your future milking herd.

For more information on calf management, visit www.calfcare.ca and contact Veal Farmers of Ontario for its *Off to a healthy start naturally: The dry cow* resource.