LAMENESS

Within a herd a combination of factors play a role in lameness problems:

a. Environment (e.g. cow races),
b. Management,
c. Conformation of the cows and
d. Nutrition are the most important.

In this article we will focus on nutritional factors causing lameness.

NUTRITIONAL FACTORS:

High starch & sugars: low fibre diets, producing ruminal acidosis are the most important nutritional factor in the production of laminitis resulting in lameness due to sole ulcers and white line abscesses.

Starch is fermented by the rumen microbes into lactic acid and the fall in rumen pH is known as rumen acidosis. Substantial quantities of lactic acid can be converted into propionate and then into glucose, but if overloading occurs lactic acid can leak into adjacent blood vessels. Increasing amounts of lactic acid produce a metabolic acidosis. It has been suggested that the resulting change in rumen fermentation causes the release of bacterial endotoxins (breakdown products of dead bacteria). The net effect of these toxins is that pooling of blood occurs and blood clots may form at the corium, where the hoof horn/keratin is normally formed. This is commonly known as laminitis - weakening between layers in the hoof structure develop. Bacterial endotoxins are not only formed in the rumen, they can also be released in the bloodstream following acute mastitis or metritis.

Acidosis. is a condition mostly thought of as a problem in systems where concentrate feeds are used. In NZ however, the incidence of sub clinical acidosis in cows grazing lush pasture is considered to be quite high, especially during spring and perhaps also autumn. In order to minimise acidosis within a herd, it is advised that during periods of lush pasture growth and availability, that cows have access to 1-2kg straw per cow per day. Dry fibrous foods are more effective in stimulating rumination and salivation than moist forages such as silage. The long fibre of baled silage is also an alternative. If concentrates are being fed to cows then it is important to introduce them gradually. Perhaps take a couple of weeks, (gradually increasing) when introducing cows to eating 2 kg meal per day. Any change in cereal type should also be done gradually. Wheat will ferment more quickly than barley and a swap from a barley meal one day to a full wheat meal the next would be expected to cause upsets.

Post calving, a cow is not able to eat enough to satisfy her energy demand. She will only be able to eat about 12 kg DM initially and any problems with acidosis will reduce her intake further, often resulting in other metabolic problems. Diets high in protein have also been suggested to play a role in increasing the number of lameness cases in a herd. The high ammonia/urea concentration the blood can cause laminitis as well. This situation occurs in New Zealand pastoral farms in springtime.

Feeding other fermentable energy sources such as cereal based feeds during this time will help rumen microbes to recapture more of this pasture protein and reduce high protein problems. Grass or whole crop silages that are lower in protein content than pasture can also be used to dilute the protein in the whole diet. Zinc, Sulphur and Biotin: Specific nutrients have been suggested to increase the hardness of hoof horn.

Soft horn is said to have greater water content and lower zinc and sulphur content than hard horn. Proteinated sources of zinc (such as Bioplex zinc) have been used with success, especially where copper deficiency is also an issue.

Zinc is a trace mineral that forms an essential part of many very important enzyme systems involved in keeping dairy cows healthy, fertile and performing at their maximum. It is involved in disease resistance, skin and coat condition, and in structural soundness of hoof and udder. Many trials and practical farm results with Bioplex Zinc have shown:

a. Reduced incidence of lameness
b. Reduced somatic cell counts (especially when combined with copper)
c. A general improvement in cow health, fertility and production

Biotin The addition to the ration has also reduced lameness and improved the rate of healing of sole ulcers. Biotin is a water-soluble B-group vitamin and is particularly important in controlling the rate of production and deposition of hard proteins such as keratin in skin, hair and hoof horn. Through this function biotin protects the sensitive tissues, strengthens the horn of the lower part of the hoof walls and improves the rate of wound healing. Stresses associated with gestation and lactation in high producing dairy cows may result in biotin status that is insufficient for optimum production and health. Supplemental biotin may be required for the cow to achieve optimum production and health. Although currently, biotin supplementation is unlikely to be cost effective due to world-wide supply shortage it does play an important role! In order to optimise the cow's own production of biotin, it is important to provide a balanced diet to promote growth and efficiency of rumen microbes and hence their own production of biotin.

Lameness is a costly problem facing dairy farmers around the globe. Several nutritional factors can play a role and it is important to understand these factors and control them where ever possible. Once the hoof has had one attack of laminitis, it never fully recovers and a cow that has suffered from this may have bad feet for the rest of her life. The hooves may remain chronically misshapen and have to be regularly trimmed to restore reasonable shape and weight bearing surfaces.

Key Points:

To minimise acidosis:

a. Ensure adequate fibre in diet to stimulate saliva production (1-2kg straw/cow/d).
b. Introduce concentrates gradually.
c. Any dietary changes should be made gradually especially for transition cow.

Try to minimise the effects of high protein spring pasture by providing a more balanced ration during this time (e.g. concentrates, silages and straw can be used to achieve this).

Supra nutritional levels of Bioplex zinc are effective in increasing hoof hardness (and improved udder health also).

Biotin supplementation can be used but while supply is short this is less likely to be a cost effective alternative and ensure the cows own biotin production is maximised by providing her with a well balanced diet.

Good nutrition is about balancing nutrients to ensure good rumen function. This means healthy and productive dairy cows!

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