

Adams Advanced Nutrition, Inc.

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Lameness III...

Feeding Management & The Claw

In addition to insuring that cows are consuming diets with adequate amounts of effective fiber and acceptable amounts of non-fiber carbohydrate (NFC), dairy producers need to implement management practices that minimize "slug" feeding, especially in early lactation. Rate of pH decline following a meal increases as meal size increases and as dietary NDF concentration decreases (Allen, 1997). Research conducted at Michigan State University by Dado and Allen (1995) indicated that when given free access to feed, cows fed a lower fiber diet (25.7% NDF vs. 35.2% NDF) consumed smaller, more consistently sized meals throughout the day, moderating the extent and duration of low ruminal pH.

Another group of cows that tend to "slug feed" are heat stressed cows (Hall, 2002). These cows tend to eat larger meals during the evening hours, while smaller meals are consumed during the hot, daylight hours. Furthermore, heat-stressed cows tend to pant and exhale more carbon dioxide, reducing the buffering capacity of their systems and bicarbonate recirculated into the rumen (Hall, 2002). Mishra et al., (1970) found that rumen pH was lower (6.3 vs. 5.8) for cows maintained under high temperatures (29°C) than cows maintained under moderate temperatures (18°C) even though both groups of cows received the same diet. Dairy managers need to strive to minimize heat stress in cows by minimizing physical exertion and exposure to radiant heat during periods of high temperatures. Working cattle and forcing cattle to walk through mud or excessive distances should be avoided on hot days. Shade, fans and sprinklers are all effective means of heat abatement for the dairy cows.

Effect of Protein

Research examining the association between quality and quantity of protein on claw integrity has been limited. Manson and Leaver (1988) examined the effect of feeding two levels of protein (19.8 vs. 16.1% CP) on claw integrity. Dietary level of crude protein was increased by adding rumen degradable protein to a 16.1% CP diet. Cows fed the higher level of crude protein had increased incidents and duration of lameness. In addition, cows fed the higher crude protein diet had higher locomotion scores (Manson and Leaver, 1988). It is believed that products of protein degradation in the rumen may be the causative agents for increased incidents of lameness (Nocek, 1997).

Increasing the supply of sulfur-containing amino acids has been suggested to improve claw quality as methionine has been identified as one of the first limiting amino acids in diets of lactating dairy cows and the horn has high



cysteine content. Galbraith et al. (1998) found that goats fed rumen-protected methionine had harder claws and higher cysteine content of the abaxial wall. However, claw growth was not affected. More research is needed to determine the relationship between sulfur amino acid supply and claw integrity.

Effect of Vitamins & Minerals

Vitamins play important roles in maintaining claw integrity. Generally, cows in the United States are supplemented with vitamins A and E to insure an adequate supply of carotenoids and tocopherol (Vitamin Nutrition for Ruminants, 1994), both important in maintaining skin integrity and immunity. In addition, vitamin D is supplemented to maintain calcium metabolism.

In the past, B-vitamins have not generally been fed to mature ruminants. However, recent research indicates that rumen microbes involved in the synthesis of biotin are sensitive to low pH. Therefore, cattle fed high grain or high quality pasture diets may develop a subclinical biotin deficiency. Biotin is a water-soluble vitamin essential for the formation and integrity of keratinized tissues such as skin and horn (Seymour, 1999). Its role in the formation and integrity of keratinized tissues is related to its role in the differentiation and keratinization of epidermal tissues that produce claw horn and skin (Seymour, 1999). Biotin reserves drop dramatically during periods of stress and lameness, resulting in reduction in keratinization and production of intercellular cementing substance of the claw horn (Seymour, 1999). Horn produced during a biotin deficiency will be soft and weak (Seymour, 1999).

Results of ten trials indicate that biotin status of cattle appears to be marginal as evidenced by the improvements in claw integrity in response to supplemental biotin. Feeding 10 to 20 mg/head/d of supplemental biotin resulted in a reduction in claw disorders such as white line separation, sole ulcers, sole hemorrhages and sandcracks.

(To be concluded in next issue. Edited from an article by Drs. Tomlinson & Socha, Zinpro Corporation)

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**RENAISSANCE... HELPING TO IMPROVE YOUR
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HEAT STRESS!



Heat and humidity of summer have arrived! And with it the stress it exerts on livestock. Are you prepared? Reviewing ration and management programs can help livestock avoid many of the problems associated with rising temperatures and humidity. We have several products to help meet a herd's increased needs during times of heat stress. Additionally, it is important to review your farm's management program to ensure livestock are equipped to cope with the heat. Be sure to consider every group on your farm from calves and heifers to the lactating and dry cow groups!

Cool off with... Renaissance!

Make a difference this summer. Minimize heat stress and its consequences!

WHAT ABOUT CALVES THIS SUMMER? There is a lot of research supporting the use of free choice water for calves. Dr. Kertz (1984) showed the correlation between feeding water and an increased consumption of calf starter. This research also showed an increase in average daily gains for calves with access to water. Since this research was published, calf raisers have been encouraged to provide free choice water to calves. Free choice water is important, but how clean should the water be? It is not uncommon for the water bucket to simply be refilled with water, never really emptied (and cleaned) on a regular basis. Over time, the water bucket accumulates feed, saliva, flies, dirt and other foreign material leading to poor quality water. What effect does poor water quality have on the growth and health of calves? Research shows calves that have their water changed daily are found to grow faster than those changed either every 7 days or every 14 days. Calves that had their water changed daily were also significantly less likely to require multiple medical treatments. Give calves plenty of water this summer and take time to keep the buckets clean!
(edited from an article by Dr. Steve Hayes, courtesy of Milk Products, Inc.)

A POINT TO PONDER... Summer is here! It's time to enjoy the warmer weather and numerous activities we have looked forward to over the past winter months. This is also a time of year when we need to continually be reminded to practice safety! With the added work and use of heavy equipment, it is important to consider your own safety and that of family and workers around the farm. Practicing good safety procedures is an investment in everyone's well-being. And be sure to take time to enjoy summer sun... and summer fun!



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July...



*feed management & nutrition ~
impacting foot health!
keeping cool this summer... and more.
Check it out.*