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HEAT STRESS AFFECTS HEIFERS & THEIR GROWTH RATE...

Cooling cows is known to have an economic return, but there are advantages to keeping heifers comfortable as well when the weather turns hot and humid!

Warming temperatures this spring serve as a reminder to be prepared for the arrival of higher summer temperatures, along with higher humidity, that are a certainty. In fact, some of these temperature extremes have already occurred and will more than likely be ever present in July!

Last summer's extreme heat tested humans, cows and calves. We often prepare for cooling cows with additional fans, soaking, etc. But calves and heifers can feel the heat too. According to several studies, calves have a "thermal neutral zone" which is from about 60-75° F in still air. The thermal neutral zone is the temperature range in which the animal does not need to expend extra energy to either keep warm or to stay cool. The range varies due to age, feed intake, body fat levels and hair coat thickness. The stress of maintaining normal body functions in cold or hot weather decreases the heifer's growth rate and a producer's bottom line. It's important to keep heifers as comfortable as possible outside of those temperatures.

Remember that heat and humidity can combine to cause even more stress than is reflected on the thermometer. Below is a list of visible signs of heat stress in calves that are important warning signs to recognize:

- Reduced movement
- Faster breathing rates
- Open-mouthed panting
- Decreased feed intake
- Increased water consumption
- Slower growth and development

What can you do to help minimize heat stress for your calves and heifers? During the hot summer months, it is recommended that hutches be moved into the shade or cover them with shade cloth. It is also critical to supply unlimited amounts of cool, fresh water to avoid dehydration. A heat-stressed calf can drink up to six gallons of water daily (and growing heifers much more). Fill and/or change the water in buckets *at least three times* each day. Calves may wait to eat in the cooler evening hours, so make sure they have plenty of water and food for overnight. Other ideas include propping the back edge of a calf hutch up about six-to-eight inches, allowing an increase in air flow. Additionally, it is recommended that calves and heifers are not handled or vaccinated except in the cool, early morning hours. Addressing heat stress in calves and heifers makes good economic sense! Heat-stressed calves may grow more slowly, reach maturity later and be delayed in entering the milking herd. Worse yet, you might even lose valuable heifer calves or heifers. Lastly, what about heifers ready to calve for the first time? Research has shown that decreasing heat stress in dry cows can result in increased

What is an ideal length of cut for chopping corn silage? Does the length of cut impact rations? There are several things to consider when it comes to best-length and maturity at cutting. The length of chop affects packing density and ultimately silage quality. The value of fine chopping increases as the crop advances in maturity and when moisture content drops below 60-65%. Unprocessed silage is often chopped at 3/8 -to- 1/2-inch theoretical cut. It is equally important that knives are kept sharp and properly set so that forage is cleanly chopped. If blades are dull, especially with overly dry forage, stringy silage will result. These factors may cause poor packing and reduce consumption rates. Knowing the ideal cut-length and maintaining equipment is critical to the quality of your silage, and ultimately to the health and productivity of your cows. Get the facts. Talk with me about maximizing this year's harvest and having a positive impact on rations throughout the coming fall and winter months. You and your cows will appreciate the difference!

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Calf size., as well as improved colostrum quality. So pre-calving heifers should not be exposed to extreme heat either.

Minimizing heat stress on calves and heifers can definitely impact and increase their growth/development rate and even improve their chances of entering the milking herd on schedule.

Work this summer to not only keep your cows cool, but your heifers and calves too!

(Edited from an article by Roberta Osborne, Michigan State University Extension)

FEED MANAGEMENT & THE HOOF

In addition to insuring that cows consume 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 (*Dado/ 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 (84°F/29°C) than cows maintained under moderate temperatures (64°F/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 dairy cows.

Effect of Protein

Research examining the association between quality and quantity of protein on hoof integrity has been limited. *Manson and Leaver (1988)* examined the effect of feeding two levels of protein (19.8 vs. 16.1% CP) on hoof 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. 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 hoof quality as methionine has been identified as one of the first limiting amino acids in diets of lactating dairy cows and the hoof horn has high cysteine content. *Galbraith et al. (1998)* found that goats fed rumen-protected methionine had harder hooves and higher cysteine content of the abaxial wall. However, hoof growth was not affected. Additional research is needed to determine the relationship between sulfur amino acid supply and hoof integrity.

Effect of Vitamins & Minerals

Vitamins play important roles in maintaining hoof 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 hoof 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 hoof horn. Horn produced during a biotin deficiency will be soft and weak (*Seymour, 1999*).

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

Contact your W-S Feeds representative for more information and how to help reduce the incidence and impact of lameness in your herd – for improved productivity and profitability all year-round.

(Edited from an article by Tomlinson & Socha, Zinpro Corporation)