

LOW COST COW/CALF PROGRAM

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A Shaggy Cow Story

It was strongly suggested that I rearrange the furniture and things in the office. This forced me to get into my archives. *My archives are a large stack of reprints from scientific reports that I have placed on top of the bookshelf, for later reading and dust collection.* I blew the dust off a paper about hair coat characteristics¹ - published back in 1991. We address hair coat characteristics during the School, especially as related to the newborn, but we've not talked about it in *The Bulletin*. There is not exactly a plethora of studies on hair coat, at least from what I have seen. When you Google - "hair coat, cattle" - you find hair coat described as smooth, slick, thick, rough, long, short, etc. Few reports provide actual numeric values for length and density of the different kinds of hair.

The Long and Short of it

Most of us, who get up close and personal with cattle, are aware that the coat consists of two hairs. There is the long hair that is easily seen and is called the guard hair. When you spread the hair apart and look beneath the guard hairs, you can see a layer of shorter hairs. They are called undercoat hairs. Some refer to this layer of hairs as down. If cows were like some goats, the undercoat hairs would be termed cashmere. What cannot be seen with the naked eye is the medullation or degree of medullation. A medullated hair is hollow, while an unmedullated hair is filled (or partially filled) with strands of protein. The way that the protein strands are intertwined gives the characteristic crimp to wool. A shortening of the photoperiod brings on hair growth, within breed. Some say that the guard hairs get longer but I have not seen definitive data to support that premise. I believe it happens to be more of a breed thing. As day length shortens, the number of undercoat hairs increases - giving rise to observable, thicker hair coat. Insulating properties come not only from the increased hair cover but also from the difference in the

length of the hairs. Some say that air is trapped between shorter, undercoat hairs and the longer, guard hairs. Others claim that the difference (in hair lengths, along with air movement) causes an electrostatic mechanism, resulting in insulation. Perhaps it could be both. Whatever, it works. Cows will carry snow on their backs for days, unless it gets knocked off. When they stand up, the ground (upon which they were just lying) is dry. In the spring, the cows shed (molt) their winter coat. The cycle then begins again. Calves are born with a summer hair coat. They must experience the lessening of the photoperiod in order to grow their first winter coat of hair. The implications, of winter-born calves, are obvious.

Winter Already

The study (referred to earlier) was carried out over two years at the Lethbridge, AB Research Station, with 577 purebred Hereford and Angus bull and heifer calves. Twelve sires were used in each breed each year. Upon weaning on Nov 1 of both years, the calves were assigned to one of the following: a high-energy diet (HED) $\frac{2}{3}$ barley and oats and $\frac{1}{3}$ chopped alfalfa and brome hay or: a medium-energy diet (MED) $\frac{1}{2}$ alfalfa and $\frac{1}{2}$ brome hay. The cattle were fed for 168 d. Hair samples were collected in the middle of Feb for both years. The sampling was accomplished by clipping a 5.1 cm² area on the left, mid-rib of each animal. The hair samples then were washed and separated into guard hairs and undercoat hairs. The hairs were weighed, counted and measured for length and diameter and examined for medullation.

Year effects: Meteorological data were similar for both years (sunlight, wind and temperature), with the exception of precipitation. Precipitation during the first year was nearly twice that of the second year. Total body weight gain was greater for the second year. Guard hairs were longer and had larger diameters in the second year. The number (of undercoat hairs per cm²) was much higher for the second year.

Diet: The MED increased all measures of hair weight per cm², undercoat number and guard hair medullation. Undercoat density

was increased by MED, whereas guard hair density was not.

Sex: The diameter of all hairs, as well as weight/length of guard hairs, was greater for the bulls. However, bulls had fewer guard hairs and less medullation of undercoat hairs. Heifers had finer and denser guard hairs. Undercoat density did not differ.

Breed: Angus cattle tended to have shorter, larger-diameter undercoat hairs (and guard hairs with less medullation) than the Herefords.

Genetics: The numbers of both types of hairs and guard hair medullation were lowly heritable. All measures of hair coat weight were moderately heritable. Guard hair length and undercoat diameter were highly heritable. Phenotypic correlations were high and positive, between the number of hairs and the weight per cm².

Body Weight Gain: All sources of variation were significant for 168 d gain, except breed. Bulls had greater ADG than heifers. In addition, cattle that consumed HED gained more than those fed MED. All of the phenotypic correlations (between hair coat characteristics and 168 d gain) were low. The genetic correlation between 168 d gain and guard hair number was strongly positive, while that between gain and undercoat was moderately negative.

Conclusions: Post-weaning body weight gain, as it relates to hair-coat characteristics, was a major part of this study. Feed efficiency was not; however, it probably should have been. The measurement/description of hair-coat characteristics is a complex process. Seed stock producers want their customers to be satisfied with the performance of the calves (out of the heifers) and bulls that they sell. Measurement of one or two hair characteristics, in order to improve gain, would be less effective than direct selection for gain.

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¹ Gilbert, RP and DRC Bailey. 1991. Hair coat characteristics and postweaning growth of Hereford and Angus cattle. *J Anim Sci.* 69:498.