

# LOW COST COW/CALF PRODUCTION

## The Bulletin For Alumni Of The School

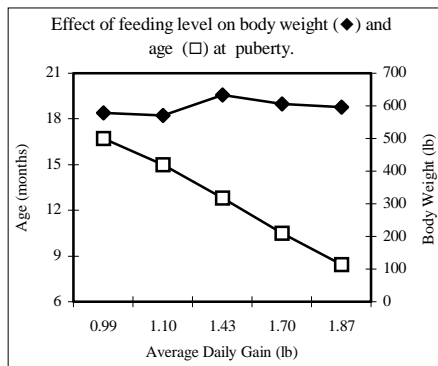
February 1997

### Mr. Postman, Please

Not to be blamed. I'm the one who is tardy with this February Newsletter. Too much Hale-Bopp viewing.

### A Stage of Adolescence

In previous Newsletters we've discussed the impact of body weight upon the age that heifers experience pubertal estrus. This relationship was addressed recently in a review by Danish researchers<sup>1</sup>. The following chart shows that a wide variation in daily gain was achieved by varying the feeding level with Danish Friesian and



Danish Red heifers. Average age to first estrus decreased from 16.6 to 8.4 mo. as growth rate increased from 0.99 to 1.87 lb/d. By contrast, body weight at puberty was unaffected.

### 4 Mamillas & A Bag

The basic structure (structural tissue, circulatory system and outer shape) of the mammary gland is formed in fetal life. Epithelial tissues (tissues involved in milk production) are rudimentary at birth. During the first few months of life, the mammary gland grows at the same rate as the rest of the body - still no epithelial tissues though. Around 3 mo. of age, the glands commence growing at a faster rate than the rest of the body. This growth phase ends at the onset of puberty or shortly thereafter. At puberty the mammary glands of heifers weigh about 4.5 to 6.5 lb. The functional portion of the gland weighs about 1 to 2 lb. It is comprised of 10 to 20% epithelial cells, 40 to 50% connective tissue and 30 to 40% fat cells. *By com-*

parison, lactating mammary glands of normally grown dairy cows can weigh as much as 55 lb. The functional tissues consist of 40 to 50% epithelial cells and almost no fat cells. Growth of the mammary gland after puberty is at the same rate as other body tissues.

### Disharmony

Feeding to achieve pubertal estrus at a young age may compromise lactation. Available data suggest that growth rates above 1.3 to 1.5 lb/d can have permanent negative impact on mammary growth in dairy cattle. Further, the data indicate that the negative effect occurs during the prepubertal phase of mammary development and starts as early as 3 mo. of age. Thus, the "critical period" lasts from about 2 to 3 mo. of age until about 2 mo. after puberty.

### Show Me

The "critical period" has been confirmed in a large study with 445 heifers from 3 Danish dairy breeds. The heifers from each breed were divided into three groups and fed diets to support three levels of daily gain from 6 wk to 463 lb live weight in Danish Jerseys and 661 lb in Danish Reds and Danish Friesians. The heifers were bred at the same body weight. The following table shows the average daily gains and milk yields. The negative effect of feeding level existed in all breeds. It is

| Danish Breeds | At Calving |        |       | 250 days |          |
|---------------|------------|--------|-------|----------|----------|
|               | ADG lb     | AGE mo | BW lb | FCM lb   | relative |
| Jersey        | 0.80       | 29     | 752   | 11299    | 100      |
|               | 1.07       | 26     | 778   | 10472    | 93       |
|               | 1.23       | 23     | 725   | 9094     | 80       |
| Red           | 1.21       | 29     | 1168  | 12511    | 100      |
|               | 1.58       | 26     | 1157  | 10803    | 86       |
|               | 1.86       | 23     | 1080  | 10362    | 83       |
| Friesian      | 1.28       | 29     | 1521  | 11960    | 100      |
|               | 1.61       | 26     | 1102  | 11905    | 100      |
|               | 1.89       | 23     | 1098  | 10803    | 90       |

also apparent that the feeding level or gain causing a reduction in milk yield is different in different breeds. The negative effect of feeding level started when average daily gain was above 0.88 lb in Jerseys, above 1.32 lb in Danish Reds and above 1.54 lb

in Danish Friesians. The latter are almost identical to the American Holstein. Milk production was reduced in the Jerseys by 20% from the low rate of gain to the high rate of gain. It similarly was reduced in the Reds by 17% and in the Friesians by 10%. This, together with the critical rates of gain given above, denotes the relationship to empty mature body weight and/or breed.

### These Aren't Beef Cows

Data pinpointing maximum rates of gain during the critical period of growth are not available for beef breeds. Recall from the November '96 Bulletin, the study conducted with beef heifers. In that study, the researchers (going one step farther) examined the cellular makeup of the udder. The udders from heifers destined to reduced milk production contained more fat cells at the expense of the DNA containing epithelial cells.

### Who Has a Problem?

The commercial producer can make better use of photoperiod to impact age of puberty in his skinny heifers. No one sees his heifers anyway. The purebred operator has a problem. It is the round, roly-poly bred heifer that brings the most money. Further, it is difficult to maximize the impact of photoperiod because of customary sale dates. Educate the buyer? Tough job! **Appearances are more substantive than production potential.**

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<sup>1</sup> Sejrnsen, K. and S. Purup. 1997. Influence of prepubertal feeding level on milk yield potential of dairy heifers: A Review. J. Anim. Sci. 75:828.