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MILK FEVER
in Idaho Dairy Herds

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Milk fever is an abnormal metabolic condition in the dairy cow occurring near calving. The typical symptoms of tetany and paralysis are a result of inadequate levels of calcium.

CALCIUM REGULATION

Calcium from the daily diet is absorbed in the upper 1/3 of the small intestine and is the major source of the mineral. Calcium also can be returned to blood plasma by the kidneys through renal reabsorption, thus minimizing the amount lost in the urine, and the cow can make available some calcium from skeletal stores when the amount from other sources is inadequate (Figure 1). These sources balance the daily needs of calcium for bone deposition, milk production, skeletal formation of the fetus during pregnancy, and those amounts lost through urine and feces.

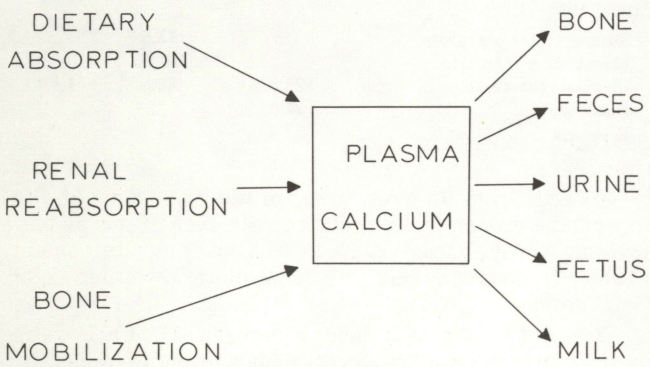

Figure 1. The factors influencing plasma calcium.

The demand for plasma calcium greatly increases near calving time. The beginning of milk secretion is partially responsible for the rapid increase. Recent research suggests that hormones may also be depressing the normal plasma calcium level. Milk fever occurs in cows unable to compensate for the increased drain on plasma calcium.

Most cows can maintain adequate plasma calcium during calving, thus averting milk fever. The difference between normal cows and those requiring treatment for milk fever appears to be related to their ability to counteract the decreasing plasma calcium. This ability is influenced by differences in age, and stage of lactation and gestation.

MILK FEVER IN IDAHO

Management practices have been suggested to reduce the incidence of milk fever; the occurrence of milk fever in problem herds has been reduced on an experimental basis. However, milk fever seems to be increasing even with current preventive measures.

Therefore, a cross section of Idaho dairy herds was surveyed to determine which factors related to feeding and management influence the occurrence of milk fever. The 5,944 cows included in the study represent a 3.8 percent of the total Idaho dairy cow population. The 72 herds were located throughout the state, with an average herd production of 497.8 pounds of milk fat and 12,800 pounds of milk per cow. This was slightly higher than the 1969 Diary Herd Improvement Association averages of 479.0 pounds of milk fat and 12,611 pounds of milk.

The average dairy herd in the study was experiencing 22.4 percent milk fever in cows third lactation or older. Variation in the frequency of milk fever was noted between the areas, breeds and individual herds.

The data collected on the dairy herds were evaluated by computer analysis. The effects of the various factors, such as feeding, production and breed, were analyzed independently in relationship to the frequency of milk fever in each of the surveyed herds. The following discussion of these factors is based on the results of this analysis.

FACTORS RELATED TO MILK FEVER

Dry cow feeding was closely related to the incidence of milk fever in the surveyed herds. Dairy herds receiving a total dietary calcium phosphorus (Ca:P) ratio near 2:1 (two parts calcium to each one part phosphorus) during the dry period, as recommended by past research, were experiencing the lowest incidence of milk fever (Figure 2). The average percent incidence of milk fever of the herds receiving the various ratios of Ca:P illustrates the importance of a dietary balance of the two minerals.

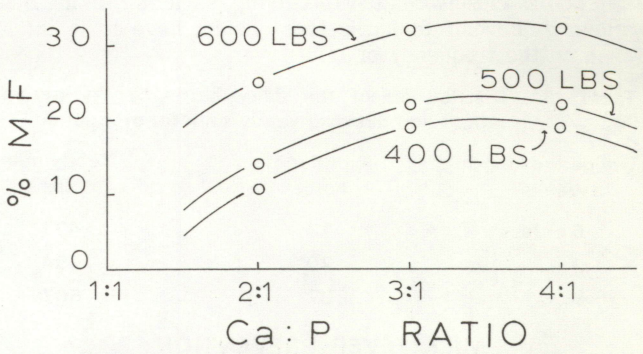

Figure 2. The estimate of milk fever (MF) in herds fed various Ca:P ratios at three levels of milk fat production per cow (LBS).

Milk fever increased significantly as higher levels of milk fat production were obtained (Figure 3); this accounts for the increasing problem in Idaho herds once free of milk fever. As milk fat production surpassed 500 pounds

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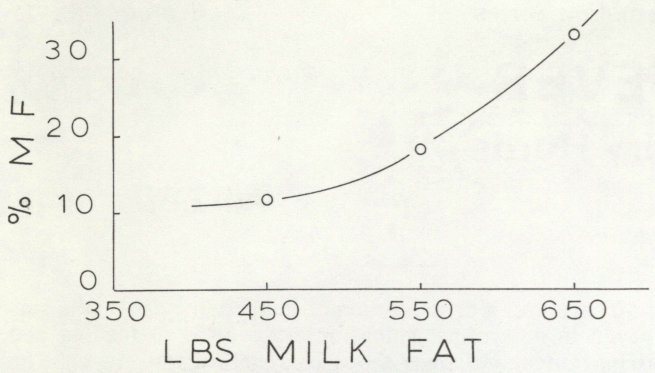

Figure 3. The effects of milk fat production (LBS) on the incidence of milk fever (MF).

per cow, the percent incidence of milk fever increased. This relationship between the level of production and milk fever incidence indicates that Idaho dairy farmers must become more aware of feeding practices as higher levels of production are reached. Milk fever will continue to increase with production unless current preventive suggestions are practiced. Milk fever resulting from higher production can be reduced by providing the dry cow with a ration containing a Ca:P ratio of about 2:1.

Other factors related to the incidence of milk fever have little if any practical application. For instance, a trend in the data analysis suggested that milk fever became more frequent as the dry period length increased from 6 to 8 weeks. But reducing the dry period length in an effort to lower the incidence is not practical, since the average production of herds with 8-week dry periods was 30 pounds of milk fat per cow greater than in herds with dry periods of 6 weeks or less (Table 1).

The effects of breed and area were related to the occurrence of milk fever. The Guernsey herds surveyed were significantly lower than Holstein and Jersey herds in the percentage of milk fever cows. Milk fever was more frequent in northern Idaho than in southern Idaho. Location, of course, has no practical application toward prevention. However, the occurrence of milk fever was extensive enough in all areas and breeds to be of economic importance.

Factors closely related to calving, such as milking and allowing the calf to nurse free choice, have little influence on the frequency of milk fever.

Table 1. Distribution of the dairy herds by dry perioo length and average yearly milk fat production

Dry period length in weeks	Number of herds	Yearly milk fat (lbs.)
6 or less	12	477
7	20	494
8	37	507

MILK FEVER PREVENTION

Balancing the Ca:P ratio in the ration of the dry cow is the most effective way to prevent milk fever. This can be accomplished by incorporating the following suggestions into the dairy operation:

1. Separate dry cows. The dry period is important for milk fever prevention as well as for calving preparation and initiation of lactation. Separation permits the necessary adjustments in the feeding program for balancing the Ca:P ratio and for regulating feed intake.

2. Keep Ca:P ratio near 2:1 in total ration. Do this either by adding a mineral high in phosphorus or by reducing when the level of phosphorus is adequate.

3. Plan a roughage program. Since adding enough dietary phosphorus to the concentrate to balance the Ca:P ratio may lead to palatability problems, the most logical solution is to plan a dry cow feeding program incorporating feeds with a narrow Ca:P ratio (Table 2). Such feeds as corn silage, oat hay or grass hay may replace a portion of high calcium content roughage, mainly alfalfa hay. You can obtain a ratio of 2:1 Ca:P from available feeds.

Table 2. Mineral content of various feedstuffs

Feed	Grams per pound Calcium	Grams per pound Phosphorus	Approximate Ratio Ca:P
ROUGHAGES			
Alfalfa hay	6.7	1.0	7:1
Oat hay	1.0	.9	1:1
Sudan hay	2.3	1.3	2:1
Grass hay	1.8	1.5	1:1
Corn silage	.4	.3	1:1
GRAINS			
Barley	.4	1.9	1:5
Corn	.1	1.2	1:9
Beet pulp	2.5	.4	7:1
Oats	.5	1.6	1:4
Wheat	.2	1.6	1:7
Wheat bran	.6	5.3	1:8
Cane molasses	4.0	.4	10:1
Beet molasses	.7	.1	6:1
MINERALS			
Sodium tripoly phosphate	.....	113.5	...
Monosodium phosphate	.....	101.6	...
Dicalcium phosphate	123.0	86.6	1.4:1
Limestone	154.0	.....	...
Bonemeal	132.0	61.7	2:1

4. Feed Grain. In many areas of the state some alfalfa hay can be economically replaced with such grains as barley and wheat. These grains have a low calcium content (Table 2) and will help create a more favorable total Ca:P ratio.

These practices will help achieve a 2:1 Ca:P ratio without the necessity of feeding high levels of minerals. Some mineral may still be incorporated into the dairy concentrate or provided free choice.

The dry period is important for the prevention of milk fever, since it is difficult to obtain the desired Ca:P ratio in the feeding program of the milking cow on legume forage. Maintain a 2:1 ratio of Ca:P in the milking herd ration whenever possible for general herd health and for additional milk fever prevention.

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