Investigation of A Dairy Farm With a High Calf Mortality Rate

Jerome Gaska
Class of 1989
University of Wisconsin
School of Veterinary Medicine

Introduction

An investigation of the farm described in this report was requested by the owners and the referring veterinarian to attempt to solve an ongoing problem of high calf mortality and various other metabolic diseases affecting the cows in this herd. The nutritional status of the lactating herd was investigated to see if there was any link between the nutrition of the cows and the calf mortality rate. There was not a disease outbreak on the farm at the time of this investigation and specific diagnoses could not be determined, rather it was felt that changes in the management of this herd could help reduce the incidence of disease on the farm.

Description of Farm.

This farm is located in northwest Wisconsin and consists of a grade A dairy with approximately 61 head of grade Holstein cows, of which 43 were at various stages of lactation at the time of the visit. There were 41 heifers ranging in age from newborn to near freshening and an undetermined number of steer and bull calves. All calves are kept on the farm and raised as replacements or for beef. A red and white Holstein bull was kept as the herd sire and used along with artificial insemination for breeding the cows. A small number of hogs were also on the farm. All forages and grains fed on the farm were home grown.

The herd is not currently on an individual cow production or reproduction record system. Production information was determined by records of creamery receipts. The rolling herd average was 14,000 lbs of milk with 3.7% butterfat and 3.1% milk protein and a somatic cell count between 250,000 and 350,000,

History

During the winter and spring of 1987-88, this farm experienced a scours and pneumonia outbreak which resulted in the loss of 18 calves (42%) ranging in age from 2 weeks to 2 months. Death loss in previous years ranged from 5-10%. Calves have since been observed coughing and in general have not responded to treatment.

The milking herd had experienced an unusually high rate of milk fevers during the past year. Five cows were affected during late lactation or at dry-off and required multiple treatments and lifting to overcome their condition. Three others were affected during the early postpartum period and responded promptly to treatment.

Ketosis has also been a problem, particularly the past year. The affected cattle were treated with propylene glycol and responded well.

In 1982 Johne's disease was diagnosed on the farm based on a fecal culture and in May of 1985 a Johne's vaccination program was initiated. Prior to the start of the vaccination program, 5 clinical cases of Johne's disease were diagnosed on the farm. There have been no reports of new cases since the institution of the vaccination program.

Evaluation Parameters

Through discussions with the farm owners, the referring veterinarian, and a review of lab reports, the following areas were selected for investigation.

Detailed history of the calf mortality.

It was suggested that there has been an ongoing problem with the calf raising for quite some time, with particularly severe episode of disease and death loss this past year. Copies of lab reports indicate that samples have been submitted over the past several years from calf necropsy specimens. The most recent outbreak has been described by the owners as following several different courses. Calves have been reported to die acutely after demonstrating clinical sign of scours and to die after a somewhat chronic course of scours, depression, and respiratory distress. Laboratory specimens were submitted by the referring veterinarian of at least one calf affected during the most recent episode in an attempt to establish an etiological diagnosis. Organisms cultured or demonstrated from the intestinal tract included *E. coli* (K99), rotavirus, and cryptosporidium. Direct FA of lung tissue was negative for BVD, IBR, PI3 and BRSV. Fecal culture for *Salmonella spp.* was negative. Several different types of treatments were tried to cure the sick calves, and these were in general not successful over a period of time. While it is not known what the exact medications consisted of, it is believed that they contained a mixture of different antibiotics, steroids, and intestinal protectants.

Ventilation of calf barn.

Measurements were taken of the barn dimensions, locations and sizes of fans, and locations of air inlets. Information was also obtained on the sizes and numbers of calves housed in the barn during various times of the year.

Growth rates and body condition of heifers.

Each heifer calf was measured for height and weight and the body condition was assessed. Approximate ages were given by the herd owner on each group of calves. This information was then plotted on standard heifer weight and height growth charts .

Adult cow ration analysis.

The types of feeds used, amounts of feed, and the feeding schedule were recorded. Samples of the haylage currently being fed were sent in for nutrient analysis. The rations being fed at the time of the visit were analyzed to determine whether all nutrients were at the recommended levels.

Body condition scoring of adult cows.

Using a scale of 1-5, with 1 being very thin and 5 being very fat, the body condition of each cow was determined. Weights were estimated by taping several cows and condition of the feet and legs were evaluated. Freshening dates were obtained and days in milk were calculated.

Milk quality.

As mentioned above the SCC for the past year ranged from 250,000 to 350,000. Individual cows were not cultured at this visit but a bulk tank culture was performed to screen the herd for the type of mastitis causing organisms. This culture revealed a large number of *Strep. ag* organisms.

Serum chemistry values for adult cows.

Blood samples were obtained from the tail vein of several cows at different stages of lactation and from dry cows. The values that were of particular concern were the serum calcium levels and the blood urea nitrogen levels.

Rumen fluid pH levels.

Samples of rumen fluid were obtained by a stomach tube from 3 cows to determine the amount of acid production and its influence on the pH of the rumen. The pH can then be used as an indicator of the health of the microbes and thier influence on fiber digestion.

Presence of ketones in urine.

Urine specimens were obtained from about 15 cows to determine if ketone bodies were present. A positive reading for ketones can be associated with a negative energy balance indicating the need to increase the amount of available energy in the ration.

Stray voltage.

Using a voltmeter, readings were taken at various areas of the farm and at cow contact points. Electrical appliances and connections were examined for corrosion, bare wires, and improper grounding. All voltage readings were below the limits which are considered to have an effect on cow production and health. Some improvements might be made to electrical connections and outlets, but in general the condition of the electrical system appeared to be adequate. One exception noted was the cow trainer which was grounded to a stanchion post in the barn and should be grounded to an outside ground rod instead.

Discussion

Calf mortality.

The cause of the high mortality in the calves is believed to be related primarily to the environment and the handling of newborn calves. The ventilation system of the calf barn was determined to be less than adequate for providing a suitable environment for the calves. The practice on the farm of leaving the newborn calves with the dam for up to 36 hours after birth greatly increased the possibility of exposure to pathogens from the adult cows. Relying on the calf to suckle enough colostrum may not always provide protective levels of antibodies. The calf barn was open to the cow barn through the entrance door and barn cleaner gutter which dumped into the calf barn. This also provided a source of contamination to the calves from the cows.

After reviewing the available information concerning the continuing problem of high death loss of calves, it was decided that the best approach to the problem would be to improve the environment and maximize the natural immunity of the calf. An improved environment would reduce the numbers of the different pathogens believed to be responsible for causing the illnesses. By reducing the exposure of calves to these infectious organisms it is felt that the calves would be able to fight off most diseases. The importance of feeding adequate amounts of high quality colostrum to the newborn calves to provide the natural immunity necessary to prevent infection is considered essential to the success of this program and was stressed to the herd owners.

Recommendations have been made to provide for a more suitable environment and ensure better natural protection of the calves.

Growth of calves.

From the charts drawn, it appeared that the weight and height of the calves far exceeded normal levels for the ages given. Inaccuracies in the reporting of the birthdates of the calves was believed to be responsible for this discrepancy. More accurate identification of the calves and better recording of the birthdates are necessary to draw any conclusions about calf growth rates on this farm.

Nutrition of the adult cows.

An analysis of the reported lactating cow ration indicated

it was adequate in most requirements. The finding of 2 ketone positive cows may indicate a possible energy deficiency. The graphing of the body condition scores indicated the cows were in less than ideal body condition throughout lactation. The sudden drop in condition after freshening may represent a too aggressive feeding of grain and the resultant acidosis and decreased energy intake at a time when energy demand is high. Lead feeding had been practiced prior to calving and the cows were receiving up to 10 lbs of grain at calving. The low pH readings of the rumen fluid indicated a rumen acidosis. This may be explained by the practice of feeding grain in 2 large feedings and before any hay is eaten to provide a buffer in the rumen;

The following is a summary of the serum chemistry analysis.

Cow ID	Days in Milk	BUN (mg/dl)	Calcium (mg/dl)
42	26	3	7.4
34	87-116	11	8.6
16	Dry 1 week	6	8.0
1	Dry 4 weeks	6	8.8
35	87-116	9	8.0

The recommended range for the BUN is 10-20 and for calcium it is 8.0-11.0 in a dairy cow. The low BUN's are an indication of a protein deficiency in the ration and the calcium levels in the low normal range may indicate a dietary calcium deficiency. These serum chemistries correlate well with the clinical signs of low milk production due to inadequate protein intake or utilization and the high rate of milk fevers, particularly in the late lactation cows.

The ration analyzed is no longer fed at the farm and it is not known when the previous ration change was made. In light of this, it was decided to concentrate efforts at providing a ration that would meet all the requirements based on all the parameters discussed here and formulated with available feedstuffs. It is hoped that if the recommended rations and feeding schedules are followed, there will be a decreased incidence of milk fevers, a lowered number of cows in a negative energy balance, and an increase in the general body condition of the cows. The overall aim of the above changes is to increase milk production. In addition, the increased protein may have the effect of producing stronger, healthier calves at birth which may be better able to survive and fight off disease.

Bulk tank analysis.

The finding of numerous *Strep. ag* organisms in the bulk tank indicates the possibility of a large number of cows with infected quarters. The moderately high somatic cell count also suggests a high rate of mastitis. Further investigation of the herd and the milking procedures is required to fully evaluate the extent and cause of mastitis in this herd.

Recommendations

1. Improve identification program and record keeping system.
   A. Use ear tags to identify all calves kept on the farm.
   B. Record all breeding dates, calving dates, and incidence of disease or death.
   C. Consider expanding the use of the herd's dairy wheel or beginning a computerized record keeping system in cooperation with a veterinary practice.
2. Provide an improved environment for newborn calves.
   A. Convert the present heifer pen in the milking barn to an indoor maternity pen which is cleaned between calvings.
   B. Place all calves in calf hutches outside the barn immediately after birth.
   C. Ensure adequate consumption of colostrum by milking cow and hand feeding 2-4 quarts of colostrum within the first hour of birth.
3. Improve the ventilation system of the calf barn.
   A. Isolate the calf barn from the milking barn to reduce the transfer of disease causing organisms to young stock from older cows.
      —Close door between cow barn and calf barn.
      —Plug gutter openings from cow barn to calf barn.
   B. Install a ceiling duct system to ensure adequate intake of fresh air.
   C. Maintain thermostats and timers on all fans to provide optimum levels of ventilation throughout the year.
4. Improve nutrition of lactating and dry cows to obtain maximum levels of milk production and minimize disease.
   A. Reduce the drop in rumen pH (acidosis).
      —Always feed hay one-half hour to one hour before grain.
      —Divide grain feeding into 3-4 separate feedings a day.
      —Lead feed grain to fresh cows by starting grain on day of calving and slowly increase grain by 1-1.5 lbs/day up to 28 lbs/day by approximately 1 month after calving.
   B. Prevent new cases of milk fever by feeding the new rations provided for dry and milking cows.
   C. Grind feed coarser with a larger screen and slower RPM of the feed grinder.
   D. Replace the plain salt fed free choice in the yard with a trace mineral salt.
   E. Reduce the variation in the daily feeding schedule and make ration changes slowly and based on analysis of the feedstuffs, condition, and production of the cows.
5. Treat all quarters of all cows at dry off with a commercial dry cow mastitis infusion preparation.