

Preventing Scours (Diarrhea) in Beef Calves

“Scours,” or diarrhea, is a common problem in young beef calves. In 1992 the U.S. Department of Agriculture determined that scours occurred in 5.5% of calves between birth and 21 days of age, and 3.5% between 22 days and 4 months. Although these numbers are relatively small, in some years scouring can occur in a high percentage of calves in some herds. In the harsh winter and spring of 1993, 31% of beef producers questioned had a significant economic impact from scours on their operations. Scours results in poor subsequent growth, costs money to prevent and treat, and can cause death.

Causes

Scours in calves is caused by infectious microorganisms, including bacteria, viruses, and protozoan parasites. The most common causes of diarrhea in calves less than 4 weeks old are intestinal infections by the bacteria *E.coli* and *Salmonella*, the corona and rota viruses, and the protozoan *Cryptosporidia*. Bacteria may also infect other areas in the body, such as the lungs, joints, brain, and abdominal cavity. This results in fever, depression, and chronic debilitation. A group of protozoan parasites called coccidia often cause diarrhea in calves older than 4 weeks of age.

Like human infants, baby calves are quite susceptible to intestinal infections. Microorganisms contaminating unsterilized bottles or liquids can cause diarrhea in human babies. Similarly, baby calves born in unsanitary calving areas are exposed to a large number of infectious microorganisms.

A scouring calf loses large amounts of fluids and electrolytes, such as sodium and chlorine. Usually the cause of death in scouring calves is dehydration and acidosis, or increased body acidity. Whatever the microbial cause of scours, the most effective treatment for a scouring calf is rehydration by administering fluids.

The single, most important causative factor of scours is lack of adequate intake of colostrum by the baby calf within the first few hours after its birth. Colostrum, the cow’s first milk after calving, contains a high concentration of protein antibodies.

These antibodies are absorbed directly into the calf’s bloodstream after the colostrum is ingested. These maternal antibodies are the calf’s “passive” protection against infectious organisms during its first weeks and months of life, while its own immune system is building up “active” resistance to these organisms.

The cow produces colostrum for only a short time after calving, and the newborn calf can absorb the protein antibodies for only a few hours. After birth the calf’s ability to absorb these antibodies decreases about 50% within 6 hours and about 90% within 24 hours (Figure 1). Therefore, it is extremely critical that the calf successfully nurse colostrum shortly after birth.

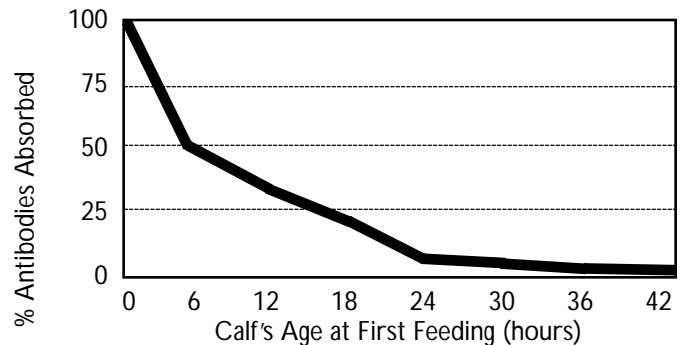


Figure 1. Age at colostrum feeding and antibody absorption into blood.

Numerous studies have shown that calves scouring, dying, or becoming ill with other diseases before weaning are usually those that failed to receive adequate colostrum. This is called “failure of passive transfer” of immunity. Even if the calf survives, the effects of failure of passive transfer may carry on after weaning. It is associated with reduced calf weaning weight and increased sickness in the feedyard after weaning. In effect, the lifetime health and performance of the calf are greatly affected by how well it absorbs colostrum during its first few hours of life.

A difficult birth is a major reason that calves are born weak and less likely to ingest adequate colostrum during the first critical hours. Such calves

take longer to stand and nurse, and consequently have lower concentrations of blood antibodies.

Prolonged periods of reduced oxygen to brain and body tissues during a long and difficult calving will produce a weak calf which may be unable to suckle. Therefore, reducing calving difficulty and early assistance during calving are keys to scours prevention and increased calf survival.

Calves from heifers tend to have more scours than calves from older cows. Two-year old heifers are more likely to have calves with lower blood antibody concentrations than calves from older cows. Two-year old heifers in poorer body condition at calving also have calves with lower blood antibody concentrations. This may be because heifers produce less colostrum, and heifers in poor body condition deliver weaker calves. In addition, heifers tend to have more calving difficulty because they have not reached mature body and birth canal size.

The mother cow's nutrition during pregnancy has a clear effect on calf survival. Diets with inadequate crude protein fed to dams during the last 60 days of pregnancy have been associated with the "weak calf syndrome" (Table 1). Weak calves, which often do not survive, may be born to cows with inadequate nutrition during pregnancy. Approximately $\frac{2}{3}$ of fetus growth occurs during the last $\frac{1}{3}$ (90 days) of pregnancy. Dams with insufficient protein intake during this period may not provide the fetus with adequate "building blocks" for growth of tissues. In addition, inadequate dietary

Table 1. Relationship Between Protein Intake During Pregnancy And "Weak Calf Syndrome" In 14 Herds.

Crude protein intake	No. of herds	Average crude protein per cow (lb./day)	Avg. % calves with "weak calf syndrome"
High (more than 2 lb./day)	6	2.5	0.6
Medium (1.5 to 2 lb./day)	4	1.8	3.4
Low (less than 1.5 lb./day)	4	1.2	9.8

(Bull, 1974)

protein may reduce the amount and quality of antibodies in the dam's colostrum.

Preventing Scours

Heifer Management

Since scouring occurs more often in calves born to heifers, separate them from mature cows. Manage heifers in a convenient, observable area. This will ensure that they are fed adequately during pregnancy and closely watched as calving time approaches. Heifers managed separately after calving

will not have to compete with older cows for supplement, which improves milk production and calf growth.

Ensure that supplemental diets meet energy, protein, and mineral requirements during all stages of gestation and lactation. See Extension Circular-600, *Alabama Beef Handbook*, "Nutrient Requirements of Beef Cattle and Composition of Some Beef Cattle Feeds" (SR-2000). Feed heifers to calve in good flesh, or a Body Condition Score of 6 on a scale of 1 (extremely thin) to 9 (extremely fat).

Develop heifers so that they reach approximately 85% of their mature size at calving as 2 year olds. Use "easy calving" bulls to breed heifers. Such "heifer bulls" should have favorable expected progeny differences (EPD's) for birth weight. In some herds it may be advisable to measure pelvic openings of yearling replacement heifers to identify those with smaller birth canals. These are more likely to have problems at calving. They can either be culled out or watched more closely at calving. See Extension Circular ANR-578, "Pelvic Measurements Of Heifers and Bulls."

As many as 18 to 20% of heifers may benefit from assistance of some type during calving. Early assistance during a difficult calving saves calves, starts them suckling colostrum stronger, and leaves the heifers in better shape to breed back. Adequate handling facilities for calving females and clean, functioning obstetrical equipment (chains, handles, and a "calf jack") are essential.

In some herds, feeding at night 1 to 3 weeks before the anticipated calving season moved the majority of calvings to daylight hours. Feeding at night at least ensures that the calving females will be observed one more time.

If a calf is born weak after a natural or assisted calving, milk out the dam and administer at least 1½ quarts of colostrum. Although it is generally better for the calf to suckle colostrum from its dam or nipple bottle, an esophageal feeder is an excellent instrument to administer colostrum (Figure 2).

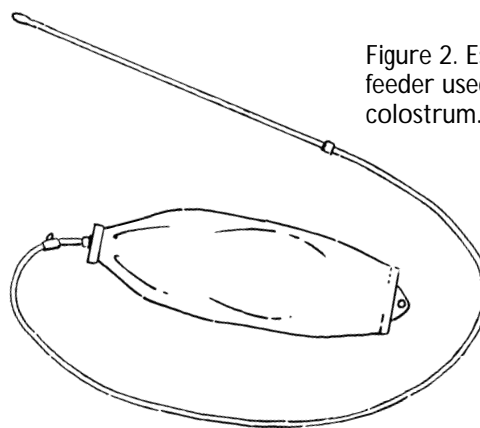


Figure 2. Esophageal feeder used to administer colostrum.

This feeder is particularly beneficial in calves with a weak suckle reflex.

Obtain supplemental colostrum from other cows. The best source is a mature beef cow from the same farm or ranch, although dairy cow colostrum is the next best alternative. Freeze colostrum in plastic milk jugs and thaw in hot water as needed. University research trials have not shown commercial “artificial” colostrum to be an effective replacement or adjunct to real colostrum.

Lack of a controlled breeding and calving season makes avoiding calving problems difficult, if not impossible. Heifers which calve over several months are difficult to manage as a group and may not be observed closely for early assistance.

Cow Management

Cows with poor udder conformation, such as “bottle teats” or broken suspensory ligaments with “sagging” udders, make it difficult for newborn calves to nurse. Consider culling these cows as early as possible. Cows with mastitis, or udder infections indicated by “lumpy-bumpy” udders, produce less and poorer quality colostrum, and should also be considered for culling. As with heifers, meet nutritional requirements of protein, energy, and minerals during late gestation.

Clean Calving Environment

No amount of colostrum can overcome a filthy calving area. Avoid placing newly calved cows and calves into small post-calving areas where they are held for a few days to “assure a good start.” These areas build up concentrations of infectious microorganisms which will overcome even adequate colostrum ingestion. Once the calf is born and has ingested colostrum, put the pair out to pasture with their nursing group. If at all possible, do this within 24 hours of birth.

Isolate scouring and sick calves in a “hospital pen” away from the nursing group. Make every effort to use the hospital pen only for treatment of scouring or sick calves. Try to keep quarantined calves away from the nursing group until the youngest calf in the group is 3 weeks of age. This is past the period during which scours usually occurs. Disinfecting a hospital pen on dirt pasture is difficult. However, provide for adequate drying and ventilation. Spread out fresh straw bedding as needed.

Avoid bringing in purchased or sale barn calves to a group of newborn calves. Cattlemen may want to buy calves to replace those lost at calving, but they are potential sources of infection and are not worth the risk.

Table 2. Guidelines For Fluid Therapy Of Scouring Calves.

% Dehydration	Clinical Signs	Fluid Therapy Route
Less than 8%	Slight loss of skin pliability, slightly dry mouth, standing	Oral
8-10%	Above signs more pronounced, weak, moderately depressed, slightly sunken eyes, mostly lying on chest	Oral & Subcutaneous (consult your veterinarian)
Greater than 10%	Eyes more sunken, cool extremities, depressed, lying on chest or side	Oral & Subcutaneous (consult your veterinarian)

Scours Treatment

Although antibiotics are commonly the first treatment cattlemen administer for scours, fluids are the most important therapy to correct dehydration. Fluid replacement may be either by mouth, injected subcutaneously (SQ), or injected intravenously (IV), depending on the degree of dehydration. A general rule is to “watch the calf, not the scours” to determine the appropriate course of action. See Table 2 for guidelines on fluid therapy.

Several excellent commercial oral electrolyte fluids are available for treating calf scours. Consult with the herd veterinarian for a recommendation on the most effective ones. As an alternative, a recipe for homemade calf scours oral fluid is:

- 1 can beef consume soup
- 1 package of jelly pectin (“Sure Gel”)
- 2 teaspoons “Lite Salt”
- 2 teaspoons baking soda (“Arm and Hammer”)
- Add warm water to make a 2 quart total.

The esophageal feeder can be used to administer oral fluids to a weak calf which does not suckle well (Figure 2).

Use only sterile electrolyte fluids for subcutaneous and intravenous injection. Administer them with sterile needles and equipment to avoid introducing other infectious agents. Consult the herd veterinarian for a source of these fluids. Without proper training, administering IV fluids is not recommended for the lay person.

In the past the common recommendation was to discontinue giving milk or milk replacer to scouring calves. However, the current recommendation is to continue administering whole milk or good quality milk replacer. This meets the calf’s needs for energy and protein and prevents weight loss. Feed scouring calves 2 quarts of oral electrolyte fluids daily, in between milk feedings or normal nursing of the cow. Do not mix oral elec-

trolyte fluids with milk. This has been associated with increased diarrhea and more weight loss.

As a rule of thumb, the scouring calf should receive 10% of its body weight in replacement fluids every day. A gallon of fluids weighs approximately 8 pounds. So an 80 pound calf should receive one gallon of fluids a day.

A common practice is to include a human anti-diarrheal liquid bismuth suspension, such as "Pepto-Bismol" in the oral electrolyte fluid. Some veterinarians report that this has decreased diarrhea and hastened the return to a more normal stool. In theory, at least, a bismuth suspension must be present during the original insult to the intestinal tract to be effective. If 1 to 2 ounces are added to oral electrolyte fluids, a bismuth suspension will do no harm and may help resolve the diarrhea.

The use of antibiotics in scouring calves is common, but not always essential. If the calf does not have fever, some veterinarians do not recommend using oral antibiotics. If the calf has fever and is depressed, however, there may be infection in other parts of the body. Use antibiotics in this case. In such cases, an injectable antibiotic is best. Consult with the herd veterinarian for an appropriate antibiotic to use. Other treatments might also be recommended, such as anti-inflammatory drugs.

Diagnosis

Investigate the cause of a scours problem with the help of the herd veterinarian. Examine dead calves with a post mortem or necropsy exam. Submit appropriate tissues to the veterinary diagnostic lab. Also, collect samples of diarrhea from live calves for microscopic examination and culture of causative organisms. See Extension circular ANR-717, "Diagnosing Disease Problems In Livestock."

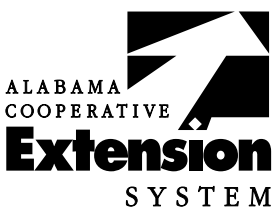
Vaccination

Vaccinations are available to increase the immunity of heifers and cows to scours-causing microor-

ganisms, and hence increase the quality of their colostrum. Vaccines are available for *E. coli*, rota and corona viruses, *Salmonella*, and *Clostridium perfringens* type C.

Farms which have had scours problems in the past commonly use a "shotgun" approach with vaccines. The effectiveness of this approach varies. Although vaccination helps in some herds, it is most effective when based on a definitive diagnosis of a particular problem for which a specific vaccine is available. Such farms will benefit more from improved management of replacement heifers and cows before and during calving, with emphasis on improved nutrition and calving environment.

As with all animal health problems, the head veterinarian is the best source of information about calf scours prevention, diagnosis, and treatment.



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