Scientific effort has paid dividends in eradicating or controlling many diseases, both human and animal. However, some diseases, such as calf scour, have yielded grudgingly to control measures. Eradication of this disease is not possible with present tools and knowledge. Nevertheless, losses from calf scour can be considerably reduced through applying the best means currently available for prevention and treatment of this disease complex.

"Scours" is a term commonly applied to a disease complex of calves and other young animals in which diarrhea is a prominent symptom. Afflicted animals usually show a great increase in fecal volume (up to 40 times the normal volume). Much of this increase is in the form of body fluids lost through the damaged gut lining. Loss of these body fluids (dehydration) often causes death. Some calves may die of pneumonia which is often concurrent with diarrhea. Dehydration and difficult breathing are often the most notable symptoms, with the calf at first showing a high body temperature followed by a drop in temperature and cold nose, ears and extremities. Eyes appear dull and sunken, and the animals either refuse feed or eat feebly. Less frequently, calves die suddenly with little or no diarrhea seen. It is thought this is due to absorbing bacterial toxins or bacteria into the blood through the damaged gut wall.

Several types of bacteria have been found associated with scour cases, and may be the primary cause in some cases; in other instances both bacteria and viruses may be involved. Apparently the causative organisms sometimes are present in the calf at or before birth and at other times they gain entrance during or shortly following birth.

One route of infection is by mouth, another is through contamination of the umbilical stump. Immersing the stump and the umbilical area in strong, fresh iodine immediately following birth may prevent entrance by this route. Clean calving stalls and sanitary feeding utensils will reduce contamination by mouth.

**STRESS AND DISEASE**

Stress relative to calf disease may be defined as the sum of all factors which tend to render the animal more vulnerable to disease. It includes exposure to drafts, extremes of temperature or frequent temperature changes, exposure to exhaust smoke or other things irritating to the lungs as well as excessive humidity and poor ventilation. Stress is also produced by overfeeding, starvation, erratic feed and rest schedules, low grade milk replacers, sudden changes in diet, excessive and rough handling, long periods of transportation, frequent changes of environment or routine, surgical procedures and vaccinations. Poor nutrition prior to birth is another type of stress.

The exposure of the young calf to disease organisms challenges the animal’s resistance apparatus. When resistance has been reduced by one or more stress factors, the calf is much more susceptible to introduced disease organisms or even to "opportunistic" germs already present in the animal's body (the latter will cause disease only when resistance is low). Stress then reduces the animal's resistance and disease germs try to overpower this resistance. A calf which has been stressed before, during or following birth and is born in dirty surroundings or fed from unsanitary utensils is more likely to die than if maintained under sanitary conditions. Literally millions of germs can reside on one square inch of an unsanitary wall or feeding utensil. The unsanitary environment adds the challenge (disease germs) faster than the calf can adapt, its resistance is overwhelmed, and the calf dies.

We might illustrate graphically eleven individual calves in a herd exposed to the same stress and challenge level.
Under the conditions depicted, calves #1, #3 and #8 have insufficient resistance to survive under the stress and challenge level of this herd. Slightly better conditions could have saved #1 and #8, while a little more stress or mismanagement could have resulted in the loss of calves #2 and #5. The goal for high survival rate is to reduce stress factors and keep challenge from disease organisms low. Since the advent of sulfa drugs and antibiotics, some stockmen have placed too much reliance on such drugs to eliminate the challenge organisms, only to find that some germ strains appear that are resistant to every medication used.

PREVENTIVE MEASURES

Prevention measures have two primary goals — keeping resistance high, and keeping stress and challenge factors low. These goals are inter-related, since stress reduces resistance. The stress factors already mentioned should be avoided or kept to a minimum.

Prenatal care of the dam determines to some extent the resistance and vigor of the calf at birth. Antibodies (one resistance mechanism of the newborn calf) are largely gained through early ingestion of colostrum. These antibodies are best absorbed when colostrum is consumed during the first few hours following birth as the first food received. Evidence indicates little antibody is absorbed after the first 24 hours of life or if non-colostrum food precedes colostrum. Some calves (about 10 per cent) do not absorb antibodies well, and these, as well as calves receiving no colostrum, will survive only under ideal conditions. Resistance in such calves may be improved by injections of bovine serum or of whole blood from their mothers.

The importance of clean surroundings and feeding utensils, feeding colostrum and immersing the umbilical stump in iodine as soon as possible after birth should not be forgotten.

Feeding errors during the first two weeks of life are often "the beginning of sorrows" in hand-fed calves. Initial overeating in calves left with the cow appears to have less serious consequences than with hand-fed calves. Overfeeding causes digestive upsets which may be difficult to correct. It is better to keep the calves a little on the "lean and hungry" side for the first two weeks of life by feeding from 0.6 to 0.8 pounds of milk or reconstituted milk replacer per 10 pounds of body weight. This can then be gradually increased. Survival rate is usually higher if whole milk is fed for two weeks, then high quality milk replacer fed for another two or three weeks. Read the ingredient tag on the milk replacer bag and avoid these containing proteins from plant sources until calves are at least a month old (older for poor-doing calves). Don't make abrupt changes in either the type or amount of feed; give them time to adjust. Feeding antibiotics during the first weeks of life appears to yield favorable results in some cases but fail completely in others. Medication and "shots" will not substitute for good management and sanitation. Excessive medication can cause harm.

Furnishing a good environment is also important to survival. The calf born into cold, damp, unsanitary or poorly ventilated surroundings is at a distinct disadvantage. Penning calves of various ages together can be a source of trouble. Ideally, calves would be housed separately during the first two or three weeks of life. Older calves may be immune carriers of scour-producing organisms. Crowding is another undesirable feature.

The continuous use of a facility permitting build up of disease organisms without opportunity to clean and disinfect may produce results similar to overcrowding. Some have found that combining a rest period for the calf-rearing facilities with cleaning and disinfection gives better results than either alone. This requires an excess of calf-rearing facilities if new groups of calves are continually brought in. Calving problems in some trouble-prone herds have been solved by calving in new or different facilities. Others have escaped trouble by shifting the calving season by a month or more and calving on pasture. Prevention measures must be adapted to the herd and circumstance.

Getting the calf off to a good start during the first hours of life will improve its chances to resist disease. If it is weak or the cow inattentive, rubbing the calf dry and getting it fed and into a warm dry place for a day or two may prevent a struggle with scours and pneumonia. Some report excellent
results where all winter-born calves are placed in a "warming pen" for 24 to 48 hours following birth.

Questions are frequently asked in regard to the efficacy of vaccines in preventing calf scours. Except for calf enterotoxemia, in which scours is seldom a prominent symptom, there is little evidence to indicate that vaccinating the pregnant cow with any presently available product will prevent calf scours. Some feel that certain bacterins administered to the calves shortly following birth have been beneficial in some herds; others see no benefit from such products. The local veterinarian is best qualified to give advice as to the success of such products in a particular area. From the theoretical viewpoint, usefulness of these products is doubtful since the young calf's ability to develop immunity is notably poor. Even if the calf could develop immunity, the time required to develop immunity spans the most critical period of his life, so the crises is largely past before immunity develops.

Research at Nebraska and elsewhere has shown that different types of viruses may be involved in calf scours. A live virus vaccine administered by mouth has been used experimentally. Testing has not been extensive enough to prove the value of this procedure as yet (1972).

TREATING CALF SCOURS

Some measures can be used both for prevention and for treatment. No one regime will be universally successful nor will any one drug always be the drug of choice. Each case presents particular problems.

Uncomplicated dietary scours (from overfeeding), if taken early, may be controlled by a prompt reduction in feed and perhaps adding raw eggs or a bland soothing agent to the reduced feed.

Transfusion of blood or serum may be indicated in cases where history indicates a deficiency of antibodies. This procedure may also be useful in dehydration if combined with large amounts of electrolytes. In some cases, food may be entirely withheld for 24 to 48 hours and replaced with injected electrolytes or a combination of injectable glucose solution, serum and electrolytes. In less severe cases a mixture consisting of 1 gallon of water, 2 ounces of baking soda, 500 cc of 50 per cent glucose and 1 or 2 teaspoons of electrolyte powder can be substituted for milk for up to five days. Such a mixture seems to be less irritating to the digestive tract than milk or milk substitutes, permitting faster healing and providing the liquid and energy most urgently needed. Oral or injectable vitamins may be a good addition to this temporary diet.

Antibiotics and sulfa drugs have proven useful in both treating and preventing scours in selected cases. Some types of scours respond best to one particular drug, some to another or to a combination, and some appear resistant to all drug therapy. This is presumably due either to the involvement of viruses which are insensitive to antibiotics or sulfa drugs or to resistant strains of bacteria. The local veterinarian is in the best position to recommend drug of choice in a particular area. For those herds where the response is poor, he may wish to secure bacterial cultures and test or have them tested for drug sensitivity. In general, three precautions should attend use of antibiotics in treating calf scours:

1. Select the drug most specific for the problem.
2. Use adequate dosage for a long enough time to do the job, but don't overdo it.
3. Discontinue before overmedication upsets the normal intestinal flora and permits take-over of yeasts or fungi or for other complications to develop.

Other adjuncts to treatment which may be useful in some cases include administering vitamins, especially vitamins A, D, E and sometimes the B complex, by mouth or injection. Anti-diarrheal agents such as carob flour or kapectate may also prove valuable as may astringents, adsorbents, or lime water. Some of these agents are contained in many calf scour formulas or boluses. Also consider that the damaged gut cannot absorb nutrients well and is losing both nutrients and energy as well as fluids. This suggests using any available means of conserving the dwindling energy supply. Energy is required to keep the calf warm, so furnishing a warm area, a heat lamp or a blanket should be standard procedure when caring for sick calves in cold weather.

Neither prevention nor treatment of calf scours is simple. It requires effort in sanitary measures, planning, proper facilities and often special evaluation of a particular problem or case in order to best apply measures of prevention or treatment. To keep calf scour losses to a minimum, each operator should formulate plans aimed at keeping individual resistance high and stress and challenge levels low under his particular circumstances. He may not win them all, but trouble will be less frequent and less severe by planning and following through with scour prevention and control measures.

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