



# Agriculture Notes

## Nutritional scours in milk-fed calves: causes and treatment

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*This Agriculture Note describes the causes of scours, the single most important cause of death in milk-fed calves. It also explores means of preventing and treating scours.*

### Introduction

Calf scours is the single most important cause of death in milk-fed calves. Even when calves survive, the increased labour requirements for their caring, together with veterinary and drug bills, make scours a costly problem for calf rearers. Furthermore, their potential productivity is likely to be decreased by setbacks in early life.

The causes of scours, particularly in calves under three weeks of age, are complex. There is usually no one single cause, with contributing factors being calf management, diet, the environment and the presence of pathogens. Prevention and early treatment with fluid replacement (electrolyte therapy) can avoid unnecessary use of antibiotics.

### What is scours

Calf scours is easily recognised. It is an increase in the frequency and quantity of faeces, which has a higher than normal water content. In some cases, blood and mucus may also be present. Whatever the cause of scours, farmers will see some or all of the following:

- bright yellow or white faeces
- depressed calves which are reluctant to feed or suck
- calves with sunken eyes and/or a temperature
- skin remaining peaked or tented when lifted, indicating dehydration
- weight loss and weakness
- if severe cases, calves will collapse, become comatose and die.

Scours can be classified into two types, nutritional and infectious. Nutritional scours is usually caused by stress to the calf due to a breakdown in management routines. Nutritional scours often progresses to an infectious scour, which is caused by a high population of pathogens.

The initial digestion of milk occurs in the abomasum (or fourth stomach) and this progresses further in the intestines. Scours can usually be traced back to a failure of adequate milk digestion in the abomasum.

Nutritional scours is simply the end-result of an oversupply of lactose in the intestines, caused by milk moving too rapidly out of the abomasum, so it cannot be broken down quickly enough. Pathogens use excess lactose as a nutrient source to increase in numbers. The rate of lactose digestion is then further reduced as a result of damage to the intestinal walls by these pathogens. This damage also causes body fluids to leak into the gut, thereby increasing the rate at which the calf dehydrates.

### Causes of nutritional scours

Scours can be traced back to 2 major causes, poor colostrum feeding management and stress.

One of the first effects of stress in calves is a reduction of acid secretion into the abomasum. This reduces both the ability of the clot to form, and digestion of milk protein.

Stress can result from a wide variety of causes. It could be due to inappropriate milk feeding programs (eg overfeeding or irregular feeding), sudden changes in the concentration of milk replacers, incorrect milk temperatures or a poor quality milk powder. Calves reared on milk replacers are more prone to scours than those reared on whole milk.

Environmental stress is also a common cause of scours, such as sudden changes in the weather (for calves run outdoors) or cold, damp, draughty or humid conditions inside calf sheds. Overcrowding in calf sheds can result in outbreaks of scours. Even changes in staff can lead to scours through different handling of calves or changes in the standards of hygiene. Combinations of any of the above stresses will greatly increase the likelihood of scours.

The duration of scours is largely under the control of the calf rearer. During their second week of life, calves are particularly susceptible. By careful observation, it is possible for experienced calf rearers to anticipate the onset of scours on the day before it occurs, after which milk feeding can be reduced, with the result that the calf recovers quickly.

The following signs of impending scours should be looked for:

- dry muzzle, thick mucus appearing from the nostrils
- very firm faeces
- refusal of milk
- a tendency to lie down
- a high body temperature (over 39.3°C).

Some farmers who routinely feed milk replacer have changed their formulation from 500 g of milk powder in 4 L water to 500 g powder in 2L of water. This reduction in fluid volume, to provide the same quantity of milk nutrients, has 2 beneficial effects. Firstly, it stimulates their appetite for concentrates at a younger age, because there is less distension in their abomasum after milk feeding. Secondly, it reduces scour problems, presumably because of reduced likelihood of undigested milk escaping into the intestine.

The stress of transporting calves from the sale yards or from one farm to another may be sufficient to lead to scours if calves are offered milk on arrival. Newly arrived calves should not be fed milk for at least 6 hours after transportation. A rest is more important than a feed and if they are obviously dehydrated, their first drink on arrival should be an electrolyte solution.

## Symptoms of scours

Scouring calves can lose up to 5 L fluid each day including minerals salts essential for normal body function. With most infectious scours, it is the dehydration and acidosis, not the infection, that kills the calf. In fact, most calves can naturally overcome infectious scours if their dehydration is quickly treated. For viral infections, this is the only treatment option.

The loss of electrolytes reduces the ability of body tissues to retain water, thus aggravating the dehydration. This highlights the importance of quick recognition and treatment of scouring calves with electrolyte therapy to replace their lost body fluids.

## Treating scours

To treat scours properly, its cause must be determined and eliminated. For example if resulting from poor shed design, a calf rearer may not be able to immediately rectify that problem, although temporary measures such as reducing draughts or decreasing calf numbers should be possible.

The top priority for treating scouring calves is to provide them with sufficient liquid and electrolytes to replace that lost in the faeces. The next priority is to supply additional sources of readily digestible energy, such as glucose (dextrose), but **not** sucrose. Finally, and only after diagnosis, should drugs be considered for treating the actual pathogens causing infectious scours.

There are a variety of electrolyte fluid replacers on the market, some of which contain a supply of energy, while others may contain chemicals to reduce the rate of passage of feed through the gut or to reduce the rate of loss of body fluids from the tissues into the intestines. Formulations incorporating antibacterials are only effective against scours caused by bacteria and/or protozoa, whereas many of the infectious scours are caused by viruses. Traditional thinking on treating scours was that milk feeding should cease, or at least be reduced. However, milk contains the best source of energy for calves, while some electrolyte treatments contain insufficient energy to maintain a sick calf. It is dangerous to withdraw milk for more than 24 to 48 hours as the intestinal wall will degenerate and lose its capacity to secrete enzymes that digest lactose. Many authorities now recommend withholding milk for no more than 24 hours, or even not at all.

Scouring calves should be isolated in a clean, dry and warm pen. Frequent small feeds of electrolytes or milk are better than fewer larger ones. Ideally, the daily volume of fluids required should be determined, based on the size of the calf, the degree of dehydration that needs to be corrected and the rate of continuing fluid loss via the faeces.

A decision must then be made as to how to administer the electrolytes. If the calf is able to suck, it can be fed by bucket or teat. If it is unable to drink, it should be fed by stomach tube. If it has collapsed and is in shock, it will require subcutaneous or intravenous therapy.

Home made treatments, used in the past to slow down the passage of feed through the gut (such as charcoal tablets, corn flour or even sawdust), can make the condition worse and should be avoided. Antibacterial compounds and antibiotics (eg calf scour tablets, drenches or injections) should be used only on recommendation of veterinarians and restricted to cases where *E. coli*, *Salmonella* or other bacteria have been diagnosed or are suspected. Prolonged use of antibiotics can lead to nutritional scours by killing off *Lactobacilli* in the abomasum and preventing development of rumen microflora.

Up to 90% of treated calves should be back to normal after two days of fluid therapy, while the remainder may require veterinary examination. This often includes faecal sampling to identify any infectious agent causing the scours. Recording the ages of scouring calves will assist veterinarians in diagnosing the causative pathogen.

When reintroducing milk after fluid therapy, it should be offered full strength. Milk should never be diluted with electrolyte solutions, as this can lead to poor milk clotting. If giving both electrolytes and milk, electrolytes should be given at least 30 minutes before a milk feed.

## Preventing calf scours

### Colostrum feeding

To ensure healthy and disease-resistant calves, the importance of good colostrum feeding management cannot be overemphasised. Up to 40% of calves do not absorb sufficient antibodies within the first 12 to 24 hours of life because of inadequate attention to their colostrum feeding. Such calves are more likely to succumb to infectious scours.

The quality of colostrum should be routinely monitored and calves not seen drinking must be fed colostrum within their first 6 hours of life. Even if calves voluntarily drink from their dam, they may not consume and absorb sufficient antibodies. Offering additional good quality colostrum, by teat or stomach tube, is the best way of giving calves a 'good start to life'. This is more important late in the calving season, as pathogen numbers build up in rearing areas because of the increasing numbers of calves present.

Feeding high quality colostrum for the first few days of life is beneficial. Even if some of these antibodies are not absorbed into the blood, they can still provide local protection in the intestines against infectious scours.

### Other preventive measures

Prevention of scours centres around good hygiene and minimising stress. Measures that can be taken include:

- Ensure calves are protected from extremes of climate, preferably in a shed.
- Carefully plan shed designs to avoid overcrowding.
- Minimise stresses associated with routine management practices, such as disbudding and castration.
- Maintain strict hygiene by cleaning and sterilising feeding utensils and facilities during milk rearing.
- Develop a routine milk feeding program, with as few people involved as possible.
- Wean early to minimise the period of milk feeding.
- Quickly respond to early symptoms of scours, isolate sick calves and address the cause.
- Minimise the use of antibiotics and then only under veterinary supervision.
- Keep records of treatment of sick calves to assist in veterinary diagnoses and for withholding periods if the calf is subsequently culled.

*The previous version of this note was published in February 2006.*

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