

rearing dairy calves

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Dairy farmers are involved in considerable work each year rearing their replacement calves. Some dairymen, particularly in manufacturing milk areas, get added income by rearing surplus dairy calves for beef. Over half the calves born on Australian dairy farms pass through the markets before they are one month old, and many of these animals are suitable for further rearing. Farmers without previous dairy experience have found that rearing dairy calves can be a profitable new enterprise. The calves can be finished as yearling dairy beef or can be reared as springing heifers for resale to dairymen. Details of such projects are discussed in Department of Agriculture Extension Bulletin 36.70 entitled "Dairy Calves for Beef".

It must be emphasised, however, that rearing calves to three months of age for sale as veal is unlikely to be profitable as this is a very specialised industry in which costs are high and intensive management is required. The demand for this type of animal is limited.

Colostrum — the first feed

It is essential that the calf takes its first few feeds from its mother. The first milk produced by the cow after calving is called colostrum, and is quite different in composition from normal cow's milk. Colostrum contains about five times as much protein as milk, and contains antibodies which, when given to the calf, protect it against disease in early life. The calf can only absorb these antibodies for the first two days of life, so it is recommended that the calf be left with its mother for this time, and then be fed colostrum taken from its mother twice-daily for the following two days.

Cows with distended udders should not be milked before calving as the antibodies in the milk may be removed and the calf will not be adequately protected against disease.

Purchased calves

With careful management it is possible to run profitable enterprises based on purchased calves. Calves can be purchased from saleyards, though health risks are involved as it is not usually known if the calves have received adequate colostrum. Furthermore, the antibodies in their mothers' colostrum may not protect them from diseases in their new environment.

A good knowledge of local markets is essential. The price of bull calves of the heavier breeds (Friesian, A.I.S.) now ranges between \$18-00 and \$30-00. Heifer calves can be up to \$10-00 more. Light breed calves (Jersey, Guernsey) will cost \$7-00 to \$15-00 each. It is possible to purchase the calves directly from farmers, and fewer health problems can be expected if this is done. But the time and cost of chasing after individual calves will usually be so great that it is easier to purchase a line of calves at a market.

Breed

If calves are being reared for dairy beef, special consideration must be given to breed. Friesians are the most popular, but large dairy calves or any dairy X beef crossbred calves can be purchased. These calves are usually about one week old in the saleyards and weigh 80 to 90 lb. A quick estimate of age can often be obtained by examining the navel cord. If it is soft and raw, the calf is only a day or two old. A calf with a dry cord may be a week old.



Feeding calves in a trial at the Northfield Research Centre.

Transport

Calves purchased at a market should be transported to the farmer's property as soon as possible. Expensive capital investment in transport is not required. A car-type utility towing a tandem axle trailer can be adapted to carry 50 to 60 calves from market. Suitable bedding is desirable in the vehicle. An industrial rubber mat laid over the tray will stop the calves sliding about, and it can be removed easily and hosed off after the calves are unloaded. Protection of young calves from rain and especially wind is desirable if the trip home is long.

Purchased calves brought home early in the afternoon can be fed milk or milk replacer on arrival, but at the Northfield Research Centre it has been found better not to give the first feed until the following morning.

Feeding

The major part of the work in rearing calves occurs during the feeding up to weaning stage. Initially, the calf is dependent on a liquid diet, but as it grows and the rumen begins to develop, calves are observed "chewing

the cud." Hay, pasture and grain can then make an increasing contribution to the nutrition of the animal. Several systems of feeding are available and farmers should select the one which best suits the operation of their farm.

Twice-daily feeding systems

Calves have traditionally been hand-reared by using a twice-daily feeding system. Either milk or a milk replacer can be used.

(i) Milk

The rates recommended for milk feeding of heavier breed calves are:

First week	3 pints per feed, given twice-daily
Second and third week	3½ pints per feed, given twice-daily
Fourth week to weaning	4 pints per feed, given twice-daily

Calves of lighter breeds, particularly if being fed milk high in butterfat, should be fed at least half a pint less than the above figures.

Overfeeding should be avoided in the first few weeks as it can lead to digestive upsets with consequent growth set-backs. When calves are four weeks old higher feeding rates can be used, but they may unnecessarily increase the cost of rearing.

(ii) Milk replacers

A reputable brand of milk powder based milk replacer is mixed at the rate of one pound of powder to each gallon of water. Some warm water is required for mixing so that it can be fed at approximately 105°F. Volumes required for heavier breed calves are:

First week	3 pints per feed, given twice-daily
Second and third week	3½ pints per feed, given twice-daily
Fourth week to weaning	4 pints per feed, given twice-daily

Calves of the lighter breeds should be fed at least half a pint less than the above figures, and care should be taken to avoid overfeeding in the first few weeks.

Once-daily feeding systems

Recent research at the Northfield Research Centre has shown that once-daily feeding can be used to greatly reduce the labour of hand rearing calves. Thirty-two Friesian calves purchased in early winter at the Murray Bridge saleyards were divided into two groups of similar bodyweight. The group fed once-daily averaged 175 lb. bodyweight when weaned at 10 weeks of age, while the twice-daily fed group, given the same amount of feed, averaged only 170 lb. bodyweight at 10 weeks. The only death was one of the twice-daily fed calves. When the trial was repeated in mid-summer with a second group of Friesian calves, the once-daily group were again heavier at weaning. In both trials, there was less scouring with the once-daily feeding. A third trial with Jersey calves again proved once-daily feeding to be satisfactory.

The feeding time should be regular each day, but the time can be selected to fit in with other farm routines. Purchased calves at Northfield are introduced to once-daily feeding as soon as they are brought home from the market.

The feeding rates recommended for once-daily feeding, based on Northfield trial results, are set out below:

(i) Milk

The amount of milk required depends on the level of butterfat in the milk being used. Daily volumes required for calves of the heavier breeds are:

Fat percentage of milk	3%	4%	5%
First week	5	4	3½ pints once daily
Second and third week	6	5	4½ pints once daily
Fourth week to weaning	7	6	5½ pints once daily

It is suggested that calves of lighter breeds be fed about half a pint less.

(ii) Milk replacers

A reputable brand of milk replacer is mixed at the rate of one and a half pounds to one gallon of water (this is a stronger concentration than is usually used for twice-daily feeding). It is fed at approximately 105°F. Volumes required for heavier breed calves are:

First week	4 pints once-daily
Second and third week	5 pints once-daily
Fourth week to weaning	6 pints once-daily

Again it is suggested that calves of the lighter breeds should be fed about half a pint less.

Washing machines are suitable for mixing 10 to 12 gallons of milk replacer, or 44 gallon drums fitted with agitators or gear pumps can be used. Some brands mix quite easily using a hand-plunger in a can. It is also possible to mix the milk replacer using a wire stirrer fitted to an electric drill. However, electric drills are not designed for use under wet conditions and their use for this purpose must be considered dangerous.

A large supply of hot water is essential for reconstituting the milk replacer and for washing the feeding and mixing equipment.

Grain-based milk substitute — not recommended

A number of milk substitutes made principally from finely crushed grains have also been marketed from time to time. These feeds are intended to be fed to young calves as a warm water gruel, and as a dry mix to older calves. Departmental investigations have shown that week-old calves cannot be raised on this diet. In an experiment in which eight calves were fed a proprietary gruel from six days of age, only one calf survived beyond the age of six weeks.



Equipment for rearing calves on milk replacers includes feeding buckets, small trolley, scales for weighing the powder, and a mixing device such as an old washing machine.



Bucket feeding is the simplest and most hygienic.

Feeding methods

It is essential to good management that all calves be individually fed. Calf feeding bails make this easier. They can be installed in a small feeding yard so that calves enter the area in batches from one end and leave by the other.

The feed can be measured with a dipper or pumped into plastic buckets. Many plastic buckets are now graduated sufficiently well for measuring feed volumes. A few extra cents for heavier gauge plastic buckets is money well spent. Calves can bunt splits into the cheapest types of plastic buckets. Metal buckets are not only expensive, but are much more laborious to use due to their greater weight.

Buckets or teats

Calves can be taught to drink from buckets or feed from individual teats. Experiments at Northfield have shown that there is no nutritional advantage in using teats, and they require additional time for washing. Calves drink very slowly from teats, but the holes in the teats can be enlarged to one quarter of an inch diameter to allow an increased drinking rate without ill effect.

Although some effort is needed in teaching calves to drink from buckets, it has been found that many calves purchased in markets have already been taught to drink from buckets, and nearly as much effort is needed to teach them to use teats. Older calves may eventually bypass the teat and drink straight out of the bucket anyway.

Washing

Feeding buckets and any feed mixing equipment should be carefully washed with a detergent and then rinsed. Hypochlorite can be added to the rinsing water to improve hygiene. If teats are used, they should be left soaking in an iodophor solution between feeds.

Supplementary feeding

(i) Pasture

It is preferable for calves to have access to good quality pasture within two or three weeks of birth. However, South Australian pastures may be too mature in summer to provide adequate supplementary feed to encourage rumen development, and in early winter, the pastures may be too short to allow much grazing. At these times, hay must be fed.



Calves are weighed regularly in feeding trials.

(ii) Hay

Hay fed to calves should be early cut pasture or lucerne hay. This type of hay will have high digestibility and protein values and will be eaten much more readily than more mature hay. Cereal hay is generally less suitable for young calves and should not be used.

(iii) Grain

Cracked or crushed grain can be introduced into the diet of calves from about four weeks of age. If only low protein hay is being fed,

meatmeal can be added to the grain to raise the protein level of the supplementary feeding diet. Finely hammermilled grain should be avoided.

(iv) Water

An adequate supply of cool fresh water should be available to the calves at all times.

Weaning

Conventionally fed calves can be fed milk or milk replacer for 10 to 12 weeks and given access to some grain prior to weaning. Abrupt methods of weaning are quite satisfactory and there is no advantage in tapering off milk feeding over several days.

Early weaned calves are given access to a high energy "starter" ration containing about 20 per cent crude protein about one week before weaning. Trials at Northfield have shown a slight set back in calves weaned at four weeks of age, but no set back if weaned at six weeks of age compared to conventionally fed calves. No differences could be seen among the calves by the time they were all 12 weeks old.

A ration containing 16 per cent crude protein can be used from about 10 to 12 weeks of age.



Calves should be given access to good quality early cut pasture or lucerne hay by the time they are two to three weeks old. Hay racks reduce wastage.

Costs

The major costs of rearing calves are the feed costs incurred before weaning. Although spectacular growth rates can be obtained if very high volumes of milk or milk replacer are fed, this type of feeding is not necessary. The aim should be to produce a healthy well-grown calf by three months of age that will use inexpensive paddock feed to grow into a strong yearling animal.

The feed costs for rearing calves of the heavier breeds to 12 weeks of age are given in Table 1. The total cost for calves of the lighter breeds will be \$1 to \$2 less than the figures given for the heavier breeds.

Table 1: Feed cost of rearing calves of heavier breeds to 12 weeks of age

	Milk or milk replacer	Pellets	Hay	Total
Weaning at 12 weeks	\$	\$	\$	\$
City milk*	19	—	4	23
Mfr. milk**	12	—	4	16
Milk replacer	15	—	4	19
Weaning at 6 weeks				
City milk*	9	5	2	16
Mfr. milk**	5	5	2	12
Milk replacer	7	5	2	14
Weaning at 4 weeks				
City milk*	6	6	2	14
Mfr. milk**	3	6	2	11
Milk replacer	5	6	2	13

* Based on the equalised price for milk sold in the Adelaide Whole Milk Zone.

** Based on the price paid for milk used for manufacturing purposes outside the Adelaide Whole Milk Zone.

Losses

In a well run enterprise losses will amount to about two per cent of the calves born or purchased. Losses of more than five per cent suggest that management techniques should be examined to see if improvements can be made. If once-daily feeding is practised, the calves may only be observed once-daily, so extra care is needed in watching for disease. The following diseases may be encountered, and if serious, veterinary advice should be sought:

1. Scouring

Most problems will occur in the second and third week after arrival. To treat scours, re-

move all feed and water for 24 hours, then feed half-ration daily until the faeces are normal. Drugs can be used where calves continue to scour for several days, but most cases of scouring can be controlled in the early stages without the use of these. The scouring calves can be grouped for ease of management. Trials at Northfield have shown no advantage in the use of proprietary electrolyte or salt solutions in the treatment of scours. The use of materials to "stop-up" the intestinal tract should also be avoided.

2. Joint-ill

This is a swelling of the joints usually as a result of a navel infection. Preventive therapy involves dipping the umbilical cord of the newly purchased calf in an iodine solution.

3. Worms

In a continuous calf rearing enterprise the worm population can increase to a level where calf growth is retarded and drenching may become necessary.

4. Lice

Unthriftiness in calves can be caused by irritation from lice, which can provoke the animal to rub off patches of hair. For lice control, there are efficient sprays, or pour-on solutions commercially available.

5. Pink eye

Pink eye is an infection in the eye which causes a discharge of tears and inflammation. The result is usually temporary blindness, but in some cases permanent blindness can occur. This disease can be easily treated with antibiotics. Its control is discussed in Department of Agriculture Extension Bulletin 18.70 entitled "Pink eye in Cattle".

6. Other diseases

Special problem diseases can be encountered in particular areas. For example, if leptospirosis is known to occur in the area where the calves are purchased, vaccination is the easiest method of protection. If starting a new enterprise, it may be wise to consult your local veterinarian first.

Shelter

For the first few weeks calves should have access to shelter either in the form of a shed or a natural wind break. The use of permanent housing where disease problems can build up should be avoided, as labour consuming cleaning programmes become necessary with this type of housing.

Portable shelter sheds which can be towed with a tractor from one paddock to another are a good idea. A shed constructed on skids, enclosed on three sides, about 10 feet long, five feet wide and four feet high makes a useful shelter for a small group of calves. Such sheds can be cleaned with a hose between batches of calves.

The rotation of sheds, yards and paddocks is essential to prevent fouling and to lessen the build-up of parasites and diseases.

Isolation of different groups

It is useful to divide large numbers of calves into separate groups to reduce the possibility of cross-infection between the calves. This precaution is particularly desirable where batches of calves, purchased from different sources, are being brought onto a property.



Identification of calves is essential to good management. Plastic ear tags are useful for young calves and can be easily applied.



Healthy calves weaned from a successful once-daily feeding programme.

Dehorning

Dehorning can be conveniently carried out with an electric dehorning iron or with an antimony trichloride – collodion paste before the calves reach three weeks of age. Details are set out in Department of Agriculture Extension Bulletin 1.71, entitled "Calf dehorning is Successful".

Castration

Castration of bull calves will involve a set back in weight gains whenever it is done, but for ease of handling calves, it is best carried out by six weeks of age. Details are given in Department of Agriculture Leaflet No. 3891, entitled "Castrating and Marking of Cattle".

Identification

For the best management of calves, particularly where large numbers are involved, it is essential to be able to identify the individual animals.

If the animals are to be held on the property for a long period, a permanent form of identification is required as soon after birth as possible. For temporary identification until the permanent mark can be applied, plastic ear tags are convenient.

Ear tattooing and freeze-branding are recommended for permanent identification. Calves from dairy cows under herd test must be identified according to herd testing regulations. Tattooing can be done for dairymen by the

herd tester. Freeze branding can be done by the farmer or can be arranged through a freeze-branding contractor.

For identification of any special group for a couple of weeks, cattle paint can be used. Methods of identification are discussed in detail in Department of Agriculture Extension Bulletin 8.71, entitled "Cattle identification".

Calf numbers

Some individual South Australian farmers are rearing 500 calves annually, while several interstate operators are rearing over 4,000 each year by employing one or two men.

Summary

The essential requirements for successful calf rearing are —

1. Breeding or purchase of a suitable type of calf.
2. Good pre-weaning calf rearing techniques.
3. The availability of high quality pasture after weaning.
4. A sound knowledge of the current market situation where buying and selling calves is practised.