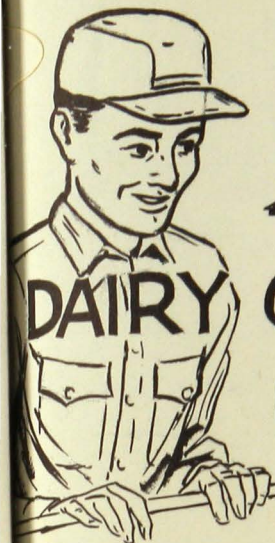


# Feeding and Managing DAIRY CALVES AND HEIFERS

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CULTURAL EXTENSION SERVICE U. S. DEPARTMENT OF AGRICULTURE



# **Feeding and Managing Dairy Calves and Heifers**

## **FOREWORD**

**M**INNESOTA has about a 20-percent mortality rate in its dairy calf and heifer herd. Further losses occur because underfed, poorly developed heifers cannot fully express their inherited ability for milk production.

Death losses can be reduced considerably through proper care and feeding. Healthy, thrifty, well-grown heifers should start to repay their rearing costs by entering the milking herd at 23 to 26 months of age.

Conditions vary from farm to farm. But an understanding of the basic needs of the growing calf is essential to any calf-raising plan. This bulletin has been prepared as a guide in the feeding and management of dairy calves and heifers.

**C. L. Wilcox**

**J. B. Williams**

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## Calving Quarters

**Nature's plan:** The maternity pen that nature provided was usually a grassy, bushy, sheltered area free from bacterial organisms harmful to the newborn calf. Man has changed this to a maternity pen sometimes contaminated with many disease organisms that infect the calf.

Pasture calving is still often desirable in areas that are not heavily used by livestock. But for the most part maternity quarters for dairy cattle will either be in or very close to the barn.

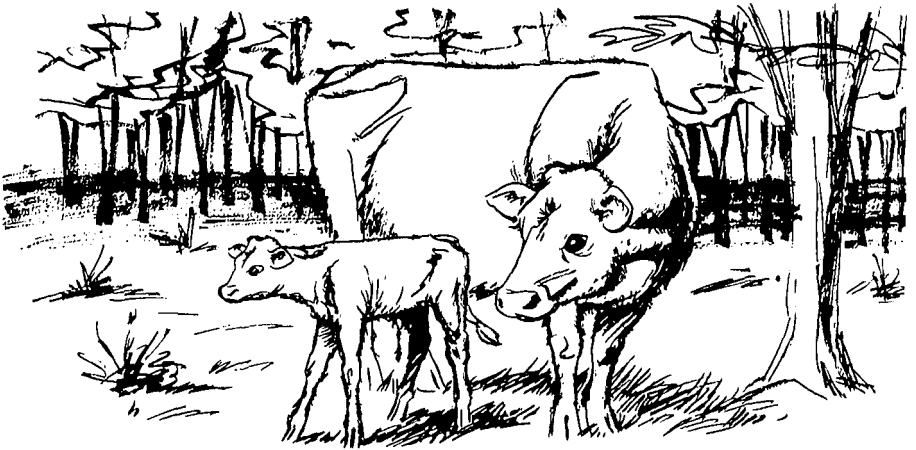
**The box stall:** A well-bedded box stall is desirable for maternity use. The stall should be large enough to allow a cow freedom of movement. It should be clean, well bedded, and well lighted, with a good supply of fresh air, but free from drafts.

Provide one maternity box stall for each 15 to 20 cows. When a box stall is not available, provide a shel-

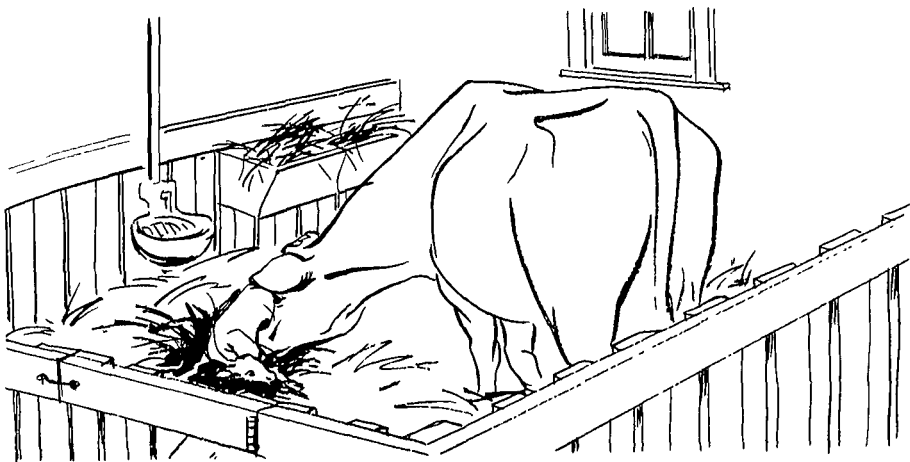
tered area that meets the above requirements as nearly as possible. Clean and disinfect the stall after each calving.

**At birth:** Keep a close watch on cows that are near calving. The udder of the cow should be clipped, washed, and disinfected before she is placed in the box stall. Be prepared to assist cows that have difficulty, and do not hesitate to call your veterinarian when his services are needed.

Under normal conditions a cow licks her calf dry and the calf nurses within 1 to 2 hours after birth. During cold weather or when the cow or calf is disabled, dry the calf with clean sacks and help it to nurse. Separate the cow and calf about 24 to 36 hours after birth. Problems which arise due to maternal anxiety and nervousness are fewer following early separation.



Nature's maternity pen usually was a grassy, bushy, sheltered area.



Usually a cow licks her calf dry and the calf nurses in an hour or two.

## Feeding the Dairy Calf

**Colostrum:** Calves should receive colostrum (first milk) for the first 4 days of life. Surplus colostrum may be mixed with other milk and fed to older calves, or it may be frozen and stored for later use.

Colostrum is very rich in protein, fat, vitamin A, and minerals. It is slightly laxative to aid the newborn's first digestive functions, and it furnishes antibodies which help protect the newborn calf from many bacterial infections.

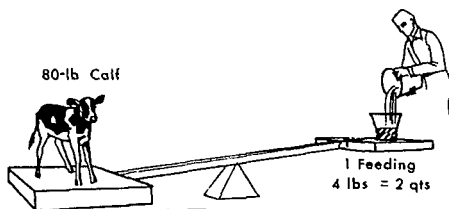
Surplus colostrum may be frozen and stored in 1-quart paper or plastic milk cartons for future use. It is a good idea to keep a couple of gallons of frozen colostrum on hand for orphaned calves. Ordinary home freezers give satisfactory storage.

**Feeding rates:** Limit calves to about 10 percent of their body weight in whole milk each day in two equal feedings.

Feed milk or milk replacer at a

uniform temperature of 95 to 100 degrees; feed about the same time each morning and evening. Feed small or weak calves their daily allowance in three feedings when practical.

**Whole milk:** Provide whole milk for calves the first 7 to 10 days. Whether whole milk is fed beyond 10 days will depend upon its market value; a good milk replacer may be more economical.



Feeding rate for whole milk is 10 percent of body weight per day.

Calves require 8 to 10 pounds of whole milk to make 1 pound of body weight gain. The cost of producing veal can be calculated by comparing the price of veal with the price per pound of milk.

**Milk replacer:** Many dairy calves are raised on milk replacer diets. Most replacers contain a high proportion of milk products and supply adequate early nutrition to young calves. Follow feeding directions supplied with the milk replacer. Make the change from whole milk to milk replacer gradually over a period of 3 to 4 days.

**Early weaning:** Calves that are doing well can be weaned from liquid feeding at 28 to 40 days of age. Early weaning requires that the calf be eating a calf starter before liquid feeding is discontinued. Calf starter may be fed in meal or pellet form,

but must be fortified with minerals and vitamins A and D. In addition to the starter a small quantity of leafy hay should be provided daily.

By weaning time a calf should be chewing its cud consistently. For all practical purposes its digestive system is then functioning as that of an adult animal and there is bacterial action in its rumen. Most calves chew their cud by the time they are 3 weeks of age and all healthy calves should be chewing their cud at 5 weeks.

An adequate supply of good quality hay, grain, and calf starter prevents the potbellied condition seen in many calves which usually indicates a marginal state of nutrition.

**Grain rations:** Calves fed limited amounts of milk or milk replacer need a grain mixture containing 14 to 16 percent crude protein. Calves prefer rolled or crushed grain to ground grain.

**Table 1. Grain mixtures to use with milk or milk replacer**

Component	Ration 1	Ration 2	Ration 3
	pounds		
Corn, coarse, ground, shelled No. 2 .....	40	60	60
Oats, ground, crushed, or rolled .....	30	15	10
Wheat bran .....	20	15	10
Soybean oil meal (44 percent) .....	10	10	10
Dicalcium phosphate .....	1	1	1
Trace mineralized salt .....	1	1	1
Linseed meal (36 percent) .....	.....	.....	10
	units		
Vitamin A* .....	200,000	200,000	200,000
Vitamin D* .....	50,000	50,000	50,000

\* Vitamin A and D need not be added to the grain mix if calves receive milk replacer which supplies 2,000 units of vitamin A and 500 units of vitamin D per day.

Either of the three rations in table 1 is suitable for young calves. One ration may be preferred over another because of availability and cost of feedstuffs.

The amount of grain or hay to feed depends upon the condition of the calf and the rate of gain desired. Growth should be continuous. Healthy calves should gain  $\frac{3}{4}$  to 1 pound of body weight per day for the first 30 days and 1 to  $1\frac{1}{2}$  pounds per day thereafter.

Rate of growth may be checked by taking heart girth measurements and using conversion data in table 3.

Growth rate should be sufficient so that heifers can be bred at 14 to 16 months of age. With underdeveloped heifers weight is a better guide than age for time of breeding.

Feed calves and heifers all of the good quality hay they will consume. As a calf's digestive tract develops he can satisfy more of his nutrient needs from forages.

Corn silage and hay silage are good feeds for calves and heifers. Calves can be fed 3 to 4 pounds of silage daily beginning at about 4 to

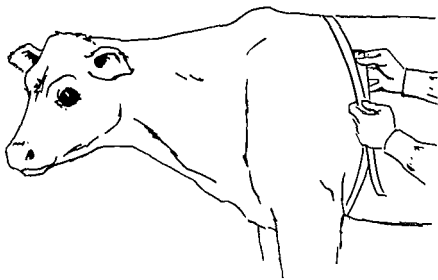
5 months of age.

Young calves may utilize some pasture if they also receive their regular allowance of milk or milk replacer, 1 to 2 pounds of grain mix, and all of the good hay they will consume each day. Otherwise keep calves off pasture until they reach 6 to 8 months of age. Too often calves are turned to pasture in the spring and forgotten until fall.

**Vitamins and minerals:** Calf rations adequate in energy and protein usually contain plenty of vitamins and minerals. Under normal conditions vitamins A and D are the only vitamins that need be considered in feeding dairy calves. Other needed vitamins usually are present in adequate supply under practical feeding conditions.

The addition of 200,000 units of vitamin A and 50,000 units of vitamin D per 100 pounds of the rations in table 1 should be more than adequate under most conditions, especially if good quality alfalfa hay is available. Two to three pounds of good leafy alfalfa hay will supply the growing calf with sufficient vitamin A and D. Most commercial milk replacers are fortified with these vitamins.

In most areas of Minnesota, common salt is the only mineral needed in calf rations. However, trace mineralized salt supplied in the grain mix at 1 pound to 100 pounds of grain mix and also fed free choice to calves 1 month of age and older will guard against the possibility of rare mineral deficiencies.



Take heart girth measurements with a snug tape in this position.

**Antibiotics:** Feeding an antibiotic helps to reduce digestive disorder and increase the feed consumption of baby calves. However, there appears to be no advantage in feeding antibiotics beyond 2 to 3 months of age.

Aureomycin and terramycin are the most widely used antibiotics for calves. The suggested dosage is 20 to 30 milligrams daily per 100 pounds of body weight, added to the milk or milk replacer. Most commercial milk replacers contain antibiotics.

**Eight months to freshening:** Nutritive needs of older heifers are easily met. At 8 to 10 months of age thrifty heifers in good condition

can meet their feed requirements when fed all the good silage and hay they will eat. Poor quality hay should be supplemented with grain. Extra grain should be fed 6 to 8 weeks before freshening to prepare the heifer for milk production. See Extension Bulletin No. 218, "Feeding the Dairy Herd."

**Don't overfeed growing heifers:** Overfed heifers tend to deposit fatty tissue in areas of the udder where milk-secreting tissue is normally found. This usually results in lower production. Overfeeding is also undesirable because of its greater cost.

Table 2 indicates a general feeding program from birth to time of calving.

**Table 2. Feeding plan**

Feedstuff	Age in months					
	0-1	1-2	2-8	8-15	15-22	22-24
Milk or milk replacer	→	→				
Calf starter	→	→				
Hay	→	→	→	→	→	→
Water		→	→	→	→	→
Herd mix			→			→
Silage			→	→	→	→
Pasture				→	→	→
Green chop				→	→	→



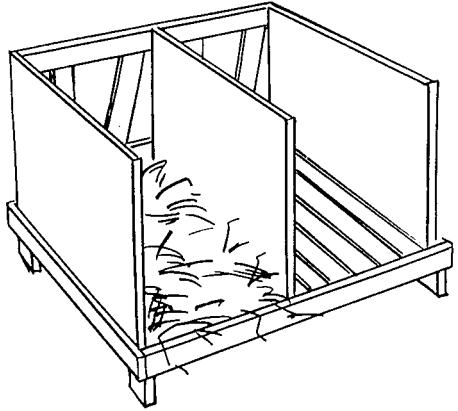
## Housing

Most calf barns are kept too warm and frequently lack fresh air; winter barn temperatures should not exceed 50° F. Newborn calves do quite well in subzero temperatures if their quarters are dry and draft free.

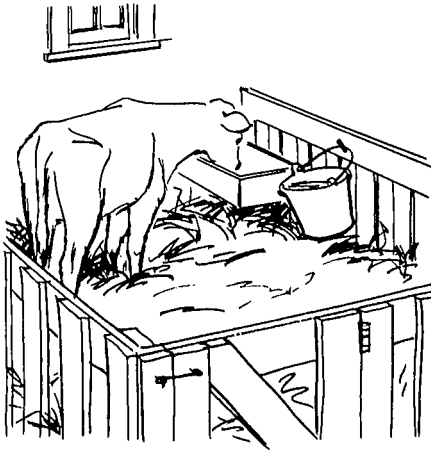
**Individual pens:** The individual calf pen should contain about 20 to 25 square feet. Plywood panels make satisfactory walls for calf pens but are difficult to keep clean. Heavy 3-inch wire mesh makes excellent dividers and allows an even distribution of air. It matters little whether the dividing wall between pens is solid or open because most calf diseases are airborne.

Provide the calf pen with a hay rack, a grain box, and a supply of fresh water. Arrange feeding and watering facilities to prevent contamination.

Dirt floors are acceptable for calf pens using deep litter but must be bedded daily. Scrape and disinfect pen walls when the calf is removed and keep each pen vacant for several days before the next calf enters. Add a generous supply of new bedding and let the litter continue to build up. Fermentation of the manure pack provides a warm bed during cold weather.



Tie stalls for dairy calves should be at least 2½ by 4 feet.



An individual calf pen should contain 20 to 25 square feet of space.

**Tie stalls:** Tie stalls are used successfully in calf raising. The stall should be at least 2½ by 4 feet. A false floor may be constructed of slatted 1- by 4-inch boards high enough above the floor for easy cleaning. Use 2 to 3 inches of bedding to prevent drafts from underneath. Lime or other disinfectant on the floor will help control flies and odors. If a false floor is not used, change bedding frequently to keep the tie stall clean.

**Group pens:** Group pens are not recommended before weaning. If group pens must be used, tie or stanchion calves during feeding. Keep calves tied until the urge to suckle has passed. Suckling may cause misshapen udders and may lead to frozen ears during cold weather.

Weaned calves of similar size and appetite may be housed in groups. Group pens should provide at least 30 to 40 square feet per animal.

The only housing needed for heifers 8 months of age and older is an open-front shed with clean, dry bedding. Feeders and waterers

should be outside the bedded area. Calf quarters need not be elaborate. Some dairymen have converted other buildings into satisfactory calf housing. Others have constructed low-cost calf barns near the main barn. (See M-130 "A Separate Barn for Dairy Calves," available from your county agent.)

Usually it is best not to house calves with the milking herd. Too often the calf pen is found in the darkest, dampest part of the barn. Regardless of the type of housing, calves must be kept clean, dry, and free from drafts.

## Diseases

**Calves are most susceptible to disease** the first 3 to 4 weeks of life. Preventive measures are, of course, preferable to treatment. However, disease outbreaks may occur even under the best of conditions.

Symptoms and suggested methods of treating some common calf ailments are discussed below. This is in no way intended to take the place of competent veterinary service.

**Calf scours:** Scours include all conditions in which there are frequent loose bowel evacuations. They may be caused by infectious bacteria and other micro-organisms and by digestive disturbances arising from overfeeding, irregular feeding, and feeding from dirty utensils. Damp, drafty quarters are often predisposing factors.

Infectious scours, often called white scours, are most severe and

most difficult to treat. They usually strike within hours after birth and are often fatal. The first symptom is a watery, light-colored, foul-smelling discharge from the bowels. Prevention is extremely important in controlling infectious scours. There is no really effective treatment after the first symptoms are noticed.

Common scours caused by digestive upsets can often be controlled with sulfonamide and antibiotics given on advice of a veterinarian.

When scours strike, replace one-half of the liquid feed with warm water. Correct any faults in feeding regularity and make certain the feeding utensils and quarters are clean. In prolonged outbreaks it may be necessary to thoroughly clean and disinfect maternity and calf quarters and let them stand idle for a few days.

More calves are lost from scours

than from any other calthood disease. New methods of treatment and control are continually being developed and tested. A competent veterinarian is in the best possible position to help you in the prevention and control of this disease.

**Pneumonia:** Pneumonia is caused by bacteria and viruses. It often occurs as a secondary disease when calves have been weakened from scours or other stress factors. Damp, drafty, or poorly ventilated quarters are predisposing factors. Calves with pneumonia usually breathe rapidly, cough, have a fever, and show a discharge from the eyes and nostrils. Penicillin, dihydrostreptomycin, and quick-acting sulfas are helps for clinical treatment. Call your veterinarian at the first sign of pneumonia.

**External parasites:** Lice and grubs irritate cattle and cause them to rub and scratch. A number of good insecticide powders and sprays are effective in control. A few minutes spent inspecting and treating calves for external parasites will go a long way toward insuring their comfort and health.

**Internal parasites:** Several kinds of stomach worms and lungworms infect calves. Infected calves may cough, scour, develop rough hair coats, and grow poorly. If internal parasites are suspected, follow your veterinarian's advice in treatment.

Internal parasites are passed to the calf through eggs. Rotating pastures and keeping pens and corrals clean are effective means of control.

**Ringworm:** Ringworm is caused by a fungus which attacks the skin and leaves scabby, crustlike circular areas on the head, neck, shoulders, and rump of cattle. Scrub infected areas with soap and water and treat with tincture of iodine. Paint infected areas with iodine every few days until they are healed. Your veterinarian may suggest other methods of treatment.

The fungus which causes ringworm may be spread by combs, brushes, halters, and other equipment. Cleaning and disinfecting equipment will aid in controlling the disease.

**Warts:** In most cases, warts which appear on the head and neck of cattle will gradually disappear. However, in some cases they may become progressively worse. Warts may be controlled by clipping and treating with iodine. Heavy infestations may require surgical removal. A vaccine against warts is available through your veterinarian.

**Brucellosis:** The incidence of brucellosis in the United States has been greatly reduced; Minnesota has achieved modified brucellosis-free status. Until the disease is eliminated in all herds it is advisable to vaccinate calves for protection against brucellosis when they are between 4 and 8 months of age.

A dairyman can do a great deal to control disease by using good management practices. With experience he can apply simple treatments effective in controlling the more common diseases. However, in times

of doubt or in case of severe outbreaks he should call his veterinarian. The veterinarian's fee is usually small compared to the loss that

may be incurred through disease outbreaks. The service and advice of a competent veterinarian are invaluable in the prevention of disease.

## Management Suggestions

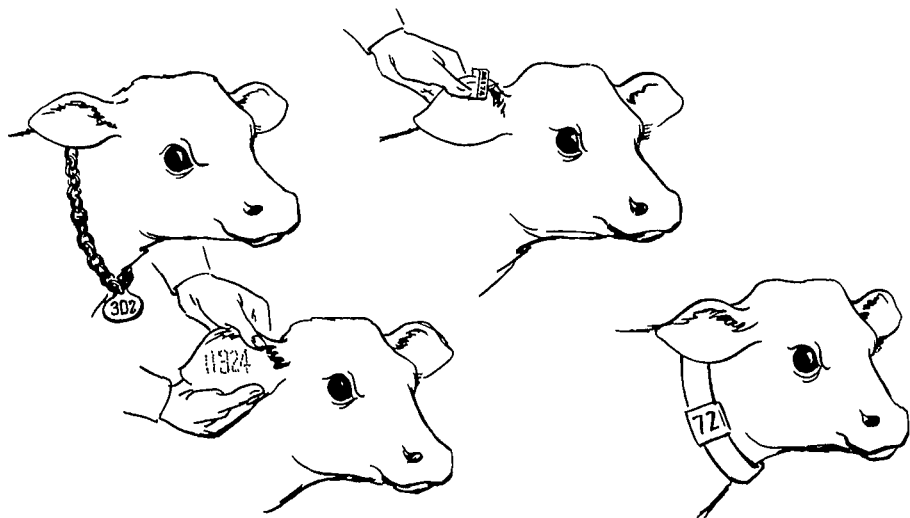
**Identification:** Mark each calf for identification when it is separated from its mother. Record this information in a permanent herdbook. Methods of identification include neckstraps, neckchains, ear tattoos, cartags, photos, branding, and color marking sketches. Two or more means of identification are worthwhile; animals sometimes lose neckstraps and cartags. Sketches and pictures are unsuitable for solid colored breeds.

**Dehorning:** Electrical or chemical dehorning may be done within the first 4 weeks after birth. The electri-

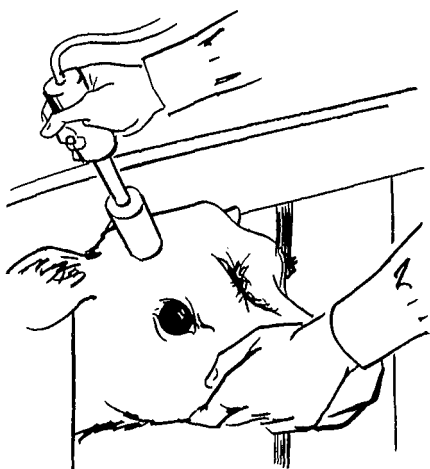
cal dehorner burns the skin around the horn button and the tender cells of the newly developing horn. By following directions and after some experience, small calves can be dehorned easily with this method.

Various caustic substances are on the market in liquid, paste, or stick form. Hair around the horn is clipped and the caustic material applied to the horn button. A ring of grease or vaseline around the horn helps to prevent the chemical from spreading to other parts of the head.

**Feeding equipment:** Small calves can be encouraged to consume grain

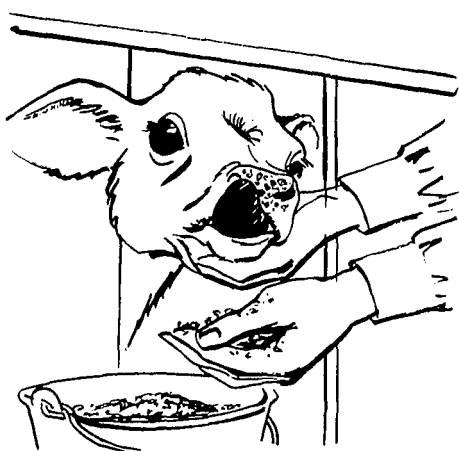


Neckchains, ear tags, tattoos, and neckstraps are used for identification.



Electrical dehorning is effective when done within the first 4 weeks.

more readily when the milk is fed in a pail suspended in or over the grain feeder. A good combination to use is a 10-quart pail for grain feeding and a 6- to 8-quart pail for milk feeding. Place the milk feeding pail inside the grain pail while feeding milk or milk replacer. Rub some dry grain on the calf's muzzle after feeding

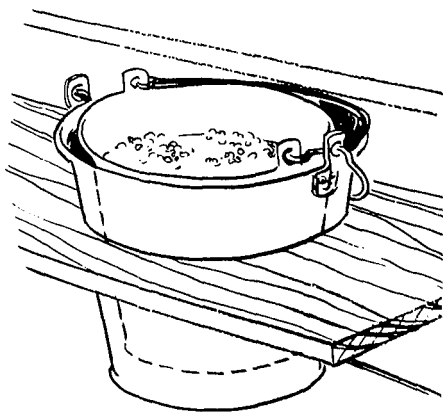


Rub dry grain on the calf's muzzle to encourage him to eat grain.

milk and at other times to encourage him to eat grain.

A used teat cup liner fitted over a pop bottle is a useful device for feeding or treating sick or disabled calves. Both bottle and liner must be clean.

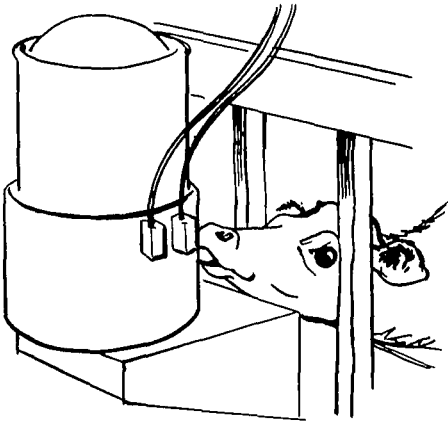
Nipple pails or other nipple devices are also satisfactory for liquid



Use a 10-quart pail for feeding grain; a 6- to 8-quart pail for milk.



This device is useful for treating sick or disabled calves.



Automatic dispensers for whole or reconstituted milk are available.

feeding but are more difficult to keep sanitary than an open top pail.

Automatic dispensing devices for whole milk or reconstituted milk are available; they should not be used for calves under 10 days of age. Small calves tend to overfeed and nutritional scours usually result; 10- to 14-day-old calves seem to adjust to frequent feedings satisfactorily. Good sanitation and management are more important than the particular device used for feeding liquids.

Occasionally a dairyman may run into calf raising problems which

nothing seems to help. In these cases the use of a nurse cow may be desirable.

**Cud inoculation:** There appears to be no special benefit from seeding the digestive tract of a calf with a cud taken from an older animal. The common micro-organisms necessary for rumination are normally supplied by feeds, bedding, feeding utensils, and by contact with other animals. Cud inoculation may benefit some slow-growing animals and animals that have had serious illness.

**Consider size when breeding heifers:** Heifers should be bred to come in production as early as possible—but not so early that they may have serious problems in calving. Vigorous, thrifty, well-grown heifers can be bred at 14 to 16 months of age. Heifers held back by poor feed or heifers that are small for their age should be bred according to weight. Breed Holstein and Brown Swiss heifers when they reach 750 to 800 pounds, Ayrshires at 600 to 650 pounds, Guernseys at 550 to 600 pounds, and Jersey heifers at 500 to 550 pounds. See table 3.

**Table 3. Normal heart girth measurement and weight of calves and heifers during the growing period\***

Age in months	Holstein		Ayrshire		Guernsey		Jersey	
	inches	pounds	inches	pounds	inches	pounds	inches	pounds
Birth .....	31	96	29½	72	29	66	24½	56
1 .....	33½	118	32	98	31½	90	29½	72
2 .....	37	161	35½	132	34½	122	32½	102
3 .....	40¼	213	38¾	179	38	164	32¼	138
4 .....	43½	272	42¾	236	41¼	217	38¼	181
5 .....	47	335	45½	291	44¼	265	41½	228
6 .....	50	396	48¼	340	47	304	44½	277
7 .....	52½	455	51¼	408	49¾	362	47¼	325
8 .....	54¾	508	53	447	51¾	410	49¾	369
9 .....	57	559	55	485	53¾	448	51¾	409
10 .....	58¾	609	57	526	55	486	53¼	446
11 .....	60½	658	58	563	56¾	521	55	481
12 .....	62½	714	59	583	58¼	549	56½	520
13 .....	63¼	740	60¾	630	59¼	587	57½	540
14 .....	64¼	774	62	666	60½	615	58½	565
15 .....	65¼	805	63	703	61¾	640	59	585
16 .....	66¼	841	64	731	62½	674	59¾	611
17 .....	67¼	874	65¼	758	63½	696	60½	635
18 .....	68½	912	66	781	65	727	61½	660
19 .....	69¼	946	66½	813	65½	752	62½	687
20 .....	70½	985	67½	841	66¼	780	63	712
21 .....	71½	1,025	68½	885	67½	816	64	740

\* Body weights for Holsteins and Jerseys from USDA Technical Bulletins 1098 and 1099. Heart girth measurements for these weights taken from Research Bulletin 194 (1960), Nebraska Agricultural Experiment Station. Weights and heart girth measurements for Ayrshires and Guernseys calculated from data furnished by professor H. P. Davis, University of Nebraska.

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