DAIRY BEEF

PRODUCING MEAT FROM DAIRY ANIMALS

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DAIRY-BEEF

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DAIRY BULL CALVES account for over 42 percent of the calves born in Michigan. In recent years this has amounted to approximately 325,000 dairy bull calves annually!

With the exception of a few animals used as herd sires these bull calves are a by-product of the milking herd. They present the dairyman with a problem and with an opportunity:

The problem is deciding how best to dispose of the calves.

The opportunity lies in turning this by-product into a profitable part of the overall dairy herd operation.

Dairymen are in a favorable position to take advantage of current trends in the American meat market. Consumers are showing a definite preference for beef over other types of meat. Beef consumption has increased from 56 pounds per capita in 1951 to 91 pounds per capita in 1963. In addition, consumer preference for beef has moved towards a high lean-to-fat ratio. The dairy animal is well adapted to this trend in beef preference.

Surplus dairy bull calves may be marketed in one of the following methods:

- Deacon calves
- Veal calves
- Feeders
- Finished steers
- Dairy bulls

SALE OF DEACON CALVES

Calves sold at a few days of age are called "deacon" calves or "bob" veal. Most surplus dairy calves are disposed of in this manner. The method lends itself well to a highly intensive dairy operation where the size of the milking herd is at the maximum permitted by the feed supply or labor force. Very few costs are involved when calves are sold as deacons and death loss can be expected to be minimum. The only feed involved is colostrum from the dam, or at most, a small quantity of salable milk.

Dairymen with more feed and labor than the milking herd requires have the opportunity to develop a dairy-beef enterprise other than the sale of deacon calves. Dairymen unwilling or unable to expand the size of the cow herd to utilize surplus feed and labor may find a dairy-beef enterprise financially profitable.

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VEAL PRODUCTION

Good and choice veal calves are young animals from 6 to 8 weeks of age weighing approximately 200 pounds. The carcass of these calves needs to be well-muscled with a layer of fat over the back. The meat should be light-colored, indicating that the calf has not been fed hay or grain.

In the past, feeding to these grades has been possible only with whole milk, generally at the rate of 10 pounds of milk per pound of veal produced. Recent developments in milk replacers have made the raising of good to choice veal economically feasible over a wider range of market conditions. Milk replacers containing emulsified animal fat in addition to milk products have produced gains approaching and in some cases equal to those from whole milk.

Table 1. Profits and Losses in Producing Veal Calves[1]

Feeding Whole Milk
at rate of 10 pounds milk per pound veal produced

	Weight of calf at birth (pounds)							
	70		80		90		100	
Selling price per pound	30c	35c	30c	35c	30c	35c	30c	35c
Milk value per cwt.	$	$	$	$	$	$	$	$
$3.00	-8.00	2.00	-5.00	5.00	-2.00	8.00	1.00	11.00
3.50	-14.50	-4.50	-11.00	-1.00	-7.50	2.50	-4.00	6.00
4.00	-21.00	-11.00	-17.00	-7.00	-13.00	-3.00	-9.00	1.00

Feeding High Animal Fat Milk Replacer
at rate of 1.3 pounds replacer per pound veal produced

	Weight of calf at birth (pounds)							
	70		80		90		100	
Selling price per pound	30c	35c	30c	35c	30c	35c	30c	35c
Milk replacer cost /pound	$	$	$	$	$	$	$	$
18c	.58	10.58	2.92	12.92	5.26	15.26	7.60	17.60
20c	-2.80	7.20	-.20	9.80	2.40	12.40	5.00	15.00
22c	-6.18	3.82	-3.32	6.68	-.46	9.54	2.40	12.40

[1]Calves assumed to be worth $25.00 at birth and fed to 200 pounds. Medical expense, death losses, hauling, and depreciation on buildings and equipment calculated at $4.00 per calf.

The major factors determining profits in veal production are:

- Feed cost
- Price of veal
- Value of calf at birth
- Weight of calf at birth
- Weight of calf when sold
- Death losses

The effect of each of these factors is reflected in Table 1. Weight of the calf at birth has a direct effect on the amount of feed required to produce a 200-pound calf. This fact places the dairy breeds with smaller calves at a distinct disadvantage in the production of veal.

Under the normal range in milk prices, the feeding of whole milk to veal calves is not profitable. Cost per pound of gain will vary between 30¢ and 45¢ when whole milk is fed as compared to a cost of 23½¢ to 28½¢ when a high fat milk replacer is fed.

The manufacturer's recommendations should be followed when feeding a milk replacer. If whole milk is fed, a level of 10 percent of body weight per day is recommended. This should be gradually increased to all the calf will drink as it approaches market weight at 6 to 8 weeks.

Death losses have a major effect on profitability of veal production. Young calves must be kept free from drafts and away from widely fluctuating temperature changes.

A death loss of 4 to 5 percent is not unusual in young calves, and a loss of up to 10 percent can be expected where purchased calves are used in the production of veal. There will be wide variations in death losses between operations, and the would-be producer of veal should expand slowly as he establishes his feeding and management program.

RAISING FEEDER CALVES

The successful raising of feeder calves involves the same management and feeding practices used in raising herd replacements:

- Good sanitation practices must be employed at the time of freshening and throughout the life of the calf.
- Overfeeding of milk or colostrum needs to be guarded against.
- Calves should be protected from drafts, cold winds and extreme fluctuations in temperature.
- Calf housing must be well ventilated and dry.

The correct feeding program for raising feeder calves is one which keeps the calves alive, healthy and produces the most economical growth from birth to sale. Limited amounts of whole milk or a commercial milk replacer are ordinarily the most economical systems of starting calves. Feeding to achieve high rates of gain during the early weeks requires large quantities of high value feeds and generally does not pay for itself.

Calves should receive colostrum for the first 3 days. When starting calves on milk replacer the manufacturer's recommendations should be followed. In using the limited whole-milk system, it is suggested that milk be fed at a rate of 6 to 8 pounds of milk per day for 4 weeks. The choice of which level of milk to feed depends on the price of milk and the feeding skill of the dairyman. Fatter calves are produced with less skill if 8 pounds per day is fed as opposed to 6 pounds per day. Recent studies have shown no advantage to feeding milk beyond 4 weeks of age when calves are eating ¾ to 1 pound of starter per day.

A grain mixture or calf starter should be offered as soon as the calf can be induced to eat it. Grain should be fed free-choice up to 5 pounds per day. A simple 15 percent protein mixture such as the one below will perform as well as the more complicated mixtures.

The feeding program for 4 weeks to 6 months should consist of up to 5 pounds of starter per day and good hay fed free-choice. Silage may be offered to calves at any age but only a small amount will be eaten until the calves are several months old. When the calves are 6 months of age, grain may be reduced to 2 or 3 pounds per day. At 9 months, grain feeding is usually discontinued. From 6 months to 1 year, feeders should receive roughage free-choice. Larger quantities of corn silage can be fed to feeders of this age.

Many calves raised as feeders are sold at approximately 6 months and weigh close to 400 pounds. Some are held until they are 1 year and weigh approximately 725 pounds. Animals of this size will move directly into the feed lot for finishing.

Table 2. Effective Calf Starter for Feeder Calves

Ingredient	Pounds
Cracked corn	1,000
Crushed or crimped oats	400
Cane molasses	180
Soybean oil meal	400
Dicalcium phosphate	10
Iodized or trace mineral salt	10
Antibiotic feed supplement[1]	—
Vitamin supplement[2]	—
Total	2,000

[1]Feed 45 to 65 mg. of aureomycin or terramycin per calf daily with the whole milk. After milk feeding has been discontinued provide at the rate of 15 mg. per pound of feed either mixed in the feed or as a top dressing. Discontinue at 3 months.

[2]Provide 4,000 I.U. of Vitamin A and 500 I.U. of Vitamin D per pound of feed. Discontinue at 3 months.

Table 3. Feed Requirements for Holstein and Brown Swiss Feeder Calves[1]

Feed Required		Limited Whole Milk for 4 Weeks		Milk Replacer
		8 lbs/day	6 lbs/day	
From Birth Through Six Months		lbs.	lbs.	lbs.
	Whole Milk	225	170	30
	Milk Replacer	—	—	40
	Concentrate	530	550	530
	Hay	750	750	750
	Feed Cost[2]	$34.25	$32.70	$32.90

Feed Required		Fall-Born Calves Pastured Part of Following Sum.	Spring-Born Calves Not Pastured
From Six Months Through One Year		lbs.	lbs.
	Concentrate	180	180
	Hay	900	1,200
	Corn Silage	—	4,200
	Pasture	5 months	—
	Feed Cost[2]	$36.65	$37.20

[1]Based on feed consumption studies at Agricultural Experiment Stations in Ohio, Kentucky, New York, Michigan, and Alberta, Canada.

[2]Feed costs used were: Milk, $4.00/100 lbs; Milk Replacer, $16.00/100 lbs; Concentrate, $3.00/100 lbs; Alfalfa Hay, $25.00/ton; Corn Silage, $8.00/ton; Pasture, $4.00/month.

FINISHING DAIRY STEERS

Dairy steers should not be overfinished. Grade is determined by finish and body conformation. Feeding dairy-type animals to a grade of *high standard* or *low good* will be more profitable than attempting to raise the grade by putting additional fat on the animals.

Corn silage with or without limited amounts of alfalfa hay makes an excellent feed for finishing dairy steers. The addition of moderate levels of grain will result in greater gains and the cattle will usually grade slightly higher than those fed on roughage alone.

Workers at several experiment stations have found the average daily gains to be from 1.7 to 2.0 pounds for steers on roughage alone and from 2.3 to 2.5 pounds for those receiving concentrate at 1 percent of body weight in addition to roughage. Steers fed roughage alone require 30 to 50 days longer to reach weights comparable to steers fed roughage plus grain.

Table 4 demonstrates the results that might be expected from a roughage feeding program and from a roughage plus ground corn program.

The table also points out the value of limited amounts of alfalfa hay in feeding dairy steers. At the prices used in this example, the feed costs are quite similar for the four feeding methods.

When labor costs are also considered, the difference in the methods of feeding of dairy steers becomes more pronounced. The feeding of moderate levels of grain increases average daily gain, reduces the length of the feeding period, and as a consequence reduces labor requirements for feeding and handling steers.

Any differences due to feeding limited amounts of alfalfa hay are minor and will disappear with even a $2.50 increase in hay price.

Dairy steers may be finished on alfalfa hay alone but require a longer feeding period. Holstein steers on all-hay rations are rangy and lack finish until they weigh from 950 to 1,000 pounds. Gains beyond this point result in increased fleshing and more finish.

The gains, feed consumption, and cost figures in Table 4 are based on the inclusion of stilbestrol and antibiotics in the protein supplement. A 10 percent increase in gains and feed efficiency can be expected from the use of stilbestrol. Results of large numbers of experiments show feeding and implanting stilbestrol to be equally effective.

Stilbestrol can be profitably used throughout the fattening period. When used for just a portion of the fattening period, it should be used during the latter part of the period. The recommended level of feeding of

Table 4. Alternate Feeding Methods for Finishing Dairy Beef[1]

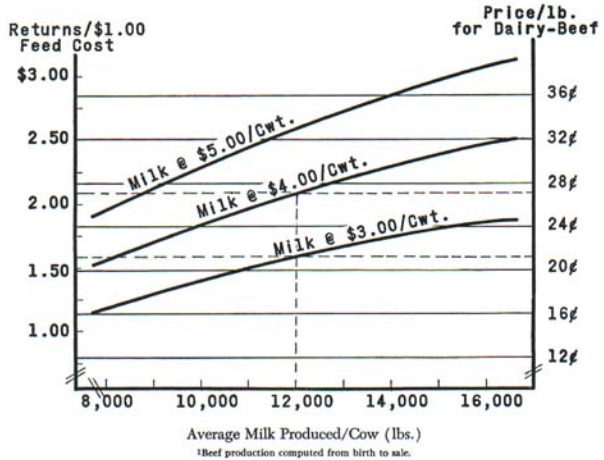
	Roughage		Roughage+Grain	
	Corn Silage +Alfalfa Hay	Corn Silage	Corn Silage +Alfalfa Hay	Corn Silage
Initial Weight (lbs.)	700	700	700	700
Final Weight (lbs.)	1,000	1,000	1,000	1,000
Gain (lbs.)	300	300	300	300
Days on Feed	170	150	125	120
Average Daily Gain (lbs.)	1.8	2.0	2.4	2.5
Average Daily Feed Consumption (lbs.)				
Ground Corn	—	—	7	7
44% Protein Supplement	1	2	1	1.5
Alfalfa Hay	5	—	5	—
Corn Silage	40	55	25	40
Total Consumption (lbs.)				
Ground Corn	—	—	875	840
44% Protein Supplement	170	300	125	180
Alfalfa Hay	850	—	625	—
Corn Silage	6,800	8,250	3,125	4,800
Feed Cost[2]	$46.33	$48.00	$46.25	$47.10
Feed Cost/lb. gain	15.4c	16c	15.4c	15.7c
Labor Cost[3]	$ 6.80	$ 6.00	$ 5.00	$ 4.80
Total Feed and Labor Cost	$53.13	$54.00	$51.25	$51.90

[1]Based on results of feeding trials at Agricultural Experiment Stations in Colorado, Nebraska, Ohio, Iowa, Nevada, and Michigan.

[2]Feed costs used were: Ground Corn, $2.25/100 lbs; 44% Protein Supplement, $100/ton; Alfalfa Hay, $25.00/ton; Corn Silage, $8.00/ton.

[3]Labor cost calculated at $1.20/steer/month.

Figure 1. Returns Per $1.00 Feed Cost[1] Resulting from Milk and Beef Production



[1]Beef production computed from birth to sale.

stilbestrol is 10 milligrams per animal per day. The implant recommended is 24 milligrams for calves weighing 400 to 500 pounds and a second implant of 36 milligrams at approximately 750 pounds. In starting yearlings on stilbestrol, one implant of 36 milligrams is recommended.

Antibiotics in the ration will usually give an additional 4 percent increase in gains and a 2 to 4 percent increase in feed efficiency. Numerous studies have shown that 70 to 80 milligrams of either terramycin or aureomycin per animal per day will increase gains, feed efficiency and health of cattle. When antibiotics are fed in combination with stilbestrol, carcass grade is improved.

Research on Vitamin A is still inconclusive. The low cost of adding supplemental Vitamin A makes the inconclusion a sound insurance practice. The addition of 20,000 I.U. is recommended for steers on high silage rations. Steers being fattened on high hay programs usually do not need supplemental Vitamin A.

DAIRY BULLS

Bulls make faster and more efficient gains than steers. Studies at the Pennsylvania Agricultural Experiment Station showed that Holstein calves fed as bulls went from birth to 1,000 pounds in 25 fewer days than similar calves fed as steers. Average daily gain was 2.31 pounds for the bulls and 2.17 pounds for the steers. The bulls had an average feed consumption of 3,550 pounds of grain and 2,370 pounds of hay, while average feed consumption for the steer was 3,950 pounds of grain and 2,520 pounds of hay.

Dairy bulls present an additional management problem due to their disposition and aggressiveness. Feeders have found that little trouble is encountered when small groups of 15 to 20 animals are started and finished together. Bringing additional animals into the groups results in fighting between bulls.

Bulls produce leaner carcasses than steers and find acceptance as a source of lean meat for sausage and hamburger. Eating quality of meat from dairy bulls is high and readily accepted by consumers. The leaner meat fits in well with current trends in beef consumption.

RETURNS FROM MILK AND BEEF PRODUCTION

The feed consumption and cost figures presented in the previous sections make it possible to determine which method of surplus dairy calf disposal is the most profitable under varying market conditions. The

method to be followed should also fit the feed and labor situations.

One further aspect of dairy enterprise should be considered before a decision is made to raise surplus calves beyond deacons. Dairy cattle are a market for crops produced. The return per $1.00 of feed cost indicates the strength of the market. When available feed can be fed to producing cows with higher returns per $1.00 of feed cost than would be returned by dairy-beef, the possibility of expanding the producing herd should be considered.

Figure 1 gives the expected returns per $1.00 feed cost as the slaughter price of steers increases. The figure also shows expected returns per $1.00 feed cost as the level of milk production and price of milk vary. For example, the returns per $1.00 feed cost for dairy-beef selling at 21¢ per pound and milk selling at $3.00 per hundred weight from a herd producing 12,000 pounds of milk per cow are the same. Returns per $1.00 feed cost are approximately $1.60 for both the steers and the milking herd. Should the milk from this 12,000-pound herd be sold at $4.00 per hundredweight dairy-beef would need to sell for 27¢ per pound to be competitive. Returns per $1.00 feed cost for 27¢ beef and $4.00 milk produced by a 12,000-pound herd are approximately $2.10.

The returns per $1.00 of feed cost increase for the producing herd as the level of milk production goes up. Increased returns for higher producing herds limit the occasions when it is more profitable to feed steers than milking cows. Lower producing herds have greater opportunities to take advantage of a dairy-beef program. The comparative advantage between milking cows and dairy steers is such that the lower producer will often find it advantageous to expand with steers in preference to cows. A dairy-beef operation can also more readily become a part of the dairy enterprise that produces milk for manufacturing purposes. The lower milk price received gives a greater advantage to the steers in returns per $1.00 feed costs.

Existing facilities, willingness to expand facilities, available labor and personal preference all have a role in determining the program to follow.

Table 5. Average Daily Gain of Dairy and Beef-Type Steers

Trial	Initial and Final Weights	Breed	
		Hereford/ Angus	Holstein/ Brown Swiss
	lbs.	lbs.	lbs.
Michigan	400-900	2.25	2.39
Ohio	400-1,100	1.73	2.10
Wisconsin	400-950	2.19	2.37
Nevada	750-950	1.6	2.3
Iowa	750-1,200	2.78	3.10

DAIRY-TYPE VS. BEEF-TYPE

Increasing numbers of dairy feeder calves are moving from dairy farms into feed lots. It is essential that the cattle feeder understand the similarities and differences between these animals and beef-type steers.

As shown in Table 5, dairy steers consistently make higher rates of gain than do beef-type steers of similar weight. Much of this difference can be attributed to stage of maturity and degree of fatness. Dairy steers are larger type animals than beef steers and when animals of the same weight are compared the beef steer will be a more mature animal carrying more fat. Rate of gain and feed efficiency decrease with increased maturity and degree of finish.

California studies show that carrying cattle 56 days past the choice grade more than doubles feed cost and cuts rate of gain in half. This points out the importance of controlling the end point of finish grade to which animals are carried. Beef-type cattle carried to moderate finish grades are competitive with the large-type cattle in feed efficiency and rate of gain.

Beef-type cattle have the advantage over dairy-type steers of having less stomach and intestinal tract, giving them a 2½ to 3 percent advantage in dressing percentage. The increased size of the digestive tract of the dairy steers illustrates the greater capacity for fill and shrink. This is particularly important in establishing weighing conditions at time of purchase. Dairy-type steers show at least 1 percent more shipping shrink than beef-type steers.

Meat from dairy-type carcasses is similar to that from beef-type carcasses. A Michigan trial showed no difference in taste-panel scores on tenderness even in carcasses from Holsteins grading *Standard* when compared to *Choice* carcasses of beef-type. The meat from beef-type steers was juicier and carried a more desirable flavor. It was suggested that this may have been the result of the difference in fatness.

Jersey and Guernsey steers are seldom used in a dairy-beef program due to buyer discrimination to the color of the fat and the resulting lower prices. While meat from these animals is sometimes criticized on the basis of the yellow color of the fat, the tenderness and flavor is as satisfactory as that from Holstein steers.

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