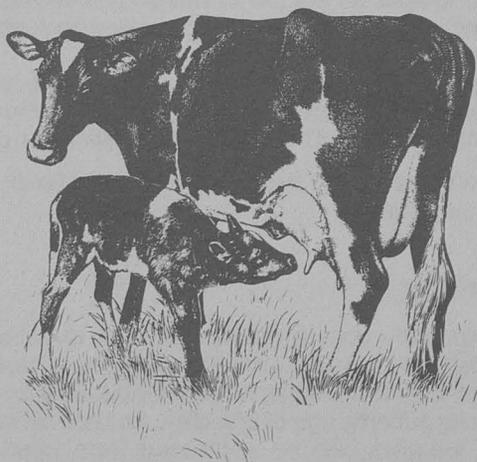


Unit 6—Heifer Management (four months to freshening)

Purposes

- Understand the importance of good heifer nutrition and breeding programs.
- Identify costs involved in raising heifers.



The feeding and management of dairy heifers is easier and less expensive from 4 months of age to calving than at any other time. These heifers, however, are often the most neglected and under managed animals on the farm. The future of your herd lies in your young stock. A heifer born today will be part of the milking herd in approximately two years. Since nearly 30 percent of the milking cows will be culled each year, raising high quality replacement animals is of utmost importance.

Advantages to raising all your heifers include: knowing the genetic value of future herd replacements, reducing disease risks that result from bringing new animals into the herd, and having a greater opportunity to cull poor producing cows. All of these add up to a better chance of increasing herd production with no cash outlay for high quality replacement animals.

NUTRIENT REQUIREMENTS OF HEIFERS

Once the calf is weaned, the high risk period for calf sickness and death has essentially run its course. In addition, you also are finished with the most expensive feeding period. The emphasis now can be shifted to normal growth rates and nutrient requirements (table 1).

FEEDSTUFFS FOR HEIFERS

Though overfeeding heifers has caused breeding and disease problems, underfeeding usually is more of a concern. Fortunately, some of the best feeds for promoting good growth also are the most economical ones. Good quality forages usually provide feed nutrients at the lowest cost per pound. They should form the basis of any heifer feeding program. Some grain will be needed for heifers less than a year old and also when poor quality forages are fed. Table 2 provides a guideline for grain feeding according to forage type and quality.

Hay and haylage—Legume or legume-grass mixtures make excellent forages for heifers. Early cut forages will provide most of the nutrients heifers need. Some grain will be needed for young heifers and when late cut, rain damaged forages are fed. The "pot belly" calf usually results from filling up on poor quality forages without sufficient energy to maintain a good growth rate.

Corn silage—This is a high-energy, low-protein forage that is low in calcium and phosphorus. Corn silage requires protein supplementation and, when properly supplemented, can be a good forage for yearling heifers. However, be careful that heifers do not get too fat on corn silage. You may need to restrict the amount fed if heifers start getting fat.

Corn silage and hay crop silage (30-40 percent dry matter) are not good forages for heifers less than 6 months of age. The limited digestive capacity of these animals does not allow enough of these forages to be consumed to provide adequate nutrients for growth.

Pasture—Pasture alone will not meet the needs of growing heifers, especially those less than a year old. Pasture, even when excellent quality, lacks sufficient nutrients for good heifer growth. Spring pastures will be high in protein,

Table 1. Daily Nutrient Requirements of Growing Heifers

Body weight (lb)	Daily gain (lb)	Protein total (lb)	Net energy maintenance (Mcal)	Net energy gain (Mcal)	TDN (lb)	Calcium (lb)	Phosphorus (lb)	Vitamin A (1000 IU)
Large breeds								
300	1.6	1.04	3.1	1.70	5.7	.041	.025	5.8
400	1.6	1.30	3.8	1.90	7.1	.045	.030	7.7
500	1.6	1.47	4.5	2.20	8.4	.050	.036	9.6
600	1.6	1.61	5.2	2.40	9.6	.052	.038	11.5
700	1.6	1.74	5.8	2.50	10.5	.054	.040	13.5
800	1.6	1.85	6.4	2.70	11.5	.057	.042	15.4
900	1.6	1.92	7.0	2.80	12.3	.058	.045	17.3
1000	1.4	1.97	7.6	2.60	12.6	.060	.046	19.2
1100	1.2	1.99	8.1	2.30	12.8	.060	.046	21.2
1200	.8	2.01	8.7	1.60	12.5	.060	.044	23.1
1300	.4	1.88	9.2	.82	11.5	.054	.040	25.0
Small breeds								
300	1.2	.96	3.1	1.2	5.2	.037	.023	5.8
400	1.2	1.22	3.8	1.4	6.6	.043	.029	7.7
500	1.2	1.41	4.5	1.6	7.8	.048	.034	9.6
600	1.2	1.56	5.2	1.8	8.9	.050	.036	11.5
700	1.0	1.67	5.8	1.6	9.5	.051	.037	13.5
800	.6	1.58	6.4	1.0	9.1	.048	.036	15.4
900	.4	1.51	7.0	.7	8.9	.045	.035	17.3
1000	.4	1.60	7.6	.7	9.6	.049	.040	19.2

Table 2. Grain Feeding Guidelines for Heifers

Heifer weight (lb)	Excellent hay ¹		Good corn silage		Poor forage ³	
	hay	grain	silage	grain ²	hay	grain
	------(pounds)-----					
400	7	3.5	20	3	5	6
600	12	2.0	30	2	10	6
800	16	1	40	1	12	6
1000	20	0	50	1	15	6

¹Alfalfa hay—18% crude protein, excellent pasture

²Grain is primarily protein source

³Corn stalks, rain damaged and mature hays, or late summer pasture

minerals, and vitamins but will need energy supplementation. Feeding 2 to 5 pounds of grain per heifer per day will be necessary to achieve adequate growth. As pastures decrease in quality during the summer, other forages along with grain may be needed.

Grain mixes—These can be as simple as corn plus minerals and vitamins or as complicated as you want them. The main purpose of feeding grain is to provide the heifer with additional energy for growth. The exception to this is for heifers fed all corn silage rations where the grain source is almost all soybean meal or other protein supplement. The herd grain mix can be used for heifers 6 months or older if it is properly supplemented with vitamins and minerals.

Urea should not be fed to heifers less than 6 months old. Keep urea levels at approximately .5 percent of the grain mix or .2 pounds to .3 pounds per heifer per day. Make sure it is incorporated thoroughly into the grain mix. If urea or other nonprotein nitrogen was added to the corn silage at ensiling, do not add urea to the grain mix.

Minerals—Trace mineral salt and dicalcium phosphate should be offered either individually or together in a 50:50 mix free choice. Specific calcium and phosphorus requirements should be met through correct supplementation of the grain mix. Table 3 provides a guideline of mineral supplements needed for different forage types. Trace

Table 3. Calcium and Phosphorus Supplements for Different Forage Feeding Programs

Forage sources	Supplement*
Legumes, legume-grass mixture, and legume-corn silage mixture	High phosphorus (15 to 20%), moderate calcium (5 to 10%) (½ bone meal or dicalcium phosphate, ½ monosodium or monoammonium phosphate)
Grass, corn silage, or a mixture of both	High phosphorus (15 to 20%), high calcium (15 to 20%) (bone meal, dicalcium phosphate, or ½ monosodium or monoammonium phosphate and ½ limestone)

*Commercial supplements are available for these forage programs.

mineral salt also should be added to the grain mix at 20 pounds per ton.

Vitamins—Delayed heat can result in heifers deficient in vitamin A (see table 1 for vitamin A requirement). Green, leafy forages are good sources of vitamin A. Residue crops, forages stored for long periods, and heat and rain damaged forages all are low in vitamin A. Feeding these forages will require supplementation of vitamin A either by feeding or injection.

Vitamin D can be supplied by sunshine if the animals are outside. For animals housed indoors, supplement with approximately 2,000 IU vitamin D per heifer per day.

Water—Heifers should have free access to fresh, clean water at all times.

HEIFER SIZE

The primary goal in raising heifers is to have them large enough to breed at 14 or 15 months of age. However, the size or weight of a heifer is more important than age in determining puberty, age of breeding, and normal calving. Heifers' weights can be estimated from heart girth measurements. The measurement is made with a tape placed snugly around the body immediately behind the

Table 4. 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
At 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	35¼	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	61¼	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

Source: *Farmers Bulletin No. 2176, Animal Husbandry Research Division, ARS, USDA, October 1961*

*Normal breeding age for heifers adequately fed

Table 5. Influence of Beef vs. Dairy Bulls Mated to Yearling Dairy Heifers (100-cow herd, 30 first calf heifers in milk)

	Number of surplus heifers for sale in a 100-cow herd*	Comments
I. When beef bulls are used to breed heifers, and:		
a. Herd reproductive performance is poor and calf death loss is high	-9	Must buy replacements to maintain normal cull rate and to improve herd production Cull rate will be below 30% or must buy some replacements, especially when more bull calves than heifer calves are born
b. Herd reproductive performance is good and calf death loss is low	-2	
II. When dairy bulls are used to breed cows and heifers, and:		
c. Herd reproductive performance is poor and calf death loss is high	-1	
d. Herd reproductive performance is good and calf death loss is low	10	Surplus stock for sale, opportunity to increase income

*Based on 30% annual replacement (cull) rate

front legs and shoulders. Estimated weights of four breeds with varying heart girths are shown in table 4. (Brown Swiss heifers would be most similar to the table values given for Holsteins.) The ages at which these weights normally are reached are shown in the table as a standard of comparison.

BREEDING HEIFERS

Size is a better indicator than age alone in deciding when heifers should be bred. Adequately fed heifers can be bred when they are 15-16 months old. It may be desirable to delay breeding heifers too small for their age (see table 4). Your goal should be to freshen heifers at 24-25 months of age.

SELECTING A SIRE WHEN BREEDING HEIFERS

On most farms, all or nearly all of the replacement heifers available are needed within the herd to maintain herd size and make maximum progress in improving the herd's genetic potential (table 5). In average size herds of fewer than 50 cows, it is common to have unusual male:female sex ratios of calves born. When this occurs, even when death losses of calves are low and dairy bulls are used as sires, there usually is a shortage of heifers.

Beef bulls should never be used in a dairy herd. When beef bulls are used to breed heifers, the usual result is that the number of heifers available as replacements are limited. There are many reasons for this including: 1. poor reproductive performance, cows not calving every 12

Heifer Management (four months to freshening)

Please Fill Out and Return

Name _____

Address _____ County _____

1. How much and what type of forages and grains are fed to your heifers?

Age

Feed

4 to 6 months

6 months to breeding

Bred to freshening

2. Check the weights of some 4, 8, and 14-month-old heifers. How do they compare with those in table 4?

If they are not very similar, what changes in your feeding program should be made to correct this?

3. Do you have at least 3 bred heifers for every 10 cows in your herd? If not, why?

4. Is the spread in the size of heifers housed together limited to not more than 200 pounds in weight?

If not, do you need to have more groups of heifers?

5. What are your estimated costs of raising replacement heifers (see table 6)?

If surplus heifers could be sold at this value (or more), how much income have you lost due to less-than-optimal heifer management?

The following material is also available on request. Please check those publications you would like to receive.

- Raising the Replacement Heifer*, Dairy Husbandry Fact Sheet 18
 Feeding the Dairy Herd, Extension Bulletin 218

months; 2. high calf losses, due to respiratory problems and calf scours; 3. loss of heifers as nonbreeders or by accidents; and 4. unusual distribution of calves born, more bulls than heifers. Holstein herds in Minnesota with an average production of more than 17,000 pounds of milk typically replace 36 percent of their cows annually; those producing fewer than 12,000 pounds replace only 30 percent.

GROUPING HEIFERS

Weaned calves up to 6 months of age may be grouped so they are housed and fed together in pens that hold 5 to 10 calves each. Allow 24 square feet of space per calf. Good quality hay and plenty of fresh, clean water should be available at all times. The starter mix should be fed at least twice a day. All calves in the pen should be approximately the same size and weight. Weight differences in pens

should not exceed 200 pounds. This minimizes the possibility of greedy heifers eating more than their share of the starter mix. Each animal in the pen should have approximately 1 foot of bunk space.

Calves should be housed where they have a dry bed and are protected from drafts. Continuous ventilation must be provided to prevent dampness of the hair coat and chilling in winter. Calves weighing less than 400 pounds should be on a solid-floor system rather than a slotted system if the barn temperature drops below 40°F.

Dry sawdust and peat moss are excellent bedding materials. Other common materials are shavings, straw, and chopped or long hay. Make certain small calves do not eat too much bedding material because it may cause impaction and digestive upsets. Manure should be removed regularly in warm barns, but in cold barns, bedding should be added to build up a warm pack.

Table 6. Estimated Costs of Raising a Dairy Heifer Replacement (birth to 24 months)

Value of calf at birth (including death loss)	Current		My Farm
	Amount	Value \$150	
FEED*			
Milk replacer	40 lb	16	_____
Calf starter	90 lb	9	_____
Corn equivalent	20 bu	60	_____
Protein supplement	160 lb	18	_____
Hay equivalent (3 tons silage and 3.5 tons hay)	4.5 tons	243	_____
Salt and mineral		5	_____
Pasture charge		20	_____
Total feed cost		\$346	_____
OTHER VARIABLE COSTS			
Bedding	1200 lb	30	_____
Health		18	_____
Breeding fee (1.5 services/replacement)		16	_____
Power, fuel, repairs		5	_____
Supplies, miscellaneous		4	_____
Interest on feed and other costs (15% × ½ total)		31	_____
Total nonfeed cost		\$104	_____
OTHER REQUIRED RESOURCES			
Building (a 12% × \$200)		24	_____
Equipment (a 18% × \$40)		7	_____
Interest on original animal (10% × \$150 × 2 years)		60	_____
Labor (30 hours (a \$3)		90	_____
Total other resources		\$174	_____
TOTAL COST OF RAISING A HEIFER		\$774	_____

*Prices used: corn, \$3.00 per bushel; corn silage, \$18 per ton; hay, \$54 per ton; protein, \$11 per 100 pounds; 16% protein calf starter, \$10 per 100 pounds; and milk replacer, \$40 per 100 pounds

MANAGEMENT JUST PRIOR TO CALVING

Heifers should start receiving grain during the last 2 to 3 weeks before calving if they haven't already. They should be handled the same as dry cows at 2 weeks before freshening (review Unit 1 on dry cow care). In addition, milking and milking routines will be new and strange to heifers. Getting heifers accustomed to milking time noises, people, and general routines will make things easier when the heifer does freshen and is added to the milking string.

COST OF RAISING HEIFERS

The value of young stock is high, but so are the costs to raise them. Use the budget in table 6 to check your estimated replacement animal costs.

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