

# **CULLING: REPLACEMENT HEIFER STRATEGIES**

**David B. Fischer**

## **TAKE HOME MESSAGES**

- Reducing herd culling rate and heifer mortality rate by 5 percent will increase surplus replacements by 30 percent per 100 cow herd.
- Adequate and timely colostrum intake is critical to improving heifer survival and proper growth.
- Monitoring heifer growth rates is essential for make important management decisions.
- Milk producing ability of 1<sup>st</sup> lactation cows is more dependent on size than age.

Longevity is quickly becoming the “buzz word” when describing a productive and profitable dairy cow. Increased longevity allows cows to remain in the herd longer resulting in lower annual cull rates and increased dairy profit potential. The health and productivity of the dairy cow is usually credited to a number of sound management practices while in the milking herd, i.e, nutrition, cow comfort, herd health, genetics, sanitation, etc. However, let us not forget that the growth and health conditions of dairy heifers in their first 22 to 24 months of life will also play an important role in their longevity and profitability as a dairy cow. Replacement heifers that have been stressed via disease problems, overcrowded conditions and/or inadequate nutrition will have detrimental affects on their production and reproduction ability as a cow, resulting in premature culling.

Cull cows can be costly when forced to leave the herd prematurely. The average culling rate for Illinois DHI herds is 35 percent when the optimum economical culling rate should range between 20 and 30 percent. Based on the 2002 National Animal Health Monitoring System (NAHMS) report, the U.S. average cull rate is 25.5 percent. Limited information is available on the culling percentage of 2-year old cows, however it is not uncommon to see 30 to 40 percent of all culls being 1<sup>st</sup> calf heifers. This is a costly problem in many dairy herds. Increasing cow longevity provides more opportunity to market cows based on voluntary culling versus involuntary culling decisions, thereby improving the overall profitability of the dairy operation. In addition, achieving lower culling rates and lower calf mortality rates will allow producers to merchandize excess replacement heifers or grow the dairy herd (Table 1).

## **STRATEGIES FOR PROFITABLE HEIFER REPLACEMENTS**

### **Goals**

- strive for 95 percent survival rate (birth to calving)
- maintain permanent identification and records

- breed at 14-15 months (60 to 65 percent of mature weight)
- select genetically superior sires
- calve at 23-24 months, body condition score of 3.0 to 3.5
  - (Lg. breed) weigh 1250 pounds post calving, withers height of 54 inches
  - (Sm. breed) weighing 825 pounds after calving and 50 inches at withers

### **INCREASE SURVIVAL RATE**

The first 2 months of life is the most critical in keeping calves alive. The 2002 NAHMS survey reports the U.S. average mortality rate for preweaned calves is 10.5 percent and an additional 3.0 percent death loss from weaning to calving. Diarrhea and respiratory problems are the leading causes of heifer mortality. It is well documented by research and on-farm trials that providing the correct amount of high quality colostrum immediately after birth is crucial in reducing heifer mortality. Getting the needed immunoglobulins into the new born calf as soon as possible is the single most important management practice in calf nutrition and should not be taken lightly. According to the NAHMS report, approximately one-third of the dairy producers still rely on calves to take the first nursing of colostrum from their dam. This practice does not insure that the calf is getting enough colostrum intake and also can be the cause of future disease problems such as Johnes'. Following these sound management practices from birth to weaning and vigilant monitoring of calf health can help minimize calf mortality during this critical time.

### **Goals**

- provide clean, dry draft-free maternity pen and calf housing
- remove calf from dam and hand feed colostrum as soon as possible (Table 2)
- provide 3 to 4 quarts of high quality colostrum within one to three hours and another 2 quarts 12 hours later (Table 3)
- dip navel with 7 percent tincture of iodine at birth and again 12 hours later
- feed whole milk or milk replacer, calf starter, and water based on desired ADG
- wean when daily intake of calf starter reaches 1.5 lbs.-Jersey and 2.0 lbs.- Holstein
- avoid other stressors at weaning, i.e. dehorning, removing extra teats, etc.
- apply vaccination and health programs as prescribed by veterinarian

### **MAINTAIN IDENTIFICATION AND RECORDS**

Identify animals as soon as possible after birth and set up a record keeping system to record birth weight, average daily gain (ADG), health events, breeding dates, pedigree and other pertinent information that will help you make important management decisions during the life of the animal. Individual permanent identification on all animals is likely to become mandatory in the very near future. Beyond the regulatory need, proper identification and records will have a "value added" effect resulting in increased dollar value for merchandizing or increased management value in selecting herd replacements. As dairy herd owners increase cow longevity, decrease culling rates and lower heifer mortality rates they have a greater excess of replacement heifers. The tendency for producers is to freshen all replacements and then cull out

the poor producers as 2-year olds. This can become very costly due to the fact that replacements generally need to produce large quantities of milk for 1.5 to 2 lactations in order to have a net return capable of paying for the total heifer rearing costs. The management practice of calving all heifers and then culling out after the first lactation can negatively affect the dairy profitability. Dairies can minimize the culling of 2-year olds by selecting herd replacements based on complete records of health, growth, genetics and production potential. The remaining heifers can then be sold at replacement values rather than cull market values.

### **BRED AT 14 TO 15 MONTHS OF AGE**

Perhaps more correctly stated, bred by size. With current documented research and knowledge of heifer growth nutritional needs and feeding technologies, it is easily attainable to have heifers reach adequate size to breed at 14 months of age. Since feed is the largest single cost of raising dairy heifers, it is important to provide a balanced diet and position forages based on the nutrient analysis. Over feeding or under feeding protein and energy will result in any number of problems, such as, increased feed costs, higher or lower body condition score, delayed puberty or poor reproductive performance. In order to make breeding decisions based on size and monitoring how well heifers are growing, it is imperative that producers take the time to weigh and measure heifers at different stages of growth. Heifer growth rates and body condition scores should be collected at a minimum of twice per year. Realizing that this requires additional labor, producers should consider incorporating this task when working cattle for other reasons. Table 4 provides the heifer growth rates that producers should strive for in attaining proper growth rates. Replacement dairy heifer nutritional goals include:

#### **Goals**

- provide quality feedstuffs and balanced ration
- include ionophores to improve feed efficiency
- adjust rations for environmental challenges (cold and heat stress)
- achieve 1.8 pounds average daily gain (ADG) for large breeds and 1.4 pounds for small breeds
- avoid over conditioning and monitor body condition score

### **SELECT GENETICALLY SUPERIOR SIRES**

It is often stated that replacement heifers entering the milking string represents the newest and best genetics. This is true if producers select A.I bulls based on high reliability production and type data for both the milking herd and the replacement heifers. Use of AI sires also provides the “value-added” effect when merchandizing dairy heifers. Producers are constantly striving to improve the milk producing ability of the dairy herd. Therefore, genetics and pedigree information should represent one of the important criteria when selecting which heifers will enter the milking herd and which excess heifers will be merchandized.

### **CALVING AT 23 TO 24 MONTHS OF AGE**

As discussed on how to achieve proper size at breeding, it is also achievable to reach optimum heifer size to calve at 23 to 24 months. While it is true that historically, older heifers (25 to 26

months) have produced more milk, it also is true that the loss of milk production in early life and the increased cost to raise the replacement more than offsets the benefits for the extra milk produced. Reports from leading researchers (Hoffman and Van Amburgh) indicate that the milk production in the first lactation is more a factor of size than age. Heifers that are not properly grown due to factors, such as inadequate nutrition, overcrowding, unhealthy housing, etc., will need to reach an older age before achieving adequate size to withstand the demands of high milk output. Any delay past 24 months will add to the cost of raising replacements as well as require more heifers to meet the herd replacement needs. Current costs for raising heifers the last 3 months, prior to calving, range between \$1.50 to \$2.50 per day. The Illinois DHI average age for 1<sup>st</sup> lactation cows is 26 months. This represents an added rearing cost of \$120 (\$60 per month) plus the lost value of milk not being produced because the heifer has not entered the milking herd.

**Table 1.** Surplus heifers per 100-cow herd.

Heifers born <sup>1</sup>	Survival rate, <sup>2</sup> %	No. heifers raised, birth to freshening	Replacement Rate		
			15%	25%	35%
45	95	43	28	18	8
45	90	40	25	15	5
45	85	38	23	13	3
45	80	36	21	11	1

<sup>1</sup> In a 100-cow herd, about 90 calves are born per year, half of which are heifers.

<sup>2</sup> Average survival rate from birth to freshening.

**Table 2.** Time with dam increases mortality

Time with Dam After Birth (hours)	Herds Evaluated	Percent Mortality
2-6	13	5.2
7 to 12	35	9.3
13 to 24	32	10.7
25 to 48	24	20.5

Source: Adapted from NCR 205 Bulletin, 1991 by H. Chester-Jones, University of Minnesota

**Table 3.** More colostrum lowers mortality.

Amount of Colostrum Fed (quarts)	Herds Evaluated	Percent Mortality
1 to 2	18	15.3
3 to 4	16	9.9
4 to 5	26	6.5

Source: Adapted from NCR 205 Bulletin, 1991 by H. Chester-Jones, University of Minnesota

**Table 4.** Heifer Growth Objectives (suggested breeding weight in bold).

Age Months	Holstein, Brown Swiss		Ayrshire, Guernsey		Jersey	
	Weight Lb	Height Inches	Weight Lb	Height Inches	Weight Lb	Height Inches
0	94	32	70	27	55	26
2	185	34	130	32	115	30
4	280	37	230	37	195	34
6	400	41	320	41	275	39
8	520	44	400	44	385	41
10	650	46	505	45	460	43
12	775	49	600	46	520	44
14	875	50	680	48	575	45
16	975	51	770	50	650	46
18	1050	52	860	51	730	47
20	1150	53	910	52	800	48
22	1275	54	1050	53	875	50
24	1340	54	1150	53	960	51

Source: Raising Dairy Replacements, NCR 205