

Pasture Management

Producers often choose to manage heifers in a pasture-based system. Pasture-based systems can range from continuous grazing, where one pasture is used for the whole summer, to intensive, rotational grazing, where heifers are moved to new forages daily. Heifer raisers need to assess labor, facility, and management resources to determine what pasture system works best for their operation.

Maintain Heifer Performance

Over the past decade, research has demonstrated that optimal heifer growth rates can be achieved in pasture-based systems. Dairy heifers reared on rotationally-grazed legume, legume-grass or grass pastures have similar average daily gains and body condition scores when compared to heifers fed in confinement. However, heifer raisers must manage the nutritional needs of heifers in a pasture-based system differently than animals in a confinement-based feeding system.

First, pasture-based systems must supply an ample amount of forage dry matter. This is the most important issue in maintaining heifer performance. Second, heifers on pasture require more calories because they are walking and active. As a result, pasture plants must be of high quality to meet energy needs.



Third, pasture forages can often contain excessive protein compared to the heifer's protein requirement. To excrete this excess protein, diets typically require additional energy. A well-managed pasture management program must address these three issues.

Managing the Pasture

In northern climates, continuously-grazed pasture tends to have relatively large amounts of high-quality forage growth during May and June, but quickly becomes overgrown or overgrazed later on in the year—unless animal units are reduced, nutritional supplementation added or intensive grazing implemented. Intensive grazing utilizes various management principles to allow more growth and higher quality of forage to be available longer during the grazing season. However, this system uses more capital investment (fence and water systems) and labor.

If continuously-grazed pastures are utilized, protein and energy needs tend to be adequate for breeding-age heifers in the early part of the season. However, by July and August, the pasture may become inadequate in supplying nutrition to the heifers. By rotating pastures and employing more intensive-grazing strategies, producers are better able to maintain pasture quality throughout the season. However, even in well-managed pastures, energy may still be a concern for young heifers, especially those weighing less than 500 pounds.

Protein needs on intensively-rotated pastures are seldom a problem. In fact, with crude protein levels often reaching 22 to 28 percent, protein can be a concern. Additional energy is needed in the diet to help the heifer use the extra protein. In either system, testing of pasture forages is necessary to determine approximate levels of protein, fiber and energy.

In an effort to improve pasture management, many producers have employed the concept of rotating their pastures and breaking them down to smaller units for a grazing event that lasts one to four days. These producers are working with the pasture forage to improve the quantity and quality of pasture growth. This improved pasture management begins with understanding basic plant growth, forage variety and growth curves, and the seasonality of production. Adhere to the following three rules:

1. Keep the grass vegetative. Both yield and quality are greatly impacted by grazing management that allows the forage to remain in

its vegetative stage. In the vegetative stage, pasture plants grow quickly. As a result, grasses should never be grazed to less than four to five inches in height. By not grazing grasses too low, the plant effectively uses solar energy to produce new vegetative growth. If grass is grazed lower than four inches, grasses draw more heavily on the root system for re-growth, which slows down the process.

Conversely, do not allow grasses to grow past their vegetative state at 10 to 14 inches, because high-quality leaf material begins to dwindle as the grass develops stems to support a seed head. A good rule of thumb: graze half the plant, leave half the plant.

- 2. Graze pastures quickly.** Ideally, allow heifers to graze a paddock for no longer than three to four days. Grazing for longer periods will tend to draw down the plant's root reserves as it tries to continually re-grow without much leaf area. Eventually, lower quality plants replace higher quality, overgrazed plants in the pasture.
- 3. Give pastures a rest.** Pasture plants need rest for quick, high-quality re-growth. However, the species of pasture plant grown and time of year can greatly affect the duration of the rest period. For example, a cool-season, sod-forming grass, such as reed canary grass, may need a rest of 14 to 16 days in the spring, 21 to 30 days in early summer and 30 to 36 days in late summer. It tends to reduce its growth curve in early fall but can be used for a late fall grazing 60 to 75 days later. Check with your agronomist or nutritionist to determine the rest periods needed for the plants in your pastures.

Determining Pasture Use Rates

Pasture quality and quantity, the number of and size of animals and the rotation rates all affect how many acres of pastures are needed to feed your herd. Table 9.1 depicts utilization rate guidelines with various rotation schedules. Table 9.2 estimates the pounds of dry matter available per inch per acre for forage type and pasture condition. To determine paddock number and size and total acres needed for a specific number of grazing animals, refer to the worksheet in Figure 9.1. These tools provide a starting point; however, season, species of plants and farm-based differences cause variation—so experience is the best teacher. Design a system with as much flexibility as possible.

Pasture System Design

After estimating animals relative to acres needed during the various seasons, design a pasture-management program that optimizes heifer growth, pasture yield and quality as well as management and labor concerns. Consider the following areas:

- **Fencing.** The key to a pasture fencing system is a good quality, well-grounded, low-impedance electric fencer that produces a minimum of 5,000 volts around the pasture system. A perimeter fence should be built typically with two to three strands of high-tensile wire. The majority of posts can be fiberglass, however, pressure points—corners, top or bottom of hill—necessitate a stronger post. Inside perimeter fencing in rotational grazing systems can be of various sizes and types of wires, but high-quality fences leads to less frustration over time.

To rotate heifers in intensely-managed systems, rapid rolling and unrolling six- to nine-strand polywire is suggested through use of specially-made reels. In addition, good quality step-in posts (pigtail or other design) allow rapid movement.

Table 9.1. Amount of pasture used by grazing animals in different systems.	
Animals on pasture can only consume a portion of the pasture when grazing. This chart estimates the amount available for a wide range of grazing systems.	
Rotation Schedule (paddocks)	Utilization Rate (percent)
Continuous grazing, 1	30-35
14 days or greater, 2-4	35-40
6-8 days, 3-7	45-55
2-3 days, 6-15	55-60
Daily, 25-35	60-70
2 times per day, 45-60	70-75

Source: Pasture Management Guide for Livestock Producers, Iowa State University Extension, 1988.

Producers should also consider larger, more flexible paddock sizes to allow more efficient clipping and hay harvest of pastures if necessary. This usually entails longer, yet narrower paddocks that also are easier to break down in a strip grazing fashion with the fencing equipment described above.

- **Lane Development.** Lanes for heifers do not need to be as heavy duty as for cows, but should allow for efficient movement. Lanes need only be eight to 10 feet wide unless machinery needs to move through (See Figure 9.2). Keep the lane as high and dry as possible and along the contour of the land to minimize erosion over time. Place three to six inches of crushed limestone on level areas to avoid erosion. Add three to six inches of larger rock underneath the limestone for areas where erosion is more prevalent. In wetter areas, consider geo-textile fabric to separate the rock from the soil. Slope the lane to allow rainwater to cross over or divert into paddocks. Use of railroad ties sloped at an angle as needed can deter long runs and divert water into paddocks.
- **Watering Systems.** A flexible, low-cost watering system is needed. Movable watering sites ensures even manure distribution in the pasture and allows easier breakdowns of pastures with portable fencing. Water lines are most preferably placed along the lane system on top of the ground. These can withstand freezing temperatures by taking the pressure off the line and draining low spots. The watering system can be very effective, yet not expensive (See Figure 9.3). Using UV-protected water pipe and 160-psi water line has proven successful in allowing large machinery to drive over it.

For best grazing management, animals should not be more than 800 feet from the water site. Distances greater than 800 feet will result in animals moving to and from the grazing area as a

Table 9.2. Dry matter estimates for various plant types.			
This estimates pounds of dry matter available per inch per acre for forage type and pasture condition.			
Forage Type	Pasture Condition (pounds of dry matter)		
	Fair	Good	Excellent
Smooth brome + legumes	150-250	250-350	350-450
Orchard grass + alfalfa	100-200	200-300	300-400
Mixed pasture	150-250	250-350	350-450
Bluegrass + white clover	150-250	300-400	450-550
Tall Fescue + legumes	200-300	300-400	400-500
Tall Fescue + nitrogen	250-350	350-450	450-550

Source: Pasture Management Guide for Livestock Producers, Pm 1713, Iowa State University Extension, 1988, p. 78.

Figure 9.1. Use these steps to calculate the amount of acres needed for your grazing operation.

For easy calculating, use the Pasture Calculator found on the accompanying CD.

Step 1. Daily forage needs of the grazing heifers.

$$\text{_____ heifers} \times \text{_____ average weight} = \text{_____ total weight} \times 2.5 \text{ percent intake} = \text{_____ lbs.}$$

Step 2. Determine forage required, adjusted for utilization rate (see above).

$$\frac{\text{_____ pounds daily forage dry matter (DM) intake (Step 1)}}{\text{Utilization rate (see Table 9.1)}} = \text{_____ pounds forage needed daily}$$

Step 3. Determine pounds dry matter (DM) per acre (See Table 9.2).

$$\text{Estimated pounds DM per inch per acre} \text{ _____} \times \text{_____ inches} = \text{_____ pounds DM per acre}$$

Step 4. Determine acres needed daily.

$$\frac{\text{Pounds forage DM needed daily (Step 2)}}{\text{Total pounds DM per acre (Step 3)}} = \text{_____ acres needed per day}$$

Step 5. Determine paddock size.

$$\text{Acres needed per day (Step 4)} \text{ _____} \times \text{_____ no. days on paddock} = \text{_____ acres per paddock}$$

Step 6. Determine number of paddocks.

$$\frac{\text{Rest period (21-42 days)} \text{ _____} + \text{_____ number of days on paddock}}{\text{Number of days on paddock}} = \text{_____ number of paddocks}$$

Step 7. Total acres required for a specific number of grazing animals.

$$\text{Number of paddocks (Step 6)} \text{ _____} \times \text{_____ acres per paddock (Step 5)} = \text{_____ acres needed}$$

group, necessitating larger watering tanks. More flexible movement of watering sites also allows for better grazing efficiency and more even manure distribution.

- **Managing Bloat.** Alfalfa would be the most popular crop for pastures, if not for its bloat-inducing characteristics. Research suggest that bloat occurs more often when heifers consume lush legumes. Lush spring pastures, frosted spring or fall pastures and dew-laden summer pastures all seem to induce some bloat. White and red clovers can also induce bloat but typically are not in pastures at a high percentage, so clovers often go unnoticed for their bloat-producing potential. This includes forages in the pre-bud stage or when frost, dew or rain are added. Introduce heifers to new forage gradually



Figure 9.2. Makes lanes 8 to 10 feet wide unless machinery needs to move through them.

and or feed supplemental forage or grain prior to grazing events. Finally, feed a bloat guard product, such as poloxalene, at one gram per 100 pound of bodyweight per day or two grams per 100 pounds in severe cases. Although not labeled for bloat protection, ionophores can also assist in reducing the incidence of bloat. More information on ionophores can be found in Chapter 8 Heifer Nutrition.

- **Nutritional Supplementation.** While optimal growth rates can be achieved on pasture, supplementation of grain, minerals, vitamins and, perhaps, protein may be necessary at times.

Ideally, you want to feed heifers in the paddock. Therefore, the feeding system needs to be portable. Feeder wagons or portable bunks chained together—allowing movement from one paddock to another with an all-terrain vehicle—can make good grain-feeding systems. Fifteen gallon to 35 gallon plastic barrels cut in half from top to bottom and wired together at bottom about two feet apart can also be moved from paddock to paddock. Feeding on the ground underneath a break wire is not recommended because feed losses are too great. If portable options are not practical, heifers can be brought back to a nearby facility or common feeding area.

In high-quality pastures with frequent movement from paddock to paddock, it is common to feed 1.5 to two pounds per day of a supplement, including minerals, salt, vitamins and an ionophore. Conversely, heifers in

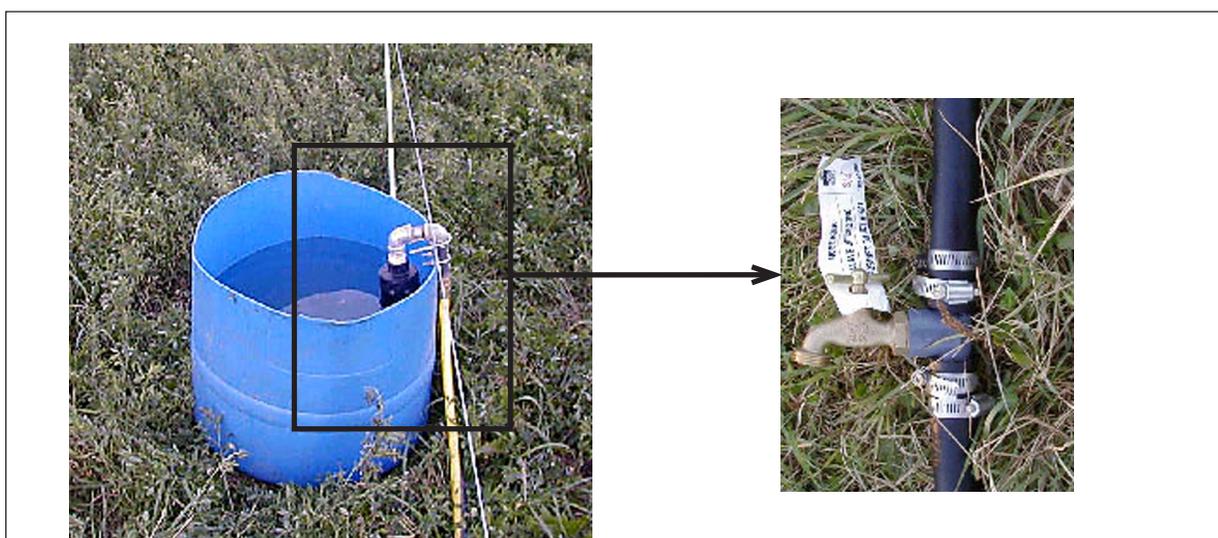


Figure 9.3. Example of a water system using a 55-gallon plastic drum cut in half, a full-flow valve and garden hose hooked up to a 0.75-inch hose bib from a one-inch water line laid on top of the ground.

continuously-grazed pastures may need five to six pounds of a grain per head per day. The specifics of supplementation should be determined based on your individual pasture quality and the nutritional needs of the grazing animals.

- **Stockpiling of Pasture Forages.** Late-season grazing, often called stockpiling, can also occur on acres harvested for hay or previously grazed. Use forage acres that were last harvested or grazed 60 to 70 days prior to the last killing frost in the area—beginning around Aug. 1 to Aug. 15. This long rest period allows an accumulation of dry matter (usually around one ton of dry matter per acre) and bloat is usually not of concern due to the forage's maturity.

In addition to stockpiling, low-cost winter feeding systems are also being used with varied degrees of success. Self-feeding of round bales or silage stacks have been used to try to reduce manure volume in the feed lot. In typical winters, it is estimated that out-wintered heifers will need four to six pounds additional grain per day to achieve the same body condition score as if fed in confinement housing.

- **Parasite Control.** Heifers on pasture tend to have more problems associated with internal and

external parasites when compared to confinement heifers. Controlling internal and external parasites in grazing heifers is usually a profitable management practice and helps maintain heifer growth rates. Deworm heifers before they are turned out to pasture in the spring to minimize parasite buildup. Typically a mid-summer, fall deworming protocol, or both is also required. Numerous deworming products are available in a variety of delivery methods: feed additive, paste, pour-on or injectable. Consider a delousing program in order to clean heifers' haircoats as well. If desired, use topical insecticides or treated ear tags for fly control.

For more information on parasite control, see Chapter 7 Heifer Health.

- **Environmental Stewardship and Grazing Heifers.** Grazing dairy heifers can have both positive and negative impacts on the environment. If rotationally grazed, streambanks and environmentally-sensitive areas can be maintained well. Nutrient dispersion can be greatly increased as producers incorporate intensive grazing, especially through the use of portable watering systems. Consult with an engineer or waste management adviser to determine the environmental effects of grazing on your farm.