## Lesson 2: Grazing Management Systems

The key to efficient livestock production is feeding and management. Grazing management combines these two elements. The way in which the forage is utilized will affect the profitability of a livestock operation. Knowing the needs of the herd and the potential of the pastureland will help the producer to determine which grazing system is best.

### Methods of Harvesting

Forages are harvested by animals and by humans. Animals, both livestock and wildlife, eat forages by grazing. Two basic types of grazing systems—continuous and rotational grazing—are used for livestock. In continuous grazing, livestock graze on only one pasture unit. The animals are allowed to graze unrestricted throughout the grazing season. In contrast to continuous grazing, rotational grazing requires at least two grazing units. The animals alternate between the different pastures in a preplanned cycle. Strip grazing and management-intensive grazing are two types of rotational grazing. Each of these methods has its advantages and disadvantages. The best method to use depends on the grassland, animal needs, and management priorities.

One of the major differences between continuous and rotational grazing is selective grazing. In continuous grazing, livestock have unrestricted access to the pastureland throughout the grazing period. The animals can pick and choose the plants that they consume. In rotational grazing systems, however, the animals are only provided with the amount of forage they require for the grazing period. The animals feed on the pants in the area more evenly, because they are limited by the quantity of forage available.

Humans also harvest forages directly through mechanical harvesting for hay, silage, or green chop. The forage is cut and then stored to be fed later. This form of harvesting will be discussed in depth in the next lesson.

### Continuous Grazing

The single pasture unit grazing system used in continuous grazing has the advantages of high initial performance and low maintenance. The high performance of animals at the outset is due to their being able to selectively graze on the most palatable grasses and legumes and leave the less palatable and less nutritious weeds. The production weight of these animals will therefore be higher than that of animals that do not selectively graze. In addition, because only one pasture unit is utilized, continuous grazing requires less maintenance than rotational grazing systems, in which the herd is moved frequently.

The disadvantages of continuous grazing are the risk of changing the grassland composition and poor forage utilization by the herd. Whenever pastures are selectively grazed, the risk exists that the forage composition will be altered due to the overgrazing of quality forages. When these plants are grazed, other, less desirable plants are allowed to grow that may eventually shade the desired forages, either hindering their regrowth or killing them. Since the quality of a pasture that is being continuously grazed will quickly decline if it is overgrazed, this system is best used for areas that are only grazed for part of the year. In addition to changing grassland composition, the selective grazing that occurs in continuous grazing means that less desirable plants are not consumed by the animals, therefore decreasing the overall utilization of the forages available. The quality of forage that the herd eats will boost their production and increase gains, but production per acre will suffer because they are not using all of the plants available. Lower forage utilization results in lower carrying capacity.

### Rotational Grazing

Rotational grazing requires more intensive management of pastureland and animals than continuous grazing due to the sequenced movement of the animals between two or more pastures or paddocks (smaller divisions of pastures). In rotational systems, the herd may be moved every 1 to 30 days. Movement of the animals is based on the rate of vegetative growth of the forage and the grazing intensity. Any grazing system based on management of forage availability, quantity, quality, and utilization is considered to be controlled grazing.

Rotational grazing has four main advantages for the producer. First, it helps to maintain the desired composition

of the grassland. This form of grazing helps to reduce selective grazing of plants that are more palatable to the animals. A second advantage of rotational grazing is that this system allows for the regrowth of vegetation after grazing by providing rest periods for the grassland. These periods may last from 10 to 60 days, depending on the rate of vegetative growth and the number of paddocks. Third, the rest periods decrease the amount of damage caused by compaction of the ground and animal wastes, because the time the herd is on the land is substantially decreased. Finally, rotational grazing allows more animals to be produced on a given area of pastureland, because more of the available forage will be utilized by the livestock. With a higher rate of forage utilization, production per acre is increased.

The grazing system has disadvantages as well. While production per acre is increased, the production weight of the livestock, or production per animal, may not be as high as that of animals that can selectively graze, although the livestock will still be of good quality. In rotational grazing, managing the herd requires much more time and labor than continuous grazing, since the animals are moved frequently. A rotational grazing system also requires extra fencing to separate the land into paddocks, increasing the costs to the producer.

Strip grazing is a type of rotational grazing system. In strip grazing, a large pasture is divided into strips with movable fences to control grazing. Paddocks are usually defined by a portable electric fence that allows the animals access to 1 to 3 days worth of forage. They have access to the areas that have been previously grazed as well as the fresh vegetation. The animals are grazed at a high stocking intensity (relative number of livestock per unit for a fixed period). Strip grazing is used mainly for stockpiled forages during the dormant season.

**Management-Intensive Grazing**

Management-intensive grazing is another form of rotational grazing. The length of the grazing period is usually less than 5 days. The stocking rate in intensive grazing systems is increased, with the number of animals per unit area being greater than the other systems.

Advantages of intensive grazing include the maintenance of grassland composition and decreased damage from compaction and animal wastes. Because more animals are stocked and forage utilization is high, the production per unit area is even greater than in other grazing systems. Since the herd is moved frequently, the increase does not additionally harm the forage population. With its short grazing periods, intensive grazing also provides for long periods of rest and regrowth. Another advantage is that the operator is in contact with the herd on a regular basis to identify and correct potential problems.

Disadvantages to using this system also exist. More time is needed to plan and set up the system. The pasture is divided into numerous paddocks, and the additional fencing increases costs. Production per animal may be decreased compared to animals allowed to selectively graze, although the large number of animals stocked in an intensive grazing system may make up for the loss per animal.

**Grazing Efficiency**

No grazing system is 100 percent efficient. In a pasture system, animal utilization of the forage is between 30 and 65 percent of what is actually grown. In continuous grazing systems, only 30 to 35 percent of the total forage produced is eaten by the livestock. When management intensive grazing is used, forage utilization can be as high as 65 percent of the forage produced.

To determine if forage availability is adequate for the herd, the efficiency of gazing must be considered. To calculate the actual amount of forage dry matter needed in a pasture to feed a herd during a particular season, the seasonal dry matter intake requirements should be divided by the forage utilization rate. For example, in a continuous grazing system with a herd that has a daily dry matter intake of 1,500 pounds and a season dry matter intake of 150,000 pounds, the amount of dry matter actually needed to feed the herd is 428,571 pounds (150,000 ÷ .35).

**Grazing Intensity**

Grazing intensity refers to the extent to which a plant or grassland is grazed. It is evaluated by looking at the height of the forage after grazing. The three levels of grazing intensity are heavy, moderate, and light grazing.

Heavy grazing, or overgrazing, exhausts the energy reserves of forages by removing growth too frequently, before it has a chance to replenish itself. Production declines, preferred plants are damaged, ground cover is reduced, and erosion begins. In cool-season grasses, heavy grazing is marked by the presence of less than 4 inches of growth in the fall. In warm-season grasses, anything less than 8 inches left at the end of the growing season would be overgrazing. Overgrazed fields typically have thin stands of vegetation, low forage vigor, and invading weeds or brush. The plants may appear short and weak.

Spot grazing is a form of overgrazing in which patches of pasture are grazed too frequently. Spot-grazing occurs during periods of active forage growth when livestock graze spots in a pasture while allowing other areas of the field to become mature and unpalatable. The livestock frequently regraze new growth in these spots because it is more palatable. Spot-grazed pastures have uneven forage heights and the forage in the grazed spots may become weak and thin.

Moderate grazing leaves enough vegetation to maintain the vigor of forage plants and protect the soil. Grass production remains high due to healthy root systems with substantial energy reserves. Cool-season grasses that are moderately grazed are 4 to 8 inches high at the end of the season. Warm-season grasses have 8 to 10 inches of growth left. Moderate grazing generally results in pastures that are evenly grazed, with a uniform grazing height, thick stands, and good forage vigor.

Light grazing, or undergrazing, may not be beneficial if it results in too much tall, dense forage left in the fall. Excessive ground litter (accumulated plant parts on the soil surface) can interfere with the next year's crop. Cool-season grasses left taller than 10 to 12 inches at the end of the growing season are considered lightly grazed. Lightly grazed warm-season grasses are more than 12 to 14 inches high.

**Carrying Capacity**

Carrying capacity is the number of animals that a grazing unit can sustain throughout the grazing season. Factors that affect carrying capacity are annual forage production, seasonal utilization rate, average daily intake, and length of the grazing season. These factors are applied in the following formula.

$$\text{Carrying Capacity} = \frac{\text{Annual Forage Production} \times \text{Seasonal Utilization Rate}}{\text{Average Daily Intake} \times \text{Length of Grazing Season}}$$

Annual forage production is the amount of forage dry matter produced per acre (lbs./acre) during the year.

Seasonal utilization rate is the percentage of the forage produced that will be consumed by the herd in one year. This figure will vary according to the length of the grazing period.

Average daily intake is the percentage of the animal's body weight that will be consumed in forages on a daily basis (lbs. forage/lbs. live weight). Because it is an average, this figure may vary from animal to animal. It is determined by the performance class of the animal, as described in Lesson 1 of this unit.

Length of grazing season is the number of days per year that the herd's nutritional needs are met through grazing.

Suppose the annual forage production for a particular grazing unit is 7,000 lbs. of forage per acre. With a 15-day rotation period, the seasonal utilization rate is 60 percent. The average daily intake for the heifers that will use that paddock is 3 percent. It is grazed from April 1 to September 30, or 183 days. The carrying capacity is 765 lbs. live weight/acre.

$$\frac{7{,}000 \text{ lbs./acre} \times .60}{.03 \text{ lbs./lbs. live weight} \times 183 \text{ days}} = 765 \text{ lbs. live weight/acre}$$

### Time of Grazing

Grazing time is determined by the stage of growth, not the calendar. The time of harvest will therefore vary slightly by plant species and may also vary within a plant species due to environmental conditions and management practices.

The goal of grazing is to keep the forage in the vegetative (leafy) stage, when forage growth is continuous and nutritional quality is high. The vegetative stage ends when plant reproduction begins. Plant growth occurs in four stages. They are referred to as the vegetative, boot, heading, and mature seed stages in grasses. In legumes, they are the vegetative, bud, bloom, and mature seed stages.

### Grazing's Effect on Wildlife

Because grazing changes the quality and quantity of plants in the grassland, wildlife is affected by grazing livestock. Continuous grazing does not benefit wildlife because it depletes the amount of food and protection available. However, special provisions such as brush piles and fence lines with tall vegetation may aid wildlife. In contrast, rotational systems provide food and habitat for wildlife while forages are growing. They favor more diversity in grassland composition, which improves the food and cover available to wildlife. Rotational grazing systems also tend to protect wildlife habitat found in woody draws and along bodies of water by restricting livestock from these areas.

### Cool-Season Grasses, Warm-Season Grasses, and Legumes in Grazing Systems

Using cool-season grasses, warm-season grasses, and legumes in a grazing system can be very beneficial. Doing so can improve overall quality of forages and increase livestock carrying capacity. Ideally, one-third of a producer's grazing system should consist of warm-season grasses. These grasses, such as big bluestem, eastern gramagrass, and indiangrass, begin the bulk of their growth around June and July, just when cool-season grasses like tall fescue and orchardgrass are finishing their spring growth. Legumes like red and white clover can lengthen the grazing season of cool-season grasses because they will often grow longer into the summer than the grasses do. They will also provide higher quality forage, fertilize the ground (through nitrogen fixation), and increase yields. As warm-season grass production declines after growth peaks in August, cool-season grasses reach another peak in forage growth during early fall.

### Benefits for Wildlife

A grazing system of cool- and warm-season grasses and legumes can also provide wildlife with a more diverse habitat. By the time warm-season grasses are ready to be harvested (hayed or grazed), most grassland species of wildlife are finished using them for reproduction. At this time, the cool-season grasses are being rested, and wildlife can then use them for cover or nesting if necessary.

### Summary

Grasslands may be harvested through grazing or mechanical harvesting. Rotational and continuous grazing are two types of grazing systems. Continuous grazing is a grazing system in which the herd remains in one pasture for the majority of the grazing season. Rotational systems, such as strip grazing and intensive grazing, involve movement of the herd between two or more pasture units. Movement is based on the rate of growth and grazing intensity. The carrying capacity of a particular pasture is determined by annual forage production, seasonal utilization rate, average daily intake, and length of grazing season. The quality and quantity of forages is optimized if harvest occurs during the second stage of plant growth. Rotational grazing is the best system for maintaining wildlife habitat. A grazing system that combines cool-season and warm-season grasses and legumes benefits both livestock and wildlife.

### Credits

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