



Forage Management

Edward B. Rayburn, Ph.D.
Extension Forage Agronomist

October 1992

Number and Size of Paddocks in a Grazing System

The questions most frequently asked by livestock producers wanting to develop a rotational grazing system are “how many paddocks do I need?” and “how large should they be?” The answers to these questions depend on the farmer’s goals, the current level of forage production, the number and size of animals in the grazing herd, the nutritional needs of the animals, and what other feeds the animals will be given while on pasture.

The number of paddocks in a grazing system determines the flexibility available to the manager in controlling the timing and intensity of livestock grazing. When grazing is managed carefully, increasing the number of paddocks can increase the grazable forage yield per acre and animal production per acre. However, this increase is at a diminishing rate as paddock numbers increase (Figure 1). The optimum number of paddocks depends on the producer’s goals, the class of livestock being grazed, and the local market and production economics. A greater number of paddocks is justified for lactating dairy cattle than beef cattle. Usually you can justify more subdivisions for stocker cattle than for a cow-calf herd. The number of paddocks in a grazing system depends on the regrowth or “rest” interval provided the pasture and the number of days the livestock are allowed to stay on the paddock. The total number of paddocks needed in the grazing system should be based on the longest regrowth interval and stay planned. This usually occurs in late summer.

The regrowth interval needed by the pasture for optimum production depends on the forage species and the time of year. In the spring, grass-clover pastures need 21 days of regrowth. This increases to 42 days in midsummer. Birdsfoot trefoil-timothy

and alfalfa brome grass pastures should have 35-42 days regrowth, depending on weather conditions.

Pastures should be grazed to the desired level using 3-7 day stay to prevent grazing of plant regrowth. A 3-day stay largely prevents regrowth grazing and may increase pasture production. The 3-day stay should be considered where economics justify the increased fencing and management input. A 7-day stay is often used by beef producers as a compromise to simplify management. When grazing stays extend beyond 10 to 14 days, approximately half the pasture will be regrazed. This can result in a 25% reduction in plant growth in the next regrowth cycle.

For dairy cattle, the number of days on a paddock should be decreased to meet animal nutrition needs. As a pasture is grazed, forage intake and nutritive quality decrease. For dairy cattle, this results in lower milk production after three days on a seven-day rotational system. One-day grazing stays are used by dairy producers first trying intensive rotational grazing. Many managers then go to a 12-hour stay since this provides more uniform nutrition from the pasture and requires little extra labor when using temporary fencing within permanent paddocks.

The number of paddocks needed in a grazing system is equal to the number of days that a paddock will be rested, divided by the number of days it will be grazed, plus one paddock for the animals to be grazing while the other paddocks are resting. This is written as the equation:

$$\text{paddocks} = (\text{days rested}/\text{days grazed}) + 1$$

Here is an example using a livestock herd

grazing paddocks for a 2-day stay in a pasture system needing a 42-day rest interval.

$$\text{paddocks needed} = (42/2)+1=21+1=22$$

Paddock size is determined by the available pregrazing mass per acre and the forage requirement of the herd. Grazable forage dry matter (DM) per acre varies. A thick, well-managed, orchardgrass-white clover stand can provide 1500-1750 lb DM/a grazable forage above a 2- to 3-inch stubble. Average grass-clover stands provide about 1000-1500 lb DM/a of grazable forage in each grazing period.

Most grazing livestock consume about 2.5% of their body weight in pasture DM every day. Dairy cattle require more feed, which is often provided as supplemental.

A good estimate of paddock size in acres is made by multiplying the pounds of pasture DM eaten per

head per day (DM/hd/day), times the number of head in the herd (hd), times the days on the paddock (d), divided by the pounds of grazable forage DM available per acre (DM/a). In equation form this is:

$$\text{Acres} = (\text{DM/hd/day} \times \text{hd} \times \text{d}) \text{ DM/a}$$

The paddock size needed for a herd of 50, 1350 lb cows, consuming pasture at 34 lb DM/hd/day (0.025 X 1350), grazing a pasture yielding 1250 lb grazable forage DM/a for a 2-day stay would be:

$$\text{acres} = (34 \times 50 \times 2)/1250 = 2.7$$

Estimates made using these equations will provide realistic paddock numbers and size. When potential pasture production is greater than the animals' needs the extra forage can be harvested from some of the paddocks for stored feed or for sale. Experience, common sense, and proper pasture and livestock management will allow livestock producers to make the most from developed grazing systems.

Figure 1. Under good forage management as the number of paddocks increases potential yield per acre increases but at a decreasing rate.

