Four steps to rotational grazing

A well-managed pasture program can be the most economical way to provide forage to ruminant animals. On dairy farms where pasture makes up a significant portion of the forage program, feed costs may be reduced during the grazing season by $.50 to $1.00 a day per cow. However, careful planning and sound management are needed to optimize pasture utilization and animal performance. Knowing your animals, plants, and soils and being able to respond to their needs are skills that must be developed if rotational grazing is to be successful on your farm.

Using your land resources to develop a pasture system that fits in with your total animal, forage, and crop program is an important first step in pasture management. A major goal is to provide quality pasture for the grazing animals throughout the grazing season. Information provided in this brochure can help you plan to attain this goal.

Example: A beef cow herd of thirty 1300-pound cows with calves and one 2000-pound bull is used as an example to demonstrate the four steps to rotational grazing.

STEP 1.

Determine the number of animal units that will be in the grazing system.

The first step to rotational grazing is to determine the forage requirements of your herd or flock based on animal units (AU). One animal unit is equivalent to the daily forage intake of a 1000-pound dry cow (about 25 pounds of dry forage per day). Dry matter forage intake varies with animal species and class. Table 1 gives some typical animal unit values for various species and classes of livestock.

Table 1. Animal units of various species and classes of livestock.

LIVESTOCK	ANIMAL UNITS
Dairy*	
1000-lb dairy cow (maintenance)	1.0
800-lb dairy cow (last 2 months of gestation)	1.0
1000-lb dairy cow (last 2 months of gestation)	1.2
1300-lb dairy cow (last 2 months of gestation)	1.5
1500-lb mature dairy bull	1.4
550-lb growing dairy heifer	1.0
Beef cattle	
1000-lb dry cow	1.0
1300-lb dry cow	1.3
1000-lb lactating cow (first 4 months after calving)	1.4
1300-lb lactating cow (first 4 months after calving)	1.6
2000-lb mature bull	1.7
550-lb growing-finishing steer (2 lb per day gain)	1.2
Sheep	
110-lb brood ewe	.15
132-lb brood ewe	.17
175-lb brood ewe	.20
300-lb mature ram	.40
110- to 132-lb replacement ewe, lambs, yearlings	.22
220-lb replacement ram, lambs, yearlings	.42

*Animal units for lactating cows are difficult to determine because of supplemental feeding.

Determine total AU of herd using the equation

AU X number of animals = AU
+ AU X number of animals = AU
Total AU of herd

Example: 1300-lb cow with calf = 1.6 AU, and 2000-lb bull = 1.7AU

1.6 AU X 30 cows = 48.0
+ 1.7 AU X 1 bull = 1.7
49.7 (50) AU of herd

STEP 2.

Estimate how many acres will be needed throughout the grazing season.

Estimating the number of acres required to pasture a herd or flock depends on both the feed requirements of the animals and the available forage produced. Pasture growth is dependent upon plant species, soil characteristics, topography, fertilization, temperature, and soil moisture. Because of the variability in pasture growth, we can only estimate the number of acres required for grazing animals. Table 2 provides some estimated values of the acres required for grazing animals on various types of pasture.

To estimate how much pasture a herd or flock will need, first calculate the total AU of the herd (Step 1). Using Table 2, estimate how many acres each AU will need during each month of the grazing season. For example, if the herd will be grazing medium-producing Kentucky bluegrass and white clover pasture in June, approximately 1.3 acres will be needed to support each AU. The same herd grazing medium-producing orchardgrass and white clover pasture would need only 0.7 acres for each AU.

> Example: Step 1 determined that the herd contains 50 AU. The herd will be grazing medium-producing orchardgrass and white clover pasture.
>
> May (0.7 acres/AU) X 50 AU = 35 acres
> June (0.7 acres/AU) X 50 AU = 35 acres
> July (1.2 acres/AU) X 50 AU = 60 acres
> Aug (1.2 acres/AU) X 50 AU = 60 acres
> Sept (1.2 acres/AU) X 50 AU = 60 acres
> Oct (6.2 acres/AU) X 50 AU = 310 acres

For the example herd, 60 acres will be sufficient for much of the year. However, there will be excess forage in the spring, and the herd will need to receive supplemental forage in October. During this deficit period in the fall, stockpiled tall fescue or brassicas could be utilized.

Table 2. Acreage required to provide the forage needs per animal unit assuming 70 percent pasture utilization.

PASTURE SPECIES	PASTURE PRODUCT	ANNUAL DM YIELD	ACRES REQUIRED TO PROVIDE FORAGE NEEDS FOR ONE ANIMAL UNIT*								
			APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
		T/A	ACRES/AU								
Bluegrass and white clover	medium	2.0	5.4	0.6	1.3	5.5	5.5	2.2	3.5		
Orchardgrass and white clover	low	2.0	.	1.0	1.1	1.8	1.8	1.8	9.2		
	medium	3.0	.	0.7	0.7	1.2	1.2	1.2	6.2		
	high	3.5	.	0.6	0.6	1.1	1.1	1.0	5.3		
Orchardgrass plus nitrogen	low	2.0	5.4	0.8	1.3	2.8	2.3	1.8	9.2		
	medium	3.0	3.6	0.5	0.9	1.8	1.5	1.2	6.2		
	high	4.5	2.4	0.4	0.6	1.2	1.0	0.8	4.1		
Stockpiled tall fescue	medium	4.5	2.4	0.4	0.6	1.0	.	.	1.1	1.0	1.0
Summer seeded brassicas	medium	3.0	.	.	.	.	.	.	0.9	0.4	0.4

*Based on an animal unit consuming 25 pounds of dry matter forage per day with 70 percent of pasture utilized.
Note: Actual acreage will depend on pasture yield, dry matter intake, and efficiency of pasture utilization.

STEP 3.

Estimate how large each paddock should be.

Paddock size depends on the AU of the herd, the amount of available pasture at the beginning of grazing, and the desired grazing period. Available pasture is pasture present in a paddock at the start of grazing minus the amount present when the animals are removed from the paddock. Depending on plant density, typical Pennsylvania pastures have about 300 pounds of pasture for each inch of height. If a herd is turned into a paddock when the pasture is 7 inches tall and taken off when the pasture is 4 inches tall, approximately 900 to 1000 pounds of pasture are available. Table 3 provides some suggested paddock sizes (acres per AU) for rotational grazing.

Table 3. Paddock sizes based on grazing period and available pasture.

GRAZING PERIOD, DAYS	% PASTURE UTILIZATION*	AVAILABLE PASTURE (LB DRY MATTER PER ACRE) 750	1000	1500
			ACRES/AU	
1	80	0.042	0.031	0.021
2	75	0.089	0.067	0.044
3	75	0.133	0.100	0.067
4	70	0.190	0.143	0.095
5	65	0.256	0.192	0.128

*These are estimates of the percentage of pasture actually consumed. Utilization is usually improved as grazing pressure is increased.

To calculate paddock size, multiply the suggested acres per AU by the AU in the herd.

Example: The herd will graze each paddock for 3 days when 1000 pounds of pasture are available.

0.1 acre/AU X 50 AU = 5 acres in each paddock

Use of temporary interior fences is recommended for flexibility.

STEP 4.

Estimate the number of paddocks needed.

The number of paddocks needed for a rotational grazing system will depend on the number of days the animals graze in a paddock and the maximum summer rest period needed. Rest periods should be based on the growth rate of the pasture, which will vary with the season and weather conditions (Table 4).

Table 4. Paddock rest periods for rotational grazing systems.

SEASON	WEATHER CONDITIONS	GROWTH RATE	REST PERIOD
Spring	Cool, moist	Fast	10–14 days
Spring	Warm, dry	Medium	14–20 days
Summer	Hot, moist	Slow	30–35 days
Summer	Hot, dry	Very slow	40–60 days

Since growth rate is affected by soil productivity and fertility levels, even within a pasture system, rest periods will vary. The best way to manage this situation is to have a flexible rotational scheme, moving animals to those paddocks that have reached their optimum available pasture. Animals should be kept off a particular paddock until it reaches its desired optimum available pasture.

Spring management usually involves diverting some of the paddocks out of the rotation scheme and using the forage for hay or silage. This effectively shortens the rest period between grazings and improves utilization of rapid spring growth.

(Maximum days rest divided by number of days grazing) + 1 = paddock number

Example: The herd will graze each paddock for 3 days, and the maximum rest period between grazings will be 35 days.

(35 days rest divided by 3 days grazing) + 1 = 13 paddocks

Species and class of grazing animal may determine the grazing period. Since lactating dairy cows need consistent forage quality, the grazing period for them may be anywhere from .5 to 2 days. However, beef cows, brood ewes, and most other ruminants do not need consistent forage quality, so a grazing period of 3 or more days may suffice.

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