

Cattle Business in Mississippi – June/July 2004
“Stocker Cents” article

Stocking Rates for Stocker Cattle

Richard Watson – Mississippi State University Extension Forage Specialist

One of the challenges to efficient and profitable stocker cattle production on pasture is matching the forage supply to animal demand and vice versa. While there are several things we can do with our pastures that will help us lift our forage production, such as fertilization and pasture renovation, we also need to be able to stock our land appropriately to make best use of this production. If we understock we will waste a lot of forage production, and if we overstock we risk running out of forage and having to buy expensive feed for our animals. Either way, we are losing money. Setting an appropriate stocking rate is even more important in stocker cattle operations where we are trying to grow the animals as efficiently as possible.

So what is an ‘appropriate’ stocking rate? In order to determine appropriate stocking rates we need to understand the concepts of forage supply and demand.

Forage supply

Forage supply is how much forage (pounds of dry matter) that you have available at a given time or within a given time period. Dry Matter is the amount of forage remaining after you remove all the water. A typical green leafy pasture might be as much as 75-85% water by weight, so if you were to cut 10 lbs of green grass and dry it you would end up with about 2 lb of dry matter. It is important to think in terms of dry matter as it is this fraction of the pasture that has the feed value. Forage supply is determined by pasture growth rate, available forage, and land area. The combination of these factors will determine how much forage we have available to feed our cattle, and understanding these factors will allow us to improve the quantity and utilization of our forage supply.

1. Pasture growth rate.

Pasture growth rate is usually expressed in terms of pounds of dry matter grown per acre per day (lbDM/A/d), and varies greatly depending on the plant species, soil fertility, season, climate, and grazing management practices. Pasture growth rate is one of the most difficult factors to measure, and certainly one of the most difficult to control. However, there are some practical methods that can be used to get estimates of pasture growth. The first method is to use the yield data for the different grass species in the Mississippi Forage Crop Variety Trials Report (Information Bulletin 401). While the variety trial reports will not give growth rates on a per day basis, the yield recorded at each harvesting date will give an indication of the growth rates between each harvest. This information can be used to estimate how much forage was produced in a given month. Remember that these variety trials are well fertilized so growth rates will be higher than on lower fertility pastures. You also need to look at a number of different years to get an idea of the annual variation in forage

growth. Another method is to use the change in forage height as an estimate of growth rate. By measuring the height of an ungrazed pasture with a ruler or forage stick, and measuring it again a month later, the amount of forage growth can be estimated using the dry matter guidelines in Table 1. For example, if you had 4 inches of growth on an annual ryegrass pasture in a month, that would be approximately 1000 lbs of dry matter growth per acre, or around 30 lb of dry matter growth per acre per day.

2. Available forage

Available forage is how much forage is present in a pasture and is usually expressed in terms of pounds of dry matter per acre (lbDM/A). It can also be used to describe the total dry matter available on the farm, and can include stored pasture feeds, such as hay. Available forage levels can be determined by cutting squares of forage from a pasture, drying them, and weighing them. However, this is not practical in a commercial situation so the easiest way to estimate available forage is again to use pasture height and the guidelines in Table 1.

Table 1. Approximate pounds of forage available per inch of growth.

Species	Dry Matter pounds/inch/acre	
	Average ¹	Range
Bermudagrass	260	150-500
Annual Ryegrass	250	75-400
Tall Fescue	210	100-350

Adapted from Ball, Lacefield, and Hoveland. Southern Forages, 3rd Edition 2002.

¹*Assumes a good stand with adequate fertilization. You must adjust the forage availability for thinning stands.*

The term ‘available forage’ can sometimes be misleading, as the total amount of forage present in a pasture is not necessarily the amount of forage that is actually ‘available’ to the animal. Cattle graze by wrapping their tongues around the grass and pulling it into their mouth. Therefore, as the height of the pasture decreases, their ability to eat the grass gets more difficult until they are unable to maintain their forage intake. As a rule of thumb, forage intakes of cattle will start to fall once the available forage levels drop below 1500 lbs of dry matter per acre (5-6” pasture height) and cattle generally cannot graze below 900-1000 lb dry matter per acre (3-4” pasture height). So we need to subtract this ungrazable portion of the pasture from our available forage total to give us the actual amount of forage that can be consumed by the animal. To maintain a good forage intake in stocker cattle you would not want to let the pasture to get below 1200 lb DM/A or about 5 inches in height.

3. Land area.

Land area is the easiest factor to control and estimate. Most of us should know how much land we have and how big our paddocks are. It is important to note that when assessing forage supply that you only include the actual land that is in productive

pasture and not forested areas, or the area covered by ponds or buildings in a pasture.

Once you have estimates of these three factors you can begin to determine your forage supply. For example, if you wanted to estimate the monthly forage supply from a 100-acre paddock of annual ryegrass that is 10" tall and is growing at approximately 40 lbDM/A/d you could use the following calculation. From Table 1, a 10" annual ryegrass stand has about 2500 lbDM/A. Therefore, total forage supplied for that month is (2500 lbDM/A x 100 acres) + (40 lbDM/A/d x 100 acres x 31 days in the month) = (250,000 lb) + (124,000 lb) = 374,000 lbs of forage dry matter supplied by the 100-acre field. Now we need to consider forage demand to help us stock this paddock.

Forage Demand

Forage demand is how much forage (pounds of dry matter) that you require at a given time or within a given time period to meet the feeding requirements of your cattle. Forage demand is generally easier to measure and control than forage supply and is determined by factors such as the size of the animal, growth rate, quality of the forage, and how many animals you have.

The liveweight and daily gain of stocker cattle greatly affects the feed required by that animal. Feed eaten by stocker cattle is used first to maintain the essential body functions, and what is left after that can then be used for growth. Larger animals require more feed to maintain their bodies than smaller animals so require more feed to achieve the same growth rates. As the animal grows, its requirement for feed will also grow if you want to maintain the same gains. For example, if you have a 400 lb stocker animal growing at 2 lb/day you will initially need to feed that animal around 12 lb dry matter per day. However, after 2 months that same animal will weigh over 500 lbs so will require about 15 lbs of forage to maintain the same growth rate. Table gives some approximate forage intake requirements for stocker cattle of different liveweight and daily gain.

Table 2. Daily forage requirement for stocker cattle at different liveweight and average daily gain.

Liveweight (lbs)	ADG (lb/d)					
	0.5	1.0	1.5	2.0	2.5	3.0
Forage Intake (pounds of dry matter per head per day) ¹						
220	5.0	6.0	7.0	8.0	9.0	10.0
440	8.5	10.0	11.5	13.5	15.0	17.0
660	11.5	13.5	16.0	18.0	20.5	22.5
880	14.5	17.0	20	22.5	25.5	28.0

¹ Intake figures are to be used as guidelines only and represent average intake of good quality forage.

Matching forage demand and supply

Once you have established how much forage you have available, you can then determine the number of animals you can graze for a given time period. You will first need to know the average weight of your stocker cattle and set target weight gains to know how much forage each animal will require on a daily basis.

Using the previous example of our 100-acre paddock, if we needed to get one month (31 days) grazing out of our 100-acre paddock, how many stocker cattle could we run on that area assuming we have animals that start at 440 lb liveweight and we want them to grow at 2 lb/head/day for the 31 day period? This would give us animals that weighed about 500 lbs after the 60 days, which means that the average weight of the animals during the grazing period would be 470 lb. Therefore, a 470 lb stocker animal growing at 2 lb per day will have a daily forage requirement of around 14 lb of dry matter, or $14 \text{ lb} \times 31 \text{ days} = 434 \text{ lbs of dry matter}$ for the whole month. The 100-acre paddock supplied 374,000 lbs of dry matter in a month, however we do not want to graze our pastures below 1200 lbs/A to maintain the intake of our stocker cattle so we must subtract $1200 \text{ lb/A} \times 100 \text{ acres} = 120,000 \text{ lbs}$ from our total forage supply (i.e. $374,000 - 120,000$). This gives us 254,000 lbs of forage dry matter that can be fed to the stocker cattle. If we divide this forage supply total by the amount of forage needed to feed one stocker animal for a month (i.e. $254,000/434$), we get the number of animals we could run on that 100-acre paddock for a month, which equals 585 stocker cattle.

We can also use these calculations to estimate the number of grazing days in a paddock. For example if we had 300 head of stocker cattle that we wanted to feed 15 lb of dry matter per head per day, the same 100-acre paddock would give us about 56 days of grazing (i.e. $254,000 \text{ lbs of dry matter}/(300 \text{ head} \times 15 \text{ lbs/day})$).

Doing these calculations does not take a lot of time, however, it may take some time and practice to feel comfortable with estimating forage availability. Once you have mastered this, you will have a valuable tool in helping you manage your forage resource to best meet the needs of your stocker cattle operation. These calculations can also help you identify times that supplemental feed might need to be fed, or times of excess forage supply where hay can be made.

Even when you feel that you are fairly accurate at estimating forage availability, it is important to realize that these calculations are based on estimates and should not be used for anything other than a general guide. It is always better to be conservative in your stocking rate and risk an excess forage supply rather than risk running out of forage too soon.