

IMPROVING PASTURE PRODUCTIVITY AND QUALITY

So you can meet the new organic pasture standard and cut feed costs

By Sarah Flack

Do your pastures “run out” in July or August so you have to start feeding more in the barn? Are your pastures weedy, short or full of plants the animals won’t eat? Many of these problems are caused by over-grazing damage. *This article will present an overview of how over grazing damage happens, and how you can get started with a new and improved grazing system to repair that damage.* This will help lower summer feed costs and make sure you are meeting the new organic pasture standard.

Common situations that cause overgrazing damage:

- **Taking down all the interior fences in the fall to let cows “clean up” the pastures**
- **Having a rotational grazing system with just 6 or 7 paddocks (or fewer) which are each grazed for 1 or 2 days.**
- **Leaving livestock in the pasture for more than 3 days in a row**
- **Returning livestock to a pasture before it has had time to regrow back up to at least 6 or 8 inches tall**
- **Using some pastures as the “lane” so they are constantly walking through pasture areas to get to other pastures.**
- **Not adding in additional acres during summer when pasture plant growth rates slow.**

Pastures, just like hay fields, need to have time to regrow after each time they are grazed (or mowed). Pasture plants need time to rest and re-grow leaves and roots. This gives them time to replenish energy stored in roots (by photosynthesis). Leaving the animals in the same pasture or returning them to a pasture before it is fully re-grown does not give the plants time to recover. Repeated grazing, without adequate time for plants to re-grow, results in plants that weaken, may stop growing and die. These weakened plants will not be able to compete with weed species, and won’t be able to hold the soil as well, resulting in bare soil and erosion. Some grasses and clovers will survive by staying very short, never growing tall enough for livestock to easily graze, while other areas in the pasture will be rejected by livestock, soon growing up into weeds, brush or small trees. (*Got thistle? Milkweed? Bedstraw?*)

With good grazing management, livestock are usually moved to a new pasture every 12 hours to 3 days. Livestock are then not returned to the pasture until it has fully recovered by re-growing to at least 6 to 8 inches of height. Here in the Northeast, this may be as soon as 14 days in early summer when the plants are growing rapidly, but it may be 40 days or longer later in the summer before the plants are fully recovered.

This variable re-growth period means that when pasture growth slows down in later summer, the total number of acres needed to graze will have to be increased. If the number of grazing acres is not increased, the plants will not be getting enough rest, and dry matter intake by animals will drop, resulting in both poor animal and poor pasture performance. One of the most common mistakes in grazing is not adding additional acres as plant growth rates slow down.

PASTURE LAYOUT

Use the worksheet at the end of this article to calculate what size paddocks is needed, and how many acres will be required. Once you have this information, sit down with an aerial photograph or survey map of your farm. You can use a marker to outline pastures and meadows and to draw in existing fences. Then, using the photograph (and some common sense) you can decide where to put lanes, fencing, paddocks and water. When subdividing your grazing land, here are some suggestions:

- Put lanes on high dry ground - you may need some improvement and maintenance on muddy or wet areas.
- Some areas on your farm will grow faster than others. Whenever possible, try to put fast growing areas in one paddock and slow growing areas in another.
- Consider topography, and if possible put south facing slopes in one paddock and north slopes in another.
- Minimize shady loafing areas where animals will tend to lay down and drop all their manure. Ideally animals will spread their manure evenly over the pasture. Instead, plan for some shade pastures, which you can use on very hot or humid days.
- Try to provide water in each paddock so animals don't have to walk to find it.
- Put gates in the corner of the pasture closest to the barn.
- Attend pasture walks, read some grazing publications, visit other grass based farms and learn from their experiences

FENCING AND WATER

Advances in fencing technology make this type of grazing management much easier. You will need a good quality, low-impedence energizer that is well grounded, and perimeter fencing which can conduct electricity with minimal resistance. Here in the Northeast you will need some type of lightning protection. Most people also use some kind of portable fencing to subdivide larger areas.

Water can be provided to cows in paddocks in several ways. Water lines can be buried, or you can just lay pipe on the ground along a fence line or a lane. Water tubs can be small and portable, or can be larger and rarely moved. It is less expensive to have a few portable tubs than a whole lot of permanent tubs. If piping water out to pastures is not possible, water can be provided using a large tank on a wagon, which is parked in the pasture. Wherever the water source is, you will probably want to use a float valve to control water flow.

To start with, try to be as flexible as possible with your fence and water system. You may change your set up a few times, and you may need to have flexible paddock sizes as your herd size changes and your pasture productivity increases.

PASTURE IMPROVEMENT IDEAS

- Don't follow a set rotation. If one pasture grows faster than the others, graze it more often.
- Walk your pastures each week to monitor how fast the plants are re-growing.
- Don't let animals back into an area until it has grown back to at least 6 to 8 inches tall.
- Don't let animals stay in one area for more than 3 days, 12 - 24 hours is far better.
- Move animals frequently - moving animals more frequently can increase dry matter intake and improve pasture quality faster.
- Lock animals in each paddock so they can't wander back to the barn.
- Use a back fence to prevent "back grazing", so that animals don't over-graze favorite plants.

Sarah Flack teaches workshops on grazing management and many other topics. You can find articles at www.nofavt.org or www.sarahflackconsulting.com

PASTURE WORKSHEET TO CALCULATE:

- percent dry matter from pasture
- paddock size needed per day for the herd
- number of acres needed throughout the grazing season

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Dry Matter Demand (DMD) - or how much dry matter (DM) the animal needs each day

You can determine your livestock's total daily DM demand several ways

- 1.) use the National Research Council (NRC) tables
- 2.) use a % body weight (total DMD will range from 2% to over 4%)
- 3.) use information from your nutrition program/ration sheets

line A: total DMD (dry matter demand) per animal _____

Once you know the total DM demand per animal, you need to decide how much of this daily DM you want to provide from pasture and how much you want to feed in the barn or barnyard. You may want make this decision with your nutritionist or other qualified farm advisor.

Line B: DM you intend to provide from pasture _____

For example if you determine that your dairy cows will each need 42 lbs of DM per day and you want to provide 30 lbs of DM from pasture, then you will plan on feeding 12 lbs of hay and grain in the barn and you write 30 lbs on line B.

Now we can use this information to calculate the % DM Intake (DMI) the animals will be getting from pasture and from stored feed AND we can calculate what size pastures and then we can go on to calculate how many acres you need to set up a grazing system.

Calculating DMI (dry matter intake) from pasture

% DMI from pasture = (lbs DM from pasture/total DMD) x 100

(Line B/line A) x 100 = _____

In our above example, this would be 30 lbs/42 lbs times 100 which is 71.4% DMI from pasture. Now we know this herd is able to meet the organic rule for DMI and we can go onto design a grazing system to provide enough high quality pasture.

Calculating The Paddock Size needed to provide enough DMI to the whole herd or group
Line C: number of animals in the herd or group _____

Line D: Total lbs of DM from pasture needed per day for the herd or group
This is line B (lbs of DM per animal from pasture) times Line C = _____

If the example we were using on the previous page was for a herd of 40 cows, each needing 30 lbs of DM from pasture each day. Then Line D would be 30 lbs x 40 cows = 1200 lbs of DM per day

Line E: number of lbs of DM AVAILABLE per acre in the pasture _____

This can be measured or estimated in a number of different ways.

- 1.) the best way is to directly measure available DM per acre using a grazing stick or other pasture measuring device
- 2.) If that isn't possible, then the table at the end of this worksheet (Table 1) can be used. You will need to know the average plant height, and if the pasture is of average plant density, low density or high density.

Calculating Paddock Size: to calculate the number of acres needed per day for the group you divide the required amount of DM by the available amount of DM per acre.

Paddock size (in acres per day) = Daily DM Required (line D)/ Available dry matter (line E)

Line D/line E = Line F

Line F: number of acres needed per day _____

To continue our example, if there are 1400 lbs of DM available per acre, then the paddock size would be calculated by dividing 1200 by 1400 = .86 acres per day.

If its easier for you to think of this number in square feet, there are approximately 43,560 square feet in an acre. So a .86 acre pasture is 37,462 sq feet. (.86 x 43,560). That's a paddock which is 200 feet by 187 feet on a side.

Calculating How Many Acres you need for the whole summer.

Now that you know how many acres you need for the herd for one day, you can calculate how many acres you need to rotate through during the spring and summer so you don't run out of pasture. To do this you need to know the average pasture regrowth periods for your farm or area. If you don't have this information for your farm you can use table 2 at the end of this worksheet.

Number of acres needed in May = Line F x May regrowth time _____

Number of acres needed in June = Line F x June regrowth time _____

Number of acres needed in July = Line F x July regrowth time _____

Number of acres needed in August = Line F x August regrowth time _____

Number of acres needed in September = Line F x Sept regrowth time _____

If our Example farm had a May regrowth time of 18 days, they would need 15.5 acres (18 days x .86 acres). In August, with a regrowth time of 30 days they would need 25.6 acres.

TABLE 1**Estimating Available Pasture Mass (forage dry matter):**

This table shows the total amount of DM per acre. In order to estimate how much is AVAILABLE for the animals to graze, you must take the pre grazing height DM amount and subtract from that the post grazing height DM amount.

For example. If you turn the cows into an average density pasture when it is 8 inches tall, and take them out when it is 2 inches tall they will be harvesting 1400 lbs of DM per acre. 2600 lbs pre grazing - 1200 lbs post grazing = 1400 lbs available

Height	Average Density*	Low Density	High Density
DM/acre	Pasture lbs. DM/acre	Pasture lbs. DM/acre	Pasture lbs. DM/acre
8"	2600	2200	2800
6"	2400	2100	2600
4"	1800	1500	2100
2"	1200	1000	1400
1"	900	600	1000

*Lbs. of **dry matter per acre at each height varies widely** with plant density and species - Attending pasture walks or discussion groups are a great way to learn how to make these estimates more accurately!

TABLE 2**AVERAGE REGOWTH PERIODS**

Research done by Bill Murphy on a Fairfax Vermont (Champlain Valley) Farm on high quality pasture produced the following average regrowth periods during a 3 year period (of reasonably average rainfall). These are just averages. The regrowth periods on your farm may be shorter or longer and in a dry summer, the regrowth periods may easily reach 60 days or longer.

- 12 to 15 days in late April to early May
- 18 days by May 31
- 24 days by July 1
- 30 days by August 1
- 36 days by September 1
- 42 days (and longer) by October 1