

What is Good Grazing Management?

Sarah Flack, Organic & Grass-Based Livestock Consultant · December, 2014

The Benefits of Good Pasture Management

When done correctly, livestock grazing can create many benefits for the environment, plants, soils, animals and farm income. Pasture plant quality and soil health can improve, animal welfare can benefit, feed costs can go down, animal performance can increase and farm finances can become more sustainable.



A high producing dairy cow grazing in a diverse, high quality pasture uses her tongue to grab a mouth full of pasture. This photo was taken just as the herd was turned into one of the new paddocks they get after each milking. Photo by Sarah Flack

Good grazing management can change pasture plant species without tillage and reseeding, by just using animal impact from grazing. This can convert weedy brushy pastures, where animals have to search to find good quality forage, into highly productive pastures, which feed more animals higher quality forage.

These improved pastures provide low cost, high quality feed, which is particularly helpful for farmers facing rising feed and fuel costs. With high quality pasture in the ration, farms can decrease the amount of purchased grain and forages. Other cost savings can come from having cows harvest their own feed instead of paying for fuel needed for mechanical harvest, storage and feeding.

As pastures improve, plant density and diversity increases and soils are protected from erosion and compaction. Soil health is also improved by increased plant root growth and improved nutrient cycling.

In addition to these many benefits to plants, soils and livestock, there are changes in the meat and milk of pastured animals. Ruminants whose diet includes more forage and less grain produce meat and milk that contain different amounts and types of nutrients than grain-fed livestock. The nutrients that can be in higher amounts include beta-carotene, vitamins A, E and D, omega-3 fatty acids, conjugated linoleic acid and others. In addition to research supporting the higher nutritional value of these foods, consumers are also attracted to some of the other benefits of grass farming, including improved animal welfare and the many environmental benefits.

With all these benefits, it is no surprise that there is growing interest from both farmers and consumers in grass farming. However, for beginner farmers or farmers new to grass-based livestock farming, the number of suggestions on the “best way” to improve soil fertility, forage quality and pasture production can be overwhelming. This is particularly challenging to farmers who have not yet learned the basic core principals of good grazing management.

Without a solid understanding of the basic guidelines of how to set up and manage a pasture system, it is easy to get side tracked by the latest new idea and end up with a system that doesn’t meet the quality of life needs of the farmers, the financial needs of the farm, or the production & welfare needs of the livestock.

Types of Grazing Systems

Comparing grazing systems

Continuous Grazing	Rotational Grazing	Systems with variable recovery periods
Cattle are in the same paddock for the whole grazing season.	Cattle are rotated around several pastures, often on a set rotation. Recovery periods are not varied as plant growth rates slow.	Cattle are moved to a new paddock only when it has fully regrown. They are moved at least every 3 days. Recovery periods are variable based on plant regrowth time requirements.
Cattle graze selectively, making it difficult to balance the ration. Pastures will generally provide enough feed in spring, but later in the summer pasture will be too short, or too over-mature to provide enough dairy quality feed.	Cattle may have adequate dry matter intake and pasture quality in the spring, but as plant growth rates slow the pastures will be too short or plants will over-mature and provide less high quality feed.	Cattle will have adequate Dry Matter Intake and pasture quality throughout the grazing season.
Pasture quality and quantity will significantly decline as the season progresses.	As Cattle rotate back into pastures that are not fully regrown the quantity and quality of feed will decline.	Cattle only rotate back into pastures that are fully recovered so pasture quality and quantity is good. Additional acres are added into the grazing rotation as growth rates slow.
Pasture quality will decrease each year due to overgrazing damage, increased weeds, and rejected forage. Clipping and eventually renovation and reseeding may be needed.	Pasture quality will gradually decrease due to overgrazing damage, weeds, and rejected forage. Clipping can help prevent weeds from spreading, but eventually renovation and reseeding may be needed.	Pasture quality will improve over time. The more intensive the management, the faster the pasture will improve.

An effectively designed and managed grass based livestock operation requires an understanding of the basic principals of grazing management. It requires understanding what pasture plants need, what livestock need and how to put it together with the right infrastructure. This knowledge makes it possible for the farmer to choose which type of grazing system best fits their own farm and family goals, and to customize it so that it really works.

The methods of pasture management include systems managed intensively, simple rotational systems and large continuously grazed pasture systems. By intensive we are not talking about how short the pasture is grazed down, it refers to the management itself. The successful management intensive systems provide livestock with new areas of high quality pasture frequently, but then give those areas of pasture time to regrow before the next grazing.

When compared to the more intensively managed systems, continuous grazing requires less daily management in moving the cattle, fence and water tubs. However, continuous systems are less efficient, so they require more acreage of pasture, more clipping and may require occasional pasture reseeding and renovation over time due to overgrazing damage. Continuous grazing systems, particularly systems where cattle continuously graze the same pasture for most of the grazing season, usually provide less high quality feed. These types of management may result in lower growth rates, and milk yields, but require less day-to-day management.

By shifting from a continuous system to a simple rotational system, it is possible to make some improvements in pasture quality and quantity. Pasture productivity, however, will still be lower in a rotational system compared to an intensively managed system. A key difference between a simple rotational system and a higher quality system is that the better grazing systems pay close attention to how fast plants are growing. This requires that the recovery period after each grazing be increased as growth rates slow to make sure plants are always fully recovered before the next grazing. This key principal of variable recovery periods is essential to create the highest quality pastures.

Pasture plants need time to rest after each grazing in order to photosynthesize and replenish the energy stored in the base of the plant and in the roots. Continuously grazing animals in the same pasture, or returning them to a pasture before it is fully regrown, does not give plants time to recover and results in overgrazing damage. Continuous grazing also gives cattle time to graze the plants down very short, which can damage the plants. The resulting weak plants may stop growing or die. These weakened overgrazed plants will not compete well with weed species, will not hold soil well, and result in bare soil and erosion. Some grasses and clovers will survive by staying very short, never growing tall enough for livestock to graze easily. At the same time in that pasture, livestock will reject areas that will soon grow up into tall patches of grass, weeds, brush, or small trees. In continuously grazed pastures, there may also be a buildup of dead plant material or thatch on the soil surface and cow pies that have not decomposed quickly. These are all symptoms of grazing damage

Over the years, many terms have been used to describe the better-managed grazing systems. Andre Voisin used "Rational Grazing" in his writing in the 1950s. More recently grazing consultant Jim Gerrish and others use the term Management Intensive Grazing (MiG). I like this one as the emphasis is on the importance of the Management! Work by Allan Savory created Holistic Planned Grazing. Holistic Grazing is part of a comprehensive Holistic Management planning system, which includes financial planning, biological monitoring and establishing goals. Prescribed grazing is a term used in many NRCS publications. The term 'Mob Grazing' is used commonly now, and refers to use of high stocking density with long recovery periods. However farmers using holistic planned grazing or MiG may also use high stock densities and long recovery periods.

But keep in mind that what is more important than the name, is to know what key principals all successful grazing systems share. Successful grazing management pays close attention to the needs of the plants, the livestock and soils. So whatever the

name, these systems will favor the better pasture plant species, reduce weed problems, improve soil health, and increase the quantity of pasture dry matter produced while improving the nutritional quality of the feed.

Grazing guidelines

- Allow plants enough time to fully regrow and recover after each grazing
- Graze livestock in each area for a relatively short time (short period of occupation) to prevent “re-grazing”.

A good quality pasture should contain a mix of many plant species, no bare soil, and uniformly distributed manure from the most recent grazing. In a continuously grazed or simple rotation system, where plants are not allowed to recover fully between grazings, there are more likely to be patches of bare soil, less vigorous desirable plants, and increasing weeds. Patches will appear that never grow very tall, and eventually many of the desirable pasture plants will disappear.

Setting up the grazing system part one: The Plants

To provide the highest quality feed, farmers give animals a fresh pasture after each milking or twice each day. Some farms may move the herd more frequently than twice a day using strip grazing or other methods. This will allow for a higher stocking density and will more quickly improve pasture quality. Strip grazing is a strategy frequently used in mob grazing, and it is done by moving fence forward frequently, giving the cattle a new strip of fresh pasture each time.

If farm labor doesn't allow for that much time moving cattle or fences, it is possible to use larger paddocks and move livestock less frequently. The important guideline to follow is that livestock return to the pasture only when it has fully recovered. Here in the northeast, this may be as soon as 18 days in early summer when plants are growing rapidly, but it may be 40 days or longer later in the summer. The length of the regrowth period will vary significantly depending on soil moisture, soil fertility, plant species, past management and temperature. Ideally, farmers move animals frequently and each paddock is not grazed for more than three consecutive days. Using smaller paddocks and moving the herd more often will provide more consistent high quality feed and higher overall pasture productivity.

It is important that as pasture growth slows the speed of the rotation must also slow down. This is usually done by adding more acreage to the rotation. If the number of grazing acres is not increased, plants will not get enough rest, and animal dry matter intake will drop resulting in poor animal and pasture performance. Timing the first cut of hay early enough to allow some areas to grow back tall enough for grazing later in the season is the easiest way to add in more good quality pasture when plant growth slows in the summer. Paddocks should not be grazed in the same order. They should instead only be grazed when they are ready! This is another key difference between a simple “rotational” system and better-managed systems where the emphasis is on plant recovery periods.

So what to do when the pasture quality isn't as good as we want it to be? A common approach to “fixing” pastures which have become weedy or not productive enough is pasture renovation. Renovation of a pasture is completely tilling it up and reseeding it, which is a labor intensive and costly project to take on. This is why it is important that

less expensive options for restoring or improving the field have not been overlooked. Keep in mind that if a pasture is plowed and reseeded but the grazing management system is not changed, the reseeded will only provide a temporary solution to poor pasture quality.

As we have already discussed, improving the grazing management is the first way to try to improve pasture. Additional improvement ideas include assessing soil health by both visual observation, measures of soil compaction and soil testing. This may indicate that adding fertility, improving aeration or drainage is necessary. If minor improvements in plant species are needed, frost seeding can be done. This is a low cost method of broadcasting seed on frozen ground. The thawing and freezing action of the soil allows the seed to be incorporated into the soil. Frost seeding works very well with legumes, but is not generally as effective for most grass species.

Once non-tillage options have already been tried, and the decision that reseeded is necessary is made, it is important to make sure time and money spent is carefully planned. This should start with a thorough evaluation of the soils including how wet or droughty they are, soil type and soil testing. This provides the information needed to choose the right mix of plant species. For example, some pasture plants thrive in wet soils, while others will not survive there. Other factors that are important to think about in choosing what to plant include the local climate, the type of grazing livestock, existing weed pressure, and the length of time the stand is needed. There are a lot of differences regionally, so when reseeded a pasture in northern Vermont, you are likely to choose a different mix of pasture species than for a pasture in Pennsylvania.

What does a high quality dense pasture look like? It should include a diverse mix of several different grass species as well as several legume and forb species. Forbs may include chicory, dandelion and plantain. This will allow a nice mix of vertical grass leaves and stems with the more horizontal legumes and broad leaf forbs. This creates density, which makes it easier for livestock to get a full mouthful in each bite. It also creates more leaf area to photosynthesize and help the plant grow vigorously. When you stand in a high quality dense pasture and look down, you should see only plants with no bare soil visible between them.

Grass Productivity by Andre Voisin is one of several older publications I enjoy re-reading, as it reminds me that much of what we know about grazing has been around for quite a while. He used the term "rational" to describe good grazing systems. I enjoy his book because of both his technical information, and his obvious passion for the subject, which he expresses here along with a good description of what a well-managed pasture landscape should look like.

"What loveliness! What shades of colour all blending to form an even more magnificent picture where rational grazing is applied. The different paddocks, at different stages of re-growth, are not all of the same hue. Moreover, in a well-managed system the paddocks are not grazed in the same order as they stand, and so the colour tones, like reflections on the sea, do not gradually and uniformly diminish in intensity. Between two dark greens one glimpses a paddock lighter in colour, like the depth of a wave. A part

where the grass has already begun to flower takes on an undulating, wavy aspect. What enchantment a pasture grazed in this way offers they eye!

Setting up a grazing system part two: The livestock



Dry cows and heifers in a continuously grazed pasture have to put more effort into finding high quality feed as the number of weeds and rejected forage increases over time. Photo by Sarah Flack

Pasture height, digestibility and plant density control dry matter intake of grazing livestock. The best way to make sure the herd or flock is eating enough dry matter from pasture is to pay close attention to the quality and size of the bite of pasture they receive. If the pasture is too short, then they cannot get enough pasture in each bite to meet their dry matter needs, even if given a larger area to graze. If the pasture they are eating is too over-mature, and contains too many fibrous stems and not enough leaves, then it may not be digestible enough. This low digestibility can also limit their ability to consume enough pasture dry matter.

Cows and other ruminants can only take a certain number of bites each day and only graze for part of each day because they must also spend time resting and ruminating. This is one reason to provide a new pasture, which is fully recovered and dense, several times a day or at least every three days. When livestock go into a pasture that is fully regrown, they can rapidly fill their rumens with high quality feed. Managing for a dense pasture sward of the correct height results in better animal performance and a more profitable farm.

When ruminants graze, they wrap their tongues around pasture plants and snip them off with their lower teeth and upper dental pad. They generally first eat tender leaves and the tops of plants. If they are grazing the same pasture for several days or a week, the nutritional quality of what they eat each day will change due to this selective grazing behavior. So on day one they will get very high quality feed which takes them less effort to eat. Several days later in the same pasture the cattle are working harder and getting lower quality feed. Using a higher stocking density (smaller paddocks) and moving them to new pastures more often will result in more predictable pasture nutrient intake, which can make ration balancing and milk production easier to manage.



Using high stocking density and strip grazing, this beef herd is being grazed to maximize dry matter intake by the herd, while also letting the herd trample the plant residue left behind to allow for even, high quality regrowth for the next grazing. This photo was taken as the herd was eagerly waiting for us to move the fence to give them a new strip of grass. Photo by Sarah Flack

Don't push them to graze it down too short. Leaving more plant residue provides better quality feed for the livestock. It is also better for the plants to leave more plant residue behind, and not push the animals to stay in the pasture too long and graze the plants down too short. Livestock will reject some pasture around manure. This natural instinct helps them avoid areas containing parasites. The best way to manage these rejected areas is to improve the biological activity of the soil and population of insects such as dung beetles, so that manure is more rapidly incorporated into the soil. Using a higher stocking density so that the leftover plant residue is trampled will encourage this decomposition activity.

For farmers who can't use a high stocking density to get a thorough trampling effect, clipping pastures immediately after grazing may help manage rejected forage and standing residue, particularly in the first few years of grazing. Clipping with a mower and can be a useful tool for both weed control and mowing "straw like" over-mature grass stems so that regrowth at the next grazing is higher quality. When clipping it is important not to set the mower too low, and also important to clip as soon as cattle finish grazing the area so you are not mowing new regrowth. Some farms also use a "follower group" of cattle that have lower nutritional needs to "clip" the pasture. However, when using this method, care must be taken not to do overgrazing damage.

Summary

Now that we have looked at things from the perspective of the plants and from the perspective of the livestock, we can see how each of their requirements complement each other. The plants do best with short periods of grazing and long regrowth periods. The livestock do best with short periods of grazing in each area and do best when the plants have had enough time to regrow. Good grazing management is a win-win system for the plants and livestock. And along the way there are many environmental benefits such as improved soil health. In addition, farm profitability can improve; the nutritional

content of the meat and milk changes, and consumer demand for grass fed products can be met.

Preventing Damage to Pastures

by Sarah Flack

Understanding how damage to pasture plants happens is another helpful way to learn about the important principals of good grazing. Overgrazing damage happens when a plant is grazed while growing from stored energy reserves rather than from active photosynthesis. Here are a few common causes of damage to pasture plants

- Taking down interior fences in the fall and letting livestock “clean up” the pastures
- Allowing livestock access to pastures in winter when soils are thawed, causing damage to plant crowns and creating soil compaction
- Having a “rotational” system of 6 or 7 paddocks, with each grazed for 1 or 2 days so plants don’t have a long enough recovery period
- Leaving animals in a pasture for more than 3 days in a row so they have time to graze plants just as they begin to regrow
- Returning animals to the pasture before all of the plants have recovered
- Not adding additional acres into the grazing rotation when plant growth rates slow down

A Few Grazing Definitions

Dry Matter or Pasture Dry Matter is the amount of pasture after all the water has been excluded. This allows us to better understand how much actual nutrition there is in the plant material.

Dry Matter Intake (DMI) refers to the amount of feed the animal eats, excluding the water content.

Forb is a flowering plant in the pasture that is not a legume or a grass. In pastures this may include forage chicory, dandelion and plantain

Paddock is a small fenced area used for grazing.

Recovery periods refer to the amount of time the pasture plants are allowed to regrow or “rest” after each grazing.

Ruminants include cows, sheep, goats and other animals that have a rumen as part of a four-stomach digestive system.

Stock density refers to the number of cows per acre or pounds of animals per acre for just the short period of time that they are in an individual paddock. This is different than stocking rate, which refers to the total number of animals on the entire farm.

Stocking rate is the long-term carrying capacity of the farm or the total number of animals on the entire farm.

Sarah Flack is a consultant specializing in grass-based and organic livestock production systems. She can be reached at: www.sarahflackconsulting.com, 802-309-3714, or sarahflackconsulting@gmail.com.