

Getting the most out of your grass, strategies for implementation of Management-intensive Grazing (MiG)

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Abstract

To get the most out of grass (one should really say forage), producers need to comprehend some grazing related terminology, understand the basics of a managed grazing system, evaluate the natural resources available to the manager, understand that grazing management is some science and a great deal of art, realize that 1 system does not always fit, each grazing season is different and a learning opportunity, and know that often times the biggest road block to implementation of a grazing system is the gray matter that sits between our ears. This is a quick overview to get a producer thinking of what goes into a managed grazing system. There are a great many detailed resources available through local extension, in books, and from industry personnel.

Key words: grazing, forage management

Introduction

To start the discussion of “Getting the most out of your grass and strategies for implementation of Management-intensive Grazing (MiG) it is important that we are talking the same language. Once we are on the same page with terminology it will be much easier to move into the discussion of why and how a producer would use MiG. The following is a list of terms and definitions that should help folks communicate in the same language:

Forage Related Terms

Dry Matter – amount of forage (usually expressed as weight) once its moisture content has been removed. As an example, 30 lb (14 kg) of fresh cut grass is not the same as 30 lb (14 kg) of dry hay. If dry hay quality is good enough, 30 lb (14 kg) of that product would meet the needs of a cow. Thirty pounds of fresh cut grass on the other hand, due to water content (up to 80%), would not be enough feed on a daily basis to meet the needs of the cow. The 30 lb (14 kg) of fresh cut grass would actually only be 6 lb (2.7 kg) of dry matter.

Forage – the edible parts of plants (other than separated grain) that can provide feed for animals or can be harvested for feeding animals. The material found, harvested, and

consumed by livestock themselves that fulfills their nutritional needs.

Forage Quality – the quality of forage as defined by the animal in terms of output. Animal output may be measured as average daily gain, milk production or reproductive success, depending on the species of livestock. Quality is greatly affected by palatability and stage of maturity of the forage.

Forb – any herbaceous broadleaf plant that is not a grass and is not grass like. Some may call forbs weeds unless livestock readily consume them. The staff at Utah State University has done a great deal of work about teaching animals to eat unfamiliar plants. Many forbs would likely fall in this category.

Grass – a member of the plant family *Poaceae*.

Graze – the activity of the animal to consume nutrients from herbage (grasses, legumes, and forbs) that grows lower to the ground. The animal would be taking in nutrients in a manner that requires the animal’s head to point down toward the ground.

Weed – a plant that is out of place. A plant whose purpose is yet to be determined. Depending on stock density and/or species of animal being grazed the list of “weeds” could be very short. There are several weeds that are very deadly to livestock, depending of stage of growth or environmental conditions. Producers should be aware of these species in their area of operation.

Grazing Related Terms

Adaptive Multi Paddock Grazing (AMP) – a system of grazing the uses 20 plus paddocks and varying stock densities to achieve management goals. This system allows for recovery of the forages and not just rest. AMP combines many of the management goals of other grazing systems.

Animal Unit (AU) – one mature, non-lactating bovine (middle third of pregnancy) weighing 1000 lb (454 kg) being fed to maintain weight. A dry 1500 lb (680 kg) cow would be considered 1.5 AU. A 500 lb (227 kg) stocker calf would be considered 0.5 AU. A 100 lb (45 kg) goat would be considered 0.1 AU. A grazing operation that can support 100 AU might graze 200, 500 lb (227 kg) stocker calves or 66, 1500 lb (680 kg) cows.

Boom and bust grazing – a grazing system that utilizes very high animal densities for very short durations. The time

between grazing events tends to be long to allow for a full and complete recovery of the plant community. This system is similar to Adaptive Multi-paddock grazing, however, the grazing event is more severe and the recovery time is longer.

Carrying capacity – the number of animals a grazing unit can support without abusing the vegetation or soil resource. Carrying capacity is the average amount of production that can be sustainably supported over the long term.

Continuous stocking – a method of grazing livestock on a specific unit of land where animals have unrestricted and uninterrupted access throughout the time-period when grazing is allowed.

Cow day or Animal Unit Day (AUD) – the amount of dry forage consumed by 1 animal unit (1000 lb [454 kg] of live weight) per 24-hour period. Figured as 26 lb (11.8 kg) of dry matter.

Creep Grazing – the practice of allowing juvenile animals to graze areas that their dams cannot access at the same time.

High stock density grazing – grazing at densities over 80,000 lb (36,290 kg) of live animal weight per acre. Live-stock are moved on a daily basis.

Intensive Grazing, Managed Grazing – generic terms that are often referring to Rotational Grazing. These grazing systems typically are a lower stock density and slower rotation speed grazing system.

Management intensive Grazing (MiG) – the thoughtful use of grazing manipulation to produce a desired agronomic and/or animal result. The term was coined by Jim Gerrish. The emphasis is placed on the Management and the Grazing and not the intensive portion of the phrase. This is why in the abbreviation a big M and G are used along with a small i (MiG).

Mob Grazing – this term has become a generic term for higher stock density grazing but does not really describe any particular practice.

Multispecies Grazing – a grazing system that uses 2 or more species of grazing livestock in 1 grazing group. The goal of this system may be to better utilize the plant community in the pasture, provide some predator protection, or possibly increase animal health.

Paddock – a permanently fenced pasture subdivision. Many times these areas also have permanent watering locations.

Pasture – a grazing management unit, enclosed and separated from other areas by fences or other barriers, that is devoted to producing forage for harvest primarily by grazing. As an example, an operation may have several large areas (pastures) that are separated from crop ground or woodlands. These areas may then be further divided for different grazing management goals.

Rational grazing – term credited to Andre' Voisin. The rational is meant as both a thoughtful approach to grazing and rationing out of the forage for the animal.

Recovery – this is the time for the plant to fully recover

from the grazing event. The length of time will allow for full root reserve development and full growth of the above ground portions of the plant. The length of time is dependent of plant species and time of year.

Residual – forage remaining on the land after a grazing event. The amount of residual will vary based on the goals of the grazing event.

Rest – the time between grazing events. This length of time varies depending of species of forage, time of year and management goals.

Rotational stocking, rotational grazing – a grazing method that involves regularly recurring periods of grazing followed by regularly recurring rest periods among 2 or more paddocks in a grazing management unit.

Strip or break – a small area of forage with in a pasture or paddock used to increase stock density. These areas are temporary, often in a different location each grazing cycle, and many times set up with step-in posts and polywire fence.

Stock density – the number of animals on a given unit of land at any 1 time. This is traditionally a short-term measurement of the entire pasture. As an example, for certain management goals a stock density of 75,000 lb (34,000 kg) per acre might be used for a day at a time.

Stocking rate – a measurement of the long-term carrying capacity of a pasture. Depending on the location of the operation this might be 2 acres per Animal Unit in high moisture areas to 75 acres or more per animal unit in the arid west.

Stockpiling forage – the practice of saving a portion of the forage produced in 1 time period to be used at a later predetermined time. In Indiana, the most common use of this practice is in late summer to allow for growth and accumulation of tall fescue pastures for grazing in mid to late winter.

Ultra-high stock density grazing – grazing at stock densities over 500,000 lb (226,796 kg) of live animal weight per acre. This is accomplished by multiple moves every day.

Utilization Rate – the amount of growing forage that is consumed by grazing livestock. This rate is affected by stock density and frequency of animal moves from 1 grazing area to the next.

This is by no means a comprehensive list of terminology related to grazing management, but it should cover enough of the terms that the same language can now be communicated between educators and producers.

Managed Grazing

The following part of this article is a very high-level overview of the thought process of getting started in managed grazing and what to potentially expect. There are many, many books and conference opportunities to learn the process first hand. Some of these references will be listed at the end of this article. The best thing a producer can do however, is to get a basic understanding of what it takes to manage forages, and then get out on their operations and put it into practice.

Nothing beats hands-on learning.

When given the opportunity a cow is very good at being a cow; however, she is not the best at managing forages with the future in mind. The cow is going to eat what is the most palatable and the closest to a water tank and shade tree first. Then, if left up to her, she will venture out a bit further over the next few days, but as soon as regrowth occurs on what she grazed on day 1, this area will soon be grazed again as this area is now the most palatable in the pasture. This starts the cycle of overgrazing near water and shade, and under-grazing on the back side of the pasture. The statement needs to be made and it is important to understand, that just because a producer implements some sort of grazing management system it does not mean that the pastures are properly grazed by the livestock.

The basics of why one would want to use a managed grazing system is really simple and is all about energy flow. In forage-based agriculture, there is an unfair advantage in that we get 2 of the major required inputs for free...solar energy and water. The forage plants need to be looked at as solar panels and energy storage units. The leaves of the plants are the solar panels. To be effective they need to be green, growing, and have as much surface area as possible. Once the solar energy is collected by the leaves it is stored in the root system as carbohydrates. The root system needs to not only be robust for energy storage, but also for the ability to efficiently uptake water and nutrients needed to feed the plant and thus feed the grazing livestock. In situations where livestock continuously graze, the plant leaf area is very small and thus is not collecting much energy. When this occurs and the plant puts out a new leaf, the energy for this growth must come from the root reserves. If this occurs over and over in unrested, unmanaged pastures the root system is weakened and dies off. Simply stated, the amount (height) of leaf area above ground is mimicked by the amount (depth) of roots below ground. If cattle keep a pasture grazed at 2 to 3 inches (5.1 to 7.6 cm) all the time, the roots are small and shallow. In this system, not only do the roots not have much energy to produce new leaves, when it gets hot and dry they have no depth to find soil moisture making, a bad situation worse. A properly implemented managed grazing system allows for plenty of leaf residual post grazing to capture solar energy, protect the soil from excessive moisture losses all without doing extensive harm to the root system from demanding energy to grow new leaves.

This example leads to the need to understand the different between rest and recovery. Rest is simply the time between grazing events. Rest might be 14 days or might be 75 days. Recovery is the point at when the root system is fully "recharged," leaf growth has maxed out, and the plant is no longer stressed. Recovery is often times 45 or more days for cool season grasses. It is easy for producers to understand the need for hay field to recover after a hay crop is removed, but they don't seem to see a pasture the same way. No producer in their right mind would go out every third day

and mow a hay field, yet that is exactly what a cow will do in a continuous grazing system. A hay producer would quickly see how inefficient hay harvest would be in this situation, and a grazing system is no different.

Work done by the University of Missouri has demonstrated how over a 7-d grazing period the daily intake of a cow goes from 4% of body weight on day 1 to 2% by day 6. The animals go from eating highly digestive leaf material to consuming stems and dead leaves. The biggest driver of animal performance on pasture is bite size and bite rate. The more feed that the animal ingests the better the performance. The greatest dry-matter intake occurs at 10 to 12-inches (25 to 30 cm) tall forages. Animal performance is 75% intake and 25% quality. Keeping forages taller and growing not only benefits the animal through increased feed intake and quality, by removing those grazing animals at a 4 to 6-inch (10 to 15 cm) residual height keeps the plant in a positive energy balance by not having to mobilize much root carbohydrates to initiate leaf growth. On cool season pastures leaving a residual height of 4 to 8 inches (10 to 20 cm) it will take 40 days to grow an additional 2000 lb (907 kg) of dry matter. If, on the other hand, pastures are grazed to a 1 to 3-inch residual height it will take 64 days to grow another 2000 lb (907 kg) of dry matter. Over the course of a growing season, this could be as much as 4000 lb (1814 kg) of difference in production of the 2 pastures. This is work documented by Jim Gerrish. This clearly demonstrates the importance of residual height at the end of the grazing event and proper recovery periods.

So, if effort to manage the forage resource is made what could be the expected outcomes? With grazing management, it is very easy to get more grazing days each grazing season. When cattle are continuously grazed (1 pasture) only about 40% of the forages grown each year are utilized. In a grazing system that utilizes 24 paddocks and cattle are moved at the proper time, the utilization of the forages reaches 70% each year. This is a giant step in the right direction. In a 5-year study at the Southern Indiana Purdue Ag Center (SIPAC) looking at a 2 paddock or a 9-paddock grazing system, the 9-paddock system averaged 52 more grazing days each year. If no other improvements were made to the herd, just this simple change could net a savings in winter feed cost (hay) of \$97.50 per cow due to grazing 52 days more a year (hay at \$125/ton and 30 lb [13.6 kg]/head/day). For the average herd in Indiana of 25 cows, that is \$2437.50 a year saved in expenses.

With a good managed grazing system, the potential exists for many improvements to the livestock operation. The potential exists, over time, to increase the overall stocking rate on the farm, assuming the farm was not overstocked to begin with. Remember that in pastures properly grazed, forage utilization can be increased from 40% to 70%. Utilizing these forages at the proper time will allow for more regrowth and production, which would allow for increased stocking rates. Good grazing management could lead to increased

animal performance due to a higher, consistent plane of nutrition. This improvement in performance could be more weight gain per animal or per acre, or even better conception rates in the cows. Over time, good forage management will lead to healthier pastures due to proper recovery periods and better water cycles (less runoff and less soil moisture evaporation). There is a potential to further reduce input cost in a well-managed grazing system by a decrease in purchased fertilizer due to better nutrient cycling. In a continuous grazing system most of the manure is deposited around the water source and shade tree. When pastures are managed in this fashion, they should be fertilized like a hay field where all nutrients are being removed. In a system where cattle are moved to a new paddock every couple of days, the manure is more evenly distributed in all the paddocks. This was demonstrated by researchers at the University of Missouri. They showed that in a continuous grazing system it takes 27 years to get a manure deposit on each square yard, but in a 24-paddock system a manure deposit gets made to each square yard in just 2 years.

Some of the science of grazing has been presented. However, there is just as much art to sound grazing management as there is science. Over time and with practice, the producer will develop the grazer's eye (and gut instincts). This is likely the most important tool in the program. The grazer's eye will be the tool that eventually will tell the producer when to move the cattle into a paddock and when to move out. It will allow for adjusting the size of temporary paddocks to fit the need at the time. It will tell them if the cattle are content and full. Observation will tell the manager much about the quality of the diet. Is the pasture too "rich?" Should some dry hay be set out to increase dry-matter intake and slow the rate of passage? Is the pasture protein level too low? Is supplement needed? Are the cattle having to walk too far to water? These are all considerations that are based on science, but it is the eye and experience of the herdsman that makes the decision in the best interest of the forage and livestock. Each grazing season, each pasture and each herd can all dictate the decision of when to start grazing and when to move, but remember the residual height at the time of moving to the next paddock can affect the entire grazing season.

Implementing the Grazing Program

Implementing a grazing program can be as simple or as complex as one wants to make it. Evaluating the existing resources is the place to start. This should start at the bottom up. Good soil samples from each pasture should be taken and sent to a lab. Then, with the help of local extension or a commercial agronomist a fertility plan should be designed. If soil nutrients are lacking, optimum forage production will never be realized. If these pastures have been continuously grazed for years with no management, don't be surprised if all nutrients are low. If soil pH is low then the first dollar spent on the soil should be for lime. Lime is slow to work and

if pH is not near neutral many soil nutrients, even if present, are not available to the plants. Once pH is headed the right direction then start working on getting soil phosphorus and potassium levels to a desired level. If the person advising on soil nutrition comes back with a recommendation of x pounds of 12-12-12 for your pasture, politely decline and look for a better advisor. Soil samples should be pulled every 3 or 4 years and then adjust the soil amendment program accordingly. Over time, if a good job of pasture management with quick, timely rotations is implemented, then the need for additional inputs should be greatly reduced.

Look at the other resources of the grazing operation. Is the exterior fence good enough to keep livestock on the property? If not, then that is the first fencing that should be done. Once a producer is comfortable with keeping the animals on the property, then consideration can be given the type of interior fencing to install. During the first few years it is important to be flexible. It is okay to make a few permanent paddocks in a large grazing area, but until a few seasons of improved grazing occur it would be best to use portable systems. This would entail step-in posts, polywire, and reels. Once cattle are trained to an electric fence it becomes very easy to make the paddock size required for the goal at the time. Is there 110-volt power available or does a producer need to set up a solar powered system? Both are now available in reliable high output systems. Electric fence is the power of managed grazing.

What type of water system is available? Is it just a pond in the low spot on the farm? Is it a creek that runs through a portion of the pasture? Is there a well or rural water system? All these sources can work and it might take a combination of them to keep water close to the grazing areas. In an ideal situation water would be within 900 feet (275 m) from any point in the grazing area. This allows for the best utilization of the forages and keeps cattle coming to water more as individuals than as a herd, assuming the water point can be seen from the entire grazing paddock. This does not mean cattle can't walk further to water, they certainly do in the west, just understand some grazing efficiency is lost and large water tanks may need to be used to allow all animals to drink before the lead cows head back to grazing.

Study the forage resource. What forage species are in the pasture? Are they all desirable? How dense is the stand of forage? How uniform is the stand? Is weed control needed? Evaluating the existing stand and getting soil deficiencies corrected are more important than seeding the newest grass variety available. If no managed grazing has taken place on the pasture give it a few years to improve as forage management improves. Most producers are surprised at the forage species that appear in a pasture sward when proper recovery occurs. Another advantage to allowing the existing stand to improve before investing in seed for pasture renovation is there can be a steep learning curve to managed grazing and mistakes will be made. Overgrazing will occur. Pugging the pasture in wet times will happen. Time will heal most

wounds, and it is much easier on the pocket book to allow an old stand to recover than to totally ruin a new seeding with \$75/acre or more invested in seed costs.

To make managed grazing work a major shift in mind set is needed for most producers. It is easy to say that may work on your farm but it won't work here. If that is the mindset at the onset of trying managed grazing, they are more than likely correct. When many producers hear the statement "moving cattle every day" or even weekly, the image that comes to mind is that of when they try to get cows in to wean or do other herd work. For many, this becomes a rodeo or an effort to try and "trick" the cattle to come in by offering feed. Handling the cattle to move them to new paddocks on a regular basis reduces this "rodeo" like situation and is an often-overlooked, undervalued benefit of a managed grazing system. Producers have no problem firing up a tractor every other day all winter long to feed hay, but don't seem to have time every other day to spend 30 minutes with the herd putting up some fence and moving a water tank. It is a change in mind set. With good grazing management with a proper stocking rate it is very easy to get the winter-feeding period to less than 90 days. How big an impact might that be to a producer? Have producers find mentors in the area to talk with and exchange ideas. There is so much to be learned by doing and then sharing with others.

Some Quotes as Final Points to Ponder

- "Stock your farm at its winter grazing capacity" – Jim Gerrish
- "A pound of forage in the pasture is worth more in the winter than in the spring" – Forage Livestock Quotes and Concept Volume Two

- "Sometimes good grazing management is ugly to look at" – Jason Tower
- "It's not what we know that counts, it's what we do" – Russell Hackley
- "Manage for what you want, but learn to utilize what you get" – Dr. R.P. Cooke
- "Ranchers love their cattle and hate their grass, but they should really love their grass and hate their cattle" – Bud Williams
- "There is more money to be made with high quality forage management and poor-quality cattle than there is with high quality cattle and poor forage management" – Wally Olsen or Bud Williams
- "It is better to move cattle half a day early than to move them half an hour late" – Jason Tower
- "Grazing management is an exercise in decision making" – Forage Livestock Quotes and Concept Volume Two

Suggested Reading

Forage Field Guide – Purdue Crop Diagnostic Training and Research Center
Grass, the Forgiveness of Nature – Charles Walters
Management-intensive Grazing, the Grassroots of Grass Farming – Jim Gerrish
Missouri Grazing Manual
Quality Pastures – Alan Nation and Jim Gerrish
Southern Forages – D. M. Ball, C.S. Hoveland, G.D. Lacefield