2022

Spring Forage Conference

PROCEEDINGS

38th Annual Southwest Missouri
SPRING FORAGE CONFERENCE

TABLE OF CONTENTS

38th ANNUAL SW MISSOURI SPRING FORAGE CONFERENCE
Tuesday, February 22, 2022

AGENDA & ROOM ASIGNMENTS

(SEE MAP ON BACK)

8:00-8:45 am CHECK-IN & VISIT TRADE SHOW

SESSION A (8:45 AM - 9:30 AM)	ROOM	SPEAKER
(A1) A Systems Approach to Limiting Feed Costs **REPEATED AT 1:45 PM**	East Grand	Dr. Jimmy Henning, Extension Professor and Forage Specialist, University of Kentucky Extension
(A2) Will Changes in Capital Gains Impact My Estate Plan? **REPEATED AT 1:45 PM**	Maui	Wesley Tucker, Field Specialist in Agriculture Business & Policy, MU Extension
(A3) Summer Stockpile Fescue	Coco	Dr. Chris Teutsch, Extension Associate Professor and Forage Specialist, University of Kentucky
(A4) Johnsongrass: The Good, The Bad, and the Ugly	Fiji	Tim Schnakenberg, Field Specialist in Agronomy, MU Extension
(A5) Multi Species Grazing & Economic Overview **REPEATED AT 1:45 PM**	Bora Bora	Jennifer Lutes, Ag Business Specialist, MU Extension

9:30-10:15 am – BREAK & VISIT TRADE SHOW

SESSION B (10:15 AM - 11:00 AM)	ROOM	SPEAKER
(B1) MO Stockers as an Alternative to Cow/Calf Production **REPEATED AT 2:45 PM**	East Grand	Dr. Eric Bailey, Assistant Professor & State Beef Extension Specialist, MU Extension
(B2) Warm-Season Forages for Mitigating Drought **REPEATED AT 2:45 PM**	Maui	Dr. Harley Naumann, Associate Teaching Professor in the Division of Plant Science and Technology & Extension State Forage Specialist, University of Missouri
(B3) Regenerative Ranching - What it is and How to Get Started	Coco	Hugh Aljoe, Director of Producer Relations, The Noble Research Institute
(B4) Management Effects on Soil Health	Fuji	Matt Fryer, Instructor - Soil Science, University of Arkansas System Division of Agriculture Cooperative Extension Service
(B5) Small Ruminant - Herd Health Management **REPEATED AT 2:45 PM**	Bora Bora	Dr. Chris Baughman, State Extension Specialist - Small Ruminant, Lincoln University Cooperative Extension

11:00-11:30 am – BREAK & VISIT TRADE SHOW

11:30 AM - LUNCHEON - Grand Ballroom

Welcome -- Mark Green, Emcee, Retired NRCS and Longtime SFC Committee Member

Keynote Address

State of the Industry and Where We are Headed

Corbitt Wall

Livestock Marketing Analyst for DV Auction, Commercial Cattle Manager, Host of the daily news production "Feeder Flash"

1:15 - 1:45 pm -- BREAK & VISIT TRADE SHOW

SESSION C (1:45 PM - 2:30 PM)	ROOM	SPEAKER
(C1) Q & A with Corbitt Wall	Grand	Corbitt Wall, Keynote Speaker
(C2) **(Repeat)** A Systems Approach to Limiting Feed Costs	Maui	Dr. Jimmy Henning, Extension Professor and Forage Specialist, University of Kentucky Extension
(C3) **(Repeat)** Will Changes in Capital Gains Impact My Estate Plan?	Coco	Wesley Tucker, Field Specialist in Agriculture Business & Policy, MU Extension
(C4) How to Best Manage Fertility in Times of High Prices	Fiji	Dr. Sarah Kenyon, Field Specialist in Agronomy, MU Extension
(C5) **(Repeat)** Multi Species Grazing & Economic Overview	Bora Bora	Jennifer Lutes, Ag Business Specialist, MU Extension

2:30 - 2:45 pm – BREAK

SESSION D (2:45 PM - 3:30 PM)	ROOM	SPEAKER
(D1) **(Repeat)** Warm-season forages for mitigating drought	Grand	Dr. Harley Naumann, Associate Teaching Professor in the Division of Plant Science and Technology & Extension State Forage Specialist, University of Missouri
(D2) **(Repeat)** MO Stockers as an Alternative to Cow/Calf Production	Maui	Dr. Eric Bailey, Assistant Professor & State Beef Extension Specialist, MU Extension
(D3) A New Look at an Old Crop: Sudangrass Not Your Grandfathers Forage	Coco	Mark Kirk, Regional Sales Manager, Alta Seeds
(D4) Marketing Local Beef	Fiji	Dr. Bryon Weigand, Professor of Animal Science & State Meats Extension Specialist, University of Missouri
(D5) **(Repeat)** Small Ruminant - Herd Health Management	Bora Bora	Dr. Chris Baughman, State Extension Specialist - Small Ruminant, Lincoln University Cooperative Extension

3:30 pm ADJOURN


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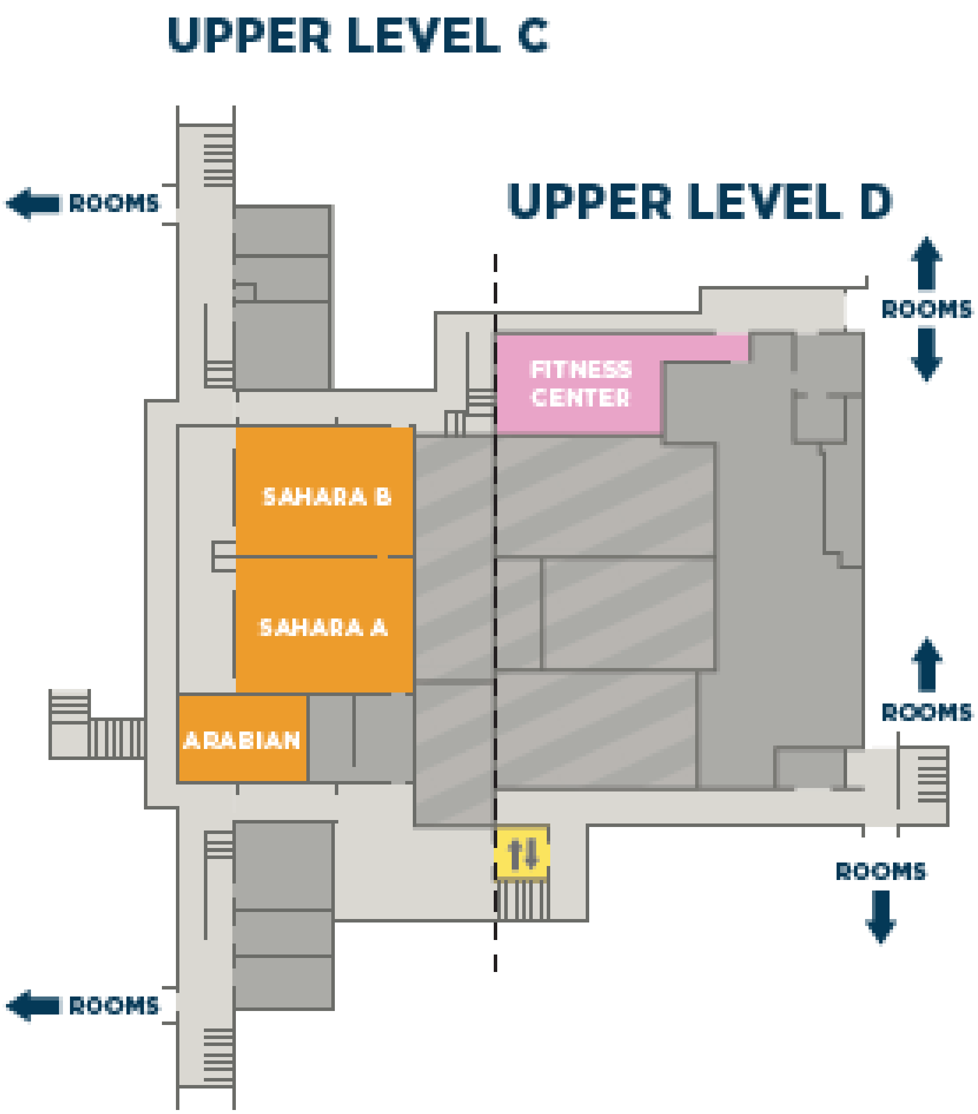
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Welcome to the 38th Annual Southwest Missouri Spring Forage Conference!

I and the planning committee want to welcome you to the 38th Annual Southwest Missouri Spring Forage Conference. Through the years this conference has always provided participants with excellent knowledge and education in current management strategies for optimum performance of there forage and livestock operations. The current conference will continue that tradition and hopefully you will be able to take information and use it to the betterment of your farming operation. In addition, we plan on an in-person conference as we have done in years prior to 2021 at the Oasis Convention Center.

For the previous 12 months committee members from USDA Natural Resources Conservation Service, Soil and Water Conservation Districts of Southwest Missouri, University of Missouri Extension, USDA Farm Service Agency, Missouri State University Darr College of Agriculture, and the Missouri Department of Conservation have been working to plan this conference. In addition, this committee's partnership with the Missouri Forage and Grasslands Council/Grazing Lands Conservation Initiative is important to planning and conducting this conference. Through the planning process we have identified current topics as well as presenters that will provide excellent knowledge in the areas of livestock and forage management that can be used to the betterment of your farming operation.

The year's conference keynote address will be given by Corbitt Wall who is the commercial cattle manager and livestock market analyst for DV Auction. Corbitt will discuss the state of the livestock industry and where we are headed. Corbitt is a fourth-generation cattlemen that hosts a daily news production called the "Feeder Flash." Corbitt has also pursued his passion of livestock auctioneering for the past 25 years. Corbitt spent an 18-year career with the US Department of Agriculture where some of his responsibilities included grading market ready cattle being delivered on Chicago Mercantile Exchange contracts and authoring the USDA National Feeder and Stocker Cattle Summary. Corbitt and his family have spent many years in the stocker cattle industry and recently relocated back to the Texas Panhandle, after 16 years in northwest Missouri where he operated a small stocker cattle operation with his three daughters. Corbitt is known for his suggestions on the best way to sell cattle as well as ways for the cattle industry to not end up like the pork and chicken industry. Corbitt's will answer questions in a breakout session following his keynote address.

The breakout sessions are designed to educate and provide forage and livestock producers management strategies on current topics for optimum productivity of their farming operations. With four sessions offered for each time-slot, there is a variety of presentations to choose from. Presenters are experienced, talented and eager to share their knowledge to improve the performance of your forage and livestock operation. In addition, there will be two breakout session that are repeated during the day, dedicated to sheep and goat multispecies grazing and herd health management.

Our vendors and exhibitors are another highlight of the conference each year. The planning committee appreciates their support to make the conference a premier event. Take some time to visit with them. You will make some invaluable contacts and reacquaint yourself with other producers whom you have gotten to know over the years.

As a participant of the conference thank you for your attendance and support. Should you have questions or need assistance please look for a committee member who will be wearing a name tag and a tan shirt. Also please provide comments on this year's conference and provide ideas to help in the planning of next year's conference by filling out the questionnaire that you receive in the bag of materials at the registration desk. Again, on behalf of the planning committee thank you for your attendance, hopefully you enjoy your day and receive information that will lead to the betterment of your farming operation.

Sincerely,

Patrick Davis
2022 Southwest Missouri Spring Forage Conference Planning Committee Chairman


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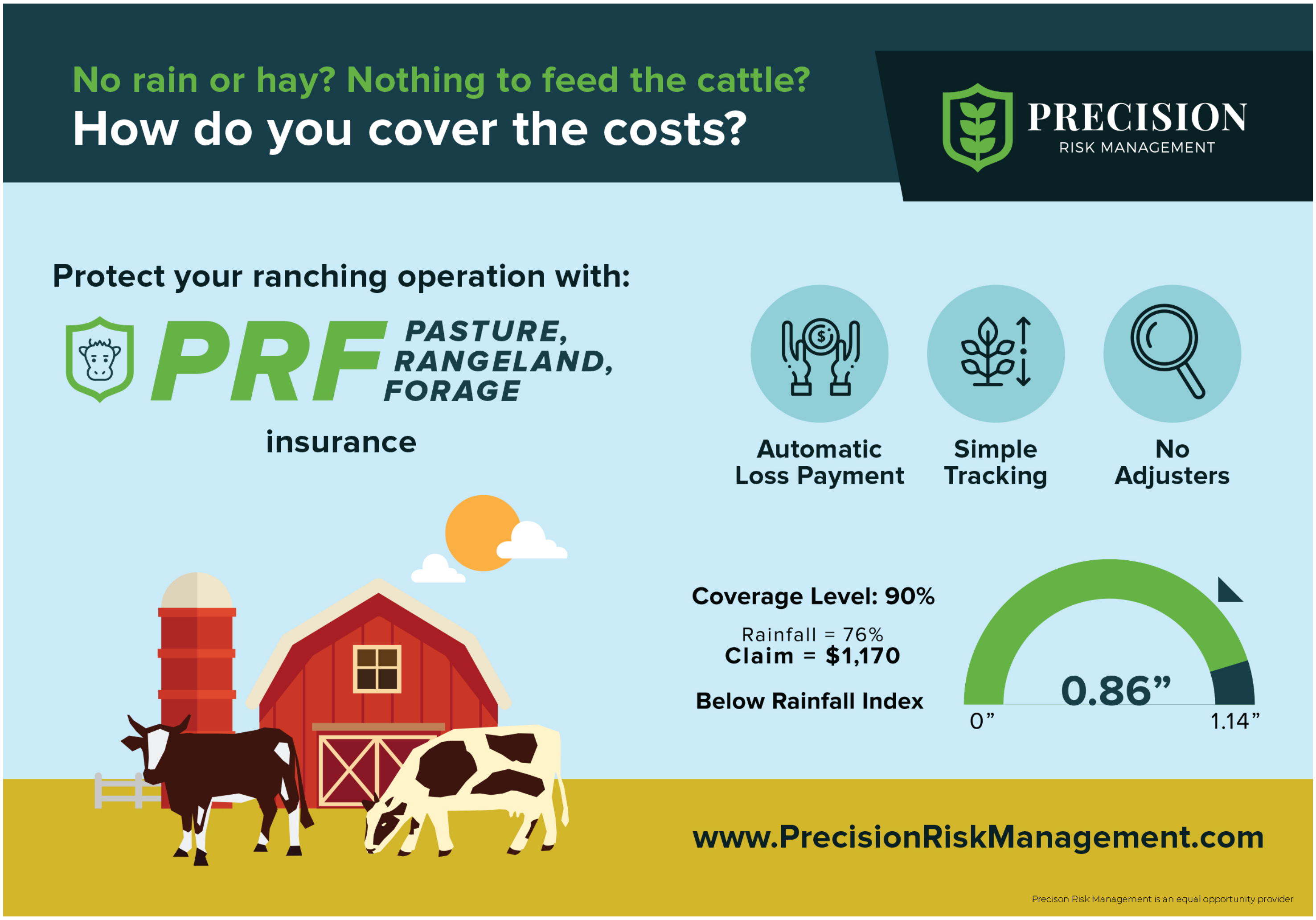

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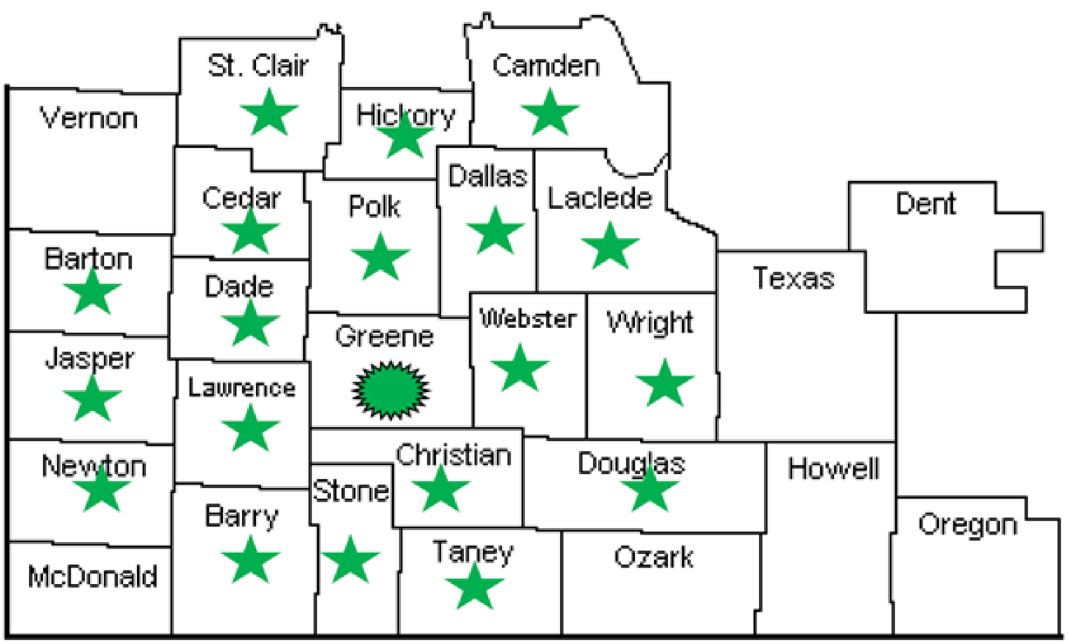

As of 2/21/2022

2022 Spring Forage Conference Keynote:

"STATE OF THE INDUSTRY & WHERE WE ARE HEADED"

By: Corbitt Wall

Corbitt Wall is a native of eastern New Mexico and Western Texas, a commercial cattle manager and livestock marketing analyst for DV Auction currently living in Canyon, Texas. Corbitt received a Bachelor's degree in Agri-business and Economics plus a Master's degree in Agriculture from West Texas A&M University in Canyon, Texas. One of his many passions is livestock auctioneering which he has done for the past 25 years. Mr. Wall hosts a daily news production called the "Feeder Flash" and declared there is hope for the livestock industry, however, warned cattlemen they could end up like the pork and chicken industries, which have been decimated, through industry wide controlled marketing practices. A fourth-generation cattleman, Corbitt grew up at his father's side, taking delivery of country cattle purchases off New Mexico ranches and wheat pastures. The Corbitt family were also some of the first to order stocker calves from the Southeast, partnering with shippers from Louisiana, Mississippi, and Florida. Mr. Wall said his great-grandfather was a farmer from Missouri who "hated farming with a passion." He decided to farm cattle rather than crops, starting out buying little strings of cattle and eventually moving to Nebraska. His father was a rancher in New Mexico who would go to six sales a week across the state back in the 60s. Mr. Wall worked for the U.S. Department of Agriculture after college and doing his 18-year career he has worked for the Agricultural Marketing Service as the Officer in Charge and Supervisor of Missouri's Federal-State Market News program based out of St. Joseph, Missouri. One of his responsibilities included grading market ready cattle being delivered on Chicago Mercantile Exchange contracts. Mr. Wall has authored the USDA's National Feeder & Stocker Cattle Summary and in 2014 started working for DV Auction as the host of the real-time auction broadcasting company based in Nebraska. He has recently relocated back to the Texas Panhandle, after 16 years in northwest Missouri where he operated a small stocker cattle operation with his three daughters.

Mr. Wall has suggested the best way to sell cattle is by negotiated cash trade, which used to be the only way cattle were sold. When the commercial feedlots grew, formula trading because more popular, working off a base price established off the cash market. Forward trading is a way to sell feeder cattle, but not a way to sell fat cattle. The negotiated grid is somewhat like formula trade, but the base price is negotiated on the merit of the cattle instead. Wall said this is the second-best way to sell cattle. In the cattle market today, 6 - 7% of Texas cattle are negotiated upon, allowing for the fat cattle market to be manipulated by the bigger commercial feeders. So, the question then becomes “How can the smaller and mid-size producers gain ground in the marketing of their stock?”

Wall offered suggestions for the cattle industry in order to, “not end up like the pork and chicken industry” saying there were several steps that could be taken. Things like alternating the calving season – 74% of the calves born in the U.S. are born in the spring – the market could be spread out to better absorb the supply.

A System Approach to Reducing Feed Costs for Cow Calf Operations

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Introduction

Missouri is home to more than two million beef cows which comprise a major agricultural enterprise for the state. Cow-calf production is well-suited to the rolling topography and forage base of South Missouri. The economic health of a given cow-calf farming operation is driven by the efficiency in which the forage base is managed to support the reproductive function of the cow. Well managed operations are able to have a annual weaning percentage (calves weaned per cow exposed) greater than 85% with calves that are 30 to 40% of their cow's mature size. Feed costs in the form of pasture, stored forage and supplements make up a significant portion of the annual costs of a cow-calf enterprise. The Southern Missouri Cow Calf Planning Budget (Tucker, Cole and Horner 2021) estimates the annual feed costs for a cow-calf enterprise to be between $352 and $386 dollars per cow (Figure 1). These costs are estimates for pasture, stored forage and supplement.

Extension
University of Missouri

Southern Missouri Beef Cow-Calf Planning Budget

Table 4. Feed requirements in Southern Missouri beef cow-calf planning budget for 2022, on a per cow basis.

	Cost per unit	Cow (units)	Calf (units)	Bull[2] (units)	Total units	Total cost per cow[3]
Fall calving						
Pasture, per animal unit equivalent	16.00	10.0[1]		0.5	10.5	168.32
Harvested forage, per pound	0.0375	3,660.0	425.0	200.0	4,285.0	160.69
Protein supplement, per pound	0.11	180.0		7.2	187.2	20.59
Salt and mineral mix, per pound	0.40	91.3			91.3	36.50
					Total	**386.10**
Spring calving						
Pasture, per animal unit equivalent	16.00	10.0[1]		0.5	10.5	168.32
Harvested forage, per pound	0.0375	3,445.5		200.0	3,645.5	136.71
Protein supplement, per pound	0.11	90.0		3.6	93.6	10.30
Salt and mineral mix, per pound	0.40	91.3			91.3	36.50
					Total	**351.83**

[1] Cow and calf requirements are combined for pasture animal unit equivalents.
[2] Bull feed units are based on 4 percent of its total need being allocated to cow-calf enterprise.
[3] Totals may not sum due to rounding.

Figure 1. Feed requirements in Southern Missouri beef cow-calf planning budget for 2022, Table 4 excerpted from Publication G679. University of Missouri- Columbia.

The variation in feed costs is a large determinant in cow-calf profitability. Miller and coworkers (2001) conducted a financial analysis of 225 commercial herds in Iowa and Illinois ranging in size from 20 to 373 cows to determine the major factors affecting profitability. On these farms, over 50% of the variability in returns to labor and management could be explained by feed costs alone.

The factors that affect the feed costs in cow-calf operations are many and dynamic. Some can be influenced by management while others like fertilizer costs are outside of the control of the producer. The purpose of this article is to take a system approach to reduce feed costs in a cow-calf enterprise.

The cost of pasture versus hay

In order to do a deep dive into the total feed costs in a cow-calf enterprise, you have to look at two major sources of feed – pasture and hay. The material that follows is excerpted from an excellent article by Dr. Kenny Burdine in the UK Department of Agricultural Economics. For further reading, you are encouraged to consult publications in the UK Agricultural Economics Extension group, particularly those of Dr Kenny Burdine and Dr Greg Halich.

It has become forage dogma that every day grazing is cheaper than any day feeding hay. Clearly there are advantages to having animals on adequate, nutritious pasture – higher nutritive quality, less labor and lower machinery costs to name a few. Respected grazing professionals like Jim Gerrish promote and encourage year-round grazing, such as Jim Gerrish. Jim is an exceptional manager of cattle and forage and no doubt practices what he preaches in terms of year round grazing. However, most farms will find themselves needing to feed hay between 60 to 120 days every year. The need to feed hay is affected by many uncontrollable factors, such as weather and should not be seen as an indicator of poor farm or forage management. The optimum hay feeding period will depend on many factors and will vary by farm. The goal should be to understand the respective costs of a day grazing versus feeding hay, and to find the right mix for your farm.

To determine the optimum length of the grazing season, you must calculate the daily feeding costs for pasture versus hay. A livestock producer should know what his / her most expensive feeding days are. In most cases these will be in winter, generally consisting of feeding either purchased or home-grown hay. What follows are specific estimates for winter feeding costs. It is important to realize that all these calculations are very “operation-specific” and it is always best to work through estimates using actual production costs.

Most cow-calf operations produce their own hay so we can start there. Hay production costs will include fertilizer, machinery, fuel, labor, and many other items. Producers should estimate hay costs on a per ton basis, then convert this into a cost per winter feeding day by tracking the amount of hay that cows are consuming through the winter. It’s also important to consider storage and feeding losses as they can greatly increase the actual winter feeding costs.

Hay production and pasture maintenance costs have both increased considerably in today’s environment of high fertilizer and fuel prices. The tables that follow are estimates of daily hay feeding costs based on applying 60 lb. of nitrogen, 60 lb. of P_2O_5, and 150 lb. of K_2O and one ton of lime per acre and at the following fertilizer prices: Urea - $900/ton, diammonium phosphate - $840/ton, muriate of postash - $780/ton, and lime - $20/ton and allowing for $40 per acre in fuel, oil and repairs. Using these prices and a yield of 3 tons per acre results in a hay cost of $83 per ton, before storage or feeding. These fertilizer prices may be different than current levels, but are a convenient place to start. Adding labor and machinery depreciation costs to these estimates would easily raise the cost per ton to $100 or higher. Most farm-raised hay would not command these prices, but the costs are real and significant.

Table 1 contains the daily feeding costs per cow to feed 30 lb. of hay valued at $60, $80 and $100 per ton and allowing for 15, 25 and 35 percent combined hay storage and feeding losses. Under these parameters, the cost per day to feed hay will range from $1.06 to $2.31.

Table 1. Estimated winter feeding costs per cow per day[1]			
	Hay production Costs[2]		
Hay storage and feeding losses	**$60 per ton**	**$80 per ton**	**$100 per ton**
15% loss	$1.06	$1.41	$1.76
25% loss	$1.20	$1.60	$2.00
35% loss	$1.38	$1.85	$2.31

[1] Assumptions: 30 lbs of hay consumed per cow per day; Fertilizer (N-P2O5-K2O) and lime applications per acre of 60-60-150 and one ton; Fertilizer and lime per ton costs of $900, $840, $780 and $20; Yield – three tons per acre.

[2] Includes fertilizer, lime, fuel, and repairs.

Now, let's turn our attention to grazing costs. Pasture maintenance costs usually include fertilizer, lime, seed, machinery, and clipping. These costs vary greatly by operation and by year, but likely will range from $50 per acre to over $150 per acre depending on fertility, lime, herbicides and how often pastures are clipped.

Once pasture costs have been considered, a reasonable estimate for daily pasture costs can be calculated by specifying a stocking rate per acre and the number of grazing days per year. Table 2 estimates grazing costs given a 240 day grazing season and various assumptions about stocking rate and pasture maintenance costs per acre. The sensitivity table ranges are very wide in an attempt to quantify operations that require more land per cow-calf pair and/or spend a lot money maintaining and clipping pastures.

Table 2. Estimated pasture costs per day for a 240 day grazing season					
	Estimated annual pasture costs per acre				
Acres per cow-calf pair	$50	$75	$100	$125	$150
2	$0.42	$0.63	$0.83	$1.04	$1.25
3	$0.63	$0.94	$1.25	$1.56	$1.88
4	$0.83	$1.25	$1.67	$2.08	$2.50

To lower total annual feed costs, you have to ask if there are ways to replace the more expensive hay feeding day with a day of grazing. It is important to realize that the daily feeding cost for hay versus pasture overlap – that is there are hay scenarios that are more economical than grazing depending on the price of each. It is also important to note that winter feeding days are typically more easily replaced by pasture at the beginning (fall) and end (spring) of the winter feeding period. Additional grazing days at these times are likely to be more expensive than the average grazing day costs estimated in Table 2. However, if additional grazing days can be added for less than those hay feeding days, feed costs per head can potentially be reduced.

Extending the Grazing Season by Stockpiling Tall Fescue

Stockpiling tall fescue for late fall and early winter grazing is one of the most practical ways to extend the grazing season, reduce hay and supplemental feeding and add body condition to cows. Stockpiling is producing forage now for use later but most often refers to fall-accumulated tall fescue.

For best results in stockpiling tall fescue, don't overgraze in mid-summer, pull cattle off in mid- to late August and apply nitrogen fertilizer, then allow to growth to accumulate until late fall. Nitrogen fertilizer applied in August will produce more yield per pound of nitrogen than September or October applications.

Fall fertilization for stockpiling purposes will be more attractive in years when nitrogen response rate is likely be high, nitrogen fertilizer is reasonably priced, and alternative winter feeds (such as hay) are expensive. Conditions that indicate nitrogen response will be high are a) tall fescue has not been overgrazed during summer and has three to four inches of residual height in August and b) moisture and temperature conditions are conducive to fescue growth. In many years, hot dry conditions in late summer limit the amount of stockpiled tall fescue that can be produced and make the decision whether to apply nitrogen very difficult.

Tall fescue is the ideal grass for fall stockpiling because it retains its quality and digestibility into late fall/early winter better than other grasses and legumes. Freezing conditions and rain quickly degrade the quality of legumes and other cool season grasses. Tall fescue on the other hand will maintain leaf integrity through winter weather and therefore the forage quality will remain high.

Good stockpiled tall fescue is excellent forage for fall weaned calves as well as for the fall calving cow herd. Stockpiled tall fescue will also add body condition back to any spring calving cows that have lost weight while nursing a calf. Quality values for fall tall fescue can approach 20 percent crude protein and mid-60’s in total digestible nutrients. These values are far superior to most mixed grass hays.

Fescue toxicity from the endophyte tends to be low in fall stockpiled tall fescue. Although fescue toxicity can peak in the early fall, low temperatures will generally cause the toxic alkaloid levels to fall to non-toxic levels by late December. Endophyte-free and novel endophyte tall fescues stockpile equally well as KY 31 and will not have any toxicity potential. Use moderate levels of nitrogen fertilizer (less than 60 pounds of actual nitrogen per acre, equivalent to 130 pounds of urea that is 46 per nitrogen) to avoid the overproduction of the endophyte toxic alkaloids in the fall.

Being correctly stocked is critical to fall productivity of tall fescue. Being able to stockpile tall fescue depends on having enough acres so that some land can be rested in late summer and fall. Successful stockpiling requires that fescue be well managed (not overgrazed) in mid-summer. Another way to say this is that overgrazed tall fescue will underproduce in fall, regardless of nitrogen management or rest. Overgrazing in mid-summer severlely limits the regrowth potential during the better production conditions in the autumn. There are many tools to help producers determine the correct stocking rate for their farm. These include the USDA Web Soil Survey, the Missouri NRCS Graze model, and observing body condition scores of cattle.

Aljoe (2019) identified several ways for a producer to determine if they are properly stocked in moderate to high rainfall areas. If properly stocked, there should always be plant and litter cover. Residual heights at the end of the grazing season should be three to four inches for cool season perennials like tall fescue and six to eight inches for native warm season grasses. Mature cattle should be able to easily maintain a body condition score of 5.5 or better for most of the grazing season. In addition, cow herds should have conception rates greater than 85 percent with most of the calves born in the first half of the calving season. If farms are not currently meeting these production and management goals, it is likely they are overstocked.

Having a diverse mix of forages, especially warm season forages is integral to a good plan to stockpile tall fescue. Pasture systems that produce good summer grazing include alfalfa, bermudagrass, tall growing summer annual grasses and native warm season grasses. Being able to rotate away from tall fescue-based pastures in mid-summer will avoid endophyte-infected tall fescue when its ergovaline content is high and elevated temperatures exacerbate the fescue-induced heat stress caused.

Strip allocation of stockpiled tall fescue will extend the grazing period. Missouri research has shown that giving cattle a three-day vs seven-day supply of stockpiled tall fescue increased grazing days by 45% due to less trampling and soiling with manure. Stockpiled fescue can be grazed close with little effect on spring regrowth so utilization efficiency is high. In fact, tightly grazed stockpiled tall fescue pastures can be a good place to frost-seed clover in late winter.

Efficient Pasture Systems and Stocking Rates

Table 2 shows the importance of stocking rate on pasture costs per day. Stocking rates are dependent on many factors including the productivity of the land, the mix of forages present, the level of management and the efficiency of pasture utilization. Each farm is limited by the native fertility and soil types that make up the farm. Producers can also improve pasture productivity by utilizing a mix of legumes, cool and warm season species and by implementing a well-designed rotational grazing system.

A well-designed rotational grazing system can add grazing days on the same forage base through improved pasture utilization (less waste). Pasture utilization rate is one of the most critical factors in grazing economics. It refers to the percentage of the forage production that is actually consumed by the animals. Just as there are losses when storing and feeding hay, there are grazing losses that must be considered. If we can improve forage utilization rates, we can stretch the grazing season and decrease our dependence on stored feed.

Do not underestimate the importance of utilization rates. A common mistake that is made when considering grazing costs is to estimate the dry matter production, but not discount that for utilization rate. For example, one might correctly estimate costs and accurately estimate forage intakes and figure a cost per day based on those two factors. However, this would greatly underestimate costs as it effectively assumes 100% utilization. For example, if utilization rates are 66%, then 1.5 lbs of forage must be produced for every lb of intake. When grazing, forage utilization is just as important as forage production.

Of course, improved utilization isn't free, and these costs should be considered as well. Setting up a rotational grazing system will potentially require investment in a fencing and watering system, as well as time. If a watering system is already in place, getting water to additional paddocks can likely be achieved much easier. Regardless, figure a useful life on these investments, value the time spent setting up and the additional management time (if applicable), estimate the additional grazing days that can be added, and compare the cost of these additional grazing days to the hay feeding days they are replacing.

Forage Quality

One of the hidden costs in forage livestock systems is low quality hay. So far in this discussion of feeding costs, a pound of forage from hay is implied to be equal in every respect to a pound of pasture. In fact, most grass hay made in Kentucky and Missouri is much lower in protein and energy than pasture. In an analysis of grass and grass-clover hays analyzed by the Kentucky Department of Agriculture from 2007 to 2017, only about 15% would meet the energy needs of cows in lactation and almost none would put weight on steers (Figure 2). Over 50% of these samples were less than 55% TDN (total digestible nutrients). In contrast, pasture samples are high in protein and energy across the entire season (Figures 3 and 4).

Consistently harvesting high quality hay is challenging given the uncertainties of rainfall patterns in the humid areas of the mid-South. It is important to realize that failing to harvest hay at the 'perfect' stage of maturity is not the end of the story; in fact there is plenty of need for what I call 'cow hay.' The mistake is to make hay and not get it tested. Feeding untested hay almost guarantees inefficient feeding, either through underfeeding or over-supplementing.

Most producers do not voluntarily test their hay, for reasons that include cost and inconvenience. An early survey of Missouri producers found that most did not test hay because 'they did not see the need.' To some degree, I can understand that sentiment. If you have just harvested first cutting fescue hay in the seed head stage which got a half inch of rainfall on it in while curing, it is understandable why testing would seem to be unnecessary. A producer might say 'I already know my hay is bad, why should I pay somebody to tell me something I already know'. However, testing hay is important whether it is 'just cow hay' or the best you have.

Low quality hay is seldom a bargain and in fact sometimes can be an economic disaster. In the wet

Kentucky winters of 2018 and 2019, a lot of 'cow hay' that was adequate in other years was badly short in energy for cows, leading to loss of significant loss of body condition and, in some cases, outright starvation. In these years, the energy content of much Kentucky hay was inadequate because cows had significantly different thermo-neutral zone due to the wet conditions. Cows in their thermo-neutral zone do not need any supplemental energy above maintenance to maintain body condition. The thermo-neutral temperature for cows with a winter hair coat in dry conditions can be as low as 18°F. For cows with wet hides, their thermo-neutral temperature is 55°F. And for every 10 degree drop in temperature below the thermo-neutral temperature, an additional five percentage units of energy is needed just to meet maintenance energy requirements. In 2018 and 2019, many winter days were rainy and between 35 and 40°F. Not knowing the energy content of the cow hay and failing to account for the increased energy needs led to thin cows and even some cow starvation.

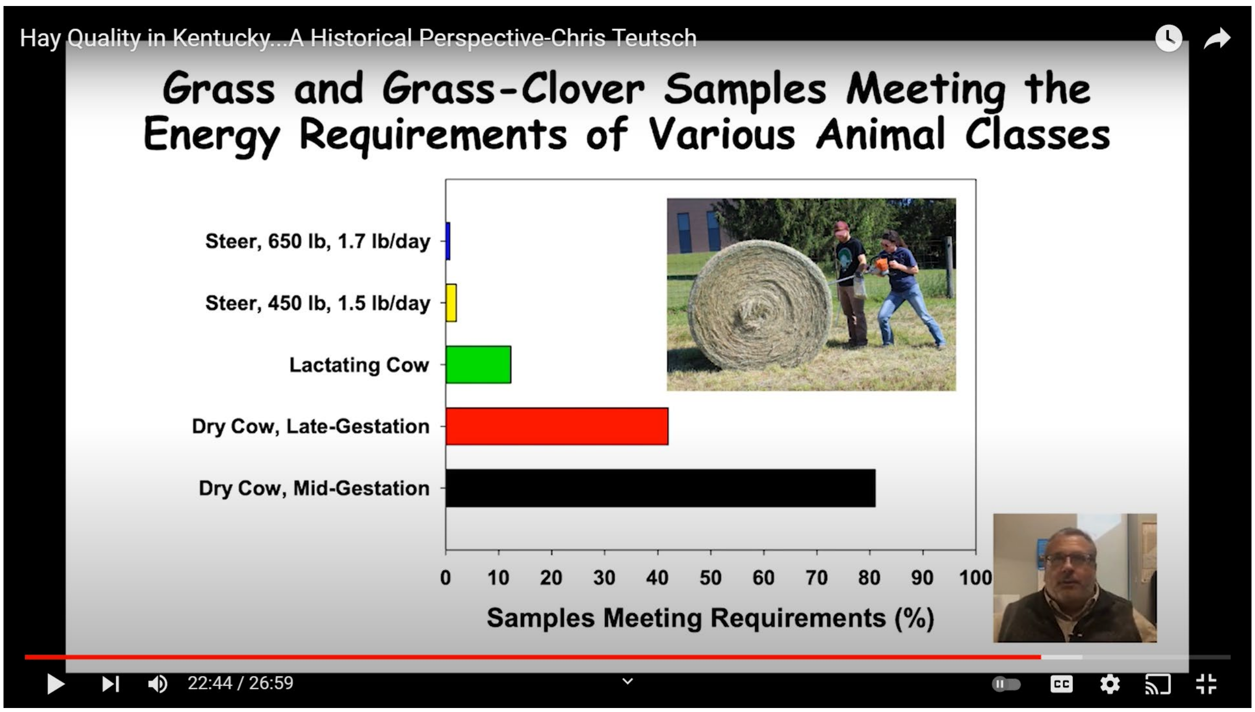

Figure 2. Ability to meet the energy requirements of beef cattle at various production stages. Sample data Kentucky hay samples analyzed by the Kentucky Department of Agriculture from 2007 to 2017. Image excerpted from the UKY Forages YouTube Channel (https://www.youtube.com/watch?v=wu13xwqm47A).

Cow Size and Stocking Rates

Cow sizes have been increasing for decades; commercial cows can commonly weigh 1600 pounds or more. Since the forage needed is proportional to body size, larger cows require more forage. An important question for cow-calf producers is whether the larger cow size results in calf weights and numbers that make the extra forage needed a good investment.

A long term Beef Integrated Resource Management (IRM) project at the University of Kentucky worked with producers to increase the efficiency of their beef cow herds, specifically the pounds of weaned calf per cow exposed and the percent of body weight weaned per average weight of cow exposed. These farms were analyzed by a diverse team of specialists and recommendations made on cattle genetics, nutrition, forages and herd health. In many cases herd efficiency was judged to be below potential, in large part due to the large size of the mature cows. In a phrase, the forage resource of the farm could not support the larger cow size.

Through a combination of culling and sire selection, the mature size of an example cow herd was reduced from over 1700 pounds to less than 1400 pounds, while maintaining or increasing weaning weights (Figure 5). Cow efficiency increased as well (Figure 6). Weaning weights as a percentage of mature cow exposed increased from 34 to almost 45%. Weaning weights per cow exposed also increased.

The reduction in cow size is in fact a reduction in stocking rate and forage needs. In another Kentucky farm that experienced a similar intervention, right-sizing the cow herd allowed a 25% increase in stocking rate while maintaining or increasing weaning weights. In addition, this herd was able to maintain a high level of calves weaned per cow exposed and the majority of these calves were born in the first half of the calving season.

Downsizing the mature weight of the cow herd is not without risk. Smaller framed cows have higher risks of producing calves that are docked in the market due to small size. Reducing cow size is not the solution on every farm, but cow size drives forage need. If weaning weights and calf crop can be maintained or increased, downsizing the cow herd is a significant way to increase herd efficiency for the same forage input.

Summary

Determining the best way to reduce feed costs without sacrificing productivity in a beef cow-calf enterprise is complex. In general the path to optimum system efficiency is best achieved from a well-designed rotational grazing system using a diverse mix of forages, especially warm season forages. Efficient systems will manage for a long grazing season, keeping hay feeding days to 60 days or less. In general, having the longest possible grazing season is the way to minimize the daily feed cost for the cow herd. However, costs per day for pasture versus hay feeding will vary based on the actual cost of producing the forage. Utilizing stockpiled tall fescue is a key part of the solution to a long grazing season, but the profitability of stockpiling over feeding hay will depend on the cost of nitrogen and the likelihood of getting a nitrogen response and the ability to set aside acreage for deferred grazing. Producers often mistake high yields of late-cut, over mature hay as a cheap source of winter feed, when in fact it will lead to lower efficiency due to increased need for supplement or significant underperformance by the cow herd. Finally, right sizing the cow herd is one method to increase the total sales of weaned calf per farm by better matching of the forage resource to the cattle enterprise.

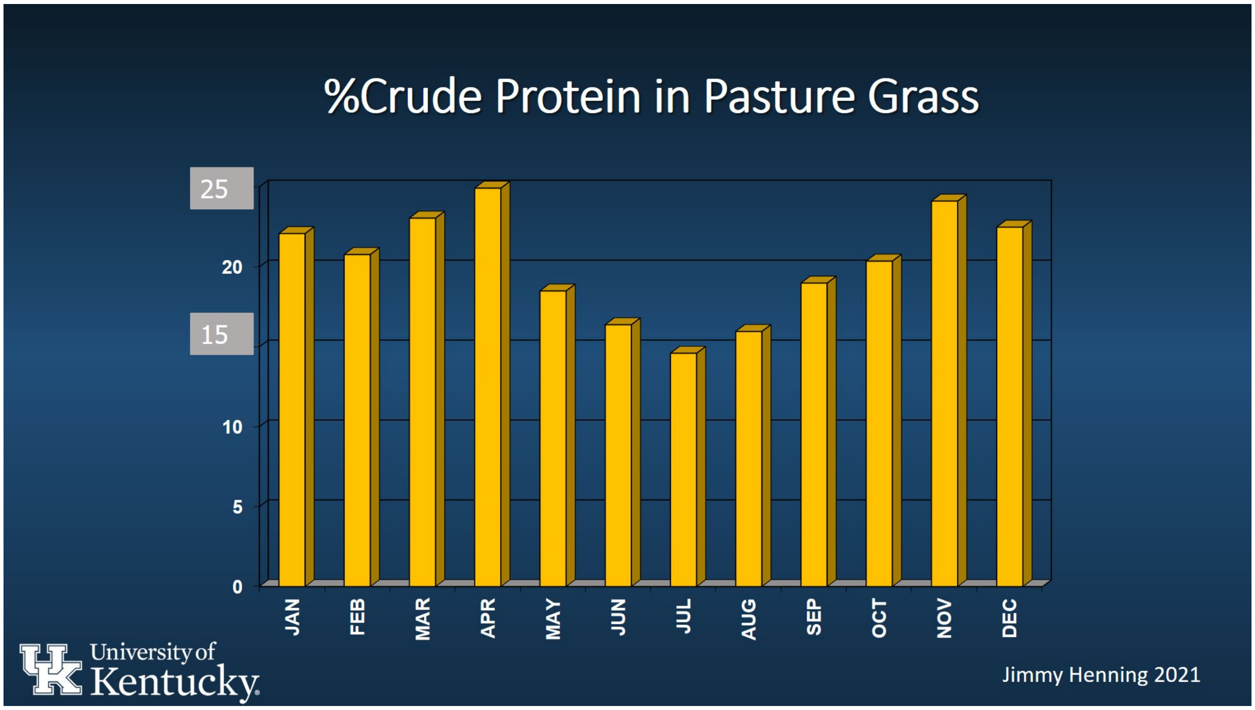

Figure 3. Monthly crude protein values in pasture grasses in Kentucky

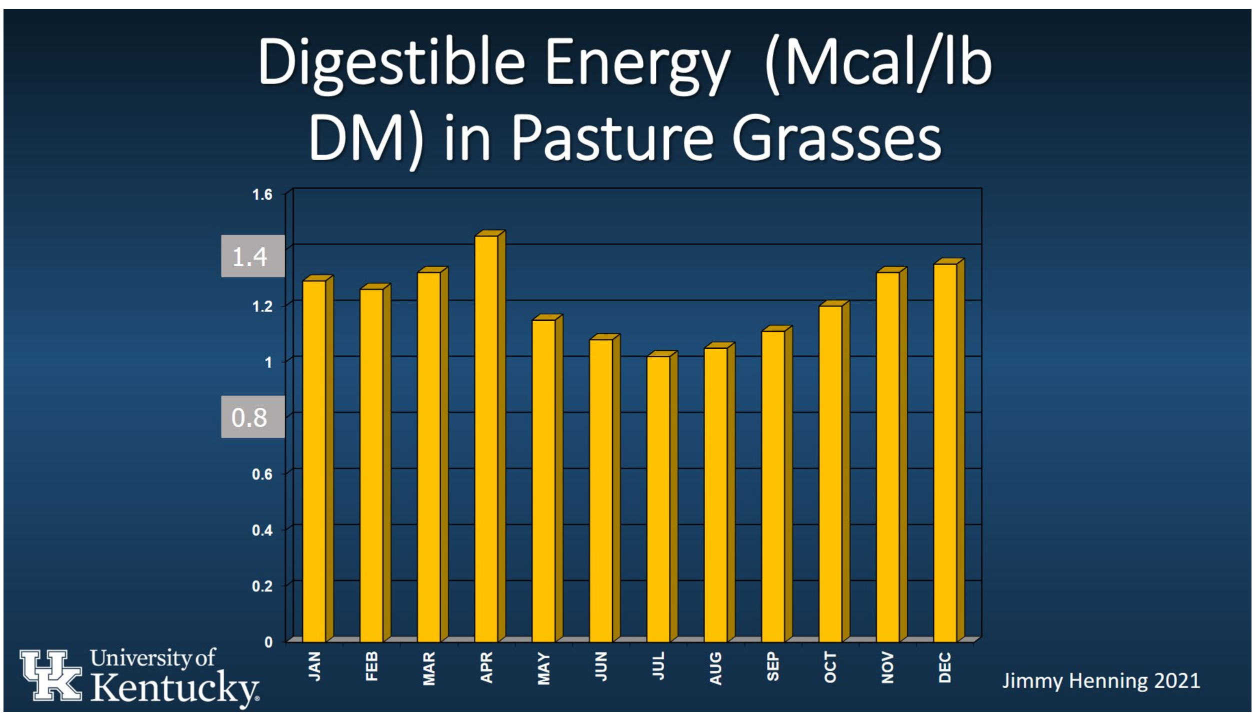

Figure 4. Monthly energy values from Kentucky cool season pasture grasses.

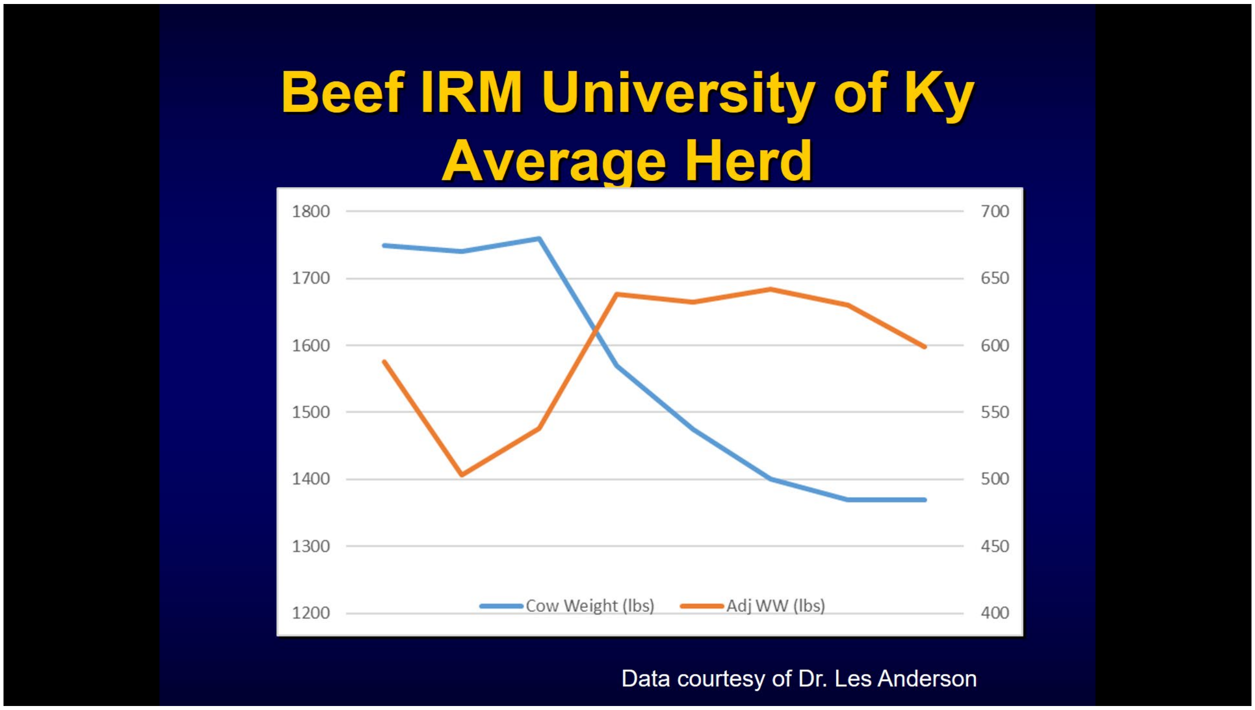

Figure 3. The impact of reducing cow size and improved genetics, nutrition and forage management on weaning weights for an average size herd in Kentucky.

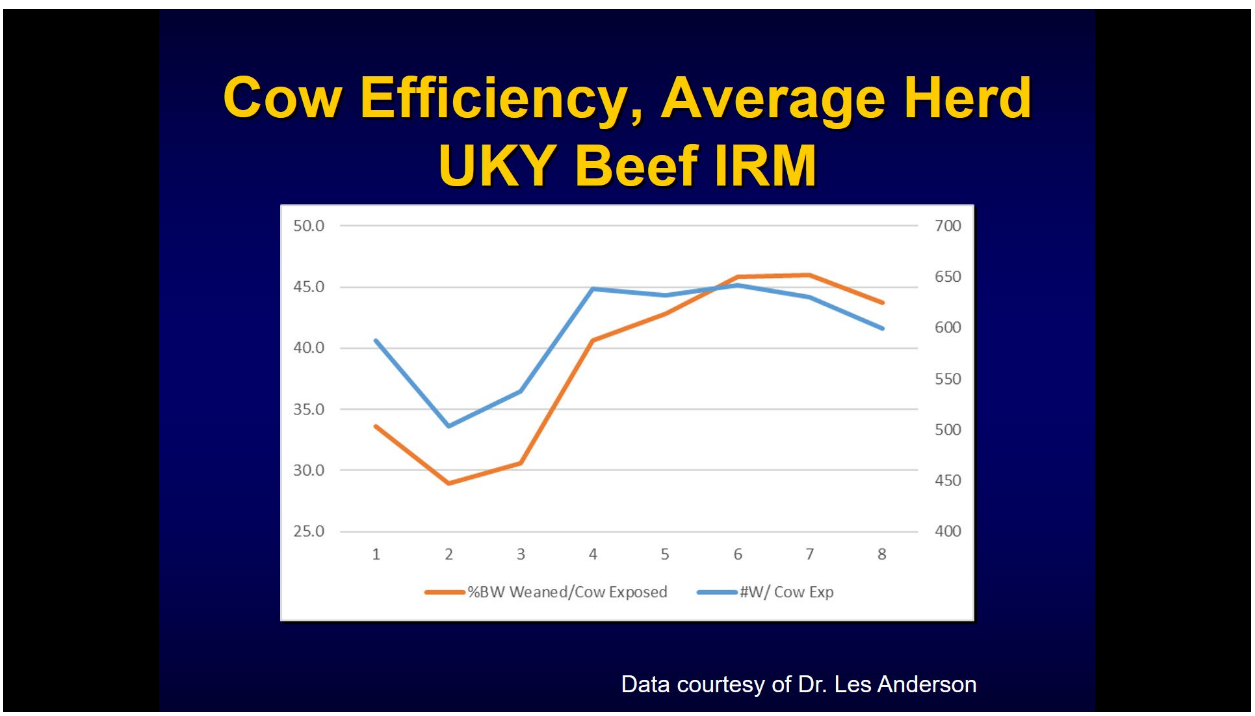

Figure 6. The impact of reducing cow size and improved genetics, nutrition and forage management on the percent body weight weaned of mature cow size and weaning weights per cow exposed for an average sized herd in Kentucky.

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"Summer Stockpile Fescue"

STOCKPILING NOVEL ENDOPHYTE TALL FECUE FOR SUMMER GRAZING

C.D. Teutsch, B.T. Campbell, N.T. Shireman, K.M. Mercier, and K.K. Quick[1]

In the transition zone of the U.S., high temperatures and drought often limit forage availability during the summer months. This area of the U.S. is also dominated by tall fescue, most of which is infected with the toxic endophyte. The use of tall fescue pastures during the summer months has been discouraged due to tall fescue toxicois. The incorporation of novel endophyte tall fescue into grazing systems has the potential to alter usage patterns. Past research has focused on stockpiling tall fescue in late summer for winter grazing. However, non-toxic tall fescue could potentially be stockpiled during spring for to provide grazing during the summer. The objective of this study was to evaluate animal performance on novel endophyte tall fescue that was stockpiled for summer grazing. The experimental design was a random complete block with three replications. Treatments were 1) pasture growth was allowed to accumulate from spring green up and 2) pastures were clipped in mid-May and growth was allowed to accumulate. All pastures were fertilized with 60 lbs of N/acre in mid-May. Heifers in 2014 (551 lb avg.) and steers in 2015 (491 lb avg.) were randomly assigned to the treatment-replication combinations. Grazing was initiated in early July and ended in mid-August. Cattle were weighed every two weeks. In 2014, heifers grazing pastures that were clipped had higher ADGs than calves grazing unclipped pastures (1.38 versus 1.20 lb/day) ($P = 0.05$). In 2015, steers grazing the clipped pastures also had higher ADGs (1.40 versus 1.09 lb/day) ($P = 0.09$). These data indicate novel endophyte tall fescue stockpiled for summer grazing can support reasonable levels of ADG during the summer months, especially if pastures are clipped or grazed to remove reproductive tissue prior to stockpiling.

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Using a Summer Stockpiling System to Extend the Grazing Season

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Cattle grazing summer-stockpiled pasture.

Fall stockpiling for winter grazing has been a common practice to extend the grazing season in Virginia for many years. Despite an overabundance of spring pasture growth that is commonly harvested for hay, the need for fall pasture often limits the acreage that can be set aside for winter grazing. A novel system developed at the Shenandoah Valley Agricultural Research and Extension Center (SVAREC) enhances producers' ability to maximize fall stockpiled acreage and consistently extend the grazing season.

Summer stockpiling is a system that excludes grazing from a portion of pasture acres during spring and summer in order to store forage for late-summer and early-fall while other pasture is stockpiled for winter grazing. A 2015-16 study funded by the Virginia Agricultural Council helped to document the summer stockpiling system and provide critical information on the forage quality it provides. The following protocol developed by the SVAREC, and has been used there since 2010 to consistently and predictably extend the grazing season into February or later.

1) **Early spring.** Select pasture to be summer-stockpiled and defer grazing on it from spring green-up through mid-August. Plan to summer stockpile around twenty-five percent of total pasture acres while rotationally grazing the remainder through spring and summer. At the SVAREC a whole-farm stocking rate of 2 acres of pasture/cow-calf pair has been used. Stockpiled plants should be allowed to mature and set seed without any grazing or mowing. Leafy regrowth will accumulate below the canopy and, by August, stems and seed heads will dry down and begin to deteriorate. While applying nitrogen does boost spring growth, it has not been found to increase yield of the final stockpile.

2) **Late summer.** Begin strip-grazing the summer stockpile in mid-August. The high stocking density afforded by limit feeding is critical to stretch the forage supply. Use electric polywire and tread-in posts to allocate two or three days-worth of pasture at a time. It may help to set up two grazing allotments using two separate fences so the first fence can be taken up and "leapfrogged" past the second one to move animals to their next portion of stockpile. No back fence is necessary and pasture should be grazed short before moving animals in order to optimize use of the forage. Animals can backgraze to the water source without permanent damage to plants because of the long recovery period that will follow.

3) **Fall.** As the summer stockpile is being grazed, apply nitrogen to other pastures and begin stockpiling fall growth for grazing in winter. When summer stockpiling is used on approximately twenty-five percent of pasture acres, cattle should be able to strip-graze on it for two months or more in late-summer/early fall, allowing for the *fall* stockpiling of fifty percent of total pasture acreage elsewhere. This model has consistently extended the grazing season ninety days longer than the conventional grazing season.

Example summer-stockpiling scenario using 100 acres of pasture with 50 fall-calving cows.

Forage Quality

While conventional wisdom would suggest summer stockpiled pasture is of low nutritional value, testing shows it to be adequate for beef cows at any stage of production (including early-lactation). Growing or finishing animals would require some supplementation with protein and energy. Forage quality analysis of summer-stockpiled pasture, with its abundant leafy undergrowth, has averaged about 12% crude protein (CP) and 60% total digestible nutrients (TDN). The toxic alkaloid content of summer stockpiled pasture tested no higher than what is commonly measured on conventionally grazed pasture. Spring fertilization with nitrogen boosted the protein content of the final stockpile in our study, but had no measurable effect on yield.

Utilization of summer-stockpiled pasture

During recent research, stockpile yield ranged from 2.5 to 4 tons/acre. Forage yield, livestock density, and the frequency at which they are moved determine how long the stockpile will last. Typically, cattle are strip-grazed on summer-stockpile pasture, resulting in a stock density of around 60,000 lbs. of live weight per acre at initial turn out. Cattle are moved about every three days. Under these conditions the summer stockpile has consistently provided sixty or more days of grazing. In addition, the summer stockpile system results in a significant amount of acreage (about 25% of total pasture) that has had the opportunity to regrow while the summer stockpile is being grazed. This acreage buys additional grazing time prior to winter grazing of the fall stockpile.

Table 1. Yield and forage quality of summer-stockpiled pasture in late-summer, 2015-2016.

	Crude protein (% CP)	Total digestible nutrients (% TDN)	Parts per billion total ergot alkaloids (ppb)	Dry matter yield (lbs./acre)
Sampled by hand clipping (averaged across years and nitrogen treatments)	11.3	60.0	550	6836
Sampled by fistula (averaged across years and nitrogen treatments)	12.4	60.2	894	6836
Treatment 1 - 0 lbs. nitrogen/acre treatment averaged across years and sampling methods	10.9	58.7	628	7138
Treatment 2 - 50 lbs. nitrogen/acre treatment (averaged across years and sampling methods)	12.9	61.5	815	6534
Averaged across all treatments and sampling methods	**11.9**	**60.1**	**722**	**6835**

Labor requirements
Labor requirements prior to grazing are limited to setting up electric fencing or otherwise restricting livestock from the area to be stockpiled. When strip-grazing, labor requirements are typically 15-30 minutes two or three times per week to move fencing.

Effects on pasture condition
We have not seen any impacts of practical significance. It is thought that the long recovery period following grazing, as well as rotating the location of summer stockpiled areas, has prevented any lasting changes in pasture composition or plant vigor. In fact, the summer stockpiled pasture grazed earliest in the process often regrows enough to provide additional grazing before moving to the fall stockpile.

Cattle on the second day of a recent allocation of summer stockpiled pasture. Temporary electric fencing, seen in the distance, is used to ration the summer stockpile and maximize forage utilization. Livestock backgraze across the previous pasture allocation seen in the foreground to access water.

Thanks to the Virginia Agricultural Council for funding this project.

THE YIELD AND NUTRITIVE VALUE OF TALL FESCUE STOCKPILED FOR SUMMER GRAZING

C. D. Teutsch, and S.R. Smith

Virginia Tech and University of Kentucky

INTRODUCTION

- Tall fescue is best adapted cool-season grass for the SE US
- Commonly stockpiled for winter grazing
- Little work has considered stockpiling for summer grazing

OBJECTIVE

To evaluate the effects of endophyte status and harvest date on the yield and nutritive value of ‘Jesup’ tall fescue stockpiled for summer grazing.

MATERIALS AND METHODS

- ‘Jesup’ tall fescue with three endophyte stauses, free (EF), toxic (EI), and friendly (NE), was seeded in late fall 2007
- Plots were allowed to establish in 2008
- Plots were harvested at the boot stage in April and fertilized with 60 lb N/A
- Regrowth was allowed to accumulate until July 1
- Starting on Jul 1 and ending on Sep 1, every 14 d a plot of each endophyte status was harvested

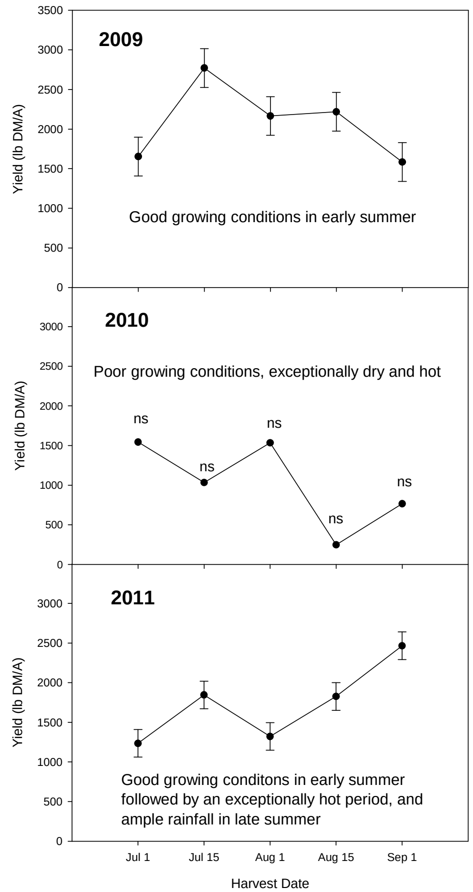

Figure1. Yields trends were impacted by both rainfall and temperature.

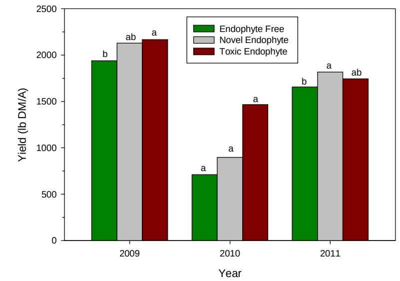

Figure 2. Endophyte status had minimal effect on the yield.

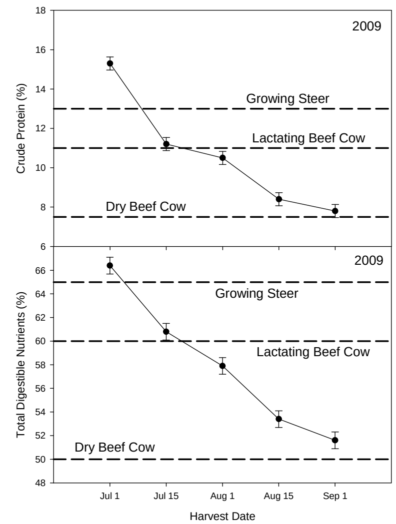

Figure 3. Crude protein and TDN decreased for the later harvests.

Figure 4. Harvesting and sampling plots on the July 1, 2009 sampling date.

SUMMARY

- Endophyte status had little or no effect on yield
- Yield decreased for the later harvest dates in 2009, but not 2011
- Early summer moisture favored growth in 2009 and 2011
- Late summer moisture favored late growth in 2011
- CP and TDN were lower for the later harvests in 2009
- CP and TDN at all harvest dates would support a dry brood cow
- CP and TDN may not meet the needs of lactating or growing animals after July 15
- Summer stockpiling may best match the nutritional needs of fall calving cows

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Extension
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Johnsongrass—The Good, The Bad & The Ugly

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Johnsongrass (*sorghum halepense*) is a perennial grass species that grows 6-8 feet tall. It is a warm season C-4 grass that is a prolific rhizome producer. The grass was introduced as a forage from Turkey into South Carolina about 1830. William Johnson, a farmer from Alabama, was believed to have propagated it about 1840. Today the opinions on whether to grow it or control it vary from farm to farm. When you sum up the traits of Johnsongrass as it grows on farms in Missouri, they can be described in three ways: The good, the bad and the ugly!

The Good

There are four positive traits about Johnsongrass that benefit farm producers:

1. **Quality**—There is adequate data available that shows that Johnsongrass is a very palatable and nutritious forage if grazed or harvested for hay at proper stages. Protein can easily obtain 14 percent and Total Digestible Nutrients (TDN) can sometimes range from 55 to 60 percent, according to Ball et al of Southern Forages 2007 edition. Palatability and grazing preference of the forage was demonstrated by the Noble Foundation.
2. **Tonnage**—Tonnage can range from 2 to 5 tons annual tons per acre.
3. **Persistence**—It can be quite persistent if allowed to reseed and is not harvested too often or low to the ground. If grazing is often, it could play out over a few years.
4. **Drought Tolerance**—Being a warm season plant, it can tolerate dry weather better than many of our other forage species.

<u>Palatability Study (1999-2001)</u>

- Averaged 11.6% Crude Protein; 58% TDN
- Among 16 grasses studied, Johnsongrass ranked 1st for CP and 2nd for TDN, slightly lower than bermudagrass

<u>Grazing Preference During AM Grazing (2007)</u>

- Yearling steers had access to 14 species
- 1st Place - 9,200 bites from Alamo Switchgrass
- 2nd Place - 6,000 bites from Johnsongrass

Source: Nobel Foundation, Oklahoma

The Bad

- Reproduces from seed and rhizomes
- Rhizomes have been found 5 ft deep
- Rhizomes can develop within 19 days of seedling emergence
- 275 ft of rhizomes from one plant
- 80,000 seeds from one plant that can remain viable for 10 years (400 seeds per panicle)
- Robs other plant species of light, nutrients and water

The Ugly

Prussic Acid Poisoning
- Caused by cyanide in immature or frost damaged leaves
- Avoid grazing until plant reaches 24", especially during dry weather
- Avoid for 14 days after killing frost
- Present only in johnsongrass and some sorghum lines.
- No problem for pearl millet.
- Not an issue in cured hay.

Nitrate Toxicity
- Accumulates in lower stalks during dry weather
- Avoid high rates of nitrates
- Test for grazing safety if a concern arises
- Present mainly in sorghums, millets and Johnsongrass
- Remains toxic in hay; Dissipates ~20-50% in silage

Sorghum Cystitis
- An occasional problem with horses, though only a small percentage are affected
- A loss of control of the rear legs and bladder resulting from permanent damage to the spinal cord
- The agent that causes the condition is unknown

Johnsongrass and the Missouri State Law

- Noxious status in Missouri
- Prohibitive status in Missouri for seed
- Some counties have special rules:

    Pettis, Morgan, Saline, Lafayette, Carroll, Dunklin, Scott, Stoddard, Mississippi, New Madrid, Pemiscot, Andrew, Ray, Clay, Holt, Buchanan, Callaway, Montgomery, St. Charles
- Upon petition of 100 landowners and approval by a county-wide election, the county may form a weed control board. The board may levy a property tax to help conduct an eradication program.

Control Options in Forages

Heavy Grazing / Low Mowing
- Reduced seed production
- Depletes carbohydrates in rootstocks; The growing point sits 4-8" above ground; Rhizome development reduced if plant height is kept below 12-15"

Rotation / Renovation
- Rotation to Roundup-Ready crops or crops with registered herbicides
- Renovation out of infested fescue (Spray-Smother-Spray approach is needed)

Weed Wiper, Spot Treatment or Full Renovation using Glyphosate
- Effective but will not eliminate it with one pass. Persistence is required for multiple years.
- Some will add Select to the mix.

Selective Herbicides (expect stunting)

- Outrider/Cryder (sulfosulfuron) - Bermudagrass, Some Native Grass Species, Fescue (labels may vary)
- Pastora (nicosulfuron) - Bermudagrass
- Panoramic (imazapic) – Bermudagrass, Native Grass

Sulfosulfuron Herbicide Use Tips

- Sold as Outrider (Valent) or Cryder (Atticus)
- Works well on Johnsongrass, nutsedge, cheat and downy brome
- Most effective with first growth Johnsongrass prior to seedhead development
- Can be injurious to fescue and other cool season grasses; Calibration is imperative; Refer to the label
- Apply 0.75-1.0 oz/acre (0.75 max. on fescue). Use a non-ionic surfactant (90% ai) at 1-2 qt/100 gallons of spray solution
- There is no grazing restriction but it's recommended to not mow or graze for 2 weeks before or after application

If Johnsongrass is Used as a Forage

Grazing Management

- Graze at 12-18" (higher if in a drought)
- Pull off at 6-8"
- Good grazing management or an occasional clipping can help reduce seed development, keeping it vegetative
- Take precautions around first frost for prussic acid issues.

Hay Management

- 2-5 tons/acre production is typical
- A hay conditioner is necessary
- Be cautious of nitrate rates ahead of drought (40-50 lbs N/ac max.)
- Harvest in the boot stage or 40" height, whichever comes first
- Regular mowing (every 21 days) can potentially reduce seed development. This may result in more tonnage and certainly more quality of hay during a growing season. However, this could affect persistence…
- Harvest high for greater tonnage and quality. Refer to the Tennessee sudangrass research data.

Mowing Height Affects Yield and Quality

Tennessee Sudangrass Research

Stubble height	Yield	Leaf	Stem
inches	-- tons per acre --		
1	5.4	4.3	1.2
6	6.0	4.8	1.2
10	6.7	6.4	0.3

Season Extension

If there is concern that Johnsongrass fields are not producing year-round, producers should consider interseeding cool season forages into the stand, if they are not already present. Options include: Tall Fescue; Annual Ryegrass (do not use around crop fields); Orchardgrass; Turnips; Clovers; or, Cereal Crops (Rye, Triticale, Wheat).

Multi-Species Grazing and Economic Overview

Most multi-species grazing presentations talk about animal and forage interactions. These topics are both important and timely, however, as an economist, I see the world through a different lens. I interweave the animal and forage interactions and turn them into dollars and cents. As such, this presentation will focus on the profitability of multi-species grazing.

Over the course of history, American farms have strived to improve profits by reducing cost of production. Advances in science have led to new production strategies and technologies designed to produce more with less. During the last 100 years, farming has rallied around the economic concept of economies of scale. By utilizing technology, farmers lower per unit production costs by increasing productivity for both land and labor. This has led to farm specialization.

In this session I ask you to open your mind and be prepared to challenge the status quo. You will learn that specialization is not the only path to increase productivity and lower production costs. You will discover how multi-species grazing can influence farm financials and hopefully walk away new ideas for your farm.

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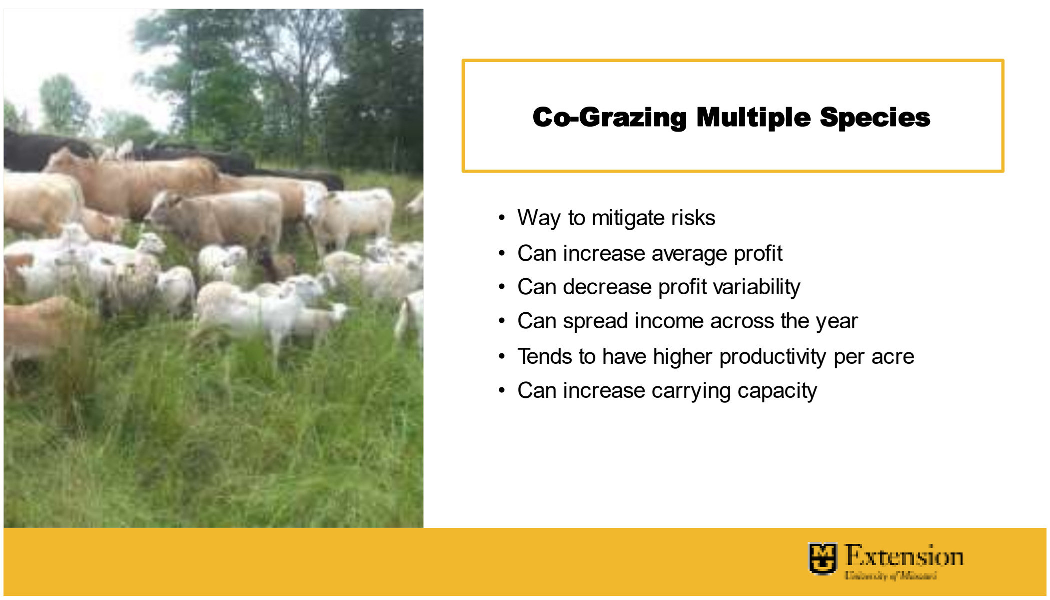

Warm-season forages for mitigating drought

Dr. Harley D. Naumann
University of Missouri, Columbia

Drought is, without doubt, a part of our forage-livestock landscape in Missouri. Drought is something that should be anticipated and planned for in our forage systems rather than be a surprise when it occurs. There is no forage that can be planted to mitigate drought once a drought has ensued unless irrigation is an option. There are however many forage tools that can be used to mitigate drought effects when initiated as part of a drought mitigation plan. Some of the most appropriate tools for use in Missouri include warm-season perennial and annual grasses, as well as perennial and annual legumes. There are several perennial grass options that may be used including native and introduced warm-season grasses. Warm season annual grasses like crabgrass and sorghum x sudangrass are also options for drought mitigation. Sun hemp and annual lespedeza are warm season annual legumes that are not only drought tolerant but will bring nitrogen into the forage system through biological nitrogen fixation. These forages alone or in combination can provide insurance against drought for the forage-livestock manager. And when the drought that was planned for does not occur, these warm season, drought tolerant forages will provide additional forage, increase grazing days and ensure adequate rest for the cool-season component of the forage-livestock system.

Management Effects on Soil Health

Matt Fryer
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Soil health is a simple term with complex implications, meanings, and applications. The Natural Resource Conservation Service (NRCS) defines soil health as “the capacity of the soil to function as a vital living ecosystem to sustain plans animals and humans”. This definition implies that the physical, chemical, and biological properties of soils are intricately connected and affected by one another in a complex and dynamic way, just like any other ecosystem on earth.

Soil physical properties like bulk density (measure of compaction), aggregate stability (how well the soil holds together and resists erosion) greatly affect water infiltration depth and rate as well as root growth. Soil biological properties like bacterial and fungal communities are greatly affected by water and root growth. Without water, soil life is all but halted, while living roots exude sugars that feed microbial life. On the same hand, soil physical properties like soil structure and decreased bulk density could not be improved without the soil biological life (microbes, earthworms, etc) and living roots. Soil chemical properties like plant nutrient availability is affected by water, since plants take up most soil nutrients via water. Other soil chemical properties like pH affect microbial life in the soil, while high sodium concentrations can affect soil physical properties like soil structure. It is easy to get caught up and confused by the intricacies of managing for soil health, but this shouldn’t be the case.

Despite the complexities of soil health, management practices to improve soil health boils down to 5 major practices as advocated for by the NRCS: 1) stop tillage, 2) keep the soil covered, 3) keep living roots growing for as long as possible, 4) plant diversity, and 5) livestock incorporation. When these 5 practices are implemented over multiple years, increased: water infiltration rate, water infiltration depth, water holding capacity, erosion resistance, forage nutrient use efficiency, and other soil functions that promote good forage growth and resilience should be expected.

Grazing operations regularly utilize these practices, but there are also other goals that fall within these 5 categories to work toward to ensure the maximum productivity, function, and health of soils. Some of these goals include rotational grazing, maintaining soil fertility, avoiding over grazing, and more. These goals aren’t new concepts to any cattle producer, but the positive affects these goals have on soils might expose new reasons for making these goals common practice on the farm.

Small Ruminant Herd Health

Chris Baughman, DVM
Assistant Professor Animal Science
Lincoln University

Topics

- How do I know I have a problem?
- Is this a management issue? YES
  - Do I need to add or subtract?
  - Diseases You should know about.
- Vaccines and other Medications
  - Drugs - We only have a few and they are likely different.
- How (and why) to work with your veterinarian (at least in my opinion)
- Some Easy checks you can do (with practice)
- Options to learn we too often miss

Operations and Goals

- How much time do you have?
- What is YOUR goal or purpose?

- Today's ability vs Tomorrow's expectations
  - Sources
  - Fields, facilities, and materials
  - Markets

- Low input and efficiency, Low treatment, High health, Seedstock, High performing, Profitability, Companionship, Exhibition, Land usage

How do I know I have a problem?

- Sometimes it's Obvious -
  - But what if it's not
  - Comparative data
    - Neighbors
    - Groups/Organizations
    - National Statistics
    - Adjustment factors – Ain't no 2 the same

    - Species expectations
      - Cattle pregnancy %
      - Swine pregnancy %

- Production
  - Lambing/Kidding rate
  - Weaning %
  - Lbs. of lamb/kid weaned
  - Lbs. Sold

  - Number of animals sold
  - Number of animals treated
  - Number lost

It's All a Management Problem

- Closed flocks/herds
  - How closed?
  - Fewer problems
  - Few Ever started that way
- Management takes planning and time
  - Is your goal reasonable
    - Ewe lambs/Doe kids
      - Offspring born/Dam
    - Adults
      - Offspring born
      - Trash brought in

- Genetic Selection
  - FEC ** Time
  - EBV ** Availability
  - SNPs (Genemax) ** Cost/Value
  - FAMACHA ** Training

  - Pasture management/rotation
  - COWP
    - Size, frequency, mineral status
    - How does Cu become an issue – often from Stress.
  - Deworming - Anthelminthics
  - Vaccine....

Diseases You Should Know About

- Clostridium perfringens
  - C&D
- Tetanus
- When?

- Abortion/Reproduction
  - EAE – chlamydia*
  - Toxoplasma
  - Campylobacter*
  - Q-Fever – Coxiella burnetti
  - Cache Valley Virus??
  - Brucella ovis#
  - Male infertility#

* - vaccine   # pre-dz Test

- CL/CAE/OPP/Johnes
  - Caseous Lymphadenitis
    - Corynebacterium pseudotuberculosis
    - Vax??
  - Caprine Arthritis and Encephalitis
  - Ovine Progressive Pneumonia
    - Maedi-Visna virus
    - Small Ruminant Lentivirus
  - Johne's disease
    - Mycobacteria Paratuberculosis

- Mycoplasma – eyes, respiratory
- Pneumonia – goat special
  - Mannheimia, Pasteurella

Diseases You Should Know About

- Coccidia
- Worms

- Coccidia – environment and ionophores
- Worms – we don't have that much time
  - Genetics
  - Know how to use
    - Fecal
    - Tx
    - FAMACHA – what does it really tell you.....

- Footrot
  - Management: 14-day life span
    - Scald vs Rot
  - Treatment
    - Footbath
    - Pharmaceuticals
      - Topicals
      - Vaccine - ?
      - Antibiotics
        - LA
        - Zactran /Draxxin (gamithromycin)(tulathromycin)
          - What's the withdrawal time?

Drugs

- Legend – prescription
- OTC

- Extra Label Drug use
  - Rascal, Reason, Route
    - Animal, problem, the way
  - Withdrawal period
    - Zactran/Draxxin - 60 days
- How long will you have OTC meds...

How to Work with Your Vet

- You need scripts and have questions
- They need to see your place and animals
- Get a visit, establish a relationship
  - Work together
- Vet:
  - Advice
  - Interpretation
  - Access
    - Testing/results
    - Medications
    - Procedures (time of day makes a difference)
    - Equipment – smaller you are, the more you may want to use other peoples stuff..
- Necropsies...

Things You Can do

- Physical on Rams and Bucks
  - Can they walk
  - What is their BCS
  - Does they have two testicles
    - How do they feel.
  - Other things of notice
- Palpate udders
  - Mastitis, fibrosis, abscesses....
- BCS
- FAMACHA
- Manage well – Systems thinking or perhaps just some thinking...

Necropsies

- Take a look
- Maybe do a test
- Have someone else look and send tests
- Send it all

- If we never get a definitive answer, how do we know the problem we are trying to solve?
- How do we answer a problem for which we do not know the question???

HOW TO BEST MANAGE FERTILITY IN TIMES OF HIGH PRICES

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Pasture management systems need to be established to better manage times of uncertainty. Having a plan in place to monitor nutrient levels and to manage pasture fertility allow farmers to better weather increasing fertilizer prices.

Management tools that could be incorporated to manage pasture soil fertility may the following.

- Soil testing can identify areas with the greatest need and areas where fertilizer can be forgone. Fertilizer is too expensive to guess how much to apply, the only way to determine fertility need is to soil test.
- During high fertility prices apply limestone first. Lime application can improve nutrient availability in the soil.
- Manure. More intensive grazing management, or more frequent livestock rotation, can improve the amount of manure that is distributed across the pasture, less of the manure is lost to non-productive areas near shade trees and water sources. Management intensive grazing has been documented to improve fertility levels over time.
- Manure from poultry or dairy operations may be a good option depending on availability. Manure can be a good source of long-term phosphorus; potassium availability is usually marginal and typically does not provide adequate potassium for alfalfa or bermudagrass crops.
- Manage hay feeding to distribute nutrients. Research has shown that unrolling hay or moving hay rings frequently distributes manure and hay waste across the pasture improving soil fertility.
- Incorporate legume crops like clover, alfalfa, lespedeza, or sunn hemp to supply nitrogen needs. Legumes have the capacity to produce between 50 to 300 pounds of nitrogen per acre per year when the sward contains more than 20% legume.
- Along with soil testing, know forage yield and removal rates and replace the nutrients at crop removal rates. Doing this can save expense by removing soil build up rates.
- Consider renovating poor performing paddocks. More productive stands have greater nitrogen use efficiency. Additionally, greater yield returns can be expected from renovating poor stands first.
- Bring the grazing stick out of the closet and start measuring farm cover. Weekly measurements can help to determine forage growth rate and allow one to predict (or model) forage supply for the weeks ahead. If forage growth is higher than the livestock demand for forage, then nitrogen fertilizer application can be reduced.

The natural tendency when fertilizer prices are high is to forgo fertilizer; however, there are consequences to this practice. Limiting fertility, specifically nitrogen, will decrease forage yield. A reduction in forage yield may lead to purchasing hay, corn, soybean meal, or other supplemental feed increasing production costs. Comparing the ratio of fertilizer prices to the cost of purchased dry matter could help determine which is more cost effective for the individual operation.

A new look at an old crop: Sudangrass not your grandfather's forage

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Sorghum is an old-world crop. Emphasis on the word "old". Sorghum traces its roots as a cultivated crop to North Africa from as far back as 10,000 years ago, and sorghum has been grown here in the United States for nearly 300 years. Even though, we have had sorghum crops for many yet they are still a mystery to many. In the past forage sorghums had many advantages but also lots of issues that made them a less desirable crop. Sorghum can generally out compete just about any other crop in hot and dry regions. We need to face the facts though forage sorghums of old had a bad reputation. Whether it was standability, feedability, or weed control the crop had some issues to overcome. There has been a lot of work done in the past few years to improve the agronomics and forage feed value of sorghum crops. Yet the education and adoption has not kept up with the improvements. The leaps and bounds in forage quality and agronomics have made a sorghum a true contender to replace corn on many acers.

One of the biggest agronomic hurdles that needed to be overcome was standability. "Old" forage sorghums were tall and gangly with a propensity to lodge especially late in maturity. This was overcome by the brachytic dwarf trait. This trait shortens the internode lengths, reducing the distance between leaves. This trait produces shorter stature plants with stout stalks resulting in excellent standability. This trait has become very important with the advent of the introduction of the BMR (brown midrib) trait into forage sorghums. BMR is a visual characteristic indicating the reduction of lignin in grasses. Reducing lignin in plant has it's advantages by increasing fiber digestibility, while increasing the likelihood of lodging, hence a greater need for the brachytic trait. Weed control has been an obstacle to many since this generation of farmers has spent most of their careers spraying glyphosate over the top of tolerant crops, but the industry has found a few solutions to this obstacle.

With these advancements in agronomics one issue has yet to be full overcome, how do we get the feed performance to match corn silage. There have been a couple ways sorghum seed producers have begun to address this question. Analytical forage testing labs have had a hand in helping realize the true value of sorghum crops by becoming more accurate in measuring fiber digestibility and the indigestible fraction of the fiber. Also, they have begun to categorize sugars in a better way by measuring the water-soluble sugars and not just the ethanol soluble ones. Ration software developers have also begun to allow nutritionist to balance rations based on metabolizable protein and not just metabolizable energy.

Sorghum is now more than ever a valuable crop to help producers increase profits. The advancements in agronomics and feed quality have made sorghum a contender for acres once dominated by corn. Less input costs including reduced seed cost per acre and decreased fertilization allow tight margins to loosen up. We need to take a fresh look at this old crop.

Marketing Beef Locally

Bryon Wiegand, PhD
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University of Missouri

Marketing foods in a local footprint has increased sharply in recent years. Covid-19 has only increased this demand and the increased push for locally produced beef is central to the conversation. This presentation will focus on how beef is evaluated for yield and quality and how those determinations drive price. There will be a heavy emphasis on price discovery for local markets and how to market the added value of a locally derived food through honest and forthright avenues. Additionally, a discussion of how to incorporate scientific data and other marketable claims will be broached as many cattle producers look to local marketing as a new or added revenue stream for their products, ultimately seeking to capture more aspects of the consumer dollar spent on beef.

The Future of Regenerative Ag

Hugh Aljoe, Director of Producer Relations
Noble Research Institute, LLC

The future of regenerative agriculture is HERE! After several decades of riding the wave of the "Green Revolution", regenerative management is now at the forefront of the minds of many agricultural producers. There are several reasons – climate variability, environmental concerns, livestock welfare, and the declining profitability of farms and ranches. However, regenerative agriculture has received more attention recently than historically because of the drastic increases in input prices. Fertilizer, agri-chemicals, fuel, farm/ranch supplies have increased 2- to 3-fold. Equipment prices and labor costs continue to increase while commodity prices have failed to keep pace. The lower profit margins in operations have created greater financial instability, and as a result, more producers have begun adopting regenerative management practices.

Regenerative agriculture is not a new concept. The "green revolution" overshadowed regenerative management. New agricultural technologies and equipment, improvements in crop species, inexpensive fertilizer, and inexpensive supplies took precedent in our agricultural systems creating an abundant, safe food supply and a strong national economy. However, revenues from commodities produced have not kept up with the associated costs of these "advances" in agriculture; therefore, more producers have embraced regenerative agriculture as the alternative to modern agriculture. Those producers that were early adopters of regenerative management and holistic management and have been practicing it for years, even decades, are the producers with the financial and ecological evidence that demonstrate regenerative agriculture is a better management option to enhance the environment while improving the sustainability of their soils, lands, and finances.

Addressing the challenges – Agriculture in the US faces 3 major challenges today. These are: land productivity and regeneration in the face of climate variability, profitability/farm debt, and the declining population of agricultural producers. Modern agriculture has limited ability to remedy these challenges, but regenerative agriculture is proving to be a viable alternative to address these challenges. Let's look at each challenge in greater detail.

The 3 Major Challenges Facing Agriculture

1. Land productivity and regeneration in the face of climate variability – In spite of technological advances that increase productivity of agricultural lands, associated technologies and management input costs have increased at a greater rate than revenues generated from greater productivity. It is also requiring more inputs to attain same level of production. In addition, droughts and floods are occurring with greater frequency and intensity. According to USDA, 90% of crop losses in U.S. are due to extreme weather. Government subsidies, insurance programs and disaster relief payments are not enough to overcome such issues. Building soil biology and soil health builds soil organic matter. Soil organic matter builds resiliency of soils to better withstand drought and flood. A 1% increase soil organic matter can help the soil hold about 20,000 gallons of additional water per acre which is effectively about 0.70 inches of rain. Regenerative management improves soil health, soil biology and soil organic matter which increases the land's resiliency to adverse climatic conditions.

2. Profitability/Farmer debt – according to the Farm Bureau 2019 report, the national farm debt is $416 billion with the highest bankruptcy rate since 2011. Profit margins are shrinking with low ROI for agricultural operations. Many producers rely upon Farm Bill programs, crop insurance, disaster relief and other government programs to continue operations. Financial decisions are made by banks and Ag lenders as they hold the line of credit, liens against the land, and finance equipment and other loans for capital purchases. It takes a lot of money to get started in agriculture and then to operate annually for a relatively low rate of return on investment. Regenerative management practices seek to reduce the dependence on equipment, fertilizer, agri-chemicals, fuel, and other annual inputs and work with nature/ecology. Reducing costs dramatically creates opportunities for greater profit margins and thus operational profitability.
3. Declining population of agriculture producers – Farmers and ranchers make up less than 2% of the US population. Average age is 58 years with more than a third that are 65 or older. Entry into agriculture takes significant capital investment and is often attained through family succession. Producers new to agriculture buy into it which takes capital attained through other careers which implies agricultural businesses will tend to be owned and operated by an older generation. Only 8% of the producers are younger than 35 years with most of those being born into an agricultural operation, working a full-time position within an operation, or working full-time off-farm and farm/ranch part-time. Regenerative management reduces the overhead and operational costs thus allowing younger producers to gain a start into agriculture at a lower entry price. In addition, if agricultural operations are more profitable, more young people would be willing to return to the operations knowing that a respectable standard of living can be achieved, and a future can be built for them and their family.

The 4 barriers to adoption – Once a producer determines their future should be in regenerative management, there are still several barriers preventing adoption. Most of these are related to the unknowns of attempting something new or different from "normal"; however, there are emerging solutions to these barriers. New producers to regenerative management must be persistent in investigating what is available and be willing to go and visit those operations. And the general passion of those early adopters to regenerative management is to build a community of practice – those successful regenerative producers are usually willing to share their experiences if one is willing to listen and learn. Below are the 4 barriers to adoption.

1. Lack of available science-based management knowledge – Most of the science-based agricultural knowledge is centric to management within our current "modern" agricultural production practices. There is very little, although growing, science-based management knowledge available in regenerative management. Until recently, most of the regenerative management data has been anecdotal and observational but were actual results from years of experience in managing, monitoring, and adapting to operational context. As the science of soil health has evolved and studies analyzing the finances and land stewardship improvements for long-term holistic and regenerative management operations, the body of knowledge clearly indicated significant improvements made by producers who have managed their entire farm or ranch as an ecosystem while striving for continual improvement in all areas. More field-scale science-based information is needed to identify most effective management strategies and practices, cost-effective infrastructure improvements, selection criteria for regionally adapted livestock and crops, and continual education needs for practitioners to guide producers in the

implementation of regenerative management in differing environments and resource conditions.

2. Lack of guidance and mentorship – In addition to lack of science-based management knowledge, there is also a lack of resources for guidance and mentorship. Since the early adopters and practitioners of regenerative agriculture are few in number and operate independently from other producers, there has not been many opportunities for them to network until recently. Producers new to regenerative agriculture should identify resources that can serve as guidance and mentorship in regenerative management and become a part of a peer network. As regenerative management becomes more mainstream, additional resources will be developed, new peer networks formed, field or hands-on educational events will be made available, and more self-paced learning activities will come online for new regenerative producers to build their knowledge and experience with management concepts and practices.
3. Economic uncertainty in adoption and operations, as well as ongoing risk – As with all transitions in management, uncertainties exist with transitioning to regenerative management. Concerns around infrastructure investment costs, annual operating costs, potential reductions in productivity, and the risk of failure when an operation is already at risk financially are all real barriers to adoption. Just the questions of how, where, and when to get started are difficult to answer without experienced guides/mentors and readily available applicable science-based knowledge. It makes sense to begin adoption of regenerative management at a scale that provides a safe to learn environment with a low economic threshold, and then expand out after gaining some experience for you and all involved in the operation. Additional information from organizations and agricultural producers on actual budgets, ROI on infrastructure, new marketing opportunities are continually being generated and will add to the existing body of knowledge and eventually reduce the economic uncertainties associated with adoption and transition to regenerative agriculture.
4. Cultural/societal influences – One of the greatest barriers to adoption is cultural or societal influences. Agriculture is steeped in decades of tradition and academic training. It is often a difficult community to find acceptance within even when you try to conform to tradition. The farming and ranching community often prides itself as independent operators that value their freedom to operate. However, most would prefer to conform to the “normal” than strike out in a different direction. Unfortunately for most agricultural producers, peer pressure still takes precedence over independent thought especially when neighbors and family are involved. It is difficult to make changes in a family operation unless the entire family agrees with the changes. Neighbors and colleagues challenge changes contrary to traditional “modern” management practices. Transitioning to regenerative management requires a change in mindset and management, both of which has are usually that has not been attentive to improving soil health and biology.

The focus of regenerative agriculture is on the 4 ecosystem processes. The objective of our management is continual improvement of these processes. It starts with understanding what a highly functional system looks like and managing such that improvement can occur. To manage for continual improvement of the ecosystem processes, a producer must strive to adhere to the 6 principles of soil health. Through regenerative management, the whole ecosystem is continually assessed as management practices are considered. Following describes the 4 ecosystem processes the 6 soil health principles that are vital to regenerative management.

The 4 ecosystem processes

1. Water cycle – The amount of water on Earth is finite, and it cycles through evaporation, precipitation, infiltration (or runoff) and transpiration. One of the ways water moves through the cycle is through its ability to permeate the soil. The amount of water that ranchers can capture on their land can be impacted by their grazing management practices. We want to make sure the ground is covered with plant life and that soil microbes are available to form soil aggregates — which help turn the soil into a sponge that soaks up air and water. A highly functional water cycle is one that allows rain to infiltrate rapidly and be stored for use by plants. Management practices should increase infiltration rate and water holding capacity and minimize evaporation and runoff.
2. Energy cycle – It all begins with the sun. Plant leaves are the solar panels that drive the energy cycle. A plant uses this energy to turn carbon dioxide into food for itself and soil microbes, which in turn becomes forage for grazing animals and ultimately protein for humans. To ensure this process functions optimally, we need to ensure plants are always present and are given adequate time to recover from grazing. In a highly functional energy cycle, leaves are grazed as they become over-mature to allow new leaves to grow and capture energy while occupying as much space as possible for as long as possible.
3. Nutrient cycle – In this cycle, energy and water are transferred between living organisms and the nonliving parts of the environment. Frequent disturbances, such as grazing, help maintain the aboveground nutrient cycle. Biotic activity, such as earthworms, insects, and microbes in the soil, further improve the nutrient cycle. An optimal nutrient cycle depends on good plant diversity and soil cover. In a highly effective nutrient cycle, nutrients are rapidly cycled from plants to animals to soil and back to plants with minimum losses or delays in total biomass production. Plants are grazed and trampled by livestock and other animals/organisms. The animal wastes and plant residues are deposited on the soil and further digested or decomposed by other soil organisms. Eventually these plant materials become nutrients made available to plants to be taken up by their roots.
4. Community dynamics – Community dynamics are the changes to community structure and composition over time, including changes in microbiology, plant, and animal life. Plant community management is critical to the other three cycles. Having a year-round, diverse plant community can improve the nutrient cycle and optimize the energy cycle. Managing for a wide diversity of plants — forage types (grasses, forbs, and trees), perennials and annuals, and cool-season and warm-season species — works to complement the other three cycles. Community dynamics is largely a function of diversity – diversity in plants and animal life. The greater the diversity in plants, the more types of organisms a community can support both above and below the soil surface. Management must encourage plant diversity to drive animal diversity.

The 6 soil health principles

1. Know your context - Know your individual situation, including your climate, geography, resources, skills, family dynamics and goals. You need to understand how the ecosystem processes function on your land so that you can work with those processes. What works for someone else may not work for you because your context is different. Find what works for you, but recognize your context is always changing. Be willing to learn, grow and adapt with it

2. Cover the soil - Soil health cannot be built if the soil is uncovered or is moving. Using a diversity of plants and leaving the proper amount of forage residue minimizes bare ground and builds soil organic matter. Plant cover further protects the soil from erosion and serves as a barrier between the sun and the raw soil, preventing escalated soil temperatures that can decrease soil microbial life.
3. Minimize soil disturbance - Mechanical soil disturbance, such as tillage, alters the structure of the soil and limits biological activity. If the goal is to build healthy, functional soil systems, tillage should be limited and only used in specific circumstances. Tillage of any specific acre even once each year is too much tillage. However, tillage is not the only disturbance. Grazing, fire, fertilizer, pesticide applications, etc., all can be soil disturbances. For this reason, with grazing lands, one must ensure that the timing, frequency, intensity, and duration of these management activities are implemented in a planned manner that aid in rebuilding ecosystem processes. Always ask yourself, "Are there any other options besides these disturbances?"
4. Maintain continuous living plants - Maintaining actively growing living plant roots is encouraged to keep the soil biology processes working, no matter the season. Perennials are a big help in this, as even when dormant their roots are living and functioning (though slower compared to during the growing season). Soil microbes use active carbon first, which comes from living roots. These roots provide food for beneficial microbes and spark beneficial relationships between these microbes and the plant. Greater plant species diversity allows for living roots during an extended period of the year.
5. Increase diversity - Increasing plant diversity creates an enabling environment and catalyst for a diverse underground community. In nature, grasses, legumes, forbs, and woody species all work together in a native, diverse rangeland setting. The complex interactions of roots and other living organisms within the soil impact soil dynamic properties, affect carbon sequestration and enable nutrient availability for plant productivity. Managing for increased diversity can also be applied to grazing animals, wildlife, and other organisms above and below the soil.
6. Integrate livestock - Research, practical application and common sense tell us the same thing: livestock are a necessity for healthy soils and ecosystems. The Great Plains evolved under the presence of animals and grazing pressure. Soil and plant health is improved by proper adaptive grazing of one or more animal species, which recycles nutrients, reduces plant selectivity, and increases plant diversity. As with any management practice, grazing is a tool that requires intentional application.

To accelerate improvements in soil health, grazing management is an important variable, probably the most important tool in grazing land management. Grazing land managers have an advantage over most farmland managers in that grazing managers have the infrastructure needed to run livestock. Not all farm managers are set up to graze. Whether grazing native grass lands, introduced pastures or cropland forages, grazing management involves 4 variables.

1. Timing – the season of use and stage of maturity that forages are grazed. Ideally, one would graze forages in late phase 2 and early phase 3 conditions, or after full recovery has occurred, but seasonal forage growth does not allow for that. The key is to allow all pastures to receive full recovery before re-grazing. Pastures grazed late in the growing season would be deferred from grazing until fully recovered the following spring. Consideration would be given to annuals or perennials, natives or introduced forages, whether actively growing or dormant, and previous

grazing intensity. Annuals have shorter recovery periods than perennials. Introduced pastures can tolerate shorter recovery periods than natives. Growing season recovery is dependent on soil moisture – more available moisture means more rapid regrowth. If a pasture was severely defoliated (or trampled) during last grazing event, extra recovery time will be required.

2. Frequency – frequency refers to the recovery periods of pastures between grazing events. Ideally, one would allow forages to be fully recovered before grazing as with timing. Typically, longer recovery periods are preferred but based on growing conditions. Slower plant growth means longer recovery periods. In limited moisture environments, a full growing season may be required to achieve full recovery. Perennial native grasses tend to respond best with recovery periods of 60 days during fast growth to longer than 120 days in slow growth. Introduced pastures developed to grow rapidly with good growing conditions typically regrow more rapidly and can be grazed more frequently than native perennials. Annual pastures have short growing seasons so tend to grow rapidly. With good moisture conditions, multiple grazing with short recovery periods can occur on annual pastures.
3. Intensity – intensity refers to the amount of plant material to be grazed within a pasture. Ideally, only the top portion of the grass plants are grazed removing half or less of the leaf material per grazing event. During the early growing season, the phrase 'graze the grass up' describes the proper management in which pastures are top-grazed, taking perhaps upper one-third only on first grazing event of a pasture during the early growing season. It is preferred that never over 50% of leaf material is grazed during the active growing season as removal of greater than 50% of the leaf material stops root growth and slows plant and pasture recovery. Once the beyond the peak growth of the season, the take half leave half rule still applies. Once dormant, grazing should not be more intense than to remove the leaf material only, leaving plenty of plant residue to protect the plants and the soil surface.
4. Duration – duration is the amount of time a pasture is grazed per grazing event. Ideally, pasture grasses would be grazed or defoliated once per grazing event. Cattle would be moved to a fresh pasture before the grazed plants start regrowing. Regrowth begins on grazed plants in about 3-4 days after grazing but is delayed somewhat as soil moisture is depleted and plant growth slows. Therefore, graze periods of less than 4 days are preferred. It is not unusual for regenerative grazing managers to rotate livestock daily or multiple times a day at least for short periods of time typically during the spring and early summer growing seasons and at seasonal transition periods on grazed cropland. Under such circumstances, there is often an accompanying trampling effect that helps lay less palatable forage components on the soil surface to be acted upon by other organisms effectively enhancing the nutrient cycle. The key is moving grazing livestock often enough to prevent the re-grazing of the key grazed plants.

The future of regenerative agriculture is now with more and more producers transitioning to regenerative agriculture. There are many reasons for this shift at this day in time but often it is associated with financial woes from operating using the current "modern" production practices. Regenerative agriculture focuses on soil health, the ecosystem process and function, and managing for continual improvement. By implementing management practices in alignment with the 6 soil health principles while applying adaptive regenerative grazing, producers can make the transition successfully and observe results that positively impact their operational finances, pastures, and soils. Identifying other like minded regenerative focused producers as well as reliable resources that aid in education, guidance and mentoring expedites the learning process and brings such producers into peer networks and communities of practice. Regenerative agriculture is not a new phenomenon but a return to managing in sync with nature. There is a growing community of regenerative producers – just in time to create a healthy future for themselves, their families, and their lands.

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